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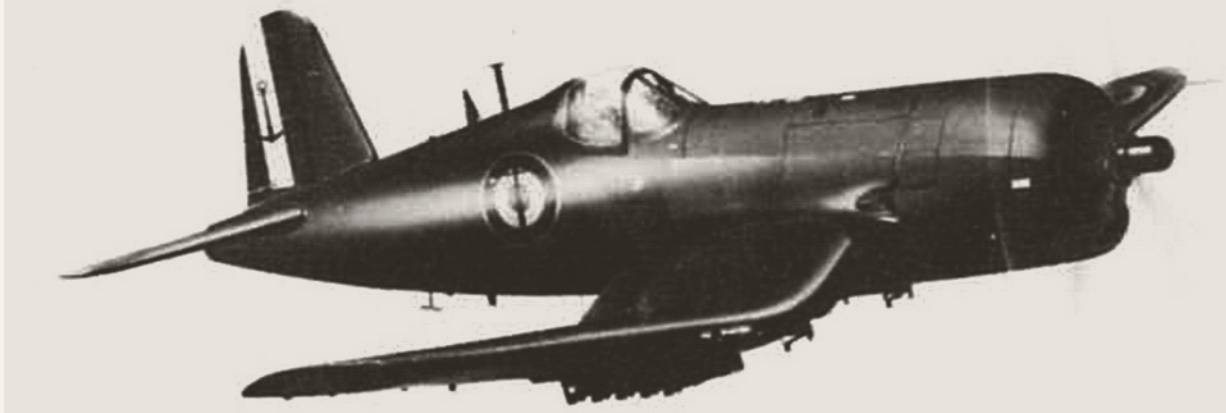
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AN 01-45HDB-1

Flight Handbook

NAVY MODEL
F4U-7
AIRCRAFT



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VOUGHT F4U-7 CORSAIR FLIGHT HANDBOOK - 36KHJ7032013

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INTRODUCTION

IMPORTANT

To gain the maximum benefit from this handbook, you should read this page carefully.

This handbook describes the airplane, its equipment, its operation and its characteristics in enough detail so that a pilot of minimum experience may safely accomplish a complete flight.

Section I describes the airplane and those systems and controls which contribute to the actual flight. Section II describes the normal flight operations from the time of preflight inspection to the time the airplane is left parked on the ramp. Section III describes the procedures to be followed in meeting flight emergencies. Section IV describes the auxiliary equipment and gives procedures for normal and emergency operations. Section V describes all important limitations to be observed during normal flight. Section VI describes the flight characteristics of the airplane. Section VII describes the operations of the various airplane systems. Section VIII is omitted because it pertains only to airplanes having crews. Section IX describes the operation of the airplane under instrument flight conditions and under extreme heat and cold. All operating charts necessary for preflight and inflight planning are included in appendix I.

Capitalized nomenclature used in this book is actual name plate nomenclature, for example GEN WARNING light. Positions of controls or switches appearing on name plates in the airplane are capitalized within quotation marks, for example, "BATT ONLY."

Frequent revisions of the handbook will be made, but because of the time necessary to incorporate such revisions it is important that the pilot keep abreast of all technical directives affecting this airplane.

