T.O. 1B-57B-1

Flight HANDBOOK

USAF SERIES B-57B AIRCRAFT

Published under authority of the secretary of the Air Force.

This revision replaces Supplements ID, E, L, N, Q, S, Z, CG, CJ, CN, CP and CT. See Basic Index T.O. 0-1-1 And Weekly Index T.O. 0-1-1A for current status of Safety of Flight Supplements.

Commanders are responsible for bringing this publication to the attention of all Air Force personnel cleared for operation of this aircraft.

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Insert revised pages into basic publication. Destroy superseded pages.

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For listing of available material and details of distribution see Naval Aeronautics Publications Index NavAer 00-500.

USAF **C-3**

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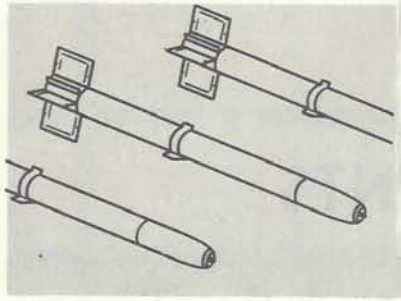
THIS IS YOUR AIRPLANE



SCOPE

This handbook contains all the information necessary for safe and efficient operation of the B-57B airplane. These instructions do not teach basic flight principles, but are designed to give a general knowledge of the airplane, its flight characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized, and elementary instructions have been avoided.

SOUND JUDGMENT

The instructions in this handbook have been prepared to answer the needs of a crew with no experience in the operation of this airplane. Although this book provides the best possible operating instructions under most circumstances, it is a poor substitute for sound judgment. Multiple emergencies, adverse weather, and terrain may require modification of the procedures contained herein.

PERMISSIBLE OPERATIONS

The Flight Handbook is positive in approach and normally tells you only what you are permitted to do. Any unusual operation is prohibited unless specifically covered. Obtain clearance from ARDC before attempting any questionable operation not specifically covered in the Flight Handbook.

STANDARDIZATION

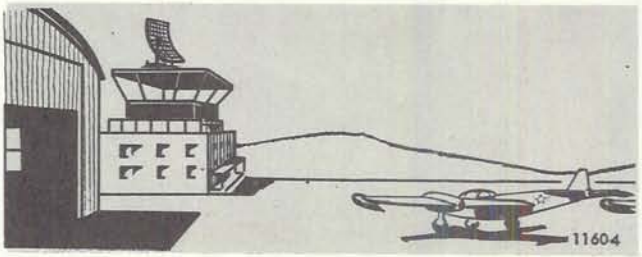
Once you have learned to use one Flight Handbook, you will know how to use them all. The scope and arrangement of all Flight Handbooks are the same.

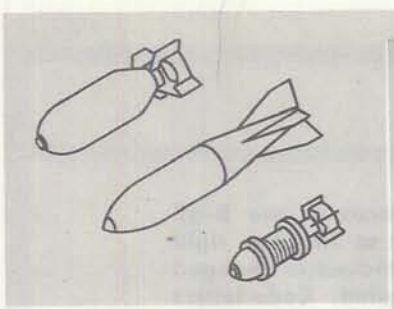
ARRANGEMENT

To make the Flight Handbook easy to read and use as a reference, the information has been divided into ten sections, each having a table of contents. The first three sections present the minimum information needed to get the airplane off the ground and back down again safely. These sections must be read thoroughly and understood fully before a new airplane is to be flown. Section IV covers all equipment not essential to flight but which permits the airplane to perform special functions. The content of the remaining sections is obvious, except for Section VII, which contains detailed information on techniques and theory of operation. The experienced pilot need not study this section, but he should acquaint himself with any possible new information.

RESPONSIBILITY

These Flight Handbooks are kept up to date through an extremely active revision program. Frequent conferences with operating personnel and constant review of UR's, accident reports, and flight test reports assure inclusion of the latest data. In this regard, it is essential that you do your part! If you find anything you don't like about this book, let us know right away. We cannot correct an error we don't know about.





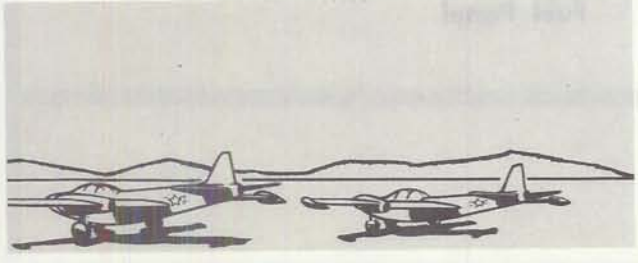
FLYING IT IS YOUR JOB!

PERSONAL COPIES

All flight crew members, except those attached to an administrative base, are entitled to a personal copy of the Flight Handbook. Air Force Regulation 5-13 specifically makes that provision. Flexible loose-leaf tabs and binders are available to hold your personal copy of the Flight Handbook and to make it much easier for you to revise your handbook and keep it in good condition. These tabs and binders are secured through your local contracting officer.

HOW TO GET COPIES

To be sure of getting your handbook on time, order them before you need them. Early ordering will assure that enough copies are printed to cover your requirements. Technical Order 0-5-2 explain how to order Flight Handbooks so that you will automatically get all revisions, reissues, and Safety of Flight Supplements. Basically, all you have to do is order the required quantities in the Publication Requirements Table (T.O. 0-3-1). Talk to your base supply officer — it is his job to fulfill your Technical Order requests. Make sure to establish some system that will rapidly get the books to the flight crews once they are received on the base.



STATUS OF SAFETY OF FLIGHT SUPPLEMENTS

You can determine the status of Safety of Flight Supplements by referring to the Index of Technical Publications (T.O. 0-1-1) and the Weekly Supplemental Index (T.O. 0-1-1A). Also check the title page of the Flight Handbook and the title block of each new Safety of Flight Supplement to determine how these publications affect existing Safety of Flight Supplements.

WARNINGS, CAUTIONS AND NOTES

The warnings, cautions, and notes found throughout the handbook have these meanings:

WARNING

Injury to personnel

CAUTION

Damage to equipment

Note:

Information requiring emphasis

COMMENTS AND QUESTIONS

Comments and questions regarding any phase of the Flight Handbook program are invited and should be addressed to the Directorate of Systems Management, Headquarters Air Research and Development Command, Wright-Patterson Air Force Base, Ohio, Attention: RDZSTH.

11605

N O T E

Paragraphs covering major system and equipment differences in the B–57 series airplanes are identified by code letters appearing at the top right corner of the paragraph. Code letters and/or text will be removed or changed in subsequent revisions as field service changes are incorporated. Code letters are assigned as follows:

A	52–1493 thru 52–1575	50 cal. guns
B	52–1576 and up	20 MM guns
C	52–1493 thru 53–3930	Fuel Panel
D	53–3931 and up	Fuel Panel
E	52–1493 thru 53–3865	Ejection system
F	53–3866 and up	Ejection system
G	52–1493 thru 53–3904	Radio compass
H	53–3905 and up	Radio compass
I	52–1493 thru 53–3881	Labs
J	53–3882 and up	Labs
K	52–1493 thru 53–3891	Interim Warning System
L	53–3892 and up	Interim Warning System
M	52–1493 thru 53–3947	Rocket Firing Order
N	53–3948 and up	Rocket Firing Order
O	Before Modification (all Aircraft)	Elevator System and Stabilizer Trim System
P	After Modification (all Aircraft)	Elevator System and Stabilizer Trim System
Q	After Modification (all Aircraft)	Fuel Panel

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This handbook is divided into nine sections and one appendix, as follows:

Section I Description	This section describes the airplane and all systems and controls that contribute to the physical act of flying the airplane. Included in this section is a description of all emergency equipment that is not a part of an auxiliary system.
Section II Normal Procedures	This section contains the procedure to be followed from the time the flight is planned until the airplane is left parked on the ramp after one complete non-tactical mission under normal conditions has been made.
Section III Emergency Procedures	This section describes clearly and concisely the procedures to follow for any emergency (except those in connection with the auxiliary equipment) that could reasonably be expected to be encountered.
Section IV Description and Operation of Auxiliary Equipment	This section includes the description, normal operation, and emergency operation of all equipment not directly contributing to flight but which enables the airplane to perform certain specialized functions.
Section V Operating Limitations	This section sets out the various ground and flight limitations which must be observed if the airplane is to be operated with safety and efficiency.
Section VI Flight Characteristics	This section familiarizes the pilot with the sort of control response and general maneuverability that he may reasonably expect in flying this airplane. It emphasizes the characteristics that are different from other airplanes.
Section VII Systems Operation	This section gives additional information (to that covered in the other sections) about the operation of the various airplane systems.
Section VIII Crew Duties	This section contains an explanation of the responsibilities of each crew member toward the safe and efficient operation of the airplane. It lists the duties and responsibilities of these crew members.
Section IX All-Weather Operation	This section outlines the proper techniques and procedures to be used in unusual or unique weather conditions. The instructions in this section supplement the procedures outlined in Section II, III, and VII.
Appendix I Performance Data	The appendix contains all performance data necessary for prefight and in-flight missions planning with explanatory text on the use of the data.
Alphabetical Index	This index facilitates locating subject material and illustrations contained in the handbook.

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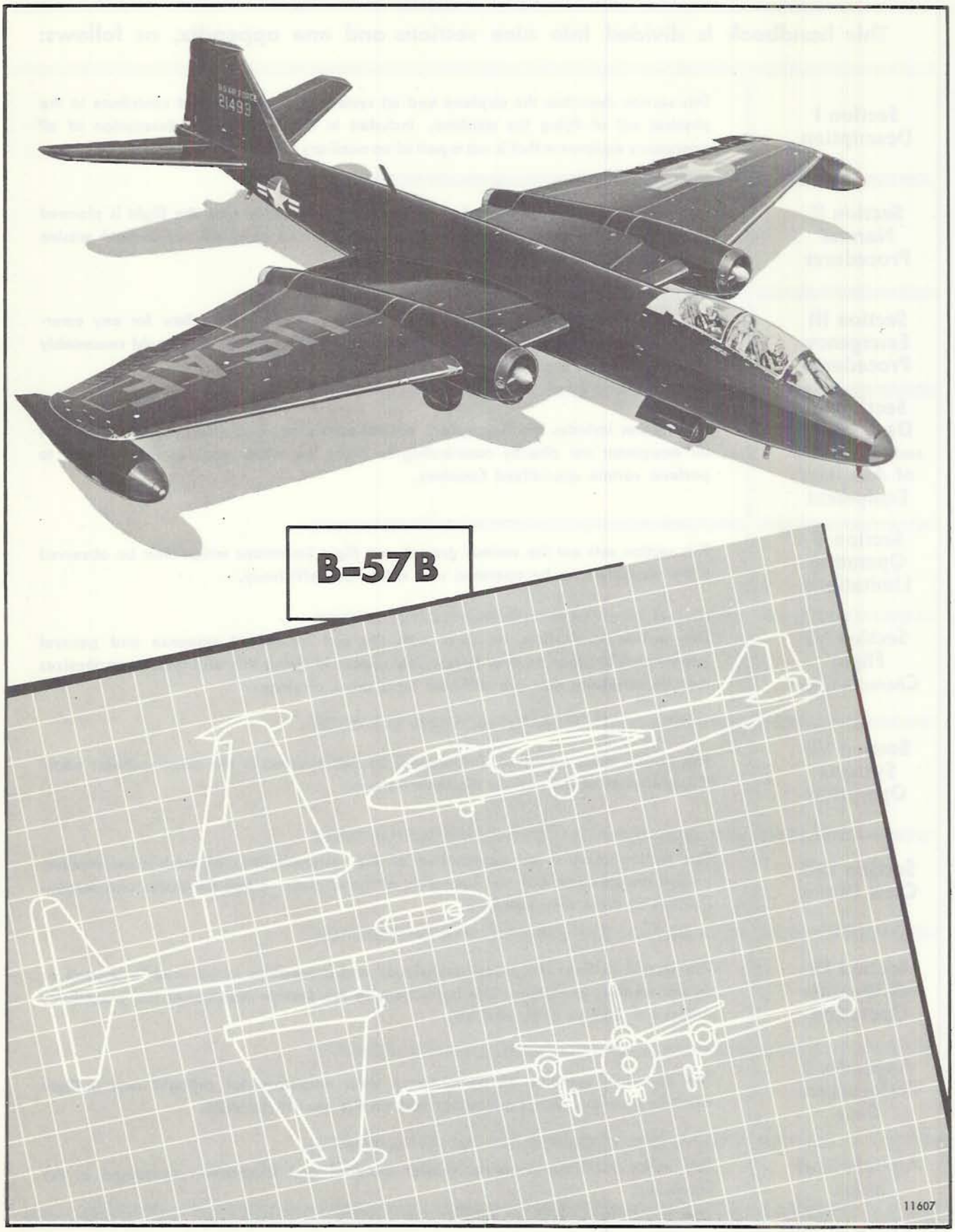
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Section I

DESCRIPTION

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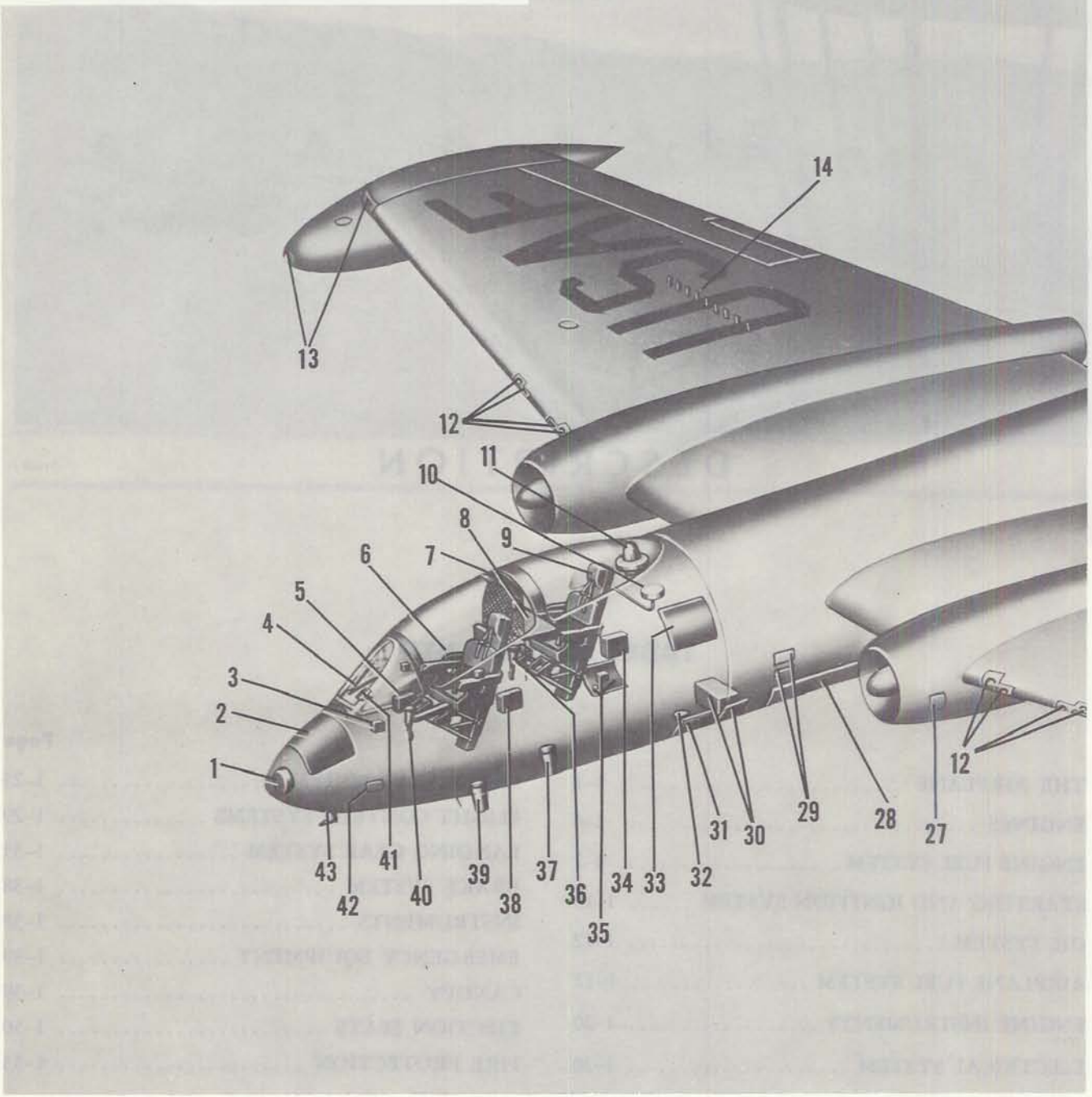
THE AIRPLANE.

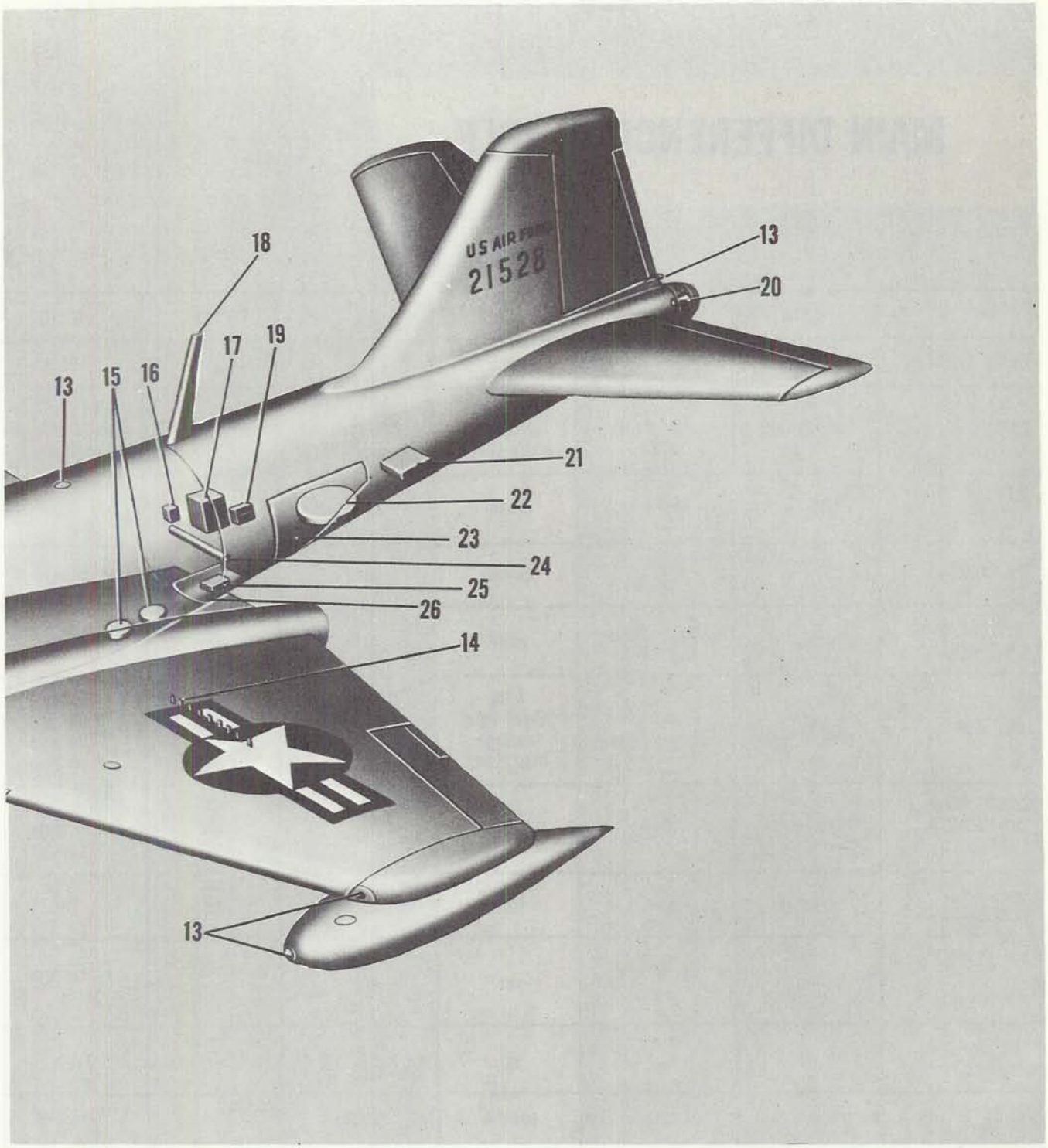
The B-57B, manufactured by the Martin Company, is a light bombardment airplane. The mission of the B-57B is the destruction of surface military targets during night tactical operations. The B-57B is an all-metal, mid-wing, twin-engine, turbo-jet-propelled monoplane with retractable landing gear. Design features include a variable-incidence stabilizer, wing and fuselage dive brakes, and a rotary bomb door. The fuselage is of semi-monocoque construction with a pressurized cabin for operation at altitudes above 10,000 feet. The outstanding recognition characteristic of the B-57 series of airplanes is the large chord of the wing between the root and the engine nacelle.

general arrangement



1. ANTENNA APG-31
2. ACCESS HATCH APG-31
3. SPARE LAMPS STOWAGE
4. WINDSHIELD WIPER
5. PILOT'S MAP CASE
6. PILOT'S EJECTION SEAT
7. GLARE SHIELD
8. OBSERVER'S TABLE
9. OBSERVER'S EJECTION SEAT
10. OXYGEN CONVERTER
11. LOOP ANTENNA
12. GUN PORTS
13. EXTERIOR LIGHTS
14. WING DIVE BRAKES
15. ANTENNA AN/APW-11A
16. LIGHT LENS STOWAGE
17. STARTER CARTRIDGE STOWAGE
18. MAST ANTENNA AN/ARN-6
19. MOORING AND TIE DOWN LUGS, INITIATOR LOCK PIN, AND LANDING GEAR EXTENDER VALVE STOWAGE
20. TAIL WARNING ANTENNA
21. MARKER BEACON AN/ARN-12
22. SHORAN ANTENNA

Figure 1-1 (Sheet 1 of 2)



23. FUSELAGE DIVE BRAKES
24. CANOPY SAFETY COLLAR STOWAGE
25. AFT FUSELAGE DATA CASE
26. AFT FUSELAGE ACCESS HATCH
27. FRANGIBLE DOORS
28. BOMB CARRIER DOOR
29. BOMB HOIST DOOR ACCESS DOORS (8)
30. BATTERY AND BATTERY ACCESS HATCH
31. LEFT ELECTRICAL ACCESS HATCH
32. IFF ANTENNA AN/APX-6A
33. EQUIPMENT ACCESS HATCH
34. OBSERVER'S DATA CASE
35. RIGHT ELECTRICAL ACCESS HATCH, EXTERNAL POWER RECEPTACLE, AND SPARE LAMPS STOWAGE
36. OBSERVER'S RELIEF TUBE
37. UHF ANTENNA AN/ARC-27
38. PILOT'S DATA CASE
39. SHORAN RECEIVING ANTENNA
40. PILOT'S RELIEF TUBE
41. GUNSIGHT
42. STATIC PLATE
43 PITOT TUBE

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Figure 1-1 (Sheet 2 of 2)

MAIN DIFFERENCES TABLE

MODEL	B-57A	RB-57A	B-57B	B-57C	RB-57D	B-57E
CREW STATIONS	three	three	two	two		two
CANOPY	pilot (fixed)	pilot (fixed)	pilot and observer (clam shell)	pilot and instructor pilot (clam shell)		pilot and tow-target operator (clam shell)
JETTISONABLE HATCH	observer	observer	none	none		none
ENTRANCE	access hatch	access hatch	canopy	canopy		canopy
PHOTOGRAPHIC EQUIPMENT	none	day or night operation	none	none	CLASSIFIED INFORMATION	none
DIVE BRAKES	wing (finger type)	wing (finger type)	wing (finger type) fuselage (flap type)	wing (finger type) fuselage (flap type)		wing (finger type) fuselage (flap type)
FLIGHT AND PROPULSION CONTROLS	pilot	pilot	pilot	pilot and instructor pilot		pilot and tow-target operator
NO. OF GENERATORS	two	three	four	four		four
ARMAMENT AND BOMB DOOR	yes	bomb door only	yes	yes		provisions for
TOW TARGET EQUIPPED	no	no	no	53-3844 and 53-3845 only		yes
NOSE	transparent	transparent	opaque	opaque		opaque

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Figure 1-2

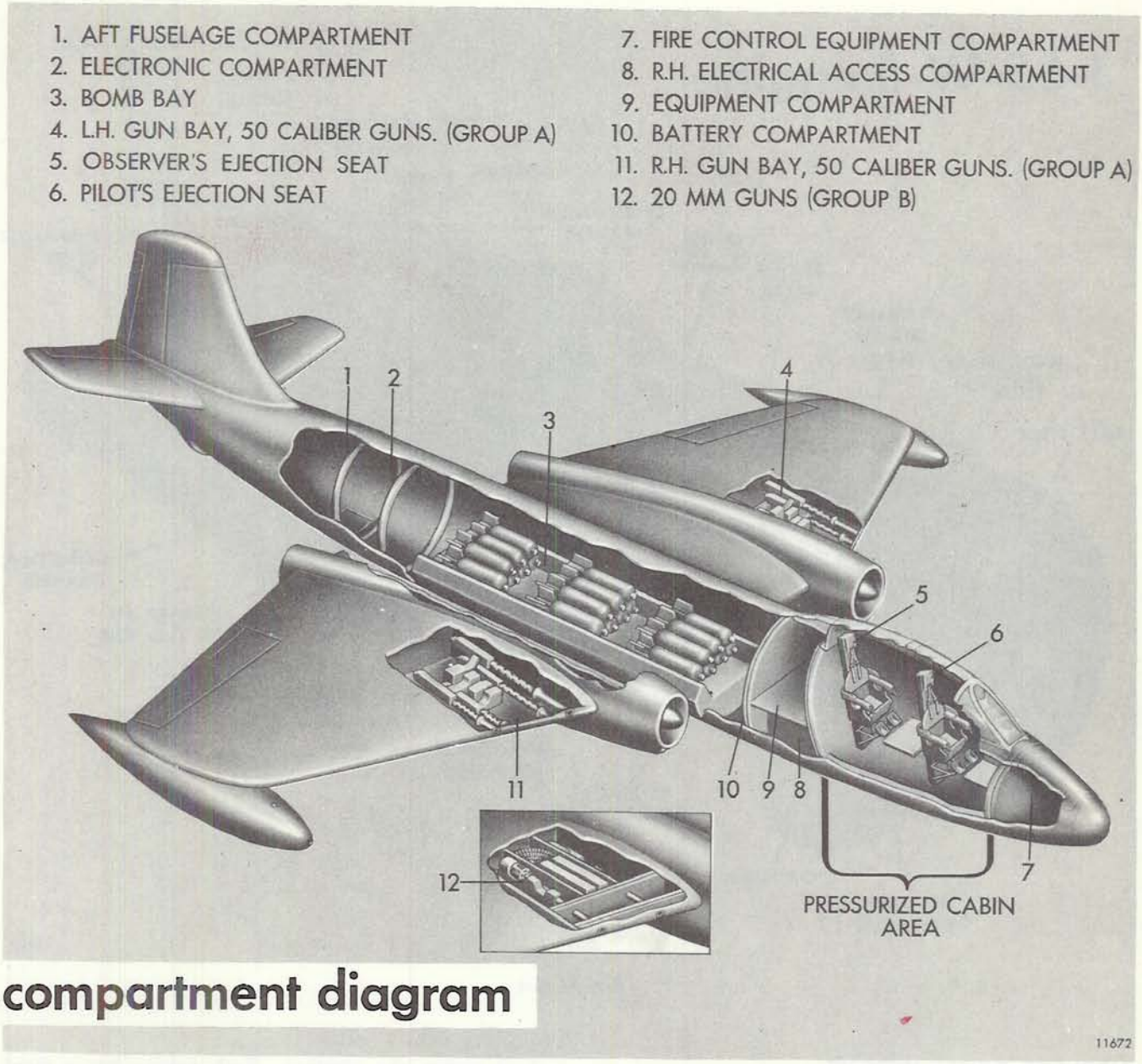

Figure 1-3

FUSELAGE AND WING.

The nose section contains the pressurized cabin for the crew. The crew consists of a pilot and observer and the tandem seating arrangement places the observer to the rear of the pilot. A jettisonable canopy and ejection seats permit immediate escape for the crew. The center section of the fuselage contains the main fuel tanks, the rotary bomb door, the battery compartment, and electrical equipment. The aft fuselage section contains dive brakes, electronic equipment, and miscellaneous ground handling equipment. A skid on the underside of the tail section prevents damage to the tail during landings. The full-cantilever wing has dive brakes, inboard and outboard split flaps, fuel tanks, fixed wing guns, and provisions for tip tanks and external stores.

AIRPLANE DIMENSIONS.

The overall dimensions of the airplane are:

Wing Span	64.0 ft.
Length	65.5 ft.
Horizontal Stabilizer Span	27.8 ft.
Height (to top of fin)	15.5 ft.
Ground clearance to bottom of fuselage for maximum gross weight	19.2 in.
Ground clearance to bottom of tip tanks for maximum gross weight	5.4 ft.

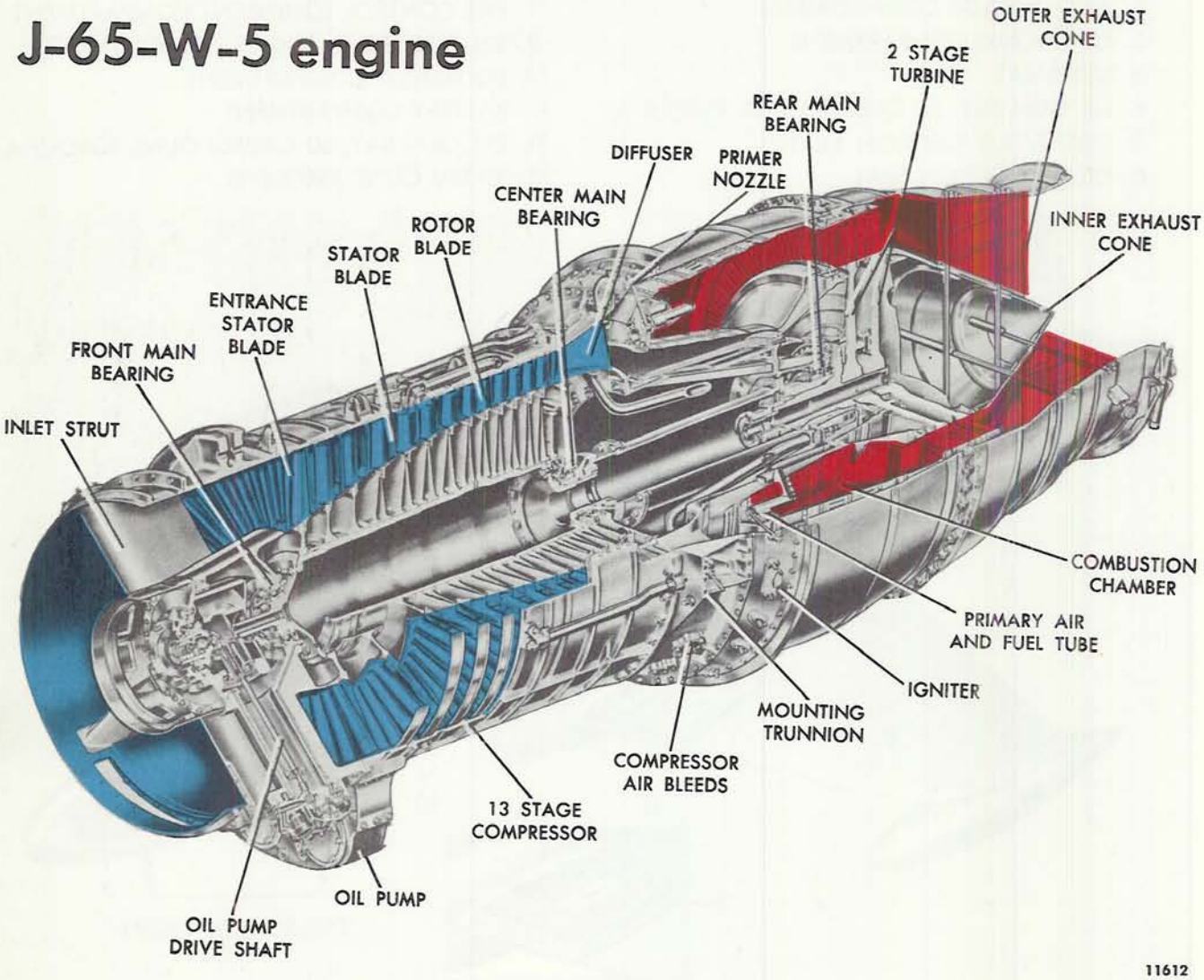

Figure 1–4

AIRPLANE GROSS WEIGHT.

The approximate maximum gross weight of the airplane is 55,000 pounds. Refer to Section V for weight information.

ARMAMENT.

Airplane armament consists of fixed guns in the wings, a rotary bomb door; wing pylons for chemical tanks, bombs, and rockets; and special weapons equipment.

ENGINES.

Two J65–W–5 or J65–BW–5 turbo-jet engines (figure 1–4) power the airplane. Each engine has a rated sea-level static thrust of 7200 pounds for take-off and military power and 6350 pounds for normal continuous power. During operation, air enters the intake duct and flows through a 13-stage axial-flow compressor. The compressed air passes into a single annular combustion chamber where it mixes with fuel for combustion. Continuous ignition is sustained by the high combustion chamber temperature. Partial expansion of the gases through a two-stage turbine produces the mechanical power that drives the compressor. Progressive expansion of the exhaust gases in the exhaust duct produces a high-velocity jet that propels the airplane. There is no anti-icing equipment on the engines.

THROTTLES.

The throttles (figure 1-5) are on the pilot's left horizontal console. Throttle markings are OFF, IDLE, and FULL. Throttle movement out of OFF and from IDLE to OFF requires a vertical pull to disengage the stud on the throttle handle from detents in the quadrant. Throttle movement mechanically positions the governor in the fuel control unit. Placing the throttles in IDLE closes the warning horn, landing gear warning light, and engine start micro-switches. The dive brake switch (on later airplanes) and a microphone press-to-talk button are on the inboard throttle lever. An adjustable throttle friction knob is on the console below the throttles. The maximum force necessary to overcome the throttles with the friction lock engaged does not exceed 17 pounds.

ENGINE FUEL SYSTEM.

The engine fuel system (figure 1-6) consists of a pump assembly, a fuel control unit, a flow transmitter, six flow dividers, and two primers. The pump assembly has three engine-driven pumps: a centrifugal boost pump and two gear-type pumps. The centrifugal boost pump receives fuel from the airplane's fuel system and delivers it to the main, gear-type pumps. The main pumps supply the fuel control unit with fuel under pressure ranging from 175 psi (at IDLE) to 600 psi (at FULL). The main pumps are in parallel and each pump has a discharge check valve that permits continued operation of one pump if the other fails. Either pump supplies enough fuel to the engine for maximum speed and power. Failure of the centrifugal pump does not cause a loss of engine power unless the fuel tank boost pumps are inoperative also. The fuel control unit automatically regulates the flow of fuel to the engine for any throttle setting at any altitude. Regulated fuel from the control unit enters the flow dividers and the flow dividers direct fuel to the nozzles in the combustion chamber. For starting, fuel flows to the combustion chamber through the primer circuits. A flow measuring mechanism at the fuel control unit outlet has a transmitter that operates the fuel flow indicator on the pilot's instrument panel.

ENGINE FUEL CONTROL UNIT.

By regulating the amount of fuel, the fuel control unit governs the speed of the engine for a given throttle setting. The unit is a composite of several independently operated valves and each valve contributes to the regulation of the fuel. A filter at the control unit inlet protects the unit from any dirt in the fuel. If the filter becomes clogged, the filter relief valve opens and bypasses the fuel. A pressure relief valve relieves excessive pressure within the control unit. The regulator valve, operated by an engine-driven flyweight governor, works in conjunction with the

throttles

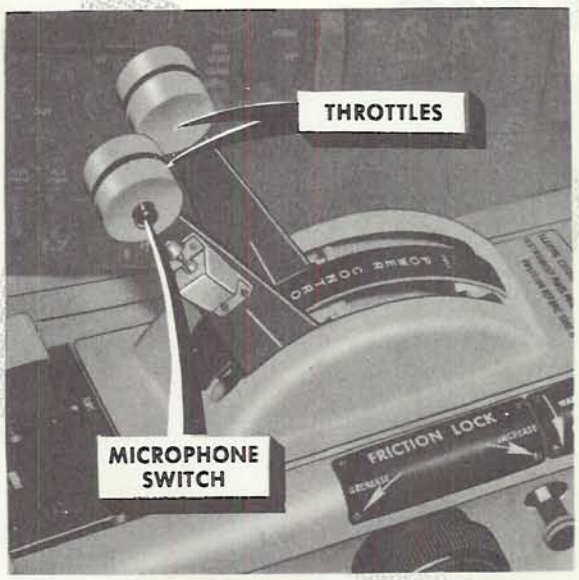

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Figure 1-5

bypass valve to regulate the fuel pressure within the control unit. The compensating devices give a fine adjustment to the pressure within the control unit. These devices compensate for altitude and engine air inlet temperature. The compressor discharge pressure limiter causes the fuel bypass valve to open when compressor discharge pressure exceeds a certain value. This results in a reduction in rpm to maintain compressor discharge pressure limits. Fuel leaves the control unit through the governor valve, which is the main metering unit. An engine-driven flyweight governor and the throttle position the governor valve. Metered fuel from the governor valve passes through a cut-off valve and a pressurizing check valve to the fuel distribution system of the engine. When the throttle is closed (OFF), the cut-off valve prevents any fuel from leaving the control unit. An engine speed of approximately 18 percent is necessary to supply the pressure necessary (100 psi) to open the pressurizing check valve. Since the pressurizing check valve restricts the flow of fuel during starting, fuel flowing through the primer circuit is the only fuel supply. The compressor pressure rise limiter causes the bypass valve to open when the compressor discharge pressure exceeds a certain value. The opening of the bypass valve causes a reduction of fuel flow from the control unit and a correspond-

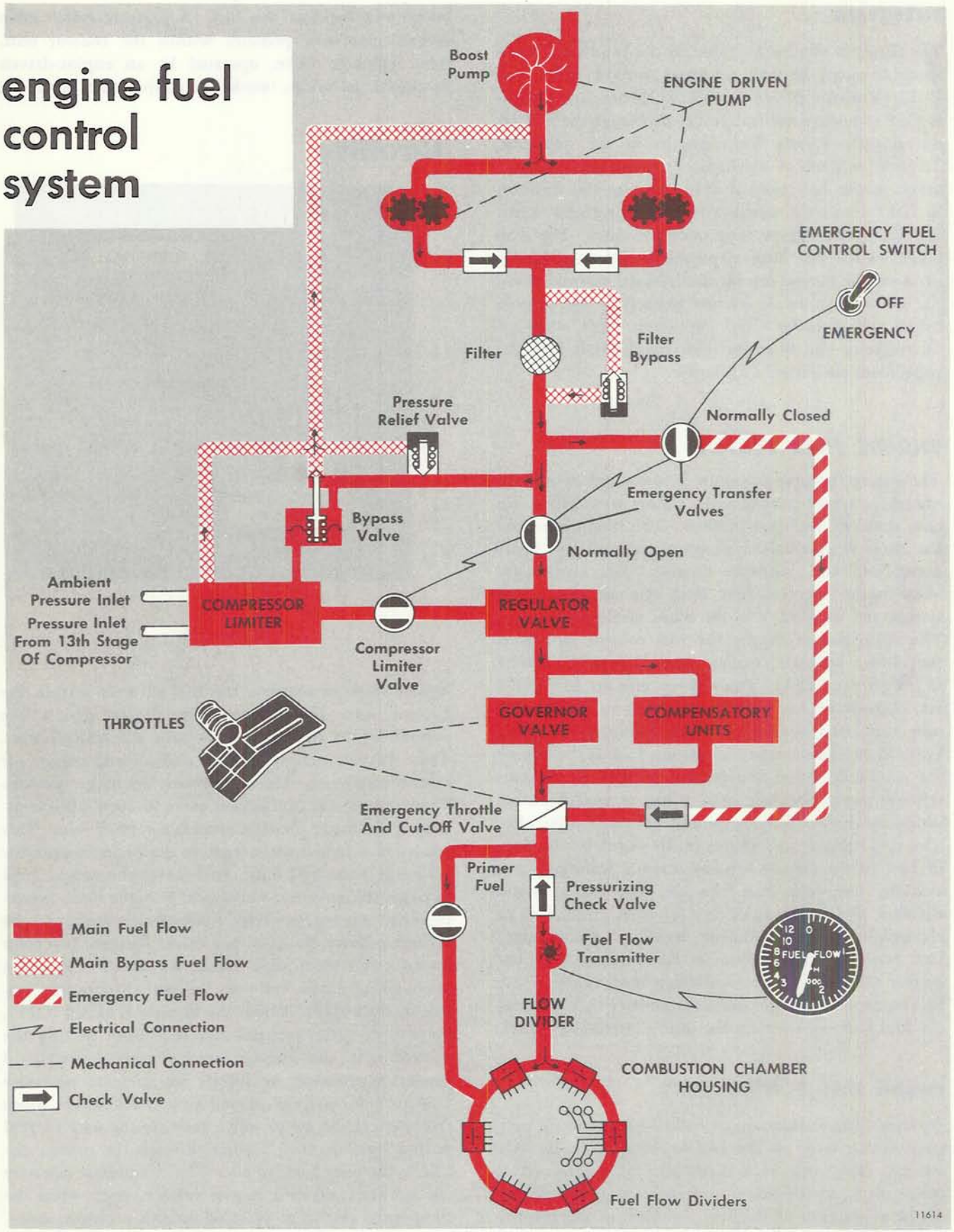

engine fuel control system
Boost Pump
ENGINE DRIVEN PUMP
EMERGENCY FUEL CONTROL SWITCH
OFF
EMERGENCY
Filter
Filter Bypass
Pressure Relief Valve
Normally Closed
Emergency Transfer Valves
Bypass Valve
Normally Open
Ambient Pressure Inlet
Pressure Inlet From 13th Stage Of Compressor
COMPRESSOR LIMITER
REGULATOR VALVE
Compressor Limiter Valve
THROTTLES
GOVERNOR VALVE
COMPENSATORY UNITS
Emergency Throttle And Cut-Off Valve
Primer Fuel
Pressurizing Check Valve
Fuel Flow Transmitter
FUEL FLOW
FLOW DIVIDER
COMBUSTION CHAMBER HOUSING
Fuel Flow Dividers
Main Fuel Flow
Main Bypass Fuel Flow
Emergency Fuel Flow
Electrical Connection
Mechanical Connection
Check Valve
11614

Figure 1-6

ing reduction in rpm to maintain the compressor discharge pressure below the limit. An electrically controlled bypass within the unit directs fuel from the main pumps directly to the engine. Since this "emergency line" bypasses all of the regulating and governing devices within the control unit, an emergency throttle valve is the only control of the bypassed fuel. The electrical power for the emergency system comes from the 28-volt pilot's circuit breaker bus.

EMERGENCY FUEL CONTROL SWITCHES.

The switches that control the emergency bypass line in the fuel control unit are on the fuel control panel. (See figure 1-7.) The switch markings are OFF and EMERGENCY. When the switch is in OFF, the emergency fuel control is inoperative. Placing the switch in EMERGENCY actuates three solenoid-operated valves that close the normal fuel passage in the fuel control unit, open the emergency passage, and isolate the compressor limiter. Placing an emergency fuel control switch in EMERGENCY causes the indicater light above the switch to illuminate. There is no automatic changeover to the emergency system; the switch must be manually placed in the EMERGENCY position to activate the system.

Note

It is permissible to transfer to the emergency fuel system with the throttle in FULL up to an altitude of 6000 feet, provided the engine speed has not dropped below 85% at the time of the transfer. Under all other conditions, the throttle lever must be in IDLE prior to the transfer. Failure to do so will result in excessive exhaust gas temperatures and rich flame-out or compressor stall.

EMERGENCY FUEL CONTROL INDICATOR LIGHTS.

There are two amber press-to-test indicator lights on the fuel control panel above the emergency fuel control switches. (See figure 1-7.) When the emergency fuel control switch is placed in EMERGENCY, its respective indicator light illuminates. Power to operate the lights comes from the pilot's 28-volt d-c circuit breaker bus.

ENGINE COOLING SYSTEM.

During flight, ram air enters four screened circular openings and two flush airscoops on the inside surface of the engine air intake duct. (See figure 1-8.) Air entering the screened openings cools the forward engine area and exhausts through flush slots forward of the firewall. Air entering the two airscoops cools the aft engine area. Aft engine cooling air exhausts

emergency fuel control switches and lights

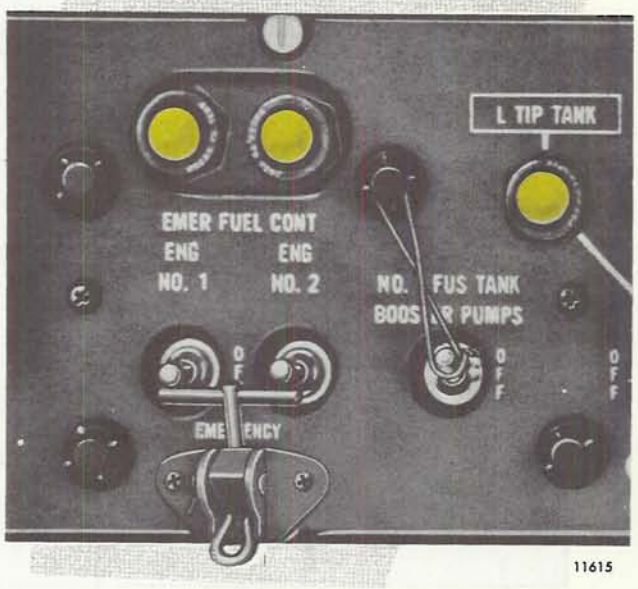


Figure 1-7

through the area between the tail pipe and the nacelle. Ground engine operation creates low-pressure areas between the engine and cowling and between the tail pipe and nacelle, thus causing reverse air flow for ground engine cooling. Air entering the flush slots in the cowling flows forward around the engine and passes through the four screened openings in the nose cowl and exhausts through the engine. Extension of the landing gear opens the cowl doors allowing air to enter and cool the aft engine area. Part of this air flows forward through the ducts forward of the firewall and exhausts through the engine. The remaining air exhausts aft around the tailpipe.

Note

If either engine ground-cooling door remains open in flight, premature airframe buffet will generally occur considerably below the normal buffet limit, and a moderate yaw will be noticeable at about 350 knots or above.

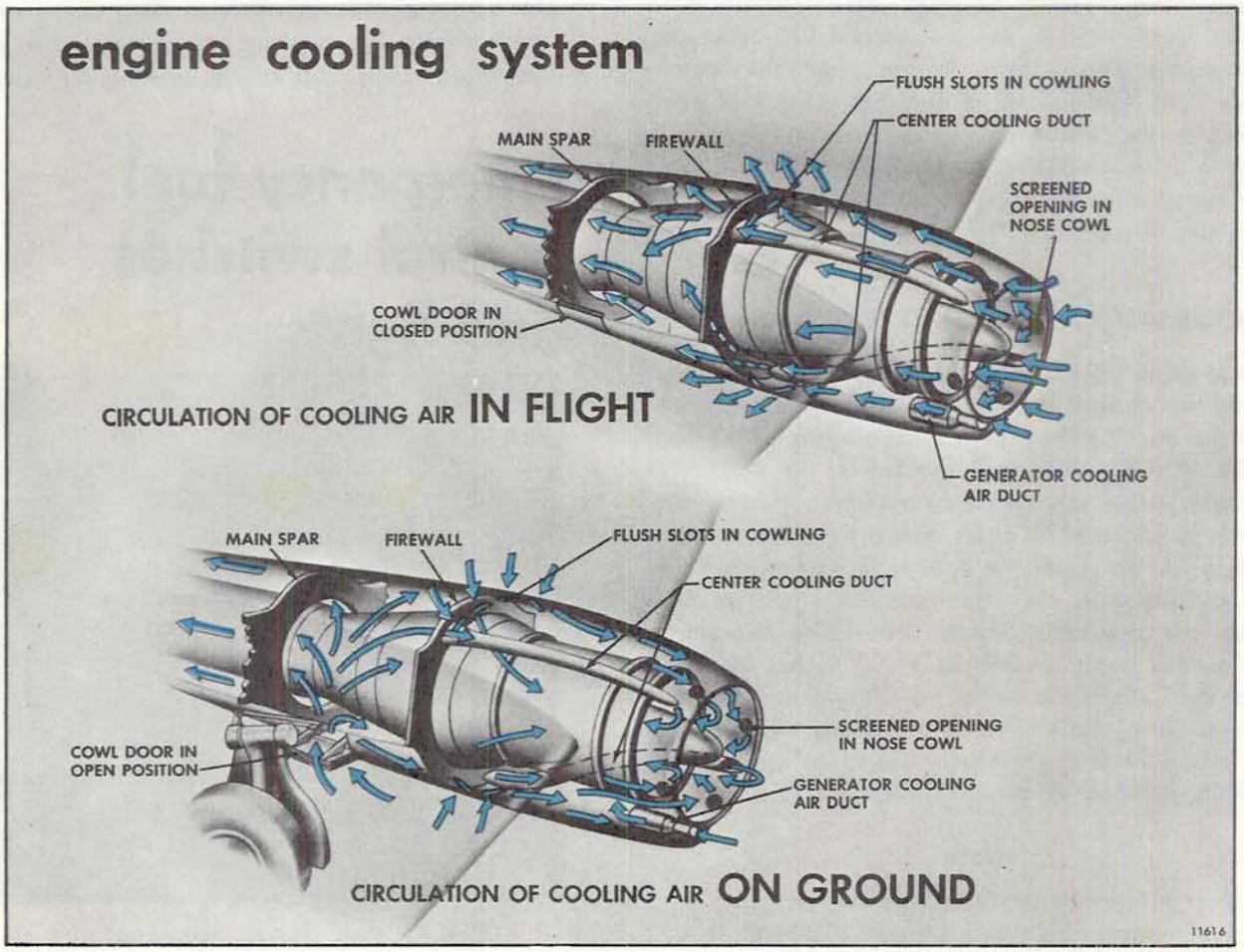


Figure 1-8

STARTING AND IGNITION SYSTEM.

Each engine has its own starting and ignition system. The systems consist of two high-tension igniters, a timer-box assembly, two fuel-primer solenoids, and an explosive-cartridge starter. Placing the throttle in IDLE closes the throttle-actuated engine start microswitch. Placing the STARTING AND IGNITION switch in START completes the circuit to the timer, igniters, fuel primer solenoid, and the explosive cartridge in the starter breech (figure 1-9) starts the engine. After 15 ± 3 seconds, the timer automatically de-energizes the fuel primers and igniters. At the end of the timing cycle, engine temperature and acceleration are sufficiently high for continued operation; therefore, the engine no longer requires ignition and fuel priming. For ground testing, the engine may be motored without combustion. Retaining the throttle in OFF stops the flow of fuel to the engine. The cranking circuit bypasses the throttle microswitch and energizes the timer, the igniters, and the cartridge.

Note

Distinct clicks heard over the interphone system or from outside the airplane indicate proper functioning of the ignition system.

The 28-volt d-c circuit breaker bus supplies the power to operate the system through a 15-ampere circuit breaker.

STARTING AND IGNITION SWITCHES.

Two starting and ignition switches and a microswitch (figure 1-10) for each throttle control the starting and ignition systems. The starting and ignition switches are on the inverter control panel on the pilot's right vertical console. The switch positions

starter cartridge and breech

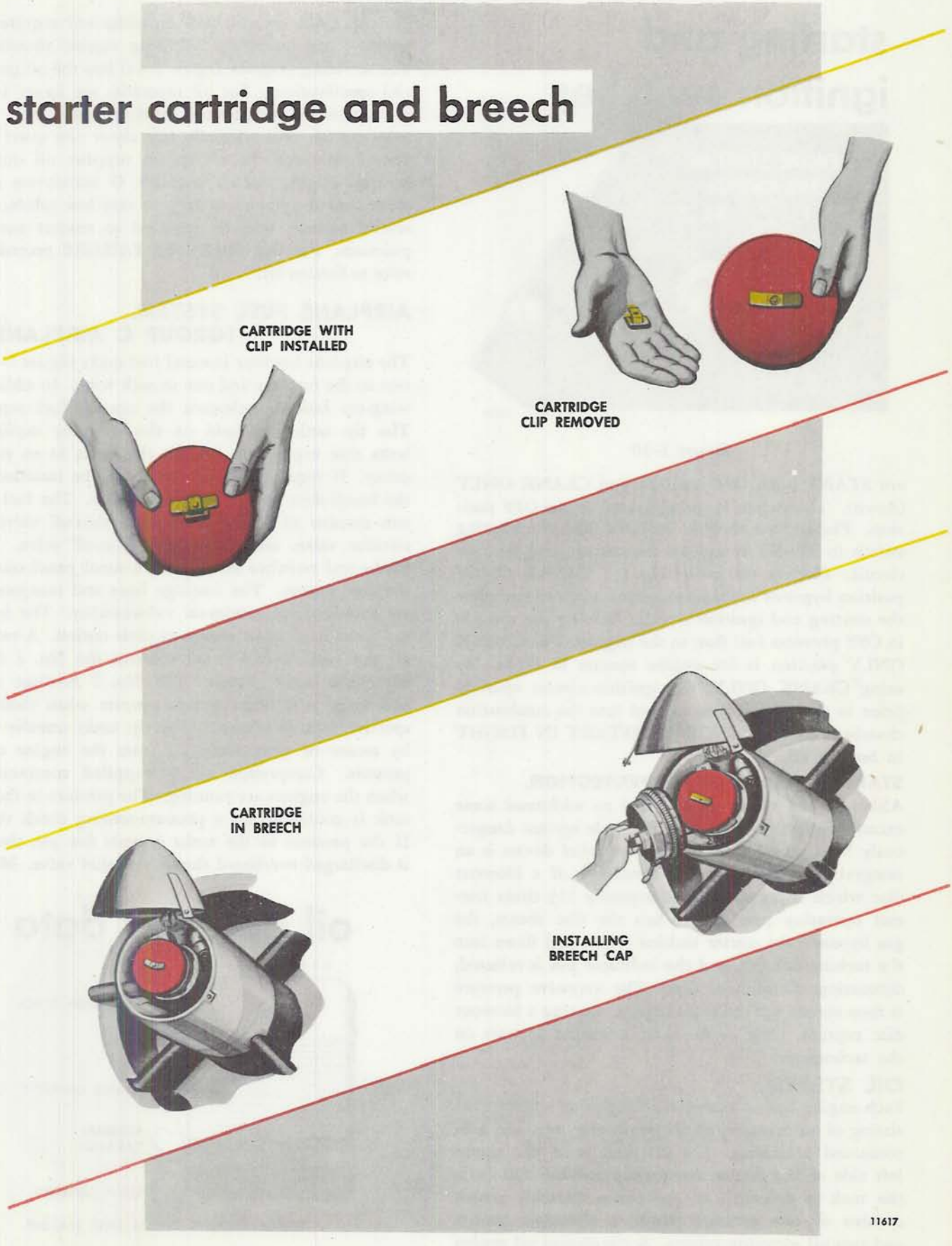


Figure 1-9

starting and ignition switches

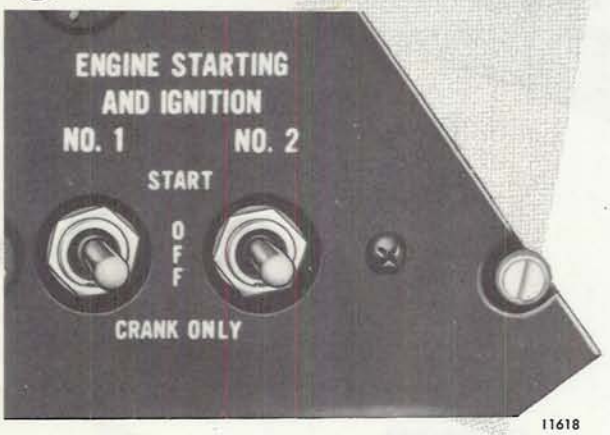


Figure 1–10

are START (up), OFF (center), and CRANK ONLY (down). The switch is spring-loaded to the OFF position. Placing the throttle in IDLE and the starting switch in START completes the starting and ignition circuit. Placing the switch in the CRANK ONLY position bypasses the throttle microswitch to complete the starting and ignition circuit. Leaving the throttle in OFF prevents fuel flow to the engine. The CRANK ONLY position is for engine restarts in flight. By using CRANK ONLY, the ignition circuit operates prior to the introduction of fuel into the combustion chamber. Refer to ENGINE RESTART IN FLIGHT in Section III.

STARTER OVER-PRESSURE PROTECTION.

Although the starter is designed to withstand some excess pressure, a safety device guards against dangerously high pressures. The pressure-relief device is an integral part of the breech consisting of a blowout disc which ruptures at approximately 1½ times normal operating pressure. When the disc shears, the gas bypasses the starter turbine wheel and flows into the turbine ducting, and the indicator pin is released, detonating the sheared disc. The excessive pressure is then vented out the exhaust port. During a blowout disc rupture, little or no rpm indication appears on the tachometer.

OIL SYSTEM.

Each engine has an automatic integral oil system consisting of an oil tank, an oil pump assembly, and self-contained plumbing. The oil tank is on the upper left side of the engine compressor section. Oil from the tank is delivered to the pump assembly which consists of one pressure pump, a scavenger pump, and two oil metering pumps. A circulating oil system is used for the front bearing and accessory drives and a total-loss system for the center and rear bearing. The oil tanks do not have dipsticks and require inspection and servicing following engine shutdown. The servicing diagram (figure 1–44) lists the oil grades and specifications. For oil capacities see figure 1–11. For operating oil pressure refer to figure 5–1. Oil consumption will normally run about one quart per hour. Although the oil system supplies oil during inverted flight, sudden negative G maneuvers may cause the oil pressure to drop to very low values, and several seconds may be required to recover normal pressures. For OIL-PRESSURE FAILURE procedure, refer to Section III.

AIRPLANE FUEL SYSTEM. (GROUP C AIRPLANES)

The airplane has four internal fuel tanks (figure 1–12), two in the fuselage and one in each wing. In addition wing-tip tanks supplement the normal fuel supply. The tip tanks are held on the wing by explosive bolts that explode to jettison the tanks in an emergency. If required, a ferry tank may be installed on the bomb door to carry additional fuel. The fuel system consists of fuel boost pumps, shut-off valves, a transfer valve, and a fuel-level shut-off valve. The knobs and switches on the fuel control panel control the fuel system. The fuselage lines and components are arranged for minimum vulnerability. The internal tanks have boost pumps at their outlets. A switch on the fuel control panel controls the No. 1 fuselage tank boost pumps. The No. 2 fuselage tank and wing tank boost pumps operate when their respective tank is selected. The tip tanks transfer fuel by means of compressed air from the engine compressors. Compressed air is supplied continuously when the engines are running. The pressure in the tip tank is controlled by a pressure-sensing check valve. If the pressure in the tanks exceeds five psi, the air is discharged overboard through a relief valve. Motor

oil quantity data

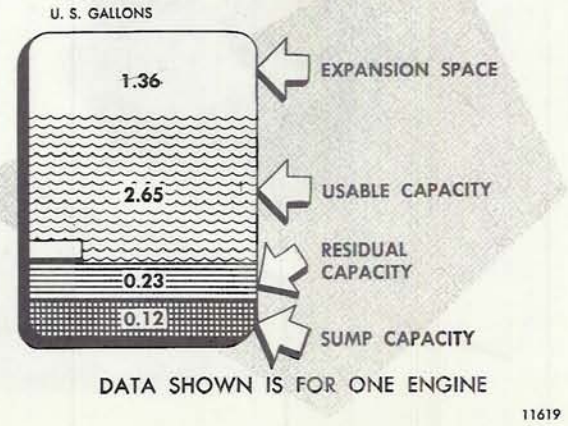


Figure 1–11

operated shut-off valves, located throughout the system, control fuel flow from the tanks to the engines. During normal operation of the fuel system, fuel flows from the No. 2 fuselage tank, the wing tanks, and the tip tanks through the auxiliary manifold (collector) to the No. 1 fuselage tank and then through the main manifold (collector) to the engines. If necessary, the No. 1 fuselage tank may be bypassed and fuel transferred from any tank directly to the engines.

A fuel-level shut-off valve in the No. 1 fuselage tank mechanically closes the tank inlet line from other tanks when fuel in the tank reaches a near full level. When fuel is transferred to the No. 1 fuselage tank the replenishment rate is sufficient to keep the No. 1 fuselage tank at least three-quarters full at all times during transfer. (See FUEL MANAGEMENT in Section VII.) There is a schematic flow diagram of the fuel system on the fuel control panel. The power to operate and control the system comes from the pilot's 28-volt d-c circuit breaker bus and the generator bus. There is a fuel-quantity indicator for each internal fuel tank. The tip tanks contain a low-level warning system. Each tank except the ferry tank has an access for ground refueling. Tank quantities are shown in figure 1-13.

AIRPLANE FUEL SYSTEM. (GROUP D AIRPLANES)

The fuel control panel comprises the only difference between the Group C and D airplane fuel systems. See figure 1-14 for panel layout.

AIRPLANE FUEL SYSTEM. (GROUP Q AIRPLANES)

The removal of the No. 1 fuselage tank boost pump indicator light from Group D airplanes and the installation of the No. 1 fuselage tank low-level warning light on Group Q airplanes comprises the only difference between Group D and Q airplanes. See figure 1-14 for panel layout.

FUEL SPECIFICATION.

Fuel specifications and grades, and fuel tank filler points are shown on the servicing diagram (figure 1-44).

FUEL CONTROLS. (See figure 1-14 for Group C, D, and Q panels.)

NO. 1 FUSELAGE TANK BOOST PUMPS SWITCH. (GROUP C AIRPLANES)

The two boost pumps in the No. 1 fuselage tank are energized when the No. 1 fuselage tank booster pumps switch is on.

NO. 1 FUSELAGE TANK BOOST PUMP INDICATOR LIGHT. (GROUP D AIRPLANES)

The red indicator light for the No. 1 fuselage tank booster pumps illuminates when both No. 1 fuselage tank boost pumps fail. The indicator light illuminates when the transfer and bypass valve knob is in the bypass position, when the No. 1 fuselage tank boost pump circuit breakers are in OFF, or when electrical malfunction causes both remote circuit breakers (power control for boost pumps and light relays) to trip off. The 28-volt d-c distribution bus supplies power to operate the indicator light and test circuits.

NO. 1 FUSELAGE TANK LOW-LEVEL WARNING LIGHT. (GROUP Q AIRPLANES)

A red low-level warning light on the fuel control panel illuminates when fuel quantity in the No. 1 fuselage tank decreases below 890 gallons (5800 pounds). The 28-volt distribution bus supplies the power to operate the warning and press-to-test circuits.

ENGINE VALVE KNOBS. (GROUP C AIRPLANES)

Two engine valve knobs control the fuel flow to the engines. Placing the No. 1 engine valve knob in the vertical (flow) position electrically opens the No. 1 engine shut-off valve in the main fuel manifold, permitting fuel to flow to the No. 1 engine. The No. 2 engine valve knob controls the No. 2 engine shut-off valve in a same manner. These valves are safetied to the flow position to prevent the pilot from turning the knobs OFF during flight. The knobs are painted with red and white stripes.

ENGINE VALVE SWITCHES. (GROUP D AND Q AIRPLANES)

An engine valve switch controls the fuel flow to each engine. Switch markings are ON (up) and OFF (down). Placing the switches in ON opens the engine fuel shut-off valves. Placing the switches in OFF closes the engine fuel shut-off valves. The 28-volt d-c pilot's circuit breaker bus supplies power through a 5-ampere circuit breaker to operate the shut-off valves.

FUEL TRANSFER AND BYPASS VALVE KNOB. (GROUP C AIRPLANES)

The fuel transfer and bypass valve knob directs fuel flow to the No. 1 fuselage tank or directly to the engines. This knob is the fourth knob from the right on the fuel control panel. Aligning the transfer and bypass valve knob with the flow line leading into the No. 1 fuselage tank causes fuel in the auxiliary manifold to flow to the No. 1 fuselage tank. With the transfer and bypass valve knob set to the flow line leading directly to the engines, fuel in the auxiliary manifold bypasses the No. 1 fuselage tank. Placing the knob in OFF prevents fuel from entering the main fuel manifold. The 28-volt d-c pilot's circuit breaker bus supplies the power through a 5-ampere circuit breaker to operate the No. 1 fuselage tank transfer and bypass shut-off valves. The 28-volt d-c generator

airplane fuel system

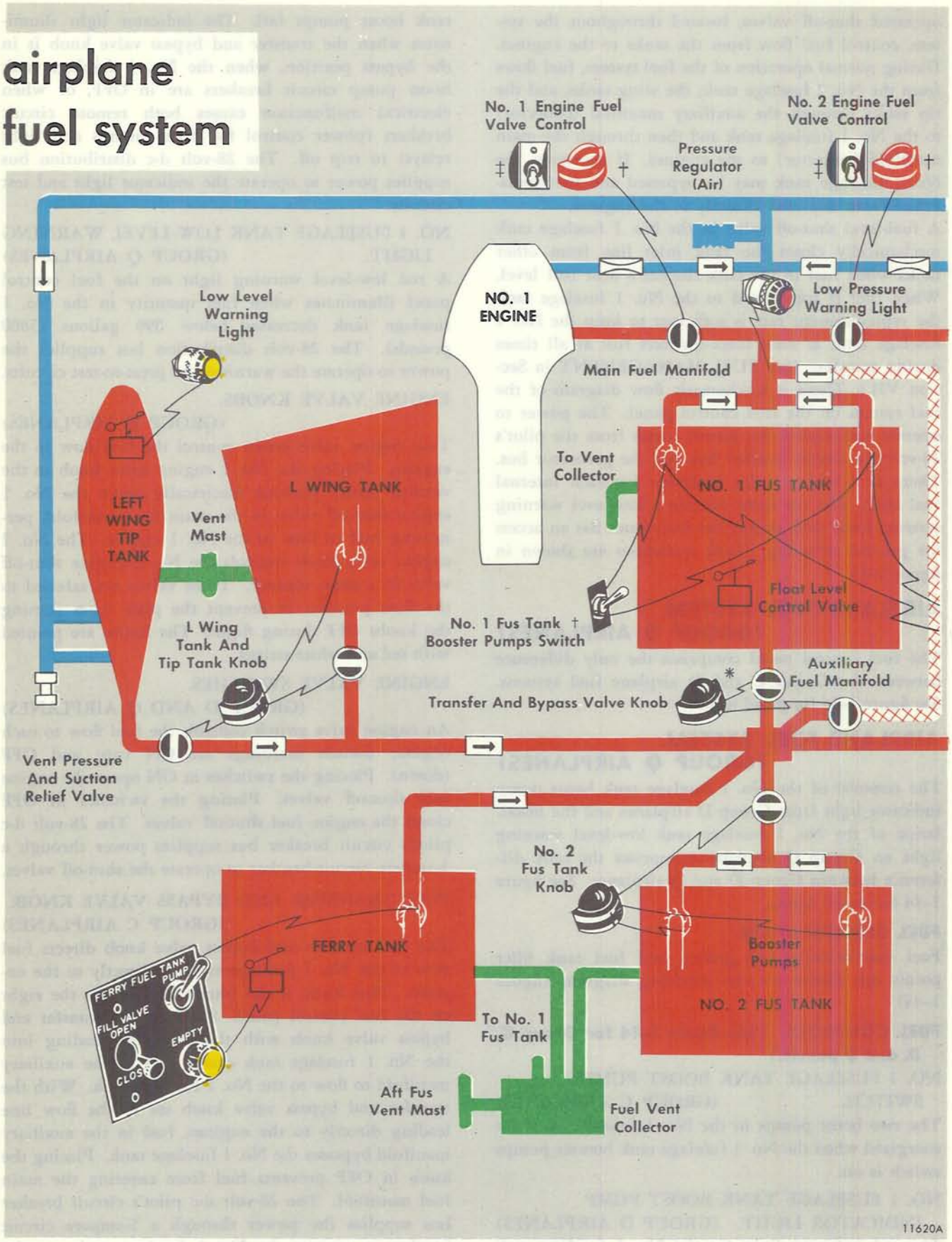


Figure 1-12 (Sheet 1 of 2)

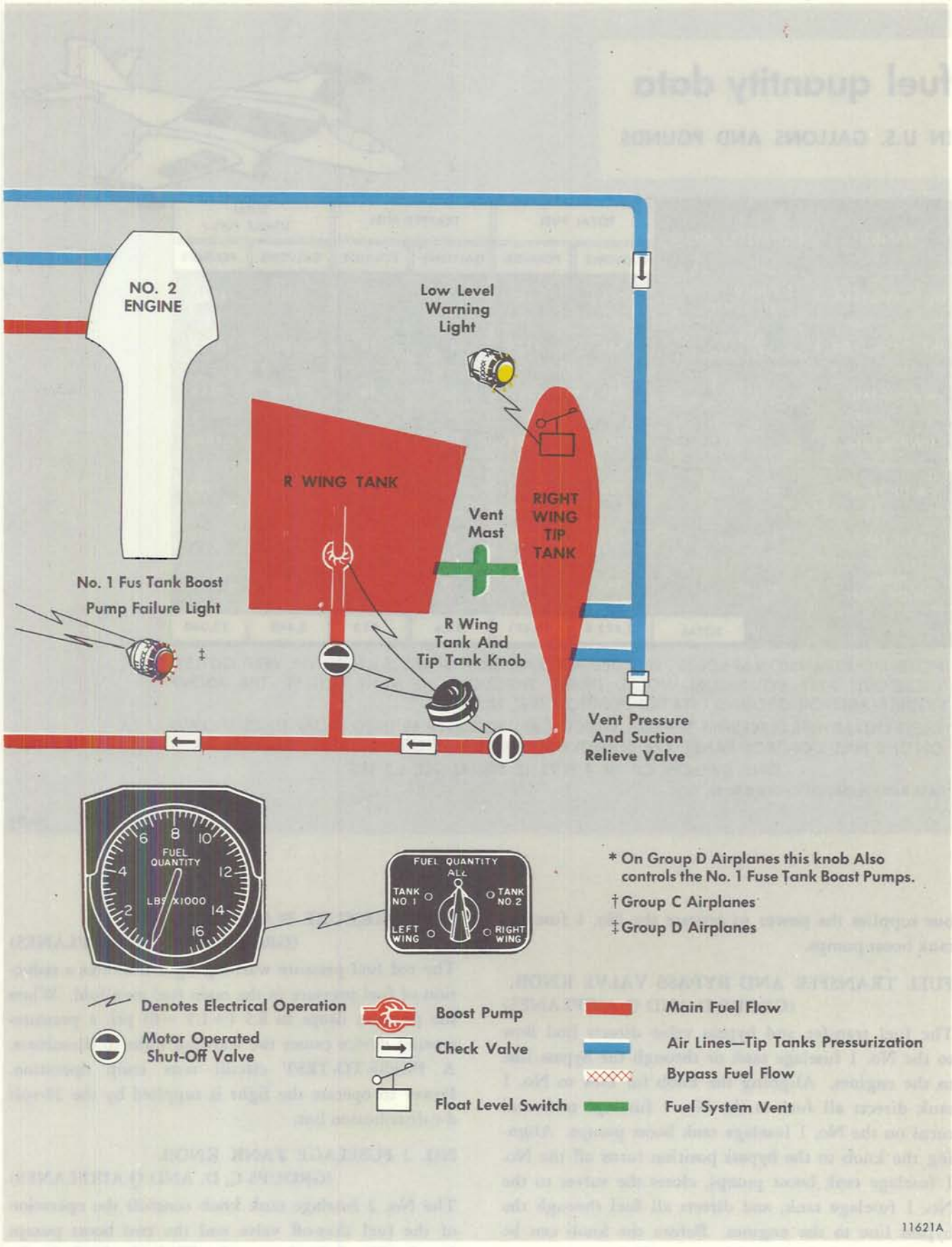
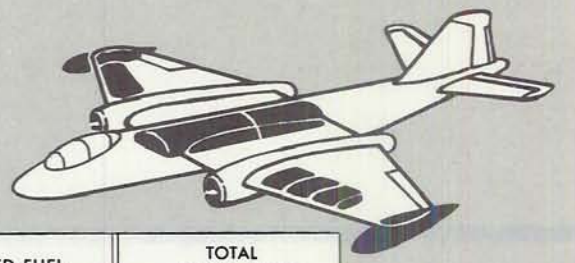


Figure 1–12 (Sheet 2 of 2)

fuel quantity data

IN U.S. GALLONS AND POUNDS



TANKS	CONSTRUCTION	TOTAL FUEL		TRAPPED FUEL		TOTAL USABLE FUEL *	
		GALLONS	POUNDS	GALLONS	POUNDS	GALLONS	POUNDS
NO. 1 FUS TANK	SPLINTER PROOF SELF-SEALING	1025.6	6667	15.6	102	1010	6565
NO. 2 FUS TANK	FLEXIBLE NON-SELF-SEALING	666	4329	4	26	662	4303
R WING TANK	FLEXIBLE NON-SELF-SEALING	291.5	1895	1.5	10	290	1885
L WING TANK	FLEXIBLE NON-SELF-SEALING	291.5	1895	1.5	10	290	1885
R TIP TANK	METAL (ALU)	320	2080	0	0	320	2080
L TIP TANK	METAL (ALU)	320	2080	0	0	320	2080
BOMB DOOR FERRY	METAL	558	3627	10	65	548	3562
	TOTAL	3,472.6	22,571	32.6	213	3,440	22,360

NOTE: NO EXPANSION SPACE IS PROVIDED AS EXPANSION SPACE IS ABOVE THE VENT OUTLET, THEREFORE, ANY EXPANSION WOULD DRAIN THROUGH THE VENT OUTLET. THE ABOVE FIGURES ARE FOR GROUND (STATIC) POSITION 0.9° NOSE UP.

*THESE QUANTITIES REPRESENT THE FUEL WHICH CAN ACTUALLY BE USED. QUANTITIES SHOWN ON THE FUEL CONTROL PANEL ARE SLIGHTLY LOWER TO AFFORD A SAFETY FACTOR.

ONE GALLON OF JP-4 FUEL IS EQUAL TO 6.5 LBS.

*DATA BASIS FLIGHT TEST AS OF 9-30-55

11622B

Figure 1-13

bus supplies the power to operate the No. 1 fuselage tank boost pumps.

FUEL TRANSFER AND BYPASS VALVE KNOB. (GROUP D AND Q AIRPLANES)

The fuel transfer and bypass valve directs fuel flow to the No. 1 fuselage tank or through the bypass line to the engines. Aligning the knob for flow to No. 1 tank directs all fuel to the No. 1 fuselage tank and turns on the No. 1 fuselage tank boost pumps. Aligning the knob to the bypass position turns off the No. 1 fuselage tank boost pumps, closes the valves to the No. 1 fuselage tank, and directs all fuel through the bypass line to the engines. Before the knob can be turned to a desired position, a pull is necessarv to disengage the knob from detents.

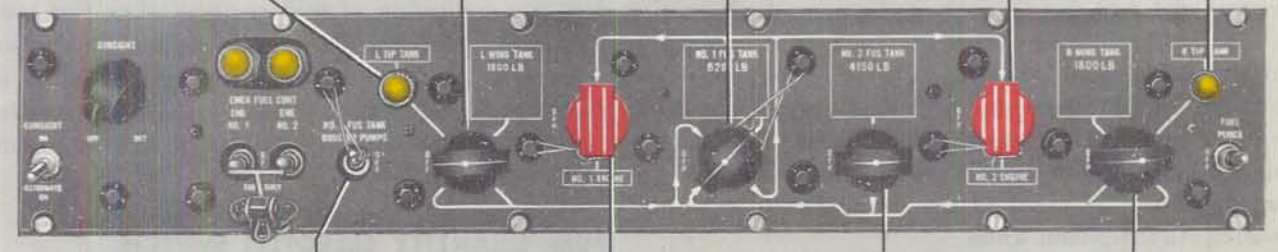
FUEL PRESSURE WARNING LIGHT. (GROUP D AND Q AIRPLANES)

The red fuel pressure warning light indicates a reduction of fuel pressure in the main fuel manifold. When the pressure drops to 8.5 (+1.5 −0) psi, a pressure-sensing device causes the warning light to illuminate. A PRESS-TO-TEST circuit tests lamp operation. Power to operate the light is supplied by the 28-volt d-c distribution bus.

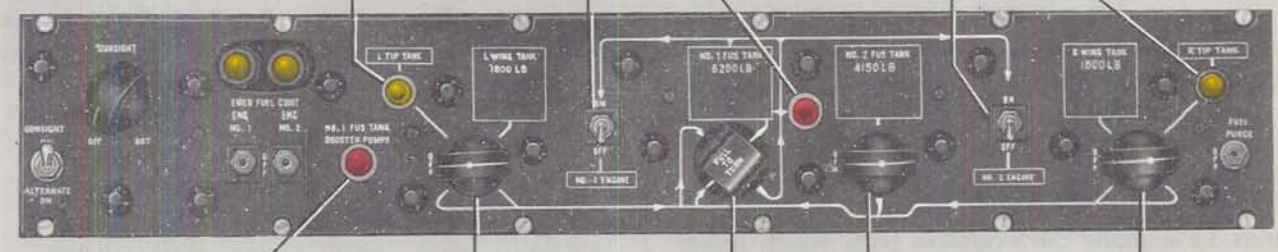
NO. 2 FUSELAGE TANK KNOB. (GROUPS C, D, AND Q AIRPLANES)

The No. 2 fuselage tank knob controls the operation of the fuel shut-off valve and the two boost pumps for the No. 2 fuselage tank. With the knob in the flow position, the shut-off valve opens and the boost

fuel control panel



Group C Airplanes



Group D and Q Airplanes

11623A

Figure 1-14

pumps operate to supply fuel to the auxiliary manifold. With the knob in OFF, the boost pumps are de-energized and the shut-off valve is closed.

WING-TANK—TIP-TANK KNOBS.
(GROUPS C, D, AND Q AIRPLANES)

Placing the left-wing-tank — left-tip-tank knob in line with the left-tip-tank flow lines, opens a valve that permits fuel to flow to the auxiliary manifold. When the knob is in this position, the wing-tank shut-off valve is closed and its boost pump is inoperative. Placing the knob in line with the left-wing-tank flow lines opens the left-wing-tank shut-off valve, energizes the tank boost pump and pumps fuel into the auxiliary manifold. With the knob in this position the left-tip-tank shut-off valve is closed. With the switch in OFF, both shut-off valves are closed and the boost pump is inoperative. The right-wing-tank —right-tip-tank knob selects fuel from the right-wing and wing-tip tanks in the same manner as the left-wing—left-tip-tank knob.

TIP-TANK LOW-LEVEL INDICATOR LIGHTS.
(GROUPS C, D, AND Q AIRPLANES)

Two amber tip-tank low-level indicator lights, one for each tip tank, are on the fuel control panel. (See figure 1-14.) The fuel quantity gage does not indicate tip tank fuel quantity. The only indication of tip tank fuel quantity is the low-level indicator light that illuminates when the fuel quantity is below 195 pounds (30 gallons). The lights have a press-to-test circuit for testing lamp operation. Power for the light comes from the 28-volt d-c distribution bus.

Note

The tip-tank low-level indicator lights may come on during rapid descent or during negative G maneuvers. After a few seconds of level flight, the indicator lights will go out.

TIP-TANK JETTISON SWITCH.

Detonators explode the explosive bolts which secure the tip tanks to the wings to jettison the tip tanks. The guarded TIP TANK JETTISON switch controls tip tank jettisoning. Switch markings are TIP TANKS ONLY, NORMAL, and OFF. The switch is spring-loaded from TIP TANKS ONLY to NORMAL. The switch is on the pilot's left main control panel (panel 5, figure 1-39). Placing the switch in the momentary TIP TANKS ONLY position fires the explosive bolts and releases both tip tanks simultaneously. Depressing the master jettison switch, when the tip tank jettison switch is at NORMAL, causes the tip tanks to jettison. See MASTER JETTISON SWITCH in Section IV. Electrical power for firing the detonators comes from the 28-volt d-c distribution bus. A resistor is installed in series with each detonator to prevent a short in any one detonator from affecting the other detonators.

FUEL QUANTITY INDICATOR.

The fuel quantity indicator (figure 1-31), on the pilot's main instrument panel, is a capacitance-type fuel gage which indicates the fuel quantity in each internal fuel tank individually or the total of all the internal tanks. The gage does not indicate the quantity of fuel in the tip tank. The indicator reflects the fuel quantity in pounds compensated for temperature, density, and airplane attitude so that the indication is a true indication of fuel quantity. The fuel quantity indicator shows the quantity of fuel in the tank selected by the fuel quantity selector switch. If the indicator is sticking, it can be checked with the fuel quantity test switch. Power for the indicator comes from the No. 1 inverter.

FUEL QUANTITY SELECTOR SWITCH.

The fuel quantity selector switch (figure 1-34), on the pilot's right horizontal console selects the tank or tanks whose fuel quantity is to appear on the fuel quantity indicator. By positioning the switch, the quantity of fuel in any internal tank or the total fuel in all the internal tanks is shown on the indicator.

FUEL QUANTITY TEST SWITCH.

The fuel quantity test switch, on the pilot's main instrument panel, is of the momentary type and checks any "sticking" condition of the fuel quantity indicator. (See figure 1-31.) Pressing the test switch causes the indicator pointer to rotate counterclockwise and thus relieve any sticking condition.

Note

The fuel quantity test switch acts slowly and must be held in FUEL QTY TEST for a few moments to ensure relieving any sticking condition.

FERRY TANK FILL SWITCH.

The ferry tank fill switch (figure 1-15) is on the pilot's right console. Switch markings are FILL VALVE OPEN and CLOSE. Placing the No. 2 fuselage tank selector knob to flow and the fill valve switch to OPEN turns on the No. 2 fuselage tank boost pumps and opens the fill valve, allowing fuel to be pumped from the No. 2 fuselage tank into the ferry tank. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the fill valve.

FERRY TANK BOOST PUMP SWITCH.

The ferry tank boost pump switch (figure 1–15) is on the pilot's right console. Switch markings are PUMP and OFF. Placing the switch in PUMP turns on the ferry tank boost pump, thereby pumping fuel from the ferry tank into the auxiliary fuel manifold. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the boost pump.

FERRY TANK FUEL LOW LEVEL INDICATOR LIGHT.

An amber PRESS-TO-TEST indicator light (figure 1–15) on the pilot's right console illuminates when the remaining fuel in the ferry tank reaches 65 pounds. Placing the ferry tank boost pump switch in OFF turns the low-level indicator light off. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the indicator light.

FUEL TANK VENT SYSTEM.

The fuel tank vent system maintains a regulated pressure within the fuel tanks to discharge combustible fuel vapors overboard and relieve excessive pressure within the tanks. When the difference between fuel tank pressure and ambient pressure reaches 0.5 psi, the corresponding vent-regulating valve opens and exhausts the vent pressure overboard through the vent masts. When the fuel tank pressure drops below 0.4 psi, the vent-regulating valve closes. The vent system services the fuselage tanks, the wing tanks, and the bomb door ferry tank when installed. The fuel tank vent system is electrically operated and automatically controlled whenever the fuel vent circuit breakers, on the pilot's circuit breaker panel, are pushed in. Power for the system comes from the 28-volt d-c pilot's circuit breaker bus.

Note

Venting of the fuel from the wing vent mast when the wing tanks are full is quite common during the early stages of a flight.

FUEL PURGE SYSTEM.

The fuel purge system adds nitrogen to the fuel tanks to keep the vapor concentration below a combustible level. The system is normally used for combat missions as a safety measure to forestall explosions or fire hazards in the fuel tanks in the event they should be damaged. The system contains six nitrogen bottles, two solenoid-operated shut-off valves, high and low pressure reducer valves, and thermal relief safety discs with discharge indicators. The purge system operates in conjunction with the vent system, maintaining nitrogen pressure in the fuel tanks between 0.25 and 0.40 psi. Pressure in excess of 0.50 psi is vented overboard by normal vent system operation. The operation of the system is automatic and requires no further action by the pilot after the initial actuation. The system services all the tanks except the tip tanks and the ferry tank. Power to operate the system comes from the 28-volt d-c distribution bus.

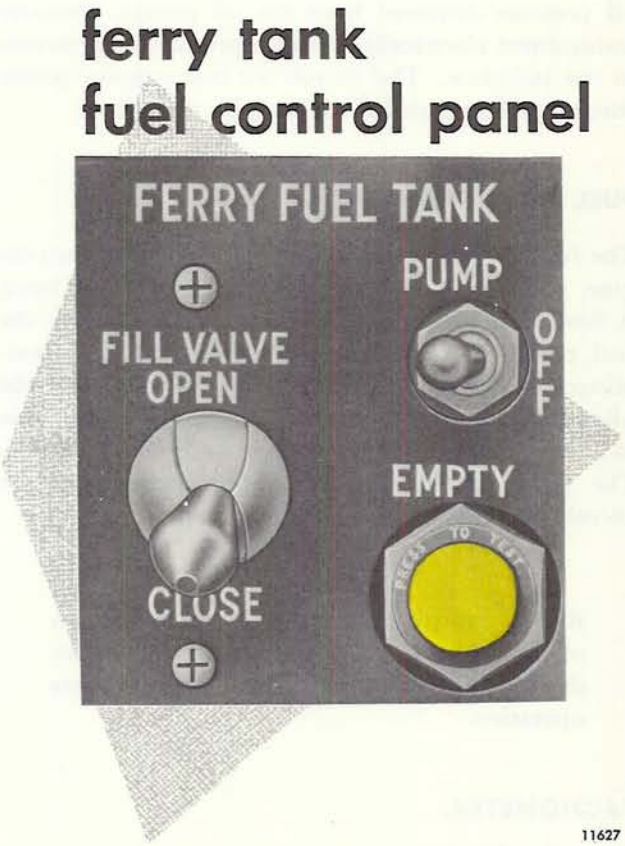


Figure 1–15

FUEL PURGE SWITCH.

The fuel purge system is controlled by the fuel purge switch on the fuel control panel (figure 1–14). Placing the switch in FUEL PURGE prior to take-off allows nitrogen to flow into the fuel tanks as fuel is consumed. Power to control the system comes from the 28-volt d-c distribution bus.

FUEL PURGE DISCHARGE INDICATORS.

Three overboard discharge indicators containing red discs are mounted in the fuselage skin just forward of the bomb bay on the right side. When the pressure in the nitrogen cylinders becomes excessive, the nitro-

gen discharges overboard. The absence of the red discs in the discharge indicators shows that the nitrogen has discharged.

ENGINE INSTRUMENTS.

OIL PRESSURE INDICATOR.

The oil pressure indicators (figure 1-31) on the right side of the pilot's main instrument panel indicate the oil pressure delivered from the oil pumps. Pressure transmitters electrically transmit pressure information to the indicator. The 28-volt a-c bus supplies power through a 1-ampere fuse to energize the circuit.

FUEL FLOW INDICATOR.

The fuel-flow indicators (figure 1-31), one for each engine, indicate fuel consumption in pounds per hour. A flow-measuring device in the fuel line between the fuel control unit and the flow dividers has a transmitter that operates the fuel-flow indicator on the pilot's main instrument panel. Errors in density due to changes in altitude and temperature are negligible. The power to operate the circuit comes from the 28-volt a-c bus through a 1-ampere fuse.

Note

Rapid throttle movement causes fluctuation of the fuel flow indicator. However, the indicator will stabilize after a few minutes operation.

TACHOMETER.

Engine-driven tachometer generators electrically transmit the percentage of engine rpm to their respective tachometer. (See figure 1-31.) The indicators are on the pilot's main instrument panel. The tachometer circuit operates independently of the airplane's electrical system.

EXHAUST TEMPERATURE INDICATOR.

Two exhaust gas temperature indicators (one for each engine) are on the pilot's main instrument panel. (See figure 1-31.) Four thermocouples connected in parallel around the tail pipe transmit an average exhaust gas temperature to the indicators. Temperature readings are in degrees centrigrade. The temperature indicator circuits operate independently of the airplane's electrical system.

ELECTRICAL SYSTEM.

A 24-volt 36-ampere-hour battery and four engine-driven 300-ampere 28-volt generators supply the electrical power to operate the airplane's electrical equipment. (See figure 1-17.) Each engine drives two generators. For starting or ground service, an external power source can be connected to the system through an external power receptacle. Four inverters supply the power to operate the equipment requiring alternating current. The battery and main (No. 1) inverter are in the forward area of the fuselage center section. The electrical distribution center, below and to the left of the pilot, contains various power busses, relay panels, and fuse panels. The left electrical access compartment, in the lower left area of the nose section aft of the pressure bulkhead, contains the No. 2 inverter, the standby instrument inverter, the battery bus, and various relays and fuses. The right electrical access compartment, in the lower right area of the nose section aft of the pressure bulkhead, contains the normal instrument inverter, generator control panels, the external power receptacle, various relays, and fuses. A kit on the pilot's right console contains spare lamps. The right equipment compartment contains spare lamps and fuses. Circuit breaker panels are on the pilot's right and left vertical consoles and on the observers' left console.

D-C POWER SYSTEM.

The d-c power system is a 28-volt multiple distribution system using the airplane's structure for ground return. Its design permits single or parallel generator operation. Energizing the generator bus also energizes the distribution, the pilot's circuit breaker, the d-c radio, the armament, and the battery busses. The battery bus supplies power from the battery to the emergency circuits in the event of generator failure. Circuit breakers and fuses protect the bus supply lines and individual circuits.

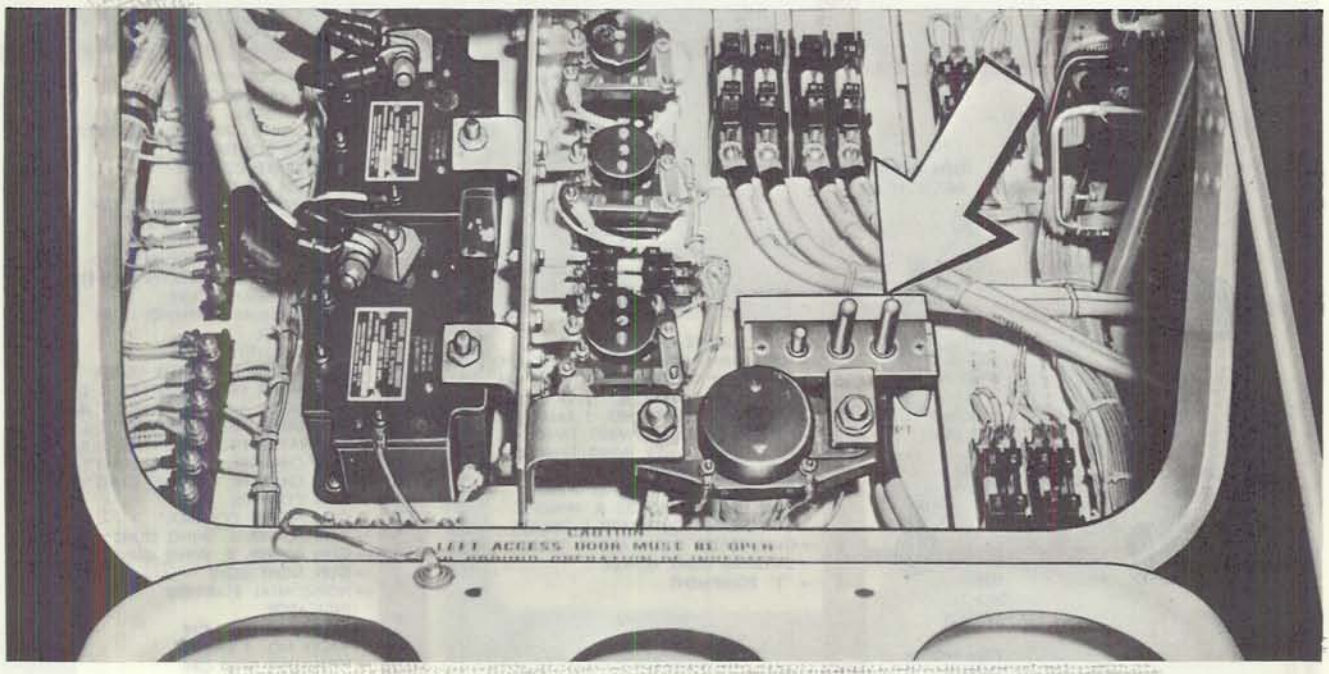
EXTERNAL POWER RECEPTACLE.

The external power receptacle in the right electrical access compartment (figure 1-16) connects to the generator bus. An indication of voltage output of the external power source appears on the voltmeter when the voltage selector switch is in the DISTR BUS position.

BATTERY.

The battery is in the left forward section of the center fuselage. Battery rating is 36 ampere-hours at 24

external power receptacle



11626

Figure 1-16

volts. The battery connects directly to the battery bus and energizes the bus at all times. The battery bus voltage reading appears on the voltmeter when the voltmeter selector switch is placed in BATT BUS. A battery vent system allows boiling electrolyte to overflow into a jar in the battery compartment.

BATTERY SWITCH.

The battery switch, on the generator control panel (figure 1-18), is a three-position switch marked OFF (center position), and BATTERY (up position). The third position has no markings or function. The battery switch controls a battery contactor relay incorporated in the circuit between the battery bus and the 28-volt d-c generator bus. Placing the switch in BATTERY closes the battery contactor, completing the circuit between the battery bus and the generator bus.

Note

Closing the battery contactor requires a minimum battery voltage of 18 volts at one ampere. The battery contactor remains closed until battery voltage drops below seven volts.

The generators then energize the generator bus and the battery bus. Also, with the generators inoperative and the battery switch in BATTERY, the battery energizes the 28-volt d-c system.

GENERATOR REGULATOR PANELS.

Four generators regulator panels, two in the right electrical access compartment and two in the equipment compartment, regulate and protect the 28-volt d-c electrical system. The panels contain the various circuit breakers, fuses, and relays to regulate the system voltage, to control the load division between generators, and to prevent reverse current flow.

GENERATOR CONTROL PANEL.

The four generator control switches are on the generator control panel. (See figure 1-18.) Each switch is marked ON, OFF, and RESET. If the engine is operating and the generator voltage is approximately 28 volts, placing a generator switch in ON connects the generator to the generator bus and then to the battery, provided the battery switch is in BATTERY. Incorporated in the circuit between the generator and the generator bus is a reverse current relay. This relay prevents battery power from energizing the generator when the generator voltage is lower than battery voltage. Reverse-current relays also prevent the generators from cutting in when an external power source

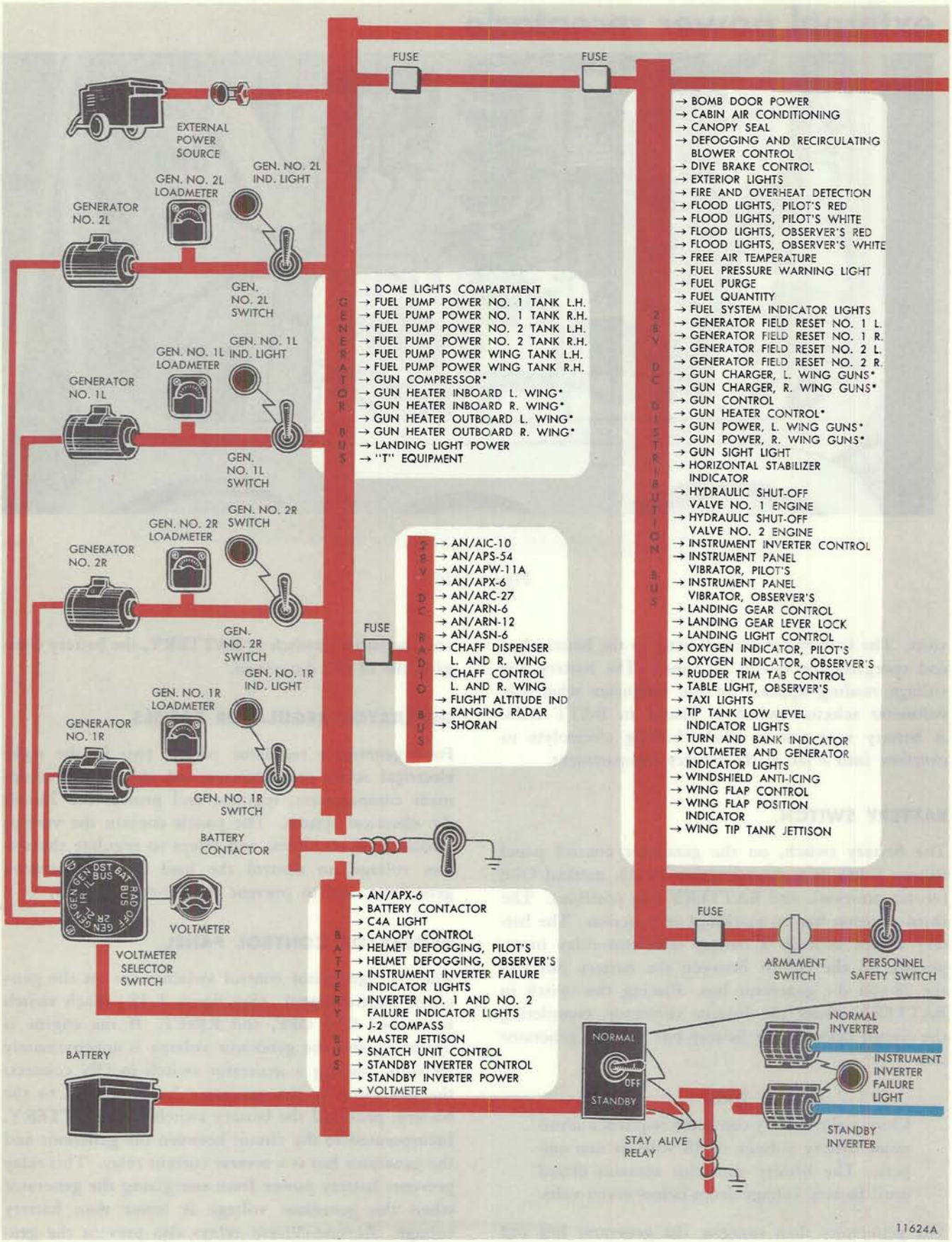


Figure 1-17 (Sheet 1 of 2)

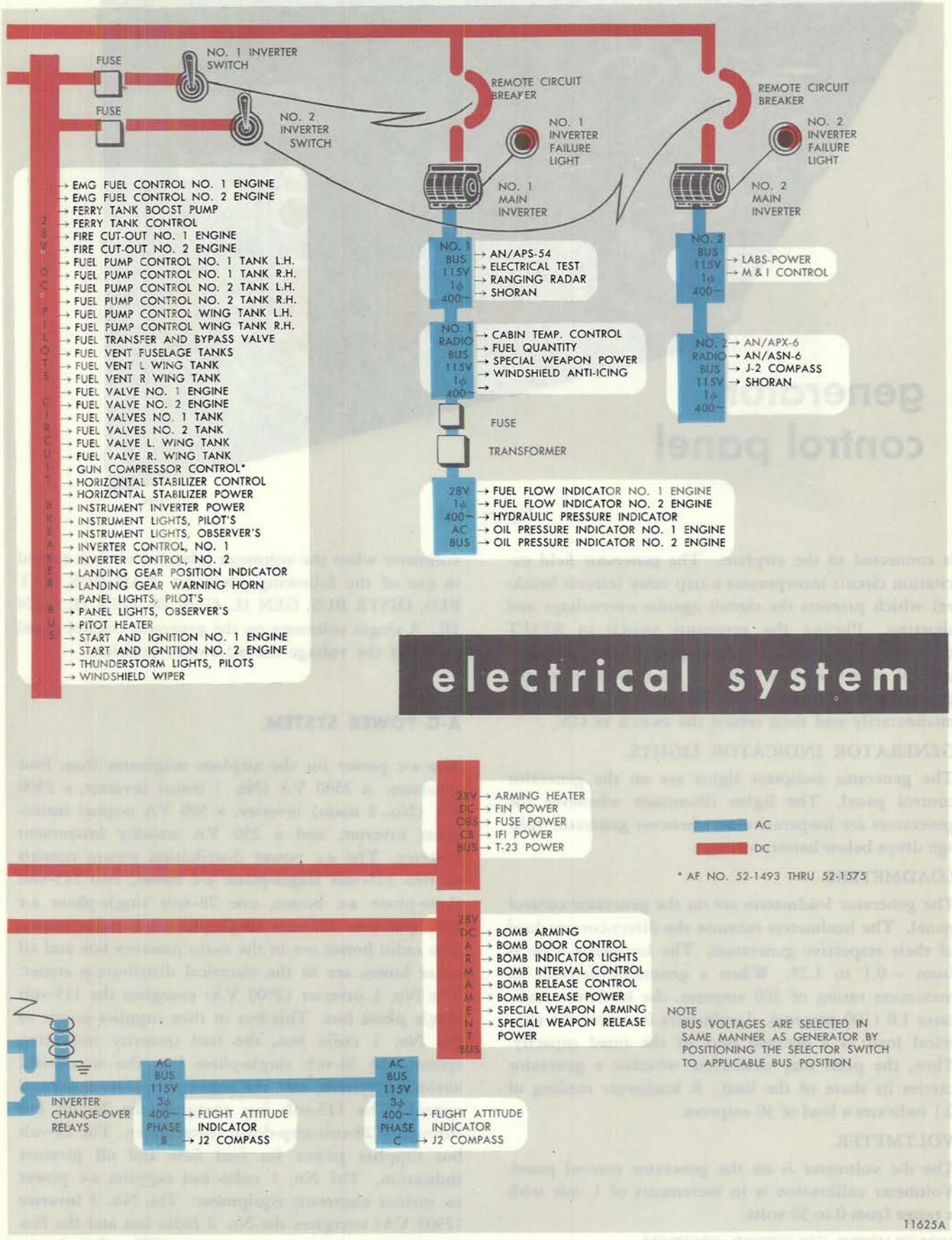
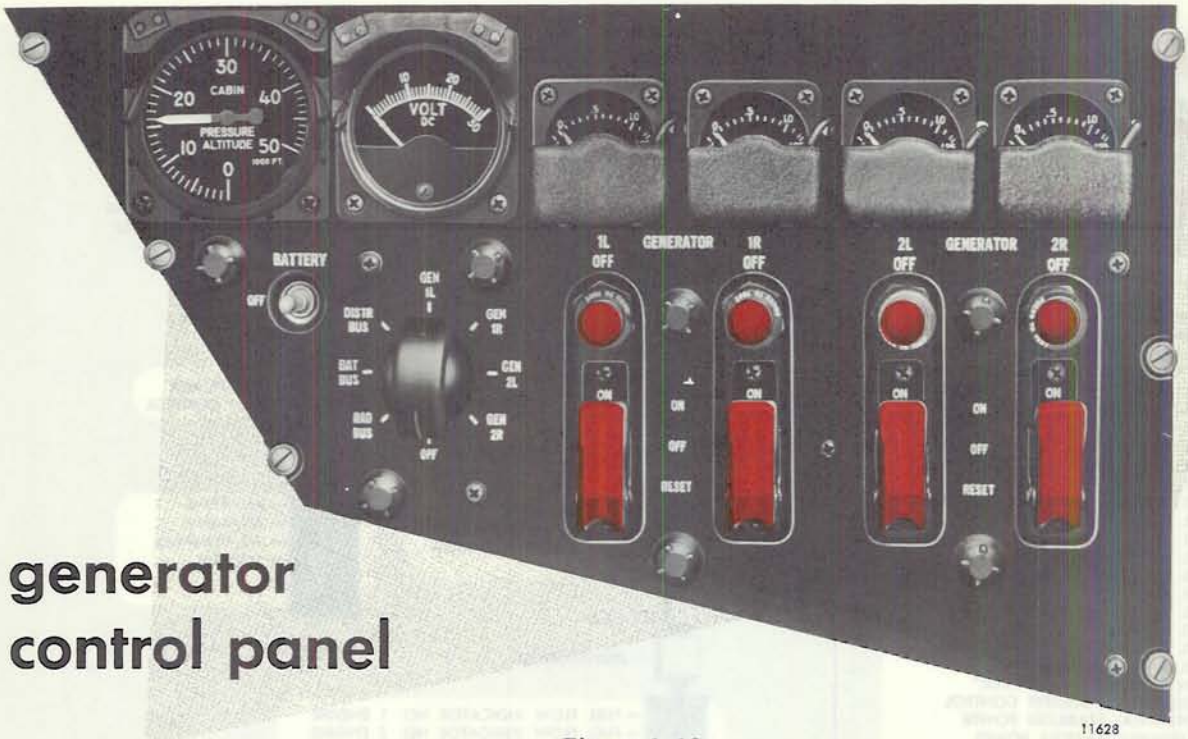


Figure 1–17 (Sheet 2 of 2)



generator control panel

Figure 1-18

is connected to the airplane. The generator field excitation circuit incorporates a trip relay (circuit breaker) which protects the circuit against overvoltage and shorting. Placing the generator switch in RESET closes the trip relay. If, upon placing the generator control switch in ON, there is no indication on the generator loadmeter, hold the switch in RESET momentarily and then return the switch to ON.

GENERATOR INDICATOR LIGHTS.

The generator indicator lights are on the generator control panel. The lights illuminate whenever the generators are inoperative or whenever generator voltage drops below battery voltage.

LOADMETERS.

The generator loadmeters are on the generator control panel. The loadmeters measure the direct-current load of their respective generators. The loadmeter scale is from —0.1 to 1.25. When a generator delivers its maximum rating of 300 amperes, the loadmeter indicates 1.0 (100 percent). Loadmeters interpret the electrical load as a decimal part of the rated capacity. Thus, the pilot may determine whether a generator carries its share of the load. A loadmeter reading of 0.1 indicates a load of 30 amperes.

VOLTMETER.

The d-c voltmeter is on the generator control panel. Voltmeter calibration is in increments of 1 volt with a range from 0 to 30 volts.

VOLTMETER SELECTOR SWITCH.

The voltage of a generator or a bus appears on the voltmeter when the voltmeter selector switch is turned to one of the following positions: RAD BUS, BAT BUS, DISTR BUS, GEN 1L, GEN 1R, GEN 2L, GEN 2R. A single voltmeter on the generator control panel indicates the voltage for all switch positions.

A-C POWER SYSTEM.

The a-c power for the airplane originates from four inverters: a 2500 VA (No. 1 main) inverter, a 2500 VA (No. 2 main) inverter, a 500 VA normal instrument inverter, and a 250 VA standby instrument inverter. The a-c power distribution system consists of two 115-volt single-phase a-c busses, two 115-volt three-phase a-c busses, one 28-volt single-phase a-c bus, and two 115-volt single-phase a-c radio busses. The radio busses are in the radio junction box and all other busses are in the electrical distribution center. The No. 1 inverter (2500 VA) energizes the 115-volt single phase bus. This bus in turn supplies power to the No. 1 radio bus, the fuel quantity indicating system, the 28-volt single-phase bus, the windshield anti-icing system, and the cabin temperature control system. The 115-volt bus energizes the 28-volt bus through a 28-volt step-down transformer. The 28-volt bus supplies power for fuel flow and oil pressure indication. The No. 1 radio bus supplies a-c power to various electronic equipment. The No. 2 inverter (2500 VA) energizes the No. 2 radio bus and the No. 2 radio bus supplies power to the IFF radar circuit. The normal instrument or standby inverters energize

the 115-volt three-phase a-c busses through a transfer relay. These busses supply power to the gyro compass, the flight attitude indicator, and the inverter failure indicator relay circuits.

NO. 1 AND NO. 2 INVERTER SWITCHES.

The No. 1 and No. 2 inverter switches (figure 1–19) on the inverter control panel control their respective inverters. Placing the switches in the up (ON) position closes a relay in the inverters. The closed relay allows power from the 28-volt d-c generator bus to operate the inverter. The No. 1 inverter energizes the No. 1 a-c 115-volt single-phase bus and the No. 2 115-volt single-phase bus and the No. 2 115-volt single-phase radio bus.

INSTRUMENT INVERTER SWITCH.

The instrument inverter switch (figure 1–19) on the inverter control panel controls the normal and standby instrument inverters. Placing the switch in NORMAL closes a relay in the inverter. The closed relay allows power from the 28-volt d-c pilot's circuit breaker bus to operate the normal instrument inverter. The inverter energizes the three-phase 115-volt a-c busses. Placing the switch in STANDBY closes a relay in the inverter allowing power from the 28-volt battery bus to operate the standby instrument inverter. The standby instrument inverter energizes the three-phase 115-volt a-c busses.

Note

The instrument inverter switch controls the stay-alive relay and must be placed to OFF before you leave the airplane.

INVERTER FAILURE INDICATOR LIGHTS.

The inverter control panel contains the No. 1, No. 2, and instrument inverter failure lights. The lights illuminate whenever the respective inverters are inoperative or whenever the output drops below 90 volts. The 28-volt battery bus supplies power to operate the lights.

HYDRAULIC SYSTEM.

