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T. O. NO. 01-40-1
A.P. 2023D

PILOT'S FLIGHT OPERATING INSTRUCTIONS

FOR

ARMY MODELS

A-20G-1-DO through A-20G-35-DO
A-20J-1-DO through A-20J-10-DO

AND SUBSEQUENT

P-70A-2 and P-70B-2

BRITISH MODEL

BOSTON IV

AIRPLANES

NOTE: This Technical Order replaces T. O. No. 01-40AL-1 dated July 30, 1943.

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MARSHALL-WHITE, CHICAGO
APRIL, 1944— 14,000

APRIL 5, 1944

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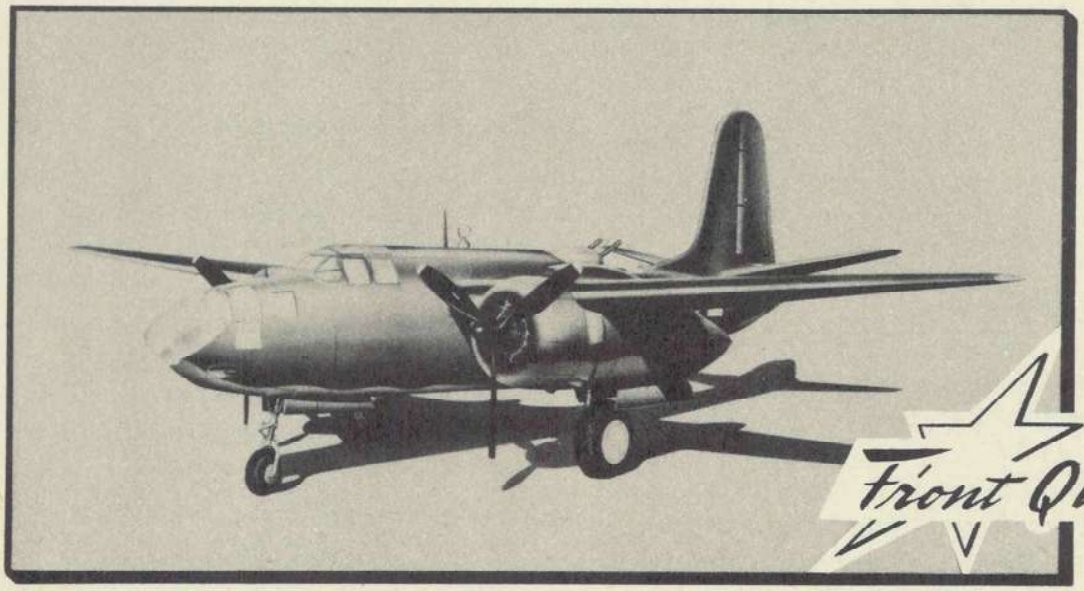


Fig 1
Front Quarter-L.H.

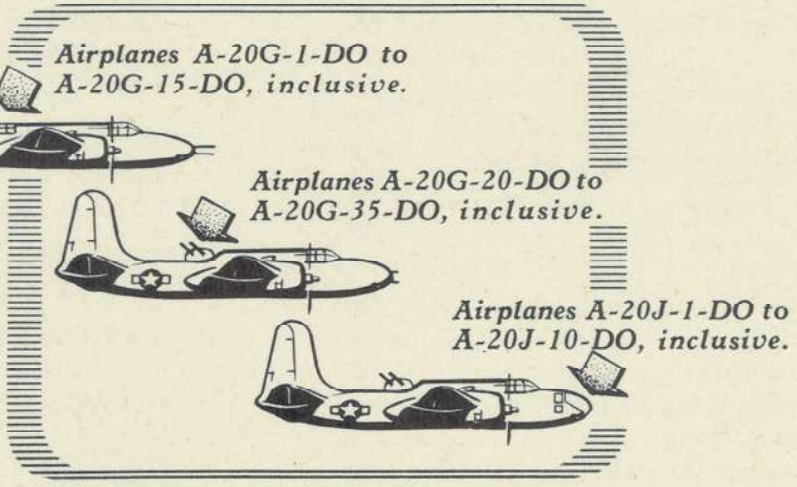


Fig 2
Front Quarter-R.H.

Fig. 3
Front Quarter

Section I
DESCRIPTION

1. Airplane.

a. General.—The A-20G and A-20J attack bombers are twin-engined mid-wing monoplanes with tricycle landing gears, two Wright Cyclone engines, Model R-2600-23, and Hamilton Standard hydromatic propellers. On the A-20J, a bombardier nose section replaces the attack nose of the A-20G. The tactical mission of this airplane is to lend bombing support to ground forces by the destruction of ground or naval personnel and light material targets, to attack and disperse troops by gunfire, and to destroy aircraft both on

Fig. 4
Rear Quarter

Fig. 5 Front Quarter

the ground and in the air. Provisions are made for laying smoke screens and performing torpedo attacks against naval units. The airplane is of all-metal construction with approximate over-all dimensions as follows:

Length	48 ft.
Height	18 ft. 1 in.
Span	61 ft. 4 in.

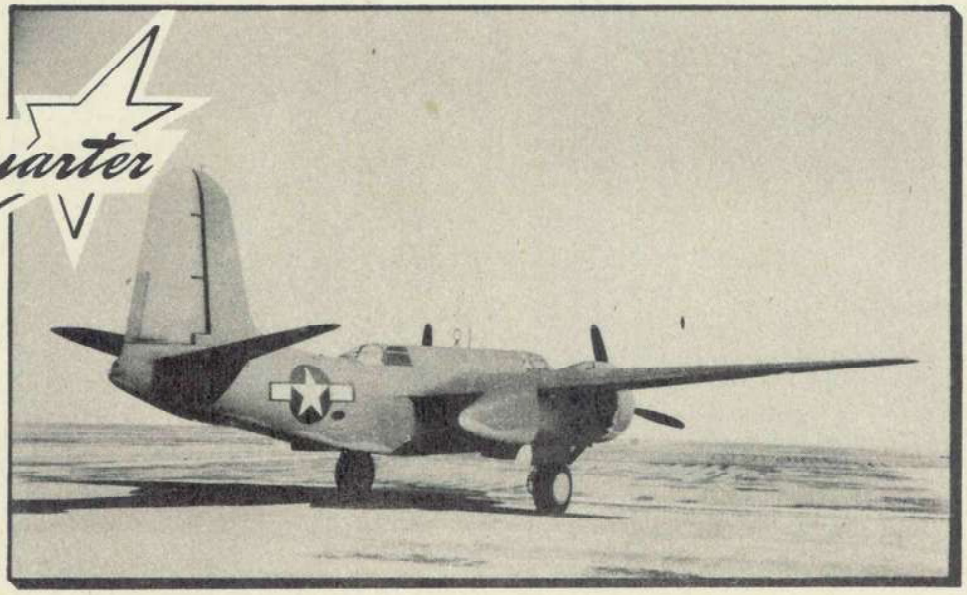
b. Access to Airplane.—The top of the pilot's cockpit is formed by a window-paneled enclosure door hinged on the right side. Entries and exits are made through the enclosure from the left side of the airplane. The gunners' compartment is provided with a door in the floor which is used for normal entry and exit, and when operating the lower flexible machine gun. On the A-20J, entrance to the bombardier's nose section is made through a door in the bottom of the compartment.

c. Fuel and Oil.

(1) Fuel: Specification: AN-F-28.
Grade: 130

(2) Oil: Specification: AN-VV-O-446.
Grade: 1120

Fig 6 Rear Quarter



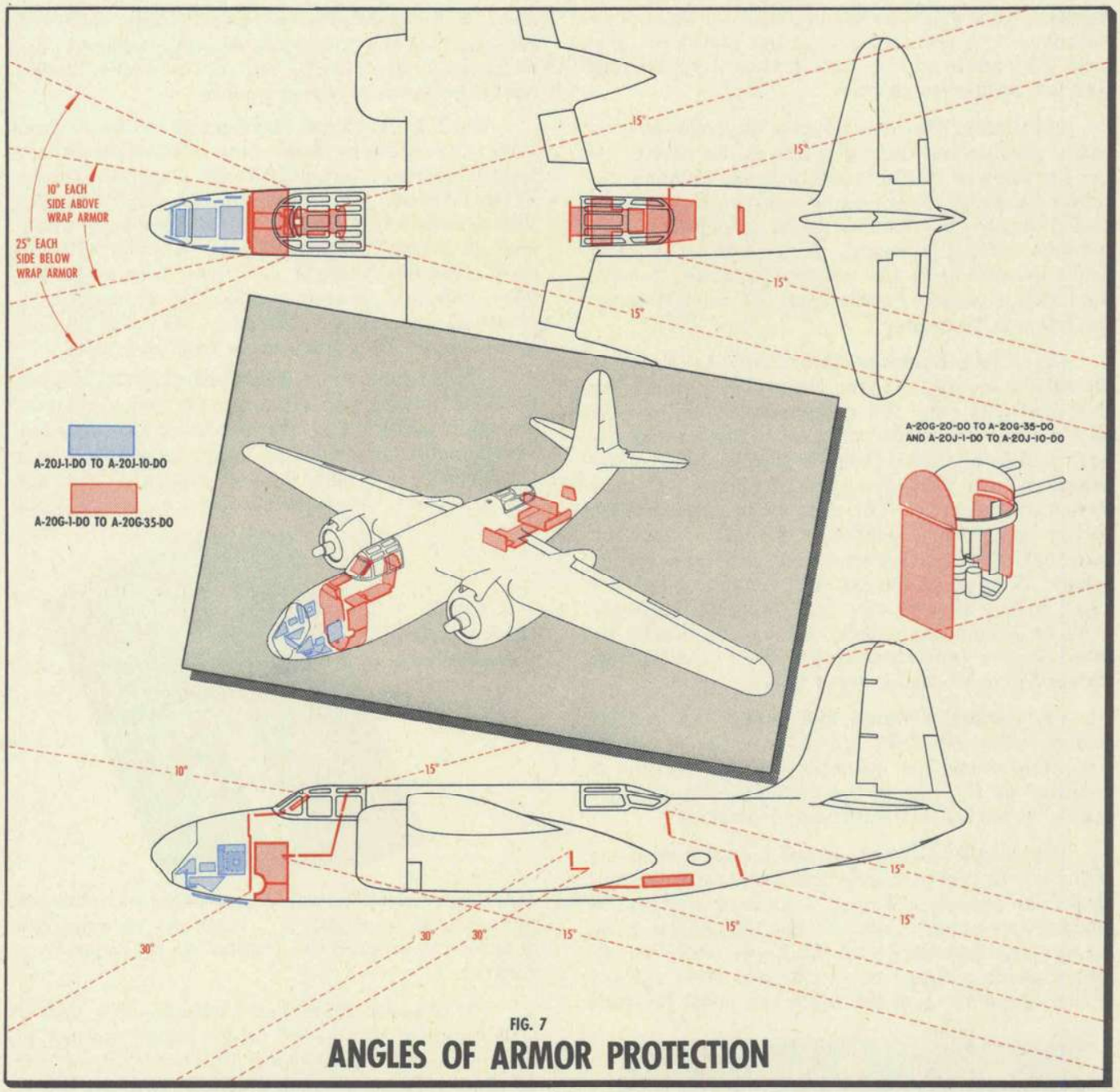


FIG. 7

ANGLES OF ARMOR PROTECTION

d. Protective Armor.—Armor is provided to protect the crew. Enemy fire, originating from within the areas graphically illustrated in Figure 7, will not reach the crew members.

2. Power Plant.—The R-2600-23 engine is a 14-cylinder double row radial aircraft engine, equipped with a two-speed supercharger.

3. Airplane Controls.

a. Operational Controls.

(1) Seat Adjustment Control.—To raise the pilot's seat, pull back on the handle located on the right side of the seat. This will release the retaining pins. At the same time ease body weight upward, allowing the shock and cord bungee to raise the seat. At the desired position, release the handle and make sure that the retaining pins are properly

engaged. To lower the seat, pull back on the handle and allow body weight to move the seat down. Release the handle and be certain that the retaining pins are properly engaged.

(2) Safety Harness Release Control.—A control is provided on the right side of the seat to allow the pilot to lean forward without undoing his safety harness. This control releases the spring-loaded drum on which a cable, attached to the shoulder straps, is wound. A catch is provided to hold the controls in the released position. Release the harness control handle from the catch to allow the harness to engage.

(3) Pilot's Enclosure Door Control.—Entry to the pilot's cockpit is made through the enclosure door installed over the compartment behind the pilot's seat. The door swings upward and to the right and is unlatched from the outside by a handle installed flush with the surface at the left rear corner of the door. The door is unlatched from within by a handle located at the left side of the door between the forward and aft transparent panels. A brace at the aft end of the door holds it open; before closing, the knee joint of the brace must be broken by pulling out on the handle located on the centerline of the door between the forward and aft transparent panels.

(4) Control Column and Wheel.—A control column is furnished for operation of the elevators. A control wheel for operation of the ailerons is mounted at the top of the column. The controls can be locked when the airplane is parked.

(5) Rudder Control.—Fore and aft movement of the pedals provides directional control of the airplane. An adjustment lever is incorporated on the inboard side of each pedal so that the pedal may be set at a position most suitable to the pilot. To adjust a pedal, rotate the adjustment lever inward to disengage the plunger, slide the pedal forward or aft to the desired position, and release the lever. Be sure that the plunger is properly engaged. Toe pressure applied to the top of the rudder pedals operates the main wheel brakes.

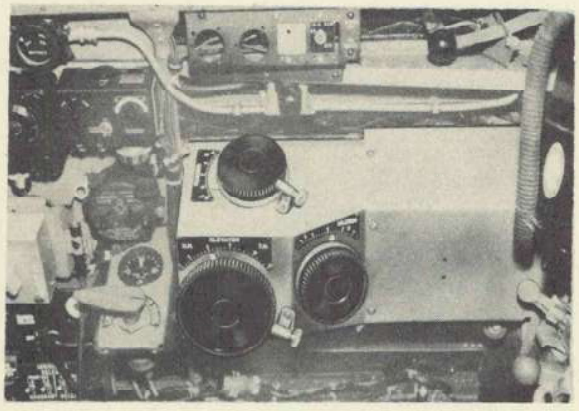


Fig. 8—Trim Tab Control Box

(6) Elevator Trim Tab Control.—The elevator trim tab control, located on the inboard face of the trim tab control unit, adjusts the longitudinal trim of the airplane. To correct a nose-heavy flight condition, rotate the elevator tab control knob clockwise (toward T.H. position) as required. To correct a tail-heavy flight condition, rotate the elevator tab control counterclockwise (toward N.H. position) as required. Elevator tab range is 8 degrees up and 14 degrees down from neutral.

(7) Aileron Trim Tab Control.—The aileron trim tab control, located on the aft end of the control unit, adjusts the lateral trim of the airplane. To correct a low left wing flight condition, rotate the aileron tab control knob clockwise (toward "R" position). To correct a low right wing flight condition, rotate the aileron tab control knob counterclockwise (toward "L" position) as required. Aileron tab range is 9 degrees up or down from neutral.

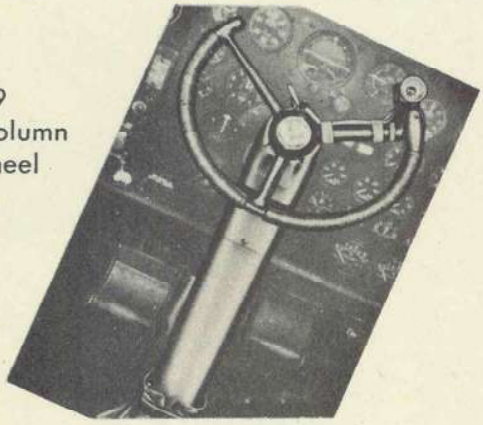


Fig. 9
Control Column
and Wheel

(8) Rudder Trim Tab Control.—The rudder trim tab control, located on the upper surface of the control unit, adjusts the directional trim of the airplane. To correct a nose-left yaw condition, rotate the rudder trim tab control knob clockwise (toward "R" position). To correct a nose-right yaw condition, rotate the rudder tab control knob counterclockwise (toward "L" position). Adjustable friction-type brakes on the rudder and elevator tab control knobs prevent creeping of the controls after a tab setting has been made. Rudder tab range is 10 degrees to either side of neutral.

(9) Surface Control Lock.—When the airplane is on the ground, the surface controls and their operating cables are protected against gust loads by a surface control "gust lock." This "lock"

consists of three fabric straps. With these the pilot fastens the control column, the control wheel, and the rudder pedals in a stationary position. The straps are marked "AILERON" and "RUDDER AND ELEVATOR," and are stowed under the pilot's seat cushion when not in use. To lock the controls, proceed as follows:

(a) Fasten each "RUDDER AND ELEVATOR" strap to the clip provided on the rudder pedals. Place the control column in the full forward position, and buckle the straps around the column.

(b) Clip one end of the "AILERON" strap to the fitting provided on the floor just aft of the right rudder pedal. Loop the strap around the center spoke of the control wheel, and fasten the other end to the fitting on the floor aft of the left rudder pedal.

(10) Parking Brake Control.—A pull - type parking brake control, to set the brakes for parking, is located centrally at the lower edge of the pilot's instrument panel. To set the brakes, apply toe pressure to the brake pedals until fully depressed, then pull out the parking brake control knob and release the pedals. With the brakes set, the control will return to its original position. For satisfactory operation of the parking brakes, the hydraulic system pressure should be at least 500 pounds per square inch.

Fig. 10 — Hydraulic Control Panel Looking Aft

(11) Wing Flap Control.—The wing flaps are actuated by hydraulic pressure. The control is located on the panel at the left side of the pilot's seat. To lower the wing flaps, move the control to "DOWN"; when the flaps have moved down (as shown by the position indicator on the pilot's instrument panel), return the control to "NEUTRAL." To raise the wing flaps, move the control to "UP" until the flaps are raised, then return control to "NEUTRAL." When the airplane is standing idle, the wing flap control should be left in the "NEUTRAL" position.

(12) Landing Gear Control.—The landing gear is actuated hydraulically and controlled by a handle at the left side of the pilot's seat. To retract the landing gear, move the control to "UP." When the gear is fully retracted (as shown by the position indicator on the pilot's instrument panel), return the control to "NEUTRAL." To extend the landing gear, move the control to "DOWN." When the landing gear is down completely (as shown by the position indicator), leave the control in the "DOWN" position. The control incorporates a latch to prevent inadvertent movement of the control to the "UP" position when the airplane is on the ground.

Note The landing gear is provided with a warning system incorporating a horn and red and green signal lights. Should the throttles be closed to less than one-quarter segment with the landing gear not latched in the "DOWN" position, the warning horn will sound and the red light will be on. With the landing gear latched in the "UP" position and the throttles closed to less than one-quarter segment, the horn and warning light will still be on. With the landing gear latched in "DOWN" position, the green light is on, the red light is off, and the warning horn is silent, regardless of throttle position.

(13) Cowl Flap Controls.—The engine cowl flaps are actuated by hydraulic pressure and controlled by handles located on the panel at the right side of the pilot's seat. The upper cowl flaps for each engine are controlled in unison by a single handle; the lower cowl flaps for each engine are controlled by individual handles. The oil cooler flaps are connected by cables to the lower cowl flap mechanism, and operate simultaneously with the lower cowl flaps. To open the cowl flaps move the corresponding controls to "OPEN." When the flaps are opened as desired, return control to "NEUTRAL." To close the cowl flaps, move the control to the "CLOSED" position. When the flaps are closed or partly closed as desired, return the control to "NEUTRAL."

(14) Hydraulic Hand Pump.—The hydraulic hand pump is an auxiliary pump used to furnish hydraulic pressure when the engine-driven pumps are inoperative. The hand-pump handle extends from the panel at the left side of the pilot's seat. Any hydraulically controlled unit may be operated by the use of the hand pump. To operate, set the control of the unit in the desired position. Work the hand pump handle until the unit has moved to the desired position, then return the control to "NEUTRAL." The hand pump may be used to charge the pressure accumulator by setting the hand pump by-pass valve control, located on the panel at the left side of the pilot's seat, to "HAND PUMP TO PRESSURE TANK" position. Operate the hand pump until the normal system operating pressure of 850 ± 25 pounds per square inch is indicated on the pressure gauge. The by-pass valve control must be returned to "HAND PUMP TO SYSTEM" position when the operation is completed.

CAUTION In the event of hydraulic failure, use the hand pump for braking only, unless the failure has been located and the control valve for the inoperative system has been set to "NEUTRAL" and left there. Do not attempt to position any hydraulic unit with the hand pump unless the failure is isolated in this manner.

(15) Brake Control—Hydraulic.—The main gear wheels incorporate brakes actuated by hydraulic pressure. The brakes are operated by toe pressure applied to the top of the pilot's rudder pedals. Each brake may be independently operated.

(16) Carburetor Air Filter Control.—*Airplanes A-20G-10-DO to A-20G-35-DO, and A-20J-1-DO to A-20-J-10-DO.*—An hydraulic control is provided for the door in the air induction system. The door permits carburetor air intake through either the ramming air scoop or the non-ramming air scoop and filter. The control is located on the left side of the pilot's seat aft of the bomb door control handle. It has two positions: "RAM" and FILTER."

CAUTION *On airplanes A-20G-30-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO,* the air scoop control must be in the "RAM" position before setting the "CARB. AIR" control to "HOT." The "CARB. AIR" control must then be set to "COLD" before the alternate "FILTER" air scoop position may again be used.

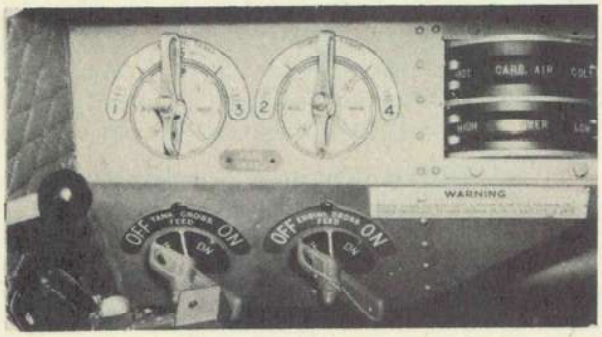


Fig. 11—Fuel Valve Control Panel
(A-20G-1-DO to A-20-G-15-DO, incl.)

(17) Fuel Tank Selector Controls.—Two fuel tank selector controls are located on the fuel valve control panel installed on the left side of the pilot's cockpit. In normal operation, each engine has an individual fuel system whereby the left fuel tanks supply the left engine, and the right fuel tanks supply the right engine. However, if the need arises, any tank may be used to supply both engines by using the fuel tank selectors in conjunction with the cross-feed system.

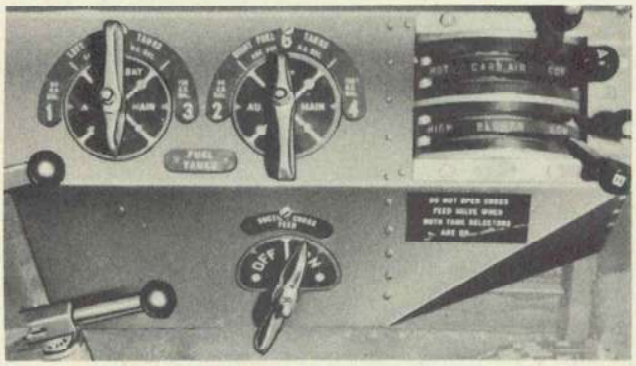


Fig. 12—Fuel Valve Control Panel
(Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO, incl.)

(18) Cross-feed Controls.—*Airplanes A-20G-1-DO to A-20G-15-DO.*—Two cross-feed controls are located on the fuel valve control panel. The "ENGINE CROSS-FEED" control operates the pressure cross-feed system and the "TANK CROSS-FEED" control operates the suction cross-feed system. The engine cross-feed should be "ON" for take-off; otherwise, both cross-feed controls are normally set in the "OFF" position.

(19) Cross-feed Control.—*Airplanes A-20G-20-DO to A-20G-35-DO, and A-20J-1-DO to A-20J-10-DO.*—The "TANK CROSS-FEED" control is located on the fuel valve control panel and operates the suction cross-feed system. In normal operation, the cross-feed control is set in the "OFF" position.

(20) Wobble Pump Control.—*Airplanes A-20G-1-DO to A-20G-15-DO.*—The wobble pump is a manually operated auxiliary fuel pump. The wobble pump control handle extends up from the floor at the left side of the pilot's seat.

CAUTION If the fuel pressure of either the left or right system drops, operate the wobble pump. If pressure comes up, failure of the corresponding engine-driven fuel pump is indicated. In this event, fuel may be supplied to both engines through the operative engine-driven fuel pump by turning the engine cross-feed "ON." All fuel tanks may be used by the operation of the tank cross-feed. If pressure fails to come up with the use of the wobble pump, fuel line failure is indicated. This failure necessitates single engine operation; therefore, the propeller on the affected engine should be feathered. Do not use fuel from a tank in the system in which the failure occurred.

(21) Primer Pump Control.—*Airplanes A-20G-1-DO to A-20G-15-DO.*—The primer pump control is located below the instrument panel to the right of the control column.

(22) Primer Switches.—*Airplanes A-20G-20-DO to A-20G-35-DO, and A-20J-1-DO to A-20J-10-DO.*—An individual switch is provided on the pilot's electrical panel for the electrically operated primer valve on each engine. When there is pressure in the fuel system, operating a primer switch admits fuel directly into the top eight cylinders of the corresponding engine. Make sure that the switch has been turned "OFF" when priming has been completed.

CAUTION Do not prime a warm engine.

(23) Anti-Icing Controls.

(a) Propeller Anti-Icing Controls.—The propeller anti-icer is controlled by a rheostat located on the left of the pilot's upper electrical panel. The rheostat turns on and regulates the anti-icer fluid pump so that the fluid may be supplied to both propellers. A supply of 2 to 4 quarts per hour is considered satisfactory under normal

Fig. 13—Propeller Anti-Icer Rheostat

icing conditions to keep ice from forming. When propeller ice is indicated by engine roughness, use full flow until ice is removed.

(b) Carburetor Anti-Icing Selector Control—*On airplanes A-20G-1-DO to A-20G-25-DO and A-20J-1-DO,* the carburetor anti-icing selector control, located on the left side of the pilot's cockpit, permits the selection of the left or right carburetor. The switch to operate the electric anti-icing pump is located on the pilot's

Fig. 14—Carburetor Anti-Icer Selector Control
(A-20G-1-DO to A-20G-25-DO, incl.)

lower electrical control panel. On *airplanes A-20G-30-DO to A-20G-35-DO, and A-20J-5-DO to A-20J-10-DO,* a hot air system replaces the liquid anti-icer. To heat the carburetor by this system, the air scoop control must be in the "RAM" position before setting the "CARB. AIR" control to "HOT." When sufficient carburetor

heating has been accomplished, return the "CARB. AIR" control to "COLD" before setting the air scoop control to "FILTER."

(24) Electrical Controls.

(a) Ignition Switch.—The ignition switch is located in the upper left corner of the pilot's instrument panel. The ignition switch incorporates a master ignition switch and two individual engine switches as follows:

1. Master Ignition Switch.—The master ignition switch has two positions:

"OFF"—Magnetos and all electrically controlled units are inoperative.

"ON"—Magnetos and all electrically controlled units are operative.

2. Individual Engine Switches.—Each individual engine switch controls the ignition of one engine. The switch has four positions that control circuits as follows:

"OFF"—Both magnetos inoperative with the master switch "ON" or "OFF."

"L"—Left magneto operative; right magneto inoperative.

"R"—Right magneto operative; left magneto inoperative.

"BOTH"—Both magnetos operative.

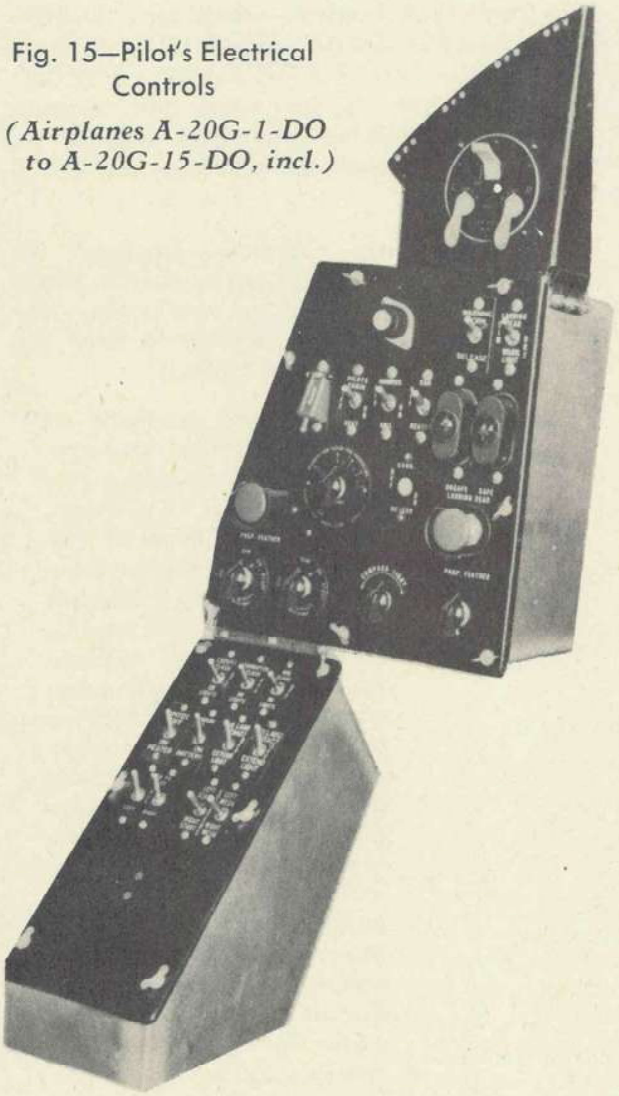
(b) Warning Horn Release Switch.—The warning horn release switch silences the horn if it is desired to close the throttles when the landing gear is not latched in the landing position. The horn circuit is automatically reset after operation of the release switch by opening the throttles; if the throttles are again closed, the horn will sound until the horn release switch is operated.

Note If only one throttle is closed when the landing gear is not latched in the landing position, the warning horn release switch will silence the horn for only an instant. To quiet the horn, the throttle must be opened beyond the horn operating position.

(c) Landing Gear Warning Lights.—On *airplanes A-20G-1-DO to A-20G-20-DO,* a red signal light on the pilot's upper electrical panel indicates that the landing gear is not latched in the "DOWN" position. A green light indicates that the gear is latched in "DOWN" position. These lights may be brightened or dimmed by the operation of the warning lights switch. On *airplanes A-20G-25-DO to A-20G-35-DO, and A-20J-1-DO to A-20J-10-DO,* the landing gear warning lights are located on the pilot's instrument panel. These warning lights may be dimmed by turning individual shutters on each light.

Fig. 15—Pilot's Electrical Controls

(Airplanes A-20G-1-DO to A-20G-15-DO, incl.)



(d) Propeller Feathering Switches.—Remote control switches provided for each propeller are operated by pushing the relay switch button for the propeller to be feathered. The relay switch will automatically release when the propeller blades reach the full feathered position. To unfeather the propeller, push in the relay switch and hold until the propeller windmills at 600 to 800 rpm; then release it. The action of the governor will control the pitch when rpm reaches governing range.

(e) Main Battery Switch.—Operation of this switch controls the circuit for the airplane batteries. If the batteries are used as the source of power supply, both the main battery switch and

the master ignition switch must be on before any electrically controlled units in the airplane can be operated.

Note An external source of power supply may be used while the airplane is on the ground, and may be plugged into the socket on the left side of the nose wheel well. If this is done, all electrically controlled units in the airplane may be operated with the main battery switch and master ignition switch "OFF." To start the engines on the external source of power supply, the master ignition switch must be "ON." When changing over from the external source of power supply to the airplane batteries with the engines running, the main battery switch must be "ON" before the external power supply plug is disconnected. Engines must be idled to insure satisfactory relay action in cutting in the battery to the electrical circuit.

(f) Landing Light Switches.—These switches control the extension and retraction of the landing lights installed on the lower surface of the inner wings. To extend a light, hold the corresponding switch in the "EXTEND" position until the light is fully lowered (approximately twelve seconds required). To retract the light, hold the switch in the "RETRACT" position until the light is fully retracted. Landing light will automatically turn on when it is extended.

(g) Circuit Breaker Switches and Fuse Panel.—***Airplanes A-20G-20-DO to A-20G-35-DO, and A-20-J-1-DO to A-20J-10-DO.***—The circuit breaker switches are located on the pilot's lower electrical panel. These switches are normally in the DOWN position but will "trip-up" if a respective electrical circuit becomes overloaded. In case of an emergency, the circuit may be maintained by resetting the switch in the down position and holding until the operation is completed.

Note These switches are for emergencies. Do not attempt to reset for normal operation.

A fuse panel is installed on the top outboard side of the electrical panel. The fuses are located inside a transparent case. A spare fuse is provided at the top of each fuse-holding block. To replace a blown fuse, open the transparent case and detach the blown fuse from the two attaching end clips. Turn the fuse block over and attach the spare fuse to the attaching end clips.

(h) Oil Dilution Switches.—An individual switch is provided to operate the oil dilution system of each engine. Propeller feathering oil dilution switches are also provided on ***airplanes A-20G-20-DO to A-20G-35-DO, and A-20J-1-DO to A-20J-10-DO.*** These engine and propeller feathering oil dilution switches are normally operated during the engine stopping procedure, when a subsequent cold engine start is anticipated. (Refer to Section V, Cold Weather Operation.)

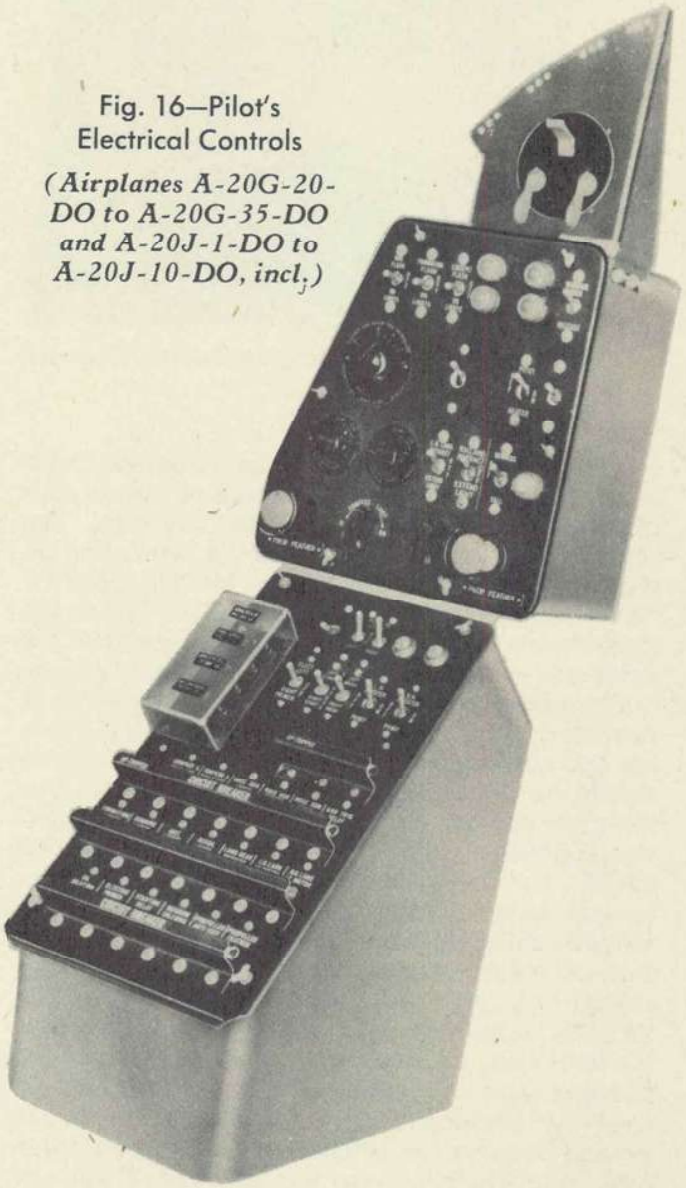


Fig. 16—Pilot's Electrical Controls

(Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO, incl.)

(i) Engine Starter Switches.—Two switches are provided to start the engine. The starter is energized by the "START" switch and engaged by the "MESH" switch. To start the right engine, push down on the "START" switch. When the inertia wheel has reached its full speed, depress the "MESH" switch, still holding down the "START" switch. To start the left engine, lift up the switches and follow procedures for starting right engine. For complete engine starting instructions, refer to Section II, Pilot's Operating Instructions.

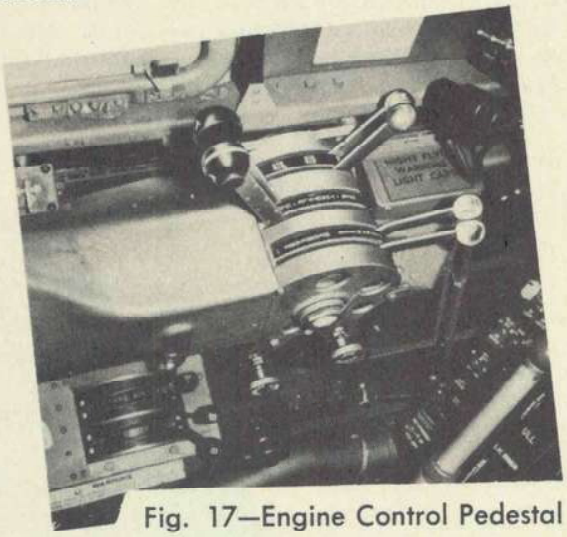


Fig. 17—Engine Control Pedestal

b. Engine Controls.

(1) Mixture Controls.—The carburetor mixture controls are located on the engine control unit installed on the left side of the pilot's cockpit. The controls have four settings from the forward to aft position: "IDLE CUT-OFF," "AUTO LEAN," "AUTO RICH," and "EMERGENCY." When the controls are in the "IDLE CUT-OFF" position, the automatic mixture control units of the carburetors are inoperative and the fuel flow is insufficient to run the engines. This position is used when starting and stopping the engine. The mixture controls should be left in the "IDLE CUT-OFF" position when the engines are not running. When the mixture controls are set to "AUTO LEAN" or "AUTO RICH," the fuel mixture control unit of each carburetor automatically maintains the correct fuel-air ratio through changes of altitude and temperature. The desired mixture ratio is not disturbed by change of throttle position or propeller control. The "AUTO LEAN" position should be used only during level cruising conditions at powers equal to and below maximum cruising power. It should not be used for cruising climb. "AUTO RICH" is the normal position for all operations, including take-offs. With the automatic mixture control units of the carburetors inoperative, the "EMERGENCY" position provides a full rich fuel-air mixture ratio. This setting may be used when full rich mixture is required for emergency operation.

(2) Throttle Controls.—The throttle controls are mounted on the engine control unit installed on the left side of the pilot's cockpit.

(3) Propeller Controls.—Forward movement of the controls toward "INCREASE RPM" increases engine rpm and decreases propeller pitch. Aft movement toward "DECREASE RPM" reduces engine rpm and increases propeller pitch.

(4) Carburetor Air Temperature Controls.—A carburetor air temperature control is provided for each engine. Move controls forward for "COLD" and aft for "HOT."

CAUTION On *airplanes A-20G-30-DO to A-20G-35-DO, and A-20J-1-DO to A-20J-10-DO*, the air scoop control must be in the "RAM" position before the "CARB. AIR" control is set to "HOT." Return the "CARB. AIR" control to "COLD" before setting the air scoop control to "FILTER."

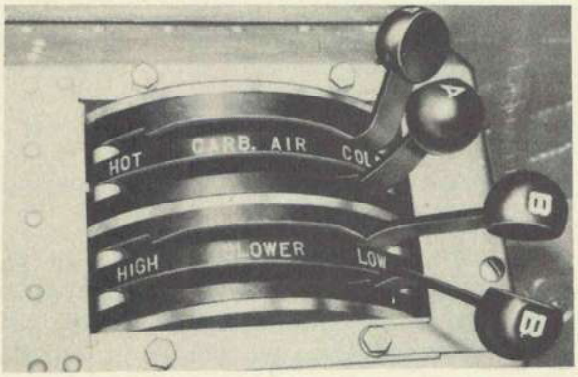


Fig. 18—Carburetor Air and Supercharger Controls

(5) Supercharger Controls.—Each engine incorporates a two-speed supercharger. Movement of the controls to "LOW" gives a 7.14:1 blower gear ratio, to "HIGH" a 10:1 ratio. When changing from one blower to the other, the engine should be half throttled and the supercharger control moved without pause to avoid rough operation during clutch engagement. Move the control as far as possible in either gear ratio to prevent clutch slippage. Normally, the supercharger gear ratios should not be changed at intervals of less than five

minutes to provide opportunity for dissipation of heat generated during clutch engagements. During a change in gear ratio, a slight hesitation of the engine may be observed. This is normal for this engine.

c. Emergency Controls and Exits.

(1) Fuel Dump Valve Control.—A fuel dump valve control is located on the right side of the pilot's seat. The fuel dump system is provided for the emergency destruction of the airplane. To operate, pull UP on the control. This will cause fuel to be dumped from each inboard wing fuel container where it can be ignited outside the airplane, by means of the Very pistol, a match, or an incendiary grenade.

Fig. 19—Emergency Landing Gear and Fuel Dump Valve Controls

(2) Landing Gear Emergency Release Control.—An emergency landing gear control is provided to lower the landing gear in case the hydraulic system should fail. The control is located near the floor on the right side of the pilot's seat. To operate, slow airplane down to 130 mph I.A.S. or under, set the landing gear hydraulic control to "DOWN," then pull UP on the emergency release. The emergency control releases the latches holding the main gear up, allowing the gear to swing down to the landing position. The latch on the nose wheel gear is operated by a cable attached to the hydraulic control handle and is released when the hydraulic control is moved to the "DOWN" position.

(3) Emergency Air Brake Control.—The emergency air brake control is an ON-OFF type valve, located on the right side of the pilot's cockpit. To open the valve, push down on the handle and rotate it clockwise.

CAUTION Use the emergency air brakes by turning the control full "ON" and leaving it on until the airplane has come to a complete stop. Do not attempt to apply the air brakes gradually.

Fig. 20 Emergency Air Brake Control

(4) Pilot's Emergency Exit.—The pilot's enclosure door is provided with an emergency release handle. When the handle is pulled, it unlatches the door, at the same time pulling the pins from the brace at the aft end of the door. Push the door up slightly to allow the airstream to carry it away.

Note Before abandoning the airplane, both engine propellers should be feathered prior to pulling the emergency release.

(5) Gunners' Emergency Exit.—An emergency exit can be made through the lower door. The upper enclosure is used for ditching. The lower door may be opened by a latching handle located in the approximate center of the door, or by operating the crank mechanism on the right side of the compartment. To open the upper enclosure on *airplanes A-20G-1-DO to A-20G-15-DO*, release the two latches at the upper forward end of the sliding section, allowing the forward end to drop down; then slide it forward under the fixed section as far as it will go. The enclosure may be opened externally by tearing a fabric patch covering the upper latch access hole. To open the upper enclosure on *airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO*, push up and out on enclosure glass.

(6) Bombardier's Emergency Exit.—*(Airplanes A-20J-1-DO to A-20J-10-DO).*—The bombardier's entrance may be used as an emergency exit in flight. In the event of a belly landing, an emergency hatch, located on the upper right side of the compartment, may be used.

CAUTION Since the hatch is directly in line with the right propeller, it must not be used in flight or at any time the right engine is running.

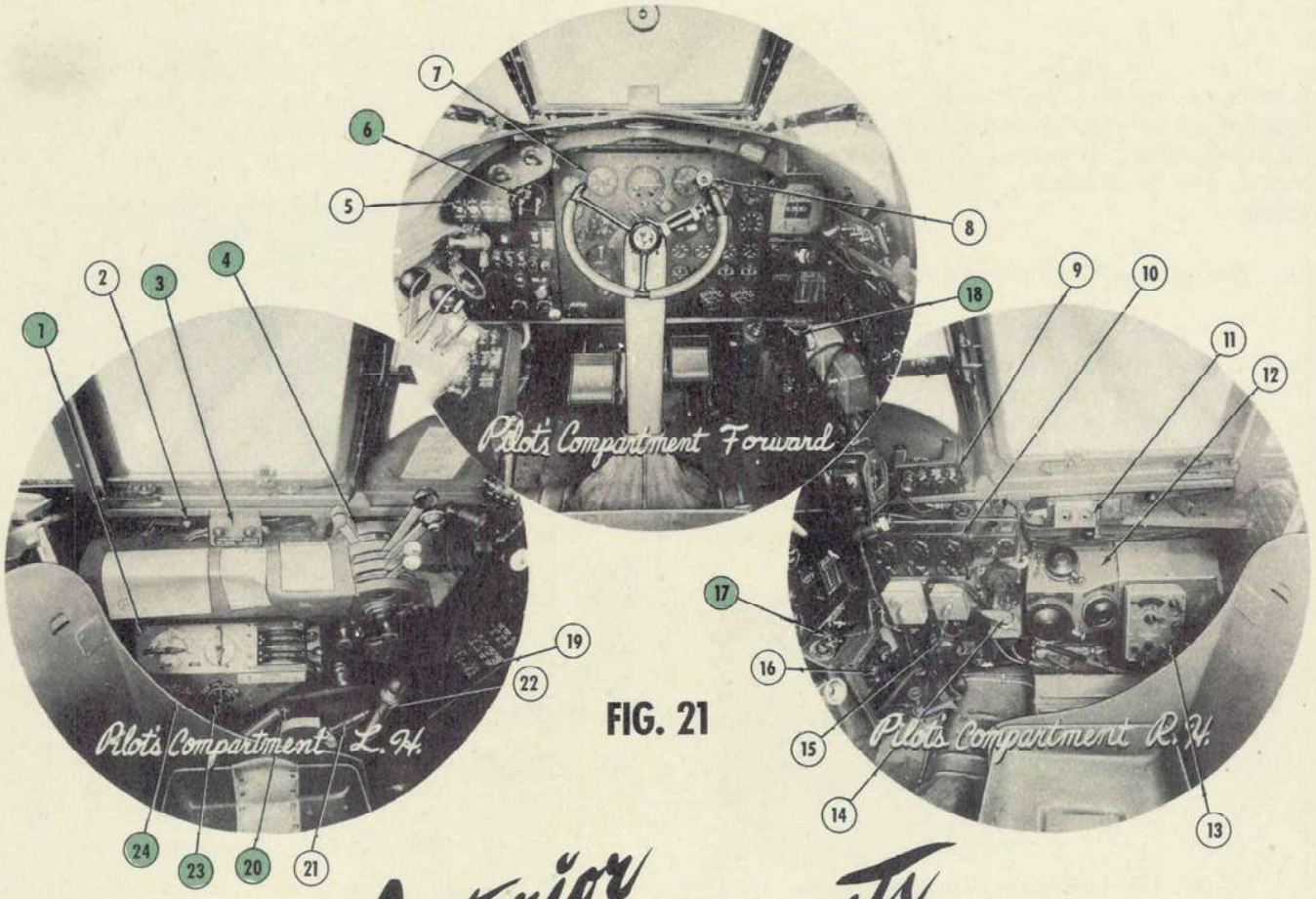


FIG. 21

Interior Arrangements

A-20G-1-DO TO A-20G-15-DO

1. FUEL TANK SELECTOR CONTROLS
2. WINDOW RELEASE
3. CARBURETOR ANTI-ICER CONTROL
4. ENGINE AND PROPELLER CONTROLS
5. GUN SELECTOR SWITCH PANEL
6. IGNITION SWITCH
7. UPPER ELECTRICAL PANEL
8. BOMB RELEASE SWITCH
9. RECOGNITION LIGHTS SWITCH PANEL
10. COMMAND RADIO SET CONTROL BOX
11. RADIO RECEIVER DESTROYER PUSH BUTTON
12. TRIM TAB CONTROL BOX
13. RADIO COMPASS CONTROL BOX
14. EMERGENCY AIR BRAKE CONTROL
15. BOMB CONTROL PANEL
16. OXYGEN REGULATOR
17. ENGINE PRIMER
18. MANIFOLD PRESSURE GAUGE DRAIN COCK
19. LOWER ELECTRICAL PANEL
20. WOBBLE PUMP
21. BOMB DOOR CONTROL
22. HYDRAULIC HAND PUMP
23. ENGINE CROSS FEED CONTROL
24. TANK CROSS FEED CONTROL

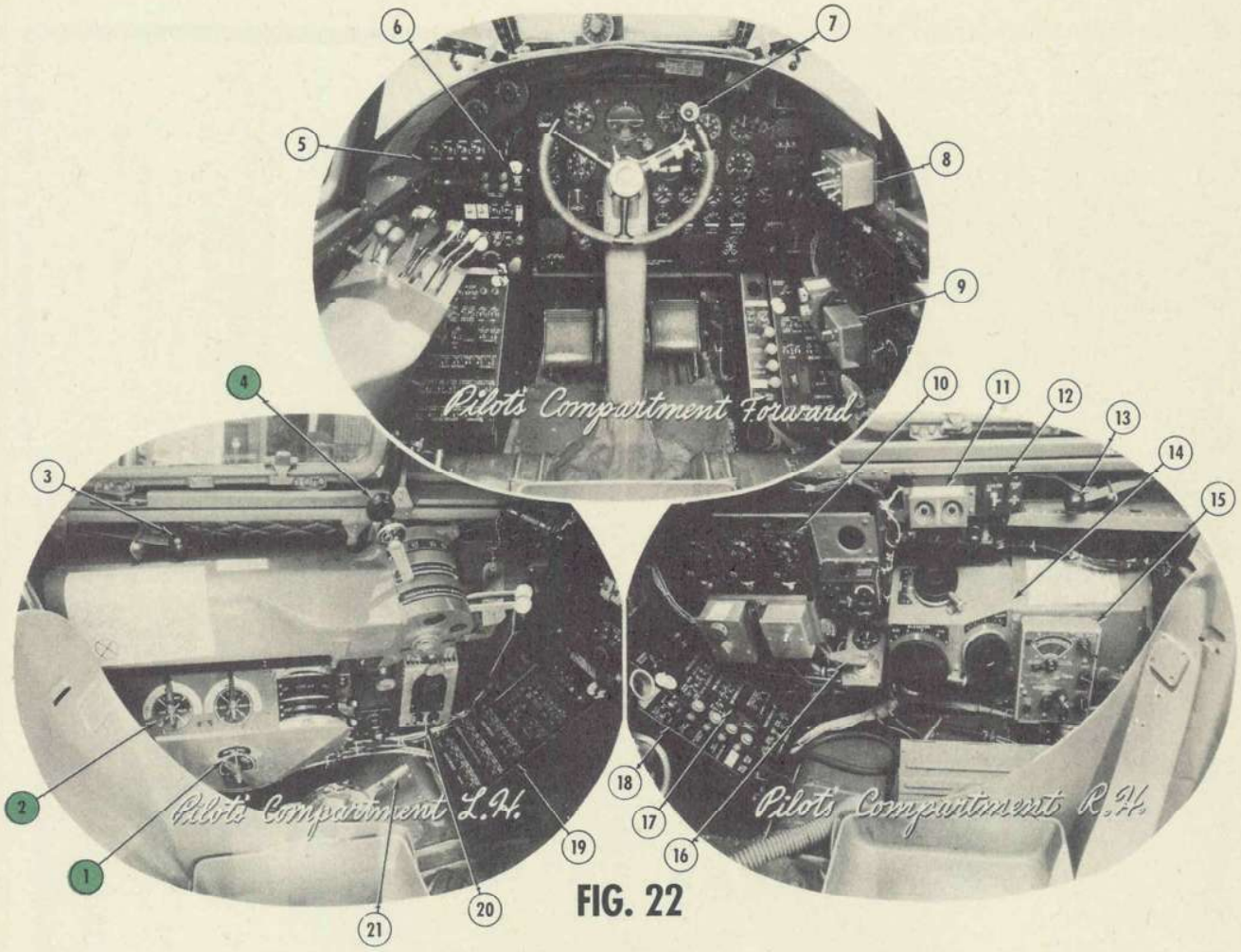


FIG. 22

Interior Arrangements

A-20G-20-DO TO
A-20G-35-DO
AND A-20J-1-DO
TO A-20J-10-DO

1. SUCTION CROSS FEED CONTROL
2. FUEL TANK SELECTOR CONTROLS
3. WINDOW RELEASE
4. ENGINE AND PROPELLER CONTROLS
5. GUN SELECTOR SWITCH PANEL
6. UPPER ELECTRICAL PANEL
7. BOMB AND CHEMICAL TANK RELEASE BUTTON
8. RECOGNITION LIGHTS SWITCH PANEL
9. INTERPHONE JACK BOX
10. COMMAND RADIO SET CONTROL BOX
11. RADIO RECEIVER DESTROYER PUSH BUTTON
12. IDENTIFICATION RECEIVER ON-OFF SWITCH
13. WINDOW RELEASE
14. TRIM TAB CONTROL BOX
15. RADIO COMPASS CONTROL BOX
16. EMERGENCY AIR BRAKE CONTROL
17. BOMB CONTROL PANEL
18. HEATER CONTROL PANEL
19. LOWER ELECTRICAL PANEL
20. SUIT HEATER OUTLET
21. BOMB DOOR CONTROL

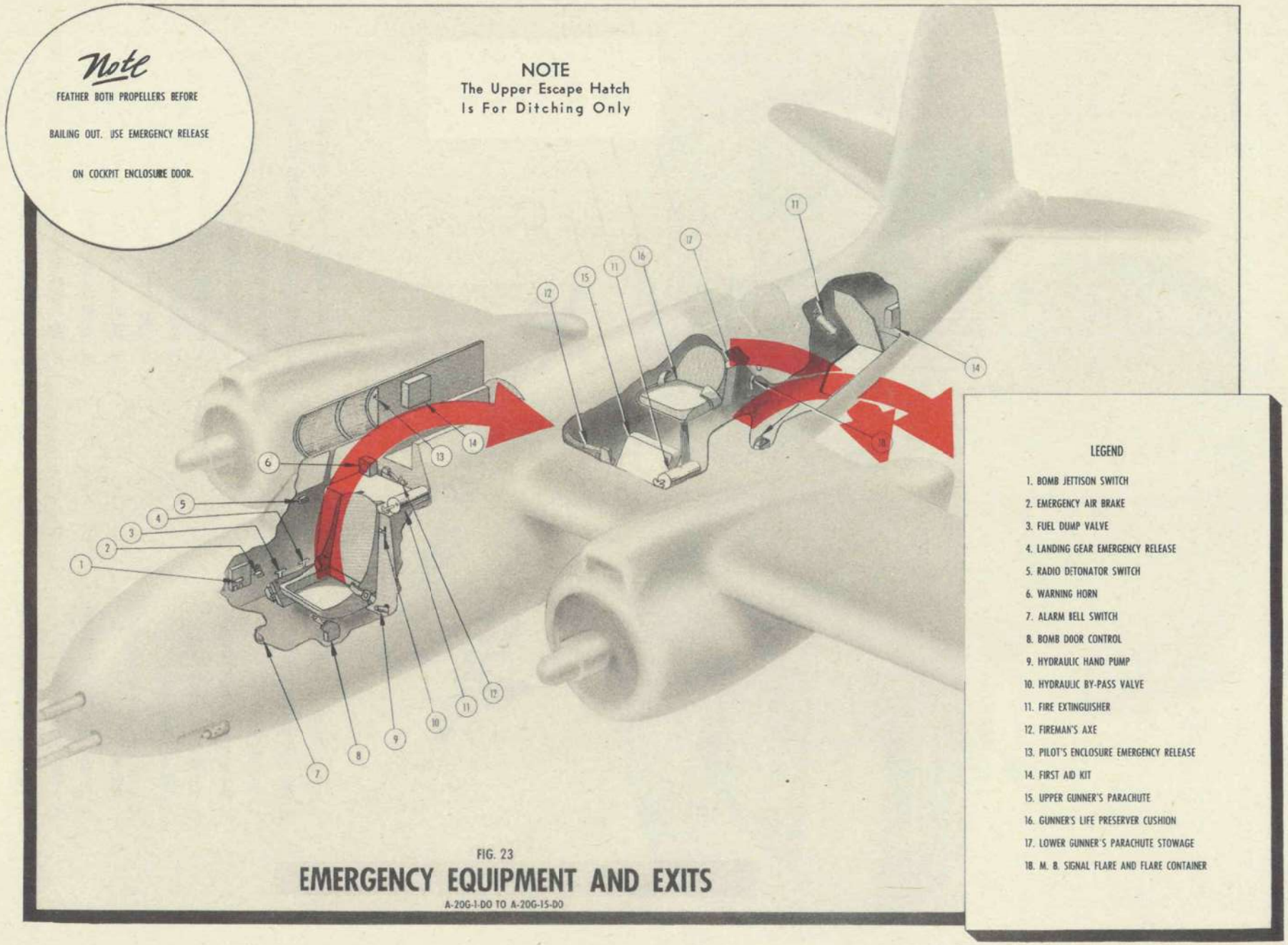


FIG. 23

EMERGENCY EQUIPMENT AND EXITS

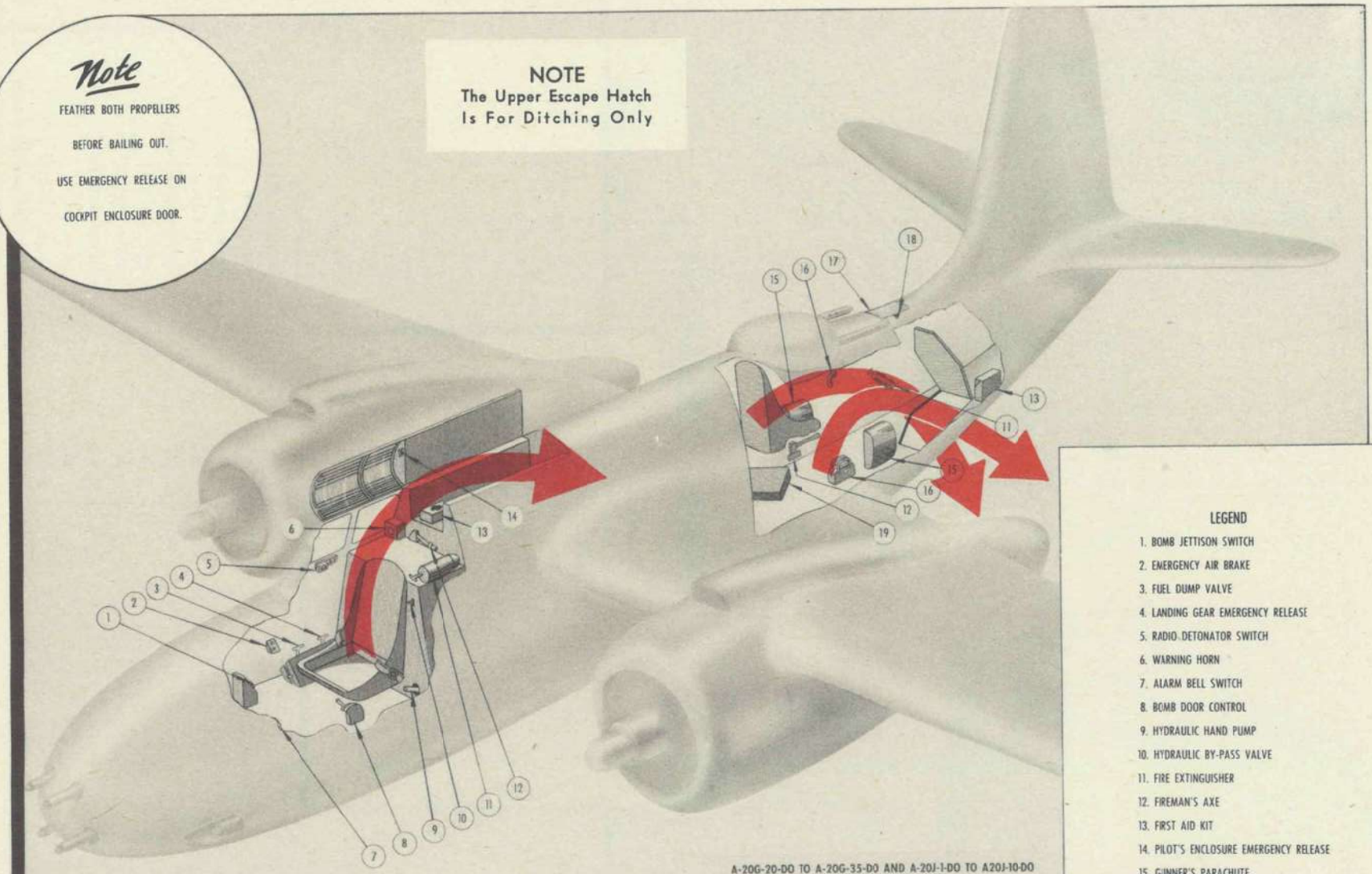
A-20G-1-DO TO A-20G-15-DO

Note

FEATHER BOTH PROPELLERS BEFORE BAILING OUT.