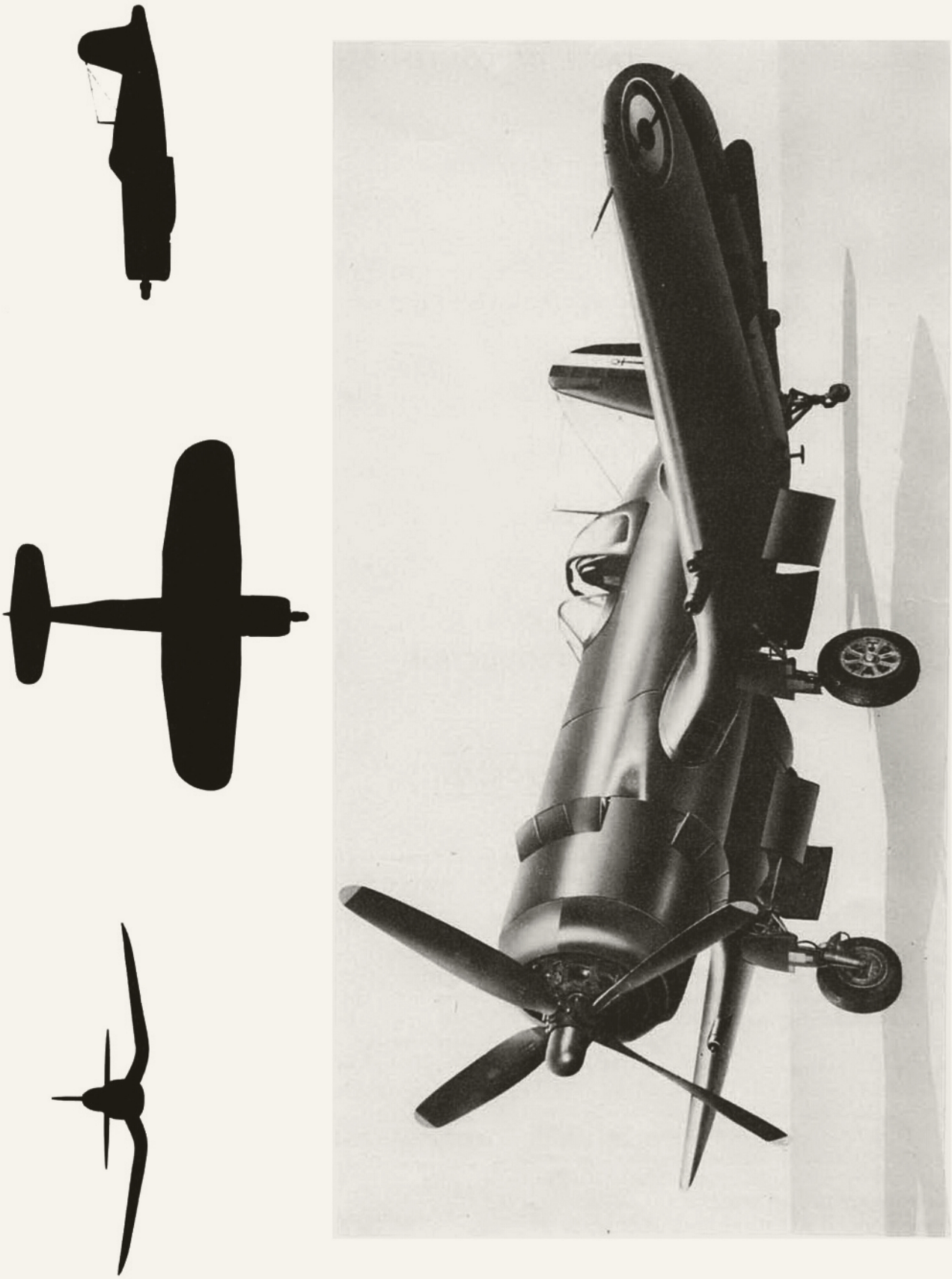
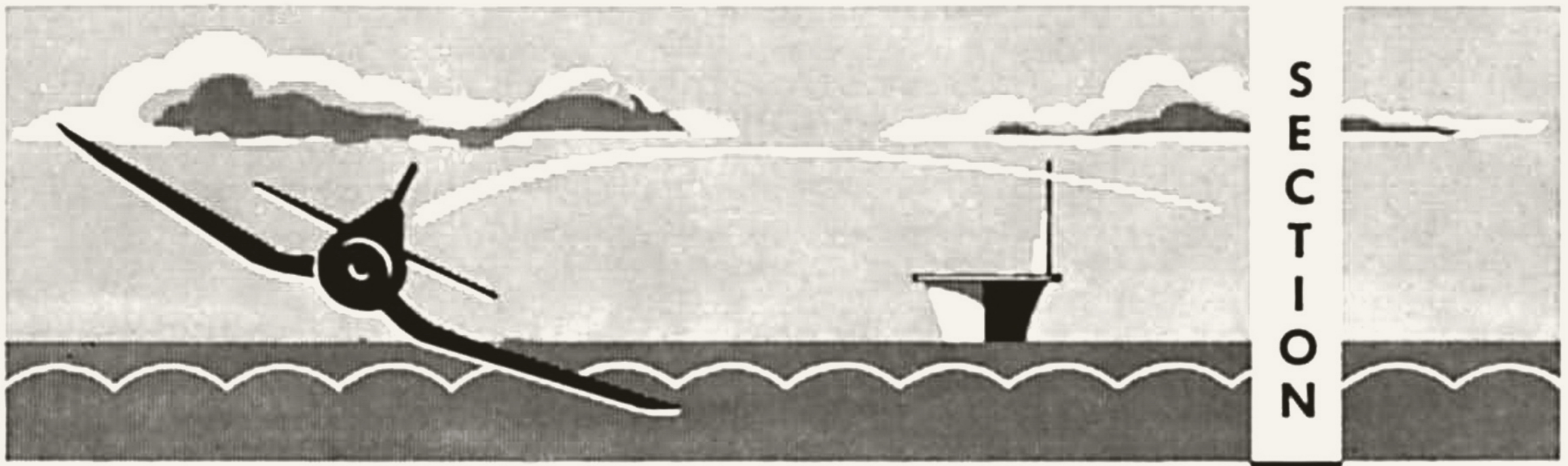


Figure 1–1. F4U-7 Airplane



SECTION I

DESCRIPTION

THE AIRPLANE.

The airplane is a single-engine single-seat low-wing monoplane of the F4U "Corsair" series, designed as a carrier-based fighter landplane. Over-all approximate dimensions are as follows:

Length	34½ feet
Width (wings spread)	41 feet
Height	13 feet
Height (wings folded)	16¼ feet

F4U-1	F4U-4	F4U-5	AU-1	F4U-7
Three-bladed propeller. Circular engine cowl with no air ducts.	Four-bladed propeller. Air duct in lower edge of engine cowl.	Four-bladed propeller. Air ducts in lower half of each side of engine cowl.	Four-bladed propeller. Noncircular engine cowl with no air ducts.	Four-bladed propeller. Air duct in lower edge of cowl.
R-2800-8W engine.	R-2800-18W or R-2800-42W engine.	R-2800-32W engine	R-2800-83WA engine.	R-2800-18W engine.
Six 50-cal machine guns, 2,400 rounds of ammunition. Eight 5-inch rockets.	Six 50-cal machine guns, 2,400 rounds of ammunition. Eight 5-inch rockets.	Four 20-mm cannons, 924 rounds of ammunition. Eight 5-inch rockets.	Four 20-mm cannons, 924 rounds of ammunition. Ten 5-inch rockets, six 500-lb or ten 250-lb bombs.	Four 20-mm cannons, 924 rounds of ammunition. Ten 5-inch rockets, six 500-lb or ten 250-lb bombs.
Two 1,000-lb bombs.	Two 11.75-inch rockets or two 1,000-lb bombs.	One 2,000-lb bomb (centerline pylon). Two 1,000-lb bombs or two 11.75-inch rockets.	One 2,000-lb bomb (centerline pylon). Two 1,000-lb bombs or two 11.75-inch rockets.	One 2,000-lb bomb (centerline pylon). Two 1,000-lb bombs or two 11.75-inch rockets.
Main tank — 237-gal max capacity. Three drop tanks — 510-gal max capacity.	Main tank — 233-gal max capacity. Two drop tanks — 300-gal max capacity.	Main tank — 234-gal max capacity. Two drop tanks — 300-gal max capacity.	Main tank — 234-gal max capacity. Two drop tanks — 300-gal max capacity.	Main tank — 234-gal max capacity. Two drop tanks — 300-gal max capacity.
12,000-lb normal gross weight.	12,500-lb normal gross weight.	12,900-lb normal gross weight.	12,900-lb normal gross weight.	13,270-lb normal gross weight.