The hydraulic system (figure 1–20) supplies the hydraulic pressure necessary to operate the landing gear, landing gear doors, wing flaps, wheel brakes, canopy and canopy latches, wing and fuselage dive brakes, gun purge doors, and the bomb door. During engine operation, the power to pressurize the hydraulic system comes from independently operating pumps (one for each engine) which draw fluid from a single reservoir in the right inner wing and transmit hydraulic pressure through pressure lines to the various actuating cylinders. Fluid from the return side of the actuating cylinders replenishes the fluid in the reservoir. Compressed air from the engines pressurizes the reservoir to assure a supply of fluid to the engine-driven pumps. A reserve supply of hydraulic fluid

inverter switches and indicator lights

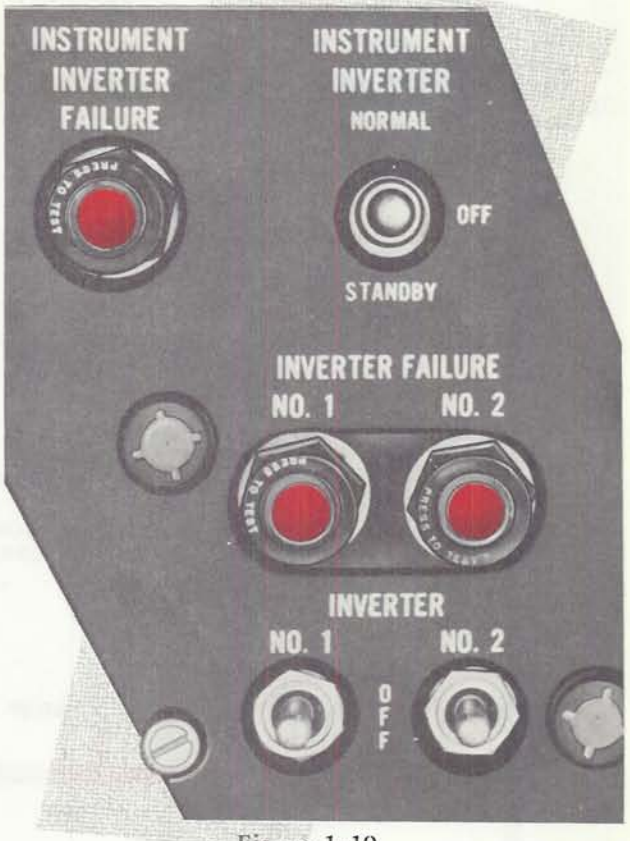


Figure 1–19

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remains in the reservoir for emergency use. A relief valve limits system pressure to 3000 (+100 —0) psi. The main accumulator is attached to the basic supply line, and an additional accumulator, smaller in volume than the main accumulator, is isolated from the system and retains pressure for emergency brake operation. Electrically controlled selector valves direct pressure to the up, close, or retract side of the actuating cylinders or to the down, open, or extend side of the cylinders, depending upon the position of the controls. Pressure exists in the actuating cylinders at all times during hydraulic pump operation, since the selector valves have no neutral position. A manually operated valve in the right wheel well bypasses hydraulic fluid, allowing the right main gear door to be closed during bomb loading. A bomb door shut-off valve in the

hydraulic system

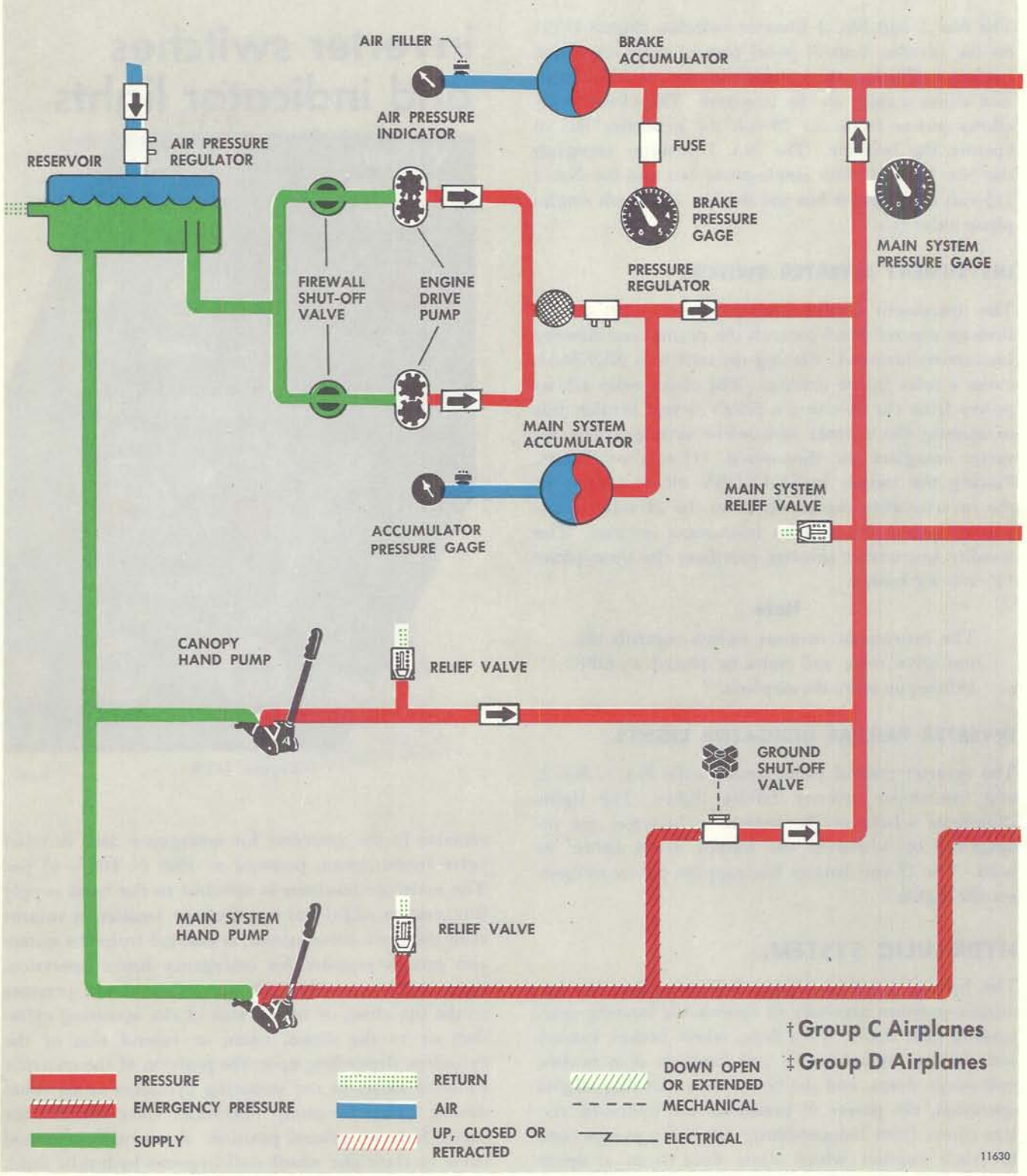

Figure 1-20 (Sheet 1 of 2)

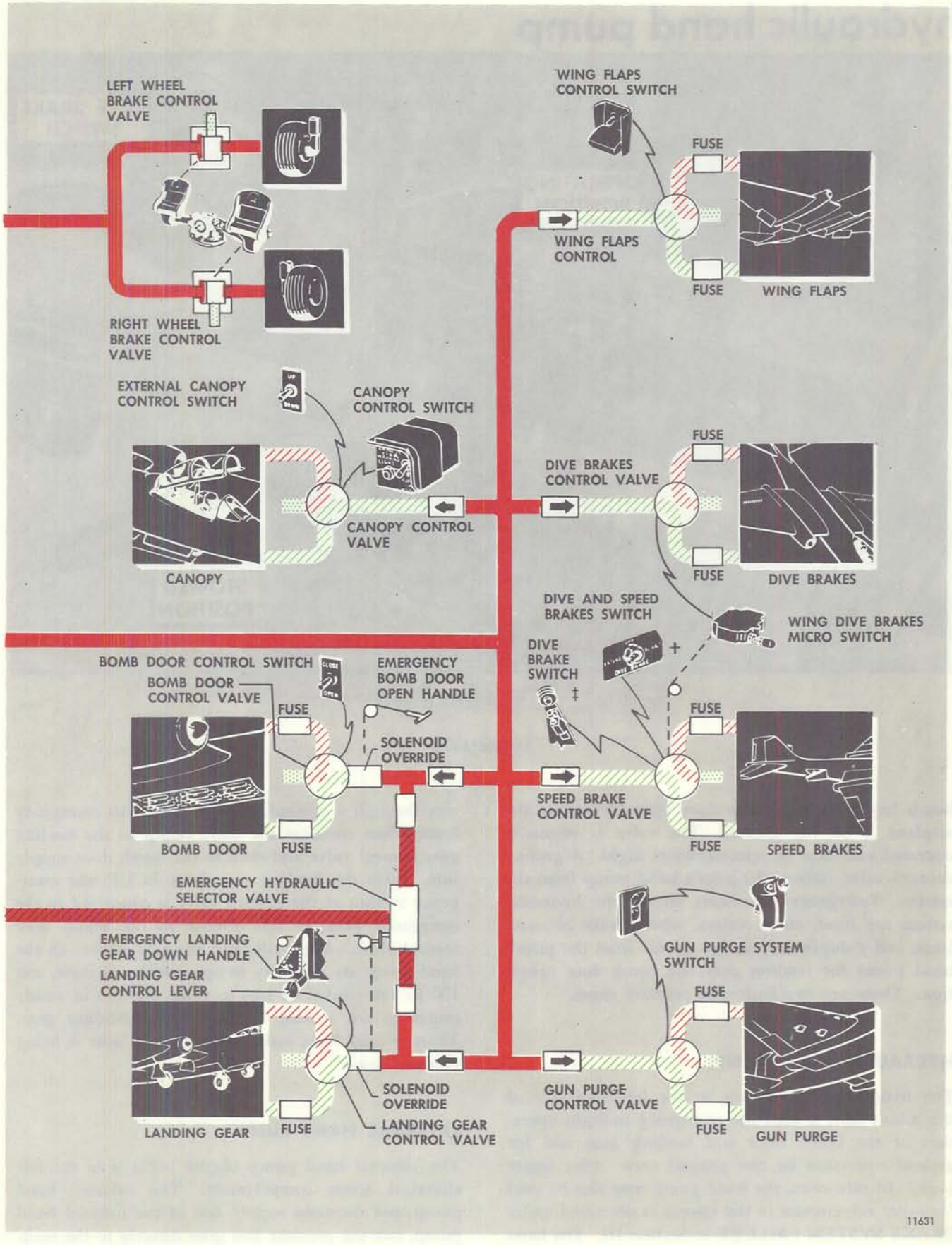

Figure 1–20 (Sheet 2 of 2)

hydraulic hand pump

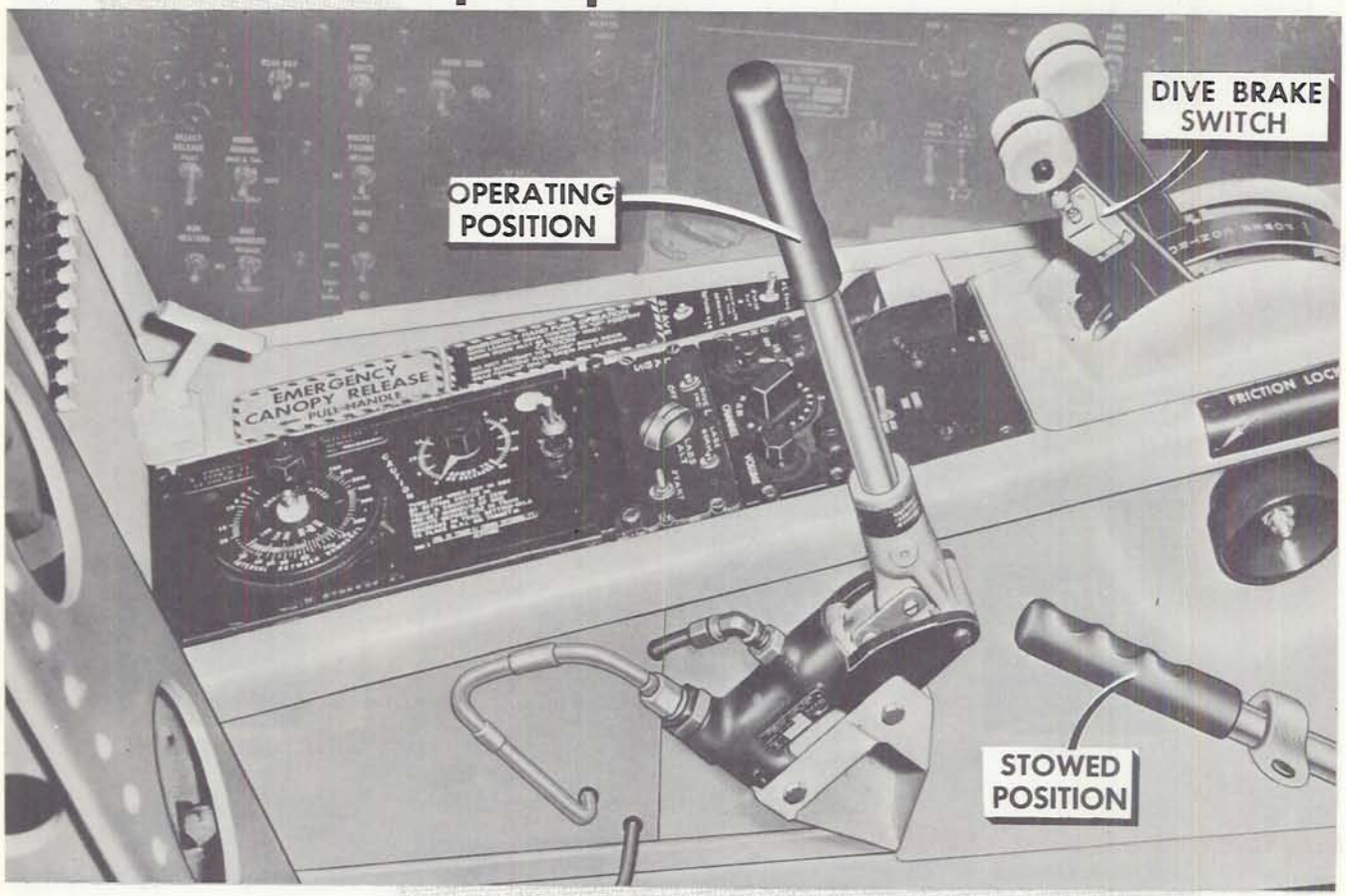

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Figure 1-21

bomb bay prohibits bomb door operation while the airplane is on the ground. The valve is manually operated and must be opened before flight. A ground shut-off valve isolates the pilot's hand pump from the system. Emergency provisions within the hydraulic system are fuses, check valves, wheel brake accumulator, and a duplicate pressure circuit from the pilot's hand pump for landing gear and bomb door operation. There are two hydraulic pressure gages.

HYDRAULIC HAND PUMP.

The hydraulic hand pump, at the left-hand side of the pilot's seat, is used for emergency in-flight operation of the bomb door and landing gear and for ground operation by the ground crew. (See figure 1-21.) In rare cases, the hand pump may also be used for other sub-circuits in the system as described under BRAKE SYSTEM FAILURE in Section III. The hand pump obtains fluid directly from the reservoir. A branch line connects the hand pump to the main system through a ground shut-off valve. An emergency branch line connects the hand pump to the landing gear control valve and then to the bomb door supply line. With the landing gear lever in UP, the emergency section of the control valve is connected to the emergency pressure line routed to the bomb door control valve. Approximately 30 to 50 strokes on the hand pump are necessary to open the bomb door, and 100 to 150 strokes or two to three minutes of steady pumping are needed to extend the landing gear. There is very light resistance when the gear is being pumped down.

EXTERNAL HAND PUMP.

The external hand pump (figure 1-22) is in the left electrical access compartment. The external hand pump uses the same supply line as the internal hand pump, but the pressure line goes directly to the main system pressure line. The external hand pump operates all of the airplane's hydraulic sub-circuits, depend-

canopy hand pump and control switch

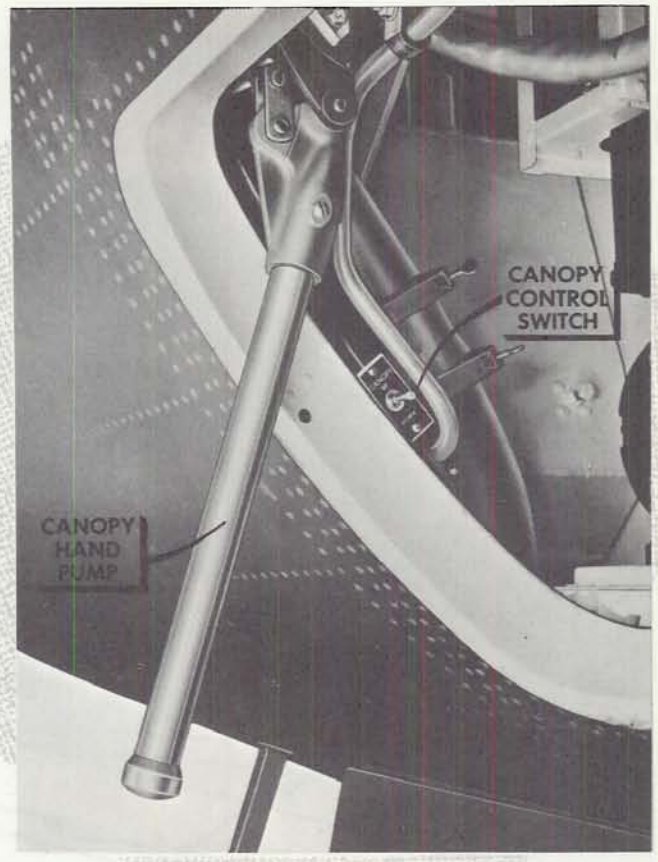

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Figure 1-22

ing upon the position of the various hydraulic sub-circuit selector valves. The canopy switch is adjacent to the pump. Actuation of the canopy switch positions valves allowing the operation of the pump to raise the canopy.

GROUND SHUT-OFF VALVE.

The ground shut-off valve is to the left of the pilot's seat on the compartment floor. This valve is manually operated and is safety-wired closed for flight. The shut-off valve is used to connect the hydraulic hand pump into the common pressure line so that pressure in the line may be built up for ground operation of the various sub-circuits. In the event of extreme emergencies, the pilot may open the valve and use the hand pump to put pressure on the hydraulic system while in flight as described under BRAKE SYSTEM FAILURE in Section III.

HYDRAULIC SYSTEM PRESSURE GAGE.

A gage (figure 1-37) on the pilot's left console indicates the pressure in the common line of the hydraulic system. The indicating system consists of the gage and a pressure transmitter. If the engines are running, the gage should reflect readings which fall within the instrument range markings given in Section V.

FLIGHT CONTROL SYSTEMS.

The ailerons, elevator, rudder, and throttles control the airplane in flight. (See figures 1-23 and 1-24.) These primary controls receive assistance from the trim devices and the variable-incidence stabilizer. Additional controls in the form of high-drag devices are the flaps and dive brakes. The conventional elevator, rudder, and ailerons have unique mechanisms which relieve the pilot of heavy control loads. At high speeds, these mechanisms also prohibit excessive loads on the airplane's structure by indirectly restricting the travel of control surfaces. Rotation of the control wheel, or movement of the rudder pedals, or longitudinal movement of the control column moves push rods to actuate the control surfaces directly or indirectly. On the ground and at low speeds, the

flight control system

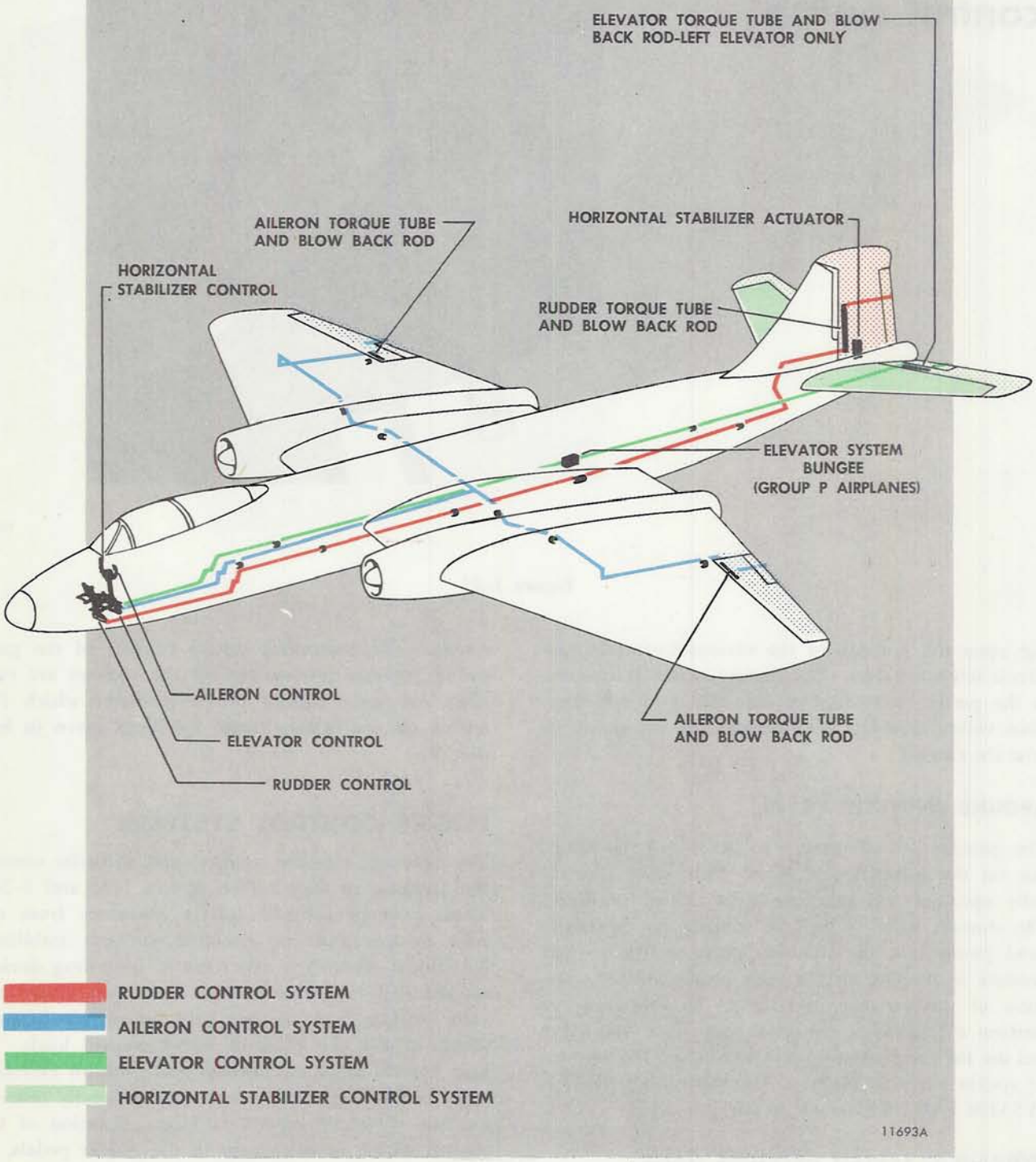

Figure 1-23

torque tube and blowback rod operation

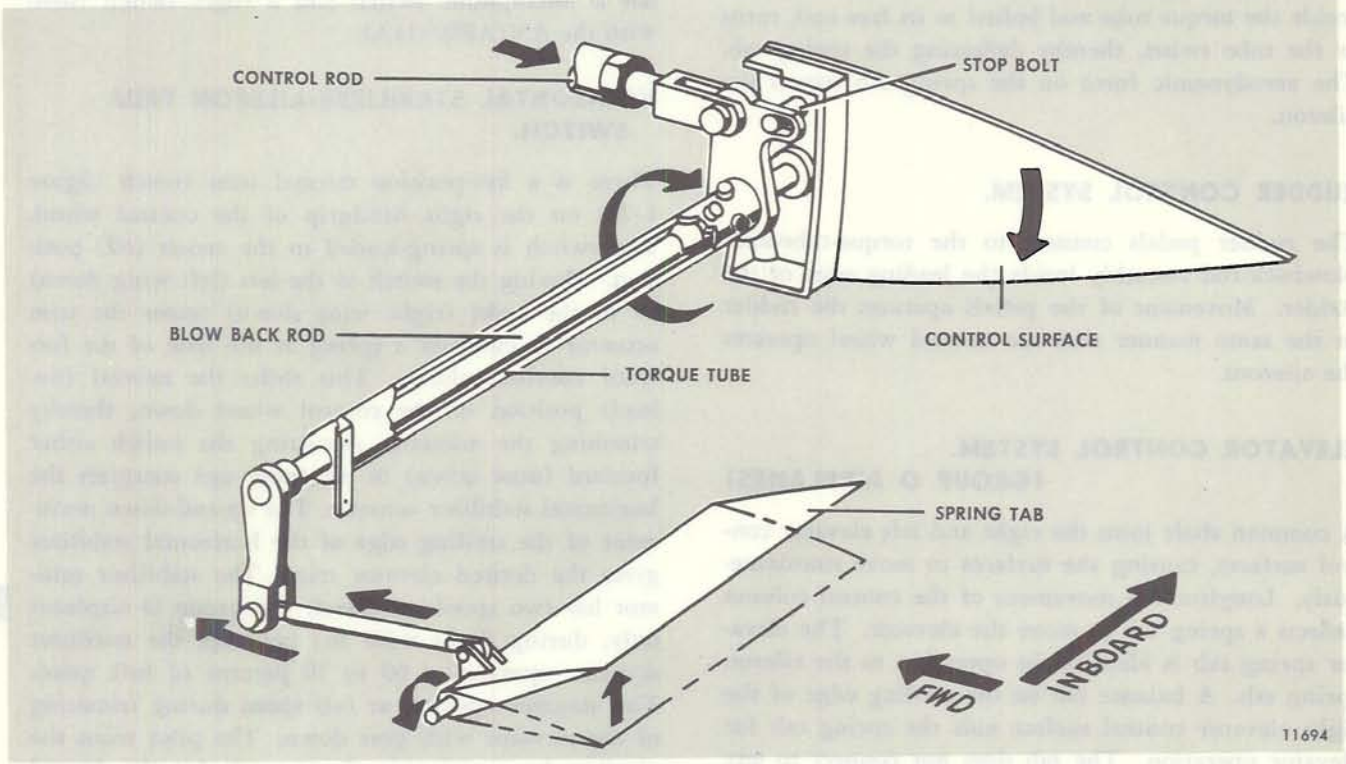

Figure 1–24

push rods directly deflect the control surfaces, but as airspeed increases, the resulting load on the control surfaces resists the action of the push rod. The torque tube in the torque-tube-and-blow-back-rod assembly twists to absorb the movement of the push rod. Twising of the torque tube rotates the blow-back rod which deflects a spring tab. The spring tabs on the trailing edge of both ailerons, the rudder, and the port elevator give the elevator the effect of having a small aileron on the aileron or a small elevator on the elevator. The reaction resulting from moving the spring tabs into the airstream forces (flies) the surface to another position. The spring tabs operated by the torque-tube-and-blowback-rod assembly are powerful aerodynamic devices which reduce pilot effort and still maintain conventional control feel at all airspeeds. The displacement of the control surface is directly proportional to the displacement of the tab; however, the blowback rod, acting as a torsion spring, restricts tab movement. At high speeds, a large tab angle imposes high air loads on the tab, causing the blowback rod to twist in the opposite direction to the torque tube. This increases the control load felt by the pilot, thereby utilizing the pilot's strength as a limiting factor to control surface movement.

CONTROL LOCKS.

External surface control locks placed on the elevator, rudder and ailerons are the only means of locking the controls. The control column has a stowage rod which holds the control column out of the way during exit or entrance but does not lock the controls.

TRIMMING.

Each flight control system has a different method of trimming. The variable-incidence stabilizer acts as elevator trim by raising and lowering the trailing edge of the horizontal stabilizer. Trimming the aileron varies the elongation of a spring (adding bias) at the base of the control column. In effect, this shifts the neutral position of the control wheel. Actuating the rudder trim switch operates an actuator in the vertical stabilizer. This actuator rotates the blowback rod which moves the combination spring tab-trim tab.

AILERON CONTROL SYSTEM.

Mechanical linkages connect the control wheel to torque-tube-and-blowback-rod assemblies in each aileron. One end of the torque tube anchors to the aileron spar. Rotation of the control wheel causes the other end of the torque tube to twist. The blowback rod, inside the torque tube and bolted to its free end, turns as the tube twists, thereby deflecting the spring tab. The aerodynamic force on the spring tab moves the aileron.

RUDDER CONTROL SYSTEM.

The rudder pedals connect to the torque-tube-and-blowback-rod assembly inside the leading edge of the rudder. Movement of the pedals operates the rudder in the same manner that the control wheel operates the ailerons.

ELEVATOR CONTROL SYSTEM. (GROUP O AIRPLANES)

A common shaft joins the right and left elevator control surfaces, causing the surfaces to move simultaneously. Longitudinal movement of the control column deflects a spring tab to move the elevator. The elevator spring tab is identical in operation to the aileron spring tab. A balance tab on the trailing edge of the right elevator control surface aids the spring tab for elevator operation. The tab does not connect to any controls but operates solely as a function of elevator movement to further reduce pilot effort in the operation of the controls.

ELEVATOR CONTROL SYSTEM. (GROUP P AIRPLANES)

Installation of the elevator bungee and a more powerful torque tube and blow-back assembly in the left elevator comprise the only difference in the elevator systems between Group O and P airplanes. Operation of the elevator system bungee is automatic and requires only that the pilot be alert for the slight forward movement of the control column when the bungee actuates. Whenever the flaps are lowered, the flap system electrical circuit energizes the elevator system bungee which causes the bungee to apply a 25 pound push force (airplane nose down) to the elevator system to compensate for the airplane nose up attitude resulting from the lowering of the flaps. Replacement of the left elevator torque tube and blow-back rod assembly with a more powerful torque tube and blow-back rod assembly improves the maneuverability of the airplane because of the reduction of stick forces required to pull G's at lower altitudes.

CONTROL WHEEL AND COLUMN.

The control wheel and column (figure 1-25) controls the movement of the ailerons and elevator. The control wheel has a normal trim switch for the ailerons and horizontal stabilizer, a bomb release button, and a gun trigger on the right handgrip. The left grip has a microphone switch and a roger switch (used with the AN/APW-11A).

HORIZONTAL STABILIZER-AILERON TRIM SWITCH.

There is a five-position normal trim switch (figure 1-25) on the right handgrip of the control wheel. The switch is spring-loaded to the center (off) position. Moving the switch to the left (left wing down) or to the right (right wing down) causes the trim actuator to elongate a spring at the base of the forward control column. This shifts the neutral (no-load) position of the control wheel down, thereby trimming the ailerons. Actuating the switch either forward (nose down) or aft (nose up) energizes the horizontal stabilizer actuator. The up-and-down movement of the trailing edge of the horizontal stabilizer gives the desired elevator trim. The stabilizer actuator has two speeds of travel. On group O airplanes only, during flight with the gear up, the stabilizer actuator operates at 60 to 70 percent of full speed. The actuator operates at full speed during trimming of the elevator with gear down. The pilot trims the airplane by positioning the controls for the desired flight altitude and operates the trim switch to relieve the control forces. On group O airplanes only, the normal trim switch is inoperative when the horizontal stabilizer override switch is in ALT. The d-c power to operate the aileron and stabilizer actuators is from the 28-volt d-c generator, distribution, and pilot's circuit breaker busses.

HORIZONTAL STABILIZER OVERRIDE SWITCHES. (GROUP O AIRPLANES)

Various trim control emergencies arise from faulty or sticking trim switches. The use of the horizontal stabilizer override switch and the stabilizer emergency control switch affords an alternate method of adjusting elevator trim. The override switch has two positions, NORM and ALT. (See figure 1-31.) When the switch is in NORM, the normal trim switch on the control wheel control the movement of the horizontal stabilizer. Placing the override switch in ALT renders the normal trim switch inoperative. The emergency control switch is spring-loaded to the center (off) position. Momentary operation to NOSE UP or NOSE DOWN adjusts the longitudinal trim in the same manner that the normal trim switch adjusts the trim.

horizontal stabilizer emergency switch (group P airplanes)

Figure 1-24A

horizontal stabilizer position indicator (group P airplanes)

Figure 1-24B

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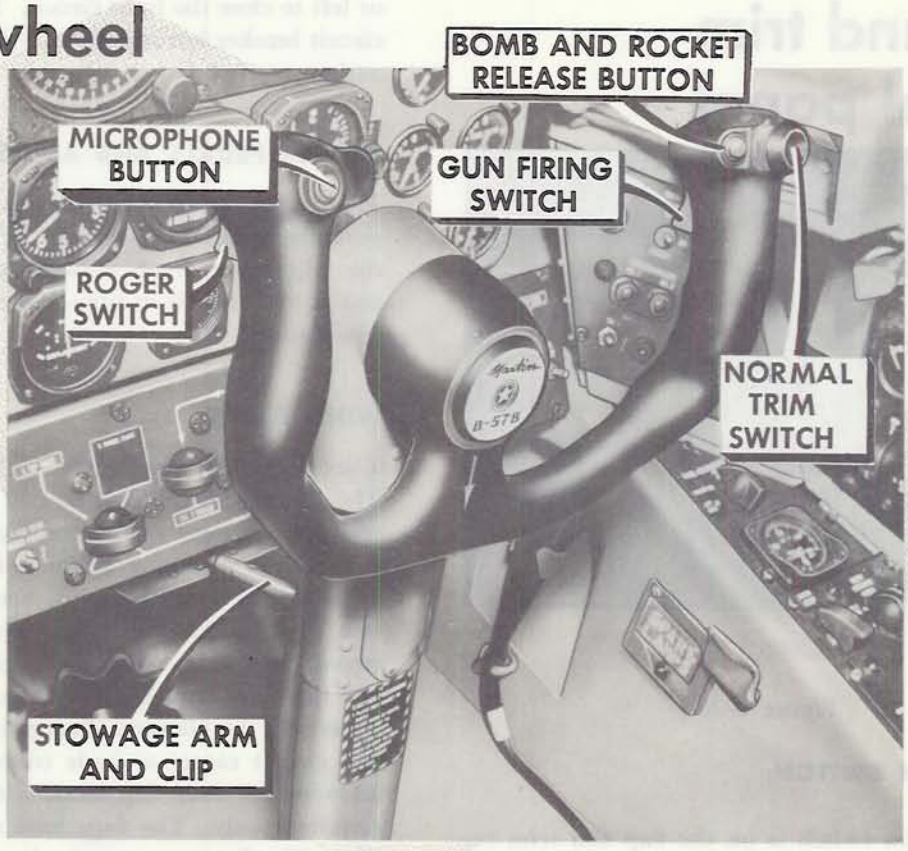


Figure 1–25

HORIZONTAL STABILIZER EMERGENCY SWITCH. (GROUP P AIRPLANES)

The horizontal stabilizer emergency switch is on the pilot's glare shield. Switch positions are NORMAL and EMER OFF. (See figure 1–24A.) During all normal flight conditions, the switch should be in NORMAL. Whenever a stabilizer trim failure occurs, the horizontal stabilizer emergency switch when placed in EMER OFF causes the stabilizer actuator brake to be applied which locks the actuator and prevents further movement of the stabilizer surface.

STABILIZER POSITION INDICATOR. (GROUP O AIRPLANES)

The stabilizer position indicator on the pilot's left main control panel operates continuously when power is on the 28-volt d-c distribution bus. (See figure 1–39.) A device attached to the stabilizer actuator drive shaft follows the movement of the stabilizer. The device electrically operates the indicators to give a visual indication of the position of the horizontal stabilizer. The indicator markings range from six divisions nose down to ten divisions nose up; however, the travel of the stabilizer and the needle is 2.5 divisions nose down and 1.5 divisions nose up. A division closely approximates a degree.

STABILIZER POSITION INDICATOR. (GROUP P AIRPLANES)

The stabilizer position indicator on the canopy control box (figure 1–24B) operates continuously when power is on the 28-volt distribution bus. A device attached to the stabilizer actuator drive shaft follows the movement of the horizontal stabilizer. The indicator pointer shows up and down movement of the stabilizer in tenths of a degree from 0° to 1.4°. Without electrical power or during electrical malfunction of the indicating system, the indicator pointer moves to the 3 o'clock position.

flap and trim control panel

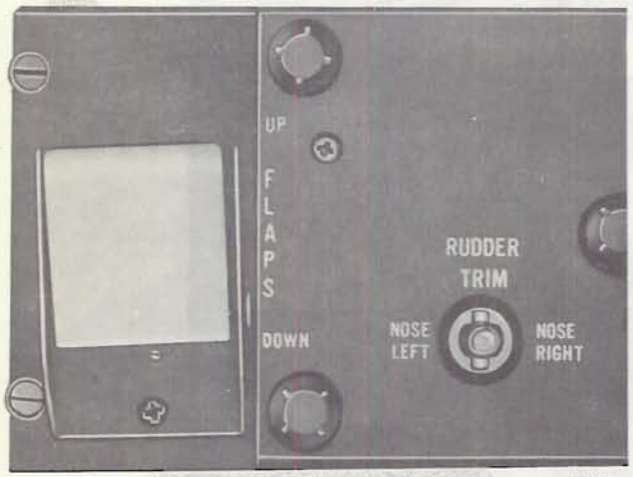


Figure 1–26

RUDDER TRIM SWITCH.

The rudder trim switch is on the flap and trim control panel. (See figure 1–26.) Switch positions are NOSE LEFT and NOSE RIGHT. Placing the switch in NOSE LEFT or NOSE RIGHT causes the rudder trim tab actuator to change rudder trim. Movement of the ball in the turn-and-slip indicator indicates changes in rudder trim. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the trim circuits.

RUDDER TRIM INDICATOR LIGHT.

The green rudder trim light on the pilot's left main control panel illuminates when the rudder trim tab is within one-eighth of an inch of the neutral position. However, to supply power to light the lamp, the rudder trim switch must be moved to the right or left to close the light circuit. The 28-volt d-c pilot's circuit breaker bus supplies the power for lamp illumination.

AILERON TRIM INDICATOR LIGHT.

The green aileron trim light on the pilot's left main control panel, illuminates when the aileron trim tab is within one-eighth of an inch of the neutral position. However, to supply power to light the lamp, the normal trim switch must be moved to the right or left to close the light circuit. The 28-volt d-c pilot's circuit breaker bus supplies the power for lamp illuminations.

RUDDER PEDALS AND ADUSTMENT KNOB.

The rudder pedals are of the conventional type, incorporating integral toe-operated brake pedals. Rotating the adjustment knob between the pedals moves the pedals fore and aft to adjust for the desired leg length. (See figure 1–27.)

WING FLAPS.

The wing flaps are of the high-drag, low-lift type. The flap system consists of two inner and two outer split flaps hinged to the trailing edges of the wings, a hydraulic actuating cylinder for each flap section, an electrical control circuit, one control switch, and two flap-position indicators. The inner flaps are between the fuselage and the engine nacélle tail cones and the outer flaps are between the engine nacelle tail cones and the ailerons. Energizing the electrical control circuit causes a single control valve to position, allowing all four flap sections to move up or down simultaneously. The flaps have no intermediate position. The flaps must not be lowered above 170 knots IAS. The 28-volt d-c distribution bus supplies the power to operate the control circuit.

WING FLAP SWITCH.

The wing flap switch (figure 1–26) is on the pilot's flap and trim control panel aft of the pilot's throttles. The switch handle resembles an airfoil section. Switch markings are UP and DOWN. Placing the switch

rudder pedals and adjustment knob

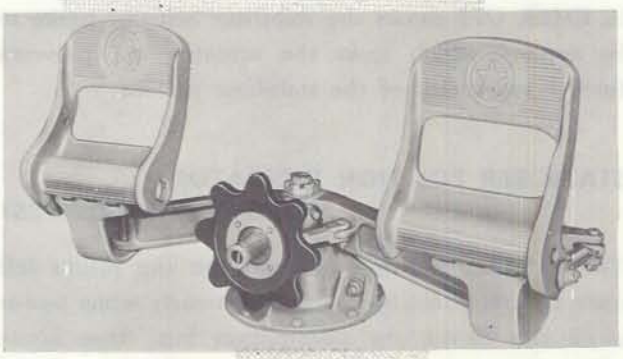


Figure 1–27

UP or DOWN electrically positions the control valve to allow hydraulic pressure to go to the up or down sides of the four actuating cylinders of the wing flap sections. The maximum down travel is 60 degrees.

WING FLAP INDICATOR.

The wing flap indicator is on the pilot's left main control panel. Lowering the flaps causes microswitches to open the circuit to the indicator and a barber-pole design appears in the indicator. Upon reaching the full down position, the flaps close microswitches and cause the indicator to show a miniature flap in the down position. Raising the flaps causes the microswitches to open, and the barber-pole design again appears on the indicator. When the flaps are in the full up position, the indicator shows a miniature flap in the up position. Flap position indication is received from a micro-switch on the left inboard flap.

DIVE BRAKES.

The airplane is equipped with wing dive brakes and fuselage dive brakes to increase drag and reduce airspeed. (See figure 1-1.) The wing dive brakes are in a series of fingers in a straight line laterally along the upper and lower surface of both wings. When retracted, the wing dive brakes are flush with the wing surface. The wing dive brakes extend perpendicularly to the wing chord.

The fuselage dive brakes are two flaps on either side of the aft fuselage. When retracted, the brakes are flush with the fuselage and hinges at the forward part of the brakes to allow the brakes to open at the aft end into the slipstream. Both the wing and fuselage dive brakes are electrically controlled and hydraulically operated. A switch on the pilot's inboard throttle lever controls the operation of the fuselage brake. The opening and closing of the fuselage dive brakes open and close microswitches. These microswitches control the operation of the wing dive brakes. When fully opened, the fuselage brakes operate microswitches which cause the wing brakes to extend to the maximum travel. The initial movement of the fuselage brakes to the close position actuates microswitches to cause the wing brakes to retract. The wing brakes retract in advance of the fuselage brakes. There are no airspeed limitations for dive brake operation. The 28-volt d-c distribution bus supplies the power for dive brakes control.

DIVE BRAKE SWITCH.

The dive brake switch (figure 1-5) is on the pilot's inboard throttle lever. Switch markings are EXTEND and RETRACT. Placing the switch in EXTEND positions a solenoid valve to allow hydraulic pressure to go to the extend side of fuselage actuating cylinder. Placing the switch in RETRACT causes the valve to allow hydraulic pressure to go to the retract side of the actuating cylinder. The fuselage brakes cannot be stopped in an intermediate position. Extending the fuselage brakes also extends the wing brakes.

LANDING GEAR SYSTEM.

The electrically controlled, hydraulically operated tricycle landing gear fully retracts within the wing and fuselage contours. The main gear retracts inboard and up into wheel wells inboard of the engine, and the nose wheel retracts aft and up into the fuselage nosewheel well. When retracted, the landing gear is enclosed by fairing doors. Each main gear consists of an air-oil shock strut with a cantilevered axle, up-and-down locks, position microswitches, an actuating cylinder, a wheel-and-brake assembly, and a gear-operated sequence valve. The nose gear consists of an air-oil shock strut with a self-centering device, dual wheels, a drag brace, an actuating cylinder, up-and-down locks, and gear-position microswitches. Sequence valves control the order of opening and closing of the gear and fairing doors. Hydraulic pressure and mechanical locks retain the gear in the desired position. When the airplane's weight is removed from the nose wheels strut, the self-centering device aligns the nose gear for retraction, and when the weight of the airplane compresses the nose wheel strut approximately two inches, the wheels are free to caster.

LANDING GEAR CONTROL LEVER.

A two-position landing gear control lever left of the landing gear control panel (figure 1-28) electrically controls gear operation. The lever handle is wheel-shaped for distinctive identification, and is held in the DOWN position by a solenoid lock when the airplane is on the ground. When the landing gear control lever is placed in UP, a microswitch closes a circuit from the 28-volt d-c distribution bus to the single-acting solenoid of the landing gear control valve. The valve then allows hydraulic pressure to flow to the actuating cylinders of the gears and then to the doors in the retract direction. When retraction is completed, the actuating cylinder remains pressurized as long as the main hydraulic system is pressurized. Should the system pressure fail, the up lock

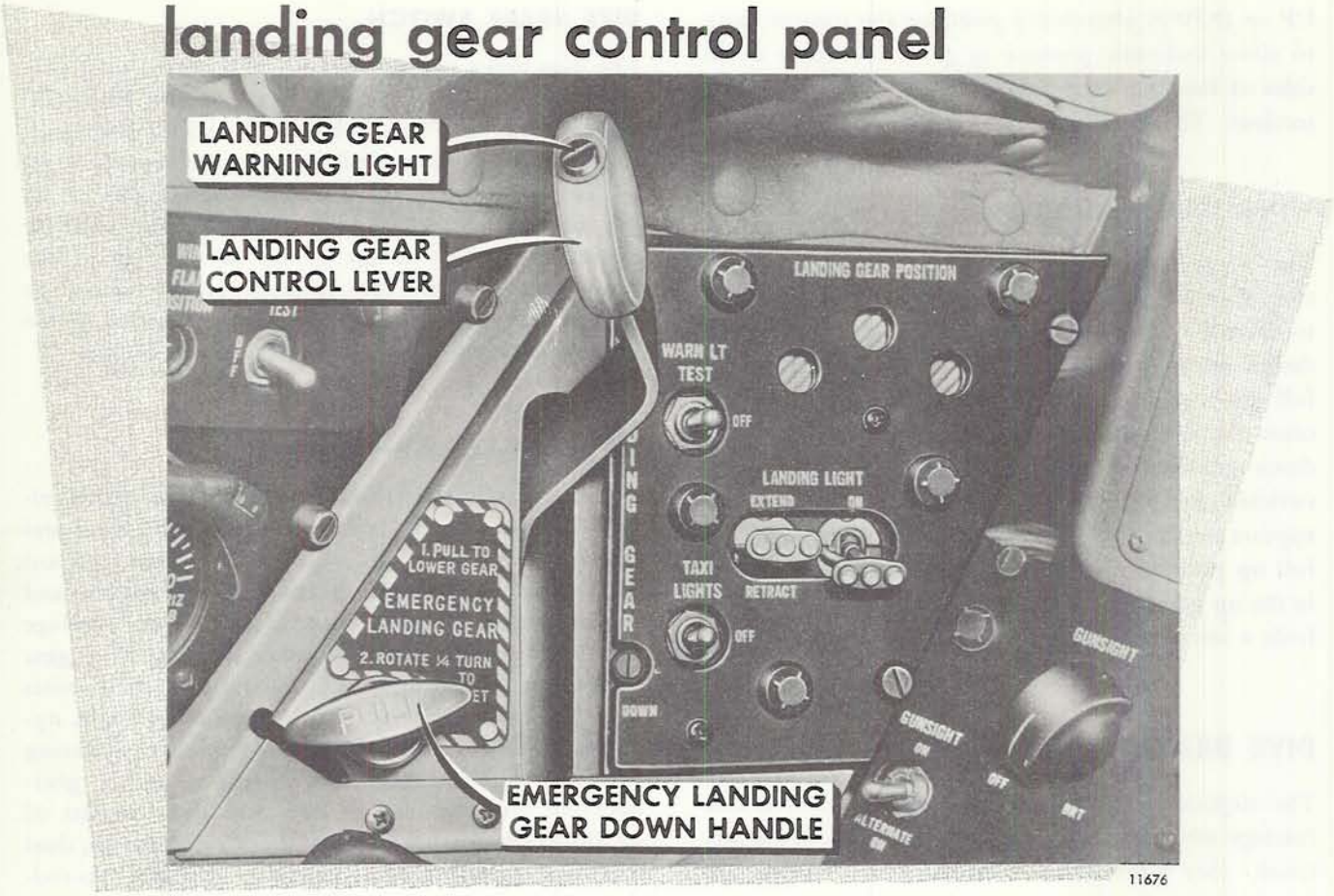


Figure 1–28

hooks will hold the gear in the retracted position. Placing the landing gear control lever in DOWN causes the solenoid valve to become de-energized, permitting hydraulic pressure to extend the doors, release the up locks, and extend the gears. Ground lock pins are provided for safety purposes and must be inserted before engine shutdown. (See figure 1–29.) Normal gear lever movement requires a force of 5 pounds (± 1 pound). An additional 25 pounds (± 5 pounds) pressure applied to the lever enables the pilot to override the solenoid for emergency gear retraction while the airplane is on the ground. Gear extension opens a nacelle cowl door to permit engine cooling. The 28-volt d-c distribution bus supplies the power to operate the landing gear controls.

EMERGENCY LANDING GEAR DOWN HANDLE.

The emergency landing gear down handle (figure 1–28) is to the left of the landing gear control lever. Using the T-handle enables the pilot to position the landing gear control valve if there is an electrical malfunction. Pulling the handle all the way out (approximately 2½ inches) mechanically positions the control valve to the down position. Normal hydraulic system pressure or hydraulic hand pump pressure lowers the gear. A one-quarter turn to the right or left resets the handle and a spring returns it to the normal (in) position.

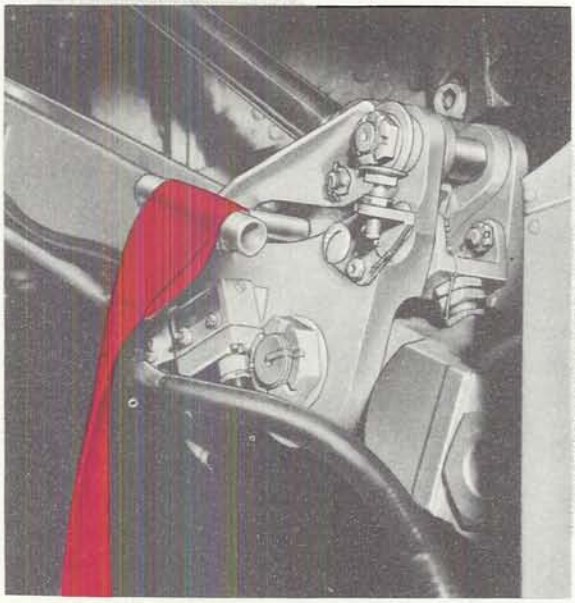
Note

When the emergency landing gear down handle has been used to lower the gear, the gear cannot be retracted if electrical power is not available.

LANDING GEAR WARNING HORN.

When the landing gear is in any position other than down and locked, retarding the throttles below mini-

ground lock pin



11677

Figure 1-29

mum cruising speed (76 ± 3 percent rpm) energizes the landing gear warning horn. Electrical power to the horn comes from the pilot's 28-volt d-c circuit breaker bus through a 5-ampere circuit breaker.

LANDING GEAR WARNING HORN RELEASE.

The warning horn release button (figure 1-30) is aft of the parking brake lever and below the throttles. Momentarily depressing the release button silences the warning horn. Advancing the throttles above minimum cruise resets the warning horn microswitch.

LANDING GEAR WARNING LIGHT.

Placing the landing gear control lever in UP or DOWN completes circuits to the landing gear warning light in the landing gear lever handle. (See figure 1-28.) The light illuminates when the landing gear is in an intermediate position. Also, retarding the throttles below minimum cruise speed illuminates the light when the gear is in any position other than down and locked. Electrical power for the light comes from the 28-volt d-c pilot's circuit breaker bus through a 5-ampere circuit breaker.

parking brake lever and warning horn cut-out release

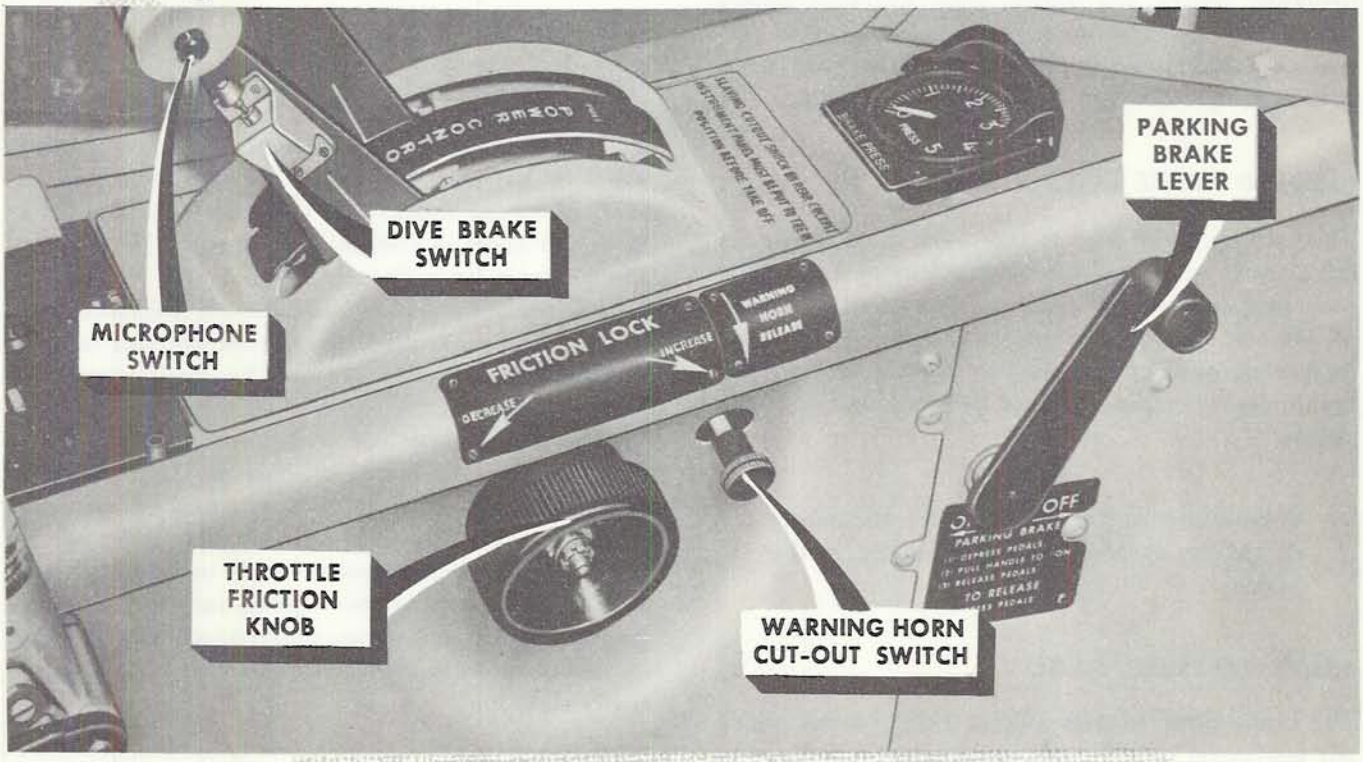


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Figure 1-30

LANDING GEAR WARNING LIGHT TEST SWITCH.

The landing gear warning light test switch (figure 1-28) is on the landing gear control panel. Placing the switch in TEST illuminates the light in the landing gear control lever handle if the light is operative. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the circuit.

LANDING GEAR POSITION INDICATION.

A three-indication, three-position indicator on the pilot's landing gear control panel represent the position of the landing gear. (See figure 1-28.) The indications are: 1) cross-hatching if the gear is in an intermediate position, 2) the word UP if the gear is up and locked, and 3) a miniature wheel if the gear is down and locked. Position-indication microswitches on the gear energize their respective indicators. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the indicators.

BRAKE SYSTEM.

Operation of the brake pedals actuates separate hydraulic brake valves for each wheel brake. Toe pressure on the brake pedals meters hydraulic fluid under pressure to the brakes on the main gear. A check valve isolates a brake accumulator from the main hydraulic system, and during main hydraulic system failure the brake accumulator supplies pressure for two or three brake applications. Differential main gear braking steers the airplane when taxiing.

PARKING BRAKE LEVER.

The parking brake lever (figure 1-30) is on the pilot's left console forward of the throttle friction knob. The pilot sets the parking brake by depressing the brake pedals and placing the parking brake in ON and then releasing the brake pedals. He releases the parking brake by adding further pressure on the brake pedals.

Note

Release the parking brake after the wheel chocks are in place to avoid damage to the brakes.

BRAKE PRESSURE GAGE.

The brake pressure gage (figure 1-39) on the pilot's left horizontal console indicates hydraulic pressure in the wheel brake hydraulic system. Pressure is hydraulically transmitted from the brake system to the brake pressure gage. The calibration of the gage is in increments of 500 psi. See Section V for instruments markings.

INSTRUMENTS.

The flight and engine instruments, which are on shock-mounted panels, are in full view of the pilot. The majority of the instruments are electrical and they receive their power from the a-c or d-c electrical systems. The electrical system supplies the power for the directional indicators, turn-and-slip indicator and the attitude indicator. The airspeed indicator, Machmeter, altimeters, and vertical velocity indicator operate by air pressure supplied from the pitot-static system. A vibrator on the pilot's and observer's main instrument panels prevents instrument lag or stick pointer indications. See Section IV for a discussion on lighting for the panels and instruments and Section V for instrument markings.

INSTRUMENT PANEL VIBRATORS.

Vibrators on the rear of the pilot's and observers main instrument panels prevent sticking or lagging of instrument pointers due to friction. There are no controls for the vibrators and they operate continuously when the 28-volt distribution bus is energized.

AIRSPEED INDICATOR.

The airspeed indicator on the pilot's and observers main instrument panels shows indicated airspeed and the maximum permissible indicated airspeed. The indicator has two pointers, a vernier drum, and a small triangular index. The indicator is marked from 50 to 650 knots in 100-knot increments. The narrow pointer registers indicated airspeed and the striped pointer registers maximum allowable indicated airspeed. The vernier drum permits the observer to read airspeed to the nearest knot. The small triangular index is preset on the ground and is set to a limiting Mach number on the face of the instrument and regulates the travel of the striped pointer. Assuming that the airplane is at sea level with a barometric pressure of 29.92 inches Hg. and the triangular index set at Mach 0.8, the striped pointer would indicate approximately 520 knots. As the airplane increases altitude, the striped pointer rotates counterclockwise, thereby indicating the maximum allowable indicated airspeed at any altitude.

MACHMETER.

The Machmeter (figure 1-31) on the pilot's main in-

strument panel is a primary flight instrument for indicating the speed of the airplane. Machmeter readings are more exact indications of airplane speed than indicated airspeed readings, particularly at higher altitudes. Indicator markings are in hundredths of Mach and are numbered every tenth of Mach from 0.3 to 1.0. The pitot-static system operates the indicator.

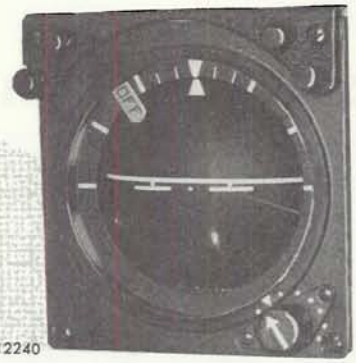
ACCELEROMETER.

During turns, loops, and similar maneuvers, the pull of centrifugal force on the airplane (and on the pilot) registers on the accelerometer. (See figure 1-31.) The calibration of the accelerometer is in terms of G, or multiples of the force of the pull of gravity. The meter has three pointers that indicate G-loads. In addition to the continuous pointer, two recording pointers (one for positive G and one for negative G) follow the continuous pointer to the maximum encountered G-load. The recording pointers return to the normal 1-G position when the knob on the lower left corner of the instrument is pressed.

FLIGHT ATTITUDE INDICATOR.

The B-1A flight attitude indicator visually indicates to the pilot, during flight, the attitude of the airplane with reference to the horizon. The B-1A gyro is non-caging, and incorporates a zero-pitch trim knob that positions both the sphere and the horizon bar to the zero position. The pitch trim knob has a triangular mark for zero-pitch trim, three dots corresponding to a one-half inch deflection in the downward direction, and six dots corresponding to a one-inch deflection in the upward direction. The gyro has a follow-up rate of 180 degrees-per-second in the pitch and bank axis. The gyro has a fast initial erection period, approximately two minutes ± 30 seconds, but if the gyro tumbles in flight, erection may take 15 minutes. Included in the gyro is an electrically-driven power warning flap that disappears from view when the gyro is up to full speed and the system is ready for operation. The flap appears when the power supplying the system is off. The instrument operates through 360 degrees of roll and through 164 degrees pitch. The instrument is compensated for turn-errors; however, the lower sensitivity limit of the turn-errors compensating mechanism is 40 degrees per minute. Any turn made below 40 degrees per minute will result in turn-errors common to other instruments. Turns made above 40 degrees per minute will be compensated for turn-errors. In level flight, the maximum error in the indication of the airplane's attitude is less than one-half degree. The 28-volt d-c radio bus supplies d-c power through a 5 ampere circuit breaker

B-1A attitude indicator



on the main radio circuit breaker panel. A-c power is supplied from the phase B and C busses.

EMERGENCY EQUIPMENT.

One bromochloromethane (CB) hand extinguisher and one crash axe constitute the items of portable emergency equipment in the airplane. (See figure 3-3.) The fire extinguisher is on the pressure bulkhead to the right of the observer's seat. The crash axe is on the right side of the cabin on the door of the main radio distribution box.

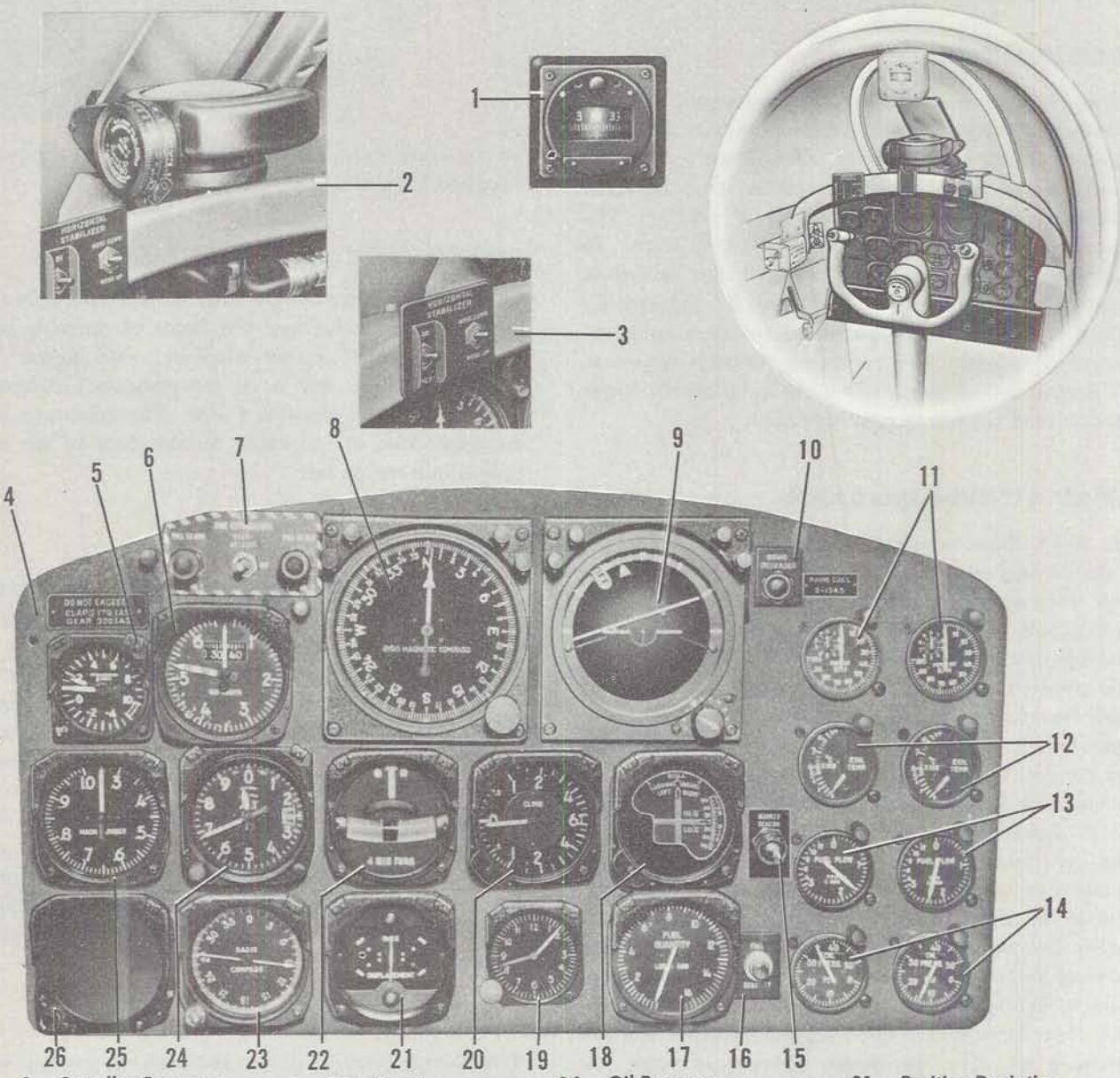
CANOPY.

The canopy is a laminated, transparent plastic bubble set in a metal frame. Its purpose is to enclose the cockpits and give the crew lateral and vertical visibility. Open hinges secure the canopy at the aft end, and a hydraulic actuating cylinder secures the canopy at the center. The canopy arcs upward for crew entrance or exit. Six hydraulically operated latches on the fuselage sill lock the canopy in the closed position. A rubber tube around the canopy inflates to form a seal for cabin pressurization. External or internal switches, handles, and hydraulic hand pumps operate the canopy to close, open, or jettison. Recirculated cabin air mixed with hot engine bleed-air defogs the canopy.

CANOPY JETTISON SYSTEM.

The canopy jettison system removes the canopy when the crew must abandon the airplane. The system is operated by three canopy emergency release handles (one external handle, one handle on the pilot's left horizontal console, and one handle on the observer's left horizontal console) and the right handgrips of the ejection seat. Cables connect the emergency release handles to a single M-3 initiator near the external release handle. The right handgrip of each ejection seat connects to the M-3 initiator in a similar manner; however, the use of the grip to jettison the canopy also initiates the elevator disconnect.

pilot's station — forward



1. Standby Compass
2. Gunsight
3. Horizontal Stabilizer Override and Emergency Switches
4. Pilot's Main Instrument Panel
5. Accelerometer
6. Airspeed Indicator
7. Fire Extinguisher Panel
8. Directional Indicator
9. Attitude Indicator
10. Bomb Released Indicator Light
11. Tachometers
12. Engine Exhaust Temperature Indicators
13. Fuel Flow Indicators
14. Oil Pressure Indicators
15. Marker Beacon Indicator
16. Fuel Quantity Test Switch
17. Fuel Quantity Indicator
18. Labs Instrument
19. Clock
20. Vertical Velocity Indicator
21. Position Deviation Indicator
22. Turn and Slip Indicator
23. Radio Compass Indicator
24. Altimeter
25. Machmeter
26. Flight Command Indicator

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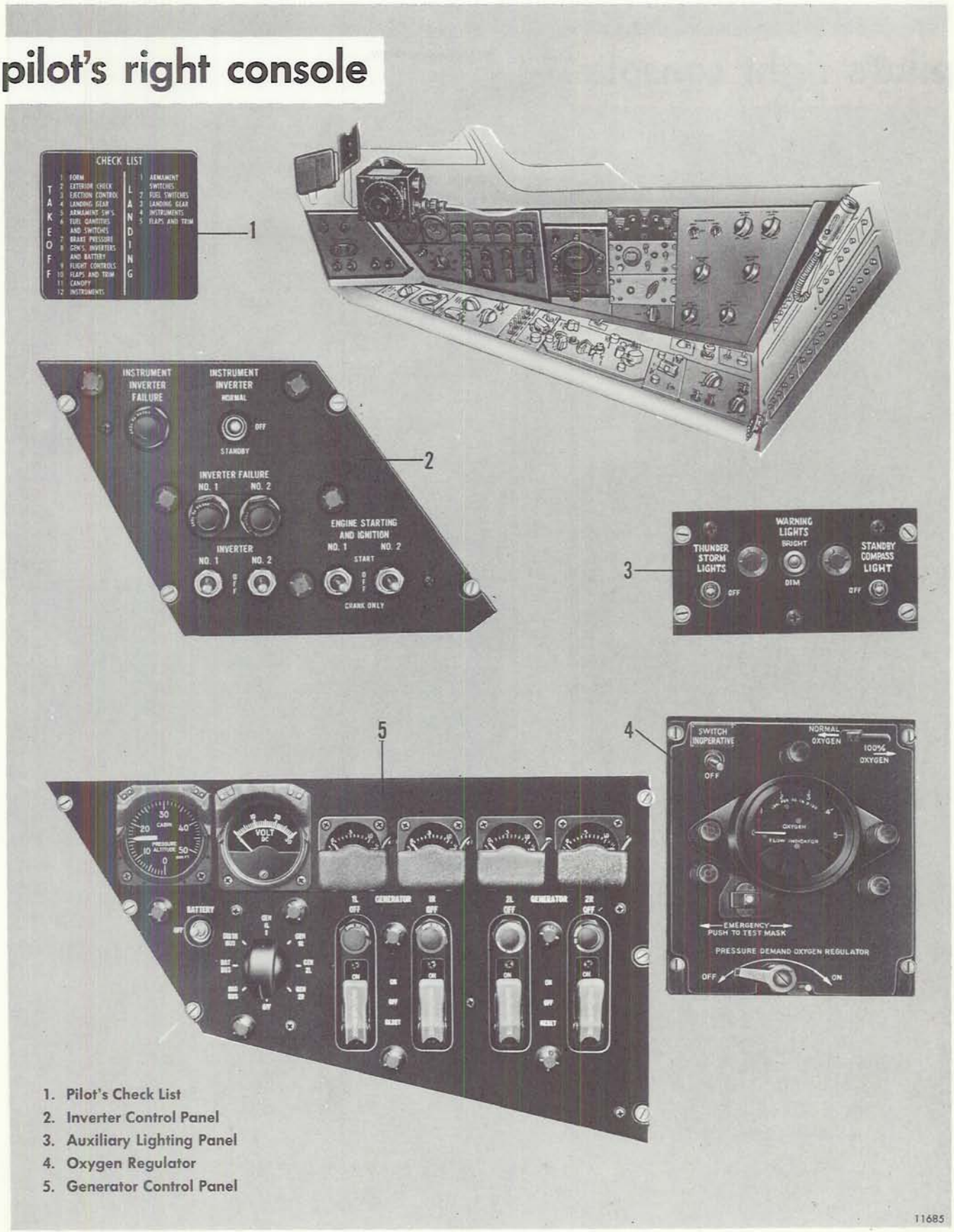
Figure 1-31

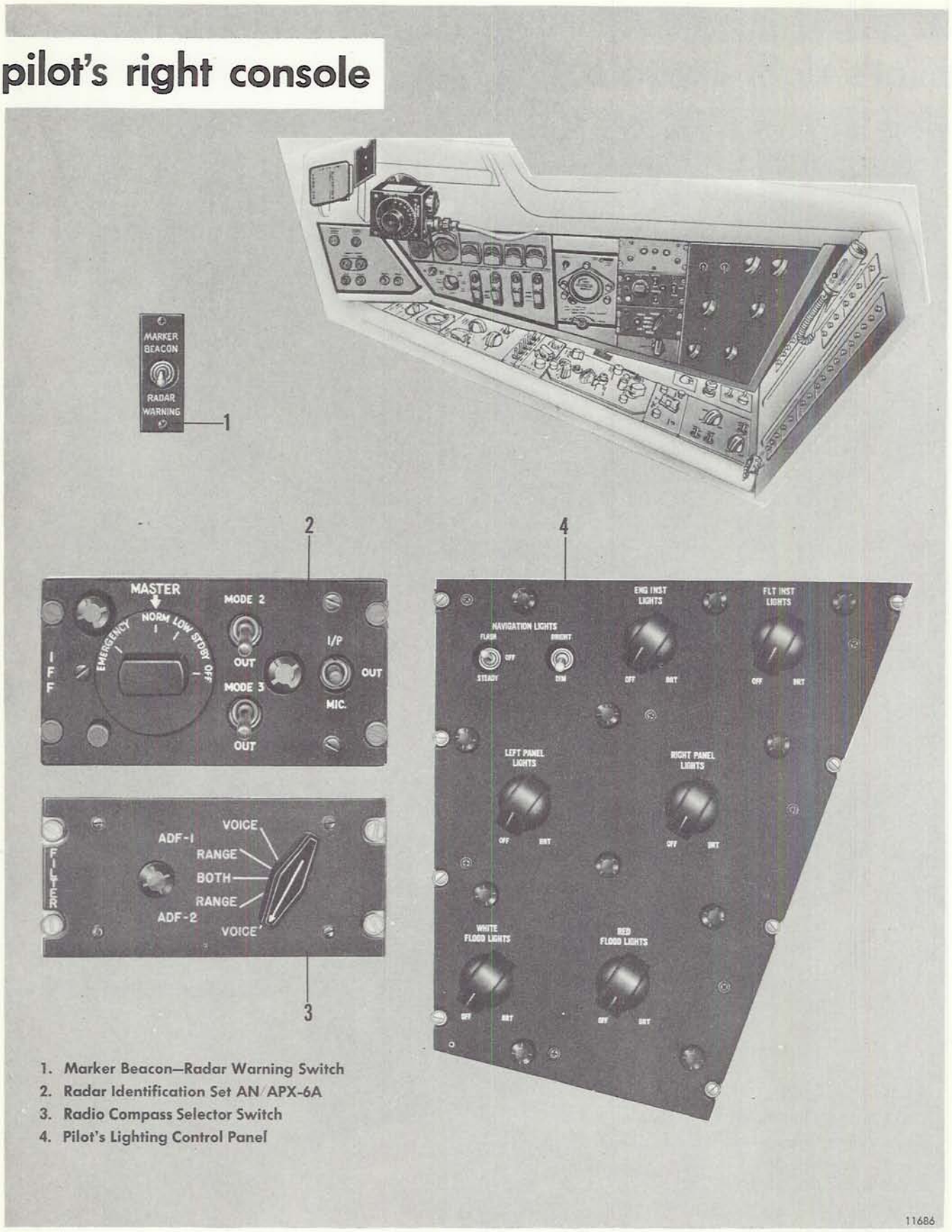
pilot's right console



1. Pilot's Check List
2. Inverter Control Panel
3. Auxiliary Lighting Panel
4. Oxygen Regulator
5. Generator Control Panel

Figure 1–32

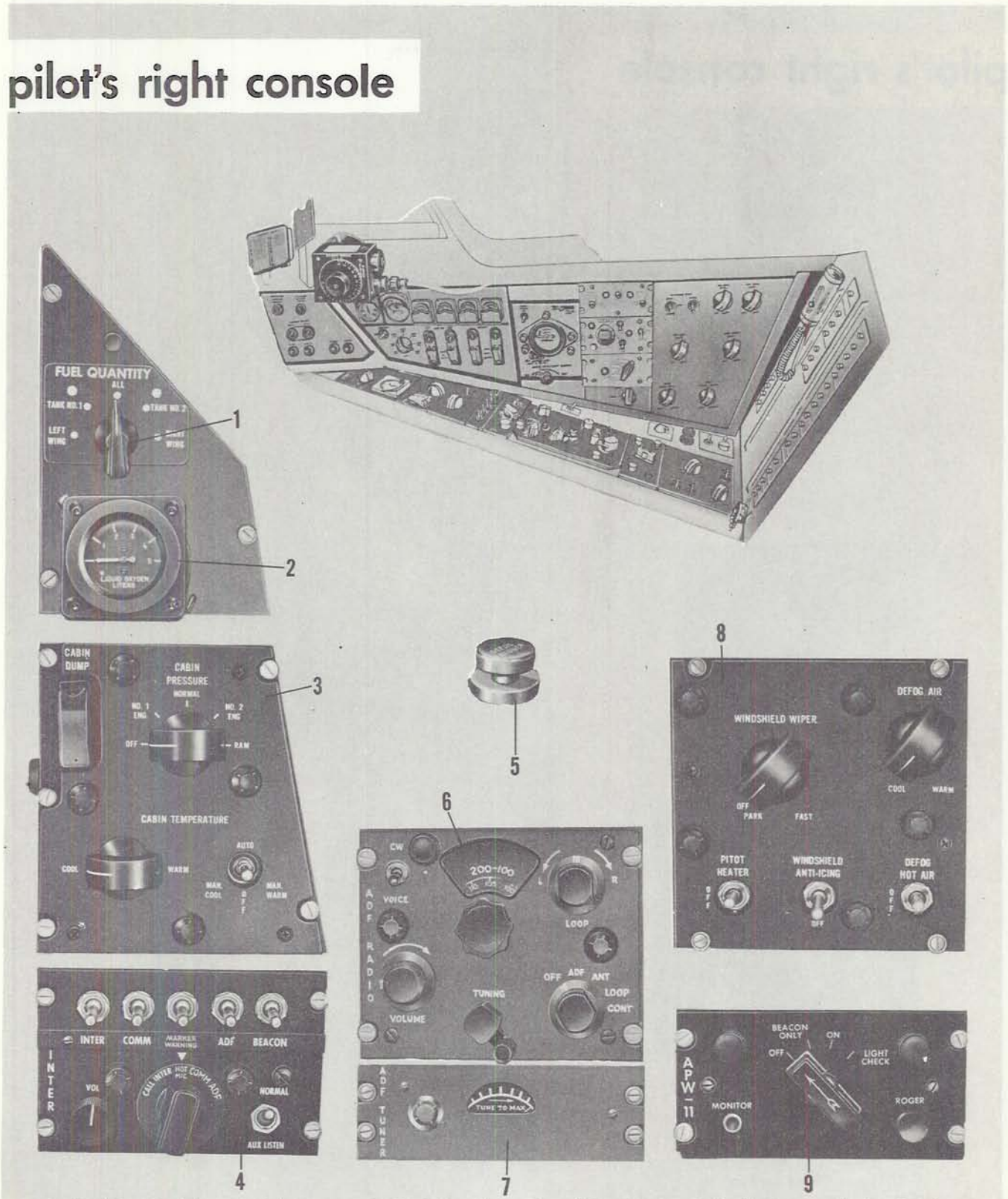
pilot's right console



1. Marker Beacon—Radar Warning Switch
2. Radar Identification Set AN/APX-6A
3. Radio Compass Selector Switch
4. Pilot's Lighting Control Panel

Figure 1-33

pilot's right console

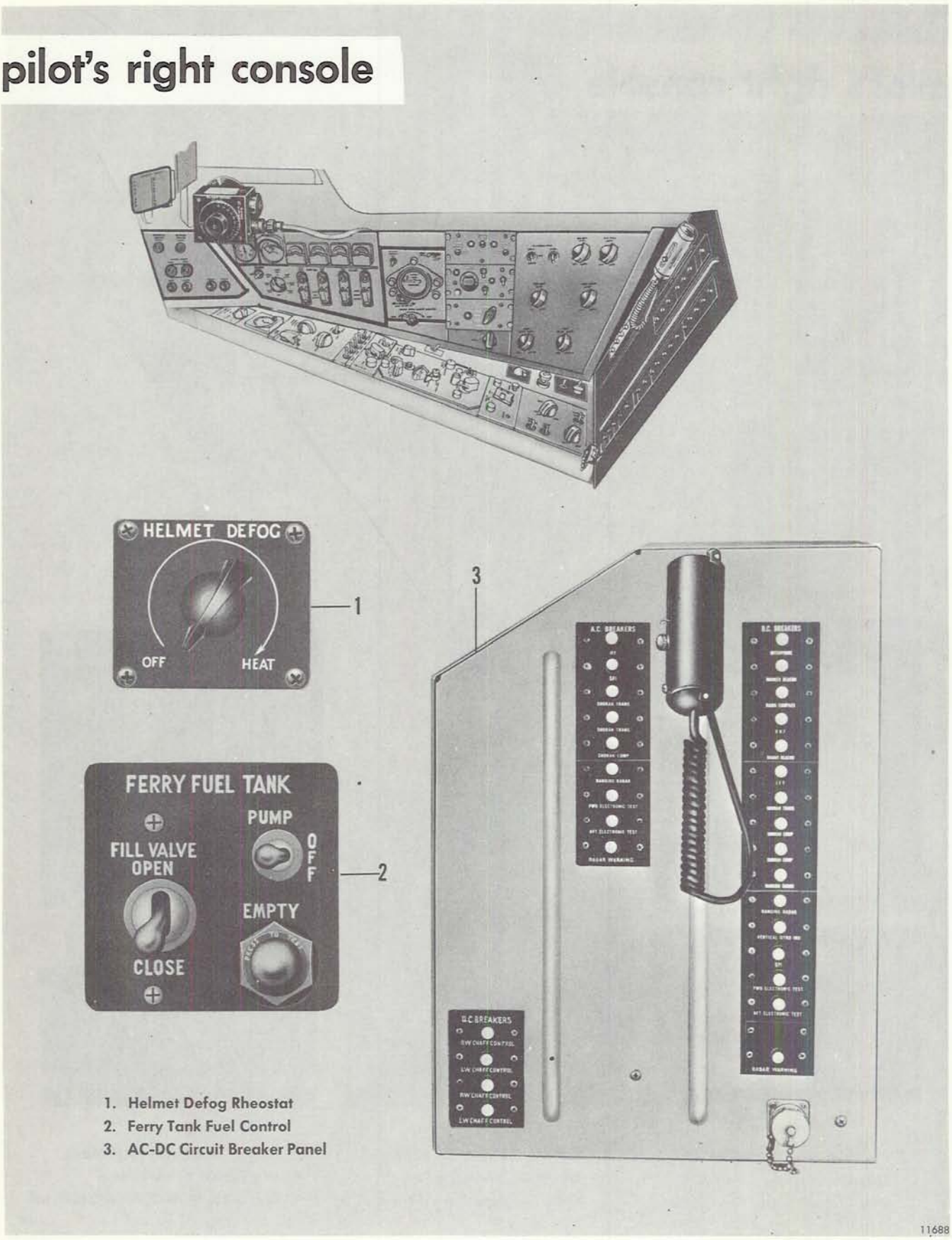


1. Fuel Quantity Selector Switch
2. Oxygen Quantity Indicator
3. Cabin Conditioning Control Panel
4. Pilot's Interphone Control Panel
5. Defogging Blower Knob
6. Radio Compass Control Panel
7. Radio Compass Tuning Panel
8. Windshield Control Panel
9. Radar Set APW–11A Control Panel

1-1687

Figure 1–34

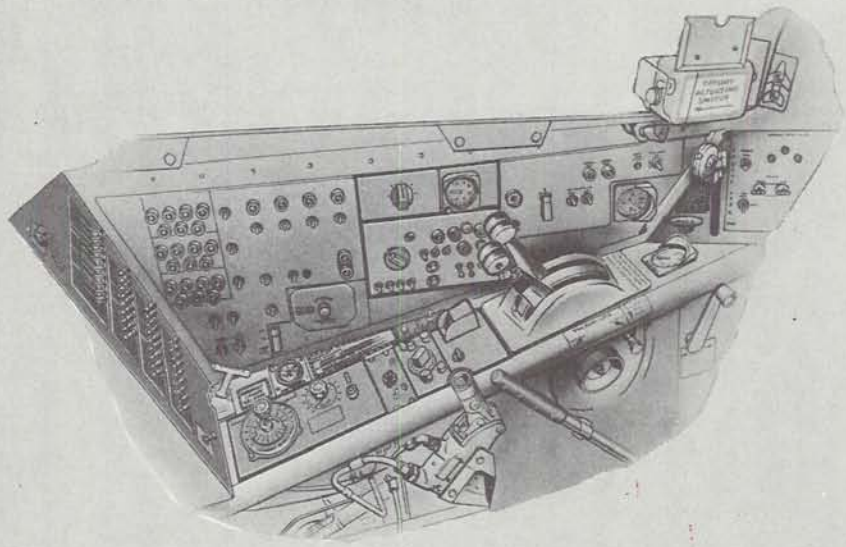
pilot's right console

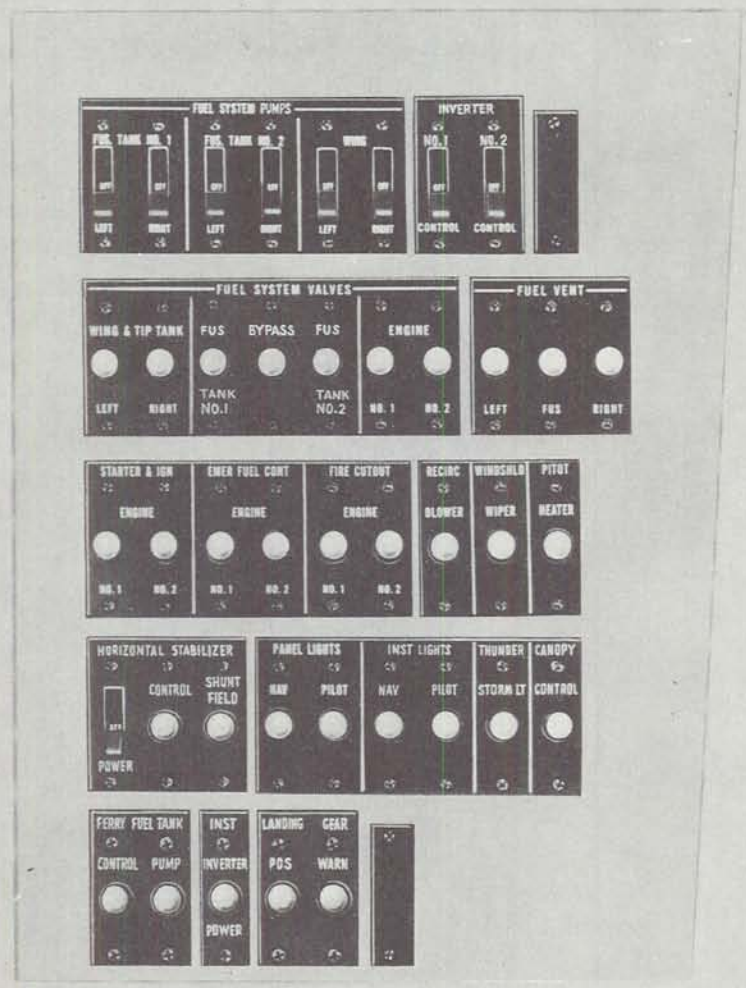


1. Helmet Defog Rheostat
2. Ferry Tank Fuel Control
3. AC-DC Circuit Breaker Panel

Figure 1-35

pilot's left console





Power Distribution Circuit Breaker Panel

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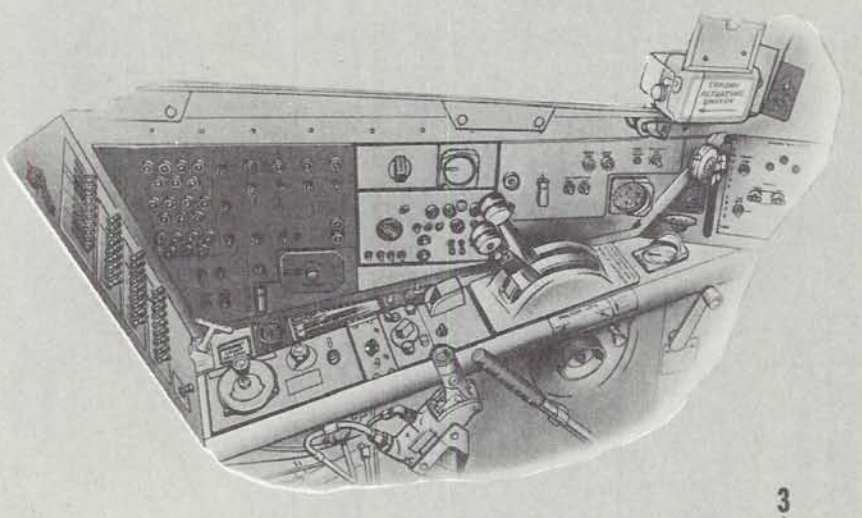
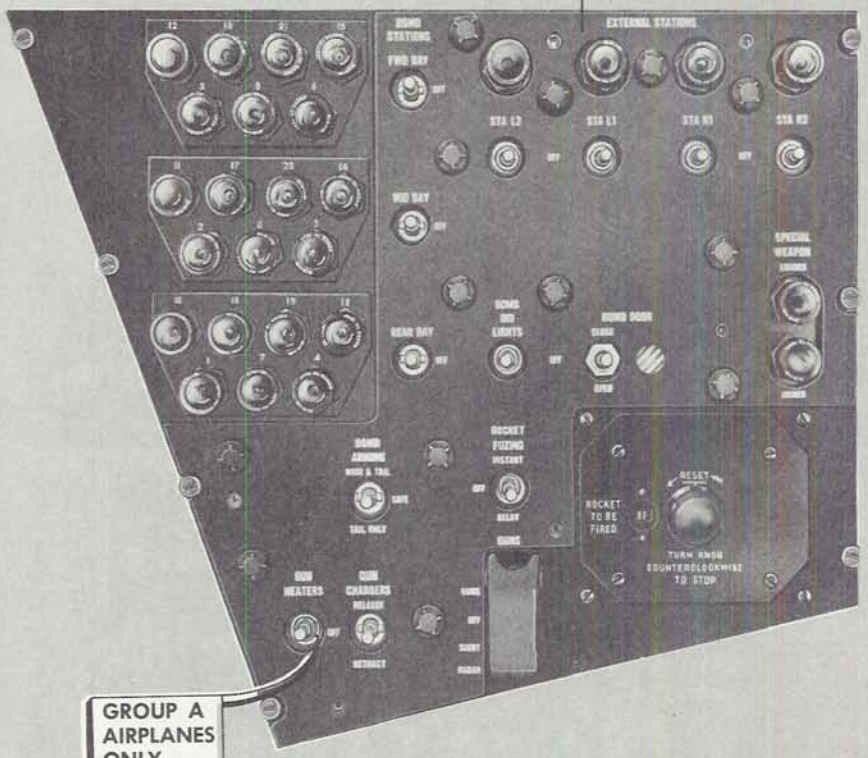
Figure 1–36

pilot's left console





1. Radar Warning Indicator AN/APS-54
2. Hydraulic System Pressure Gage
3. Armament Control Panel

11690

Figure 1-37

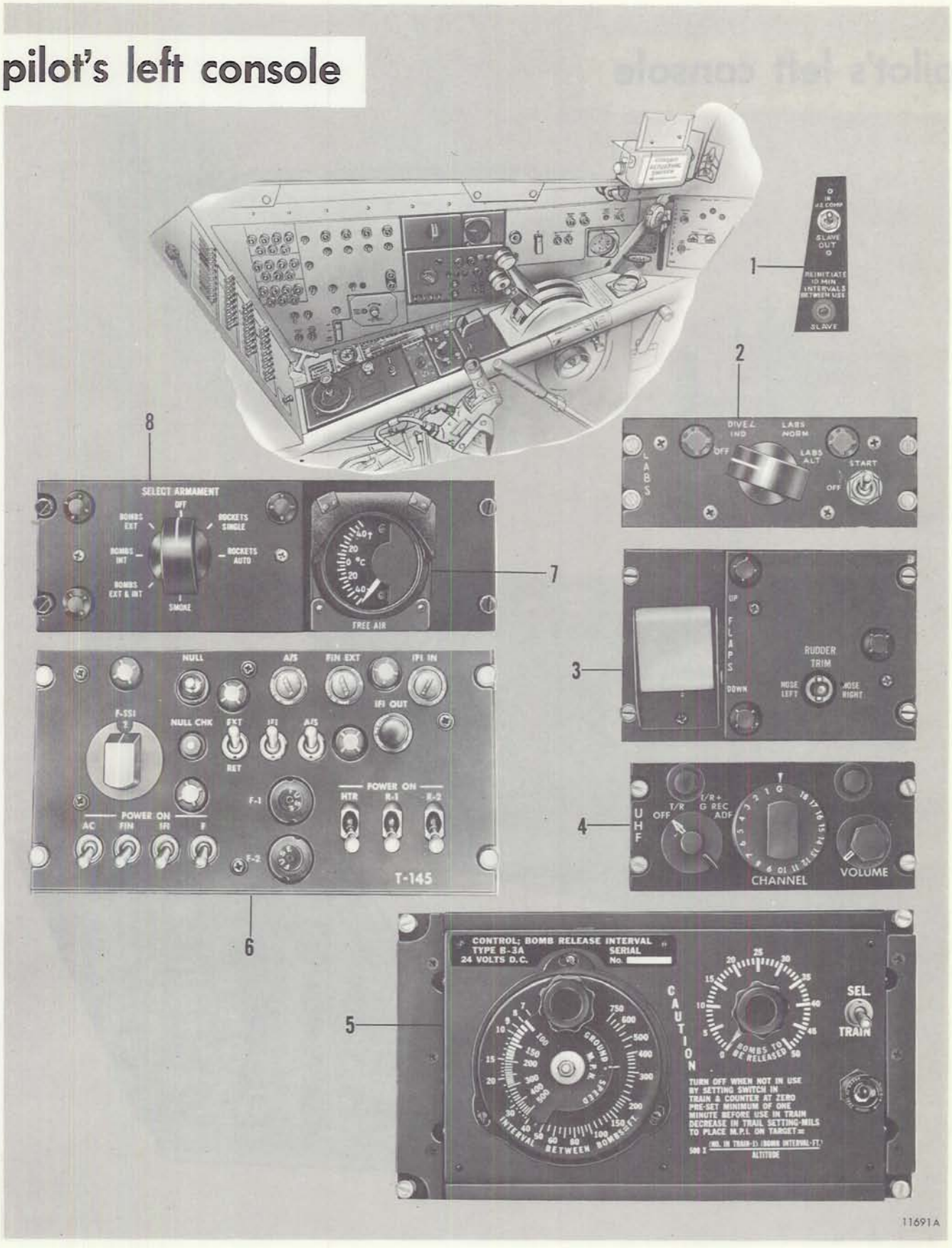
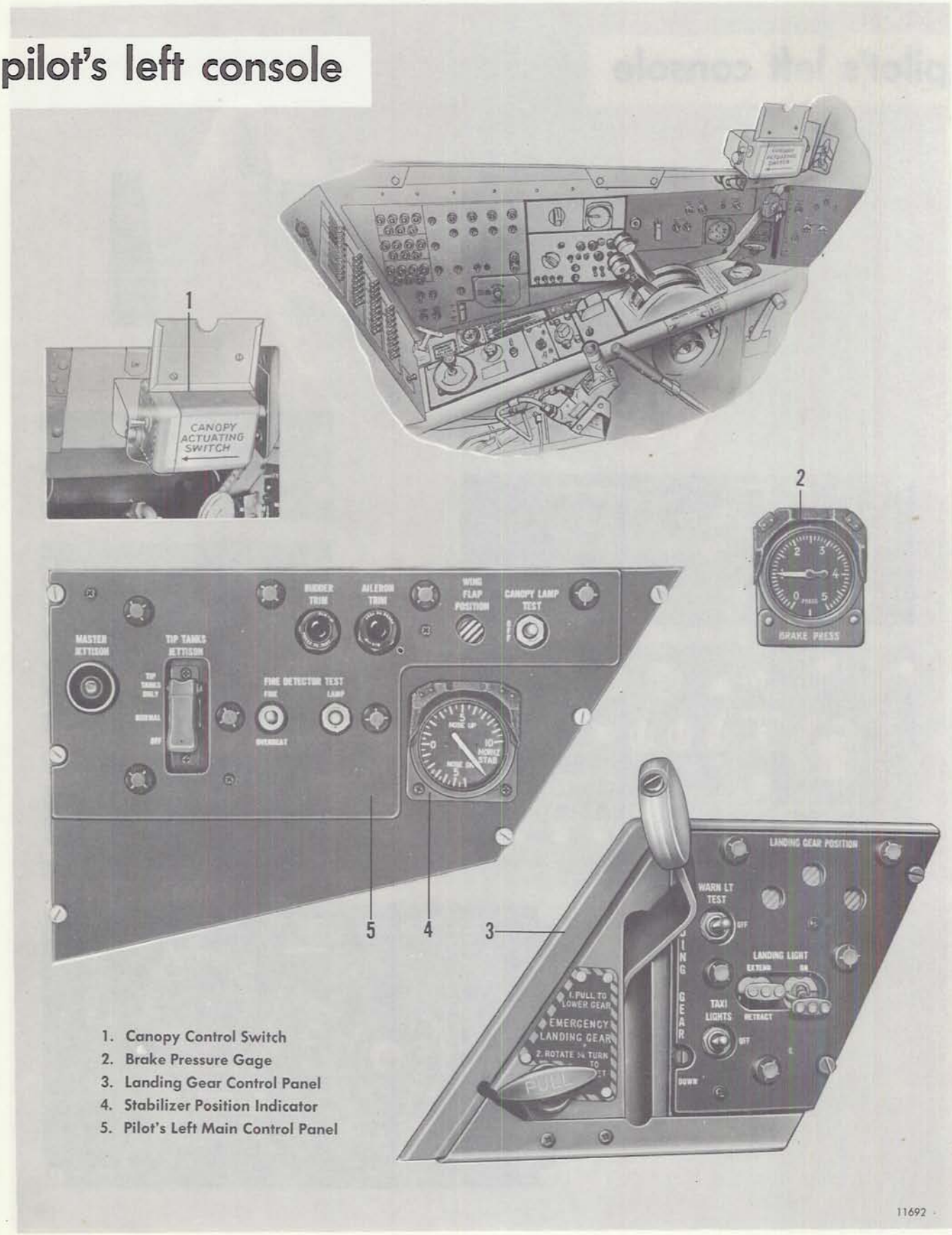

pilot's left console
1
SLAVE OUT
REINITIATE 10 MIN. INTERVALS BETWEEN USE
SLAVE
2
DIVEL IND
LABS NORM
LABS ALT
OFF
START
LABS
3
UP
FLAPS
DOWN
RUDDER TRIM
NOSE LEFT
NOSE RIGHT
4
UHF
OFF
T/R
T/R+ G REC ADF
CHANNEL
VOLUME
5
CONTROL; BOMB RELEASE INTERVAL
TYPE B-3A
24 VOLTS D.C.
SERIAL No.
GROUND SPEED M.P.H.
INTERVAL BETWEEN BOMBS FT.
BOMBS TO BE RELEASED
CAUTION
TURN OFF WHEN NOT IN USE BY SETTING SWITCH IN TRAIN & COUNTER AT ZERO PRE-SET MINIMUM OF ONE MINUTE BEFORE USE IN TRAIN DECREASE IN TRAIL SETTING-MILS TO PLACE M.P.I. ON TARGET=
500 X (NO. IN TRAIN-1) (BOMB INTERVAL-FT.) / ALTITUDE
SEL.
TRAIN
6
NULL
A/S
FIN EXT
IFI IN
IFI OUT
F-SSI
NULL CHK
EXT
IFI
A/S
RET
POWER ON
AC
FIN
IFI
F
F-1
F-2
HTR
R-1
R-2
T-145
7
FREE AIR
8
SELECT ARMAMENT
OFF
BOMBS EXT
ROCKETS SINGLE
BOMBS INT
ROCKETS AUTO
BOMBS EXT & INT
SMOKE
11691A

Figure 1-38

pilot's left console



1. Canopy Control Switch
2. Brake Pressure Gage
3. Landing Gear Control Panel
4. Stabilizer Position Indicator
5. Pilot's Left Main Control Panel

Figure 1–39

CANOPY EMERGENCY RELEASE HANDLES.

The two yellow internal canopy release handles are aft on the pilot's left console and on the observer's left console respectively. The external handle is on the left side of the fuselage in an access door above the electrical access hatch. The three handles connect to a single M-3 initiator. Pulling any one of the three handles fires the M-3 initiator. The force created by the expanding initiator gas moves the canopy locks to the open position. Also, the gas fires a second and larger M-5 initiator. The force created by this initiator disconnects the canopy from the canopy hydraulic actuating cylinder and fires the canopy thruster.

Note

When used, the canopy emergency release handles should be pulled straight out from the recess to prevent binding.

Note

The canopy thruster causes the canopy to jettison toward the aft fuselage. The six-foot cable extension is adequate to keep the person pulling the release handle clear of the falling canopy. However, the person pulling the release handle should observe the falling canopy and if necessary use the outer wing for protection in case high winds or abnormal jettisoning causes the canopy to fall too far to the left.

CANOPY SEAL.

The canopy seal is a rubber tube around the base of the canopy. (See figure 4-1.) When inflated, the canopy seal prevents loss of cabin pressure. Automatically controlled air from the air-conditioning system inflates the seal. With the canopy fully down, the movement of the canopy latches to lock the canopy actuates the canopy seal pressure regulator switch. The canopy seal pressure regulator switch turns on the regulator, allowing engine compressor air to inflate the canopy seal. As the canopy latches move to allow the canopy to open, the latches release the regulator switch, thereby turning off the regulator and deflating the canopy seal. The operation of at least one engine is needed to inflate the seal.

CANOPY ACTUATING SWITCH.

The three-position canopy actuating switch is on the pilot's left sill. (See figure 1-40.) Switch markings are OPEN (up) and CLOSE FOR FLIGHT (down). The switch has a center (off) position. Holding the switch in OPEN energizes the canopy latch solenoid to direct hydraulic pressure to the unlock side of the canopy latch-actuating cylinder. The movement of the latches to the unlock position operates three microswitches. One microswitch completes a circuit to the CANOPY OPEN WARNING LIGHT, the second microswitch completes a circuit to the canopy actuating cylinder solenoid, which positions to allow hydraulic pressure to the up side of the canopy actuating cylinder, and the third microswitch completes a circuit to de-energize the canopy seal regulator. Placing the switch in CLOSE FOR FLIGHT reverses this sequence. The 28-volt d-c battery bus supplies the power to operate the circuit through a 5-ampere circuit breaker on the pilot's circuit breaker panel.

Figure 1-40

CANOPY CONTROL SWITCH, EXTERIOR.

The exterior canopy control switch (figure 1-22) is in the left electrical access compartment. Switch markings are UP and DOWN. Placing the switch in UP completes a circuit to the canopy latch solenoid valve, which positions to allow hydraulic pressure to the unlock side of the canopy latch actuating cylinder.

The movement of the latches operates three microswitches. One switch completes a circuit to the CANOPY OPEN WARNING LIGHT. The second microswitch completes a circuit to the canopy actuating cylinder solenoid valve which positions to allow hydraulic pressure to the up side of the canopy actuating cylinder. The third microswitch completes a circuit to de-energize the canopy seal regulator. Placing the switch in DOWN reverses this sequence. The 28-volt d-c battery bus supplies the power to operate the circuit through a 5-ampere circuit breaker on the pilot's circuit breaker panel.

CANOPY LOCK WARNING LAMP.

The red canopy lock warning lamp is on the canopy control box on the pilot's left sill. Movement of the canopy latches to the locked position opens the canopy lock warning lamp microswitch, thereby breaking the circuit to the warning lamp. The warning lamp illuminates when the canopy latches move to the unlocked position. The 28-volt d-c distribution bus supplies the power to operate the circuit.

CANOPY LOCK WARNING LAMP TEST SWITCH.

The canopy lock warning lamp test switch is on the pilot's left main control panel. Holding the switch in CANOPY LAMP TEST tests operation. The 28-volt d-c distribution bus supplies the power to operate the test circuit.

GLARE SHADE.

The ribbed pilot's and observer's canopy shades (figure 1-1) slide along a track on the lower surface of the canopy. The stowage position for the pilot's shade is behind the pilot's headrest. A loop grip in the wire stiffener along the forward edge of the shade enables the pilot to move the shade forward to the windshield. The stowage position for the observer's shade is forward of the observer above the glare shield. A strap retains the shade in the stowed position. To place the shade in position for use, loosen the strap and move the shade aft behind the observer's headrest.

EJECTION SEATS.

In an emergency, the pilot's and observer's ejection seat system (figure 1-41) catapults the seat and occupant clear of the airplane and releases the occupant from the seat approximately two seconds after ejection. Each seat consists of an outer frame and guide rail, a fixed headrest, inertia reel, a seat bucket, foot rests, an equipment quick-disconnect, catapult and safety belt initiators, right and left handgrips, and a vertical seat adjustment lever. The seat bucket accommodates a one-man life raft and a seat-type parachute. An inertia reel in the headrest holds the shoulder harness firmly against the occupant. The pilot's seat adjustment and equipment disconnect are on the right side of the seat; the observer's are on the left side of the seat. Spring clips on the armrests hold the handgrips in the stowed position. A force of approximately 20 pounds is necessary to move a handgrip out of the stowed position.

CONTROL COLUMN STOWAGE. (GROUP E AIRPLANES)

Raising the right grip on the pilot's ejection seat, energizes the elevator control rod detonator and the snatch unit solenoid. The detonator severs the elevator control rod and the snatch unit solenoid releases a spring which pulls the control column forward, leaving a clear path for seat ejection. Power to operate the system is supplied by the battery bus. However, a one-shot battery on the seat assembly assures power to energize the circuits, should battery failure occur.

Note

The electrical control columns stowage system in group E airplanes is being removed by a field service change. The system will be replaced by a gas-operated system described in the following paragraph.

CONTROL COLUMN STOWAGE. (GROUP F AIRPLANES)

The gas-operated control column stowage system consists of an elevator disconnect link, a control column snatch unit, an M-3 initiator, and two M-2 extractors. When the pilot pulls up the right-hand grip of the ejection seat to the locked position, the M-3 initiator is fired and the resultant gas pressure passes through tubing to the extractors at the elevator disconnect link and the control column snatch unit. The gas pressure withdraws the extractor rods from the disconnect link and the snatch unit spring-loaded latching mechanism. The release of this mechanism disconnects the elevator push-pull linkage from the control column and pulls the control column against the pilot's main instrument panel.

SHOULDER HARNESS.

The shoulder harness straps fasten to an inertia reel in the ejection seat headrest. The straps connect to the safety belt when in use. A lock control handle in the left armrest controls the inertia reel to lock or unlock the harness; however, an unlocked harness automatically restricts a forward movement of the occupant when there is an impact force of 2 to 3 G's.

SHOULDER HARNESS LOCK CONTROL.

The shoulder harness lock control is in the left arm rest of both ejection seats. To unlock the harness, the occupant depresses the lock control handle and moves the handle to the forward position. This allows the occupant freedom to bend forward. To lock the har-

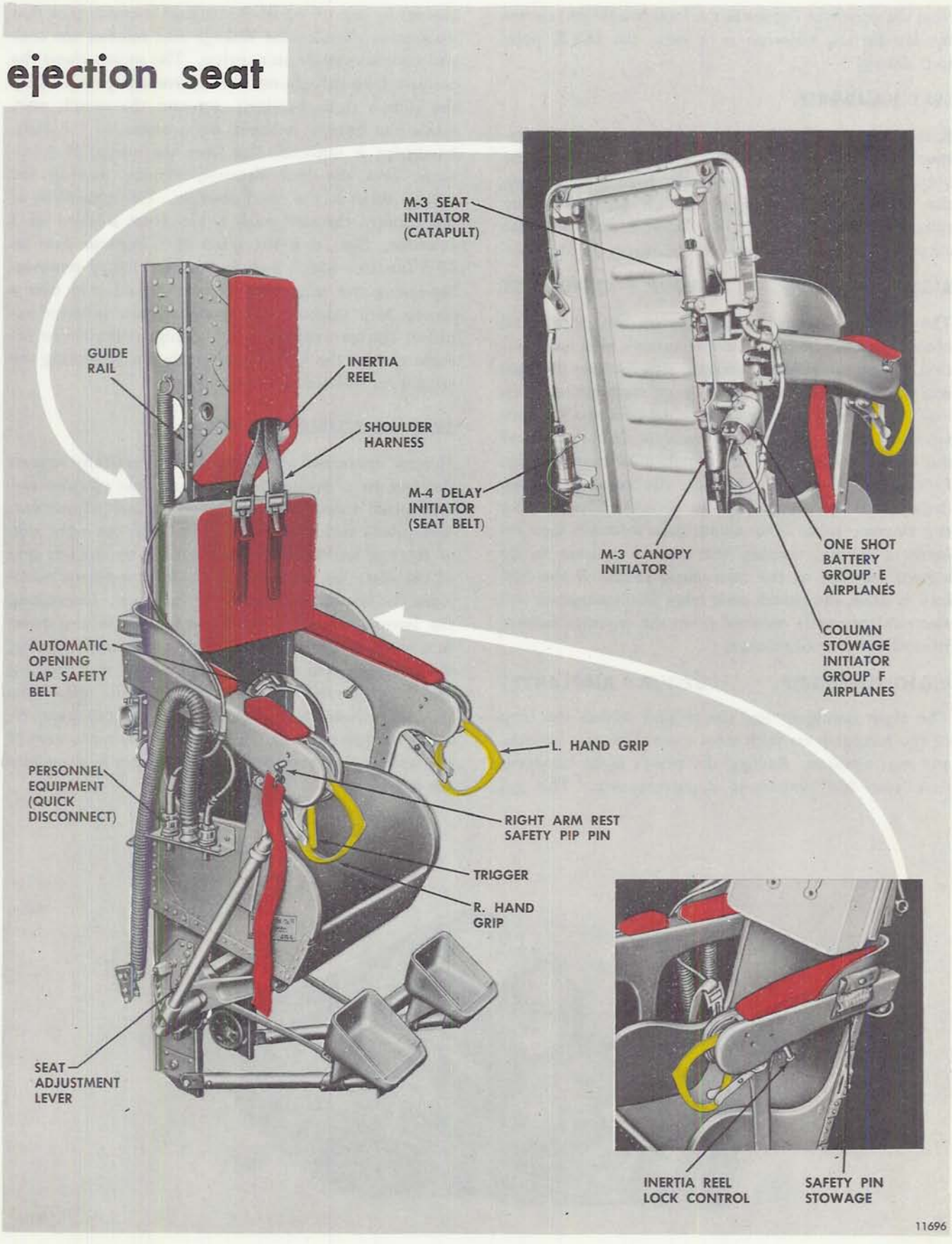

ejection seat
M-3 SEAT INITIATOR (CATAPULT)
GUIDE RAIL
INERTIA REEL
SHOULDER HARNESS
M-4 DELAY INITIATOR (SEAT BELT)
M-3 CANOPY INITIATOR
ONE SHOT BATTERY GROUP E AIRPLANES
COLUMN STOWAGE INITIATOR GROUP F AIRPLANES
AUTOMATIC OPENING LAP SAFETY BELT
L. HAND GRIP
PERSONNEL EQUIPMENT (QUICK DISCONNECT)
RIGHT ARM REST SAFETY PIP PIN
TRIGGER
R. HAND GRIP
SEAT ADJUSTMENT LEVER
INERTIA REEL LOCK CONTROL
SAFETY PIN STOWAGE
11696

Figure 1-41

ness, the occupant depresses the lock handle and moves the handle aft, allowing it to enter the LOCK position detent.

LEFT HANDGRIP.

Raising the left handgrip on both seats locks the respective shoulder harness. If, during seat ejection, the occupant fails to lock the shoulder harness by placing the lock control handle in the aft position or by raising the left handgrip, the inertia reel locks the shoulder harness to retain the occupant in the seat.

RIGHT HANDGRIP. (GROUP E AIRPLANES)

The right handgrip and trigger on the pilot's and observer's seats control canopy jettison and seat ejection. The pilot's right handgrip also actuates the control column disconnect and stowage mechanism. Raising the pilot's right handgrip actuates two microswitches, completing circuits from the battery bus and the one-shot battery to the snatch unit control relay. If battery power is available, the control column detonator fires, separating the control column from the elevator tube. The snatch unit solenoid then releases a spring, causing the control column to be stowed forward to the instrument panel. If the battery is dead, the snatch unit relay is de-energized and electrical power is received from the one-shot battery to stow the control column.

RIGHT HANDGRIP. (GROUP F AIRPLANES)

The right handgrip and the trigger within the loop of the handgrip on both seats control canopy jettison, and seat ejection. Raising the pilot's right handgrip fires two M-3 initiators simultaneously. The gas created by one of the M-3 initiators removes pins that disconnect the elevator linkage and releases the control column snatch unit spring. The spring slams the column forward against the instrument panel. Only the pilot's right handgrip actuates the snatch unit, while the canopy jettisons when either of the right handgrips is actuated. Gas from the second M-3 initiator fires the lock thruster, thereby moving the canopy locks to the open position. The movement of the canopy thruster pulls a pin from a third M-3 initiator. Gas from the third M-3 initiator fires an M-5 initiator which in turn fires the canopy remover. Squeezing the trigger against the raised grip fires a fourth M-3 initiator and gas from this initiator explodes the seat catapult. Each occupant must raise his right grip to the locked position before squeezing the trigger for individual seat ejection.

SEAT ADJUSTMENT LEVER.

Manual operation of the seat lever vertically adjusts the seat to a desired position, and seat ejection can take place from any position of vertical adjustment. The pilot's seat adjustment lever is on the right side of the seat and the observer's lever is on the left side of the seat. To move the lever, it is necessary to depress the button on the end of the lever. Depressing the button releases a pin from one of several holes in a quadrant attached to the side of the seat. Moving the lever forward and down lowers the seat; moving the lever upward and aft raises the seat. When the vertical adjustment is satisfactory, the occupant releases the lever button. A slight vertical movement of the seat by the occupant permits the pin to drop into the nearest hole in the quadrant.