USE EMERGENCY RELEASE ON COCKPIT ENCLOSURE DOOR.

NOTE
The Upper Escape Hatch Is For Ditching Only



LEGEND

1. BOMB JETTISON SWITCH
2. EMERGENCY AIR BRAKE
3. FUEL DUMP VALVE
4. LANDING GEAR EMERGENCY RELEASE
5. RADIO DETONATOR SWITCH
6. WARNING HORN
7. ALARM BELL SWITCH
8. BOMB DOOR CONTROL
9. HYDRAULIC HAND PUMP
10. HYDRAULIC BY-PASS VALVE
11. FIRE EXTINGUISHER
12. FIREMAN'S AXE
13. FIRST AID KIT
14. PILOT'S ENCLOSURE EMERGENCY RELEASE
15. GUNNER'S PARACHUTE
16. M. 8. SIGNAL FLARE AND FLARE CONTAINER
17. EMERGENCY ESCAPE HATCH
18. EMERGENCY ESCAPE HATCH RELEASE
19. LIFE PRESERVER CUSHION

FIG. 24

EMERGENCY EQUIPMENT AND EXITS

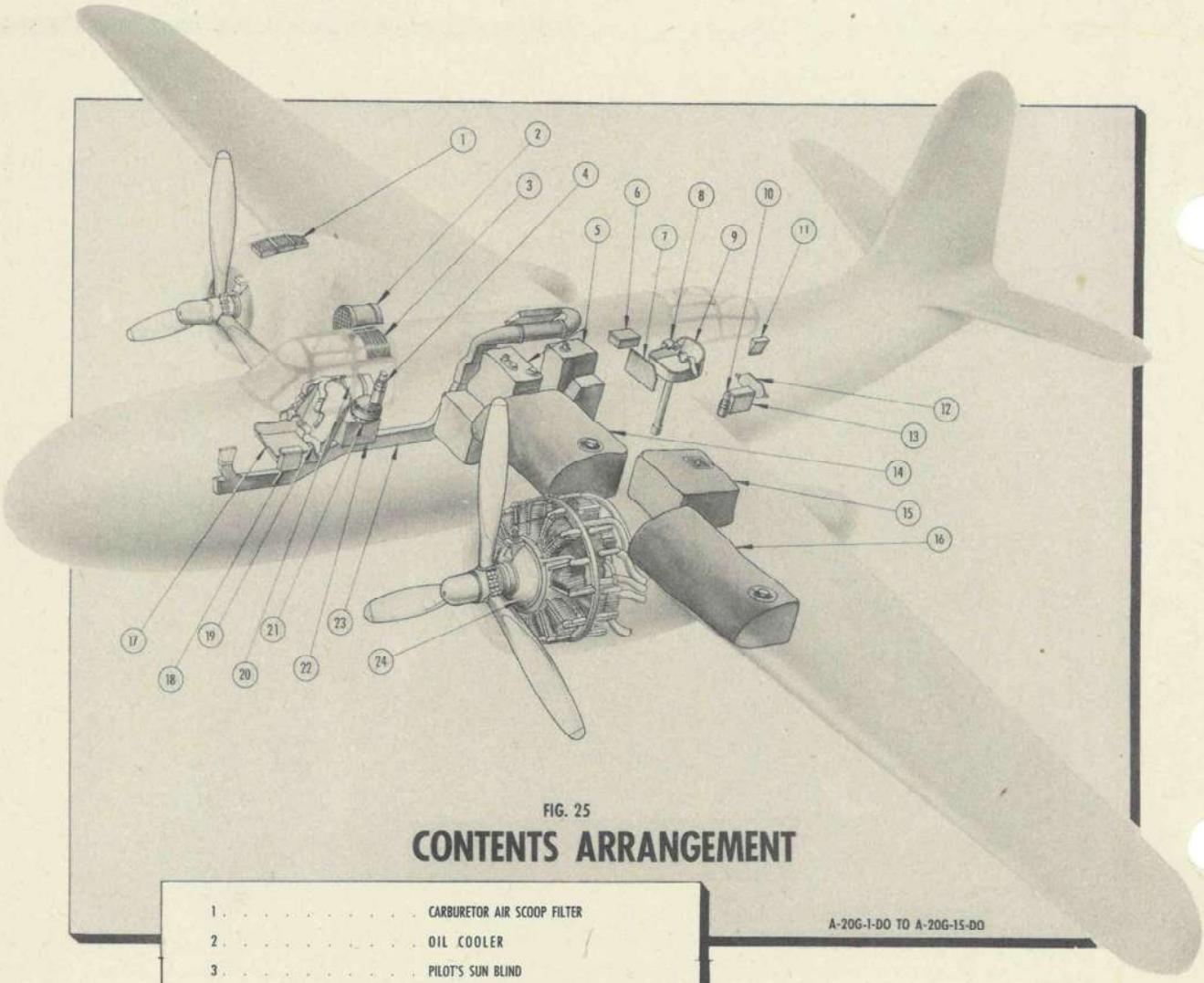


FIG. 25

CONTENTS ARRANGEMENT

A-20G-1-DO TO A-20G-15-DO

1 . . . . . CARBURETOR AIR SCOOP FILTER
2 . . . . . OIL COOLER
3 . . . . . PILOT'S SUN BLIND
4 . . . . . PILOT'S VACUUM BOTTLE
5 . . . . . FUSELAGE FUEL TANKS
6 . . . . . UPPER GUNNER'S DRAWER
7 . . . . . UPPER GUNNER'S SHELF
8 . . . . . UPPER GUNNER'S BELT ASSEMBLY
9 . . . . . UPPER GUNNER'S SEAT
10 . . . . . UPPER GUNNER'S VACUUM BOTTLE
11 . . . . . CONTAINER ASSEMBLY
12 . . . . . LOWER GUNNER'S BACK REST BELT ASSEMBLY
13 . . . . . GUNNER'S MAP CASE
14 . . . . . INBOARD WING FUEL TANK
15 . . . . . WING OIL TANK
16 . . . . . OUTBOARD WING FUEL TANK
17 . . . . . PILOT'S SEAT
18 . . . . . MAP CASE AND GLOVE COMPARTMENT
19 . . . . . PILOT'S SAFETY BELT
20 . . . . . HYDRAULIC RESERVOIR
21 . . . . . HYDRAULIC ACCUMULATOR
22 . . . . . BATTERIES
23 . . . . . HEAT AND VENT SYSTEM
24 . . . . . WRIGHT CYCLONE ENGINE MODEL R-2600-23

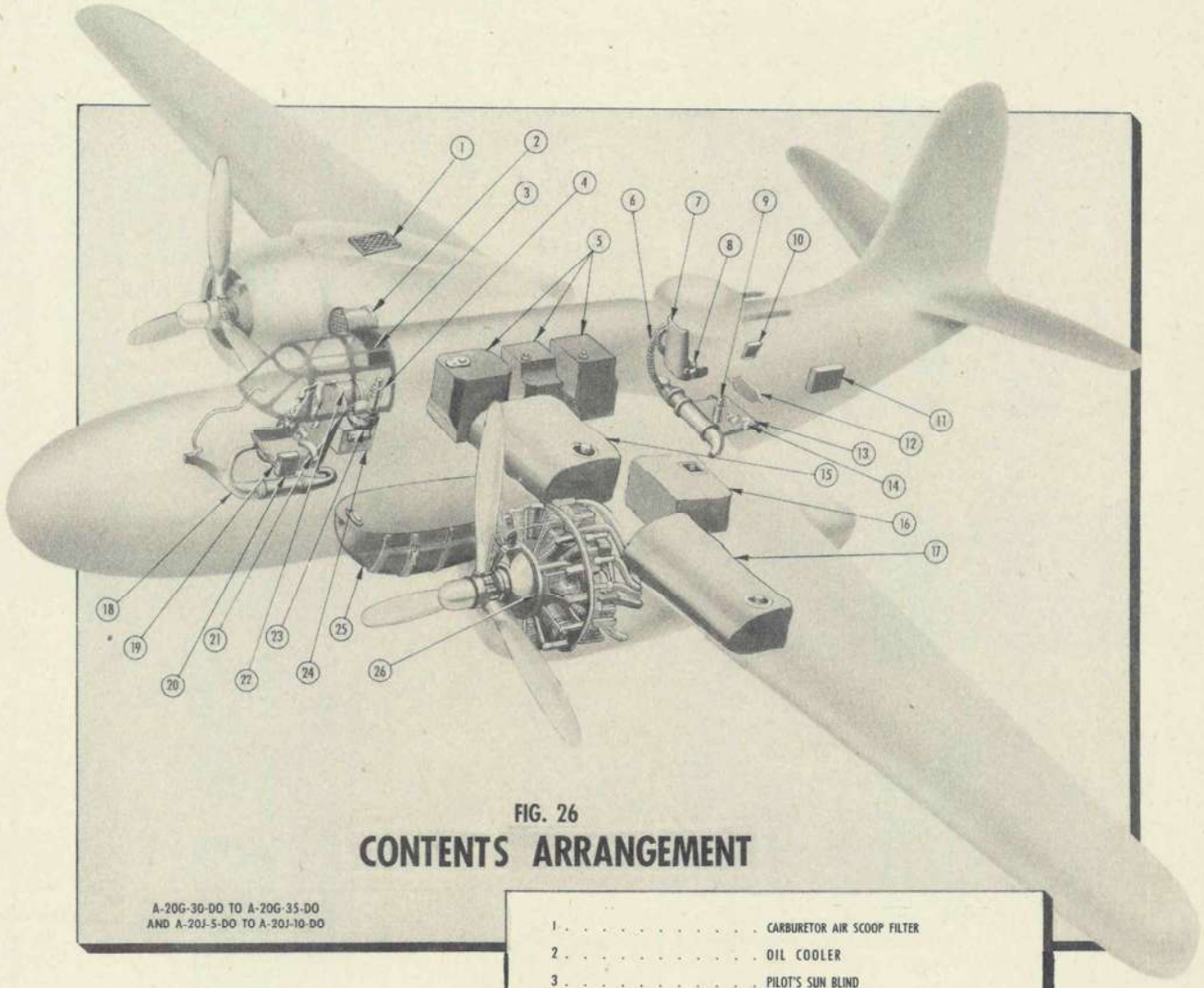


FIG. 26

CONTENTS ARRANGEMENT

A-20G-30-DO TO A-20G-35-DO
AND A-20J-5-DO TO A-20J-10-DO

1 . . . . . CARBURETOR AIR SCOOP FILTER
2 . . . . . OIL COOLER
3 . . . . . PILOT'S SUN BLIND
4 . . . . . PILOT'S VACUUM BOTTLE
5 . . . . . FUSELAGE FUEL TANKS
6 . . . . . GUNNER'S HEAT AND VENT UNIT
7 . . . . . TURRET GUNNER'S SEAT
8 . . . . . TURRET GUNNER'S BELT ASSEMBLY
9 . . . . . TURRET GUNNER'S VACUUM BOTTLE
10 . . . . . CONTAINER ASSEMBLY
11 . . . . . GUNNER'S DATA CASE
12 . . . . . LOWER GUNNER'S BACK REST BELT ASSEMBLY
13 . . . . . LOWER GUNNER'S KNEE PAD
14 . . . . . LOWER GUNNER'S BELT ASSEMBLY
15 . . . . . INBOARD WING FUEL TANK
16 . . . . . WING OIL TANK
17 . . . . . OUTBOARD WING FUEL TANK
18 . . . . . PILOT'S HEAT AND VENT UNIT
19 . . . . . PILOT'S SEAT
20 . . . . . MAP CASE AND GLOVE COMPARTMENT
21 . . . . . PILOT'S SAFETY BELT
22 . . . . . HYDRAULIC RESERVOIR
23 . . . . . HYDRAULIC ACCUMULATOR
24 . . . . . BATTERIES
25 . . . . . DROPPABLE BELLY FUEL TANK
26 . . . . . WRIGHT CYCLONE ENGINE MODEL R2600-23