Figure 1–2. Main Differences — F4U Series Airplanes

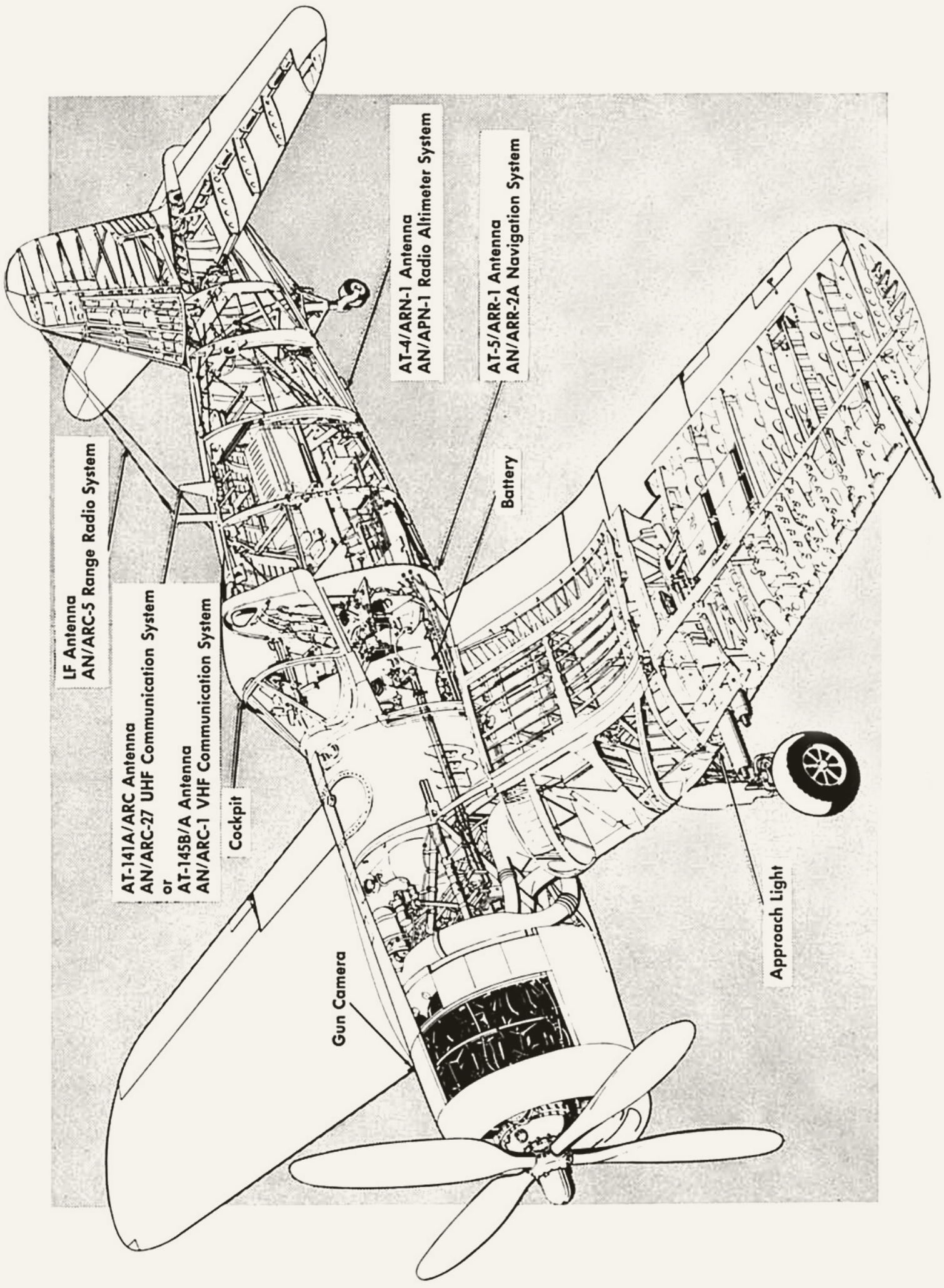
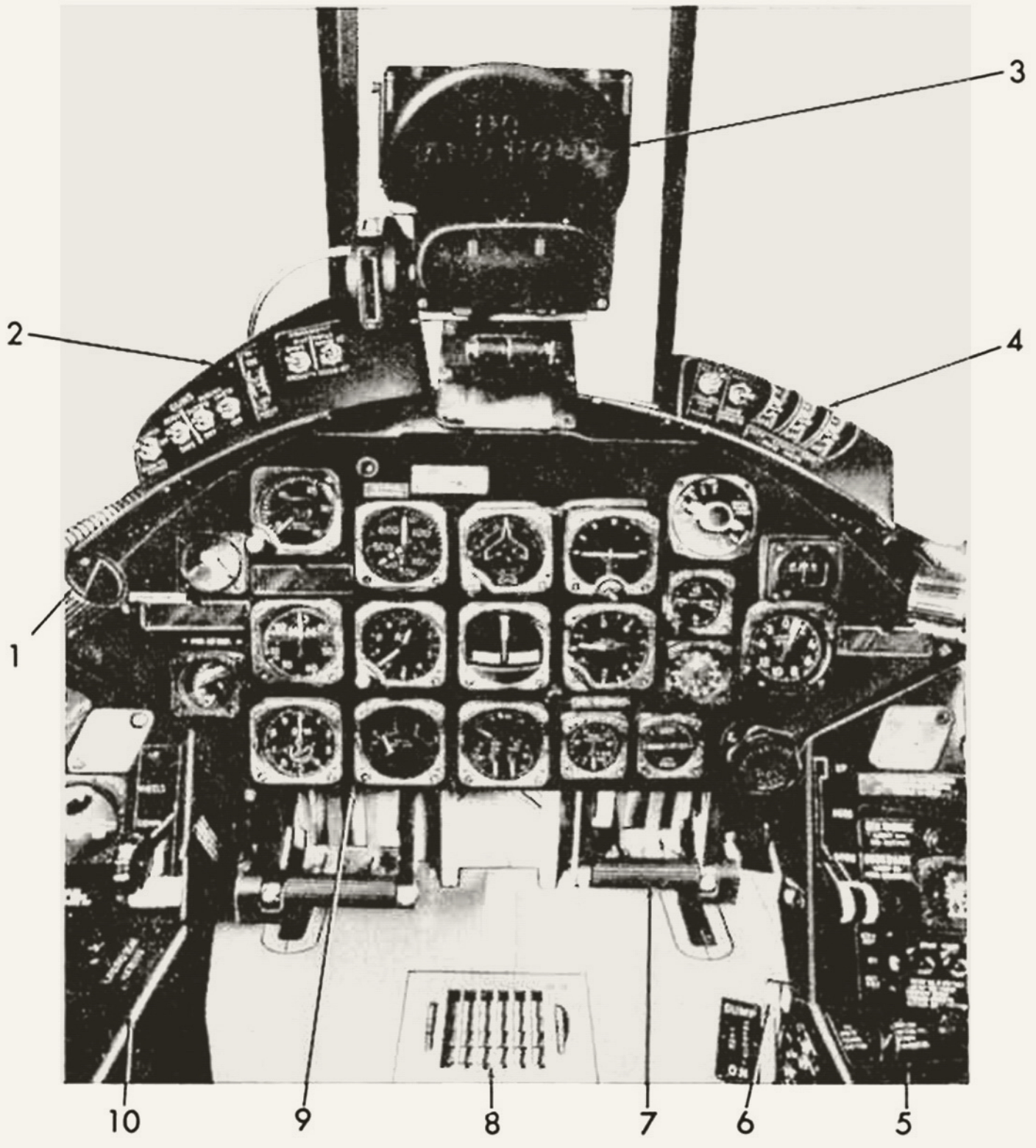