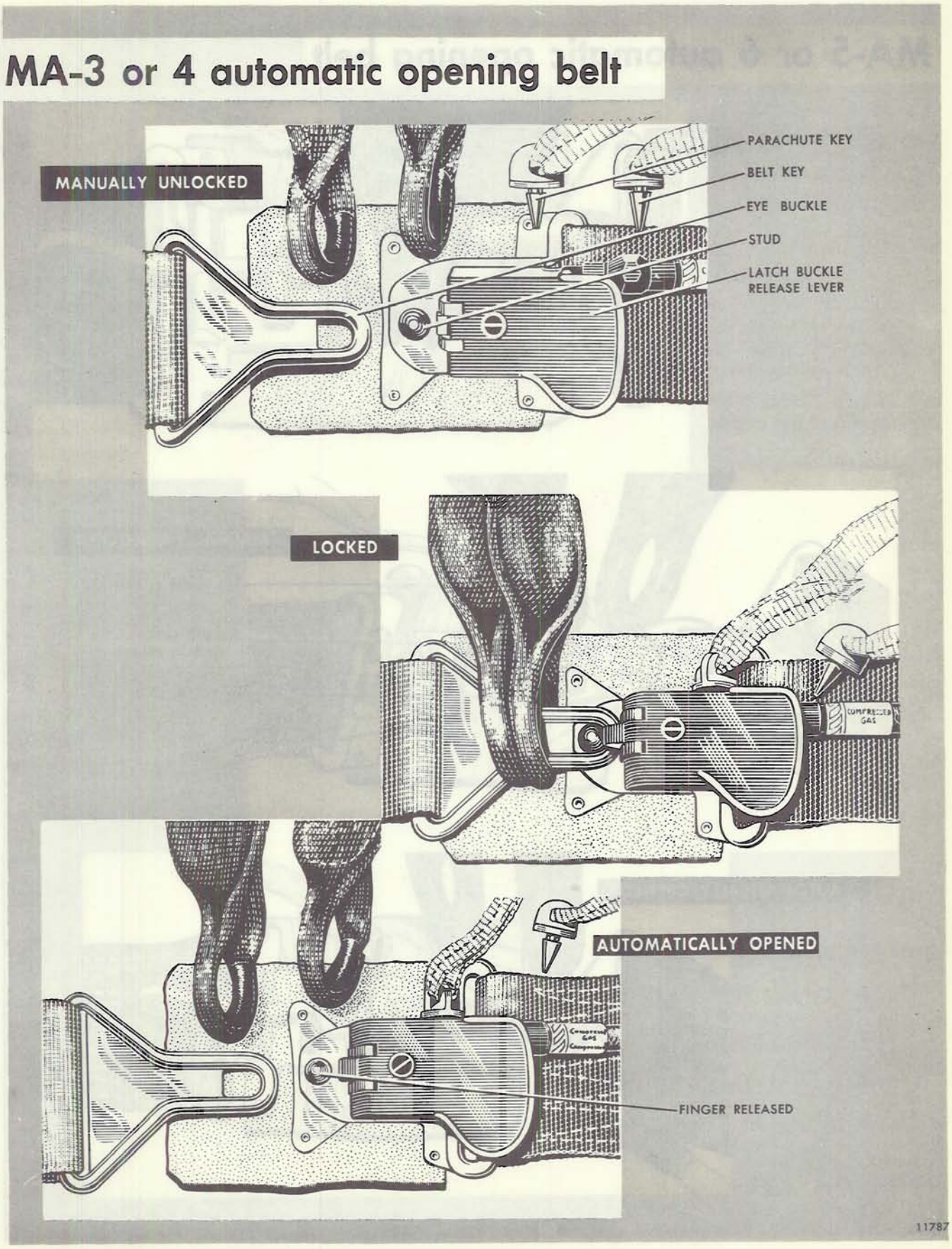

MA-3 or 4 automatic opening belt
MANUALLY UNLOCKED
PARACHUTE KEY
BELT KEY
EYE BUCKLE
STUD
LATCH BUCKLE RELEASE LEVER
LOCKED
COMPRESSED GAS
AUTOMATICALLY OPENED
FINGER RELEASED
11787

Figure 1–42

MA-5 or 6 automatic opening belt

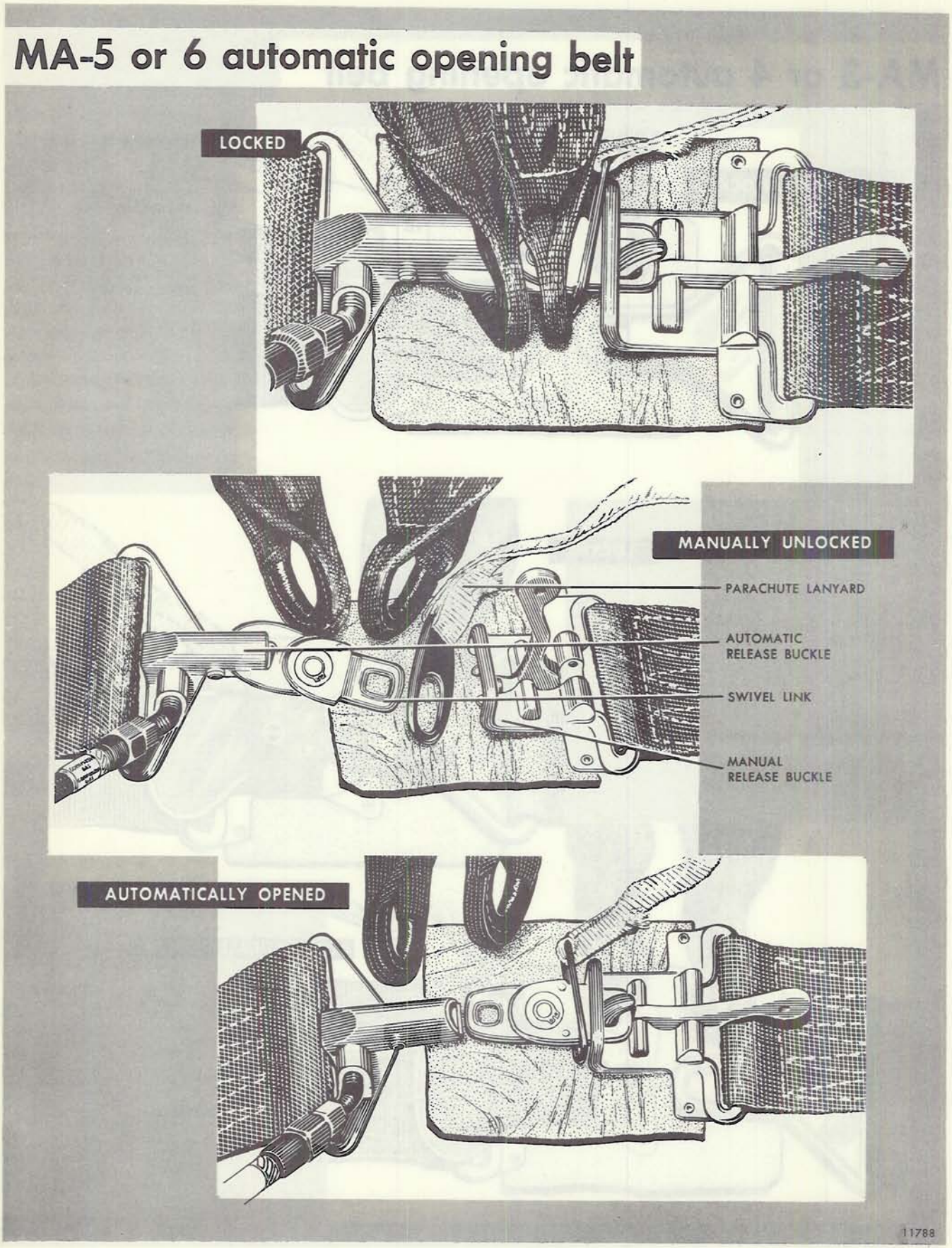


Figure 1-42A

MA-3 OR MA-4 AUTOMATIC SEAT BELT.

The MA-3 (or MA-4) automatic belt (figure 1-42) consists of two adjustable webbed belts, an eye buckle, a latch buckle, a latch buckle key, and a flexible hose. The occupant fastens the belt by inserting the eye buckle through the loops of the shoulder harness and placing the eye buckle on the stud of the latch buckle. The occupant then presses the key into the spring-loaded receptacle on the side of the latch buckle and depresses the latch lever. A finger moves into position to retain the eye buckle to the stud of the latch buckle. After ejection, gas pressure through the flexible hose moves the finger out of the locked position to free the occupant from the seat. The key remains in the receptacle of the latch buckle and as the occupant separates from the seat, the parachute lanyard actuates the aneroid-release device of the parachute. See AUTOMATIC OPENING SEAT BELT AND PARACHUTE in Section VII.

WARNING

Use the latch key attached to the lanyard of the automatically opening parachute. When using a manually opened parachute, insert the latch key attached to the MA-4 webbed belt.

For normal release, the occupant lifts the latch lever which causes the spring-loaded receptacle to move the finger out of the locked position and release the key.

MA-5 OR MA-6 AUTOMATIC SEAT BELT.

The MA-5 (or MA-6) automatic seat belt (figure 1-42A) consists of two adjustable webbed belts, a manual release buckle, a swivel link, an automatic release buckle, and a flexible hose. The occupant fastens the belt by inserting the swivel link through the loops of the shoulder harness and parachute lanyard. He then places the swivel link in the manual release buckle and locks the link in position with the manual release lever. After ejection, gas through the flexible hose moves a locking finger in the automatic release buckle to the unlocked position to free the occupant from the seat. A shoulder on the swivel link retains the loop of the parachute lanyard, and as the occupant separates from the seat, the parachute lanyard actuates the aneroid-release device of the parachute. See AUTOMATIC OPENING SEAT BELT AND PARACHUTE in Section VII.

SEAT BELT AUTOMATIC RELEASE MECHANISM.

During ejection, as the seat rises along the guide rails, a telescopic tube fixed to the frame of the airplane pulls a pin to fire a slow-burning initiator. Gas from the initiator operates the release mechanism of the belt 2.5 seconds after the pin fires the initiator.

FIRE PROTECTION.

Each engine has a separate fire and overheat detection system. The system senses the presence of fire or an overheated condition in the engine area and electrically transmits this information to indicator lights on the pilot's instrument panel. Separate fire extinguishing systems for each engine route bromochloromethane from a bottle in the wings inboard of the engines to the nacelles.

Note

Repeated or prolonged exposure to high concentrations of Bromochloromethane (CB) or decomposition products should be avoided. CB is a narcotic agent of moderate intensity but of prolonged duration. It is considered to be less toxic than carbon tetrachloride, methyl bromide, or the usual products of combustion. Bromochloromethane is safer to use than previous fire-extinguishing agents. However, normal precautions should be taken, including the use of 100% oxygen when available.

FIRE AND OVERHEAT DETECTION SYSTEM.

Each engine contains two detector systems—one for fire detection and one to warn the pilot of an overheated condition. (See figure 1-43.) The fire detection system consists of nine fire detectors strategically placed in each engine nacelle area forward of the fire wall, an indicator light for each engine, a detector test switch, a lamp test switch, and an overheat blinker relay for each engine. The indicator lights and detector test switch are common to both systems. An excessive amount of heat causes the temperature-sensitive fire detectors and overheat detectors to complete a circuit to the indicator light on the pilot's main instrument panel. The blinker (flasher) relay in the overheat circuit causes the indicator light to flash. The fire detectors and overheat detectors cannot distinguish between an engine fire or an engine overheat condition. However, upon observing a flashing red light, the pilot may assume that an overheat condition exists in the aft engine nacelle area and when observing a steady red light the pilot must assume that a fire exists in the forward engine nacelle area. The 28-volt d-c distribution bus supplies the power to operate the system.

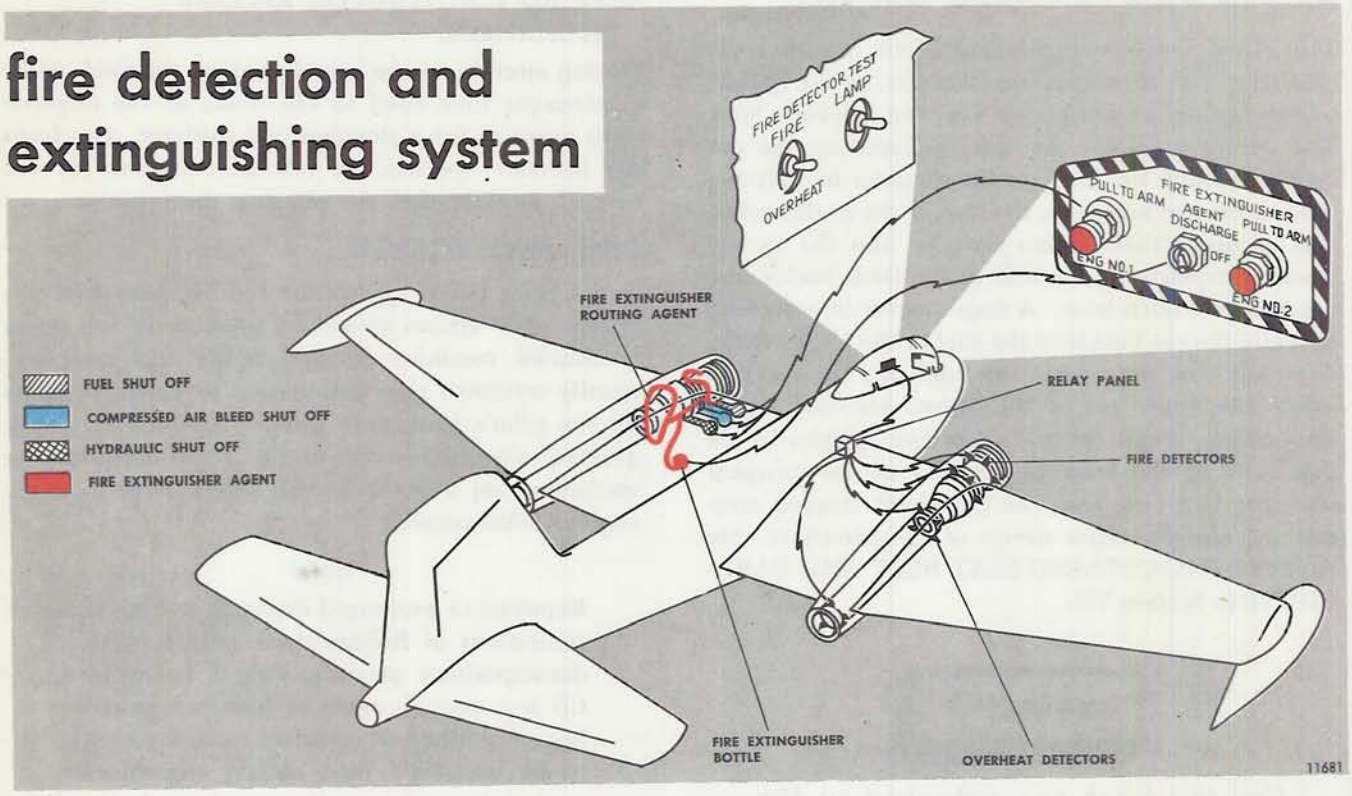


Figure 1–43

FIRE AND OVERHEAT DETECTION TEST SWITCH.

The three-position momentary fire and overheat detection test switch is on the pilot's left main control panel. Operation of the switch checks the continuity of the fire and overheat detection circuits. Holding the switch in the FIRE position completes the fire detection circuit to illuminate both lamps in the PULL-TO-ARM knobs. Placing the switch in the OVERHEAT position completes the overheat detection circuit through a flasher unit to illuminate both lamps in the PULL-TO-ARM knobs. The 28-volt d-c distribution bus supplies the power to operate the test circuit.

FIRE AND OVERHEAT DETECTION LIGHTS.

A red warning light in each fire extinguisher PULL-TO-ARM knob warns the pilot of fire or an overheat condition in the engine nacelle area. (See figure 1–43.) A fire in the forward engine nacelle area causes the detectors to complete a circuit to illuminate their respective indicator light. An overheat condition in the aft engine nacelle area causes the detectors to complete a circuit through a flasher relay unit to illuminate their respective indicator light. The light goes out after the fire has been extinguished or the overheated condition alleviated. The 28-volt d-c distribution bus supplies the power to operate the light circuit.

FIRE AND OVERHEAT INDICATOR LAMP TEST SWITCH.

The fire and overheat indicator lamp test switch is on the pilot's left main control panel. Holding the switch in the LAMP position tests lamp operation. The 28-volt d-c distribution bus supplies the power to operate the test circuit.

FIRE EXTINGUISHER SYSTEM.

The fire extinguisher system (figure 1–43) sprays bromochloromethane into the engine nacelle area. Bromochloromethane expands into a dense gas in the presence of high heat or flame. The system consists of a bottle of bromochloromethane in each wing inboard of the engines: hydraulic valves, fuel valves, and compressors air shut-off valves; an arming knob for each engine; and an agent discharge switch. One operation of the fire extinguisher system exhausts the supply of bromochloromethane. The bottles supply their respective engine nacelle areas only. The 28-volt d-c electrical system supplies the power to operate the extinguisher system.

FIRE EXTINGUISHER PULL-TO-ARM KNOBS.

The PULL-TO-ARM knobs (figure 1-43) on the main instrument panel energize the fire extinguisher system. Each knob contains a (red) warning light. Pulling the knobs out arms the AGENT DISCHARGE switch and causes the hydraulic, fuel, and compressor air shut-off valves to move to the closed position. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the circuit.

Note

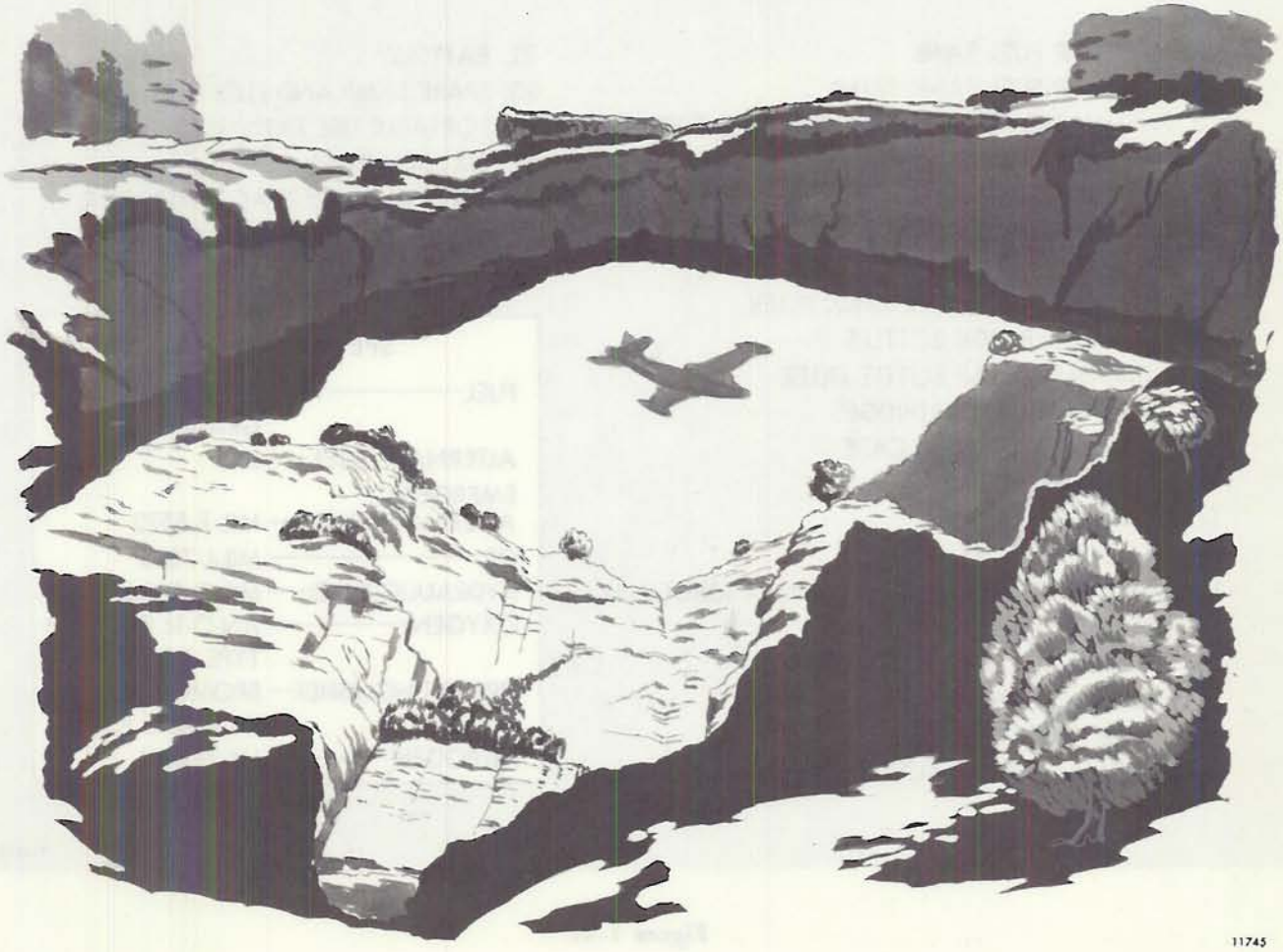
Pulling the PULL-TO-ARM knob closes the air conditioning shut-off valve. This eliminates the possibility of the toxic bromochloromethane fumes from entering the cabin through the air conditioning system. However, use 100 percent oxygen for added protection.

FIRE EXTINGUISHER AGENT DISCHARGE SWITCH.

The AGENT DISCHARGE switch is on the pilot's main instrument panel. (See figure 1-43.) The switch is not armed until one of the PULL-TO-ARM knobs is in the out position. When one of the PULL-TO-ARM knobs is in the out position, placing the agent discharge switch in the AGENT DISCHARGE position energizes a circuit to an explosive cartridge on the respective fire extinguisher bottle. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the circuit.

AUXILIARY EQUIPMENT.

Refer to Section IV for a discussion of the air-conditioning and pressurization system, the defogging and anti-icing systems, communication and electronic equipment, oxygen system, navigation equipment, armament equipment, and miscellaneous equipment.



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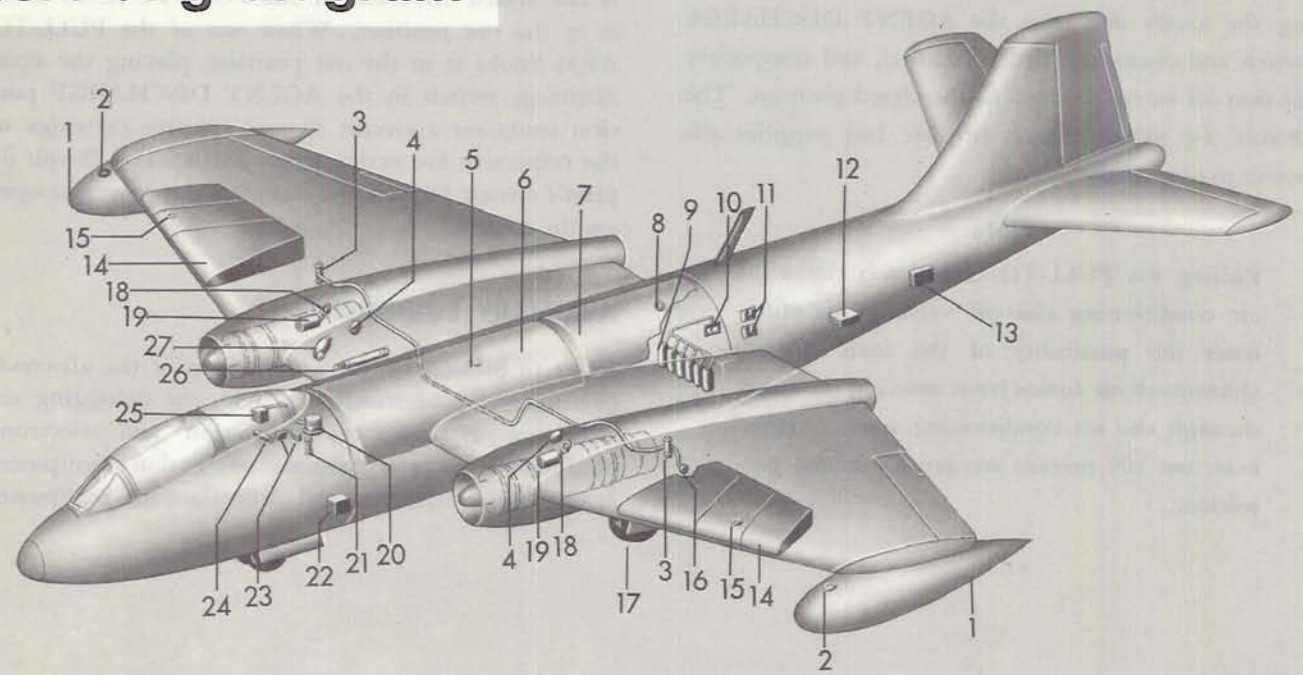
servicing diagram



1. WING TIP FUEL TANK
2. WING TIP FUEL TANK FILLER
3. PNEUMATIC GUN CHARGING BOTTLE (GROUP A)
4. FIRE EXTINGUISHER BOTTLE
5. NO. 1 FUSELAGE FUEL TANK FILLER
6. NO. 1 FUSELAGE FUEL TANK
7. NO. 2 FUSELAGE FUEL TANK
8. NO. 2 FUSELAGE FUEL TANK FILLER
9. NITROGEN PURGE BOTTLES
10. NITROGEN PURGE BOTTLE FILLER
11. SPARE STARTER CARTRIDGES
12. AFT FUSELAGE DATA CASE
13. LIGHT LENS STOWAGE
14. WING FUEL TANK
15. WING FUEL TANK FILLER
16. PNEUMATIC GUN CHARGING FILLER (GROUP A)
17. TIRES AIR FILLER STEM
18. ENGINE OIL TANK FILLER
19. ENGINE OIL TANK
20. OXYGEN CONVERTER
21. HYDRAULIC BRAKE ACCUMULATOR
22. BATTERY
23. SPARE LAMP AND FUSE STOWAGE
24. PORTABLE FIRE EXTINGUISHER
25. OXYGEN FILLER
26. MAIN HYDRAULIC ACCUMULATOR
27. HYDRAULIC RESERVOIR AND FILLER

SPECIFICATIONS

FUEL	MIL-F-5624A GRADE JP-4
ALTERNATE FUEL	JP-3
EMERGENCY ALTERNATE FUEL	MIL-F-5572
OIL	MIL-L-7808
HYDRAULIC FLUID	MIL-O-5606
OXYGEN	AN-O-1c GRADE B TYPE 2 (LIQUID)
FIRE EXTINGUISHER	BROMO-CHLORO-METHANE (CB)
NITROGEN	MIL-N-6011

11680A

Figure 1-44

Section II

NORMAL PROCEDURES

11658

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STATUS OF THE AIRPLANE.

FLIGHT PLANNING.

1. Accumulate the necessary weather data and flight equipment (maps, computer, pencil, flashlight, etc.) and check NOTAMS.
2. Compute cruise control data (airspeeds, power settings, gross weights, etc.) from the operating data in Appendix I of this handbook.
3. Check that the required fuel, oil, oxygen, armament, and all special equipment are suitable and in sufficient quantity for the mission to be performed.

11651

Figure 2-1

4. Brief the observer on mission and emergency procedures.
5. Complete and file a clearance.

FLIGHT RESTRICTIONS.

Refer to Section V for flight and engine limitations.

WEIGHT AND BALANCE.

The airplane is stable if the center of gravity is within the published limits. The control-stick-force-per-G characteristics of the airplane vary over a wide range. The forces are high with the center of gravity at the forward limit and low with the center of gravity at the aft limit. The center of gravity is very close to the aft stability limit during take-off with maximum gross weight. You, the pilot, should be aware of this fact to insure that you do not inadvertently exceed the stability limits. Variation in the center of gravity of the airplane is primarily due to fuel consumption; therefore, use the correct fuel management procedures. Also, be careful when adding extra baggage or equipment to the aircraft. Refer to Section V for weight and balance limitations, to HANDBOOK OF WEIGHT AND BALANCE, T.O. 1B-1-40, and to BASIC WEIGHT CHECK LIST AND LOADING DATA, T.O. 1B-57B-5, for loading information. Before each flight:

1. Check take-off and anticipated landing gross weights.
2. Check weight and balance clearance. DD Form 365F.
3. Compute the take-off performance data.
4. Check the landing distance and final approach speed for the anticipated landing gross weight and pressure altitude.

AIRPLANE ENTRANCE. (See figure 2-1.)

For entrance:

1. Place the canopy external control switch (left electrical access compartment) in UP.
2. Actuate the external hand pump (above the canopy external control switch) to build up sufficient hydraulic system pressure to open the canopy.
3. Place a portable ladder in position for entry.

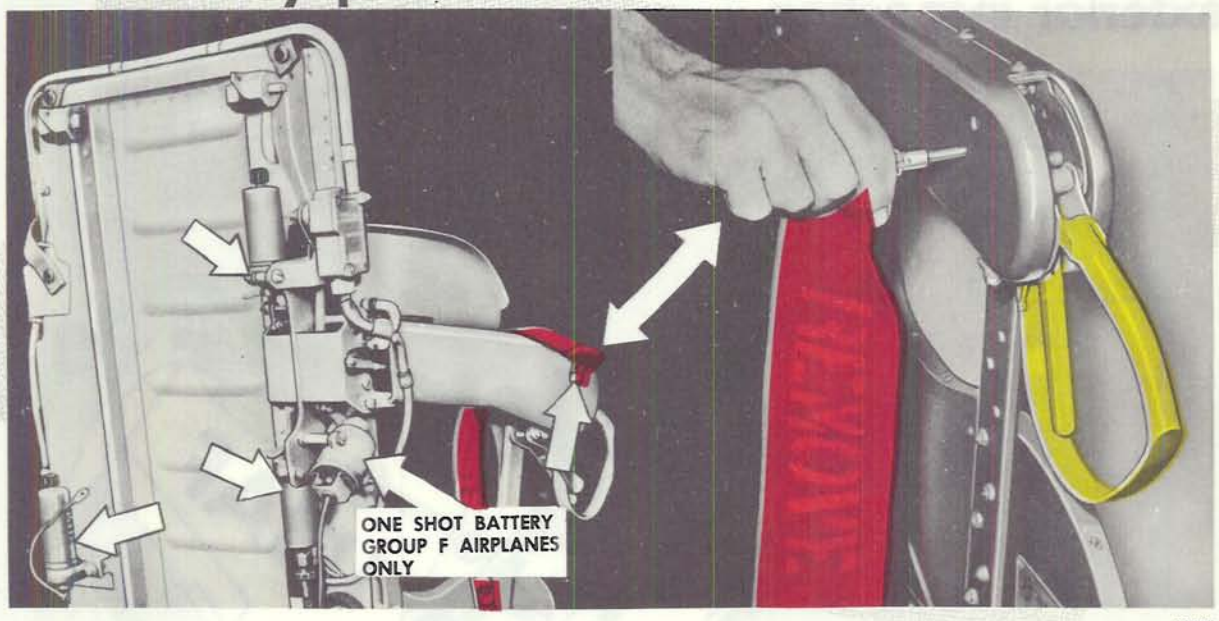


Figure 2–2

BEFORE EXTERIOR INSPECTION.

Before making the exterior inspection, complete the following checks:

1.	Canopy	Condition and cleanliness
2.	Canopy safety pin	In place
3.	Seat safety pins, front and rear (See figure 2–2.)	In place
4.	DD Form 781	Check

Determine the engineering status of the airplane and check for proper servicing.

5. Publications — In place

Check the data case for the following:

a. Radio Facility Charts (LF/MF Edition)

b. Supplementary Flight Information Document

c. Pilot's Handbooks—Jet, East and West

d. Flight Handbook, T.O. 1B–57B–1

6. All armament switches — OFF or SAFE

Place the following armament switches in the OFF or SAFE position: Master guns switch, select armament switch, gun charger switch, bomb arming switch, rocket fuzing switch, bomb bay station switches, and external station switches.

7.	Tip tank jettison switch	OFF
8.	Landing gear lever	Down
9.	Emergency gear T-handle	In
10.	Battery switch	OFF
11.	Power distribution circuit breaker panel	All circuit breakers ON or IN
12.	Seat quick-disconnect pins	In place
13.	All emergency equipment	Stowed

Check the following emergency equipment for proper stowage: Hydraulic hand pump handle, crash axe, and fire extinguisher.

14.	Main system hydraulic pressure gage	Zero pressure

SOLO FLIGHT INSPECTION.

Before a solo flight, secure the aft crew station.

1. Fasten the seat belt, shoulder harness, oxygen hose, and radio cord.
2. Place the oxygen supply lever in the OFF position.
3. Check seat safety pins.

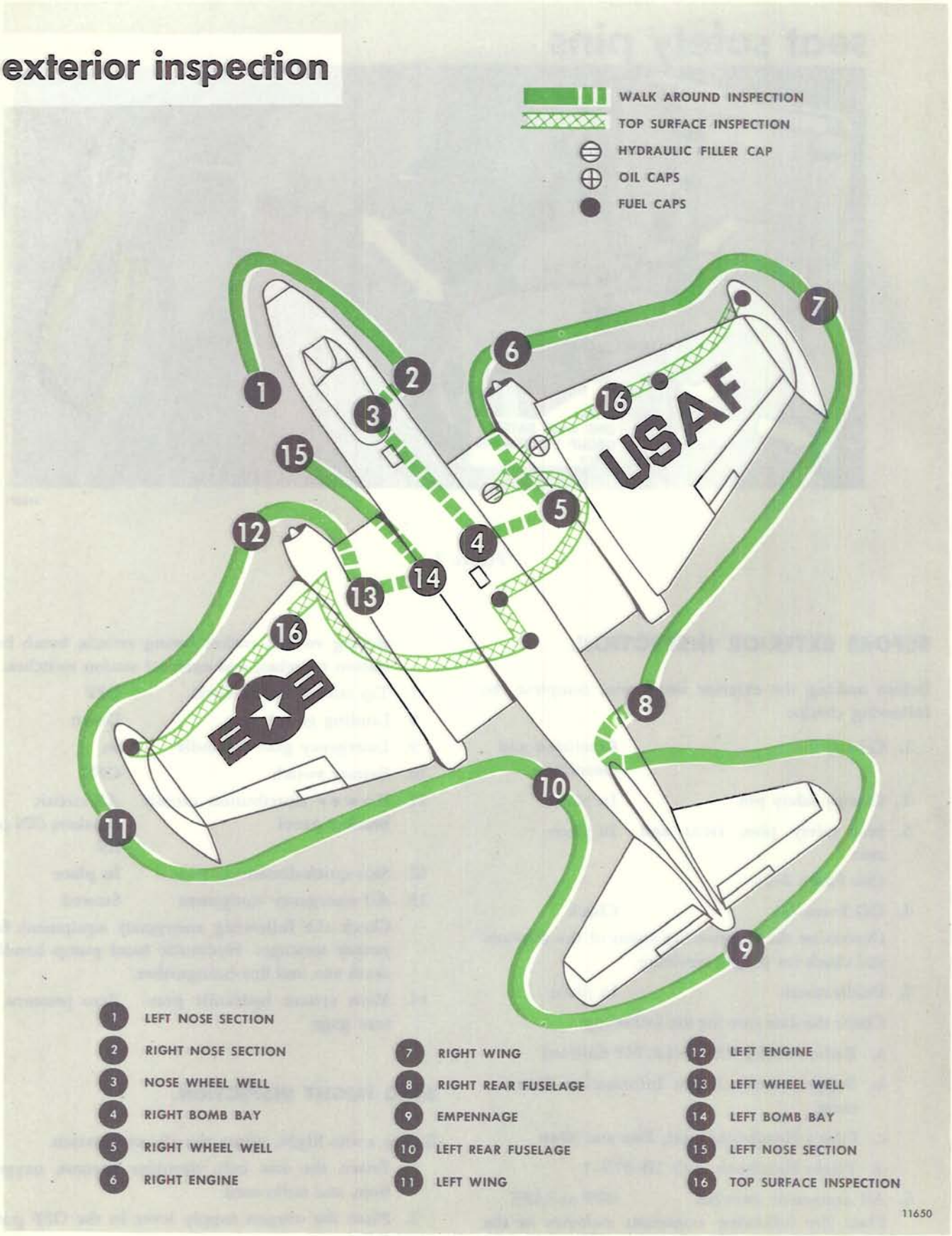

exterior inspection
WALK AROUND INSPECTION
TOP SURFACE INSPECTION
HYDRAULIC FILLER CAP
OIL CAPS
FUEL CAPS
USAF
1 LEFT NOSE SECTION
2 RIGHT NOSE SECTION
3 NOSE WHEEL WELL
4 RIGHT BOMB BAY
5 RIGHT WHEEL WELL
6 RIGHT ENGINE
7 RIGHT WING
8 RIGHT REAR FUSELAGE
9 EMPENNAGE
10 LEFT REAR FUSELAGE
11 LEFT WING
12 LEFT ENGINE
13 LEFT WHEEL WELL
14 LEFT BOMB BAY
15 LEFT NOSE SECTION
16 TOP SURFACE INSPECTION
11650

Figure 2-3

EXTERIOR INSPECTION.
(See figure 2-3.)

At each of the following inspection points, check the condition of the airplane for miscellaneous damage, dents, etc. Also, check the security of all access doors and that all control surfaces locks and mooring lugs have been removed and stowed in the tail section.

1. LEFT NOSE SECTION.
   - a. Bomb door shut-off valve — SAFE
   - b. Personnel safety switch — SAFE
   - c. Battery compartment — Check
     Disconnect the battery and check the brake accumulator pressure gage for 850 psi min.
   - d. Left electrical access compartment — Check
     Check for proper stowage of the external hand pump handle. Also, place the following circuit breakers to the IN position: standby instrument inverter, J-2 compass, APX-6A, and helmet defog.
   - e. Shoran antenna — Condition
   - f. Static air vent — Open and clean
   - g. Nose hatch — Secure
2. RIGHT NOSE SECTION.
   - a. Pitot cover — Removed
   - b. Static air vent — Open and Clean
   - c. UHF antenna — Condition
   - d. Pressure regulator static vent — Open
   - e. Right electrical access compartment — Check
     Inspect inverter for indication of overheating or scorching.
     Check security of fuses, electrical leads, and for loose equipment.
   - f. Right upper equipment compartment — Check
     Check the oxygen filler cap for security and that the build up lever is in the BUILD UP position. Be sure the cabin pressure regulator handle is in the FLIGHT position and safety wired. The UHF radio switches must be in the BOTH, REMOTE, and VOICE position.
3. NOSE WHEEL WELL.
   - a. Gear lock safety pin — In place
   - b. Gear strut for correct inflation — 6 to 9 inches
   - c. Condition of tires, wheels and fairing doors — Check
     Check the tires and wheel assembly for slippage, and wheel lock nuts for security.
4. BOMB BAY (RIGHT SIDE).
   - a. Forward bomb door actuating cylinder — Leakage
   - b. Fuel manifolds and lines — Leakage
   - c. Defueling valve — Wired closed
   - d. No. 1 and No. 2 fuselage tank boost pumps and No. 2 probe — Leakage and connection
   - e. Aileron crossover rods — Possible distortion
   - f. Aft bomb door actuating cylinder — Leakage
   - g. Hydraulic equipment and lines — Leakage
   - h. Boost pump drains — Check for moisture
5. RIGHT WHEEL WELL.
   - a. Gear lock safety pin — In place
   - b. Gear doors, linkage, and pins — Condition
   - c. Fuel strainer — Security and leakage
   - d. Main system hydraulic accumulator — 1000 psi
   - e. Interphone switch — NORMAL and cap in place
   - f. Hydraulic fluid level — Check
   - g. Fire extinguisher bottle — 450 psi
   - h. Microswitches — Condition
   - i. Gear extender valve removed and port covered — Check
   - j. Gear strut for correction extension — 1½ to 3 inches
     Strut extension varies with airplane gross weight.

     Note

     The extension of both main gear struts should be equal.
   - k. Tire and wheel — Condition and slippage
   - l. Brake assembly — Condition
   - m. Hydraulic and fuel lines — Leakage
   - n. Wheel chocks — In place
6. RIGHT ENGINE.
   - a. Cowling — Secure
   - b. Ground cooling door — Secure and cable taut
   - c. Starter breech lock and dome — Secure

Note

Be sure that the clip is removed from the starter cartridge.

d. Front main bearing — Oil seepage

CAUTION

If oil seepage is excessive, check the front main bearing seal prior to flight.

e. Engine and generator air intake ducts — Clear
Insure that the generator duct is free of moisture.

f. Compressor blades — Check for cracks and breaks

g. Frangible doors — Condition

7. RIGHT WING.

a. Under surface of wing — Check
Inspect for fuel leaks, cracks, and security of all access doors. Check dive brakes and pylons for security and that mooring lugs are removed.

b. Fuel drain valve — No leakage
With the right wing boost pump on, inspect the fuel drain valve in the nacelle for leaks.

c. Fuel vent — Check
Inspect vent mast for cracks and distortion.

d. Navigation and taxi lights — Check

e. Tip tank — Check
Check tip tank for security, dents, and leaks.

f. Aileron and tab — Check
Remove locks and check aileron for binding and full travel.

g. Wing flaps — Condition

h. Tail pipe — Check
Check the tailpipe for cracks, dents, holes, and wrinkles and the condition of the turbine wheel. Also look for any accumulation of fuel or oil.

8. RIGHT REAR FUSELAGE.

a. Navigation lights — Condition

b. Nitrogen purge indicator and filler cap — Check
The nitrogen system gage should indicate 400 psi for airplanes in a non-combat status and 1000 psi for airplanes in a combat status.

c. Dive brake — Condition

d. Dive brake actuating cylinder — Leakage

e. Aft fuselage entrance door — Closed

f. Fuel vent mast — Cracks and distortion

g. Tail skid — Condition

9. EMPENNAGE.

a. Control locks — Removed

b. Stabilizer surfaces and tabs — Condition and freedom of movement

c. Variable-incidence stabilizer — Condition

d. Navigation lights — Condition

10. LEFT REAR FUSELAGE.

a. Dive brake — Condition

b. Dive brake actuating cylinder — Leakage

c. Aft fuselage compartment — Check
Check for fuel and hydraulic leaks. Inspect control rods and hydraulic cylinders for condition and security. Check the stowage of spare starter cartridges, control locks, and loose articles.

d. Nitrogen purge blow-out disk — Intact

11. LEFT WING.

a. Tail pipe — Check
Check the tailpipe for cracks, dents, holes, and wrinkles and the condition of the turbine wheel. Also look for any accumulation of fuel or oil.

b. Fuel drain valve — No leakage
With the left wing tank boost pump on, inspect the fuel drain valve in the nacelle for leaks.

c. Wing flaps — Condition

d. Aileron and tab — Check
Remove locks and check aileron for binding and full travel.

e. Tip tank — Check
Check tip tank for security, dents, and leaks.

f. Fuel vent — Check
Inspect vent mast for cracks and distortion.

g. Under surface of wing — Check
Inspect for fuel leaks, cracks and security of all access doors. Check landing light for condition. Check dive brakes and pylons for security and that mooring lugs are removed.

h. Navigation and taxi lights — Check

12. LEFT ENGINE.

a. Engine and generator air intake ducts — Clear
Insure that the generator duct is free of moisture.

b. Starter breech lock and dome — Secure

Note

Be sure that the clip is removed from the starter cartridge.

c. Front main bearing	Oil seepage

CAUTION

If oil seepage is excessive, have the front main bearing seal checked prior to flight.

d. Cowling	Secure
e. Ground cooling door	Secure and cable taut
f. Cabin ram air inlet duct	Clear
g. Frangible doors	Condition
h. Compressor blades	Check for cracks and breaks

13. LEFT WHEEL WELL.

a. Gear lock safety pin	In place
b. Gear doors, linkage, and pins	Condition
c. Fire extinguisher bottle	450 psi
d. Fuel strainer	Security and leakage
e. Microswitches	Condition
f. Gear extender valve removed and port covered	Check
g. Gear strut for correct extension	1½ to 3 inches

Strut extension varies with airplane gross weight.

h. Tire and wheel	Condition and slippage

Note

The extension of both main gear struts should be equal.

i. Brake assembly	Condition
j. Hydraulic and fuel lines	Leakage
k. Wheel chocks	In place

14. BOMB BAY (LEFT SIDE).

a. Forward bomb door actuating cylinder	Leakage
b. Hydraulic valves and lines	Leakage
c. No. 1 and No. 2 fuselage tank boost pumps and probe	Leakage and connection
d. Aileron cross over and control rods	Possible distortion
e. Aft bomb door actuating cylinder	Leakage
f. Boost pump drains	Check for moisture

15. LEFT NOSE SECTION.

a. Bomb door shut-off valve	FLIGHT
b. Personnel safety switch	FLIGHT
c. Battery	Connected
d. Emergency canopy initiator safety pin	Removed
e. All hatches	Secure

16. TOP SURFACE INSPECTION.

Fuel and oil tanks	Check

Check all fuel and oil tanks for quantity. Check all filler caps and doors for security. Inspect the top surface of the wings for dents, cracks, etc., and the wing dive brakes for condition.

INTERIOR INSPECTION.

1. Parachute, shoulder harness, and seat belt	Adjusted
2. Inertia reel	Unlocked
3. Oxygen hose, bail-out bottle, and radio cord	Connected
4. Seat and rudder pedals	Adjusted
5. Parking brake	Set
6. External power	Connected
7. Star valve	Closed (safetied)
8. Electrical distribution panel circuit breakers	All ON or IN
9. Emergency canopy release T-handle	In
10. UHF radio	OFF
11. Wing flaps switch	UP
12. Throttles	OFF
13. Dive brakes switch	Retract
14. Taxi and landing lights switch	OFF
15. Fire extinguisher agent discharge switch	OFF
16. Altimeter	Set to field elevation
17. Clock	Set and operating
18. Fuel panel (Group C airplanes only)	Set for start

Place the emergency fuel control switches and the wing tank-tip tank selector knobs in OFF. Insure that safety wire retains the No. 1 boost

pump switch, the No. 1 and No. 2 engine valve knobs, and the No. 1 fuselage tank transfer and bypass valve knob in ON or FLOW. Place the No. 2 fuselage tank selector knob in the flow position.

Fuel panel (Group D airplanes only) — Set for start

Place the fuel control switches and knobs in the following positions: Emergency fuel control switches, OFF; NO. 2 fuselage tank selector knob, flow; Wing tank tip tank selector knobs, OFF; NO. 1 and NO. 2 engine valve switches, ON; and the NO. 1 fuselage tank transfer and bypass valve knob in the flow to NO. 1 tank position.

19. Inverter switches — All OFF
20. Starting and ignition switches — OFF
21. Voltmeter selector switch to BAT BUS — Check voltage. (18 volts minimum)
22. Generator switches — ON
23. Oxygen quantity gage — 4.0 to 4.5 liters
24. Air conditioning control panel — Check

Place the air conditioning controls and switches in the following positions:

Dump valve guard	DOWN
Cabin pressure selector	RAM
Temperature control	AUTO

Set the temperature rheostat as desired.

25. Interphone control panel — As desired
26. Radio compass — OFF
27. APW-11A radar set — OFF
28. Windshield control panel — All switches OFF
29. Defog air knob — As desired
30. A-c and d-c circuit breakers — All in except GPI
31. Lighting control panel switches — As desired
32. IFF — OFF
33. AIC filter switch — BOTH
34. Oxygen system — Checked

a. Place the diluter lever in NORMAL OXYGEN and blow gently into the oxygen regulator hose. (A resistance to blowing indicates satisfactory operation of the demand diaphragm.)

b. Place the diluter lever in 100% OXYGEN and blow gently into the oxygen regulator hose. (A resistance to blowing indicates satisfactory operation of the demand diaphragm and diluter air valve.)

c. Don the mask and connect the mask to the regulator hose. (Breathe normally and note operation of the blinker dial.)

d. Hold breath and place the EMERGENCY pressure lever to the right or left. (A positive pressure felt within the mask indicates proper emergency oxygen flow.)

e. Depress the EMERGENCY pressure lever while holding the breath to test the mask for leakage. (A properly fitted mask will retain the EMERGENCY oxygen pressure until normal breathing is resumed.)

f. Mask hose fittings are properly seated and secure.

g. The mask hose attachment to the parachute harness is as required.

35. All indicator and warning lights — PRESS TO TEST

INTERIOR INSPECTION (NIGHT FLIGHT)

For night operation, perform all of the preceding checks, and add the following:

1. Navigation lights — ON
2. All other lights — Checked

Note

Spare lamps are in a kit on the pilot's right console. Fuses and additional spare lamps are in the right electrical access compartment and are inaccessible in flight.

BEFORE STARTING ENGINES.

When available, use an external source for starting the engines. When using battery power to start the engines, turn off all unnecessary electrical equipment.

Note

A battery contactor joins the battery to the 28-volt d-c generator bus. Placing the battery switch on completes a circuit from the battery to the battery contactor. The battery must be of sufficient voltage (approximately 18 volts) to close the contactor and join the battery to the 28-volt generator bus. Since the starting and fuel systems receive their power from the generator bus, you will be unable to start the engines if the battery voltage is low. To determine battery voltage, place the voltmeter selector switch in BAT BUS and observe the voltmeter.

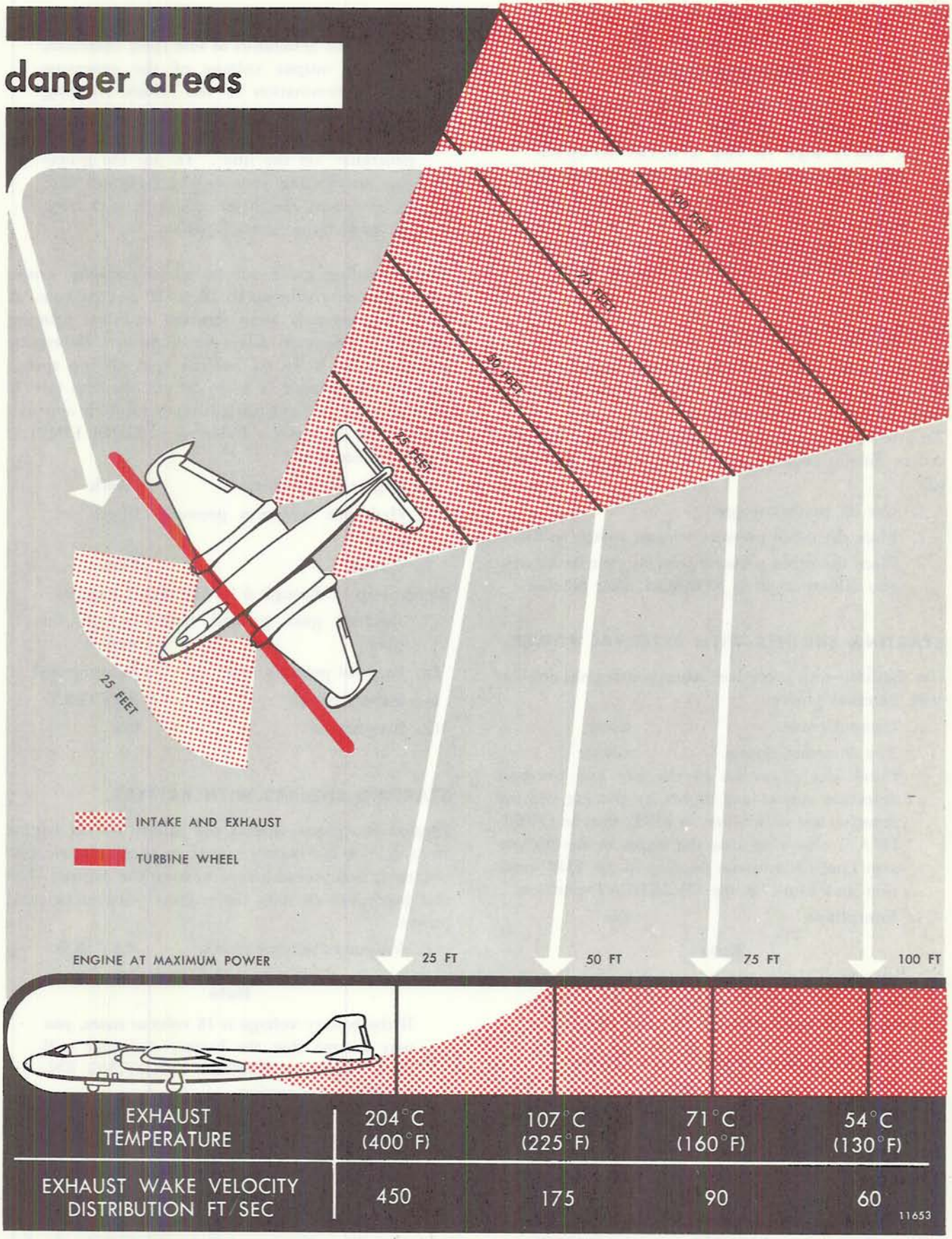

danger areas
100 FEET
75 FEET
50 FEET
25 FEET
25 FEET
INTAKE AND EXHAUST
TURBINE WHEEL
ENGINE AT MAXIMUM POWER
25 FT
50 FT
75 FT
100 FT
EXHAUST TEMPERATURE
204°C (400°F)
107°C (225°F)
71°C (160°F)
54°C (130°F)
EXHAUST WAKE VELOCITY DISTRIBUTION FT/SEC
450
175
90
60
11653

Figure 2-4

WARNING

Insure that the starting and ignition switch is OFF before placing a cartridge in the starter breech. All ground personnel must be at least 25 feet from the plane of rotation of the starter turbine wheel before starting the engines. See DANGER AREAS, figure 2-4.

STARTING ENGINES.

When practicable, head the airplane into the wind when starting the engines to keep fumes out of the cabin and to aid engine cooling.

To avoid carbon-monoxide poisoning, follow this procedure during engine start, taxiing, run-up, and take-off:

1. Use 100 percent oxygen.
2. Place the cabin pressure selector switch in RAM.
3. Place the cabin pressure selector switch and oxygen diluter lever to NORMAL after take-off.

STARTING ENGINES WITH EXTERNAL POWER.

Use the following procedure when starting the engines with external power:

1. Ground crew — Clear
2. Fire detection system — Check
   Check the operation of the fire and overheat detection system and lights by placing the fire detector test switch first in FIRE, then in OVERHEAT, observing that the lights in the pull-to-arm knobs illuminate steadily in the FIRE position and blink in the OVERHEAT position.
3. Interphone — On

Note

Distinct clicks over the interphone or from outside the airplane indicates proper functioning of the timer and ignition circuit.

4. NO. 2 engine throttle — IDLE
5. NO. 2 start and ignition switch — START

Note

- A faulty throttle microswitch can prevent detonation of the cartridge. If the cartridge does not detonate, attempt the start by placing the starting and ignition switch in the CRANK ONLY position.
- The voltage regulators do not effectively control the generators at idle rpm; therefore, the low output voltage of the generator causes illumination of the failure warning light. Under this condition, placing the generator switch in RESET does not put the generator "on the line". To put the generator on the line, increase the generator rpm by advancing the throttle slightly or increase the load on the electrical system.

The expanding gas from the starter cartridge causes the engine to accelerate to 18 to 22 percent rpm. A timer automatically stops ignition and fuel priming after 15 ± 3 seconds. After the "light-up", the engine accelerates to 36 to 42 percent rpm (idling speed) and the oil pressure is 10 to 20 psi, the fuel flow is 1000 pph, and the exhaust gas temperature is approximately 550 degrees C. Refer to ENGINE LIMITATIONS in Section V.

6. Engine instruments — Check
7. Hydraulic system pressure gage — Check
8. Canopy — Close

Repeat steps 4 through 6 for the NO. 1 engine.

9. Landing gear ground lock pins — In sight, then stowed
10. External power source — Disconnected
11. Battery switch — BATTERY
12. Inverters — On

STARTING ENGINES WITH BATTERY.

Because you must conserve the battery for the engine start, do not use battery power to check electrical or electronic equipment before starting the engines. Use this procedure to start the engines without external power:

1. Voltmeter selector switch — BAT BUS

Note

If the battery voltage is 18 volts or more, you may assume that the battery contactor will close. Refer to BEFORE STARTING ENGINES in this section.

2. Ground crew — Clear
3. Battery switch — BATTERY
4. Fire detection system — Check
   Check the operation of the fire and overheat detection system and lights by placing the fire detector test switch first in FIRE, then in OVER-

HEAT, observing that the lights in the pull-to-arm knobs illuminate steadily in the FIRE position and blink in the OVERHEAT position.

5. Interphone ON

Note

Distinct clicks over the interphone or from outside the airplane indicate proper functioning of the timer and ignition circuit.

6. NO. 2 engine throttle IDLE
7. NO. 2 start and ignition switch START

The expanding gas from the starter cartridge causes the engine to accelerate to 18 to 22 percent rpm. A timer automatically stops ignition and fuel priming after 15 ± 3 seconds. After the engine "light-up", the engine accelerates to 36 to 42 percent rpm (idling speed) and the oil pressure is 10 to 20 psi, the fuel flow is 1000 pph, and the exhaust gas temperature is approximately 550 degrees C. Refer to ENGINE LIMITATIONS in Section V.

Note

Do not turn off the battery switch if the engine fails to start. Instead immediately attempt to start the other engine.

8. Engine instruments Check
9. Hydraulic system pressure gage Check
10. Canopy Close

Repeat steps 6 through 8 for the NO. 1 engine.

11. Gear lock safety pins In sight, then stowed
12. Inverters On

HOT START.

A faulty starter cartridge, timer, or primer can cause a hot start. The maximum permissible exhaust temperature during starting is 800 degrees C. If the exhaust gas exceeds this temperature:

1. Immediately place the throttle OFF.
2. Determine the cause of the excessive temperature.
3. Attempt a second start after eliminating the cause of the overtemperature and allowing the fuel to drain from the combustion chamber.
4. Record in DD Form 781 all starting temperatures that reach or exceed the limit. The engine requires an inspection after five hot starts.

FALSE START.

If the exhaust gas temperature does not rise before the engine accelerates to 17 percent rpm:

1. Move the throttle to OFF.
2. Eliminate the cause of the false start before making further starting attempts.
3. Be sure that surplus fuel is completely drained from the combustion chamber before attempting another start.

CAUTION

Because of the excessive heat generated by the ignition coils during the starting cycle, make only two consecutive starting attempts. A 20-minute cooling period is required before making a third attempt. After 40 minutes or longer, this cycle may be repeated.

BEFORE TAXIING.

Refer to Section V for the exhaust gas temperature allowed for steady-state operation. If the exhaust temperature exceeds the maximum limit, shut down the engine immediately. Complete the following checks before taxiing.

1. Generators Check output
2. Voltmeter selector switch Check all positions
3. Aileron trim Neutral (green light)
4. Rudder trim Neutral (green light)

Note

Prior to checking rudder trim, neutralize the rudder.

5. Horizontal stabilizer override switch (Group O Airplanes) NOR

5a. Horizontal stabilizer emergency switch (Group P Airplanes) NORMAL

6. Horizontal stabilizer (Group O Airplanes) ¼ division nose down

Actuate the horizontal stabilizer through a complete cycle in the normal system. Then use the override switches to actuate the stabilizer through a complete cycle and return the system to normal. Have the ground crew observe the stabilizer travel during check.

6a. Horizontal stabilizer (Group P Airplanes) 0°

Actuate the stabilizer through a complete cycle. Have the ground crew observe the stabilizer travel during the check.

7. UHF radio On
8. J2 COMP SLAVE switch IN

CAUTION

The main system hydraulic pressure gage is a good indication of the proper functioning of the hydraulic system. Normally, the gage will show an imperceptible amount of movement and will indicate only an occasional recharge of the system at about 2-1/2 minute intervals. When no hydraulic component is being operated and the main system gage shows a continual oscillation, or a constant value of approximately 3,500 psi, these are indications of a malfunction of the hydraulic system. It is good pilot practice to check this after the gear has been retracted during the initial climb out after take-off. Discovery of a hydraulic malfunction at this stage of the flight may make possible a normal immediate landing without recourse to emergency procedures. Rapid continued fluctuation of this gage will indicate a malfunctioning or bypassing control valve which will generate excessive heat in the hydraulic lines. Rapid continued fluctuation of the gage will also indicate hydraulic leak in a pressure line or certain failures of the accumulator.

9.	Flight and engine instruments	Check
10.	Fuel quantity	Check (all tanks)
11.	Fuel quantity indicator	Test
12.	IFF	As desired
13.	Radio compass function control	ANT
14.	GPI circuit breakers	In
15.	Bomb door, dive brakes, and flaps (Group O and P airplanes)	Close and retract
15a.	Elevator system bungee (Group P airplanes)	Check operation

Check the operation of the elevator system bungee by cycling the wing flap system. As the wing flaps extend and retract, a slight movement of the control column should occur indicating operation of the bungee.

Note

Check with the ground crew for the position of the bomb door, dive brakes, and flaps.

16.	Seat safety pin	Remove and stow
17.	Brake pressure	1000 psi minimum
18.	UHF radio	Check
19.	Chocks	Remove
20.	Parking brake	OFF

TAXIING.

Steer the airplane by applying differential pressure to the brake pedals. The engines consume approximately 8 gallons (52) pounds of fuel a minute during taxiing under normal conditions. Complete the following checks while taxiing:

1.	Brakes	Check
2.	Turn and slip indicator	Check

CAUTION

Stop taxiing and request a tow to the parking area if a loss of air charge in the nose oleo strut causes excessive noise, bottoming, or hard riding. Turning the nose wheel more than 20 degrees without air in the oleo will cause damage to the nose wheel and airplane structure.

Note

During night ground operation, the landing light should be used when necessary to supplement the taxi lights.

Figure 2-5 is deleted.

BEFORE TAKE-OFF.

PREFLIGHT AIRPLANE CHECK.

After taxiing to the take-off area, hold the brakes and check the following:

1.	Trim	Checked
2.	Cabin pressure selector switch	RAM
3.	Pitot heater switch	As desired
4.	Canopy	Closed, light out
5.	Wing flaps switch	UP
6.	Seat belt and shoulder harness	Adjusted
7.	Inertia reel	Unlocked
8.	Flight controls	Check travel, free and correct movement

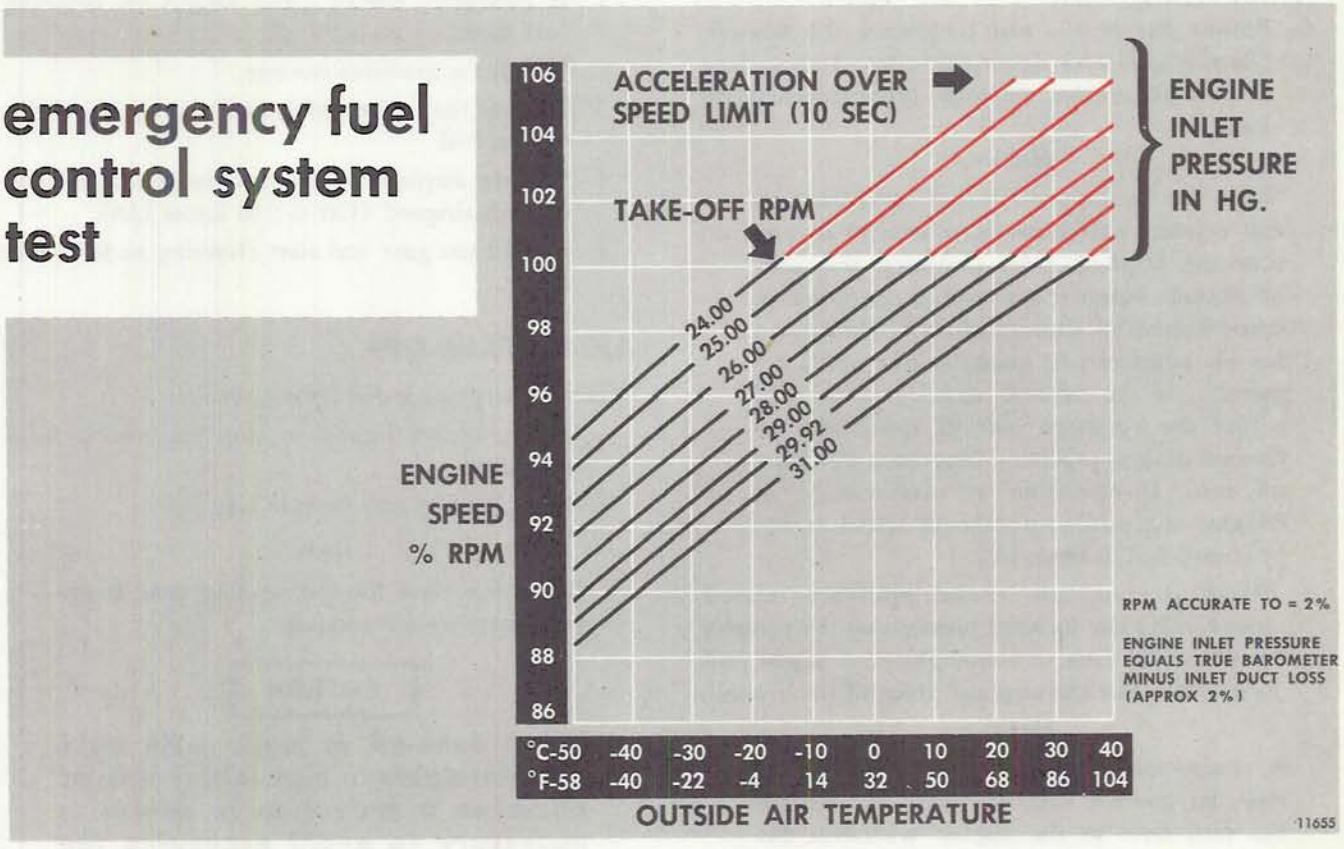


Figure 2–6

Note

Prior to checking rudder movement, neutralize the rudder trim.

PREFLIGHT ENGINE CHECK.

1. Check that the fuel controls are in the following positions:

Engine valve knobs	Flow
No. 1 fuselage tank boost pumps switch (Group C airplanes only)	Wired ON
Fuel transfer and bypass valve knob	Flow to No. 1 fuselage tank
No. 2 fuselage tank knob	Flow

Note

Assure that the NO. 2 fuselage tank is feeding into the NO. 1 fuselage tank.

2. Advance the throttle for No. 1 engine to 90 percent rpm.
3. Place the emergency fuel control switch for No. 1 engine in EMERGENCY. The emergency fuel control warning light should come on.

Note

The engine rpm will increase or decrease immediately if the ambient conditions differ from those of a standard day. If the ambient conditions are near standard, no apparent change will occur.

4. Advance the throttle for No. 1 engine to FULL and check the rpm against figure 2–6.

CAUTION

If the results obtained in step 4 are not ± 2 percent of the value specified in figure 2–6, maintenance will be required.

5. If the results are satisfactory, retard the throttle slowly to IDLE, and place the emergency fuel control switch in OFF when the rpm drops to 60 percent during deceleration. This will return the engine to the normal fuel control system.
6. Repeat the above procedure for No. 2 engine.
7. Check the engine instruments for satisfactory readings.

TAKE-OFF.

1. Align the airplane with the runway and check the heading indication.
2. Depress the brakes.
3. Advance throttles to FULL and check engine instruments for normal readings.
4. Partially tighten the throttle friction knob to prevent "creepback" during take-off.

5. All warning lights Out
6. Release the brakes and commence the take-off. Use the brakes for directional control until there is positive rudder response (approximately 60 knots).

Note

When the brakes are released, hold the control column well forward of neutral to prevent the airplane from assuming the take-off attitude before it has reached the optimum take-off speed of approximately 110 knots IAS for an approximate gross weight of 45,000 pounds. If the take-off attitude is assumed before the optimum take-off speed, the increased drag appreciably lengthens the take-off run. If operating at maximum gross weight, the optimum take-off speed is approximately 120 knots IAS.

7. When the airplane attains optimum take-off speed, relax the forward pressure on the controls to allow the nose to rise slightly. A slight pull is necessary for the airplane to fly off the ground.

Note

A compressor discharge pressure limiter in the fuel control unit automatically reduces the fuel flow to the engine whenever the compressor discharge pressure exceeds a certain value. This excess pressure occurs at high speeds, low altitudes, and on cold days. Learn to recognize this condition to avoid unnecessary concern regarding the proper functioning of the engine fuel system.

CROSS-WIND TAKE-OFF.

In addition to the normal take-off procedure:

1. Increase the nose wheel lift-off speed approximately 10 to 15 knots IAS by holding the nose wheel down a little longer during ground run.
2. Anticipate drift when the airplane lifts off; then lower a wing or "crab" into the wind.

NIGHT TAKE-OFF.

Night take-off procedure is the same as daylight operation; however, a thorough knowledge of switch and light location is essential. Follow this additional procedure:

1. Adjust the cabin and instrument lights to the desired brilliance.
2. Use the runway lights for reference to maintain alignment with the runway on take-off run.

MINIMUM-RUN TAKE-OFF.

Refer to the take-off distance chart in APPENDIX I for the minimum distance required. To make a short take-off:

1. If necessary, reduce gross weight by reducing fuel load.
2. Use all the available runway.
3. Depress the brake pedals and advance the throttles to full.
4. Pull the airplane off the runway at a lower than normal airspeed (130 to 140 knots IAS).
5. Retract the gear and start climbing at 340 knots IAS.

AFTER TAKE-OFF.

When the airplane is definitely airborne:

1. Apply brakes lightly to stop the wheels from spinning.
2. Place landing gear lever in UP.

Note

Retraction time for the landing gear is approximately eight seconds.

CAUTION

When take-off is made with light gross weights, a high initial rate of climb or a reduction in power is necessary to avoid exceeding the 200 knots IAS maximum speed, for extended landing gear.

3. Accelerate to the safe single engine speed by maintaining the take-off attitude.
4. Check the landing gear warning light and position indicators for an "up" indication.
5. Place the cabin pressure selector switch in NORMAL.
6. Position the cabin temperature selector as desired.
7. Place the oxygen selector lever to NORMAL.

CLIMB.

Refer to the Performance Data Charts in Appendix I for best climb speeds and approximate time to attain a desired altitude with varied gross weights and configurations. Establish the initial climb at 340 knots IAS.

CAUTION

The maximum time allowed for use of maximum or military thrust is 30 minutes. Reduce power to 96.5 percent rpm for maximum continuous power as soon after take-off as practicable.

TRANSFERRING FUEL CONTROL.

To transfer from emergency fuel control to normal fuel control during flight, use the following procedure:

1. Set the throttle at 90% rpm.
2. Retard the throttle slowly to IDLE and place the emergency fuel switch to OFF at 60% rpm or less during the deceleration.
3. Accelerate slowly to the desired rpm.

CRUISE.

Refer to Appendix I for cruise data and to Section VII for fuel management procedure.

FLIGHT CHARACTERISTICS.

Refer to Section VI for information on flight characteristics.

DESCENT.

Refer to the descent charts in Appendix I. Before descent, complete the following checks:

1. Place the windshield anti-icing switch in ANTI-ICING position.

Note

Whenever possible, turn on the windshield anti-icing switch thirty minutes before a descent.

2. Pull the defog air knob up.
3. Turn on the defog hot air switch.
4. Adjust the defog air rheostat as desired.
5. Turn on the pitot heater.
6. Retard the throttles as necessary to avoid excessive airspeed.
7. If necessary, place the dive brake switch in EXTEND.

TRAFFIC PATTERN CHECK.

1. Alert the observer for landing

CAUTION

When landing with the emergency fuel control switches in EMERGENCY, move the throttles slowly and smoothly to avoid engine compressor stall or overspeed.

2. All armament switches	OFF or SAFE
3. Fuel transfer and bypass valve knob	Flow to NO. 1 tank
4. NO. 1 fuselage tank boost pump switch (group C airplanes only)	ON
5. Applicable fuel tank (containing fuel) knob	Flow

Note

If the NO. 2 fuselage tank contains fuel, assure the NO. 2 fuselage tank selector knob is in the flow position and that the NO. 2 tank is feeding the NO.1 fuselage tank.

6. Oxygen	100%
7. Safety belt and shoulder harness	Adjusted and tight
8. Inertia reel	Unlocked

The remaining operations, the places at which they are to be performed, and the safe approach speeds are shown on the Typical Landing Pattern Diagram. (See figure 2-7.)

9. Landing gear handle	DOWN

CAUTION

Do not lower the gear above 200 knots IAS.

Note

The landing gear extension time is approximately six seconds. Operation of two or more hydraulic sub-circuits at the same time will not lengthen the normal operating time.

10. Landing gear position indicators	Down
11. Landing gear warning light	Out
12. Dive brakes	As desired
13. Flaps	Down
14. Main hydraulic system pressure gage	2500 psi minimum
15. Brake pressure gage	1000 psi minimum

CAUTION

Do not check brake operation by depressing the pedals after an emergency landing gear extension.

Note

Lowering the flaps causes the airplane to pitch up. On rare occasions the flaps may operate slightly out of unison. You will notice it because of a moderate rolling tendency. This condition lasts for one or two seconds, and is easily controlled.

Figure 2-7 (Sheet 1 of 2)

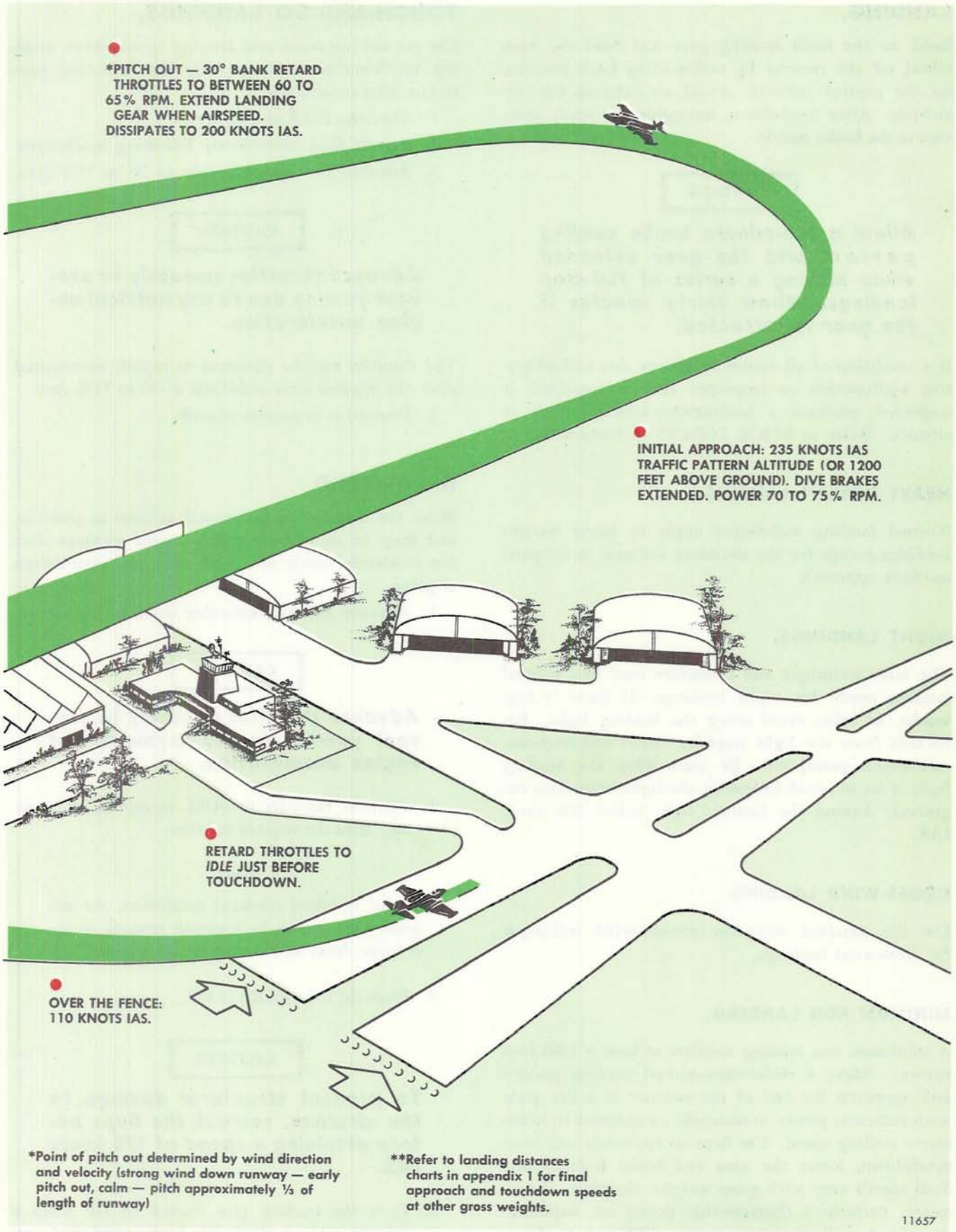


Figure 2–7 (Sheet 2 of 2)

LANDING.

Land on the main landing gear and hold the nose wheel off the runway by maintaining back pressure on the control column. Avoid an extreme tail-low attitude. After touchdown, intermittently apply pressure to the brake pedals.

CAUTION

Allow a ten-minute brake cooling period with the gear extended when making a series of full-stop landings. Allow thirty minutes if the gear is retracted.

If a condition of aft center of gravity due to fuel system malfunction or improper fuel management is suspected, perform a landing-characteristic stall at altitude. Refer to STICK FORCES in Section VI.

HEAVY WEIGHT LANDING.

Normal landing techniques apply to heavy weight landings except for the necessary increase in airspeed on final approach.

NIGHT LANDINGS.

The same technique and procedure used in a normal landing apply for night landings. If there is fog, smoke, or haze, avoid using the landing light. Reflection from the light impedes vision and may distort depth perception. Be alert when the landing light is on to avoid following the light beam into the ground. Extend the landing light below 200 knots IAS.

CROSS-WIND LANDING.

Use the standard wing-low-into-the-wind technique for cross-wind landings.

MINIMUM RUN LANDING.

A minimum run landing requires at least a 3000 foot runway. Make a wider-than-normal landing pattern and approach the end of the runway in a flat glide with sufficient power to maintain an airspeed 10 knots above stalling speed. Use flaps on approach and, after touchdown, lower the nose and brake immediately. Stall speeds vary with gross weight; therefore, if necessary, perform a characteristic power on, flaps-and-gear-down stall at approximately 5000 feet to determine the airspeed on final approach.

TOUCH-AND-GO LANDINGS.

Use normal approach and landing speeds when making touch-and-go landings. Use the following procedure after touchdown.

1. Throttles IDLE at touchdown.
2. Retract flaps immediately following touchdown.
3. Advance throttles smoothly to 70 to 75% rpm.

CAUTION

Advance throttles smoothly to prevent yawing due to asymetrical engine acceleration.

The throttles may be advanced as rapidly as required after the engines have stabilized at 70 to 75% rpm.

4. Proceed as in normal take-off.

GO-AROUND.

Make the decision to go around as soon as possible, and keep in mind that a jet-powered airplane does not accelerate nearly as rapidly as a propeller-driven airplane.

1. Advance throttles smoothly to 70 to 75 percent.

CAUTION

Advance throttles smoothly to prevent yawing due to asymmetrical engine acceleration.

2. Advance throttles to FULL as rapidly as necessary after the engines stabilize.

Note

Under standard sea-level conditions, the engines take eleven to fourteen seconds to accelerate from idle to maximum thrust.

3. Place the flaps switch in UP.

CAUTION

To prevent structural damage to the airplane, retract the flaps before attaining a speed of 170 knots IAS.

4. Place the landing gear control in UP when a definite rate of climb has been established and contact with the ground will not be made.

Note

During the go-around it may be necessary to touchdown momentarily; therefore, establish a climb before raising the gear.

CAUTION

To prevent structural damage to the airplane, retract the landing gear before attaining a speed of 200 knots IAS.

5. Place the dive brakes switch in RETRACT to retract the brakes.
6. Make trim changes as necessary.

AFTER LANDING.

1.	Wing flaps	UP
2.	Dive brakes	RETRACT
3.	Trim indicators	Neutral (green lights)
4.	Canopy	As desired

Note

If practicable, park the airplane headed into the wind and wait at least 15 minutes before putting on the engine covers or moving the airplane into the hangar. This is to disperse fuel fumes which might be present and which could cause an explosion.

STOPPING ENGINES.

Note

If the engines are being shut down from 95 percent rpm or above, pause for at least one minute at IDLE power to allow temperature conditions in the engines to stabilize, and then place the throttles in OFF. If engines are being shut down from below 95 percent rpm, throttles may be moved immediately to OFF.

1.	Parking brake	Set
2.	Throttle NO. 2	Off

Note

Shut down the No. 2 engine first and check the hydraulic pump operation of the No. 1 engine.

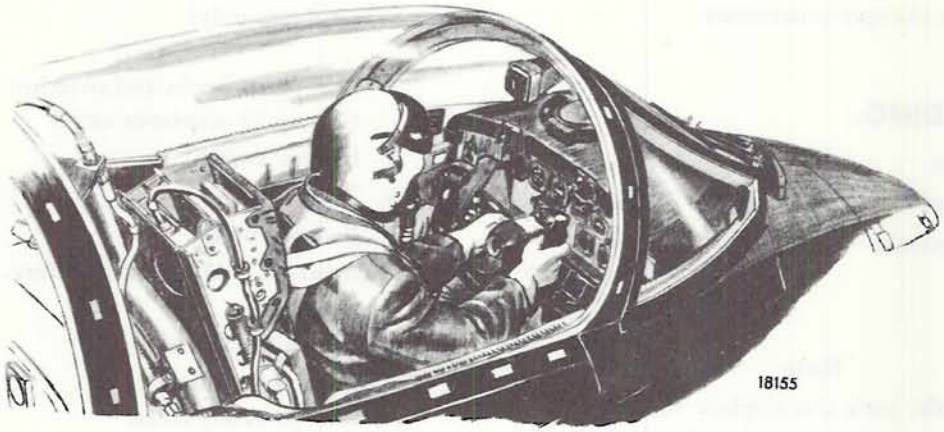
3.	Hydraulic pressure NO. 1 engine	Checked
4.	All radios and IFF	OFF
5.	Inverters	OFF
6.	Oxygen supply lever	OFF
7.	Throttle NO. 1	OFF
8.	Fuel panel knobs (Group C airplanes only)	All OFF except those which are safetied
	Fuel panel knobs and switches (Group D airplanes only)	All OFF
9.	Battery switch	OFF
10.	Wheel chocks	In place
11.	Parking brake	OFF
12.	Armrest and canopy safety pins	Installed
13.	All electrical switches	OFF
14.	Control column	Secured
15.	Canopy safety collar	In place

BEFORE LEAVING AIRPLANE.

WARNING

Be sure that the seat safety pins are in place before leaving the airplane. Personnel might fire one of the explosive charges and it could result in serious injury or death.

1.	Gear lock safety pins	In place
2.	Battery	Disconnected
3.	Personnel safety switch	SAFE
4.	Bomb bay door shut-off valve	SAFE
5.	Complete DD Form 781	Check


18155

B-57B

CONDENSED CHECK LIST

2 July 1956

Revised 2 January 1957

CUT ON BLACK LINE

CUT ON BLACK LINE

B-57B CONDENSED CHECK LIST

BEFORE ENTERING THE AIRPLANE.

Flight Restrictions	Checked

FLIGHT PLANNING.

1. Flight data and equipment	Available and checked
2. Cruise control data	Checked
3. Fuel, oil, oxygen, armament and special equipment	Checked
4. Observer briefed on mission and emergency procedures	Checked
5. Clearance filed	Checked

BEFORE EXTERIOR INSPECTION.

1. Canopy	Condition
2. Canopy safety pin	In place
3. Seat armrest safety pins, front and rear	In
4. DD Form 781	Check
5. Publications	In place
6. All armament switches	OFF or SAFE
7. Tip tank jettison switch	OFF
8. Landing gear lever	Down
9. Emergency gear T-handle	In
10. Battery switch	OFF
11. Power distribution circuit breaker panel	All circuit breakers in
12. Seat quick-disconnect pins	In place
13. All emergency equipment	Stowed
14. Main system hydraulic pressure gage	Zero pressure

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EXTERIOR INSPECTION.

1. LEFT NOSE SECTION

a. Bomb door shut-off valve	SAFE
b. Personnel safety switch	SAFE
c. Battery compartment	Check
d. Left electrical access compartment	Check
e. Shoran antenna	Condition
f. Static air vent	Open and clean
g. Nose hatch	Secure

2. RIGHT NOSE SECTION

a. Pitot cover	Removed
b. Static air vent	Open and clean
c. UHF antenna	Condition
d. Pressure regulator static vent	Open
e. Right electrical access compartment	Check
f. Right upper equipment compartment	Check

3. NOSE WHEEL WELL.

a. Gear lock safety pin	In place
b. Gear strut for correct inflation	6 to 9 inches
c. Tires, wheels, fairing, and doors	Check

4. BOMB BAY (RIGHT SIDE).

a. Forward bomb door actuating cylinder	Leakage
b. Fuel manifolds and lines	Leakage

2

CUT ON BLACK LINE

CUT ON BLACK LINE

c. Defueling valve	Wired closed
d. No. 1 and No. 2 fuselage boost pumps and No. 2 probe	Leakage and connection
e. Aileron crossover rods	Possible distortion
f. Aft bomb door actuating cylinder	Leakage
g. Hydraulic lines	Leakage
h. Boost pump drains	Check for moisture
5. RIGHT WHEEL WELL.	
a. Gear lock safety pin	In place
b. Gear doors, linkage and pins	Condition
c. Fuel strainer	Security and leakage
d. Main system hydraulic accumulator	1000 psi
e. Interphone switch	NORMAL and cap in place
f. Hydraulic fluid level	Check
g. Fire extinguisher bottle	450 psi
h. Microswitches	Condition
i. Gear extender valve removed and port covered	Check
j. Gear strut for correct extension	1½ to 3 inches
k. Tire and wheel	Condition and slippage
l. Brake assembly	Condition and slippage
m. Hydraulic and fuel lines	Leakage
n. Wheel chocks	In place
6. RIGHT ENGINE	
a. Cowling	Secure
b. Ground cooling door	Secure and cable taut
c. Starter breech lock and dome	Secure

3

CUT ON BLACK LINE

d. Front main bearing	Oil seepage
e. Engine and generator air intake ducts	Clean
f. Compressor blades	Checked for cracks and breaks
g. Frangible doors	Condition
7. RIGHT WING.	
a. Under surface of wing	Check
b. Nacelle fuel drain valve	No leakage
c. Fuel vent	Check
d. Navigation and taxi lights	Check
e. Tip tanks	Check
f. Aileron	Check
g. Wing flaps	Condition
h. Tail pipe	Condition and warpage
8. RIGHT REAR FUSELAGE.	
a. Navigation lights	Condition
b. Nitrogen purge indicator and filler cap	Check
c. Dive brakes	Condition
d. Dive brake actuating cylinder	Leakage
e. Aft fuselage entrance door	Closed
f. Fuel vent mast	Cracks and distortion
g. Tail skid	Condition
9. EMPENNAGE.	
a. Control locks	Removed
b. Stabilizer surfaces and tabs	Condition and freedom of movement
c. Variable incidence stabilizer	Condition
d. Navigation lights	Condition
10. LEFT REAR FUSELAGE.	
a. Dive brake	Condition
b. Dive brake actuating cylinder	Leakage
c. Aft fuselage compartment	Check
d. Nitrogen purge blow-out disk	Intact

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CUT ON BLACK LINE

11. LEFT WING.	
a. Tail pipe	Condition and warpage
b. Nacelle fuel drain valve	No leakage
c. Wing flaps	Condition
d. Aileron	Check
e. Tip tanks	Check
f. Fuel vent	Check
g. Under surface of wing	Check
h. Navigation and taxi lights	Check
12. LEFT ENGINE.	
a. Engine and generator air intake ducts	Clear
b. Starter breech lock and dome	Secure
c. Front main bearing	Oil seepage
d. Cowling	Secure
e. Ground cooling door	Secure and cable taut
f. Cabin ram air inlet duct	Clear
g. Frangible doors	Condition
h. Compressor blades	Condition
13. LEFT WHEEL WELL.	
a. Gear lock safety pin	In place
b. Gear doors, linkage and pins	Condition
c. Fire extinguisher bottle	450 psi
d. Fuel strainer	Security and leakage
e. Micro switches	Condition
f. Gear extender valve removed and port covered	Check
g. Gear strut for correct extension	1½ to 3 inches
h. Tire and wheel	Condition and slippage
i. Brake assembly	Condition and slippage
j. Hydraulic and fuel lines	Leakage
k. Wheel chocks	In place

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14. BOMB BAY (LEFT SIDE).

a. Forward bomb door actuating cylinder	Leakage
b. Hydraulic valves and lines	Leakage
c. No. 1 and No. 2 fuselage tank booster pumps and probe	Leakage and connection
d. Aileron cross over and control rods	Possible distortion
e. Aft bomb door actuating cylinder	Leakage
f. Boost pump drains	Check for moisture

15 LEFT NOSE SECTION.

a. Bomb door shut-off valve	FLIGHT
b. Personnel safety switch	FLIGHT
c. Battery	Connected
d. Emergency canopy initiator safety pin	Removed
e. All hatches	Secure

16. TOP SURFACE INSPECTION.

a. Fuel and oil tanks	Checked and full Caps and doors secure

INTERIOR CHECK.

1. Parachute, harness, and seat belt	Adjusted
2. Inertia reel	Unlocked
3. Oxygen hose, bail-out bottle and radio cord	Connected
4. Seat and rudder pedals	Adjusted
5. Parking brake	Set
6. External power	Connected

6

CUT ON BLACK LINE

CUT ON BLACK LINE

7.	Star valve	Closed (safetied)
8.	Electrical distribution panel circuit breakers	All in or ON
9.	Emergency canopy release T-handle	In
10.	UHF radio	OFF
11.	Wing flaps switch	UP
12.	Throttles	OFF
13.	Dive brakes switch	RETRACT
14.	Taxi and landing lights	OFF
15.	Fire extinguisher agent discharge switch	OFF
16.	Altimeter	Set to field elevation
17.	Clock	Set and operating
18.	Fuel panel	Set for start
19.	Inverter switches	ALL OFF
20.	Starting and ignition switches	OFF
21.	Voltmeter selector switch to BATT	Check voltage (18 volts min.)
22.	Generators switches	ON
23.	Oxygen quantity gage	4.0 to 4.5 liters
24.	Air conditioning control panel	Check
25.	Interphone control panel	As desired
26.	Radio compass	OFF
27.	APW-11A radar set	OFF
28.	Windshield control panel	All switches OFF
29.	Defog knob	As desired
30.	A-c and d-c circuit breakers	All in except GPI
31.	Lighting control panel	As desired
32.	IFF	OFF
33.	AIC filter switch	BOTH
34.	Oxygen system	Checked
35.	All indicator and warning lights	PRESS TO TEST

7

INTERIOR INSPECTION (NIGHT FLIGHT)

1. Navigation lights	ON
2. All other lights	Checked

BEFORE STARTING ENGINES.

1. Voltmeter selector switch	BAT and check voltage
2. Ground personnel	Clear
3. Use 100% oxygen	Check

STARTING ENGINES.

STARTING ENGINES WITH EXTERNAL POWER.

1. Ground crew	Clear
2. Fire detection system	Check
3. Interphone	On
4. NO. 2 engine throttle	IDLE
5. NO. 2 start and ignition switch	START
6. Engine instruments	Check
7. Hydraulic system pressure gage	Check
8. Canopy	Close

Repeat steps 4 through 6 for the NO. 1 engine.

9. Landing gear ground lock pins	In sight then stowed
10. External power source	Disconnected
11. Battery switch	BATTERY
12. Inverters	On

STARTING ENGINES WITH BATTERY.

1. Voltmeter selector switch	BAT BUS
2. Ground crew	Clear
3. Battery switch	BATTERY
4. Fire detection system	Check

8

CUT ON BLACK LINE

CUT ON BLACK LINE

5. Interphone	ON
6. NO. 2 engine throttle	IDLE
7. NO. 2 start and ignition switch	START
8. Engine instruments	Check
9. Hydraulic system pressure gage	Check
10. Canopy	Close

Repeat steps 6 through 8 for the NO. 1 engine.

11. Landing gear pins	In sight; then stowed
12. Inverters	On

BEFORE TAXIING.

1. Generator	Check output
2. Voltmeter selector switch	Check all positions
3. Aileron trim	Neutral (green light)
4. Rudder trim	Neutral (green light)
5. Horizontal stabilizer override switch (Group O Airplanes)	NOR
5a. Horizontal stabilizer emergency switch (Group P Airplanes)	NORMAL
6. Horizontal stabilizer (Group O Airplanes)	¼ division nose down
6a. Horizontal stabilizer (Group P Airplanes)	0°
7. UHF radio	On
8. J2 COMP SLAVE switch	IN
9. Flight and engine instruments	Check
10. Fuel quantity	Check (all tanks)
11. Fuel quantity indicator	Test
12. IFF	As desired
13. Radio compass function control	ANT
14. GPI circuit breakers	In
15. Bomb door, dive brakes and flaps (Group O and P airplanes)	Close and Retract
15a. Elevator system bungee (Group P airplanes)	Check operation
16. Seat safety pins	Remove and stow
17. Brake pressure	1000 psi minimum
18. Chocks	Remove

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19. Parking brake	OFF

TAXIING.

1. Brakes	Check
2. Turn-and-slip indicator	Check

BEFORE TAKE-OFF.

PREFLIGHT AIRPLANE CHECK.

1. Trim devices	Check
2. Cabin pressure selector switch	RAM
3. Pitot heater switch	As desired
4. Canopy	Closed, light out
5. Wing flaps switch	UP
6. Seat belt and shoulder harness	Adjusted
7. Inertia reel	Unlocked
8. Flight controls	Check travel, free and correct movement

PREFLIGHT ENGINE CHECK.

1. Fuel controls	Check
2. No. 2 fuselage tank valve knob	Flow
3. No. 2 fuselage tank	Feeding
4. Advance No. 1 engine throttle	90% rpm
5. No. 1 engine emergency fuel control switch	Emergency (check light)
6. No. 1 engine throttle	FULL (check rpm)
7. No. 1 emergency fuel control switches	OFF (60% rpm or less)
8. Repeat procedure for No. 2 engine	
9. Instruments	Check

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CUT ON BLACK LINE

CUT ON BLACK LINE

TAKE-OFF.

1. Align the airplane with the runway and check the heading indication.
2. Depress the brakes
3. Throttles — FULL
4. Throttle friction knob — Tighten
5. All warning lights — Out
6. Release brakes

AFTER TAKE-OFF.

1. Brakes — Applied
2. Landing gear lever — UP
3. Safe single engine speed — 155 knots
4. Landing gear position indicators — Up indication
5. Cabin pressure selector switch — NORMAL
6. Cabin temperature selector switch — As desired
7. Oxygen selector lever — Normal

DESCENT.

1. Windshield anti-icing switch — ANTI-ICING
2. Defog air knob — Out
3. Defog hot air switch — ON
4. Defog air rheostat — As desired
5. Pitot heater switch — ON
6. Throttles — As required
7. Dive brakes — As required

TRAFFIC PATTERN CHECK LIST.

1. Alert observer for landing
2. All armament switches — OFF or SAFE

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3. Fuel transfer and bypass valve knob	Flow to NO. 1 tank
4. NO. 1 fuselage tank boost pump switch (Group C airplanes only)	ON
5. Applicable fuel tank (containing fuel) knob	Flow
6. Oxygen	100%
7. Safety belt and shoulder harness	Adjusted and tight
8. Inertia reel	Unlocked
9. Landing gear handle	DOWN and locked
10. Landing gear position indicators	Down
11. Landing gear warning light	Out
12. Dive brakes	As desired
13. Flaps	Down
14. Main hydraulic system pressure gage	2,500 psi minimum
15. Brake pressure gage	1,000 psi minimum

LANDING.

1. Downwind	Dive brakes as desired
2. Base	Airspeed 155 knots minimum
3. Final	Airspeed 130 knots minimum

AFTER LANDING.

1. Wing flaps	UP
2. Dive brakes	RETRACT
3. Trim indicators	Neutral
4. Canopy	As desired

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CUT ON BLACK LINE

CUT ON BLACK LINE

STOPPING ENGINES.

1.	Parking brake	Set
2.	Throttle NO. 2	Off
3.	Hydraulic pressure No. 1 engine	Checked
4.	All radios and IFF	OFF
5.	Inverters	OFF
6.	Oxygen supply lever	OFF
7.	Throttle NO. 1	OFF
8.	Fuel panel knobs and switches	All OFF
9.	Battery switch	OFF
10.	Wheel chocks	In place
11.	Parking brake	OFF
12.	Armrest and canopy safety pins	Installed
13.	All electrical switches	OFF
14.	Control column	Secured
15.	Canopy safety collar	In place

BEFORE LEAVING AIRPLANE.

1.	Gear lock safety pins	In place
2.	Battery	Disconnected
3.	Personnel safety switch	SAFE
4.	Bomb bay door shut-off valve	SAFE
5.	Complete DD Form 781	

End Condensed Check List

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Section III

EMERGENCY PROCEDURES

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INTRODUCTION.

To minimize the degree of emergencies created by the failure or malfunction of one or more components, the crew is advised to follow the procedures outlined in this section. The emergencies described are those more likely to occur, and complete understanding of the airplane and its systems is invaluable in coping with emergencies. Section IV of the handbook describes the normal and emergency operation of the auxiliary systems and equipment.

ENGINE FAILURE.

Most jet-engine failures are the result of improper fuel flow caused by malfunction of the fuel control system or by incorrect operating techniques. In this airplane, the pilot receives warnings of engine failure from engine instruments and warning lights before actual engine stoppage. In the event of stoppage and where there are no obvious mechanical failures, the pilot should have no difficulty in making air starts.

ENGINE FLAME-OUT.

Prolonged maneuvers involving negative G's disrupt the normal fuel flow to the engines, thereby causing flame-outs. Since the engines receive fuel from a common manifold, dual flame-outs are entirely possible, and simultaneous dual flame-outs are almost always the result of improper fuel management. With sufficient battery power, altitude, and fuel, the pilot can feasibly start one and then the other engine.

FLIGHT CHARACTERISTICS WITH ONE ENGINE INOPERATIVE.

When one engine is inoperative, the normal cruise characteristics present no difficulties and the airplane may be trimmed to fly "hands-off" at normal cruising power. However, single-engine control speed is governed by maximum rudder force in relation to rudder deflection. Below the airspeed established as the single-engine control speed, the pilot cannot exert enough effort on the rudder to hold the necessary rudder deflection when excessive thrust is applied to the operating engine. Although one engine is capable of providing sufficient hydraulic and electrical power for all basic flight requirements, the pilot must monitor all electrical loads.

WARNING

Minimum single engine control speed is 155 knots IAS.

During take-off, accelerate the aircraft to a speed above the minimum control speed (155 knots IAS) as quickly as possible to insure that adequate directional control is available in the event of an engine failure.

WARNING

Should an engine fail on take-off, exercise the utmost care in the manipulation of the throttle controlling the operating engine. Rapid advancement of the throttle may result in an uncontrollable yaw force at any speed, particularly when below the minimum single engine control speed of 155 knots IAS. (Refer to ENGINE FAILURE ON TAKE-OFF in this Section.)

PROCEDURES WHEN ENCOUNTERING ENGINE FAILURE.

If a rapid drop in fuel flow occurs, place the emergency fuel control switch for the malfunctioning engine in EMERGENCY. If one engine fails in flight, do this immediately:

1. Adjust the throttle on the operating engine to maintain airspeed and directional control.
2. Retard the throttle of the malfunctioning engine to OFF to prevent flooding the engine with fuel.
3. Retrim the airplane for flight.
4. Place the engine valve knob for the inoperative engine in OFF.
5. Check for possible engine fire.
6. Reset the cabin pressure selector switch to the operating engine.
7. Turn off the generators on the inoperative engine.

8. If extended operation is required, adjust the operating engine to give the desired airspeed. (Refer to Appendix I for single-engine performance data.)

ENGINE FAILURE DURING TAKE-OFF.

ENGINE FAILURE DURING TAKE-OFF BEFORE LEAVING GROUND.

If an engine should fail before leaving the ground, do this:

1. Retard both throttles immediately to IDLE.
2. Apply full braking to stop.

If the landing gear must be retracted because of insufficient remaining clearance, do this:

1. Actuate the wing tip tanks jettison switch if the tip tanks contain fuel.
2. Pull the canopy emergency release handle switch to jettison the canopy.
3. Place the landing gear lever in UP.

Note

A force of 25 pounds is necessary to override the solenoid lock which holds the control lever in the DOWN position.

4. Place the battery switch in OFF.

ENGINE FAILURE DURING TAKE-OFF AFTER LEAVING GROUND.

If an engine fails after the airplane is airborne, do this:

1. Reduce power on operating engine to counteract yaw while accelerating to 155 knots.
2. Place the landing gear lever in UP.
3. Place the throttle for the malfunctioning engine in OFF.
4. Place the engine valve knob for the inoperating engine in OFF.
5. Check that the fire warning lights are out.
6. Gain sufficient altitude before attempting to restart the malfunctioning engine. Refer to ENGINE RE-START IN FLIGHT in this section.

If a rapid drop in fuel flow occurs during take-off, place the emergency fuel control switch for the malfunctioning engine in EMERGENCY.

CAUTION

If the engine fuel system fails on take-off or up to an altitude of 6000 feet, it is permissible to transfer to the emergency fuel system with the throttle in the FULL position provided that the engine rpm has not dropped below 85% at the time of transfer. Under all other conditions the throttle level must be retarded to IDLE prior to the transfer; failure to do so results in excessive exhaust gas temperatures and rich flame-out (blow-out) and/or compressor stall.

If the engine rpm returns to the approximate take-off setting, continue to operate in the emergency system and observe normal precaution for emergency fuel control procedures.

ENGINE FAILURE DURING FLIGHT.

To determine the cruise control conditions for single-engine operation, see the Single Engine Cruise Control Charts in Appendix I. Refer to PROCEDURE WHEN ENCOUNTERING ENGINE FAILURE in this section for shutting down an engine. Also, for information concerning engine oil pressure failure and engine noise and roughness, refer to ENGINE OIL PRESSURE FAILURE in this section and ENGINE NOISE AND ROUGHNESS in Section VII.

ENGINE AIR START. (NORMAL)

Air starts can be made consistently up to 16,000 feet if you follow the normal restart procedures.

CAUTION

Do not attempt to restart the inoperative engine until you are sure that it will be reasonably safe to do so.

1. Place the throttle in OFF and descend below 20,000 feet.
2. Check that the FUEL SYSTEM VALVES and FUEL SYSTEM PUMPS circuit breakers are all in ON.

3. Place the airplane in a nose-high attitude for 15 seconds to drain any excess fuel from the combustion chamber.

Note

A nose-high attitude held for 15 seconds will dissipate G forces and allow fuel to drain freely.

4. Adjust the attitude of the airplane to attain a speed between 155 knots and 220 IAS or from 14 to 22 percent rpm.
5. Place the engine valve knob in the flow position.
6. Check that the battery switch is in BATTERY.
7. Momentarily place the start and ignition switch in CRANK ONLY.
8. Immediately move the throttle to IDLE or slightly above. This opens the fuel shut-off valve and the throttle valve. An increase in exhaust gas temperature and rpm indicates the engine has started.

Note

Any delay in moving the throttle wastes a portion of the 15 ± 3 seconds ignition cycle. The ignition timer cannot be recycled until the 15 ± 3 second period has run out.

9. If the exhaust gas temperature does not increase within five to ten seconds after the throttle is open, immediately place the throttle in OFF to prevent flooding the engine with fuel.

ENGINE AIR START. (ALTERNATE)

Although air starts can be obtained above 20,000 feet, the chances of a successful air start increase at lower altitudes. Occasionally, when normal air start methods fail, it is possible to obtain a start by placing the emergency fuel control switch in EMERGENCY and following the normal air start procedure. Monitor the start carefully under these circumstances. After the start has been obtained and the engine is idling normally, continue to operate on the emergency system and make a landing as soon as possible.

DUAL ENGINE FAILURE.

The two most prominent reasons for engine stoppage are mechanical failure and fuel starvation. Because the fuel system is common to both engines, the majority of dual engine flame-outs occuring simultaneously or at short intervals result from fuel starvation. The causes of fuel starvation are improper fuel management or failure within the fuel system. During electrical system failure at high altitudes, the fuel tank boost pumps do not receive power for operation and a dual engine flame-out is possible. Below 25,000 feet, the engine-driven pumps draw enough fuel from the tanks for normal engine operation. Since the engine run-down time is approximately 30 seconds, the generators supply sufficient power to operate the flight instruments, inverters, canopy and windshield anti-icing for this period of time. At altitudes above 42,000 feet, heat and pressurization can be retained in the cabin by placing the cabin pressure selector switch in OFF. As the engines decelerate, the generators trip off the line; therefore, the battery is the only source of electrical power. When descending from 43,000 feet, place the cabin pressure selector switch in RAM to avoid canopy and windshield fogging.

If dual engine flame-out occurs, do this:

1. Place the battery switch in OFF.
2. Turn off all electrical equipment.
3. If flame-out occurred at an altitude above 43,000 feet, turn the battery switch to ON and reposition the cabin pressure selector switch to OFF. Make a rapid descent to below 30,000 feet if the glide distance of an airfield is not critical.
   a. If the flame-out occurred at an altitude below 43,000 feet, turn the battery switch to ON and reposition the cabin pressure selector switch to RAM. Descend to a safe relight altitude.
4. Refer to procedures listed under DUAL ENGINE AID START PROCEDURE.

DUAL ENGINE AIR START PROCEDURE.

1. Place the battery switch in ON.
2. Place the No. 1 inverter switch in ON.
3. Check the fuel quantity and realign the fuel selector switches to the fullest tank.
4. Turn off the battery switch and the NO. 1 inverter switch.
5. Follow the procedures as outlined under ENGINE RESTART IN FLIGHT in this section.

Note

Start one engine at a time. If the first starting attempt is unsuccessful, try to start the second engine before making a second attempt to start the first engine.

MAXIMUM GLIDE.

The maximum glide ranges for various altitudes are given in figure 3-1. To obtain maximum range during descent without engine power, fly at the speeds given in figure 3-1.

Note

To obtain maximum glide distance, keep gear and flaps up and the dive brakes retracted.

PARTIAL POWER.

Partial power of these engines can be caused by icing, or malfunction of the engine, the engine fuel system, or the airplane fuel system. For failure due to icing, refer to ICE, SNOW, AND RAIN in Section IX. A partial power failure due to improper fuel flow is indicated by a drop in fuel flow and should be corrected as follows after checking all fuel switches and fuel knobs on the fuel control panel and all circuit breakers placarded FUEL SYSTEM VALVES and FUEL SYSTEM PUMPS.

1. Check all fuel switches and fuel knobs on the fuel control panel for proper setting.
2. Check circuit breakers placarded FUEL SYSTEM VALVES and FUEL SYSTEM PUMPS and reset if necessary.
3. Place the emergency fuel control switch of the malfunctioning engine in EMERGENCY.
4. If power is not recovered when the emergency fuel control switch is placed in EMERGENCY, the malfunction is in a part of the engine or the airplane fuel system that affects both normal and emergency fuel flow, or in the engine itself.
5. If the cause of a partial power failure cannot be definitely established, check the fuel flow to the

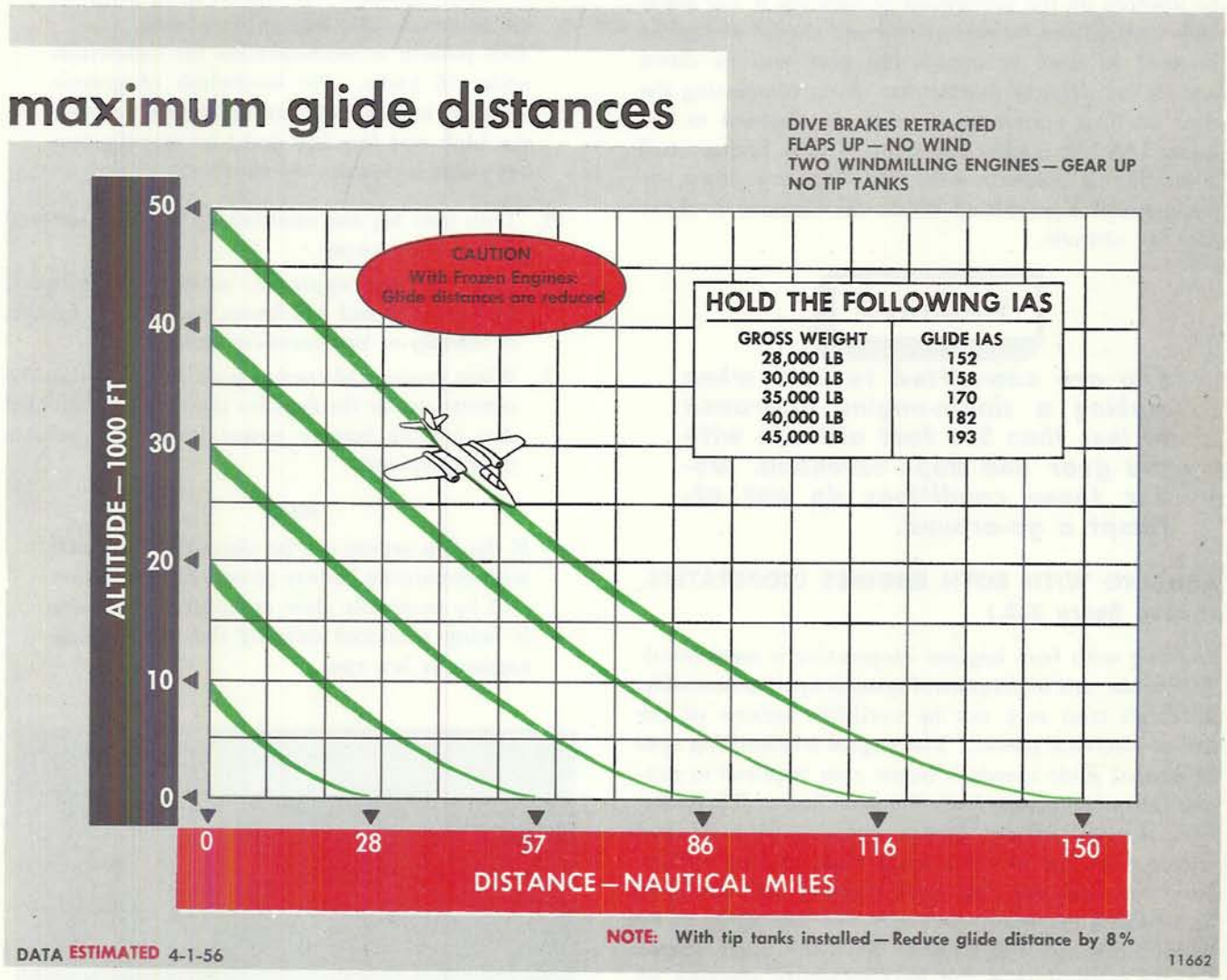


Figure 3-1

malfunctioning engine against the existing power setting to determine if excessive fuel is being lost. If the fuel flow is consistent with the existing power setting and the engine is otherwise operating within normal limits, you may continue to operate the engine. If the fuel flow is excessive for the power setting and/or there is a fluctuation in rpm, shut the malfunctioning engine down to avoid further damage and eliminate the possibilities of fire in the engine.

6. Trim the airplane for single-engine operation and adjust the power of the operating engine for desired crusing conditions. Refer to FLIGHT CHARACTERISTICS WITH ONE ENGINE INOPERATIVE in this section.

LANDING WITH ONE ENGINE INOPERATIVE.

If a landing is to be made with one engine inoperative, do not allow airspeed to decrease below 155 knots IAS until on final approach. The landing gear may be lowered on the downwind or base leg if 155 knots IAS airspeed can be maintained and should always be lowered in time to insure that gear will be down and locked prior to touchdown. After completing the turn on final approach, decrease the airspeed to 130 knots IAS but do not use flaps or dive brakes until a landing is assured. After the flaps are down, do not attempt a go-around unless the airplane is above 500 feet altitude.

WARNING

You are committed to land when making a single-engine approach at less than 500 feet altitude with the gear and flaps extended. Under these conditions do not attempt a go-around.

LANDING WITH BOTH ENGINES INOPERATIVE. (See figure 3-2.)