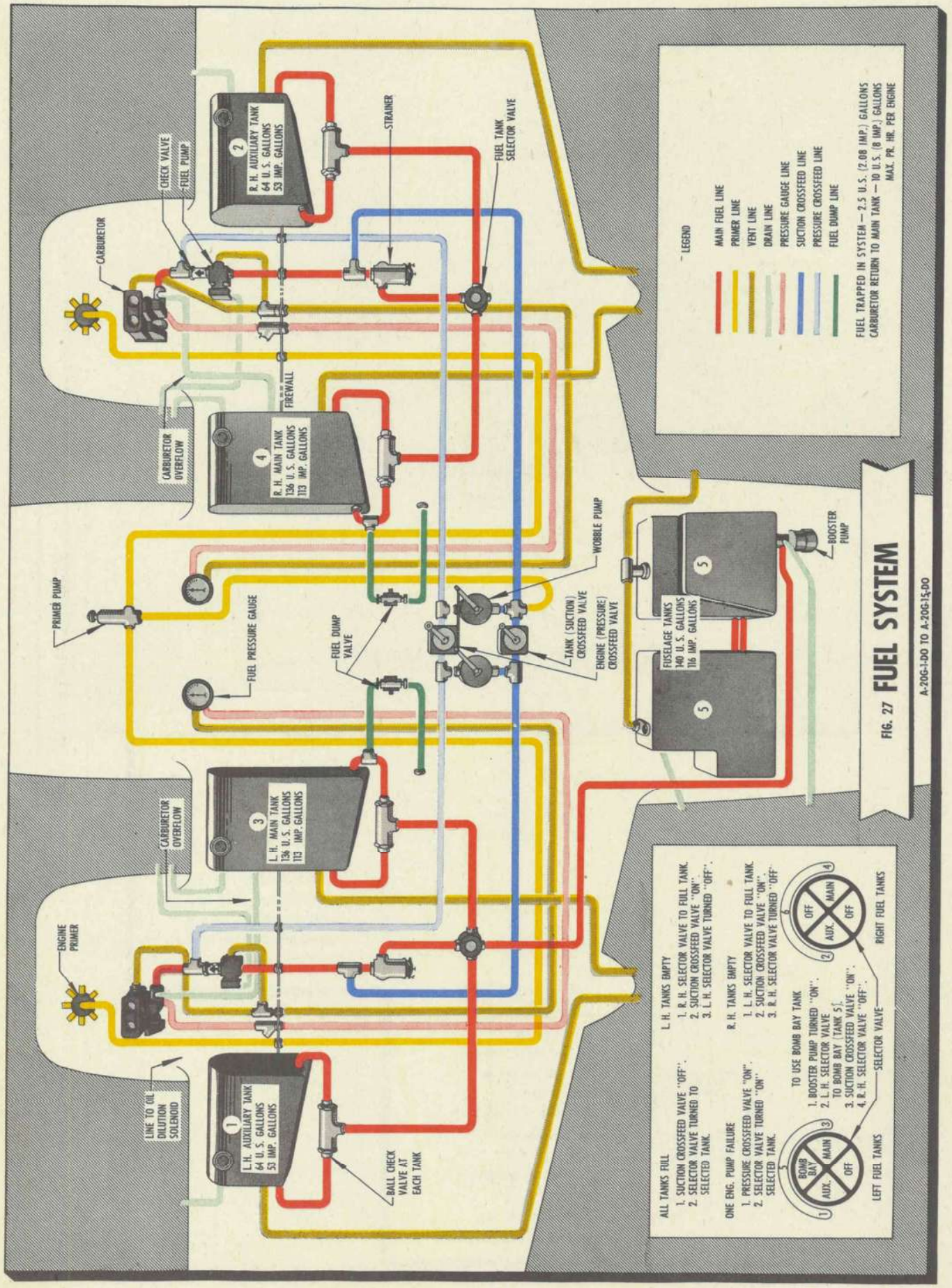


FIG. 27 FUEL SYSTEM

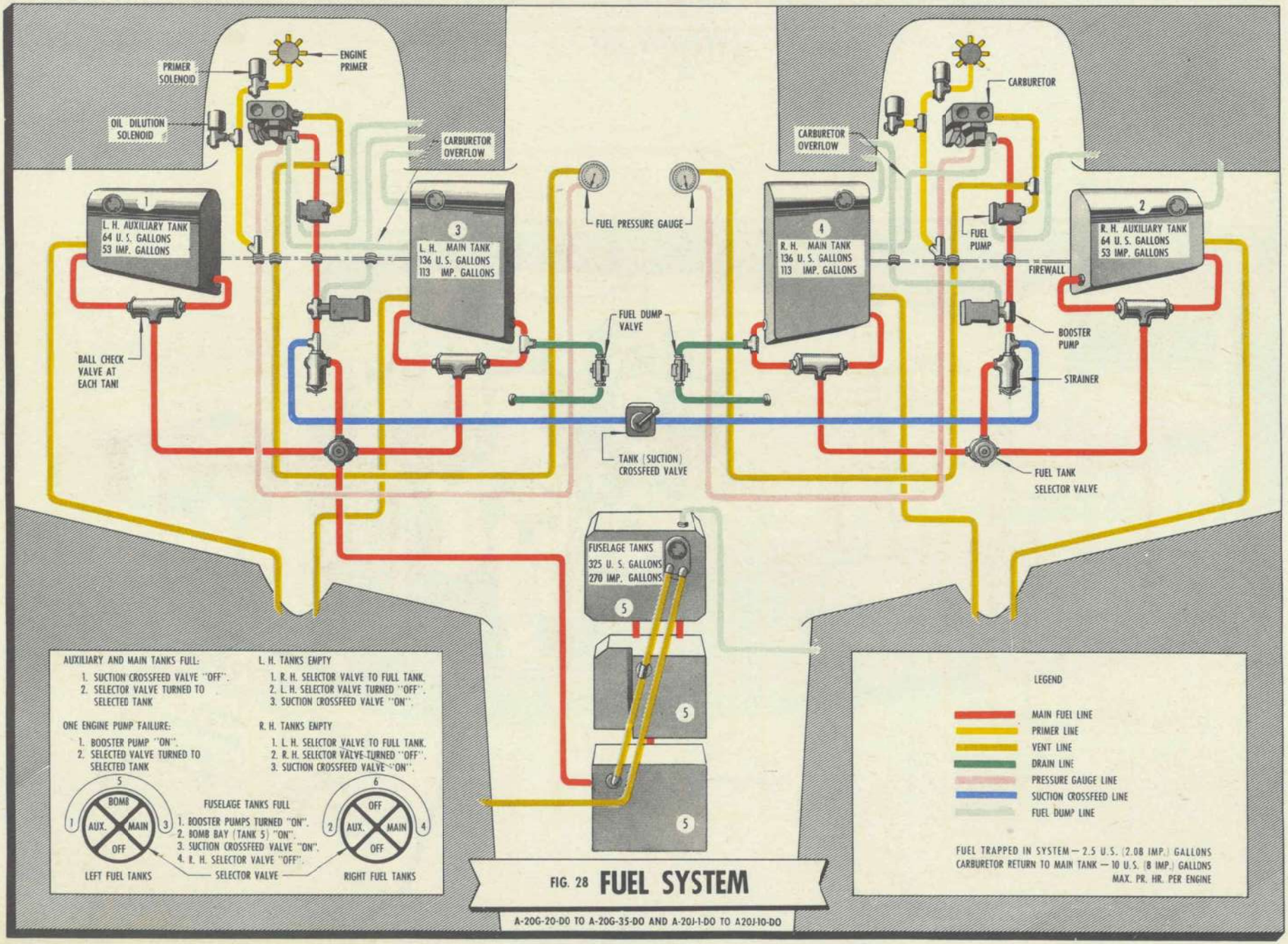


FIG. 28 **FUEL SYSTEM**

A-20G-20-DO TO A-20G-35-DO AND A-20J-1-DO TO A20J-10-DO

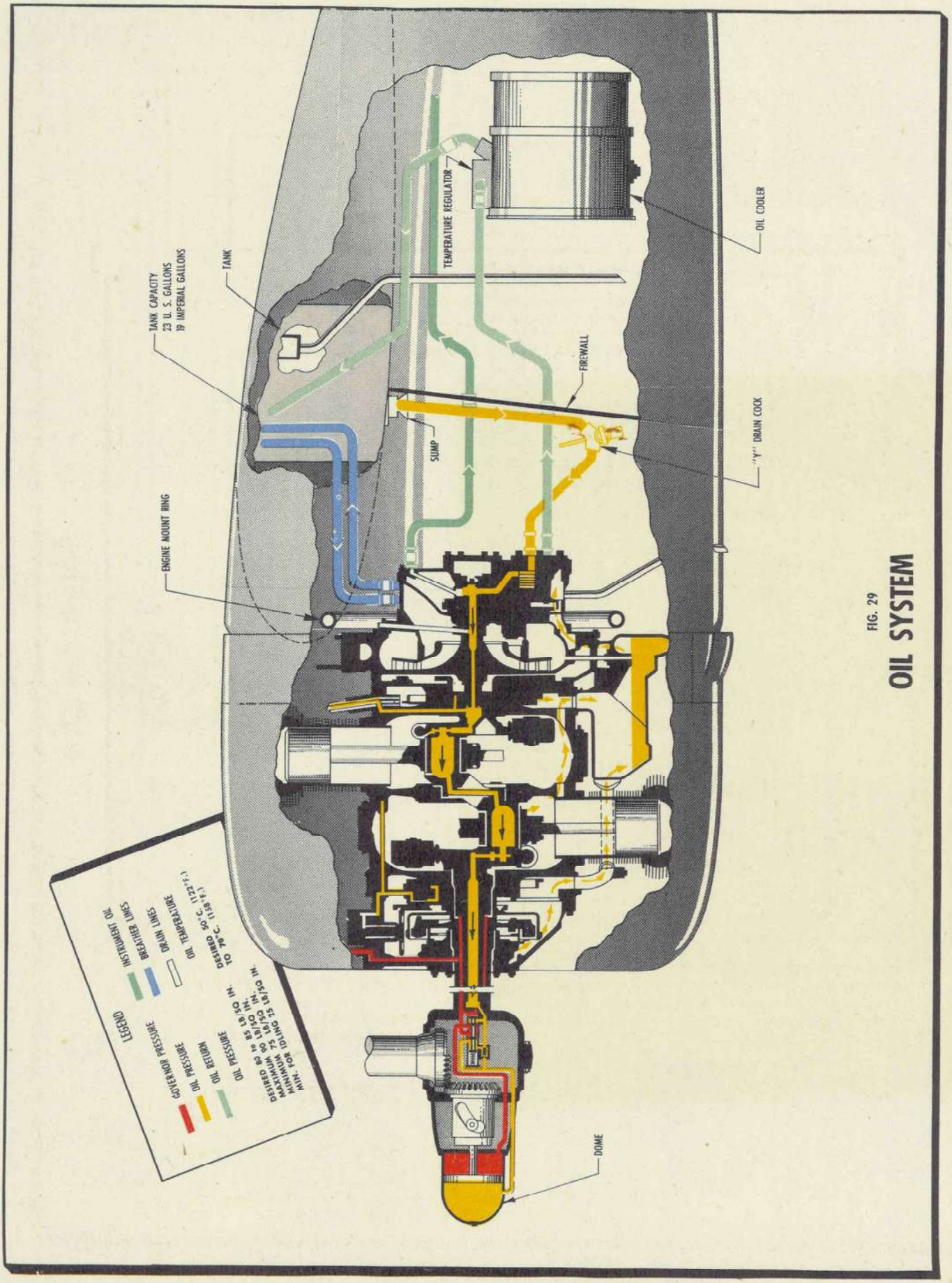


FIG. 29
OIL SYSTEM

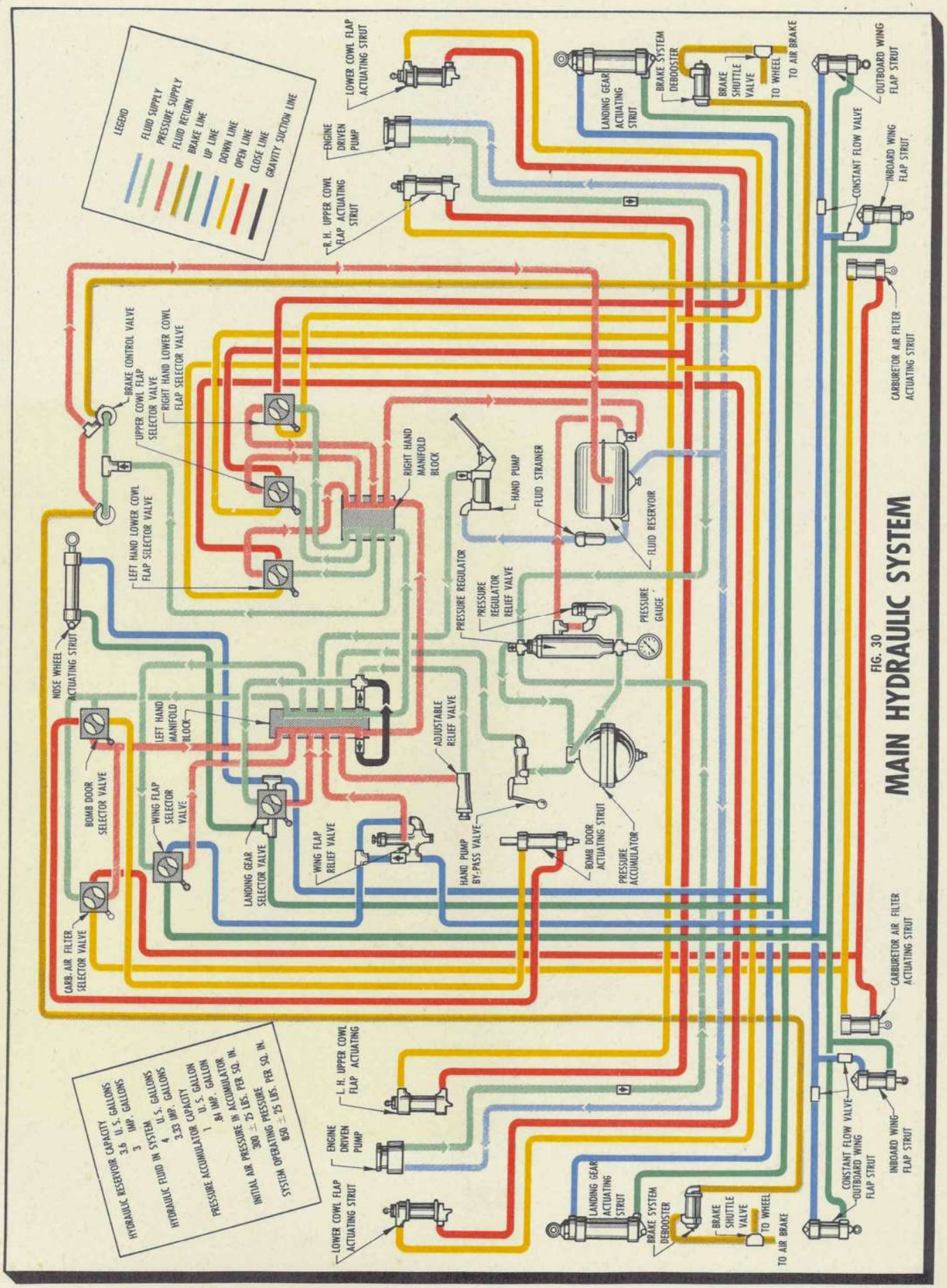


FIG. 30

MAIN HYDRAULIC SYSTEM

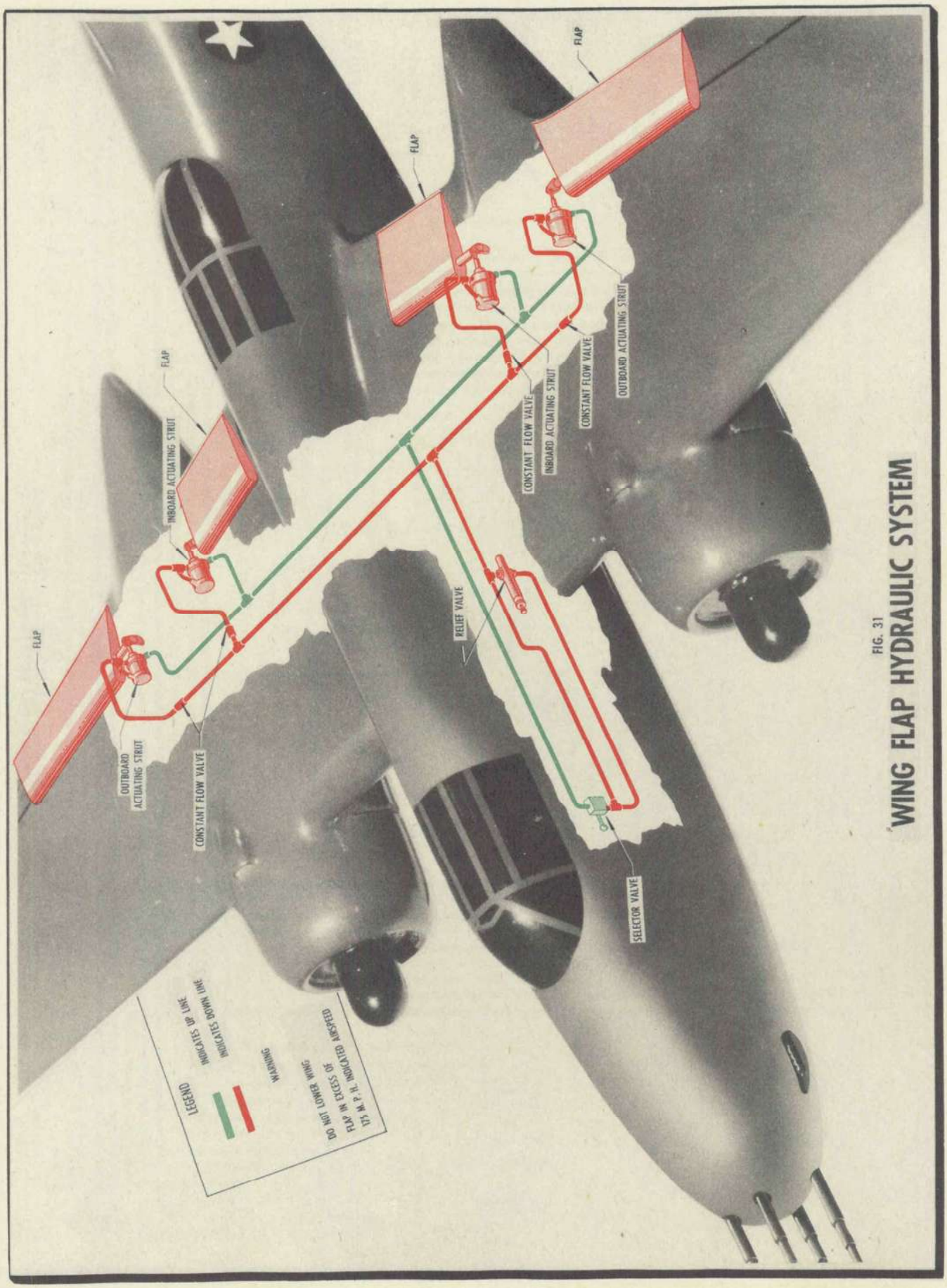


FIG. 31
WING FLAP HYDRAULIC SYSTEM

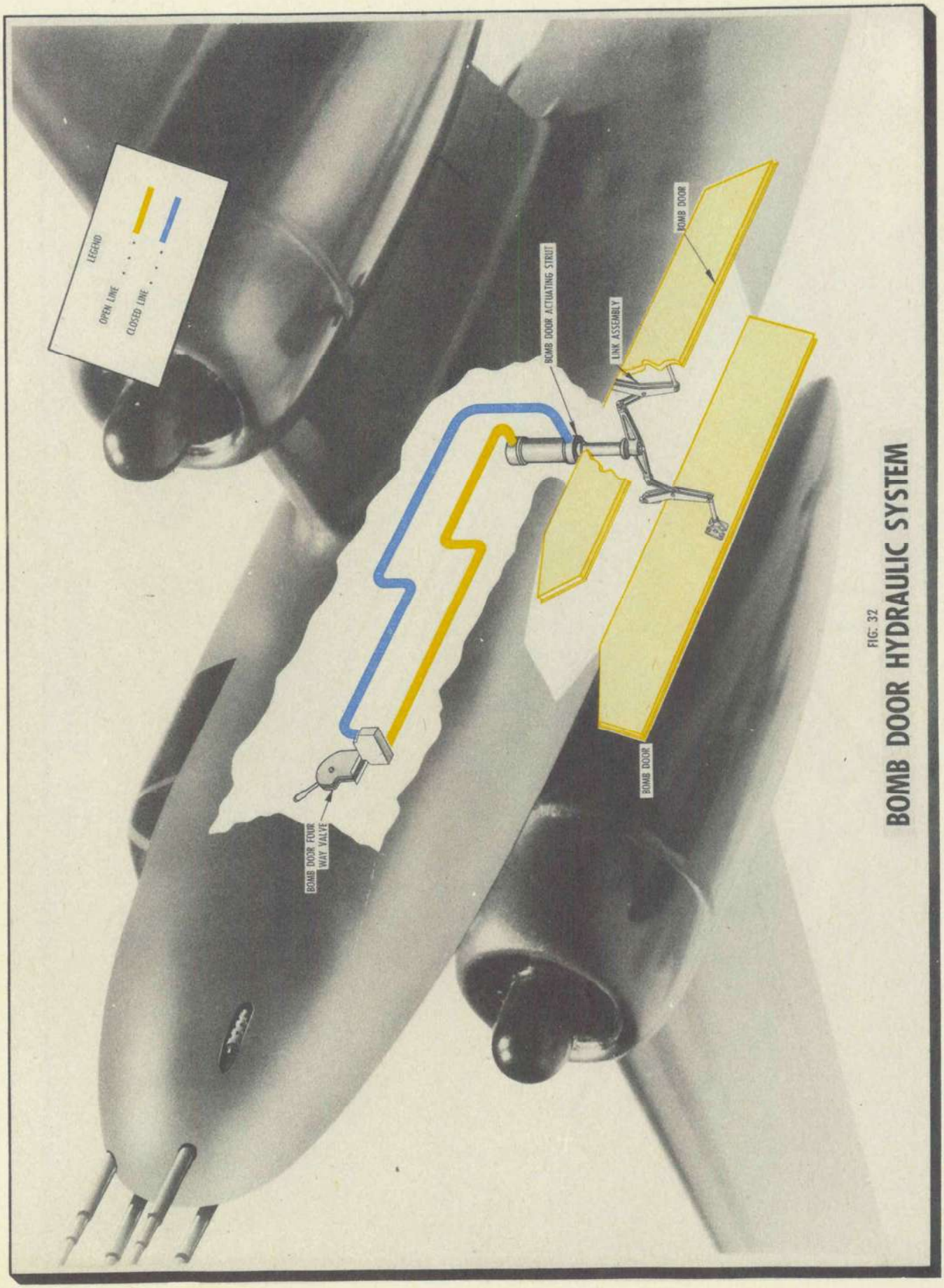


FIG. 32
BOMB DOOR HYDRAULIC SYSTEM

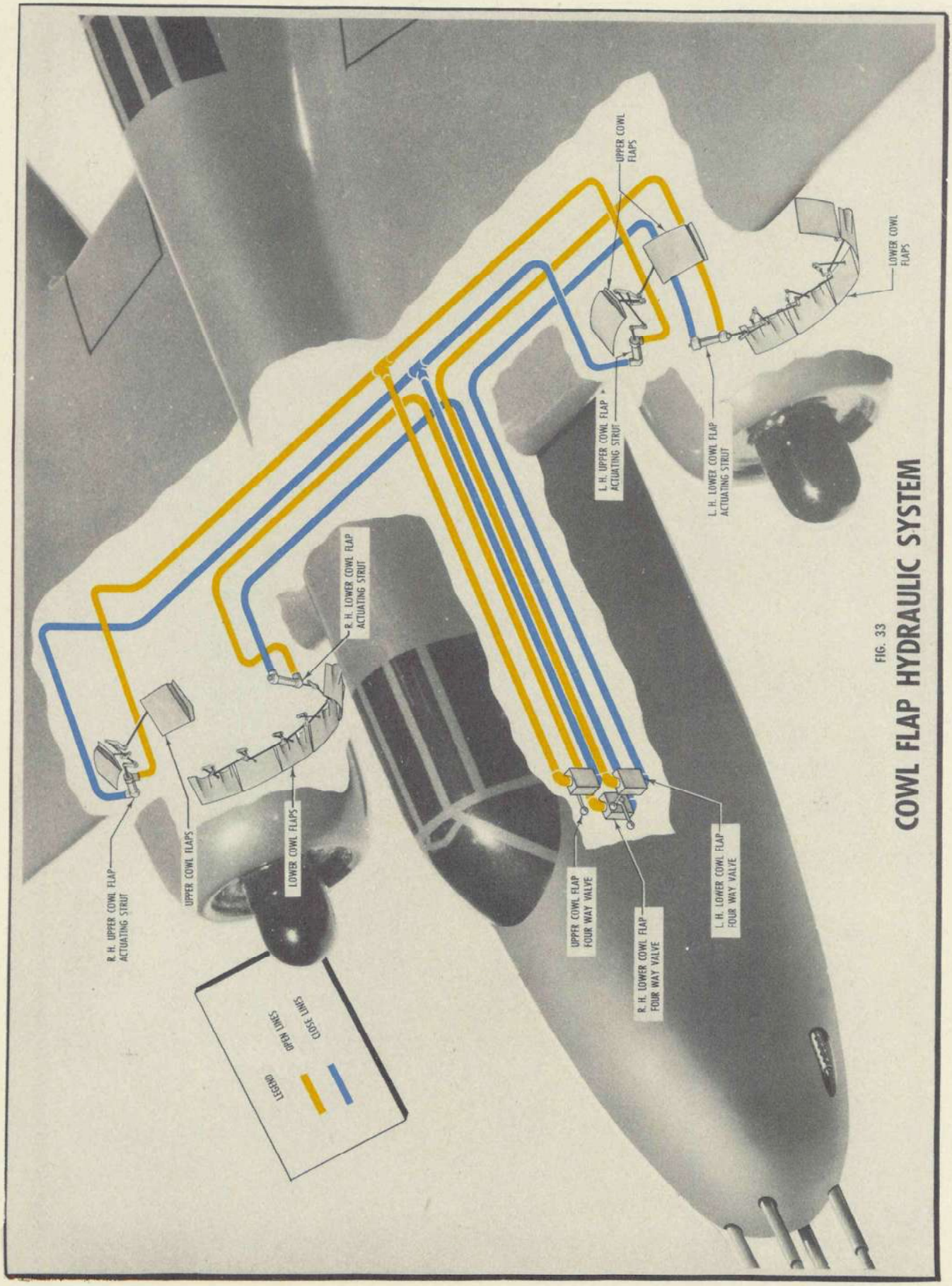


FIG. 33

COWL FLAP HYDRAULIC SYSTEM

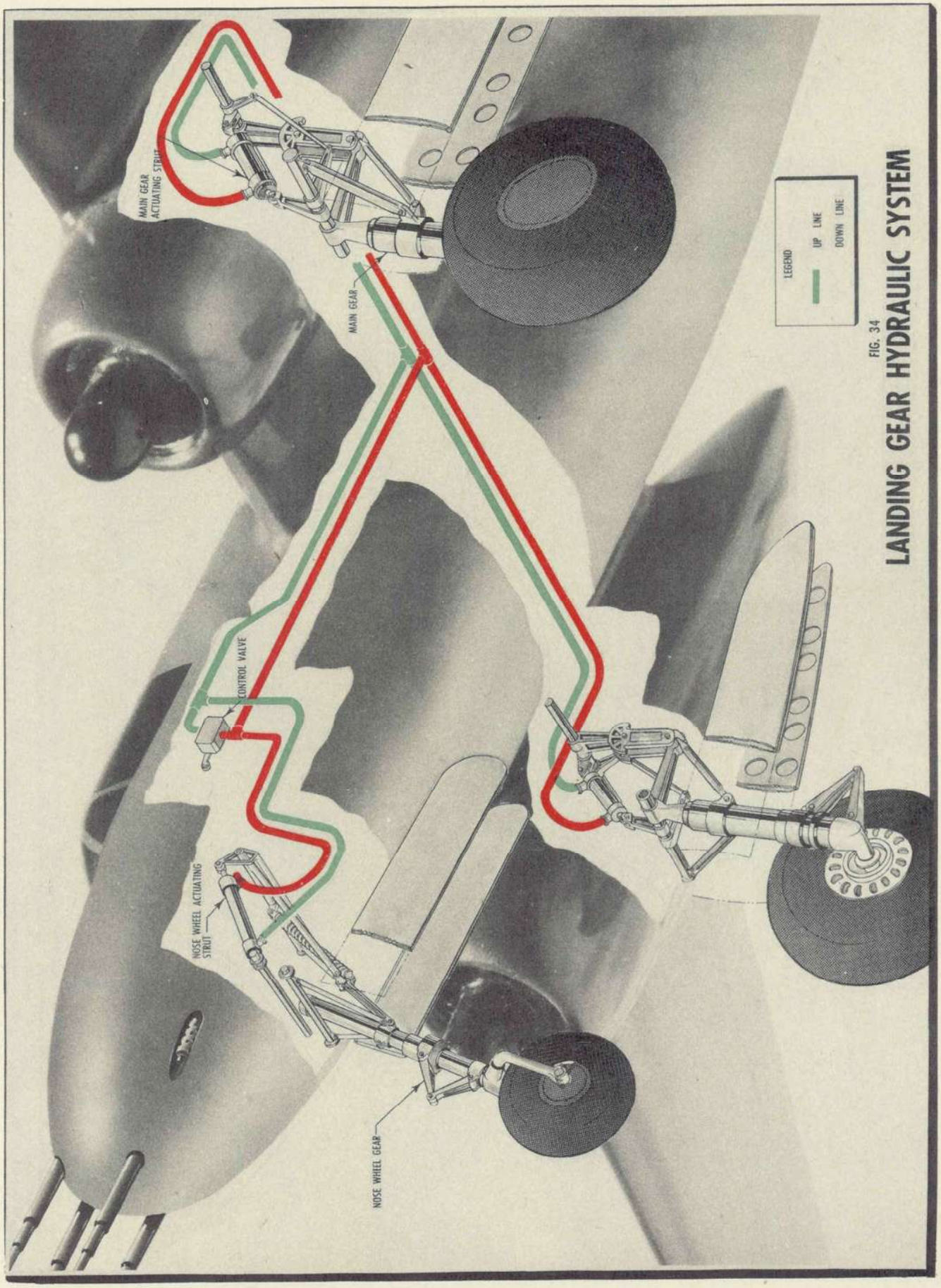


FIG. 34

LANDING GEAR HYDRAULIC SYSTEM

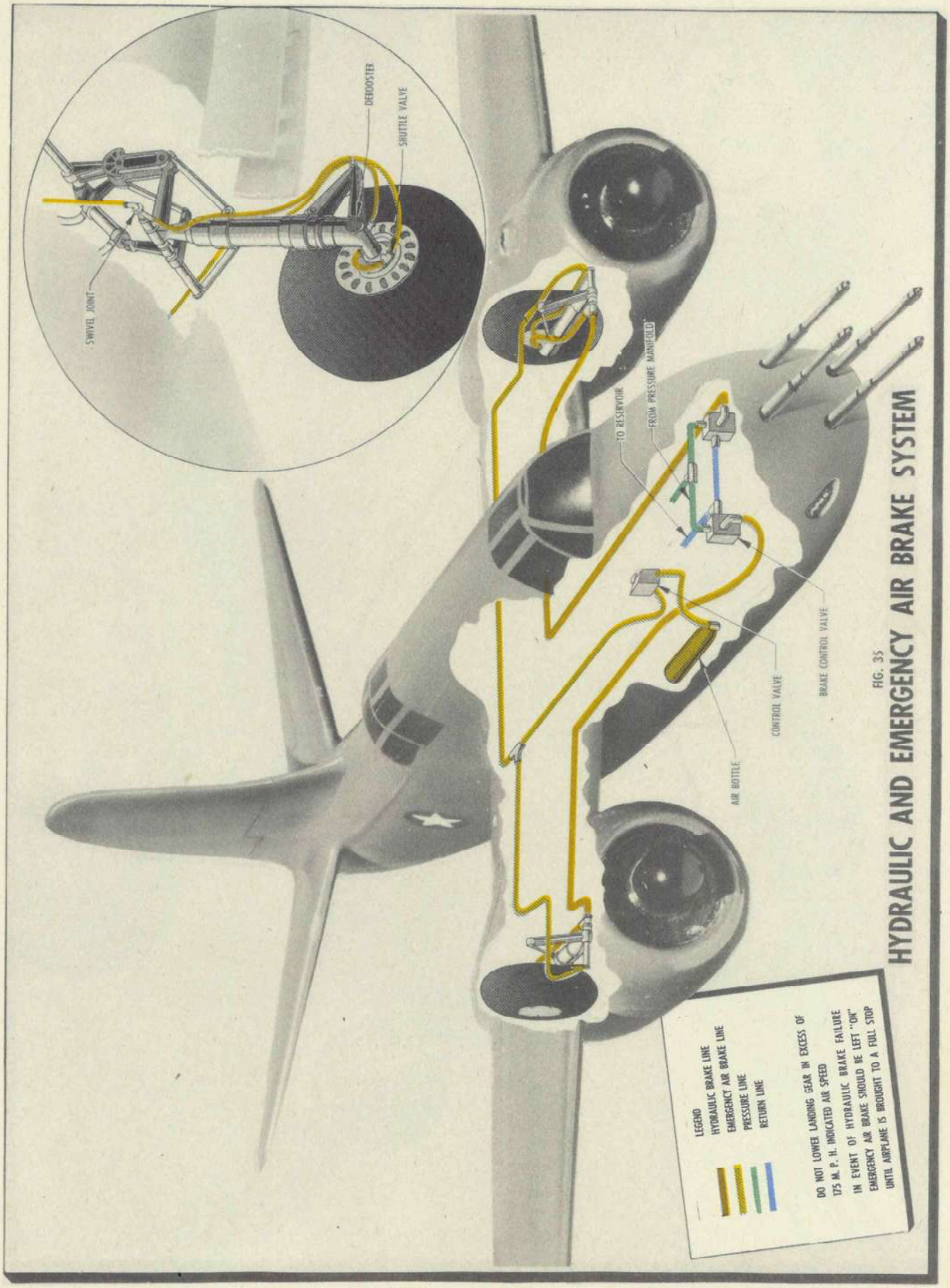


FIG. 35

HYDRAULIC AND EMERGENCY AIR BRAKE SYSTEM

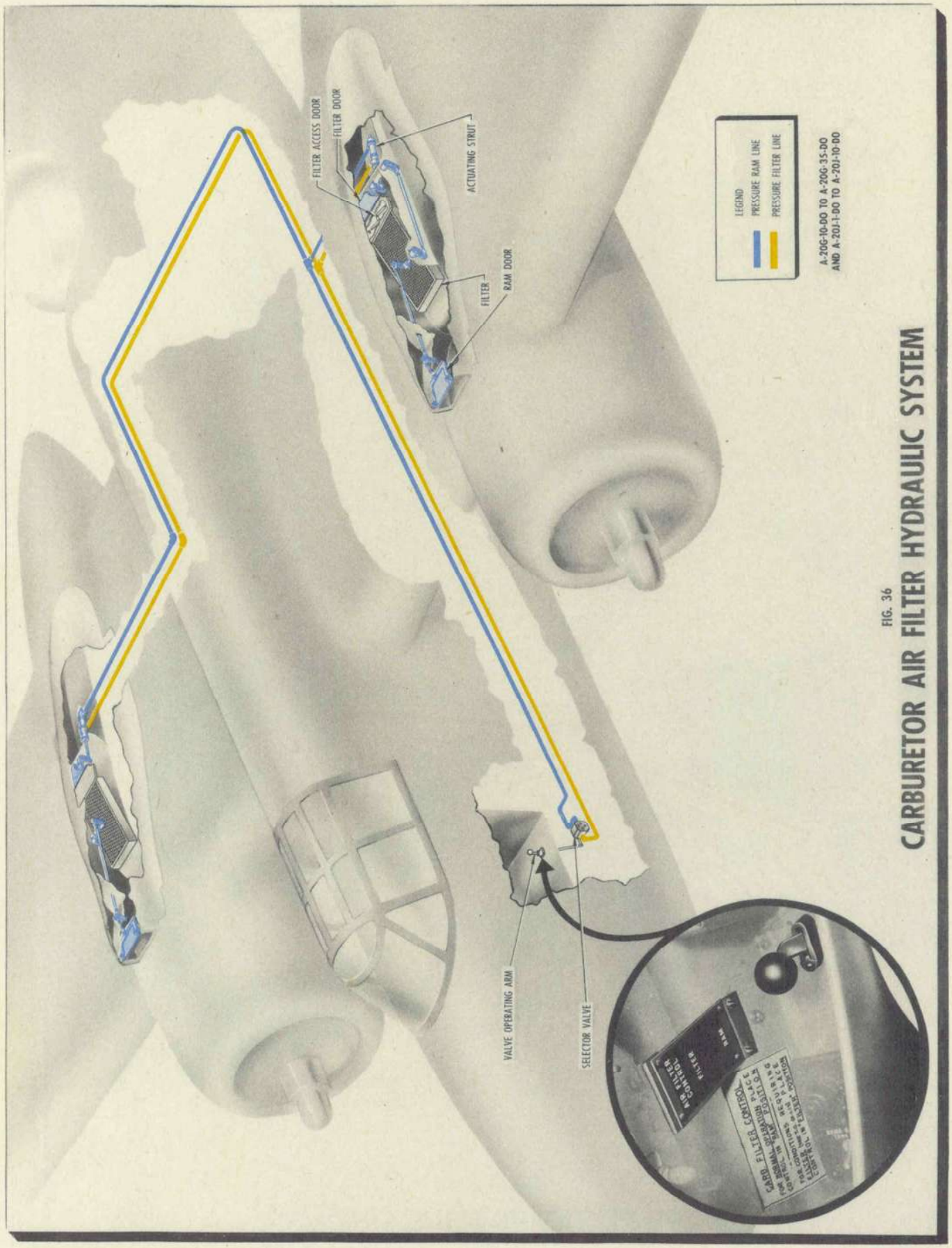


FIG. 36

CARBURETOR AIR FILTER HYDRAULIC SYSTEM

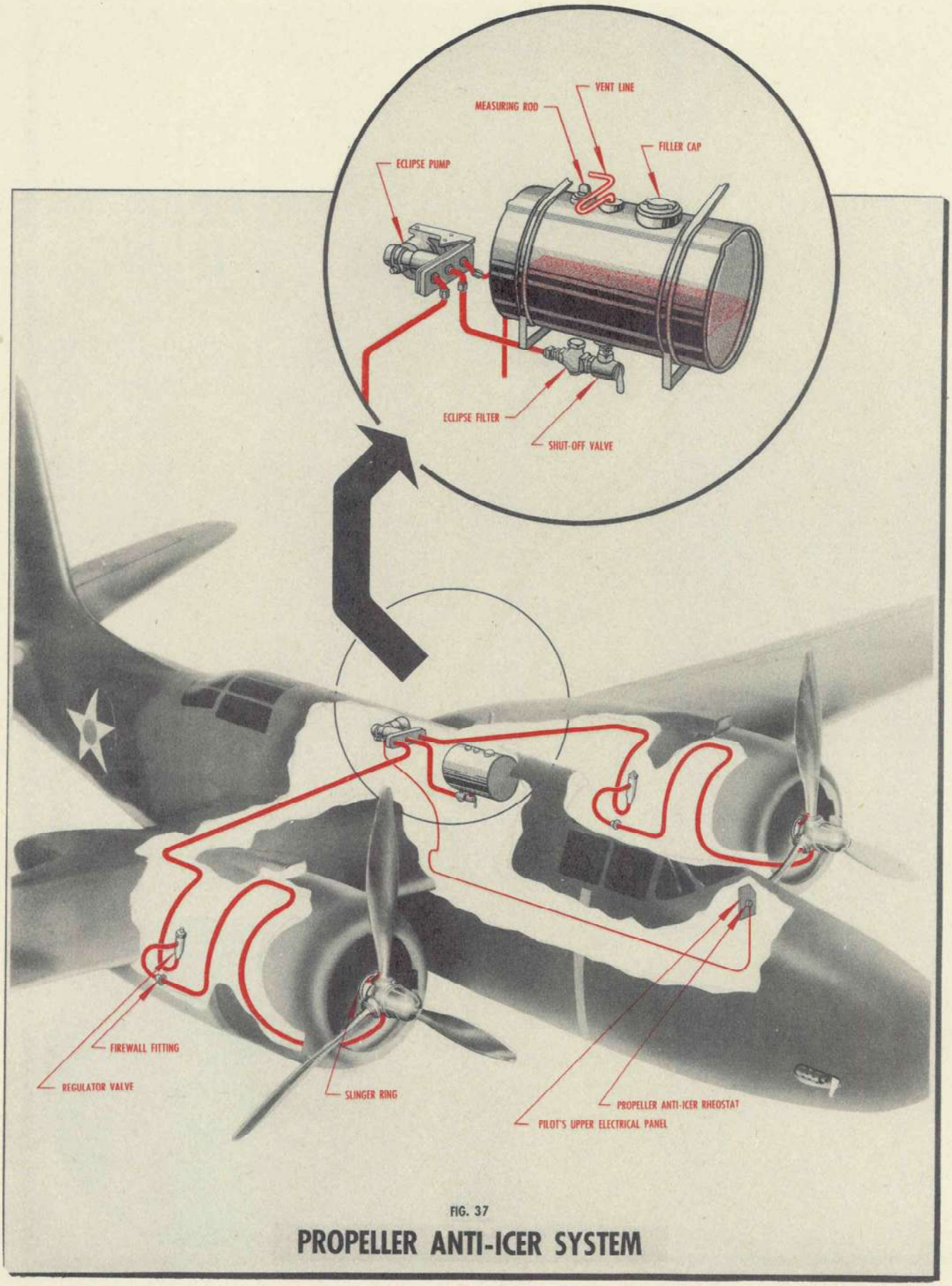


FIG. 37

PROPELLER ANTI-ICER SYSTEM

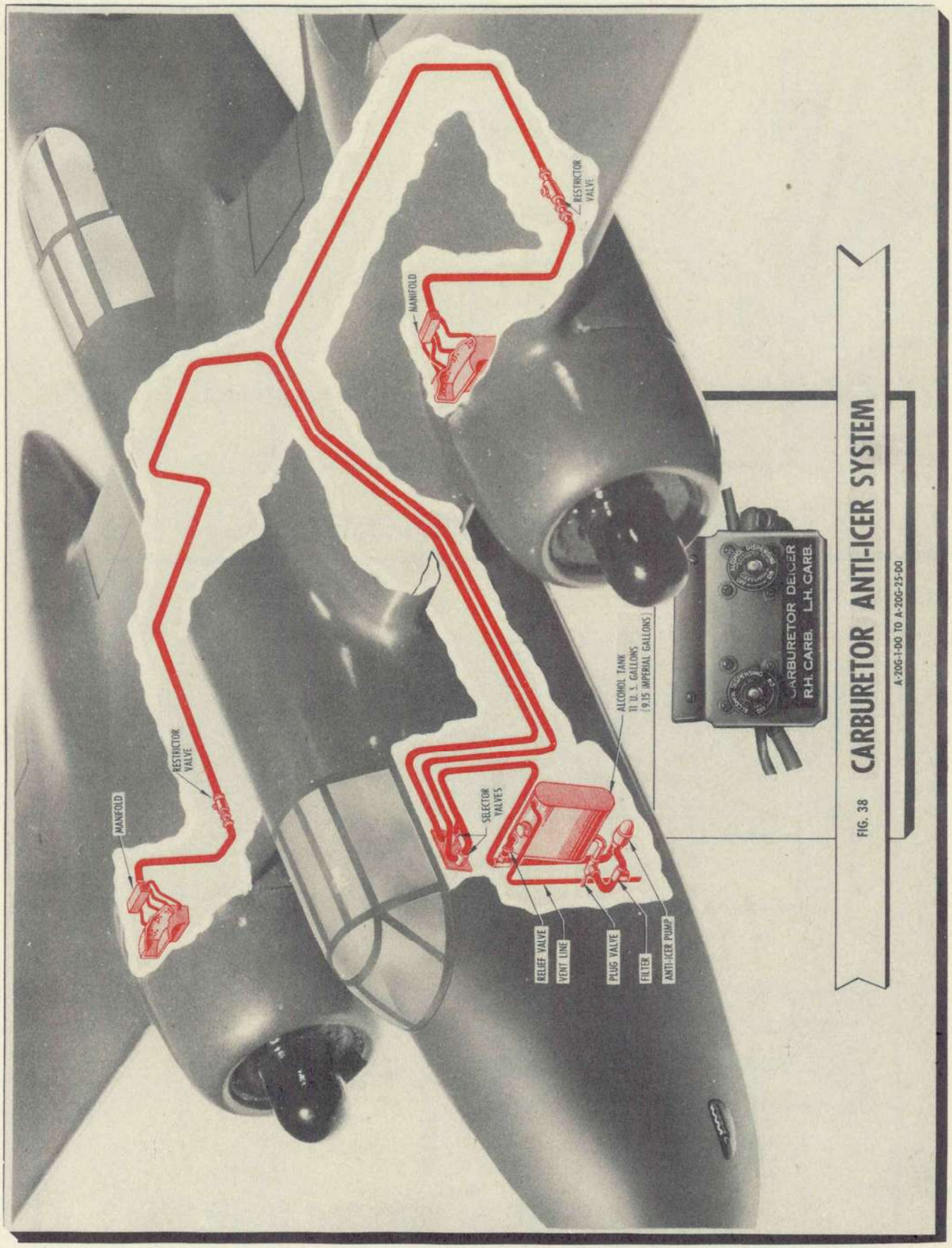


FIG. 38 CARBURETOR ANTI-ICER SYSTEM

A-20G-1-00 TO A-20G-25-00

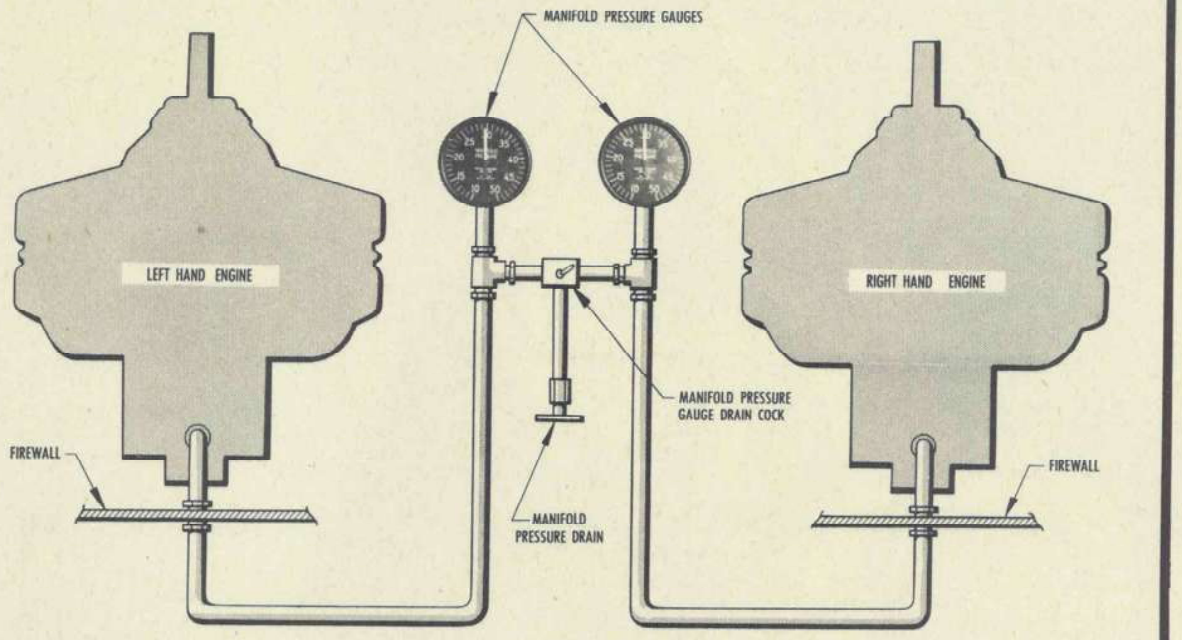


FIG. 39

MANIFOLD PRESSURE GAUGE SYSTEM

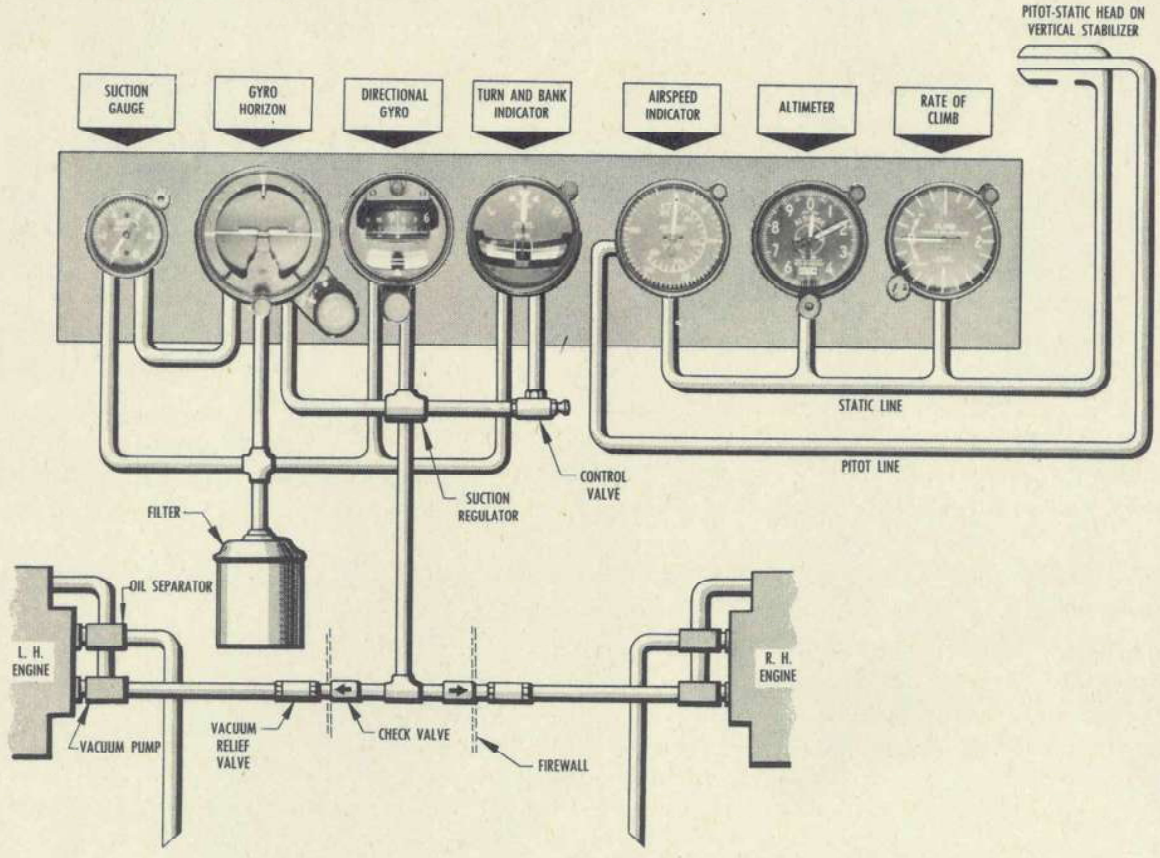
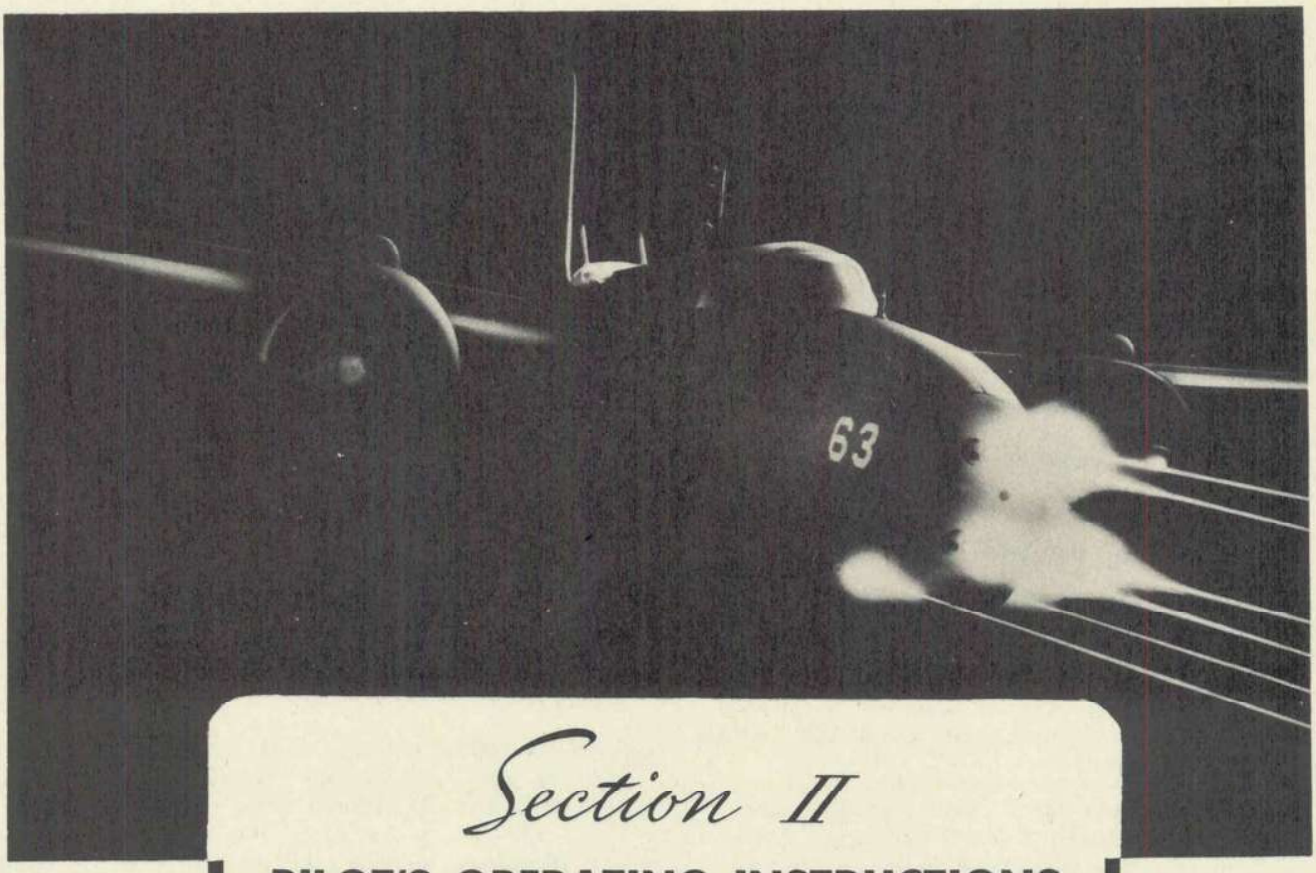


FIG. 40

PITOT AND VACUUM INSTRUMENT SYSTEM



Section II

PILOT'S OPERATING INSTRUCTIONS

1. Flight Restrictions.

a. All acrobatics are strictly prohibited.

b. Intentional spins are prohibited.

2. Before Entering Pilot's Cockpit.

a. Check the following:

(1) Nose wheel snubbing pin—engaged.

(2) See that nose wheel mechanical release cable is attached to mechanism with clevis pin.

(3) Wheels—chocked.

(4) Visually check contents of fuel and oil tanks.

(5) Visually inspect nacelle engine section for fuel leaks.

3. On Entering Pilot's Cockpit.

a. Standard Check for all Flights.

(1) Surface control straps—removed.

(2) Switch "ON" generator switch in gunner's compartment.

(3) Ignition—"OFF."

(4) Landing gear hydraulic control "DOWN."

(5) Master battery switch—"ON."

(6) Landing gear indicator (green) light—"ON."

Note If the green indicator light is on, and hydraulic pressure is assured, have the main landing gear safety pins and the nose wheel safety clamp removed.

(7) Parking brake—engaged.

(8) Carburetor air filter—"RAM" *(airplanes A-20G-10-DO to A-20G-35-DO and A-20J-1DO to A-20J-10-DO).*

(9) Check controls for free and full movement.

(10) Wing flaps—"UP."

Note Before starting engine, make sure that ground fire extinguisher is available.

(11) Check rudder pedal adjustments.

b. Special Checks for Night Flying.

(1) Compass light switch—"ON."

(2) Cockpit light switch—"ON."

(3) Adjust rheostats for compass light, engine instrument lights, and flight instrument lights so that all instruments can be easily read.

(4) Navigation lights switch—"ON."

(5) Extend landing lights and test their operation. Use landing lights only as necessary, to conserve bulb life and to avoid heavy current load on the battery when the engines are not running. Retract the landing lights as soon as climb has been established and ground contact is lost.

(6) Test operation of the identification lights.

4. Starting Engine.

a. Cockpit hood and enclosures—secured.

b. Start right engine first. With ignition switches "OFF," have propeller pulled through at least nine blades.

c. Set right fuel tank selector to "4—MAIN." Set left fuel tank selector to "3—MAIN" when starting left engine.

Note To avoid overpriming while starting the first engine, keep the fuel tank selector for the other engine in the "OFF" position.

d. Cross-feed—"OFF."

e. Supercharger—"LOW."

f. Carburetor air temperature—"COLD."

Note The engine should never be started with the carburetor air temperature controls in the "HOT" position. Serious damage and fire may result from a backfire. During icing conditions, start the engine in the "COLD" position, then move the control to "HOT."

CAUTION On *airplanes A-20G-30-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO*, see that airscoop control is in the "RAM" position.

g. Upper and lower cowl flaps—"OPEN."

Note If there is no hydraulic system pressure, operate the hydraulic hand pump until cowl flaps are open, then return control to "NEUTRAL." Before operating the hand pump, make certain that all other hydraulic controls are in "NEUTRAL," except the landing gear control which should be left in the "DOWN" position. Oil cooler flaps will open with the lower cowl flaps.

h. Propeller—"INCREASE RPM."

i. Throttle—¼ "OPEN."

j. Mixture—"IDLE CUT-OFF."

k. Ignition—"BOTH."

l. Booster pump—"ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO)*

or

Maintain fuel pressure at 8 to 10 pounds per square inch with wobble pump *(airplanes A-20G-1-DO to A-20G-15-DO)*.

m. If engine is cold, pump primer three to five strokes and lock primer "OFF" *(airplanes A-20G-1-DO to A-20G-15-DO)*

or

If engine is cold, use electric primer. Hold down momentarily to avoid flooding *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO)*.

CAUTION Do not prime an engine that is warm from previous running (15°C. or 60°F., or above).

n. Starter energizing switch—"ON." (Approximately 30 seconds; or until starter flywheel is brought up to full speed.)

o. When starter comes up to speed, mesh switch "ON." (Do not depress mesh switch longer than 45 seconds.)

p. Mixture—"AUTO RICH."

q. If engine does not fire after 30 seconds, discontinue fuel pressure and return mixture control to "IDLE CUT-OFF." If flooding is indicated by a discharge of fuel from the blower drain, clear engine out by turning it through several revolutions (throttle open). If engine starts during clearing, immediately move the mixture control to "AUTO RICH," closing the throttle to ¼ "OPEN." If engine does not start, repeat the original procedure.

Note If the engine does not start within the above time, shut

down and allow starter to cool for three minutes.

r. Idle engine at 800 rpm. If oil pressure does not come up to at least 40 pounds per square inch within one-half minute after starting, stop engine and investigate.

s. After oil pressure comes up, increase engine speed to 1100-1200 rpm.

t. Note hydraulic pressure, lower and raise wing flaps, and return control lever to "NEUTRAL." After operation, the hydraulic pressure should recover to 850 ± 25 pounds per square inch, indicating that the right engine hydraulic pump is operating properly.

u. Follow the same procedure to start the L.H. engine.

v. Booster pump—"OFF" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

Note The above operation will check satisfactory operation of engine-driven fuel pump during engine check.

w. Set altimeter (standard atmosphere sea level pressure) for field.

x. Gyro horizon—"UNCAGED."

y. Set directional gyro, and uncage.

5. Engine Warm-Up.—Run engine at 1100-1200 rpm until the oil temperature is at least 55°C. (131°F.).

6. Engine and Accessories Ground Test.

a. Check propeller controls.

Note With engine speed at 1500 rpm, move propeller controls toward "DECREASE RPM" until a drop in rpm is shown, then return control to "INCREASE RPM." Minimum governing rpm is 1200.

b. Check supercharger.

Note With propeller controls in "INCREASE RPM," open throttle to 1700 rpm, move supercharger control to "HIGH" position, then open the throttle sufficiently to obtain not over 30 inches Hg. manifold pressure. When the engine speed has stabilized, observe the manifold pressure and shift the supercharger to "LOW" without moving throttle. A sudden decrease in manifold pressure is an indication that the two-speed supercharger is operating properly. When changing the supercharger ratios, the control should be moved quickly, without pausing, between one extreme of the control position and the other.

c. Check magnetos by momentarily switching from "BOTH" magnetos to one. The normal drop-off is 50 to 70 rpm and should not exceed 100 rpm.

CAUTION Do not run at high manifold pressures longer than is necessary. Cooling of the cylinder heads, barrels, and ignition harness is insufficient for prolonged periods on the ground above 1400 rpm and should be avoided. Stationary engine running should be made with the airplane headed into the wind to aid cooling. Do not exceed 232°C. (450°F.) cylinder head temperatures.

d. Open throttle to 30 inches Hg. manifold pressure; check all engine instruments:

Oil pressure—80 to 85 pounds per square inch.

Oil temperature—50° to 70°C. (122° to 158° F.).

Note A drop in oil pressure when the throttle is open indicates that further warming up is required.

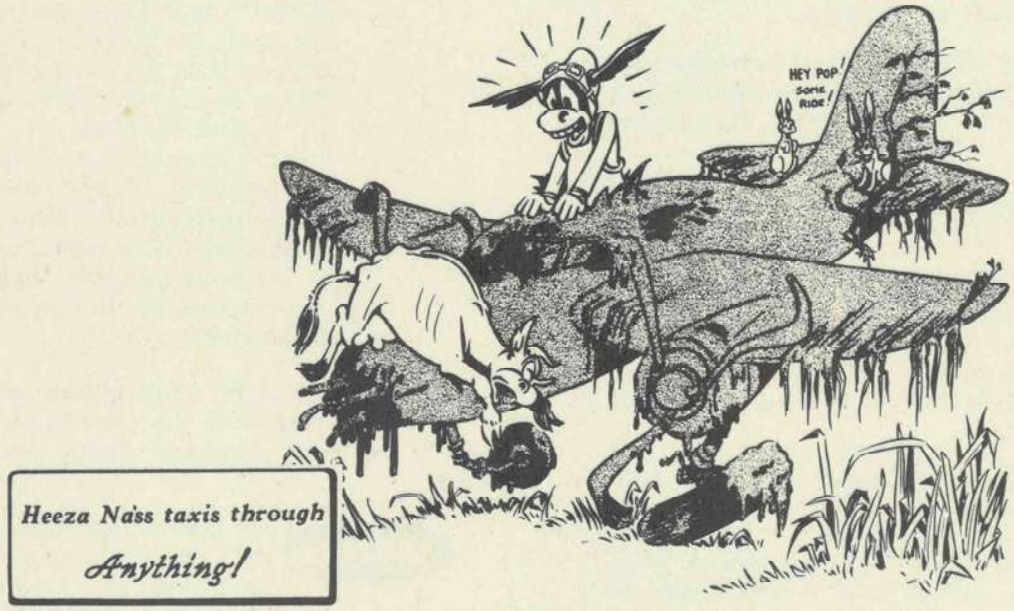
Fuel pressures:

Desired—15 to 16 pounds per square inch.
Maximum—16 pounds per square inch.
Idling—12 to 16 pounds per square inch.
Minimum—12 pounds per square inch.

e. Pitot head heater—"ON" (if icing conditions prevail).

f. Make sure that cockpit hood and enclosures are secured.

g. Fuselage step—retracted.



7. Taxiing Instructions.

a. Before taxiing out, remove landing gear safety clamps. Make sure that the snubbing pin on the nose wheel is seated.

CAUTION Destructive nose wheel shimmy will result if snubbing pin is not seated.

b. Rolling motion is an absolute necessity before the nose wheel will caster. With even power applied to both engines, the brakes are released and the roll begun. Changing direction may then be done by differential braking. Abrupt and sharp turns will cause uneven tire wear if the turn is attempted beyond the limitations of the nose wheel turning limits.

CAUTION Do not attempt sharp turns.

c. Once the airplane has begun to roll on level ground, it can be stopped only by wheel braking. The thrust of the idling propeller is sufficient to overcome rolling friction. Proper and adequate braking is necessary. A pilot should have a thorough understanding of the hydraulic system and emergency air brakes in case line and pump fail.

d. Forward speed should be held to a minimum over soft, rough terrain. With the sinking of the nose wheel, the nose wheel digs in, tending to increase the nose load and subject the nose wheel strut to undue loads. Avoid field obstructions such as rocks, boards, or ditches. Forward loads may be minimized by full-up elevators and minimum braking. The pilot's attention, therefore, should be focused on the terrain to be traversed by the nose wheel.

e. The taxiing speed is limited only to the precautions noted above. When the speed is increased, nose wheel action and control are stabilized, and ground looping is impossible. After the forward roll has been started, normal methods of directional control are present, and the taxiing direction is left open for the use of the rudder, differential engines, brakes, or a combination of the three. Use the first two wherever possible to minimize wear on the brakes and tires.

f. To stop rolling, apply the brakes evenly. The slower the rolling speed, the greater the turning ability of the airplane. As the airplane approaches a standstill, reduce braking gradually to lessen nose pitching.

8. Take-Off.

a. Preflight.

(1) Trim tabs—"ZERO."

Note Set elevator trim tab at "ZERO" or as center of gravity position and experience warrant.

(2) Mixture—"AUTO RICH."

(3) Propellers—"INCREASE RPM."

(4) Supercharger—"LOW."

(5) Carburetor air—"COLD."

(6) Cross-feed valves: Engine pressure cross-feed—"ON" *(airplanes A-20G-1-DO to A-20G-15-DO);* tank suction cross-feed—"OFF" *(airplanes A-20G-1-DO to A-20G-35DO and A-20J-1-DO to A-20J-10-DO).*

(7) Booster pump—"ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(8) Fuel tank selectors—"MAIN" (tanks 3 and 4).

(9) Upper cowl flaps—"CLOSED" (return control to "NEUTRAL").

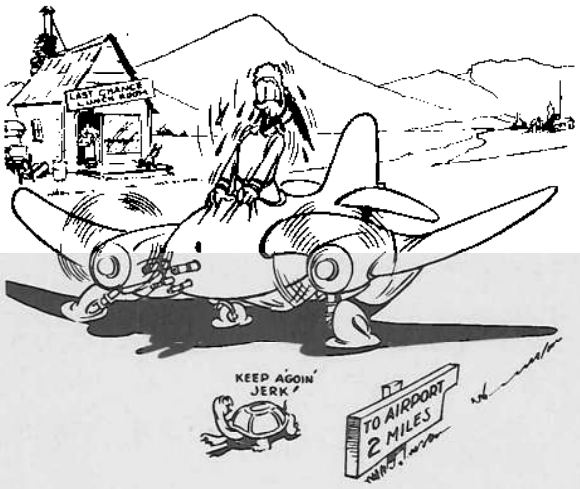
Note If upper cowl flaps are left "OPEN," take-off run will be increased and severe buffeting will be experienced.

(10) Lower cowl flaps—oil cooler flaps—"OPEN" (return control to "NEUTRAL").

(11) Wing flaps—half "DOWN" (22½ degrees).

Note Under all conditions, it is advisable to take off with the wing flaps in the half "DOWN" position (22½ degrees).

b. **Take-Off.**—Refer to Take-Off, Climb, and Landing Charts, Section III, for take-off distances at various gross weights and conditions.



Heeza Nass tries to take off an overloaded plane!

c. Take-Off—Notes to be Observed by Pilot.

(1) Taxi the airplane to take-off position and stop. Allow the airplane to roll forward a few feet in the direction of the take-off, to insure that the nose wheel is also headed in this direction. If this is not done, braking will be necessary when the take-off roll is commenced, and the take-off distance will be increased. As the airplane increases speed (100 to 110 miles per hour), raise the nose wheel clear of the ground by pulling back on control column. On rough terrain, lessen loads on nose wheel with "up" elevator.

Note For the first part of the roll, direction of elevator movement is exactly opposite to that of airplanes equipped with a tail wheel. Considerable "up" elevator is required during the first part of the roll if the nose wheel is to be cleared of the ground and if the angle of attack of the wings is to be increased. The airplane is normally rolling with its wings at nearly zero angle. Center of gravity and center of lift are ahead of the main wheels. Therefore, smaller elevator angles are necessary as the main wheel ground load is reduced and the wing load increased with speed. When the wheels are raised after take-off, some "down" elevator movement is required to overcome change in center of gravity as the wheels move aft to "RETRACT" position.

(2) At an indicated airspeed of 100 to 110 mph, ease the control column back and raise the nose wheel. Allow the airplane to accelerate before starting the climb. This will insure control if one of the engines fails. An indicated airspeed of 165 mph is suggested to obtain satisfactory cooling (under extreme heat conditions) and rate of climb for all conditions. Under optimum conditions, the A-20G airplane may be controlled on single engine at 135 mph (military rated power)—128 mph (minimum power).

Heeza Nass raised his landing gear before flying speed was assured!

(3) To improve the take-off distance, hold the airplane against the brakes until 30 inches Hg. manifold pressure has been reached. Open the throttles as the brakes are released.

(4) Take-off manifold pressure should be 45 inches Hg. (5 minutes only).

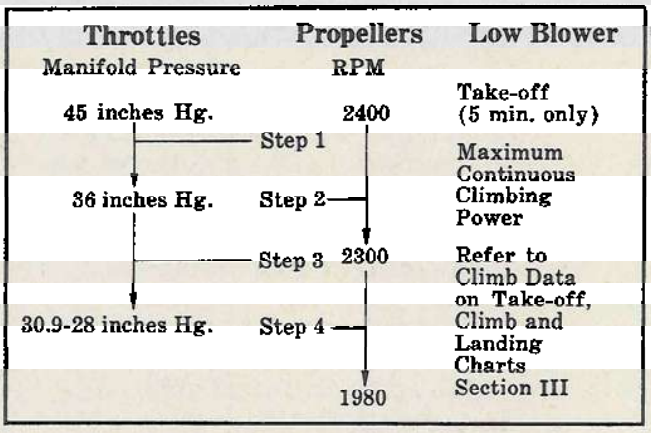
(5) Take-off rpm should not exceed 2400 rpm (5 minutes only).

(6) As soon as the airplane has left the ground and attained climbing speed, do the following:

(a) Raise landing gear. (When up, return control to "NEUTRAL.")

Note As the landing gear retracts, the airplane becomes tail heavy.

(b) Reduce power as follows and in accordance with the arrows:



(c) Check cylinder head temperatures, oil pressure, oil temperature, and fuel pressure by the Specific Engine Flight Chart, Section III. With the control in the "COLD" position, the carburetor air temperature should be slightly above outside air temperatures.

(d) Adjust lower cowl flaps—oil cooler flaps to obtain desired cylinder head and oil temperatures.

(e) Hydraulic controls should be in "NEUTRAL," except when operation is necessary.

(f) Engine pressure cross-feed—"OFF" *(airplanes A-20G-1-DO to A-20G-15-DO).*

(g) Booster pumps—"OFF" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

Note Shut booster pumps "OFF" one at a time. During climbs and in flight, use booster pumps (wobble pump) whenever the engine-driven pumps fail to supply adequate fuel pressure.

9. **One-Engine Failure During Take-Off.**—If an engine fails during take-off, and the field can no longer be used, proceed as follows:

a. Refer to Par. 7, c, (2), preceding, for single-engine operating speed.

b. Insure that the landing gear is up or coming up.

c. Apply sufficient rudder tab to hold airplane straight.

d. Adjust throttle setting of good engine.

Note At normal loads, this airplane will climb satisfactorily on one engine at 36 inches Hg. manifold pressure at approximately 140 mph indicated airspeed at 2300 rpm.

e. Determine cause of failure. If no longer usable, feather propeller of dead engine by emergency procedure as follows:

(1) Push feathering switch button and close throttle. (Closing throttle sounds landing gear warning horn.)

(2) Fuel tank selector—"OFF" for failing engine.

(3) Mixture—"IDLE CUT-OFF."

(4) Engine cross-feed—"OFF."

(5) Booster pump—"OFF" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(6) Ignition switch—"BOTH" until engine stops; then turn "OFF."

(7) Close cowl flap. (Return control to "NEUTRAL.")

(8) Move throttle of dead engine past ¼ segment to quiet the landing gear warning horn.

f. Circle landing field on a circuit toward the good engine at an indicated airspeed of 165 mph, and carry out an engine-assisted approach at approximately 130 mph indicated airspeed.

g. To avoid excessive rudder pedal load, reduce rudder tab offset as speed decreases during final approach.

h. A normal final approach and landing may be made with the assistance of the good engine. The three-wheeled landing gear enables the airplane to be flown onto the ground at a higher speed than one with the standard two-wheeled landing gear. Conservative speeds may thus be maintained during the final approach.

CAUTION Do not lower gear until airplane is on final approach. Do not lower wing flaps until certain the field can be reached.

i. If an engine should fail due to loss of fuel pressure on a take-off, or while in flight, operate the wobble pump *(airplanes A-20G-1-DO to A-20G-15-DO;*—turn booster pump—"ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO)*. If the wobble pump (booster pump) fails to bring up the pressure, a broken fuel line is indicated. In this event, be sure that the cross-feed controls are "OFF" and the respective fuel tank selector valve is "OFF" to avoid loss of fuel.

CAUTION Do not use fuel from the system in which the failure occurred. If the wobble pump (booster pump) brings up the pressure, failure of the engine-driven fuel pump is indicated. To supply the failing engine with fuel, turn the engine cross-feed control "ON" *(airplanes A-20G-1-DO to A-20G-15-DO)*—booster pump control "ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO)*. At take-off power, however, and with throttles full open, the single operating pump may be insufficient to supply both engines. When the cross-feed is used under these conditions, hold the rpm at 2300 to maintain maximum pump outlet, and reduce the throttles (until fuel pressure rises to a minimum of 12 pounds per square inch).

10. Climb.

a. For the best climbing airspeed under various gross weights, refer to Section III.

b. Cylinder head temperature limits:

(1) Military power climb (5 minutes only)—248°C. (478°F.).

(2) Rated power climb—232°C. (450°F.).

c. Oil temperature limits:

(1) Take-off and climb (5 minutes only)—95°C. (203°F.).

(2) Continuous operation—85°C. (185°F.).

d. See Engine Flight Calibration Curves, Section III, critical altitudes for low blower.

e. When critical altitudes for low blower have been reached, partially close the throttle to reduce manifold pressure 3 to 4 inches Hg., and shift supercharger controls rapidly, without pausing, to the limit of the "HIGH" position. Do not use high blower when desired power is available in low blower, as fuel economy is inferior to that obtained in the low blower and tendency to detonate is greater.

11. Flight Operation.—Refer to Flight Operation Instruction Charts, Section III, for ranges and recommended power settings.

12. General Flying Characteristics.

a. When flying this airplane at extreme conditions of center of gravity loading, instability is approached.

b. Take care not to subject the airplane to high acceleration loading during steep turns, or when recovering from a dive at high speed.

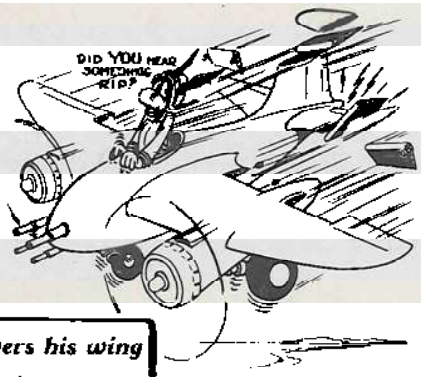
c. Tighten trim tab friction knobs.

d. Tab controls must not be used to assist recovery from a dive.

e. As the airplane is not designed to exceed 6G ($6 \times$ the force of gravity) at 19,750 lbs. gross weight, and correspondingly less as weight is increased, avoid rapid pull-outs.

f. The raising of the landing gear causes tail heaviness and vice versa. Do not lower wheels at an indicated airspeed over 175 mph.

g. The lowering of the wing flaps does not produce any appreciable change in trim. Do not lower wing flaps over 175 mph indicated airspeed.



h. When the lower engine cowl flaps are closed, the airplane becomes nose heavy, and vice versa.

i. Do not open the upper cowl flaps when taking off or during flight. If they are opened, buffeting will occur, and the airplane becomes nose heavy.

j. Use fuel from the "AUXILIARY" tanks when in flight to reserve the "MAIN" tanks for final operation and landing. Normally, the cross-feed controls should be "OFF" during flight. If a tank runs dry, shift to full tank and use wobble pump *(airplanes A-20G-1-DO to A-20G-15-DO)* —booster pump *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO)*—to help displace any air that might have entered the system. By using the wobble pump (booster pump), only a short interval will elapse before normal engine operation is resumed.

Note Return fuel flow through the carburetor vent line to the main fuel tanks will reach a maximum of ten gallons per hour.

k. The cylinder head and oil temperatures should not exceed the maximum permissible. For continuous cruising level flight, maximum temperatures are as follows:

Cylinder head temperature—205°C (401°F) maximum (level flight).

Oil temperature—85°C. (185°F.) continuous operation.

l. Emergency maximum temperatures, to be used for five minutes only, are as follows:

Cylinder head temperature—248°C. (478°F.).

Oil temperature—95°C. (203°F.).

13. Engine Failure During Flight.—If one engine fails during flight and it is imperative that the propeller be feathered as quickly as possible, proceed as noted in Par. 9., e., preceding. Otherwise proceed as follows:

a. Propeller Feathering.

(1) Throttle—"CLOSED."

(2) Propeller—"DECREASE RPM."

(3) Booster pump "OFF" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(4) Cross-feed (engine)—"OFF."

(5) Mixture—"IDLE CUT-OFF."

(6) Dead engine ignition—"OFF."

(7) Cowl flaps—"CLOSED."

(8) Push feathering switch button (release button after feathering action starts). When blades are fully feathered, the button will "kick out" automatically.

b. Operate fuel tank selectors and cross-feed, depending on circumstances and cause of failure, as follows:

Note Pressure cross-feed control is installed on *airplanes A-20G-1-DO to A-20G-15-DO.*

Condition	Remarks	Selector Valve	Pres.	Suction
L.H. Engine Failure	R. H. tank supplies R.H. engine.	L.H.—"OFF" R.H. on tank desired.	"OFF"	"OFF"
	L.H. tank supplies R.H. engine.	L.H.—tank desired. R.H. "OFF."	"OFF"	"ON"
R.H. Engine Failure	L.H. tank supplies R.H. engine.	R.H.—"OFF" L.H. on tank desired.	"OFF"	"OFF"
	R.H. tank supplies L.H. engine.	R.H.—tank desired L.H. "OFF."	"OFF"	"ON"

c. Regulate the cylinder head temperature of the good engine by the lower cowl flaps. Head temperatures, which are sensitive to mixture, should not exceed 248°C. (478°F.) for military power climb, 232°C. (450°F.) for rated continuous power, and 205°C. (401°F.) for cruising powers.

d. Adjust rudder tab to suit speed and horsepower output conditions.

e. Final single-engine approach and landing should be made as noted in Par. 9., preceding.

f. If it is desired to stop an engine during flight, and then restart, adhere to the following procedures:

(1) Propeller Feathering.

(a) Throttle—"CLOSED."

(b) Propeller—"DECREASE RPM."

(c) Mixture—"IDLE CUT-OFF."

(d) Ignition switch—"ON."

(e) Fuel—"OFF."

(f) Press feathering button.

Note If considered necessary, ignition switch may be turned "OFF" if propeller windmills; otherwise, switch may be left "ON."

(2) Propeller Unfeathering and Starting Engine.

(a) Ignition switch—"ON."

(b) Propeller—"DECREASE RPM."

(c) Press button to unfeather, hold down until 800 rpm is reached, then release.

(d) Fuel supply—"ON."

(e) Booster pump—"ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(f) Mixture—"AUTO RICH."

(g) Open throttles gradually to 20-25 inches Hg. manifold pressure.

(h) Maintain this power until satisfactory operating temperatures are obtained. Make sure engine is operating at proper fuel and oil pressures.

(i) When engine has warmed up, adjust propeller control for desired rpm.

(j) Adjust throttle for desired manifold pressure.

CAUTION The engine must not be run on full power until oil pressure and oil temperatures are normal.

14. Stalls.—The stalling characteristics of this airplane are good. With the power off, the stall is straightforward and controllable. The airplane shudders before the stall, and then the nose drops. With power on, if extreme stall conditions are allowed to develop, the stall follows out the wings from the fuselage. As the ailerons stall, the control wheel will tend to whip. Grip the control wheel firmly and drop the nose of the airplane for a normal recovery.

15. Spins.

a. Intentional spinning is prohibited. In the event of an accidental spin, standard methods of recovery are used. If an uncontrolled spin is allowed to develop below 5,000 feet, abandon the airplane.

b. On abandoning the airplane, both engine propellers should be feathered prior to pulling the emergency release of the cockpit enclosure door.

16. Acrobatics. — Acrobatics are strictly prohibited.

17. Diving.

a. Do not exceed the following diving limits:

Gross Weight	Maximum Diving Speed
18,500 to 23,500	412 mph I.A.S.
23,500 to 25,000	403 mph I.A.S.

b. Use cruising powers during dive.

c. Supercharger controls should be shifted to "LOW" before starting a dive.

CAUTION Before pulling out of a dive, reduce power by partly closing throttles.

d. Airplane may be trimmed in a dive, but not changed for pullouts.

e. Tighten trim tab friction knobs to prevent creepage.

18. Gliding.—This airplane is stable in a glide, and visibility is good. The application of the wing flaps does not appreciably alter the trim of the airplane, but the gliding angle is steepened for constant speed. Refer to Stalling Speed Chart for speeds at various gross weights and conditions.

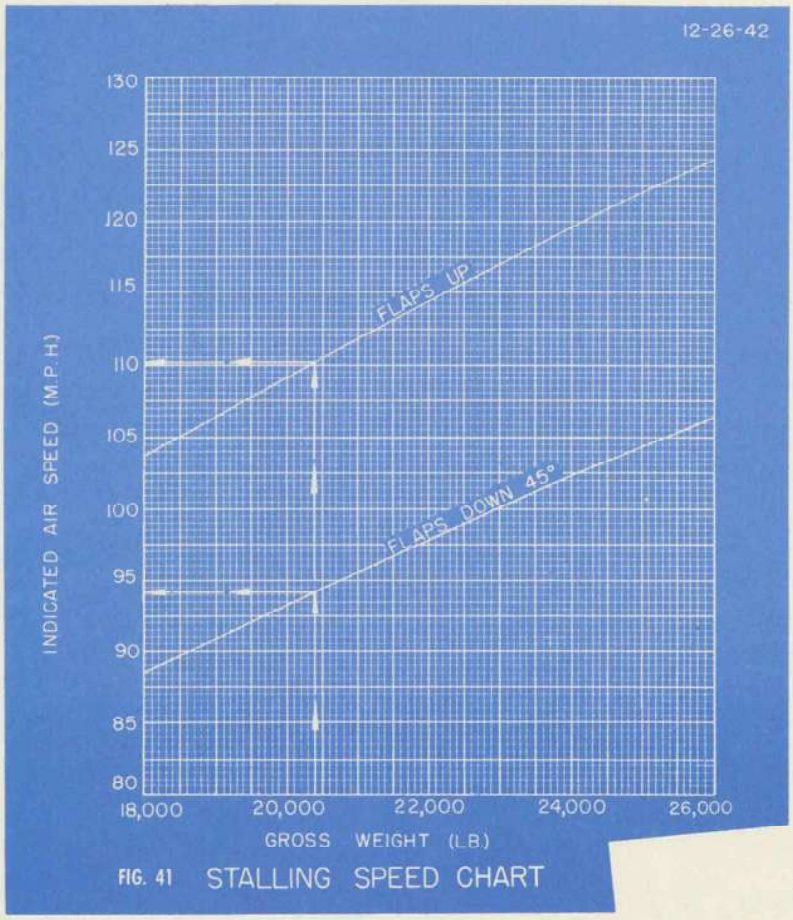


FIG. 41 STALLING SPEED CHART

EXAMPLE

WING FLAPS UP
GROSS WEIGHT — 20,400 LBS.

MOVE UP VERTICALLY FROM ESTABLISHED GROSS WEIGHT (20,400 LBS.) TO INTERSECTION OF WING FLAP UP LINE AND INDICATED STALLING SPEED LINE — 110.2 M. P. H. — CORRECT STALLING SPEED.

WING FLAPS DOWN
GROSS WEIGHT — 20,400 LBS.

MOVE VERTICALLY FROM ESTABLISHED GROSS WEIGHT (20,400 LBS.) TO INTERSECTION OF WING FLAP DOWN LINE AND INDICATED STALLING SPEED LINE — 94.2 M. P. H. — CORRECT STALLING SPEED.

19. Approach, Landing, and Cross Wind Landing.

a. Preliminary Approach.—The approach to land may be made with or without power, but should always be made with the wing flaps full DOWN. The preliminary circuit of the landing field should be made at approximately 150 mph indicated airspeed and the following actions should be carried out:

(1) During First Half of Circuit:

(a) Fuel tank selectors set for "MAIN" tanks, or tanks with greater quantity of fuel.

(b) Cross-feed controls "OFF" unless cross-feed system is necessary.

(c) Propeller controls—2100 rpm.

(d) Carburetor air—"COLD."

(e) Supercharger—"LOW."

(f) Mixture—"AUTO-RICH."

(g) Upper and lower cowl flaps "CLOSED" (return control to "NEUTRAL").

(h) Booster pump—"ON" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(2) During Last Half of Circuit:

(a) Lower landing gear and check for green light. (Leave control "DOWN.")

Note If landing gear will not lower or latch, refer to Par. 19., e, following.

(b) Wing flaps—"DOWN." Return control to "NEUTRAL."

(c) Check brake pressures by depressing the rudder pedals.

b. Final Approach.—When loaded to approximately 20,000 pounds, the final approach should be carried out at an indicated airspeed of 120 to 115 mph with power off, or an indicated airspeed of 115 to 110 mph with power on. These speeds will be sufficient to give a reasonable hold-off during the landing. Refer to Stalling Speed Chart for various gross weights.

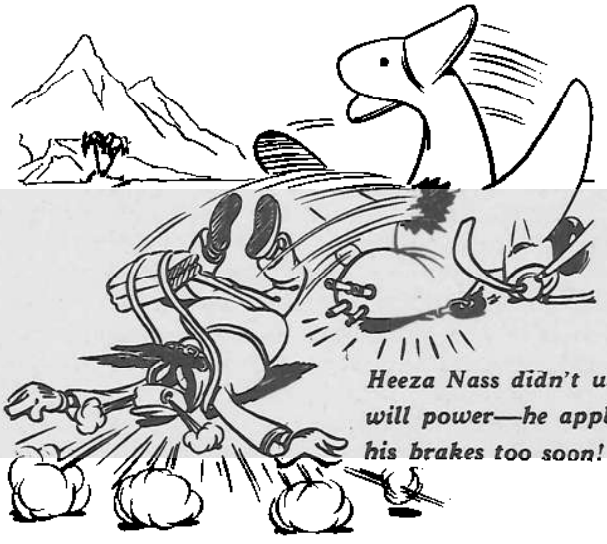
c. Landing.

(1) Refer to Take-Off, Climb, and Landing Charts, Section III, for the necessary landing run.

(2) As the landing gear is extended, "up" elevator forces will increase and should be neutralized by the elevator tab. Make a normal approach, so that the main wheels will touch first. Then maintain "up" elevator to hold the nose wheel off the ground until full "up" elevator forces are no longer effective if the field length permits. The airplane will then settle gently on the nose wheel. To stop roll, apply brakes evenly.

Note **Take care if brakes are applied with the nose wheel off the ground;** undue bouncing of the nose wheel might occur. With elevators holding the nose wheel **off the ground, a different elevator load is encountered with varying braking effort; for** more effective braking on slippery fields, apply full up elevators. With elevators in the **full up position, additional weight is centered on the main wheels due to the air load on the** elevators. This will tend to offset the normal forward pitching movement as the brakes are applied. If one wheel should lock on a slippery runway, due to uneven brake application or uneven friction of the field surface, the airplane will turn in an opposite direction to the locked wheel. If the brake pressure is released and the brakes are applied evenly again, the airplane will immediately straighten itself out.

(3) Do not apply the brakes in the event of nose wheel shimmy. This will only increase the shimmy amplitude. If the shimmy cannot be relieved by holding back the control column, or the landing run cannot be completed in the space available, take the airplane off again and make a new



Heeza Nass didn't use will power—he applied his brakes too soon!

landing. If nose wheel shimmy is still apparent on the new landing attempt, apply braking cautiously at the lower rolling speeds when shimmy will be less pronounced.

(4) After completing the landing run, taxi clear of the runway, and carry out the following:

(a) Wing flaps—"UP."

(b) Upper and lower cowl flaps—"OPEN."

(c) Propellers—"DECREASE RPM."

d. Night Landing.—During night landings or when visibility is poor, land faster than usual with the nose lower than normal. It is safer to strike the ground in this attitude at high speed than to drop the airplane in so that it will pitch forward, due to a stall, and allow the nose wheel to strike the ground first.

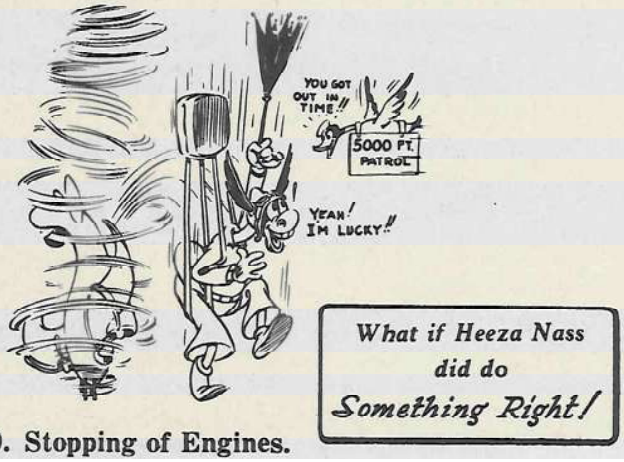
e. Emergency Operation of Landing Gear.—If the hydraulic pressure fails, immediately place all hydraulic controls in "NEUTRAL" and leave them there to conserve remaining fluid for operation of the landing gear and brakes. Place control in "DOWN" position and lower the main gear by means of the emergency release. Reduce speed to 130-140 mph indicated airspeed as the release is operated, and assist the gear to latch by sharply depressing the nose of the airplane. If the gear fails to latch, with the landing gear control "DOWN," operate the hydraulic hand pump. Return the control to "NEUTRAL." When gear is down, sufficient fluid is trapped in the reservoir, available only to the hand pump, for approximately 75 cycles. Conserve the remainder for brake operation by not attempting to lower the wing flaps. If 30 to 40 strokes of the hand pump fail to latch the gear, the entire reserve supply of fluid may be used, provided the pilot has no reason to believe the air brake system is damaged (or if there is a large enough area within range for a landing without brakes).

f. Emergency Operation of Brakes.—After hydraulic pressure failure, check the hydraulic brake system before landing. Operate the hand pump. Toe pressure will be felt at the brake pedals if no serious leaks in the brake lines are present. The emergency air brake system is provided as a "last resort" method of stopping the airplane after landing. Apply the air brakes by fully opening the control valve. The rudder pedals are not connected with this system. Do not apply air brakes until ground contact is made.

Note If the air lines as well as the hydraulic lines are punctured or damaged, no brake pressure will be available, and it is doubtful whether the airplane can be stopped once it is on the ground unless there is a long landing area. Any attempt to swing the airplane by the engines to avoid obstacles will result in a considerable increase in speed and it is not recommended. Do not lower the landing gear by the mechanical means. Make a belly landing.

g. Cross-Wind Landing.—The approach is made longer and lower than normal to allow the pilot sufficient time to establish a heading to give a ground track parallel to the runway. With wings level, no skidding is necessary. Alter the course of the airplane just prior to ground contact so that it is parallel to the runway, and place the wheels on the ground. Do not raise the nose wheel from the ground once contact has been made.

h. Emergency Take-Off if Landing Not Completed.—If the landing is not completed, apply power gradually by first opening the throttles, then increasing the engine speed. No additional power will be achieved by suddenly opening the throttles when the propellers are in low pitch. This will merely overspeed and tend to damage the engines.



20. Stopping of Engines.

a. Stop the right engine first so that the hydraulic pump on the left engine can be checked. While the left engine is still running, note the hydraulic pressure and operate the wing flaps. The hydraulic pressure should then recover to 850 ± 25 pounds per square inch.

Note The right engine hydraulic pump is checked during starting procedure.

b. Park the airplane by pulling out the parking brake control and depressing brake pedals after

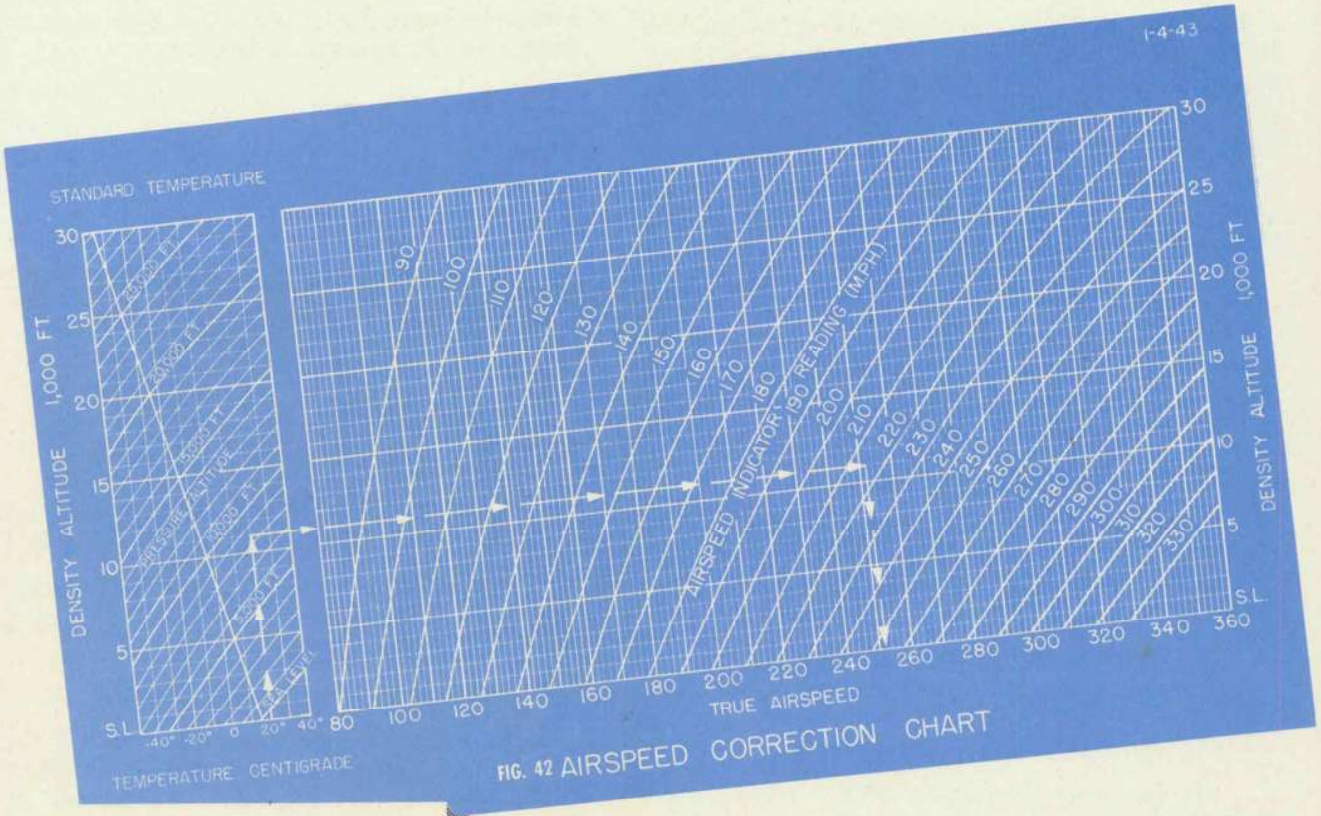


FIG. 42 AIRSPEED CORRECTION CHART

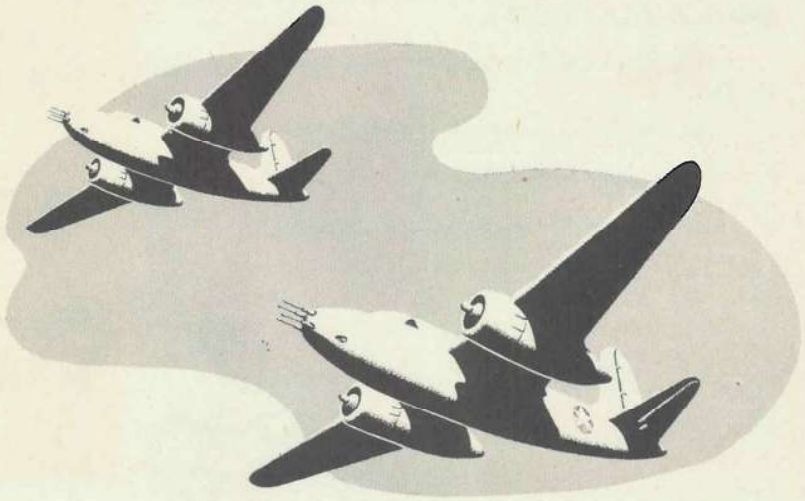
EXAMPLE

GIVEN: PRESSURE ALTITUDE — 8,600 FT.
AIR TEMPERATURE — 20°C.
INDICATED AIR SPEED — 215 M. P. H.