Figure 1–3. General Arrangements Diagram



1. Floodlamps
2. Gunnery Switch Box
3. Sight Unit
4. Bomb and Rocket Switch Box
5. Right-hand Control Shelf
6. Fuel Tank Pressure Dump Control
7. Brake and Rudder Pedals
8. Ventilator
9. Instrument Board
10. Left-hand Control Shelf

Figure 1–4. Cockpit Arrangement

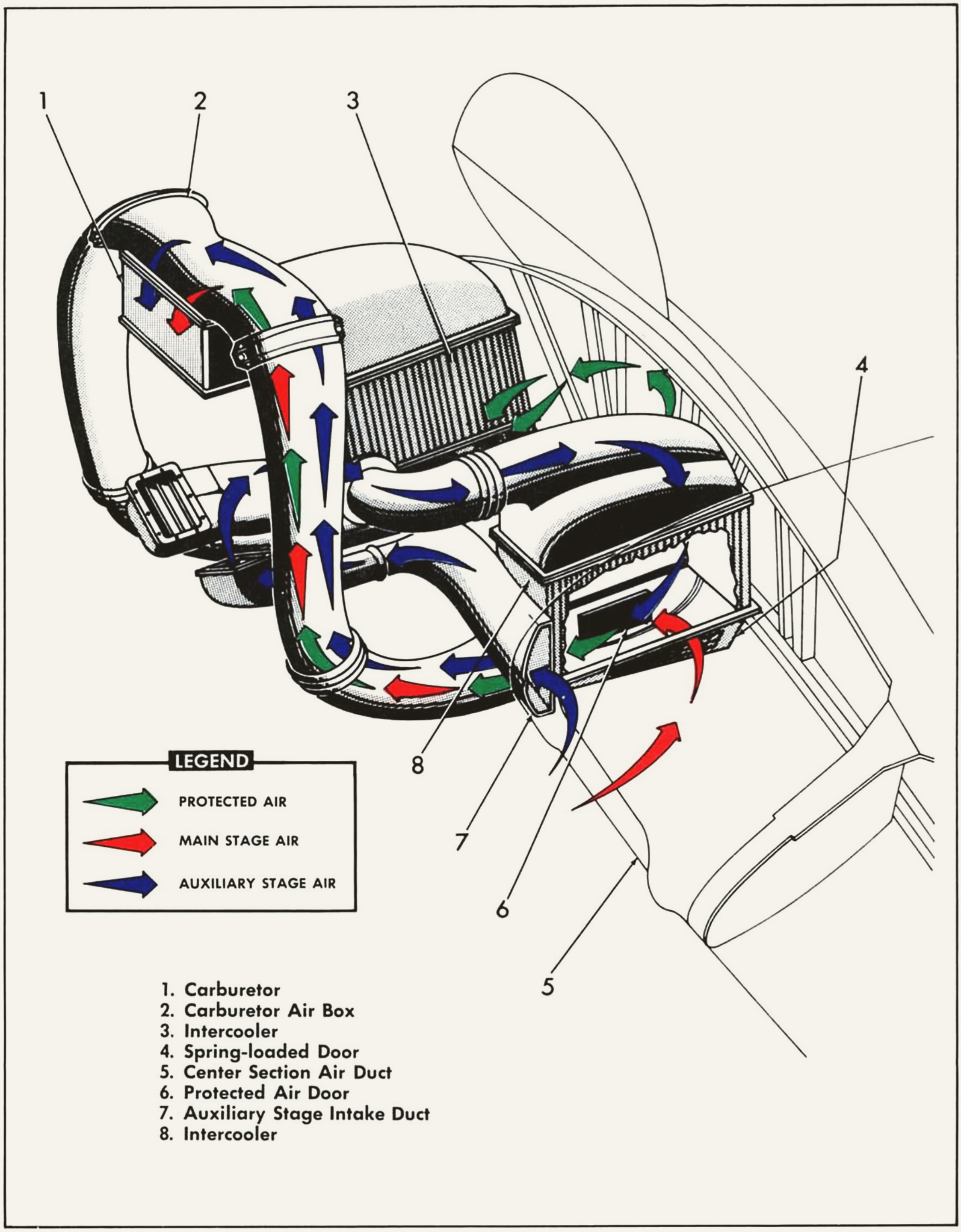
ENGINE.