Landing with both engines inoperative is mechanically feasible. All flight control systems operate normally, although trim may not be available because of the loss of electrical power. The engine windmilling rpm at normal glide speeds is below rpm required to produce electrical power from the generators. Therefore, because only battery power remains, plan to land without the use of trim, wing flaps, or dive brakes. However, sufficient hydraulic pressure will probably be available to permit extremely slow operation of all hydraulically operated units. Thus the units desired may be used if they can be electrically actuated by remaining battery power.

In preparing for a landing with both engines inoperative, do this:

1. Establish a glide speed of approximately 160 knots.
2. At approximately 10,000 feet above the terrain, place the landing gear lever DOWN and pull emergency landing gear down handle. (Use of the emergency landing gear down handle conserves battery power.)
3. Select a high key point to the right of the runway, approximately 5,000 feet above the terrain.
4. Proceeding through 360° approach, select a low key point approximately 1500 feet above the terrain. This point should be at the turn from downwind to base leg, 1 mile to the side of the runway, and 1 mile downwind from the end of the runway.

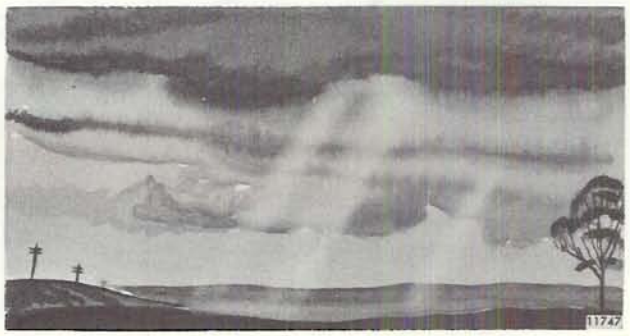
Note

This pattern is for a normal landing weight of 37,500 pounds. For higher gross weights, use proportionally higher key points.
This pattern is recommended for headwinds under 10 knots. For headwinds of greater velocity, reduce the turning radius between the high and low key point so that the low key point is closer to the runway.

5. Turn base leg and establish an airspeed between 140 and 150 knots.
6. Turn on final approach, establish an airspeed between 120 and 130 knots, and S-turn, fishtail, or sideslip to lose excessive altitude.
7. When positive of correct position relative to the runway, lower the flaps for the landing, provided that enough battery power remains to actuate the flap system.

Note

If the flap system can be electrically actuated with remaining battery power, flap operation will be extremely slow as hydraulic pressure is being produced only by the windmilling engines at low rpm.



dual flame-out landing pattern

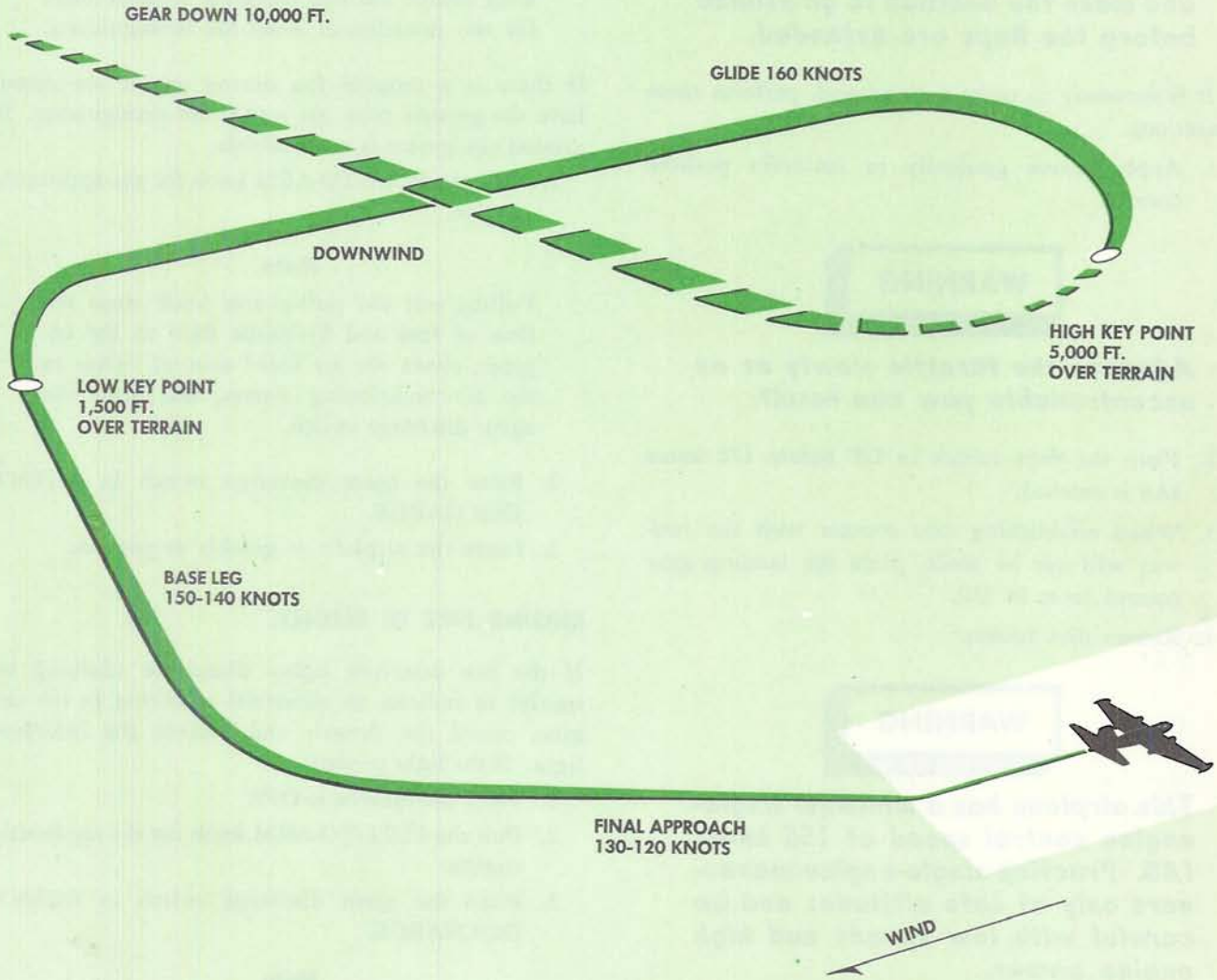


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Figure 3-2

SINGLE ENGINE GO-AROUND.

WARNING

You are committed to land when making single-engine approaches at less than 500 feet with flaps and gear extended. Under these conditions, do not attempt a go-around and make the decision to go around before the flaps are extended.

If it is necessary to make a go-around, perform these operations:

1. Apply power gradually to maintain positive control.

WARNING

Advance the throttle slowly or an uncontrollable yaw can result.

2. Place the flaps switch in UP before 170 knots IAS is reached.
3. When establishing that contact with the runway will not be made, place the landing gear control lever in UP.
4. Retract dive brakes.

WARNING

This airplane has a minimum single-engine control speed of 155 knots IAS. Practice single-engine maneuvers only at safe altitudes and be careful with low speeds and high engine power.

FIRE.

ENGINE FIRE.

A flashing or steady red light in the PULL-TO-ARM knobs indicates a fire or an overheat condition in the engine area. In most cases, retarding the throttle alleviates the overheat condition. However, if the flashing or steady light persists, you must institute corrective action for an engine fire.

ENGINE FIRE ON GROUND.

If a fire detection light illuminates (flashing or steady) to indicate an abnormal condition in the engine, retard the throttle and observe the indicator light. If the light persists:

1. Place both throttles in OFF.
2. Signal the ground crew to use carbon dioxide fire extinguishing equipment.

Note

Each nacelle has two frangible wooden doors for the insertion of hand fire extinguishers.

If there is a tailpipe fire during engine shutdown, have the ground crew use a CO_2 fire extinguisher. If ground equipment is not available:

1. Pull the PULL-TO-ARM knob for the applicable engine.

Note

Pulling out the pull-to-arm knob stops the flow of fuel and hydraulic fluid to the engines, closes the air bleed shut-off valves to the air-conditioning system, and arms the agent discharge switch.

2. Place the agent discharge switch in AGENT DISCHARGE.
3. Leave the airplane as quickly as possible.

ENGINE FIRE IN FLIGHT.

If the fire detection lights illuminate (flashing or steady) to indicate an abnormal condition in the engine, retard the throttle and observe the indicator light. If the light persists:

1. Move the throttle to OFF.
2. Pull the PULL-TO-ARM knob for the applicable engine.
3. Place the agent discharge switch in AGENT DISCHARGE.

Note

This is a one-shot system, and actuating the agent release switch exhausts the fire extinguishing supply for the affected engine. Therefore, do not actuate the AGENT DISCHARGE switch unless it is necessary.

4. Move the oxygen diluter lever to 100% OXYGEN.
5. Insure that the cabin pressure selector switch is in the proper position (NORMAL or in position for the operating engine).

6. Follow the procedure outlined under PROCEDURE WHEN ENCOUNTERING ENGINE FAILURE in this section.

CAUTION

Do not attempt to restart the engine after extinguishing the fire.

ENGINE OVERHEAT CONDITION.

A flashing red light in the PULL-TO-ARM knob indicates an overheat condition, but the overheat detectors cannot distinguish between a fire and an overheat condition.

1. Correct the overheat condition by reducing the power of the affected engine.
2. If the light persists, follow the procedures outlined under ENGINE FIRE IN FLIGHT in this section.

WING OR FUSELAGE FIRE.

A fire in the fuselage or the wing cannot be extinguished in flight.

1. If a system is afire, shut it off immediately.
2. If the fire gets out of control, abandon the airplane.

FIRE IN FLIGHT COMPARTMENT.

In the event of a fire in the flight compartment:

1. Connect the oxygen masks.
2. Set the oxygen regulator diluter lever to 100% OXYGEN.
3. Use the hand fire extinguisher.
4. Place the cabin pressure selector switch in RAM.
5. If the fire gets out of control, abandon the airplane.

ELECTRICAL FIRE.

Circuit breakers and fuses protect most of the circuits and tend to isolate an electrical fire. However, if the source of the fire cannot be determined, turn off all electrical equipment not absolutely essential for flight in order to isolate the fire. If you can locate the source of the fire by this procedure, gradually restore all circuits to operation except those causing or affected by the fire. If smoke or fumes are present during or after the fire proceed as follows:

CAUTION

Above an altitude of 26,000 feet, engine flame-out will almost cerly occur if there is not at least one fuel tank boost pump feeding fuel directly to the engine. Therefore, if the boost pumps must be turned off, you must descend to below 26,000 feet.

1. Cabin Pressure Selector Switch	As required
2. Oxygen Mask	Connected
3. Oxygen Diluter Lever	100% OXYGEN
4. Hand Fire Extinguisher	As necessary

Note

To prevent rapid blow-off of cabin air at high altitude, place the cabin pressure selector switch in OFF.

5. Gradually restore electrical power to determine the source of fire.

CAUTION

Make sure that the electrical circuit involved is isolated before restoring complete power.

If the source of the electrical fire is not determined, land as soon as possible, or if the fire is serious enough, abandon the airplane.

ELIMINATION OF SMOKE OR FUMES.

In the event of heavy smoke or toxic fume concentration in the flight compartment, do this:

1. Determine which engine might be causing the smoke or fumes by placing the cabin pressure selector switch in the NO. 1 ENG and then in the NO. 2 ENG position. If this reveals that the engines are the source of the smoke or fumes, then proceed with step 2 or 3.
2. If below 42,000 feet cabin altitude:

Oxygen Mask	Connected
Oxygen Regulator Diluter Lever	100% OXYGEN
Cabin Pressure Selector Switch	RAM

3. If above 42,000 feet cabin altitude, make a rapid descent to below 42,000 feet and purge the cabin

Figure 3-3 (Sheet 1 of 2)

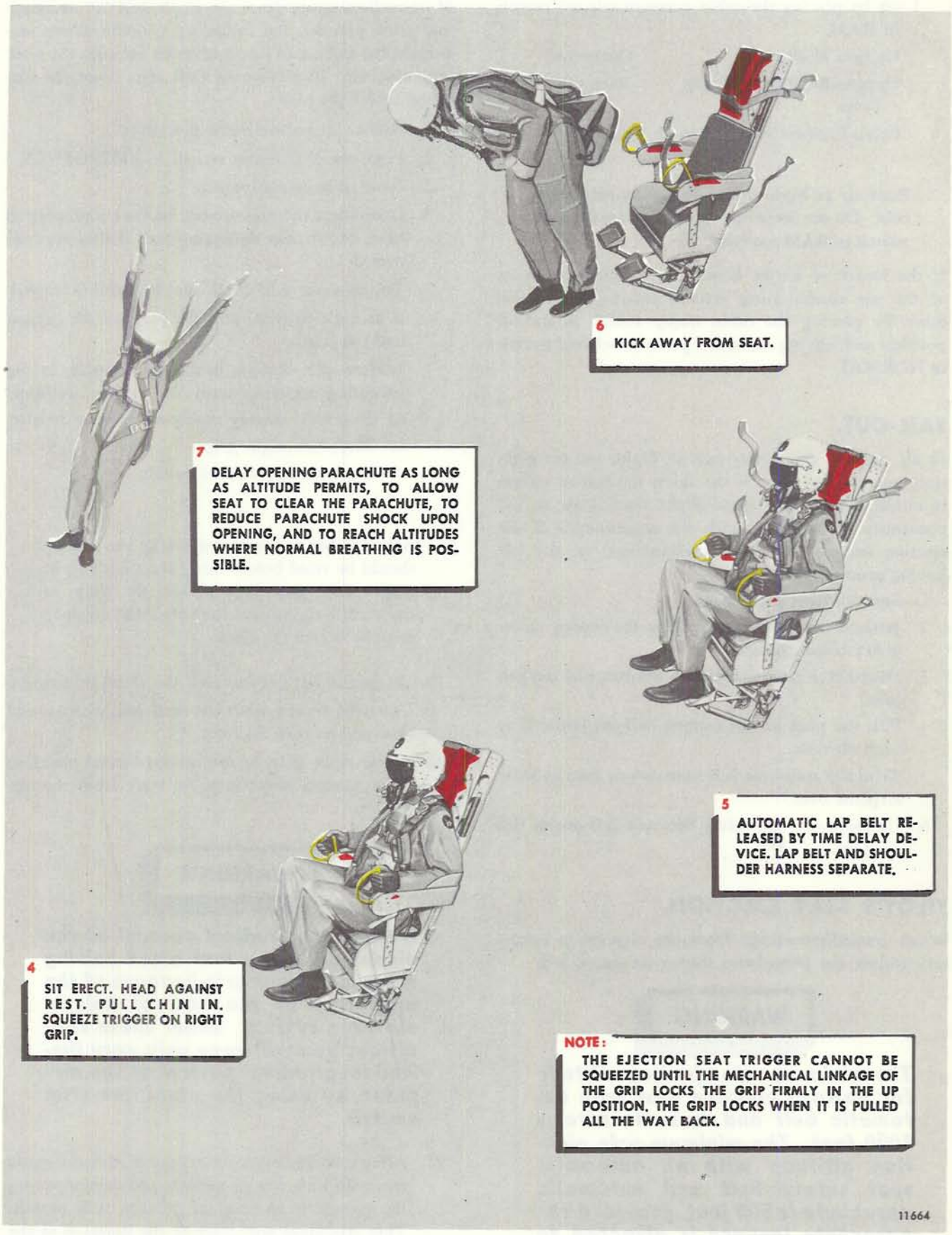


Figure 3-3 (Sheet 2 of 2)

air by placing the cabin pressure selector switch in RAM.

Oxygen Mask	Connected
Oxygen Regulator Diluter Lever	100% OXYGEN
Cabin Pressure Selector Switch	RAM

Note

Ram air at high altitudes may be extremely cold. Do not leave the cabin pressure selector switch in RAM too long.

If the source of smoke is not due to malfunctioning of the air conditioning system, retain heat in the cabin by placing the cabin dump switch in the on position and leaving the cabin pressure selector switch in NORMAL.

BAIL-OUT.

In all cases of emergency exit in flight, use the ejection seat system. This is the safest method of escape in either high or low speed flight since it avoids the possibility of colliding with the empennage. If the ejection seat system should malfunction, use the following procedure to bail out:

1. Stow all loose equipment.
2. Jettison the canopy by pulling the canopy emergency release handle.
3. Disconnect the microphone headset and oxygen hose.
4. Pull the plug on the oxygen bail-out bottle if at high altitude.
5. Trim the stabilizer full nose down; then roll the airplane over.
6. Unfasten the seat safety belt and fall out of the airplane.

PILOT'S SEAT EJECTION.

When immediate escape from the airplane is necessary follow the procedures shown on figure 3-3.

WARNING

The minimum safe ejection altitude for upward ejection seat with automatic belt and manual chute is 1000 feet. The minimum safe ejection altitude with an automatic seat safety belt and automatic parachute is 500 feet, provided the parachute lanyard is attached to the seat belt.

If immediate escape from the airplane is not necessary and time permits, the following procedures are recommended and are to be coordinated between the pilot and observer. The observer will eject from the airplane before the pilot.

1. Follow the radio distress procedure.
2. Place the IFF master switch in EMERGENCY.
3. Stow all loose equipment.
4. Disconnect the microphone headset lead, oxygen hose, and helmet defogging lead if they are connected.
5. The observer will check that his table is stowed.
6. If at high altitude, pull the plug on the oxygen bail-out bottle.
7. Jettison the canopy, using the controls in the following sequence until the canopy jettisons:
   a. Observer's canopy emergency release handle.
   b. Observer's right grip.
   c. Pilot's canopy control switch.

Note

All available means of jettisoning the canopy should be tried before using the pilot's right grip. This procedure allows the pilot to maintain longitudinal control of the airplane until he is ready to eject.

8. Raise the left grip to lock the shoulder harness.
9. Sit erect, head against the head rest, chin in, and feet and arms in the rests.
10. Raise right grip to the up-and-locked position; then squeeze the trigger to eject from the airplane.

WARNING

Normal longitudinal control of the airplane will be lost after raising the pilot's right grip because of the operation of the control column stowage system. Under these conditions you will have only very limited longitudinal control of the airplane by using the stabilizer trim switch.

11. After ejecting and after release of the automatic seat belt, kick free of the seat and delay opening the parachute as long as altitude will permit. This procedure will prolong the duration of the oxygen in the bail-out battle.

OBSERVER'S SEAT EJECTION.

Ejection of the observer's seat is identical to that for the pilot except that the observer's right grip will not stow the control column. Therefore, the observer must use the procedures shown on figure 3-3. If the seat fails to eject, follow the procedures required under BAIL-OUT.

LANDING EMERGENCIES.

LANDING WITH GEAR RETRACTED.

WARNING

Whenever the terrain is unknown or unsuited for forced landing, use the ejection seat to escape from the airplane rather than attempt a forced landing. The probability of receiving severe injuries from a forced landing under adverse conditions is very high. The minimum safe ejection altitude in level flight for upward ejection seats with automatic seat belt and manual chute is 1,000 feet. The minimum safe ejection altitude with an automatic seat belt and an automatic parachute is 500 feet, provided the parachute lanyard is attached to the seat belt.

If it should be necessary to land with the landing gear retracted, proceed as follows:

1. Notify the observer to prepare for a crash landing.
2. Advise the control tower of the existing emergency and request an application of foam to the runway when the time of landing has been determined.
3. Reduce the fuel load but retain empty or nearly empty tip tanks.

Note

If wing tip tanks are installed and they are full of fuel, actuate the tip tank jettison switch. If the tip tanks are empty, or nearly empty retain them; they will act as skids and will prevent a wing tip from digging in, especially on soft surfaces, and causing the airplane to cartwheel.

4. Jettison all internal and external stores and close the bomb door.
5. Unfasten the parachute harness buckles and readjust safety belt and shoulder harness (pilot and observer).
6. Turn off all unneeded electrical equipment.
7. Set up landing pattern using a flat, power-on approach.
8. Jettison the canopy when airspeed reduces to 180 knots IAS or below.

WARNING

Before pulling the canopy emergency release handle, bottom the ejection seat to avoid any possibility of being struck by the canopy.

9. Just before touchdown perform the following:
   a. Place the throttle in OFF.
   b. Pull the pull-to-arm knobs and place the agent discharge switch in the AGENT DISCHARGE position.
   c. Lock the shoulder harness (pilot and observer).

CAUTION

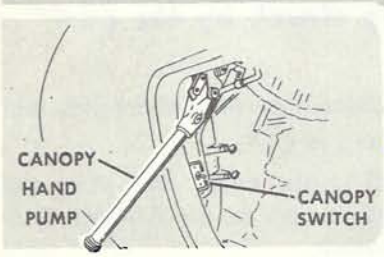
You cannot bend forward when the inertia reel is locked; therefore, before locking the reel, cut all switches not accessible from the locked position.

   d. Disconnect the radio cord and oxygen hose (pilot and navigator).
   e. Place the battery and generator switches in OFF.
   f. Make contact with the ground in a normal-landing attitude at the lowest possible airspeed and rate of descent consistent with safe control of the airplane. Do not stall in. If necessary "stick" the airplane on the ground.
10. After the airplane comes to a complete stop, get out as soon as possible.

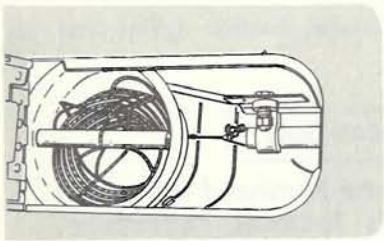
LANDING WITH ONE MAIN GEAR UP OR UNLOCKED.

If one main gear remains in the up position or does not lock in the down position, retract the gear and make a wheels-up landing in accordance with the instructions under LANDING WITH GEAR RETRACTED.

emergency entrance and exit



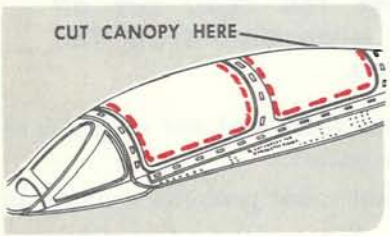
1. If the canopy has not been jettisoned by the pilot, and time and conditions permit, actuate the external canopy release switch to the UP position and use the hydraulic hand pump to open the canopy.



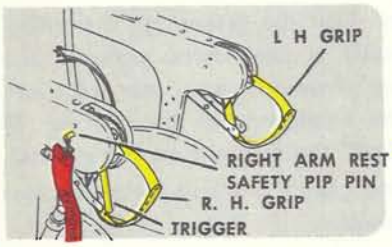
2. If the canopy will not open electrically, open the canopy emergency release door, pull the handle out to six feet away from the airplane. When the cable tightens, pull hard to release the canopy.

WARNING

WATCH OUT FOR THE JETTISONED CANOPY



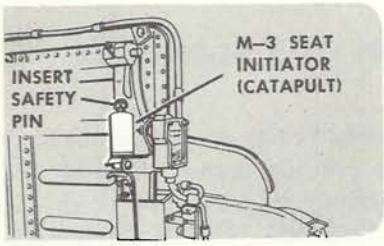
3. If the canopy cannot be removed after performing steps 1 and 2, chop openings in the canopy with a fire ax as shown.



4. If both seat hand-grips are in the normal (down) positions, complete the rescue operation.

WARNING

Keep clear of the seat hand-grips at all times. If the right-handgrip is inadvertently raised by rescue personnel, the canopy remover will be fired, and the trigger may be accidentally actuated and the seat ejected.



5. If the right-hand grip is raised, the seat catapult will be armed to fire, therefore, before continuing rescue operations, a safety pin must be inserted in the M-3 seat catapult initiator to prevent inadvertent firing of the ejection seat.

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Figure 3-4

LANDING WITH MAIN GEAR EXTENDED AND NOSE GEAR UP OR UNLOCKED.

Touch down on main gear and hold the nose off the runway as long as possible.

LANDING WITH FLAPS UP.

When landing without the use of wing flaps, add approximately 10 knots to speeds used during a normal landing.

EMERGENCY ENTRANCE.

To gain emergency entrance to the airplane on the ground, follow the procedures shown in figure 3-4.

EMERGENCY EXIT.

Two methods of emergency exit from the airplane are available. In flight, use the ejection seat system. (See PILOT'S SEAT EJECTION and OBSERVER'S SEAT EJECTION in this section.) If the airplane is on the ground and emergency exit is necessary, do this:

1. Insert seat safety pins.
2. Actuate the canopy control switch to OPEN.
3. If the canopy control switch fails to open the canopy, pull the canopy emergency release handle (pilot's or observer's) to jettison the canopy.

WARNING

Watch out for the jettisoned canopy.

4. If the canopy cannot be opened according to the procedures in 2 and 3, use the crash ax to chop through the canopy.

DITCHING.

Ditching is a last resort. Since all survival equipment is carried by the crew on their persons, there is no advantage to be gained in riding the airplane down. However, if altitude is not sufficient for bail-out and ditching is unavoidable, do this:

1. Notify the observer to prepare for ditching.
2. Place the IFF switch in EMERGENCY.
3. Actuate the master jettison switch if it is desirable to jettison stores and tip tanks.

Note

The construction of the rotary bomb door is such that the presence of bombs on the closed door may tend to reduce the cave-in of the door. If the tip tanks are empty and the sea is calm, do not jettison the tanks as they will provide additional buoyancy.

4. If stores are jettisoned, place the bomb door switch in CLOSE.
5. Check that the landing gear lever is in UP.

CAUTION

The landing gear must be retracted. If the gear is extended, the airplane will dive into the water upon contract.

6. Place the dive brakes switch in EXTEND.
7. Place the wing flaps switch in DOWN.
8. Disconnect all personal equipment except the oxygen hose.
9. Unbuckle the parachute harness.
10. When the airspeed has dropped to 180 knots IAS or less, jettison the canopy by pulling the canopy emergency release handle.
11. Check that the seat belt and shoulder harness are secure and lock the inertia reel.

CAUTION

The pilot cannot bend forward when the inertia reel is locked. Therefore, cut all switches not accessible before locking the inertia reel.

12. Insert the seat safety pins.
13. Make the landing into the wind. If the sea is rough, land in a direction parallel to the waves and on top of a wave crest if possible.
14. Place the throttles in OFF.
15. Make the touchdown as slowly as possible with a slightly nose-high attitude.
16. After the airplane has stopped, abandon it immediately; the airplane may sink rapidly.

Note

In the event of ditching and sinking in water where you find yourself unable to immediately escape due to any number of factors, it is possible for you to survive under water with your oxygen equipment until you can free yourself and escape. The diluter-demand-type oxygen regulator is a suitable underwater breathing device when the regulator is set at 100% OXYGEN. The mask must be in place and tightly strapped, and that the regulator must be set at 100% OXYGEN, but remember the bail-out bottle cannot be used under water.

ENGINE FUEL CONTROL SYSTEM MALFUNCTION.

If an engine fuel control system malfunctions, as indicated by a loss of power and drop in fuel flow indication, attempt to correct the condition in this manner:

1. Check all circuit breakers placarded FUEL SYSTEM VALVES and FUEL SYSTEM PUMPS for proper setting and reset if necessary. If this does not correct the condition proceed with step No. 2.
2. Place the emergency fuel control switch of the malfunctioning engine in EMERGENCY.

CAUTION

If the engine fuel control system fails on take-off or up to 6,000 feet, you can transfer to the emergency fuel system at FULL throttle, if the engine has not dropped below 85% at the time of transfer. Under all other conditions retard the throttle to IDLE prior to the transfer. Failure to do this causes excessive exhaust gas temperatures, rich flame-out and/or compressor stall. The emergency fuel control does not incorporate the compensatory features of the normal fuel control. Therefore, rpm and exhaust temperature limits may be exceeded if you do not make accelerations slowly and smoothly.

3. If the use of emergency fuel control does not correct the condition and the engine is still operating, refer to PARTIAL POWER FAILURE in this section.
4. If the use of emergency fuel control does not correct the condition and the engine has flamed-out, attempt to start the engine as described under ENGINE RE-START IN FLIGHT in this section.

ENGINE-DRIVEN FUEL PUMP FAILURE.

If both main pumps of the engine-driven fuel pump assembly fail completely, engine flame-out results and the engine cannot be restarted. Normal engine operation will not be affected, however, by the loss of one main (gear) pump or by the loss of one main (gear) pump and the boost pump (centrifugal), provided that the boost pumps of the airplane fuel system are operating.

AIRPLANE FUEL SYSTEM FAILURE.

CAUTION

Above an altitude of about 26,000 feet, engine flame-out will almost certainly occur if there is not at least one fuel tank boost pump feeding fuel directly to the engines. Since fuel is normally fed from the No. 1 tank to the engines, this means that if both the boost pumps in that tank are inoperative, normal flight above approximately 26,000 feet is not possible. Under these conditions and just prior to flame-out, a rapid fluctuation of the fuel flow will be evident.

NO. 1 OR NO. 2 FUSELAGE TANK BOOST PUMP FAILURE.

The No. 1 and No. 2 fuselage tanks each have two boost pumps and it is unlikely that all four pumps would fail simultaneously. In the event of boost pump failure, do this:

1. Check that all fuel system circuit breakers are on or in.
2. In the event of failure of both boost pumps in the No. 1 fuselage tank, position the fuel transfer and bypass valve knob to feed fuel directly to the engines from the No. 2 fuselage tank, the wing tanks, or the wing tip tanks. Turn the No. 1 fuselage booster pumps switch to OFF on Group C airplanes. If necessary, fuel may may be recovered from the No. 1 tank even though the boost pumps have failed but continued flight is limited to altitudes below 26,000

feet due to the limited suction action of the engine-driven fuel pumps. Recover the fuel in the No. 1 fuselage tank only if the other tanks have been exhausted.

CAUTION

When drawing fuel from the No. 2 fuselage tank or the wing tanks directly to the engines, observe the fuel quantity indicator to avoid flame-out. Delivery rates from the tip tanks are sufficient for satisfactory engine operation only at low power and at low altitudes.

3. If both No. 2 fuselage tank boost pumps fail below 26,000 feet, fuel may be recovered by positioning the fuel transfer and bypass valve knob to the flow to engines position and by placing the No. 2 fuselage tank knob in the flow position. Under these conditions, the No. 1 fuselage tank boost pumps should be off on Group C Airplanes.

NO. 1 FUSELAGE TANK FUEL LEVEL SHUT-OFF VALVE FAILURE.

Malfunctioning of the No. 1 tank fuel level shut-off valve will cause large quantities of fuel to be dumped overboard out of the fuselage vent mast. This will generally be noticeable prior to take-off. However, during flight, if the airplane is apparently consuming abnormally large amounts of fuel, temporarily halt the transfer of fuel to the No. 1 tank and check to see that all fuel vent circuit breakers are in and that the fuel consumption is normal from the No. 1 tank to the engines and from all other tanks to the No. 1 fuselage tank. If fuel consumption is abnormally high from the No. 1 fuselage tank, the valve is malfunctioning. Transfer fuel intermittently to the No. 1 tank as needed without relying on the No. 1 fuselage tank fuel level shut-off valve.

WING TANK BOOST PUMP FAILURE.

Failure of a wing tank boost pump prevents the flow of fuel from that tank. Trim change and fuel quantity indication enable the pilot to determine the operation of the wing tank boost pump. If a wing tank boost pump is inoperative, check the applicable circuit breaker before turning off the wing-tank—tip-tank selector switch. If fuel fails to flow from any one of the wing or tip tanks causing extensive lateral trim correction, draw fuel from the opposite tank in the same wing to decrease the necessary lateral trim correction. For example, if the left tip tank fails to supply fuel while the right tip tank supplies fuel normally, and an out-of-lateral trim condition occurs, discontinue drawing fuel from the right and left tip tanks and draw fuel from the left wing tank until the lateral trim to neutral. Continue drawing fuel from the tanks in any manner that maintains lateral trim. Refer to procedures under TIP TANK FUEL SYSTEM FAILURE in this section.

TIP TANK FUEL SYSTEM FAILURE.

Excessive use of aileron trim may indicate uneven feeding from a tip tank. Maneuver the airplane in an attempt to start the flow of the fuel from the tip tank by inducing positive and negative G loads. If these maneuvers fail to start the fuel flow, check the aileron control above 10,000 feet with the aircraft in landing configuration. After establishing the amount of aileron control required to maintain level flight, jettison the heavy tank, if necessary. (See TIP TANK JETTISON in this section). If the heavy tip tank cannot be emptied or jettisoned, empty the wing tank on the heavy side and leave the wing tank on the light side full to create the best landing situation. Although landings have been made with one tip tank empty and the other full, do not attempt them unless it is absolutely necessary and then only under the best conditions. Make your "touchdown" at approximately 130 knots to maintain lateral control with full aileron.

BOMB DOOR FERRY TANK BOOST PUMP FAILURE.

If the boost pump in the bomb door ferry tank fails, place the ferry tank boost pump selector switch in OFF and select the next tank to be used. Fuel in the ferry tanks cannot be recovered nor can the tank be jettisoned.

TIP TANK JETTISON.

To jettison the tip tanks, place the tip tank jettison switch in TIP TANK ONLY. The tip tanks will also jettison if the master jettison switch is actuated and the tip tank jettison switch is in NORMAL. It is not necessary to turn the wing tip tank fuel selector knob to OFF when jettisoning, because a flapper valve closes the line. Do not jettison empty tip tanks above 365 knots; full tip tanks under 160 knots.

BOMBS AND EXTERNAL STORES JETTISON.

During an emergency, all bombs and external stores can be jettisoned in an unarmed condition by momentarily actuating the master jettison switch.

Note

If the wing tip tanks are to be retained the tip tank jettison switch must be OFF. If the tip tank switch is in NORMAL when the master jettison switch is actuated, the wing tip tanks will be jettisoned as well as the stores.

ENGINE OIL PRESSURE FAILURE.

GROUND OPERATION.

Normal operating oil pressure is between 20 and 35 psi. Oil pressure between 10 and 20 psi and between 35 and 40 psi is undesirable; however, it is possible to operate the engines extensively within these pressure areas. Retard the throttle to reduce oil pressure in excess of 40 psi. Stop the engine and land as soon as possible when the oil pressure falls below 10 psi. One minute of continuous engine operation with zero oil pressure is satisfactory for continued service. Over one minute but less than two and one-half minutes is satisfactory for continued service, provided:

1. No abnormal engine noise exists.
2. The oil pressure pump strainer and the oil scavenge pump are checked and found free of metallic particles.
3. No indication of damage or metallization exists. No oil pressure for a period exceeding two and one half minutes is cause for engine removal.

IN FLIGHT.

One minute of continuous engine operation with zero oil pressure is permissible. Over one minute but less than two and one-half minutes engine operation may be continued at the pilot's discretion; after landing, inspection should be made as in items No. 1 and No. 3 of ENGINE OIL PRESSURE FAILURE, GROUND OPERATION, this section.

ELECTRICAL POWER SUPPLY SYSTEM FAILURE.

GENERATOR FAILURE.

1. If a generator fails, as indicated by voltage reading of zero, a loadmeter reading of zero, the generator indicator light being on, and normal indications of the remaining three generators, place the indicated generator switch in OFF. No monitoring of the electrical load is required. (See figure 3-6.)
2. If a generator fails, as indicated by a loadmeter reading of zero and the generator indicator light being on, but with a normal voltage reading and the remaining three generators indicating normal, do this:
   a. Place the indicated generator switch momentarily in RESET and return it to ON.
   b. If the generator indicator light is out and the loadmeter indication is normal, leave the generator switch in ON.
   c. If the generator indicator light remains on and the loadmeter indicates a zero reading, place the generator switch in OFF.
   d. No monitoring of the electrical load is required.
3. If a generator fails, as indicated by a low voltage reading and a high loadmeter reading:
   a. Place the generator switch for the indicated generator in OFF.
   b. Check the loadmeters of the remaining generators for indications that the electrical load is approximately in balance.
   c. No monitoring of the electrical load is required.
4. If any two generators fail (assuming both engines are operating) and either or both cannot be reconnected to the electrical system by following the procedures given in 1, 2, and 3 above, place both indicated generator switches in OFF.

CAUTION

For two-generator operation at 50,000 feet altitude and cruise-combat speeds, the amount of monitoring required is high and the type of equipment that must be shut off may reduce the effectiveness of some missions and may even preclude the completion of others. Two operating generators have a system capacity of 396 amperes (0.65 per loadmeter, 1.3 total), while the predicted maximum continuous amperes required

for this flight condition is 542 amperes (0.9 per loadmeter, 1.8 total) or 146 amperes (0.25 per loadmeter, 0.5 total) more than two-generator output. Therefore, it is extremely important that the electrical loads be monitored to prevent overloading the generators.

Note

One way to obtain the required amount of monitoring is to limit the use of fuel pumps to two at a time and to turn off both the S-4 Shoran and the APG-31 Gun Ranging Radar. The electrical system loading will then be below the system's two-generator capacity and will operate safely.

For two-generator operation at altitudes of 36,500 feet and below, no monitoring is required.

5. If two generators are lost because of engine failure:
   a. Place both generator switches for the malfunctioning engine in OFF.
   b. No monitoring of electrical load is required.

Note

The capacity of the two operating generators at the airplane's single engine service ceiling is sufficient to supply the electrical system without monitoring.

6. If two generators are lost because of engine failure and one of the remaining generators fails, as indicated by any of the conditions in paragraphs 1 through 3:
   a. Place the generator switches for the inoperative generators in OFF.

Note

As a result of an engine failure, the mission will probably have to be aborted. The system's electrical loads should be monitored, commensurate with the gross weight of the airplane and the altitude at which it is flying. The electrical load must not exceed the electrical system's capacity for single-engine, single-generator operation so that the effectiveness of the airplane will be maintained on the return flight to base. The generator rating for maximum operational altitude of 36,500 feet, for light gross weight is 294 amperes 0.95 loadmeter reading.

   b. Monitor electrical loads by turning off power for special weapons, bomb control, gun ranging radar, gun charging, gun heaters, recirculating blower, Radar Beacon APW-11A, inverters, and by limiting the use of fuel boost pumps to two at a time.

7. If all four generators indicate failure:
   a. Immediately place the battery switch in OFF if the airplane is below 26,000 feet altitude.

CAUTION

Above an altitude of about 26,000 feet, engine flame-out occurs if there is not at least one fuel tank boost pump feeding fuel directly to the engines.

   b. Turn off all non-essential electrical loads.
   c. Place the battery switch in ON and, one at a time, place each generator switch in RESET, note the voltage, and place the switch in OFF.
   d. After checking all the generators, place the battery switch in OFF.
   e. If normal voltage is indicated by any or all generators, place the switch for the generators that indicated normal voltage in ON one at a time.
   f. If the electrical system is functioning properly, place the battery switch in ON and turn on needed electrical equipment.

CAUTION

Be careful not to overload the generator or generators now supplying the electrical system.

8. If none of the generators can be returned to the electrical system, leave the generators switches in OFF, leave the battery switch in OFF, and land as soon as possible.

Note

If it is necessary and sufficient battery power remains, the battery will operate the canopy control circuit, control column stowage system (Group E Airplanes), master jettison circuit, standby inverter circuits, and the C-4A lights. These circuits operate regardless of the position of the battery switch.

ELECTRICAL FAILURE

NO. OF GENERATORS OPERATING	NO. OF ENGINES OPERATING	BATTERY POWER	MAXIMUM ALLOWABLE LOADMETER READING PER GENERATOR	GENERATING SYSTEM OUTPUT (AMPERES)	REMARKS
4	2	Yes	.7*	792	Normal operation, 50,000 ft. altitude no monitoring required.
3	2	Yes	.7*	594	Normal operation, 50,000 ft. altitude. No monitoring required.
2	2	Yes	.7*	396	Unnecessary loads must be monitored. Maximum loadmeter reading at 50,000 ft. altitude is .7.
1	2	Yes	.7*	220	Unnecessary loads must be monitored. Maximum loadmeter reading at 50,000 ft. altitude is .7.
0	2	Yes	0	Depends upon conditions of battery†	Since fuel booster pumps are necessary at altitudes above 26,000 ft. the battery can be used to operate necessary fuel booster pumps during let down to 26,000 ft. It is imperative that all loads except necessary fuel booster pumps and standby instrument inverter be turned off.
0	2	No	0	0	No power available for flight instruments or for relite in case of flame-out. Engines will probably flame-out when operating above 26,000 ft. with no power for the fuel booster pumps. The center of gravity cannot be controlled without fuel booster pumps.
2	1	Yes	.95	540	The altitude for single-engine operation is limited to 36,500 ft. Tactical mission considered aborted. No monitoring of loads required for all other remaining operating conditions.
1	1	Yes	.95*	300	Altitudes limited to 36,500 ft. Loads (all but 2 fuel pumps) shall be monitored so that loadmeter reading of remaining generator does not exceed 1.0.
0	1	Yes	0	Depends upon condition of battery†	Altitude limited to approximately 26,000 ft. Supply loads on battery bus only. Preserve battery for relite attempts in case of flame-out. (Battery switch in OFF position.)
0	1	No	0	0	Altitude limited to approximately 26,000 ft. No electrical power available.
0	0	Yes	0	Depends upon condition of battery†	Only battery bus should be energized. (Battery switch in OFF position.) Engine relight is possible depending upon the condition of the battery.
0	0	No	0	0	Refer to glide distance in this section. No electrical power available.

† Life expectancy of battery depends upon the state of charge, its temperature, and rate of discharge.

*Maximum allowable loadmeter readings at different altitudes.

ALT. FEET	ALLOWABLE LOAD PER GENERATOR	
	Amperes	Aircraft loadmeter reading
Ground Operation	110	.35
S.L. to 35,000	300	1.0
40,000	280	.9
45,000	245	.8
50,000	220	.7

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Figure 3-5

CIRCUIT BREAKERS.

If a circuit breaker opens disconnecting power to any circuit, it indicates an overload or short in that circuit. If the circuit breaker reopens after being reset, do not use that circuit.

NO. 1 AND NO. 2 INVERTER FAILURE.

If the No. 1 or No. 2 inverter fails during flight, the No. 1 and No. 2 inverter failure indicator light illuminates. If one of these light should illuminate, place its respective inverter switch in OFF. Because there is no alternate source of power for the a-c circuits if the No. 1 or No. 2 inverter fails, all circuits supplied by the inoperative inverter will be out.

Note

When the No. 1 inverter fails during flight, the following instruments probably will retain the same readings as were indicated immediately prior to the No. 1 inverter failure: the fuel quantity gauge, No. 1 and No. 2 engine oil pressure indicators, the No. 1 and No. 2 engine fuel flow indicators, and the main system hydraulic pressure indicator.

INSTRUMENT INVERTER FAILURE.

If the instrument inverter fails in flight, as indicated by the inverter failure light, place the instrument inverter switch in STANDBY. In this position, the standby instrument operates the flight attitude indicator and the J-2 compass.

Note

When the instrument inverter fails during flight, J-2 compass will retain the same reading as was indicated immediately before the inverter failed. The vertical gyro indicator will assume an erratic position.

COMPLETE ELECTRICAL FAILURE.

Note

During complete electrical failure, all a-c instruments retain the same readings as were indicated immediately before the electrical failure occurred. All d-c instruments will assume an off-scale position or revert to zero.

If the entire electrical system fails or if it becomes necessary to turn off the battery and generators, much of the auxiliary equipment and many controls will be inoperative. Flight without electrical power is limited and should be conducted as follows:

1. If it is possible, reduce airspeed and adjust trim before turning off the electrical power. Trim control is not available without electrical power and the trim devices will continue to assume the positions they had at the time of electrical failure.
2. The fuel system will not continue to operate if electrical power is not available. All fuel boost pumps, except the engine-driven fuel boost pump, will cease operation. Therefore, a reduction in altitude and rpm may be necessary for satisfactory engine operation.

CAUTION

Loss of boost pump pressure may cause erratic engine operation above an altitude of 26,000 feet. Engine flame-out will almost certainly occur if there is not at least one fuel tank boost pump feeding fuel directly to the engines. Since fuel is normally fed from the No. 1 fuselage tank to the engines, this means that if both the boost pumps in that tank are inoperative, normal flight above 26,000 feet is not possible. Under these conditions and just prior to flame-out, a rapid fluctuation of the fuel flow will be evident.

CAUTION

When electrical power has been lost, the emergency fuel control system cannot be put into operation.

3. If possible, check that the fuel transfer and bypass valve knob is in the flow from No. 1 tank position, before turning off electrical power. The No. 1 fuselage tank is the main service tank to which fuel from all other tanks is normally transferred. (This procedure is recommended since more fuel is in the No. 1 tank than in any other tank all times during flight.)

CAUTION

If all electrical power is lost, the fuel quantity indicator is inoperative. However, the pointer remains in position and gives a false reading.

4. Land as soon as possible. The landing gear and bomb door will operate satisfactorily, but the flaps and dive brakes will be inoperative.

CAUTION

The external stores, internal stores, and wing tip tanks cannot be released without electrical power.

HORIZONTAL STABILIZER MALFUNCTION. (GROUP O AIRPLANES)

The maximum speed at which a runway stabilizer can be safely controlled is 250 knots IAS. If stabilizer failure occurs at full nose-up trim, you can still make a flaps-up landing safely. If stabilizer failure occurs at full nose-down trim, a full flaps landing can be made safely. If failure of the stabilizer normal control system should occur, do this:

1. Place the horizontal stabilizer control switch in ALT.
2. Actuate the stabilizer emergency control switch to position the stabilizer.

Note

When the horizontal stabilizer control override switch is in ALT, the aileron trim control system is inoperative.

HORIZONTAL STABILIZER MALFUNCTION. (GROUP P AIRPLANES)

Full nose-down trim failure can be controlled at maximum airspeeds using about 80 pounds of stick force for an airplane with an aft cg condition. With a forward cg condition, full nose-down trim failure can be controlled at maximum airspeeds using about 135 pounds stick force. Full nose-up trim failure cannot be overcome at maximum airspeeds. Under this condition the airplane will climb, the airspeed will decrease, and at about 350 knots IAS the trim can be overpowered to attain level flight. If failure of the stabilizer trim system occurs:

1. Place the stabilizer emergency switch in EMERG OFF.
2. Place the stabilizer POWER circuit breaker in OFF.

HYDRAULIC SYSTEM FAILURE.

If the hydraulic system fails, a wheel brake accumulator which is isolated from the main system by a check valve provides fluid for emergency operation of the wheel brakes. Emergency operation of the landing gear and bomb door is possible by the use of the pilot's hydraulic hand pump which supplies pressure to a duplicate pressure line to the control valves for the landing gear and bomb systems. There is enough fluid in the emergency portion of the hydraulic reservoir for opening the door and extending the landing gear. If the bomb door is closed at the time of hydraulic system failure, and it is necessary to open the door before landing in order to release the bomb load, the landing should be made with the door open. If, after approximately 50 strokes of the hand pump, there is no indication of pressure build-up or bomb door operation, make no further attempt to operate the bomb door. For other hydraulic system failures, see BRAKE SYSTEM FAILURE and LANDING GEAR EMERGENCY EXTENSION in this section.

EXCESSIVE HYDRAULIC FLUID TEMPERATURES.

Loss of accumulator precharge pressure is a major factor in attaining a high frequency of pressure oscillation and excessive hydraulic fluid temperatures. The temperature of the hydraulic fluid becomes excessive when a high pressure drop is combined with high fluid flow over an extended period of time. This condition can also be the result of pressure regulator failure in the cut-in position, requiring the output of both pumps to be passed through the main relief valve. It will be evident by a continuous 3500 psi indication on the main hydraulic system pressure gage. High temperatures will occur in approximately 20 minutes. This may cause hydraulic system failure due to pump failure or loss of fluid through leakage induced by the high temperatures. The emergency procedures described in this section must then be followed for bomb door and landing gear operation. Excessive fluid temperatures can also be caused by very rapid continuous oscillation of system pressure, when the subcircuits are not being operated, between the normal cut-in pressure of $2600 \begin{smallmatrix}+100\\-0\end{smallmatrix}$ psi and the normal cut-out pressure of $3000 \begin{smallmatrix}+100\\-0\end{smallmatrix}$ psi. Rapid fluctuation of system pressure is the result of considerable increase in the internal leakage rate. Fluctuation of system pressure is indicated by the main hydraulic system pressure gage. Operation of each subcircuit may stop the internal leakage and fluctuation. The operation of one subcircuit should be completed before actuating another. This will assist in determining the circuit in which internal leakage existed.

LANDING GEAR SYSTEM FAILURE.

MAIN LANDING GEAR EMERGENCY EXTENSION.

If the landing gear fails to extend in the normal manner, do this:

1. Place the landing gear lever in DOWN.
2. Pull the emergency landing gear down handle all the way out.
3. Operate the hydraulic hand pump.

Note

The hand pump requires approximately 100 to 150 strokes to extend the landing gear, and landing gear extension may require as much as three minutes.

CAUTION

If the bomb door is closed at the time of the hydraulic system failure and it is necessary to open the door before landing to release the bomb load, land with the door open. The emergency portion of the hydraulic reservoir contains only enough fluid for opening the bomb door and extending the landing gear.

NOSE LANDING GEAR EMERGENCY EXTENSION.

If the nose gear fails to extend normally, it can be the result of damage to the nose gear door locking mechanism. Reduce the airspeed well below the 200-knot limitation and apply sufficient engine power while attempting to extend the gear. If repeated cycling fails to obtain extension of the nose gear, operate the hand pump with the gear in the extended position. The forces on the hand pump will be exceedingly high but in some cases it will be possible to obtain slightly more pressure on the nose gear lock mechanism than by the normal system.

CAUTION

If the main hydraulic system fails, do not depress the pedals while in flight, since all brake system pressure will be lost. Save the brake pressure for landing. Although the brake circuit contains enough fluid for two or three applications of the brakes, after touchdown is made, apply the brakes gradually and do not let up until stopped. After the airplane has been brought to a complete stop on the runway, do not attempt taxiing under any conditions because total brake failure will occur in a very short period of time.

BRAKE SYSTEM FAILURE.

In the event the main hydraulic system fails, the wheel brake accumulator has sufficient pressure for two or three applications of the brakes. However, only one continued application is recommended when the main hydraulic system has failed.

Note

In the event pressure has been lost in the brake system and the landing gear is down and locked, open the ground shut-off valve and use the hydraulic hand pump to charge the brake accumulator. Do not use this method to lower the flaps or operate any other system. If the flaps are lowered by this means, it is entirely possible that they could not be raised. The possibility of both hydraulic pumps malfunctioning at the same time is highly improbable. However, if this should happen, the valve and hand pump may be used as a last resort to lower the flaps.

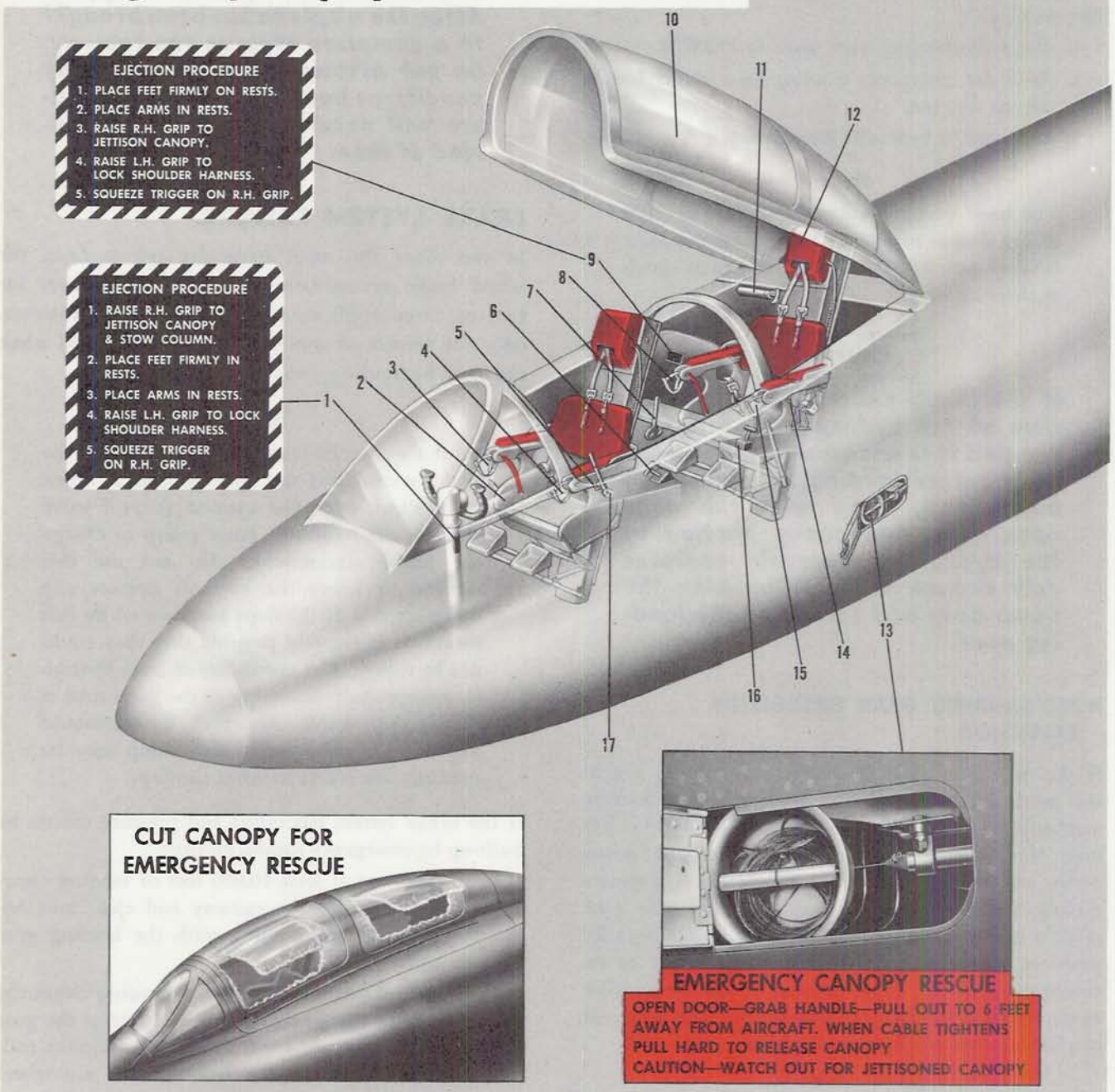
If the brake system has failed and pressure cannot be built-up by emergency means, do this:

1. If there are at least 10,000 feet of landing clearance, including the runway and clear area beyond, make the landing with the landing gear extended.
2. If there is less than 10,000 feet landing clearance, land with the gear extended and retract the gear when it becomes apparent that insufficient roll-out distance remains. Raising the nose-wheel and leaving the flaps down after touchdown decreases the landing roll distance.

Note

See LANDING WITH GEAR RETRACTED in this section.

emergency equipment and exits



1. PILOT'S EJECTION PLACARD
2. PILOT'S SEAT
3. PILOT'S (R. GRIP) CANOPY JETTISON CONTROL, COLUMN STOWAGE, AND EJECTION CONTROL
4. PILOT'S (L. GRIP) INERTIA REEL LOCK CONTROL
5. PILOT'S INERTIA REEL LOCK CONTROL
6. PILOT'S EMERGENCY CANOPY RELEASE
7. CRASH AXE
8. OBSERVER'S (R. GRIP) CANOPY JETTISON AND EJECTION CONTROL
9. OBSERVER'S EJECTION PLACARD
10. JETTISONABLE CANOPY
11. HAND FIRE EXTINGUISHER (C.B.)
12. OBSERVER'S SEAT
13. EXTERIOR EMERGENCY CANOPY RELEASE
14. OBSERVER'S INERTIA REEL LOCK CONTROL
15. OBSERVER'S (L. GRIP) INERTIA REEL LOCK
16. CONTROL OBSERVER'S EMERGENCY CANOPY RELEASE
17. HYDRAULIC HAND PUMP

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Figure 3-6

CUT ON BLACK LINE

CHECK LIST OF EMERGENCY PROCEDURES

ENGINE FAILURE DURING TAKE-OFF.

With sufficient runway remaining.

1. Throttles	OFF
2. Brakes	Apply

With insufficient runway remaining.

1. Throttles	OFF
2. Brakes	Apply
3. Wing tip tanks	Jettison
4. Canopy emergency release handle	Pull
5. Landing gear	UP
6. Battery switch	OFF

After becoming airborne

1. Throttle on operating engine	Reduce to maintain directional control while accelerating to safe single-engine speed of 155 knots
2. Landing gear	UP
3. Throttle on dead engine	OFF
4. Engine valve knob for dead engine	OFF
5. Fire warning lights	Check OUT to eliminate possibility of fire

ENGINE FAILURE IN FLIGHT.

1. Throttle on operating engine	Adjust to maintain airspeed and directional control
2. Throttle on dead engine	OFF
3. Trim system	Retrim to maintain level flight
4. Engine valve knob for dead engine	OFF

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5. Fire warning lights	Check OUT to eliminate possibility of fire
6. Cabin pressure selector switch	Reset to operative engine
7. Generators on dead engine	OFF

SINGLE ENGINE AIR START PROCEDURE.

1. Throttle	OFF
2. Fuel system circuit breakers	In (ON)
3. Drain fuel from engine	Nose-high attitude for 15 seconds
4. Windmill engine	Air speed 155 to 220 knots IAS: 14 to 22% rpm
5. Engine valve knob	Flow position
6. Battery switch	BATTERY
7. Ignition switch	To CRANK ONLY momentarily
8. Throttle	IDLE or slightly above

DUAL ENGINE FAILURE.

1. Battery switch	OFF
2. All electrical equipment	OFF
3. Battery switch	BATTERY
4. Cabin pressure selector switch	OFF
a. Above 43,000 feet	OFF
b. Below 43,000 feet	RAM

DUAL ENGINE AIR START PROCEDURE.

1. Battery switch	BATTERY
2. No. 1 inverter switch	ON
3. Fuel selector switches	Fullest tank

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CUT ON BLACK LINE

CUT ON BLACK LINE

4. Battery switch	OFF
5. No. 1 inverter switch	OFF
6. Throttle	OFF
7. Fuel system circuit breakers	In (ON)
8. Drain fuel from engines	Nose-high attitude for 15 seconds
9. Windmill engine	Airspeed 155 to 220 knots IAS; 14 to 22% rpm
10. Engine valve knob	Flow position
11. Battery switch	BATTERY
12. Ignition switch	To CRANK ONLY momentarily
13. Throttle	IDLE or slightly above

SINGLE ENGINE LANDING.

1. Maintain safe single engine control speed (155 knots) until on final approach.

2. Landing gear	DOWN in time to insure down and locked prior to touchdown
3. Final approach	130 knots IAS
4. Flaps	DOWN when landing assured

LANDING WITH BOTH ENGINES INOPERATIVE.

1. Glide speed	Approximately 160 knots
2. Landing gear	DOWN, 10,000 feet above terrain
3. High key point	Select 5,000 feet above terrain
4. Low key point	Select 1,500 feet over the terrain
5. Base leg	Turn with IAS 140 to 150 knots
6. Final approach	IAS 120 to 130 knots. Side-slip and "S" turn to lose excessive altitude

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LANDING WITH GEAR RETRACTED.

1. Notify observer to prepare for crash landing.
2. Advise control tower of emergency and request foam on runway just prior to landing.
3. Reduce fuel load but retain empty or nearly empty tanks.
4. Jettison all internal and external stores and close bomb door.
5. Unfasten parachute harness and readjust lap belt and shoulder harness.

6. All unneeded electrical equipment	OFF
7. Landing pattern	Set up flat with power on
8. Canopy	Jettison with IAS 180 knots or below.
9. Flaps	DOWN
10. Touchdown	105 knots maximum
(After Touchdown)	
11. Throttle	OFF
12. Battery switch	OFF

13. Abandon airplane as soon as possible.

DITCHING.

1. Notify observer to prepare for ditching.

2. IFF switch	EMERGENCY

3. Actuate master jettison switch if it is desirable to jettison stores.

4. Bomb door switch	CLOSE
5. Landing gear	UP
6. Dive brakes	EXTEND
7. Flaps	DOWN

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CUT ON BLACK LINE

CUT ON BLACK LINE

8. Disconnect all personal equipment except oxygen hose.
9. Unbuckle parachute harness.
10. Airspeed 180 knots or less — Jettison canopy
11. Check seat belt and shoulder harness secure and locked.
12. Insert seat safety pins.
13. Make landing into wind. If sea is rough, land parallel to waves, on top of wave crest.
14. Throttles — OFF
15. Make touchdown as slowly as possible with slightly hose-high attitude.
16. After airplane has stopped, abandon it immediately.

SINGLE ENGINE GO-AROUND.

1. Throttle of operative engine	Advance gradually as airspeed increases to maintain directional control
2. Dive brakes	RETRACT
3. Flaps	UP
4. Landing gear	UP as soon as climb is established

ENGINE FIRE.

1. Fire extinguisher PULL-TO-ARM knob	Pull
2. Agent discharge switch	AGENT DISCHARGE
3. Throttle	OFF
4. Oxygen	100%

ENGINE FIRE ON GROUND.

1. Throttles	OFF
2. Carbon dioxide fire extinguishing equipment	Signal for use by ground crew
(If ground crew not available.)	
1. Fire extinguisher PULL-TO-ARM knob	Pull

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2. Agent discharge switch	AGENT DISCHARGE
3. Throttle	OFF
4. Pilot	Leave airplane as soon as possible

WING OR FUSELAGE FIRE.

1. Cabin pressure selector switch	RAM
2. If system fire	Shut down system feeding fire
3. If fire is uncontrollable	Bail out

FIRE IN FLIGHT COMPARTMENT.

1. Oxygen regulator	100%
2. Hand fire extinguisher	Use as necessary
3. Cabin pressure selector switch	RAM
4. If fire uncontrollable	Bail out

ELECTRICAL FIRE.

1. All non-essential electrical equipment	OFF
2. Cabin pressure selector switch	As required
3. Oxygen regulator	100%
4. Hand fire extinguisher	Use as necessary
5. Electrical equipment	Restore units individually to determine faulty circuit

ELIMINATION OF SMOKE OR FUMES.

(Below 42,000 feet)

1. Cabin pressure selector switch	NO. 1 ENG and NO. 2 ENG to determine source of smoke or fumes

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CUT ON BLACK LINE

CUT ON BLACK LINE

2. Oxygen regulator	100%
3. Cabin pressure selector switch (Above 42,000 feet)	RAM
1. Cabin pressure selector switch	NO. 1 ENG and NO. 2 ENG to determine source of smoke or fumes
2. Oxygen regulator	100%
3. Cabin pressure selector switch	RAM after rapid descent to below 42,000 feet

LANDING GEAR SYSTEM FAILURE.

1. Landing gear lever	DOWN
2. Emergency landing gear handle	OUT, all the way
3. Hydraulic hand pump	Operate manually as required
4. Landing gear	DOWN and locked

HORIZONTAL STABILIZER SYSTEM FAILURE. (GROUP O AIRPLANES)

1. Stabilizer control switch	ALT
2. Stabilizer emergency control switch	Actuate to position stabilizer as desired

HORIZONTAL STABILIZER SYSTEM FAILURE. (GROUP P AIRPLANES)

1. Stabilizer emergency switch	EMERG OFF
2. Stabilizer POWER circuit breaker	OFF

SEAT EJECTION.

1. Right and left grips	Raise to jettison canopy, lock shoulder harness, and stow control column

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CUT ON BLACK LINE

2. Feet	Place in rests
3. Arms	Place in rests
4. Body	Erect, head against rest, chin in
5. Trigger on right grip	Squeeze

End Check List of Emergency Procedures

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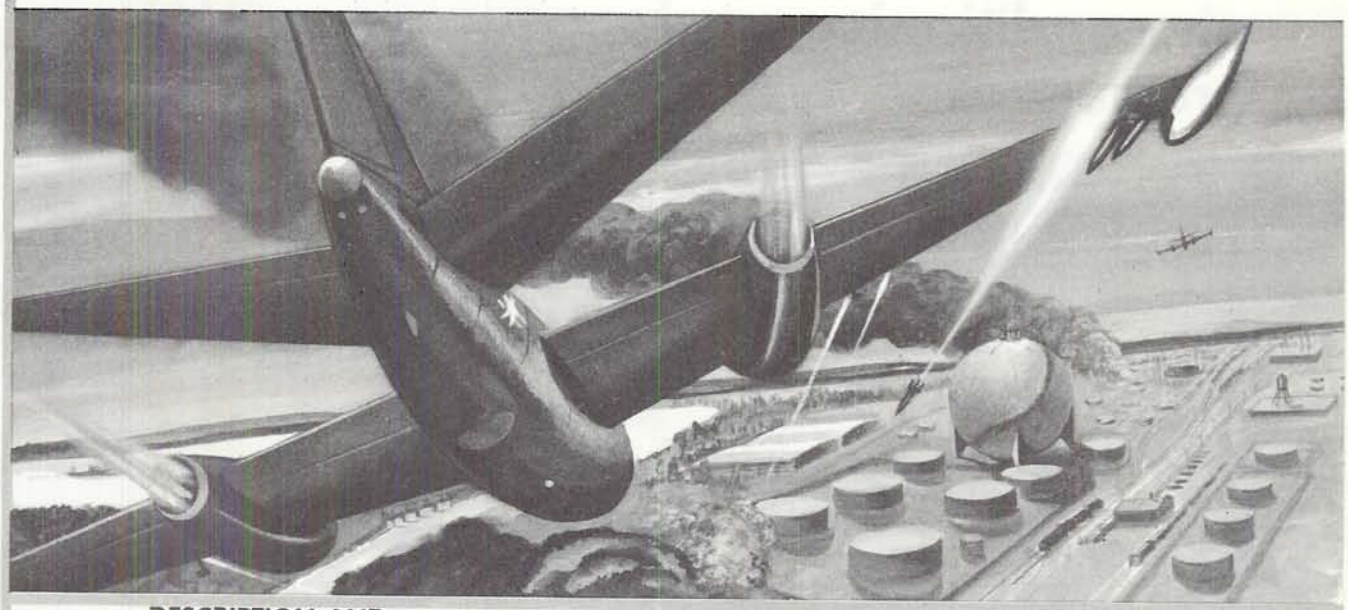
Section IV



DESCRIPTION AND OPERATION OF

AUXILIARY EQUIPMENT

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AIR-CONDITIONING AND PRESSURIZATION SYSTEM.

The air-conditioning and pressurization system (figure 4-1) heats, ventilates, and pressurizes the cabin. The system also supplies air for canopy and windshield defogging, windshield anti-icing, and for pressure in the canopy seal.

CABIN PRESSURIZATION AND HEATING.

A shut-off valve in the ducts from each engine permits one or both engines to supply hot pressurized air to the cabin. One engine supplies enough air to the system for normal operation. Air pressure from the engines varies with engine rpm; therefore, an automatic venturi airflow regulator incorporated in the system maintains a constant system pressure. Hot air from the thirteenth stage of the engine compressor(s) passes through a refrigeration unit for cooling, an electrically controlled hot-air modulating valve regulates the mixing of refrigerated air with hot engine compressor air to give the selected cabin temperature. Air enters the cabin through the canopy

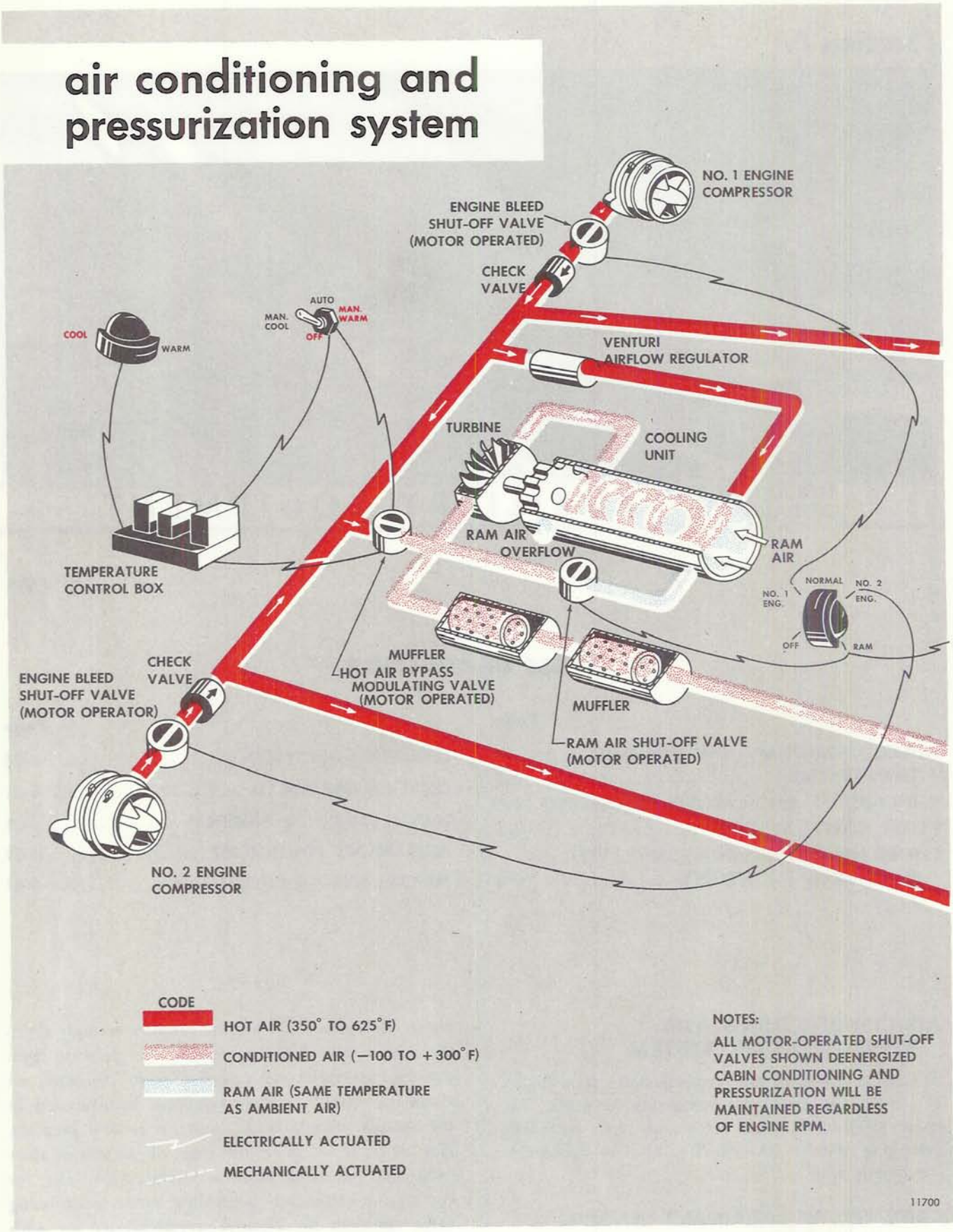

Figure 4–1 (Sheet 1 of 2)

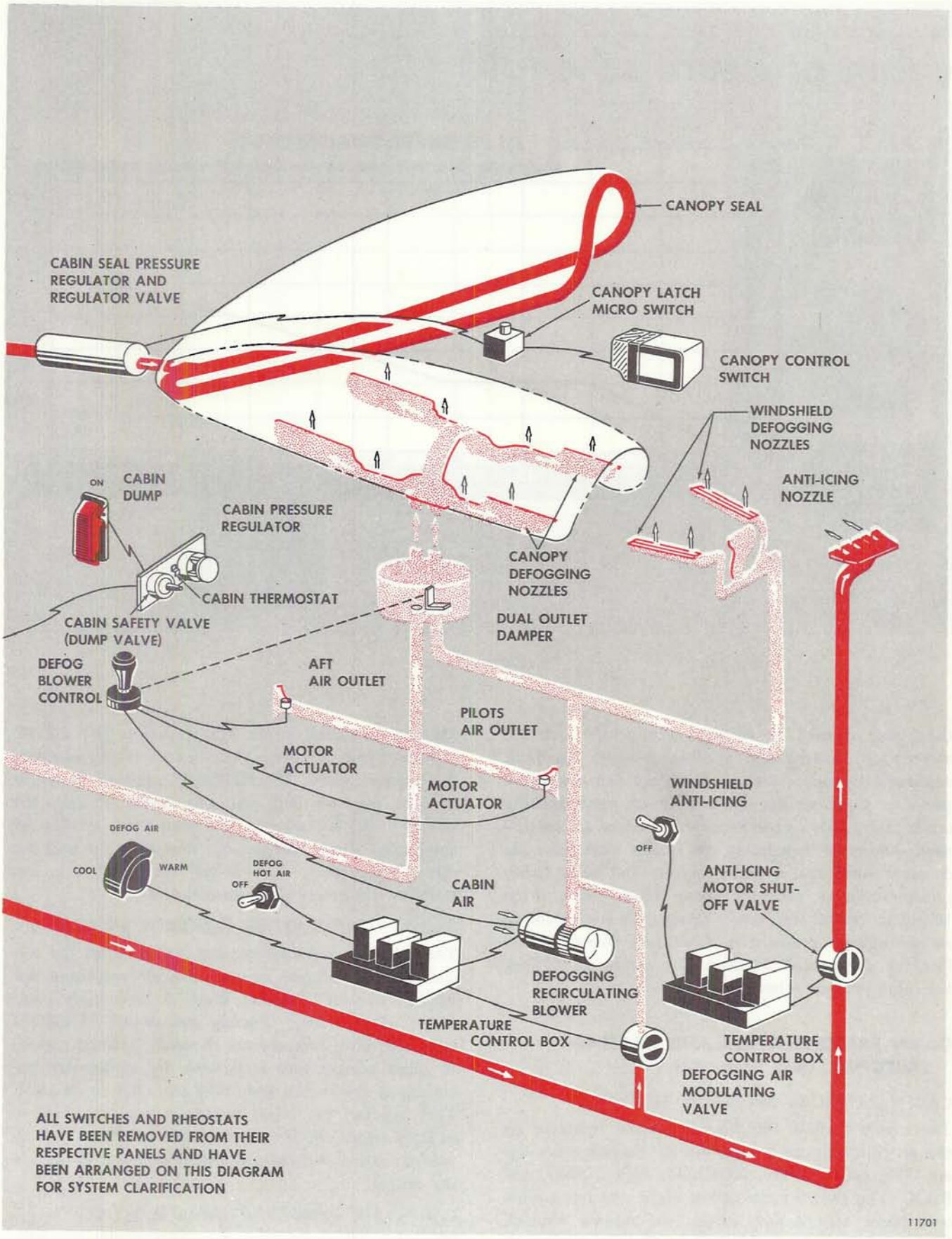

Figure 4-1 (Sheet 2 of 2)

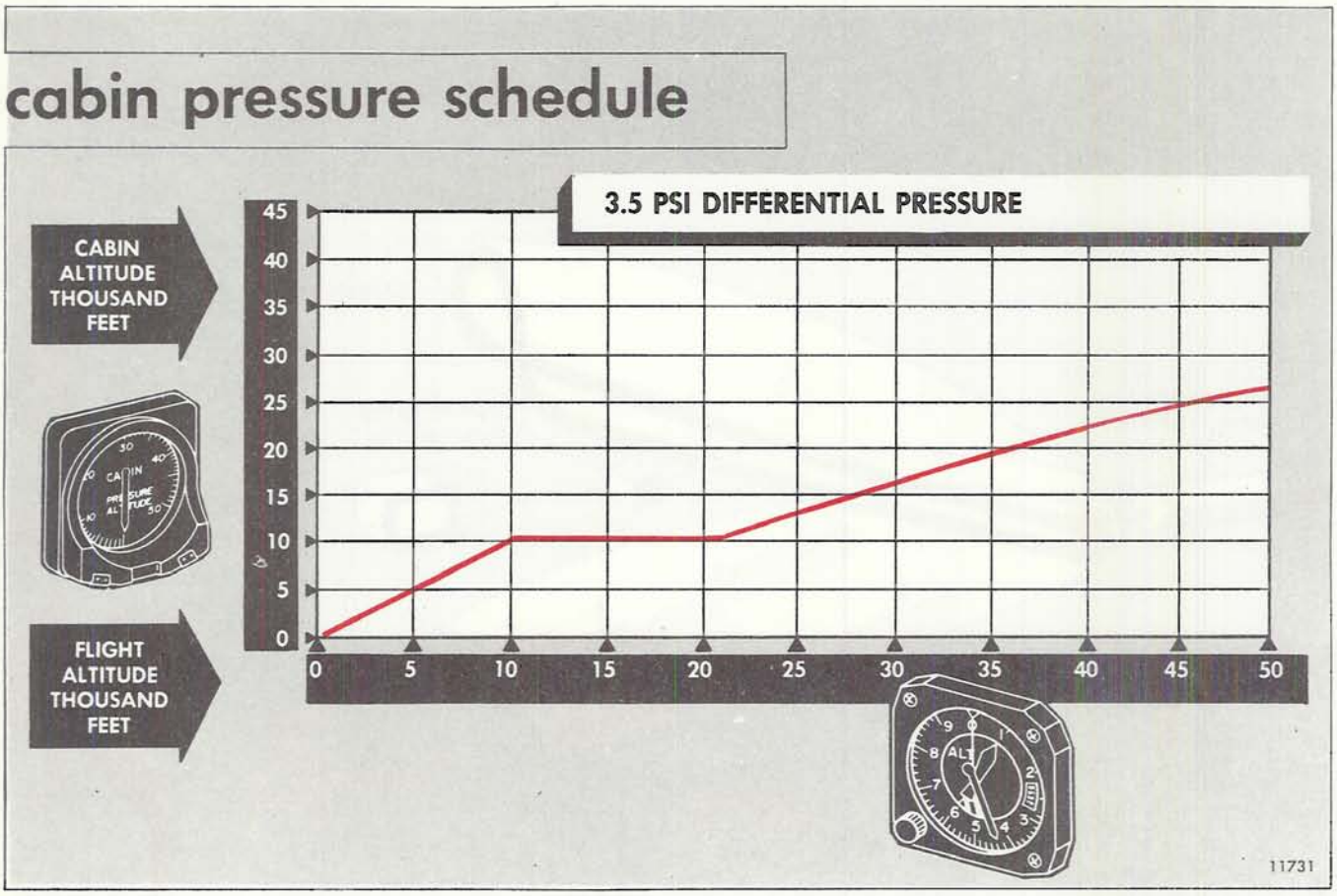

Figure 4–2

defogging nozzles or through the pilot's and observer's air outlets, and a cabin pressure regulator automatically opens and closes to regulate the cabin pressure. Opening the ram-air shut-off valve and the cabin safety valve permits unrestricted cabin ventilation; however, ventilating the cabin with ram air causes a rapid loss of cabin pressure and heat. Cabin pressurization is effective above 10,000 feet. From 10,000 to 20,500 feet, cabin pressure is equivalent to an atmospheric pressure of 10,000 feet. Above 20,500 feet the differential pressure is constant at 3.5 psi. See cabin pressure schedule, figure 4–2.

CABIN PRESSURIZATION AND HEATING SWITCHES. (See figure 4–3.)

CABIN PRESSURE SELECTOR SWITCH.

The rotary CABIN PRESSURE selector switch is on the air-conditioning control panel. Switch markings are OFF, NO. 1 ENG., NORMAL, NO. 2 ENG. and RAM. The switch controls the right and left engine compressor air shut-off valves, the ram-air shut-off valve, and the cabin safety valve. Placing the switch in OFF closes the right and left engine shut-off valves. Placing the switch in the NO. 1 ENG or NO. 2 ENG position opens the respective shut-off valve and closes the opposite valve. The NORMAL position allows air to flow through both shut-off valves. Placing the switch in RAM closes the two compressor air shut-off valves and opens the ram-air shut-off valve and the cabin safety valve. The 28-volt d-c distribution bus supplies the power to operate the valves.

CABIN TEMPERATURE CONTROL SWITCH.

The cabin temperature control switch is on the air-conditioning control panel. Switch markings are AUTO (up), OFF (center), WARM (lower right), and COOL (lower left). Placing the switch in AUTO arms the cabin temperature rheostat. Manual control of cabin temperature is possible by momentary operation of the switch from OFF to COOL or WARM. This bypasses the cabin temperature control box to directly adjust the hot-air modulating valve. The 28-volt d-c distribution bus supplies the power to operate the circuit.

CABIN AIR TEMPERATURE RHEOSTAT.

The cabin air temperature rheostat is on the air-conditioning control panel. The markings for the rheostat

are COOL and WARM. Placing the cabin temperature control switch in AUTO and rotating the rheostat cause the hot air modulating valve to move to a desired position between fully opened and fully closed, depending on the direction of rheostat rotation. A thermostat and a temperature control box regulate the modulating valve to maintain the selected temperature. The 28-volt d-c distribution bus supplies the power to operate the circuit.

CABIN DUMP SWITCH.

The guarded two-position CABIN DUMP switch on the cabin air-conditioning panel controls the cabin safety valve. Raising the guard and placing the switch in the up position open the cabin safety valve. The 28-volt d-c distribution bus supplies the power to operate the circuit.

CABIN PRESSURE ALTITUDE INDICATOR.

The cabin pressure altitude indicator on the generator control panel indicates cabin pressure. Comparing the cabin pressure altitude indication with the altimeter enables the pilot to evaluate cabin pressurization.

CABIN PRESSURIZATION AND HEATING, NORMAL OPERATION.

1. After starting the engines, place the cabin pressure selector switch in RAM for taxiing and take-off.
2. After take-off, place the selector switch in NORMAL and place the cabin temperature control switch in AUTO.
3. Position the cabin pressure temperature rheostat to select a desired temperature.
4. Before leaving the airplane and de-energizing the 28-volt system, place the selector switch in OFF.

CABIN PRESSURIZATION AND HEATING, EMERGENCY OPERATION.

ENGINE FAILURE.

1. Place the cabin pressure switch in the operating engine position.
2. Compare the cabin pressure altitude indicator with the altimeter to evaluate system operation.

cabin conditioning control panel

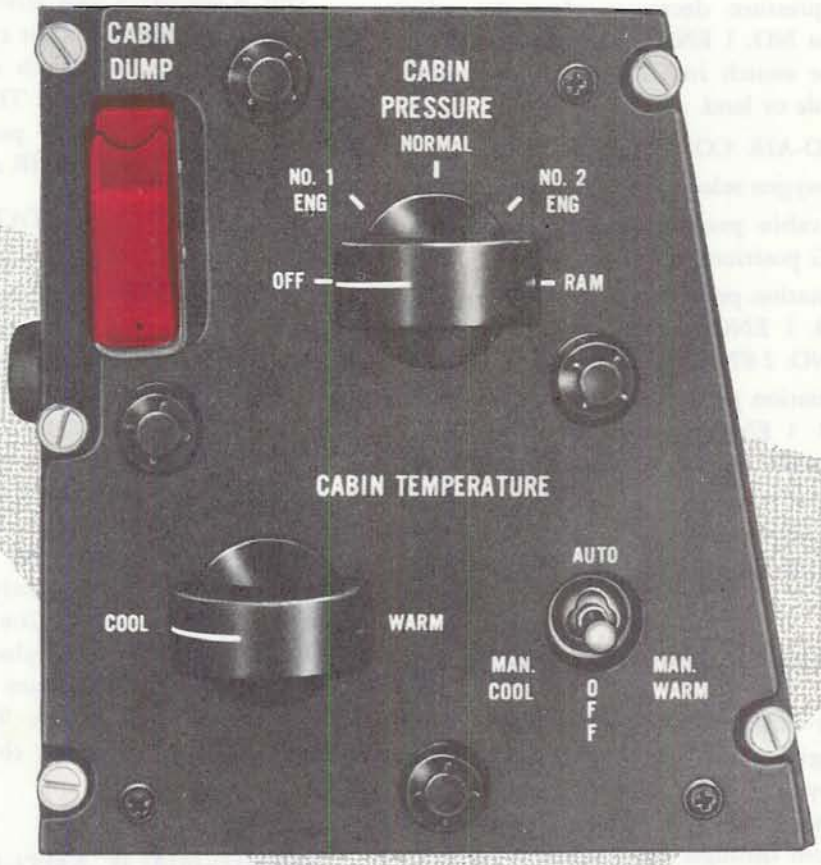

Figure 4–3

HEATING SYSTEM MALFUNCTION.

To regulate cabin temperature during heating system malfunction:

1. Momentarily move the cabin temperature control switch to COOL or WARM and then to OFF.
2. Reduce altitude and place the cabin pressure selector switch in RAM if heat becomes excessive.

Note

Electrically operated valves control the temperature. During electrical failure, the valves remain in the position held at the time of the electrical failure.

ENGINE BLEED-AIR-DUCT RUPTURE.

1. Place the selector switch in NO. 1 ENG position and check system operation by observing the cabin pressure indicator.
2. If the cabin pressure decreases after the switch is in the NO. 1 ENG position, place the selector switch in the NO. 2 ENG position and check system operation by observing the cabin pressure indicator.
3. If cabin pressure decreases after the selector switch is in NO. 1 ENG and NO. 2 ENG, place the selector switch in OFF and if necessary reduce altitude or land.

ENGINE BLEED-AIR CONTAMINATION.

1. Place the oxygen selector to 100 percent.
2. Place the cabin pressure selector switch in the NO. 1 ENG position.
3. If contamination persists with the selector switch in the NO. 1 ENG position, place the selector switch in NO. 2 ENG position.
4. If contamination persists with the selector switch in the NO. 1 ENG and NO. 2 ENG positions, reduce altitude if above 18,000 feet and place the selector switch in RAM.
5. If desired, after clearing the cabin by ram ventilation, repeat steps 1 through 4.

WINDSHIELD AND CANOPY DEFOGGING.

Air from the air-conditioning and pressurization system plus hot engine compressor air defogs the windshield and canopy. During the heating and pressurization not requiring windshield and canopy defogging, air enters the cabin through the CANOPY NOZZLES and not through the pilot's and observer's air outlets. During heating and pressurization requiring windshield and canopy defogging, shut-off valves divert the air from the canopy nozzles to the pilot's and observer's air outlets. The defogging and recirculating blower forces the cabin air through a separate duct to the windshield and canopy. A defogging air-modulating valve permits a desired amount of hot engine compressor air to mix with the air from the blower.

DEFOGGING BLOWER KNOB.

The defogging blower knob on the pilot's right console controls the canopy and windshield defogging and air circulation within the cabin. Pulling the defogging blower knob all the way out (on) mechanically positions a damper that closes the cabin conditioned air inlet and opens the recirculating and defogging air inlet. The final 1/8 inch of travel (out) actuates a microswitch which energizes the recirculating blower and the defogging control circuits. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the circuits.

DEFOG HOT AIR SWITCH.

The windshield and canopy DEFOG HOT AIR switch (figure 4-4) is on the windshield control panel. It is marked DEFOG HOT AIR and OFF. The switch circuit is operative only after the DEFOGGING BLOWER KNOB on the right console is pulled all the way out. Placing the switch in DEFOG HOT AIR arms the defog air rheostat. The 28-volt auxiliary distribution bus supplies the power to the control circuit through the DEFOG AIR switch.

DEFOG AIR RHEOSTAT.

The DEFOG AIR rheostat, marked COOL and WARM, is on the windshield control panel. Rotating the rheostat clockwise causes a heating coil to raise the mercury level in a thermostat. When the mercury rises sufficiently, it completes a circuit to the "more heat" relay. Closing the "more heat" relay completes a circuit to open the hot-air modulating valve, thereby raising the temperature of the air delivered to the windshield and canopy. Rotating the rheostat counterclockwise reduces the mercury level. When the mercury lowers sufficiently, it completes a circuit to the "less heat" relay. Closing of the "less heat" relay causes the hot-air modulating valve to close, thereby lowering the temperature of the air delivered to the windshield and canopy. The 28-volt d-c distribution bus supplies the power to operate the circuits.

WINDSHIELD ANTI-ICING SYSTEM.

The windshield anti-icing system (figure 4-1) distributes a stream of hot air to the outside surface of

windshield control panel

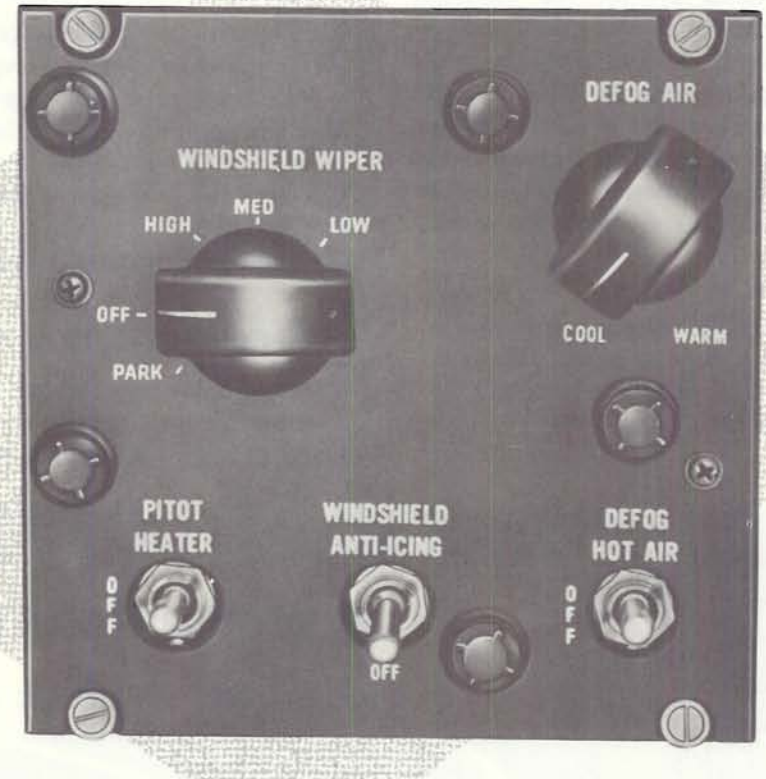

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Figure 4-4

the windshield through an external nozzle. The air-conditioning and pressurization system supplies the hot air for the windshield anti-icing system; therefore, the air-conditioning and pressurization system must be operating to de-ice the windshield. A grid of tungsten wire embedded in the windshield glass senses windshield temperature. Since the electrical resistance of the sensing element varies with the windshield temperature, the variation of resistance causes the shut-off valve to adjust the amount of hot air flowing to the windshield.

WINDSHIELD ANTI-ICING SWITCH.

The two-position WINDSHIELD ANTI-ICING switch (figure 4-4) is on the windshield control panel. Placing the switch in ANTI-ICING energizes relays in the windshield anti-icing temperature control box and completes a circuit to the shut-off valve. Placing the switch in OFF de-energizes the relays and closes the shut-off valve. The 28-volt d-c distribution bus supplies the power to operate the system.

WINDSHIELD ANTI-ICING SYSTEM, NORMAL OPERATION.

1. Place the cabin pressure switch in the NORMAL, NO. 1 ENG, or NO. 2 ENG positions.
2. Place the windshield anti-icing switch in WINDSHIELD ANTI-ICING.

PITOT STATIC SYSTEM.

The pitot static system supplies dynamic and static air pressure to the airspeed indicator, Machmeter, and the vertical velociter indicator. Static plates are on both sides of the nose section and the pitot head is on the under surface of the nose.

PITOT HEATER SWITCH.

The two-position PITOT HEATER switch on the windshield control panel controls the heating element in the pitot head. Switch markings are PITOT HEATER and OFF. Placing the switch in PITOT HEATER energizes the heating element. There are no devices in the circuit to limit the heating of the element, therefore, turn the pitot heater switch off during ground operation. The 28-volt d-c pilot's distribution bus supplies the power to operate the circuit.

HELMET DEFOGGING RHEOSTAT.

Helmet defogging rheostats control the electrical power to the heating element in the pilot's and observer's helmet face piece. Rheostat markings are OFF and HEAT. The pilot's rheostat is on his right console, and the observer's rheostat is on his left console. To operate the system, move the rheostat clockwise, out of OFF until desired heat is obtained. The 28-volt d-c battery bus supplies the power to operate the system.

Note

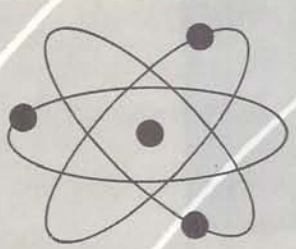
The helmet defog circuit breakers are in the left electrical access compartment. These circuit breakers are inaccessible during flight, and must be placed IN during the exterior inspection.

COMMUNICATIONS AND ASSOCIATED ELECTRONICS EQUIPMENT.

All electronic and communication equipment controls are at the pilot's and observer's stations. (See figure 4-5 for equipment and range data.) The airplane has nine antennas for the operation of the existing equipment. See figure 1-1 for antenna locations. The 28-volt d-c radio bus and the NO. 1 and NO. 2 a-c radio busses supply the power to operate the communications and electronics equipment.

INTERCOMMUNICATION SET AN/AIC-10.

The intercommunication set receives signals from all communications equipment on the airplane. Manipulation of the switch on the pilot's interphone control



communications

and associated electronic equipment

TYPE	DESIGNATION	FUNCTION	OPERATOR	RANGE	CONTROL LOCATION
UHF COMMAND RECEIVER-TRANSMITTER	RADIO SET AN/ARC-27	RADIO TELEPHONE COMMUNICATION ON PRESELECTED UHF CHANNELS	PILOT	LINE OF SIGHT	PILOT'S LEFT CONSOLE
RADIO COMPASS	RADIO COMPASS AN/ARN-6	RECEIVER COMMUNICATIONS FOR AUTOMATIC DIRECTION FINDING AND GENERAL RECEPTION OF L-F AND M-F, C-W AND A-M, SIGNALS	PILOT OBSERVER	200 MILES	PILOT'S AND OBSERVER'S RIGHT CONSOLE
MARKER BEACON RECEIVER	MARKER BEACON RECEIVING SET AN/ARN-12	AURAL AND VISUAL INDICATIONS OF COURSE AND CONE OF SILENCE MARKERS	PILOT	ALL ALTITUDES	PILOT'S RIGHT CONSOLE
INTERPHONE	INTERCOMMUNICATION SET AN/AIC-10	TALKING AND LISTENING CONTROL BETWEEN AIRPLANE STATIONS AND OTHER COMMUNICATIONS EQUIPMENT	PILOT OBSERVER MAINTENANCE PERSONNEL	CABIN	PILOT'S RIGHT CONSOLE OBSERVER'S LEFT CONSOLE RIGHT WHEEL WELL
IFF	RADAR IDENTIFICATION SET AN/APX-6A	AUTOMATICALLY IDENTIFIES AIRPLANE AS FRIENDLY WHEN CHALLENGED BY PROPERLY EQUIPPED RADARS	PILOT	LINE OF SIGHT	PILOT'S RIGHT CONSOLE
RADAR BEACON	RADAR SET AN/APW-11A WITH INDICATING GROUP AN/APA-90	NAVIGATIONAL AND BOMBING-AID RADAR GUIDANCE SYSTEM	PILOT	200 MILES	PILOT'S RIGHT CONSOLE
SHORAN	S-4	NAVIGATIONAL RADAR SYSTEM	OBSERVER	LINE OF SIGHT	OBSERVER'S RIGHT CONSOLE
GYRO COMPASS	TYPE J-2 SLAVED-GYRO MAGNETIC COMPASS	PROVIDES STABILIZED MAGNETIC HEADING OF AIRPLANE	PILOT	—	PILOT'S INSTRUMENT PANEL
RADAR WARNING	RADAR RECEIVING SET AN/APS-54	VISUAL AND AURAL WARNING OF AIRBORNE INTERCEPTION OF AIRBORNE GUN LAYING RADAR	OBSERVER (VISUAL) PILOT (AURAL)	75 MILES	PILOT'S RIGHT CONSOLE PILOT'S LEFT CONSOLE

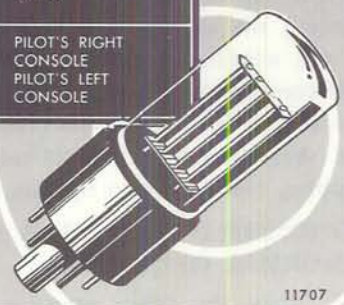


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Figure 4-5

panel (right horizontal console) or the observer's interphone control panel (left console) enables the user to receive a single signal or to mix two or more signals. The equipment used by the pilot or observer are the control panels, headsets, microphones, and press-to-talk switches on the control wheel and inboard throttles. The observer's microphone switch (figure 4-6) is below the observer's instrument panel on the floor. Three features of the set insure high intelligibility at all altitudes: 1) the air-damped headphones that enable the vibrations of the diaphragm to become more vigorous as the air becomes thinner due to increases in altitude, 2) the barometric switches that automatically adjust sound volume during changes in altitude, and 3) the automatic volume control. A control box in the right wheel well enables the crew to talk to ground personnel.

Figure 4-6

INTERCOMMUNICATION SET AN/AIC-10 CONTROL PANEL.

The pilot's interphone control panel (figure 4-7) is on the pilot's right horizontal console, and the observer's interphone control panel is on the observer's left console. The control panels contain a rotary function-selector switch, a volume control knob, a NORMAL-AUX LISTEN switch, and a row of audio mixing switches along the top of the control panel. The 28-volt d-c radio bus supplies the power to operate the intercommunication set.

FUNCTION SELECTOR SWITCH.

A rotary function selector switch is on the pilot's and observer's intercommunication set control panel. The position of the switch determines the equipment used for transmission and reception. Switch markings are CALL, INTER, HOT-MIC, COMM, and ADF. Rotating the function selector switch to CALL and depressing a microphone switch enables the user to communicate with the other crew member regardless

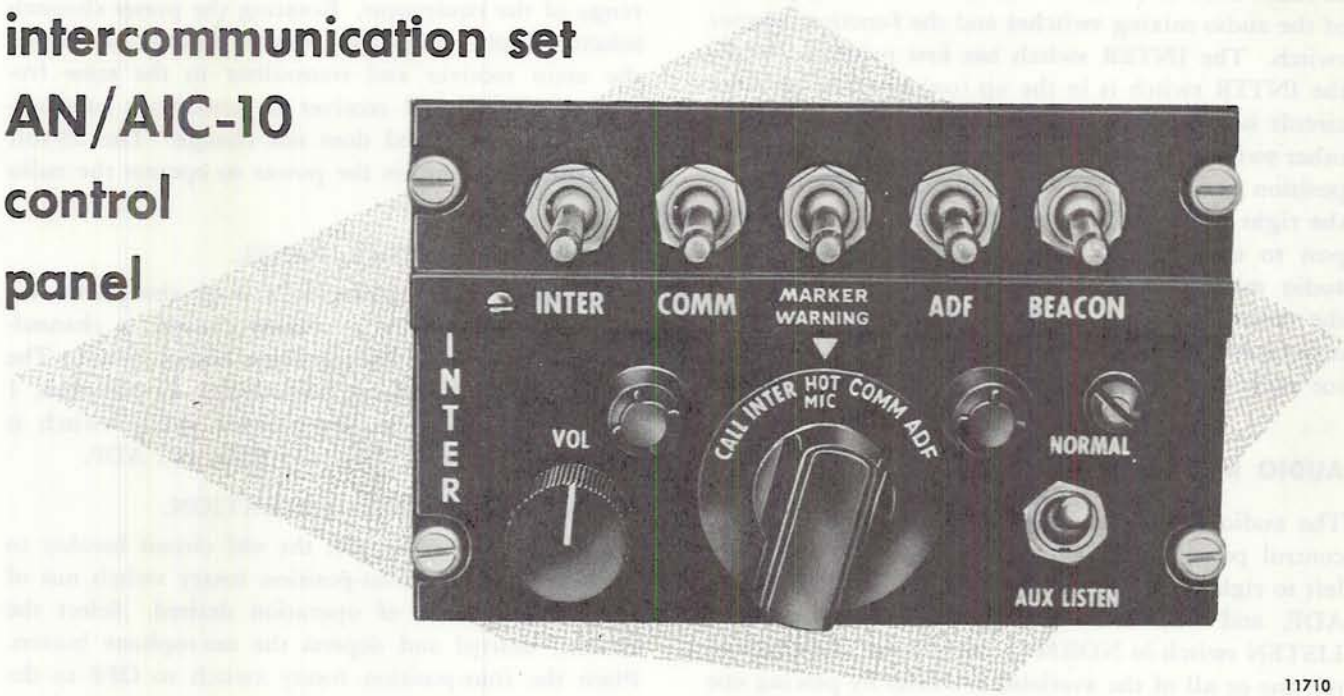


Figure 4-7

of the position of the latter's function selector switch or mixing switches. Placing the switch in INTER and depressing a microphone switch enables the user to talk to the other occupant if the latter also has his function selector switch in INTER or has his INTER mixing switch in the up position. However, a conversation cannot take place unless both rotary function selector switches are in INTER or HOT-MIC. Rotating the function selector switch to COMM enables the user to transmit and receive with the uhf set. Placing the function selector switch in HOT-MIC enables the user to converse with the other crew member without depressing a microphone switch, provided the latter also has his function selector switch in HOT-MIC. The HOT-MIC function enables the crew to use the interphone while monitoring the uhf radio. Depressing a microphone switch with the function selector switch in HOT-MIC energizes the AN/ARC-27 transmitter. Placing the function selector switch to ADF permits the user to monitor the radio compass exclusively.

MALFUNCTION OF CONTROL UNIT.

In the event of intercommunication set malfunction, it is possible to listen (but not transmit) by placing the NORMAL-AUX LISTEN switch in AUX LISTEN. In this position, both headsets are in parallel, thereby permitting reception from the other control panel. Operation in this function reduces the strength of the signal to the headsets with a consequent reduction in volume. During individual panel operation in AUX LISTEN, there is a definite switching priority of the audio mixing switches and the function selector switch. The INTER switch has first priority. While the INTER switch is in the up (on) position no other circuit is connected, regardless of the position of the other switches. Placing the INTER switch in the down position passes priority to the switch immediately to the right of the INTER switch. Priority continues to pass to the right in this manner along the line of audio mixing switches. All switches to the left of the desired switch must be down. Placing all audio mixing switches off (down), enables the function selector switch to control the selection of the equipment.

AUDIO MIXING SWITCHES.

The audio mixing switches are along the top of the control panel. Individual switch markings are, from left to right, INTER, COMM, MARKER WARNING, ADF, and BEACON. Placing the NORMAL-AUX LISTEN switch in NORMAL enables the user to monitor one or all of the available facilities by placing one or all of the audio-mixing switches in the up position.

AIC FILTER.

The AIC filters, one on the pilot's right vertical console and one on the observer's right console, enable the pilot or observer to separate the simultaneous voice-range broadcast from the radio range stations. Switch markings are VOICE, RANGE, BOTH, RANGE, and VOICE in that order from the top to the bottom of the panel. The first two (top) VOICE-RANGE positions are for one ADF system and the last two (bottom) RANGE-VOICE positions are for a second ADF system. Since the airplane has only one ADF system, the last two (bottom) positions are inoperative. The BOTH position is common to ADF-1, ADF-2. Placing the switch in VOICE enables the listener to hear only the voice transmission from the radio range station. Placing the switch in RANGE enables the listener to hear only the range transmission, and placing the switch in BOTH enables the listener to hear the range and voice transmissions simultaneously.

RADIO SET AN/ARC-27.

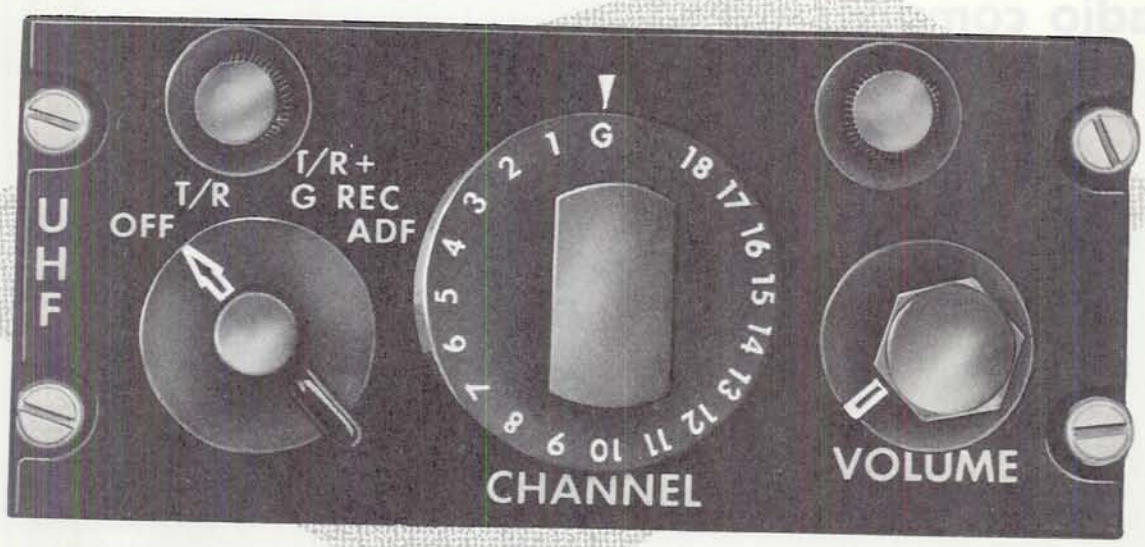
The radio set AN/ARC-27 provides air-to-air or air-to-ground communication in the uhf spectra from 225.0 to 399.9 megacycles. The set includes a stub antenna on the bottom right side of the nose section, a transmitter and two receivers (guard and main) in the equipment compartment, and a control panel on the pilot's left console. There are 1750 frequencies available in 100 kilocycle steps. Eighteen frequencies can be preset in any order within the operating range of the equipment. Rotating the preset channel-selector knob selects the desired channel and tunes the main receiver and transmitter to the same frequency. The guard receiver is tuned to a predetermined frequency and does not change. The 28-volt d-c radio bus supplies the power to operate the radio set.

AN/ARC-27 CONTROL PANEL.

The control panel (figure 4-7) is on the pilot's left console. Controls are a volume control, a channel-selector knob and a four-position rotary switch. The channel-selector knob is marked for 19 positions, 1 thru 18 and G. The four-position rotary switch is marked OFF, T/R, T/R + G REC, and ADF.

AN/ARC-27, NORMAL OPERATION.

To turn on the radio, put the uhf circuit breaker to IN and rotate the four-position rotary switch out of OFF to the mode of operation desired. Select the channel desired and depress the microphone button. Place the four-position rotary switch to OFF to de-energize the equipment.



uhf radio control panel AN/ARC-27

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Figure 4-8

AN/ARC-27 EMERGENCY OPERATION.

In-flight emergency operation is not possible with this installation.

RADIO COMPASS AN/ARN-6.

The radio compass AN/ARN-6 (figure 4-8) is an airborne navigational aid and a general communications receiver. The components of the set are a sense antenna mounted on top of the center fuselage, a loop antenna behind the observer's headrest, a receiver in the electrical equipment compartment, the pilot's and observer's control panels and ADF tuners on the right horizontal consoles, and the pilot's and observer's radio compass indicator on the main instrument panels. By individual or combined use of the loop and sense antennas, the compass can be used for weather report reception, position-finding, and homing. Many radio range stations do not have uhf transmitters, but all have uhf receivers. Transmission on uhf and reception on radio compass establish two-way radio communications with range stations for position reports, weather requests, etc. The 28-volt d-c radio bus supplies the power through a 10-ampere circuit breaker to operate the radio compass.

RADIO COMPASS CONTROLS.

The control unit on the pilot's and observer's right horizontal console contains all the controls for operating the AN/ARN-6 radio compass. The various knobs and switches on the unit for control of the radio compass are a function-control knob, a frequency TUNING crank, a VOLUME control, a CW-VOICE switch, a frequency-band selector, and a LOOP rotator switch.

RADIO COMPASS FUNCTION CONTROL.

Knob position markings for the function control are OFF, ADF, ANT, LOOP and CONT. Rotating the knob from OFF to any one of the other positions turns the set on. Placing the knob in ADF combines the functions of the sense and loop antennas for homing and automatic direction finding. With the knob in ANT, only the sense antenna receives signals for set operation. The LOOP position allows the operator to use the loop antenna for aural-null operation. To transfer control of the set from the observer to the pilot or from the pilot to the observer, momentarily place the knob in CONT.

RADIO COMPASS TUNING CRANK.

Rotation of the TUNING crank permits selection of a desired frequency shown on the calibrated dial at the top of the control unit.

RADIO COMPASS BAND SELECTOR KNOB.

Rotation of the band-selector knob permits selection of any one of four bands of receiver frequencies. Band ranges are 100 to 200 kcs, 200 to 410 kcs, 410

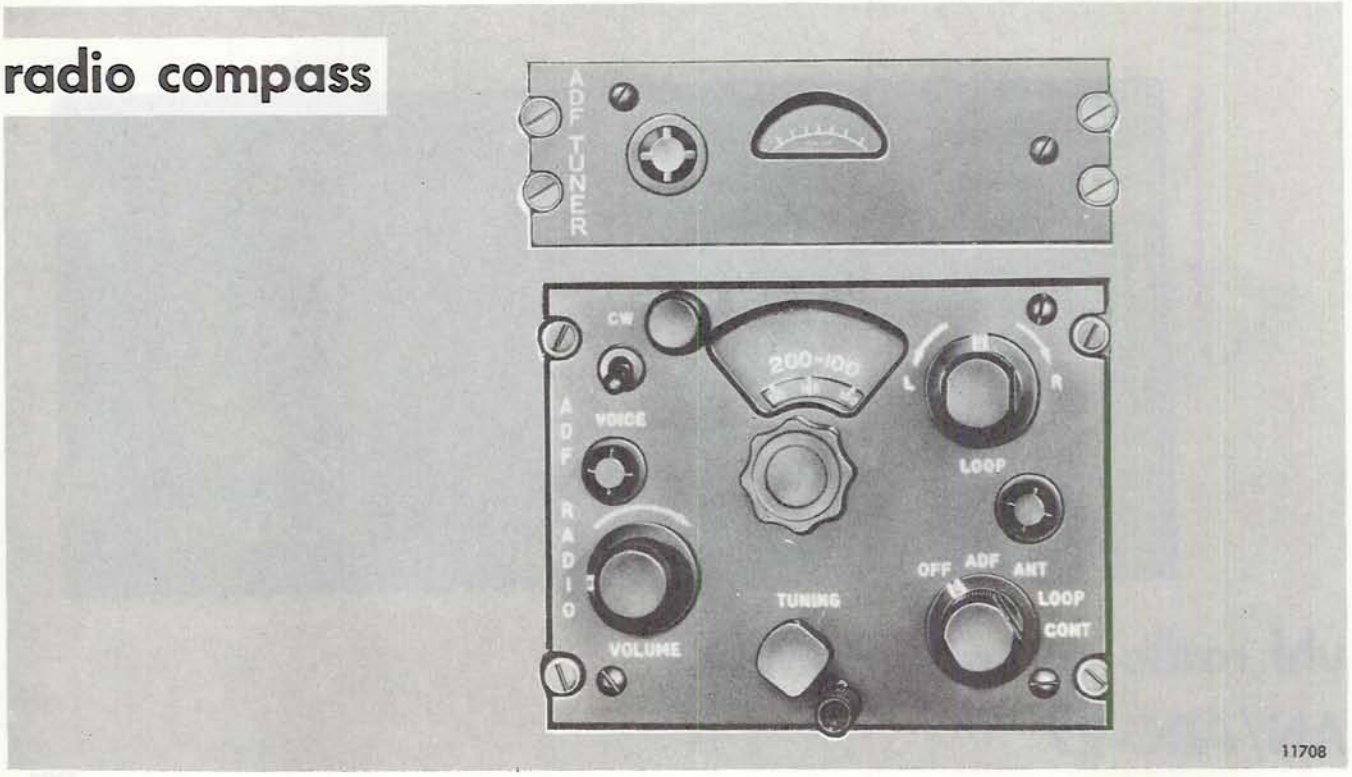


Figure 4-9

to 850 kcs, and 850 to 1750 kcs. Rotating the band-selector knob changes the band's calibrated range scale in the window above the knob.