FIND: TRUE AIR SPEED

METHOD: ENTER TEMPERATURE SCALE AT ESTABLISHED OUTSIDE AIR TEMPERATURE (20°C). MOVE UP VERTICALLY TO ESTABLISHED PRESSURE ALTITUDE CURVE (8,600 FT.). FROM INTERSECTION OF TEMPERATURE AND ALTITUDE CURVES, MOVE HORIZONTALLY ACROSS CHART TO AIR SPEED INDICATOR READING (215 M. P. H.). AT THIS POINT MOVE DOWN VERTICALLY TO TRUE AIR SPEED TABLE.

ANSWER: 252 M. P. H. — TRUE AIR SPEED.



brake discs are allowed sufficient time to cool and so avoid seizing.

c. With propeller controls in "INCREASE RPM," idle engines at 800 to 1000 rpm for approximately five minutes. This will allow the crankcase to be properly scavenged of oil, and head temperatures to drop to 150°C. (302°F.).

d. Move mixture controls to "IDLE CUT-OFF" at any idling rpm and gradually open the throttles. This will give a clear cut-off with no backfiring.

e. When engines have stopped, turn ignition switch "OFF."

f. When a cold weather start is anticipated, dilute the engine oil as described in Section V, Par. 7, Cold Weather Operation.

21. Engine Section Fire in Flight.

a. If there is a fire in the engine section, cut off fuel supply to the engine and immediately feather the propeller to prevent more fuel and oil reaching the blaze. Proceed as follows:

(1) Depress propeller feathering button.

(2) Throttle—"CLOSE."

(3) Ignition switch—"OFF."

(4) Booster pump—"OFF" *(airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO).*

(5) Fuel tank selector valve for engine afire —"OFF."

(6) Mixture—"IDLE CUT-OFF."

(7) Cross-feed—"OFF."

(8) Engine cowl flaps—"CLOSED."

(9) Lower landing gear after reaching vicinity of field at cruising altitude. This will allow complete venting of nacelles. If fire reoccurs and cannot be extinguished—bail out.

22. Before Leaving Pilot's Compartment.—Before leaving the pilot's compartment, adhere to the following instructions:

a. Have wheels chocked if possible.

b. Fuel valves—"OFF."

c. All lights—"OFF."

d. Radio—"OFF."

e. Main battery switch—"OFF."

f. All cowl flaps closed when engine cylinder head temperatures drop below 120°C. (248°F.).

g. All hydraulic controls in "NEUTRAL" except the landing gear. This should be left—"DOWN."

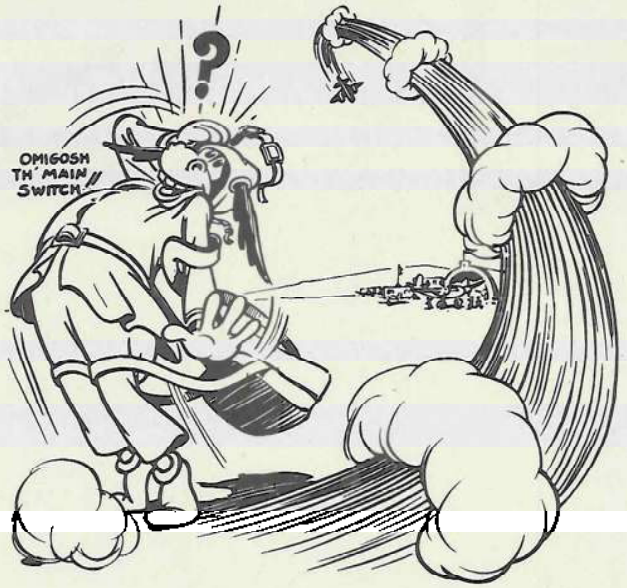
h. Surface controls—"LOCKED."

i. If dusty air conditions prevail, set the carburetor air temperature controls to "COLD" and filter control to "FILTER" *(airplanes A-20G-10-DO and subsequent).*

j. Have pitot head covered.

k. Entrance doors—CLOSED AND LOCKED.

23. Charts.—An airspeed correction chart and a stalling speed chart are provided in this section.



Section III

FLIGHT OPERATION DATA

1. The Flight Instruction Charts give complete performance of the airplane in steady level flight. Charts covering three ranges of weight for normal and single engine operation are furnished for the basic airplane and several loading conditions in which large external items are carried.

2. Each chart contains five columns showing ranges and corresponding operating data for conditions varying from maximum continuous power to maximum range. Steps in range between any two adjoining columns are nearly equal. The ranges quoted have been decreased ten per cent from the calculated values to allow sufficient reserve for accidental differences from ideal conditions. The speeds and fuel consumptions listed in the operating data are the calculated values.

3. In any of the alternate cruising condition columns except that for maximum continuous power, it is intended that the operating data at all altitudes give the same distance flown per gallon of fuel burned. However, at some altitudes the value of miles per gallon for the column falls between the values obtained for auto-lean and auto-rich operation at the speed for maximum power with auto-lean mixture setting. In these cases, auto-lean operation is listed and the number of miles per gallon is greater than for the other altitudes in the same column.

4. Use the chart which includes the weight of the airplane during the part of the flight being planned. To obtain the range originally selected, follow the operating data in the same numbered column on all charts. The desired reserve fuel must be added to the quantity listed.

5. All data presented are for no wind. When there is a wind, use conventional methods to calculate air distances and use these air distances in the charts.

6. The range quoted depends upon steady operation at conditions given in the corresponding operating data. If the flight consists of a number of periods of operation under widely different conditions, it can be planned as a number of short flights.

7. During flight, the charts can be used to keep a continuous record of the gross weight and of the amount of fuel remaining, so that, if necessary, a new flight plan can be worked out at any time for any new set of conditions.

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-512

AIRPLANE MODELS

A-20G-1-DO TO A-20G-35-DO
A-20J-1-DO TO A-20J-10-DO

SPECIFIC ENGINE FLIGHT CHART

ENGINE MODELS

Wright Cyclone
R-2600-23

CONDITION	FUEL PRESSURE (LB./SQ. IN.)	OIL PRESSURE (LB./SQ. IN.)	OIL TEMP. °C	OIL TEMP. °F
DESIRED	15	85	50-70	122-158
MAXIMUM	16	90	85-95	185-203
MINIMUM	14	75	..	..
IDLING	..	30	..	..

MAX. PERMISSIBLE DIVING R.P.M.: 2750

CONDITION	ALLOWABLE OIL CONSUMPTION
MAX. CONT.	17 U.S. QT./HR.
MAX. CRUISE	13 U.S. QT./HR.
MIN. SPECIFIC	5 U.S. QT./HR.

OIL GRADE: (S) 1120 (W) 1120

SUPERCHARGER TYPE: TWO SPEED

FUEL GRADE: 100 OCTANE

OPERATING CONDITION	RPM	ABSOLUTE MANIFOLD PRESSURE (IN. Hg)	HORSE-POWER PER ENGINE	CRITICAL ALTITUDE WITHOUT RAM (FEET)	BLOWER	USE LOW BLOWER BELOW:	MIXTURE CONTROL POSITION	FUEL FLOW (U.S. GAL./HR./ENG.)	MAXIMUM CYL. TEMP. °C	MAXIMUM CYL. TEMP. °F	MAXIMUM DURATION (MINUTES)
TAKE-OFF	2400	45.0 42.7	1600	SEA LEVEL 2000	LOW	ALWAYS USE LOW BLOWER	AUTO-RICH	205	248	478	5
WAR EMERGENCY	2400	46.0		SEA LEVEL	LOW	ALWAYS	FULL-RICH	210	260	500	5
MILITARY	2400 2400	42.7 44.3	1600 1400	2000 10800	LOW HIGH	6,000 FT.	AUTO-RICH AUTO-RICH	205 170	248 248	478 478	5 5
MAXIMUM CONTINUOUS	2300 2300	36.7 41.4	1350 1275	5800 11800	LOW HIGH	7,400 Ft.	AUTO-RICH AUTO-RICH	150 145	232 232	450 450	NO LIMIT
MAXIMUM CRUISE	2050 2050	26.5 29.5	905 855	12500 18200	LOW HIGH	14,100 Ft.	AUTO-LEAN AUTO-LEAN	70 70	205 205	401 401	NO LIMIT
MINIMUM SPECIFIC CONSUMPTION											

REMARKS:

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-510

AIRPLANE MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) *(WING FLAPS HALF DOWN*)*

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2500	4300	3150	5350	4100	7400	2750	4550	3500	5700	4700	8000	3700	5500	4950	7150	7200	10450
	15	1900	3450	2450	4400	3200	6150	2100	3650	2700	4650	3650	6600	2800	4350	3800	5750	5650	8500
	30	1400	2750	1800	3500	2450	5000	1550	2850	2050	3700	2800	5350	2050	3400	2850	4500	4350	6800
	45	950	2100	1250	2700	1800	3950	1050	2200	1400	2850	2000	4200	1400	2500	2000	3450	3100	5300
23000	0	1750	2900	2150	3550	2800	4750	1900	3050	2350	3750	3150	5100	2350	3500	3050	4450	4300	6250
	15	1300	2300	1650	2850	2150	3850	1400	2400	1750	3000	2400	4100	1750	2750	2300	3550	3300	5000
	30	900	1750	1150	2200	1600	3050	1000	1850	1300	2350	1800	3250	1250	2050	1700	2750	2450	3950
	45	600	1300	750	1650	1100	2350	650	1350	850	1750	1250	2350	800	1500	1100	2000	1700	2950
19000	0	1150	1900	1400	2300	1800	3000	1200	1950	1500	2400	2000	3150	1450	2200	1850	2750	2500	3650
	15	800	1450	1000	1800	1350	2400	850	1500	1100	1850	1500	2500	1000	1650	1350	2100	1850	2850
	30	550	1050	700	1350	1000	1850	600	1100	800	1400	1050	1900	700	1200	950	1550	1350	2200
	45	350	750	450	1000	650	1350	350	750	500	1000	700	1400	450	850	600	1100	850	1550

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32°F)

ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

CLIMB DATA

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT.			10000 FT. ALT.				15000 FT. ALT.				20000 FT. ALT.				25000 FT. ALT.				BLOWER CHANGE (FT.)
		BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	
27000	COMBAT	158	1530	2.9	154	1060	7.0	95	154	780	12.5	120	154	330	21.1	150					6000
	FERRY	154	370	14.0	154	360	28.5	115	154	170	45.7	150									14100
23000	COMBAT	157	1990	2.3	154	1460	5.0	85	150	1170	8.8	100	144	720	14.1	120	144	230	24.8	150	6000
	FERRY	144	710	7.0	144	710	14.3	85	144	540	22.1	100	144	350	33.3	125					14100
19000	COMBAT	155	2610	1.8	153	2320	3.8	75	146	1670	6.4	90	135	1180	9.9	100	132	690	15.0	120	6000
	FERRY	132	1140	4.3	136	1130	8.9	70	136	930	13.9	80	133	740	20.0	95	132	340	29.0	115	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0 C FREE AIR TEMPERATURE (5% FOR EACH 20 F ABOVE 32°F). FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) *(WING FLAPS FULL DOWN)*

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3550	2250	3900	2500	4300	2800	3900	2600	4300	2900	4750	3250	9200	7900	10200	8850	1350	9850
19000	115	3000	1850	3300	2050	3650	2300	3300	2150	3650	2400	4000	2700	7650	6500	8500	7300	9450	8150

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95°F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-510

AIRPLANE MODELS
A-20G-35-DO, A-20J-10-DO
BASIC

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) (*WING FLAPS HALF DOWN**)

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY AT SEA LEVEL GROUND RUN	HARD SURFACE AT SEA LEVEL TO CLEAR 50' OBJ.	HARD SURFACE AT 3000 FT. GROUND RUN	HARD SURFACE AT 3000 FT. TO CLEAR 50' OBJ.	HARD SURFACE AT 6000 FT. GROUND RUN	HARD SURFACE AT 6000 FT. TO CLEAR 50' OBJ.	SOD-TURF RUNWAY AT SEA LEVEL GROUND RUN	SOD-TURF AT SEA LEVEL TO CLEAR 50' OBJ.	SOD-TURF AT 3000 FT. GROUND RUN	SOD-TURF AT 3000 FT. TO CLEAR 50' OBJ.	SOD-TURF AT 6000 FT. GROUND RUN	SOD-TURF AT 6000 FT. TO CLEAR 50' OBJ.	SOFT SURFACE RUNWAY AT SEA LEVEL GROUND RUN	SOFT SURFACE AT SEA LEVEL TO CLEAR 50' OBJ.	SOFT SURFACE AT 3000 FT. GROUND RUN	SOFT SURFACE AT 3000 FT. TO CLEAR 50' OBJ.	SOFT SURFACE AT 6000 FT. GROUND RUN	SOFT SURFACE AT 6000 FT. TO CLEAR 50' OBJ.
27000	0	2600	4400	3250	5550	4250	7700	2850	4700	3650	5950	4850	8350	3850	5700	5150	7500	7550	11000
	15	1950	3550	2500	4550	3350	6400	2150	3800	2800	4850	3850	6900	2950	4500	4000	6050	5950	8950
	30	1450	2800	1850	3650	2550	5250	1600	2950	2100	3900	2900	5600	2150	3500	3000	4750	4550	7200
	45	1000	2100	1300	2800	1850	4150	1100	2200	1450	3000	2100	4400	1450	2600	2100	3600	3250	5600
23000	0	1800	2950	2200	3700	2900	4950	1950	3100	2400	3900	3250	5300	2450	3650	3200	4650	4500	6550
	15	1300	2350	1650	2950	2250	4000	1450	2450	1800	3100	2500	4300	1800	2850	2400	3650	3500	5250
	30	900	1800	1200	2300	1650	3200	1000	1900	1350	2450	1850	3400	1300	2150	1750	2800	2600	4100
	45	600	1300	800	1700	1150	2450	650	1350	900	1800	1250	2550	850	1550	1150	2050	1750	3050
19000	0	1150	1950	1450	2400	1850	3100	1250	2000	1550	2500	2050	3250	1450	2250	1850	2850	2600	3800
	15	850	1500	1050	1850	1400	2450	900	1550	1150	1950	1500	2600	1050	1700	1350	2150	1950	3000
	30	550	1100	750	1400	1000	1900	600	1150	800	1450	1050	2000	750	1250	950	1650	1350	2300
	45	350	750	450	1000	650	1400	350	800	500	1050	700	1450	450	850	600	1150	900	1650

NOTE: INCREASE DISTANCE 10% FOR EACH 10 C ABOVE 0 C (10% FOR EACH 20 F ABOVE 32 F) ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

CLIMB DATA

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT. BEST I.A.S. (M.P.H.)	S. L. TO 5000 FT. RATE OF CLIMB (FT/MIN)	S. L. TO 5000 FT. TIME From S.L. (MIN.)	10000 FT. ALT. BEST I.A.S. (M.P.H.)	10000 FT. RATE OF CLIMB (FT/MIN)	10000 FT. TIME FROM S. L. (MIN.)	10000 FT. FUEL FROM S. L. (U.S.GAL.)	15000 FT. ALT. BEST I.A.S. (M.P.H.)	15000 FT. RATE OF CLIMB (FT/MIN)	15000 FT. TIME FROM S. L. (MIN.)	15000 FT. FUEL FROM S. L. (U.S.GAL.)	20000 FT. ALT. BEST I.A.S. (M.P.H.)	20000 FT. RATE OF CLIMB (FT/MIN)	20000 FT. TIME FROM S. L. (MIN.)	20000 FT. FUEL FROM S. L. (U.S.GAL.)	25000 FT. ALT. BEST I.A.S. (M.P.H.)	25000 FT. RATE OF CLIMB (FT/MIN)	25000 FT. TIME FROM S. L. (MIN.)	25000 FT. FUEL FROM S. L. (U.S.GAL.)	BLOWER CHANGE (FT.)
27000	COMBAT	158	1470	3.0	154	990	7.1	95	154	710	13.0	125	154	270	23.6	170					6000
	FERRY	154	340	15.4	154	320	30.3	120	154	130	49.6	155									14100
23000	COMBAT	157	1920	2.4	154	1380	5.3	90	150	1090	9.2	110	144	650	15.0	130	144	170	27.2	165	6000
	FERRY	144	680	7.5	144	670	14.9	85	144	500	23.1	105	144	300	35.2	135					14100
19000	COMBAT	155	2530	2.0	153	2330	4.0	80	146	1580	6.9	95	135	1100	10.5	110	132	620	16.2	125	6000
	FERRY	132	1110	4.5	136	1090	9.1	70	136	880	14.0	80	133	680	20.1	95	132	290	30.9	120	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0 C FREE AIR TEMPERATURE (5% FOR EACH 20 F ABOVE 32 F) FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) (*WING FLAPS FULL DOWN*)

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE AT SEA LEVEL TO CLEAR 50' OBJ.	HARD DRY SURFACE AT SEA LEVEL GROUND ROLL	HARD DRY SURFACE AT 3000 FT. TO CLEAR 50' OBJ.	HARD DRY SURFACE AT 3000 FT. GROUND ROLL	HARD DRY SURFACE AT 6000 FT. TO CLEAR 50' OBJ.	HARD DRY SURFACE AT 6000 FT. GROUND ROLL	FIRM DRY SOD AT SEA LEVEL TO CLEAR 50' OBJ.	FIRM DRY SOD AT SEA LEVEL GROUND ROLL	FIRM DRY SOD AT 3000 FT. TO CLEAR 50' OBJ.	FIRM DRY SOD AT 3000 FT. GROUND ROLL	FIRM DRY SOD AT 6000 FT. TO CLEAR 50' OBJ.	FIRM DRY SOD AT 6000 FT. GROUND ROLL	WET OR SLIPPERY AT SEA LEVEL TO CLEAR 50' OBJ.	WET OR SLIPPERY AT SEA LEVEL GROUND ROLL	WET OR SLIPPERY AT 3000 FT. TO CLEAR 50' OBJ.	WET OR SLIPPERY AT 3000 FT. GROUND ROLL	WET OR SLIPPERY AT 6000 FT. TO CLEAR 50' OBJ.	WET OR SLIPPERY AT 6000 FT. GROUND ROLL
23000	125	3550	2250	3900	2500	4300	2800	3900	2600	4300	2900	4750	3250	9200	7900	10200	8850	11350	9850
19000	115	3000	1850	3300	2050	3650	2300	3300	2150	3650	2400	4000	2700	7650	6500	8500	7300	9450	8150

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95 F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8 DEC. 18, 1942

FORM ASC-510

AIRPLANE MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED
WITH OR WITHOUT I MK XIII TORPEDO

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) *(WING FLAPS HALF DOWN*)*

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2500	4400	3150	5500	4150	7700	2800	4650	3500	5850	4750	8250	3750	5600	5000	7300	7350	10850
	15	1900	3550	2450	4500	3250	5350	2100	3700	2700	4750	3700	6800	2850	4450	3800	5900	5800	8850
	30	1400	2850	1800	3550	2500	5200	1550	2900	2050	3800	2800	5550	2100	3500	2850	4650	4450	7050
	45	950	2150	1250	2750	1850	4100	1050	2200	1400	2950	2000	4300	1400	2550	2000	3550	3150	5500
23000	0	1750	2900	2150	3600	2850	4850	1900	3050	2350	3800	3150	5200	2400	3550	3050	4550	4350	6400
	15	1300	2300	1650	2900	2150	3950	1400	2450	1750	3050	2400	4200	1750	2800	2300	3650	3300	5100
	30	900	1750	1150	2250	1600	3150	1000	1850	1300	2400	1800	3300	1250	2050	1700	2750	2500	4050
	45	600	1300	750	1650	1100	2400	650	1350	850	1750	1250	2400	800	1500	1100	2050	1700	3000
19000	0	1150	1900	1400	2350	1850	3050	1200	1950	1500	2450	2000	3200	1450	2200	1850	2750	2500	3700
	15	800	1450	1000	1800	1350	2400	850	1500	1100	1900	1500	2550	1000	1650	1350	2100	1850	2850
	30	550	1050	700	1350	1000	1850	600	1100	800	1400	1050	1950	700	1200	950	1550	1350	2200
	45	350	750	450	1000	650	1350	350	750	500	1000	700	1400	450	850	600	1100	850	1550

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32°F)

ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT.			10000 FT. ALT.				15000 FT. ALT.				20000 FT. ALT.				25000 FT. ALT.				BLOWER CHANGE (FT.)
		BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	
27000	COMBAT	156	1440	3.0	154	970	7.7	95	154	690	13.5	120	154	230	24.3	165					6000
	FERRY	154	280	18.7	154	280	38.0	130	154	100	60.5	180									14100
23000	COMBAT	154	1890	2.4	150	1380	5.5	85	146	1090	9.5	105	144	630	15.3	125	144	140	29.2	165	6000
	FERRY	144	630	7.8	144	630	16.1	85	144	440	25.3	105	144	260	39.3	140					14100
19000	COMBAT	153	2510	1.8	150	2220	3.9	75	143	1580	6.8	90	132	1100	10.3	105	132	600	16.5	120	6000
	FERRY	132	1070	4.8	134	1060	9.4	70	133	850	14.7	85	132	650	21.5	100	132	250	33.4	120	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0°C FREE AIR TEMPERATURE (5% FOR EACH 20°F ABOVE 32°F). FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) *(WING FLAPS FULL DOWN)*

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3500	2250	3850	2500	4250	2800	3850	2600	4250	2900	4700	3250	9000	7750	10000	8650	11100	9700
19000	115	2950	1850	3250	2050	3600	2300	3250	2150	3600	2400	3950	2700	7500	6400	8350	7150	9300	8000

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95°F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-510

AIRPLANE MODELS
A-20G-35-DO, A-20J-10-DO
BOMB BAY DOORS REMOVED
WITH OR WITHOUT 1 MK XIII TORPEDO

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) (*WING FLAPS HALF DOWN**)

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.	SOD-TURF RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.	SOFT SURFACE RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2600	4500	3250	5650	4300	7900	2850	4750	3650	6050	4900	8500	3900	5800	5250	7600	7650	11300
	15	1950	3600	2550	4650	3350	6600	2150	3800	2850	4950	3850	7050	2950	4650	4050	6150	6100	9250
	30	1450	2850	1900	3750	2550	5450	1600	3050	2100	3950	2950	5750	2150	3600	3000	4850	4650	7400
	45	1000	2150	1300	2850	1850	4300	1100	2250	1500	3050	2150	4500	1500	2650	2150	3650	3300	5750
23000	0	1800	3000	2250	3750	2950	5000	1950	3150	2450	3950	3250	5350	2450	3650	3200	4700	4550	6600
	15	1350	2400	1700	3000	2250	4050	1450	2500	1850	3150	2500	4350	1850	2900	2400	3700	3550	5350
	30	950	1850	1250	2350	1650	3250	1000	1950	1350	2450	1850	3400	1300	2200	1750	2850	2600	4150
	45	600	1300	800	1750	1150	2500	650	1400	900	1800	1300	2600	850	1550	1150	2100	1800	3000
19000	0	1200	1950	1450	2400	1900	3150	1250	2000	1550	2500	2050	3300	1500	2250	1900	2850	2600	3850
	15	850	1500	1050	1850	1400	2500	900	1550	1150	1950	1500	2600	1100	1750	1400	2250	1950	3050
	30	550	1100	750	1400	1000	1900	600	1150	850	1450	1050	2000	750	1300	950	1650	1350	2300
	45	350	750	450	1000	650	1400	350	800	500	1050	700	1450	450	850	600	1150	900	1650

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32 F) ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	10000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	15000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	20000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	25000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BLOWER CHANGE (FT.)
27000	COMBAT	156	1380	3.1	154	900	7.8	95	154	620	14.2	130	154	170	26.9	185					6000
	FERRY	154	250	20.0	154	250	40.0	135													14100
23000	COMBAT	154	1830	2.5	150	1300	5.8	90	146	1010	10.0	110	144	560	16.2	135	144	-95	35.0	200	6000
	FERRY	144	600	8.4	144	590	16.8	90	144	400	26.3	110	144	210	42.2	145					14100
19000	COMBAT	153	2430	2.1	150	2130	4.1	80	143	1490	7.2	95	132	1030	11.2	110	132	530	17.4	130	6000
	FERRY	132	1040	4.9	134	1020	9.8	70	133	800	15.0	85	132	590	22.0	100	132	200	35.5	130	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0°C FREE AIR TEMPERATURE (5% FOR EACH 20°F ABOVE 32°F) FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) (*WING FLAPS FULL DOWN*)

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	FIRM DRY SOD AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	WET OR SLIPPERY AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3500	2250	3850	2500	4250	2800	3850	2600	4250	2900	4700	3250	9000	7750	10000	8650	11100	9700
19000	115	2950	1850	3250	2050	3600	2300	3250	2150	3600	2400	3950	2700	7500	6400	8350	7150	9300	8000

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95 F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-510

AIRPLANE MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
WITH DROPPABLE BELLY TANK

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) *(WING FLAPS HALF DOWN*)*

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2500	4350	3150	5450	4150	7550	2800	4600	3500	5800	4700	8100	3750	5550	5000	7250	7300	10650
	15	1900	3500	2450	4450	3250	6250	2100	3700	2700	4700	3700	6700	2850	4400	3800	5850	5750	8700
	30	1400	2800	1800	3550	2500	5100	1550	2900	2050	3750	2800	5450	2100	3450	2850	4600	4400	6950
	45	950	2150	1250	2750	1850	4050	1050	2200	1400	2900	2000	4250	1400	2500	2000	3500	3150	5400
23000	0	1750	2900	2150	3600	2850	4800	1900	3050	2350	3800	3150	5150	2400	3550	3050	4500	4350	6300
	15	1300	2300	1650	2900	2150	3900	1400	2450	1750	3050	2400	4150	1750	2800	2300	3600	3300	5050
	30	900	1750	1150	2250	1600	3100	1000	1850	1300	2400	1800	3250	1250	2050	1700	2750	2500	4000
	45	600	1300	750	1650	1100	2400	650	1350	850	1750	1250	2400	800	1500	1100	2050	1700	3000
19000	0	1150	1900	1400	2350	1850	3050	1200	1950	1500	2450	2000	3250	1450	2200	1850	2750	2500	3700
	15	800	1450	1000	1800	1350	2400	850	1500	1100	1900	1500	2550	1000	1650	1350	2100	1850	2850
	30	550	1050	700	1350	1000	1850	600	1100	800	1400	1050	1950	700	1200	950	1550	1350	2200
	45	350	750	450	1000	650	1350	350	750	500	1000	700	1450	450	850	600	1100	850	1550

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32°F)

ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT.			10000 FT. ALT.				15000 FT. ALT.				20000 FT. ALT.				25000 FT. ALT.				BLOWER CHANGE (FT.)
		BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	
27000	COMBAT	157	1480	3.0	154	1000	7.5	95	154	720	13.0	120	154	270	23.0	160					6000
	FERRY	154	310	16.6	154	310	33.7	125	154	120	54.4	170									14100
23000	COMBAT	155	1920	2.4	151	1410	5.3	85	147	1120	9.2	105	144	660	15.0	125	144	170	27.4	160	6000
	FERRY	144	660	7.4	144	660	15.3	85	144	470	24.0	105	144	290	36.6	135					14100
19000	COMBAT	154	2550	1.8	151	2260	3.9	75	144	1620	6.6	90	133	1140	10.1	105	132	630	16.0	120	6000
	FERRY	132	1090	4.7	135	1080	9.1	70	135	880	14.3	85	132	680	21.0	100	132	280	31.5	120	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0°C FREE AIR TEMPERATURE (5% FOR EACH 20°F ABOVE 32°F). FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) *(WING FLAPS FULL DOWN)*

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3500	2250	3850	2500	4250	2800	3850	2600	4250	2900	4700	3250	9050	7800	10100	8700	11200	9750
19000	115	2950	1850	3250	2050	3600	2300	3250	2150	3600	2400	3950	2700	7550	6450	8400	7200	9350	8050

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95°F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8 DEC. 18, 1942 FORM ASC-510

AIRPLANE MODELS
A-20G-35-DO, A-20J-10-DO
WITH DROPPABLE BELLY TANK

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) (WING FLAPS HALF DOWN*)

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2600	4500	3250	5650	4300	7900	2850	4750	3650	6050	4900	8500	3900	5800	5250	7600	7650	11300
	15	1950	3600	2500	4650	3350	6550	2150	3800	2850	4950	3850	7050	2950	4600	4050	6150	6050	9250
	30	1450	2850	1850	3700	2550	5400	1600	3000	2100	3950	2950	5750	2150	3600	3000	4850	4600	7400
	45	1000	2150	1300	2850	1850	4250	1100	2250	1500	3050	2100	4500	1500	2650	2100	3650	3300	5700
23000	0	1800	3000	2250	3750	2950	5000	1950	3150	2450	3950	3250	5350	2450	3650	3200	4700	4550	6600
	15	1350	2400	1700	3000	2250	4100	1450	2500	1850	3150	2500	4350	1850	2850	2400	3700	3500	5300
	30	950	1800	1250	2350	1650	3250	1000	1950	1350	2450	1850	3400	1300	2150	1750	2850	2600	4150
	45	600	1300	800	1750	1150	2500	650	1400	900	1800	1300	2600	850	1550	1150	2100	1750	3000
19000	0	1200	1950	1450	2400	1900	3150	1250	2000	1550	2500	2050	3300	1500	2250	1900	2850	2600	3850
	15	850	1500	1050	1850	1400	2500	900	1550	1150	1950	1500	2600	1100	1750	1400	2200	1950	3050
	30	550	1100	750	1400	1000	1900	600	1150	800	1450	1050	2000	750	1300	950	1650	1350	2300
	45	350	750	450	1000	650	1400	350	800	500	1050	700	1450	450	850	600	1150	900	1650

NOTE: INCREASE DISTANCE 10% FOR EACH 10 C ABOVE 0 C (10% FOR EACH 20 F ABOVE 32 F) ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT.			10000 FT. ALT.				15000 FT. ALT.				20000 FT. ALT.				25000 FT. ALT.				BLOWER CHANGE (FT.)
		BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	
27000	COMBAT	157	1420	3.1	154	930	7.7	95	154	650	14.0	130	154	210	25.8	180					6000
	FERRY	154	280	17.9	154	280	35.6	125													14100
23000	COMBAT	155	1850	2.5	151	1330	5.6	90	147	1040	9.9	110	144	590	16.1	135	144	110	34.5	185	6000
	FERRY	144	630	8.1	144	620	16.1	85	144	430	25.1	105	144	240	39.8	145					14100
19000	COMBAT	154	2470	2.1	151	2170	4.1	80	144	1530	7.0	95	133	1060	10.9	110	132	560	17.0	130	6000
	FERRY	132	1060	4.8	135	1040	9.5	70	135	830	14.6	85	132	620	21.3	100	132	230	33.8	120	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10 C ABOVE 0 C FREE AIR TEMPERATURE (5% FOR EACH 20 F ABOVE 32 F) FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) (WING FLAPS FULL DOWN)

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3500	2250	3850	2500	4250	2800	3850	2600	4250	2900	4700	3250	9050	7800	10100	8700	11200	9750
19000	115	2950	1850	3250	2050	3600	2300	3250	2150	3600	2400	3950	2700	7550	6450	8400	7200	9350	8050

NOTE: FOR GROUND TEMPERATURES ABOVE 35 C (95 F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8
DEC. 18, 1942
FORM ASC-510

AIRPLANE MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
WITH 4 M-10 CHEMICAL TANKS

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) (*WING FLAPS HALF DOWN**)

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.	SOD-TURF RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.	SOFT SURFACE RUNWAY AT SEA LEVEL GROUND RUN	TO CLEAR 50' OBJ.	AT 3000 FT. GROUND RUN	TO CLEAR 50' OBJ.	AT 6000 FT. GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2550	4450	3200	5550	4200	7850	2800	4700	3550	5950	4800	8450	3800	5700	5050	7400	7450	11100
	15	1950	3600	2500	4600	3300	6500	2100	3750	2700	4800	3750	6950	2900	4500	3850	5950	5850	9050
	30	1450	2900	1850	3650	2550	5300	1550	2950	2050	3850	2850	5700	2150	3550	2900	4700	4500	7200
	45	950	2200	1250	2800	1850	4200	950	2250	1400	3000	2050	4400	1450	2600	2050	3600	3200	5600
23000	0	1750	2950	2200	3650	2900	4950	1900	3100	2400	3850	3200	5250	2400	3600	3100	4600	4400	6500
	15	1300	2350	1700	2950	2200	4000	1400	2500	1800	3100	2450	4250	1750	2850	2350	3700	3350	5150
	30	900	1800	1150	2300	1650	3200	1000	1900	1300	2450	1850	3350	1250	2100	1750	2800	2550	4100
	45	600	1350	750	1700	1100	2450	650	1350	850	1800	1250	2450	800	1550	1150	2100	1750	3050
19000	0	1150	1900	1450	2350	1900	3100	1250	2000	1500	2450	2000	3250	1450	2200	1850	2800	2550	3750
	15	800	1450	1000	1800	1400	2450	900	1550	1100	1900	1500	2550	1000	1650	1350	2150	1850	2900
	30	550	1050	700	1350	1050	1900	650	1150	800	1400	1050	1950	700	1200	950	1600	1350	2250
	45	350	750	450	1000	650	1400	350	750	500	1000	700	1450	450	850	600	1100	850	1600

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32°F)

ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	10000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	15000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	20000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	25000 FT. ALT. BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BLOWER CHANGE (FT.)
27000	COMBAT	155	1440	3.1	154	940	7.9	95	154	660	14.0	125	154	190	25.7	170					6000
	FERRY	154	250	20.9	154	240	42.4	140													14100
23000	COMBAT	153	1850	2.5	150	1340	5.7	85	144	1060	9.8	105	144	600	15.7	130	144	100	31.1	175	6000
	FERRY	144	600	8.3	144	600	16.9	90	144	410	26.7	110	144	220	42.0	145					14100
19000	COMBAT	152	2460	1.8	149	2170	4.0	75	141	1540	7.0	90	132	1060	10.5	105	132	560	17.0	125	6000
	FERRY	132	1040	4.9	132	1030	9.8	75	132	820	15.1	85	132	610	22.0	100	132	210	35.3	125	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0°C FREE AIR TEMPERATURE (5% FOR EACH 20°F ABOVE 32°F). FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) (*WING FLAPS FULL DOWN*)

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	FIRM DRY SOD AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	WET OR SLIPPERY AT SEA LEVEL TO CLEAR 50' OBJ.	GROUND ROLL	AT 3000 FT. TO CLEAR 50' OBJ.	GROUND ROLL	AT 6000 FT. TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3450	2200	3800	2500	4200	2800	3800	2550	4200	2900	4650	3200	8900	7650	9900	8550	11000	9600
19000	115	2900	1800	3200	2050	3550	2300	3200	2100	3550	2400	3900	2650	7400	6350	8250	7100	9200	7900

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95°F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8 DEC. 18, 1942 FORM ASC-510

AIRPLANE MODELS
A-20G-35-DO, A-20J-10-DO
WITH 4 M-10 CHEMICAL TANKS

TAKE-OFF, CLIMB, & LANDING CHART

ENGINE MODELS
Wright Cyclone
R-2600-23

TAKE-OFF DISTANCE (IN FEET) (WING FLAPS HALF DOWN*)

GROSS WEIGHT (LB.)	HEAD WIND (M.P.H.)	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
27000	0	2600	4600	3300	5800	4350	8250	2900	4850	3700	6200	5000	8850	3950	5900	5300	7800	7900	11800
	15	2000	3700	2550	4750	3400	6900	2200	3900	2850	5050	3950	7350	3000	4700	4050	6250	6250	9650
	30	1450	2950	1900	3800	2600	5600	1600	3050	2150	4050	3000	6000	2200	3650	3050	4950	4700	7750
	45	1000	2200	1350	2950	1850	4450	1100	2300	1500	3100	2150	4700	1500	2700	2150	3750	3350	5950
23000	0	1800	3050	2250	3800	2950	5150	1950	3200	2450	4000	3300	5500	2500	3750	3250	4750	4600	6700
	15	1350	2400	1700	3050	2300	4200	1450	2550	1850	3200	2550	4450	1850	2900	2450	3750	3550	5450
	30	950	1850	1250	2400	1700	3300	1000	1950	1350	2500	1850	3500	1300	2200	1800	2900	2650	4250
	45	600	1350	800	1750	1150	2550	650	1400	900	1850	1300	2650	850	1600	1200	2150	1800	3200
19000	0	1200	1950	1450	2450	1900	3200	1250	2050	1550	2550	2050	3350	1500	2300	1900	2900	2650	3900
	15	850	1500	1100	1900	1400	2550	900	1550	1150	2000	1550	2650	1100	1750	1400	2250	1950	3100
	30	600	1150	750	1450	1000	1950	600	1150	800	1500	1100	2050	750	1300	1000	1650	1400	2350
	45	350	800	450	1050	650	1400	350	800	500	1050	700	1450	450	900	600	1150	900	1700

NOTE: INCREASE DISTANCE 10% FOR EACH 10°C ABOVE 0°C (10% FOR EACH 20°F ABOVE 32°F) ENGINE LIMITS FOR TAKE-OFF 2400 R.P.M. & 42.7 IN. Hg

TAKE-OFF WITH LOWER COWL FLAPS WIDE OPEN

CLIMB DATA

COMBAT MISSIONS USE 2400 R.P.M. & 42.7 IN. Hg IN LOW BLOWER
COMBAT MISSIONS USE 2400 R.P.M. & 44.3 IN. Hg IN HIGH BLOWER**

FERRY MISSIONS USE 2050 R.P.M. & 26.5 IN. Hg IN LOW BLOWER
FERRY MISSIONS USE 2050 R.P.M. & 29.5 IN. Hg IN HIGH BLOWER

GROSS WEIGHT (LB.)	TYPE OF CLIMB	S. L. TO 5000 FT. ALT.			10000 FT. ALT.				15000 FT. ALT.				20000 FT. ALT.				25000 FT. ALT.				BLOWER CHANGE (FT.)
		BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME From S.L. (MIN.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	BEST I.A.S. (M.P.H.)	RATE OF CLIMB (FT/MIN)	TIME FROM S. L. (MIN.)	FUEL FROM S. L. (U.S.GAL.)	
27000	COMBAT	155	1350	3.4	154	870	8.2	100	154	590	14.9	135	154	130	30.0	200					6000
	FERRY	154	220	23.2	154	210	46.4	155													14100
23000	COMBAT	153	1790	2.6	150	1260	6.0	90	144	980	10.2	115	144	530	17.0	140					6000
	FERRY	144	570	8.7	144	560	17.5	90	144	370	27.6	115	144	170	45.4	155					14100
19000	COMBAT	152	2380	2.1	149	2080	4.2	80	141	1450	7.4	95	132	990	11.5	115	132	490	18.1	130	6000
	FERRY	132	1010	5.0	132	990	10.0	75	132	770	15.6	90	132	550	23.1	105	132	160	38.8	140	14100

NOTE: INCREASE ELAPSED CLIMBING TIME 5% FOR EACH 10°C ABOVE 0 C FREE AIR TEMPERATURE (5% FOR EACH 20 F ABOVE 32 F) FUEL INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

CLIMB WITH LOWER COWL FLAPS WIDE OPEN

LANDING DISTANCE (IN FEET) (WING FLAPS FULL DOWN)

GROSS WEIGHT (LB.)	BEST I.A.S. APPROACH (M.P.H.)	HARD DRY SURFACE						FIRM DRY SOD						WET OR SLIPPERY					
		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.		AT SEA LEVEL		AT 3000 FT.		AT 6000 FT.	
		TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL
23000	125	3450	2200	3800	2500	4200	2800	3800	2550	4200	2900	4650	3200	8900	7650	9900	8550	11000	9600
19000	115	2900	1800	3200	2050	3550	2300	3200	2100	3550	2400	3900	2650	7400	6350	8250	7100	9200	7900

NOTE: FOR GROUND TEMPERATURES ABOVE 35°C (95 F) INCREASE APPROACH I.A.S. 10% AND ALLOW 20% INCREASE IN GROUND ROLL.

LAND WITH COWL FLAPS CLOSED

REMARKS * NORMAL TAKE-OFF IS MADE WITH FLAPS UP. DISTANCES WITH FLAPS UP ARE 15% GREATER THAN THOSE QUOTED.
** WITHIN 5 MINUTES FROM TAKE-OFF REDUCE R.P.M. TO 2300 AND MANIFOLD PRESSURE TO 41.4 IN. Hg IN HIGH BLOWER.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

LEGEND
I.A.S.: Indicated Air Speed
R.P.M.: Revolutions Per Minute
M.P.H.: Miles Per Hour
S.L.: Sea Level
IN. Hg: Inches Mercury
NOTE: All Distances are Average

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 1 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES				FUEL U.S. GAL. (2)	II RANGE IN AIR MILES		III RANGE IN AIR MILES		IV RANGE IN AIR MILES		FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES	
STATUTE		NAUTICAL			STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL		STATUTE	NAUTICAL
AT S.L.	AT 12,000	AT S.L.	AT 12,000										
870	980	760	850	1000	1270	1100	1540	1340	1810	1570	1000	2080	1810
780	880	680	760	900	1140	990	1380	1200	1620	1410	900	1860	1620
690	780	600	680	800	1010	880	1220	1060	1430	1240	800	1640	1420
610	690	530	600	700	880	760	1050	910	1230	1070	700	1410	1220
520	590	450	510	600	750	650	890	770	1040	900	600	1190	1030
430	490	370	430	500	610	530	730	630	850	740	500	970	840
350	390	300	340	400	490	430	590	510	680	590	400	780	680

OPERATING DATA						(1) DENSITY ALT. IN FEET	OPERATING DATA						OPERATING DATA						OPERATING DATA						(1) DENSITY ALT. IN FEET	OPERATING DATA					
R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.		R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.		R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
2300	170	A.R.	F.T.	145	251	30000																			30000						
2300	213	A.R.	F.T.	185	289	25000																			25000						
2300	245	A.R.	F.T.	240	307	20000							2150	204	A.R.	F.T.	170	277	2050	195	A.L.	F.T.	130	264	20000						
2300	264	A.R.	F.T.	290	314	15000	2150	236	A.R.	F.T.	215	296	2000	212	A.L.	30.5	140	265	2000	212	A.L.	30.5	140	265	15000	1950	197	A.L.	F.T.	115	246
2300	268	A.R.	43.5	290	305	12000	2300	244	A.R.	F.T.	210	291	2000	222	A.L.	27.0	140	264	2000	222	A.L.	27.0	140	264	12000	1900	196	A.L.	23.5	110	233
2300	278	A.R.	F.T.	295	302	9000	2150	246	A.R.	30.5	205	280	2000	228	A.L.	27.5	140	259	2000	224	A.L.	27.0	135	255	9000	1850	198	A.L.	24.0	105	225
2300	284	A.R.	38.5	300	295	6000	2100	247	A.R.	30.5	195	268	2000	232	A.L.	28.5	140	252	2000	225	A.L.	27.5	130	244	6000	1850	198	A.L.	24.5	100	214
2300	287	A.R.	41.0	300	285	3000	2100	248	A.R.	31.0	190	258	2000	236	A.L.	29.5	140	245	1950	225	A.L.	27.5	125	233	3000	1800	198	A.L.	24.5	95	205
						S. L.	2050	251	A.R.	31.5	180	249	2000	242	A.L.	30.5	140	240	1950	228	A.L.	28.0	120	226	S. L.	1800	200	A.L.	25.5	90	198

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 400 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 590 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2000 R.P.M. and 222 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition III on Sheets 2 and 3 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 2 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

ALTERNATE CRUISING CONDITIONS

(NO WIND) — (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
790	890	690	770	900	1210	1050	1510	1310	1810	1570	900	2120	1840
700	790	610	690	800	1070	930	1340	1160	1600	1390	800	1870	1620
610	690	530	600	700	930	810	1160	1010	1380	1200	700	1610	1400
530	590	460	510	600	790	690	980	850	1170	1020	600	1360	1180
440	490	380	430	500	650	560	800	690	950	820	500	1110	960
350	390	300	340	400	520	450	640	560	760	660	400	890	770
260	300	230	260	300	390	340	480	420	570	490	300	670	580
170	200	150	170	200	260	230	320	280	380	330	200	440	380
90	100	80	90	100	130	110	160	140	190	170	100	220	190

I OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	185	A.R	F.T.	145	274	25000													2050	163	A.L.	F.T.	105	241	25000						
2300	220	A.R.	F.T.	185	298	20000							2100	205	A.R	F.T.	155	278	2050	204	A.L.	F.T.	130	277	20000	1900	171	A.L.	F.T.	95	231
2300	249	A.R.	F.T.	240	312	15000	2150	237	A.R.	34.0	205	297	2000	218	A.L.	30.5	140	273	2050	214	A.L.	F.T.	130	268	15000	1800	185	A.L.	21.5	95	230
2300	267	A.R.	F.T.	290	318	12000	2250	243	A.R.	F.T.	205	290	2000	229	A.L.	27.0	140	272	1950	216	A.L.	25.0	120	258	12000	1750	183	A.L.	21.5	90	218
2300	272	A.R.	43.5	290	309	9000	2100	246	A.R.	30.0	195	280	2000	233	A.L.	27.5	140	265	1900	216	A.L.	25.5	115	246	9000	1750	183	A.L.	21.5	85	207
2300	280	A.R.	F.T.	295	304	6000	2100	246	A.R.	30.0	190	268	2000	237	A.L.	28.5	140	257	1900	217	A.L.	26.0	115	235	6000	1700	183	A.L.	22.0	80	198
2300	286	A.R	38.5	300	297	3000	2050	247	A.R.	30.5	180	256	2000	241	A.L.	29.5	140	250	1850	218	A.L.	26.0	105	225	3000	1700	183	A.L.	23.0	80	190
2300	290	A.R	41.0	300	288	S. L.	2050	250	A.R.	30.5	170	248	2000	243	A.L.	29.5	135	241	1850	219	A.L.	26.5	100	217	S. L.	1650	184	A.L.	23.5	75	182

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 23,000 Lb. Gross Wt. with 900 Gal. of Fuel (After deducting total allowance of 75 Gal.) to Fly 1700 Stat. Air Miles at 12,000 Ft. Alt. Maintain 1950 R.P.M. and 216 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition IV on Sheet 3 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 3 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
530	600	460	520	600	840	730	1080	940	1310	1140	600	1550	1350
440	500	380	430	500	700	610	880	760	1070	930	500	1260	1090
350	400	300	350	400	560	490	710	620	860	750	400	1010	880
260	300	230	260	300	420	370	530	460	640	560	300	760	660
180	200	160	170	200	280	240	350	300	430	370	200	500	430
90	100	80	90	100	140	120	180	160	210	180	100	250	220

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	194	A.R.	F.T.	145	288	25000							2300	194	A.R	F.T.	145	288	2050	178	A.L	F.T.	105	263	25000						
2300	225	A.R.	F.T.	185	305	20000							2050	211	A.L.	F.T.	130	286	1900	197	A.L.	26.0	110	267	20000	1750	167	A.L.	F.T.	80	226
2300	253	A.R.	F.T.	240	316	15000	2100	237	A.R.	33.0	190	296	2000	224	A.L.	30.5	140	280	1900	209	A.L.	23.0	110	261	15000	1700	170	A.L.	19.0	75	212
2300	260	A.R.	F.T.	290	322	12000	2150	242	A.R.	F.T.	180	288	2000	233	A.L.	27.0	140	277	1850	208	A.L.	23.5	105	247	12000	1650	172	A.L.	19.5	75	205
2300	274	A.R.	43.5	290	311	9000	2050	245	A.R.	29.0	180	278	2000	234	A.L.	27.0	135	266	1850	209	A.L.	23.5	100	237	9000	1600	167	A.L.	20.0	65	189
2300	282	A.R.	F.T.	295	307	6000	2050	245	A.R.	29.0	170	266	2000	235	A.L.	27.5	130	256	1800	208	A.L.	24.0	95	226	6000	1600	166	A.L.	20.0	65	179
2300	288	A.R.	38.5	300	299	3000	2000	245	A.R.	29.5	165	254	1950	236	A.L.	28.0	125	244	1800	208	A.L.	24.5	95	216	3000	1550	162	A.L.	21.0	60	168
2300	292	A.R.	41.0	300	290	S. L.	2000	250	A.L.	30.5	140	248	1950	238	A.L.	28.0	120	236	1750	209	A.L.	25.0	85	207	S. L.	1550	169	A.L.	22.0	60	167

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 420 Gal. of Fuel (After deducting Total Allowance of 75 Gal.) to Fly 1000 Stat. Air Miles at 9000 Ft. Alt. Maintain 1600 R.P.M. and 167 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 4 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES				FUEL U.S. GAL. (2)	II RANGE IN AIR MILES		III RANGE IN AIR MILES		IV RANGE IN AIR MILES		FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES	
STATUTE		NAUTICAL			STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL		STATUTE	NAUTICAL
AT S.L.	AT 12,000	AT S.L.	AT 12,000										
610	690	530	600	725	890	780	1070	920	1250	1080	725	1410	1220
590	670	510	580	700	860	740	1030	890	1200	1040	700	1360	1180
510	570	440	490	600	730	630	880	760	1020	880	600	1140	990
420	470	360	410	500	600	520	720	620	830	720	500	930	810
340	380	290	330	400	480	420	580	500	660	570	400	740	640

I OPERATING DATA						(1) DENSITY ALT. IN FEET	II OPERATING DATA						III OPERATING DATA						IV OPERATING DATA						(1) DENSITY ALT. IN FEET	V OPERATING DATA					
R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.		R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.		R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	205	A.R.	F.T.	185	278	20000							2150	195	A.R.	F.T.	170	264	2050	185	A.L.	F.T.	130	250	20000						
2300	238	A.R.	F.T.	240	297	15000	2150	229	A.R.	F.T.	215	286	2000	203	A.L.	30.5	140	254	2000	203	A.L.	30.5	140	254	15000	1950	186	A.L.	F.T.	115	233
2300	257	A.R.	F.T.	290	306	12000	2300	238	A.R.	F.T.	210	282	2000	215	A.L.	27.0	140	257	2000	215	A.L.	27.0	140	256	12000	1900	186	A.L.	23.5	110	222
2300	260	A.R.	43.5	290	297	9000	2150	239	A.R.	30.5	205	272	2000	221	A.L.	27.5	140	252	2000	218	A.L.	27.0	135	248	9000	1850	190	A.L.	24.0	105	216
2300	270	A.R.	F.T.	295	294	6000	2100	241	A.R.	30.5	195	262	2000	227	A.L.	28.5	140	247	2000	220	A.L.	27.5	130	238	6000	1850	189	A.L.	24.5	100	205
2300	276	A.R.	38.5	300	287	3000	2100	244	A.R.	31.0	190	253	2000	231	A.L.	29.5	140	240	1950	220	A.L.	27.5	125	227	3000	1800	190	A.L.	24.5	95	197
2300	280	A.R.	41.0	300	277	S. L.	2050	246	A.R.	31.5	180	244	2000	238	A.L.	30.5	140	236	1950	222	A.L.	28.0	120	220	S. L.	1800	191	A.L.	25.5	90	189

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 26,000 Lb. Gross Wt. with 700 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1360 Stat. Air Miles at 15,000 Ft. Alt., Maintain 1950 R.P.M. and 186 M.P.H. Ind. Airspeed with Mixture Set Auto Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition V on Sheets 5 & 6 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS

A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 5 OF 44 SHEETS

2 ENGINE OPERATION

GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS

NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
610	700	530	600	725	950	820	1180	1020	1410	1220	725	1610	1390
590	670	510	580	700	910	790	1140	990	1350	1170	700	1550	1340
510	580	440	500	600	780	680	960	830	1140	990	600	1310	1130
420	480	360	420	500	640	550	790	680	930	800	500	1070	930
340	380	290	330	400	510	440	630	540	750	650	400	860	740
250	290	220	250	300	380	330	470	410	560	480	300	640	550
170	190	150	160	200	260	230	320	280	370	320	200	430	370
80	100	70	90	100	130	110	160	140	190	160	100	210	180

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	213	A.R.	F.T.	185	289	20000							2100	198	A.R.	F.T.	155	268	2050	195	A.L.	F.T.	130	265	20000	1900	156	A.L.	F.T.	95	211
2300	240	A.R.	F.T.	240	301	15000	2150	231	A.R.	34.0	205	289	2000	211	A.L.	30.5	140	264	2050	209	A.L.	F.T.	130	260	15000	1800	175	A.L.	21.5	95	218
2300	258	A.R.	F.T.	290	308	12000	2250	238	A.R.	F.T.	205	283	2000	224	A.L.	27.0	140	266	1950	210	A.L.	25.0	120	251	12000	1750	174	A.L.	21.5	90	207
2300	263	A.R.	43.5	290	300	9000	2100	240	A.R.	30.0	195	272	2000	227	A.L.	27.5	140	258	1900	210	A.L.	25.5	115	238	9000	1750	175	A.L.	21.5	85	198
2300	271	A.R.	F.T.	295	295	6000	2100	241	A.R.	30.0	190	262	2000	233	A.L.	28.5	140	253	1900	211	A.L.	26.0	115	230	6000	1700	177	A.L.	22.0	80	192
2300	279	A.R.	38.5	300	289	3000	2050	243	A.R.	30.5	180	252	2000	237	A.L.	29.5	140	246	1850	212	A.L.	26.0	105	220	3000	1700	177	A.L.	23.0	80	183
2300	281	A.R.	41.0	300	279	S. L.	2050	246	A.R.	30.5	170	244	2000	239	A.L.	29.5	135	237	1850	214	A.L.	26.5	100	212	S. L.	1650	178	A.L.	23.5	75	176

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.

2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.

USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 23,000 Lb. Gross Wt. with 700 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1140 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2000 R.P.M. and 224 M.P.H. Ind. Airspeed with Mixture Set Auto Lean. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition III on Sheet 6 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 | FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 6 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
420	480	360	420	500	680	590	870	750	1050	910	500	1200	1040
340	390	290	340	400	540	470	700	610	840	730	400	960	830
250	290	220	250	300	410	350	520	450	630	550	300	720	620
170	190	150	160	200	270	230	350	300	420	360	200	480	420
80	100	70	90	100	140	120	170	150	210	180	100	240	210

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	188	A.R.	F.T.	145	277	25000							2300	187	A.R	F.T.	145	277	2050	170	A.L.	F.T.	105	251	25000						
2300	219	A.R.	F.T.	185	297	20000							2050	203	A.L.	F.T.	130	277	1900	191	A.L.	26.0	110	259	20000	1750	160	A.L.	F.T.	80	215
2300	244	A.R.	F.T.	240	305	15000	2100	231	A.R	33.0	190	289	2000	219	A.L.	30.5	140	273	1900	204	A.L.	23.0	110	255	15000	1700	162	A.L.	19.0	75	203
2300	260	A.R.	F.T.	290	311	12000	2150	237	A.R.	F.T.	180	282	2000	229	A.L.	27.0	140	272	1850	202	A.L.	23.5	105	241	12000	1650	165	A.L.	19.5	75	195
2300	263	A.R.	43.5	290	301	9000	2050	239	A.R	29.0	180	271	2000	230	A.L.	27.0	135	261	1850	203	A.L.	23.5	100	232	9000	1600	160	A.L.	20.0	65	181
2300	272	A.R.	F.T.	295	297	6000	2050	240	A.R.	29.0	170	261	2000	231	A.L.	27.5	130	252	1800	203	A.L.	24.0	95	222	6000	1600	160	A.L.	20.0	65	173
2300	279	A.R.	38.5	300	289	3000	2000	240	A.R	29.5	165	249	1950	231	A.L.	28.0	125	240	1800	204	A.L.	24.5	95	212	3000	1550	156	A.L.	21.0	60	161
2300	282	A.R.	41.0	300	280	S. L.	2000	245	A.L.	30.5	140	243	1950	234	A.L.	28.0	120	232	1750	205	A.L.	25.0	85	203	S. L.	1550	162	A.L.	22.0	60	160

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1000 Stat. Air Miles at 12,000 Ft. Alt. Maintain 1850 R.P.M. and 202 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC 511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 7 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

ALTERNATE CRUISING CONDITIONS

(NO WIND) — (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
580	650	500	560	725	820	710	1040	900	1150	1000	725	1320	1140
560	630	480	550	700	790	680	1000	870	1110	960	700	1270	1100
480	540	420	470	600	670	580	860	750	940	820	600	1070	930
400	450	350	390	500	550	480	710	620	770	670	500	870	760
320	360	280	310	400	440	380	570	490	620	540	400	700	610

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II R.P.M.	II I.A.S. M.P.H.	II M I X.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III R.P.M.	III I.A.S. M.P.H.	III M I X.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV R.P.M.	IV I.A.S. M.P.H.	IV M I X.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V R.P.M.	V I.A.S. M.P.H.	V M I X.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	193	A.R.	F.T.	185	261	20000							2150	182	A.R.	F.T.	170	247	2050	173	A.L.	F.T.	130	234	20000						
2300	225	A.R.	F.T.	240	281	15000	2200	218	A.R.	F.T.	220	273	2050	199	A.R.	32.0	170	249	2000	192	A.L.	30.5	140	240	15000	1900	172	A.L.	23.5	110	215
2300	242	A.R.	F.T.	290	288	12000	2300	223	A.R.	F.T.	215	266	2050	203	A.R.	27.0	165	242	2000	202	A.L.	27.0	140	240	12000	1850	173	A.L.	23.5	105	205
2300	247	A.R.	43.5	290	280	9000	2150	228	A.R.	31.0	210	259	2000	207	A.L.	27.5	140	235	2000	206	A.L.	27.5	140	233	9000	1850	176	A.L.	24.0	105	200
2300	255	A.R.	F.T.	295	277	6000	2100	230	A.R.	31.0	200	249	2000	212	A.L.	28.5	140	230	2000	207	A.L.	27.5	130	224	6000	1850	179	A.L.	24.5	100	194
2300	260	A.R.	38.5	300	270	3000	2100	230	A.R.	31.5	195	238	2000	217	A.L.	29.5	140	225	1950	208	A.L.	28.0	125	216	3000	1800	181	A.L.	25.0	95	187
2300	265	A.R.	41.0	300	263	S. L.	2100	233	A.R.	32.0	190	231	2000	222	A.L.	30.5	140	220	1950	210	A.L.	28.5	120	208	S. L.	1800	182	A.L.	25.5	90	180

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 26,000 Lb. Gross Wt. with 460 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 350 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2300 R.P.M. and 242 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition I on Sheets 8 and 9 Respectively for Operating Data.

T. O. No. 01-40-1

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 8 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES			R-2600-23			

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
580	660	500	570	725	870	750	1080	940	1280	1110	725	1490	1290
560	640	490	550	700	840	730	1040	900	1240	1080	700	1440	1250
480	550	420	480	600	710	620	880	760	1050	910	600	1210	1050
400	460	350	400	500	590	510	720	620	860	750	500	990	860
320	370	280	320	400	470	410	580	500	680	590	400	790	690
240	270	210	230	300	350	300	430	370	510	440	300	590	510
160	180	140	160	200	240	210	290	250	340	300	200	400	350
80	90	70	80	100	120	100	140	120	170	150	100	200	170

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	166	A.R.	F.T.	145	246	25000																			25000						
2300	200	A.R.	F.T.	185	272	20000							2100	187	A.R.	F.T.	155	253	2050	185	A.L.	F.T.	130	251	20000						
2300	229	A.R.	F.T.	240	285	15000	2150	219	A.R.	34.5	210	273	2000	199	A.L.	30.5	140	249	2050	196	A.L.	F.T.	130	245	15000	1800	162	A.L.	21.0	90	202
2300	245	A.R.	F.T.	290	292	12000	2250	226	A.R.	F.T.	205	269	2000	209	A.L.	27.0	140	248	1950	200	A.L.	25.5	125	238	12000	1750	164	A.L.	21.5	90	195
2300	250	A.R.	43.5	290	284	9000	2100	228	A.R.	30.0	195	259	2000	212	A.L.	27.5	140	241	1950	200	A.L.	26.0	120	227	9000	1750	166	A.L.	22.0	85	188
2300	258	A.R.	F.T.	295	280	6000	2100	229	A.R.	30.5	190	248	2000	218	A.L.	28.5	140	236	1900	202	A.L.	26.0	115	219	6000	1750	166	A.L.	22.5	85	180
2300	263	A.R.	38.5	300	273	3000	2050	229	A.R.	30.5	180	237	2000	222	A.L.	29.5	140	230	1900	203	A.L.	26.5	110	210	3000	1700	166	A.L.	23.0	80	171
2300	267	A.R.	41.0	300	265	S. L.	2050	231	A.R.	31.0	175	229	2000	226	A.L.	30.0	140	224	1850	202	A.L.	27.0	105	200	S. L.	1700	171	A.L.	24.0	75	169

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 600 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1200 Stat. Air Miles at 9000 Ft. Alt. Maintain 1750 R.P.M. and 166 M.P.H. Ind. Airspeed with mixture Set Auto-Lean. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 9 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 9 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
490	560	430	490	600	760	660	960	830	1160	1010	600	1350	1170
400	460	350	400	500	620	540	790	690	950	820	500	1110	960
320	370	280	320	400	500	430	630	550	760	660	400	890	770
240	280	210	240	300	370	320	470	410	570	490	300	670	580
160	180	140	160	200	250	220	320	280	380	330	200	450	390
80	90	70	80	100	120	100	160	140	190	170	100	220	190

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	177	A.R.	F.T.	145	261	25000													2050	160	A.L.	F.T.	105	236	25000						
2300	206	A.R.	F.T.	185	279	20000							2050	192	A.L.	F.T.	130	261	1950	183	A.L.	F.T.	120	248	20000	1750	149	A.L.	F.T.	80	202
2300	232	A.R.	F.T.	240	291	15000	2100	220	A.R.	34.0	200	275	2000	206	A.L.	30.5	140	257	1950	195	A.L.	F.T.	115	243	15000	1700	157	A.L.	19.5	80	196
2300	248	A.R.	F.T.	290	296	12000	2200	225	A.R.	F.T.	190	268	2000	214	A.L.	27.0	140	254	1900	195	A.L.	24.0	110	232	12000	1700	161	A.L.	20.0	75	191
2300	252	A.R.	43.5	75	175	9000	2100	227	A.R.	29.5	185	258	2000	217	A.L.	27.5	140	247	1850	196	A.L.	24.0	105	222	9000	1650	162	A.L.	20.5	75	183
2300	260	A.R.	F.T.	295	283	6000	2050	228	A.R.	29.5	180	247	2000	220	A.L.	28.0	135	239	1850	196	A.L.	24.5	100	212	6000	1650	162	A.L.	21.0	70	175
2300	265	A.R.	38.5	300	275	3000	2050	229	A.R.	30.0	170	237	2000	220	A.L.	28.5	130	228	1800	196	A.L.	25.0	95	203	3000	1600	157	A.L.	21.5	65	162
2300	269	A.R.	41.0	300	267	S. L.	2000	230	A.R.	30.0	165	228	1950	221	A.L.	29.0	125	219	1800	197	A.L.	25.5	90	195	S. L.	1600	162	A.L.	22.5	65	160

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 20,000 Lb. Gross Wt. with 300 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 500 Stat. Air Miles at 12,000 Ft. Alt. Maintain 1900 R.P.M. and 195 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 10 OF 44 SHEETS
2 ENGINE OPERATION
GT. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
560	630	480	540	725	790	680	940	810	1080	930	725	1210	1040
540	610	470	530	700	760	660	910	790	1050	910	700	1160	1000
460	520	400	450	600	650	560	780	670	900	780	600	1000	870
380	430	330	370	500	540	470	650	560	750	650	500	830	720
310	350	270	300	400	430	370	520	450	600	520	400	660	570

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II R.P.M.	II I.A.S. M.P.H.	II M I X.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III R.P.M.	III I.A.S. M.P.H.	III M I X.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV R.P.M.	IV I.A.S. M.P.H.	IV M I X.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V R.P.M.	V I.A.S. M.P.H.	V M I X.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	184	A.R	F.T.	185	250	20000							2150	173	A.R.	F.T.	170	234	2050	164	A.L.	F.T.	130	220	20000						
2300	217	A.R	F.T.	240	271	15000	2200	210	A.R	F.T.	220	263	2050	190	A.R.	32.0	170	238	2000	184	A.L.	30.5	140	229	15000	1900	162	A.L.	23.5	110	202
2300	235	A.R.	F.T.	290	280	12000	2300	215	A.R.	F.T.	215	257	2050	196	A.R.	27.0	165	234	2000	195	A.L.	27.0	140	232	12000	1850	165	A.L.	23.5	105	194
2300	240	A.R.	43.5	290	272	9000	2150	221	A.R.	31.0	210	251	2000	200	A.L.	27.5	140	228	2000	199	A.L.	27.5	140	226	9000	1850	169	A.L.	24.0	105	191
2300	248	A.R.	F.T.	295	269	6000	2100	224	A.R.	31.0	200	243	2000	207	A.L.	28.5	140	225	2000	200	A.L.	27.5	130	218	6000	1850	170	A.L.	24.5	100	185
2300	252	A.R.	38.5	300	262	3000	2100	225	A.R.	31.5	195	233	2000	212	A.L.	29.5	140	220	1950	203	A.L.	28.0	125	210	3000	1800	172	A.L.	25.0	95	178
2300	257	A.R.	41.0	300	255	S. L.	2100	228	A.R.	32.0	190	226	2000	218	A.L.	30.5	140	216	1950	204	A.L.	28.5	120	202	S. L.	1800	173	A.L.	25.5	90	171

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN. USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 26,000 Lb. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 830 Stat. Air Miles at 15,000 Ft. Alt. Maintain 1900 R.P.M. and 162 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition V on Sheets 11 and 12 respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC 511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 11 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
560	640	480	550	725	840	730	1030	890	1210	1040	725	1390	1200
540	620	470	540	700	810	700	990	860	1170	1010	700	1340	1160
470	530	410	460	600	690	600	850	740	1000	870	600	1150	1000
390	440	340	380	500	580	500	710	610	830	720	500	960	830
310	350	270	300	400	460	400	570	490	670	580	400	770	670
230	260	200	230	300	350	300	430	370	500	430	300	570	490
150	180	130	160	200	230	200	280	240	330	290	200	380	330
80	90	70	80	100	110	90	140	120	170	150	100	190	160

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V (MAX. RANGE) OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	193	A.R	F.T.	185	262	20000							2100	179	A.R.	F.T.	155	243	2050	176	A.L.	F.T.	130	239	20000						
2300	220	A.R	F.T.	240	275	15000	2150	212	A.R.	34.5	210	265	2000	192	A.L.	30.5	140	240	2050	190	A.L.	F.T.	130	237	15000	1800	154	A.L.	21.0	90	191
2300	237	A.R	F.T.	290	282	12000	2250	220	A.R.	F.T.	205	262	2000	203	A.L.	27.0	140	242	1950	194	A.L.	25.5	125	231	12000	1750	156	A.L.	21.5	90	184
2300	241	A.R	43.5	290	275	9000	2100	220	A.R.	30.0	195	251	2000	207	A.L.	27.5	140	235	1950	194	A.L.	26.0	120	220	9000	1750	159	A.L.	22.0	85	179
2300	250	A.R	F.T.	295	271	6000	2100	223	A.R.	30.5	190	242	2000	214	A.L.	28.5	140	232	1900	297	A.L.	26.0	115	214	6000	1750	160	A.L.	22.5	85	173
2300	255	A.R.	38.5	300	264	3000	2050	225	A.R.	30.5	180	233	2000	218	A.L.	29.5	140	226	1900	197	A.L.	26.5	110	205	3000	1700	160	A.L.	23.0	80	164
2300	258	A.R.	41.0	300	256	S. L.	2050	227	A.R.	31.0	175	225	2000	222	A.L.	30.0	140	220	1850	197	A.L.	27.0	105	195	S. L.	1700	165	A.L.	24.0	75	163

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 23,000 Lb. Gross Wt. with 650 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 850 Stat. Air Miles at 15,000 Ft. Alt. Maintain 2000 R.P.M. & 192 M.P.H. Ind. Airspeed. with Mixture Set Auto-Lean. When Gross Weight Decreases to 21,000 Lbs. Refer to Alternate Cruising Condition III on Sheet 12 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 | FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 12 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES				FUEL U.S. GAL. (2)	II RANGE IN AIR MILES		III RANGE IN AIR MILES		IV RANGE IN AIR MILES		FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES	
STATUTE		NAUTICAL			STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL		STATUTE	NAUTICAL
AT S.L.	AT 12,000	AT S.L.	AT 12,000										
OPEN LOWER COWL FLAPS 1/4													
390	450	340	390	500	610	530	770	670	930	800	500	1060	910
310	360	270	310	400	490	420	620	540	740	640	400	850	730
230	270	200	230	300	370	320	460	400	560	480	300	640	550
150	180	130	160	200	240	210	310	270	370	320	200	430	370
80	90	70	80	100	120	100	150	130	190	160	100	210	180

OPERATING DATA						(1)	OPERATING DATA						OPERATING DATA						OPERATING DATA						(1)	OPERATING DATA					
R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	DENSITY ALT. IN FEET	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	DENSITY ALT. IN FEET	R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	170	A.R.	F.T.	145	251	25000													2050	152	A.L.	F.T.	105	224	25000						
2300	200	A.R.	F.T.	185	271	20000							2050	185	A.L.	F.T.	130	252	1950	176	A.L.	F.T.	120	240	20000	1750	143	A.L.	F.T.	80	191
2300	224	A.R.	F.T.	240	280	15000	2100	214	A.R.	34.0	200	268	2000	200	A.L.	30.5	140	250	1950	190	A.L.	F.T.	115	236	15000	1700	150	A.L.	19.5	80	186
2300	240	A.R.	F.T.	290	285	12000	2200	219	A.R.	F.T.	190	261	2000	209	A.L.	27.0	140	249	1900	190	A.L.	24.0	110	226	12000	1700	153	A.L.	20.0	75	181
2300	244	A.R.	43.5	290	277	9000	2100	221	A.R.	29.5	185	251	2000	212	A.L.	27.5	140	242	1850	191	A.L.	24.0	105	217	9000	1650	155	A.L.	20.5	75	175
2300	251	A.R.	F.T.	295	273	6000	2050	223	A.R.	29.5	180	242	2000	216	A.L.	28.0	135	235	1850	191	A.L.	24.5	100	208	6000	1650	156	A.L.	21.0	70	168
2300	255	A.R.	38.5	300	265	3000	2050	224	A.R.	30.0	170	232	2000	216	A.L.	28.5	130	224	1800	191	A.L.	25.0	95	199	3000	1600	151	A.L.	21.5	65	155
2300	259	A.R.	41.0	300	257	S. L.	2000	225	A.R.	30.0	165	223	1950	217	A.L.	29.0	125	215	1800	193	A.L.	25.5	90	191	S. L.	1600	155	A.L.	22.5	65	153

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lbs. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 930 Stat. Air Miles at 9,000 Ft. Alt. Maintain 1850 R.P.M. & 191 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

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MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 13 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
900	1020	780	880	1099	1310	1130	1590	1380	1870	1620	1099	2150	1860
820	920	710	800	1000	1180	1020	1430	1240	1670	1450	1000	1930	1670
740	830	640	720	900	1060	920	1280	1110	1500	1300	900	1720	1490
650	740	560	640	800	940	820	1130	980	1320	1150	800	1520	1320
570	640	490	560	700	820	710	980	850	1150	1000	700	1320	1150
490	550	430	480	600	700	610	830	720	970	840	600	1110	960
410	460	360	400	500	580	500	680	590	800	690	500	910	790
330	370	290	320	400	460	400	550	480	640	560	400	730	630

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	198	A.R.	F.T.	185	269	20000							2150	187	A.R.	F.T.	170	253	2050	179	A.L.	F.T.	130	242	20000						
2300	230	A.R.	F.T.	240	288	15000	2150	222	A.R.	F.T.	215	277	2000	197	A.L.	30.5	140	246	2000	196	A.L.	30.5	140	245	15000	1900	175	A.L.	23.0	110	218
2300	247	A.R.	F.T.	290	294	12000	2300	229	A.R.	F.T.	215	273	2000	208	A.L.	27.0	140	247	2000	207	A.L.	27.0	140	246	12000	1850	175	A.L.	23.5	105	208
2300	252	A.R.	43.5	290	287	9000	2100	231	A.R.	30.5	205	262	2000	212	A.L.	27.5	140	241	2000	209	A.L.	27.0	135	237	9000	1850	177	A.L.	23.5	100	200
2300	261	A.R.	F.T.	295	284	6000	2100	232	A.R.	30.5	195	252	2000	218	A.L.	28.5	140	236	2000	210	A.L.	27.5	130	228	6000	1800	178	A.L.	24.0	95	193
2300	267	A.R.	38.5	300	277	3000	2100	233	A.R.	31.0	190	242	2000	222	A.L.	29.5	140	230	1950	211	A.L.	28.0	125	219	3000	1800	181	A.L.	24.5	95	187
2300	271	A.R.	41.0	300	269	S. L.	2100	237	A.R.	31.5	185	235	2000	227	A.L.	30.5	140	225	1950	214	A.L.	28.0	120	212	S. L.	1800	184	A.L.	25.5	90	182

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 1000 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1900 Stat. Air Miles at 6000 Ft. Alt. Maintain 1800 R.P.M. and 178 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition V on Sheets 14 and 15 Respectively for Operating Data.

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 14 OF 44 SHEETS

2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
740	840	640	730	900	1120	970	1400	1220	1670	1450	900	1940	1680
660	750	570	650	800	990	860	1230	1070	1470	1280	800	1710	1490
570	650	490	560	700	870	760	1070	930	1270	1100	700	1480	1290
490	560	430	490	600	740	640	910	790	1080	940	600	1250	1090
410	460	360	400	500	610	530	740	640	880	760	500	1020	890
330	370	290	320	400	490	430	600	520	700	610	400	820	710
250	280	220	240	300	360	310	450	390	530	460	300	610	530
160	190	140	170	200	240	210	300	260	350	300	200	410	360
80	90	70	80	100	120	100	150	130	180	160	100	200	170

I OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	171	A.R.	F.T.	145	253	25000																			25000						
2300	205	A.R.	F.T.	185	278	20000							2100	191	A.R.	F.T.	155	259	2050	190	A.L.	F.T.	130	257	20000						
2300	234	A.R.	F.T.	240	293	15000	2150	223	A.R.	34.0	205	278	2000	204	A.L.	30.5	140	255	2050	201	A.L.	F.T.	130	251	15000	1800	168	A.L.	21.5	95	209
2300	251	A.R.	F.T.	290	299	12000	2250	230	A.R.	F.T.	205	274	2000	214	A.L.	27.0	140	254	1950	204	A.L.	25.5	125	242	12000	1800	171	A.L.	21.5	90	203
2300	255	A.R.	43.5	290	290	9000	2100	232	A.R.	30.0	195	263	2000	218	A.L.	27.5	140	248	1950	205	A.L.	25.5	120	232	9000	1750	172	A.L.	22.0	85	195
2300	264	A.R.	F.T.	295	286	6000	2050	233	A.R.	29.5	180	253	2000	223	A.L.	28.5	140	242	1900	205	A.L.	26.0	115	222	6000	1750	173	A.L.	22.5	85	187
2300	269	A.R.	38.5	300	279	3000	2050	234	A.R.	30.5	180	242	2000	227	A.L.	29.5	140	235	1900	208	A.L.	26.5	110	215	3000	1700	171	A.L.	23.0	80	176
2300	273	A.R.	41.0	300	271	S. L.	2050	236	A.R.	31.0	175	234	2000	230	A.L.	30.0	140	228	1850	207	A.L.	27.0	105	205	S. L.	1700	177	A.L.	24.0	75	175

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 lb. Gross Wt. with 700 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 1000 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2000 R.P.M. and 214 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 21,000 lb. Refer to Alternate Cruising Condition III on Sheet 15 for Operating Data.

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MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 15 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
330	380	290	330	400	520	450	650	560	790	690	400	920	800
250	280	220	240	300	390	340	490	430	590	510	300	690	600
170	190	150	170	200	260	230	320	280	390	340	200	460	400
80	90	70	80	100	130	110	160	140	200	170	100	230	200

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	182	A.R.	F.T.	145	268	25000													2050	165	A.L.	F.T.	105	243	25000						
2300	210	A.R.	F.T.	185	286	20000							2050	197	A.L.	F.T.	130	267	1900	187	A.L.	F.T.	115	254	20000	1750	155	A.L.	F.T.	80	209
2300	238	A.R.	F.T.	240	297	15000	2100	224	A.R.	33.5	195	280	2000	210	A.L.	30.5	140	262	1900	198	A.L.	F.T.	115	247	15000	1700	162	A.L.	19.5	80	202
2300	254	A.R.	F.T.	290	302	12000	2150	229	A.R.	F.T.	190	273	2000	218	A.L.	27.0	140	260	1900	198	A.L.	24.0	110	236	12000	1700	165	A.L.	20.0	75	195
2300	258	A.R.	43.5	290	294	9000	2100	231	A.R.	29.0	185	262	2000	223	A.L.	27.5	140	253	1850	198	A.L.	24.0	105	225	9000	1650	163	A.L.	20.5	75	184
2300	266	A.R.	F.T.	295	289	6000	2050	232	A.R.	29.5	180	252	2000	224	A.L.	28.0	135	244	1850	198	A.L.	24.5	100	215	6000	1650	164	A.L.	21.0	70	177
2300	271	A.R.	38.5	300	281	3000	2050	233	A.R.	29.5	170	247	2000	225	A.L.	28.5	130	233	1800	199	A.L.	24.5	95	206	3000	1600	156	A.L.	21.0	65	161
2300	275	A.R.	41.0	300	273	S. L.	2000	235	A.L.	30.5	140	233	1950	226	A.L.	29.0	125	224	1800	200	A.L.	25.5	90	198	S. L.	1550	162	A.L.	22.0	60	160

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 400 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 350 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2300 R.P.M. and 254 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS

A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 16 OF 44 SHEETS

2 ENGINE OPERATION

GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS

DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
870	990	750	860	1099	1280	1110	1560	1350	1820	1570	1099	2060	1780
790	900	680	780	1000	1160	1010	1410	1220	1630	1410	1000	1840	1590
710	810	610	700	900	1040	900	1260	1090	1460	1260	900	1650	1430
630	720	550	620	800	920	800	1110	960	1290	1120	800	1450	1260
550	630	480	550	700	800	690	970	840	1120	970	700	1250	1080
470	540	410	470	600	680	590	820	710	950	820	600	1060	920
390	450	340	390	500	560	480	670	580	770	670	500	860	740
320	360	280	310	400	450	390	540	470	620	540	400	690	600

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II R.P.M.	II I.A.S. M.P.H.	II M I X.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III R.P.M.	III I.A.S. M.P.H.	III M I X.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV R.P.M.	IV I.A.S. M.P.H.	IV M I X.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V R.P.M.	V I.A.S. M.P.H.	V M I X.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	190	A.R.	F.T.	185	258	20000							2150	176	A.R.	F.T.	170	240	2050	169	A.L.	F.T.	130	228	20000						
2300	222	A.R.	F.T.	240	278	15000	2150	214	A.R.	F.T.	215	267	2000	188	A.L.	30.5	140	235	2000	187	A.L.	30.5	140	234	15000	1900	165	A.L.	23.0	110	205
2300	240	A.R.	F.T.	290	286	12000	2300	221	A.R.	F.T.	215	264	2000	200	A.L.	27.0	140	239	2000	200	A.L.	27.0	140	238	12000	1850	167	A.L.	23.5	105	197
2300	245	A.R.	43.5	290	279	9000	2100	224	A.R.	30.5	205	254	2000	206	A.L.	27.5	140	234	2000	203	A.L.	27.0	135	230	9000	1850	169	A.L.	23.5	100	191
2300	254	A.R.	F.T.	295	276	6000	2100	226	A.R.	30.5	195	246	2000	212	A.L.	28.5	140	231	2000	204	A.L.	27.5	130	222	6000	1800	170	A.L.	24.0	95	184
2300	259	A.R.	38.5	300	269	3000	2100	229	A.R.	31.0	190	237	2000	218	A.L.	29.5	140	225	1950	205	A.L.	28.0	125	213	3000	1800	172	A.L.	24.5	95	178
2300	263	A.R.	41.0	300	261	S. L.	2100	232	A.R.	31.5	185	230	2000	223	A.L.	30.5	140	221	1950	208	A.L.	28.0	120	206	S. L.	1800	175	A.L.	25.5	90	173

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.

2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 26,000 Lb. Gross Wt. with 1000 Gallons of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 790 Stat. Air Miles at 5,000 Ft. Alt. Maintain 2300 R.P.M. & 254 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000, & 21,000 Lbs. Refer at Alternate Cruising Condition 1 on Sheets 17 & 18 respectively.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 17 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
710	810	610	700	900	1100	950	1370	1190	1630	1410	900	1860	1610
640	720	550	620	800	970	840	1210	1050	1440	1250	800	1640	1420
560	630	480	550	700	850	740	1050	910	1240	1070	700	1420	1230
480	540	420	470	600	720	620	890	770	1050	910	600	1200	1040
400	450	350	390	500	600	520	730	630	860	740	500	980	850
320	360	280	310	400	480	420	590	510	690	600	400	790	680
240	270	210	230	300	360	310	440	380	520	450	300	590	510
160	180	140	160	200	240	210	290	250	340	290	200	390	340
80	90	70	80	100	120	100	150	130	170	150	100	200	170

OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	198	A.R.	F.T.	185	268	20000							2100	184	A.R.	F.T.	155	249	2050	180	A.L.	F.T.	130	245	20000						
2300	226	A.R.	F.T.	240	282	15000	2150	216	A.R.	34.0	205	270	2000	197	A.L.	30.5	140	246	2050	194	A.L.	F.T.	130	243	15000	1800	160	A.L.	21.5	95	198
2300	242	A.R.	F.T.	290	289	12000	2250	223	A.R.	F.T.	205	267	2000	209	A.L.	27.0	140	248	1950	197	A.L.	25.5	125	235	12000	1800	162	A.L.	21.5	90	192
2300	248	A.R.	43.5	290	281	9000	2100	223	A.R.	30.0	195	255	2000	212	A.L.	27.5	140	242	1950	199	A.L.	25.5	120	225	9000	1750	165	A.L.	22.0	85	186
2300	254	A.R.	F.T.	295	277	6000	2050	227	A.R.	29.5	180	247	2000	220	A.L.	28.5	140	238	1900	200	A.L.	26.0	115	217	6000	1750	166	A.L.	22.5	85	180
2300	260	A.R.	38.5	300	270	3000	2050	230	A.R.	30.5	180	238	2000	223	A.L.	29.5	140	231	1900	202	A.L.	26.5	110	210	3000	1700	165	A.L.	23.0	80	170
2300	264	A.R.	41.0	300	262	S. L.	2050	232	A.R.	31.0	175	230	2000	226	A.L.	30.0	140	224	1850	202	A.L.	27.0	105	200	S. L.	1700	171	A.L.	24.0	75	169

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 22,000 Lb. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 600 Stat. Air Miles at 15,000 Ft. Alt. Maintain 2150 R.P.M. & 216 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lbs. Refer to Alternate Cruising Condition II on Sheet 18.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 18 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
320	360	280	310	400	500	430	640	550	770	670	400	880	760
240	270	210	230	300	380	330	480	420	580	500	300	660	570
160	180	140	160	200	250	220	320	280	380	330	200	440	380
80	90	70	80	100	130	110	160	140	190	160	100	220	190

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V (MAX. RANGE) OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	172	A.R.	F.T.	145	258	25000													2050	158	A.L.	F.T.	105	231	25000						
2300	204	A.R.	F.T.	185	278	20000							2050	190	A.L.	F.T.	130	258	1900	181	A.L.	F.T.	115	246	20000	1750	148	A.L.	F.T.	80	198
2300	230	A.R.	F.T.	240	286	15000	2100	219	A.R.	33.5	195	273	2000	204	A.L.	30.5	140	255	1900	192	A.L.	F.T.	115	240	15000	1700	155	A.L.	19.5	80	192
2300	245	A.R.	F.T.	290	291	12000	2150	223	A.R.	F.T.	190	266	2000	214	A.L.	27.0	140	255	1900	193	A.L.	24.0	110	230	12000	1700	156	A.L.	20.0	75	185
2300	250	A.R.	43.5	290	284	9000	2100	224	A.R.	29.0	185	255	2000	219	A.L.	27.5	140	248	1850	194	A.L.	24.0	105	220	9000	1650	156	A.L.	20.5	75	176
2300	256	A.R.	F.T.	295	279	6000	2050	228	A.R	29.5	180	247	2000	221	A.L.	28.0	135	240	1850	195	A.L.	24.5	100	211	6000	1650	158	A.L.	21.0	70	170
2300	260	A.R.	38.5	300	271	3000	2050	229	A.R	29.5	170	237	2000	221	A.L.	28.5	130	229	1800	196	A.L.	24.5	95	202	3000	1600	150	A.L.	21.0	65	154
2300	265	A.R.	41.0	300	263	S. L.	2000	230	A.L.	30.5	140	228	1950	222	A.L.	29.0	125	220	1800	196	A.L.	25.5	90	194	S. L.	1550	155	A.L.	22.0	60	153

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 100 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 220 Stat. Air Miles at S.L. Maintain 1550 R.P.M. and 155 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC 511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 19 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES			R-2600-23			

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
570	640	490	550	725	800	690	960	830	1120	970	725	1270	1100
550	620	480	540	700	780	680	930	810	1080	940	700	1220	1060
470	530	410	460	600	660	570	790	690	910	790	600	1030	890
390	440	340	380	500	550	480	650	560	750	650	500	840	730
310	350	270	300	400	440	380	520	450	600	520	400	670	580
230	260	200	230	300	330	290	390	340	450	390	300	510	440
160	180	140	160	200	220	190	260	230	300	260	200	340	300
80	90	70	80	100	110	100	130	110	150	130	100	170	150

I OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	188	A.R.	F.T.	185	255	20000							2150	177	A.R.	F.T.	170	239	2050	167	A.L.	F.T.	130	226	20000						
2300	220	A.R.	F.T.	240	275	15000	2200	212	A.R.	F.T.	220	265	2050	195	A.R.	32.0	170	243	2000	187	A.L.	30.5	140	233	15000	1950	171	A.L.	F.T.	115	214
2300	237	A.R.	F.T.	290	282	12000	2300	219	A.R.	F.T.	215	261	2050	199	A.R.	27.0	165	237	2000	198	A.L.	27.0	140	235	12000	1900	174	A.L.	24.0	110	206
2300	242	A.R.	43.5	290	275	9000	2150	222	A.R.	31.0	210	252	2000	202	A.L.	27.5	140	231	2000	203	A.L.	27.5	140	230	9000	1900	177	A.L.	24.5	105	200
2300	250	A.R.	F.T.	295	272	6000	2100	223	A.R.	31.0	200	242	2000	208	A.L.	28.5	140	225	2000	204	A.L.	27.5	130	221	6000	1850	179	A.L.	25.0	105	194
2300	255	A.R.	38.5	300	264	3000	2100	225	A.R.	31.0	190	233	2000	213	A.L.	29.5	140	220	1950	206	A.L.	28.0	125	213	3000	1850	181	A.L.	25.5	100	188
2300	260	A.R.	41.0	300	258	S. L.	2100	228	A.R.	32.0	190	226	2000	217	A.L.	30.5	140	215	1950	207	A.L.	28.5	120	205	S. L.	1800	182	A.L.	26.0	95	180

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 840 Stat. Air Miles at 6000 Ft. Alt. Maintain 1850 R.P.M. and 179 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition V on Sheets 20 and 21 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 20 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES			R-2600-23			

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
570	650	490	560	725	850	740	950	820	1240	1070	725	1440	1250
550	620	480	540	700	820	710	910	790	1200	1040	700	1380	1190
470	540	410	470	600	700	610	760	660	1010	880	600	1170	1020
390	450	340	390	500	580	500	700	610	830	720	500	950	820
320	360	280	310	400	460	400	560	490	660	580	400	760	660
240	270	210	230	300	350	300	420	370	500	430	300	570	490
160	180	140	160	200	230	200	280	240	330	290	200	380	330
80	90	70	80	100	120	100	140	120	170	150	100	190	170

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	162	A.R.	F.T.	145	239	25000																			25000						
2300	196	A.R.	F.T.	185	266	20000							2100	182	A.R.	F.T.	155	247	2050	180	A.L.	F.T.	130	244	20000						
2300	225	A.R.	F.T.	240	281	15000	2150	215	A.R.	34.5	210	268	2000	195	A.L.	30.5	140	243	2050	192	A.L.	F.T.	130	240	15000	1800	162	A.L.	21.5	95	201
2300	240	A.R.	F.T.	290	286	12000	2250	221	A.R.	F.T.	205	264	2000	204	A.L.	27.0	140	243	1950	197	A.L.	26.0	130	235	12000	1800	164	A.L.	22.0	90	195
2300	245	A.R.	43.5	290	278	9000	2100	223	A.R.	30.0	195	253	2000	209	A.L.	27.5	140	237	1950	198	A.L.	26.0	120	225	9000	1750	166	A.L.	22.5	90	188
2300	253	A.R.	F.T.	295	275	6000	2100	224	A.R.	30.0	190	243	2000	214	A.L.	28.5	140	232	1950	200	A.L.	26.5	120	216	6000	1750	163	A.L.	22.5	85	176
2300	258	A.R.	38.5	300	267	3000	2050	225	A.R.	30.5	180	233	2000	217	A.L.	29.5	140	225	1900	200	A.L.	26.5	110	207	3000	1750	168	A.L.	23.0	80	173
2300	262	A.R.	41.0	300	260	S. L.	2050	227	A.R.	31.0	175	225	2000	222	A.L.	30.0	140	220	1900	202	A.L.	27.0	110	200	S. L.	1700	170	A.L.	24.0	75	168

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN. USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 300 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 240 Stat. Air Miles at 6000 Ft. Alt. Maintain 2300 R.P.M. and 253 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition I on Sheet 12 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 21 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
					OPEN LOWER COWL FLAPS 1/4								
320	360	280	310	400	490	430	610	530	740	640	400	860	750
240	270	210	230	300	370	320	460	400	550	480	300	650	560
160	180	140	160	200	240	210	310	270	370	320	200	430	370
80	90	70	80	100	120	100	150	130	180	160	100	210	190

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	173	A.R.	F.T.	145	256	25000													2050	156	A.L.	F.T.	105	230	25000						
2300	201	A.R.	F.T.	185	273	20000							2050	188	A.L.	F.T.	130	255	1950	180	A.L.	F.T.	120	244	20000	1850	152	A.L.	F.T.	85	205
2300	228	A.R.	F.T.	240	285	15000	2100	215	A.R.	33.5	195	269	2000	201	A.L.	30.5	140	251	1950	190	A.L.	F.T.	115	240	15000	1750	159	A.L	20.0	85	198
2300	244	A.R.	F.T.	290	290	12000	2200	220	A.R.	F.T.	190	262	2000	210	A.L.	27.0	140	249	1900	192	A.L.	24.0	110	229	12000	1700	161	A.L.	20.5	80	191
2300	248	A.R.	43.5	290	282	9000	2100	223	A.R	29.5	185	253	2000	213	A.L.	27.5	140	242	1900	192	A.L.	24.5	105	218	9000	1700	161	A.L	21.0	75	183
2300	255	A.R.	F.T.	295	277	6000	2050	223	A.R.	29.5	180	242	2000	217	A.L.	28.0	135	235	1850	193	A.L.	25.0	100	209	6000	1650	163	A.L	21.5	75	176
2300	260	A.R.	38.5	300	270	3000	2050	224	A.R	30.0	170	232	2000	216	A.L.	28.5	130	224	1800	193	A.L.	25.0	95	200	3000	1650	159	A.I	22.0	70	164
2300	265	A.R.	41.0	300	263	S. L.	2000	226	A.R	30.0	165	224	1950	219	A.L.	29.0	125	217	1800	195	A.L.	25.5	90	193	S. L.	1600	162	A.L.	22.5	65	160

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 400 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 600 Stat. Air Miles at 12,000 Ft. Alt. Maintain 2000 R.P.M. and 210 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 22 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
550	620	470	540	725	780	670	940	810	1090	940	725	1210	1040
530	600	460	520	700	760	660	910	780	1050	910	700	1170	1010
450	510	390	440	600	650	560	770	670	880	760	600	980	850
380	430	330	370	500	530	460	630	550	720	620	500	800	690
300	340	260	290	400	430	370	510	440	580	500	400	640	550
230	260	200	230	300	320	280	380	330	430	370	300	480	420
150	170	130	150	200	210	180	250	220	290	250	200	320	280
70	80	60	50	100	110	100	130	110	140	120	100	160	140

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	180	A.R.	F.T.	185	244	20000							2150	167	A.R.	F.T.	170	226	2050	157	A.L.	F.T.	130	212	20000						
2300	212	A.R.	F.T.	240	265	15000	2200	204	A.R.	F.T.	220	255	2050	186	A.R.	32.0	170	232	2000	178	A.L.	30.5	140	222	15000	1950	162	A.L.	F.T.	115	201
2300	230	A.R.	F.T.	290	274	12000	2300	211	A.R.	F.T.	215	252	2050	192	A.R.	27.0	165	229	2000	190	A.L.	27.0	140	227	12000	1900	168	A.L.	24.0	110	195
2300	235	A.R.	43.5	290	267	9000	2150	215	A.R.	31.0	210	244	2000	198	A.L.	27.5	140	224	2000	196	A.L.	27.5	140	223	9000	1900	169	A.L.	24.5	105	191
2300	243	A.R.	F.T.	295	264	6000	2100	218	A.R.	31.0	200	236	2000	203	A.L.	28.5	140	220	2000	199	A.L.	27.5	130	215	6000	1850	170	A.L.	25.0	105	185
2300	247	A.R.	38.5	300	256	3000	2100	220	A.R.	31.0	190	228	2000	207	A.L.	29.5	140	215	1950	200	A.L.	28.0	125	207	3000	1850	173	A.L.	25.5	100	179
2300	252	A.R.	41.0	300	250	S. L.	2100	223	A.R.	32.0	190	221	2000	213	A.L.	30.5	140	211	1950	201	A.L.	28.5	120	199	S. L.	1800	173	A.L.	26.0	95	171

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 27,000 Lb. Gross Wt. with 650 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 970 Stat. Air Miles at 20,000 Ft. Alt. Maintain 2050 R.P.M. and 157 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 24,000 and 21,000 Lbs. Refer to Alternate Cruising Condition IV on Sheets 23 and 24 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942
FORM ASC-311

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 23 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF	2400	42.7	LOW	A. R.	5	410
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

ALTERNATE CRUISING CONDITIONS

(NO WIND) (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS 1/4

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
550	630	470	540	725	840	730	1030	890	1210	1040	725	1380	1190
530	600	460	520	700	810	700	990	850	1170	1010	700	1330	1150
460	520	400	450	600	690	600	840	730	990	860	600	1120	970
380	430	330	370	500	570	490	690	600	810	700	500	920	800
300	340	260	290	400	450	390	550	480	650	560	400	740	640
230	260	200	230	300	340	290	410	360	490	420	300	550	480
150	170	130	150	200	230	200	280	240	320	280	200	370	320
80	90	70	80	100	110	90	140	120	160	140	100	180	160

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
2300	189	A.R.	F.T.	185	256	20000							2100	175	A.R	F.T.	155	237	2050	171	A.L.	F.T.	130	232	20000						
2300	216	A.R.	F.T.	240	270	15000	2150	208	A.R	34.5	210	260	2000	188	A.L	30.5	140	234	2050	186	A.L.	F.T.	130	232	15000	1800	154	A.L	21.5	95	190
2300	232	A.R	F.T.	290	276	12000	2250	215	A.R.	F.T.	205	257	2000	199	A.L.	27.0	140	237	1950	191	A.L.	26.0	130	228	12000	1800	156	A.L	22.0	90	184
2300	236	A.R.	43.5	290	269	9000	2100	215	A.R	30.0	195	245	2000	203	A.L.	27.5	140	231	1950	192	A L	26.0	120	218	9000	1750	159	A.L.	22.5	90	179
2300	245	A.R.	F.T.	295	266	6000	2100	219	A.R.	30.0	190	237	2000	210	A.L.	28.5	140	228	1950	194	A.L.	26.5	120	211	6000	1750	157	A.L.	22.5	85	169
2300	249	A.R.	38.5	300	258	3000	2050	221	A.R.	30.5	180	229	2000	213	A.L.	29.5	140	221	1900	195	A.L.	26.5	110	202	3000	1750	161	A.L	23.0	80	166
2300	253	A.R	41.0	300	251	S. L.	2050	223	A.R.	31.0	175	221	2000	218	A.L.	30.0	140	216	1900	197	A.L	27.0	110	195	S. L.	1700	164	A.L	24.0	75	162

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 500 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 690 Stat. Air Miles at 6000 Ft. Alt. Maintain 2000 R.P.M. and 210 M.P.H. Ind Airspeed with Mixture Set Auto-Lean. When Gross Wt. Decreases to 21,000 Lbs. Refer to Alternate Cruising Condition III on Sheet 24.

T. O. No. 01-40-1

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 24 OF 44 SHEETS
2 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
300	350	260	300	400	480	420	600	520	720	620	400	820	710
230	260	200	220	300	360	310	450	390	540	470	300	610	530
150	170	130	150	200	240	210	300	260	360	310	200	410	350
80	90	70	80	100	120	100	150	130	180	160	100	200	170

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
2300	167	A.R	F.T.	145	246	25000													2050	149	A.L	F.T.	105	218	25000						
2300	195	A.R	F.T.	185	265	20000							2050	182	A.L	F.T.	130	246	1950	174	A.L	F.T.	120	236	20000	1850	145	A.L.	F.T.	85	194
2300	219	A.R	F.T.	240	274	15000	2100	210	A.R	33.5	195	262	2000	195	A.L	30.5	140	244	1950	186	A.L	F.T.	115	233	15000	1750	152	A.L.	20.0	85	188
2300	234	A.R	F.T.	290	279	12000	2200	214	A.R.	F.T.	190	255	2000	205	A.L	27.0	140	244	1900	187	A.L	24.0	110	223	12000	1700	153	A.L.	20.5	80	181
2300	240	A.R	43.5	290	272	9000	2100	217	A.R	29.5	185	246	2000	209	A.L	27.5	140	237	1900	188	A.L	24.5	105	213	9000	1700	155	A.L.	21.0	75	175
2300	249	A.R	F.T.	295	270	6000	2050	219	A.R	29.5	180	237	2000	212	A.L	28.0	135	231	1850	189	A.L	25.0	100	205	6000	1650	156	A.L.	21.5	75	169
2300	250	A.R	38.5	300	260	3000	2050	220	A.R	30.0	170	227	2000	212	A.L	28.5	130	220	1800	190	A.L	25.0	95	196	3000	1650	152	A.L.	22.0	70	157
2300	255	A.R	41.0	300	253	S. L.	2000	221	A.R	30.0	165	219	1950	215	A.L	29.0	125	213	1800	191	A.L	25.5	90	189	S. L.	1600	155	A.L.	22.5	65	153

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 300 Gal. of Fuel (After Deducting Total Allowance of 75 Gal.) to Fly 260 Stat. Air Miles at 25,000 Ft. Alt. Maintain 2300 R.P.M. and 167 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

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MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 25 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
1190		1030		1000			1270	1100			1000	1330	1160
1060		920		900			1140	990			900	1180	1020
940		820		800			1000	870			800	1040	900
820		710		700			870	760			700	890	770
700		610		600			740	640			600	750	650
580		500		500			600	520			500	600	520
460		400		400			480	420			400	480	420

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	179	A.R.	F.T.	145	194	6000							2250	163	A.R.	35.0	130	176							6000	2250	163	A.R.	35.0	130	176
2300	187	A.R.	38.5	150	193	3000							2250	182	A.R.	36.5	140	188							3000	2250	182	A.R.	36.5	140	188
2300	194	A.R.	41.0	150	192	S. L.							2250	187	A.R.	37.5	140	185							S. L.	2250	187	A.R.	37.5	140	185

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 700 Gal. of Fuel to Fly 890 Stat. Air Miles at 5000 Ft. Alt. Maintain 2250 R.P.M. and 163 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition V on Sheets 26 and 27 Respectively for Operating Data.

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MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 26 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE													
1110		960		900			1340	1160			900	1570	1360
980		850		800			1170	1020			800	1350	1170
860		750		700			1000	870			700	1140	990
730		630		600			830	720			600	930	810
600		520		500			660	570			500	720	630
480		420		400			530	460			400	580	500
360		310		300			400	350			300	430	370
240		210		200			270	230			200	290	250
120		100		100			130	110			100	140	120

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	181	A.R.	43.5	145	205	9000							2300	172	A.R.	F.T.	130	195							9000	2250	168	A.R.	F.T.	120	190
2300	192	A.R.	F.T.	145	208	6000							2250	186	A.R.	35.5	140	202							6000	2200	174	A.R.	33.5	120	188
2300	198	A.R.	38.5	150	205	3000							2250	191	A.R.	36.0	135	197							3000	2200	177	A.R.	34.0	115	183
2300	202	A.R.	41.0	150	200	S. L.							2250	193	A.R.	36.5	130	191							S. L.	2150	181	A.R.	34.5	110	179

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 635 Gal. of Fuel to Fly 700 Stat. Air Miles at 6000 Ft. Alt. Maintain 2300 R.P.M. and 192 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition I on Sheet 27 for Operating Data.

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MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 27 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
750		650		600			1030	900			600	1310	1140
630		550		500			840	730			500	1050	910
500		430		400			670	580			400	840	730
380		330		300			510	440			300	630	550
250		220		200			340	300			200	420	360
120		100		100			170	150			100	210	180

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	192	A.R	43.5	145	218	9000							2150	169	A.R.	30.5	105	192							9000						
2300	200	A.R.	F.T.	145	216	6000							2100	173	A.R.	31.0	100	187							6000	2000	152	A.L	28.5	70	164
2300	205	A.R.	38.5	150	212	3000							2100	175	A.R.	31.5	95	181							3000	2000	159	A.L	29.5	70	164
2300	209	A.R.	41.0	150	207	S. L.							2100	178	A.R.	32.0	95	176							S. L.	2000	166	A.L	30.5	70	164

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 400 Gal. of Fuel to Fly 800 Stat. Air Miles at 6000 Ft. Alt. Maintain 2000 R.P.M. and 152 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 28 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R ?600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ¼

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
800		690		725			900	780			725	970	840
770		670		700			870	750			700	930	810
650		560		600			720	620			600	760	660
540		470		500			580	500			500	590	510
430		370		400			460	400			400	470	410
320		280		300			350	300			300	350	300
220		190		200			230	200			200	240	210
110		100		100			110	100			100	120	100

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	167	A.R.	F.T.	145	180	6000							2250	160	A.R.	35.5	140	173							6000						
2300	176	A.R.	38.5	150	182	3000							2250	165	A.R.	36.0	135	171							3000	2200	147	A.R.	34.0	115	151
2300	182	A.R.	41.0	150	180	S. L.							2250	170	A.R	36.5	130	168							S. L.	2150	152	A.R	34.5	110	150

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 700 Gal. of Fuel to Fly 870 Stat. Air Miles at 3000 Ft. Alt. Maintain 2250 R.P.M. and 165 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition III on Sheet 29 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 29 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
570		490		500			730	630			500	850	740
460		400		400			580	500			400	680	590
340		300		300			440	380			300	510	440
230		200		200			290	250			200	340	290
110		100		100			150	130			100	170	150

OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II R.P.M.	II I.A.S. M.P.H.	II MIX.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III R.P.M.	III I.A.S. M.P.H.	III MIX.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV R.P.M.	IV I.A.S. M.P.H.	IV MIX.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V R.P.M.	V I.A.S. M.P.H.	V MIX.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	180	A.R.	F.T.	145	196	6000							2100	151	A.R.	31.0	100	163							6000						
2300	187	A.R.	38.5	150	194	3000							2100	156	A.R.	31.5	95	160							3000	2000	131	A.L.	29.5	70	132
2300	192	A.R.	41.0	150	190	S. L.							2100	157	A.R.	32.0	95	155							S. L.	2000	139	A.L.	30.5	70	137

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN. USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 20,000 Lb. Gross Wt. with 400 Gal. of Fuel to Fly 460 Stat. Air Miles at 3000 Ft. Alt. Maintain 2300 R.P.M. and 187 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 30 OF 44 SHEETS

1 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
790		690		725			800	690			725	820	710
760		660		700			770	670			700	790	690
650		560		600			650	560			600	660	570
530		460		500			530	460			500	530	460
430		370		400			430	370			400	430	370

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
2300	171	A.R.	38.5	150	177	3000							2300	171	A.R.	38.5	150	177							3000	2300	171	A.R.	38.5	150	177
2300	179	A.R.	41.0	150	177	S. L.							2300	179	A.R.	41.0	150	177							S. L.	2300	179	A.R.	41.0	150	177

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 500 Gal. of Fuel to Fly 530 Stat. Air Miles at 3000 Ft. Alt. Maintain 2300 R.P.M. and 171 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition 1 on Sheets 31 and 32 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 31 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE													
830		720		725			930	810			725	1080	940
800		700		700			900	780			700	1040	900
690		600		600			740	640			600	840	730
570		490		500			590	510			500	640	560
450		390		400			470	410			400	520	450
340		300		300			350	300			300	390	340
230		200		200			240	210			200	260	230
110		100		100			120	100			100	130	110

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II R.P.M.	II I.A.S. M.P.H.	II M I X.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III R.P.M.	III I.A.S. M.P.H.	III M I X.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV R.P.M.	IV I.A.S. M.P.H.	IV M I X.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V R.P.M.	V I.A.S. M.P.H.	V M I X.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	166	A.R	43.5	145	187	9000																			9000						
2300	177	A.R.	F.T.	145	192	6000							2300	175	A.R.	36.5	145	189							6000	2200	159	A.R.	33.5	120	171
2300	185	A.R.	38.5	150	191	3000							2300	181	A.R.	37.0	145	187							3000	2200	166	A.R.	34.5	120	171
2300	190	A.R	41.0	150	188	S. L.							2250	185	A.R.	37.5	140	183							S. L.	2200	173	A.R.	35.0	120	171

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 300 Gal. of Fuel to Fly 390 Stat. Air Miles at S.L. Maintain 2200 R.P.M. and 173 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 32 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-1-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO
BOMB BAY DOORS REMOVED

FLIGHT OPERATION INSTRUCTION CHART

SHEET 32 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
710		620		600			930	810			600	1190	1040
590		510		500			760	660			500	970	840
470		410		400			610	530			400	780	680
350		300		300			460	400			300	580	500
240		210		200			300	260			200	390	340
120		100		100			150	130			100	190	170

OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	178	A.R.	43.5	145	202	9000							2100	150	A.R.	30.5	100	170							9000						
2300	187	A.R.	F.T.	145	202	6000							2150	162	A.R.	31.5	105	175							6000						
2300	192	A.R.	38.5	150	199	3000							2100	167	A.R.	32.0	100	172							3000						
2300	197	A.R.	41.0	150	195	S. L.							2100	169	A.R.	32.5	100	167							S. L.	2000	150	A.L.	30.0	70	148

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN. USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 500 Gal. of Fuel to Fly 550 Stat. Air Miles at 6000 Ft. Alt. Maintain 2300 R.P.M. and 187 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 33 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
730		630		725			810	700			725	880	760
700		610		700			770	670			700	840	730
590		510		600			640	550			600	680	590
490		420		500			510	440			500	520	450
390		340		400			410	350			400	420	360
290		250		300			310	270			300	310	270
190		160		200			200	170			200	210	180
100		90		100			100	90			100	100	90

OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G.P.H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G.P.H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G.P.H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G.P.H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G.P.H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
2300	163	A.R.	38.5	150	168	3000							2300	156	A.R.	37.0	145	161							3000	2200	136	A.R.	34.5	120	138
2300	169	A.R.	41.0	150	167	S. L.							2250	162	A.R.	37.5	140	160							S. L.	2200	143	A.R.	35.0	120	141

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 600 Gal. of Fuel to Fly 660 Stat. Air Miles at 3000 Ft. Alt. Maintain 2200 R.P.M. and 136 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 34 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC 511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 34 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
WITH OR WITHOUT
1 MK XIII TORPEDO

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE													
530		460		500			660	570			500	800	690
430		370		400			530	460			400	640	550
320		280		300			400	350			300	480	420
210		180		200			260	230			200	320	280
110		100		100			130	110			100	160	140

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	168	A.R.	F.T.	145	181	6000							2150	140	A.R.	31.5	105	150							6000						
2300	175	A.R.	38.5	150	181	3000							2100	146	A.R.	32.0	100	150							3000						
2300	179	A.R.	41.0	150	177	S. L.							2100	148	A.R.	32.5	100	146							S. L.	2000	126	A.L.	30.0	70	124

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN. USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 200 Gal. of Fuel to Fly 260 Stat. Air Miles at 3000 Ft. Alt. Maintain 2100 R.P.M. and 146 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-311

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 35 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

ALTERNATE CRUISING CONDITIONS

(NO WIND) — (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
1250		1080		1099			1340	1160			1099	1420	1230
1130		980		1000			1180	1020			1000	1220	1060
1020		890		900			1050	910			900	1090	950
900		780		800			930	810			800	950	820
790		690		700			800	690			700	820	710
670		580		600			680	590			600	690	600
550		480		500			550	480			500	550	480
440		380		400			440	380			400	440	380

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	167	A.R.	F.T.	145	180	6000							2300	167	A.R.	F.T.	145	180							6000	2300	167	A.R.	F.T.	45	180
2300	178	A.R.	38.5	150	184	3000							2300	178	A.R.	38.5	150	184							3000	2300	178	A.R.	38.5	150	184
2300	185	A.R.	41.0	150	183	S. L.							2300	185	A.R.	41.0	150	183							S. L.	2300	185	A.R.	41.0	150	183

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 26,000 Lb. Gross Wt. with 800 Gal. of Fuel to Fly 900 Stat. Air Miles at 6000 Ft. Alt. Maintain 2300 R.P.M. and 167 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition I on Sheets 36 and 37 Respectively for Operating Data.