GENERAL. The airplane is powered by a Pratt & Whitney model R-2800-18W double-Wasp C-series 18-cylinder engine, which is equipped with a two-stage two-speed manually controlled supercharger and provisions for water injection.

THROTTLE. The THROTTLE control (11, figure 1–11), located on the left-hand control shelf, is equipped with a fire control system ranging grip and a microphone switch button. The THROTTLE control mechanically actuates the carburetor. Indirectly, the THROTTLE control affects the propeller, which must change pitch to absorb the engine power output without changing rpm. When placed in the combat position, the THROTTLE control actuates a water injection microswitch. The tachometer (25, figure 1–12), located in the bottom row of the instrument panel, indicates the engine rpm. The manifold pressure gage (26, figure 1–12), located in the middle row of the instrument panel, indicates the pressure at the intake manifold.

CARBURETOR. The carburetor meters fuel in proportion to the air flow. The MIXTURE control (27, figure 1–11) inboard of the THROTTLE and PROPELLER controls, adjusts the ratio of fuel to air. The MIXTURE control may be positioned in "IDLE CUT-OFF" to stop fuel flow to the carburetor; in "AUTO-LEAN" for normal flight operations; or in "AUTO-RICH" for ground, take-off, landing, and for all operations exceeding 2,600 rpm. Intermediate positions provide proportional mixture control. The CARB AIR TEMP gage (27, figure 1–12), located on the left-hand side of the instrument panel, indicates the temperature of the induction air at the carburetor air box.

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1. Carburetor
2. Carburetor Air Box
3. Intercooler
4. Spring-loaded Door
5. Center Section Air Duct
6. Protected Air Door
7. Auxiliary Stage Intake Duct
8. Intercooler

Figure 1–5. Air Induction System

FRICTION ADJUSTMENT CONTROL. *(See figure 1–11.)* A friction adjustment control (26) is located inboard of the MIXTURE control on the left-hand control shelf. The control adjusts the friction of the PROPELLER and THROTTLE controls. Rotating the control forward increases friction and rotating it aft decreases friction.

AIR INDUCTION SYSTEM. *(See figure 1–5.)* When the SUPERCHARGER control is in "LOW" or "HIGH" position, air is taken in through the center section ducts (5), the auxiliary stage intake ducts (7), the auxiliary stage of the supercharger, out through the intercoolers (3), into the carburetor (1) and down to the main stage of the supercharger, where the fuel is injected. When the SUPERCHARGER control is in "NEUTRAL" position, a butterfly valve at the auxiliary stage entrance is closed and air is taken in through a spring-loaded door (4) at the bottom of the outboard side of each intercooler. The air then goes up to the carburetor and into the main stage of the supercharger. When the PROTECTED CARB AIR switch, aft of the THROTTLE control (29, figure 1–11), is placed in the "ON" position, an electrical actuator opens a door on the inboard side of each intercooler and pushes the outboard door shut, so that warm air is taken from the interior of the accessory section. The INTERCOOLER FLAP switch (33, figure 1–11) is located aft of the THROTTLE control, and has momentary "OPEN" and "CLOSE" positions plus an "OFF" position. The intercooler flap may be opened or closed at any time during flight to control cylinder head temperature or oil temperature. The intercooler flap position indicator (25, figure 1–11) is combined with the oil cooler shutters indicator, forward of the THROTTLE control.

SUPERCHARGER. The integral two-stage two-speed supercharger is controlled from the cockpit by the SUPERCHARGER control (14, figure 1–11) outboard of the THROTTLE control. The "NEUTRAL" position is used for low-altitude operations. For increased manifold pressure at higher altitudes, the SUPERCHARGER is shifted to the "LOW" position and then to the "HIGH" position. An auxiliary supercharger regulator maintains a constant pressure at the carburetor entrance during low- or high-blower operation by adjusting the butterfly valves in the auxiliary supercharger inlet passages. The intercoolers, located inboard of the center section air ducts, cool the air from the auxiliary stage of the supercharger before it goes to the main stage.

ENGINE COOLING. The engine is cooled externally by air flow through the nose cowl around the cylinders and internally by cooled lubricating oil. Cooling is regulated by controlling the air flow through the cowl flaps, the oil cooler, and the intercooler flap. The cowl flaps are controlled by the COWL FLAPS switch (31, figure 1–11) on the left-hand control shelf, below the MIXTURE control. On the ground, the cowl flaps are automatically opened by a microswitch on the landing gear, allowing maximum air flow. A COWL FLAPS OVERRIDE switch (19, figure 1–13) is provided on the aft end of the right-hand control shelf to allow closing of the cowl flaps on the ground after the engine has cooled. The oil cooler shutters are controlled by the OIL COOLER SHUTTERS switch. The intercooler flap is controlled by the INTERCOOLER FLAP switch. Engine temperatures are indicated by the cylinder temperature gage (23, figure 1–12) located in the bottom row of instruments on the instrument panel.