RADIO COMPASS VOLUME CONTROL.

The VOLUME control enables the operator to adjust the audio level to the interphone system.

RADIO COMPASS CW-VOICE SWITCH.

To obtain greater accuracy in tuning, place the CW-VOICE switch in CW. When the switch is in ADF, you can hear a 900-cycle tone along with station modulation. Tune to a zero beat in the ANT or LOOP position.

RADIO COMPASS LOOP ROTATOR SWITCH.

Switch position markings are L and R. Turning the switch to L rotates the loop antenna to the left. Turning the switch to R rotates the loop antenna to the right. When released, the switch springs back to the neutral position. The amount of deflection of the switch governs the speed of the loop rotation. To attain maximum speed of loop rotation, turn the switch to the maximum L or R position.

ADF TUNER.

The TUNE TO MAX (ADF Tuner) is on the pilot's and observer's right horizontal console immediately forward of the pilot's and observer's AN/ARN-6 control panel. Maximum needle deflection to the right indicates proper tuning of a desired signal.

RADIO COMPASS INDICATOR.

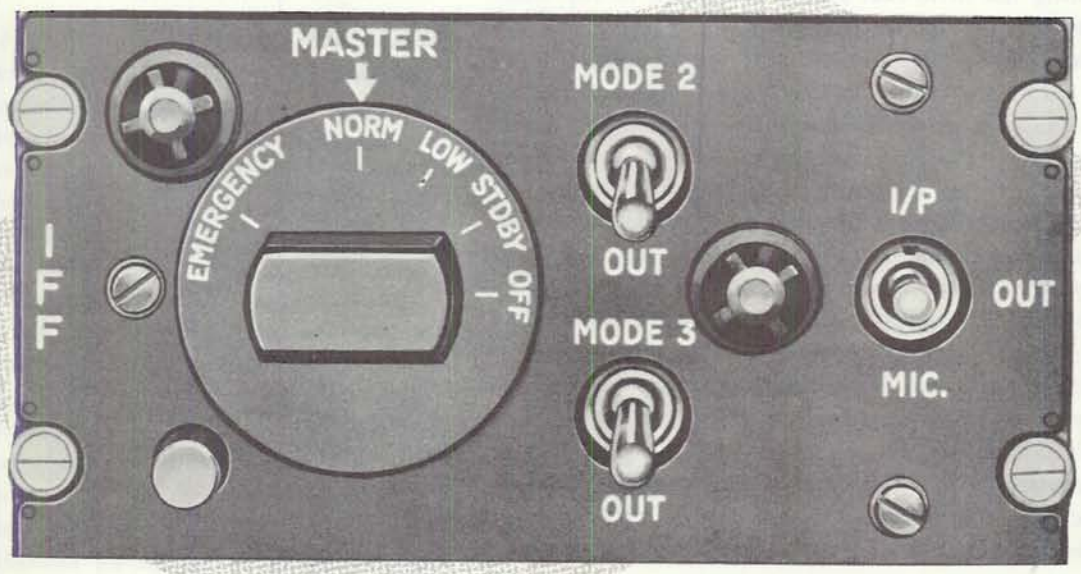
The radio compass indicator for the pilot and observer is on the main instrument panels. The radio compass needle indicates the direction of a tuned station relative to the airplane's heading.

RADIO COMPASS OPERATION.

To turn on the radio compass, rotate the function-control knob to the LOOP position and operate the L-R switch to determine proper loop operation and to determine which panel has control. If there is no pointer rotation, place the function control switch momentarily in CONT to gain control. After gaining control of the set, place the function control switch in ANT; then:

1. Place the ADF audio mixer switch on intercommunication control panel in the up position.
2. Place the CW-VOICE switch in CW.
3. Rotate the band-selector knob to the band scale containing the desired frequency.
4. Adjust the volume control as necessary.
5. Rotate the TUNING crank to the desired frequency and tune to the maximum needle deflection on the ADF tuner.
6. Place the CW-VOICE switch in VOICE.

To operate the set for automatic direction finding, place the function control knob in ADF. To operate the set for aural-null operation, place the function



radar identification set AN/APX-6A control panel

11727

Figure 4-10

control knob in LOOP and use the loop rotator knob for loop rotation.

MARKER BEACON AN/ARN-12.

Applying power to the electrical system causes the marker beacon to operate continuously. The set receives 75 megacycle transmissions from the ground. An indicator light on the pilot's and observer's main instrument panel flashes as the airplane passes over a marker transmitter, thereby giving a navigational fix. Also, placing the BEACON switch on the interphone control panel in the BEACON position and the marker beacon radar warning switch in MARKER BEACON enables the pilot or observer to hear the coded marker identification. Pressing the lamp case completes a circuit to test the lamp operation. The 28-volt d-c radio bus supplies the power for marker beacon receiver operation.

MARKER BEACON-RADAR WARNING SWITCH.

The MARKER BEACON-RADAR WARNING switch is on the pilot's right console. Placing the switch in MARKER BEACON enables the crew to listen to the aural code transmitted from a marker beacon. However, the MARKER BEACON audio mixing switch on the interphone control panel must be in the UP position. (Refer to RADAR RECEIVING SET AN/APS-54 for switch function at the RADAR WARNING positions.)

IFF RADAR SET AN/APX-6A.

The IFF radar set AN/APX-6A enables an aircraft to identify itself automatically when challenged by suitably equipped friendly surface radar or airborne radar. The radar set is a transponder rather than a transmitter since it does not originate signals. The set receives signals from a remote radar station and amplifies these signals. The originating radar station picks up the amplified signal and reproduces it visually on its radar scope. The 28-volt d-c radio bus and the 115-volt a-c No. 2 radio bus supply the power to operate the set.

IFF CONTROL PANEL.

The control panel (figure 4-10) on the pilot's right vertical console enables the pilot to select all operational conditions of the transponder by means of the following switches:

1. *Master switch.* This control is a five-position rotary switch. The five positions are: OFF, STDBY, LOW, NORM, and EMERGENCY.
2. *MODE 2 switch.*
3. *MODE 3 switch.*
4. *L/P MIC switch.*

IFF MASTER SWITCH.

Rotating the MASTER switch from OFF to any other position turns on the equipment. Operation of the master switch does not turn on panel illumination. The pilot must run a "parrot" check with ground or airborne radar to assure the proper functioning of the equipment. Placing the master switch in STDBY energizes the set so that it is ready for immediate use but no replies from a challenging radar are answered. Placing the master switch in LOW causes the set to reply in mode 1. The reply is of low intensity. This is particularly useful to the interrogating radar when the airplane is flying nearby. Placing the switch in NORM causes the set to reply in mode 1 and the reply is of normal intensity. Placing the switch in EMERGENCY causes the set to transpond a distinctive emergency reply of normal intensity. To rotate the switch to EMERGENCY, depress the button at the lower left corner of the control panel.

MODE SELECTOR SWITCHES.

The two mode-selector switches to the right of the master switch are the controls for transponder operation in MODE 2 and MODE 3. Switch markings are MODE 2—OUT and MODE 3—OUT. Placing either switch in the mode position causes the set to reply in the selected mode. The master switch and the mode selector switches operate independently; therefore, an individual reply or any combination of replies is possible. However, the master switch must be in LOW or NORMAL for set operation.

Note

Placing the master switch in EMERGENCY causes the set to transpond an emergency reply regardless of the position of mode selector switches.

I/P-MIC SWITCH.

The three-position I/P-MIC switch is at the right of the control panel. Switch markings are I/P (up), OUT (center), and MIC (down). The switch enables the pilot to identify his position to interrogating radar by momentarily changing the transponder to a different mode. To identify his position, the pilot places the switch momentarily in the I/P position. An observer using the interrogating radar notes the change in modes to determine on the radar scope the position of the airplane. An alternate method of identifying position is to place the switch in the MIC position and to use the microphone button on the control wheel or on the inboard throttle. When the MIC position is in use, the airplane's uhf radio must be on. The mode change remains in effect for thirty seconds after releasing the switch or microphone button. The transponder then replies in the mode originally selected.

RADAR SET AN/APW-11A WITH INDICATING GROUP AN/APA-90.

Radar Set AN/APW-11A, (figure 4-11) used in conjunction with the Indicating Group AN/APA-90, serves as a navigational and bombing-aid radar guidance system. In navigational operations, intelligence obtained from a ground station can help determine aircraft speed, heading, and altitude. In bombing-aid operations, the pilot receives tactical instructions visually. The pilot controls the radar set AN/APW-11A. Actuate the BEACON mixing switch on the pilot's interphone control panel, for radar beacon reception. Tactical instructions for the pilot are indicated by the flight command indicator. A roger switch, located in the left handgrip of the control wheel, is connected in parallel with the roger switch on the AN/APW-11A control panel. This switch cancels all previous indications on the flight command indicator and acknowledges receipt of all indications. The 28-volt d-c radio bus supplies the power to operate the equipment.

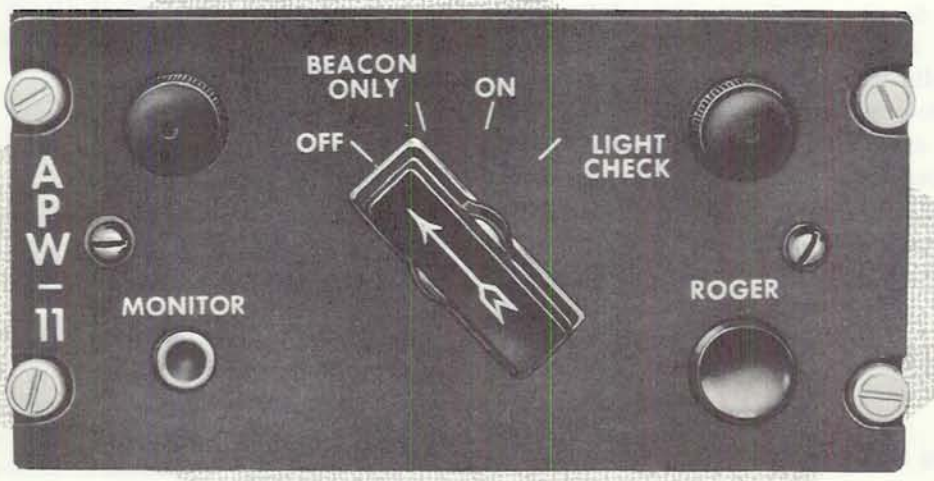
RADAR SET AN/APW-11A WITH INDICATING GROUP AN/APA-90, NORMAL OPERATION.

The radar set AN/APW-11A control panel is on the pilot's right console. The control is a four-position switch marked OFF, BEACON ONLY, ON, and LIGHT CHECK, and a ROGER button. To energize the equipment place the four position switch to ON. Place the switch to OFF to de-energize the equipment.

RADAR RECEIVING SET AN/APS-54.

Radar Receiving Set AN/APS-54 transmits visible and audible warning to the pilot when an airborne interception or an airborne gun-laying radar system is in position to offer a potential threat to the airplane. The visible warning is displayed by indicator lights on the pilot's indicator panel and the observer's AN/APS-54 control panel (figure 4-12). The red lights illuminate when radar signals arrive from the direction of the nose, the tail, or both. The green light (observer's panel only) illuminates during an absence of signals. The audible warning is an audio tone in the headset and corresponds to the pulse rate frequency (high pulse rate for airborne radar and medium or low pulse rate for gun-laying or ground radar) of the intercepted signals. The audible tones are monitored through the AN/AIC-10 Intercommunication set. A test switch on the observer's control panel tests operation of the visible and audible warning systems. The 28-volt d-c radio bus and the No. 1 a-c radio bus supplies the power to operate the equipment.

radar set APW-11 control panel



11713

Figure 4–11

radar receiving set AN/APS-54 control panel

11716

Figure 4–12

NORMAL OPERATION.

Place the AN/APS-54 power switch to ON. Place the pilot's interphone marker warning switch ON and the marker beacon-radar warning switch to RADAR WARNING. Set the panel controls as follows: delay switch OUT, audio switch BOTH, and audio-gain maximum (fully clockwise). Place the test switch to UP. An audio tone in the headset, illumination of both red nose and tail warning lights, and extinguishing of the green light, indicator proper system operation. The audio switch selects tones from the nose, tail, or both positions. The audio gain control governs the amplitude of the signals. Place the delay switch IN to delay signal indication. Delay time is two seconds. Place the delay switch OUT for instant signal indication.

S-4 SHORAN SYSTEM.

The S-4 shoran system is a highly accurate, short-range, navigational and bombing radar device. In navigational function, the equipment aids in computing a fix on the airplane's position. In bombing functions, the equipment automatically compensates for the variables of flight that affect the accuracy of bombing and provides data which enable flight to the true release point. At the release point, the bombs are automatically dropped whether the target is visible or not. The equipment is operated by the observer, but both the pilot and the observer receive indications from the system. Power for the system comes from the No. 1 radio bus and the 28-volt d-c radio bus through three circuit breakers on the main radio circuit breaker panel.

SHORAN COMPUTER UNIT.

The computer unit is on the observer's right console. (See figure 4-13.) Flight variables automatically feed into the computer as the airplane approaches the release point. The computer determines the release point and the instant of release. At a predetermined distance from the bomb-release point, power is automatically supplied to the bomb carrier door control circuit to open the door. At the release point, power is automatically supplied to the bomb release circuits to release the bombs.

SHORAN RANGE INDICATOR.

The shoran range indicator is on the observer's right console. (See figure 4-12.) A transmitter in the airplane sends out radar signals which are received by two shoran ground stations and retransmitted. The range indicator receives these retransmitted signals and indicates them visually on the range indicator scope. The observer then superimposes the returned video signals upon reference marker pulses on the scope to reveal the distances to each station. Distances are indicated on station-miles dials and vernier counters. This locates the point on the earth's surface directly below the airplane. Prior to receiving video pulses, preset the indicator by means of the various controls and indicators on its panel.

SHORAN COMPARATOR.

The shoran comparator (figure 4-31), located to the right of the observer's feet, receives timing signals and the returned drift station video from the shoran range indicator. Deviations of returning video pulses are visually indicated to the pilot and observer.

SHORAN POSITION DEVIATION INDICATOR.

Two shoran position deviation indicators, one on the pilot's main instrument panel and the other on the observer's instrument panel give instantaneous rate-of-approach and displacement-from-track data. This enables the pilot to fly the airplane precisely along a predetermined flight path.

SHORAN MILES-TO-RELEASE INDICATOR.

The shoran miles-to-release indicator on the observer's instrument panel indicates the miles remaining to the release point. The indicator is calibrated in one-mile increments from zero to nine. One revolution of the indicator needle represents ten miles; therefore, the needle recycles every ten miles.

AN/ALE-2 CHAFF DISPENSER.

The AN/ALE-2 Chaff Dispenser equipment is for protection and evasion from hostile radar. The system consists of two control panels on the observer's left console, and two dispenser pads. The pads are on the left and right wing inboard pylons. The 28-volt d-c radio bus supplies the power to operate the equipment.

C-1282/ALE-1 CONTROL PANELS.

Two C-1282/ALE-1 control panels (figure 4-29) are on the observer's left console. Each panel controls the operation of its respective chaff dispenser pod. Controls are an ON-OFF power switch, CHAFF RESERVE subtractive counters, a SIGNAL lamp, and a speed selector switch placarded INTERVALOMETER-CONTINUOUS FPM.

The chaff reserve counter indicates the number of chaff packages available for dispensing. The speed-selector switch selects variable-speed or intervalometer-controlled chaff dispensing. For variable-speed control, the selector speed is marked numerically in feet-per-minute positions: 2.5, 5, 10, 20, 40, and 80. For intervalometer-controlled dispensing, there is a choice of

shoran computer and indicator

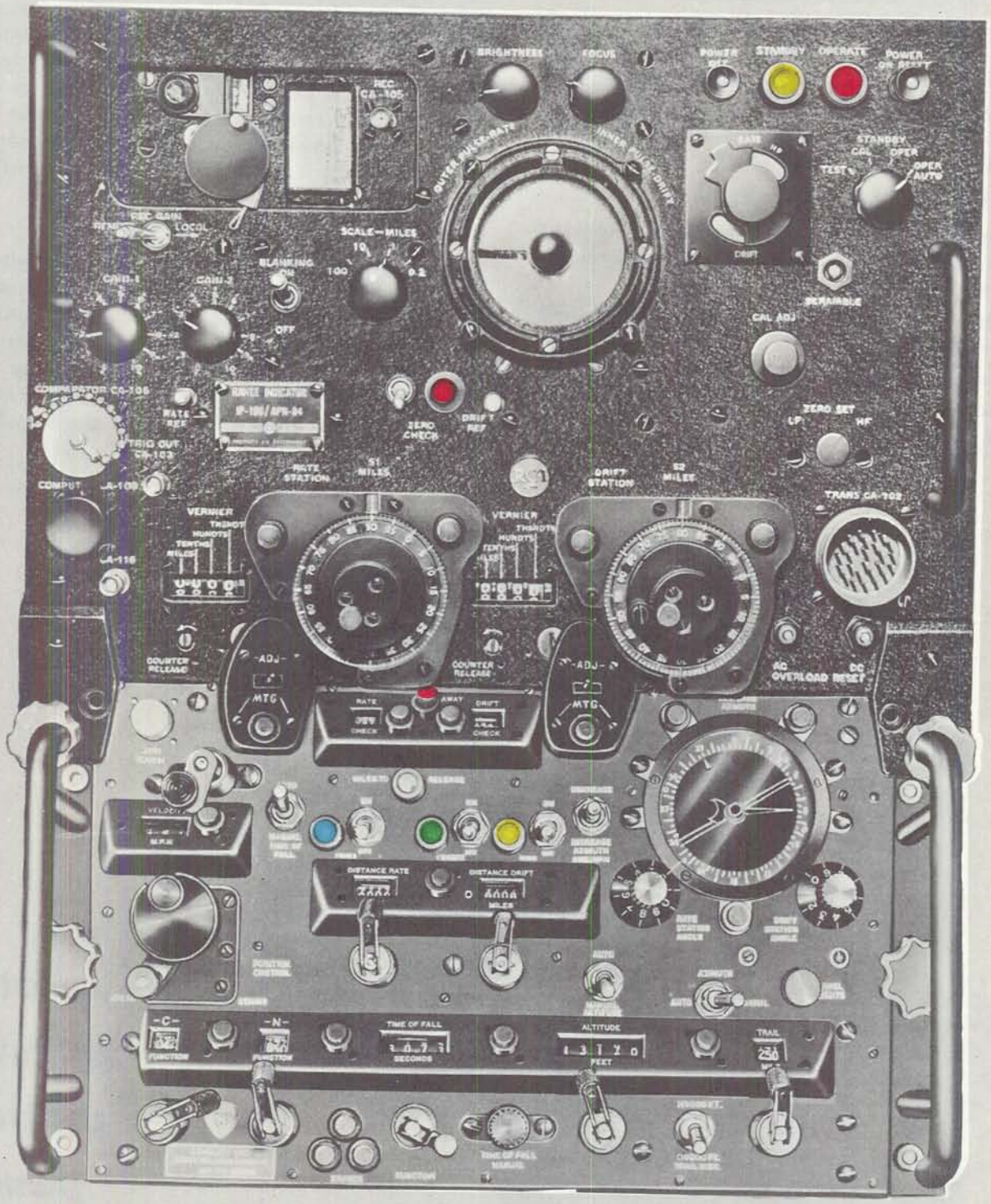


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Figure 4–13

four timed intervals between chaff package release: A (5 sec. off), B (10 sec. off), C (15 sec. off), and D (20 sec. off). E and F positions dispense single packages. Select position E for packages with 3⅝ inches to 4 inches between centers and position F for packages having 2½ inches between centers.

The SIGNAL light indicates the operation of the stripper unit. With numerical selections, the light goes out as each chaff package is stripped and relights ready for the next package. With alphabetical selections the SIGNAL light remains out, illuminating only during the stripping of each package.

AN/ALE-2 NORMAL OPERATION.

1. Set the CHAFF RESERVE counter to correspond with the number of chaff packages in the respective pod.
2. Place the speed selector switch to the desired position.
3. Place the power switch in ON.
4. Monitor the SIGNAL light for proper operation of equipment.

LIGHTING EQUIPMENT.

NAVIGATION LIGHTS.

The navigation lights (figure 1-1) consist of two clear lights on top of the fuselage center section, two clear lights on the bottom of the fuselage center section, a yellow light and a white light on the top and bottom of the tail cone, a red light in the left wing tip, a red light on the left tip tank, a green light in the right wing tip, and a green light on the right tip tank. Two switches on the pilot's lighting control panel control the lights and the 28-volt d-c distribution bus supplies the power to operate them.

NAVIGATION LIGHTS SWITCHES.

The two navigation lights switches are on the pilot's lighting control panel. (See figure 4-14.) Switch position markings for one of the switches are FLASH, OFF, and STEADY. Switch position markings for the second switch are BRIGHT and DIM. Placing the first switch from OFF to STEADY turns on the navigation lights and causes the lights to glow steadily.

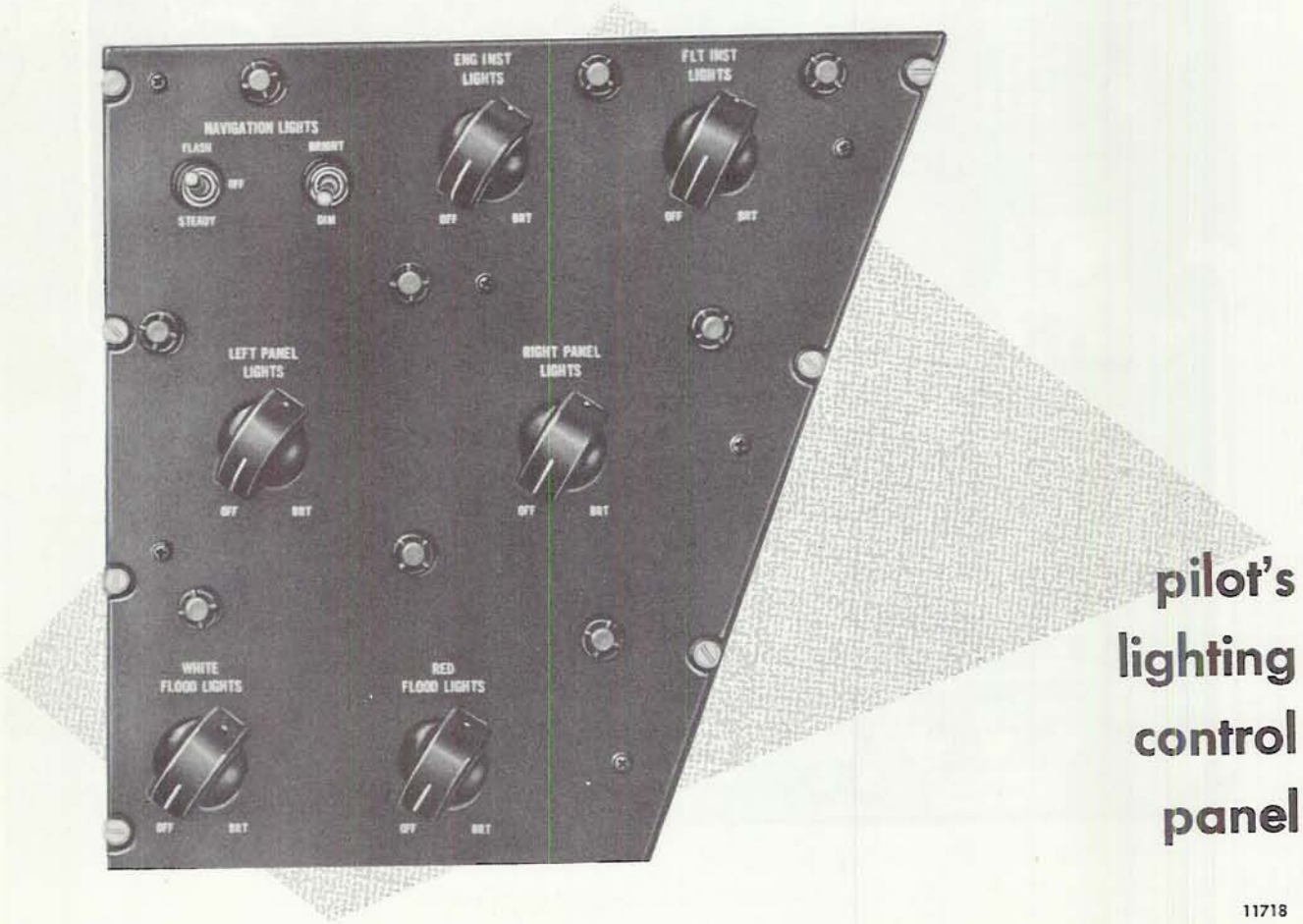


Figure 4-14

Placing the switch from OFF to FLASH turns on the lights and causes the lights to flash. The clear lights at the top and bottom of the fuselage glow steadily in either switch position. Operating the DIM-BRIGHT switch controls light intensity.

PILOT'S CONSOLE AND INSTRUMENT LIGHTS.

The pilot's console and instrument lights furnish red illumination for the pilot's station. The lights are divided into four groups: engine instruments, flight instruments, left console and right console lights, and include both lucite panel and instrument ring lights. Each group is controlled by a rheostat. The rheostat varies light intensity and is placarded OFF and BRT. The rheostats are on the pilot's lighting control panel. (See figure 4-14.) The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the system.

PILOT'S RED AND WHITE FLOODLIGHTS.

The pilot's station has red floodlights for general illumination and white floodlights to provide a color contrast to reduce visual distortion. The floodlight system is controlled by two rheostats on the pilot's lighting control panel. The rheostats control the intensity of all the floodlights from dim to bright and also have an OFF position. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the system.

OBSERVER'S CONSOLE AND INSTRUMENT LIGHTS.

The observer's console and instrument lights furnish red illumination for the observer's station. The lights are divided into two groups and include both lucite panel and instrument mask lights. Each group is controlled by a rheostat. The rheostat varies light intensity and is placarded OFF BRT. The rheostats are on the observer's lighting control panel. (See figure 4-15.) The 28-volt d-c circuit breaker bus supplies the power to operate the system.

OBSERVER'S RED AND WHITE FLOODLIGHTS.

The observer's station is equipped with red and white floodlights for general illumination of the consoles and the instrument panel. The floodlights are controlled by two rheostats on the observer's lighting control panel. (See figure 4-15.) The rheostats control light intensity from dim to bright and also have an OFF position. The 28-volt d-c distribution bus supplies the power to operate the system.

observer's lighting control panel

11720

Figure 4-15

OBSERVER'S SPOTLIGHT.

The observer's spotlight is on the aft glare shield. The observer's spotlight switch is on the observer's main instrument panel. Placing the switch from the center position to the ON (up) position causes the spotlight to illuminate. Placing the switch from ON to the center position turns the light off.

C-4A LIGHTS.

Two C-4A lights, one on the pilot's right circuit

pilot's auxiliary lighting control panel

11729

Figure 4-16

breaker panel and one on the pressure bulkhead to the right of the observer's seat, are convenient portable lights for map reading and general illumination. The light assemblies consist of a stowage rod, a coiled electrical wire, a metal case housing the lamp, and a detachable red lens. Appearing on the lamp casing are a button switch and a rotary switch. The button switch and the rotary knob switch control lamp operation. The 28-volt d-c battery bus supplies power to operate the lamp.

C-4A LIGHT CONTROLS.

A spring-loaded button switch on the lamp casing is the control for momentary lamp operation. Depressing the button causes the lamp to illuminate; releasing the button causes the lamp to go out. Rotating the rotary switch from one of the extreme positions causes the light to illuminate and remain illuminated. Light intensity depends on the amount of switch rotation. Depressing two clips on the sides of the red lens enables the operator to remove the red lens. To use the light for illuminating a specific object in the cabin, remove the lamp from its stowed position.

Note

To avoid discharging the battery, turn off the C-4A lamps before leaving the airplane.

COMPARTMENT DOME LIGHTS.

Compartment dome lights are in the right electrical access compartment, the bomb door area, the electronic compartment, the equipment compartment, the electrical distribution center, and the gun bays. The right electrical access compartment light and switch are on the same bracket, located over the access door. The bomb door area has two lights, one at each end, controlled by a switch at the forward end of the bomb door area on the right side. The electronic compartment lights are controlled by a switch in the electronic compartment above the aft fuselage access door. Each gun bay has two lights, one over the inboard guns and one over the outboard guns. The gun bay lights are controlled by a switch on the forward side of the spar, inside the gun bay access door. The equipment compartment has one light and two switches. Each switch is in the equipment compartment inside and aft of each hatch. The electrical distribution center light is controlled by a switch inside and forward of the access door on the lower right side of the forward fuselage. Electric power for the dome lights comes from the 28-volt generator bus.

TAXI LIGHTS.

Two taxi lights, one mounted in the leading edge of

each wing tip, furnish limited illumination for night ground operation. The taxi lights switch on the landing gear control panel controls this circuit. The 28-volt d-c distribution bus supplies power for operation.

TAXI LIGHTS SWITCH.

Placing the tax lights switch, on the pilot's auxiliary switch panel, to TAXI LIGHTS turns the lights on. (See figure 1-28.) Placing the switch in OFF turns the lights off.

WARNING LIGHTS.

There are warning lights of variable brilliance for the emergency fuel control indicator, the landing gear indicator, and the inverter indicator.

WARNING LIGHTS SWITCH.

A warning lights switch, on the pilot's auxiliary lighting control panel, controls the intensity of the warning lights. (See figure 4-16.) The switch has two positions: BRIGHT AND DIM.

THUNDERSTORM LIGHTS SWITCH.

The pilot's thunderstorm lights, under the glare-shield and above the consoles, are controlled by a three-position switch on the pilot's auxiliary lighting control panel. Place the switch in the up position for steady illumination and hold the switch in the down position for momentary illumination. Placing the switch in OFF (center) turns the lights off.

LANDING LIGHT.

A high-intensity lamp within the lower surface of the left wing supplies the illumination for night landings. The light fully retracts within a recess in the wing. The airspeed limitation for light extension is 200 knots IAS.

LANDING LIGHT SWITCHES.

Two switches on the landing gear control panel control landing light operation. (See figure 1-28.) The markings for one switch are EXTEND and RETRACT. The markings for the second switch are ON and OFF. The EXTEND-RETRACT switch controls the light motor to raise or lower the light and the OFF-ON switch controls lamp operation. The EXTEND-RETRACT switch has a neutral position. The switch must be in the neutral position when the light is fully up or down. The 28-volt generator bus supplies the power to operate the motor and illuminate the lamp.

OXYGEN SYSTEM.

A five-liter high-flow oxygen converter supplies oxygen to the low-pressure (70 psi) system. The converter in the equipment compartment delivers oxygen to two automatic pressure-demand regulators. The regulators (at the pilot's and observer's station) combine the functions of an oxygen flow indicator, pressure gage, and regulator. The converter is serviced through a quick-disconnect filler valve. During servicing, the converter vents to the atmosphere through the build-up-and-vent valve. Both valves are in the right equipment compartment. Placing the build-up-and-vent valve in the build-up position closes the system to atmospheric pressure and a relief valve prevents system pressure from exceeding 100 psi. A bracket on the compartment door prevents the door from closing until the build-up-and-vent valve handle is in the build-up position. An oxygen duration table is shown in figure 4-17. Refer to figure 1-44 for the location of the filler valve and converter and for oxygen specification.

WARNING

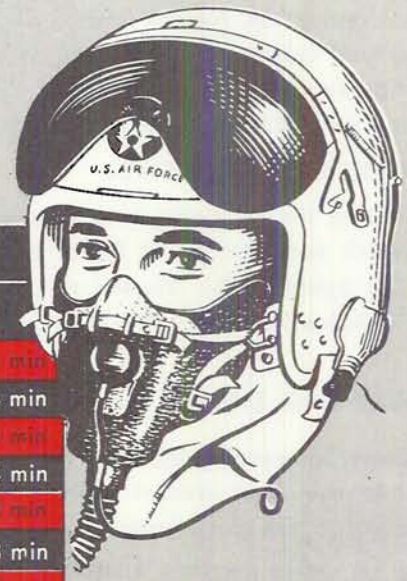
Keep oxygen equipment clean. Oil or grease in contact with oxygen under pressure causes fire or explosion.

PRESSURE-DEMAND OXYGEN REGULATORS.

A Type D-2 automatic pressure-demand oxygen regulator (figure 4-18) at each crew station control oxygen flow from the converter to the mask. The regulator automatically mixes the correct ratio of cabin air and 100% oxygen. A diluter air valve in the regulator controls the flow of cabin air into the regulator. As cabin altitude increases, the diluter air valve closes, permitting less cabin air to mix with the 100% oxygen. A demand diaphragm in the regulator operates a demand valve. Inhalation causes the diaphragm to open the demand valve to permit the flow of diluted oxygen to the mask. A faulty demand diaphragm or a faulty diluter air valve allows oxygen to leak out of the regulator during exhalation. Perform a blow-back test as described under OXYGEN SYSTEM BLOW BACK TEST in this section before flight to detect regulator malfunction. The regulator controls are an oxygen supply lever, an oxygen-diluter lever, and an EMERGENCY PRESSURE lever. While in use, the oxygen system stabilizes at 70 psi as long as there is liquid oxygen in the converter. Check DD Form 781 to insure that the system has been serviced before flight.

oxygen duration

CREW MEMBERS
HOURS FOR 2



CABIN ALTITUDE FEET	GAGE QUANTITY — LITERS				
	5	4	3	2	1
40,000	12 hr 00 min	9 hr 36 min	7 hr 12 min	4 hr 48 min	2 hr 24 min
35,000	12 hr 00 min	9 hr 36 min	7 hr 12 min	4 hr 48 min	2 hr 24 min
30,000	8 hr 42 min	6 hr 48 min	5 hr 12 min	3 hr 30 min	1 hr 48 min
	8 hr 54 min	7 hr 06 min	5 hr 18 min	3 hr 36 min	1 hr 48 min
25,000	6 hr 42 min	5 hr 18 min	4 hr 00 min	2 hr 42 min	1 hr 24 min
	8 hr 24 min	6 hr 42 min	5 hr 00 min	3 hr 24 min	1 hr 42 min
20,000	5 hr 12 min	4 hr 12 min	3 hr 12 min	2 hr 00 min	1 hr 00 min
	9 hr 30 min	7 hr 36 min	5 hr 42 min	3 hr 48 min	1 hr 54 min
15,000	3 hr 54 min	3 hr 06 min	2 hr 48 min	1 hr 36 min	0 hr 48 min
	11 hr 30 min	9 hr 12 min	6 hr 54 min	4 hr 36 min	2 hr 18 min
10,000	3 hr 18 min	2 hr 42 min	2 hr 00 min	1 hr 18 min	0 hr 42 min
	11 hr 30 min	9 hr 12 min	6 hr 54 min	4 hr 36 min	2 hr 18 min

RED BOXES INDICATE DILUTER LEVER SET AT 100 PERCENT OXYGEN

BLACK BOXES INDICATE DILUTER LEVER SET AT NORMAL OXYGEN

BELOW 1 LITER – MAKE EMERGENCY DESCENT TO ALTITUDE NOT REQUIRING OXYGEN

CONVERTER: I-TYPE A-3 CREW: 2

11723

Figure 4–17

OXYGEN-REGULATOR DILUTER LEVER.

The oxygen-diluter lever on the oxygen regulator is a manual control for selecting 100% oxygen or diluted oxygen. Placing the lever in NORMAL OXYGEN causes the regulator to mix a proper ratio of cabin air to oxygen; however, above 30,000 feet cabin altitude the user receives 100% oxygen in the NORMAL OXYGEN position. Placing the lever in 100% OXYGEN causes the user to receive 100% oxygen at any altitude.

OXYGEN-REGULATOR SUPPLY LEVER.

The oxygen-regulator supply lever on the oxygen regulator controls the oxygen supply shut-off valve. Placing the lever in ON opens the shut-off valve. The opened shut-off valve releases oxygen under pressure

oxygen regulator

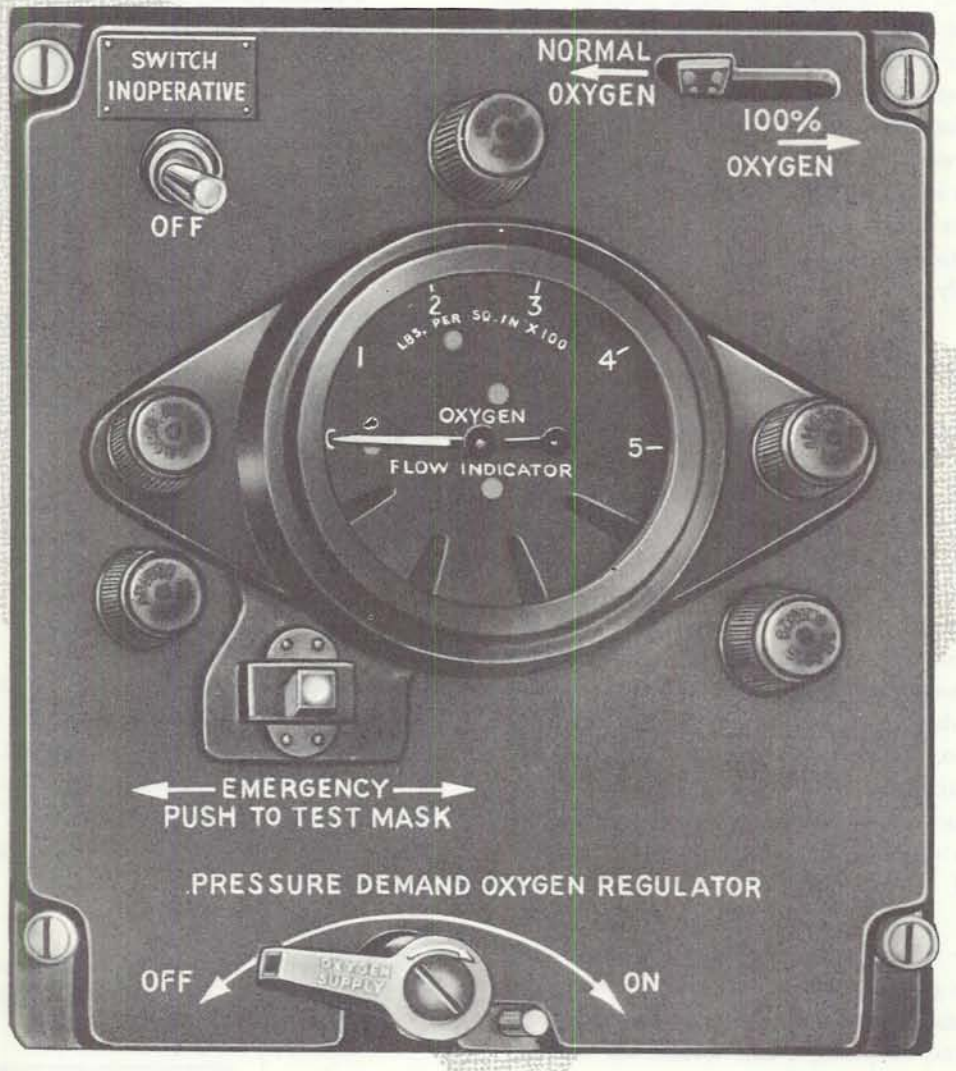


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Figure 4–18

from the converter to the regulator at 70 to 100 psi. Placing the lever in OFF shuts off the valve.

EMERGENCY PRESSURE LEVER.

The EMERGENCY pressure lever is on the oxygen regulator. Placing the lever to the right or left increases the oxygen pressure from the regulator to the mask for additional pressure. Returning the lever to the center position restores normal operation. Depress the lever to obtain maximum oxygen pressure to the mask for a preflight check of mask.

OXYGEN PRESSURE GAGE AND FLOW INDICATOR.

The combination pressure gage and flow indicator is on the oxygen regulator. As long as there is liquid oxygen in the converter, the pressure gage indicates a pressure between 70 to 100 psi. Gage markings are from 0 to 500 in 100 psi increments. Since the airplane has a low-pressure system, the needle normally does not exceed the 1 on the face of the gage. The flow indicator blinker dial exposes four luminescent

painted segments in tear-shaped windows every time the user inhales.

OXYGEN QUANTITY GAGE.

The oxygen quantity gage is on the pilot's right console. It indicates the quantity of liquid oxygen in the converter. The gage indicates the quantity in one-liter increments from 0 to 5 liters. The liquid oxygen contents indicators should read between four and four and one-half liters when the system is fully charged. Do not be alarmed if the indicator does not read five liters since it is impossible to charge the liquid oxygen converter to five liters. Use the oxygen duration chart (figure 4-34) to determine oxygen duration for the indicated supply.

OXYGEN SYSTEM BLOW-BACK TEST.

The oxygen regulator contains a demand diaphragm and diluter air valve. The diaphragm operates a demand valve and controls the flow of oxygen according to the suction created in the regulator by the user. The diluter air valve controls the flow of air into the regulator, decreasing the flow with increases in altitude so that the suction in the regulator creates a greater load on the diaphragm, thus giving more oxygen. A damaged diaphragm will allow air to enter the regulator during inhalation, thus decreasing the oxygen-air ratio. Therefore, a damaged diaphragm or faulty diluter air valve will allow oxygen to leak out of the regulator at all times during positive pressure breathing. To check the operation of the regulator before take-off on each flight, conduct a blow-back test as follows:

1. Place the diluter lever in NORMAL OXYGEN and blow gently into the oxygen regulator hose. A resistance indicates satisfactory operation of the demand diaphragm and diluter air valve.
2. Place the diluter lever in 100% OXYGEN and blow gently into the oxygen regulator hose. A resistance indicates satisfactory operation of the demand diaphragm and diluter air valve.
3. Don the mask and connect the mask to the regulator hose. Breathe normally and note operation of blinker dial.
4. Hold breath and place the EMERGENCY pressure lever to the right or left. A positive pressure felt within the mask indicates proper emergency oxygen flow. This positive pressure is approximately 0.07 psi more than cabin altitude.
5. To test the mask for leakage, depress the EMERGENCY pressure lever while holding the breath. Oxygen pressure from the regulator enters the mask at approximately 0.5 psi above cabin altitude. A properly fitted mask retains this pressure until normal respiration continues.
6. Check that the mask hose fittings are properly seated are secure.
7. Check the mask hose attachment to the parachute harness in accordance with the instructions on figure 4-19.

Note

Depress the PUSH-TO-TEST-MASK lever only for preflight mask and helmet testing. Depressing the lever during flight causes discomfort and could cause maladjustment of an otherwise properly fitted mask.

OXYGEN SYSTEM, NORMAL OPERATION.

For normal operation, place the OXYGEN SUPPLY LEVER in ON and place the oxygen diluter lever in NORMAL OXYGEN. The user receives a diluted supply of oxygen up to approximately 30,000 feet cabin altitude and receives 100 percent oxygen under pressure above approximately 30,000 feet cabin altitude.

OXYGEN SYSTEM, EMERGENCY OPERATION.

With symptoms of the onset of the hypoxia, or if smoke or fuel fumes should enter the cabin, set the diluter lever of the oxygen regulator at 100% OXYGEN. In event of accidental loss of cabin pressure, set the diluter lever to 100% OXYGEN and actuate the oxygen regulator emergency toggle switch to the right or left.

Note

When the emergency is over, set the oxygen regulator diluter lever to NORMAL OXYGEN.

WARNING

The presence of carbon monoxide in the flight compartment of jet aircraft has been suspected in numerous instances. There are various ways which carbon monoxide may enter these compartments during ground operation, but as yet, neither the exact concentration nor the exact sources have been determined.

If the airplane is to be operated on the ground under possible conditions of carbon monoxide contamina-

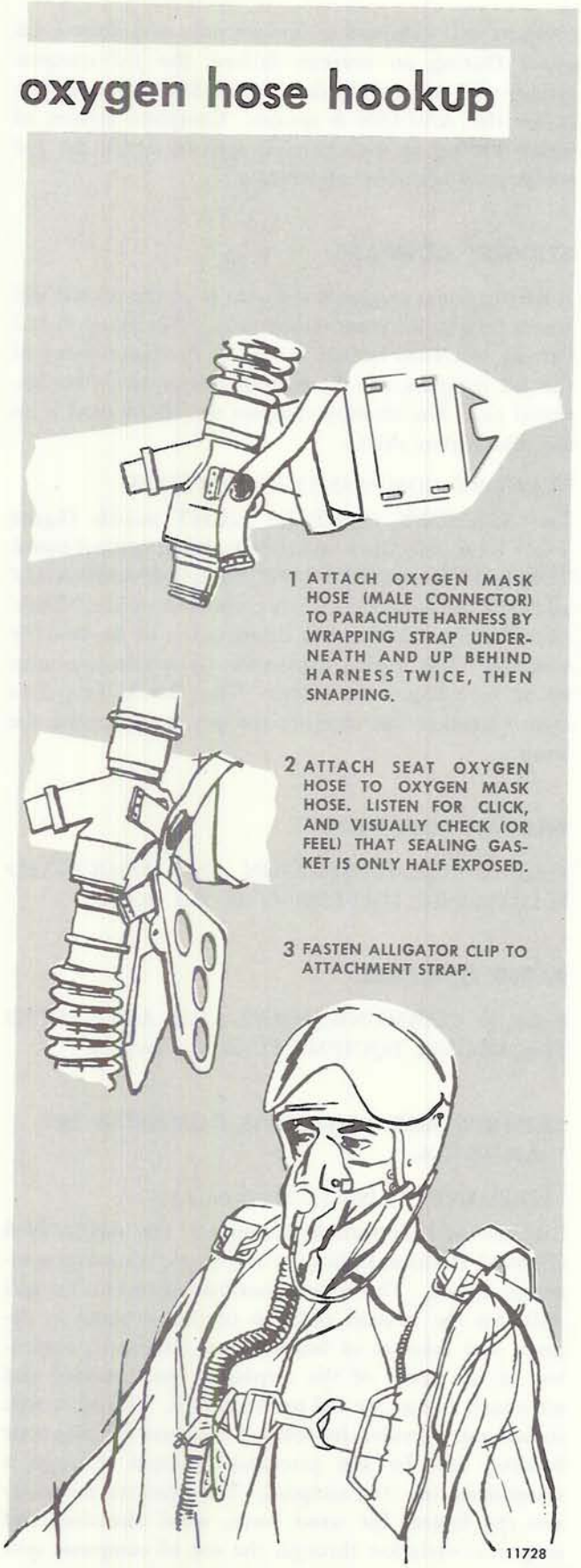


Figure 4–19

tion, such as during runup or taxiing directly behind another operating jet aircraft, or during runup with its tail into the wind, the following procedure shall be used:

1. Before starting engines, all crew members must don oxygen masks, connect hoses to oxygen regulator, and place diluter lever at the 100% OXYGEN position.
2. Whenever contamination is suspected, 100 percent oxygen must be used during ground operation and take-off.
3. After contamination is no longer suspected, place the diluter lever of the oxygen regulator in NORMAL OXYGEN.

WARNING

Return the oxygen diluter lever to NORMAL OXYGEN as soon as possible because the use of 100 percent oxygen throughout a long mission will so deplete the oxygen supply as to be hazardous to the flight crew.

NAVIGATION EQUIPMENT.

J–2 COMPASS SYSTEM.

The J–2 compass system indicates the airplane's heading. The direction-seeking characteristics of the magnetic compass combined with the stability of a gyro give headings without northerly turning error, oscillation, or swinging. Operating within 85 degrees from level flight (climbs, dives, and banks), the gyro strikes mechanical stops at 85 degrees, causing subsequent heading indications to be inaccurate within ± 5°. After five minutes or less of level flight, the gyro recovers and automatically begins to give correct heading indications. The compass system receives its heading information from a compass transmitter remotely installed in the right horizontal stabilizer. An amplifier receives a relatively weak signal from the compass transmitter, increases the strength of the signal, and directs this information to torque motors which slave the gyro. The transmitter is accurate between the latitudes of 78 degrees north and 69 degrees south. An out-of-slave function permits the compass to operate as a directional gyro in polar areas. The compass requires both a-c and d-c power. The a-c power is supplied from 115-volt phase B and phase C busses and from the No. 2 radio bus. The d-c power is sup-

plied from the 28-volt d-c battery bus. A one-ampere circuit breaker in the left electrical access compartment controls operation of the J-2 compass system.

Note

The J-2 compass circuit breaker is in the left electrical access compartment. This circuit breaker is not accessible during flight and must be placed in during the exterior inspection.

J-2 COMPASS SWITCH.

The J-2 COMP switch (figure 1-37) is on the pilot's left horizontal console. The switch is marked IN and SLAVE OUT. Placing the switch in the IN position completes the slaving circuits from the remote compass transmitter to the gyro torque motors. Placing the switch in SLAVE OUT de-energizes the circuit from the transmitter to the motors. While out of slave, the gyro acts as an independent directional gyro.

J-2 COMPASS SLAVE REINITIATE BUTTON.

The SLAVE REINITIATE button (figure 1-37) is on the pilot's left horizontal console. Depressing the button closes a circuit to supply high voltage for two to three minutes to the gyro torque motors, thereby accelerating the gyro erection and alignment. Allow a ten-minute interval before again depressing the button, to allow a thermal time switch to cool.

J-2 COMPASS INDICATOR.

The compass indicators (one on the pilot's main instrument panel and one on the observer's main instrument panel) furnish the crew magnetic heading indications without a northerly turning error, oscillation, or swinging. (See figures 1-31 and 4-30.) A settable dial knob enables the user to rotate the dial index to the desired heading. A selsyn unit transmits heading information from the gyro to the compass indicator. The 115-volt a-c 400-cycle B and C phase bus supplies the power to operate the compass.

J-2 COMPASS NORMAL OPERATION.

The compass will operate if the engines are running and the instrument inverter switch is in NORMAL or STANDBY, if the engines are shut-down and the instrument inverter switch is in STANDBY, or if external power is supplied and the instrument inverter switch is in NORMAL. After turning on the equipment, allow three minutes to elapse so that the gyro in the directional gyro control comes up to operating speed, levels, and aligns the indication on the slaved gyro compass indicator with the remote control compass transmitter.

J-2 COMPASS EMERGENCY OPERATION.

If any one of the three inverters should fail, the J-2 compass will continue to operate only as a directional gyro. During an inverter failure, the J-2 compass system will not supply data to the S-4 shoran system or to the AN/ASN-6 system. Complete failure of either the a-c or d-c electrical systems causes the J-2 compass system to be inoperative.

STANDBY COMPASS.

A conventional magnetic compass is on the windshield frame directly in front of the pilot. (See figure 1-31.) During electrical system failure or malfunctioning of the J-2 compass, use the standby compass as a navigational aid. The standby compass correction card is on the pilot's glare shield.

STANDBY COMPASS LIGHT SWITCH.

The STANDBY COMPASS LIGHT switch (figure 4-16) is on the pilot's auxiliary lighting control panel. The switch is marked STANDBY COMPASS LIGHT and OFF. Placing the switch from OFF to STANDBY COMPASS LIGHT causes illumination of the standby compass. The flight instrument light rheostat must be on to energize the circuit. The 28-volt d-c pilot's circuit breaker bus supplies the power to operate the lamp.

SHORAN EQUIPMENT.

Refer to COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT in this section.

RADIO COMPASS.

Refer to COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT in this section.

LATITUDE AND LONGITUDE COMPUTER SET AN/ASN-6.

(AIRPLANES AF No. 52-1510 and up.)

Latitude and Longitude Computer Set AN/ASN-6 (Ground Position Indicator) is a dead-reckoning navigation system. The system continuously solves for and indicates the ground position of the airplane in degrees and minutes of latitude and longitude, regardless of the speed of the airplane. Both manual and automatic inputs are fed to the system. The automatic inputs are provided by the J-2 compass for magnetic heading and by the pitot-static system through a transmitter for true airspeed. The observer manually sets the figures for wind force, wind direction, and magnetic variation through the use of computer controls. A-c power for the system is supplied by the No. 2 radio bus, and d-c power by the 28-volt d-c radio

bus. The system is operable whenever these busses are energized and no power switch is provided.

COMPUTER CONTROLS.

The computer controls, on the observer's left console, permit the manual adjustment of wind force, wind heading, and magnetic variation to be transmitted to the computer. Located on the panel are three knobs labeled WF, WD, and VAR. These knobs control three indicators also located on the panel and labeled WIND FORCE, WIND DIRECTION, and VARIATION. These knobs are connected to the indicators, and turning one of them causes its respective indicator to turn. In the case of the wind direction and wind force knobs, turning the knobs in a clockwise direction causes their respective indicators to show an increase in the reading. In the case of the variation knob, turning it in a clockwise direction will show a decrease in westerly variation or an increase in easterly variation, whichever may be the presetting.

DEPARTURE SWITCH.

A departure switch on the observer's console, permits the retention of the airplane's point of departure position data on the latitude and longitude counters until the airplane is airborne and generating change of position. The switch is labeled LAT-DEPART and has two positions: ON and OFF. Placing the switch in OFF applies 28-volt d-c power to a locking relay in the computer. This relay then opens the circuits to the latitude and longitude counters and causes them to remain at the positions they had when the switch was actuated. Placing the switch in ON causes the locking relay to close the circuits to the counters and they will then begin indicating a change of position.

GROUND POSITION INDICATOR.

The ground position indicator, on the observer's instrument panel, continuously indicates the ground position of the airplane. In addition to indicating the position visually, the indicator also transmits this information to the latitude and longitude computing system. The ground position is indicated by a latitude counter and a longitude counter on the face of the indicator. The counters automatically indicate whether the latitude is north or south and whether the longitude is east or west.

GROUND POSITION INDICATOR COUNTER RESET SWITCHES.

Two counter reset switches are on the front of the ground position indicator. These switches permit setting the initial co-ordinates of the point of departure or any other point desired. Each switch controls a motor, and the direction of rotation depends on the displacement of the switch. The reset switches may also be used to reset the counters while the system is in operation.

LATITUDE AND LONGITUDE COMPUTER SET AN/ASN-6, NORMAL OPERATION.

1. Check that both GPI circuit breakers on the a-c, d-c circuit breaker panel are pushed in.
2. Position the wind force, wind direction, and variation knobs so that their respective indicators reflect a zero reading.
3. Actuate the counter reset switches until the counters reflect the correct co-ordinates on the indicator.
4. Place the departure switch in OFF.
5. Before take-off, place the mean wind direction, wind force, and magnetic variation for climb on the computer control indicators. As soon as practicable after take-off, determine the actual wind conditions and adjust the indicators as necessary. If leaving a check point, place the actual wind conditions and magnetic variation on the indicators.
6. Place the departure switch in ON during take-off or when leaving a check point.

ARMAMENT EQUIPMENT.

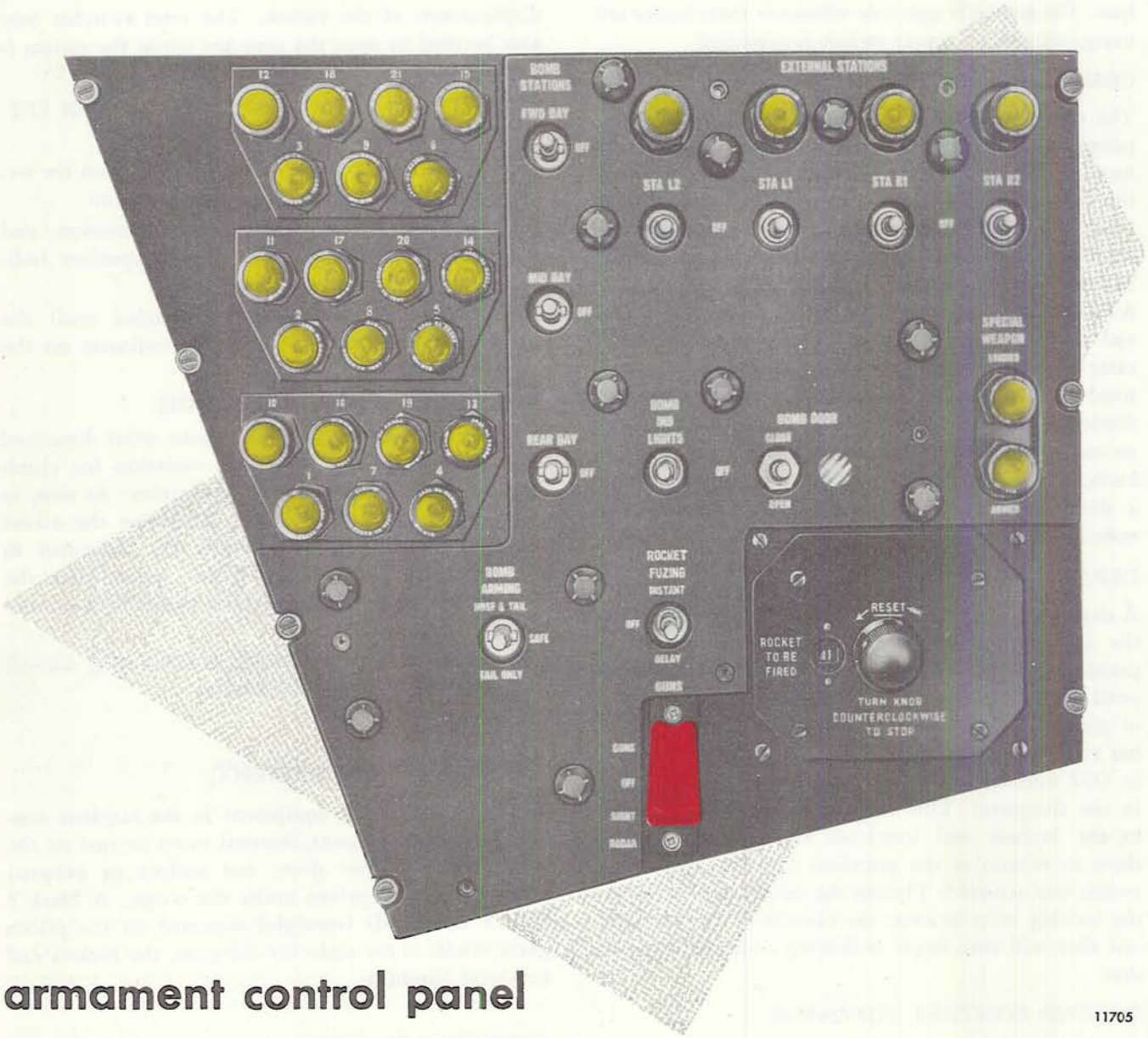
The basic armament equipment in the airplane consists of fixed wing guns, internal stores carried on the rotary bomb carrier door, and rockets or external stores carried on pylons under the wings. A Mark 8 Mod 8 (modified) Gunsight, mounted on the pilot's glare shield, is the sight for the guns, the rockets and low-level bombing.

GUNNERY EQUIPMENT. (GROUP A)

The gunnery equipment consists of eight M3 50-caliber machine guns. Four guns are mounted in a horizontal bank in a gun bay outboard of the engine nacelle in each wing. Each gun can fire 300 rounds of ammunition for a total of 2,400 rounds for the airplane. In addition, each gun is electrically heated and pneumatically charged. All controls for the guns are electrical.

WARNING

To prevent inadvertent firing of the M3 50-caliber guns while the airplane is on the ground, make absolutely sure that the master guns switch is OFF.



armament control panel

11705

Figure 4–20

PNEUMATIC GUN-CHARGING SYSTEM. (GROUP A)

Each M3 50-caliber gun is equipped with a pneumatic gun charger. Pressure is maintained by an air compressor and two air storage bottles. A relief valve at each bottle protects the bottle and system from excessive pressures. A fuse in each gun line prevents loss of the entire system should a line fail. A line tapped into the engine compressor bleed line augments the pneumatic compressor at altitudes above 35,000 feet. The system is controlled by a gun charger switch on the armament control panel. (See figure 4–20.) The operation of the compressor is controlled by two pressure switches in the system; one completes the circuit to energize the compressor when system pressure is low, and the other breaks the circuit to de-energize the compressor when the pressure in the system is normal. Power for the system comes from the pilot's 28-volt d-c circuit breaker bus. A pressure gage is located in the outlet line of the compressor before it branches off to the air bottle in each wing. A ground charging valve adjacent to the pressure gage is used for charging the system before flight rather than using the compressor in the airplane.

GUN-CHARGERS SWITCH. (GROUP A)

The gun-chargers switch, on the armament control

panel, permits clearing the guns if a misfire should occur. The switch is of the momentary type and has three positions: RELEASE, RETRACT, and OFF. When the switch is placed momentarily in RETRACT, and chargers place the guns in a hold-back condition. Held momentarily in the RELEASE position, the switch causes the gun chargers to return the guns to the battery position.

MASTER GUNS SWITCH. (GROUP A)

The master guns switch, marked GUNS, is on the armament control panel. (See figure 4-25.) The switch has three positions: GUNS, SIGHT AND RADAR, and OFF. When guns are to be fired, the switch must be in the GUNS position. When the switch is in this position, circuit will be completed from the 28-volt d-c distribution bus to the gun firing switch and the gunsight light switch. When rockets are to be fired or bombs dropped, and the gunsight is to be used, the master guns switch must be in SIGHT AND RADAR. When the switch is in this position, the circuit will be completed from the distribution bus to the gunsight light switch, but the circuit to the gun firing switch will be open. When the switch is in the OFF position, both circuits are broken.

GUN-FIRING TRIGGER. (GROUP A)

The gun-firing switch, in the right handgrip of the control wheel, is the trigger for the gun. (See figure 1-25.) When the master guns switch is in the GUNS position, the gun-firing switch is energized. Depressing this switch closes the circuit to the gun controls in the wings, causing the guns to fire. The switch supplies power from the 28-volt d-c distribution bus.

GUN-HEATERS SWITCH. (GROUP A)

The gun-heaters switch, located on the armament control panel, controls the heaters for each 50-caliber gun. During extreme cold or icing conditions placing the switch in HEATERS keeps the guns from freezing. When the switch is placed in this position, a circuit to the heaters is energized and the heaters warm up the guns. Power for the heaters comes from the 28-volt d-c distribution bus.

GUNNERY EQUIPMENT. (GROUP B)

The gunnery equipment consists of four M39 20-millimeter guns. Two guns are mounted in a horizontal bank in a gun bay outboard of the engine nacelle in each wing. The guns are fixed to fire downward at 3 degrees 36 minutes from the flight path and converge at a point 3,250 feet in front of the airplane. Each gun can fire 290 rounds of ammunition, totaling 1,160 rounds for the airplane. The guns have a rate of fire in excess of 1,500 rounds per minute. All controls for the guns are electrical, with the exception of the manual chargers.

GROUND CHARGER CABLES. (GROUP B)

Each M39 20-millimeter gun is equipped with a manual gun charger. To ready the guns for firing, the armorer must charge each gun separately three times prior to flight. The guns cannot be charged in flight.

MASTER GUNS SWITCH. (GROUP B)

Refer to MASTER GUNS SWITCH (GROUP A) in this section.

GUN-FIRING TRIGGER. (GROUP B)

The gun-firing switch, located in the right handgrip of the control wheel, is the trigger for the guns. (See figure 1-25.) When the master guns switch is in the GUNS position, the gun-firing switch is energized. When the trigger is depressed, a circuit is completed to the open side of the air purge control valve solenoid. When this valve opens, hydraulic pressure opens the two air-purge intake doors, one of which is located in the leading edge of each wing. After the intake doors open, outside air pressure passes through air-purge exhaust openings under the guns to purge the gun bay areas of all gases. When these doors have fully opened, microswitches complete circuits to fire the guns. The guns cease firing immediately after release of the trigger, but the purge doors remain open for a two-minute period to ensure the expulsion of all gases.

GROUND FIRING SWITCH. (GROUP B)

A ground-firing switch, mounted on the left canopy sill, permits the guns to be fired while the airplane is on the ground by bypassing the landing gear gun cutout relay. The gun-firing switch is placarded OFF and GROUND FIRING. The guns fire when the switch is held in the momentary GROUND FIRING position and the gun-firing trigger is squeezed.

GUNSIGHT.

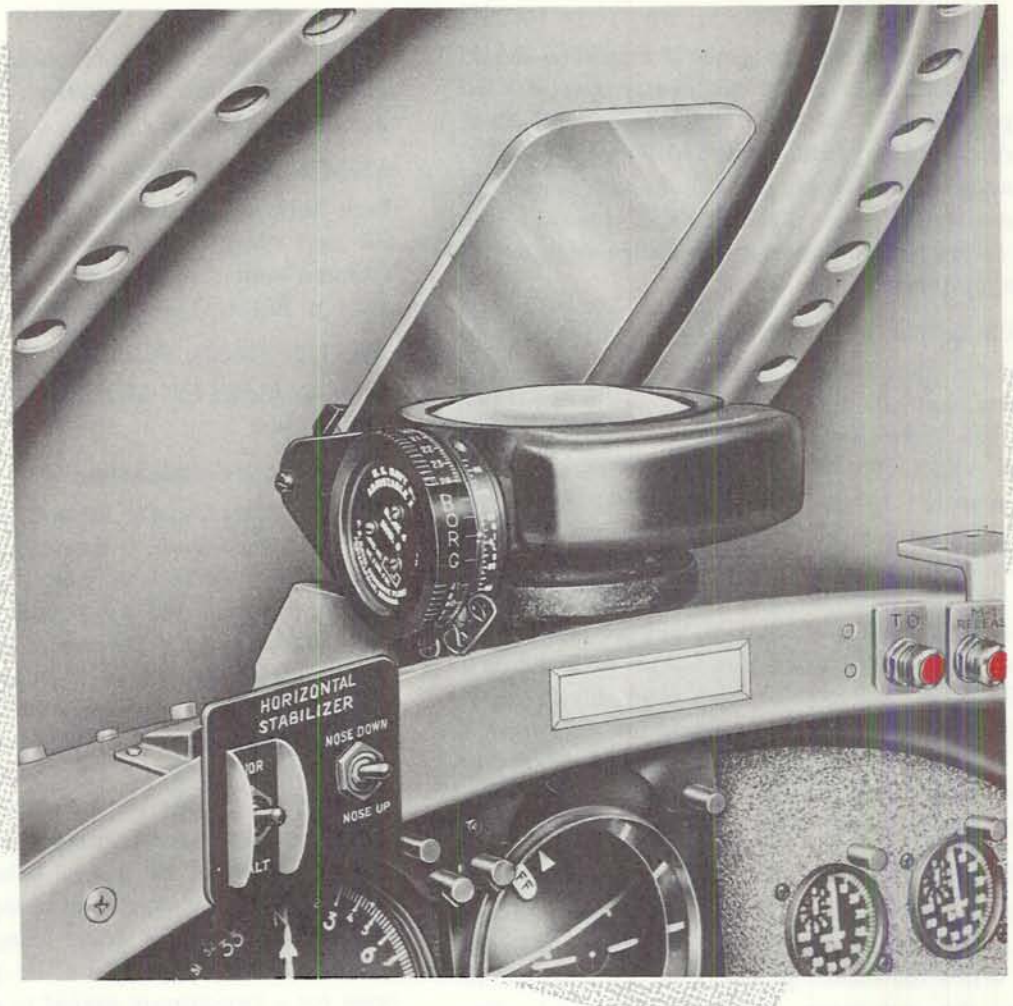
An illuminated Mark 8 Mod 8 (Modified) Gunsight, mounted on the pilot's glare shield on the centerline of the airplane, is the sight for the guns and rockets and for low-level bombing. (See figure 4-21.)

Note

The Mark 8 Mod 8 (Modified) Gunsight is an interim sight. When available, a computing gunsight will be installed to be used with the MA-1 Fire Control System.

The sight is of the collimator type, and the pilot observes the reticle image on an adjustable reflecting

gun sight



11706

Figure 4–21

glass plate through which the target is also visible. and for low-level bombing. (See figure 4–21.)

A soft rubber crash pad is on the rear of the sight. The adjustable reflector plate can be tilted to allow 4 degrees elevation and at least 8½ degrees depression of th reticle image with respect to the detent lock position of the reflector plate. An index plate placarded B (bombs), O (reflector position at 45 degrees), R (rockets), and G (guns) permits the sight to be adjusted for use when firing the guns or rockets or when bombing at low levels.

GUNSIGHT TILTING KNOB.

The knurled tilting knob, on the left side of the gunsight, elevates or depresses the reticle image. The tilting knob is turned up or down to align the index pointer with one of the four modes of operation, B (bombs), O (reflector position at 45 degrees), R (rockets) and G (guns).

GUNSIGHT LIGHT SWITCH.

The gunsight light switch, on the left side of the fuel control panel (figure 1–14), controls the lamp for the reticle image in the sight. The switch has three positions: GUNSIGHT ON, ALTERNATE ON, and off (neutral). The lamp is of the dual-filament type, so that, if the filament which is controlled by the GUNSIGHT ON position should burn out, the other filament will light when the switch is placed in the ALTERNATE ON position. Power for the light comes from the 28-volt d-c distribution bus. The master guns switch on the armament control panel must be in the guns or SIGHT & RADAR position for the circuit to be completed to the gunsight light switch. See MASTER GUNS SWITCH in this section.

GUNSIGHT LIGHT RHEOSTAT.

The gunsight light rheostat, on the left side of the fuel control panel (figure 1–14), controls the brilliance of the reticle image. When the gunsight light is lit, the brilliance of the image may be adjusted as desired by positioning the rheostat to any position between the BRT and DIM markings on the panel. The rheo-

position setting unit

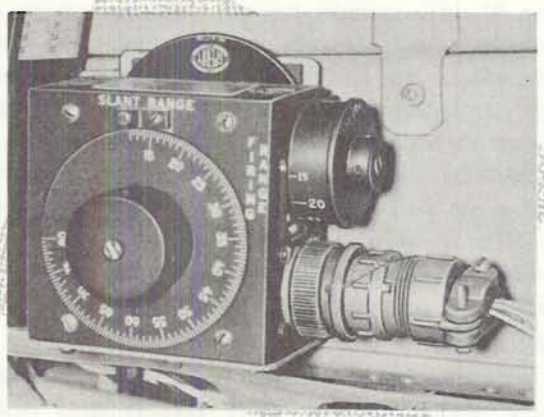


Figure 4–22

stat controls voltage from the 28-volt d-c distribution bus through the master guns switch and the gunsight light switch.

FIRING M3 50-CALIBER GUNS. (GROUP A)

To fire the M3 50-caliber guns, proceed as follows:

1. Check that the gun compressor circuit breaker is ON.
2. If extreme cold or icing conditions exist, place the gun heaters switch in the HEATERS position.
3. Place the master guns switch in the GUNS position.
4. Set the gunsight tilting knob to the GUNS position.
5. Place the gunsight light switch in the GUNSIGHT ON or ALTERNATE ON position.
6. Adjust the gunsight light rheostat to desired reticle brilliance.
7. Actuate the gun-firing trigger.

Note

If the guns fail to fire after actuating the gun-firing switch, place the chargers switch in the RETRACT and RELEASE positions alternately a few times to clear the guns.

CAUTION

After firing has been completed, place the master guns switch in OFF to safety the guns.

FIRING M39 20-MILLIMETER GUNS. (GROUP B)

To fire the M39 20-millimeter guns, proceed as follows:

Note

Before take-off, make sure that all the guns have been charged, as there are no provisions for charging the guns in flight.

1. Place the master guns switch in the GUNS position.
2. Set the gunsight tilting knob to the GUNS position.
3. Place the gunsight light switch to the GUNSIGHT ON or ALTERNATE ON position.
4. Adjust the gunsight light rheostat to desired reticle brilliance.
5. Actuate the gun firing trigger.

CAUTION

After firing has been completed, place the master guns switch in OFF to safety the guns.

INTERIM WARNING SYSTEM.

The interim warning system is an automatic range and warning system, used for air-to-ground gunnery only. The radar portion of an MA–1 fire control system supplies automatic range information, which is transmitted to the pilot's headset as audible signals. Preselected firing data is set in the equipment prior to take off. The system uses a non-computing gunsight.

POSITION SETTING UNIT.

The position-setting unit (figure 4–22) is on the right side of the pilot's compartment above the generator control panel and is the only control necessary for operation of the interim warning system. Controls are a SLANT RANGE dial and a FIRING RANGE dial. Both dials are calibrated in hundreds of feet. A removable pull-up range computer is mounted on the position-setting unit. The 28-volt d-c radio bus and the 115-volt No. 2 a-c bus supply the power to operate the system.

NORMAL OPERATION.

1. Determine the value for the following air-to-ground gunnery conditions:
   - Dive angle of 10, 20, or 30 degrees
   - Pull-up acceleration of 2, 3, or 4 G's
   - True air speed of 200, 300, or 400 knots
   - Terrain clearance of 500, 1000, or 1500 feet

Note

Always use true air speed when computing slant range.

2. Rotate the inner disk of the pull-up range computer until the predetermined values appear at the appropriate part of the open window. When inserting values into the computer, follow the order listed in step 1.
3. Read the slant range value appearing at the appropriate part of the open window.
4. Set the SLANT RANGE control on the position setting unit to the computed value of slant range obtained in step 3. The slant range value obtained from the computer represents the slant range at the time of pull-up and not the vertical terrain clearance.
5. Determine a value for the firing range and set the FIRING RANGE control on the position-setting unit to that value. This setting determines the radar target range at which the firing range signal is transmitted to the pilot's headset.

WARNING

The preselected terrain clearance will be reduced if the following precautions are not adhered to: Never increase or decrease the dive angle during attack. Never increase the true air speed. Start pull-up immediately after receiving the pull-up signal. Do not decrease pull-up acceleration.

6. Place the guns switch to the GUNS or SIGHT-RADAR position to energize the system. The pilot receives two operational signals: An interrupted tone indicates that the airplane is within firing range of the target, and a siren tone indicates the point of pull-up.

Note

Depressing the mike button or placing the AIC-10 control switch to CALL during a gunnery run prevents the pilot from receiving the firing range and pull-up signals.

7. After firing is completed, place the guns switch to OFF to de-energize the system.

BOMBING EQUIPMENT.

The airplane is equipped with a horizontal, rotary-type bomb-carrier door for carrying various sized bombs in varied configurations. Pylons, two under each wing, carry the external stores. Both the internal and external stores may be released by the normal bomb release system, the jettison bomb release system, or the shoran bomb release. For buffet and release speed limitations, refer to EXTERNAL STORES in Section V. All controls for the bombing system are at the pilot's station, except the shoran controls, which are located in the observer's station. During normal release or shoran release, all stores may be dropped singly or in train. During jettison bomb release, all stores will be released simultaneously. If it is desired, the wing tip fuel tanks may be jettisoned simultaneously. If it is desired, the wing tip fuel tanks may be jettisoned simultaneously with the stores. There are provisions for carrying special weapons.

BOMB DOOR.

The removable bomb-carrier door is in the center fuselage section and can carry various sized bombs in varied configurations. (See figure 4-23.) The door is electrically controlled and hydraulically actuated to pivot 180 degrees on its horizontal axis to expose the bombs for release. At the same time, the lower surface of the door seals the cavity of the bomb door area. The door is divided into three armament bays: forward bay, middle bay, and rear bay, each having seven bomb stations. These stations are so arranged and electrically interconnected that any number of bomb racks, up to a total of 21, may be installed to accommodate various bomb loadings. Two alternate bomb racks are installed between the middle and rear bays to accommodate large stores. All stores are retained by S2A or MA-4 bomb racks, chocks, and a second layer suspension assembly of racks and chocks. Controls for the bomb door are the bomb door switch (for normal bomb release), the shoran bomb release system, or the jettison bomb release system.

BOMB DOOR SWITCH. The bomb door switch, located on the armament control panel, is of the momentary type and has three positions: OFF, OPEN, and CLOSE. (See figure 4-20.) The switch is spring-loaded to the OFF position. When the switch is placed in OPEN, power passes to a double-acting solenoid valve, energizing the open side of the valve. When the valve opens, hydraulic pressure passes to two double-acting actuating cylinders which rotate the door 180 degrees clockwise in four seconds. When the bomb door switch is placed in CLOSE, the door rotates counterclockwise 180 degrees in six seconds to the close position. With the door fully opened or closed, the respective double-acting solenoid valve remains energized. The door has no mechanical locks since the actuating cylinder lines are pressurized in either direction. Loss of hydraulic fluid in these lines normally causes the door to move to a position near full open.

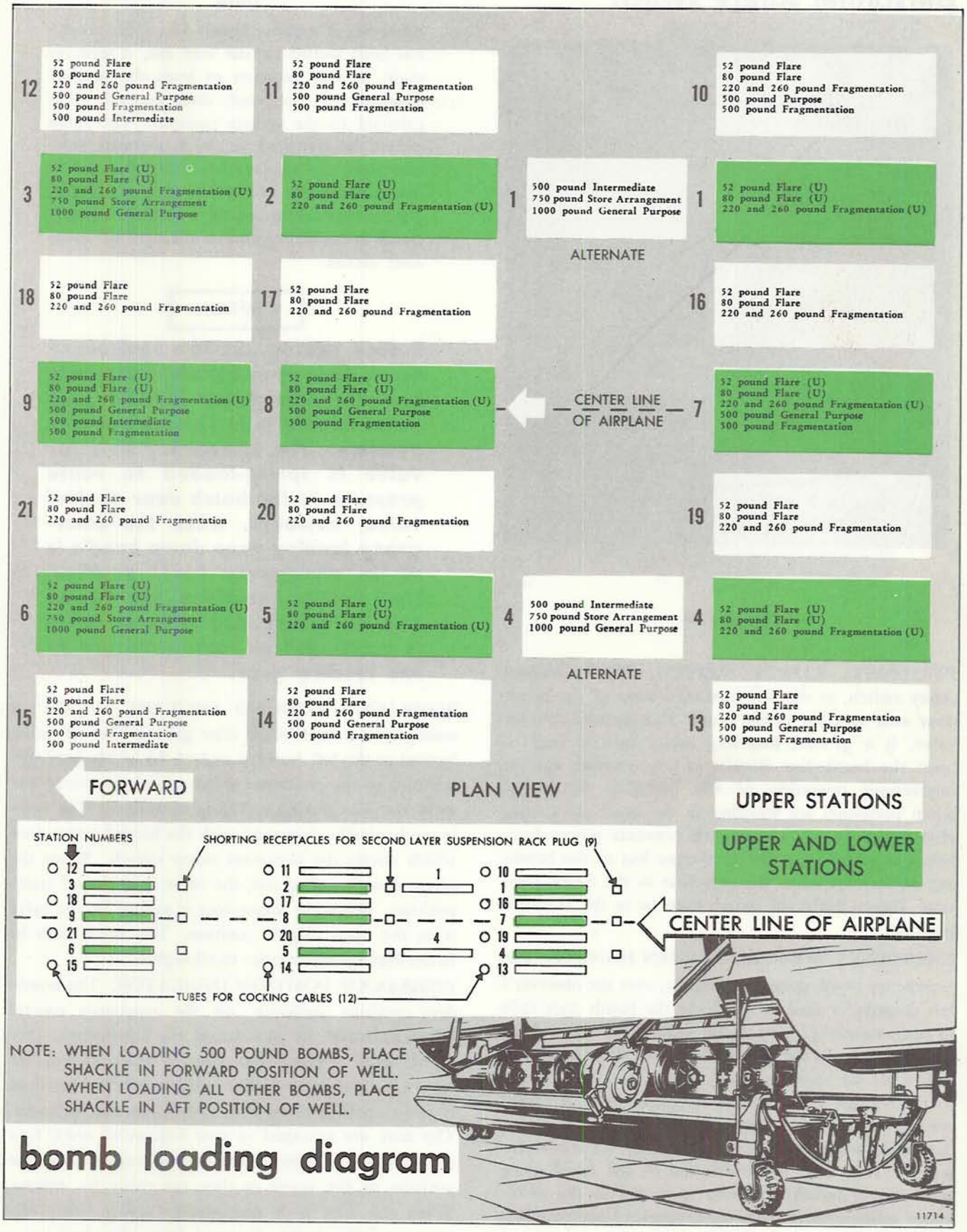

12
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound General Purpose
500 pound Fragmentation
500 pound Intermediate
11
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound General Purpose
500 pound Fragmentation
10
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound Purpose
500 pound Fragmentation
3
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
750 pound Store Arrangement
1000 pound General Purpose
2
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
1
500 pound Intermediate
750 pound Store Arrangement
1000 pound General Purpose
ALTERNATE
1
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
18
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
17
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
16
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
9
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
500 pound General Purpose
500 pound Intermediate
500 pound Fragmentation
8
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
500 pound General Purpose
500 pound Fragmentation
CENTER LINE OF AIRPLANE
7
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
500 pound General Purpose
500 pound Fragmentation
21
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
20
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
19
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
6
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
750 pound Store Arrangement
1000 pound General Purpose
5
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
4
500 pound Intermediate
750 pound Store Arrangement
1000 pound General Purpose
ALTERNATE
4
52 pound Flare (U)
80 pound Flare (U)
220 and 260 pound Fragmentation (U)
15
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound General Purpose
500 pound Fragmentation
500 pound Intermediate
14
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound General Purpose
500 pound Fragmentation
13
52 pound Flare
80 pound Flare
220 and 260 pound Fragmentation
500 pound General Purpose
500 pound Fragmentation
FORWARD
PLAN VIEW
UPPER STATIONS
UPPER AND LOWER STATIONS
STATION NUMBERS
SHORTING RECEPTACLES FOR SECOND LAYER SUSPENSION RACK PLUG (9)
12
3
18
9
21
6
15
11
2
17
8
20
5
14
1
4
10
1
16
7
19
4
13
CENTER LINE OF AIRPLANE
TUBES FOR COCKING CABLES (12)
NOTE: WHEN LOADING 500 POUND BOMBS, PLACE SHACKLE IN FORWARD POSITION OF WELL. WHEN LOADING ALL OTHER BOMBS, PLACE SHACKLE IN AFT POSITION OF WELL.
bomb loading diagram
11714

Figure 4-23

personnel safety switch

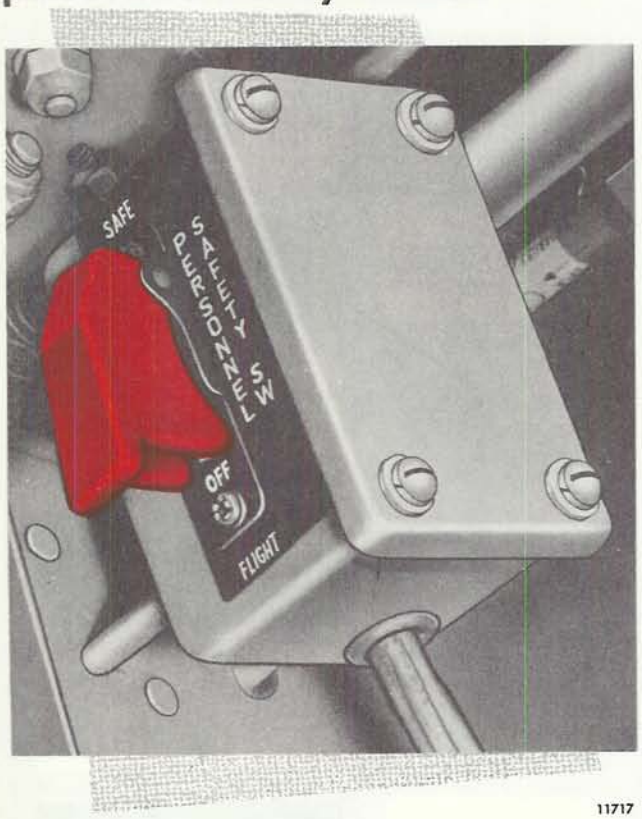


Figure 4–24

PERSONNEL SAFETY SWITCH. The personnel safety switch, at the left forward corner of the bomb door area adjacent to the bomb door ground shut-off valve, is a ground handling safety feature used to open the bomb bay circuits as a precaution against inadvertent operation of the bombing equipment when personnel are working in the bomb door area. (See figure 4–24.) This switch prevents power from being supplied from the armament bus to the bombing equipment when the switch is in the SAFE position. Before flight the switch must be in the FLIGHT position.

EMERGENCY BOMB DOOR OPEN HANDLE. The emergency bomb door open handle, over the observer's left console, is used in the event the bomb door fails to open normally. (See figure 4–29.) When this handle is lifted, turned one-quarter turn clockwise, and pulled all the way out (four inches), a cable attached to the handle will manually override the bomb door control valve solenoid and position the valve so that hydraulic pressure from an emergency selector valve will be routed to the open side of the bomb door actuating cylinders. Pressure is routed to the emergency selector valve from the emergency pressure line of the hydraulic system by the hydraulic system hand pump.

Note

After the emergency bomb door open handle has been pulled all the way out, it will remain in that position to keep the manual override on the bomb door control valve solenoid in the correct position. The valve cannot be returned to the door-closed position until the airplane is on the ground. To return the valve to the door-closed position, pull out the lanyard in the upper left forward bomb hoist access door a distance of about four inches.

CAUTION

Before pulling out the emergency bomb door open handle, make sure that the emergency landing gear down handle is in the normal (in) position. The emergency selector valve is spring-loaded to route pressure to the bomb door control valve; however, when the emergency landing gear down handle is in the emergency (out) position, the handle overrides the spring and the emergency selector valve is positioned to route pressure to the landing gear.

BOMB-DOOR GROUND SHUT-OFF VALVE. A manually operated bomb door ground shut-off valve, located at the left forward end of the bomb door area adjacent to the personnel safety switch, positions and locks the door during servicing operations. The valve is mechanically connected with the hinged access door which covers the personnel safety switch. When the access door is pulled out, the valve is in the off (safe) position. When the access door is pushed in, the valve is in the open (flight) position. The valve must be in the flight position prior to all flights.

BOMB-DOOR POSITION INDICATOR. The bomb-door position indicator, on the armament control panel, indicates the position of the bomb door. (See figure 4–25.) When the door is fully closed, the word *closed* appears on the indicator. When the door is fully opened, seven dots appear on the indicator. The dots are arranged in two horizontal rows, four on the top and three on the bottom, representing the position of the stores as they are ready for release. When the door is in any position other than fully open or fully closed, diagonal lines like those on a barber pole appear on the indicator.

Note

The bomb-door position indicator will not function unless the select armament switch is in any position other than OFF.

EMERGENCY BOMB DOOR OPERATION.
If the bomb door system fails, proceed as follows to open the door:

1. Check that the emergency landing gear down handle is in the normal (in) position.

CAUTION

The emergency selector valve is spring-loaded to route pressure to the bomb door control valve, but when the emergency landing gear down handle is in the out position, it overrides the spring and the valve will be positioned to route pressure to the landing gear control valve.

2. Have the observer pull the emergency bomb door open handle all the way out.
3. Operate the hydraulic hand pump.

Note

Approximately 30 to 50 light strokes of the hand pump are needed to open the door.
Once the door has been opened it cannot be closed again until the airplane is on the ground.

WARNING

If after approximately 50 strokes of the hand pump there is no indication of pressure build-up or bomb door operation, make no further attempt to open the door.

BOMBING CONTROLS.

BOMB-AND-ROCKET RELEASE BUTTON. The bomb-and-rocket release button, located in the right handgrip of the pilot's control wheel, energizes the various stores and rocket release circuits. (See figure 1-25.) When the stores or rockets and their manner of release have been selected by their respective controls, depressing the release button energizes the respective circuit.

Note

Internal bomb stores will not release unless the bomb door is in the full open position.

The release button supplies power from the 28-volt d-c armament bus.

WARNING

Before pressing the bomb and rocket release button, make sure that all bomb and rocket controls are in the correct positions for the desired release to avoid accidental bomb or rocket release.

SELECT ARMAMENT SWITCH. The select armament switch, located on the select armament control panel next to the armament control panel, permits the selection of stores to be released. (See figure 4-25.) When this switch is in OFF, the armament bus is de-energized. When the switch is in any position other than OFF, the armament bus is energized and the stores may be selected for release as follows: internal, external, or both, or smoke may be selected when external chemical tanks are carried. The rockets may be released either singly or automatically by positioning the switch in either the ROCKETS SINGLE or in the ROCKETS AUTO position.

BOMB STATION SWITCHES. Three bomb station switches, located on the armament control panel, are

select armament control panel

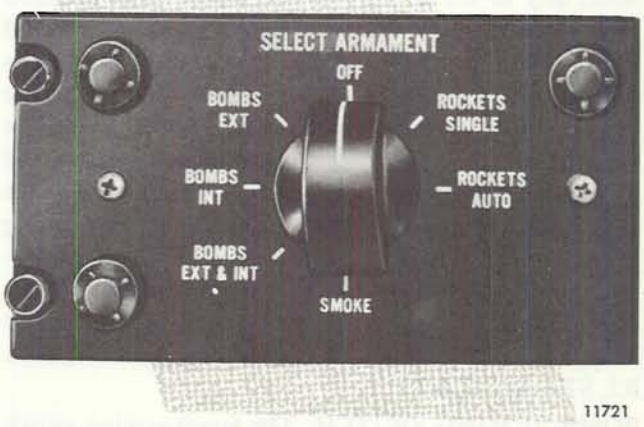


Figure 4-25

bomb intervalometer

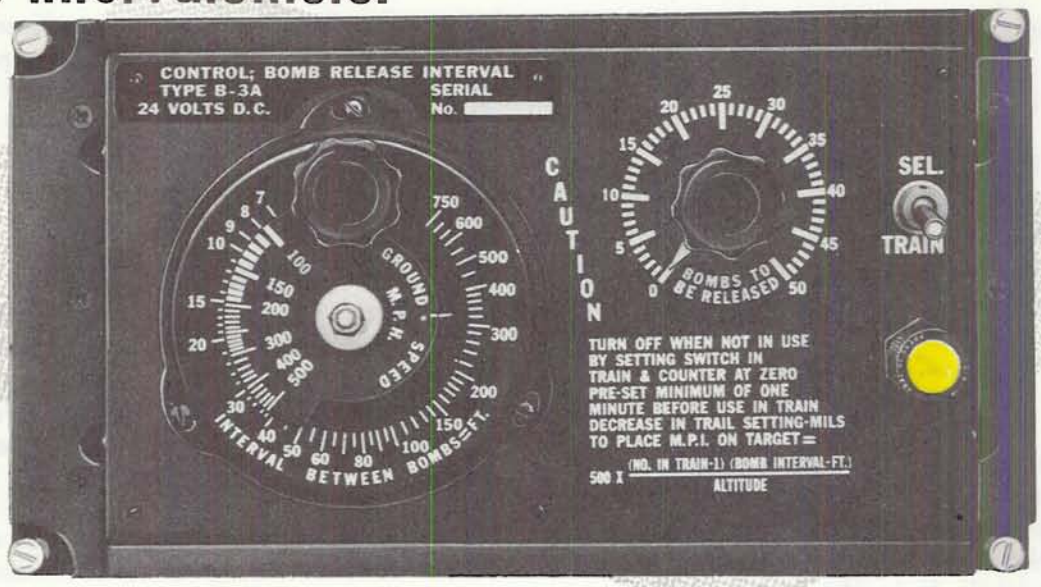


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Figure 4–26

marked FWD BAY, MID BAY, and REAR BAY. (See figure 4–25.) Each switch is located adjacent to the indicator lights for its respective bay. These switches enable the pilot to select the bay to be released. When any or all of the switches are placed in their respective BAY position, the bombs in the respective bays are released in ascending numerical order, either singly or in train, depending upon the position of the intervalometer train-select switch. When the intervalometer is set for train and the select armament switch is in the BOMB EXT & INT position, the internal stores will be released after the external stores.

EXTERNAL STORES SWITCHES. Four external stores switches, located on the armament control panel, select any or all of the external stores to be dropped by the normal bomb release system. (See figure 4–25.) There is one switch for each external store carried, as follows: STA L2 controls the power circuit to the left outboard pylon bomb rack; STA L1; the left inboard rack; STA R3, the right inboard racks; and STA R2, the right outboard rack. The external stores may be dropped in train or individually, depending upon the setting of the switches and the intervalometer. If both the external stores and internal stores are to be dropped in train, the external stores will be dropped first in the following order: STA L2, STA R2, STA R1, STA L1.

BOMB-ARMING SWITCH. The bomb-arming switch located on the armament control panel, is used to arm both the internal and external stores. (See figure 4–25.) The switch has three positions: NOSE & TAIL, TAIL ONLY, and SAFE. The bombs are set to explode instantly upon impact when the arming switch is set at the NOSE & TAIL position. Setting the arming switch at the TAIL ONLY position arms the bombs for delayed detonation. The bombs will be released unarmed if the switch is in the SAFE position. When the select armament switch is in the SMOKE position, placing the bomb arming switch in the NOSE & TAIL position energizes the chemical tank smoke release unit thereby causing the release of smoke. When the jettison bomb system is operating, a relay opens the arming circuit so that the bombs will be released in an unarmed condition.

BOMB INTERVALOMETER. The bomb intervalometer located on the pilot's left console, enables the pilot to release the internal and external bombs individually or in train. (See figure 4–26.) The select-train switch on the intervalometer selects the method of release. Placing the switch in the SEL position releases the bombs singly. When train release is desired, the switch must be in the TRAIN position, the ground spacing knob must be set for the interval desired, and the bomb counter must be set for the number of bombs to be released. With either method of release, the internal bombs are dropped in ascending numerical order from the bomb stations which are loaded and selected. When the select armament switch is in the BOMBS EXT & INT position, the

external stores are released before the internal stores.

MASTER JETTISON SWITCH. The master jettison switch is located on the pilot's left main control panel (figure 1-35). When this switch is pressed, the bomb door opens, and all stores, including external stores or rockets, are released. In addition, when the switch is actuated, a relay opens the bomb arming circuit so that the bombs will be released unarmed. Power for the jettison system comes from the battery bus.

CAUTION

The wing tip tanks will be jettisoned with the bombs and external stores or rockets if the tip tanks jettison switch is in NORMAL when the master jettison switch is actuated.

BOMBING INDICATORS.

BOMB INDICATOR LIGHTS. Twenty-one bomb indicator lights are mounted on the armament control panel. (See figure 4-25.) Each light corresponds to a bomb station. The lights are arranged in three groups of seven to correspond to the three bomb bays of the bomb carrier door. When bombs are loaded at any or all of the stations and the respective racks are cocked, the lights operate, provided the armament bus is energized and the bomb station and bomb indicator lights switches are on. When a bomb is released, its corresponding indicator light goes out.

BOMB INDICATOR LIGHTS SWITCH. The bomb indicator lights switch is located on the armament control panel. (See figure 4-25.) When bombs are loaded at any or all stations, the respective racks cocked, and the bomb station switches placed in the BAY position, actuating the bomb indicator lights switch causes the bomb indicator lights to operate if their respective station is loaded. Power for the switch comes from the armament bus.

EXTERNAL STORES INDICATOR LIGHTS. Four external stores indicator lights are mounted on the armament control panel. (See figure 4-25.) Each light corresponds to one of the external stores stations. When external stores are loaded at any or all of the stations and the respective racks are cocked, the lights operate, provided the arament bus is energized and the external stores and bomb indicator lights switches are on. When an external store is released, its corresponding indicator light goes out.

BOMB-RELEASED INDICATOR LIGHT. A bomb-released indicator light (figure 1-31) is mounted on the pilot's main instrument panel and another is mounted on the observer's instrument panel. (See figure 4-30.) When stores are being released, the pulse from the intervalometer which energizes the bomb racks also energizes a circuit to the bomb-released indicator light. Therefore, every time a store is released, the indicator light will light for the time the signal is transmitted for bomb release. Power is supplied to the bomb-released light through the intervalometer from the 28-volt d-c armament bus.

Note

When a bomb is released, the corresponding bomb station indicator light on the armament control panel will go out.

BOMB RELEASE.

NORMAL BOMB RELEASE. The normal bomb release system permits selected release or train release of the internal and external stores as follows:

Note

If the gunsight is used for low-level bombing, place the master guns switch in the SIGHT & RADAR position, place the gunsight light switch in the GUNSIGHT ON or ALTERNATE ON position, adjust the gunsight light rheostat for the desired brilliance, and set the gunsight tilting knob to the B (bombs) position.

1. Position the select armament switch to the BOMBS INT, BOMBS EXT, or BOMBS EXT & INT position.
2. Place the bomb arming switch in the desired postion.
3. Set the bomb intervalometer select-train switch in the SEL or TRAIN position, and if TRAIN is selected also set the ground spacing knob for the interval desired and the bomb counter for the number of bomb stations to be released.

Note

If external stores are to drop at the same time as the internal bombs, the external stores will be released first.

4. Place the bomb stations switches in the up position for the stations to be released, and if external bombs are being released, check that the external stores switches are in the ON position.

CAUTION

If the external stores switches are in the STA position, all external stores selected will be released together.

5. Place the bomb indicator lights switch in LIGHTS.
6. Place the bomb door switch in OPEN and check that the bomb door reaches the full open position by observing that the bomb door position indicator shows seven dots (representing the bombs on the bomb door).
7. Press the bomb and rocket release button in the right handgrip of the control wheel.
8. If all the selected internal bomb station indicator lights have gone out (all selected bombs released), place the bomb door switch in CLOSE.

BOMB JETTISON RELEASE. All internal and external stores can be jettisoned by actuating the master jettison switch. This action will jettison all internal bombs, external stores, and rockets.

CAUTION

Actuating the master jettison switch also jettisons the wing tip tanks, if the tip tanks jettison switch is in the NORMAL position. Therefore the tip tank jettison switch should be in the OFF position if the tanks are not to be jettisoned.

NORMAL EXTERNAL STORES RELEASE. The external stores may be released with the internal stores as described under NORMAL BOMB RELEASE in this section, or they may be released separately as follows:

Note

If the gunsight is used for low-level bombing, place the master guns switch in the SIGHT & RADAR position, place the gunsight light switch in the GUNSIGHT ON or ALTERNATE ON position, adjust the gunsight light rheostat for the desired brilliance, and set the gunsight tilting knob to the R or B position.

1. Position the select armament switch in the BOMBS EXT position.
2. Set the bomb arming switch in the desired position.
3. Place the external stores switches in STA for the stores to be released.
4. Place the bomb indicator lights switch in LIGHTS.
5. Press the bomb and rocket release button in the right handgrip of the control wheel.

SMOKE RELEASE.

When any or all of the external bomb pylons are loaded with an E-26 chemical tank, a smoke release may be made by proceeding as follows:

1. Place the select armament switch to SMOKE.
2. Place the external stores switches for the desired tanks in the STA position.
3. Actuate the bomb arming switch to the NOSE & TAIL position to release the smoke.

SHORAN BOMB RELEASE. To release bombs by means of the shoran system, follow the procedure given under NORMAL BOMB RELEASE or NORMAL EXTERNAL STORES RELEASE in this section, with the following exceptions:

1. Do not open the bomb door because shoran control of the door is automatic.
2. Do not depress the bomb and rocket release button because release power is initiated by the shoran computer.
3. If all the selected internal bomb station indicator lights have gone out (all selected bombs released), place the bomb door switch in CLOSE.

ROCKET EQUIPMENT.

There are fittings for the installation of eight rocket pylons, four under each wing. Four of these pylons are alternates to the four external stores pylons. Two 5-inch HVAR rockets, one mounted directly below the other, hang from each pylon. The Mk Mod 8 (Modified) Gunsight aims the rockets. Controls for normal firing and emergency release of the rockets are at the pilot's station. During normal firing, rocket can be fired singly or in salvo. The firing order is illustrated in figure 4-27.

ROCKET CONTROLS.

SELECT ARMAMENT SWITCH. Refer to BOMBING CONTROLS in this section.

ROCKET FUZING (ARMING) SWITCH. The rocket fuzing switch on the armament control panel controls the arming of the nose fuzes of rockets to be released normally. (See figure 4-25.) When the switch is set in INSTANT, the nose fuze is armed upon release to detonate upon impact. The nose fuze is unarmed if the switch is set at DELAY or OFF. However, an internal fuze will cause delayed detonation after impact on a normal release. During jettison, the nose fuze is automatically unarmed and the internal fuze is inoperative.

ROCKET INTERVALOMETER (PROJECTOR RELEASE CONTROL). The rocket intervalometer on the armament control panel controls the sequence of

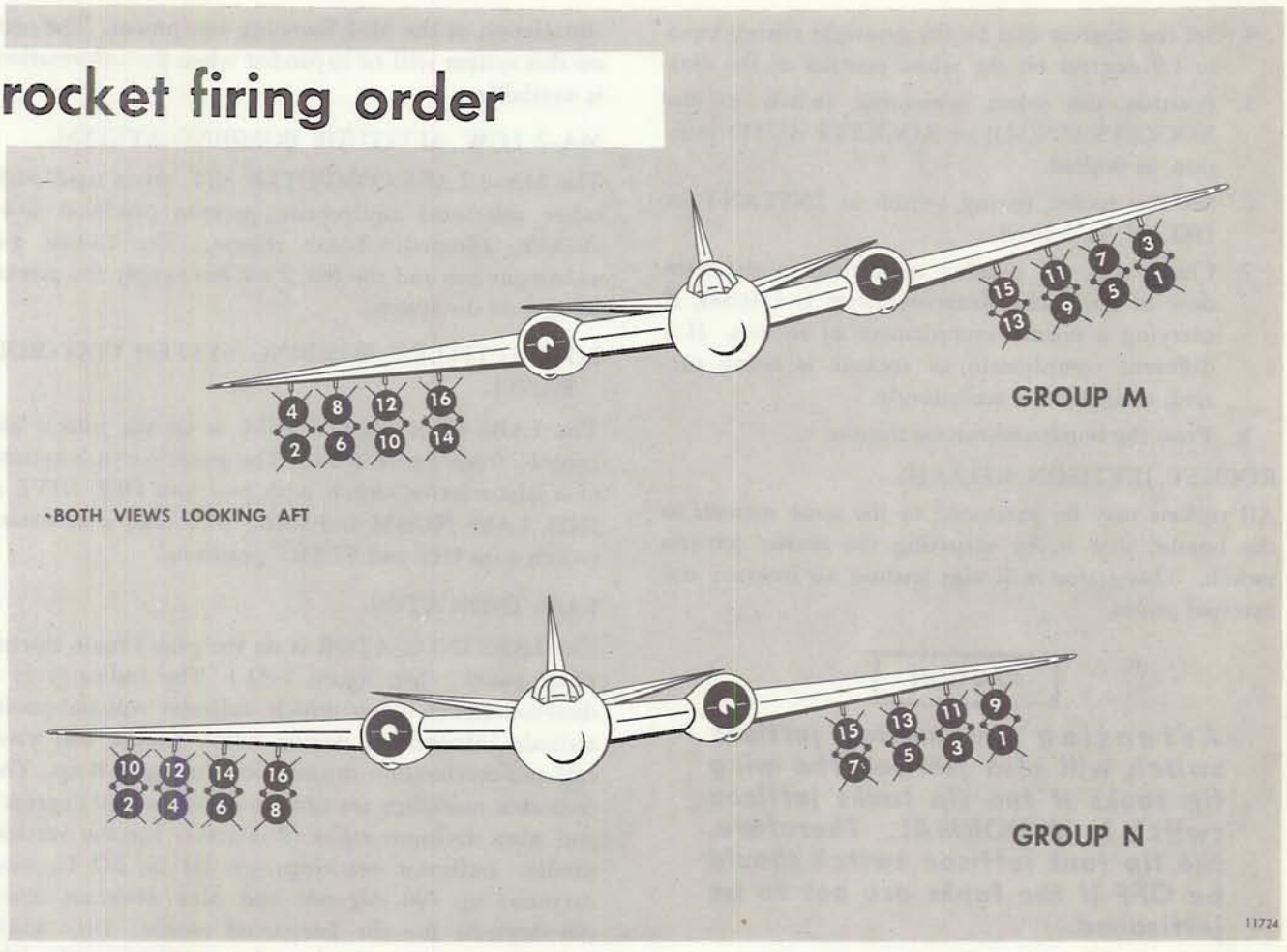


Figure 4–27

firing in both single firing or salvo. (See figure 4–25.) When the select armament switch has been set at the ROCKETS SINGLE position, one rocket is released each time the pilot depresses the bomb and rocket release button, and the intervalometer automatically maintains the correct firing sequence for each successive release. When the selector switch is set at the ROCKETS AUTO position and the bomb and rocket release button is depressed, the intervalometer causes the rockets to be fired in the proper salvo sequence at approximately 1/10-second intervals as long as the button is depressed. A numbered dial, visible through a window in the intervalometer housing, indicates the rocket to be fired. The dial is set at the time of rocket loading and should be set at 1 when a normal complement of rockets is carried. The reset knob on the intervalometer selects release of any particular rocket in case of misfire or other malfunction during a "single" release.

Note

If one of the lower rockets misfires, the corresponding upper rocket may be fired. However, both rockets will dive upon release and the airplane may receive superficial damage consisting of a scratched and scorched wing.

BOMB-AND-ROCKET RELEASE BUTTON. Refer to BOMBING CONTROLS in this section.

MASTER JETTISON SWITCH. Refer to BOMBING CONTROLS in this section.

FIRING ROCKETS.

To launch rockets, proceed as follows:

1. Place the master guns switch in SIGHT & RADAR.
2. Place the gunsight light switch in the GUNSIGHT ON or ALTERNATE ON position.
3. Set the gunsight light rheostat to the desired reticle brilliance.

4. Set the degrees dial on the gunsight tilting knob to 1.9 degrees on the white portion of the dial.
5. Position the select armament switch to the ROCKETS SINGLE or ROCKETS AUTO position, as desired.
6. Set the rocket fuzing switch at INSTANT or DELAY, as desired.
7. Check that the number appearing in the window of the rocket intervalometer is 1 (one), if carrying a normal complement of rockets. If a different complement of rockets is being carried, reset the dial accordingly.
8. Press the bomb-and-release button.

ROCKET JETTISON RELEASE.

All rockets may be jettisoned in the same manner as the bombs, that is, by actuating the master jettison switch. This action will also jettison all internal and external stores.

CAUTION

Actuating the master jettison switch will also jettison the wing tip tanks if the tip tanks jettison switch is in NORMAL. Therefore, the tip tank jettison switch should be OFF if the tanks are not to be jettisoned.

M-1 BOMBING SYSTEM.

At the present time, there are only provisions for the installation of the M-1 bombing equipment. The text on this system will be expanded when the information is available.

MA-2 LOW ALTITUDE BOMBING SYSTEM.

The MA-2 LABS COMPUTER SET, when used with other associated equipment, permits precision low-altitude, automatic bomb release. The 28-volt d-c armament bus and the No. 2 a-c bus supply the power to operate the system.

LOW ALTITUDE BOMBING SYSTEM CONTROL PANEL.

The LABS CONTROL PANEL is on the pilot's left console. (See figure 4-28.) The panel controls consist of a labs selector switch with positions OFF, DIVE ∠ IND, LABS NORM and LABS ALT, and a labs start switch with OFF and START positions.

LABS INDICATOR.

The LABS INDICATOR is on the pilot's main instrument panel. (See figure 1-31.) The indicator is a dual-movement meter which indicates roll-and-pitch-attitude information during bomb run-in, and yaw-roll and acceleration information during pull up. The indicator markings are nine divisions left (9 degrees), and nine divisions right (9 degrees) for the vertical needle. Indicator markings are HI G, LO G, nine divisions up (90 degrees) and nine divisions down (90 degrees) for the horizontal needle. Dive angle indication can be obtained by positioning the labs selector switch in the DIVE ∠ IND position.

labs control panel

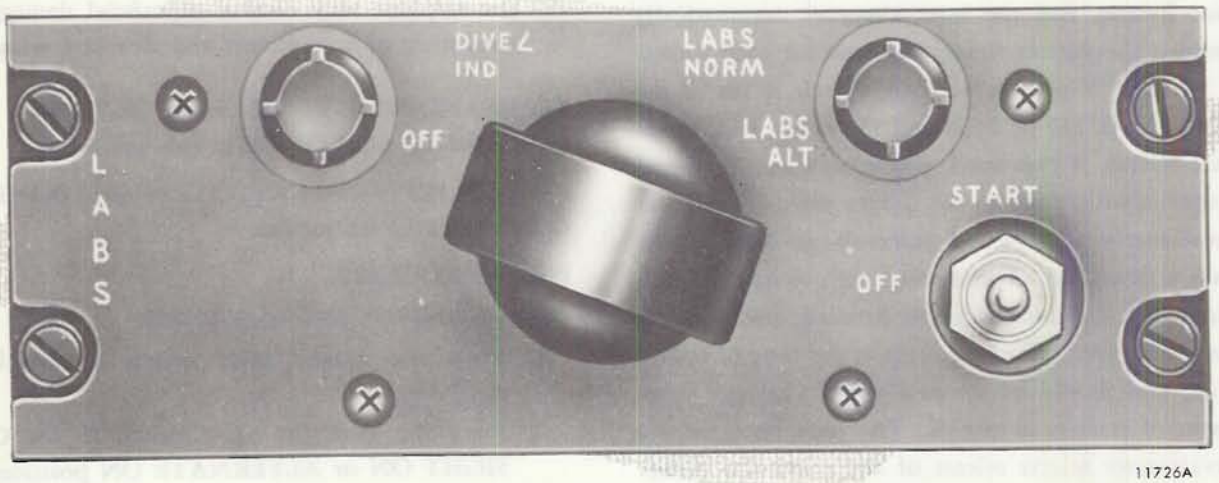


Figure 4-28

NORMAL OPERATION.

1. Place the select armament switch in the desired position.
2. Place the labs selector switch in LABS NORM.
3. Place the labs start switch in START no sooner than two minutes after positioning the labs selector switch. The sight reticle light will illuminate, and airplane pitch-and-roll movement is indicated by the labs indicator.
4. Depress the bomb release button when the airplane passes over the proper point. (The bomb release button must remain depressed until run-in, pull-up, and release are completed.)

Note

To abort a low-angle (normal) delivery, rapidly switch to LABS ALT any time during the run-in and perform a high-angle (alternate) release.

5. When the sight reticle light goes out (completion of the timing cycle), start the pull-up. The labs instrument automatically transfers from pitch to acceleration indication. Transfer from roll to yaw-roll indication occurs either when the wings are level or within ± 4 seconds after the completion of the timing cycle.
6. When the airplane has maneuvered through the selected angle, the sight reticle light will illuminate, indicating bomb release.
7. Release the bomb release button after the bomb delivery. This transfers the labs instrument indication from acceleration to pitch-attitude information, and turns the sight reticle light off.
8. Depressing the bomb release button after completion of step 6 causes the labs instrument to retain yaw-roll indication and transfer from pitch to acceleration. The sight reticle light remains off. Repeat this cycle after bomb release, and prior to recycling the labs system.
9. Place the labs start switch in OFF for a minimum of 10 seconds, and then ON when the airplane is in position to commence another run.

CAUTION

Never operate the labs start switch unless the airplane is in a relatively static state about its roll axis. Operation of the switch will cause serious damage to the equipment gyros.

10. Place the labs start switch in OFF to de-energize the system.

ALTERNATE OPERATION.

1. Place the select armament switch in the desired position.
2. Place the labs selector in LABS ALT.
3. Place the labs start switch in START no sooner than two minutes after positioning the labs selector switch.

Note

Disregard the operation of the sight reticle light while the labs selector switch is in LABS ALT. All operations normally started at the completion of the timing cycle start when the bomb release button is depressed.

4. When the airplane passes over the target, start the pull-up. Depress the bomb release button and hold until the selected release angle is reached. Labs instrument will transfer from pitch to acceleration and roll to yaw-roll indication when the wings are level. The remaining operations are the same as for normal operation.
5. To stop the labs system at any time during operation, release the bomb release button.

MISCELLANEOUS EQUIPMENT.

Miscellaneous equipment such as data cases, relief tubes, stowage bags, etc. are shown on the general arrangement diagram (figure 1-1).