T. O. No. 01-40-1

RESTRICTED

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 36 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
1060		920		900			1270	1100			900	1470	1290
940		820		800			1100	960			800	1270	1100
820		710		700			940	820			700	1070	930
700		610		600			780	680			600	870	760
580		500		500			620	540			500	670	580
460		400		400			500	430			400	530	460
350		300		300			370	320			300	400	350
230		200		200			250	220			200	270	230
120		100		100			120	100			100	130	110

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	172	A.R.	43.5	145	195	9000							2300	162	A.R.	F.T.	125	184							9000	2300	162	A.R.	F.T.	125	184
2300	183	A.R.	F.T.	145	198	6000							2250	179	A.R.	35.5	140	193							6000	2200	167	A.R.	33.5	120	181
2300	189	A.R.	38.5	150	196	3000							2250	182	A.R.	36.0	135	188							3000	2200	172	A.R.	34.5	120	178
2300	194	A.R.	41.0	150	192	S. L.							2250	187	A.R.	36.5	135	185							S. L.	2200	178	A.R.	35.0	120	176

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 23,000 Lb. Gross Wt. with 400 Gal. of Fuel to Fly 500 Stat. Air Miles at 6000 Ft. Alt. Maintain 2250 R.P.M. and 179 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition III on Sheet 37 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 37 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) — **ALTERNATE CRUISING CONDITIONS** — (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
480		420		400			640	560			400	800	690
360		310		300			480	420			300	600	520
240		210		200			320	280			200	400	350
120		100		100			160	140			100	200	170

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	183	A.R.	43.5	145	208	9000							2100	154	A.R.	30.0	100	174							9000						
2300	192	A.R.	F.T.	145	208	6000							2100	163	A.R.	31.0	100	177							6000						
2300	197	A.R.	38.5	150	204	3000							2100	168	A.R.	31.5	95	173							3000	2000	149	A.L.	29.0	70	154
2300	202	A.R.	41.0	150	200	S. L.							2100	170	A.R.	32.0	95	168							S. L.	2000	158	A.L.	30.0	70	156

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: 20,000 Lb. Gross Wt. with 100 Gal. of Fuel to Fly 200 Stat. Air Miles at 3000 Ft. Alt. Maintain 2000 R.P.M. and 149 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS

A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 38 OF 44 SHEETS

1 ENGINE OPERATION

GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS

DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
940		810		900			1090	940			900	1180	1020
830		720		800			950	820			800	1020	880
720		620		700			810	700			700	860	750
610		530		600			680	590			600	700	610
500		430		500			540	470			500	540	470
400		350		400			430	370			400	430	370
300		260		300			320	280			300	320	280
200		170		200			210	180			200	220	190
100		90		100			110	100			100	110	100

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
2300	167	A.R.	38.5	150	173	3000							2250	157	A.R.	36.0	135	162							3000	2200	142	A.R.	34.5	120	145
2300	173	A.R.	41.0	150	171	S. L.							2250	164	A.R.	36.5	135	162							S. L.	2200	148	A.R.	35.0	120	146

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.

2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BELLY, BOMB BAY, AUXILIARY, MAIN.

USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 23,000 Lb. Gross Wt. with 600 Gal. of Fuel to Fly 700 Stat. Air Miles at 3000 Ft. Alt. Maintain 2200 R.P.M. and 142 Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 39 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-311

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 39 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
DROPPABLE BELLY TANK

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) — **ALTERNATE CRUISING CONDITIONS** — (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U.S. GAL. (2)	II STATUTE	II NAUTICAL	III STATUTE	III NAUTICAL	IV STATUTE	IV NAUTICAL	FUEL U.S. GAL. (2)	V (MAX. RANGE) STATUTE	V NAUTICAL
440		380		400			560	490			400	640	550
330		290		300			420	360			300	480	420
220		190		200			280	240			200	320	280
110		100		100			140	120			100	160	140

OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
2300	172	A.R.	F.T.	145	187	6000							2100	142	A.R.	31.0	100	152							6000						
2300	180	A.R.	38.5	150	186	3000							2100	145	A.R.	31.5	95	151							3000	2000	122	A.L.	29.0	70	122
2300	184	A.R.	41.0	150	182	S. L.							2100	149	A.R.	32.0	95	147							S. L.	2000	131	A.L.	30.0	70	129

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 20,000 Lb. Gross Wt. with 200 Gal. of Fuel to Fly 220 Stat. Air Miles at 3000 Ft. Alt. Maintain 2300 R.P.M. and 180 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 40 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 27,000 TO 24,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
770		670		725			780	680			725	790	680
740		640		700			750	650			700	760	660
630		550		600			630	550			600	640	560
520		450		500			520	450			500	520	450
410		360		400			410	360			400	410	360
310		270		300			310	270			300	310	270
210		180		200			210	180			200	210	180
100		90		100			100	90			100	100	90

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	II I.A.S. M.P.H.	II M I X.	II M.P. IN. Hg	II U.S. G. P. H.	II T.A.S. M.P.H.	III OPERATING DATA R.P.M.	III I.A.S. M.P.H.	III M I X.	III M.P. IN. Hg	III U.S. G. P. H.	III T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	IV I.A.S. M.P.H.	IV M I X.	IV M.P. IN. Hg	IV U.S. G. P. H.	IV T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	V I.A.S. M.P.H.	V M I X.	V M.P. IN. Hg	V U.S. G. P. H.	V T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
						3000																			3000						
2300	173	A.R.	41.0	150	171	S. L.							2300	173	A.R.	41.0	150	171							S. L.	2300	173	A.R.	41.0	150	171

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 25,000 Lb. Gross Wt. with 400 Gal. of Fuel to Fly 400 Stat. Air Miles at S.L. Maintain 2300 R.P.M. and 173 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 24,000 and 21,000 Lb. Refer to Alternate Cruising Condition I on Sheets 41 and 42 Respectively for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC 511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 41 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
810		700		725			910	790			725	1030	890
780		680		700			870	750			700	990	860
670		580		600			730	630			600	800	690
550		480		500			580	500			500	610	530
440		380		400			470	410			400	490	430
330		290		300			350	300			300	370	320
220		190		200			230	200			200	240	210
110		100		100			120	100			100	120	100

I OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	II OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	III OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	IV OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	V OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	159	A.R.	43.5	145	180	9000																			9000						
2300	171	A.R.	F.T.	145	185	6000							2250	167	A.R.	36.0	140	180							6000	2200	157	A.R.	34.0	125	170
2300	179	A.R.	38.5	150	185	3000							2250	174	A.R.	36.5	140	180							3000	2200	164	A.R.	35.0	125	170
2300	185	A.R.	41.0	150	183	S. L.							2250	178	A.R.	37.0	135	176							S. L.	2200	171	A.R.	35.5	125	169

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 300 Gal. of Fuel to Fly 370 Stat. Air Miles at S.L. Maintain 2200 R.P.M. and 171 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 42 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 | FORM ASC-511

MODELS
A-20G-20-DO TO A-20G-30-DO INCL.
A-20J-1-DO AND A-20J-5-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 42 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
460		400		400			580	500			400	750	650
340		300		300			430	370			300	560	490
230		200		200			290	250			200	370	320
110		100		100			140	120			100	190	160

OPERATING DATA R.P.M.	I.A.S. MPH	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	MIX.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
2300	173	A.R.	43.5	145	196	9000							2150	153	A.R.	31.5	110	173							9000						
2300	182	A.R.	F.T.	145	197	6000							2150	160	A.R.	32.0	110	173							6000						
2300	187	A.R.	38.5	150	194	3000							2150	166	A.R.	32.5	105	171							3000						
2300	192	A.R	41.0	150	190	S. L.							2150	168	A.R	33.0	105	166							S. L.	2000	147	A.L	30.0	70	145

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE.
RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR.
USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.

REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.

RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 200 Gal. of Fuel to Fly 350 Stat. Air Miles at S.L. Maintain 2000 R.P.M. and 147 M.P.H. Ind. Airspeed with Mixture Set Auto-Lean.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-311

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 43 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 24,000 TO 21,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND)

ALTERNATE CRUISING CONDITIONS

(NO RESERVE FUEL ALLOWANCE)

OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT 12,000	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT S.L.	I (MAX. CONT. POWER) RANGE IN AIR MILES NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II RANGE IN AIR MILES NAUTICAL	III RANGE IN AIR MILES STATUTE	III RANGE IN AIR MILES NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV RANGE IN AIR MILES NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V (MAX. RANGE) RANGE IN AIR MILES NAUTICAL
710		610		725			780	680			725	850	740
680		590		700			750	650			700	810	700
580		500		600			620	540			600	660	570
480		420		500			500	430			500	500	430
380		330		400			400	350			400	400	350
290		250		300			300	260			300	300	260
190		160		200			200	170			200	200	170
100		90		100			100	90			100	100	90

OPERATING DATA R.P.M.	I.A.S. MPH	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
						3000																			3000						
2300	164	A.R.	41.0	150	162	S. L.							2250	156	A.R	37.0	135	154							S. L.	2200	141	A.R	35.5	125	139

LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 24,000 Lb. Gross Wt. with 600 Gal. of Fuel to Fly 660 Stat. Air Miles at S.L. Maintain 2200 R.P.M. and 141 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich. When Gross Wt. Decreases to 21,000 Lb. Refer to Alternate Cruising Condition V on Sheet 44 for Operating Data.

SPEC. AN-H-8 DEC. 18, 1942 — FORM ASC-511

MODELS
A-20G-35-DO, A-20J-10-DO

FLIGHT OPERATION INSTRUCTION CHART

SHEET 44 OF 44 SHEETS
1 ENGINE OPERATION
GR. WT. 21,000 TO 18,000 POUNDS

EXTERNAL LOAD ITEMS
4 M-10 CHEMICAL TANKS

CONDITION	R.P.M.	M.P. (IN. Hg)	BLOWER POSITION	MIXTURE POSITION	DURATION IN MIN.	U.S. G.P.H.
TAKE-OFF						
MILITARY POWER	2400	42.7	LOW	A. R.	5	410
ENGINES	R-2600-23					

INSTRUCTIONS FOR USING CHART: Select figure in fuel column equal to or less than total amount of fuel in airplane. Move horizontally to the right or left and select a figure equal to or greater than the air miles to be flown. Vertically below and opposite desired cruising altitude, read optimum cruising conditions.

NOTES: (A) Avoid continuous cruising in Column I except in emergency. (B) Columns II, III, IV & V toward the right progressively give increase in range at sacrifice in speed. (C) Manifold Pressure (M.P.), Gallons Per Hour (G.P.H.), are approximate maximum values for reference. (D) For quick reference, take-off and military power data are listed in the upper left corner of chart.

(NO WIND) **ALTERNATE CRUISING CONDITIONS** (NO RESERVE FUEL ALLOWANCE)

I (MAX. CONT. POWER) RANGE IN AIR MILES STATUTE AT S.L.	I STATUTE AT 12,000	I NAUTICAL AT S.L.	I NAUTICAL AT 12,000	FUEL U. S. GAL. (2)	II RANGE IN AIR MILES STATUTE	II NAUTICAL	III RANGE IN AIR MILES STATUTE	III NAUTICAL	IV RANGE IN AIR MILES STATUTE	IV NAUTICAL	FUEL U. S. GAL. (2)	V (MAX. RANGE) RANGE IN AIR MILES STATUTE	V NAUTICAL
OPEN LOWER COWL FLAPS ½ ON OPERATING ENGINE													
420		360		400			500	430			400	500	430
310		270		300			370	320			300	370	320
210		180		200			250	220			200	250	200
100		90		100			120	100			100	120	100

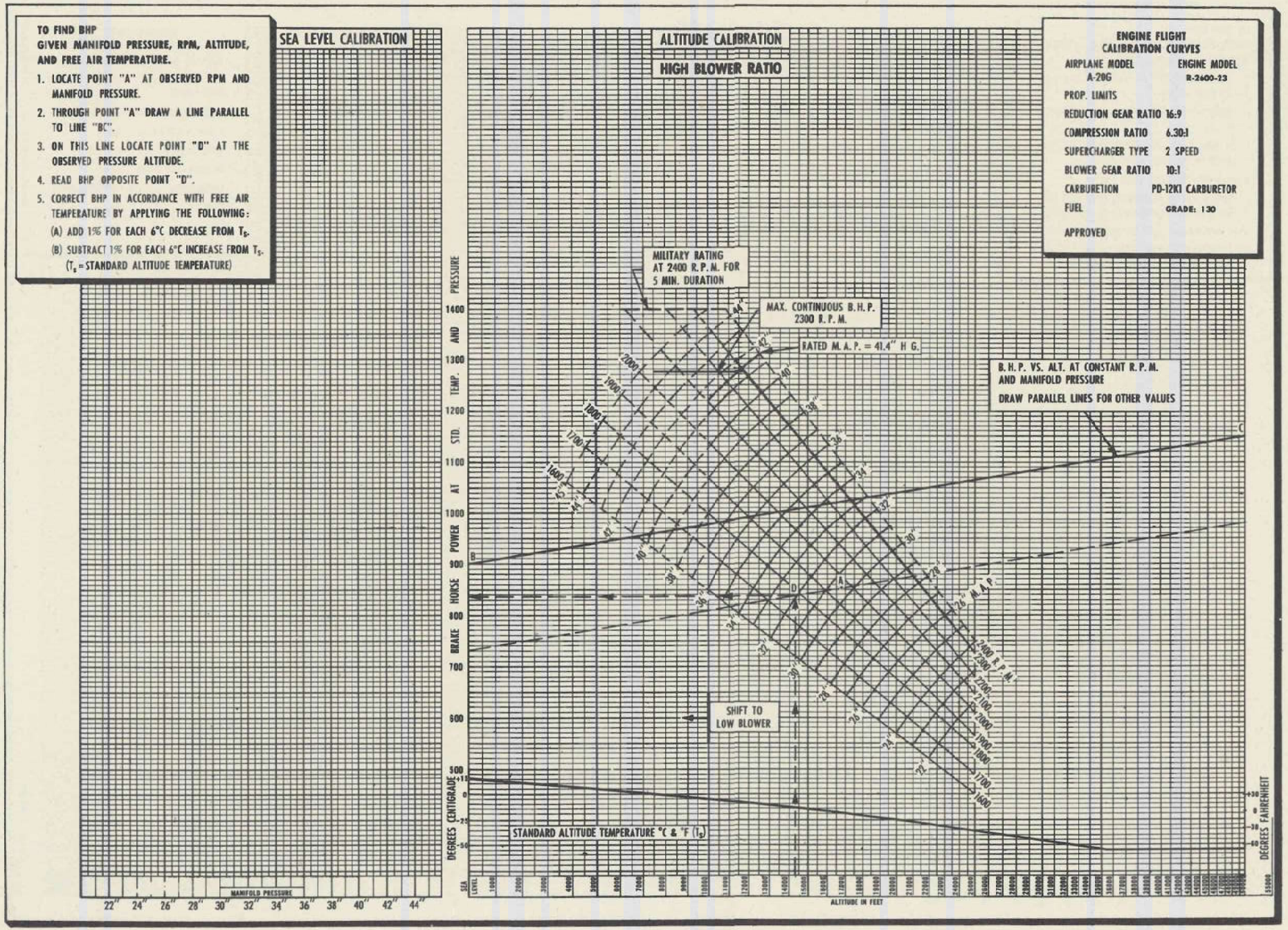
OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.	(1) DENSITY ALT. IN FEET	OPERATING DATA R.P.M.	I.A.S. M.P.H.	M I X.	M.P. IN. Hg	U.S. G. P. H.	T.A.S. M.P.H.
						30000																			30000						
						25000																			25000						
						20000																			20000						
						15000																			15000						
						12000																			12000						
						9000																			9000						
						6000																			6000						
2300	170	A.R.	38.5	150	176	3000							2150	146	A.R.	32.5	105	150							3000	2150	146	A.R.	32.5	105	150
2300	174	A.R.	41.0	150	172	S. L.							2150	149	A.R.	33.0	105	147							S. L.	2150	149	A.R.	33.0	105	147

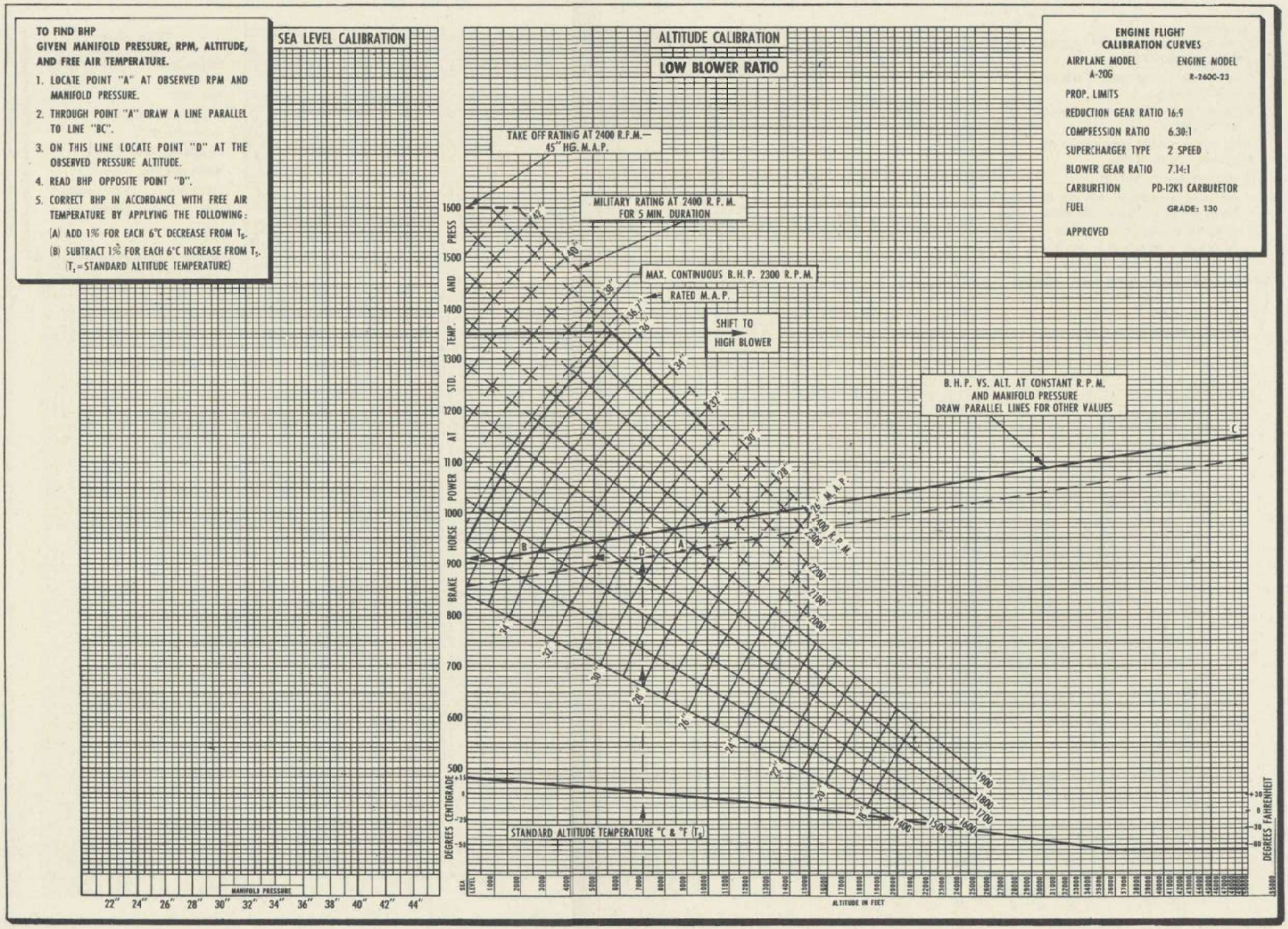
LEGEND

1 INDICATED ALTITUDE CORRECTED FOR FREE AIR TEMPERATURE.
2 ALLOW 75 U. S. GAL. FOR WARM-UP, TAKE-OFF AND CLIMB TO 5000 FEET ALTITUDE. RETURN FUEL FLOWS TO MAIN TANKS AT RATE OF 10 GAL./HR. USE FUEL FROM TANKS IN THE FOLLOWING ORDER: MAIN (FOR TAKE-OFF AND CLIMB), BOMB BAY, AUXILIARY, MAIN.
USE HIGH BLOWER ABOVE HEAVY LINE ONLY.
REFER TO "SPECIFIC ENGINE FLIGHT CHART" FOR ADDITIONAL ENGINE OPERATION DATA.
RED FIGURES HAVE NOT BEEN FLIGHT CHECKED

I.A.S.: Indicated Air Speed
T.A.S.: True Air Speed
M.P.: Manifold Pressure (IN. Hg)
U.S.G.P.H.: U.S. Gallons Per Hour
F.T.: Full Throttle
S.L.: Sea Level
A.R.: Auto Rich
A.L.: Auto Lean

EXAMPLE: At 21,000 Lb. Gross Wt. with 100 Gal. of Fuel to Fly 120 Stat. Air Miles at S.L. Maintain 2150 R.P.M. and 149 M.P.H. Ind. Airspeed with Mixture Set Auto-Rich.


TO FIND BHP
GIVEN MANIFOLD PRESSURE, RPM, ALTITUDE, AND FREE AIR TEMPERATURE.
1. LOCATE POINT "A" AT OBSERVED RPM AND MANIFOLD PRESSURE.
2. THROUGH POINT "A" DRAW A LINE PARALLEL TO LINE "BC".
3. ON THIS LINE LOCATE POINT "D" AT THE OBSERVED PRESSURE ALTITUDE.
4. READ BHP OPPOSITE POINT "D".
5. CORRECT BHP IN ACCORDANCE WITH FREE AIR TEMPERATURE BY APPLYING THE FOLLOWING:
(A) ADD 1% FOR EACH 6°C DECREASE FROM T_s.
(B) SUBTRACT 1% FOR EACH 6°C INCREASE FROM T_s.
(T_s = STANDARD ALTITUDE TEMPERATURE)
SEA LEVEL CALIBRATION
MANIFOLD PRESSURE
22" 24" 26" 28" 30" 32" 34" 36" 38" 40" 42" 44"
ALTITUDE CALIBRATION
HIGH BLOWER RATIO
ENGINE FLIGHT CALIBRATION CURVES
AIRPLANE MODEL A-20G
ENGINE MODEL R-2600-23
PROP. LIMITS
REDUCTION GEAR RATIO 16:9
COMPRESSION RATIO 6.30:1
SUPERCHARGER TYPE 2 SPEED
BLOWER GEAR RATIO 10:1
CARBURETION PD-12K1 CARBURETOR
FUEL GRADE: 130
APPROVED
MILITARY RATING AT 2400 R.P.M. FOR 5 MIN. DURATION
MAX. CONTINUOUS B.H.P. 2300 R.P.M.
RATED M.A.P. = 41.4" H.G.
B.H.P. VS. ALT. AT CONSTANT R.P.M. AND MANIFOLD PRESSURE
DRAW PARALLEL LINES FOR OTHER VALUES
SHIFT TO LOW BLOWER
STANDARD ALTITUDE TEMPERATURE °C & °F (T_s)
BRAKE HORSE POWER AT STD. TEMP. AND PRESSURE
DEGREES CENTIGRADE
DEGREES FAHRENHEIT
ALTITUDE IN FEET
2400 R.P.M.
2300
2200
2100
2000
1900
1800
1700
1600
M.A.P.


TO FIND BHP
GIVEN MANIFOLD PRESSURE, RPM, ALTITUDE, AND FREE AIR TEMPERATURE.
1. LOCATE POINT "A" AT OBSERVED RPM AND MANIFOLD PRESSURE.
2. THROUGH POINT "A" DRAW A LINE PARALLEL TO LINE "BC".
3. ON THIS LINE LOCATE POINT "D" AT THE OBSERVED PRESSURE ALTITUDE.
4. READ BHP OPPOSITE POINT "D".
5. CORRECT BHP IN ACCORDANCE WITH FREE AIR TEMPERATURE BY APPLYING THE FOLLOWING:
(A) ADD 1% FOR EACH 6°C DECREASE FROM T_s.
(B) SUBTRACT 1% FOR EACH 6°C INCREASE FROM T_s.
(T_s = STANDARD ALTITUDE TEMPERATURE)
SEA LEVEL CALIBRATION
MANIFOLD PRESSURE
22" 24" 26" 28" 30" 32" 34" 36" 38" 40" 42" 44"
ALTITUDE CALIBRATION
LOW BLOWER RATIO
TAKE OFF RATING AT 2400 R.P.M.— 45" HG. M.A.P.
MILITARY RATING AT 2400 R.P.M. FOR 5 MIN. DURATION
MAX. CONTINUOUS B.H.P. 2300 R.P.M.
RATED M.A.P.
SHIFT TO HIGH BLOWER
B.H.P. VS. ALT. AT CONSTANT R.P.M. AND MANIFOLD PRESSURE DRAW PARALLEL LINES FOR OTHER VALUES
M.A.P.
2400 R.P.M.
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
STANDARD ALTITUDE TEMPERATURE °C & °F (T_s)
BRAKE HORSE POWER AT STD. TEMP. AND PRESS
DEGREES CENTIGRADE
DEGREES FAHRENHEIT
ALTITUDE IN FEET
ENGINE FLIGHT CALIBRATION CURVES
AIRPLANE MODEL A-20G
ENGINE MODEL R-2600-23
PROP. LIMITS
REDUCTION GEAR RATIO 16:9
COMPRESSION RATIO 6.30:1
SUPERCHARGER TYPE 2 SPEED
BLOWER GEAR RATIO 7.14:1
CARBURETION PD-12K1 CARBURETOR
FUEL GRADE: 130
APPROVED

Section IV

OPERATIONAL EQUIPMENT

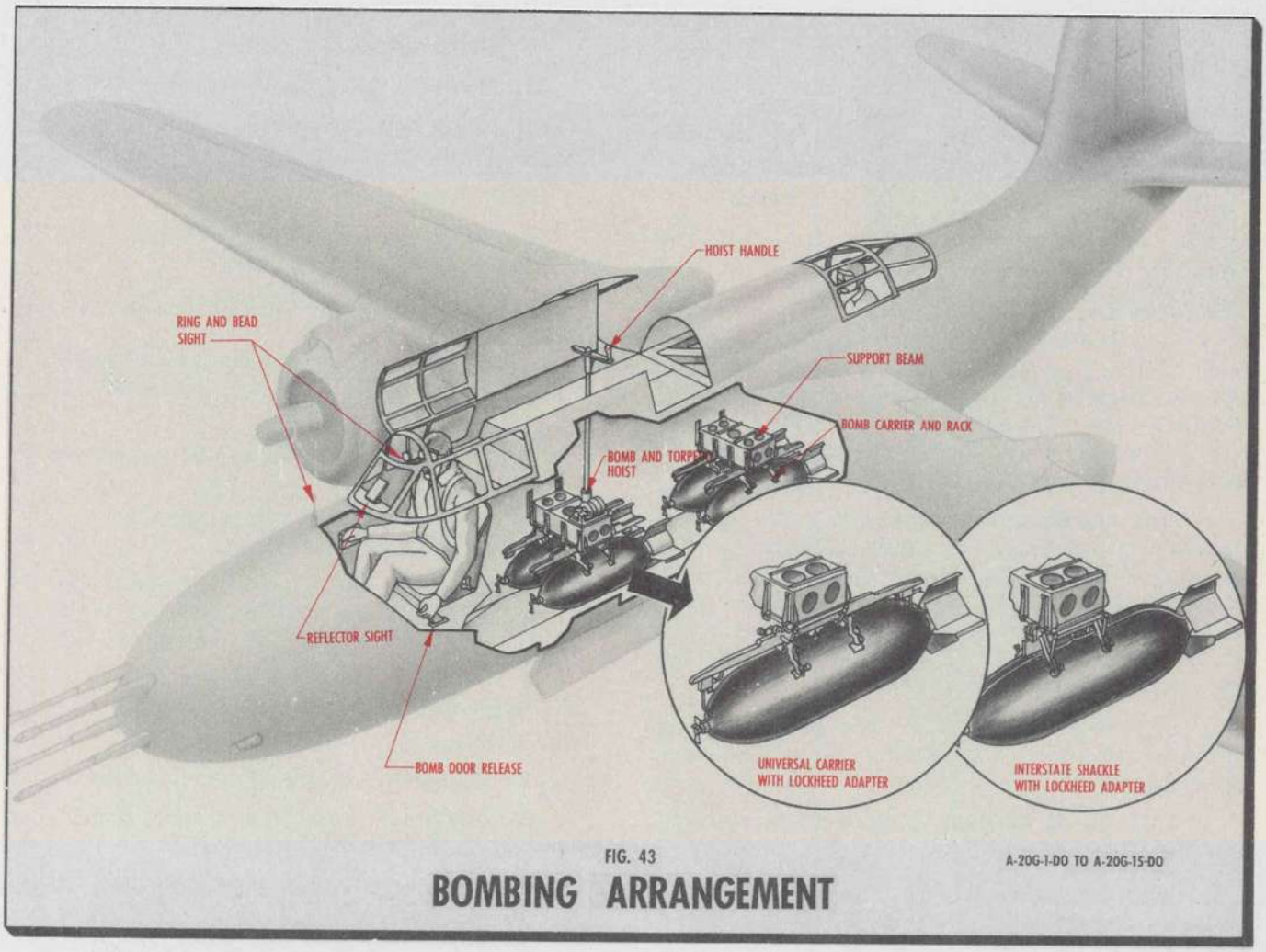


FIG. 43 A-20G-1-DO TO A-20G-15-DO

BOMBING ARRANGEMENT

1. Bombing Equipment.—*Airplanes A-20G-1-DO to A-20G-15-DO.*

a. General.—The fusing and release of bombs are controlled electrically from the pilot's compartment.

b. Bombing Controls.

(1) Bomb Control Panel.—The pilot's bomb control panel is located just forward of the trim tab control unit on the R.H. side of the cockpit. The panel contains the following controls:

(a) Master Bomb Control Switch. — This switch controls the circuit to all bomb switches, and must be "ON" before any of the bomb control switches are operative. The bomb doors must be open before any bombs may be dropped.

CAUTION Insure that the S.C.I. smoke curtain switch is "OFF." This switch overrides the bomb door electrical control, and if left "ON" would result in the dropping of bombs even if the doors are closed.

(b) Bomb Selector Switches.—Four switches select the bombs that are to be released. When any one is moved to the "INDIVIDUAL RELEASE" position, the bomb selected may be released by the pilot's individual release button installed on the control column head. When any

combination of the selector switches is moved to the "QUADRANT RELEASE" position, the quadrant release switch will drop the selected bombs as it is moved to the corresponding rack numbers "1," "2," "3," or "4."

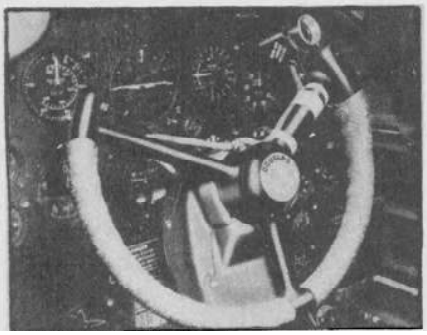


Fig. 44
Bomb Release Switch

(c) Individual Bomb Release Switch.—This push button type switch releases bombs individually as selected by the selector switches when placed in the "INDIVIDUAL RELEASE" position. The switch should not be used to release more than one bomb at a time.

(d) Quadrant Release Switch.—This switch provides train release of bombs selected by the selector switches placed in the "QUADRANT RELEASE" position. As the switch is moved over markings "1" to "4" on the quadrant, the bomb on the corresponding rack will drop if selected by the respective selector switch.

(e) Fusing Selector Switches.—Two switches are provided for fusing the nose and tail of the bombs.

(f) Bomb Jettison Switch.—Provides for jettison release of all bombs.

(g) Small Bomb Containers Jettison Switch.—Provides for the jettison release of the small bomb containers.

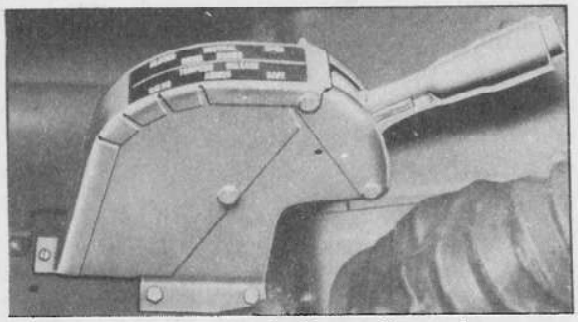


Fig. 45—Bomb Door Control

(2) Bomb Door Control.—The bomb doors, actuated by hydraulic pressure, are controlled by a handle mounted on the floor adjacent to the left side of the pilot's seat. To open the bomb doors, press down the thumb button and move the control forward to "OPEN." To close the bomb doors, press down the button, and move the control aft to "CLOSED." The handle should be returned to "NEUTRAL" after each operation.

c. Bombing Operation—Normal.

(1) Bomb doors—"OPEN."

(2) Master bomb control switch—"ON."

(3) Bomb selector switch — "INDIVIDUAL RELEASE" or "QUADRANT RELEASE."

(4) Fusing switch—"UP."

(5) Individual bomb release switch—PRESS BUTTON TO RELEASE BOMB.

(6) Quadrant release—TO DESIRED SELECTIONS.

CAUTION Do not open doors in excess of 321 mph indicated airspeed.

(7) Bomb clearance angles are as follows:

10 degrees on each side
30 degrees on forward end
15 degrees on aft end

CAUTION Do not drop bombs while the airplane is at an angle of dive in excess of 20 degrees.

d. Bombing Operation—Emergency.

(1) Bomb doors—"OPEN."

(2) Master bomb control switch—"ON."

(3) Bomb jettison switch or small bomb containers jettison switch—"PUSH IN."

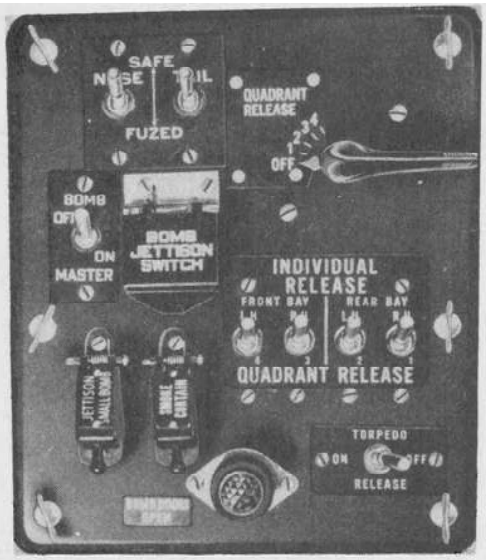


Fig. 46 — Bomb Control Panel
(A-20G-1-DO to A-20G-15-DO incl.)

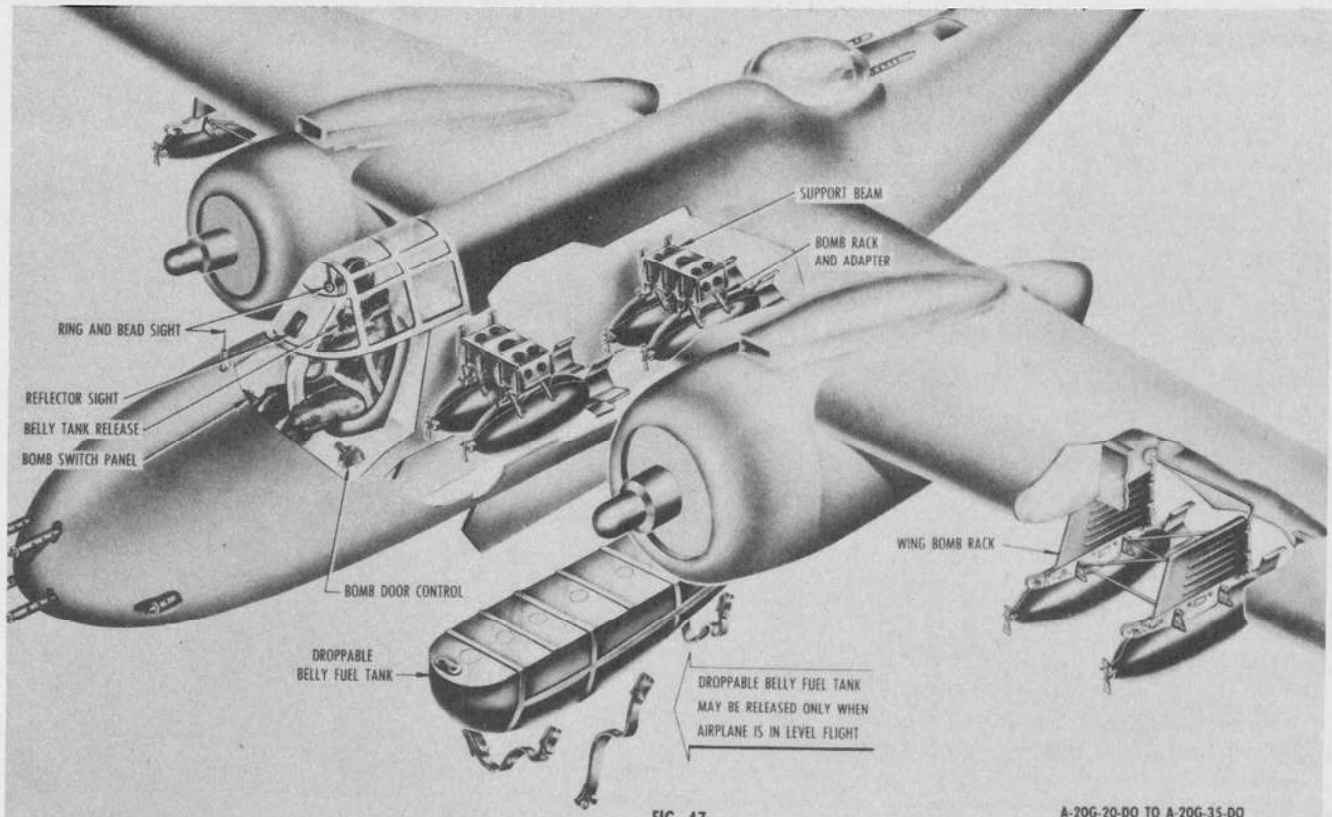


FIG. 47
BOMBING ARRANGEMENT

2. Bombing Equipment.—*Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

a. General.—Provision is made to carry bombs below the wings and in the fuselage. Provision is also made for long-distance bombing missions by the installation of a belly fuel tank that can be released manually. A bombardier's nose section *(airplanes A-20J-1-DO)* permits the bombardier to take over control of bomb release from the pilot.

b. Bombing Controls.

(1) Bomb Control Panel.—A bomb control panel is provided at the right of the pilot's seat just below the instrument panel, which contains switches identical to those outlined in Par. 1, preceding, with the addition of:

(a) Wing Bomb Release Controls.—There are four single-pole single-throw switches on the bomb control panel. No provisions are made for train release of the wing racks.

(2) Bombardier's Controls.—*Airplanes A-20J-1-DO to A-20J-10-DO.*—The bombardier's controls consist of a right-left indicator control to assist the pilot in staying "on line" with the target, and a bomb release switch. The switch is inoperative until the bomb bay doors are opened by the pilot, closing the bomb release circuit. Selection of the bombs to be released is made by the pilot.

(3) Belly Fuel Tank Release Control.—To release the belly fuel tank, pull hard on the manual control handle (red) to the right of the pilot's seat.

b. Attack Bombing Operation—Wing Bombs Installed.

(1) Arm bombs by throwing "ON" either the nose or tail fusing switch.

(2) Select wing bomb by throwing to "ON" position the respective wing rack selector switch.

(3) Press bomber's switch on pilot's control wheel, or press bombardier's release switch.

c. Long Range Bombing Operation—Belly Fuel Tank Installed.

(1) Drain belly tank.

(2) Pull hard on manual control handle to release belly fuel tank.

(3) Bomb bay doors—"OPEN."

(4) Master bomb control switch—"ON."

(5) Bomb selector switch—"INDIVIDUAL RELEASE" or "QUADRANT RELEASE."

(6) Fusing switch—"UP."

(7) Pilot's bomb release switch, or quadrant release lever, or bombardier's release switch—PRESS TO RELEASE BOMB OR BOMBS, as selected.

CAUTION Do not open bomb bay doors in excess of 321 mph indicated airspeed.

(8) Bomb clearance angles are as follows:

10 degrees on each side
30 degrees on forward end
15 degrees on aft end

CAUTION Do not drop bombs while airplane is on an angle of dive in excess of 20 degrees.

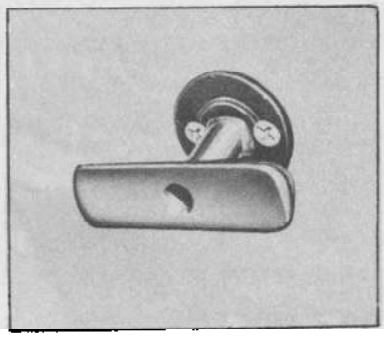


Fig. 49—Belly Tank Release Control

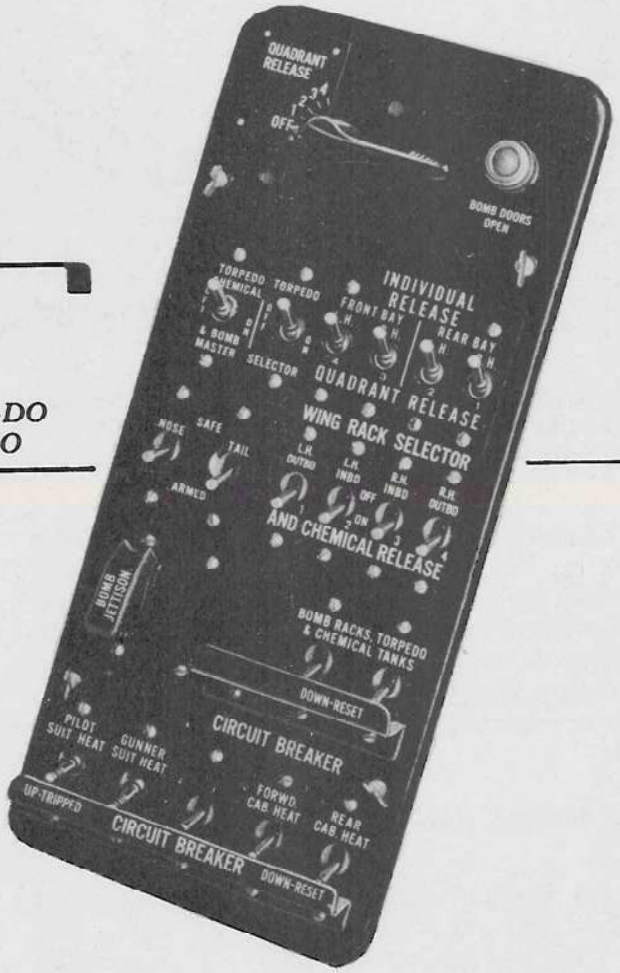
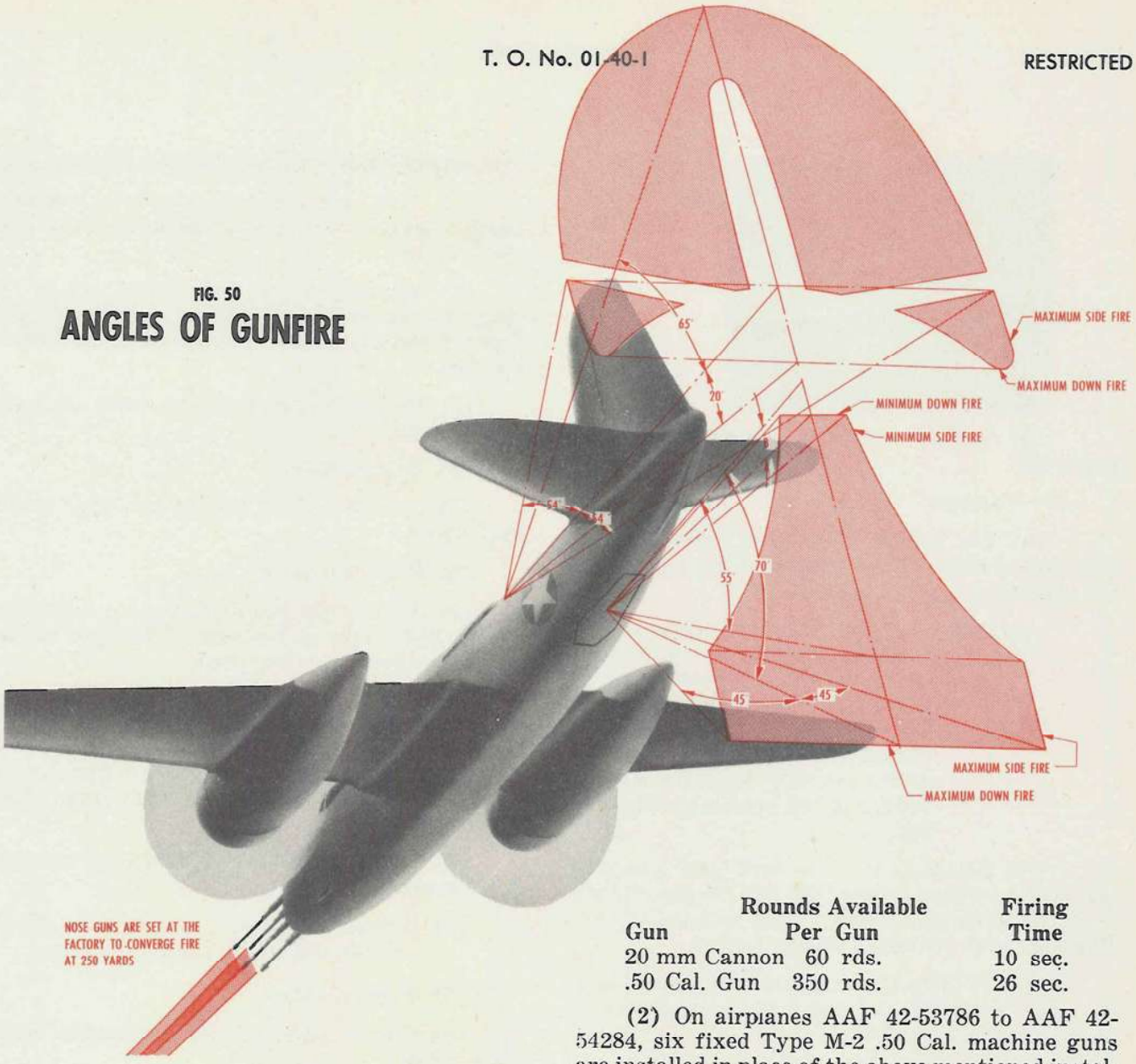


Fig. 48
Bomb Control Panel

A-20G-20-DO to A-20G-35-DO
A-20J-1-DO to A-20J-10-DO

FIG. 50

ANGLES OF GUNFIRE



3. Armament.—*Airplanes A-20G-1-DO to A-20G-15-DO.*

The P-70A-2 airplane has six .50 caliber fixed guns installed in the nose. One single .50 caliber flexible gun is installed in the upper rear gunner's position and another .50 caliber flexible gun is located in the lower gunner's position. The SCR-540 Radar antenna is also installed in the gun nose.

a. General.

(1) Two Type M-2 fixed .50 Cal. machine guns and four fixed Type M-2 20 mm aircraft cannons are installed in the nose section of airplanes AAF 42-53535 to AAF 42-53785. The guns are set to converge at 250 yards, and are directed upon the target by a type N-3A optical gun sight. Total firing time available per gun is as follows:

Gun	Rounds Available Per Gun	Firing Time
20 mm Cannon	60 rds.	10 sec.
.50 Cal. Gun	350 rds.	26 sec.

(2) On airplanes AAF 42-53786 to AAF 42-54284, six fixed Type M-2 .50 Cal. machine guns are installed in place of the above mentioned installation. Total firing time available per gun is as follows:

Gun	Rounds Available Per Gun	Firing Time
.50 Cal. Gun	350 rds.	26 sec.

(3) One Type M-2 .50 Cal. flexible machine gun is installed in the upper rear gunner's position. It is provided with a flexible chute and an integral ammunition box holding 500 rds. of ammunition. A Type M-2 .30 Cal. flexible machine gun, installed at the lower gunner's position, has provision for 500 rds. of ammunition in 100 rd. boxes adjacent to the gun position.

(4) A Type N-1 gun sight aiming point camera is installed in the nose of the airplane.

b. Operation of Pilot's Gun Controls.

(1) Preflight.

(a) Check to see that fixed guns are properly charged.

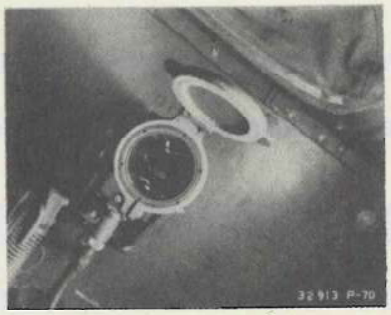


Fig. 51
Optical Gun Sight

(b) Test for proper functioning of optical gun sight.

(2) Combat.

(a) Gun heater "ON" after take-off. (This procedure should only be performed if temperatures are equal to or below —17.8°C (0°F).

Note The gun heater is thermostatically controlled and will keep the guns above freezing at outside air temperatures as low as —54° C. (—65° F.). Firing a cold gun causes uneven expansion, and probable failure of the breech mechanism.

(b) Select guns to be fired, and place respective selector switches "ON." If the gun camera is to be used, place "ON." The camera is controlled by the gun firing trigger switch.

(c) If the gun camera overrun control is to be used, turn "ON" the switch and set the interval pointer at the control box.

Note The overrun control unit causes the camera to run for a period equal to the setting indicated by the overrun control pointer, after the gun trigger switch has been released.

(d) Gun reflector sight "ON." Adjust the intensity with the "ON-OFF" rheostat, located on the gun selector switch panel.

(e) Fire guns.

Note Push trigger switch, located on the right side of the control wheel, for the duration of the salvo.

(3) Before Landing.

(a) Shut "OFF" the camera, the gun selector switches, and the camera overrun control after use.

c. Operation of the Upper Flexible Machine Gun.

(1) Slide back the enclosure door, and open the gun tunnel doors by pushing down on the door crank handle.

(2) Release the gun by pushing aft on the catch at the rear of the mount. Swing the gun forward and up, and lock the mount in the vertical position.

(3) Insure that ammunition belts are properly adjusted.

(4) Release safety.

(5) Charge gun by pulling charging handle back twice.

(6) Press trigger to fire.

(7) Restow the gun after use by pulling out on the two knobs at the base of the gun mount. Swing the gun down into place.

d. Operation of the Lower Flexible Machine Gun.

(1) With the lower door open, release the gun mount by lifting the catch. Swing the gun down horizontally.

(2) Latch gun mount securely by inserting locking pin.

(3) Release the catch at the base of the mount and swing the gun into line.

(4) Release safety.

(5) Charge gun by pulling charging handle back twice.

(6) Press trigger to fire.

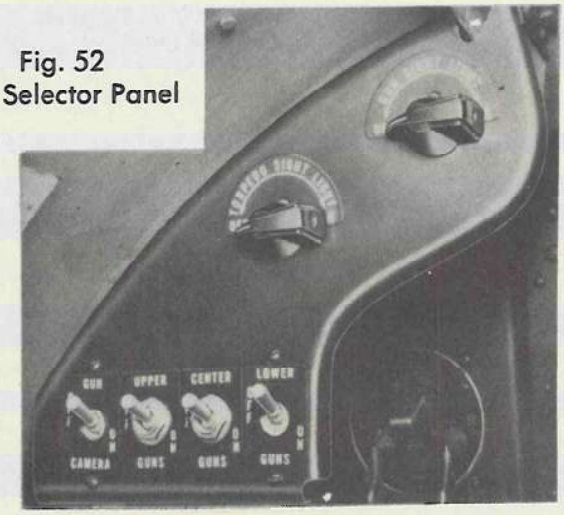


Fig. 52
Gun Selector Panel

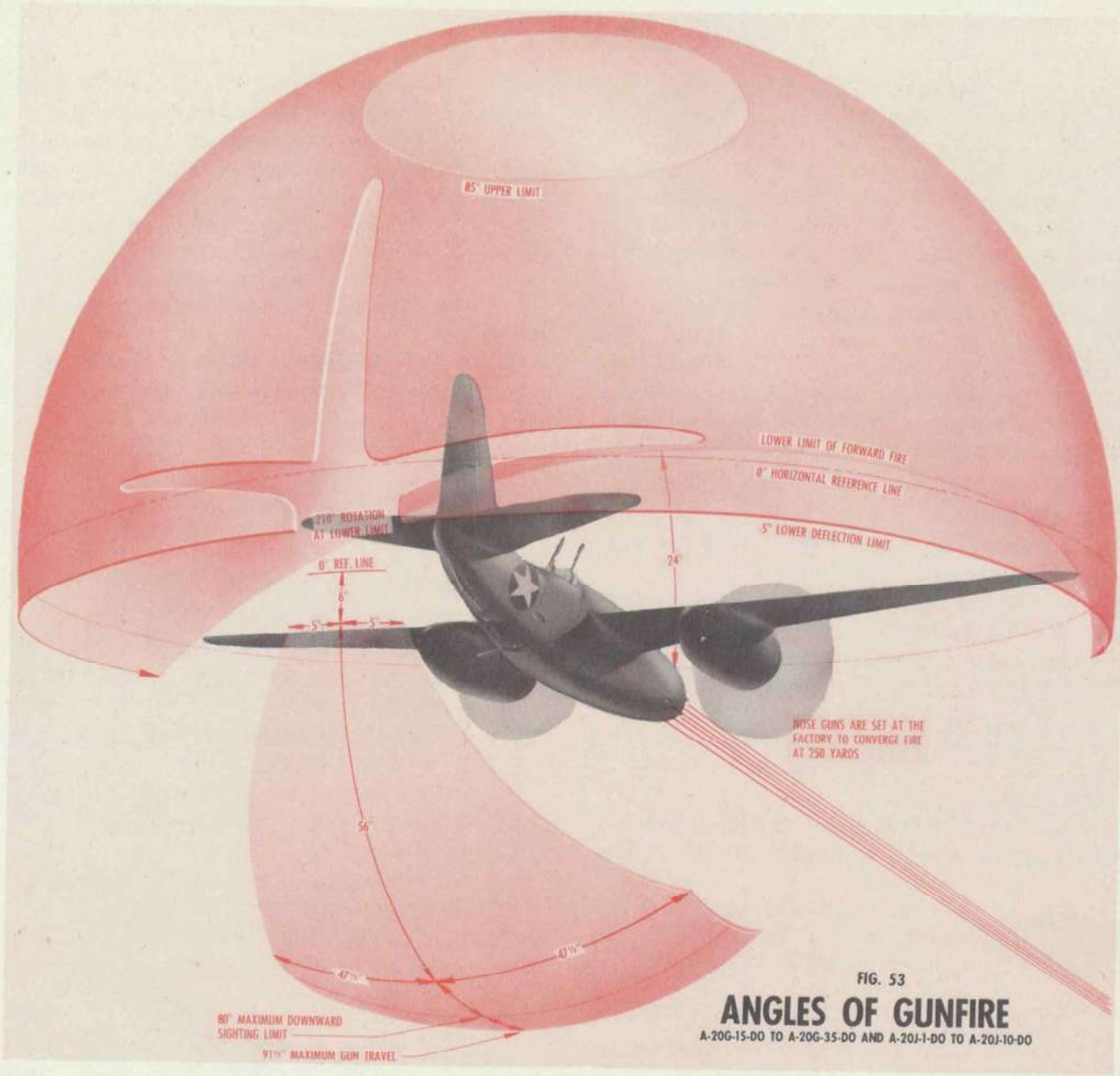


FIG. 53
ANGLES OF GUNFIRE
A-20G-15-DO TO A-20G-35-DO AND A-20J-1-DO TO A-20J-10-DO

4. Armament.—*Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

Note The P-70B-2 airplane is equipped with six forward firing .50 caliber package guns. These are mounted three on each side of the fuselage at the wing root. One .50 caliber flexible gun is mounted at the lower gunner's position. SCR-720 Radar equipment is installed in the gun nose.

a. General.

(1) Six Type M-2 fixed .50 Cal. machine guns are installed in the attack nose section *(airplanes A-20G-20-DO to A-20G-35-DO)* and two similar guns are installed in the bombardier nose section *(airplanes A-20J-1-DO to A-20J-10-DO)*. The machine guns are set to give converging fire at 250 yards and are aimed by a Type N-3A optical gun sight. Total firing time available per gun is as follows:

Gun	Rounds Available Per Gun	Firing Time
.50 Cal.	350 rds.	26 sec.