IGNITION SYSTEM. The ignition system is the conventional dual type. The ignition switch (2, figure 1–12), located on the left-hand side of the instrument panel, has "BOTH," "L," "R," and "OFF" posititons.

PRIMER SYSTEM. The primer system injects fuel into the top eight cylinders to aid in starting the engine. The PRIME switch (5, figure 1–13) is located inboard of the START switch on the right-hand control shelf.

STARTER. The electric starter accelerates the engine to sufficient rpm to sustain engine operation. The START switch (5, figure 1–13) is located on the forward inclined portion of the right-hand control shelf.

PROPELLER.

GENERAL. The airplane is equipped with a four-bladed Hamilton Standard hydromatic propeller.

GOVERNOR. The blade pitch angle is automatically controlled by the propeller governor to maintain a constant engine speed as selected by the pilot. The PROPELLER control (12, figure 1–11) is located inboard of the THROTTLE control on the left-hand control shelf. Moving the control forward increases rpm and moving it aft decreases rpm.

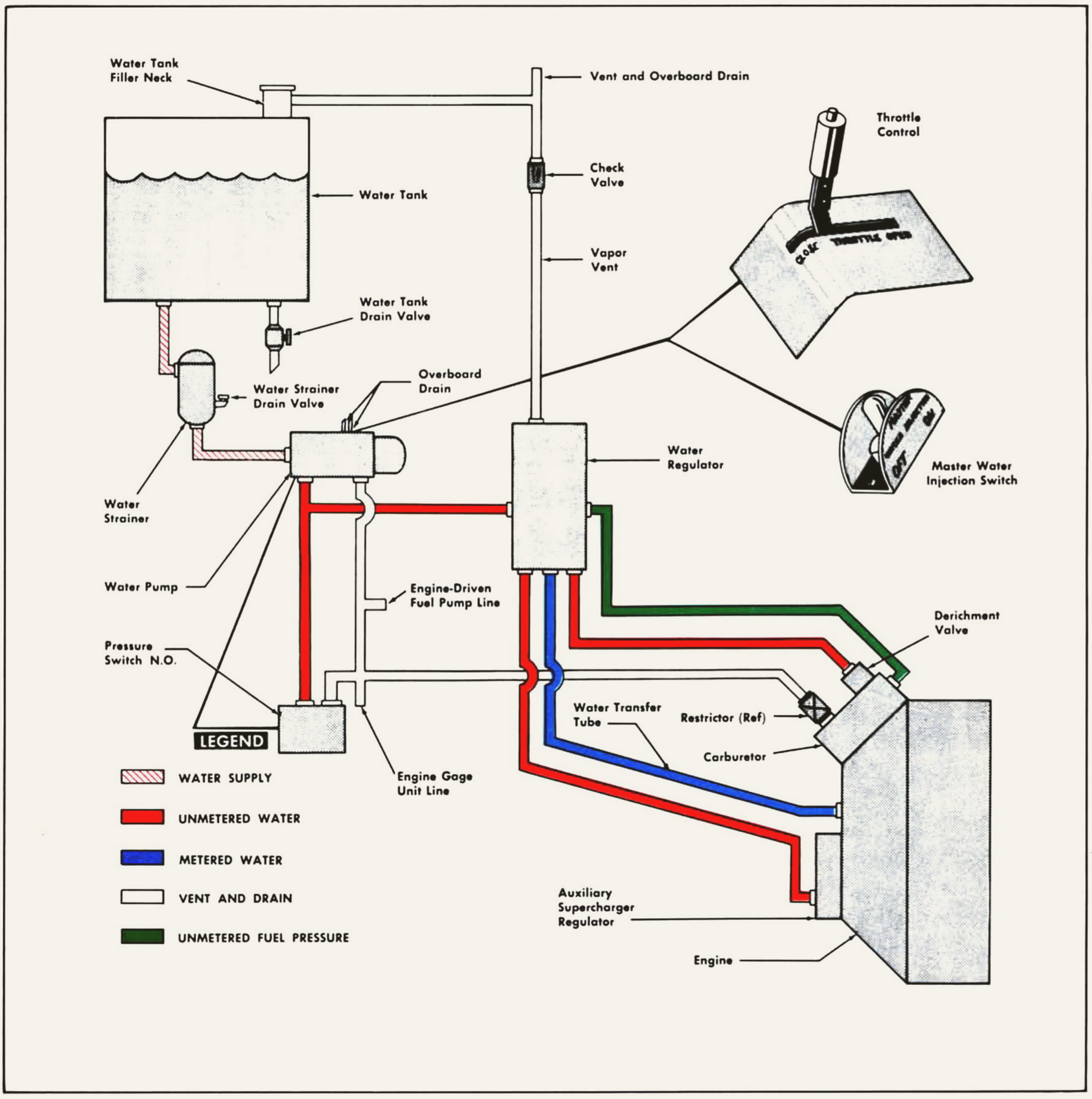


Figure 1–6. Water Injection System

WATER INJECTION SYSTEM.

The water injection system (see figure 1–6) allows the normally limited manifold pressure to be exceeded in emergencies. A water-alcohol mixture is injected into the blower throat whenever the MASTER WATER INJECTION switch (13, figure 1–11), located on the left-hand control shelf, is turned "ON" and the THROTTLE control is pushed beyond the military power stop to the combat power position and held in this position. The 14 gallons of water injection fluid will last a total of approximately 7½ minutes.

Note

Engine operation in combat power shall be limited to 5 minutes at any one time.