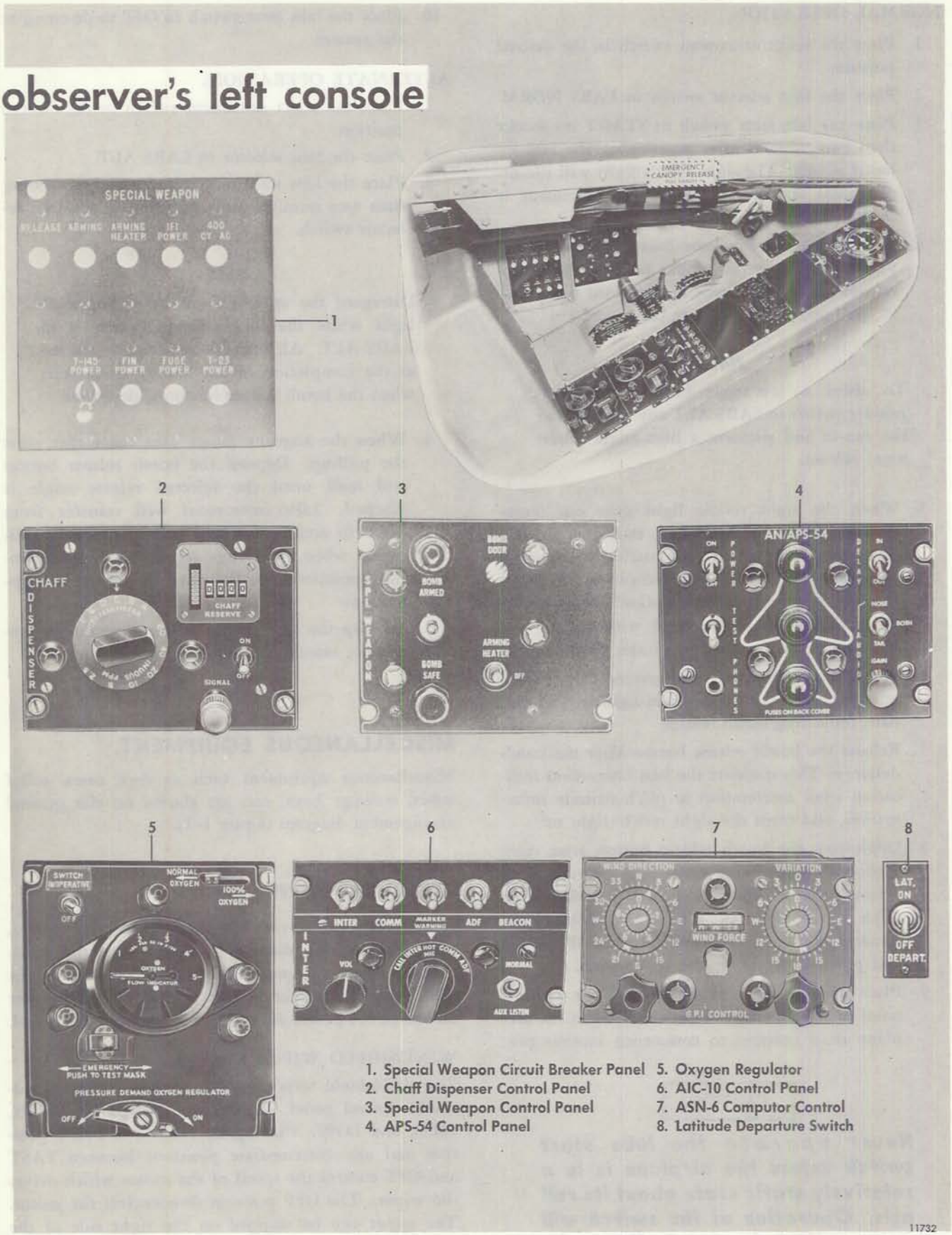
WINDSHIELD WIPER.

A motor-operated variable-speed windshield wiper, controlled by the pilot, is installed below the windshield. Power to operate the wiper comes from the pilot's circuit breaker bus through a circuit breaker on the pilot's power distribution circuit breaker panel.

WINDSHIELD WIPER SWITCH.

The windshield wiper switch, located on the windshield control panel, is marked PARK, OFF, HIGH, MED, and LOW. (See figure 4-4.) The FAST position and any intermediate positions between FAST and OFF control the speed of the motor which drives the wiper. The OFF position de-energizes the motor. The wiper can be stopped on the right side of the windshield by rotating the switch from OFF to the PARK position momentarily, and then back to OFF.

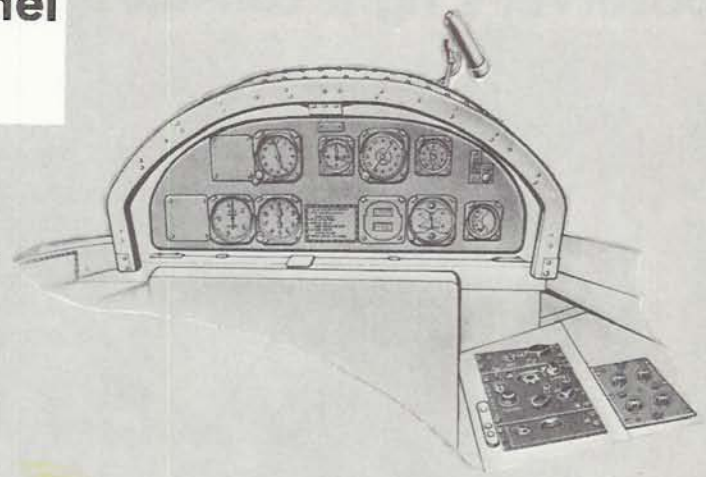
observer's left console

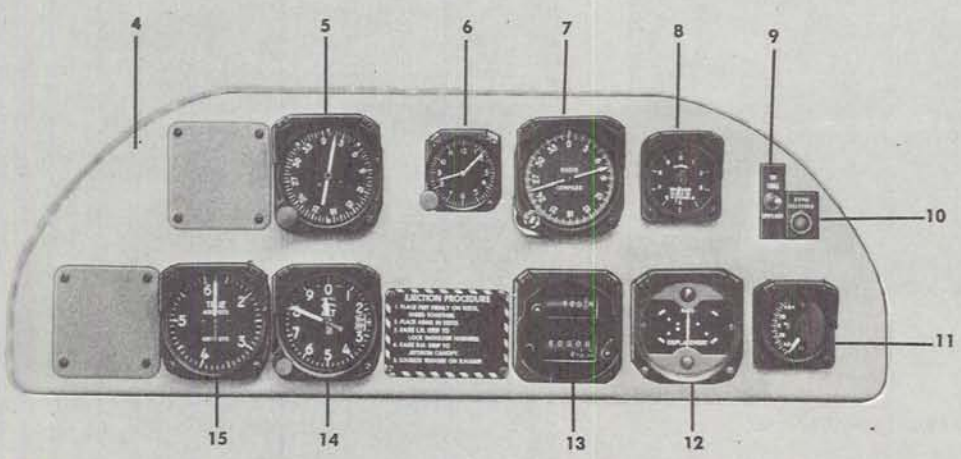


1. Special Weapon Circuit Breaker Panel
2. Chaff Dispenser Control Panel
3. Special Weapon Control Panel
4. APS-54 Control Panel
5. Oxygen Regulator
6. AIC-10 Control Panel
7. ASN-6 Computor Control
8. Latitude Departure Switch

Figure 4-29

observer's instrument panel and right console





1. OBSERVER'S TABLE LIGHT
2. RADIO COMPASS CONTROL PANEL
3. OBSERVER'S LIGHTING CONTROL PANEL
4. OBSERVER'S INSTRUMENT PANEL
5. GYRO MAGNETIC COMPASS
6. CLOCK
7. RADIO COMPASS INDICATOR
8. SHORAN "MILES TO RELEASE" INDICATOR
9. TABLE LIGHT SWITCH
10. BOMB RELEASED INDICATOR LIGHT
11. OUTSIDE AIR TEMPERATURE INDICATOR
12. POSITION DEVIATOR INDICATOR
13. GROUND POSITON INDICATOR
14. ALTIMETER
15. TRUE AIRSPEED INDICATOR

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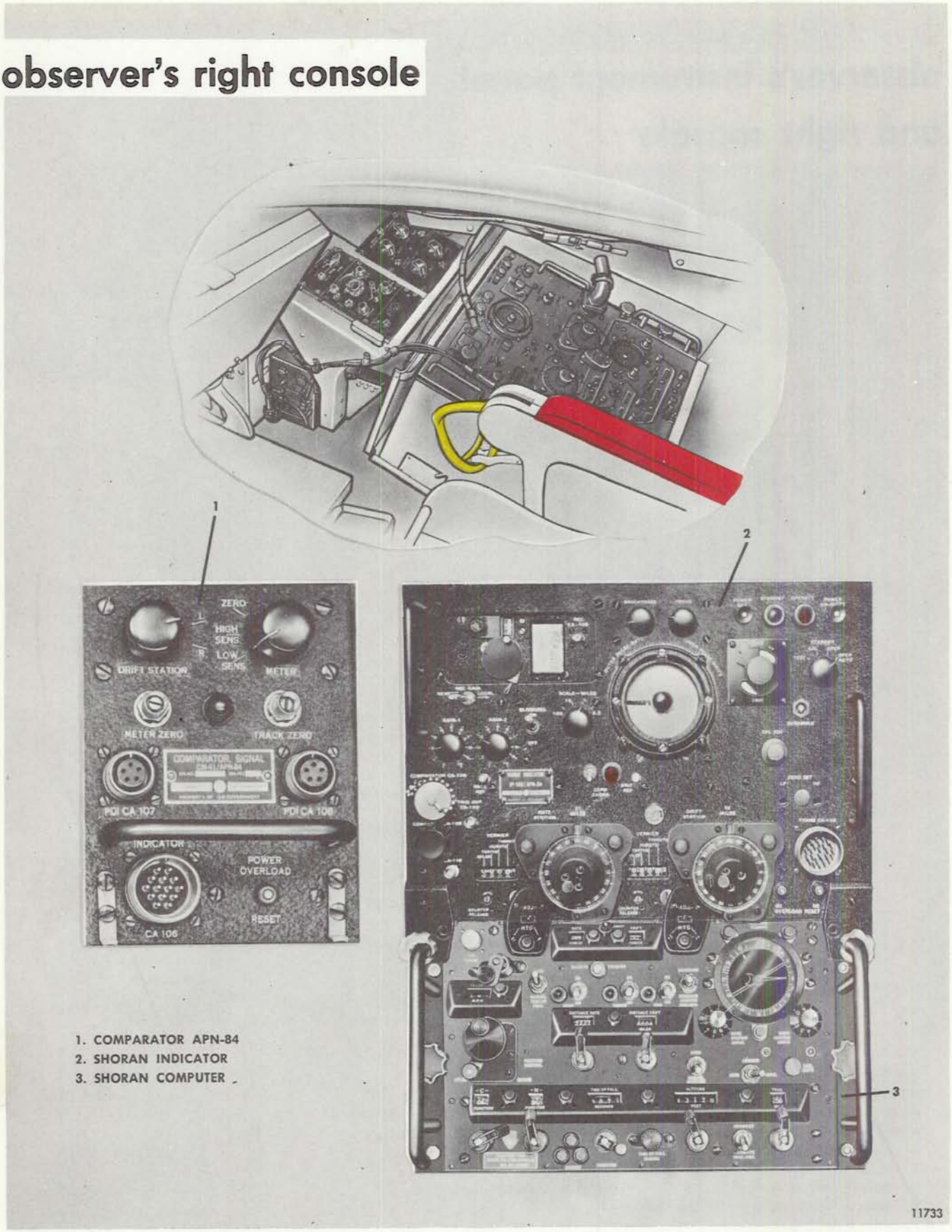
Figure 4-30

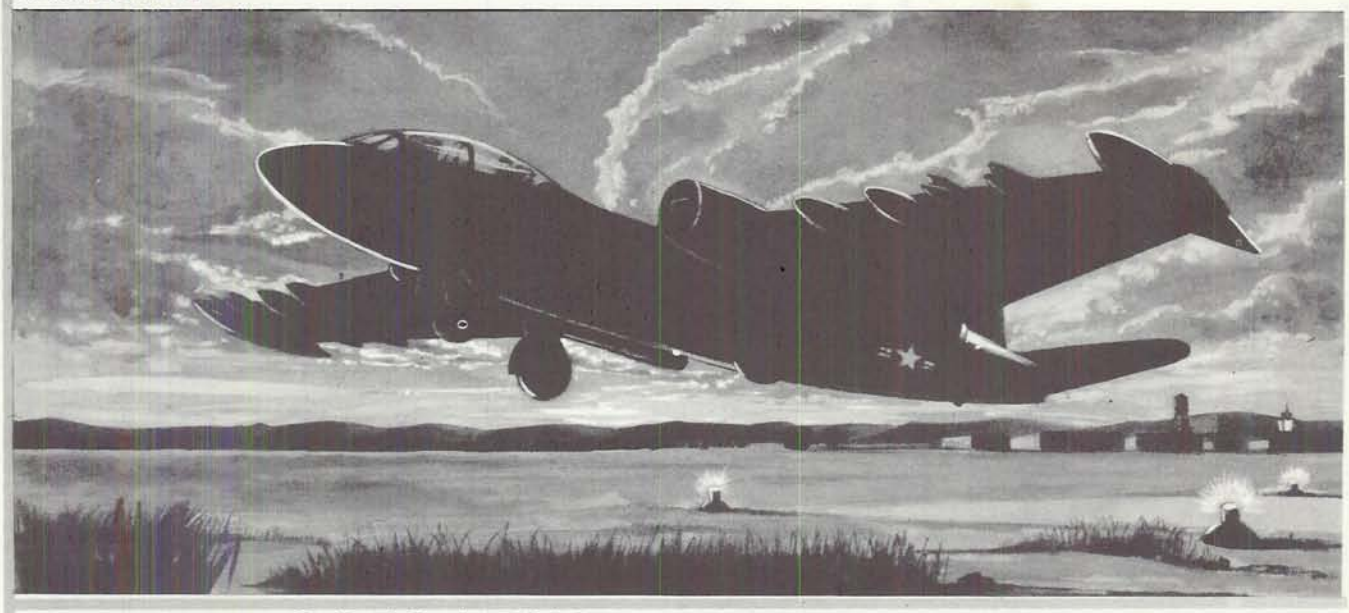
observer's right console



1. COMPARATOR APN-84
2. SHORAN INDICATOR
3. SHORAN COMPUTER

Figure 4-31

Section V



OPERATING LIMITATIONS

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INTRODUCTION.

This section contains the engine and aircraft limitations that must be observed during normal operations. For instrument markings, refer to figure 5–1 because these limitations are not necessarily repeated in the text of this or other sections.

MINIMUM CREW REQUIREMENTS.

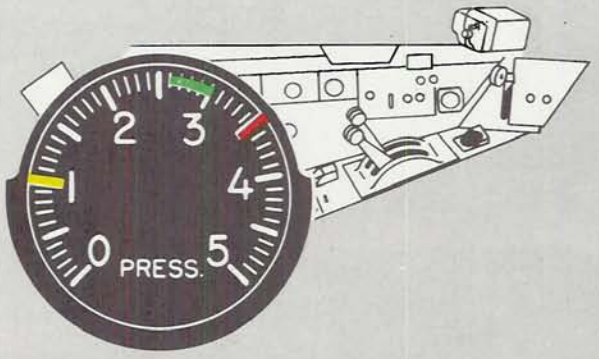
The minimum crew required for this airplane is the pilot. Additional crew members can be added at the discretion of the Commanding Officer.

ENGINE LIMITATIONS.

GENERAL.

All normal limitations are shown in figure 5–2. If the limits for steady-state operation, acceleration, or starting are reached or exceeded, make an entry in form DD787 of the magnitude and duration of the operation at or above the limitations. During steady state operation, note only the indications above the limitations. When shutting down the engine from 95% or above, idle the engine for at least one minute to allow temperature conditions to stabilize, and then

instrument markings

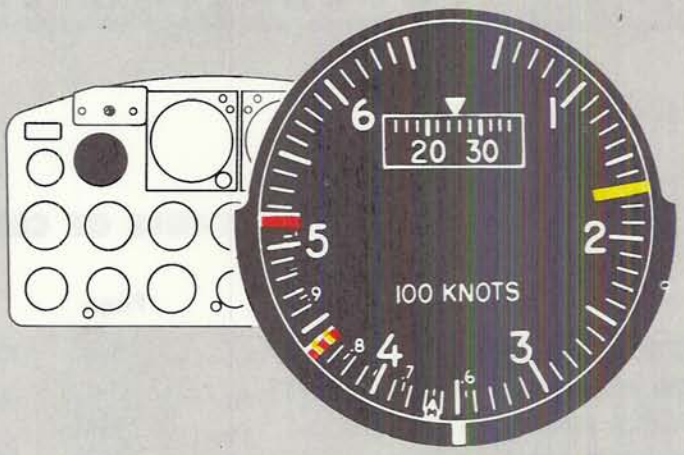


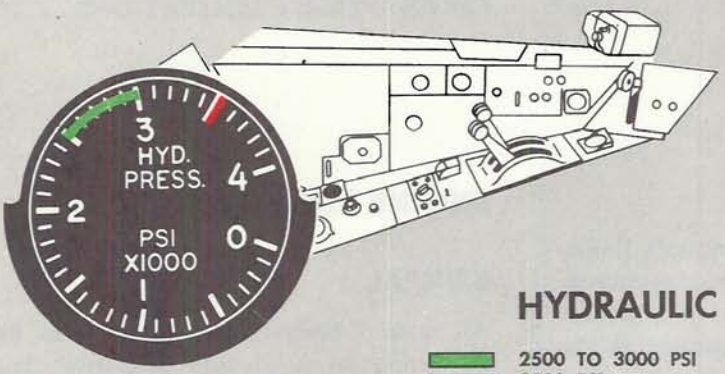
BRAKE PRESSURE

- 1000 PSI-MINIMUM
- 2600 PSI TO 3000 PSI-NORMAL
- 3500 PSI-MAXIMUM

AIRSPEED

- 170 KNOTS IAS-FLAP EXTENSION
- 200 KNOTS IAS-LANDING GEAR EXTENSION
- 444 KNOTS IAS-AIRSPEED LIMIT WITH TIP TANKS
- 513 KNOTS IAS-AIRSPEED LIMIT WITHOUT TIP TANKS





HYDRAULIC SYSTEM PRESSURE

- 2500 TO 3000 PSI
- 3500 PSI

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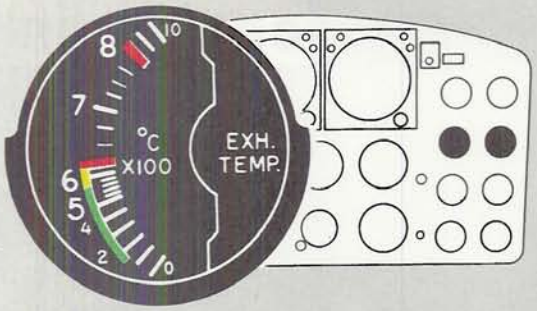
Figure 5-1 (Sheet 1 of 2)

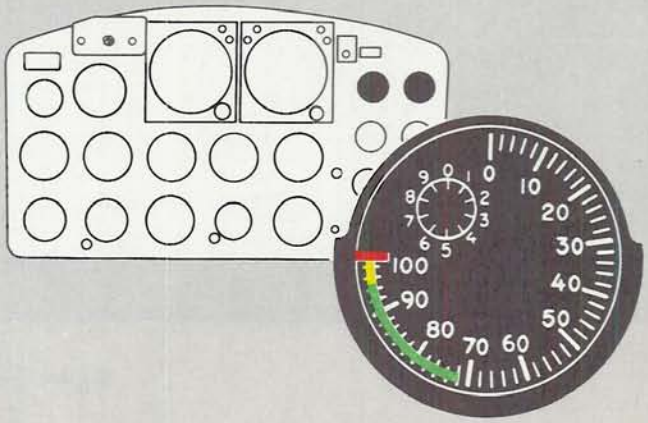


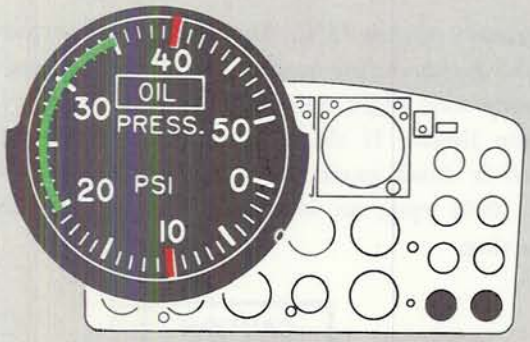
EXHAUST GAS TEMPERATURE

- 150°C TO 585°C
- 585°C TO 620°C-MAXIMUM CONTINUOUS
- 620°C-MAXIMUM DURING TAKE-OFF AND MILITARY THRUST (30 MIN. LIMIT)
- 800°C-MAXIMUM DURING STARTING AND ACCELERATION ONLY.

TACHOMETER

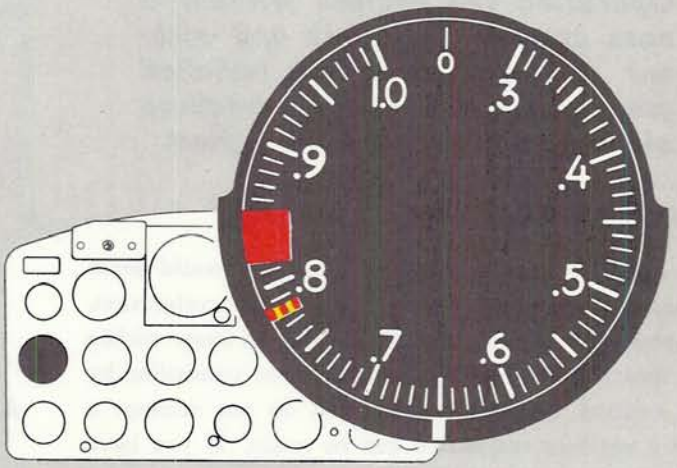
- 72% TO 96%-NORMAL CONTINUOUS
- 96.5% TO 100%-MAXIMUM CONTINUOUS
- 100% TAKE OFF AND MILITARY POWER





OIL PRESSURE

- 10 PSI-MINIMUM
- 20 PSI TO 35 PSI-NORMAL
- 40 PSI-MAXIMUM



MACHMETER

- .78 MACH LIMIT WITH TIP TANKS
- .82 TO .85 BUFFET AREA

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Figure 5-1 (Sheet 2 of 2)

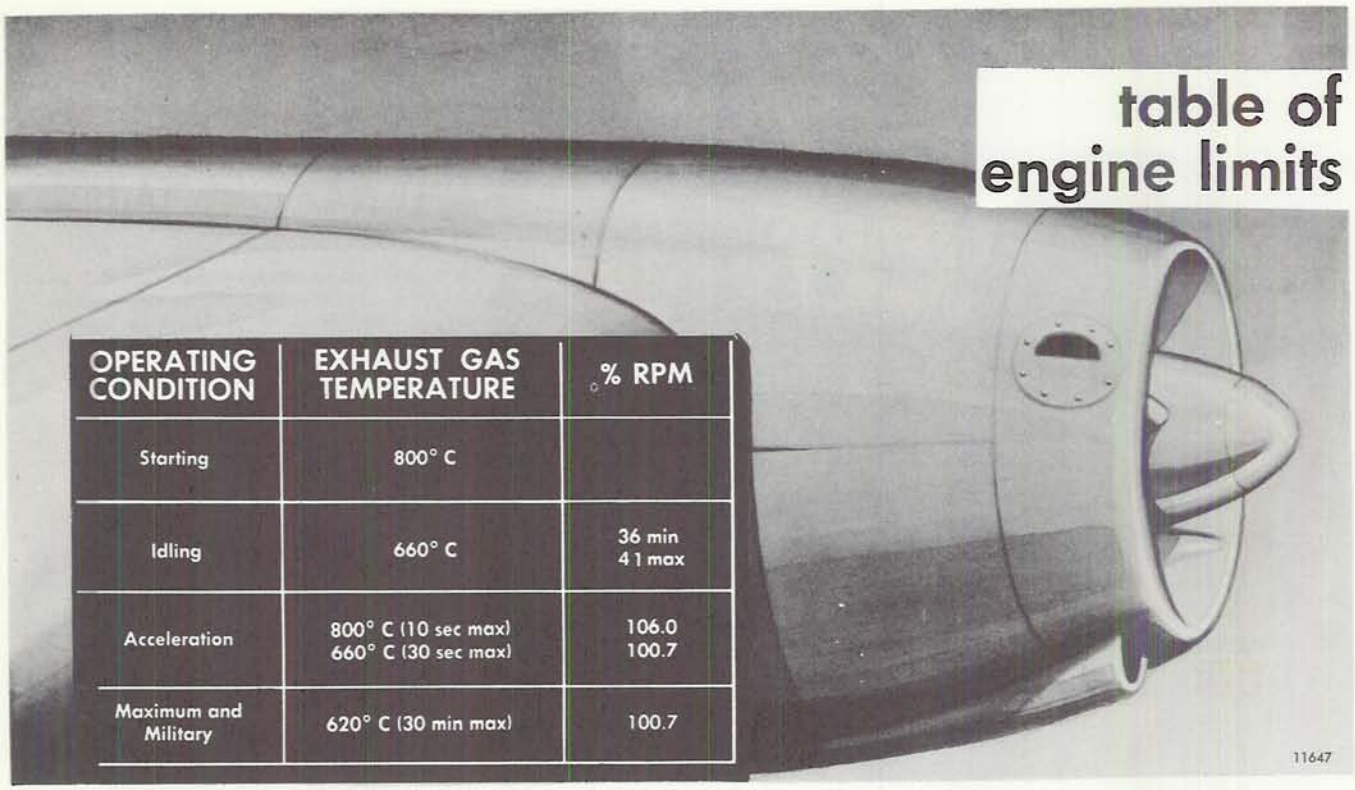


table of engine limits

OPERATING CONDITION	EXHAUST GAS TEMPERATURE	% RPM
Starting	800° C	
Idling	660° C	36 min 41 max
Acceleration	800° C (10 sec max) 660° C (30 sec max)	106.0 100.7
Maximum and Military	620° C (30 min max)	100.7

Figure 5–2

place the throttles in OFF. If the engines are being shut down from below 95% rpm, you can close the throttles immediately.

CAUTION

Operating the engines without a nose cowl or bellmouth and without a starter fairing installed causes compressor failure because of improper airflow distribution.

TEMPERATURE AND POWER LIMITS.

The steady-state exhaust gas temperature should never exceed 620°C except during starting or acceleration. If necessary, throttle back the engine to keep within this limit. If the temperature cannot be controlled by this method, stop the engine and do not attempt a restart until an inspection can be made. If you have made five starts in which the exhaust gas temperature is 800° to 900°C, or one start exceeding 900°C, stop the engine and perform an immediate inspection. If airborne and unable to determine the cause of the malfunction, stop the engine and do not attempt a restart. Never operate the engine if the engine air inlet temperature reaches 93°C. Should the engine rpm exceed 105.5% rpm during acceleration or 102.5% rpm during steady state flight, retard the throttle and keep below these limits. If the engine continues to overspeed, shut it down immediately. If the engine overspeeds to 106% rpm, an inspection is required before restarting.

CAUTION

Do not attempt to restart the engine after exceeding a starting exhaust gas temperature of 900°C, or an rpm limit of 106% without first performing an inspection.

AIRSPEED LIMITATIONS.

LANDING GEAR EXTENSION SPEED.

The limiting airspeed for extending the landing gear is 200 knots IAS. If the gear is lowered at speeds in excess of this value, the fairing, doors, or operating mechanism may be damaged.

WING FLAP LOWERING SPEED.

The limiting airspeed for lowering the wing flaps is 170 knots IAS. Flap distortion or damage to the operating mechanism may result at speeds in excess of this limiting value.

DIVE BRAKES.

There is no limitation for the operation of the dive brakes.

CAUTION

Do not extend the dive brakes when the airplane is equipped with external wing stores. This results in severe buffeting.

BOMB DOOR.

There is no airspeed limitation imposed on the operation of the bomb door.

LANDING LIGHT EXTENSION.

The limitation airspeed for extending the landing light is 200 knots IAS. Damage to the light support and buffet may occur in excess of this speed.

MAXIMUM ALLOWABLE AIRSPEEDS WITH WING TIP TANKS.

When tip tanks are carried, the maximum allowable airspeed at any altitude is 444 knots IAS or 0.78 Mach, whichever is less. (See figure 5–3.)

MAXIMUM ALLOWABLE AIRSPEEDS WITHOUT WING TIP TANKS.

Without tip tanks the maximum allowable airspeed up to 5,000 feet is 513 knots IAS. (See figure 5–4.) From 5,000 to 20,000 feet the limit is 0.82 Mach. From 20,000 feet up the buffet limit is encountered between 0.83 and 0.85 Mach. The airspeed limitations for normal control are shown in figures 5–3 and 5–4. If you exceed these values, the result will be extremely heavy buffeting at low altitudes and in severe longitudinal trim changes at high altitudes.

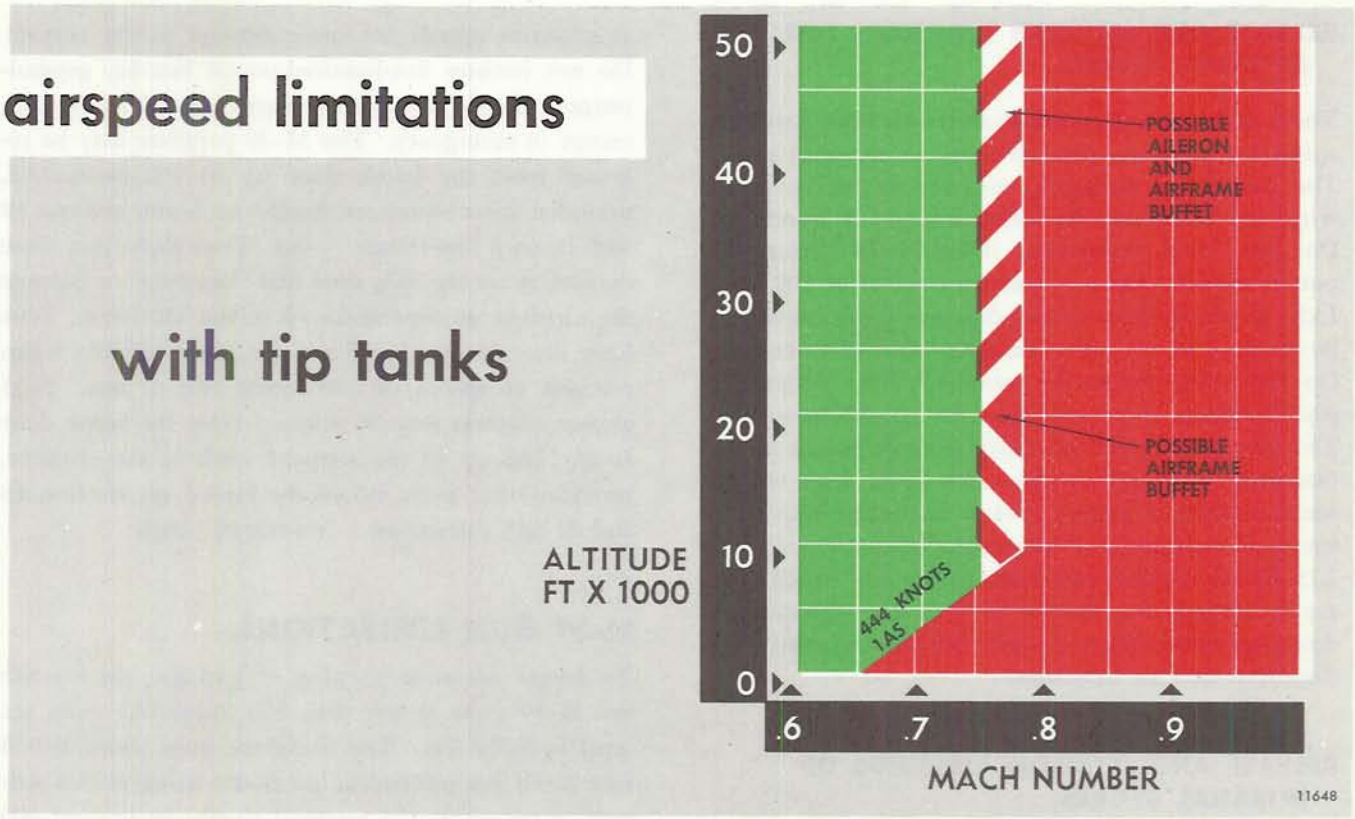


Figure 5–3

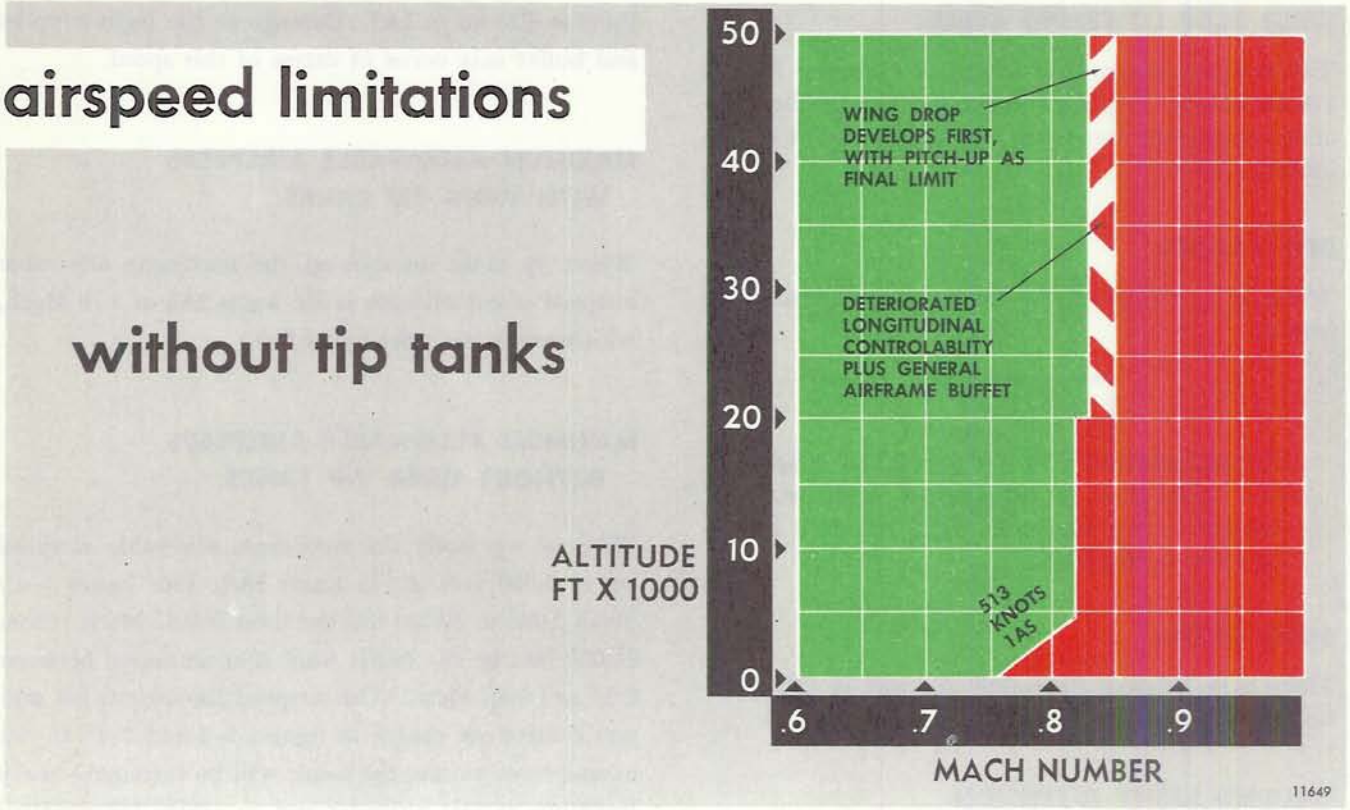


Figure 5-4

RELEASE AND JETTISON AIRSPEEDS FOR EXTERNAL STORES.

There is danger of external stores striking and damaging the airplane when dropped at excessive speeds. The maximum allowable airspeed at which empty wing tip tanks can be jettisoned is 365 knots IAS. Do not drop completely filled E-74 series 750-pound napalm tanks at speeds in excess of 200 knots IAS. If partly filled or empty, these tanks should not be dropped at any speed except in case of emergency. Do not drop externally mounted T-54 series 750-pound bombs at speeds in excess of 350 knots IAS. This restriction does not apply to those bombs carried internally. Do not jettison five-inch, high-velocity aerial rockets at speeds greater than 200 knots IAS, except in emergency. This restriction does not include 2.75 FFAR rockets and rocket pods for which there are no jettison restrictions. The speed restrictions for dropping other external stores will be included when flight-test data are available.

RELEASE AND JETTISON AIRSPEEDS OF INTERNAL STORES.

As with external stores, the release of internal stores at excessive speeds can cause damage to the aircraft. Do not jettison five-hundred-pound box-fin, general-purpose bombs at speeds in excess of 400 knots IAS, except in emergency. The M-26 paraflare may be released from the bomb door up to 350 knots IAS, provided inert stores are loaded on bomb stations 18 and 21 on a "no-release" basis. Tests show that these two stores are the only ones that "hang-up" or damage the airplane on separation up to the 350 limit. Tests have also shown that flares are more reliable when released at speeds of 300 knots IAS or less. E-53 cluster adapters may be released from the bomb door at any IAS up to the airspeed limit of the airplane, provided that inert stores are loaded on stations 18 and 21 and carried on a "no-release" basis.

M-39 GUN LIMITATIONS.

To insure adequate purging of gun gas, do not fire the M-39 guns at less than 190 knots IAS from sea level to 5,000 feet. Test firing the guns above 20,000 feet is not recommended, but if test firing at this altitude is necessary, the airspeed should be at least 300 knots IAS.

LANDING DESCENT.

540 fpm with a gross weight of 37,600 pounds.
438 fpm with a gross weight of 44,000 pounds.
300 fpm with a gross weight of 53,400 pounds.

PROHIBITED MANEUVERS.

Do not perform the following maneuvers:

1. Intentional spins.
2. Snap rolls or any other snap maneuver.
3. Inverted flying or any maneuvers resulting in extended negative acceleration.
4. Abrupt rudder-induced maneuvers.

CAUTION

Inverted flying or any maneuver resulting in extended negative acceleration may result in engine flame-out, since there are no means of insuring a continuous flow of fuel in this attitude.

Do not make maneuvers solely by use of trim devices. Trim devices increase the pilot's apparent strength by reducing the required stick forces. The high stick forces experienced during maneuvers without the use of trim serve to protect the crew and the airplane. Use trim devices only to reduce the maneuvering stick forces to tolerable limits, and not to zero. The use of trim in anticipation of a maneuver, or to reduce maneuvering stick forces to very small values, may result in airloads strong enough to cause complete structural failure of the airplane.

ACCELERATION LIMITATIONS.

The maximum allowable G for different conditions is illustrated in the operating flight strength diagrams. (See figures 5-5 and 5-6.) These flight strength (V-G) diagrams define the flight speed and load factor limits at various altitudes for a given airplane gross weight. The speeds quoted are indicated readings exactly as observed during flight.

MAXIMUM ACCELERATION.

NO EXTERNAL LOAD.

The maximum allowable positive acceleration for the airplane with no external load is 5G and the maximum negative limits is 2.5G. (See figure 5-5.)

WING TIP TANKS INSTALLED.

The maximum allowable positive 4G acceleration is 4G's for an airplane with tip tanks. (See figure 5-6.) This acceleration limit is for both the full or empty tip tanks. The negative limit varies with full or empty tip tanks. The maximum negative limit with tip tanks is 1.33G, while a 2.05G acceleration is allowable with the tip tanks empty.

CENTER OF GRAVITY LIMITATIONS.

The CG limitations of the airplane are: forward 21.0% MAC, with or without tip tanks; aft 28.3% MAC, with tip tanks; and aft 28.8% MAC without tip tanks. The location of all equipment (see figures 5-7, 5-8, and 5-9) has been carefully controlled to provide satisfactory center-of-gravity position at all times. The greatest single cause of CG travel is the distribution of the fuel load. The normal sequence of fuel distribution to the engines, as outlined in Section VII, keeps the airplane well within the CG limits.

GROSS WEIGHT LIMITATIONS.

The maximum gross weight of the B-57B is 57,000 pounds, provided that cargo and stores are loaded as specified in T.O. 1-1B-40. This gross-weight limitation is not imposed by the structural limits of the airplane, but by the facilities available for the loading of internal and external stores. There are certain limitations associated with gross weight that affect the service life, strength, and performance of the airplane. A tabulation of these limitations follows.

Gross Weight Pounds	
55,000	Requires at least 5,400-foot take-off roll at 100% rpm; standard day at sea level, no wind.
57,000	Requires at least 10,000-foot take-off roll to clear 50-foot take-off obstacle with 100% rpm; sea level, hot day, no wind.
57,000	Maximum gross weight based on available capacity.
53,400	Limit of 300 fpm sinking speed imposed at time of landing contact with runway.
49,000 to 53,400	Load factor limited to +4G and —1.33G constant with tip tanks installed.
44,000 to 49,000	Load factor limited to +4G and —2G constant without tip tanks installed.
37,500	Load factor limited to +5G and —2.3G constant without tip tanks installed. Sinking speed limited to 540 fpm at landing contact with runway.

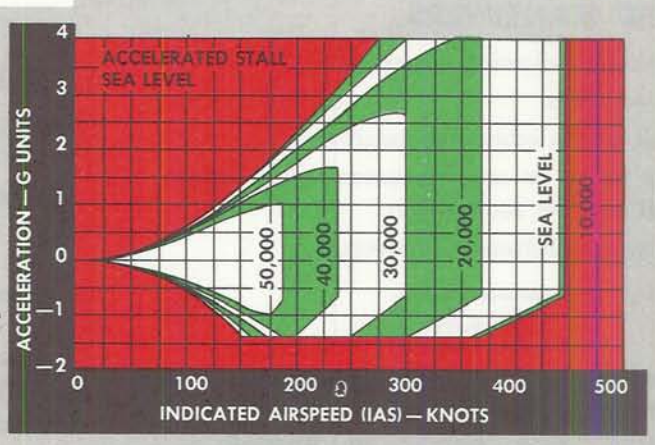
operating flight strength diagrams

HOW TO USE CHART

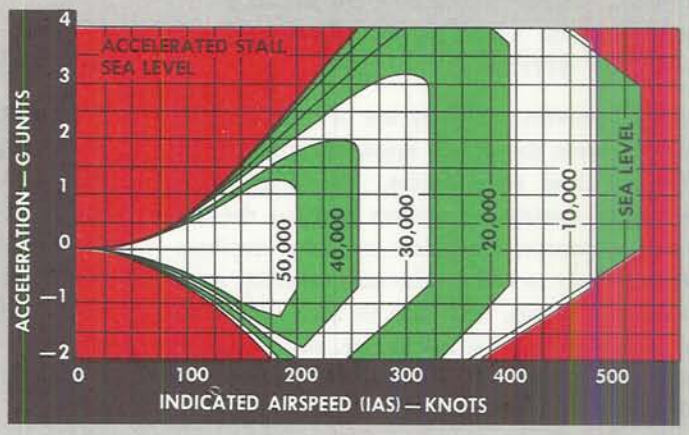
1. Select your indicated airspeed.
2. Trace vertically your flight altitude.
3. Move horizontally to the left and find the maximum G you can pull at that airspeed and altitude before stalling.

NOTE: Any G in excess of 5G is prohibited.

SYMETRICAL FLIGHT WITH WING-TIP TANKS GROSS WEIGHT – 53,400 LB



SYMETRICAL FLIGHT WITHOUT WING-TIP TANKS GROSS WEIGHT – 48,600 LB



SYMETRICAL FLIGHT WITHOUT WING-TIP TANKS GROSS WEIGHT – 37,600 LB

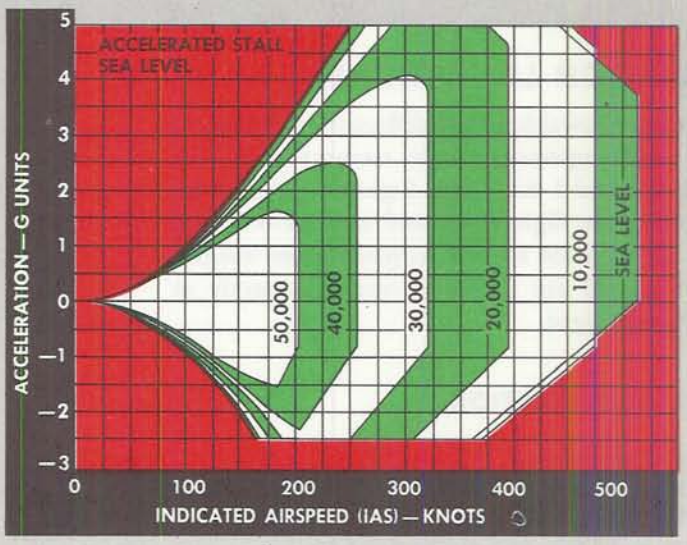


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Figure 5–5

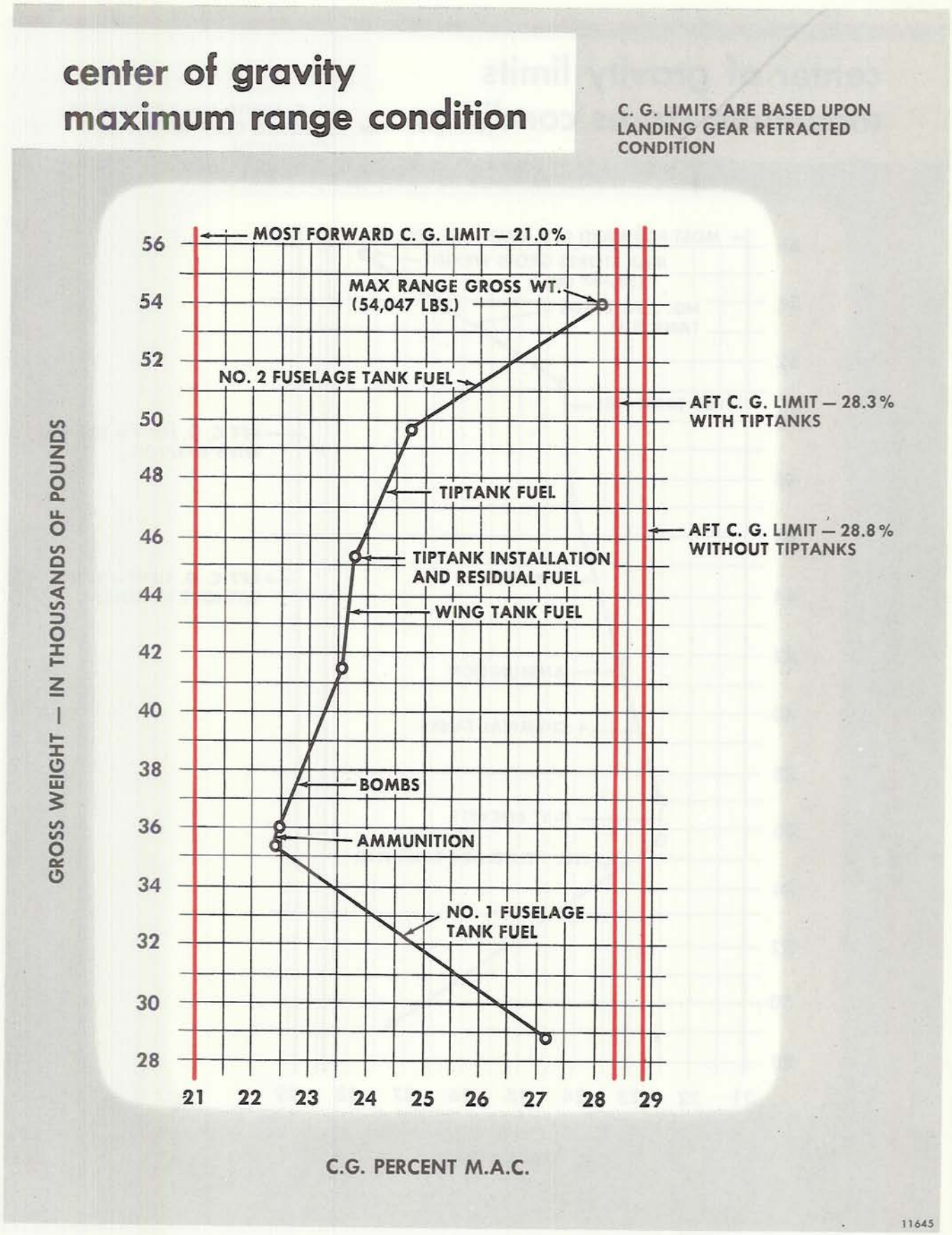
center of gravity
maximum range condition
C. G. LIMITS ARE BASED UPON LANDING GEAR RETRACTED CONDITION
MOST FORWARD C. G. LIMIT — 21.0%
MAX RANGE GROSS WT. (54,047 LBS.)
NO. 2 FUSELAGE TANK FUEL
AFT C. G. LIMIT — 28.3% WITH TIPTANKS
TIPTANK FUEL
AFT C. G. LIMIT — 28.8% WITHOUT TIPTANKS
TIPTANK INSTALLATION AND RESIDUAL FUEL
WING TANK FUEL
BOMBS
AMMUNITION
NO. 1 FUSELAGE TANK FUEL
GROSS WEIGHT — IN THOUSANDS OF POUNDS
56
54
52
50
48
46
44
42
40
38
36
34
32
30
28
21
22
23
24
25
26
27
28
29
C.G. PERCENT M.A.C.
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Figure 5-6

center of gravity limits maximum stores condition

C. G. LIMITS ARE BASED UPON LANDING GEAR RETRACTED CONDITION

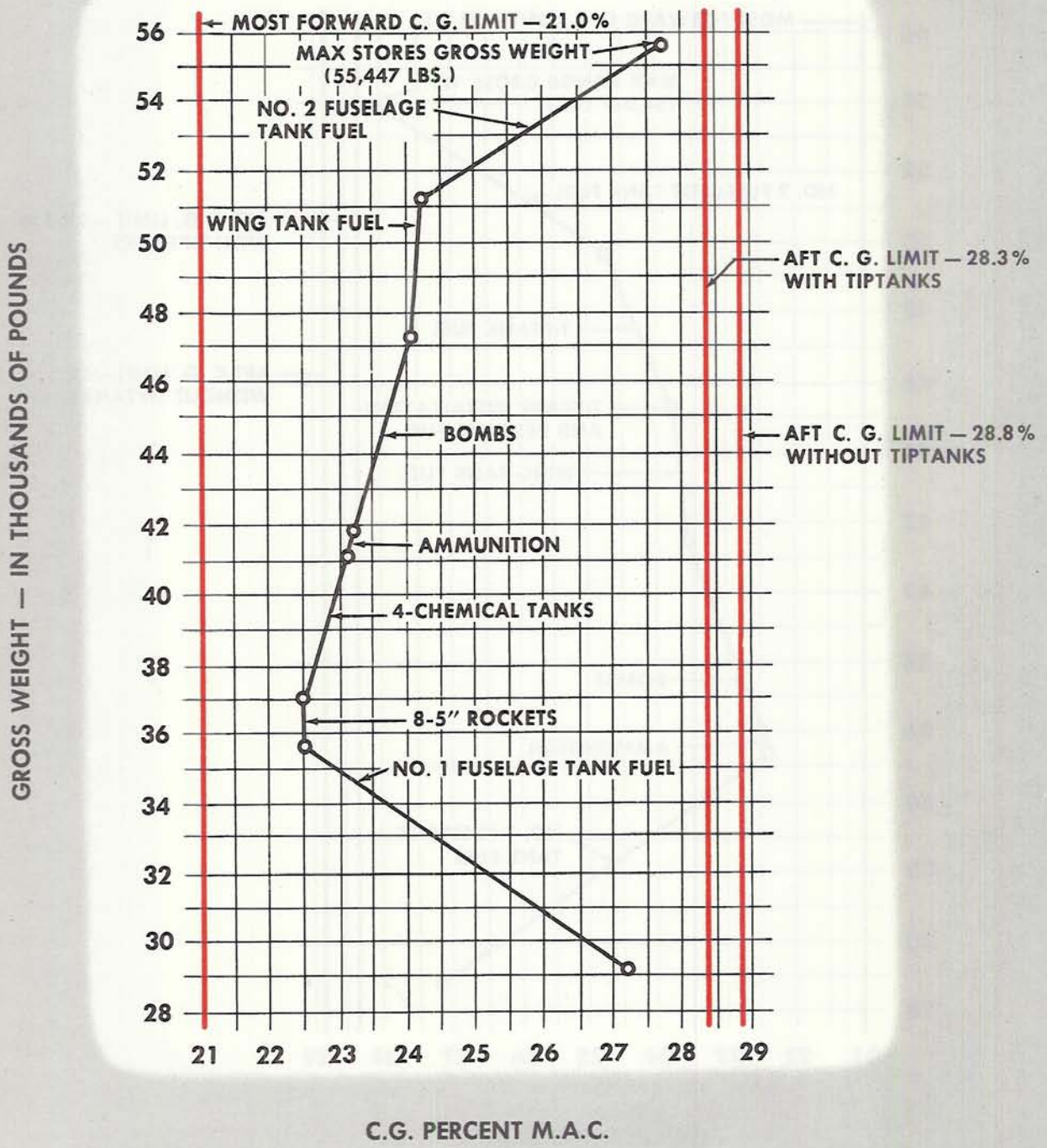


Figure 5-7

center of gravity limits ferry condition

C. G. LIMITS ARE BASED UPON LANDING GEAR RETRACTED CONDITION

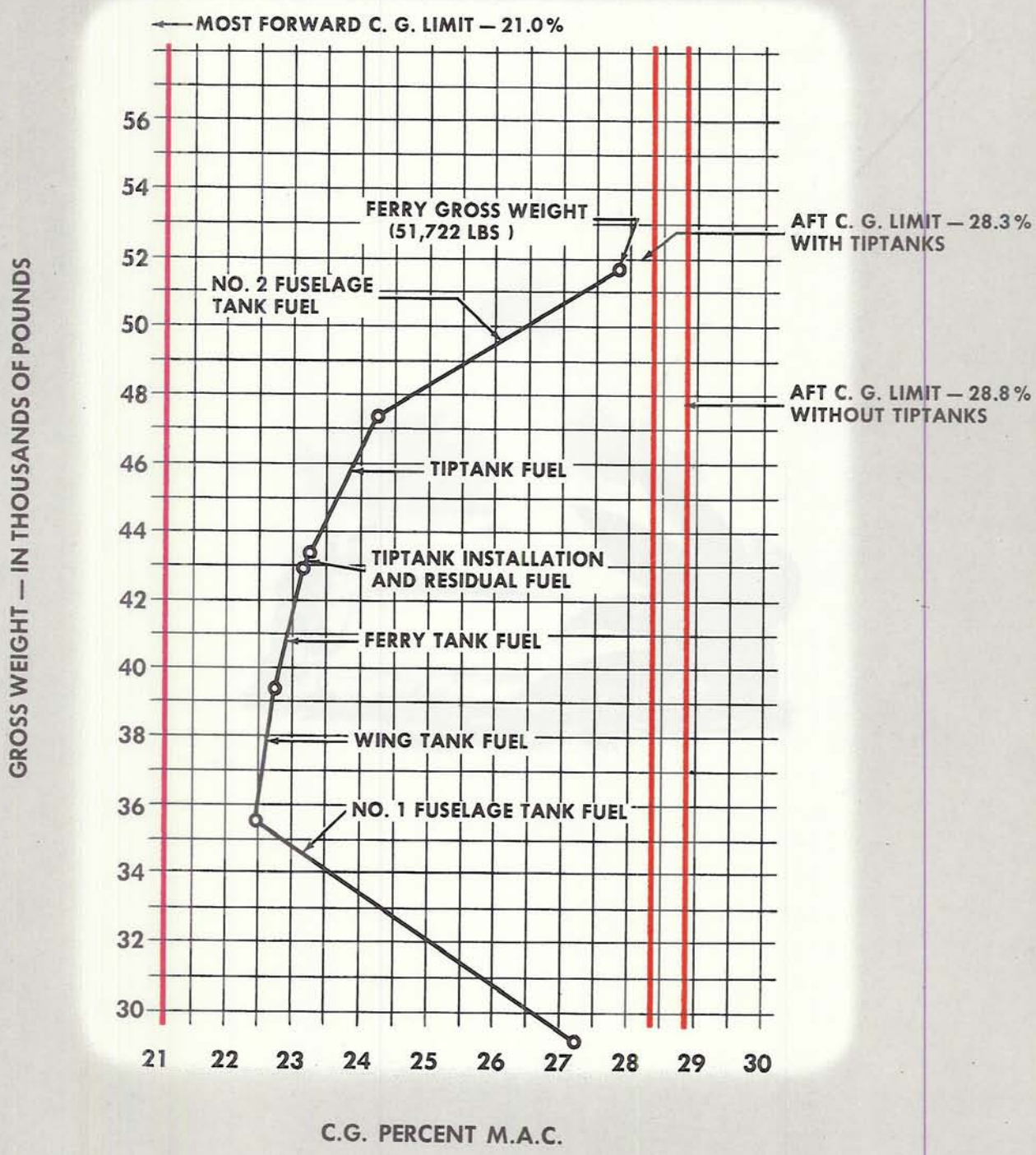


Figure 5-8

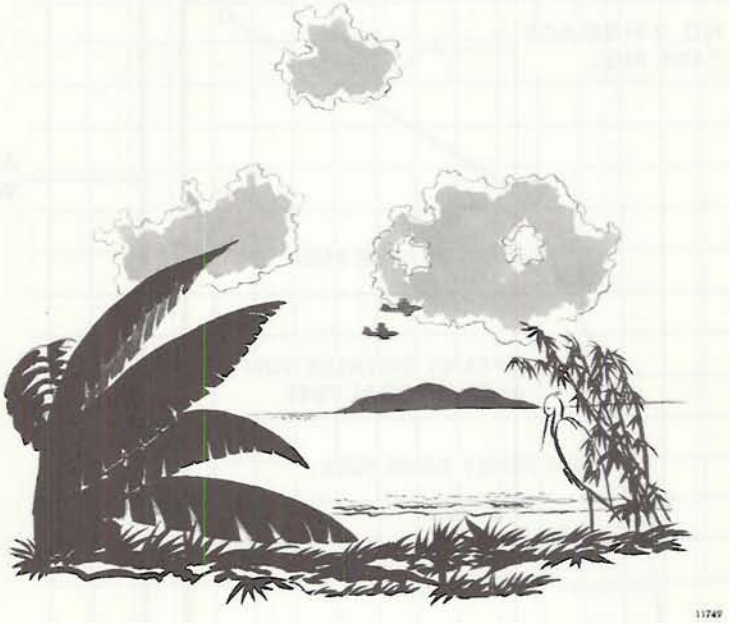
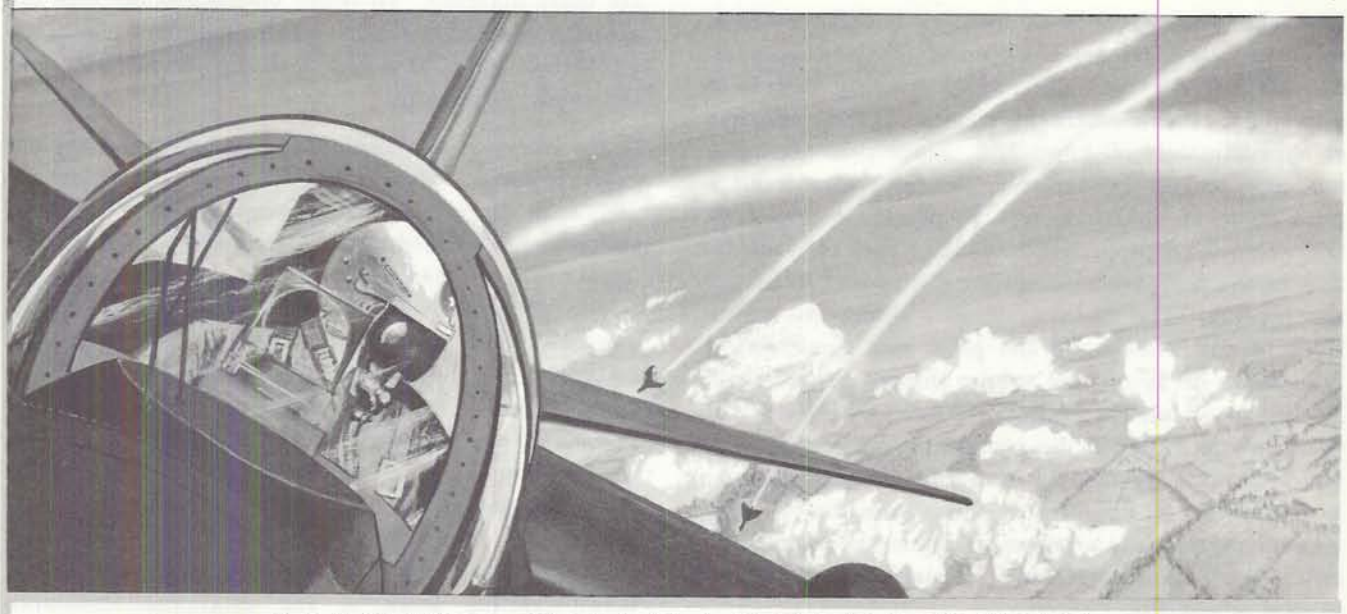


Figure 5-9

Section VI



FLIGHT CHARACTERISTICS

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GENERAL FLIGHT CHARACTERISTICS.

The B–57B is a high-performance airplane that combines the simplicity of operation of a fighter with the load-carrying capabilities and the safety of a twin-engine bomber. It has unusually good speed acceleration for a jet-powered aircraft. Unlike an airplane with reciprocating engines, it does not decelerate rapidly when the engines are throttled. Therefore, the airplane is equipped with dive brakes to aid deceleration from high speeds. The B–57B has a relatively low wing loading and a high load-factor strength. As a result, it is unusually maneuverable for a bomber and the comparatively low thrust loading results in a service ceiling of over 50,000 feet.

The B–57B is stable about all axes throughout its speed and center-of-gravity range. As with all high-speed, high-altitude aircraft, the longitudinal stability starts to deteriorate at the Mach number where the effects of compressibility begin. At extremely high altitudes, the airplane has a certain amount of lateral-directional oscillation known as Dutch-roll. Dutch-roll is a characteristic of most aircraft at these altitudes, and while annoying, it is controllable. You can stop it for short periods to maintain a stable platform for bombing or photography.

TAKE-OFF.

The take-off characteristics are slightly different from those of other airplanes with tricycle landing gear. On the take-off roll, differential braking maintains directional control until the rudder becomes effective at approximately 60 knots IAS. Since the nose has a tendency to rise prematurely, the pilot must exert a push force of approximately 30 pounds on the control column. At approximately 100 knots IAS, relaxation of the push force allows the nose wheel to lift off the runway. The main gear oleos absorb the vibrations of the wheels and the pilot may experience a false sense of flying due to the smooth ground roll. A slight pull on the control column is necessary for the airplane to fly off the ground (approximately 110 to 130 knots). For take-off distances refer to Appendix I. Restriction of the rate of climb immediately after take-off permits the airplane to accelerate beyond the safe single-engine speed and to attain the best climb as soon as possible.

CLIMB.

A vibration that shakes the entire airplane may develop during climbs to altitude. This condition is not dangerous and can be eliminated by reducing power. The vibration is caused by the nose or "beak" of the aileron contacting the surrounding wing structure and transmitting engine vibration throughout the airplane. The clearance between the aileron and the surrounding structure is very close to obtain the lowest possible aileron forces. Temperature changes cause the various metal parts to expand and contract, thus producing the vibration contact.

CAUTION

If vibration through aileron contact occurs during climb, inspect the aileron and surrounding structure after completing the flight for possible damage.

CRUISE PERFORMANCE.

The range and endurance performance of turbo-jet airplanes differs from that of aircraft with reciprocating engines in one important respect. The reciprocating engine operates most efficiently at low power outputs, whereas the gas turbine operates most efficiently at, or near, maximum power output. Because of this characteristic, the maximum range and maximum endurance procedures for jet-powered aircraft are quite different. To better understand the way the airplane is affected by maximum range and maximum endurance flying, it is best to study the airframe and the engine separately.

If the airframe is considered separately from the engine, it can be shown aerodynamically that at one indicated airspeed with a constant gross weight the airframe can be flown at its maximum efficiency. Flying at this airspeed will result in the most miles per pound of applied effort. There is also one indicated airspeed, a few knots lower, at which the airframe can be flown for the most hours per pound of applied effort. These airspeeds, which are relatively low (about 180 and 160 knots IAS for the B-57) and which change very little with altitude, are the maximum range and maximum endurance speeds. The airframe is flown at the greatest ratio of velocity to thrust at the maximum range airspeed, and at the minimum-thrust-required point at the maximum endurance speed.

When considered separately from an airframe, the gas turbine engine operates most efficiently and produces the most thrust per pound of fuel per hour at 95% to 100% rpm. This is true regardless of altitude, but the total amount of thrust produced at a constant rpm is greater at low altitudes and falls off appreciably at high altitudes. Mount the turbo-jet engine on the airframe, and at low altitudes the most efficient engine operation, 95% to 100% rpm, will produce far more thrust than the airframe requires to be propelled at its most efficient speed. If the airplane is climbed to high altitudes, there will be one altitude at which the engine can be operated at its most efficient rpm, and produce just enough thrust to propel the airframe at its most efficient indicated airspeed (180 knots IAS). Flying at this altitude, near the airplane's service ceiling, will result in a maximum of miles per pound of fuel used. At lower altitudes both the engine and the airframe compromise their efficiency. The engine must be operated below its most efficient power setting, and the airframe must be flown faster than its most efficient indicated airspeed. Consult the Operating Data in Appendix I for specific range figures.

An additional advantage in cruising at high altitude is the increase in true airspeed. Two hundred knots indicated airspeed at sea level is about two hundred knots true airspeed. An indicated airspeed of 200 knots at 40,000 feet is approximately 400 knots true airspeed. This discussion is reference to an airplane at a constant gross weight. An increase in gross weight requires a slight increase in the recommended cruising speeds.

To obtain maximum range with a full load of fuel, climb the B-57B to maximum altitude as rapidly as possible and cruise at maximum continuous power at the recommended Mach number. Make a normal descent (RPM-IDLE, Dive Brakes-EXTENDED, IAS-250 knots) when reaching the precomputed descent distance from your destination. You can obtain maximum endurance by flying at the minimum-thrust-required speed, approximately 160 knots indicated, depending on weight. Because it is difficult to stabilize at this speed, a speed of 10 to 15 knots faster is recommended. The difference in endurance is negligible, and some excess thrust is available for turns and other maneuvering.

At low altitudes, engine rpm is reduced to considerably less than its most efficient setting. Therefore, more time per pound of fuel is gained by flying at a high altitude where the engine can be operated at maximum continuous power, and where this power setting is just sufficient to maintain maximum endurance speed. When deciding whether or not to climb, give consideration to the fuel required to climb and descend. If you have less than 2,000 pounds of fuel remaining in the fuel supply, it is to your advantage to reduce power and remain at the same altitude.

In cases of emergency and when it may be impractical to climb to a high altitude, one engine may be shut down and the other engine operated at a higher rpm. If at an altitude where one engine will provide sufficient thrust, it is more economical to operate one engine at full or near full rpm than two engines, each at a reduced rpm.

STICK FORCES.

The airplane is longitudinally stable through a cg range of 21% MAC to 28.3% MAC with tip tanks, 28.8% MAC without tip tanks. Under certain loading conditions when all fuel except that in the No. 1 fuselage tank is used, the forward cg limit may be exceeded by approximately three-fourths of one percent. This presents no operational problem because stick forces at the forward cg are normally high and this slight additional forward movement has little effect. The airplane will not fully stall in this condition, but the airspeed can be reduced to near actual stall speed. At high speed with a forward cg the stick forces per G are such that the load factor that can be applied to the plane is limited by pilot strength. For example, at 21% cg and 450 knots it takes about 150 pounds of effort to pull about 2 G. This fact is important during aerobatics. Refer to Stick Forces Chart, figure 6-1.

It is important to keep in mind that the B-57B normally operates close to its aft cg limit when fully loaded with fuel. The basic longitudinal stability is reduced as the center of gravity approaches the aft limit, and less pilot effort on the control column is required to change the airspeed from a given trim point. The plane's cg can easily move beyond its aft limit if fuel and equipment are improperly loaded, or the fuel system is mismanaged in flight, particularly if the No. 2 fuselage tank is allowed to remain full while utilizing fuel only from the No. 1 fuselage tank. Progressively less pilot effort is required for control as the cg moves aft of its limit and after a shift of approximately 3%, the plane reaches its so-called neutral point. Here there is little feel in the elevator control system and the control column can be moved back and forth with little effort. The elevator remains effective, however, and movement of the control results in normal aircraft response. The pilot can apply destructive load factors to the plane in this condition with absolutely no effort. The B-57B becomes essentially unmanageable past this neutral point and if it begins a pitching motion in either direction, it has a tendency to continue the pitching motion by itself.

These characteristics are basic to any plane and should not be considered peculiar to the B-57. You should know of them, however, since it is possible to create such conditions on the B-57B through carelessness in fuel management, and/or equipment loading. If the plane seems unusually light on the control column or if the longitudinal control seems spongy while flying, you should check your loading condition and handle the plane with extreme care. Reduce airspeed to between 200 and 250 knots and make all control motions as smoothly and gently as possible. Do not attempt steep turns or any other maneuvers that apply a load factor to the plane and be especially cautious of handling the plane roughly in turbulent air. Try to move the cg forward bxy fuel management, particularly before trying to land.

MANEUVERING FLIGHT.

The maneuverability of the B-57B is aided by spring-tab assists on the control surfaces. The ailerons are designed to be fully deflected only at low indicated airspeeds and are limited to an 80-pound effort on the control wheel. The elevator also has a spring tab assist but several other factors affect elevator effectiveness. The most important of these factors is the position of the center of gravity. The plane is more maneuverable at the aft cg position and requires more pilot effort at the forward cg positions. Altitude also affects maneuverability or the ease with which G acceleration can be produced during turns, pull-outs, loops, and

stick forces – group O airplanes

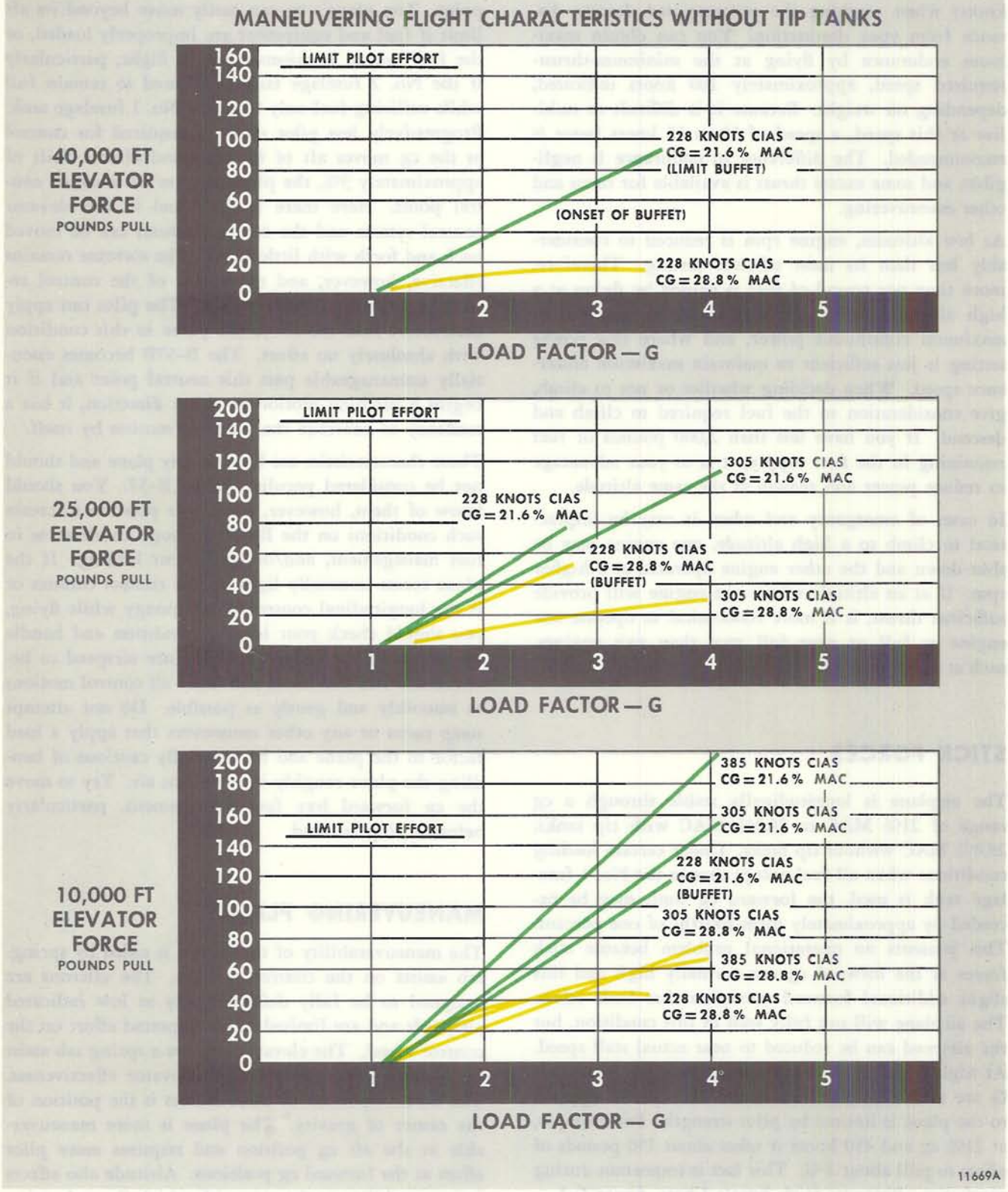
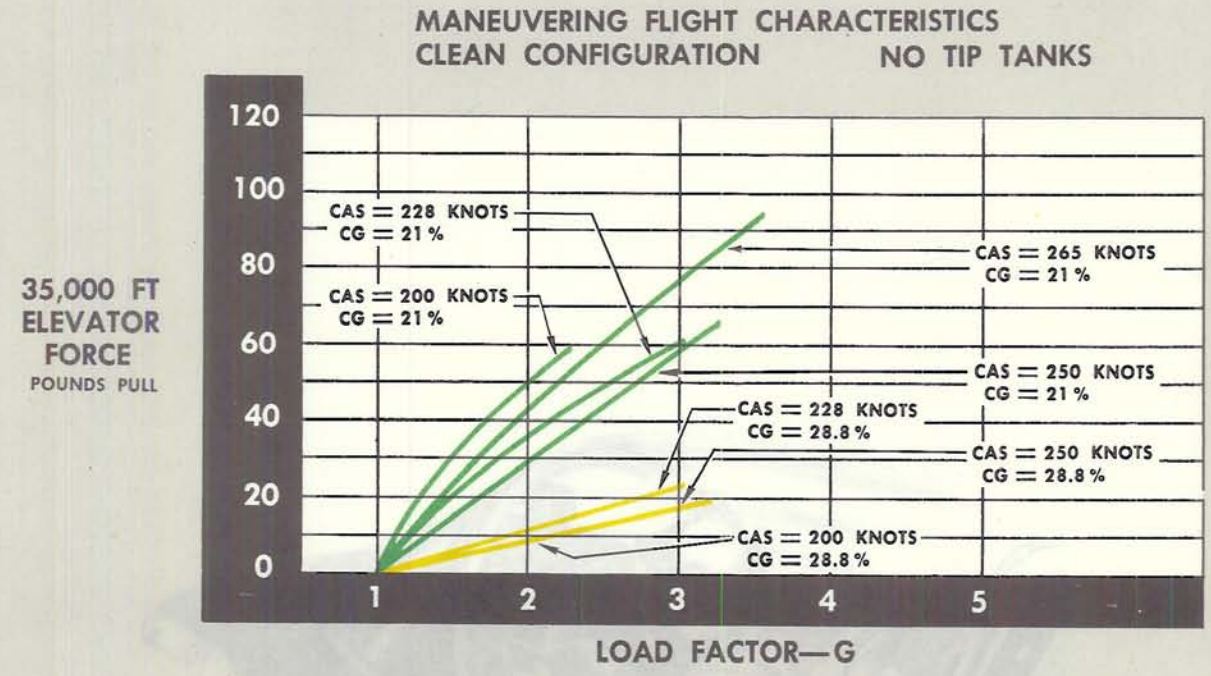


Figure 6–1 (Sheet 1 of 2)

stick forces - group P airplanes



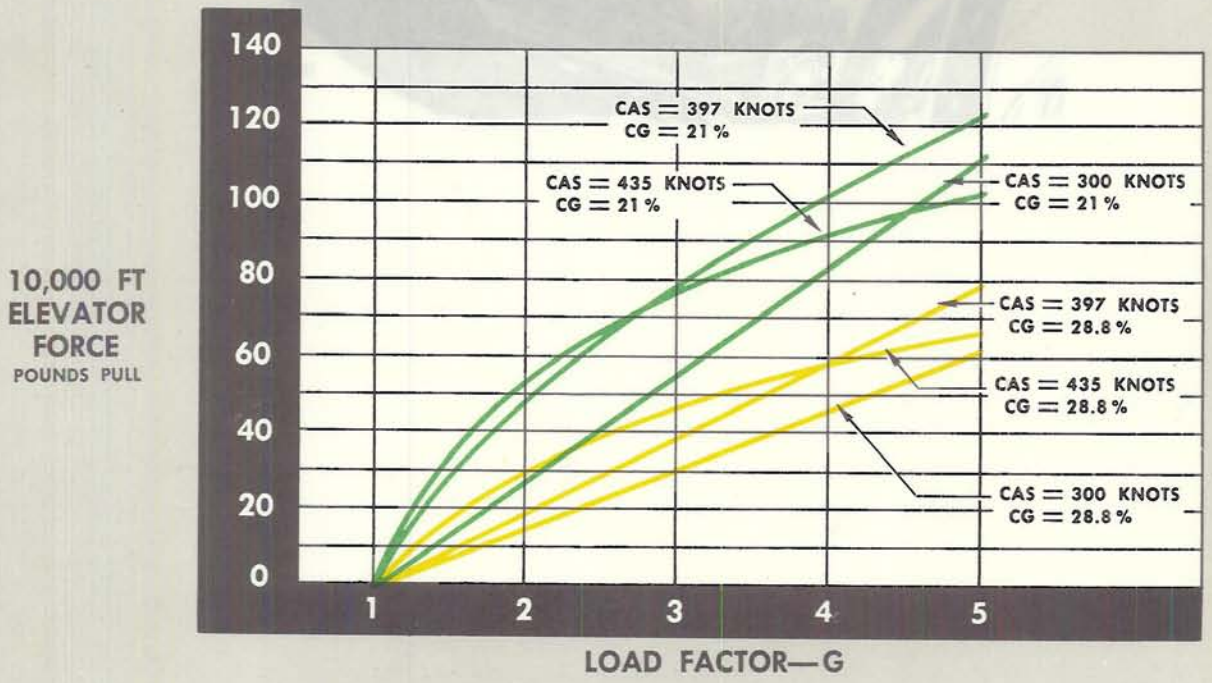


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Figure 6-1 (Sheet 2 of 2)

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other G-producing maneuvers. At the same cg, it requires less pilot effort to pull G at high altitudes than at low altitudes. On the other hand, while it requires less pilot effort to maneuver at high altitudes, less G can be produced because of lowering buffet limits. Therefore, practice aerobatic maneuvers at low to medium altitudes, 5,000 to 15,000 feet. Practice loops at 5000 to 10,000 feet with entry speeds ranging from 375 to 425 knots IAS. Use full power during the climb portion of the loop and hold a constant 3 to 3½ positive G through the maneuver. Practice aileron rolls at 5000 to 10,000 feet and become proficient in performing aileron rolls before attempting an Immelmann. The aileron roll can be performed between 225 and 300 knots IAS (optimum 250 knots IAS) with power settings from IDLE to FULL. If performing the aileron roll at low power settings, keep a nose low attitude to maintain the optimum indicated airspeed; if performing the maneuver at high power settings, climb steeply to avoid excessive airspeed. Enter the roll with the nose of the airplane above the horizon to produce and stabilize and indicated airspeed that is compatible with your power setting. Apply full aileron in the desired direction of the roll with rudder in the same direction as necessary for coordination. Apply slight back pressure on the control column to produce a positive load factor and hold the controls fixed in this position until the roll is completed. A positive load factor held throughout the maneuver avoids a possible flame-out. Enter an Immelmann at 425 knots IAS, FULL power, and pull a constant 3 positive G. Immediately after reaching the vertical climb position, look directly back over your head to locate the horizon as soon as possible. After locating the horizon, continue the maneuver until you reach an inverted dive angle of approximately 40 degrees; then execute the scond half of an aileron roll. The altitude gained from the point of entry to the roll-out point is approximately 6000 to 7000 feet.

CAUTION

The airplane has not been tested for spin characteristics. Therefore, it is important to follow the recommended aerobatic procedures to avoid stalls.

HIGH-SPEED CHARACTERISTICS.

All pilots flying moderate- to high-performance aircraft should have a thorough understanding of the high speed characteristics of the aircraft. Jet airplanes in general are capable of level flight cruise speeds that are very close to the flight limitations of the aircraft, whether these limitations are structural or aerodynamic. The B-57 is no exception.

WITH TIP TANKS.

With tip tanks (figure 5-3) the limiting speed is 444 knots IAS or 0.78 Mach, whichever is lower. It is possible to exceed this structural limit speed at lower altitudes without any particular aerodynamic effects. Above 10,000 feet the limiting speed is 0.78 Mach. This is primarily an aerodynamic limitation but it also approaches the structural limits with tip tanks installed. Between 7,500 feet and 15,000 feet considerable airframe buffet and aileron shake occur at Mach numbers above 0.75. Even though the airspeed at which this occurs is within the placard limitations, sustained cruising at this speed may possibly result in loosening rivets in the ailerons. Above 20,000 feet, the placard speed of 0.78 Mach can be attained with little or no aerodynamic effects. The last few hundredths of the Mach number may be accompanied by light airframe buffet, aileron shake, and occasionally by light, intermittent wing dropping. Actually, the structural limitation on the tip tanks at altitudes above approximately 10,500 feet is 0.79 Mach. Very few airplanes will reach this limitation without excessive aerodynamic effects in the form of buffet, aileron shake, or wing drop.

WITHOUT TIP TANKS.

Without tip tanks (figure 5-4) the airspeed limit below 5000 feet is 513 knots IAS or 0.82 Mach, whichever is less. The airplane can be flown to the structural limit airspeed of 513 knots IAS at all altitudes below 5000 feet without any aerodynamic effects occurring. From 5,000 feet to 20,000 feet, the Mach limit of 0.82 is attained with little aerodynamic effect, although a slight airframe buffet may occur at approximately 0.81 Mach below 5,000 feet. If the speed is advanced beyond this limitation, buffet will usually increase. The Mach limit of 0.82 is established for this altitude range because of the aerodynamic tendencies encountered above it. At approximately 0.83 Mach the aircraft has a light "tucking" tendency, and an increase in speed to 0.85 Mach requires a pull force of three to eight pounds, instead of a push force, to maintain the initial attitude. At airspeeds between 0.86 and 0.87 Mach the airplane pitches up sharply with the amount of pitch-up directly proportional to the entry rate at which you encounter the pitch-up area. If the airplane reaches this area with even small amounts of acceleration in speed, uncontrollable pitch-up occurs, resulting in a high-speed stall at high altitudes. If the stall is

penetrated deeply enough, it generally results in loss of control and entry into a spin. At lower altitudes, the pitch-up may be sufficient magnitude to cause structural failure before the stall is reached. Above 30,000 feet the Mach limitation is 0.83. The characteristics of the airplane are similar to those just discussed, although aerodynamic buffet may not be present at a Mach reading as high as 0.85. However, above 0.85 Mach, wing dropping may occur and a strong pitch-up may result in a high-speed accelerated stall.

ACCELERATION AND DECELERATION.

With Mach readings of 0.82 and 0.85 there is at least a 0.003 Mach margin before any serious aerodynamic effects occur. However, the B-57, like most jet airplanes, is very clean and accelerates extremely fast. Always remain conscious of your airspeed in dives and maneuvers and maintain a margin to regulate your speed within safe limits. The airplane has effective dive brakes which can be used at all speeds to aid in speed regulation. These dive brakes are much more effective at altitudes below 30,000 feet and will not immediately affect speed above that altitude. Decreasing power also helps to decelerate, especially at lower altitudes. Always remember that a standard Machmeter has a rather large speed tolerance. An error of 0.02 and 0.03 is not uncommon at high altitudes. Develop a feel for the aerodynamic characteristics of your plane so that you can correlate the response characteristics of the airplane with the indicated Mach number, and not be totally reliant on the Machmeter. If buffet occurs before the Mach limitation is reached, be very cautious until the Machmeter can be checked for accuracy.

DIVE BRAKES.

The extension of the dive brakes is effective at high speeds and is accompanied by an increase in buffet. There is a very slight nose-down trim change with the extension of the dive brakes.

HORIZONTAL STABILIZER.

Varying the incidence of the horizontal stabilizer trims the airplane longitudinally. Using the entire surface of the horizontal stabilizer requires only small changes in the angle of incidence to make a large trim correction, either nose up or nose down. Therefore, at high indicated airspeeds, it is difficult to make small trim corrections without overtrimming.

ROTARY BOMB CARRIER.

The rotary bomb carrier can be operated with or without stores at any speed. (Refer to Section V for stores drop speeds.) During the transition movement of the rotary bomb carrier, a moderate pitch-up of the airplane occurs, and when the carrier is fully open, a certain amount of nose-up pitching remains. This may be readily "trimmed-out" with a small amount of nose-down trim. Also, during the transition movement of the bomb carrier, there is some buffeting of the airplane. However, with the carrier fully open, only very moderate amounts of buffeting will be noticed. At an extremely high indicated airspeed, (about 400 to 425 knots) the amount of pitch-up during the transition movement is fairly large and elevator push-force in the neighborhood of 30 to 40 pounds is necessary during operation of the carrier to maintain level flight.

Following the completion of the opening cycle, the push-force will decrease to approximately 20 pounds. During the closing cycle the reverse of the pitching tendency will occur. At high altitudes (even at the limiting Mach number) there is practically no noticeable trim change and practically no buffeting.

SPINS.

WARNING

Intentional spins are prohibited. The procedures given below are merely recommendations since this airplane has not been flight tested for spins.

To recover from an inadvertent spin, use the following spin recovery procedure. Fuel in the tip tanks has an adverse affect on spins and spin recovery. If there is no response to recovery, jettison the tip tanks.

The recovery procedure for erect and inverted spins is the same. The G forces on the pilot indicate the type of spin: You are pressed against the seat during an erect spin, and pressed against the seat-belt during an inverted spin. The recovery procedure is:

1. Gear and flaps—UP.
2. Throttle—IDLE.
3. Ailerons—Neutral.
4. Control column—Aft.
5. Rudder—Against the spin until rotation stops, then neutralize.
6. Back pressure on the control column—Release after rotation stops. If oscillation accompanies the spin, apply rudder against the rotation when the nose is well below the horizon.

stall speed KNOTS IAS

ANGLE OF BANK		0°	30°	45°	60°
LOAD FACTOR		1.0G	1.2G	1.4G	2.0G
CRUISING CONFIGURATION OR TAKE-OFF WITH GEAR DOWN	GROSS WT—LBS 28,000	93	99	110	131
	35,000	104	111	123	146
	45,000	119	126	139	166
	55,000	130	140	155	183
FLAPS AT 60° OR LANDING FLAPS AT 60° GEAR DOWN	GROSS WT—LBS 28,000	81	88	97	115
	35,000	91	98	108	129
	45,000	103	111	123	146
	55,000	114	122	136	161

DATA ESTIMATED 4-1-56 11670

Figure 6–2

Note

Wind tunnel tests of spins and spin characteristics are being made at the present time. Results of these tests will be included in the handbook when the tests are completed.

LOW-SPEED CHARACTERISTICS.

The B–57B has good handling characteristics at low speeds. Controls are effective down to the stall and response is good. Sufficient horizontal stabilizer trim is available for all normal conditions. Should horizontal stabilizer trim failure occur with the trim setting anywhere between full nose-up or full nose-down, there is sufficient control to override the trim system at speeds below 250 knots. (Refer to HORIZONTAL STABILIZER SYSTEM FAILURE, Section III.) High rudder-pedal forces result in a minimum single-engine control speed of 155 knots. These forces cannot be eliminated by use of trim.

STALLS.

The airplane has extremely safe stall characteristics although normal pre-stall buffet is hard to detect with the gear and flaps extended. Power-off and power-on stalls have like characteristics. (See figure 6–2.)

STALLS WITH GEAR AND FLAPS RETRACTED.

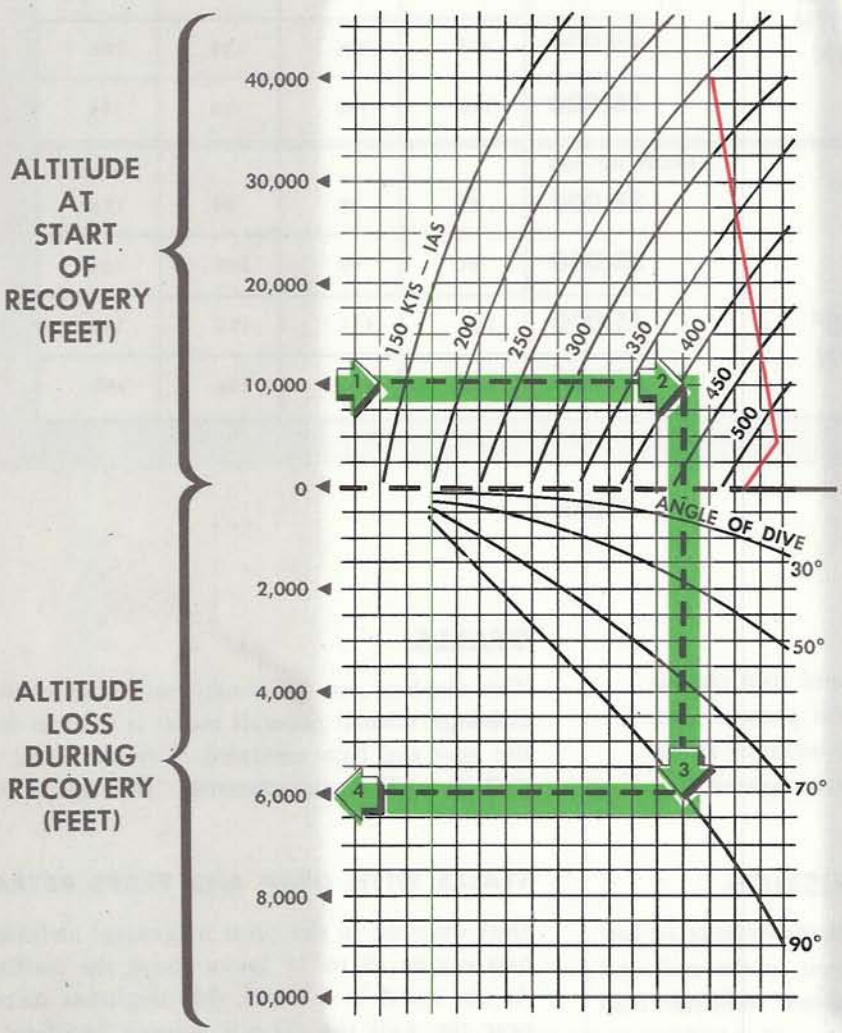
Stall warning in the form of general airframe roughness occurs 10 to 15 knots above the stalling speed. As the speed is reduced, the roughness increases and near the stall the control column oscillates slightly. At the stall a mild aileron snatch occurs. Aileron snatching characteristics are aggravated by a sideslip allowed to occur during the approach to the stall. There is sufficient rudder control to control any sideslips that might occur. The airplane pitches mildly nose down at the stall and may roll slightly either way. Recovery is easily made with or without power and sufficient aileron control is available throughout the stall.

dive recovery

HOW TO USE CHART

1. Enter chart at altitude line nearest actual altitude at start of pull-out. (For example, 10,000 ft.)
2. On scale along altitude line, select point nearest the IAS at which pull-out is started (400 knots IAS).
3. Sight vertically down to point on curve of dive angle (90°) directly below airspeed.
4. Sight back horizontally to scale at left to read altitude lost during pull-out. (Constant 4G pull-out—6000 ft.)

4G
ALTITUDE LOSS
CONSTANT RECOVERY



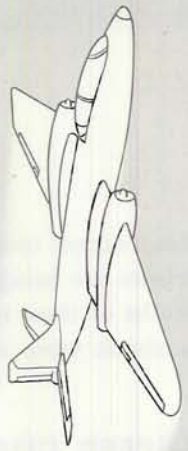


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Figure 6–3 (Sheet 1 of 2)

dive recovery

STARTED AT 10,000 FEET
472 KNOTS IAS (.82 MACH)

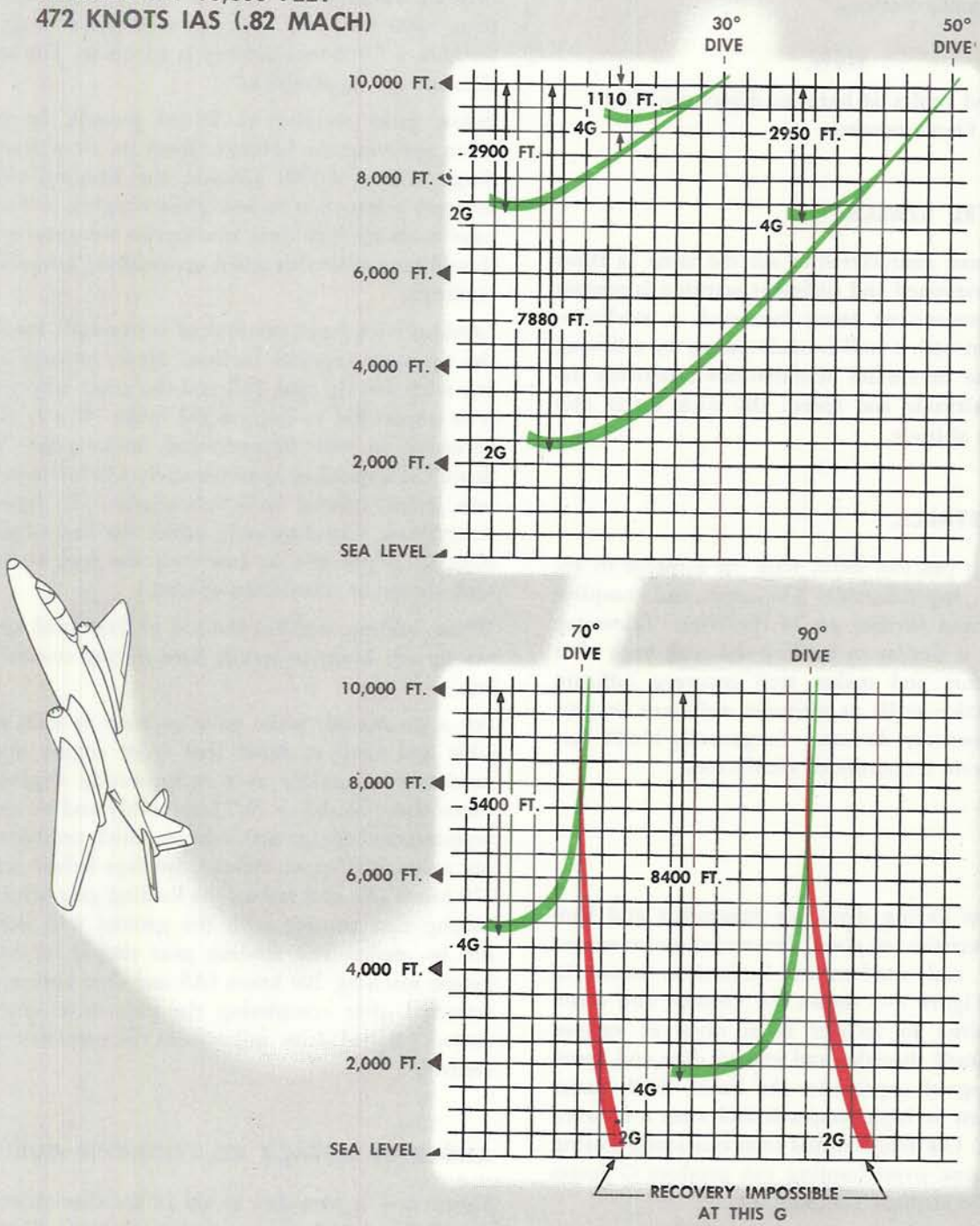

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Figure 6-3 (Sheet 2 of 2)

STALL WITH GEAR AND FLAPS EXTENDED.

Stall characteristics are generally the same as with gear and flaps retracted. The warning buffet is less noticeable because of general airframe roughness with the flaps and gear extended. Stall speeds are approximately 10 knots lower with the gear and flaps extended. See figure 6–2 for stall speeds at various gross weights and configurations.

Note

Pre-stalled buffet is hard to detect with the gear and flaps extended.

ACCELERATED STALLS.

Accelerated stall characteristics are the same as those previously mentioned and sufficient warning is present to prevent inadvertent entry into such a condition. Recovery from such a stall is made simply by relieving the load. The maximum accelerations attainable decrease with altitude and speed; the stick forces also decrease with altitude.

PRACTICE STALLS.

In performing practice stalls, trim the airplane to approach speed, approximately 130 knots, and complete the stall without further use of the trim. Trimming into the stall is similar to holding the stick back after the stall occurs and makes stall recovery difficult. Perform practice stalls at altitudes sufficient to provide a safe recovery distance. In general, 10,000 feet above the terrain is considered satisfactory.

DIVES.

Control forces during dives are reasonable and handling characteristics are good. Be careful not to exceed the airspeed and acceleration limitations stated in Section V. Figure 6–3 shows the altitude and acceleration required to recover from dives at various altitudes. Retard throttles and extend dive and speed brakes if airspeed approaches the limit. Stick forces will be highest at high airspeeds and with a forward cg condition. Use longitudinal trim cautiously during recovery because overtrimming can produce G forces in excess of the airplane's limitations.

LANDING.

The B–57 lands in a conventional manner and you may follow a normal pattern. (See figure 2–7.) Extend the flaps at any speed below 170 knots IAS with approximately 15 pounds of push-force on the control column to prevent nose pitch-up. A slight buffet may accompany flap extension.

Make a conventional nose-high landing. There is little or no danger of striking the tail skid. At normal landing weights, the airplane can be stopped in less than 3,000 feet, and even for landings at high gross weights, a 5,000-foot runway is adequate. For landing distances see Appendix I.

Below gross weights of 38,000 pounds, be careful when applying the brakes to keep the tires from skidding. Above 40,000 pounds, the braking effect is noticeably less than at low gross weights. Pilots who have made most of their landings at low gross weights should remember this when undertaking heavy-weight landings.

Landing with large amounts of asymmetric loading in the tip tanks requires caution. Never attempt a landing with one tip tank full and the other empty unless it is impossible to jettison the tanks. If a landing is necessary in this configuration, make your "touchdown" at a speed of approximately 130 knots to maintain lateral control with full aileron. To repeat, attempt such a landing only under the best of circumstances. If possible, at least half the fuel in the full tank should be transferred or used.

When landing without the use of flaps, add approximately ten knots to speeds used during normal landing.

For a go-around, make your decision as soon as possible and keep in mind that a jet engine does not accelerate as rapidly as a reciprocating engine. Advance the throttles to FULL smoothly and be alert for asymmetrical engine acceleration which produces varying amounts of yaw. Retract the flaps before reaching 170 knots IAS and retract the landing gear after establishing that contact with the ground will definitely not be made. The landing gear should be retracted before reaching 200 knots IAS and dive brakes can be retracted after completing the procedures just mentioned. Rapid trim adjustment is necessary to aid control.

ANGLE OF ATTACK RELATIONSHIP CURVE.

Figure 6–4 is provided to aid in familiarization with the flight characteristics of the airplane. This angle of attack relationship curve indicates the angle of attack of the airplane at sea level for various airspeeds and attitudes. Included on the chart is an example of its use.

angle of attack relationship curve

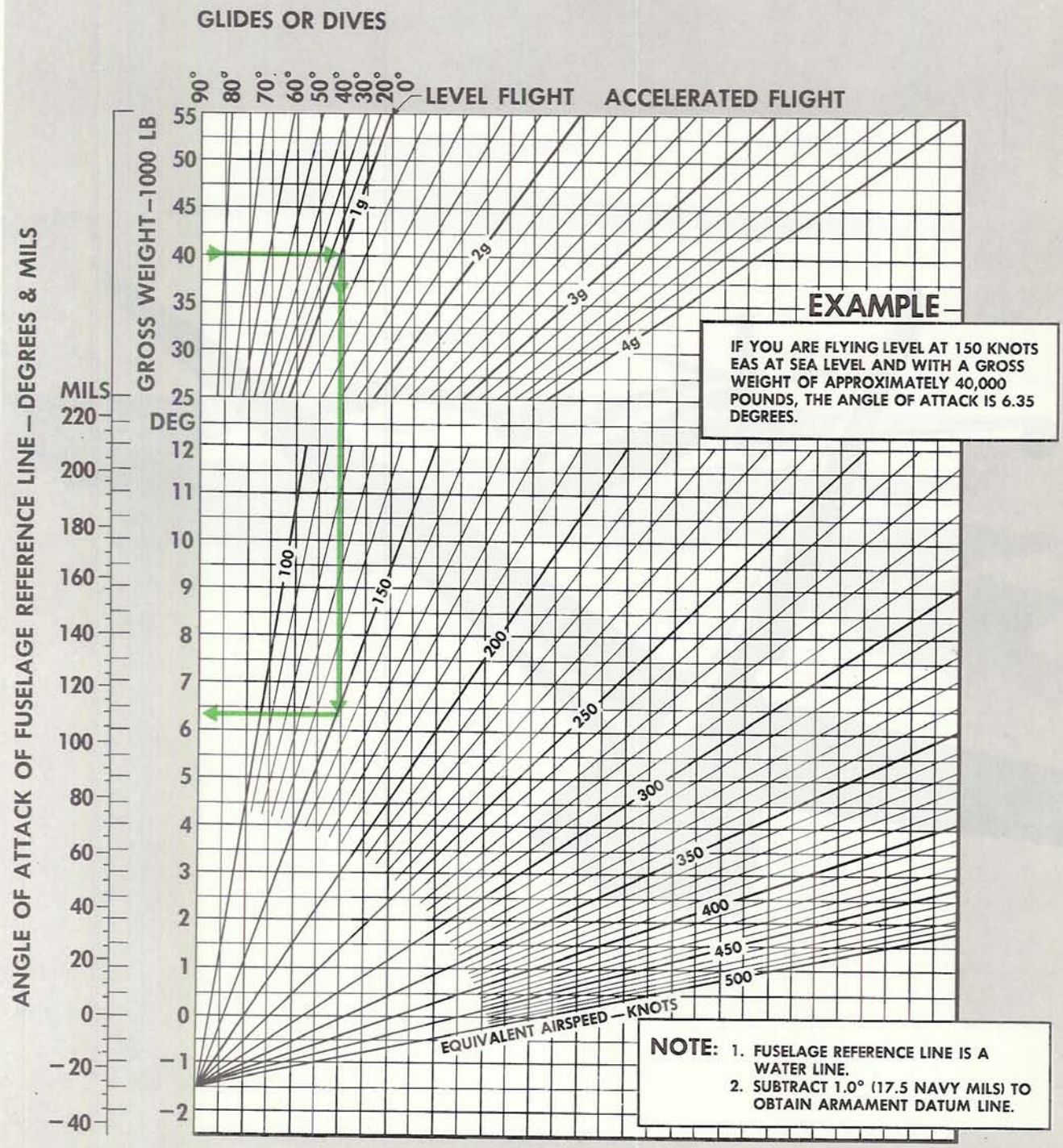
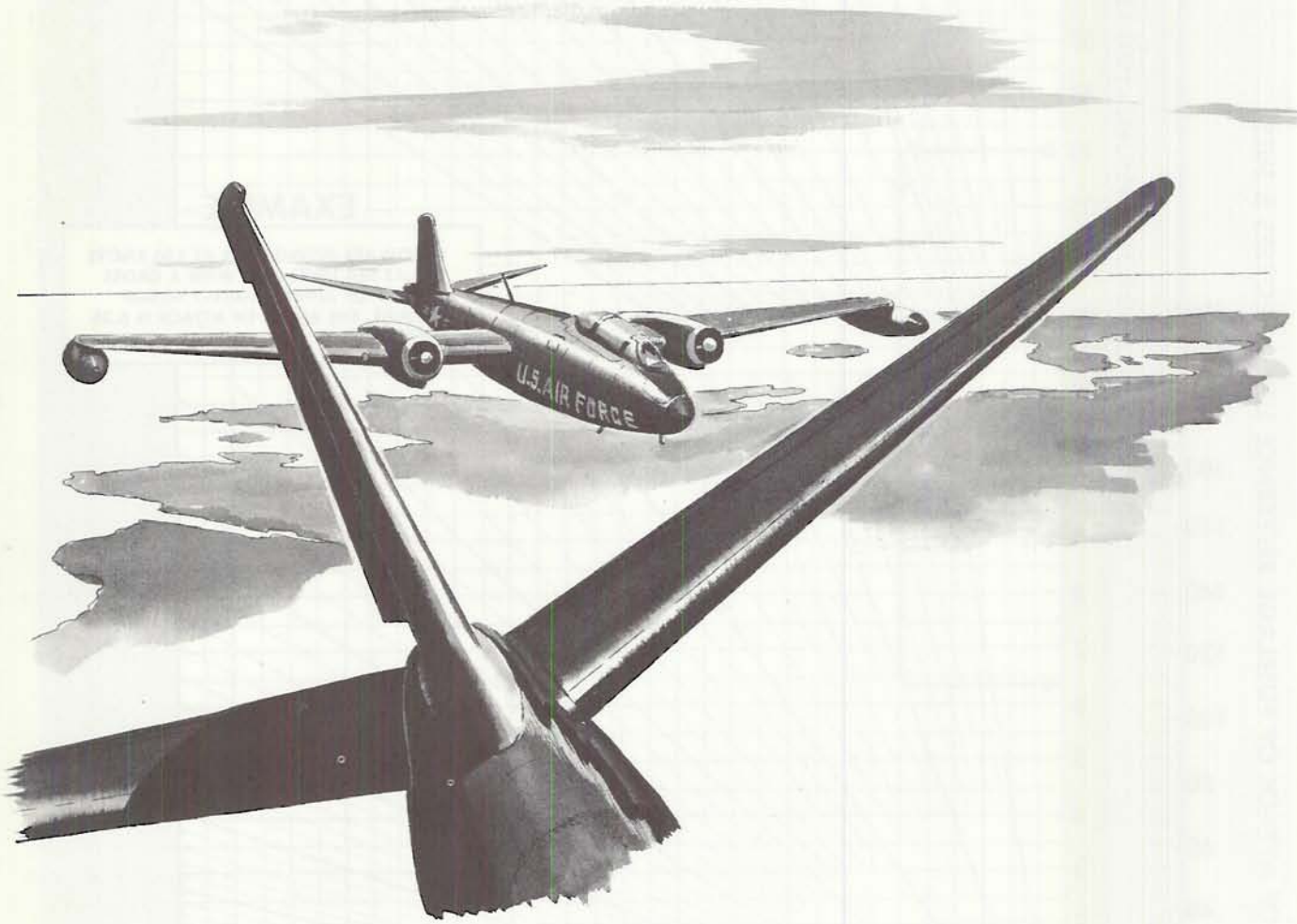


Figure 6-4



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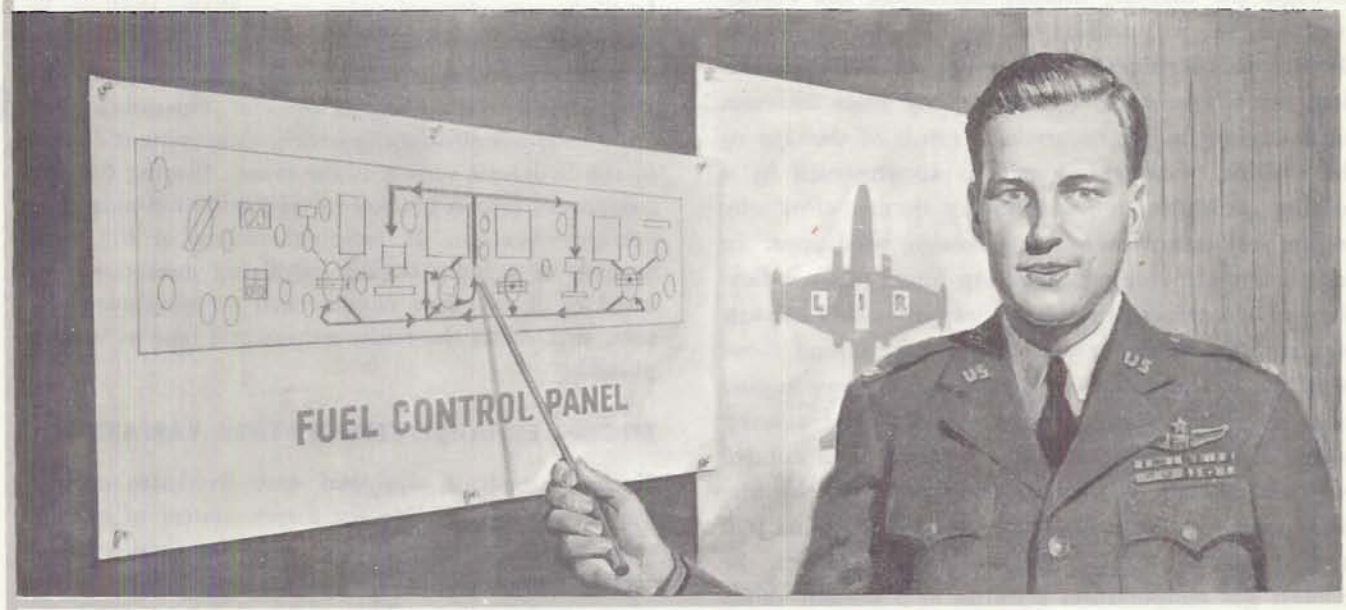
Section VII



SYSTEMS OPERATION

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ENGINE.

ENGINE ACCELERATION.

The maximum permissible exhaust gas temperature during an acceleration appears in Section V under ENGINE LIMITATIONS. If any of these limitations are exceeded during an acceleration, retard the throttle until the temperature has dropped below the steady-state limit. Then accelerate the engine slowly by advancing the throttle gradually so that you do not exceed the acceleration temperature limit.

COMPRESSOR STALL.