(2) Two .50 Cal. modified M-2 machine guns are installed in the Plexiglas-enclosed turret of the gunner's compartment. The guns have a fire dispersion range from the horizontal to an elevation of 85 degrees. They operate through an azimuth angle of 360 degrees, except when the gun interrupters prevent their firing. Total firing time available per gun is as follows:

Gun	Rounds Available Per Gun	Firing Time
.50 Cal.	400 rds.	30 sec.

(3) One Type M-2 .50 Cal. flexible machine gun is installed at the lower gunner's position. It is provided with a flexible chute and an integral ammunition box above the gun emplacement. Total firing time available is as follows:

Gun	Rounds Available Per Gun	Firing Time
.50 Cal.	400 rds.	30 sec.

b. Operation of Pilot's Gun Controls.—Operation of the pilot's gun controls is identical with the procedure outlined in Par. 3. b., preceding.

c. Operation of Turret Gun Controls.

(1) Preflight.

(a) External power supply must be used for ground operation.

(b) Adjust seat for desired height by adding or omitting cushions.

(c) Lower seat by releasing spring catches and enter turret.

Note Do not use the sight link rods as handgrips when entering turret.

(2) Combat.

(a) Turn power switch "ON." Azimuth and elevation power switch is located on the turret seat.

CAUTION Any overload will open the switch after which it must again be closed to operate the turret.

(b) Turn gun safety switch "ON."

(c) Gun sight rheostat "ON." Adjust to desired brilliancy.

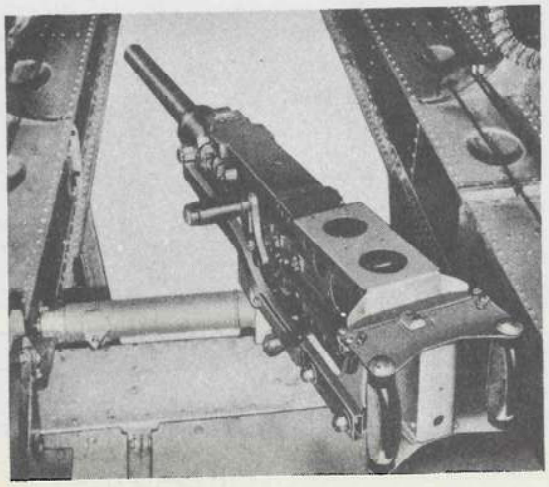


Fig. 54—Lower Flexible Gun

(d) Hands on "pistol" grips, left hand depressing safety switch located on L.H. grip.

(e) Operate turret by twisting handgrips (fore and aft to elevate and lower guns; push against one grip and pull on the other to turn).

For high speed operation, press high speed switch proceeding with above operation.

(f) Fire both guns by squeezing either trigger switch.

Fire interruptors are installed which automatically open gun circuits individually whenever guns are aimed at tail surfaces.

(3) Before Landing.

(a) Azimuth and elevation power switch "OFF."

(b) Gun safety switch "OFF."

(c) Gun sight rheostat "OFF."

d. Operation of the lower flexible machine gun is identical with the procedure outlined in Par. 3, d., preceding.

1. Gun Selector Switch Panel
2. N-6 Gun Sight
3. Ventilator
4. Booster Feed Motors
5. Armor Plate
6. Fire Structural Interruptor Cam Shaft
7. Pistol Grips Safety Switch
8. Gun Sight Light Rheostat
9. Elevation Clutch Lever

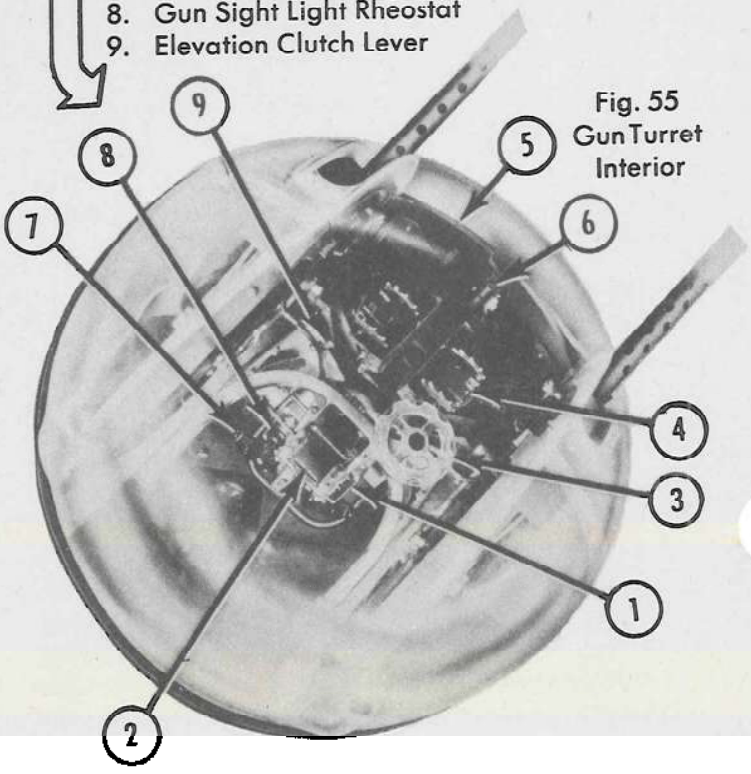


Fig. 55 Gun Turret Interior

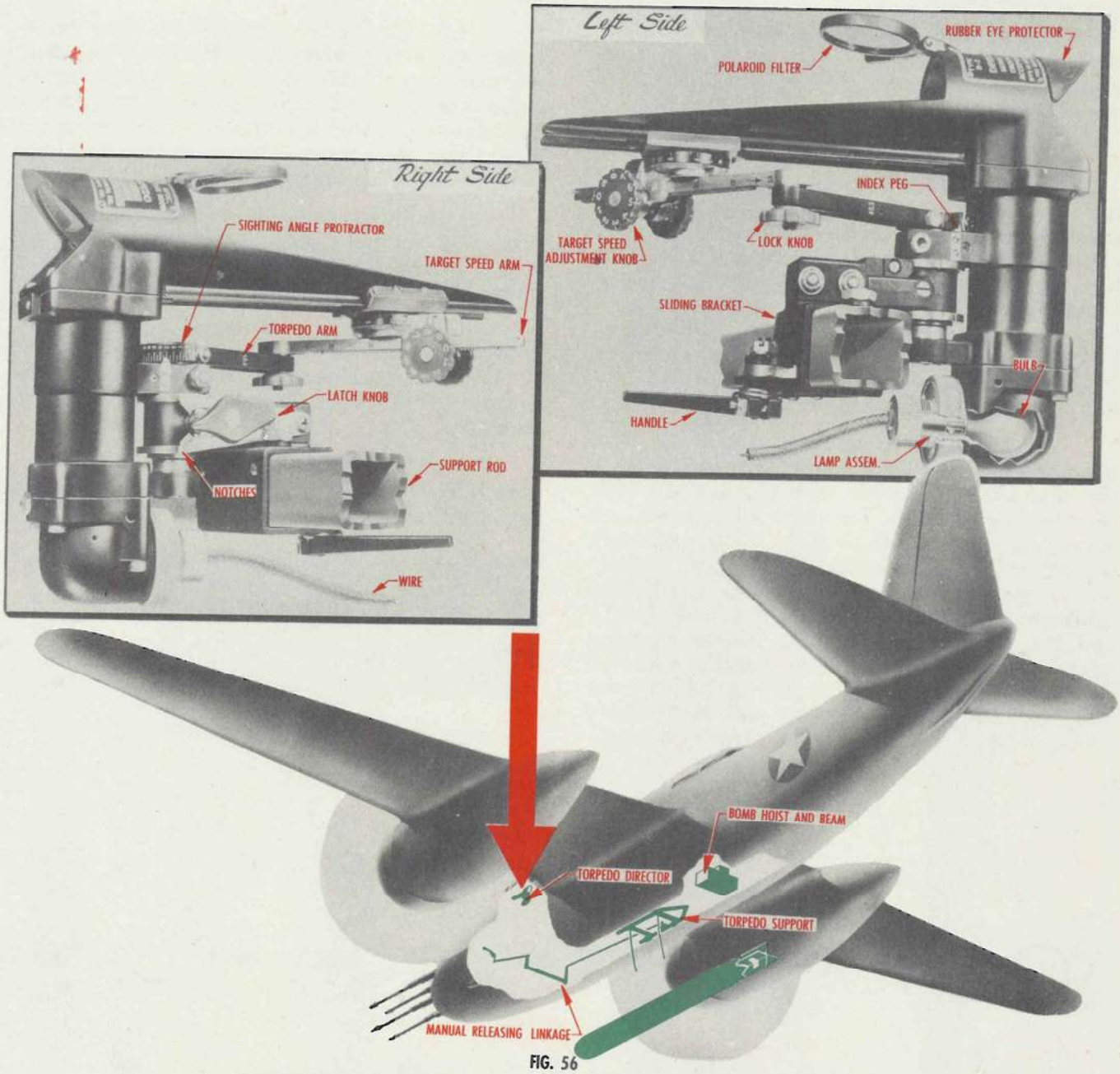


FIG. 56

TORPEDO DIRECTOR AND EQUIPMENT INSTALLED

5. Operation of Torpedo Equipment.—*Airplanes A-20G-1-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

a. **To Position Torpedo Director and Fire Torpedo.**—The torpedo director is an instrument operated by the pilot to help him approach a moving target in such a manner that the torpedo will intercept the target on its course. Direct and release the torpedo with one hand, as follows:

(1) Place torpedo director in a convenient position for sighting.

(2) Set light selector switch to torpedo sight —"ON," and adjust dimming rheostat to suitable brilliancy, according to the degree of light prevailing in the target field.

Note At dusk, dawn, or night, adjust the light on the torpedo director sight to DIM.

(3) When forced to work against direct sunlight or against bad reflection from the water, snap the polaroid filter "DOWN"; otherwise, leave it "UP."

(4) Approach target from desired direction. With the torpedo director in the forward position, align the airplane to the target so that the luminous vertical crosshair appears on the target.

(a) Approach Techniques.

1. The approach may be made in a "homing" curve with the torpedo director locked in the exact forward sight position. Roughly estimate the amount of lead required for interception, with the target appearing at an acute angle off the airplane's bow. Under certain circumstances it might be better to make the approach on an approximately straight air collision course. This technique requires less banking during the approach, and less veering in the final maneuver.

2. It might be desirable to set the sight to a definite angle without reference to the mechanical interception triangle. For this purpose, and for checking purposes, the sight is equipped with a sighting angle protractor that may be read from the left or the right-hand index peg. This depends on the side to which the sight is yawed. The protractor gives the angle between the line of sight and the torpedo arm, i.e., the desired sighting angle, provided the triangle is properly adjusted. Independently of the triangle, it also indicates the angle between the line of sight and the airplane when the sight is latched in the torpedo position.

3. During the approach (or when the director has been installed into the firing position) and when the airplane has been maneuvered to the firing course, the setting of the target arm may be readjusted for speed or course, or both. The target course arm, however, must be reset only when the sight is trained on the target.

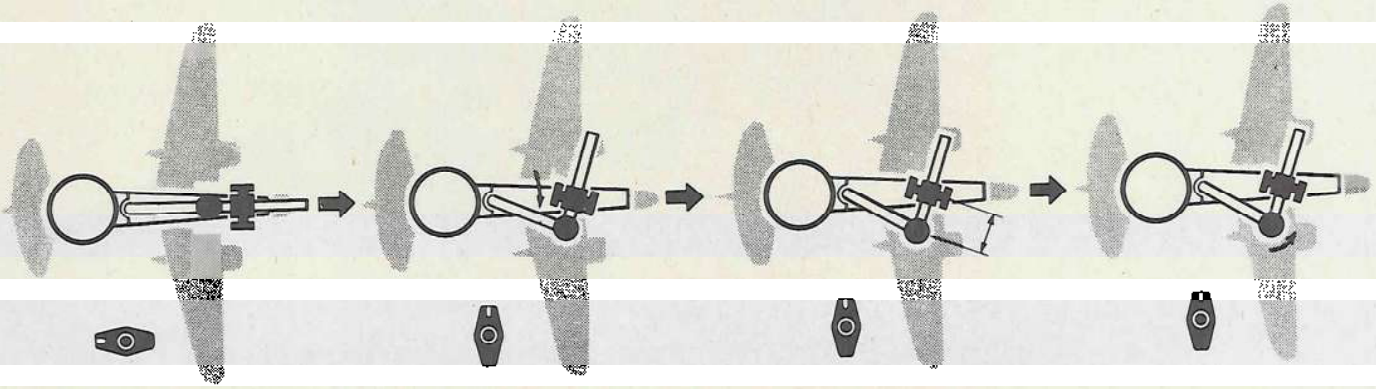
(5) Estimate the speed of the target in knots. With the lock knob loose, and the linkage broken into a triangle, adjust target arm to the value of this estimate by graduations.

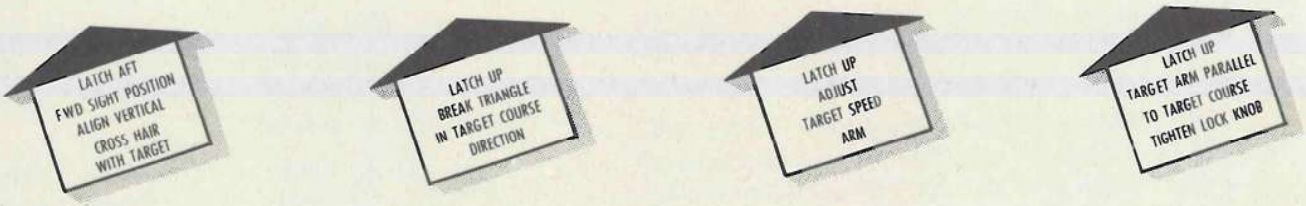
(6) Estimate the direction of the target course. Unlatch and rotate target arm so that it is reasonably parallel to target course, with arrow in direction of course. Lock triangle by tightening lock knob.

(7) Turn latch knob down, and swing the torpedo director sight into position where torpedo arm latches forward.

Fig. 57
Torpedo Release

(8) Turn torpedo release switch "ON."





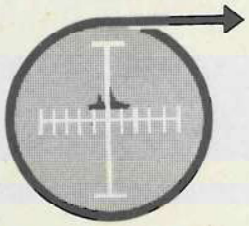


FIG. 58
TORPEDO DIRECTOR OPERATING INSTRUCTIONS

(9) Veer airplane so that target is again brought into coincidence with the luminous vertical crosshair. Steady airplane on the new interception course, and reduce airspeed to pre-determined values.

Note If the field of vision is obstructed during the torpedo maneuver by a windshield stanchion, reposition the torpedo director sideways by sliding the clamp bracket a few inches to one side to clear the obstruction. This should not upset the alignment, nor require any repetition of operations.

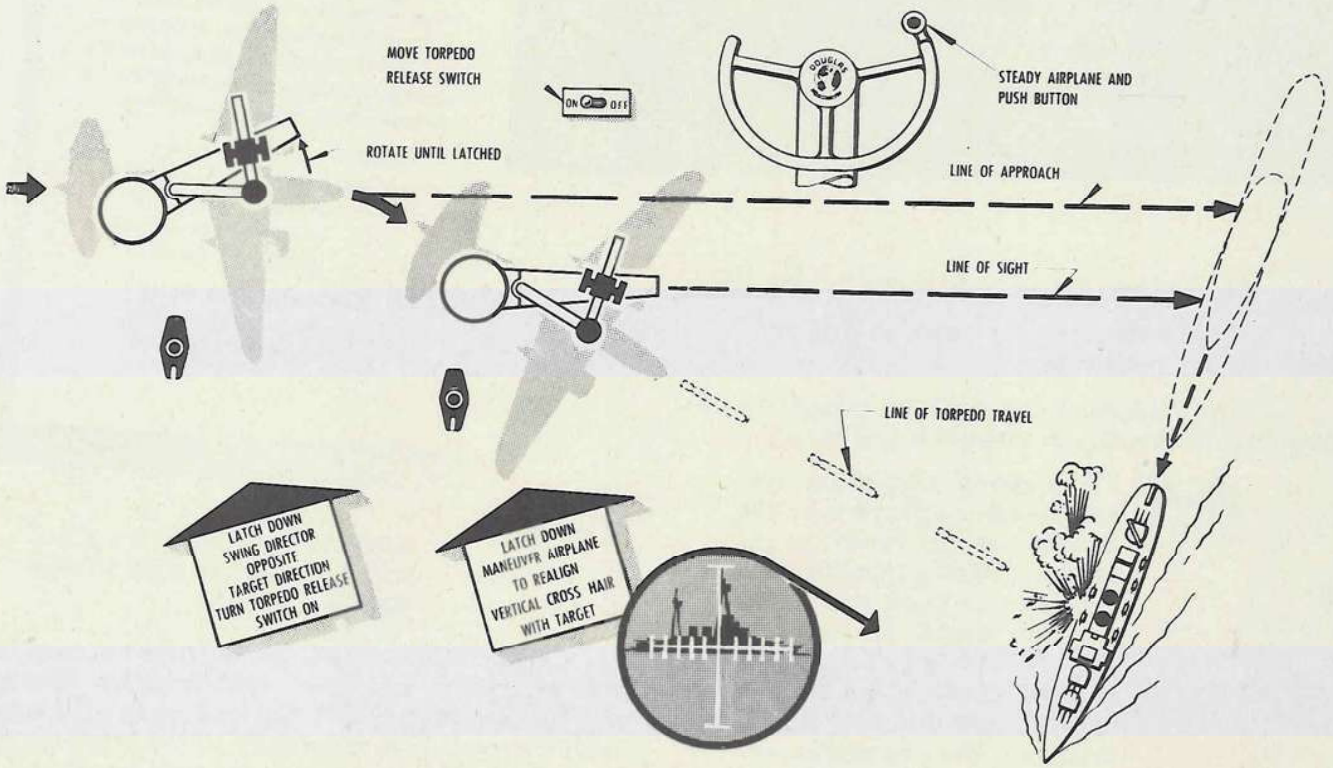
(10) Push torpedo release button and fire torpedo.

Note Should the electrical release for the torpedo fail to fire during the maneuver, a manual release control is provided on the left side of the compartment, adjacent to the pilot's seat. Release the torpedo by moving the control to the "ARMED" POSITION.

b. Range Correction.

(1) General.—The torpedo falls through the air like a bomb when it has first been released. The horizontal distance it travels depends upon the altitude and ground speed of the airplane. When the torpedo hits the water, it slows down and attains its terminal water speed. Then it continues to travel until it hits its target, or spends itself. The time the torpedo travels at terminal water speed varies with the range; the time it flies through the air does not vary with the range. The interception triangle, therefore, would be independent of range, and it would not matter how closely the airplane approached the target before launching the torpedo. The sighting angle varies slightly at long range, and more discernibly at short range. The B-2 Type torpedo director is equipped with a torpedo speed arm of fixed length, corresponding to an actual torpedo travel speed of 40.5 knots (46.6 mph). This is computed to correspond to 2500 yards torpedo travel range (launched from 250 feet at 175 mph indicated airspeed, assuming five seconds deceleration time, and 33.5 torpedo terminal water speed).

(2) Method of Range Correction Procedure.—This correction method depends primarily on the distance actually traveled by the torpedo, i.e., the torpedo travel range. It may be the same for a variety of optical distances between airplane and target at the distance of launching, i.e., the sight range.



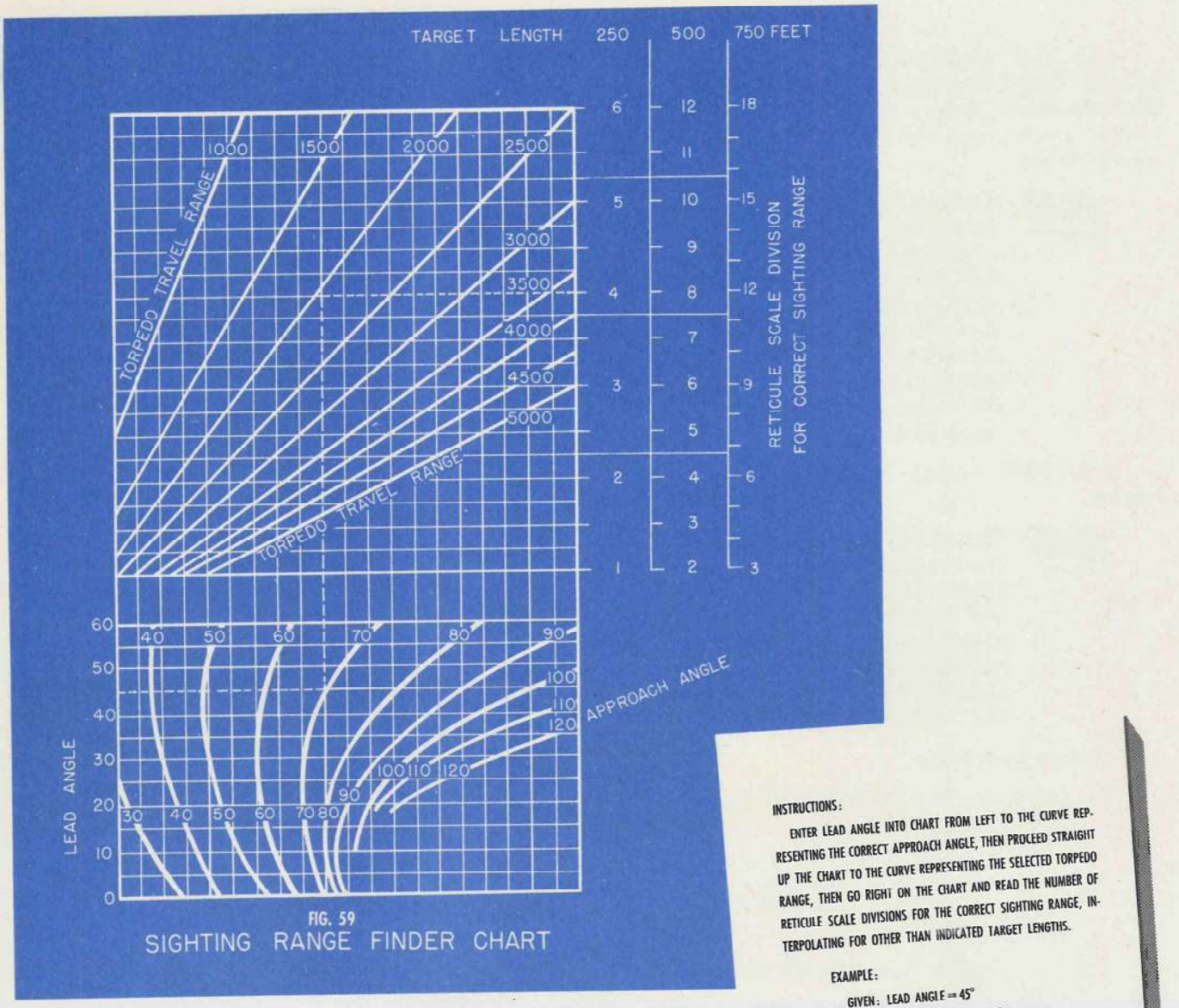


FIG. 59
SIGHTING RANGE FINDER CHART

(a) Choose the torpedo travel range.

(b) Correct the interception triangle for the torpedo travel range.

(c) Determine the sighting range corresponding to the chosen torpedo travel range.

Note The apparent size of any vessel depends on the perspective foreshortening. To find an unknown side of a triangle, it is necessary to know two angles and the length of one side. Once the interception triangle is set up for a given torpedo range (the known leg of the triangle), the two angles necessary for solving the sighting range (the unknown leg of the triangle), can be read off the torpedo director.

(d) Read the lead angle from the torpedo arm protractor, and enter chart from the left, on the line corresponding to the lead angle. Continue until the curve, corresponding to the interception angle read off the forward protractor, is reached.

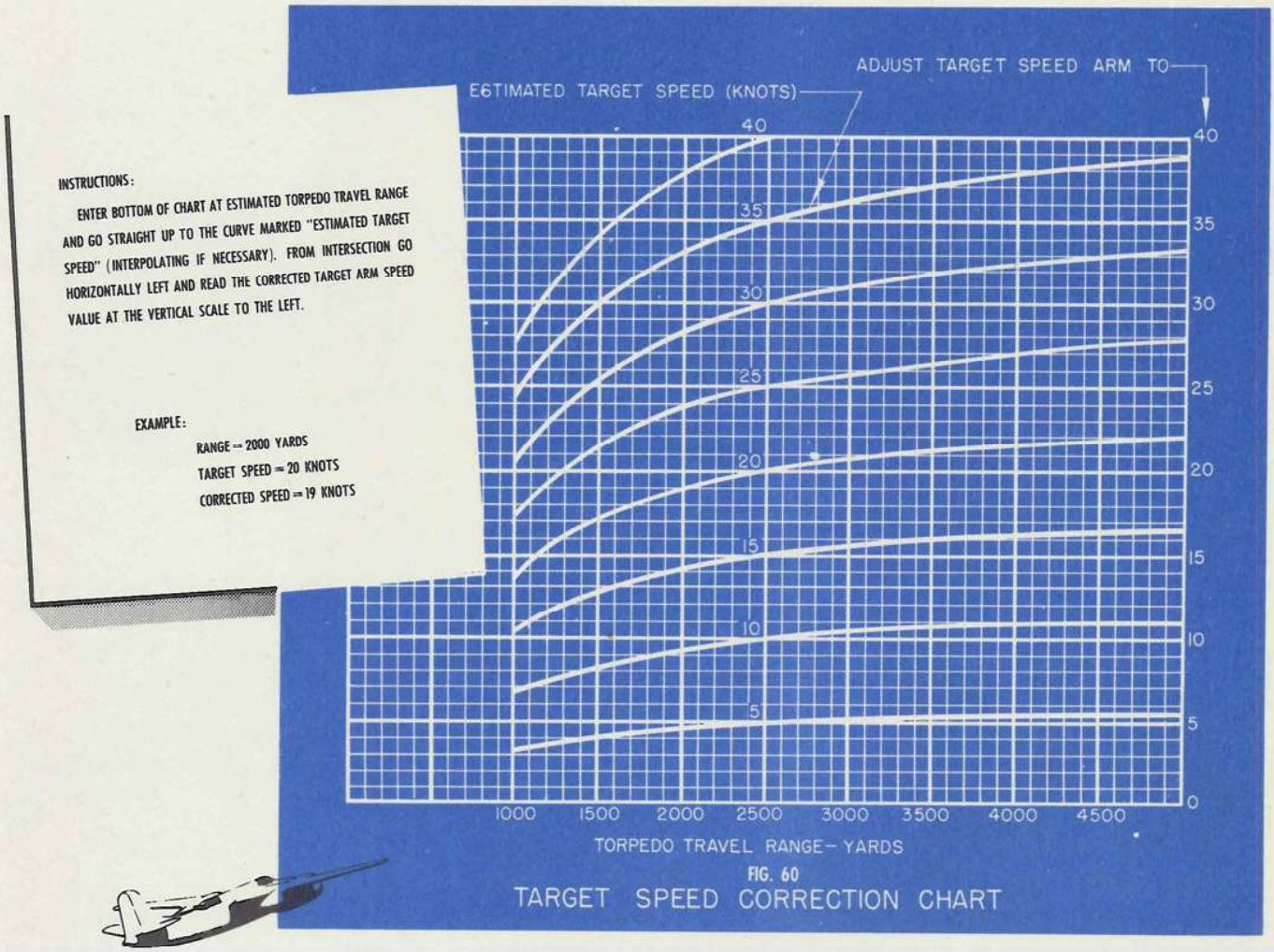


FIG. 60
TARGET SPEED CORRECTION CHART

(e) Go straight up the chart until the line corresponding to the torpedo travel range is intercepted, then read straight over to the right and find the correct number of reticule divisions for the target length of 250, 500 and 750 foot vessels.

(f) Swing the torpedo director into the lead position. Swing the airplane to bring the target into the corrected aim.

(g) Launch the torpedo when the target vessel appears to be the computed size by the luminous scale.

c. To Use Torpedo Director as Auxiliary Gun Sight.

(1) General.—In an emergency the torpedo director, when latched in the forward sight position, can be used as an auxiliary fixed gun sight (turn latch knob "UP"). The triangle can be used to introduce lead on the basis of 50 mph target airplane speed, corresponding to each knot on the water target scale.

(2) Operation.

(a) For 250 mph, set target to 5 knots. Place target arm approximately parallel to target course, and leave torpedo arm in notch.

(b) Fly so that the vertical crosshair intersects the target without leading.

(c) When using the triangle to introduce lead, turn latch knob "DOWN" and engage torpedo arm.

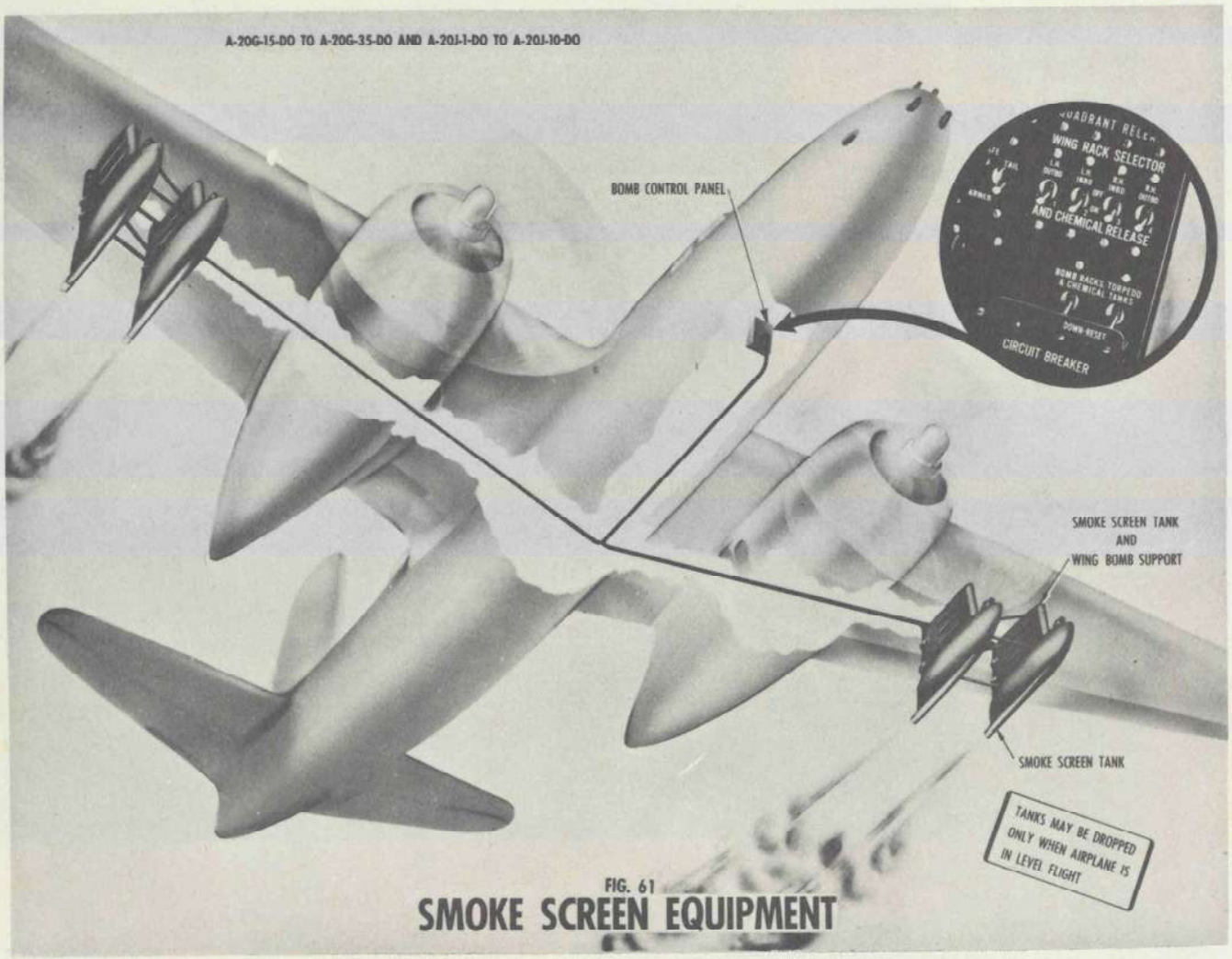


FIG. 61
SMOKE SCREEN EQUIPMENT

6. **Smoke Screen Equipment.**—*Airplanes A-20G-15-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

a. General.—Provisions are made for carrying four chemical tanks supported by two racks on each outer wing. Release of smoke screen and tanks is controlled by individual toggle switches located on the center of the pilot's bomb control panel.

Chemical Tank Weight Empty	68 lbs.
Chemical Tank Weight Full	588 lbs.
Chemical Tank Capacity	33 gals.
Effective Duration	7 secs.

b. Operation.—To release smoke from the tank selected, throw "ON" any one of the four switches on the pilot's bomb control panel.

CAUTION Chemical tanks cannot be turned "OFF" after they are turned "ON."

The tanks are provided with a release so that they may be dropped when the mission is completed. To release the chemical tank, leave the operating switch "ON" and press the switch on the control wheel.

CAUTION Maximum speed allowed with chemical tanks installed is 306 mph.

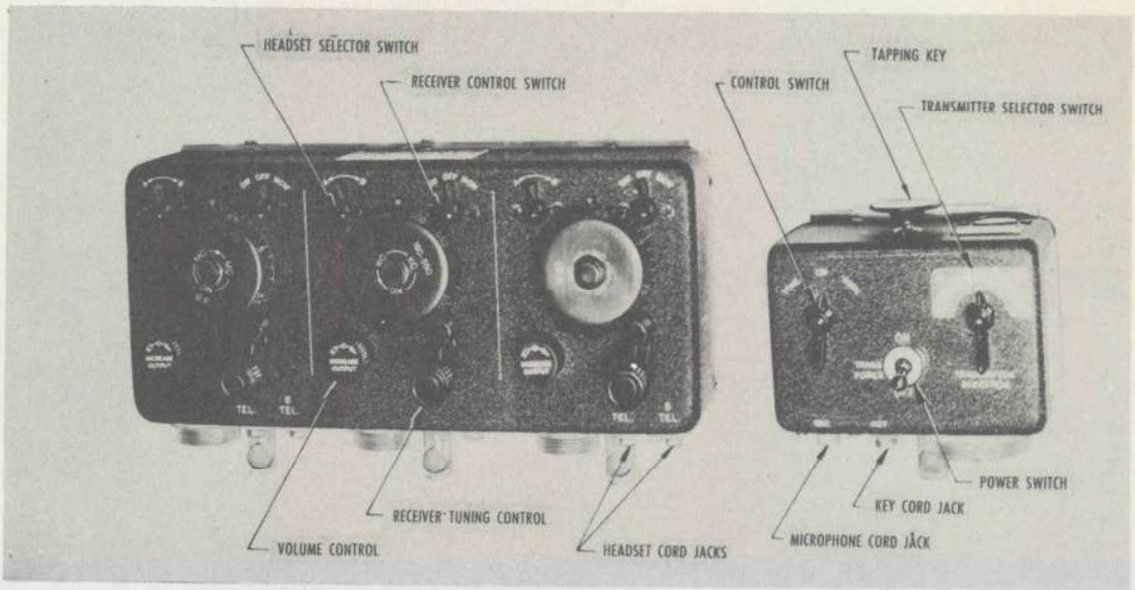


Fig. 62—SCR-274N Command Set Control Box

7. Operation of Communications Equipment.— *Airplanes A-20G-1-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

Note The P-70A-2 Airplane has an SCR-540 Radar Antenna installed in the gun nose. The radio control equipment is installed in the center fuselage. The P-70B has SCR-720 Radar equipment installed in the nose. Controls for this equipment replaces the .50 caliber ball turret in the upper gunner's position.

Other radio equipment includes

2—SCR-522 Command Sets
1—RC-36 Interphone Equipment
1—SCR-729 I F F
1—SCR-695 I F F
1—BC-1206 Range Receiver
2—T-30 Microphones
2—HS-33 Head Sets
2—MC-385 Head Set Adapters

a. Operation of SCR-274N Command Radio Set.

(1) Receiver Operation.—Three separate receivers are installed covering 190-550kc, 3.0-6.0 mc, and 6.0-9.1 mc frequency bands. Operation of the receivers is as follows:

(a) See that receiver controls are in their normal position, i. e., headset selector switches in intermediate position between "A" and "B," and receiver control switches "OFF."

(b) Plug headset into extension cord jack.

(c) Select receiver tuning control covering desired reception frequency. Turn corresponding receiver control switch to "MCW" for voice or MCW code, or to "CW" for straight CW code.

(d) For normal reception, set the filter selector switch to "BOTH." To receive radio range without interference, set selector switch to "RANGE." To receive voice without interference, set selector switch to "VOICE."

Note It is impossible to receive voice with selector switch in "RANGE" position.

(e) Note which jack ("A" or "B"), the "TEL" plug is in and turn the headset selector switch of the receiver to be employed to the corresponding position ("A" or "B").

(f) Tune receivers to desired frequency on tuning dial, and adjust corresponding volume control knob.

(g) To turn off receiver volume controls, return them to normal position.

Note More than one receiver may be heard simultaneously by turning the corresponding headset selector switches to "A" or "B."

(2) Transmitter Operation.—Three separate transmitters are installed with frequency ranges of 3.0-4.0 mc, 4.0-5.3 mc, and 5.3-7.0 mc. Operation of the transmitters is as follows:

(a) Turn transmitter power switch "ON" and allow 15 seconds for transmitter to "warm up."

(b) Plug microphone into extension cord jack.

(c) Turn transmitter selector switch to desired transmitter.

(d) To transmit voice turn transmitter control switch to "VOICE," and press microphone button while speaking.

(e) To transmit code, turn transmitter control switch to "CW" and operate key. When transmitting to receivers not capable of receiving straight CW, set transmitter control switch to "TONE" and operate key.

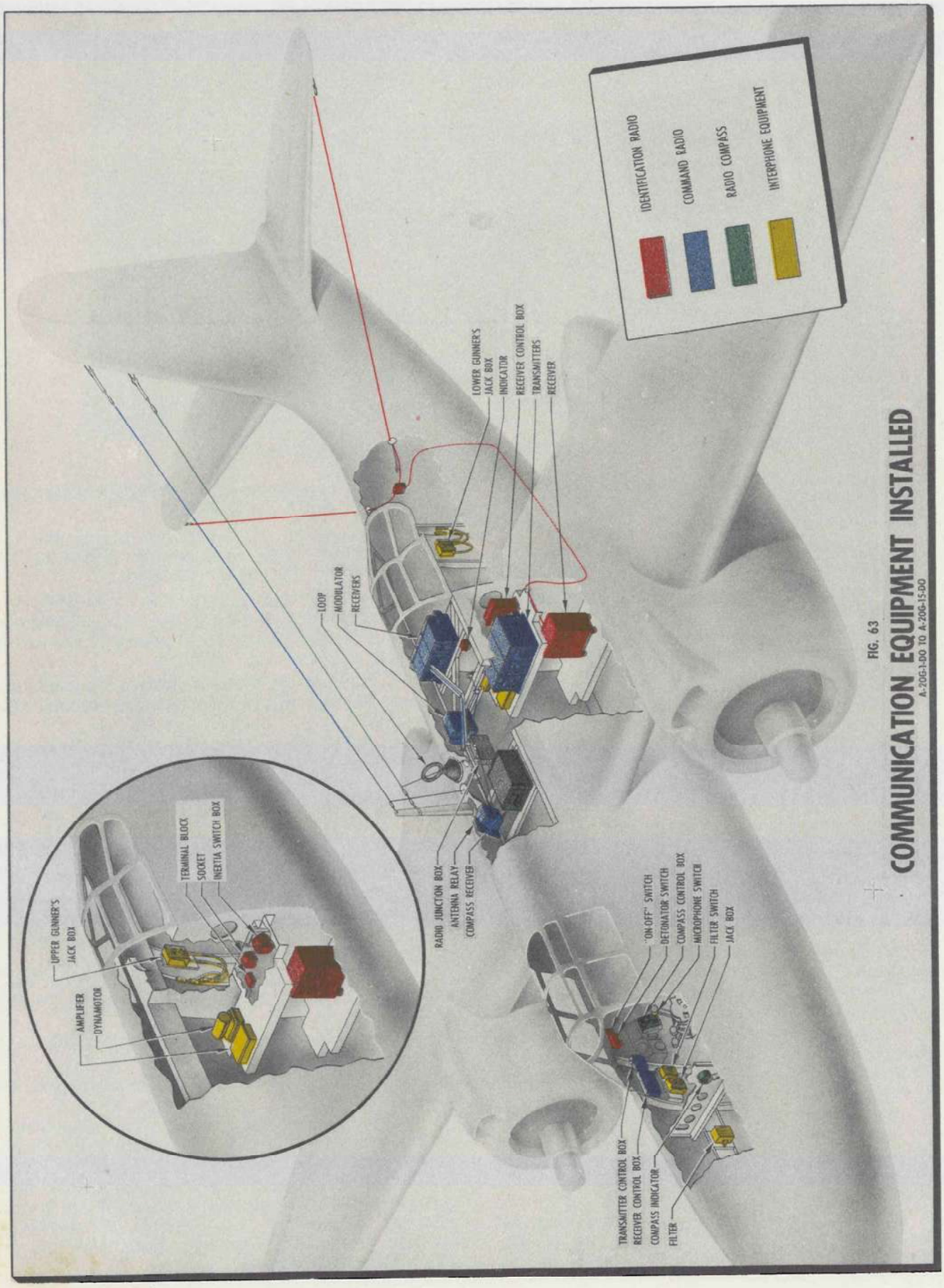


FIG. 63

COMMUNICATION EQUIPMENT INSTALLED

A-206-1-DO TO A-206-15-DO

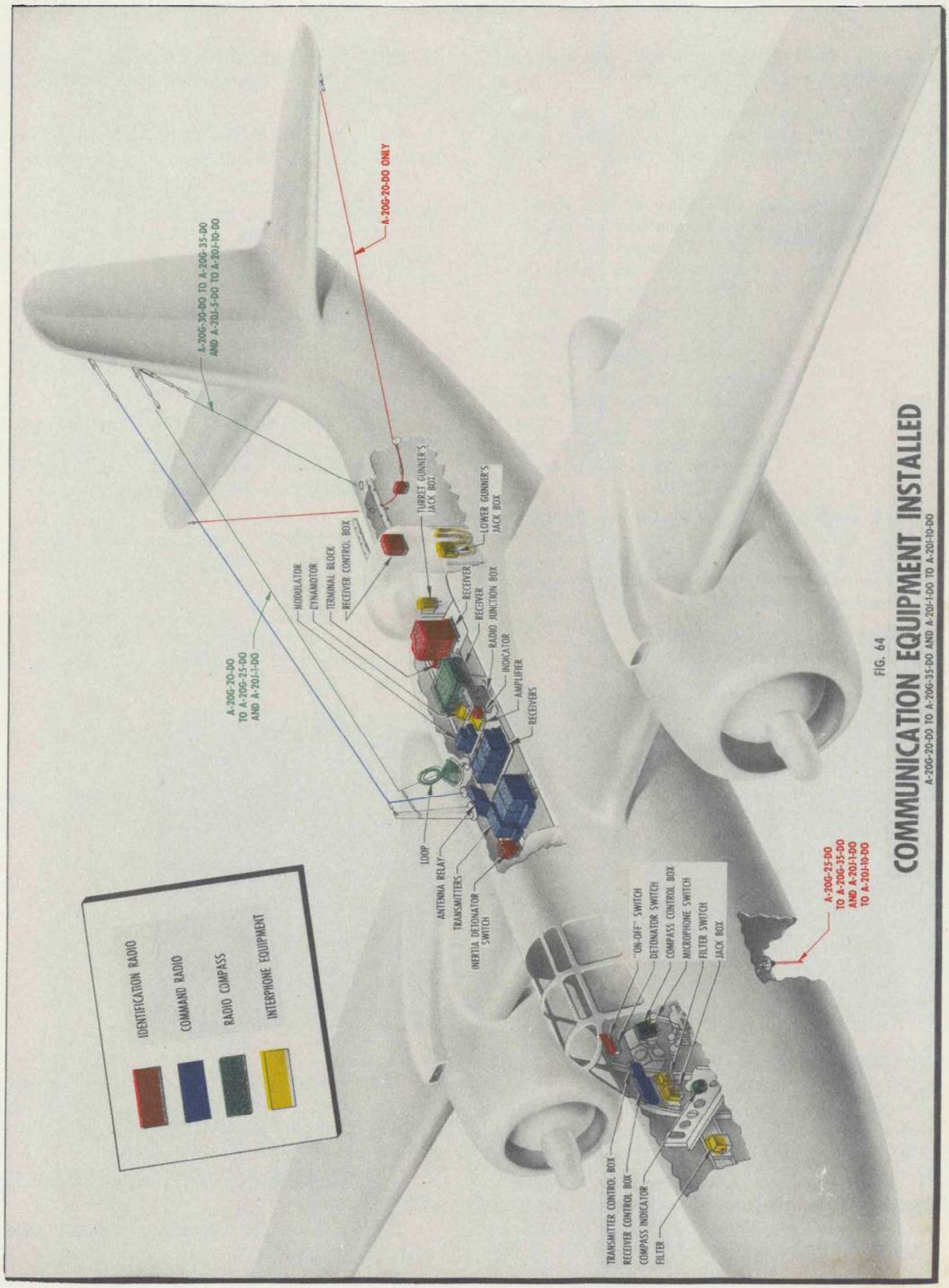


FIG. 64

COMMUNICATION EQUIPMENT INSTALLED

A-206-20-DO TO A-206-35-DO AND A-20J-1-DO TO A-20J-10-DO

(f) Turn transmitter off by switching transmitting power switch "OFF."

(g) To reduce battery drain and increase dynamotor life, place the emission selector switch in "VOICE," unless continued use on "TONE" or "CW" is expected.

CAUTION Operation of this equipment involves the use of high voltages which are dangerous. In tuning up the antenna circuit of the transmitters, avoid touching the antenna when the power is on, or severe burns may result. Make certain that the dynamotor is not running before making any adjustment other than tuning up.

(3) Bombardier Operation.—***Airplanes A-20J-1-DO to A-20J-10-DO.***—Channels "A" and "B" can be used by the bombardier for reception and transmission. However, the band must be selected by the pilot.

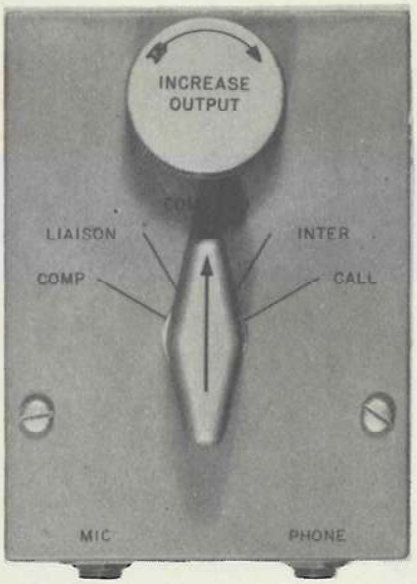


Fig. 65 Interphone Jack Box

b. Operation of the RC-36 Interphone Equipment.

(1) The interphone amplifier is "ON" whenever the airplane's electrical system is "ON," as it is connected directly to the airplane's battery.

(2) Interphone jack boxes are installed at stations of the pilot, the upper gunner, and lower gunner *(airplanes A-20G-1-DO to A-20G-35-DO)* and bombardier *(A-20J-1-DO to A-20J-10-DO)*. Each jack box has a volume control and a selector switch. The selector switch has the following positions:

(a) "COMP." The audio output of the compass receiver will be heard in the interphone.

(b) "LIAISON." The command set receiver audio output will be heard in the channel "B" in the earphones. The command set transmitter may be modulated with the microphone switch closed.

Note As no liaison set is used in this airplane, one audio channel of the command set is connected to the "LIAISON" position of the jack box.

(c) "COMMAND." The command set receiver audio output will be heard in channel "A" in the earphones. The command set transmitter may be modulated with the microphone switch closed.

(d) "INTER." Communication with any other crew member having his jack box switch at "INTER" position will be obtained.

(e) "CALL." This emergency position will enable any crew member to call all members of the crew regardless of the position of their jack box switch.

Fig. 66 Filter Switch Box

(3) A filter switch box, located in the pilot's compartment, is used to filter out radio range signals or radio-telephone signals. The selector switch has the following positions:

(a) "RANGE." Radio range signals only can be heard.

(b) "VOICE." Radio-telephone signals only can be heard.

(c) "BOTH." Both radio range and radiotelephone signals are heard.

Note To use the filter, the headset cord must be plugged into the phone jack on the filter switch box.

Fig. 67 Destroyer Push Button

c. Operation of SCR 535A Identification Equipment.

(1) The radio control box is located in the rear gunner's compartment. An on-off switch and detonator switches are located on the R.H. side of the pilot's compartment.

(2) Preflight Check.

(a) Check the detonator circuit for proper operation.

(b) Set the sensitivity controls in accordance with the instructions in the *SCR 535A Radio Set Operating Instructions Handbook.*

(3) Operation.

(a) To turn on, turn either the on-off switch in the pilot's compartment, or the on-off switch on the control box to "ON."

(b) Adjust knob "V" until the pointer of the voltmeter on the face of the control box points to the red marking on the voltmeter scale.

(c) To turn off, turn the on-off switch of both control box and pilot's switch to "OFF."

CAUTION The radio destroyer dual push button marked "DANGER," is located on the right-hand side of the pilot's compartment, and should be used only when abandoning the airplane over enemy territory. When the two buttons are pressed simultaneously a detonator is set off in the receiver that will destroy it internally. No damage will be done either to the airplane or personnel. Bodily contact with the receiver should be avoided at the time of destruction.

d. Operation of MN-26-Y Radio Compass.—On *airplanes A-20J-1-DO to A-20J-10-DO,* provisions are made in the bombardier's nose section for a radio compass. On *airplanes A-20G-1-DO to to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO,* the radio compass consists of a control box, located on the R.H. side of the pilot's compartment; a radio compass indicator, located on the L.H. side of the instrument panel; a radio compass loop, installed on the top of the fuselage aft of the pilot's enclosure door; and a receiver, mounted on the fuselage deck truss, forward of the gunners' cockpit. The loop is installed in a fixed position with its plane perpendicular to the line of flight. The frequency range of this equipment is covered in three bands, calibrated in kilocycles as follows: Band I, 150 to 325; Band II, 325 to 695; Band III, 3400 to 7000 kc. The master control switch of the radio compass control box marked "COMP," "REC ANT," and "REC LOOP," controls all radio compass equipment functions except tuning and adjustment of signal level as follows:

Fig. 68 Radio Compass Control Box

"COMP." For obtaining communications reception and visual on-course indication of homing.

"REC ANT." For communication and aural radio range reception.

"REC LOOP." For communications reception during conditions of severe rain and snow

static, aural radio range reception, and aural null homing from communications stations.

"AUDIO." Regulates the level of the audio signal in the headsets.

"COMPASS." Regulates the extent of pointer deflection of the left-right indicator needle.

(1) Normal Reception.—(Antenna).

(a) Turn master switch to "REC ANT."

(b) Select desired frequency range.

(c) Snap "CW" switch "ON" or "OFF" as desired.

(d) Tune in station.

(e) Adjust "AUDIO" control for desired headset volume.

(2) Anti-Rain-Static Reception—(Loop).

(a) Turn master switch to "REC LOOP."

(b) Select desired frequency range.

(c) Snap "CW" switch "ON" or "OFF" as desired.

(d) Tune in station.

(e) If the station is directly in line with the airplane's course, no signal will be heard, as the loop is fixed with its plane perpendicular to the line of flight.

(f) Adjust "AUDIO" control for desired headset volume.

(3) Homing—Radio Range Reception.—It is necessary to either have a map showing the radio range course and characteristics, or to know the location of the course and its characteristic "A" and "N" signal areas.

(a) Turn master switch to "REC ANT."

(b) Turn band switch to 150-325 kc.

(c) Tune to desired frequency.

(d) Adjust "AUDIO" control to desired signal level.

(e) Turn airplane so as to intercept the radio range course.

(f) The "A" and "N" signals will blend into a continuous dash interrupted by the station identification when on course.

(g) The airplane may then be flown on course to the location of the radio range station.

(h) Arrival at destination is indicated by an abrupt decrease in headset volume known as the "cone of silence."

(4) Visual Radio Compass Homing.

(a) Adjust compass control to maximum.

(b) Turn master switch to "COMP."

(c) Select desired frequency range, and tune in station.

(d) Listen carefully for station identification to insure that the desired station is being received. "AUDIO" control may be set for any audio output level without affecting the deflection of the left-right indicator needle.

(e) Alter the airplane's course to left or right as shown by the left-right indicator needle, until reading "ZERO" or "on-course."

(f) Although "on-course" indications will be obtained both when approaching and when flying away from a transmitter, no confusion as to location of the station need result. (If a course correction to the right, is accompanied by a deflection of the indicating needle in the same direction, the station is aft; if the deflection is in the opposite direction, the station is forward.) The indicating needle points in the general direction of the transmitting station.

(g) Reduce "COMPASS" control setting until an intermediate value has been obtained. This permits the course to be followed accurately.

(5) Aural Null Homing.—This type may be used in place of visual radio compass homing should any of the compass circuits of the indicator be inoperative, or in cases of severe rain static. This method is undesirable because of the possibility of 180 degrees ambiguity of direction.

(a) Turn master switch to "REC LOOP."

(b) Select desired frequency range, and tune in station.

(c) Listen carefully for station identification.

(d) When homing on weak signals, turn "CW" switch "ON."

(e) Adjust "AUDIO" control for desired audio level.

(f) Turn airplane until headphone volume decreases to minimum.

(g) Fly airplane on this null course until desired position has been reached.