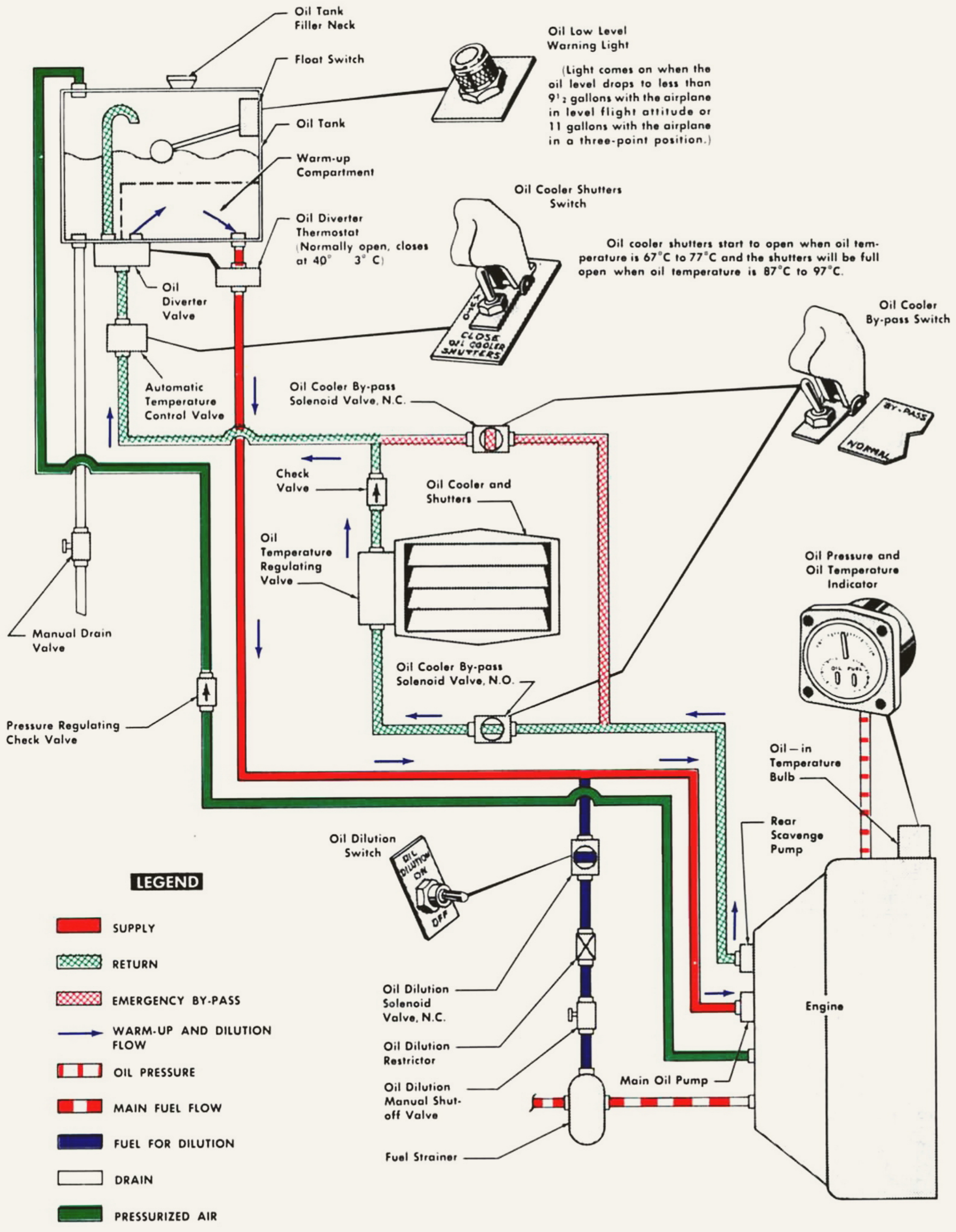


Figure 1–7. Oil System

OIL SYSTEM.

GENERAL. *(See figure 1–7.)* The oil system stores, supplies, and cools oil for the lubrication of the engine and accessories, for operation of the supercharger clutches, and for operation of the propeller pitch. The system provides for warm-up and dilution of oil for cold weather operation. The oil tank, located on the forward side of the fire wall, has a capacity of 27.5 gallons with an expansion space of 8.4 gallons. An oil cooler located in the engine accessory compartment provides oil cooling from air which flows in through the nose cowl air ducts. Oil grade and specification are given in the servicing diagram (figure 1–14).

OIL COOLER SHUTTERS SWITCH. The OIL COOLER SHUTTERS switch (28, figure 1–11) is located below the THROTTLE control on the left-hand control shelf. When the switch is in "AUTO" position, the oil cooler shutters are operated automatically. The "OPEN" and "CLOSE" positions are for emergency operation if the automatic adjustment fails. The shutters position indicator (25, figure 1–11) is combined with the intercooler flap indicator forward of the THROTTLE control on the left-hand control shelf.

OIL COOLER SWITCH. The OIL COOLER switch (17, figure 1–11) is covered with a guard and located on the left-hand control shelf below the wheel-and-flap position indicator. If the oil low-level warning light (23, figure 1–11) adjacent to the by-pass switch goes on, the oil coolers may be damaged and leaking. To by-pass the oil coolers, the OIL COOLER switch should be moved from the "NORMAL" to the "BY-PASS" position.

OIL DILUTION SWITCH. The OIL DILUTION switch (7, figure 1–13), located on the forward inclined panel of the right-hand control panel, energizes the oil dilution system when it is placed in the "ON" position.

OIL DILUTION MANUAL SHUTOFF VALVE. A manual valve, located adjacent to the fuel strainer in the engine accessory compartment, must be opened before oil dilution can take place. Access to the valve is through the intercooler flap.

OIL PRESSURE GAGE. The oil pressure gage is part of the engine gage unit (22, figure 1–12) and indicates the pressure of the oil entering the engine.

OIL TEMPERATURE GAGE. The oil temperature gage is part of the engine gage unit (22, figure 1–12) and indicates the temperature of the oil entering the engine.