The possibility of compressor stall is practically eliminated when the normal engine fuel control system is in operation. Compressor stall may occur after any rapid advancement of the throttle if either of the following conditions prevails: a malfunction develops in the normal engine fuel control system, or the emergency fuel control system is set in operation. If the emergency fuel control system is in manual operation, rapid throttle advancements inject more fuel into the combustion chamber than the engine can utilize for acceleration at the existing rpm. As this additional fuel burns, the combustion pressures increase. Because of these increases in pressure, there is a corresponding increase in the pressure against the compressor discharge air. This increase of compressor discharge air pressure results in a breakdown of the airflow through the last stages of the compressor. This condition is known as compressor stall. As a result of this stall, the mass airflow through the com-

pressor is reduced and causes a reduction in airflow through the turbine, thereby decreasing the energy available to the turbine wheel. If the engine is allowed to continue operating in this stalled condition, the temperatures of the burning gases increases until engine failure occurs as a result of damage to the turbine. Compressor stall is accompanied by a roaring, pulsating noise and may occur before any engine instrument reflects the existing conditions. In addition to the roaring, pulsating noise, other indications of a compressor stall are a rapidly rising exhaust temperature, steady or decreasing rpm, a long flame from the tail pipe, loss of thrust, and a heavy engine vibration. Immediately upon hearing the roaring noise, check to see that the emergency fuel control switches are OFF. If they are OFF, retard the throttle, since there may be malfunctioning of the normal fuel control system. If, after the throttle is retarded, the exhaust gas temperatures stabilize at a normal value, readvance the throttle. The exhaust temperature rise should be normal during the throttle advancement. If it is not, retard the throttle again and place the emergency fuel control switch to ON. If, after retarding the throttle and switching to the emergency fuel control system, the exhaust temperature stabilizes at the normal value, slowly advance the throttle. If the exhaust temperature continues to drop after retarding the throttle, you have a flame-out and should try an air start.

FLAME-OUT.

Flame-out is exactly what the name implies and it can occur during acceleration or deceleration of the engine. Acceleration flame-out, like compressor stall, results when more fuel is injected into the combustion chamber than the engine can utilize for acceleration at the existing rpm. The difference is that the mixture which is injected into the combustion chamber is so rich that it cannot burn and it extinguishes the flame. Flame-out may also occur during rapid engine decelerations when the amount of fuel injected into the combustion chamber may be too lean to sustain combustion at the existing rpm. Flame-out is indicated by loss of thrust, drop in exhaust temperature, and possibly by a loud noise similar to engine torching. If flame-out occurs, place the throttles in OFF and try an air start.

ENGINE NOISE AND ROUGHNESS.

In flight, any unusual noise or roughness that can be attributed to the engine and cannot be eliminated by variations in engine speed or altitude indicates that some mechanical failure is present. Operate all hydraulically operated equipment to determine if chatter in the hydraulic system is the cause. Placing the gun compressor circuit breaker in OFF will eliminate compressor vibration. If incipient failure of the main bearing or a loose engine stabilizing mount is indicated or if excessive engine noise or roughness persists, shut down the faulty engine and land as soon as possible.

ENGINE EXHAUST TEMPERATURE VARIATION.

Turbo-jet engines equipped with fixed-area exhaust nozzles do not provide for direct control of exhaust temperature. Therefore, you must be familiar with certain engine characteristics to obtain maximum airplane performance. This airplane has a fixed-area engine-exhaust nozzle. The only direct control over exhaust temperature is adjusting the engine rpm. The exhaust temperature will vary with changes in the temperature and density of the engine inlet air, as well as with changing thermal conditions within the engine. Generally, an increase in outside air temperature or an increase in altitude causes an increase in the exhaust temperature, while an increase in airspeed decreases the exhaust temperature. Since all three factors can change singly or together, their effect on exhaust temperature will not be consistent for any given rpm. You can expect the exhaust temperature to be relatively high at 100% rpm when the airplane is not moving, but as the airspeed increases during a take-off run, the exhaust temperature will drop well below the maximum operating limit. Since take-offs are made with unstabilized engines, the exhaust temperatures will remain below the maximum limit until it stabilizes at steady-state operation. If the exhaust temperature rises above the maximum limitation after the engine has stabilized, you will have to retard the throttle to bring the temperature down to normal.

SMOKE FROM TURBINES DURING SHUTDOWN.

During engine shutdown, fuel may accumulate in the turbine housing where heat from the turbine section may cause it to boil. Although there are drains for this accumulated fuel, some fuel may still remain. The presence of this residual fuel in the engine is indicated by the emission of fuel vapor or smoke from the tailpipe of the intake duct, depending on the

ground wind condition. Boiling fuel, which is indicated by the presence of white fuel vapor, is not injurious to the engine but does create a hazard to personnel. The vapor may ignite with explosive violence if allowed to accumulate. The appearance of black smoke coming out of the tailpipe indicates that fuel is burning. Extinguish the burning with a CO_2 extinguisher or serious damage to the engine may result.

WARNING

An accumulation of fuel in the tailpipe may explode with serious injury to personnel. All personnel should keep clear of the tailpipe for at least three minutes after shutting down the engine and should keep away at all times when fuel vapor or smoke issues from the engine.

FUEL MANAGEMENT.

The No. 1 fuselage tanks is the main service tank. The normal fuel management procedure consists of transferring fuel from all other tanks to the No. 1 fuselage tank. Since the fuel system is controlled manually, the pilot must constantly check the fuel quantity. The change in weight distribution due to fuel consumption is the most important factor affecting the center of gravity. The consumption of all fuel from the No. 2 fuselage tank, before using the fuel from the other tanks, eliminates the center of gravity problem.

NORMAL FUEL MANAGEMENT PROCEDURE.

To transfer fuel to the No. 1 fuselage tank:

1. Align the No. 2 fuselage tank selector switch to allow fuel to flow to the No. 1 fuselage tank.
2. Allow the No. 2 fuselage tank to empty and turn off the No. 2 fuselage tank selector switch.
3. For airplane using a ferry tank, place the ferry tank pump switch in the PUMP position. When the ferry tank empties (light indication), return the switch to the OFF position.
4. Align the tip tank-wing tank selector switches to allow fuel to flow from the tip tanks to the No. 1 fuselage tank and allow the tip tanks to empty.
5. Align the tip tank-wing tank selector switches to allow fuel to flow from the wing tanks to the No. 1 fuselage tank. After emptying the wing tanks, rotate the tip tank-wing tank selector switches to OFF.
6. Use the fuel in the No. 1 fuselage tank for the remainder of the mission.

Note

To consume all fuel in the tanks and to compensate for any asymmetrical fuel feeding from the wing and tip tanks, delay switching tanks for a few minutes after noting empty tank indications (indicator light or quantity gage). Fuel in the No. 1 fuselage to maintains engine operation for this period.

ALTERNATE FUEL MANAGEMENT PROCEDURE.

During operations using the NORMAL FUEL MANAGEMENT PROCEDURE, approximately 70 gallons of fuel siphon out of the wing tanks through the fuel vents during take-off and climb. To avoid loss of this fuel, use alternate procedure for fuel management. For starting, taxiing, take-off, and climb:

1. Align the tip tank-wing tank selector switches to allow fuel to flow from the wing tanks to the No. 1 fuselage tank.
2. After ten minutes of flying, turn the tip tank-wing tank selector switches OFF and follow the NORMAL FUEL MANAGEMENT PROCEDURE.

EMERGENCY FUEL MANAGEMENT.

Under emergency conditions, fuel may be transferred from the No. 2 fuselage tank, the tip tanks, or the wing tanks directly to the engines by placing the desired tank knobs in the flow position, placing the fuel transfer valve knob in the flow-to-engines position.

When fuel is transferred from No. 2 fuselage tank, the tip tanks, or the wing tanks directly to the engines, closely observe the quantity of fuel remaining in the tanks selected (light indication of fuel quantity indicator) to avoid a flame-out when the tanks empty.

The maximum rate of fuel consumption for both engines at sea level with standard day temperature and both engines operating at 100% rpm is 17,000 pounds per hour. The rate of transfer of fuel from the No. 2 fuselage tank or the wing tanks is 18,000 to 19,000 pounds per hour which is sufficient for normal engine operation when bypassing the No. 1 fuselage tank. However, the rate of transfer of fuel from both tip tanks is approximately 7,000 pounds per hour which will not sustain normal engine oaperation under all conditions. If the No. 1 fuselage tank is bypassed because the boost pumps in that tank are inoperative

above 25,000 feet, fuel flow from the tip tanks will sustain normal engine operation with the aid of the fuel that is normally drawn from the No. 1 fuselage tank by the engine-driven fuel pump without the No. 1 fuselage tank boost pumps operating. In discussing this emergency it is assumed that the tip tank pressurization system is operating normally. If no fuel is available from the No. 1 fuselage tank fuel flow from the tip tanks sustain engine operation only at high altitudes where fuel consumption is at a minimum. In this condition, fuel flow from the wing tanks is selected immediately after the tip tank low-level indicator illuminates to avoid a flame-out when the tip tank fuel supply is exhausted.

AUTOMATICALLY OPENING SEAT BELT AND PARACHUTE.

The automatically opening seat belt and parachute extend the maximum and minimum altitudes for successful escape with the ejection seat. In a low-altitude ejection, the use of the automatic belt reduces the time required for separation from the seat and the opening of an automatically opening parachute. In a high-altitude ejection, using the automatic belt and parachute avoids the opening of the parachute at an altitude where the lack of oxygen would reduce the possibility of a safe descent. Also, the automatic belt retains the occupant in the seat for a sufficient length of time (2.5 seconds) to take advantage of the slower rate of deceleration caused by the combined weight of the seat and occupant.

WARNING

Never release the belt manually prior to ejection, since this causes immediate separation of the seat and occupant. At high speed without the protection of the seat, the parachute could open inadvertently and the opening shock of the parachute may cause fatal injuries. If the belt fails to open automatically after ejection, the occupant can manually release the belt and under these circumstances, the occupant must open the parachute manually.

There may be a tendency for the user to distrust the automatic equipment; however, the automatic belt and parachute have been tested thoroughly and are completely reliable. The best human reaction is slower than the operation of the automatic belt. Also, the user may not be conscious after an actual emergency ejection. It is possible to release the belt manually anytime during or after ejection. Likewise, the user may open the parachute manually anytime before the operation of the aneroid-release device.

Section VIII

CREW DUTIES

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INTRODUCTION.

Each crew member has primary duties and additional duties. The primary duties of the crew member are explained by his title, for example, pilot and observer. The additional duties are those which must be performed to insure proper flight of the airplane and to support crew safety during ground operation and flight. It is the responsibility of each crew member to be familiar with each item of equipment and to be able to inspect it thoroughly for any irregularities. Do not let this inspection become so routine that you check it off as completed without doing a thorough job. Remember, it is not just your life that is at stake but also the life of your crew member and the success of your mission.

PILOT'S RESPONSIBILITIES.

The pilot is responsible for the issuance of all instructions governing flight operation. His duties and functions are given in NORMAL PROCEDURES, Section II. His responsibilities with regard to formal crew briefing are discussed in the following paragraphs.

CREW BRIEFING.

The pilot should conduct a formal crew briefing as soon as possible after detailed mission planning. The first item he should cover in his briefing is a recapitulation of the mission plan to insure that the ob-

server is completely familiar with the purpose of the mission. If any phase of the mission seems unclear to the observer, the pilot should completely review that phase. Before dismissing the observer, he should discuss personal equipment to be carried and make certain that the observer is aware of the schedule for reporting to the airplane and of take-off time. If the pilot has paid close attention to the premission planning and has conducted his briefing well, he will have successfully surmounted one of the most difficult phases of flying a mission.

PERSONAL EQUIPMENT REQUIREMENTS.

Personal equipment plays such an important part in the safety and comfort of the crew that the pilot must never assume that the observer is adequately equipped. It is his responsibility to make certain that the observer knows what equipment he must carry and to hold a formal inspection before boarding the plane. In the briefing that will be conducted prior to flight, either the operations officer or the pilot will specify the equipment needed for the flight.

Common sense will tell you that if you are scheduled for any high-altitude work you will need heavy clothing, oxygen equipment, and bail-out bottles, plus your normal gear. Keep the cabin heat down when flying over cold regions so that the crew may wear their heavy clothing in comfort. Thus, if an emergency occurs, the crew will be properly clothed for survival.

OBSERVER'S RESPONSIBILITIES.

The primary duty of the observer is, naturally, navigation. The navigation equipment includes shoran equipment, compasses, and a latitude and longitude computer, all of which are located in the observer's station. In addition to his primary duties, the navigator has the duties listed below.

BEFORE EXTERIOR INSPECTION.

Enter the airplane and perform the following inspection at the aft crew station.

Seat safety pin	Installed in armrest
Emergency canopy release handle	In
Oxygen supply lever	OFF
Landing gear emergency down handle	In

INTERIOR CHECK.

Seat belt, harness, oxygen hose and radio cord	Adjusted and connected
Seat and rudder pedals	Adjusted
Inertia reel	Unlocked
Interphone function selector switch	HOT-MIC
Interphone audio-mixing switches	As necessary

OXYGEN SYSTEM.

a. Place the diluter lever in NORMAL OXYGEN and blow gently into the oxygen regulator hose. (A resistance to blowing indicates satisfactory operation of the demand diaphragm.)
b. Place the diluter lever in 100% OXYGEN and blow gently into the oxygen regulator hose. (A resistance to blowing indicates satisfactory operation of the demand diaphragm and diluter air valve.)
c. Don the mask and connect the mask to the regulator hose. (Breathe normally and note operation of the blinker dial.)
d. Hold breath and place the EMERGENCY pressure lever to the right or left. (A positive pressure felt within the mask indicates proper emergency oxygen flow.)
e. Depress the EMERGENCY pressure lever while holding the breath to test the mask for leakage. (A properly fitted mask will retain the EMERGENCY oxygen pressure until normal breathing is resumed.)
f. Make sure the mask hose fittings are properly seated and secure.
g. Check the mask hose attachment to the parachute.

AIC filter switch	As desired
Circuit breakers	In
Clock	Set
Altimeter	Set to field elevation
Spotlight switch	As desired
Radio compass function selector switch	OFF
Lighting control switches	As desired
Fire extinguisher	Secure
C-4A light	Secure and off

BEFORE TAXIING.

Indicator and warning lights	Press to test
Radio compass	Obtain control and check for proper operation
Seat safety pin	Remove and stow

DURING FLIGHT.

It is assumed that the observer fully understands his duties as a navigator. The navigation equipment is discussed in Section IV.

AFTER LANDING.

Radio compass	OFF
C-4A light	OFF
Lighting control switches	OFF

BEFORE LEAVING AIRPLANE.

Seat safety pin	Install
Oxygen supply lever	OFF

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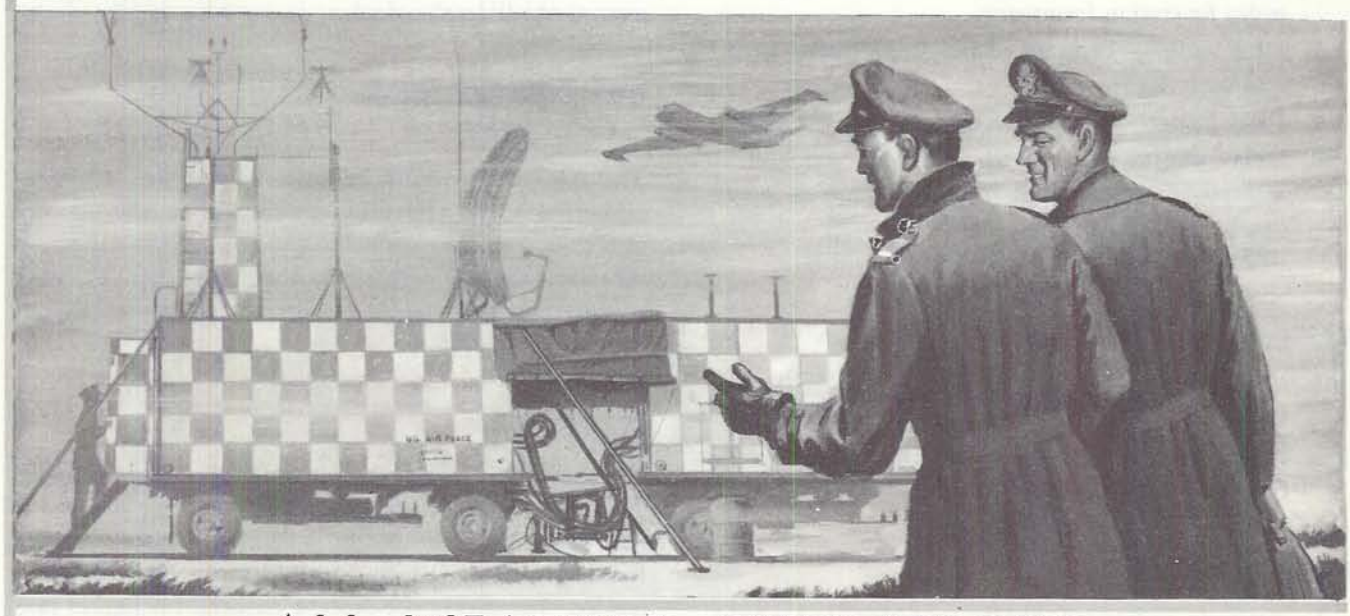
Section IX



ALL WEATHER OPERATIONS

11709

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GENERAL INSTRUMENT FLIGHT.

Flying the B-57B airplane in instrument weather conditions requires instrument proficiency and thorough preflight planning. In planning for instrument flight, remember to consider the fuel requirements for completing an instrument let down and approach. This additional requirement reduces maximum range and endurance accordingly. The airplane has good stability characteristics and flight-handling qualities for weather flying. The limitations on the aircraft result primarily from the lack of navigational equipment and anti-icing provisions. Except for some repetition necessary for emphasis or continuity of thought, this section contains only those procedures that differ from, or are in addition to, the normal operating instructions covered in Section II.

INSTRUMENT FLIGHT PROCEDURES.

ON ENTERING THE AIRCRAFT.

1. External power—ON.
2. Inverters—ON.
3. APX-6A IFF master switch—STANDBY, if use is anticipated.

4. Radio compass—check all positions. Set to first unroute station frequency or to local approach radio fix station frequency.
5. UHF radio—check all channels pertinent to instrument flight.
6. Pitot heater—check operation (with crew chief).
7. Delay engine start until immediate take-off is assured. Conserve fuel by performing as many operations as possible before starting engines, including ARTC approval and clearance.

TAXIING.

1. Turn-and-slip indicator—check operation during taxi turns.
2. Directional indicator—check for proper operation.

BEFORE TAKE-OFF.

1. Attitude indicator—check operation and adjust the miniature airplane to align with the horizon bar.
2. Set the runway heading to the top of the directional indicator.
3. Pitot heater—ON as required.

TAKE-OFF AND INITIAL CLIMB PROCEDURES.

1. Maintain direction with brakes until the rudder becomes effective at approximately 50 knots.
2. At approximately 110 knots during take-off roll, raise the nose to position the miniature airplane one bar width above the horizon bar and allow the airplane to fly off at 130 to 140 knots.
3. Gear UP, when the upward trend of both the altimeter and vertical velocity indicator show that the aircraft is definitely climbing.

CAUTION

Maintain airspeed below 200 knots until the gear locks up (approximately 7 to 10 seconds).

4. Maintain take-off attitude until the airplane accelerates to its best climb speed, and anticipate a rate of climb of approximately 4000 feet per minute at 96 percent rpm.

TURNS.

To keep control forces down and reduce your workload, limit the maximum angle of bank in climbing and level turns to 30 degrees. Steep turns also lead to over controlling the airplane in instrument procedures.

COMMUNICATION AND NAVIGATION EQUIPMENT.

The AN/ARN-6 radio compass is susceptible to precipitation static and false indications in the vicinity of a thunderstorm. Switching to the loop position and rotating the needle 90° from the station bearing and/or reducing IAS and/or changing altitude usually improves the reception.

DESCENTS.

The optimum power setting for fuel economy during descent is IDLE. The recommended descent airspeed is 250 knots or limit Mach, whichever is lower, with landing gear and flaps retracted and dive brakes extended. Increasing the descent airspeed for higher rate of descent through icing layers slightly reduces the handling characteristics. Decreasing the descent airspeed for more comfortable turbulence penetration results in a small penalty in fuel consumption. Normally, thirty degrees of bank is the limit for high-speed descending turns.

INSTRUMENT LOITERING AND HOLDING. (MAXIMUM ENDURANCE)

For airspeeds, refer to the performance charts in Appendix I. When making turns during instrument loiter, add power as necessary to hold the recommended IAS.

INSTRUMENT APPROACHES.

GENERAL.

The stability and handling characteristics for instrument flight are excellent in all configurations; however, the dive brakes are not effective at low airspeeds and their use is not recommended for approach patterns. The use of wing flaps is not recommended for instrument approaches other than GCA finals, due to the fuel penalty and buffeting encountered. Visibility in moderate precipitation is good. Letdowns and approaches on a single engine can be made satisfactorily. Normal penetrations can be made from initial penetration altitude and go-around characteristics are satisfactory. For minimum landing roll, lower the nose and brake immediately. See figure 9-6 for landing roll distances.

RADAR RECOVERY. (See figure 9-1.)

The handling characteristics and stability in instrument conditions facilitate satisfactory radar recovering procedures. Radar control for the letdown and the turn on to final approach (GCA) offers maximum economy of fuel and time.

CAUTION

Radar recovery in precipitation or heavy clouds is not effective without an operational AN/APX-6 (IFF).

RADIO RANGE AND JET PENETRATION. (See figures 9-2, 9-3.)

If icing is anticipated, retract the dive brakes to prevent icing of the speed and dive brakes. Also, when descending through icing layers, increase penetration speed to 350 knots but within the limit Mach in order to decrease intake duct icing. In the event icing is built up while dive brakes are retracted, leave dive brakes extended and descend at 250 knots or limit Mach, whichever is lower. For a penetration turn use the 90-270° turn method, unless another procedure is specified.

WARNING

Actual altitude during high rate descents may be as much as 1,000 feet lower than indicated altitude, because of altimeter lag.

MISSED APPROACH GO-AROUND PROCEDURE. (See figures 9-2, 9-4.)

Acceleration characteristics of the aircraft are excellent. The missed approach procedure is similar to the go-around procedure described in Section II.

1. Advance throttles to FULL, level off and check for acceleration. Be alert for asymmetrical power conditions resulting from uneven engine acceleration.
2. Retract flaps below 170 knots IAS and landing gear below 200 knots IAS.
3. Execute missed-approach for the particular field.
4. Go-around on a single engine can be made without loss of altitude at 155 knots IAS. At slower speeds, accelerate to at least 155 knots before attempting to hold altitude. From 135 knots, you will lose approximately 400 feet of altitude in accelerating to 155 knots. Advance the throttle to at least 90 percent rpm as soon as possible and retract flaps and gear. As rudder control becomes more effective with increasing airspeed, advance the throttles to FULL for climb.

WARNING

When making a single-engine approach at less than 500 feet with gear and flaps extended, you are committed to land. Under these conditions, do not attempt a go-around.

GROUND CONTROLLED APPROACH (GCA). (See figures 9-4, 9-5.)

The airplane has good handling qualities during ground control approaches. However, keep in mind that during heavy precipitation, the GCA controller may have some difficulty in keeping the airplane on the scope. Try to anticipate this condition.

ICE, SNOW, AND RAIN.

Normally, the heaviest icing takes place in clouds with strong vertical currents. Icing conditions in stratus clouds are generally light to moderate, but heavy icing conditions may occur in this type of cloud. Prolonged flights through moderate icing can build up as much ice as a short flight through heavy icing conditions. You can expect icing when the temperature is between approximately —10°C (14°F) and 5°C (41°F) if fog is present or the dew point is within 4°C (7°F) of the ambient temperature. From 0°C (32°F) to approximately 5°C (41°F) and the dew point within 4°C (7°F) of the ambient temperature, conditions exist under which jet engine icing can occur without wing icing. The heaviest type of ice formation generally occurs about —5°C (23°F). There is no anti-icing equipment on this airplane except for the windshield. Therefore, if you can avoid flight through icing conditions, make every effort to do so. Ice can build up on the engine's inlet guide vanes when the airplane is flown through areas where icing conditions prevail and may occur when no evidence of ice can be visually detected on the airplane. Icing on the guide vanes restricts the flow of inlet air thus causing the loss of thrust and a rapid rise in exhaust gas temperatures. The fuel control attempts to control the loss in engine rpm by adding more fuel to the engine, thereby worsening the condition. Under

severe conditions, engine failure can occur in four minutes or less. Therefore, to avoid engine icing, proceed as follows:

1. Avoid flying into areas where icing conditions may prevail, if at all possible.
2. If the ambient temperature is within the approximate range of 0°C (32°F) to 5°C (41°F) and sufficient moisture is present in the atmosphere:
   a. Reduce airspeed, if practicable, to minimize the rate of ice buildup.
   b. Change altitude rapidly by climb or descent in layer clouds or vary your course as necessary to avoid cloud formation.
   c. Observe the exhaust gas temperature and reduce engine rpm as necessary to prevent excessive exhaust gas temperature.

WARNING

Do not attempt flight when icing conditions are forecasted at the pattern level of the proposed destination.

FLIGHT IN TURBULENCE AND THUNDERSTORMS.

BEFORE TAKE-OFF.

1. Make a complete analysis of the existing and forecast weather conditions to determine thunderstorm areas, and prepare a flight plan which avoids flight through thunderstorms.
2. Check the proper operation of all flight instruments, navigation equipment, pitot heater, instrument panel lights, and the defogging systems before undertaking any instrument flights and before attempting to fly through a thunderstorm area.

APPROACHING THE STORM.

Power settings and the attitude of the airplane are the keys to the proper flight technique in turbulent air. The power settings and airplane attitude required for desired penetration airspeed should be established before entering the storm. If you maintain these power settings and attitude throughout the storm, the result will be a constant airspeed regardless of any false readings of the airspeed indicator.

The most turbuent air in a thunderstorm is generally between 10,000 and 20,000 feet. The least turbulence is usually above 30,000 feet or below 10,000 feet, and the recommended penetration procedure is to penetrate a thunderstorm above or below these altitudes. Icing conditions are very common near the top of these storms. See ICE, SNOW, AND RAIN in this section. If the storm cannot be seen, you can determine its approximate nearness by radio crash static. Use the following procedure to prepare the airplane for entry into the turbulent area:

1. Adjust the throttles as necessary to obtain an airspeed derived from the Extremely Gusty Air Chart.
2. Turn the pitot heat switch on.
3. Trim the airplane.
4. Check the gyro instruments.
5. Lock the seat belt and adjust the shoulder harness (both stations).
6. Turn off any radio equipment which static has rendered useless.
7. Turn on the thunderstorm lights.

Note

Do not lower the landing gear or flaps, because they will merely decrease the aerodynamic efficiency of the airplane.

IN THE STORM.

To maintain safe flight after entering the storm, follow this procedure:

1. Expect turbulence, precipitation, and lightning; do not allow them to cause undue concern.
2. Maintain power settings and attitudes throughout the storm. If they are held constant, airspeed will remain constant regardless of the reading of the airspeed indicator.
3. Devote all attention to flying the airplane.
4. Concentrate principally on holding a level attitude by using the attitude indicator.
5. Maintain the original headings. Do not make any turns unless it is absolutely necessary.
6. Use as little elevator control as possible to maintain attitude in order to minimize stress on the airplane.

Note

The altimeter may be unreliable in thunderstorms because of differential barometric pressures. Therefore, make allowance for this error when determining the minimum safe altitude. It may amount to several thousand feet. The vertical velocity indicator is of little value during periods of high turbulence and should not be referred to for altitude indication.

WARNING

Do not fly through thunderstorms unless there is no alternative. If flight through a thunderstorm cannot be avoided, follow the preceding steps.

NIGHT FLYING.

Night flying imposes no particular problem except that the landing light must supplement the taxi lights when taxiing in dark areas.

CAUTION

Limit the continuous use of landing light to two minutes during ground operation.

COLD-WEATHER PROCEDURES.

Most cold weather difficulties will be encountered on the ground. The following instructions are additional to the normal procedures in Section II. Follow them when operating in regions of extremely cold weather. Icing conditions in flight will not be covered here as they are discussed under ice, snow, and rain in this section.

BEFORE ENTERING THE AIRPLANE.

1. Check that the pressurized cabin has been preheated if the temperature is below —18°C (0°F).
2. Inspect the fuel tank vents and the pitot tube and remove any ice which may be present.
3. Check the entire airframe surface and the landing gear of the airplane for freedom from frost, snow, or ice. Brush off light snow or frost and remove any ice which may have formed by using a direct flow of hot air from a portable heater.

CAUTION

- ***All ice and snow must be removed from the airplane.***
- ***Chipping or scraping ice may damage the airplane.***

4. Check all visible hydraulic lines and fittings for signs of leakage.

ON ENTERING THE AIRPLANE.

1. Carefully check surface controls and trim devices for proper operation.
2. If the temperature is —29°C (—20°F), attempt normal start. If unsuccessful, make a second starting attempt. Heat from the first starting attempt should then allow a satisfactory start. If at all possible, use cartridges which have been stored in a warm place.
3. If the ambient temperature is —40°C (—40°F) or less, use a portable heater to blow hot air into the engine intake duct for 20 to 30 minutes to insure a successful start and to prevent the starter from being damaged if ice has seized the compressor rotor.
4. Operate the surface controls several times to insure that no ice has formed in the hinges.

STARTING ENGINES.

1. Start the engines in a normal manner.
2. If there is no oil pressure within 30 seconds after starting, or if the pressure drops after a few minutes of ground operation, shut down the engines and check for clogged oil lines.

Note

During cold weather starts, the oil pressure may temporarily exceed the maximum limits until the oil temperature approaches normal.

WARM-UP AND GROUND TESTS.

1. Inspect all instruments for normal operation.

CAUTION

Do not turn on the unneeded electrical equipment until the generators show output.

2. Operate all the hydraulic circuits except the bomb door to check for proper operation.
3. Use cabin heat as desired.

TAXIING.

1. Keep the engines running at a high enough rpm to keep up the generator output while taxiing, as low temperatures decrease the battery output.
2. Increase the normal taxi interval between airplanes and reduce the taxiing speed for approaches on ice or snow-covered area.

Note

Take extreme care when maneuvering near other aircraft. The blast and heat may blow snow and slush which will freeze into ice on contact.

CAUTION

Do not taxi in deep snow or slush because steering will be more difficult and brakes, landing gear, and flaps are apt to freeze after take-off. Use extreme caution when taxiing on ice-covered taxi strips or runways because excessive speeds or crosswinds can start a skid, and remember that brakes are ineffective on ice.

Note

Taxi time on snow and ice will be longer than under normal conditions; therefore, plan the shortest route to take-off to reduce fuel consumption.

BEFORE TAKE-OFF.

CAUTION

Make sure that all snow is removed from the runway or is firmly packed. If snow has been removed from the runway, be sure that the banks are piled far enough from the runway to permit a safe take-off.

WARNING

Do not attempt a take-off with a badly frosted canopy, or with snow, ice, or frost on the wings or control surfaces.

TAKE-OFF.

1. If precipitation is present, or if icing conditions are expected during or immediately following take-off, place the pitot heat switch to ON and turn on the windshield anti-icing system.
2. Apply the brakes and advance the throttles to take-off power. If the airplane begins to slide before take-off power is reached, immediately release the brakes and commence the take-off.

Note

Continue the engine check during the early part of the take-off run. If any portion of the engine check is not satisfactory, retard the throttles and bring the airplane to a normal stop.

AFTER TAKE-OFF.

1. After take-off from a snow or slush-covered field, operate the flaps and the landing gear several times to prevent their freezing in the up position.
2. Watch closely for icing on critical areas, and if ice begins to form, attempt flight in a more suitable area, if possible.
3. Adjust the cabin air selector switch to give the desired cabin temperature.
4. Under certain conditions, fog may form in the cabin and restrict visibility. If this should happen, turn the cabin temperature control rheostat to WARM until the fog clears.

DESCENT.

Note

At least 30 minutes before a descent, pull the defogging blower knob out (ON) and place the defogging hot air switch in the DEFOG HOT AIR position to avoid frost or icing on the canopy during descent.

LANDING.

The landing pattern is similar to a normal landing but because of thrust augmentation caused by extremely low temperatures, the approach must be made with a flatter glide than usual.

STOPPING ENGINES.

The engines are stopped in the normal manner.

BEFORE LEAVING AIRPLANE.

1. Have the chocks put in place so that the parking brake can be released. If moisture has entered the brake assembly around the brake shoe, leaving the parking brake released will forestall the possibility that the brakes will freeze in position.
2. Be sure that the airplane is serviced with fuel and oil and that the sumps are drained before the condensates reach the freezing point.
3. Have all covers for the engine, pitot tube, and landing gear installed if there is the slightest possibility of drifting snow.
4. If a layover of several days is anticipated, have the battery removed. If the temperature is −7°C (20°F), the battery should be removed if a layover of four hours or more is expected.

HOT-WEATHER PROCEDURES.

Successful hot-weather operation will require attention and preparation other than the normal operating instructions covered in Section II.

CAUTION

Metal surfaces exposed to the sun will be burning hot to touch. Wear gloves to prevent burns.

BEFORE ENTERING THE AIRPLANE.

1. Check tires and shock struts carefully to assure proper inflation. Overinflation is often encountered during high temperatures.
2. Check that all electrical equipment is completely dry.
3. Check carefully for hydraulic leaks because heat and moisture can cause valves and packing to swell.

ON ENTERING AIRPLANE.

1. Place the cabin pressure selector switch in RAM for cabin ventilation.
2. If high humidity has caused moisture to form on the instruments and controls, direct a flow of warm air from a portable ground heater, if available, on the instruments and controls to dry them.

BEFORE STARTING ENGINES.

Check the take-off distances for existing atmospheric conditions by using the charts in Appendix I.

STARTING ENGINES.

Start the engines in the normal manner.

Note

The engines will accelerate to idle rpm much more slowly on a hot day than on a normal or cold day.

TAXIING.

CAUTION

Use the brakes as little as possible, because high temperatures will retard cooling.

TAKE-OFF.

WARNING

Take-off distances in hot weather will show a considerable increase over the distance required during normal operation.

CLIMB.

Follow the normal climb pattern for the existing conditions.

Note

When the fuel in the tanks is warm, it is more susceptible to vaporization losses during rapid climbs. To avoid vaporization, hold the rate of climb to the minimum requirements of the mission.

DURING FLIGHT.

Under high-temperature conditions, it will be necessary to increase rpm to obtain the desired combination of Mach number and altitude for the best range performance.

DESCENT.

Use the normal descent procedure.

LANDING.

Use the normal landing technique and remember that the ground roll will be longer than usual.

WARNING

During extremely high temperature true airspeed is much higher than indicated airspeed. Therefore, stall and touchdown speeds will be higher.

STOPPING ENGINES.

1. Stop the engines by using the normal procedure and release the parking brakes to avoid possible damage to the brake assemblies due to excessive heat generated during taxiing.

BEFORE LEAVING AIRPLANE.

1. Have the covers for the engine, canopy, and tire installed for protection from the sun.
2. Leave the cabin access door open for ventilation.
3. Have the fuel and oil tanks serviced.

DESERT PROCEDURES.

Desert operation which presents high temperatures with blowing sand and dust is considerably more difficult than the normal operating procedures which are covered in Section II. Damage can occur to both the airplane and the engines if the extra precautions presented here are not observed.

BEFORE ENTERING AIRPLANE.

1. Check tires and shock struts for proper inflation. Overinflation is encountered often during high-temperature conditions.

WARNING

If necessary, position the airplane so that the jet blast will not blow sand toward other airplanes or personnel. Sand blown by the engines can severely damage other airplanes and can also harm personnel.

2. Inspect all control surface hinges for sand and/or excess dust and, if present, have it removed.
3. Check the shock struts for sand and have it removed, if present.
4. Remove all protective covers before entering the airplane.

ON ENTERING AIRPLANE.

1. Check all dials, flight controls, and switches for sand accumulation, and have them cleaned if present.
2. Place the cabin pressure selector switch in RAM for cabin ventilation.

BEFORE STARTING ENGINES.

1. Operate all control surfaces several times to be sure that they move freely and easily.
2. Check take-off distances in Appendix I for the existing conditions.

STARTING ENGINES.

1. Complete as much of the preflight as possible before starting the engines so that ground operation will be held to a minimum.
2. Start the engines by using the normal procedure.

Note

The engines will accelerate to idle rpm much more slowly on a hot day than on a cold or normal day.

WARM-UP AND GROUND TESTS.

1. Be sure the airplane is clear of other airplanes and personnel before accelerating the engines.
2. The only warm-up period required is for the exhaust gas temperatures to stabilize.

TAXIING.

1. Use the brakes as little as possible, because high temperatures retard cooling.
2. Keep a sufficient taxi interval between other airplanes to prevent blowing sand into other engines.

TAKE-OFF.

Get the airplane into the air as soon as possible after starting the engines so that dust and sand will not be drawn into the engines.

Note

The take-off distance will be increased appreciably in high temperatures.

WARNING

It is necessary to adhere strictly to the suggested take-off and climbing speeds during hot weather operation since stalling speeds increase with temperature.

CLIMB.

Follow the normal climb procedure.

Note

Warm fuel is more susceptible to vaporization losses during rapid climbs. To avoid this condition, hold the rate of climb as low as practicable.

CAUTION

Avoid flying through dust or sand storms because grit or dust will cause damage to the engines.

Under high-temperature conditions, it will be necessary to increase rpm to obtain desired Mach number-altitude combination for the best range performance.

DESCENT.

Use the normal descent procedure.

LANDING.

WARNING

During extremely high temperature true airspeed is much higher than indicated airspeed. Therefore, stall and touchdown speeds will be higher.

Use the normal landing technique and remember that the ground roll will be longer than usual.

STOPPING ENGINES.

1. When the airplane is taxied to a parking position, shut down the engines at once.
2. Have the chocks put in place and release the parking brakes as soon as possible, because the brake assemblies may be damaged due to excess heat generated by taxiing.
3. Have the covers for the engine, wheel, pitot tube and canopy installed as soon as possible.

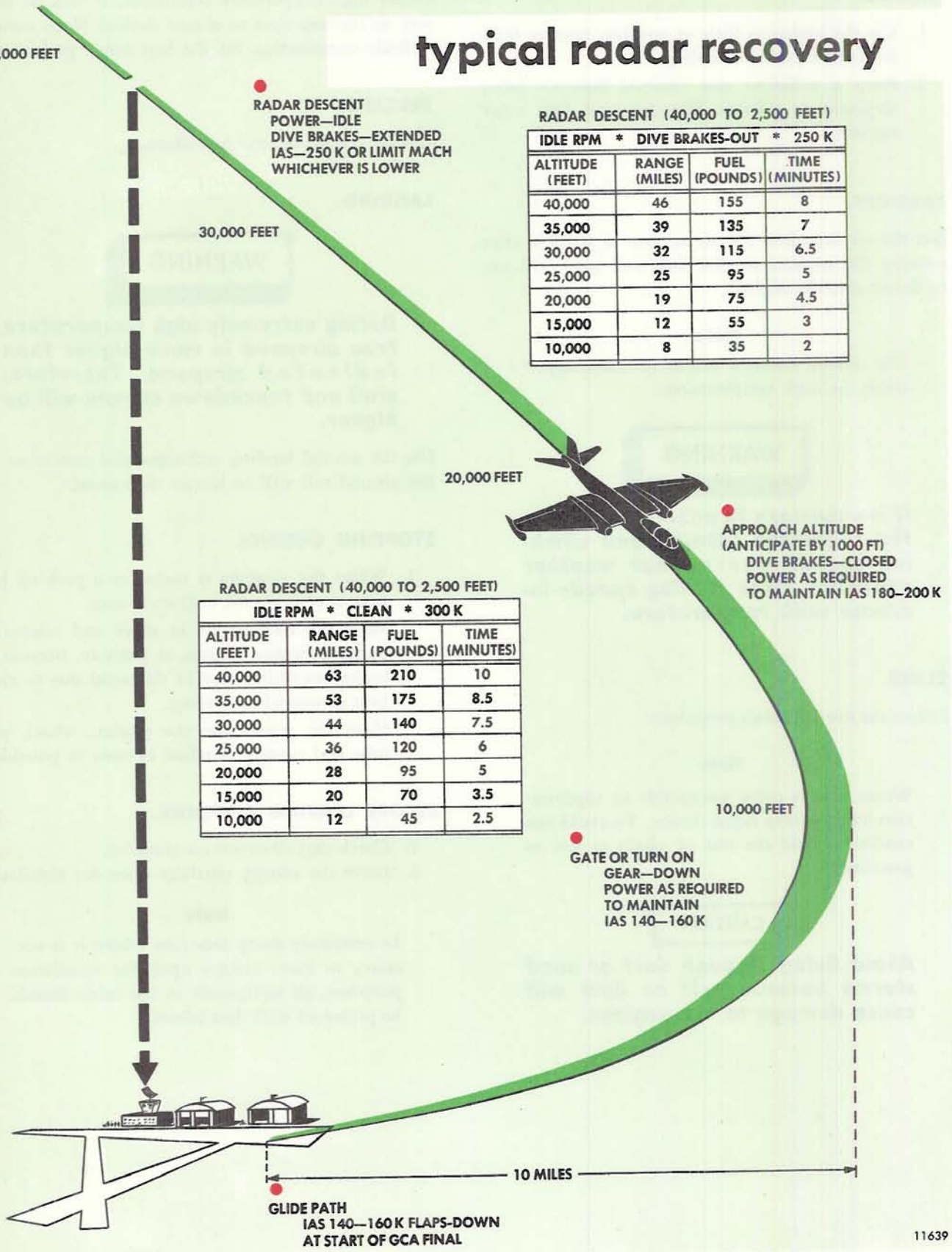
BEFORE LEAVING AIRPLANE.

1. Check that all covers are installed.
2. Leave the canopy partially open for ventilation.

Note

In extremely dusty locations where it is necessary to leave canopy open for ventilation purposes, all equipment in the cabin should be protected with dust covers.

typical radar recovery



RADAR DESCENT (40,000 TO 2,500 FEET)

IDLE RPM * DIVE BRAKES-OUT * 250 K			
ALTITUDE (FEET)	RANGE (MILES)	FUEL (POUNDS)	TIME (MINUTES)
40,000	46	155	8
35,000	39	135	7
30,000	32	115	6.5
25,000	25	95	5
20,000	19	75	4.5
15,000	12	55	3
10,000	8	35	2

RADAR DESCENT (40,000 TO 2,500 FEET)

IDLE RPM * CLEAN * 300 K			
ALTITUDE (FEET)	RANGE (MILES)	FUEL (POUNDS)	TIME (MINUTES)
40,000	63	210	10
35,000	53	175	8.5
30,000	44	140	7.5
25,000	36	120	6
20,000	28	95	5
15,000	20	70	3.5
10,000	12	45	2.5

Figure 9-1

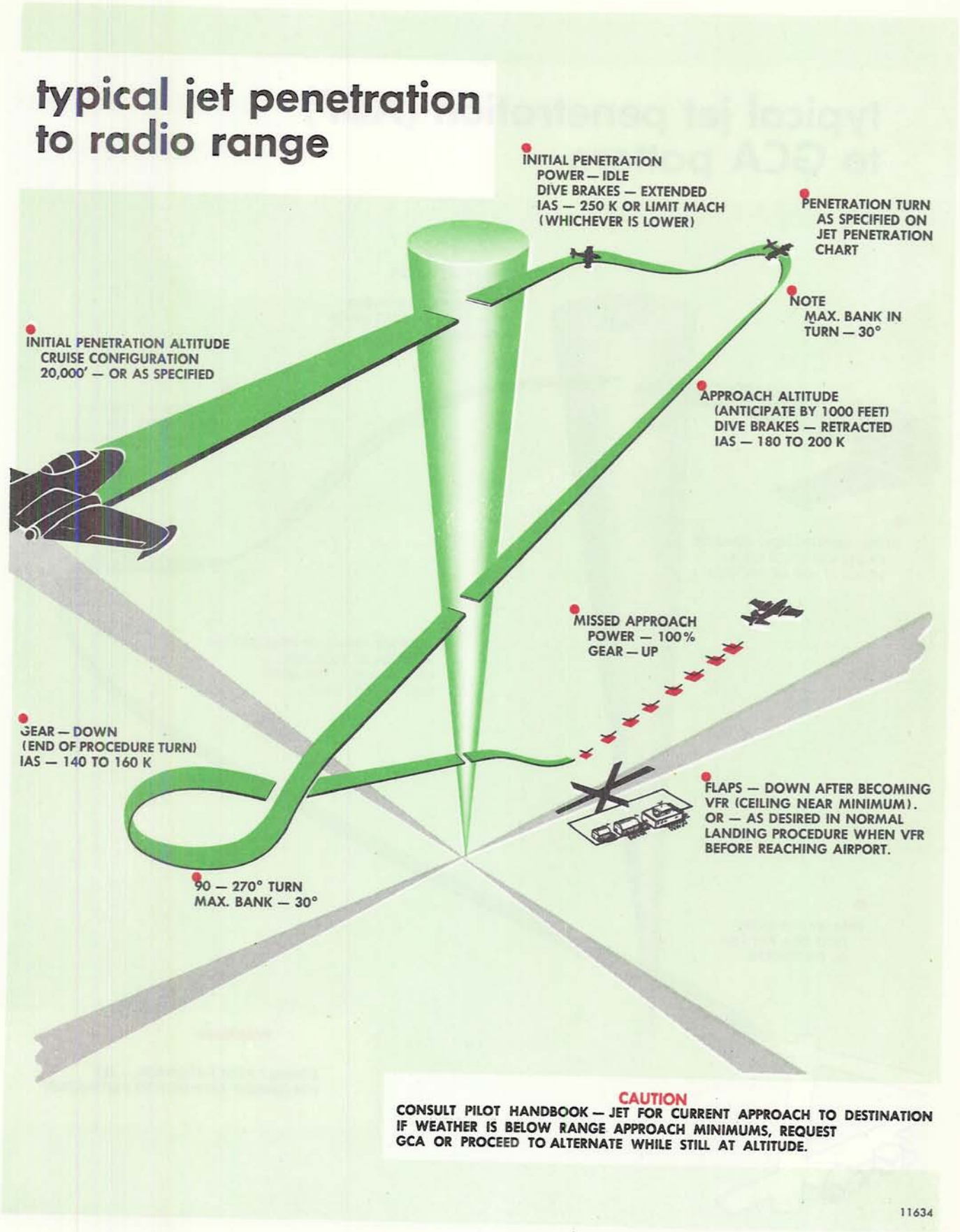

typical jet penetration to radio range
INITIAL PENETRATION
POWER — IDLE
DIVE BRAKES — EXTENDED
IAS — 250 K OR LIMIT MACH
(WHICHEVER IS LOWER)
PENETRATION TURN
AS SPECIFIED ON
JET PENETRATION
CHART
NOTE
MAX. BANK IN
TURN — 30°
INITIAL PENETRATION ALTITUDE
CRUISE CONFIGURATION
20,000′ — OR AS SPECIFIED
APPROACH ALTITUDE
(ANTICIPATE BY 1000 FEET)
DIVE BRAKES — RETRACTED
IAS — 180 TO 200 K
MISSED APPROACH
POWER — 100%
GEAR — UP
GEAR — DOWN
(END OF PROCEDURE TURN)
IAS — 140 TO 160 K
FLAPS — DOWN AFTER BECOMING
VFR (CEILING NEAR MINIMUM).
OR — AS DESIRED IN NORMAL
LANDING PROCEDURE WHEN VFR
BEFORE REACHING AIRPORT.
90 — 270° TURN
MAX. BANK — 30°
CAUTION
CONSULT PILOT HANDBOOK — JET FOR CURRENT APPROACH TO DESTINATION
IF WEATHER IS BELOW RANGE APPROACH MINIMUMS, REQUEST
GCA OR PROCEED TO ALTERNATE WHILE STILL AT ALTITUDE.
11634

Figure 9–2

typical jet penetration (ADF) to GCA pattern

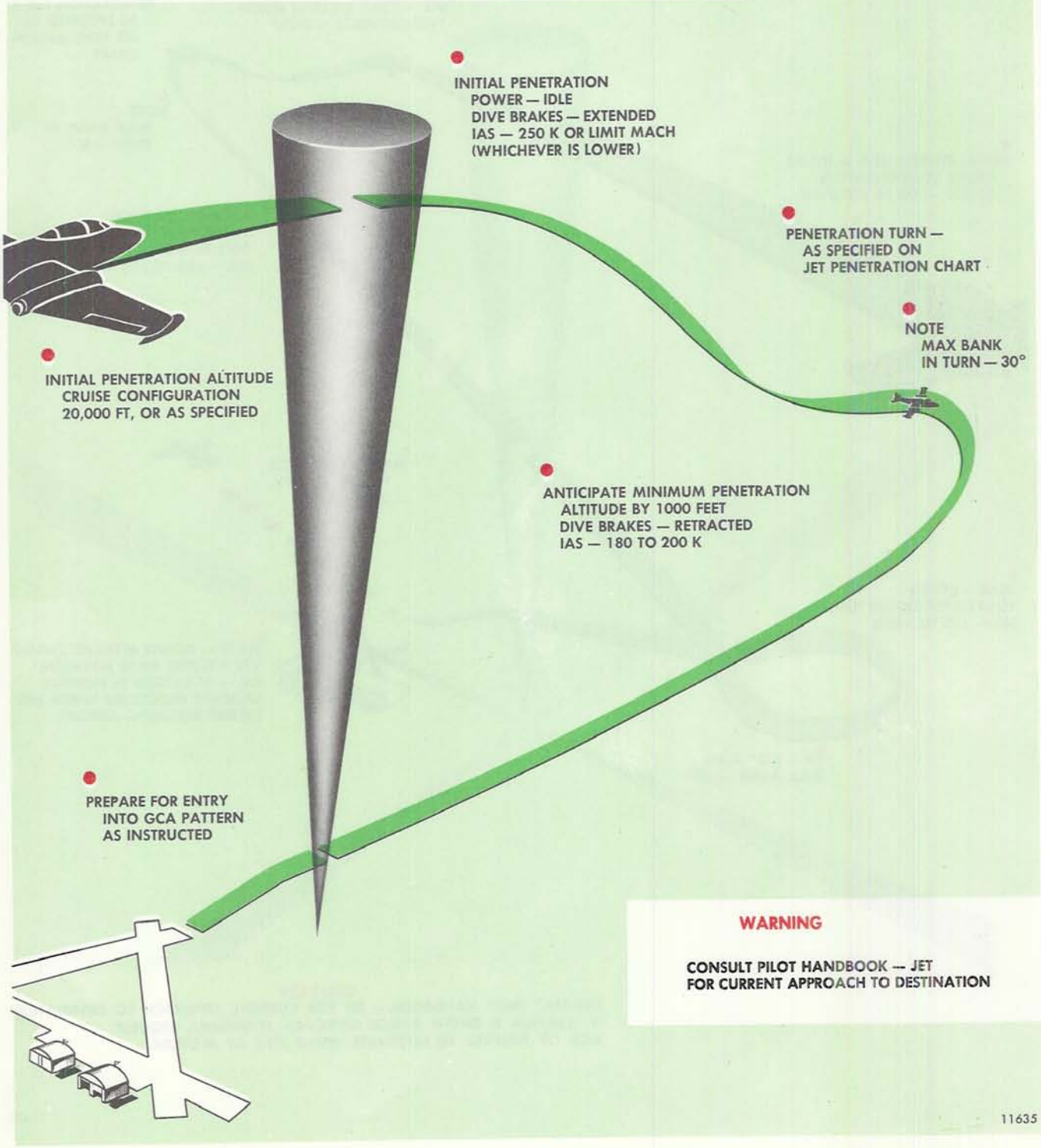


Figure 9-3

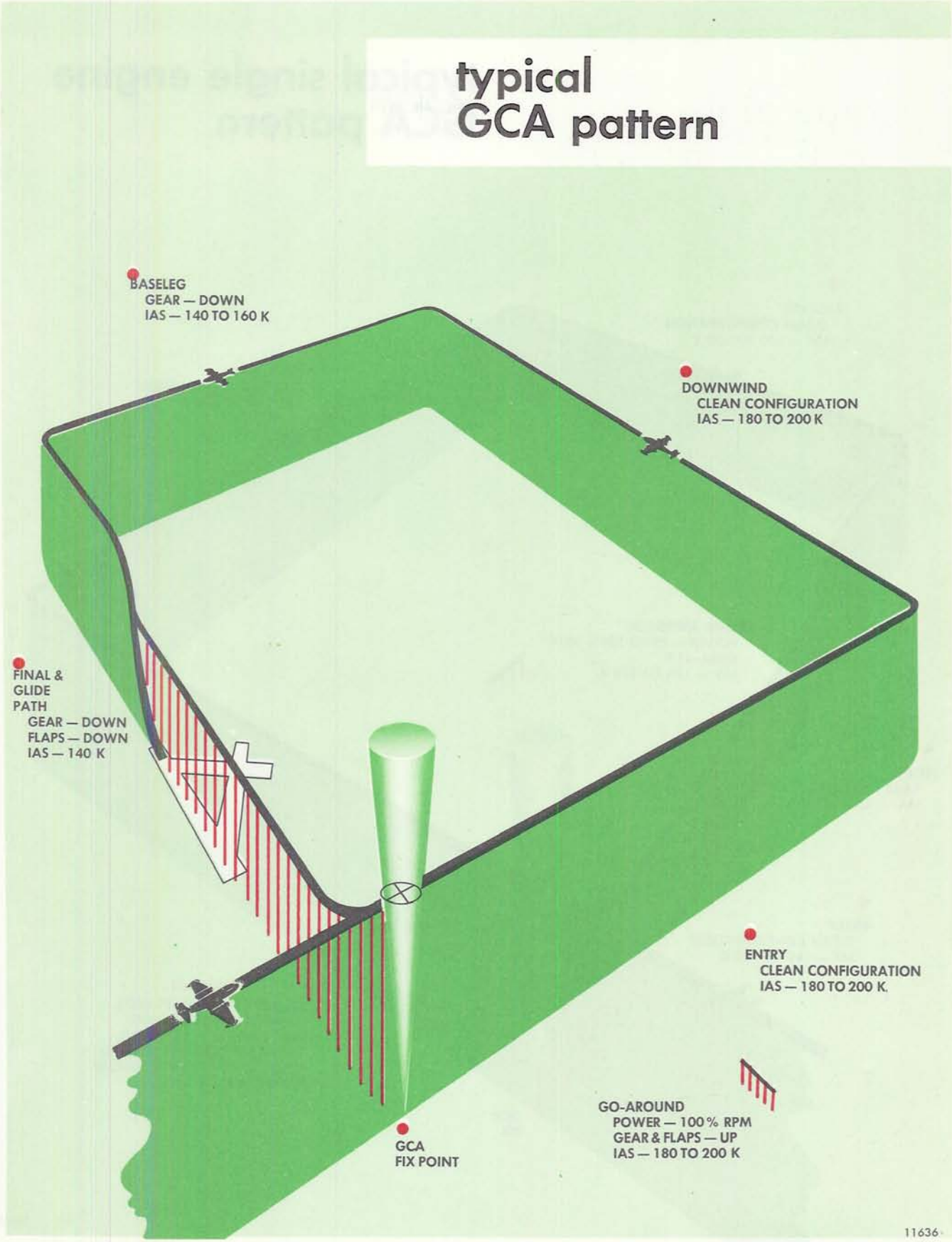

typical
GCA pattern
BASELEG
GEAR — DOWN
IAS — 140 TO 160 K
DOWNWIND
CLEAN CONFIGURATION
IAS — 180 TO 200 K
FINAL &
GLIDE
PATH
GEAR — DOWN
FLAPS — DOWN
IAS — 140 K
ENTRY
CLEAN CONFIGURATION
IAS — 180 TO 200 K
GO-AROUND
POWER — 100% RPM
GEAR & FLAPS — UP
IAS — 180 TO 200 K
GCA
FIX POINT
11636

Figure 9-4

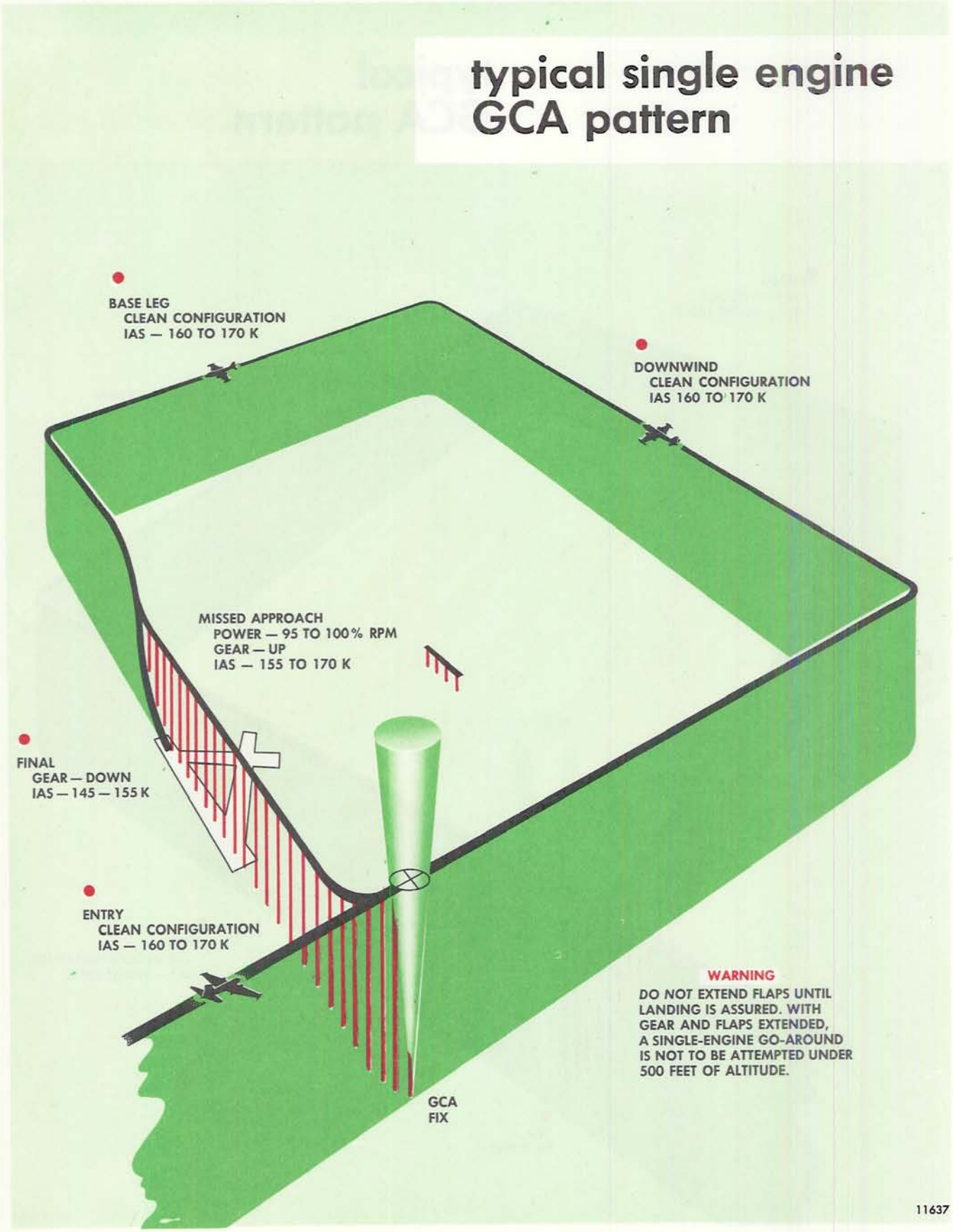

typical single engine GCA pattern
BASE LEG
CLEAN CONFIGURATION
IAS — 160 TO 170 K
DOWNWIND
CLEAN CONFIGURATION
IAS 160 TO 170 K
MISSED APPROACH
POWER — 95 TO 100% RPM
GEAR — UP
IAS — 155 TO 170 K
FINAL
GEAR — DOWN
IAS — 145 — 155 K
ENTRY
CLEAN CONFIGURATION
IAS — 160 TO 170 K
WARNING
DO NOT EXTEND FLAPS UNTIL LANDING IS ASSURED. WITH GEAR AND FLAPS EXTENDED, A SINGLE-ENGINE GO-AROUND IS NOT TO BE ATTEMPTED UNDER 500 FEET OF ALTITUDE.
GCA
FIX
11637

Figure 9-5

typical runway roll after GCA landing

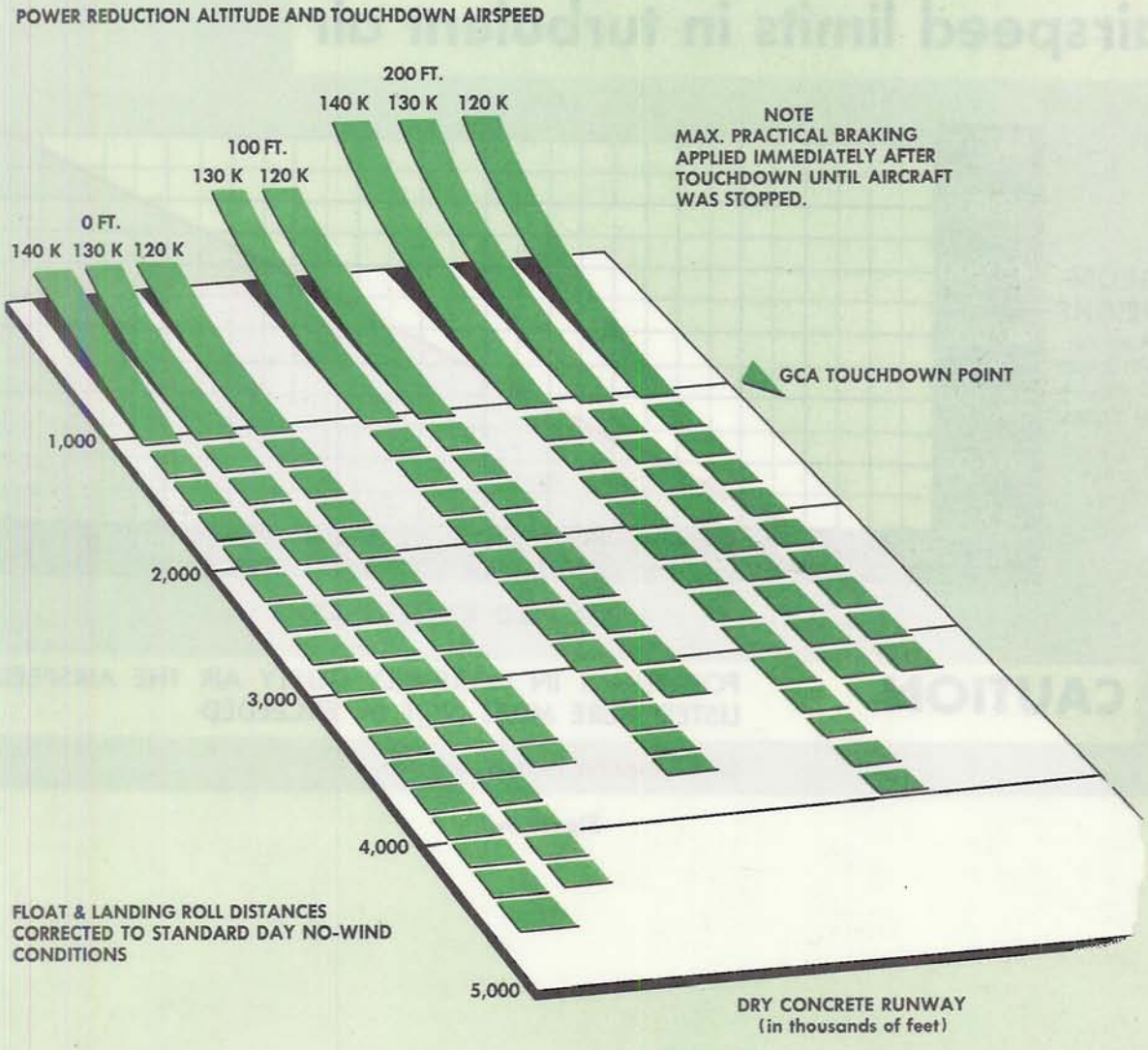


Figure 9-6

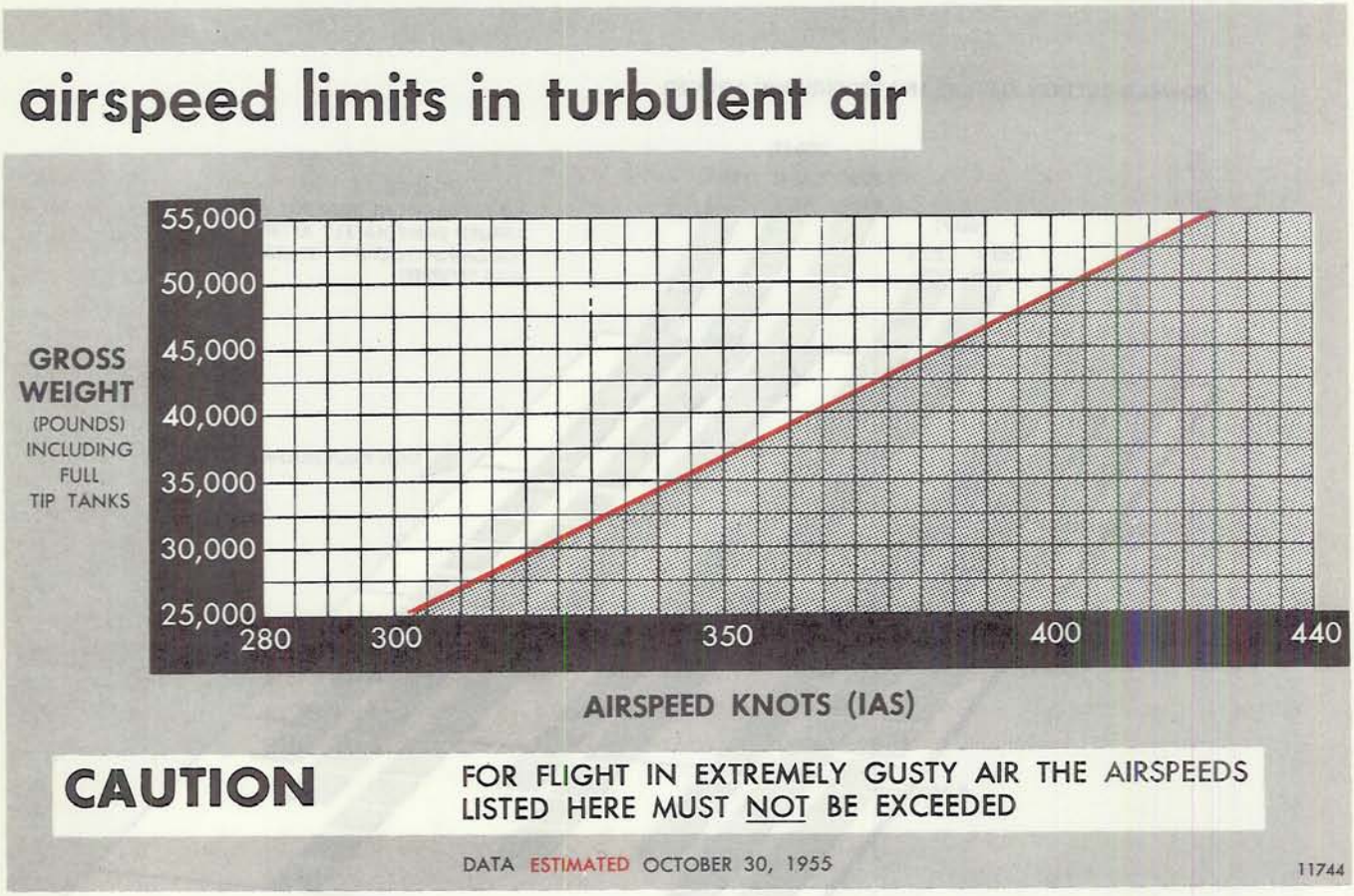
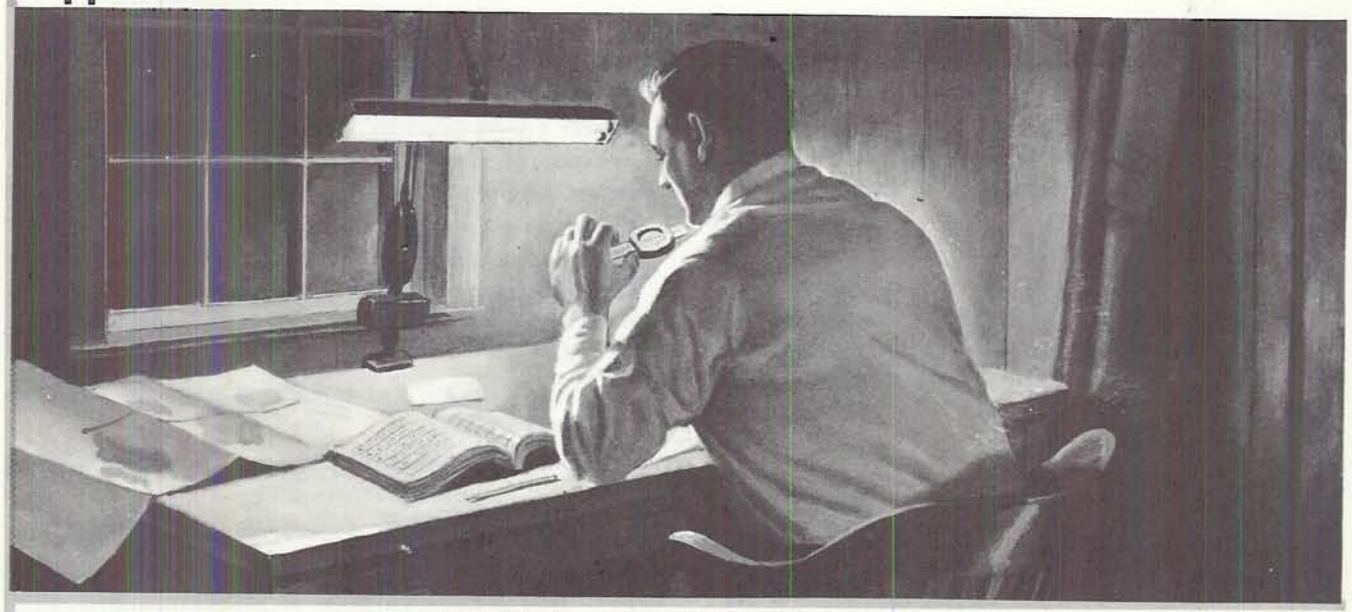

airspeed limits in turbulent air
GROSS WEIGHT (POUNDS) INCLUDING FULL TIP TANKS
55,000
50,000
45,000
40,000
35,000
30,000
25,000
280
300
350
400
440
AIRSPEED KNOTS (IAS)
CAUTION
FOR FLIGHT IN EXTREMELY GUSTY AIR THE AIRSPEEDS LISTED HERE MUST NOT BE EXCEEDED
DATA ESTIMATED OCTOBER 30, 1955
11744

Figure 9-7

Appendix I



PERFORMANCE DATA

11735

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INTRODUCTION.

The following charts set forth the estimated performance capabilities of this airplane. These data are based on operation in NACA standard atmospheric conditions. Additional take-off data are presented with temperature and pressure altitude as variants. The flight operation instruction charts are also applicable to operation in non-standard atmosphere if the recommended CAS values are maintained.

AIRSPEED CORRECTIONS.

1. Instrument correction to airspeed.
   The error in the individual airspeed indicator, considered negligible in most cases, may be obtained from the instrument calibration card to obtain indicated airspeed (IAS).
2. Installation correction to airspeed.
   Figures (A-3 and A-4) gives the airspeed installation correction to be applied to indicated air-

speed in order to obtain calibrated airspeed (CAS).

3. Compressibility correction to airspeed.
The compressibility correction to airspeed is obtained from figure A-2 and when applied to calibrated airspeed (CAS) provides equivalent airspeed (EAS). The conversion of equivalent airspeed to true airspeed is accomplished by multiplying (EAS) by the reciprocal of the square root of the relative density. The vector addition of wind velocity and true airspeed provides ground speed. A free air temperature correction table (figure A-1) is also furnished, as true free air temperature must be known to obtain true airspeed (TAS).

USE OF AIRSPEED CORRECTION TABLES.

Consider an airplane flying at 15,000 feet with an indicated free air temperature of +5°C and an airspeed indicator reading of 300 knots.

Airspeed indicator reading	300 knots
Correction for installation error	+0 knots
(Gross weight approximately 40,000 pounds)..	
	300 knots

The value of 300 knots is the calibrated airspeed (CAS).

Free air temperature indicator reading..	+5°C
Correction for temperature error.....	−15°C
	−10°C

The value of −10°C is the true free air temperature. Use CAS and true free air temperature with a type D-4 or type G-1 airspeed computer to determine true airspeed (TAS) of 374 knots. When the dead reckoning computer is used, the CAS (300 knots) must be corrected for compressibility. The airspeed compressibility correction table shows that 6 knots must be subtracted from CAS (300 knots) to obtain equivalent airspeed (294 knots). Use the dead reckoning computer and the values of 294 knots and −10°C to determine the true airspeed of 374 knots.

EFFECTIVE WIND.

The effective wind chart, figure A-5, is used for computing the wind component (head or tail wind) for take-off. Enter the chart at the known wind velocity. Move horizontally and intersect the line representing the wind distance in degrees, relative to the take-off runway. Move down vertically to the base line. The figure read from the base line is the wind component figure to be used with the take-off distance chart.

TAKE-OFF DISTANCE.

Figure (A-6) presents ground-run distances and the distance to clear a 50-foot obstacle for a military-thrust take-off. The distances shown are for normal technique on a dry hard-surface runway. The chart includes variable of gross weight, temperature, pressure altitude, and head wind; and may be used for both clean and tip tank configurations. Use the chart as follows:

1. Enter the chart at ambient temperature and pressure altitude.
2. Proceed horizontally to the line corresponding to your take-off gross weight.
3. Move vertically downward to Wind Baseline. If there is no headwind continue downward and read ground distance. If you have a head wind, follow the wind guide line to the correct wind value and read the distance on the ground reference line.
4. The lower portion of the chart will give the distance needed to clear a 50-foot obstacle; that is, for a ground run of 5900 feet, you need 7300 feet of runway distance to clear a 50-foot obstacle.

TAKE-OFF SPEEDS.

Figure A-7 should be used to determine the airspeed for the best-take-off performance. On this chart there are curves for both the normal take-off and a maximum effort take-off. Also included are the minimum single engine control speed (155 knots) and the initial stall warning (outside ground effect). In the flaps-up configuration, initial stall warning occurs 10 to 12 knots above the stall speed.

CLIMB.

The climb charts (figure A-8 to A-17) present the estimated time to climb, distance covered, fuel used, best climb speed, and rate of climb for military and normal thrust with two engines operating. Separate charts include single engine climb data at military thrust. The fuel allowance for starting engines, taxiing, take-off, and acceleration to climb speed is listed at sea level. Fuel required at other altitudes includes this allowance plus the fuel needed to climb from sea level. Fuel required for an in-flight climb from one altitude to another is the difference of the tabulated

fuel required to climb to each altitude from sea level. Time and distance covered in an in-flight climb may be obtained in the same manner. All of the data appearing on the climb charts are presented at the tabulated gross weight for purposes of interpolation.

DESCENT.

The descent charts (figures A-18, A-19 and A-20) are based on the use of both wing dive brakes and fuselage speed brakes to obtain moderately high rates of descent. A constant Mach number speed schedule is shown for the clean airplane (M = .74). With wing tip tanks installed, this speed schedule is maintained until the airplane level flight structural limitation (434 knots EAS) is attained. The remaining descent with tip tanks installed is scheduled at this airspeed limitation. To minimize fuel consumption, idling power is used throughout the descent with both engines operating. The single engine descent data are presented for a constant Mach number schedule (M = .74), with one engine windmilling and one engine idling, dive brakes extended. Neither the fuel or time tabulated includes any allowance for loitering while awaiting landing clearance, for taxiing after landing, or for any navigational errors.

LANDING.

The landing distances presented in figure A-21 are based on the normal landing technique described in Section II. The percentage decrease noted on the charts for landing with dive brakes extended may be applied when this configuration is assumed. Dry, hard-surface runway and no wind are the only conditions shown.

MAXIMUM ENDURANCE.

Estimated airspeed, rpm, and fuel consumption for maximum endurance are presented in figures A-22 thru A-27. These data are shown for all configurations used in the flight operation instruction charts and include altitudes ranging from sea level to cruise ceiling.

COMBAT ALLOWANCE.

The combat allowance chart (figure A-28) includes estimated fuel flow at military thrust, normal thrust, and level flight thrust at the proved limit of normal control. Data are shown for the clean airplane.

MAXIMUM CONTINUOUS POWER.

The maximum continuous power charts (figures A-29 thru A-34) show estimated percentages of rpm, airspeed, and fuel consumption required at normal rated thrust. Configuration and weights correspond to those used in the flight operation instruction charts. Data shown for the airplane is within proved limit of normal control.

FLIGHT OPERATION INSTRUCTION CHARTS.

The flight operation instruction charts (figures A-35 to A-68) are presented to facilitate mission planning. The charted values include long-range airspeeds, fuel quantities, and altitudes in increments of 5,000 feet to the altitude where 300 fpm rate of climb at normal rated power can be maintained (cruise ceiling). In general, two range values are estimated for each fuel quantity and altitude shown. One is for continued operation at the initial altitude, and the other is maximum range obtainable by climbing to and cruising at the optimum altitudes shown for the specific initial conditions. Fuel consumed and distance covered during engine starting, taxiing, take-off, and initial climb at the start of a flight are not included in these charts. However, distances covered and fuel consumed during let-down or during in-flight climbs to optimum altitudes are taken into account. Operating conditions are shown on the lower portion of the charts. These operating conditions must be maintained if the range listed in the upper section of the chart are to be obtained. Under different wind conditions, ranges in ground miles are varied by the effect of wind on ground speed. The quoted let-down distances are affected for the same reason. Recommended CAS values also may change in order to obtain optimum ground miles per gallon. The lower half of each chart includes operating instructions to be followed when various wind conditions are encountered. Range in a wind is obtained by multiplying chart air miles by the range factor presented for the specific altitude and effective wind. Thus range factors may be used to determine the best altitude for cruise when there is a known wind difference at different altitudes. Effective wind has the same effect on the airplane ground speed as if it were a straight head wind or tail wind. The wind component in the direction of the airplane heading is the effective wind. For instance, a 100 knot wind at 30 degrees to the course is an effective head wind of approximately 85 knots. If the true airspeed

of the airplane is 500 knots, the true ground speed is approximately 415 knots. The approximate rpm values quoted on any one chart are based on the gross weight of the airplane equal to the high limit of the chart weight band. If the recommended CAS values are maintained, the rpm values will decrease slightly as the gross weight decreases. No allowances are made for navigation errors, combat, formation flight, landing, or similar contingencies.

PRE-FLIGHT RANGE PLANNING.

Select the applicable flight operation instruction charts. Determine the amount of fuel available. Available fuel is the total fuel aboard less allowances for starting engines, taxiing, take-off, initial climb, and reserve. Select a figure in the fuel column equal to, or less than, the amount available for flight planning. Interpolate as necessary. To determine maximum range at a given altitude, move horizontally right or left to the desired altitude column. The range value thus obtained must be multiplied by the correct range factor. Add the distance covered in the initial climb to obtain total range. To fly a given distance, determine range factors for the effective wind, and altitudes to be considered. From the desired distance subtract the climb distance. Divide the resultant figure by the range factor to obtain distance in cruise and descent. Enter the chart as previously. Move horizontally right or left to a calculated distance which exceeds the calculated air distance to be covered in cruise and descent. Use the operating conditions for the altitude so obtained, changing charts as fuel load decreases, or wing tip tanks are dropped. If altitude, wind, or disposable load does not remain reasonably constant, divide the flight into separate sections, planning each section individually.

IN-FLIGHT RANGE PLANNING.

To use the charts in flight, determine altitude, effective wind, and fuel available. Fuel available is equal to total usable fuel aboard less necessary reserves. Enter the flight operation instruction chart applicable to the specific airplane weight and fuel available. Move horizontally right or left to the desired altitude column. Determine the altitude at which flight is to be continued. Operating conditions for continued flight at this altitude can be found directly below. When changing charts, refer to cruising instructions on the new chart at the flight altitude. Ranges shown at optimum altitude may be obtained by immediately climbing at recommended climb procedure to this altitude. Cruising instructions at this new altitude will be found in the lower half of the chart in the column under the new altitude. In order to obtain best range, it is necessary to observe the optimum altitude when changing charts due to configuration change and weight changes.

SAMPLE PROBLEMS BASED ON JP-4 FUEL.

PROBLEM I.

Ferry Range Required—1500 nautical miles

Reserve Fuel Needed—1000 pounds

Payload (bombs)—none

Initial gross weight with wing tip tanks full—47,500 pounds with 2,972 gallons of fuel (19,318 pounds).

Effective winds—80 knot head wind above 35,000 feet

Effective winds—40 knot head wind below 35,000 feet

From the climb charts, figure A-8 to A-17 and the flight operation instruction charts for 320 gallon wing tip tanks carried the entire distance, figures A-53 and A-54, the following data are obtained.

1. Cruising Altitude (feet)	25,000	30,000	35,000
2. Fuel Capacity (pounds)	19,318	19,318	19,318
3. Reserve Fuel (pounds)	1,000	1,000	1,000
4. Fuel used in Climb to altitude at MRP (pounds)	2,385	2,700	3,060
5. Available Cruise Fuel (pounds)	15,933	15,618	15,258
6. Cruise and Descent Air Distance (interpolate nautical miles)	1,558	1,701	1,797
7. Range Factor	.90	.89	.80
8. Cruise and Descent Ground Distance (6 x 7)	1,400	1,510	1,440
9. Nautical Miles in Initial Climb	48	66	91
10. Nautical Ground Miles (8 + 9)	1,448	1,576	1,531

These preliminary calculations indicate that the range of 1,500 nautical miles may be attained at a cruise altitude of 30,000 feet. At this altitude with a 40-knot head wind the initial cruise speed, while within the weight bracket of 48,000 to 44,300 pounds, is 266 knots CAS. When gross weight reduces to the weight range of 44,300 to 39,800 pounds, airspeed reduces to 262 knots CAS and is further reduced to 255 knots CAS when operating within the weight band of 39,800 to 35,300 pounds.

PROBLEM II.

Suppose that changing winds throughout the previous range problem make an extension of range necessary. Fuel aboard is approximately 6,000 pounds and empty wing tip tanks remain. Flight altitude is 30,000 feet. Gross weight is within the weight bracket of 35,300 to 30,800 pounds. Continued flight at this altitude will result in a range of approximately 540 nautical miles with a 40-knot head wind, maintaining a 1,000 pound fuel reserve. However, by immediately dropping the empty wing tip tanks, a range of 575 nautical miles may be obtained with a similar reserve fuel allowance. The previous example shows that when empty wing tip tanks are installed and maximum range is essential, the wing tip tanks should be jettisoned.

MAXIMUM RANGE SUMMARY.

The maximum range summary charts (figures A-69 thru A-74) summarize the no-wind flight operating conditions for the data in the flight operation instruction charts. The maximum range summary charts presents the airspeeds, fuel flow, and percent rpm for maximum range flight at various altitudes and for various weights and configurations given in the flight operation instruction charts.

FREE AIR TEMPERATURE CORRECTION

PRESSURE ALTITUDE	CALIBRATED AIRSPEED – KNOTS							
	150	200	250	300	350	400	450	500
SEA LEVEL	2	4	7	9	13	17	21	26
5,000	3	5	8	11	15	19	24	
10,000	3	6	9	13	17	22	28	
15,000	4	7	10	15	20	25		
20,000	4	8	12	17	23	29		
25,000	5	9	14	20	26			
30,000	6	11	16	23				
35,000	7	13	19	27				
40,000	9	16	24					
45,000	12	20	29					
50,000	14	24						

REMARKS: SUBTRACT CORRECTION FROM INDICATED FREE AIR TEMPERATURE (°C) TO OBTAIN TRUE FREE AIR TEMPERATURE (°C)

DATA BASIS ESTIMATED
DATA AS OF: 1 MAY 1953

Figure A-1

COMPRESSIBILITY CORRECTION TABLE

PRESSURE ALTITUDE	C.A.S.- KNOTS								
	150	200	250	300	350	400	450	500	550
5,000	0	0	-1	-2	-2	-3	-5	-6	-8
10,000	0	-1	-2	-3	-5	-7	-10	-13	-17
15,000	-1	-2	-3	-6	-8	-12	-16	-21	
20,000	-1	-3	-5	-8	-12	-17	-23		
25,000	-2	-4	-7	-11	-17	-24			
30,000	-2	-5	-9	-15	-23				
35,000	-3	-7	-12	-20					
40,000	-4	-9	-16						
45,000	-5	-11	-20						
50,000	-7	-14							

REMARKS: ADD CORRECTION TO CALIBRATED AIRSPEED TO OBTAIN EQUIVALENT AIRSPEED

C.A.S : CALIBRATED AIRSPEED

DATA BASIS: ESTIMATED
DATA AS OF: 1 MAY 1953

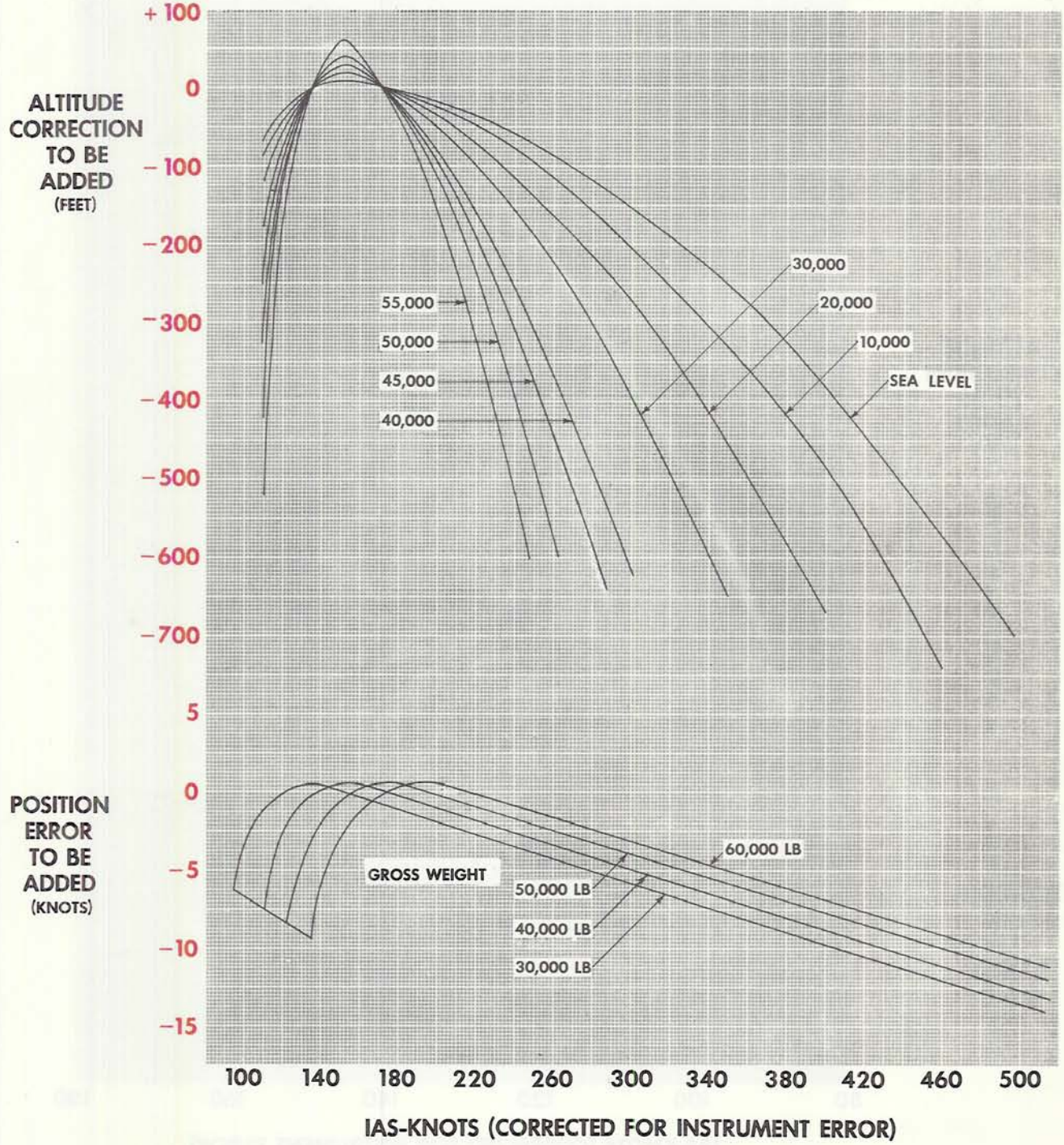
Figure A-2

airspeed and altitude calibration

CRUISE CONFIGURATION

MODEL(S): B -57B

ENGINE(S): (TWO) J65-W-5



DATA ESTIMATED 4-1-56

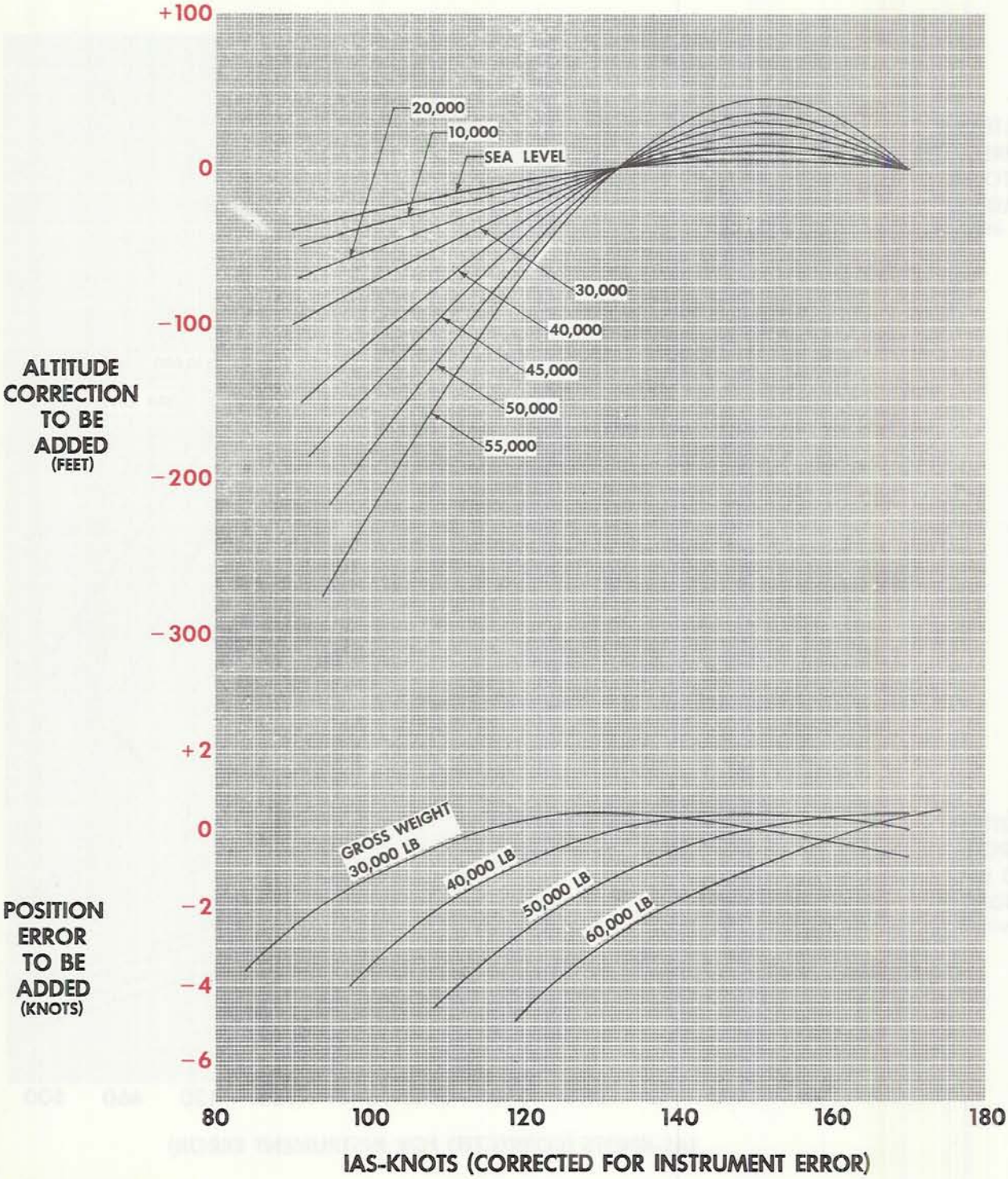
11738

Figure A-3

airspeed and altitude calibration

GEAR AND FLAPS DOWN

MODEL(S): B -57B ENGINE(S): (TWO) J65-W-5



ESTIMATED DATA 4-1-56 11739

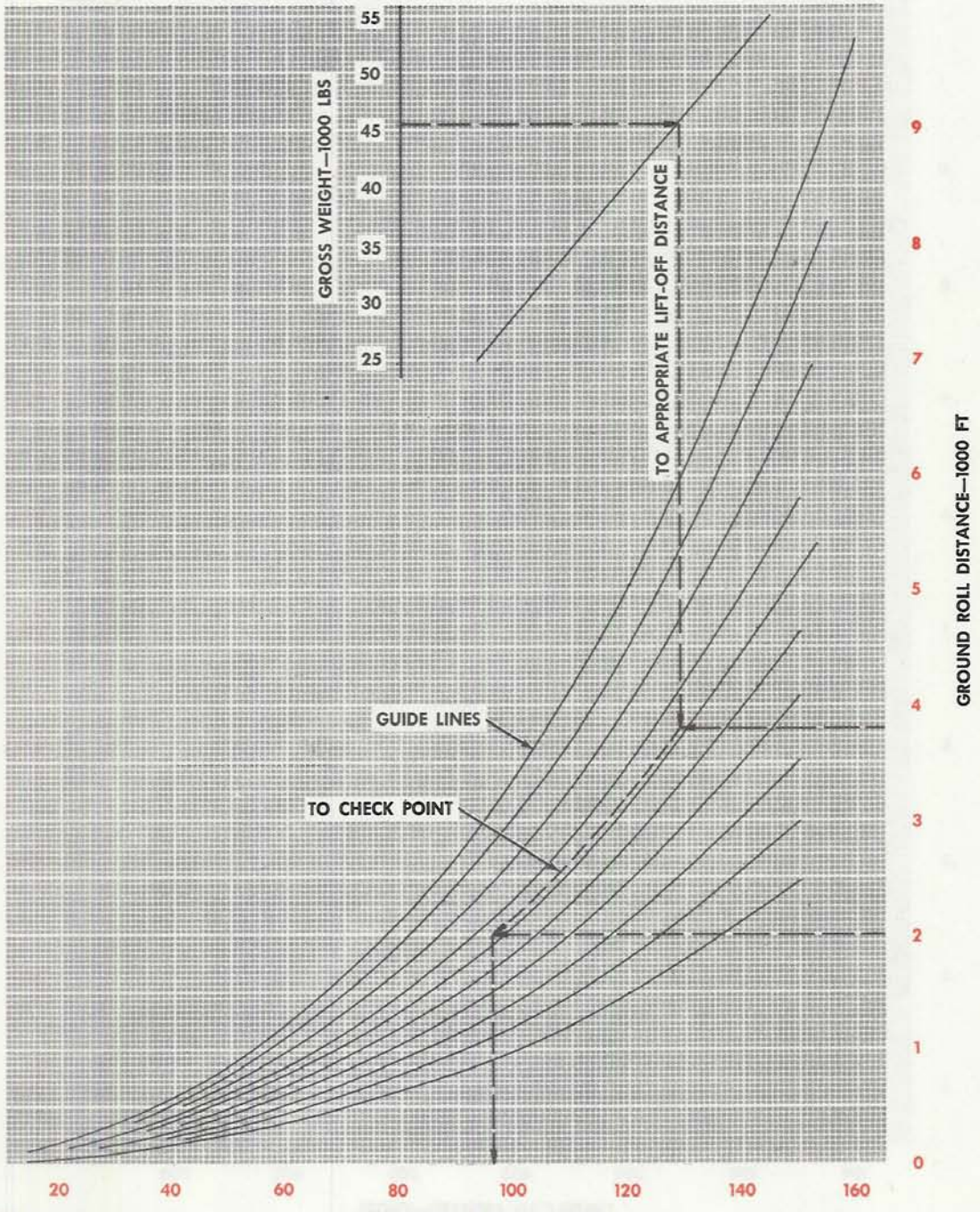
Figure A-4

airspeed and ground roll distance during takeoff

MODEL(S): B-57B

HARD, DRY SURFACE RUNWAY
NORMAL TECHNIQUE
MILITARY POWER
FLAPS UP

ENGINE(S): (TWO) J65-W-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB PER GAL



DATA AS OF: 4-1-56
DATA BASIS ESTIMATED

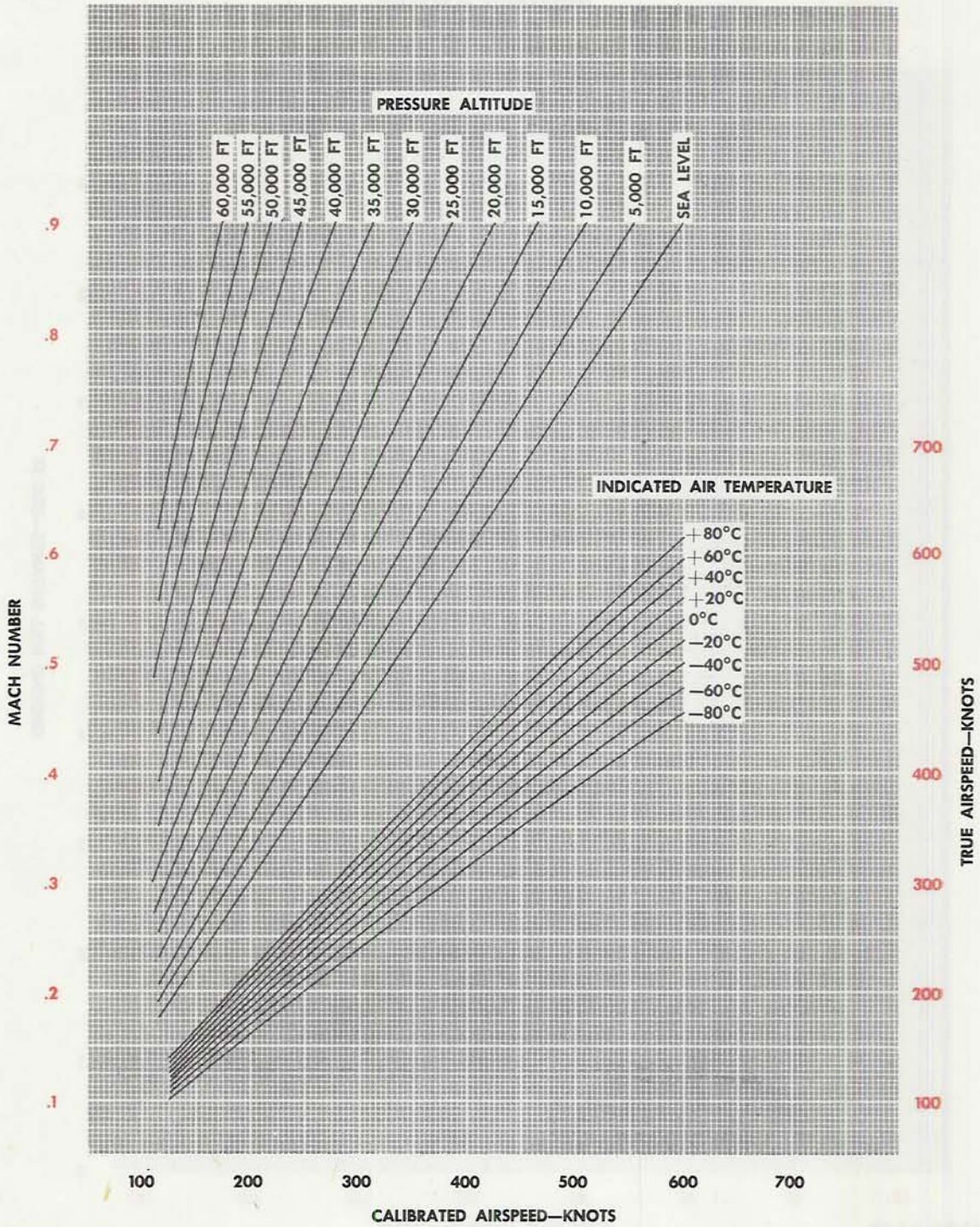
11789

Figure A-4A

airspeed conversion

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB PER GAL



DATA AS OF: 4-1-56
DATA BASIS ESTIMATED

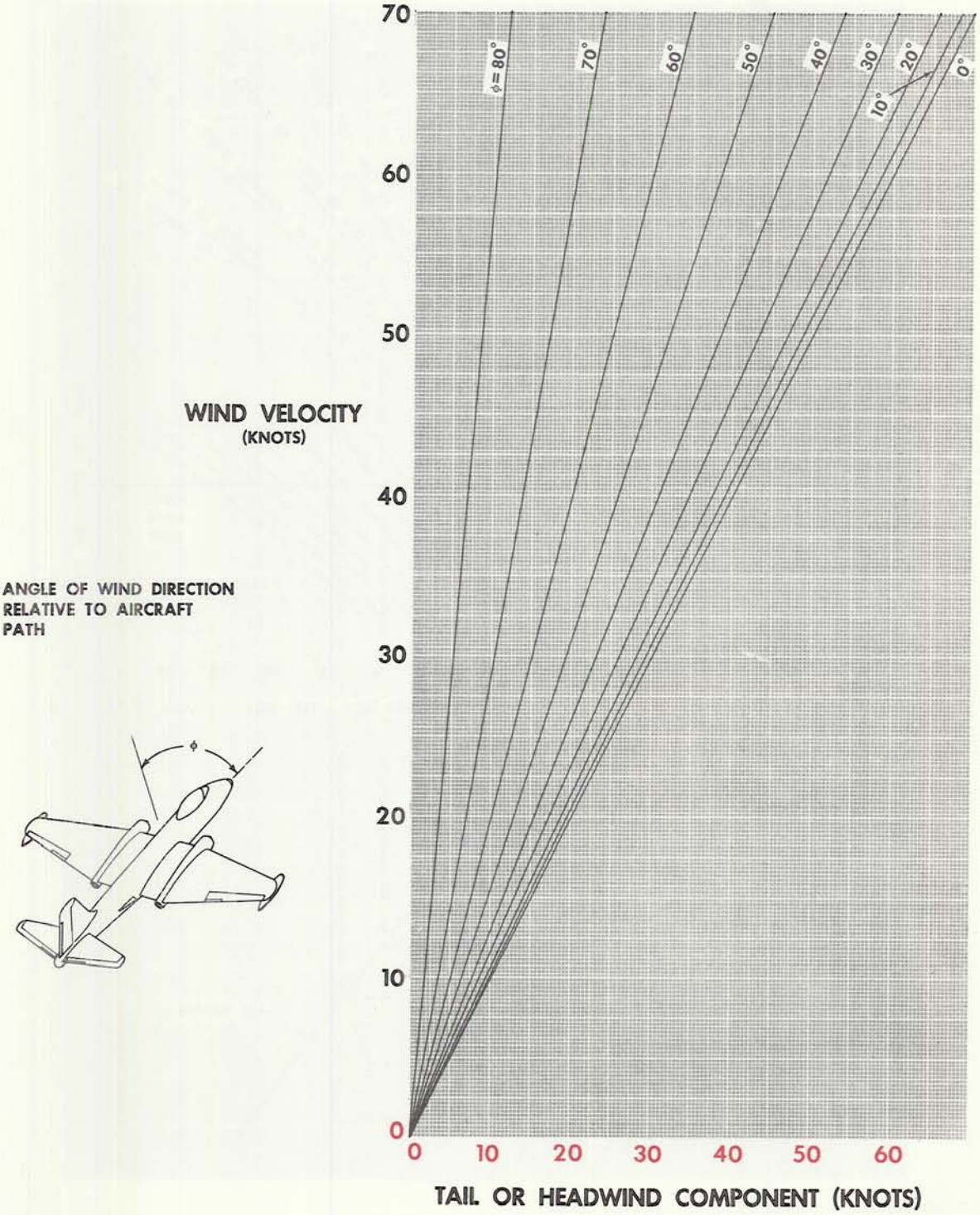
11790

Figure A-4B

effective wind

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5



ϕ = ANGLE OF WIND DIRECTION RELATIVE TO AIRCRAFT PATH

DATA ESTIMATED 4-1-56

11740

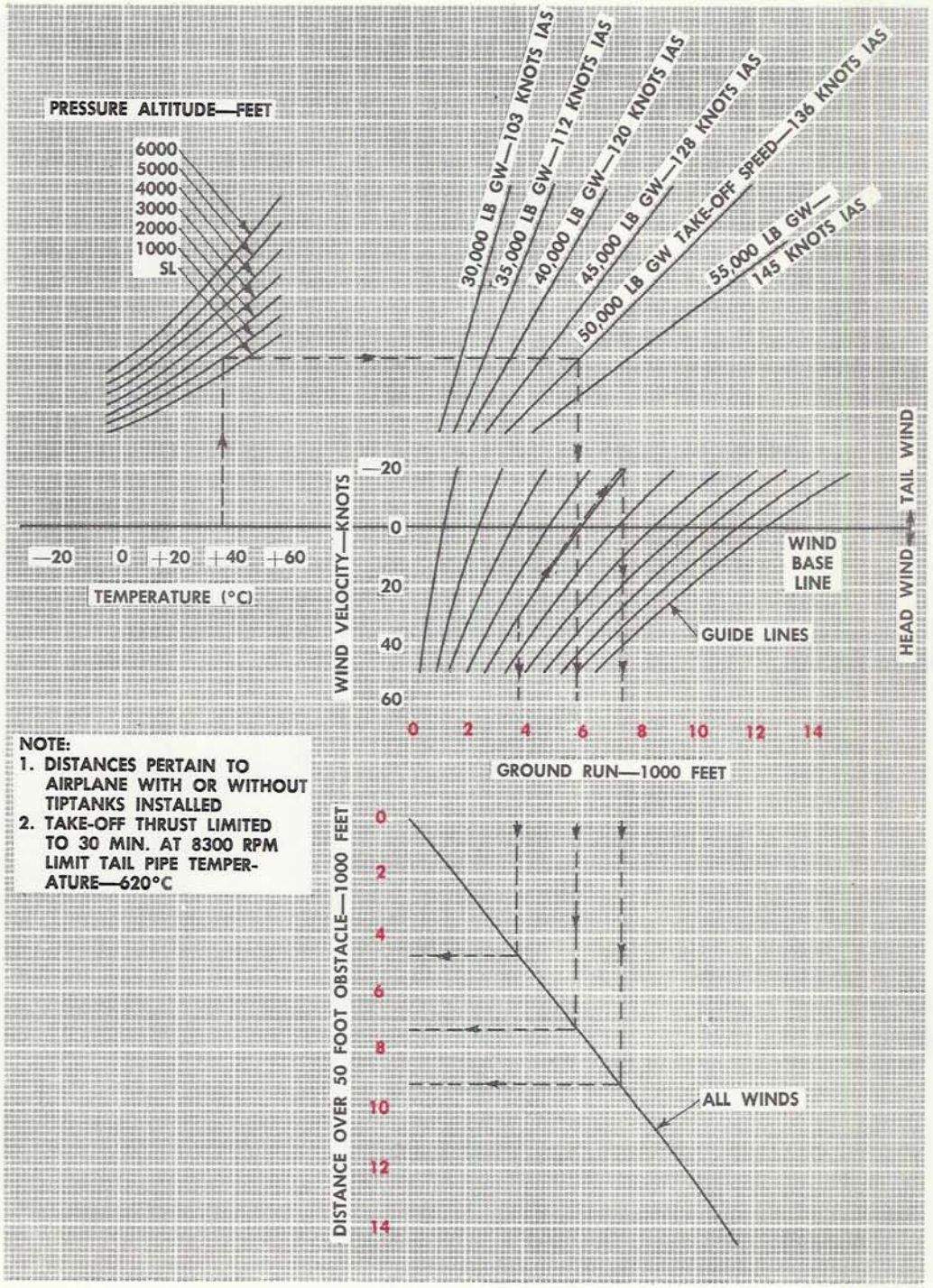
Figure A-5

take-off distances

MILITARY POWER

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB PER GAL



NOTE:
1. DISTANCES PERTAIN TO AIRPLANE WITH OR WITHOUT TIPTANKS INSTALLED
2. TAKE-OFF THRUST LIMITED TO 30 MIN. AT 8300 RPM LIMIT TAIL PIPE TEMPERATURE—620°C

DATA AS OF: 4-1-56
DATA BASIS: ESTIMATED

11742

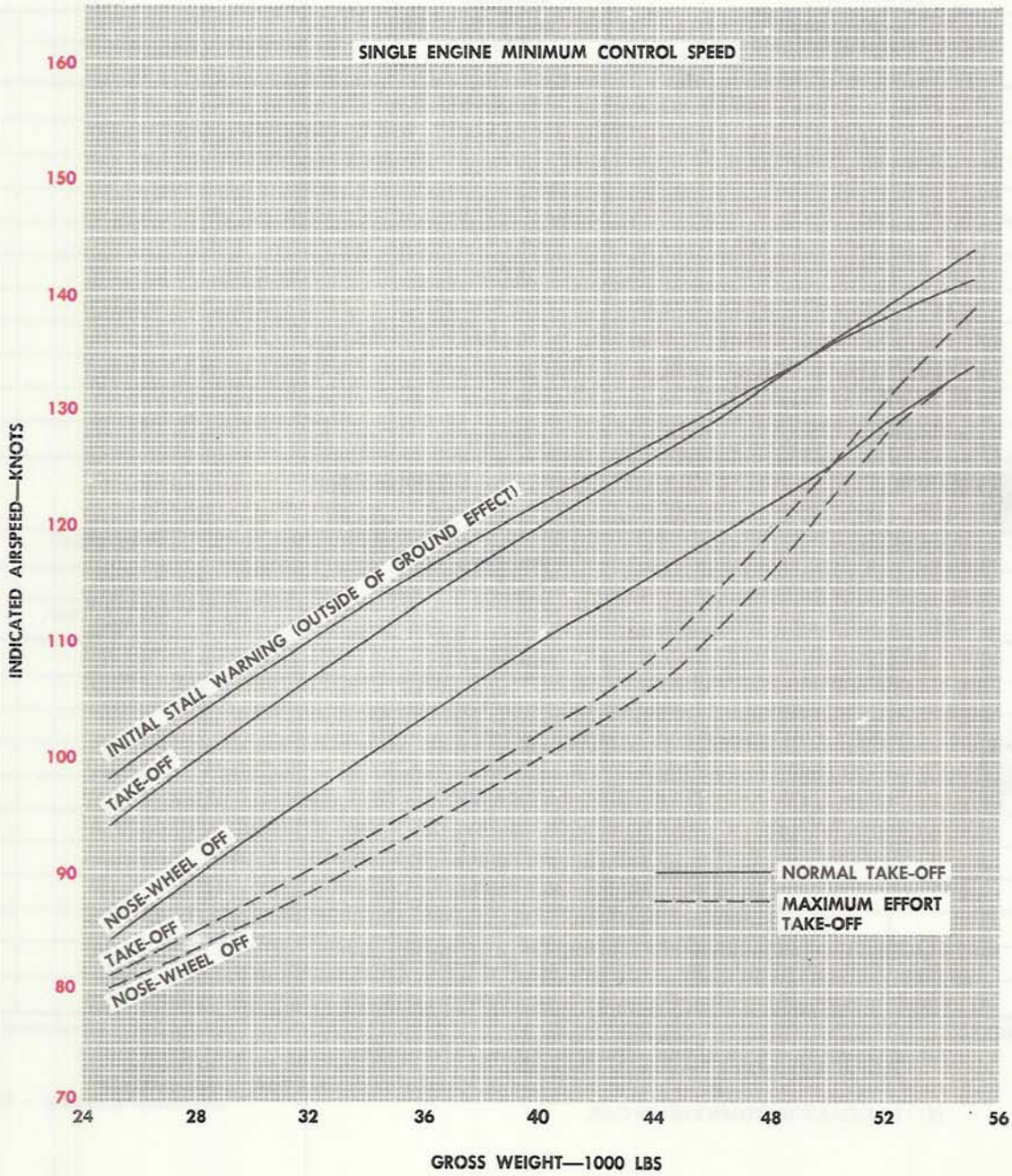
Figure A-6

take-off speeds

HARD SURFACE RUNWAY
MILITARY THRUST
FLAPS UP

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB PER GAL



DATA AS OF: 4-1-56
DATA BASIS: ESTIMATED

11743

Figure A-7

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL	KNOTS			FUEL	TIME	DIST.	
6400	0	0	985(1)	314	SEA LEVEL					
5750	5	0.8	1160	312	5,000					
5100	10	1.8	1330	305	10,000					
4500	16	2.8	1500	297	15,000					
3900	23	4.0	1660	286	20,000					
3350	32	5.3	1830	271	25,000					
2800	43	6.9	2000	256	30,000					
2200	57	8.8	2180	240	35,000					
1500	74	11.6	2370	214	40,000					
750	105	16.0	2610	192	45,000					
					50,000					

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
					SEA LEVEL					
					5,000					
					10,000					
					15,000					
					20,000					
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE TO CLIMB SPEED

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: NAUTILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED - KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-8

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL			KNOTS		KNOTS	FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
3800	0	0	985 (1)	320	SEA LEVEL	318	985 (1)	0	0	4250
3350	7	1.4	1280	317	5,000	316	1240	1.2	6	3750
2900	17	3.0	1560	310	10,000	310	1500	2.7	15	3300
2500	28	4.8	1860	302	15,000	301	1770	4.3	25	2800
2100	42	7.0	2160	290	20,000	290	2040	6.2	37	2400
1700	60	9.6	2500	276	25,000	276	2320	8.5	52	2000
1250	82	13.0	2870	259	30,000	259	2610	11.4	71	1550
750	117	18.1	3330	241	35,000	241	2950	15.0	96	1000
					40,000	216	3450	21.7	143	400
					45,000					
					50,000					

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL			KNOTS		KNOTS	FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
4750	0	0	985 (1)	317	SEA LEVEL	316	985 (1)	0	0	5500
4250	6	1.1	1210	316	5,000	314	1190	1.0	5	4850
3750	13	2.4	1450	308	10,000	307	1390	2.1	11	4300
3250	22	3.8	1680	300	15,000	299	1590	3.3	19	3800
2800	32	5.5	1910	289	20,000	288	1790	4.8	28	3300
2300	45	7.4	2150	275	25,000	273	1990	6.3	39	2800
1900	61	9.8	2400	258	30,000	258	2200	8.3	52	2300
1350	81	12.7	2660	241	35,000	241	2420	10.7	68	1750
700	114	17.4	3000	216	40,000	215	2660	14.2	92	1100
					45,000	192	3060	21.2	140	400
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: NAUTICAL MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-9

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL W ING TIP TANKS
WEIGHT: 35,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 30,800 POUNDS

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL			KNOTS		KNOTS	FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
5350	0	0	985 (1)	306	SEA LEVEL	305	985 (1)	0	0	6150
4750	5	1.0	1190	300	5,000	298	1160	0.9	5	5600
4190	11	2.2	1390	294	10,000	293	1330	1.9	10	4900
3650	19	3.5	1600	286	15,000	285	1510	3.0	16	4300
3100	28	4.9	1810	276	20,000	275	1690	4.2	24	3700
2600	39	6.7	2020	264	25,000	263	1870	5.7	34	2130
2100	53	8.9	2250	249	30,000	248	2050	7.6	45	2550
1590	73	11.7	2500	233	35,000	233	2240	9.8	60	2000
910	98	15.5	2770	210	40,000	209	2450	12.7	80	1350
					45,000	188	2720	17.2	113	670
					50,000					

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
					SEA LEVEL					
					5,000					
					10,000					
					15,000					
					20,000					
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE NAUT MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-10

CLIMB CHART FOR NORMAL POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
3350	0	0	985 (1)	310	SEA LEVEL	309	985 (1)	0	0	3700
2920	8	1.5	1300	305	5,000	303	1280	1.4	8	3250
2480	19	3.5	1670	298	10,000	297	1580	3.1	17	2800
2100	32	5.7	2020	290	15,000	289	1890	5.1	28	2350
1700	47	8.3	2380	280	20,000	279	2200	7.4	42	1950
1290	69	11.6	2800	266	25,000	265	2550	10.2	60	1500
840	98	16.3	3280	250	30,000	250	2940	14.0	84	1110
410	154	24.0	4060	235	35,000	235	3440	19.7	123	620
					40,000					
					45,000					
					50,000					

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
4100	0	0	985 (1)	308	SEA LEVEL	307	985 (1)	0	0	4640
3680	7	1.3	1250	302	5,000	301	1220	1.2	6	4120
3200	15	2.8	1500	296	10,000	295	1450	2.4	13	3620
2700	24	4.5	1780	288	15,000	287	1690	4.0	21	3110
2270	37	6.5	2050	278	20,000	277	1930	5.7	32	2610
1820	52	8.9	2360	265	25,000	264	2190	7.8	46	2180
1390	72	12.0	2680	250	30,000	249	2460	10.4	62	1690
880	102	16.4	3060	234	35,000	234	2760	13.8	86	1200
300	154	24.4	3660	213	40,000	211	3140	19.2	121	610
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE NAUTMILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-11

CLIMB CHART FOR MILITARY POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
8000	0	0	985 (1)	361	SEA LEVEL					
7300	4	0.6	1140	350	5,000					
6550	9	1.4	1310	336	10,000					
5800	14	2.2	1460	320	15,000					
5050	20	3.1	1620	302	20,000					
4300	28	4.2	1780	283	25,000					
3550	36	5.5	1930	263	30,000					
2800	47	7.1	2080	243	35,000					
2000	61	9.2	2260	217	40,000					
1150	84	12.4	2470	194	45,000					
350	129	19.3	2830	172	50,000					

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
					SEA LEVEL					
					5,000					
					10,000					
					15,000					
					20,000					
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: NAUT MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-12

CLIMB CHART FOR MILITARY POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
4950	0	0	985 (1)	366	SEA LEVEL	365	985 (1)	0	0	5500
4400	6	1.1	1260	354	5,000	353	1220	0.9	6	4900
3850	15	2.3	1530	342	10,000	339	1460	2.0	13	4300
3350	24	3.7	1790	326	15,000	323	1700	3.2	21	3750
2800	35	5.4	2060	306	20,000	304	1940	4.7	31	3200
2300	48	7.2	2350	287	25,000	285	2180	6.4	42	2650
1750	66	9.7	2630	267	30,000	266	2440	8.5	57	2100
1100	89	13.1	2960	245	35,000	245	2720	11.3	76	1400
400	130	19.0	3480	221	40,000	220	3090	15.7	108	750
					45,000					
					50,000					

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
6200	0	0	985 (1)	364	SEA LEVEL	363	985 (1)	0	0	7050
5500	5	0.8	1200	352	5,000	351	1170	0.8	5	6300
4850	11	1.8	1410	338	10,000	337	1360	1.6	10	5600
4250	19	2.9	1610	322	15,000	321	1540	2.5	16	4950
3650	27	4.2	1830	303	20,000	302	1720	3.6	23	4300
3050	37	5.6	2040	284	25,000	283	1900	4.8	32	3650
2450	49	7.4	2260	265	30,000	264	2090	6.4	42	3000
1850	65	9.7	2490	244	35,000	244	2280	8.3	56	2250
1100	90	13.1	2780	219	40,000	218	2500	11.0	74	1450
350	147	20.4	3260	195	45,000	194	2810	15.7	107	650
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE NAUT MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-13

CLIMB CHART FOR MILITARY POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 35,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 30,800 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
6700	0	0	985 (1)	340	SEA LEVEL	339	985 (1)	0	0	7760
5910	5	0.8	1170	331	5,000	330	1150	0.7	4	6950
5230	10	1.8	1370	320	10,000	319	1310	1.6	9	6150
4570	16	2.7	1560	307	15,000	306	1470	2.4	14	5400
3920	24	3.9	1760	292	20,000	291	1635	3.4	20	4680
3310	33	5.3	1950	276	25,000	275	1800	4.6	28	4000
2700	44	7.0	2150	258	30,000	258	1970	6.0	37	3335
2090	58	9.0	2370	238	35,000	238	2140	7.6	47	2620
1320	79	11.8	2600	214	40,000	213	2320	9.9	63	1820
600	114	16.1	2950	190	45,000	189	2550	13.3	88	1020
					50,000	169	2870	21.1	137	260

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
					SEA LEVEL					
					5,000					
					10,000					
					15,000					
					20,000					
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: Naut. MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-14

CLIMB CHART FOR MILITARY POWER

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
4250	0	0	985 (1)	345	SEA LEVEL	344	985 (1)	0	0	4700
3750	8	1.2	1290	335	5,000	334	1260	1.1	7	4150
3250	15	2.8	1600	324	10,000	323	1550	2.5	14	3600
2750	27	4.4	1920	311	15,000	310	1830	4.0	24	3050
2250	39	6.5	2250	296	20,000	295	2120	5.7	36	2550
1760	56	9.2	2590	280	25,000	279	2430	8.0	49	2050
1280	78	12.2	2980	261	30,000	260	2760	10.6	69	1550
780	110	17.0	3470	240	35,000	240	3150	14.4	95	1050
100	189	28.8	4360	216	40,000	216	3750	21.5	145	350
					45,000					
					50,000					

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
5250	0	0	985 (1)	342	SEA LEVEL	341	985 (1)	0	0	5820
4600	0	1.0	1230	333	5,000	332	1200	0.9	6	5200
4000	13	2.2	1490	322	10,000	321	1430	2.0	12	4500
3500	22	3.5	1740	309	15,000	308	1650	3.1	19	3950
2950	32	5.0	2000	294	20,000	293	1880	4.4	28	3350
2400	43	6.9	2270	278	25,000	277	2110	6.0	38	2800
1850	60	9.2	2550	260	30,000	259	2350	8.0	52	2250
1350	81	12.3	2860	239	35,000	239	2600	10.6	69	1700
650	119	17.3	3280	215	40,000	214	2910	14.3	98	980
					45,000	191	3460	22.6	153	250
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: Naut. MILES
TIME: MINUTES
FUEL: POUNDS/HR
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-15

CLIMB CHART FOR MILITARY POWER

STANDARD DAY
ONE ENGINE OPERATION

MODEL(S): B-57B ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

APPROXIMATE RATE OF CLIMB	FROM SEA LEVEL DIST.	TIME	FUEL	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE FROM SEA LEVEL FUEL	TIME	DIST.	RATE OF CLIMB
2450	0	0	985 (1)	234	SEA LEVEL					
2100	9	2.2	1230	223	5,000					
1750	18	4.8	1490	213	10,000					
1400	33	8.0	1780	208	15,000					
1040	51	12.1	2100	198	20,000					
700	76	17.6	2450	188	25,000					
400	120	27.6	2990	178	30,000					
					35,000					
					40,000					
					45,000					
					50,000					

CONFIGURATION:
WEIGHT:

APPROXIMATE RATE OF CLIMB	FROM SEA LEVEL DIST.	TIME	FUEL	CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE FROM SEA LEVEL FUEL	TIME	DIST.	RATE OF CLIMB
					SEA LEVEL					
					5,000					
					10,000					
					15,000					
					20,000					
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: NAUTICAL MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-16

CLIMB CHART FOR MILITARY POWER

STANDARD DAY
ONE ENGINE OPERATION

MODEL(S): B-57B ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

APPROXIMATE RATE OF CLIMB	FROM SEA LEVEL DIST.	TIME	FUEL	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE FROM SEA LEVEL FUEL	TIME	DIST.	RATE OF CLIMB
1170	0	0	985 (1)	246	SEA LEVEL	243	985 (1)	0	0	1400
900	21	4.6	1560	242	5,000	237	1430	3.8	16	1130
660	48	11.1	2190	232	10,000	227	1940	8.9	38	860
400	89	20.5	2980	226	15,000	222	2550	15.8	68	580
140	177	41.0	4460	216	20,000	212	3390	27.2	122	300
					25,000					
					30,000					
					35,000					
					40,000					
					45,000					
					50,000					

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

APPROXIMATE RATE OF CLIMB	FROM SEA LEVEL DIST.	TIME	FUEL	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE FROM SEA LEVEL FUEL	TIME	DIST.	RATE OF CLIMB
1700	0	0	985 (1)	240	SEA LEVEL	237	985 (1)	0	0	2050
1400	13	3.1	1340	232	5,000	228	1280	2.5	11	1740
1100	30	7.1	1760	222	10,000	218	1600	5.7	24	1400
800	53	12.4	2220	217	15,000	213	1960	9.8	41	1080
500	88	20.0	2800	207	20,000	203	2370	15.3	65	750
200	152	33.8	3630	197	25,000	193	2910	24.0	105	450
					30,000	183	3800	46.0	210	130
					35,000					
					40,000					
					45,000					
					50,000					

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

REMARKS:

(1) ALLOWANCE FOR START ENGINES, TAXI, TAKE-OFF AND ACCELERATE-TO-CLIMB SPEED.