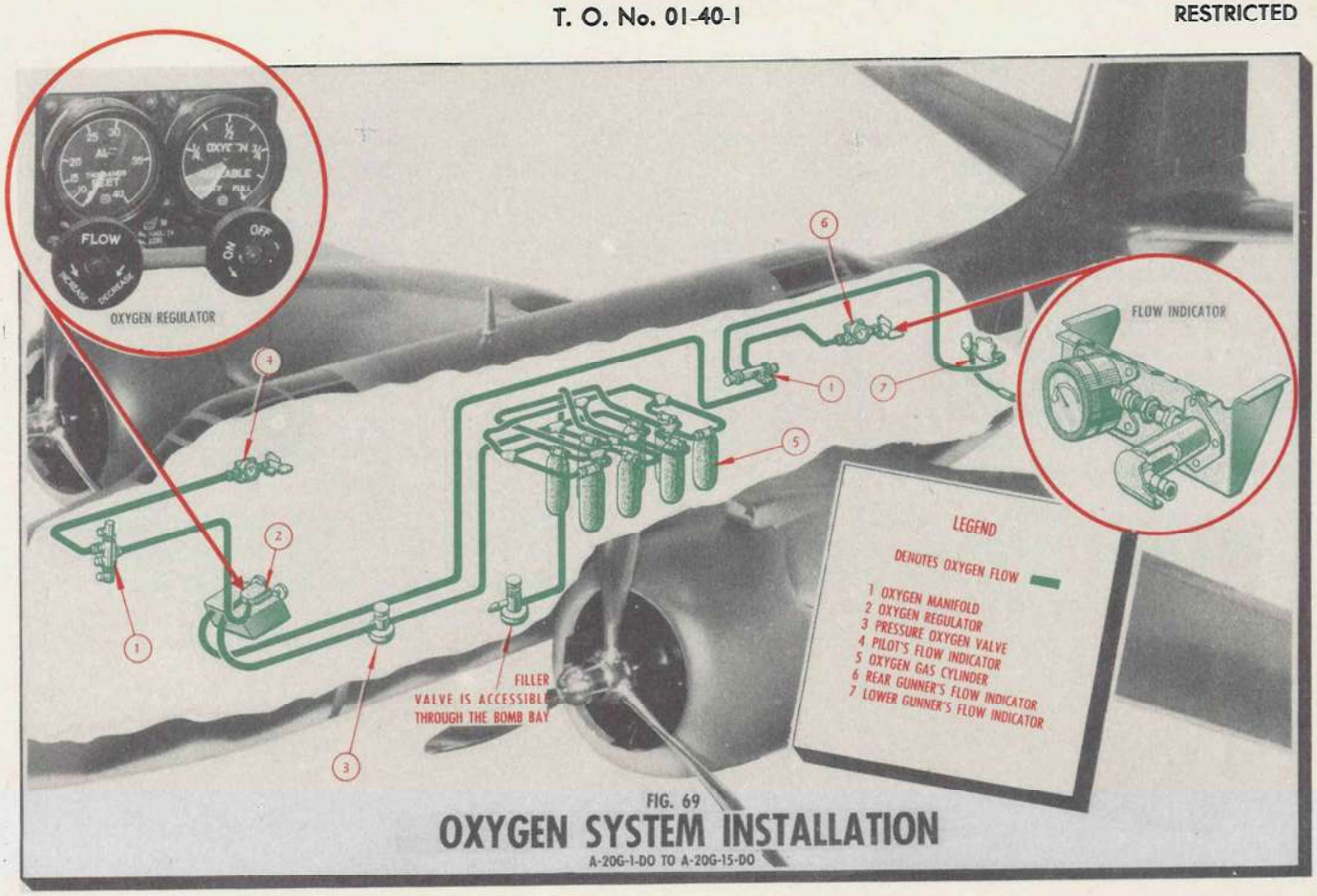


FIG. 69
OXYGEN SYSTEM INSTALLATION
A-20G-1-DO TO A-20G-15-DO

8. Oxygen System.—*Airplanes A-20G-1-DO to A-20G-15-DO, inclusive.*

Note A low pressure demand type oxygen system is installed in P-70 Airplanes.

a. Use of Oxygen.—To provide safety and personnel efficiency at high altitudes, a British high-pressure type oxygen system is provided for the three crew members. The time required to complete the mission determines the use of oxygen at the various levels. If the flight is to be maintained at high altitudes for a certain period of time, and if oxygen is not supplied, the efficiency of the operators will drop considerably. They will grow dizzy, lose consciousness, or have a case of "bends." During short intervals at high altitudes, however, no effect will be apparent. A suggested formula for the use of oxygen is as follows:

At 15,000 ft. on all flights.
At 12,000 ft. on all flights from two to four hours.
At 10,000 ft. on all flights in excess of four hours.

b. Duration of Oxygen.—The duration of the oxygen supply carried in the eight cylinders, with an initial pressure of 1800 pounds per square inch, varies with the altitude and the consequent increase in the oxygen requirements. The following duration at various altitudes represents the maximum hours available to one man, and must be divided by the number of men in the crew for the actual duration.

Regulator Setting	Man Hours
10,000 ft.	35
15,000 ft.	24
20,000 ft.	19
25,000 ft.	15
30,000 ft.	13
35,000 ft.	9

c. Preflight Check.

(1) Check the pilot's regulator controls to make certain that they are "OFF."

(2) Turn the pilot's shut-off valve, located on the floor to the right of the pilot's seat, "ON."

(3) Insure that the cylinders are full (as indicated by the gage on the oxygen flow regulator).

(4) See that each crew member is supplied with a mask, and that his mask tube connector fits into the oxygen outlet socket.

d. Use in Flight.

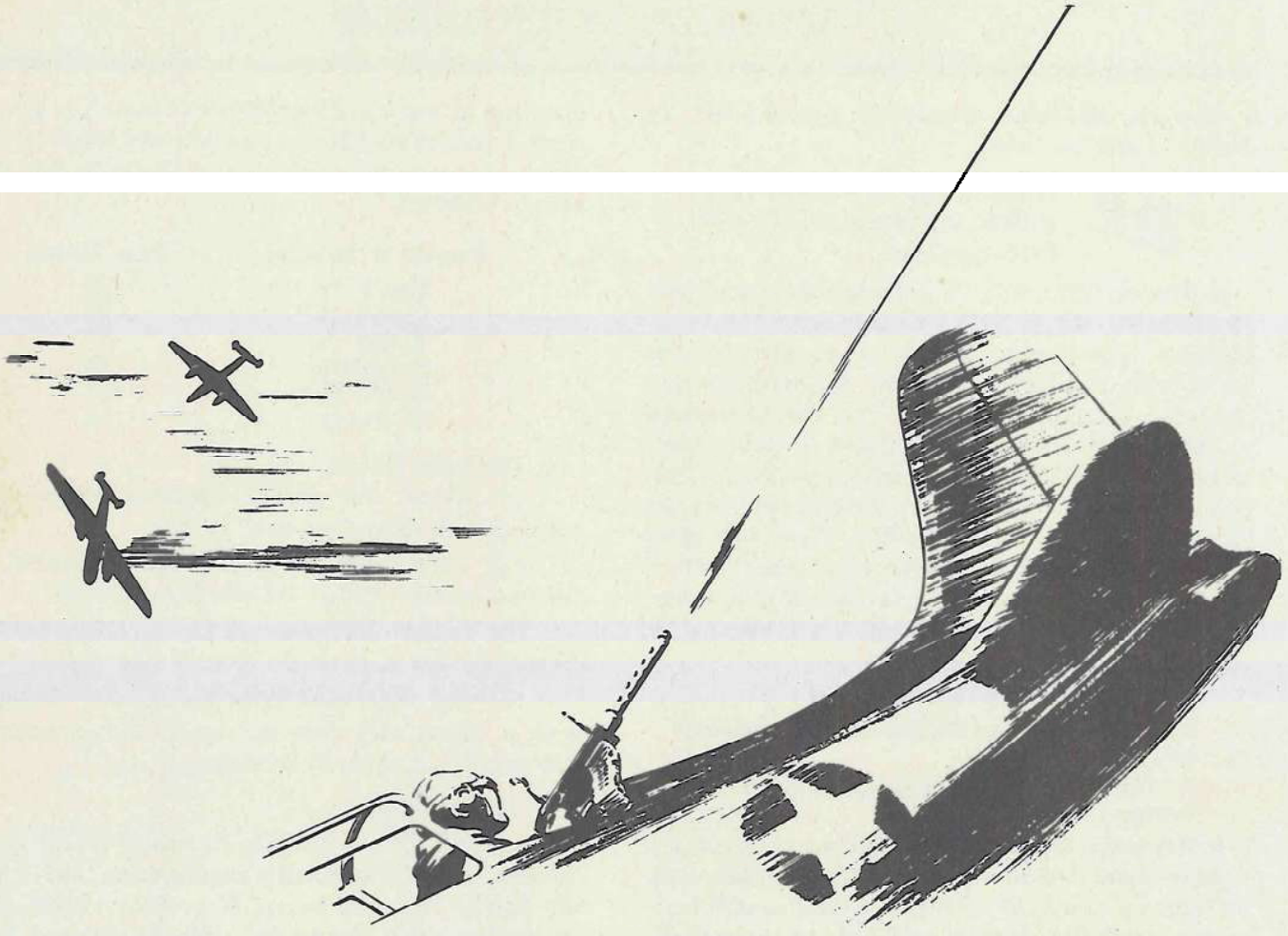
(1) Adjust the mask to fit snugly on the face. To test, pinch the mask's supply tube, and draw air lightly into the lungs. If properly fitted, the mask should be "drawn in" without leaking. Test the mask frequently while in flight.

(2) Clip the mask to the clothing to prevent it pulling away from the face.

(3) The pilot should set the oxygen regulator so that the gauge on the regulator coincides with the altimeter reading. This should supply sufficient oxygen to all the personnel. If the pilot, or one of the gunners, feels he is not getting a sufficient supply, the pilot should open the regulator to a higher altitude reading. A measured quantity of pure oxygen is supplied by the regulator to each of the crew members' stations, where it is mixed with the ambient air in the user's mask.

CAUTION Each of the crew should watch his oxygen flow indicator to insure that oxygen is being delivered. If no flow is indicated, check the supply tubing for kinks, or the mask for looseness. If this does not remedy the trouble, notify the pilot immediately. The oxygen mask should not be removed from the face to permit conversation, or for any other reason, as this may result in dizziness, loss of consciousness, or a case of "bends."

e. **After Flight.**—After flight, the pilot should close the regulator and turn the shut-off valve, located on the floor to the right of the pilot's seat, "OFF."



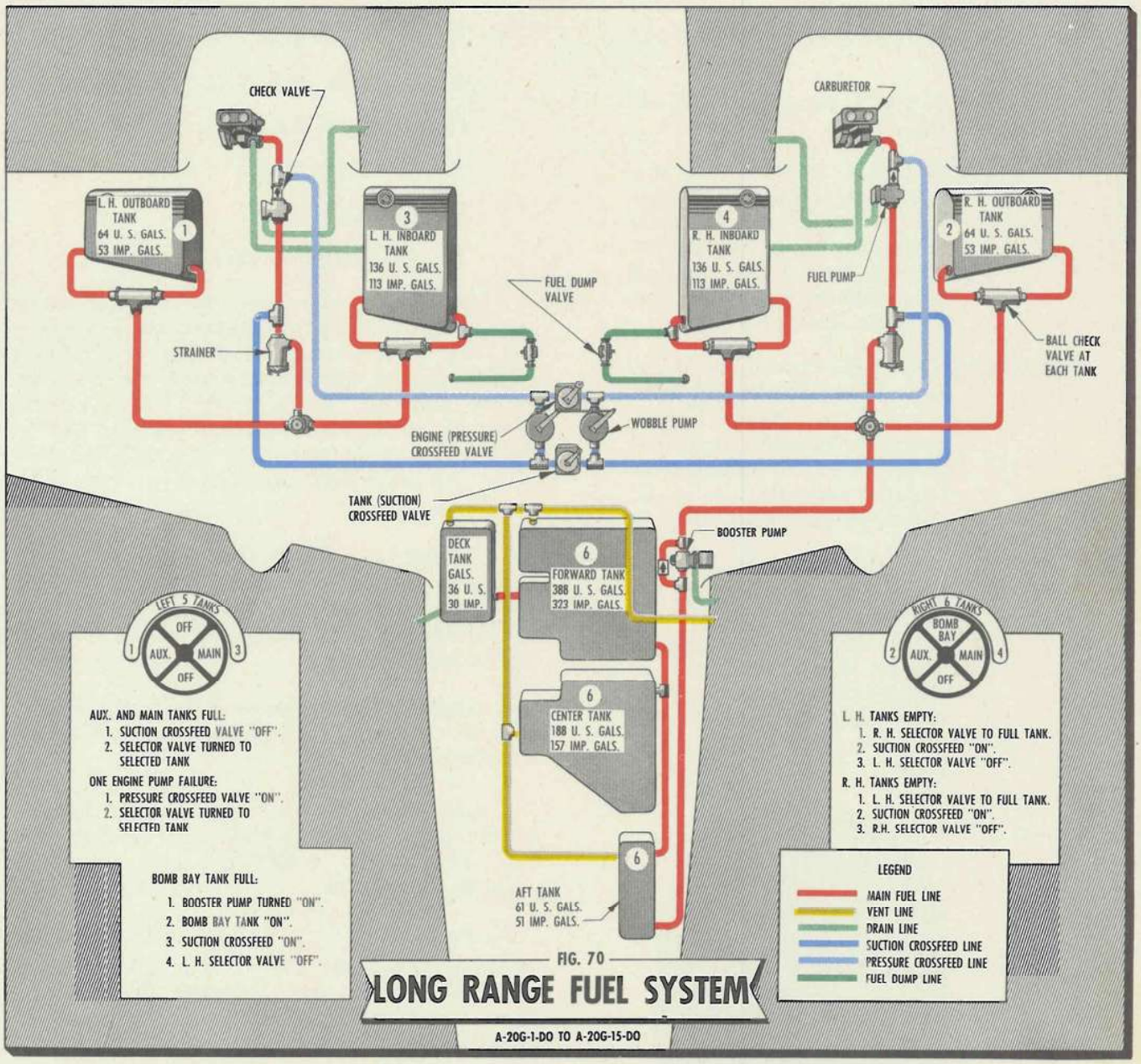


FIG. 70

LONG RANGE FUEL SYSTEM

A-20G-1-DO TO A-20G-15-DO

9. Long Range Fuel System.—*A-20G-1-DO to A-20G-15-DO.*

a. General.

(1) A long range fuel system is furnished to provide adequate ferrying facilities over long distances. The system can be removed easily when the ferrying mission has been completed. It incorporates a bomb bay installation, comprised of four all-metal fuel tanks with a total fuel capacity of 676 U.S. (563 Imperial) gallons. The fuel is drawn from the tanks by an electrically driven fuel booster pump, and is forced under pressure to the fuel tank selector valve in the R.H. inboard wing. From here the fuel is supplied to the engine (or engines, as may be determined by the setting of the tank cross-feed control). In normal operation, each engine has an individual fuel system whereby the L.H. tanks supply the L.H. engine, and R.H. tanks supply the R.H. engine. However, if the need arises, or in the case of the ferry fuel installation, any tank may be used to supply both engines by the operation of the cross-feed controls. The normal positions of the fuel tank selector con-

trols, with the cross-feed controls "OFF," are as follows:

"OFF."	No fuel is supplied to the engines.
"AUX."	No. 1 L.H. outboard tank and No. 2 R.H. outboard tank supply fuel to the L.H. and R.H. engines, respectively. Approximately 64 U.S. gallons (53 Imperial gallons) are available from each tank.
"MAIN."	No. 3 L.H. inboard and No. 4 R.H. inboard tanks supply to the L.H. and the R.H. engines, respectively. Approximately 136 U.S. gallons (113 Imperial gallons) are available from each tank.
"BOMB BAY"	L.H. Selector valve "OFF." No. 6 bomb bay tanks "ON," supplies fuel to the R.H. engine only. Turn the suction (tank) cross-feed "ON" to supply both engines. Approximately 676 U.S. gallons (563 Imperial gallons) are available.

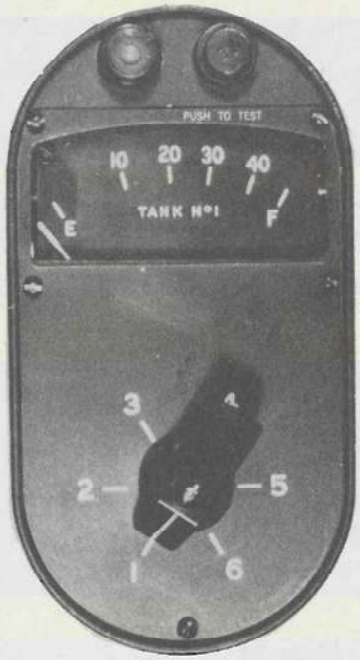


Fig. 71
Liquidometer

(2) A liquidometer fuel quantity gauge, with a selector, is mounted on the R.H. side of the pilot's compartment on the instrument panel. The selector switch points are as follows:

No. 1—"L.H. AUX." (outboard) Tank.

No. 2—"R.H. AUX." (outboard) Tank.

No. 3—"L.H. MAIN" (inboard) Tank.

No. 4—"R.H. MAIN" (inboard) Tank.

No. 5.—"OFF."

No. 6—"BOMB BAY."

(3) The two cross-feed controls are located on the fuel valve control panel on the left side of the pilot's compartment. The "ENGINE CROSS-FEED" control operates the pressure cross-feed system and the "TANK CROSS-FEED" control operates the suction cross-feed system. The engine cross-feed should be "ON" for take-off; otherwise, both cross-feed controls are normally in the "OFF" position.

b. Filling Long Range Fuel Tanks.—The bomb bay ferry fuel tanks are filled (capacity 676 U.S. —563 Imperial—gallons) through the filler neck on the fuselage deck tank, located just aft of the pilot's seat.

c. Loading Instructions.—Take care not to exceed the balance limits. Special instructions are as follows:

(1) Ammunition.—As ammunition must be carried for protection in flight, observe the following restrictions to maintain proper weight and balance distribution.

Location	Ammunition (Rounds)
20 mm Cannon (4)	20 (For Each Cannon)
Forward .50 Cal. (2)	100 (For Each Gun)
Rear Upper .50 Cal.	100
Rear Lower .30 Cal.	100

(2) Crew's Luggage.—The crew's luggage should not exceed 120 pounds (40 pounds per man), and must be stowed in the rear gunner's compartment as far forward as possible.

d. Preflight Test.—The preflight test should be carried out in the manner specified in Section II. Due to the installation of the long range fuel tanks, the following steps must be included in the engine ground run prior to take-off. Operate the engines to make certain that all fuel lines are full, and to prevent the possibility of an airlock.

(1) Run the engines with the L.H. and the R.H. selector valve—"AUX."

(2) Move L.H. and R.H. selector valves—"MAIN."

(3) Turn bomb bay booster pump switch—"ON." Be sure that the amber light, adjacent to the switch, illuminates, indicating proper operation of the pump.

(4) Move R.H. selector valve—"BOMB BAY."

(5) Turn "TANK CROSS-FEED"—"ON."

(6) Move L.H. selector valve—"OFF."

(7) After five minutes, move L.H. selector—"MAIN," move "TANK CROSS-FEED"—"OFF," and R.H. selector—"MAIN."

(8) Continue preflight check in accordance with Section II.

(9) On completion of satisfactory engine operation on all tank combinations, stop the engines and re-fill tanks to capacity.

e. **Flight Instructions.**—Operate the airplane in accordance with the operation instructions, provided in Section II, and the flight operation data, provided in Section III. Exceptions to these operation instructions, due to the long range fuel tank installation, are as follows:

(1) **Preflight.** — Wing flaps — "HALF-DOWN" (22½ degrees).

(2) **Take-Off.**—Raise the wing flaps when the indicated airspeed reaches 165 mph.

(3) **During Flight.** — When the pre-determined cruising altitude has been reached, proceed as follows:

(a) Turn booster pump switch "ON" (insure that amber light is illuminated).

(b) R.H. selector—"BOMB BAY" (No. 6).

(c) Tank cross-feed—"ON."

(d) L.H. selector — "OFF," liquidometer switch (No. 6).

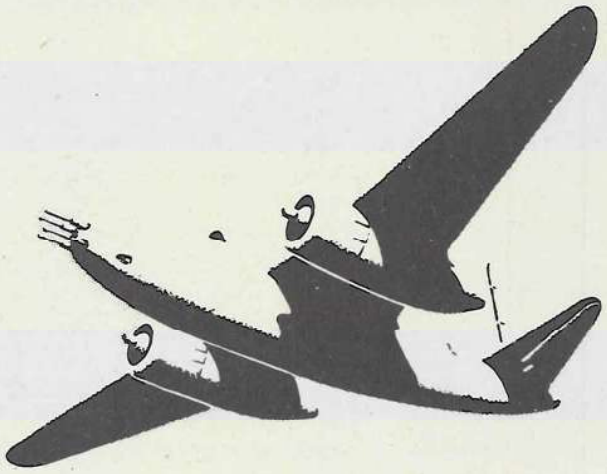
CAUTION The carburetor overflow line pumps 10 gallons of fuel to the main tanks per hour. When the main tanks are full, this fuel is pumped overboard. Therefore the quantity of fuel in the main tanks must be checked periodically. When the liquidometer gauge indicates more than 120 gallons of fuel in the main tanks, switch over to the main tanks temporarily.

(e) When the liquidometer gauge indicates that the fuel quantity in the bomb bay tanks is approximately 20 gallons, turn the L.H. selector valve —"AUX."

(f) Turn cross-feed—"OFF."

(g) Turn R.H. selector valve—"AUX," and booster pump—"OFF." (See CAUTION.)

(h) When the fuel quantity in the "AUX" tanks registers less than 15 gallons each, turn the R.H. and the L.H. selector valves—"MAIN."



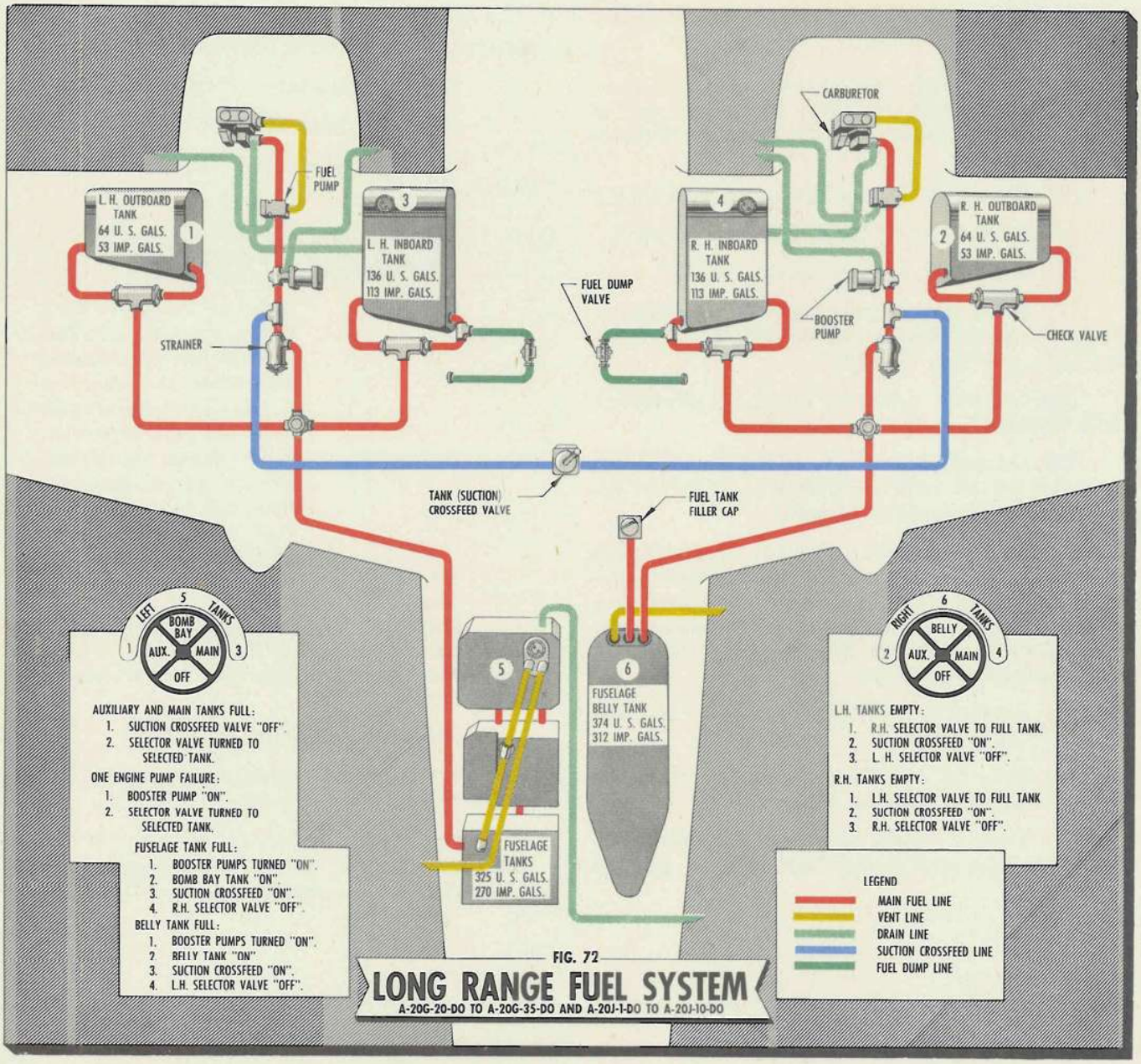


FIG. 72

LONG RANGE FUEL SYSTEM

A-20G-20-DO TO A-20G-35-DO AND A-20J-1-DO TO A-20J-10-DO

10. Long Range and Combat Fuel System.—*Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

a. General.

(1) The combat fuel system consists of three bomb bay fuel tanks (capacity 325 U.S.—270 Imperial—gallons) that can be used in combat. These tanks are connected to the L.H. selector valve. Fuel can be supplied to both engines by use of the cross-feed control. The long range system consists of one droppable tank (capacity 374 U.S.—312 Imperial—gallons) located beneath the fuselage. It is connected to the R.H. selector valve. Fuel can be supplied to both engines by using the cross-feed control. Two additional electrically driven booster pumps are incorporated in each nacelle and operated by switches located in the pilot's cockpit. In normal operation, each engine has an individual fuel system whereby the L.H. tanks supply the L.H. engine, and the R.H. tanks supply the R.H. engine. However, if the need arises, or in the case

of the ferry and combat fuel installations, any tank may be used to supply both engines by the operation of the cross-feed control. The normal positions of the fuel tank selector control, with the cross-feed control "OFF," are as follows:

"OFF." No fuel is supplied to the engines.

"AUX." No. 1 L.H. outboard tank and No. 2 R.H. outboard tank supply fuel to the L.H. and R.H. engines respectively. Approximately 64 U. S. (53 Imperial) gallons are available from each tank.

"BELLY." L.H. selector valve—"OFF." No. 6 belly tank "ON" supplies fuel to the R.H. engine only. Turn the suction (tank) cross-feed "ON" to supply both engines. Approximately 374 U.S. (312 Imperial) gallons available.

"BOMB BAY." R.H. selector valve "OFF." No. 5 bomb bay tanks "ON" supplies fuel to L.H. engine only. Turn the suction (tank) cross-feed "ON" to supply both engines. Approximately 325 U.S. (270 Imperial) gallons available.

(2) A liquidometer fuel quantity gauge, with a selector mounted on the R.H. side of the pilot's compartment, is located on the instrument panel. The selector switch points are as follows:

No. 1—"L.H. AUX" (outboard) tank.

No. 2—"R.H. AUX" (outboard) tank.

No. 3—"L.H.MAIN" (inboard) tank.

No. 4—"R.H.MAIN" (inboard) tank.

No. 5—"BOMB BAY" combat tank.

No. 6—"BELLY" tank.

(3) The cross-feed control is located on the fuel control panel on the left side of the pilot's compartment. The "TANK CROSS-FEED" control operates the suction cross-feed system. In normal operation the cross-feed control is set in "OFF" position.

b. Filling the Bomb Bay Fuel Tanks. — These tanks are filled (capacity 325 U. S.—270 Imperial gallons) through the filler neck, located on the No. 1 tank in the forward bomb bay underneath the pilot's walkway.

c. Filling the Belly Fuel Tank.—This tank is filled (capacity 374 U. S.—312 Imperial gallons) through the filler casting installed on the aft side of the forward bulkhead in the bomb bay.

d. Loading Instructions.—Take care not to exceed the balance limits. Special instructions are as follows:

(1) **Ammunition.**—As ammunition must be carried for protection in flight, observe the following restrictions to maintain proper weight and balance distribution:

Location	Ammunition (Rounds)
Forward .50 Cal. (6)	350 for each gun
Rear Upper.50 Cal. (Turret)	100 for each gun
Rear Lower .50 Cal.	100

(2) **Crew's Luggage.** — The crew's luggage should not exceed 120 pounds (40 pounds per man), and must be stowed in rear gunners' compartment as far forward as possible.

e. Preflight Test.—The preflight test should be carried out in the manner specified in Section II. Due to the installation of the combat and belly tanks, the following steps must be included in the engine ground run prior to take-off. Operate the engines to make certain that all fuel lines are full, and to prevent the possibility of an airlock.

(1) Run the engines with the R.H. and L.H. selector valve "AUX." (Tanks 1 and 2 — run for three minutes.)

(2) Move the L.H. and R.H. selector valves "MAIN." (Tanks 3 and 4 — run for three minutes.)

(3) Turn booster pump switches "ON." Be sure that the amber light, adjacent to the switch, illuminates, indicating proper operation of the pump.

(4) Move R.H. selector valve to "BELLY." (No. 6.)

(5) Turn tank cross-feed "ON."

(6) Move L.H. selector valve to "OFF." Run for three minutes.

(7) Move L.H. selector valve to "BOMB BAY." (No. 5.)

(8) Move R.H. selector valve to "OFF."

(9) After five minutes, move R.H. selector to "MAIN," tank cross-feed "OFF," and L.H. selector to "MAIN."

(10) Booster pumps—"OFF."

(11) Continue preflight check in accordance with Section II.

(12) On completion of satisfactory engine operation on all tank combinations, stop the engines and re-fill tanks to capacity.

f. Flight Instructions.—Operate the airplane in accordance with the operation instructions provided in Section II, and the flight operation data

provided in Section III. Exception to these operations due to the belly fuel tank installation, are as follows:

(1) **Take-off.**—Wing flaps—"HALF DOWN" (22½ degrees).

(2) **Take-off.**—Raise the wing flaps when the indicated airspeed reaches 165 mph.

(3) **During Flight.** — When the pre-determined cruising altitude has been reached, proceed as follows:

(a) Turn booster pump switches "ON." (Insure that amber light is illuminated.)

(b) L.H. selector—"BOMB BAY" (No. 5).

(c) Tank cross-feed—"ON."

(d) R.H. selector—"OFF."

OR: If Using Belly Tank:

(e) Booster pumps—"ON."

(f) R.H. selector—"BELLY" (No. 6).

(g) Tank cross-feed—"ON."

(h) L.H. selector—"OFF."

(i) When the liquidometer gauge warning light or indicator indicates that the fuel quantity in either the bomb bay or belly tanks is empty, turn the L.H. selector valve—"AUX."

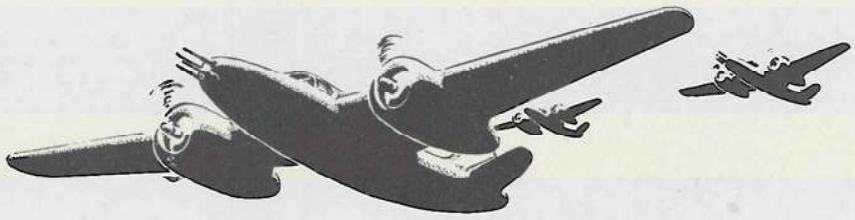
(j) Avoid running tanks dry before turning selector to next tank.

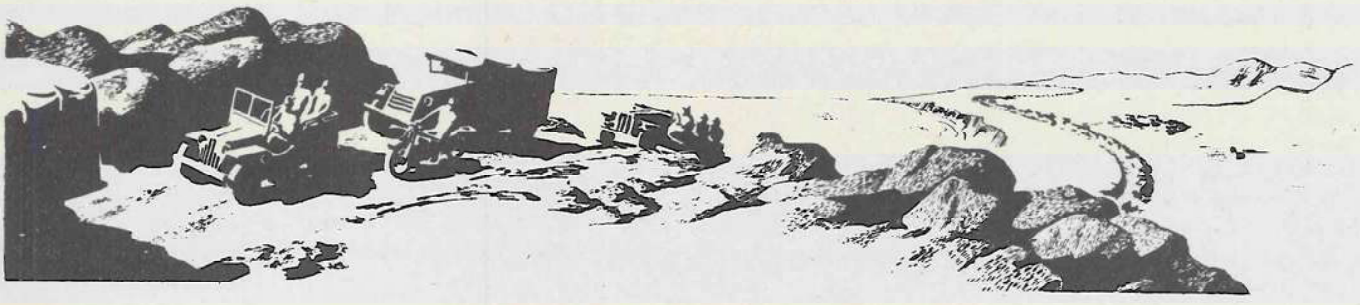
(k) Turn cross-feed—"OFF."

(l) Turn R.H. selector valve—"AUX," and booster pumps "OFF."

CAUTION The carburetor overflow line pumps 10 gallons of fuel to the main tanks per hour. When the main tanks are full, this fuel is pumped overboard. Therefore, the quantity of fuel in the main tanks must be checked periodically. When the liquidometer gauge indicates more than 120 gallons of fuel in the main tanks, switch over to the main tanks temporarily when computing fuel used during flight on other than main tanks.

(m) When the fuel quantity in the "AUX" tanks registers empty, turn the R.H. and L.H. selector valves—"MAIN."





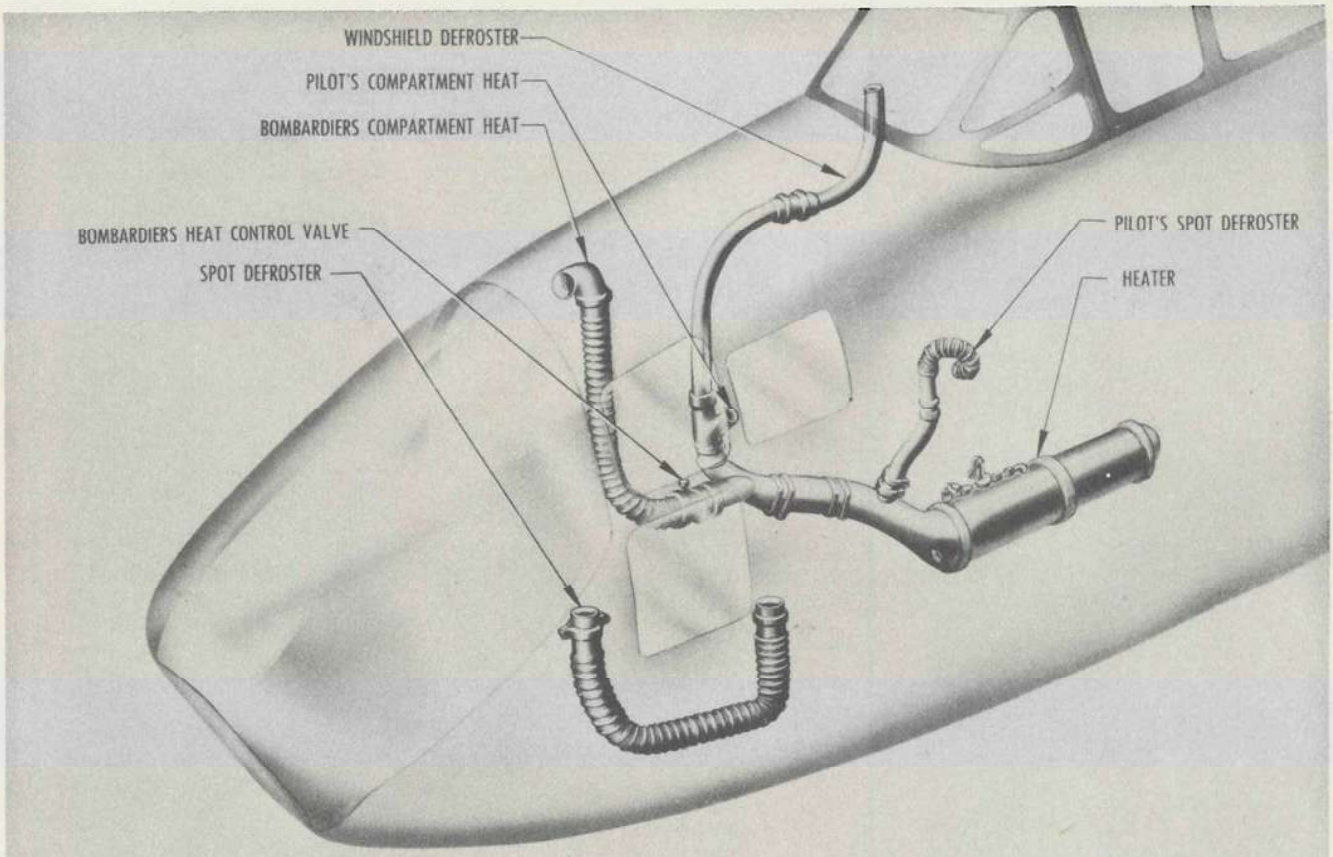


FIG. 73 A-20J-1-DO TO A-20J-10-DO

NOSE HEATING AND VENTILATING SYSTEM

11. Heating and Ventilating System.—*Airplanes A-20G-1-DO to A-20G-10-DO.*

a. **General.**—A 40,000 Btu per hour Stewart Warner heater, located on the top forward end of the aft bomb bay, supplies heated air to the pilot's and gunners' compartments. A Stewart Warner 8500 Btu per hour heater in the nose of the airplane is independently operated by a switch on the pilot's upper electrical panel labeled "GUN HEATER."

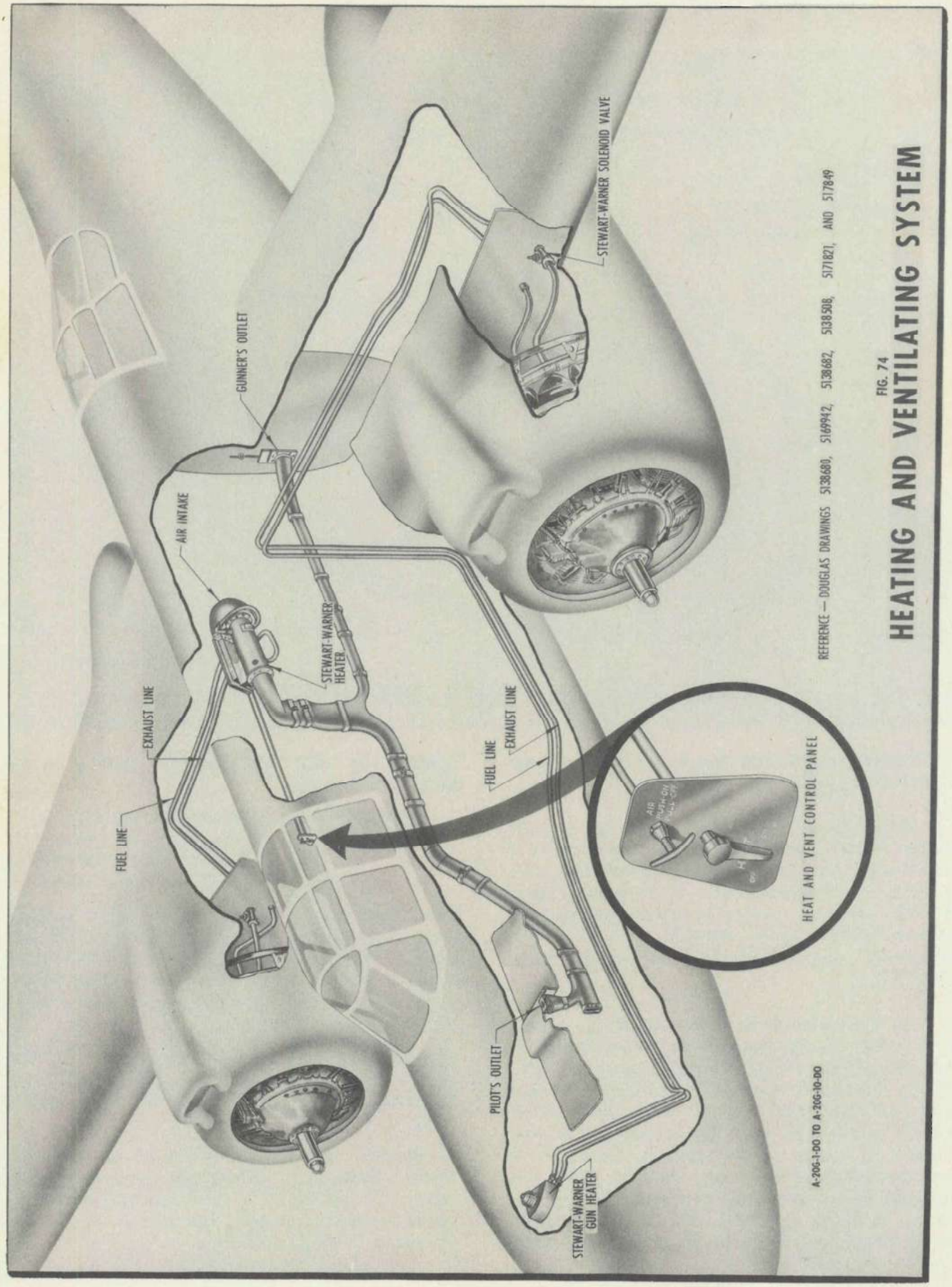
(1) Operation of Sytem.—Outside air enters the fuselage heater through an air scoop on the right side of the fuselage beside the heater. The fuel-air mixture to operate the heater is obtained from the right-hand engine. The pilot controls the air intake and also the amount of fuel-air mixture by means of two controls located on a panel behind the pilot's right shoulder. This system may be operated only in flight. To start the heater, turn on the "PILOT'S CABIN HEAT" switch located on the pilot's upper electrical panel. Operate the "AIR" and "HEAT" controls on the pilot's control panel.

Note When operating the airplane at freezing temperatures, set the "Heat" control approximately half open until the heater starts.

The "AIR" control opens the air scoop a maximum of one inch. To obtain cold ventilating air, use the "AIR" control independently. The pilot's outlet is located on the floor to the right of the pilot's seat and is manually operated by a lever which connects a damper.

The rear gunner's outlet is located in the forward right-hand corner of the compartment near the floor. This outlet is controlled by a sliding door.

A Spencer thermostat prevents operation of the gun heater until the outside temperature falls below 4°C. (40°F.). The thermostat automatically turns the heater off when the nose of the airplane is heated to 38°C. (100°F.).



REFERENCE — DOUGLAS DRAWINGS 5138680, 5169942, 5138682, 5138508, 5171821, AND 5178149

FIG. 74

HEATING AND VENTILATING SYSTEM

12. **Heating and Ventilating System.**—*Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*

a. **General.**—Two independent 40,000 Btu per hour Stewart Warner heating systems are installed in these airplanes. One heater, located in the right-hand nose wheel tunnel, supplies the pilot's compartment; the other heater is installed just aft of the gunners' shelf on the floor of the gunners' compartment. The .50 Cal. machine guns in the attack nose of *airplanes A-20G-20-DO to A-20G-35-DO* are warmed by six Morris electric heaters that fit over the top and sides of the gun breeches. These heating units have thermostatic controls to maintain constant temperatures. This system may be operated only in flight. In *airplanes A-20J-1-DO to A-20J-10-DO,* warm air is provided for the bombardier's nose section through flexible ducts from the pilot's heater.

(1) **Pilot's Heating and Ventilating System.** The pilot's heater receives its fuel-air mixture from the left-hand engine and ventilating air from a scoop located just aft of the heater on the right side of the airplane. The heated air is distributed through a duct system to three outlets in the pilot's compartment. One outlet defrosts the windshield, another delivers air to a flexible spot de-icer, and the third heats the pilot's compartment. A control panel, located forward and right of the pilot's seat, contains a master switch, a heater switch, and the push-pull controls which regulate the flow from each outlet and the quantity of fuel entering the heater.

(a) **Pilot's Controls.**—The "MASTER HEAT" switch must be "ON" before the individual heater switches can be operated. To start the heater, turn the "PILOT'S CABIN HEAT" switch "ON," and open the "HEAT THROTTLE" and "PILOT'S AIR VOLUME" control. If the heater fails to start within three minutes, close the "HEAT THROTTLE" for approximately two minutes and then re-open. Heat may be supplied to the windshield by opening the "WINDSHIELD DEFROST" control. The flexible spot de-icer hose at the right of the pilot's seat has a flapper valve in the outlet; heat is available through this hose whenever the heating system is in operation. If additional heat is required for the windshield or spot de-icer, close the "PILOT'S AIR VOLUME." To supply ventilating air to the system, discontinue operation of the above-mentioned controls and open the "VENTILATING AIR" control. This control over-powers the heat regulator unit in the Stewart Warner heater and allows cold air to enter the system.

(2) **Gunners' Heating and Ventilating System.**—The rear gunner's heater obtains its fuel-air mixture from the right-hand engine and ventilating air from a scoop located on the left side of the airplane. The air is distributed immediately through two outlets; one supplying a flexible de-icer duct and the other heating the compartment. A control panel, located on the left side of the airplane above the heater, contains a heater switch and the push-pull controls which regulate the flow from each outlet and the quantity of fuel-air mixture entering the heater.

(a) **Gunners' Controls.**—With the pilot's "MASTER HEAT" switch "ON," start the gunners' heater by operating the "GUNNERS' AIR VOLUME" control. If the heater fails to start for three minutes, close the "THROTTLE HEAT" control for approximately two minutes and then re-open. Open the "SPOT DE-ICER" control to obtain heat through the flexible hose. To ventilate the gunners' compartment, discontinue operation of the above-mentioned controls and open the "COLD AIR" control. This overpowers the temperature regulator unit in the Stewart Warner heater.

(3) **Bombardier's Heating and Ventilating System.**—A flexible duct, located on the right side of the bombardier's compartment, connects to the main heater duct leading to the pilot's heater. An additional length of flexible duct for spot heating is located on the left side of the compartment. To use the extra length of flexible hose, detach the main duct from the elbow outlet by twisting and pulling the duct. Insert the main duct into the end of the spot-heat hose, twisting it slightly to provide a tight fit. The main duct may also be used for spot de-icing by leaving the elbow end fitting off the flex hose.

(a) **Bombardier's Controls.**—The bombardier may control the degree of heat by operating the control valve in the heat duct. This valve is located below and to the right of the bombardier's seat. To operate the control, unscrew the knob and move the control handle to the "OPEN" or "CLOSED" position, as desired. Screw the knob tight to lock in place.

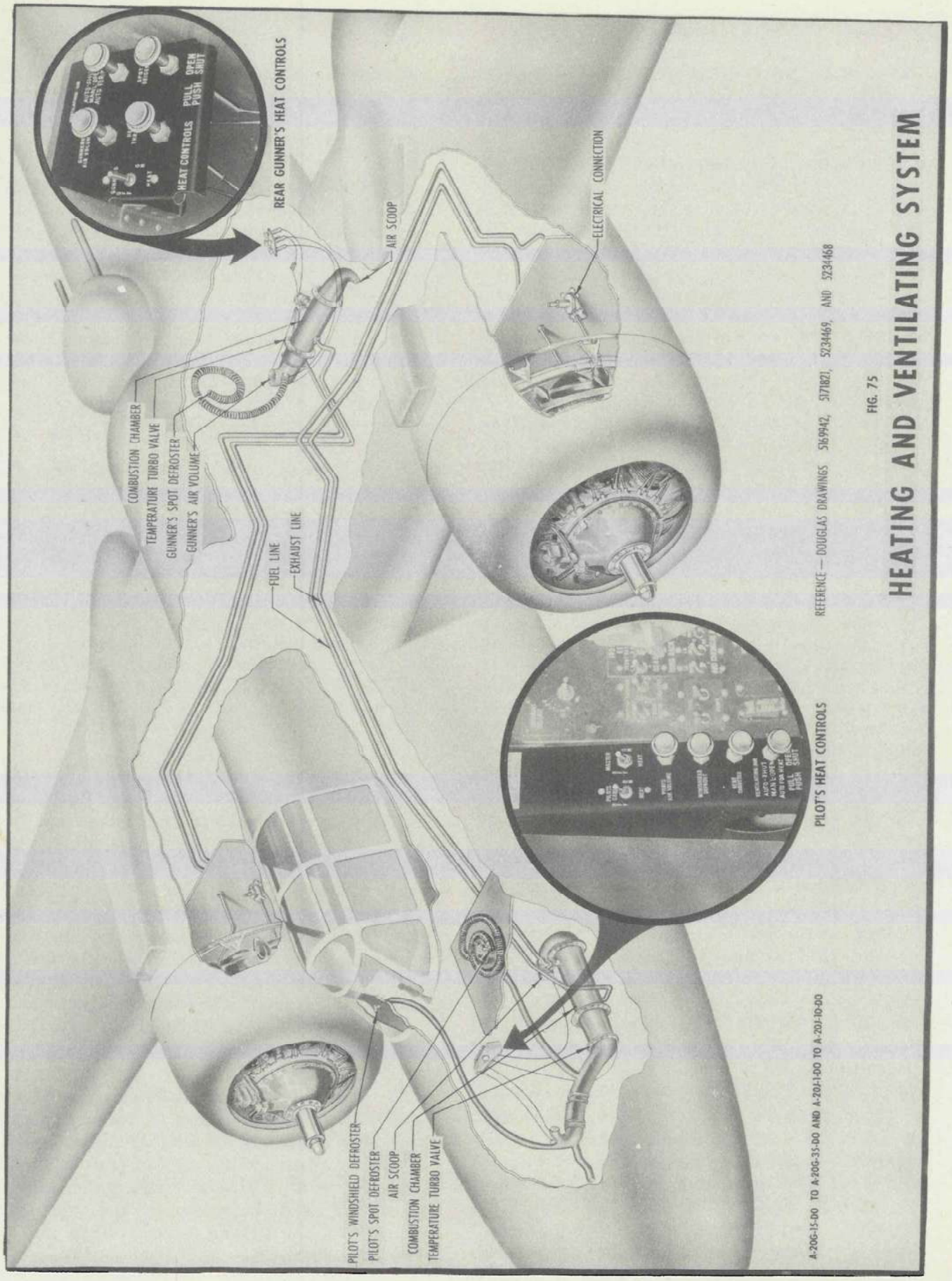


FIG. 75

HEATING AND VENTILATING SYSTEM

Section V
COLD WEATHER OPERATION

1. General.—This section contains special instruction for operation of this airplane under Arctic conditions, and is to be used in conjunction with Section II, Pilot's Operating Instructions.

2. Starting Engines.—Cold weather starting may be accomplished as outlined in Section II, with the following exceptions:

a. Except in cases of emergency, an external source of power supply must be used when starting the engines.

b. Before engaging starter, move mixture control from "IDLE CUT-OFF" to "EMERGENCY RICH" until approximately one-half pint of fuel runs out the overflow.

c. Move mixture control back to "IDLE CUT-OFF," and engage starter.

Note It may be necessary to operate the primer, after the engine has been started in extremely cold weather.

d. If the engine does not start, moisture may have accumulated on the spark plugs. Have one plug removed from each cylinder and warm until all moisture has disappeared.

3. Engine Warm-Up.—Do not warm up engine to more than 900 rpm until oil has reached a temperature of 40°C. (104°F.).

4. Take-Off.

a. Do not take off with frost or snow on the wings. Airplane should be kept in a shelter or have canvas covers over the control surface areas. Loose snow may then be easily swept from upper surfaces before take-off.

b. Do not take off on soft snow. Taxi along the runway a few times to pack the snow down.

c. Before taking off, pay particular attention to the movable surfaces of the wing flaps and bomb doors to see that the hinges and controls have free and full movement.

5. During Flight.

a. Following take-off from snow- or slush-covered fields, have the landing gear in the "DOWN" position long enough for the moisture to either dry off or freeze, thereby guarding against freezing in the "UP" position.

b. Increase propeller speed momentarily by about 200 rpm every half hour, to insure continued propeller governing. After operation, return propeller control to desired cruising rpm.

6. Preparation for Landing.

a. Cowl flaps must be "CLOSED" when landing, to prevent low engine temperatures which may result from rapid descent.

b. Make descents using cruising power.

c. During glides, oil dilution may be necessary to keep the engine running free.

d. Since the action of the brakes may be slower than normal under icing conditions, the approach for landing should take full advantage of the available runway.

7. **After Landing.**

a. **Oil Dilution.**

(1) **Description.**—Oil dilution provides a method of diluting or thinning oil with gasoline at the end of each engine run in preparation for a cold engine start. Oil dilution is accomplished prior to stopping the engines with oil temperature ranging between 5°C. to 50°C. (41°F. to 122°F.). The oil dilution switches are located on the pilot's lower electrical panel.

Note Open cowl flaps and allow engine to cool. Do not attempt an oil dilution with the oil temperature above 50°C. (122°F.) as the excessive heat will evaporate the fuel, rendering the dilution useless.

(2) **Operation.**

(a) Operate each engine at 800 rpm.

(b) Maintain oil temperature 5°C. to 50°C. (41°F. to 122°F.).

(c) For ground temperatures ranging between 5°C. to —7°C. (41°F. to 20°F.), hold oil dilution switch "ON" for four minutes; stop engine and release oil dilution switch.

(d) For ground temperatures ranging between —7°C. to —30°C. (+20°F. to —22°F.), dilute for a second four-minute period fifteen minutes after first dilution.

(e) For ground temperatures below —30°C. (—22°F.), dilute for a third four-minute period fifteen minutes after the second dilution.

(3) **Propeller Oil Dilution.**—Hydromatic propellers require filling of the dome with diluted oil to prevent sluggish response of the propeller when starting the engine.

(a) **Operation.**—*Airplanes A-20G-1-DO to A-20G-15-DO.*—During the engine oil dilution process, move propeller control from "INCREASE RPM" to "DECREASE RPM" several times.

(b) **Operation.**—*Airplanes A-20G-20-DO to A-20G-35-DO and A-20J-1-DO to A-20J-10-DO.*—These airplanes incorporate an independent propeller oil dilution system to be used during an engine failure or when an emergency take-off has been made and the oil viscosity is too high. The propeller feathering oil dilution switches are located on the pilot's upper electrical panel. The propeller feathering "push buttons" and the oil dilution switches are electrically wired so that oil may be diluted only when the feathering operation is being accomplished and the dilution switch is "ON." When the feathering cycle is completed, the push button "pops out" and cuts off electrical current to the pump and also to the oil dilution solenoid valve. Be sure that the dilution switch is manually returned to "OFF."

8. **Stopping Engines.**—The engines should be stopped by closing the fuel valves and allowing the carburetors to run dry. The ignition switch may then be closed. As soon as the engines have cooled sufficiently, the cowl flaps should be closed. Stopping the engine in this manner leaves as small an amount of fuel as possible in the engine nacelle and reduces the fire hazard during preheating of the engines by portable ground heater.

9. **Before Leaving Pilot's Compartment.**—Parking brakes should be "OFF" to prevent brake seizure and possible freezing. The tires should be taxied onto boards, cardboards, boughs, or a similar protective material to avoid tires freezing to ice surface.

APPENDIX I

GLOSSARY OF NOMENCLATURE

ACCUMULATOR (HYDRAULIC)	PRESSURE RESERVOIR
AIRPLANE	AEROPLANE
ANGLE OF ATTACK	TRUE ANGLE OF INCIDENCE
ANTENNA	AERIAL
BATTERY (ELECTRICAL)	ACCUMULATOR
BEACON, AIRPORT	AERODROME-PROXIMITY BEACON
BEACON, RADIO RANGE	RADIO TRACK BEACON
BULLET PROOF GLASS	ARMOUR GLASS
CARBURETOR	CARBURETTOR OR CARBURETTER
CEILING	CLOUD HEIGHT
CYLINDER (HYDRAULIC)	JACK
DISTANCE	RUN
DUMP VALVE	JETTISON VALVE
EFFICIENCY, PROPELLER	NET EFFICIENCY
EMPENNAGE	TAIL UNIT
ENGINE OR POWER PLANT	AERO-ENGINE
ENGINE SECTION (COMPLETE)	POWER PLANT OR POWER EGG
EXIT	EGRESS
FEATHERING CONTROL	DIFFERENTIAL PITCH-CONTROL
FIELD, LANDING	LANDING GROUND
FILTER, AIR	AIR CLEANER
FLIGHT CONTROLS	FLYING CONTROLS
FLIGHT INDICATOR	ARTIFICIAL HORIZON
FLYING, BLIND	INSTRUMENT FLYING
GASOLINE, "GAS" OR FUEL	PETROL OR FUEL
GEAR, RETRACTABLE LANDING	RETRACTABLE UNDERCARRIAGE
GENERATOR	DYNAMO
GROSS WEIGHT	ALL-UP WEIGHT
GROUND (ELECTRICAL)	EARTH
GYRO HORIZON	ARTIFICIAL HORIZON
HOOD	BONNET

GLOSSARY OF NOMENCLATURE

IGNITION HARNESS	SHIELD
INTERPHONE	INTER-COMMUNICATION
INVERTER	MOTOR GENERATOR
LAND	ALIGHT
LEAN	WEAK
LEFT	PORT
LEVEL OFF	FLATTEN OUT
LOOP, RADIO	AERIAL LOOP
MAST, RADIO	AERIAL ROD
MANIFOLD PRESSURE	BOOST
METER, FREQUENCY	WAVEMETER
NAVIGATION, AIR	AVIGATION
NOSE HEAVY	BOW HEAVY
OIL PAN	SUMP
OVERLOAD	NON-STANDARD LOAD
PANEL, INBOARD	INNER PLANE
PANEL, OUTER	OUTER PLANE
PRIME	DOPE
PLUG, SPARK	SPARKING PLUG
PROPELLER	AIRSCREW
RADIO COMPASS	RADIO DIRECTION FINDER
RAFT, LIFE	DINGHY
RETICULE (GUN, TORPEDO, ETC.)	GRATICULE
RIGHT	STARBOARD
RUNWAY	LANDING STRIP
SET, COMMAND	PILOT CONTROLLER SET
STALLING SPEED	CRITICAL SPEED
STACK	PIPE
STRUT, OLEO	COMPRESSION STRUT
TACHOMETER	ENGINE SPEED INDICATOR
TAIL HEAVY	STERN HEAVY
WEIGHT, EMPTY	TARE WEIGHT OR TARE