(2) CLIMB AT RECOMMENDED CAS.

RATE OF CLIMB: FEET PER MINUTE
DISTANCE NAUT MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-17

DESCENT CHART

STANDARD DAY

MODEL B-57B

FUSELAGE AND WING BRAKES EXTENDED
IDLING POWER

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 35,600 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 30,100 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL						TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
4,200	34	4.8	105	200	45,000	200	91	4.2	29	4,500
5,150	26	3.7	91	220	40,000	220	78	3.2	22	5,700
6,200	20	2.8	80	250	35,000	250	68	2.4	17	7,000
7,750	15	2.0	69	280	30,000	280	60	1.8	12	8,900
9,700	11	1.5	57	310	25,000	310	49	1.2	9	11,200
12,300	7	1.0	46	345	20,000	345	39	.9	6	14,400
15,900	3	.7	31	378	15,000	378	26	.5	4	18,900
20,800	2	.4	17	415	10,000	415	14	.3	2	24,800
26,300	1	.2	6	451	5,000	451	5	.1	1	31,600
31,900	0	0	0	490	SEA LEVEL	490	0	0	0	38,000

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL						TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
					45,000					
					40,000					
					35,000					
					30,000					
					25,000					
					20,000					
					15,000					
					10,000					
					5,000					
					SEA LEVEL					

REMARKS:

RATE OF DESCENT FEET PER MINUTE
DISTANCE: Naut. MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

(1) MAINTAIN IDLE POWER THROUGHOUT DESCENT.

(2) REFER TO MAXIMUM GLIDE CHART FOR OPTIMUM DESCENT RANGE WITHOUT POWER, SPEED BRAKES RETRACTED.

DATA AS OF: 15 DECEMBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-18

DESCENT CHART

STANDARD DAY

MODEL B-57B

FUSELAGE AND WING BRAKES EXTENDED
IDLING POWER

ENGINE(S):(TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 36,500 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 31,000 POUNDS

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL			KNOTS		KNOTS	TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
4,400	33	4.7	106	200	45,000	200	91	4.2	29	4,650
5,250	26	3.7	90	220	40,000	220	78	3.2	22	5,800
6,300	20	2.8	80	250	35,000	250	68	2.4	16	7,150
7,800	14	2.1	70	280	30,000	280	60	1.8	12	9,000
9,850	10	1.4	59	310	25,000	310	50	1.2	9	11,400
12,700	7	1.0	47	345	20,000	345	39	.8	6	14,600
16,400	5	.6	32	380	15,000	380	27	.5	4	19,200
20,900	3	.4	19	415	10,000	415	16	.3	2	24,700
24,300	1	.2	8	440(1)	5,000	440(1)	7	.1	1	28,600
25,000	0	0	0	434(1)	SEA LEVEL	434(1)	0	0	0	29,700

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL						TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
					45,000					
					40,000					
					35,000					
					30,000					
					25,000					
					20,000					
					15,000					
					10,000					
					5,000					
					SEA LEVEL					

REMARKS:

(1) SPEED LIMITED BY PROVED LIMITS OF NORMAL CONTROL

(2) MAINTAIN IDLE POWER THROUGHOUT DESCENT.

(3) REFER TO MAXIMUM GLIDE CHART FOR OPTIMUM DESCENT RANGE WITHOUT POWER, SPEED BRAKES RETRACTED.

DESCENT
RATE OF FEET PER MINUTE
DISTANCE: Naut. MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 15 DECEMBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-19

DESCENT CHART

STANDARD DAY

ONE ENGINE OPERATION

MODEL B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 35,600 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 30,100 POUNDS

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL						TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
					45,000					
					40,000					
					35,000					
9600	13	1.8	32	280	30,000	280	27	1.6	11	11,500
11,200	10	1.3	27	310	25,000	310	23	1.1	8	13,300
13,900	7	.9	22	345	20,000	345	18	.8	5	16,400
17,300	4	.6	14	378	15,000	378	12	.5	3	20,600
21,600	3	.3	8	415	10,000	415	7	.3	2	26,000
27,400	1	.1	3	451	5,000	451	2	.1	1	33,100
34,600	0	0	0	490	SEA LEVEL	490	0	0	0	41,800

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE				CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE			
RATE OF DESCENT	TO SEA LEVEL						TO SEA LEVEL			RATE OF DESCENT
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
					50,000					
					45,000					
					40,000					
					35,000					
					30,000					
					25,000					
					20,000					
					15,000					
					10,000					
					5,000					
					SEA LEVEL					

REMARKS:

(1) MAINTAIN IDLE POWER ON OPERATING ENGINE THROUGHOUT DESCENT.

(2) REFER TO MAXIMUM GLIDE CHART FOR OPTIMUM DESCENT RANGE WITHOUT POWER. SPEED BRAKES RETRACTED.

(3) SPEED SCHEDULE IS APPROXIMATELY M = .74

RATE OF DESCENT FEET PER MINUTE
DISTANCE: NAUT MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED KNOTS

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-20

LANDING DISTANCE - FEET

STANDARD DAY

MODEL (S): B-57C AND B

ENGINE (S)(TWO) J65-W-5

GROSS WEIGHT LB	BEST CAS FOR APPROACH		60 DEGREE FLAPS - HARD SURFACE - NO WIND							
	POWER OFF	POWER ON	AT SEA LEVEL		AT 2000 FT		AT 4000 FT		AT 6000 FT	
			GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'	GROUND ROLL	CLEAR 50'
50,000	143	143	2180	4250	2310	4500	2460	4760	2620	5030
40,000	128	128	1750	3580	1850	3800	1970	4030	2100	4250
30,000	111	111	1310	2930	1400	3110	1490	3300	1570	3470
26,000	103	103	1140	2670	1220	2840	1300	3010	1370	3170

REMARKS:

(a) DATA BASED ON LANDING WITH SPEED BRAKES RETRACTED.

(b) FOR LANDING WITH SPEED BRAKES EXTENDED, REDUCE THESE DISTANCES BY 5%.

(c) THESE LANDING DISTANCES AND APPROACH SPEEDS ARE PART OF NORMAL LANDING PROCEDURE. OPTIMUM LANDING TECHNIQUE RESULTS IN SHORTER DISTANCES.

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

CAS: CALIBRATED AIRSPEED

Figure A-21

MAXIMUM ENDURANCE

STANDARD DAY

MODEL (S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB/HR.	%RPM	KNOTS			%RPM	/HR.
3240	71	150	SEA LEVEL			
2920	72	150	5,000			
2650	73	150	10,000			
2450	74	150	15,000			
2280	75	150	20,000			
2150	77	151	25,000			
2070	78	153	30,000			
2020	81	156	35,000			
2110	84	160	40,000			
2200	89	163	45,000			
2280	95	167	50,000			

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
/HR.	%RPM				%RPM	/HR.
			SEA LEVEL			
			5,000			
			10,000			
			15,000			
			20,000			
			25,000			
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN.
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-22

MAXIMUM ENDURANCE

STANDARD DAY

MODEL (S): B-57B

ENGINE(S):(TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB/HR.	%RPM	KNOTS		KNOTS	%RPM	LB/HR.
4200	76	188	SEA LEVEL	180	74	3900
3910	77	188	5,000	180	76	3650
3700	79	188	10,000	180	78	3420
3530	80	188	15,000	180	79	3260
3400	82	188	20,000	180	80	3130
3350	84	190	25,000	182	82	3070
3350	86	193	30,000	184	84	3030
3450	90	198	35,000	187	88	3030
			40,000	192	92	3200
			45,000			
			50,000			

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB/HR.	%RPM	KNOTS		KNOTS	%RPM	LB/HR.
3700	73	171	SEA LEVEL	160	72	3460
3400	75	171	5,000	160	73	3150
3160	76	171	10,000	160	74	2900
3000	77	171	15,000	160	76	2710
2850	79	171	20,000	160	77	2570
2750	80	172	25,000	162	79	2460
2700	82	174	30,000	164	80	2400
2660	85	177	35,000	167	83	2350
2810	90	182	40,000	170	87	2460
2960	96	190	45,000	174	92	2600
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN.
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-23

MAXIMUM ENDURANCE

STANDARD DAY

MODEL (S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS WEIGHT: 35,300 POUNDS				CONFIGURATION: 2 X 320 GAL WING TIP TANKS WEIGHT: 30,800 POUNDS		
APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB /HR.	%RPM	KNOTS		KNOTS	%RPM	LB /HR.
3470	72	156	SEA LEVEL	145	71	3280
3180	73	156	5,000	145	71	2930
2930	75	156	10,000	145	73	2670
2740	76	156	15,000	145	74	2480
2620	78	158	20,000	145	76	2340
2500	79	158	25,000	150	77	2230
2450	81	160	30,000	150	79	2140
2440	84	163	35,000	150	81	2080
2580	88	166	40,000	155	85	2180
2720	94	170	45,000	160	91	2300
			50,000			

CONFIGURATION: WEIGHT:				CONFIGURATION: WEIGHT:		
APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
/HR.	%RPM				%RPM	/HR.
			SEA LEVEL			
			5,000			
			10,000			
			15,000			
			20,000			
			25,000			
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-24

MAXIMUM ENDURANCE

STANDARD DAY

MODEL (S): B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE	CAS	APPROXIMATE	
LB/HR.	%RPM	KNOTS	FEET	KNOTS	%RPM	LB/HR.
4440	77	194	SEA LEVEL	185	76	4190
4200	78	194	5,000	185	77	3960
4010	80	194	10,000	185	79	3750
3880	82	194	15,000	185	81	3610
3800	84	195	20,000	187	83	3500
3780	86	195	25,000	187	85	3480
3830	89	198	30,000	190	87	3490
3940	92	202	35,000	193	91	3560
			40,000			
			45,000			
			50,000			

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE	CAS	APPROXIMATE	
LB/HR.	%RPM	KNOTS	FEET	KNOTS	%RPM	LB/HR.
3940	75	176	SEA LEVEL	166	74	3700
3700	77	176	5,000	166	75	3440
3470	78	176	10,000	166	77	3200
3300	79	176	15,000	166	78	3020
3200	81	178	20,000	169	79	2900
3140	83	178	25,000	169	81	2820
3120	85	180	30,000	171	83	2780
3180	88	184	35,000	174	86	2800
3340	94	188	40,000	177	91	2960
			45,000			
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN.
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-25

MAXIMUM ENDURANCE

STANDARD DAY

ONE ENGINE OPERATION

MODEL (S): B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB /HR.	%RPM				%RPM	/HR.
2600	80	142	SEA LEVEL			
2370	81	148	5,000			
2200	82	151	10,000			
2130	83	154	15,000			
2120	86	154	20,000			
2230	89	154	25,000			
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
/HR.	%RPM				%RPM	/HR.
			SEA LEVEL			
			5,000			
			10,000			
			15,000			
			20,000			
			25,000			
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-26

MAXIMUM ENDURANCE

STANDARD DAY

MODEL (S): B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB /HR.	%RPM	KNOTS		KNOTS	%RPM	LB /HR.
3800	88	184	SEA LEVEL	174	86	3500
3630	90	188	5,000	177	88	3320
3540	92	190	10,000	180	89	3200
3550	93	191	15,000	181	91	3160
			20,000	182	92	3300
			25,000			
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

APPROXIMATE		CAS	PRESSURE ALTITUDE FEET	CAS	APPROXIMATE	
LB /HR.	%RPM	KNOTS		KNOTS	%RPM	LB/HR.
3200	84	163	SEA LEVEL	153	82	2880
3020	85	168	5,000	158	83	2690
2900	87	171	10,000	161	84	2550
2840	88	172	15,000	163	86	2460
2870	90	173	20,000	163	88	2500
3050	93	173	25,000	164	91	2630
			30,000			
			35,000			
			40,000			
			45,000			
			50,000			

REMARKS:

CAS - CALIBRATED AIRSPEED KN
LB/HR. - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-27

COMBAT ALLOWANCE CHART

CLEAN CONFIGURATION
STANDARD DAY

MODEL: B-57B

ENGINES: (TWO) J65-W-5

AT ALTITUDE FEET	FUEL REQUIRED - POUNDS PER MINUTE		
	96.5% RPM NORMAL POWER MAXIMUM CONTINUOUS	100% RPM MILITARY POWER 30 MINUTE LIMIT	FOR LEVEL FLIGHT AT PROVED LIMIT OF NORMAL CONTROL
SEA LEVEL	—	—	210
5,000	—	—	182
10,000	—	—	163
15,000	—	—	157
20,000	150	169	
25,000	124	143	
30,000	104	111	
35,000	91	98	
40,000	65	78	
45,000			

REMARKS:
CLEAN: GROSS WEIGHT = 42,000 LB.

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB./GAL.

Figure A-28

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL : B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS KNOTS	TAS KNOTS	LB/HR
10,500	434	434	92	SEA LEVEL	91	434	434	10,300
10,400	468	438	93	5,000	93	438	468	10,300
9,300	477	420	92	10,000	92	420	477	9,300
7,900	470	384	92	15,000	92	384	470	7,700
6,300	460	348	91	20,000	91	348	460	6,300
5,500	450	313	90	25,000	90	313	450	5,400
4,850	441	281	92	30,000	92	281	441	4,850
4,600	431	251	94	35,000	93	251	431	4,500
				40,000				
				45,000				
				50,000				

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS KNOTS	TAS KNOTS	LB/HR
10,300	434	434	91	SEA LEVEL	91	434	434	10,200
10,300	468	438	93	5,000	93	438	468	10,200
9,300	477	420	92	10,000	92	420	477	9,300
7,600	470	384	91	15,000	91	384	470	7,600
6,300	460	348	91	20,000	90	348	460	6,000
5,400	450	313	90	25,000	89	313	450	5,200
4,600	441	281	91	30,000	90	281	441	4,400
4,000	431	251	92	35,000	90	251	431	3,750
3,900	430	225	96	40,000	93	225	430	3,500
				45,000				
				50,000				

REMARKS:

(1) SPEED LIMITED BY PROVED LIMITS OF NORMAL CONTROL (.75 M ABOVE 8,000 FEET ALTITUDE).

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
LB/HR - FUEL CONSUMPTION

DATA AS OF: 15 DECEMBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-29

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL(S): B-57B ENGINE(S): (TWO) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

APPROXIMATE LB/HR	TAS KNOTS	CAS KNOTS	%RPM	PRESSURE ALTITUDE FEET
12,780	495 x	495 x	94	SEA LEVEL
11,000	496 x	465 x	93.5	5,000
9,950	499 x	438 x	93.5	10,000
9,700	504 x	413 x	95.5	15,000
8,750	497	378	96.5	20,000
7,400	485	339	96.5	25,000
6,300	473	304	96.5	30,000
5,250	457	269	96.5	35,000
				40,000
				45,000
				50,000

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

%RPM	APPROXIMATE CAS KNOTS	TAS KNOTS	LB/HR
94	495 x	495 x	12,700
93.5	465 x	496 x	10,950
93.5	438 x	499 x	9,820
95	413 x	504 x	9,530
96.5	379	498	8,750
96.5	341	487	7,500
96.5	306	476	6,300
96.5	272	462	5,250
96.5	232	444	4,000

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

APPROXIMATE LB/HR	TAS KNOTS	CAS KNOTS	%RPM	PRESSURE ALTITUDE FEET
12,620	495 x	495 x	94	SEA LEVEL
10,860	496 x	465 x	93	5,000
9,720	499 x	438 x	93	10,000
9,360	504 x	413 x	94.5	15,000
8,740	499	380	96.5	20,000
7,500	489	343	96.5	25,000
6,300	478	308	96.5	30,000
5,250	466	274	96.5	35,000
4,000	452	238	96.5	40,000
				45,000
				50,000

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

%RPM	APPROXIMATE CAS KNOTS	TAS KNOTS	LB/HR
94	495 x	495 x	12,600
93	465 x	496 x	10,750
93	438 x	499 x	9,640
94.5	413 x	504 x	9,220
96.5	380	500	8,750
96.5	343	490	7,500
96.5	310	480	6,320
96.5	278	469	5,280
96.5	241	459	4,120
96.5	207	444	3,200

REMARKS:

(x) PROVED LIMITS OF NORMAL CONTROL (COMPRESSIBILITY, BUFFET AND/OR PITCH CHANGE).

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
LB/HR - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-30

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL : B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 35,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 30,800 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS KNOTS	TAS KNOTS	LB/HR
10,100	434	434	91	SEA LEVEL	91	434	434	10,100
10,100	468	438	93	5,000	93	438	468	10,100
9,300	477	420	92	10,000	92	420	477	9,300
7,500	470	384	91	15,000	91	384	470	7,400
6,000	460	348	90	20,000	90	348	460	5,900
5,000	450	313	89	25,000	88	313	450	4,800
4,200	441	281	89	30,000	88	281	441	4,000
3,500	431	251	88	35,000	87	251	431	3,300
3,100	430	225	91	40,000	89	225	430	2,900
				45,000	93	200	430	2,700
				50,000				

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/	TAS	CAS				CAS	TAS	/HR
				SEA LEVEL				
				5,000				
				10,000				
				15,000				
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

(1) SPEED LIMITED BY PROVED LIMITS OF NORMAL CONTROL (.75 M ABOVE 8,000 FEET ALTITUDE).

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
/HR - FUEL CONSUMPTION

DATA AS OF: 15 DECEMBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-31

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL : B-57B

ENGINE(S): (TWO) J65-W-5

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET
LB/HR	TAS KNOTS	CAS KNOTS		
10,500	434	434	92	SEA LEVEL
10,400	468	438	93	5,000
9,300	477	420	92	10,000
7,900	470	384	92	15,000
6,300	460	348	91	20,000
5,500	450	313	90	25,000
4,850	441	281	92	30,000
4,600	431	251	94	35,000
				40,000
				45,000
				50,000

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

%RPM	APPROXIMATE		
	CAS KNOTS	TAS KNOTS	LB/HR
91	434	434	10,300
93	438	468	10,300
92	420	477	9,300
92	384	470	7,700
91	348	460	6,300
90	313	450	5,400
92	281	441	4,850
93	251	431	4,500

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET
LB/HR	TAS KNOTS	CAS KNOTS		
10,300	434	434	91	SEA LEVEL
10,300	468	438	93	5,000
9,300	477	420	92	10,000
7,600	470	384	91	15,000
6,300	460	348	91	20,000
5,400	450	313	90	25,000
4,600	441	281	91	30,000
4,000	431	251	92	35,000
3,900	430	225	96	40,000
				45,000
				50,000

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

%RPM	APPROXIMATE		
	CAS KNOTS	TAS KNOTS	LB/HR
91	434	434	10,200
93	438	468	10,200
92	420	477	9,300
91	384	470	7,600
90	348	460	6,000
89	313	450	5,200
90	281	441	4,400
90	251	431	3,750
93	225	430	3,500

REMARKS:

(1) SPEED LIMITED BY PROVED LIMITS OF NORMAL CONTROL (.75 M ABOVE 8,000 FEET ALTITUDE).

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
LB/HR - FUEL CONSUMPTION

DATA AS OF: 15 DECEMBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-32

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS	TAS	/HR
6650	355	355	96.5	SEA LEVEL				
5940	362	337	96.5	5,000				
5230	362	317	96.5	10,000				
4550	368	298	96.5	15,000				
3900	365	272	96.5	20,000				
3250	362	247	96.5	25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

CONFIGURATION:
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/	TAS	CAS				CAS	TAS	/HR
				SEA LEVEL				
				5,000				
				10,000				
				15,000				
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
LB /HR - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-33

MAXIMUM CONTINUOUS POWER SUMMARY

STANDARD DAY

MODEL(S): B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION: CLEAN
WEIGHT: 48,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS KNOTS	TAS KNOTS	LB/HR
6550	344	343	96.5	SEA LEVEL	96.5	347	347	6630
5860	343	318	96.5	5,000	96.5	323	348	5880
5130	335	291	96.5	10,000	96.5	302	346	5150
				15,000	96.5	277	348	4410
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

CONFIGURATION: CLEAN
WEIGHT: 39,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

APPROXIMATE			%RPM	PRESSURE ALTITUDE FEET	%RPM	APPROXIMATE		
LB/HR	TAS KNOTS	CAS KNOTS				CAS KNOTS	TAS KNOTS	LB/HR
6650	350	350	96.5	SEA LEVEL	96.5	354	353	6650
5900	353	328	96.5	5,000	96.5	333	358	5910
5170	353	308	96.5	10,000	96.5	313	358	5200
4500	353	288	96.5	15,000	96.5	292	360	4500
				20,000	96.5	266	355	3860
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
TAS - TRUE AIRSPEED KNOTS
LB/HR - FUEL CONSUMPTION

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-34

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 30,500 POUNDS OR LESS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
180	45	365	3000	210	45	390	245	45	410	280	45	435	3000	315	45	455
120	45	190	2000	140	45	210	165	45	240	190	45	260	2000	210	45	280
60	15	---	1000	75	15	---	85	25	---	100	35	---	1000	110	35	120

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	304	84	4260	285	.64	4
						80 HW							278	82	4320	242	.69	2	281	82	4050	270	.72	4	80 HW	279	83	3770	294	.75	5
293	80	5000	253	.85	0	40 HW	279	80	4360	260	.84	1	267	80	3870	269	.85	2	257	80	3550	281	.86	4	40 HW	254	81	3330	301	.86	6
272	78	4530	272	1.00	0	0	261	79	3970	280	1.00	1	251	79	3560	290	1.00	2	243	80	3280	302	1.00	4	0	239	80	3090	322	1.00	6
257	77	4250	297	1.16	0	40 TW	243	77	3680	301	1.16	1	233	77	3290	309	1.15	2	225	78	3000	321	1.16	4	40 TW	223	79	2840	341	1.15	6
						80 TW							206	76	2920	319	1.34	2	211	77	2810	343	1.32	4	80 TW	214	78	2710	369	1.30	7
						120 TW																			120 TW	201	77	2580	393	1.46	8

Figure A-35

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 30,500 POUNDS OR LESS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			(1) FUEL POUNDS	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			(1) FUEL POUNDS	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
180	45	365	3000	210	45	390	245	45	410	280	45	435	3000	315	45	455
120	45	190	2000	140	45	210	165	45	240	190	45	260	2000	210	45	280
60	15	---	1000	75	15	---	85	25	---	100	35	---	1000	110	35	120

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	304	84	4260	285	.64	4
						80 HW							278	82	4320	242	.69	2	281	82	4050	270	.72	4	80 HW	279	83	3770	294	.75	5
293	80	5000	253	.85	0	40 HW	279	80	4360	260	.84	1	267	80	3870	269	.85	2	257	80	3550	281	.86	4	40 HW	254	81	3330	301	.86	6
272	78	4530	272	1.00	0	0	261	79	3970	280	1.00	1	251	79	3560	290	1.00	2	243	80	3280	302	1.00	4	0	239	80	3090	322	1.00	6
257	77	4250	297	1.16	0	40 TW	243	77	3680	301	1.16	1	233	77	3290	309	1.15	2	225	78	3000	321	1.16	4	40 TW	223	79	2840	341	1.15	6
						80 TW							206	76	2920	319	1.34	2	211	77	2810	343	1.32	4	80 TW	214	78	2710	369	1.30	7
						120 TW																			120 TW	201	77	2580	393	1.46	8

Figure A-36

AIRCRAFT MODEL (S) B-57B ENGINE(S) J65-W-5	FLIGHT OPERATION INSTRUCTION CHART STANDARD DAY CHART WT. LIMITS 35,000 TO 30,500 POUNDS	EXTERNAL LOAD ITEMS NONE NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
415	45	980	7000	485	45	1000	555	45	1025	625	45	1045	7000	705	45	1070
355	45	795	6000	410	45	820	470	45	845	530	45	865	6000	600	45	885
295	45	625	5000	345	45	650	395	45	670	445	45	695	5000	500	45	715
235	45	470	4000	275	45	490	315	45	510	355	45	530	4000	400	45	550
175	45	320	3000	205	45	335	235	45	350	265	45	370	3000	300	45	395
115	45	180	2000	135	45	190	155	45	205	175	45	225	2000	200	45	245
60	10	---	1000	70	15	---	80	15	----	90	25	----	1000	100	35	----

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	311	85	4540	295	.66	4
						80 HW							293	83	4700	258	.70	2	295	83	4430	286	.74	4	80 HW	291	84	4090	309	.76	5
300	80	5220	260	.85	0	40 HW	289	81	4690	270	.85	1	280	81	4270	284	.85	2	272	82	3950	298	.86	4	40 HW	269	82	3710	320	.87	6
279	79	4750	279	1.00	0	0	271	80	4290	291	1.00	1	263	80	3910	304	1.00	2	259	81	3650	321	1.00	4	0	255	81	3480	343	1.00	6
266	78	4500	306	1.16	0	40 TW	253	78	3970	312	1.16	1	244	79	3580	322	1.15	2	238	79	3340	337	1.15	4	40 TW	238	80	3210	361	1.14	6
						80 TW							214	78	3190	328	1.32	2	224	79	3140	360	1.31	4	80 TW	230	80	3180	390	1.37	7
						120 TW																			120 TW	218	80	2940	414	1.43	8

Figure A-37

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 35,000 TO 30,500 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (TWO)

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

IF YOU ARE AT 25000' RANGE IN AIRMILES			FUEL POUNDS	IF YOU ARE AT 30000' RANGE IN AIRMILES			IF YOU ARE AT 35000' RANGE IN AIRMILES			IF YOU ARE AT 40000' RANGE IN AIRMILES			FUEL POUNDS	IF YOU ARE AT 45000' RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
800	45	1090	7000	920	45	1105	1045	45	1125	1120	45	1140	7000	1150	45	----
680	45	905	6000	775	45	925	885	45	940	950	45	955	6000	970	45	----
565	45	735	5000	645	45	750	730	45	770	785	45	----	5000	800	45	----
450	45	570	4000	515	45	590	580	45	610	625	45	----	4000	640	45	----
340	45	425	3000	385	45	450	440	45	465	470	45	----	3000	480	45	----
225	45	260	2000	255	45	280	290	45	300	315	45	----	2000	325	45	----
120	35	----	1000	135	35	----	150	35	----	160	40	----	1000	170	45	----

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
291	85	4000	302	.68	6	120 HW	267	85	3460	300	.68	8	243	85	3010	298	.69	12	220	88	2780	303	.71	16	120 HW	197	94	2800	308	.71	21
280	84	3770	326	.77	7	80 HW	263	85	3390	334	.77	10	241	85	2950	335	.80	13	220	88	2780	343	.80	18	80 HW	196	93	2740	346	.81	23
264	83	3490	344	.88	8	40 HW	253	84	3180	359	.89	11	235	84	2880	369	.90	15	220	88	2780	383	.90	20	40 HW	195	93	2740	385	.90	26
254	82	3310	369	1.00	9	0	247	83	3070	390	1.00	12	235	84	2840	405	1.00	17	220	88	2780	423	1.00	22	0	195	93	2740	425	1.00	29
244	82	3180	397	1.12	10	40 TW	243	83	3000	424	1.11	13	234	84	2820	444	1.10	19	216	87	2700	458	1.10	24	40 TW	195	93	2740	465	1.10	32
233	81	3030	421	1.24	11	80 TW	233	82	2900	450	1.22	14	230	84	2770	478	1.21	21	215	87	2700	496	1.20	26	80 TW	194	93	2700	503	1.19	35
224	81	2900	448	1.38	12	120 TW	229	82	2830	482	1.34	16	226	84	2720	512	1.32	22	215	87	2700	536	1.30	28	120 TW	194	93	2700	543	1.30	37

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

EXAMPLE

If you are at 15,000 ft. with 5000 lb. of available fuel, you can fly 445 nautical airmiles by holding 259 knots CAS. However, you can fly 695 nautical airmiles by immediately climbing to 45,000 ft. using 100% RPM. At 45,000 ft. cruise at 195 knots CAS and start let down 29 nautical miles from home. With a 120 knot headwind the range at 45,000 ft. would be .71 x 695 or 493 nautical miles. Cruise at 197 knots CAS with this wind and start let down 21 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOB ER 1953

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-38

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART

STANDARD DAY

CHART WT. LIMITS 39,500 TO 35,000 POUNDS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1))																
690	40	1690	12,000	810	40	1715	930	40	1740	1050	40	1760	12,000	1185	40	1780
630	40	1510	11,000	740	40	1535	850	40	1560	965	40	1580	11,000	1075	40	1600
570	40	1340	10,000	670	40	1360	765	40	1385	865	40	1405	10,000	975	40	1430
510	40	1170	9,000	600	40	1195	690	40	1215	780	40	1240	9,000	865	40	1260
450	40	1005	8,000	530	40	1030	610	40	1050	690	40	1075	8,000	770	40	1100
400	40	845	7,000	465	40	875	530	40	900	600	40	920	7,000	670	40	940
345	40	700	6,000	395	40	720	455	40	745	490	40	765	6,000	575	40	790
290	40	550	5,000	335	40	575	380	40	600	430	40	625	5,000	480	40	650
230	40	415	4,000	265	40	440	305	40	465	345	40	490	4,000	390	40	520
180	40	275	3,000	205	40	300	230	40	325	260	40	355	3,000	290	40	380
115	40	145	2,000	135	40	170	160	40	195	180	40	215	2,000	200	40	240

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	319	86	4800	305	.68	4
						80 HW							303	84	5100	270	.71	2	305	85	4780	299	.75	4	80 HW	301	85	4400	322	.78	5
306	81	5460	266	.85	0	40 HW	299	82	4980	281	.86	1	292	82	4600	296	.86	2	285	83	4330	314	.87	4	40 HW	280	84	4060	335	.88	6
286	80	5020	286	1.00	0	0	280	81	4590	301	1.00	1	275	81	4260	318	1.00	2	272	82	4040	337	1.00	4	0	270	83	3860	362	1.00	6
273	79	4730	313	1.16	0	40 TW	263	79	4280	322	1.15	1	254	80	3930	334	1.14	2	250	81	3700	352	1.13	4	40 TW	253	82	3590	380	1.13	6
						80 TW							227	79	3540	343	1.30	2	238	80	3490	377	1.29	4	80 TW	244	82	3420	409	1.28	7
						120 TW																			120 TW	233	81	3280	433	1.41	8

Figure A-39

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 39,500 TO 35,000 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
1345	40	1800	12,000	1525	40	1820	1695	40	1835	1830	40	1845	12,000			
1215	40	1615	11,000	1385	40	1635	1530	40	1650	1655	40	1660	11,000			
1110	40	1450	10,000	1255	40	1465	1380	40	1480	1490	40	----	10,000			
990	40	1280	9,000	1120	40	1300	1235	40	1315	1325	40	----	9,000			
880	40	1115	8,000	990	40	1135	1090	40	1155	1170	40	----	8,000			
760	40	955	7,000	860	40	975	940	40	990	1010	40	----	7,000			
650	40	810	6,000	785	40	830	810	40	845	865	40	----	6,000			
540	40	670	5,000	610	40	690	670	40	705	725	40	----	5,000			
440	40	535	4,000	495	40	555	540	40	570	590	40	----	4,000			
325	40	400	3,000	375	40	420	415	40	435	450	40	----	3,000			
225	40	265	2,000	255	40	295	285	40	310	315	40	----	2,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
297	86	4230	309	.69	6	120 HW	269	87	3690	304	.69	8	245	87	3240	302	.70	12	221	91	3080	305	.71	16	120 HW						
287	85	4040	336	.79	7	80 HW	267	86	3630	340	.79	10	243	86	3200	339	.80	13	221	91	3080	345	.81	18	80 HW						
273	85	3770	357	.89	8	40 HW	258	86	3420	366	.89	11	241	86	3130	375	.90	15	220	90	3060	384	.90	20	40 HW						
267	84	3640	387	1.00	9	0	256	85	3360	403	1.00	12	241	86	3130	415	.86	17	220	90	3060	424	.91	22	0						
258	83	3520	416	1.11	10	40 TW	251	84	3310	437	1.10	13	238	86	3100	450	1.10	19	217	90	3000	460	1.11	24	40 TW						
247	83	3360	441	1.24	11	80 TW	244	84	3220	466	1.21	14	235	86	3060	486	1.20	21	216	90	3000	499	1.20	26	80 TW						
237	83	3240	468	1.36	12	120 TW	238	84	3140	498	1.32	16	234	86	3060	524	1.30	22	216	90	3000	539	1.30	28	120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 20,000 ft. with 11,000 lb. of available fuel, you can fly 1075 nautical miles by holding 270 knots CAS. However, you can fly 1600 nautical miles by immediately climbing to 40,000 ft. at 100% RPM. At 40,000 ft. cruise at 220 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 45,000 ft. is attained. At 45,000 ft. cruise at 195 knots CAS and start let down 29 nautical miles from home. With a 40 knot headwind, the range at optimum altitude would be .90 x 1600 or 1440 nautical miles. Cruise at 195 knots CAS and start let down 26 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-40

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 44,000 TO 39,500 POUNDS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1))

IF YOU ARE AT S.L. — RANGE IN AIRMILES: BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	FUEL POUNDS (1)	IF YOU ARE AT 5000' — RANGE IN AIRMILES: BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	IF YOU ARE AT 10000' — RANGE IN AIRMILES: BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	IF YOU ARE AT 15000' — RANGE IN AIRMILES: BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	FUEL POUNDS (1)	IF YOU ARE AT 20000' — RANGE IN AIRMILES: BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
865	40	2020	15,158	1005	40	2040	1140	40	2060	1285	40	2085	15,158	1440	40	2105
800	40	1815	14,000	925	40	1835	1050	40	1855	1180	40	1875	14,000	1320	40	1900
740	40	1645	13,000	855	40	1670	970	40	1690	1090	40	1720	13,000	1215	40	1740
685	40	1495	12,000	790	40	1515	890	40	1540	1000	40	1560	12,000	1120	40	1590
625	40	1340	11,000	720	40	1365	815	40	1390	915	40	1410	11,000	1025	40	1430
565	40	1205	10,000	650	40	1230	740	40	1255	830	40	1275	10,000	930	40	1295
510	40	1090	9,000	590	40	1115	670	40	1135	750	40	1155	9,000	840	40	1175
455	40	965	8,000	525	40	990	595	40	1010	670	40	1030	8,000	750	40	1050
400	40	830	7,000	460	40	855	520	40	875	585	40	895	7,000	660	40	915
(345)	40	(695)	6,000	(400)	40	(720)	(455)	40	(740)	(510)	40	760	6,000	(570)	40	(785)

EFFECTIVE WIND	CRUISING AT S.L. C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 5000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 10000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 15000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 20000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
120 HW																									324	87	4980	311	.70	4
80 HW													314	86	5500	283	.72	2	315	86	5100	310	.76	4	308	86	4730	332	.79	5
40 HW	312	82	5600	272	.87	0	307	82	5310	290	.86	1	303	83	5040	310	.86	2	297	84	4740	329	.87	4	290	85	4400	348	.89	6
0	293	81	5270	293	1.00	0	290	81	4910	311	1.00	1	287	82	4650	331	1.00	2	286	83	4440	354	1.00	4	284	84	4260	379	1.00	6
40 TW	280	80	5000	320	1.15	0	273	80	4600	333	1.15	1	266	81	4300	348	1.14	2	265	82	4100	369	1.13	4	267	83	3980	398	1.12	6
80 TW													241	81	3940	358	1.27	2	252	82	3880	394	1.27	4	257	83	3790	426	1.26	7
120 TW																									246	82	3640	452	1.39	8

Figure A-41

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 44,000 TO 39,500 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING:(TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
1650	40	2125	15,158	1855	40	2140	2040	40	2155	2165	40	----	15,158			
1500	40	1920	14,000	1695	40	1935	1840	40	1955	1970	40	----	14,000			
1395	40	1760	13,000	1560	40	1780	1695	40	1790	1800	40	----	13,000			
1280	40	1600	12,000	1435	40	1620	1550	40	1640	1655	40	----	12,000			
1170	40	1450	11,000	1310	40	1465	1420	40	1485	1500	40	----	11,000			
1050	40	1310	10,000	1190	40	1380	1290	40	1345	1355	40	----	10,000			
960	40	1195	9,000	1075	40	1210	1170	40	1225	1240	40	----	9,000			
845	40	1065	8,000	960	40	1080	1045	40	1095	1115	40	----	8,000			
755	40	935	7,000	840	40	950	920	40	970	985	40	----	7,000			
(650)	40	(800)	6,000	(735)	40	(820)	(800)	40	(840)	(860)	40	----	6,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
301	87	4480	315	.70	6	120 HW	272	88	3940	308	.69	8	246	88	3500	304	.71	12	221	93	3400	305	.71	16	120 HW						
291	86	4300	343	.79	7	80 HW	270	87	3860	345	.79	10	244	88	3450	338	.81	13	221	93	3400	345	.82	18	80 HW						
281	86	4100	369	.89	8	40 HW	262	87	3680	374	.90	11	244	88	3450	378	.90	15	221	93	3400	385	.90	20	40 HW						
277	85	3960	400	1.00	9	0	262	86	3640	411	1.00	12	244	88	3450	418	1.00	17	221	93	3400	425	1.00	22	0						
266	85	3830	428	1.11	10	40 TW	257	86	3590	445	1.10	13	241	88	3400	455	1.10	19	219	93	3350	462	1.10	24	40 TW						
258	84	3700	456	1.22	11	80 TW	252	86	3540	478	1.20	14	240	88	3400	493	1.20	21	219	93	3350	502	1.20	26	80 TW						
251	84	3600	487	1.34	12	120 TW	248	86	3480	512	1.30	16	239	88	3400	531	1.30	22	219	93	3350	542	1.30	28	120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 10,000 ft. with 11,000 lb. of available fuel, you can fly 815 nautical miles by holding 287 knots CAS. However, you can fly 1390 nautical miles by immediately climbing to 40,000 ft. at 100% RPM. At 40,000 ft. cruise at 221 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 45,000 ft. is attained. At 45,000 ft. cruise at 195 knots CAS and start let down 29 nautical miles from home. With an 80 knot headwind, the range at optimum altitude would be .81 x 1390 or 1125 nautical miles. Cruise at 196 knots CAS and start let down 23 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-42

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 48,800 TO 44,000 POUNDS

EXTERNAL LOAD ITEMS NONE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
850	35	1800	15,158	970	35	1820	1100	35	1845	1230	35	1865	15,158	1380	35	1885
785	35	1670	14,000	900	35	1695	1020	35	1720	1140	35	1735	14,000	1280	35	1755
730	35	1560	13,000	840	35	1585	950	35	1610	1070	35	1630	13,000	1190	35	1650
675	35	1450	12,000	780	35	1470	880	35	1500	995	35	1515	12,000	1110	35	1535
620	35	1330	11,000	710	35	1355	805	35	1375	905	35	1400	11,000	1015	35	1415
(565)	35	(1205)	10,000	(650)	35	(1230)	(740)	35	(1255)	(830)	35	(1275)	10,000	(930)	35	(1295)

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	327	88	5130	315	.72	4
						80 HW							327	87	5890	296	.73	2	324	87	5450	321	.77	4	80 HW	316	87	4990	340	.80	5
318	82	6000	278	.86	0	40 HW	315	84	5650	299	.86	1	313	84	5360	321	.87	2	308	85	5120	342	.87	4	40 HW	300	86	4760	362	.89	6
298	82	5540	298	1.00	0	0	299	82	5250	321	1.00	1	299	83	5040	345	1.00	2	298	85	4810	369	1.00	4	0	296	86	4620	394	1.00	6
286	80	5210	326	1.16	0	40 TW	283	81	4950	344	1.14	1	278	82	4700	362	1.13	2	276	83	4540	388	1.11	4	40 TW	279	85	4380	414	1.11	6
						80 TW							253	82	4360	373	1.25	2	265	83	4280	410	1.25	4	80 TW	271	84	4160	443	1.26	7
						120 TW																			120 TW	262	83	4040	472	1.37	8

Figure A-43

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 48,800 TO 44,000 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (TWO)

(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)

IF YOU ARE AT 25000' RANGE IN AIRMILES			FUEL POUNDS	IF YOU ARE AT 30000' RANGE IN AIRMILES			IF YOU ARE AT 35000' RANGE IN AIRMILES			IF YOU ARE AT 40000' RANGE IN AIRMILES			FUEL POUNDS	IF YOU ARE AT 45000' RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
1570	35	1900	15,158	1740	35	1915	1865*	35	1930				15,158			
1470	35	1770	14,000	1620	35	1785	1735	35	1800				14,000			
1355	35	1665	13,000	1510	35	1680	1620	35	1690				13,000			
1255	35	1550	12,000	1410	35	1565	1510	35	1580				12,000			
1165	35	1430	11,000	1300	35	1440	1390	35	1460				11,000			
(1060)	35	(1310)	10,000	(1190)	35	(1330)	(1280)	35	(1345)				10,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.
326	88	5150	349	.70	6	120 HW	274	89	4210	310	.70	8	247	90	3830	305	.71	12							120 HW						
297	88	4525	349	.80	7	80 HW	272	88	4120	347	.80	10	246	90	3800	343	.81	13							80 HW						
288	87	4400	378	.89	8	40 HW	267	88	3940	379	.90	11	244	90	3800	380	.90	15							40 HW						
283	87	4270	410	1.00	9	0	266	88	3940	417	1.00	12	244	90	3800	422	1.00	17							0						
275	86	4150	440	1.10	10	40 TW	261	88	3900	452	1.10	13	243	90	3750	459	1.10	19							40 TW						
268	86	4030	470	1.21	11	80 TW	257	87	3850	486	1.20	14	243	90	3750	499	1.19	21							80 TW						
264	85	3970	504	1.32	12	120 TW	255	87	3850	522	1.29	16	243	90	3750	539	1.29	22							120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 5000 ft. with 14,000 lb. of available fuel, you can fly 900 nautical miles by holding 299 knots CAS. However, you can fly 1695 nautical miles by immediately climbing to 35,000 ft. at 100% RPM. At 35,000 ft. cruise at 244 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 45,000 ft. is attained. At 45,000 ft. cruise at 195 knots CAS and start let down 29 nautical miles from home. With an 80 knot tailwind, the range at optimum altitude would be 1.19 x 1695 or 2015 nautical miles. Cruise at 194 knots CAS and start let down 35 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-44

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 30,800 POUNDS OR LESS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
175	45	340	3000	205	45	365	235	45	385	265	45	410	3000	305	45	430
115	45	175	2000	135	45	200	155	45	220	180	45	245	2000	205	45	265
60	15	60	1000	70	15	70	80	20	80	90	30	95	1000	100	35	110

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	293	84	4280	271	.63	5
						80 HW							280	82	4440	242	.70	2	277	83	4100	264	.73	4	80 HW	271	83	3800	284	.75	5
283	80	4960	243	.84	0	40 HW	274	80	4430	254	.85	1	265	81	4030	266	.85	2	257	81	3750	281	.85	4	40 HW	251	82	3450	298	.86	6
261	78	4480	261	1.00	0	0	254	78	4030	273	1.00	1	247	79	3670	285	1.00	2	241	79	3400	300	1.00	4	0	236	80	3170	318	1.00	6
245	76	4200	285	1.17	0	40 TW	237	77	3750	295	1.17	1	229	78	3370	306	1.16	2	222	78	3100	318	1.15	4	40 TW	217	79	2900	333	1.15	6
						80 TW							212	76	3160	327	1.28	2	212	77	2950	344	1.30	4	80 TW	208	78	2780	361	1.29	7
						120 TW																			120 TW	201	78	2670	390	1.45	7

Figure A-45

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 30,800 POUNDS OR LESS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
C ARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING:(TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
345	45	450	3000	390	45	470	445	45	485	490	45	500	3000	515	---	----
230	45	285	2000	260	45	300	300	45	320	330	45	335	2000	350	---	----
115	40	125	1000	135	40	140	155	45	---	170	45	---	1000	180	---	----

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
271	85	3730	274	.65	7	120 HW	257	85	3320	284	.66	9	240	85	2920	293	.69	13	219	88	2700	303	.70	16	120 HW	195	93	2570	306	.71	21
259	84	3470	297	.75	7	80 HW	247	84	3160	311	.76	10	232	85	2820	320	.78	14	217	88	2650	339	.80	18	80 HW	194	92	2540	342	.81	24
245	82	3250	318	.86	8	40 HW	237	83	2960	336	.88	11	226	84	2700	351	.88	15	215	87	2610	373	.89	20	40 HW	193	92	2500	378	.89	26
232	81	2990	339	1.00	9	0	226	82	2780	359	1.00	12	222	83	2620	383	1.00	17	214	87	2560	412	1.00	22	0	193	92	2500	418	1.00	29
217	80	2750	356	1.13	10	40 TW	217	81	2650	386	1.13	13	216	83	2540	414	1.12	19	211	86	2530	449	1.10	24	40 TW	193	91	2470	458	1.10	32
207	80	2650	383	1.25	11	80 TW	207	81	2550	409	1.27	14	209	83	2540	445	1.23	20	209	86	2500	485	1.19	26	80 TW	191	90	2470	496	1.17	34
201	79	2570	416	1.42	11	120 TW	201	80	2500	450	1.39	15	208	82	2400	481	1.35	21	208	86	2490	525	1.31	28	120 TW	190	90	2470	534	1.29	37

SPECIAL NOTES

1 Climb at 100 % RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE

DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 20,000 ft. with 2000 lb. of available fuel, you can fly 205 nautical airmiles by holding 236 knots CAS. However, you can fly 265 nautical airmiles by immediately climbing to 45,000 ft. using 100% RPM. At 45,000 ft. cruise at 193 knots CAS and start let down 29 nautical miles from home. With an 80 knot headwind the range at 45,000 ft. would be .81 x 265 or 215 nautical miles. Cruise at 194 knots CAS with this wind and start let down 24 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-46

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 35,300 TO 30,800 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1))																
400	40	915	7000	465	40	940	530	40	960	600	40	985	7000	680	40	1005
345	40	750	6000	395	40	775	455	40	795	510	40	815	6000	580	40	840
285	40	590	5000	325	40	610	370	40	635	425	40	655	5000	480	40	675
225	40	435	4000	260	40	460	295	40	480	335	40	500	4000	380	40	525
170	40	290	3000	195	40	315	225	40	335	250	40	355	3000	285	40	380
115	40	170	2000	130	40	185	145	40	205	165	40	225	2000	190	40	240
55	5	---	1000	65	10	---	75	15	---	85	20	---	1000	95	30	100

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	301	85	4590	281	.64	5
						80 HW							296	83	4950	262	.71	2	292	84	4500	283	.74	4	80 HW	283	85	4150	300	.76	5
290	80	5200	250	.85	0	40 HW	285	82	4740	266	.85	1	279	82	4410	282	.86	2	272	83	4150	299	.87	4	40 HW	265	83	3810	316	.88	6
268	79	4720	268	1.00	0	0	264	80	4330	283	1.00	1	259	80	4030	299	1.00	2	254	81	3750	316	1.00	4	0	251	82	3560	337	1.00	6
255	78	4490	295	1.16	0	40 TW	249	78	4100	307	1.16	1	243	79	3750	320	1.15	2	237	80	3500	335	1.15	4	40 TW	233	81	3300	354	1.14	6
						80 TW							226	78	3470	340	1.32	2	226	79	3280	361	1.30	4	80 TW	225	80	3130	383	1.28	7
						120 TW																			120 TW	219	80	3050	411	1.43	7

Figure A-47

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 35,300 TO 30,800 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
770	40	1025	7000	875	40	1040	975	40	1055	1065	----	1070	7000			
655	40	860	6000	745	40	875	830	40	890	905	----	----	6000			
545	40	695	5000	615	40	710	680	40	725	740	----	----	5000			
430	40	545	4000	485	40	565	540	40	575	590	----	----	4000			
325	40	395	3000	365	40	415	410	40	430	445	----	----	3000			
215	40	255	2000	245	40	275	275	40	285	295	----	----	2000			
110	30	----	1000	125	35	----	140	40	----	155	----	----	1000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
278	86	4000	284	.66	7	120 HW	262	86	3600	292	.67	9	242	87	3170	298	.70	13	220	90	3000	301	.70	16	120 HW						
269	85	3750	311	.77	7	80 HW	254	86	3430	321	.77	10	237	86	3100	328	.79	14	219	89	2900	340	.80	18	80 HW						
256	84	3560	334	.88	8	40 HW	247	85	3300	351	.89	11	233	86	3000	364	.90	15	219	89	2900	380	.91	20	40 HW						
246	83	3360	359	1.00	9	0	240	84	3130	379	1.00	12	230	85	2920	396	1.00	17	219	89	2900	420	1.00	22	0						
232	82	3150	380	1.13	10	40 TW	232	84	3050	410	1.12	13	228	85	2900	434	1.11	19	216	89	2850	456	1.10	24	40 TW						
225	81	3020	409	1.25	11	80 TW	224	83	2910	435	1.24	14	222	84	2850	465	1.22	20	214	89	2850	493	1.20	26	80 TW						
219	81	2970	440	1.40	11	120 TW	219	83	2870	473	1.37	15	219	84	2800	502	1.33	21	214	89	2850	533	1.30	28	120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 10,000 ft. with 3000 lb. of available fuel, you can fly 225 nautical airmiles by holding 259 knots CAS. However, you can fly 335 nautical airmiles by immediately climbing to 40,000 ft. using 100% RPM. At 40,000 ft. cruise at 219 knots CAS and start let down 22 nautical miles from home. With a 40 knot headwind, the range at 40,000 ft. would be .91 x 335 or 305 nautical miles. Cruise at 219 knots CAS with this wind and start let down 20 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-48

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 39,800 TO 35,300 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NUMBER OF ENGINES OPERATING:(TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
680	40	1590	12,000	775	40	1610	885	40	1635	1005	40	1655	12,000	1135	40	1675
625	40	1420	11,000	710	40	1445	805	40	1470	915	40	1490	11,000	1035	40	1510
565	40	1255	10,000	640	40	1280	730	40	1305	825	40	1325	10,000	935	40	1345
505	40	1105	9,000	575	40	1125	655	40	1150	745	40	1170	9,000	835	40	1190
445	40	955	8,000	510	40	975	580	40	1000	655	40	1020	8,000	740	40	1040
395	40	810	7,000	445	40	830	505	40	855	575	40	875	7,000	645	40	895
335	40	665	6,000	380	40	690	430	40	715	485	40	735	6,000	550	40	755
285	40	540	5,000	320	40	565	360	40	585	410	40	605	5,000	460	40	625
225	40	415	4,000	255	40	435	290	40	455	325	40	475	4,000	370	40	495
170	40	280	3,000	190	40	300	215	40	320	250	40	345	3,000	280	40	365
115	40	145	2,000	125	40	165	145	40	190	165	40	210	2,000	190	40	235

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	308	86	4860	291	.66	5
						80 HW							310	85	5400	281	.72	2	305	85	4900	301	.76	4	80 HW	293	86	4450	315	.77	5
296	82	5470	256	.85	0	40 HW	293	82	5050	276	.86	1	290	82	4780	290	.86	2	285	84	4520	314	.87	4	40 HW	277	85	4190	332	.88	6
276	80	4980	276	1.00	0	0	274	81	4680	294	1.00	1	270	82	4380	312	1.00	2	267	83	4140	332	1.00	4	0	264	84	3910	353	1.00	6
263	79	4750	304	1.16	0	40 TW	260	80	4400	318	1.16	1	255	80	4150	335	1.15	2	251	81	3870	353	1.14	4	40 TW	247	82	3670	374	1.13	6
						80 TW							240	79	3840	355	1.30	2	240	80	3650	378	1.29	4	80 TW	242	82	3500	404	1.27	7
						120 TW																			120 TW	231	82	3400	430	1.40	7

Figure A-49

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 39,800 TO 35,300 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS CARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL POUNDS	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL POUNDS	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
1285	40	1700	12,000	1455	40	1715	1605	40	1730	1740	----	1745	12,000			
1165	40	1535	11,000	1320	40	1550	1455	40	1565	1575	----	----	11,000			
1060	40	1365	10,000	1190	40	1385	1305	40	1400	1415	----	----	10,000			
940	40	1210	9,000	1060	40	1230	1160	40	1245	1255	----	----	9,000			
830	40	1060	8,000	935	40	1080	1025	40	1095	1110	----	----	8,000			
730	40	915	7,000	815	40	935	890	40	950	960	----	----	7,000			
620	40	775	6,000	695	40	795	760	40	805	820	----	----	6,000			
515	40	645	5,000	475	40	665	635	40	675	685	----	----	5,000			
415	40	515	4,000	465	40	535	510	40	545	555	----	----	4,000			
315	40	385	3,000	350	40	400	385	40	415	425	----	----	3,000			
215	40	255	2,000	235	40	270	265	40	285	295	----	----	2,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
284	87	4250	293	.67	7	120 HW	265	87	3850	298	.68	9	245	88	3450	302	.69	13	221	92	3230	305	.70	16	120 HW						
277	86	4050	325	.78	7	80 HW	259	87	3710	330	.79	10	241	88	3390	335	.79	14	221	92	3230	345	.80	18	80 HW						
267	85	3900	348	.88	8	40 HW	255	86	3600	364	.89	11	240	87	3330	374	.89	15	221	92	3230	385	.90	20	40 HW						
259	85	3690	376	1.00	9	0	250	86	3470	394	1.00	12	236	87	3250	407	1.00	17	221	92	3230	425	1.00	22	0						
246	83	3540	401	1.12	10	40 TW	246	85	3410	428	1.11	13	236	87	3250	447	1.11	19	219	92	3190	460	1.10	24	40 TW						
240	83	3400	430	1.24	11	80 TW	238	85	3300	456	1.22	14	232	87	3200	481	1.21	20	216	92	3150	498	1.19	26	80 TW						
231	83	3350	461	1.37	11	120 TW	231	85	3250	491	1.34	15	230	87	3150	518	1.31	21	211	92	3140	538	1.29	28	120 TW						

SPECIAL NOTES

1 Climb at 100 % RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 5000 ft. with 11,000 lb. of available fuel, you can fly 710 nautical miles by holding 274 knots CAS. However, you can fly 1445 nautical miles by immediately climbing to 40,000 ft. at 100% RPM. At 40,000 ft. cruise at 221 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 45,000 ft. is attained. At 45,000 ft. cruise at 193 knots CAS and start let down 29 nautical miles from home. With an 80 knot headwind, the range at optimum altitude would be .81 x 1445 or 1170 nautical miles. Cruise at 194 knots CAS and start let down 24 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-50

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 44,300 TO 39,800 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			(1) FUEL POUNDS	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			(1) FUEL POUNDS	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL(1)																
895	40	2045	16,000	1015	40	2070	1150	40	2095	1305	40	2115	16,000	1475	40	2135
835	40	1880	15,000	945	40	1905	1075	40	1930	1215	40	1950	15,000	1370	40	1975
775	40	1720	14,000	880	40	1745	995	40	1770	1130	40	1790	14,000	1275	40	1810
720	40	1570	13,000	815	40	1595	925	40	1620	1045	40	1640	13,000	1175	40	1660
665	40	1420	12,000	750	40	1445	855	40	1465	960	40	1485	12,000	1075	40	1505
610	40	1285	11,000	690	40	1305	780	40	1325	880	40	1345	11,000	985	40	1365
555	40	1150	10,000	625	40	1175	705	40	1195	795	40	1215	10,000	895	40	1235
505	40	1035	9,000	565	40	1055	635	40	1080	715	40	1100	9,000	805	40	1120
445	40	920	8,000	500	40	940	570	40	965	645	40	985	8,000	725	40	1005
390	40	795	7,000	445	40	820	500	40	845	565	40	865	7,000	635	40	885
335	40	665	6,000	380	40	685	430	40	710	485	40	730	6,000	550	40	750

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	316	87	5120	299	.68	5
						80 HW							322	85	5850	293	.73	2	315	86	5275	311	.77	4	80 HW	302	87	4750	323	.79	5
301	82	5750	261	.85	0	40 HW	300	83	5400	283	.86	1	299	84	5130	305	.87	2	295	85	4880	326	.88	4	40 HW	288	86	4530	345	.89	6
282	81	5230	282	1.00	0	0	282	82	5000	303	1.00	1	282	83	4750	325	1.00	2	279	84	4530	347	1.00	4	0	275	85	4280	368	1.00	6
271	80	4950	311	1.15	0	40 TW	270	81	4720	330	1.15	1	267	82	4500	349	1.14	2	264	83	4230	369	1.14	4	40 TW	261	84	4030	392	1.13	6
						80 TW							252	81	4300	369	1.28	2	253	82	4080	394	1.27	4	80 TW	254	83	3920	421	1.25	7
						120 TW																			120 TW	244	83	3770	448	1.37	7

Figure A-51

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 44,300 TO 39,800 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
1650	40	2155	16,000	1865	40	2170	2055	40	2190	2195	----	2200	16,000			
1540	40	1990	15,000	1730	40	2005	1905	40	2025	2035	----	2040	15,000			
1435	40	1830	14,000	1605	40	1845	1750	40	1860	1875	----	1880	14,000			
1315	40	1680	13,000	1475	40	1695	1615	40	1710	1720	----	----	13,000			
1205	40	1525	12,000	1355	40	1545	1475	40	1560	1575	----	----	12,000			
1100	40	1385	11,000	1235	40	1405	1350	40	1425	1440	----	----	11,000			
1005	40	1255	10,000	1120	40	1275	1220	40	1290	1305	----	----	10,000			
900	40	1140	9,000	1010	40	1155	1105	40	1170	1185	----	----	9,000			
810	40	1020	8,000	905	40	1035	990	40	1050	1065	----	----	8,000			
710	40	900	7,000	800	40	915	875	40	930	940	----	----	7,000			
620	40	770	6,000	695	40	790	765	40	805	820	----	----	6,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
290	88	4530	301	.69	7	120 HW	269	89	4110	304	.70	9	247	90	3700	304	.71	13	220	94	3560	306	.71	16						
284	87	4380	333	.79	7	80 HW	264	89	4000	337	.80	10	244	90	3700	341	.80	14	220	94	3560	346	.81	18						
277	87	4220	362	.89	8	40 HW	262	89	3970	374	.89	11	244	90	3700	381	.89	15	220	94	3560	386	.89	20						
268	86	4030	389	1.00	9	0	258	88	3820	407	1.00	12	243	89	3620	417	1.00	17	220	94	3560	426	1.00	22						
259	85	3880	418	1.12	10	40 TW	255	87	3750	441	1.11	13	243	89	3620	457	1.10	19	220	94	3560	466	1.10	24						
252	85	3780	448	1.22	11	80 TW	248	87	3670	473	1.21	14	240	88	3570	492	1.20	20	217	94	3520	501	1.18	26						
244	85	3700	479	1.34	11	120 TW	243	87	3600	506	1.31	15	236	88	3520	528	1.29	21	217	94	3520	541	1.28	28						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

EXAMPLE

If you are at 25,000 ft. with 12,000 lb. of available fuel, you can fly 1205 nautical airmiles by holding 268 knots CAS. However, you can fly 1525 nautical airmiles by immediately climbing to 40,000 ft. using 100% RPM. At 40,000 ft. cruise at 220 knots CAS and start let down 22 nautical miles from home. With an 80 knot tailwind the range at 40,000 ft. would be 1.18 x 1525 or 1800 nautical miles. Cruise at 217 knots CAS with this wind and start let down 26 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-52

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 48,800 TO 44,300 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
1060	35	2330	19,318	1200	35	2355	1355	35	2375	1535	35	2395	19,318	1720	35	2415
985	35	2135	18,000	1110	35	2155	1255	35	2175	1415	35	2195	18,000	1590	35	2215
930	35	1985	17,000	1050	35	2005	1185	35	2025	1330	35	2045	17,000	1495	35	2060
875	35	1835	16,000	990	35	1855	1115	35	1880	1255	35	1900	16,000	1400	35	1920
820	35	1695	15,000	925	35	1715	1045	35	1740	1175	35	1755	15,000	1305	35	1775
770	35	1585	14,000	865	35	1610	980	35	1630	1100	35	1650	14,000	1225	35	1665
715	35	1490	13,000	810	35	1510	915	35	1530	1025	35	1550	13,000	1145	35	1570
665	35	1385	12,000	755	35	1410	850	35	1430	955	35	1450	12,000	1065	35	1470
610	35	1265	11,000	690	35	1290	780	35	1310	880	35	1335	11,000	980	35	1355

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	323	88	5480	311	.69	5
						80 HW							331	87	7980	301	.72	2	322	87	5600	319	.78	4	80 HW	310	88	5110	334	.80	5
307	82	6050	267	.85	0	40 HW	307	84	5660	290	.87	1	307	85	5450	314	.88	2	305	86	5240	338	.88	4	40 HW	297	87	4890	358	.89	6
288	82	5530	288	1.00	0	0	291	83	5320	313	1.00	1	292	84	5090	336	1.00	2	291	85	4810	360	1.00	4	0	285	87	4640	381	1.00	6
279	81	5320	319	1.15	0	40 TW	280	82	5060	341	1.14	1	278	83	4900	362	1.12	2	277	84	4620	384	1.13	4	40 TW	274	86	4430	407	1.12	6
						80 TW							263	82	4750	384	1.22	2	266	84	4520	411	1.24	4	80 TW	266	85	4310	438	1.23	7
						120 TW																			120 TW	258	85	4150	466	1.37	7

Figure A-53

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 48,800 TO 44,300 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
1920	35	2430	19,318	2155	35	2450	2345	---	2460				19,318			
1785	35	2230	18,000	1990	35	2250	2155	---	2265				18,000			
1670	35	2075	17,000	1865	35	2095	2015	---	2110				17,000			
1565	35	1935	16,000	1745	35	1955	1890	---	1965				16,000			
1455	35	1795	15,000	1630	35	1815	1765	---	1825				15,000			
1365	35	1685	14,000	1530	35	1700	1660	---	1710				14,000			
1275	35	1585	13,000	1430	35	1605	1560	---	1615				13,000			
1190	35	1485	12,000	1330	35	1505	1450	---	1515				12,000			
1100	35	1375	11,000	1230	35	1390	1350	---	1405				11,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
295	88	4850	309	.70	7	120 HW	273	90	4400	309	.70	9	250	91	4100	309	.71	13							120 HW						
290	88	4650	340	.80	7	80 HW	269	89	4300	344	.80	10	247	91	4060	345	.80	14							80 HW						
284	88	4530	373	.90	8	40 HW	266	89	4240	379	.89	11	246	91	4010	383	.90	15							40 HW						
277	88	4370	401	1.00	9	0	265	89	4140	415	1.00	12	245	91	3980	420	1.00	17							0						
270	86	4260	432	1.11	10	40 TW	260	88	4100	450	1.10	13	243	91	3950	458	1.10	19							40 TW						
262	86	4160	462	1.21	11	80 TW	257	88	4000	485	1.21	14	242	90	3940	497	1.19	20							80 TW						
257	86	4080	495	1.32	11	120 TW	252	88	3940	518	1.31	15	241	90	3880	535	1.31	21							120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 15,000 ft. with 13,000 lb. of available fuel, you can fly 1025 nautical miles by holding 291 knots CAS. However, you can fly 1550 nautical miles by immediately climbing to 35,000 ft. at 100% RPM. At 35,000 ft. cruise at 245 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 40,000 ft. is attained. At 40,000 ft. cruise at 320 knots CAS and start let down 22 nautical miles from home. With an 40 knot tailwind, the range at optimum altitude would be 1.10 x 1550 or 1705 nautical miles. Cruise at 220 knots CAS and start let down 24 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-54

AIRCRAFT MODEL B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 53,000 TO 48,800 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE

NUMBER OF ENGINES OPERATING: (TWO)

INSTRUCTIONS FOR USING CHART: (A) **IN FLIGHT** - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) **FLIGHT PLANNING** - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for **IN FLIGHT** above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			(1) FUEL POUNDS	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			(1) FUEL POUNDS	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
(1035)	35	(2125)	19,318	(1175)	35	(2150)	(1325)	35	(2175)	(1485)	35	(2200)	19,318	(1655)	35	(2220)
975	35	2000	18,000	1095	35	2020	(1240)	35	(2040)	(1390)	35	(2060)	18,000	(1550)	35	(2085)
925	35	1895	17,000	1045	35	1915	1175	35	1940	1320	35	1960	17,000	1470	35	1980
870	35	1795	16,000	985	35	1815	1115	35	1840	1250	35	1860	16,000	1390	35	1880
820	35	1695	15,000	925	35	1715	1045	35	1740	1175	35	1760	15,000	1310	35	1780

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	325	88	5590	313	.70	5
						80 HW							334	87	6420	304	.74	2	326	88	5780	324	.78	4	80 HW	313	88	5260	338	.80	5
311	83	6240	271	.85	0	40 HW	313	85	5880	296	.87	1	312	86	5630	320	.88	2	309	87	5430	344	.88	4	40 HW	304	87	5070	365	.90	6
293	82	5740	293	1.00	0	0	297	83	5520	319	1.00	1	298	84	5310	343	1.00	2	296	86	5100	367	1.00	4	0	290	87	4830	388	1.00	6
284	82	5540	324	1.14	0	40 TW	286	83	5260	347	1.14	1	286	84	5130	370	1.12	2	283	85	4840	392	1.12	4	40 TW	279	86	4600	414	1.12	6
						80 TW							269	83	4950	391	1.22	2	273	84	4680	419	1.24	4	80 TW	271	85	4480	443	1.23	7
						120 TW																			120 TW	263	85	4330	473	1.36	7

Figure A-55

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 53,000 TO 48,800 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
CARRIED ENTIRE DISTANCE
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	POUNDS	BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
(1840)	35	(2240)	19,318	(2055)	35	(2255)	(2220)	35	(2270)				19,318			
(1720)	35	(2100)	18,000	(1925)	35	(2120)	(2080)	35	(2130)				18,000			
1635	35	2000	17,000	1830	35	2015	1975	35	2030				17,000			
1545	35	1900	16,000	1730	35	1915	1875	35	1930				16,000			
1455	35	1795	15,000	1630	35	1815	1765	35	1825				15,000			

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.
300	89	5000	315	.70	7	120 HW	273	90	4470	310	.70	9	251	92	4170	310	.71	13							120 HW						
292	88	4820	344	.79	7	80 HW	270	90	4410	345	.80	10	247	91	4120	346	.81	14							80 HW						
287	88	4660	376	.89	8	40 HW	267	89	4290	380	.90	11	246	91	4080	384	.90	15							40 HW						
279	88	4470	404	1.00	9	0	265	89	4220	416	1.00	12	245	91	4040	421	1.00	17							0						
273	87	4370	437	1.11	10	40 TW	262	89	4180	453	1.10	13	243	91	4000	459	1.10	19							40 TW						
265	87	4300	467	1.20	11	80 TW	257	88	4130	486	1.20	14	242	91	4000	496	1.19	20							80 TW						
261	87	4200	500	1.32	11	120 TW	254	88	4030	520	1.31	15	241	91	3950	535	1.30	21							120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1:15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 15,000 ft. with 18,000 lb. of available fuel, you can fly 1390 nautical miles by holding 296 knots CAS. However, you can fly 2060 nautical miles by immediately climbing to 35,000 ft. at 100% RPM. At 35,000 ft. cruise at 245 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 40,000 ft. is attained. At 40,000 ft. cruise at 220 knots CAS and start let down 22 nautical miles from home. With an 80 knot headwind, the range at optimum altitude would be .80 x 2060 or 1648 nautical miles. Cruise at 220 knots CAS and start let down 18 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-56

AIRCRAFT MODEL B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 53,000 TO 48,800 POUNDS

EXTERNAL LOAD ITEMS
2 X 320 GAL WING TIP TANKS
DROPPED WHEN EMPTY
NUMBER OF ENGINES OPERATING:(TWO)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
1060	35	2215	19,318	(1210)	35	(2240)	(1365)	35	(2265)	(1535)	35	(2295)	19,318	(1710)	35	(2310)
995	35	2080	18,000	1135	35	2105	(1280)	35	(2130)	(1445)	35	(2160)	18,000	(1605)	35	(2175)
945	35	1980	17,000	1075	35	2005	1215	35	2030	1370	35	2055	17,000	1525	35	2070
890	35	1875	16,000	1020	35	1900	1150	35	1925	1295	35	1950	16,000	1445	35	1970
840	35	1760	15,000	965	35	1785	1090	35	1810	1225	35	1830	15,000	1365	35	1850

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	325	88	5590	313	.70	5
						80 HW							334	87	6420	304	.74	2	326	88	5780	324	.78	4	80 HW	313	88	5260	338	.80	5
311	83	6240	271	.85	0	40 HW	313	85	5880	296	.87	1	312	86	5630	320	.88	2	309	87	5430	344	.88	4	40 HW	304	87	5070	365	.90	6
293	82	5740	293	1.00	0	0	297	83	5520	319	1.00	1	298	84	5310	343	1.00	2	296	86	5100	367	1.00	4	0	290	87	4830	388	1.00	6
284	82	5540	324	1.14	0	40 TW	286	83	5260	347	1.14	1	286	84	5130	370	1.12	2	283	85	4840	392	1.12	4	40 TW	279	86	4600	414	1.12	6
						80 TW							269	83	4950	391	1.22	2	273	84	4680	419	1.24	4	80 TW	271	85	4480	443	1.23	7
						120 TW																			120 TW	263	85	4330	473	1.36	7

Figure A-57

AIRCRAFT MODEL B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 53,000 TO 48,800 POUNDS

EXT. LOAD
2 X 320 GAL WING TIP TANKS
DROPPED WHEN EMPTY
NO. OF ENGINES OPERATING: (TWO)

IF YOU ARE AT 25000' RANGE IN AIRMILES: BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	FUEL POUNDS	IF YOU ARE AT 30000' RANGE IN AIRMILES: BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	IF YOU ARE AT 35000' RANGE IN AIRMILES: BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	IF YOU ARE AT 40000' RANGE IN AIRMILES: BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	FUEL POUNDS	IF YOU ARE AT 45000' RANGE IN AIRMILES: BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)																
(1945)	35	(2330)	19,318	(2145)	35	(2345)	(2295)	35	(2365)				19,318			
(1830)	35	(2195)	18,000	(2015)	35	(2215)	(2160)	35	(2230)				18,000			
1740	35	2090	17,000	1915	35	2110	2055	35	2120				17,000			
1650	35	1990	16,000	1815	35	2005	1950	35	2020				16,000			
1560	35	1875	15,000	1730	35	1890	1845	35	1905				15,000			

CRUISING AT 25000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	EFFECTIVE WIND	CRUISING AT 30000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 35000' C.A.S.	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.	CRUISING AT 40000' C.A.S.	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.	EFFECTIVE WIND	CRUISING AT 45000' C.A.S.	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
300	89	5000	315	.70	7	120 HW	273	90	4470	310	.70	9	251	92	4170	310	.71	13							120 HW						
292	88	4820	344	.79	7	80 HW	270	90	4410	345	.80	10	247	91	4120	346	.81	14							80 HW						
287	88	4660	376	.89	8	40 HW	267	89	4290	380	.90	11	246	91	4080	384	.98	15							40 HW						
279	88	4470	404	1.00	9	0	265	89	4220	416	1.00	12	245	91	4040	421	1.00	17							0						
273	87	4370	437	1.11	10	40 TW	262	89	4180	453	1.10	13	243	91	4000	459	1.10	19							40 TW						
265	87	4300	467	1.20	11	80 TW	257	88	4130	486	1.20	14	242	91	4000	496	1.19	20							80 TW						
261	87	4200	500	1.32	11	120 TW	254	88	4030	520	1.31	15	241	91	3950	535	1.30	21							120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at Sea Level with 17,000 lb. of available fuel, you can fly 945 nautical miles by holding 293 knots CAS. However, you can fly 1980 nautical miles by immediately climbing to 35,000 ft. at 100% RPM. At 35,000 cruise at 245 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 40,000 ft. is attained. At 40,000 ft. cruise at 221 knots CAS and start let down 22 nautical miles from home. With an 80 knot headwind, the range at optimum altitude would be .80 x 1980 or 1585 nautical miles. Cruise at 221 knots CAS and start let down 18 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

WADC Form 241N
(11 Jun 51)

Figure A-58

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 30,500 POUNDS OR LESS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (ONE)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
205	25	255	3000	235	25	280	260	25	300	290	25	315	3000	320	25	335
135	15	150	2000	155	20	165	175	25	185	195	25	205	2000	215	25	220
70		---	1000	80		---	90		---	100	--	---	1000	110	--	---

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW	266	96	3670	236	.61	3
						80 HW							272	92	3830	233	.70	2	258	92	3500	240	.71	2	80 HW	247	93	3280	252	.73	4
271	88	4170	231	.82	0	40 HW	260	89	3700	239	.83	1	250	90	3420	249	.84	2	241	90	3190	260	.85	3	40 HW	232	92	3000	272	.86	4
248	86	3670	248	1.00	0	0	241	87	3330	258	1.00	1	232	87	3090	268	1.00	2	224	88	2910	279	1.00	3	0	219	90	2810	296	1.00	5
226	84	3330	266	1.18	0	40 TW	221	85	3070	278	1.17	1	217	86	2890	292	1.16	2	211	87	2720	305	1.16	3	40 TW	201	89	2640	321	1.15	6
						80 TW							205	85	2730	318	1.34	2	203	87	2610	334	1.33	4	80 TW	199	88	2530	349	1.31	6
						120 TW																			120 TW	194	88	2470	383	1.47	7

Figure A-59

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 30,500 POUNDS OR LESS

EXT. LOAD NONE

NO. OF ENGINES OPERATING:(ONE)

IF YOU ARE AT 25000' RANGE IN AIRMILES			FUEL POUNDS	IF YOU ARE AT 30000' RANGE IN AIRMILES			IF YOU ARE AT 35000' RANGE IN AIRMILES			IF YOU ARE AT 40000' RANGE IN AIRMILES			FUEL	IF YOU ARE AT 45000' RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
				(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)												
350	--	----	3000													
235	--	----	2000													
120	--	----	1000													

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE % RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.	C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.		C.A.S.	APPROXIMATE % RPM	/HR	G.S.	R.F.	LET DOWN DIST.
--	--	---	--	---	--	120 HW																			120 HW						
241	96	3170	271	.75	7	80 HW																			80 HW						
226	94	2940	291	.86	7	40 HW																			40 HW						
216	93	2740	317	1.00	8	0																			0						
204	92	2610	341	1.14	9	40 TW																			40 TW						
198	91	2510	371	1.28	9	80 TW																			80 TW						
194	91	2470	406	1.43	10	120 TW																			120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

EXAMPLE

If you are at 15,000 ft. with 3000 lb. of available fuel, you can fly 290 nautical airmiles by holding 224 knots CAS. However, you can fly 315 nautical airmiles by immediately climbing to 25,000 ft. using 100% RPM. At 25,000 ft. cruise at 216 knots CAS and start let down 8 nautical miles from home. With a 40 knot tailwind the range at 25,000 ft. would be 1.14 x 315 or 359 nautical miles. Cruise at 204 knots CAS with this wind and start let down 9 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-60

AIRCRAFT MODEL (S) B-57B ENGINE(S) J65-W-5	FLIGHT OPERATION INSTRUCTION CHART STANDARD DAY CHART WT. LIMITS 35,000 TO 30,500 POUNDS	EXTERNAL LOAD ITEMS NONE NUMBER OF ENGINES OPERATING: (ONE)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. **(B) FLIGHT PLANNING** - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL POUNDS (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL POUNDS (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
460	20	650	7000	520	20	665	585	20	690	645	20	705	7000	705	20	710
395	20	530	6000	445	20	550	500	20	570	550	20	590	6000	605	--	---
330	20	425	5000	370	20	445	415	20	460	460	20	480	5000	505	--	---
265	20	325	4000	295	20	340	330	20	360	365	20	380	4000	400	--	---
200	20	230	3000	225	20	245	250	20	265	275	20	285	3000	300	--	---
130	10	140	2000	150	15	150	165	--	---	185	--	---	2000	205	--	---
65	--	---	1000	75	--	---	85	--	---	90	--	---	1000	100	--	---

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW						
						80 HW						
280	89	4460	240	.83	0	40 HW	271	90	4070	251	.84	1
259	88	4000	259	1.00	0	0	252	88	3680	270	1.00	1
243	86	3700	283	1.18	0	40 TW	237	87	3470	295	1.16	1
						80 TW						
						120 TW						

CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
												120 HW	---	--	----	---	---	---
277	93	4130	240	.71	2	263	94	3790	247	.72	2	80 HW	250	94	3530	256	.74	4
260	91	3740	260	.85	2	249	92	3530	270	.85	3	40 HW	239	93	3320	282	.86	4
244	89	3450	282	1.00	2	236	91	3270	294	1.00	3	0	230	93	3100	310	1.00	5
231	89	3250	308	1.16	2	226	90	3130	323	1.15	3	40 TW	213	92	3010	338	1.14	6
225	88	3170	340	1.32	2	219	89	3030	354	1.30	4	80 TW	212	91	2900	367	1.29	6
												120 TW	212	91	2900	407	1.44	7

Figure A-61

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 35,000 TO 30,500 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING:(ONE)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
				(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)												

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW																			80 HW						
						40 HW																			40 HW						
						0																			0						
						40 TW																			40 TW						
						80 TW																			80 TW						
						120 TW																			120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

EXAMPLE

If you are at 5000 ft. with 3000 lb. of available fuel, you can fly 225 nautical airmiles by holding 252 knots CAS. However, you can fly 245 nautical airmiles by immediately climbing to 20,000 ft. using 100% RPM. At 20,000 ft. cruise at 230 knots CAS and start let down 5 nautical miles from home. With an 80 knot tailwind, the range at 20,000 ft. would be 1.29 x 245 or 316 nautical miles. Cruise at 212 knots CAS with this wind and start let down 6 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind-Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption-Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

BASED ON: ESTIMATE

DATA AS OF: 1 OCTOBER 1953

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-62

AIRCRAFT MODEL (S) B-57B ENGINE(S) J65-W-5	FLIGHT OPERATION INSTRUCTION CHART STANDARD DAY CHART WT. LIMITS 39,500 TO 35,000 POUNDS	EXTERNAL LOAD ITEMS NONE NUMBER OF ENGINES OPERATING: (ONE)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
765	15	1085	12,000	870	15	1105	975	15	1125	1075	15	1140	12,000			
700	15	965	11,000	790	15	985	885	15	1005	980	15	1020	11,000			
635	15	855	10,000	715	15	870	800	15	895	885	15	910	10,000			
570	15	755	9,000	645	15	770	720	15	795	790	15	810	9,000			
510	15	655	8,000	570	15	675	635	15	695	700	15	710	8,000			
440	15	560	7,000	495	15	575	550	15	600	610	15	610	7,000			
380	15	470	6,000	430	15	485	475	15	500	520	--	---	6,000			
315	15	380	5,000	355	15	390	395	15	410	435	--	---	5,000			
250	15	295	4,000	285	15	305	320	--	---	350	--	---	4,000			
190	15	210	3,000	215	15	225	240	--	---	265	--	---	3,000			
130	--	---	2,000	145	--	---	165	--	---	180	--	---	2,000			

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW						
						80 HW						
288	91	4770	248	.84	0	40 HW	278	92	4390	259	.85	1
269	89	4330	269	1.00	0	0	263	90	4040	282	1.00	1
256	88	4080	296	1.17	0	40 TW	250	90	3830	309	1.16	1
						80 TW						
						120 TW						

CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
												120 HW						
284	94	4440	247	.72	2	269	95	4120	254	.73	2	80 HW						
270	93	4120	272	.85	2	257	94	3880	281	.85	3	40 HW						
255	91	3820	295	1.00	2	248	93	3640	308	1.00	3	0						
246	91	3650	324	1.15	2	240	92	3530	340	1.14	3	40 TW						
240	90	3580	358	1.29	2	235	92	3450	373	1.27	4	80 TW						
												120 TW						

Figure A-63

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 39,500 TO 35,000 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (ONE)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
				(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)												

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW																			80 HW						
						40 HW																			40 HW						
						0																			0						
						40 TW																			40 TW						
						80 TW																			80 TW						
						120 TW																			120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 5000 ft. with 10,000 lb. of available fuel, you can fly 715 nautical miles by holding 263 knots CAS. However, you can fly 870 nautical miles by immediately climbing to 15,000 ft. at 100% RPM. At 15,000 ft. cruise at 248 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 20,000 ft. is attained. At 20,000 ft. cruise at 230 knots CAS and start let down 5 nautical miles from home. With an 80 knot headwind, the range at optimum altitude would be .74 x 870 or 640 nautical miles. Cruise at 250 knots CAS and start let down 4 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE-Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-64

AIRCRAFT MODEL (S) B-57B

ENGINE(S) J65-W-5

FLIGHT OPERATION INSTRUCTION CHART
STANDARD DAY

CHART WT. LIMITS 44,000 TO 39,500 POUNDS

EXTERNAL LOAD ITEMS
NONE

NUMBER OF ENGINES OPERATING: (ONE)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953

BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			(1) FUEL POUNDS	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			(1) FUEL POUNDS	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.		BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
950	15	1290	15,158	1070	15	1310	1190	15	1325	1305	15	1340	15,158			
875	15	1170	14,000	980	15	1190	1090	15	1205	1195	15	1220	14,000			
810	15	1070	13,000	910	15	1090	1005	15	1110	1105	15	1130	13,000			
740	15	975	12,000	830	15	995	920	15	1015	1015	15	1035	12,000			
680	15	880	11,000	760	15	900	840	15	920	925	15	940	11,000			
615	15	795	10,000	690	15	810	765	15	830	840	15	850	10,000			
555	15	705	9,000	620	15	725	690	15	745	760	15	760	9,000			
495	15	620	8,000	555	15	640	615	15	655	675	--	----	8,000			
435	15	535	7,000	490	15	555	545	15	570	595	--	----	7,000			
380	15	455	6,000	425	15	475	470	15	490	520	--	----	6,000			

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW							291	96	4800	256	.73	2	---	--	---	--	----	---	80 HW						
295	92	5020	255	.85	0	40 HW	287	93	4770	269	.85	1	280	94	4500	283	.86	2	270	96	4280	293	.86	3	40 HW						
280	90	4680	280	1.00	0	0	273	91	4420	293	1.00	1	265	93	4190	306	1.00	2	260	95	4030	322	1.00	3	0						
267	90	4480	307	1.15	0	40 TW	267	91	4140	327	1.15	1	260	93	4090	341	1.14	2	253	95	3980	356	1.12	3	40 TW						
						80 TW							254	92	3990	374	1.28	2	249	94	3910	391	1.26	4	80 TW						
						120 TW																			120 TW						

Figure A-65

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 44,000 TO 39,500 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (ONE)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.
				(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)												

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW																			80 HW						
						40 HW																			40 HW						
						0																			0						
						40 TW																			40 TW						
						80 TW																			80 TW						
						120 TW																			120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at S.L. with 15,158 lb. of available fuel, you can fly 950 nautical miles by holding 280 knots CAS. However, you can fly 1290 nautical miles by immediately climbing to 15,000 ft. at 100% RPM. At 15,000 ft. cruise at 260 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 20,000 ft. is attained. At 20,000 ft. cruise at 230 knots CAS and start let down 5 nautical miles from home. With an 80knot tailwind, the range at optimum altitude would be 1.29 x 1290 or 1660 nautical miles. Cruise at 212 knots CAS and start let down 6 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-66

AIRCRAFT MODEL (S) B-57B

ENGINE (S): J65-W-5

HIGH ALTITUDE

CHART WT. LIMITS 48,500 TO 44,000 POUNDS

EXT. LOAD NONE

NO. OF ENGINES OPERATING: (ONE)

IF YOU ARE AT 25000'			FUEL	IF YOU ARE AT 30000'			IF YOU ARE AT 35000'			IF YOU ARE AT 40000'			FUEL	IF YOU ARE AT 45000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT 25000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 30000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 35000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.	BY CRUISING AT 40000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT.		BY CRUISING AT 45000'	OPT ALT. 1000 FT.	BY CRUISING AT OPT. ALT
				(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL)												

CRUISING AT 25000'						EFFECTIVE WIND	CRUISING AT 30000'						CRUISING AT 35000'						CRUISING AT 40000'						EFFECTIVE WIND	CRUISING AT 45000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW																			80 HW						
						40 HW																			40 HW						
						0																			0						
						40 TW																			40 TW						
						80 TW																			80 TW						
						120 TW																			120 TW						

SPECIAL NOTES

1 Climb at 100% RPM
2 Multiple Nautical units by 1.15 to obtain Statute units.
3 Read lower half of chart opposite effective wind only.
4 Make additional allowances for landing, navigational errors, combat, formation flight etc. as required.

BASED ON: ESTIMATE
DATA AS OF: 1 OCTOBER 1953

EXAMPLE

If you are at 5000 ft. with 14,000 lb. of available fuel, you can fly 950 nautical miles by holding 282 knots CAS. However, you can fly 1085 nautical miles by immediately climbing to 10,000 ft. at 100% RPM. At 10,000 ft. cruise at 274 knots CAS. When reduced weight allows, continue climbs to and cruises at higher altitudes until 20,000 ft. is attained. At 20,000 ft. cruise at 230 knots CAS and start let down 5 nautical miles from home. With an 40 knot headwind, the range at optimum altitude would be .86 x 1085 or 934 nautical miles. Cruise at 239 knots CAS and start let down 4 nautical miles from destination.

LEGEND

EFFECTIVE WIND-HW, Headwind, TW, Tailwind- Knots
R.F.-Range factor-Ratio of ground distance to airmiles for corresponding winds
G.S.-Ground speed in Knots
CAS-Calibrated airspeed in Knots
LB/HR-Fuel consumption- Pounds per hour
RANGE- Nautical miles
( ) RANGE IN PARENTHESIS FOR INTERPOLATION PURPOSES ONLY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-67

AIRCRAFT MODEL (S) B-57B ENGINE(S) J65-W-5	FLIGHT OPERATION INSTRUCTION CHART STANDARD DAY CHART WT. LIMITS 48,500 TO 44,000 POUNDS	EXTERNAL LOAD ITEMS NONE NUMBER OF ENGINES OPERATING: (ONE)

INSTRUCTIONS FOR USING CHART: (A) IN FLIGHT - Select figure in fuel column equal to or less than fuel available for cruise (fuel on board minus allowance for reserve, combat, navigational error, formation flight, etc.). Move horizontally right or left to section according to present altitude and read total range available (no wind) by cruising at that altitude or by climbing to another altitude of maximum range. For a flight at initial altitude, operating instructions are given directly below. For a flight at higher altitude, climb immediately to desired altitude and read cruising instructions in appropriate cruising altitude section. (B) FLIGHT PLANNING - From initial fuel on board subtract fuel for take-off and climb to desired cruising altitude and all other necessary allowances. Then use chart as for IN FLIGHT above, adding initial climb distances to range values.

NOTES: Ranges shown at optimum altitudes are maximum. In order to obtain maximum range on flights requiring more than one chart (due to external configuration or gross weight changes), it is necessary to observe the optimum cruising altitude on each chart; i.e., when changing charts a climb may be required to obtain a maximum range. All range values include allowances for descent distance and fuel. Climb distance and fuel are included where climbs are indicated.

DATA BELOW CONTAIN NO FUEL RESERVE FOR LANDING

DATA AS OF: 1 OCTOBER 1953 BASED ON: ESTIMATE

LOW ALTITUDE

IF YOU ARE AT S.L.			FUEL (1)	IF YOU ARE AT 5000'			IF YOU ARE AT 10000'			IF YOU ARE AT 15000'			FUEL (1)	IF YOU ARE AT 20000'		
RANGE IN AIRMILES				RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES				RANGE IN AIRMILES		
BY CRUISING AT S.L.	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 5000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 10000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	BY CRUISING AT 15000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.	POUNDS	BY CRUISING AT 20000'	OPT. ALT. 1000 FT	BY CRUISING AT OPT.ALT.
(RANGE FIGURES INCLUDE ALLOWANCES FOR PRESCRIBED CLIMB & DESCENT TO SEA LEVEL (1)																
915	10	1140	15,158	1120	10	1165	1125	10	1180				15,158			
850	10	1070	14,000	950	10	1085	1050	10	1105				14,000			
790	10	1005	13,000	885	10	1020	980	10	1030				13,000			
735	10	935	12,000	820	10	950	910	10	965				12,000			
675	10	860	11,000	760	10	875	840	10	890				11,000			
615	10	785	10,000	695	10	805	770	10	820				10,000			

CRUISING AT S.L.						EFFECTIVE WIND	CRUISING AT 5000'						CRUISING AT 10000'						CRUISING AT 15000'						EFFECTIVE WIND	CRUISING AT 20000'					
C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE					C.A.S.	APPROXIMATE						C.A.S.	APPROXIMATE				
	% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	LB/HR	G.S.	R.F.	LET DOWN DIST.		% RPM	/HR	G.S.	R.F.	LET DOWN DIST.			% RPM	/HR	G.S.	R.F.	LET DOWN DIST.
						120 HW																			120 HW						
						80 HW																			80 HW						
302	93	5390	262	.85	0	40 HW	296	95	5140	278	.85	1	291	96.5	5130	298	.86	2							40 HW						
288	92	5030	288	1.00	0	0	282	93	4780	303	1.00	1	274	95	4600	317	1.00	2							0						
276	91	4790	316	1.15	0	40 TW	276	93	4640	338	1.15	1	273	95	4600	356	1.13	2							40 TW						
						80 TW							268	94	4470	390	1.26	2							80 TW						
						120 TW																			120 TW						

Figure A-68

MAXIMUM RANGE SUMMARY

STANDARD DAY

MODEL(S) B-57B ZERO WIND ENGINE(S): (TWO) J65-W-5

CONFIGURATION. CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS	MACH NO.	APPROXIMATE MI/	APPROXIMATE %RPM
78	.0600	.41	272	SEA LEVEL				
79	.0705	.43	261	5,000				
79	.0815	.46	251	10,000				
80	.0923	.48	243	15,000				
80	.1044	.52	239	20,000				
81	.1185	.58	238	25,000				
82	.1358	.63	235	30,000				
83	.1541	.68	227	35,000				
85	.1694	.73	215	40,000				
90	.1767	.74	194	45,000				
				50,000				

CONFIGURATION.
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE %RPM	APPROXIMATE MI/	MACH NO.	CAS	PRESSURE ALTITUDE FEET	CAS	MACH NO.	APPROXIMATE MI/	APPROXIMATE %RPM
				SEA LEVEL				
				5,000				
				10,000				
				15,000				
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB - NAUT MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-69

MAXIMUM RANGE SUMMARY

STANDARD DAY

MODEL(S) B-57B ZERO WIND ENGINE(S): (TWO) J65-W-5

CONFIGURATION. CLEAN
WEIGHT: 48,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	MACH NO.	APPROXIMATE MI/LB	APPROXIMATE %RPM
82	.0539	.45	298	SEA LEVEL	293	.44	.0556	81
82	.0611	.49	299	5,000	290	.48	.0633	81
83	.0685	.54	299	10,000	287	.52	.0714	82
85	.0767	.59	298	15,000	286	.56	.0799	83
86	.0852	.64	296	20,000	284	.62	.0890	84
87	.0960	.68	283	25,000	277	.67	.1010	85
88	.1057	.71	266	30,000	262	.70	.1130	86
90	.1116	.73	244	35,000	244	.73	.1212	88
				40,000	221	.74	.1250	93
				45,000				
				50,000				

CONFIGURATION. CLEAN
WEIGHT: 39,500 POUNDS

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	MACH NO.	APPROXIMATE MI/LB	APPROXIMATE %RPM
80	.0570	.43	286	SEA LEVEL	279	.42	.0586	79
81	.0656	.46	280	5,000	271	.45	.0679	80
81	.0745	.50	275	10,000	263	.47	.0778	80
82	.0836	.54	272	15,000	259	.51	.0878	81
83	.0938	.59	270	20,000	255	.56	.0986	81
84	.1063	.64	267	25,000	254	.61	.1117	82
85	.1200	.68	256	30,000	247	.66	.1272	83
86	.1320	.72	241	35,000	235	.70	.1429	84
90	.1380	.74	220	40,000	220	.74	.1532	88
				45,000	195	.74	.1550	93
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB NAUT MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-70

MAXIMUM RANGE SUMMARY

STANDARD DAY

MODEL(S) B-57B ZERO WIND ENGINE(S): (TWO) J65-W-5

CONFIGURATION. 2 X 320 GAL WING TIP TANKS
WEIGHT: 35,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 30,800 POUNDS

APPROXIMATE		MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	MACH NO.	APPROXIMATE	
%RPM	MI/LB						MI/LB	%RPM
79	.0569	.41	268	SEA LEVEL	261	.39	.0583	78
80	.0653	.44	264	5,000	254	.42	.0678	78
80	.0743	.47	259	10,000	247	.45	.0777	79
81	.0842	.51	254	15,000	241	.48	.0882	79
82	.0947	.55	251	20,000	236	.52	.1003	80
83	.1068	.60	246	25,000	232	.56	.1135	81
84	.1210	.64	240	30,000	226	.61	.1290	82
85	.1358	.69	230	35,000	222	.67	.1463	83
89	.1454	.73	219	40,000	214	.72	.1605	87
				45,000	193	.73	.1672	92
				50,000				

CONFIGURATION.
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE		MACH NO.	CAS	PRESSURE ALTITUDE FEET	CAS	MACH NO.	APPROXIMATE	
%RPM	MI/						MI/	%RPM
				SEA LEVEL				
				5,000				
				10,000				
				15,000				
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB NAUT MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-71

MAXIMUM RANGE SUMMARY

STANDARD DAY

MODEL(S) B-57B ZERO WIND ENGINE(S): (TWO) J65-W-5

CONFIGURATION. 2 X 320 GAL WING TIP TANKS
WEIGHT: 53,000 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 48,800 POUNDS

APPROXIMATE		MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	MACH NO.	APPROXIMATE	
%RPM	MI/LB						MI/LB	%RPM
82	.0511	.44	293	SEA LEVEL	288	.44	.0521	82
83	.0578	.49	297	5,000	291	.48	.0589	83
84	.0647	.54	298	10,000	292	.53	.0660	84
86	.0719	.59	296	15,000	291	.58	.0734	85
87	.0804	.63	290	20,000	285	.62	.0821	87
88	.0904	.67	279	25,000	277	.67	.0918	88
89	.0985	.71	265	30,000	265	.71	.1002	89
91	.1041	.73	245	35,000	245	.73	.1057	91
				40,000				
				45,000				
				50,000				

CONFIGURATION. 2 X 320 GAL WING TIP TANKS
WEIGHT: 44,300 POUNDS

CONFIGURATION: 2 X 320 GAL WING TIP TANKS
WEIGHT: 39,800 POUNDS

APPROXIMATE		MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	MACH NO.	APPROXIMATE	
%RPM	MI/LB						MI/LB	%RPM
81	.0539	.43	282	SEA LEVEL	276	.42	.0554	80
82	.0606	.47	282	5,000	274	.45	.0628	81
83	.0685	.51	282	10,000	270	.49	.0712	82
84	.0766	.55	279	15,000	267	.53	.0802	83
85	.0860	.60	275	20,000	264	.58	.0904	84
86	.0966	.65	268	25,000	259	.63	.1019	85
88	.1064	.69	258	30,000	250	.67	.1134	86
89	.1150	.72	243	35,000	236	.71	.1252	87
94	.1199	.74	220	40,000	221	.74	.1314	92
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB NAUT MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-72

MAXIMUM RANGE SUMMARY

STANDARD DAY

ZERO WIND

MODEL(S) B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION. CLEAN
WEIGHT: 30,500 POUNDS

CONFIGURATION:
WEIGHT:

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET	CAS	MACH NO.	APPROXIMATE MI/	APPROXIMATE %RPM
86	.0675	.37	248	SEA LEVEL				
87	.0774	.40	241	5,000				
87	.0868	.42	232	10,000				
88	.0960	.45	224	15,000				
90	.1055	.48	219	20,000				
93	.1149	.53	216	25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

CONFIGURATION.
WEIGHT:

CONFIGURATION:
WEIGHT:

APPROXIMATE %RPM	APPROXIMATE MI/	MACH NO.	CAS	PRESSURE ALTITUDE FEET	CAS	MACH NO.	APPROXIMATE MI/	APPROXIMATE %RPM
				SEA LEVEL				
				5,000				
				10,000				
				15,000				
				20,000				
				25,000				
				30,000				
				35,000				
				40,000				
				45,000				
				50,000				

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB NAUT. MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-73

MAXIMUM RANGE SUMMARY

STANDARD DAY

ZERO WIND

MODEL(S) B-57B

ENGINE(S): (ONE) J65-W-5

CONFIGURATION. CLEAN
WEIGHT: 48,500 POUNDS

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET
92	.0573	.44	288	SEA LEVEL
93	.0634	.46	282	5,000
95	.0690	.50	274	10,000
				15,000
				20,000
				25,000
				30,000
				35,000
				40,000
				45,000
				50,000

CONFIGURATION: CLEAN
WEIGHT: 44,000 POUNDS

CAS KNOTS	MACH NO.	APPROXIMATE MI/LB	APPROXIMATE %RPM
280	.42	.0598	90
273	.45	.0663	91
265	.48	.0730	93
260	.51	.0798	95

CONFIGURATION. CLEAN
WEIGHT: 39,500 POUNDS

APPROXIMATE %RPM	APPROXIMATE MI/LB	MACH NO.	CAS KNOTS	PRESSURE ALTITUDE FEET
89	.0621	.41	269	SEA LEVEL
90	.0698	.43	263	5,000
91	.0772	.46	255	10,000
93	.0847	.49	248	15,000
				20,000
				25,000
				30,000
				35,000
				40,000
				45,000
				50,000

CONFIGURATION: CLEAN
WEIGHT: 35,000 POUNDS

CAS KNOTS	MACH NO.	APPROXIMATE MI/LB	APPROXIMATE %RPM
259	.39	.0648	88
252	.42	.0734	88
244	.44	.0816	89
236	.47	.0900	91
230	.51	.0982	93

REMARKS:

CAS - CALIBRATED AIRSPEED KNOTS
MI/LB NAUT. MILES PER POUND

DATA AS OF: 1 OCTOBER 1953
DATA BASIS: ESTIMATE

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

Figure A-74

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