OIL LOW-LEVEL WARNING LIGHT. The oil low-level warning light (23, figure 1–11) is located on the left-hand control shelf and lights up when the oil level has dropped to approximately 9½ gallons with the airplane level, or approximately 11 gallons with the airplane in a three-point attitude. The lamp bulb may be tested by pressing on the lamp housing.

Note

If the oil low-level warning light goes on during engine warm-up in cold weather, it indicates that the oil warm-up system is in operation.

ENGINE CYLINDER TEMPERATURE GAGE. The engine cylinder temperature gage (23, figure 1–12) is located in the bottom row of instruments on the instrument panel. It indicates the engine cylinder head temperatures which are affected by the air and oil cooling systems.

FUEL SYSTEM.

GENERAL. *(See figure 1–8.)* The fuel system consists of a primary fuel supply system, a transfer system, a venting and pressurizing system, and an emergency stand-by fuel selection system. The cockpit heater is also fed by the fuel system. The 234-gallon self-sealing main fuel cell is pressurized above 18,000 feet by the vapor pressure of the fuel. Three external drop tanks may be carried on the centerline and center section pylons, but the left-hand and centerline tanks cannot be used simultaneously. The drop tanks are pressurized at all altitudes by the positive pressure of the vacuum pump. A valve is incorporated to vent the main fuel cell in a dive. Fuel grade and specification are given in the servicing diagram (figure 1–14).

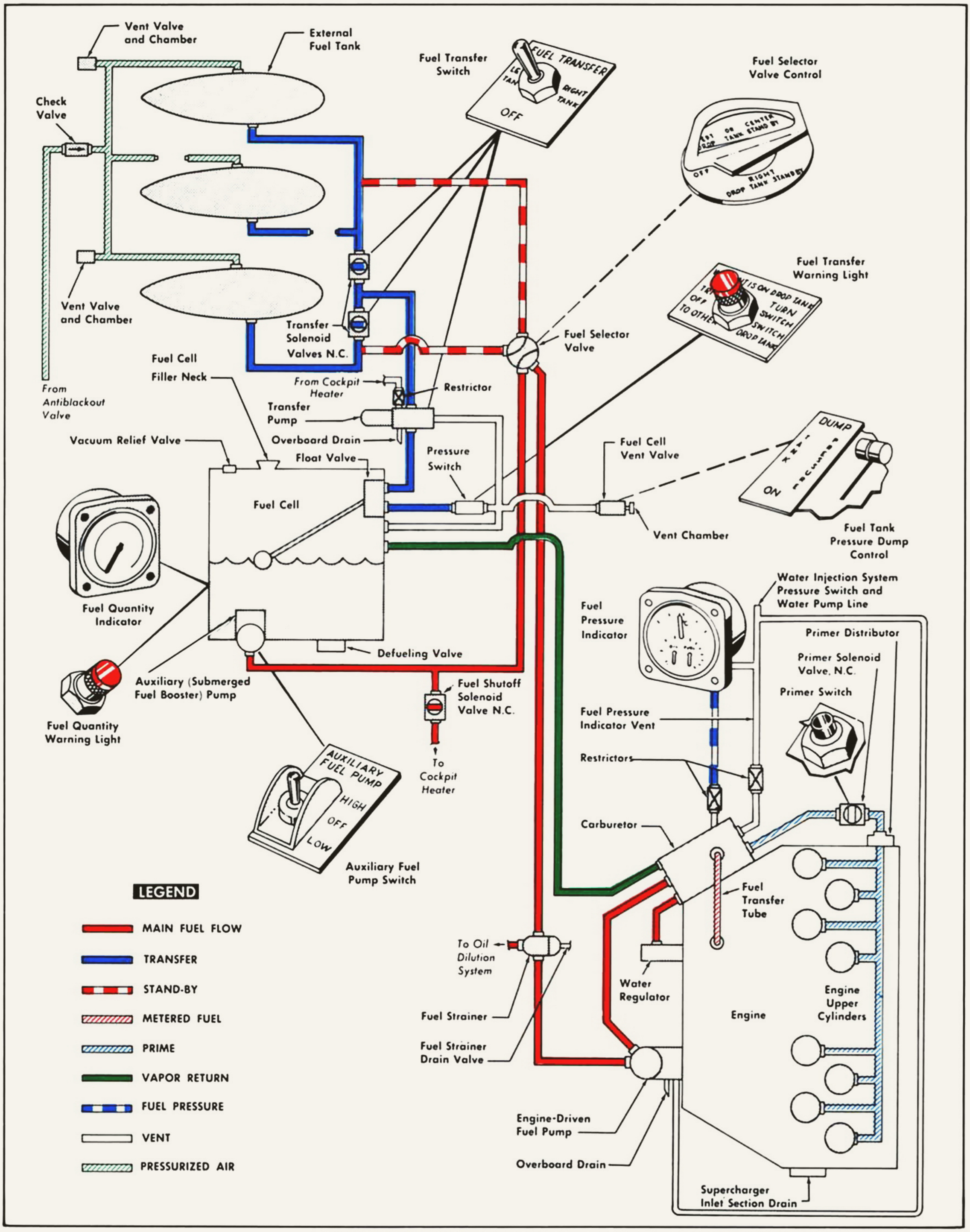


Figure 1–8. Fuel System

Fuel Quantity Data

*Configuration**	*Tank Selection*	*Volume (Gallons)*	*Total Volume (Gallons)*
Main cell	"ON"	234	234
Main cell plus Right drop tank	"ON" "RIGHT DROP TANK STAND-BY"	234 150	384
Main cell plus Left* or centerline drop tank	"ON" "LEFT OR CENTERLINE DROP TANK STAND-BY"	234 150	384
Main cell plus Right drop tank plus Left* or centerline drop tank	"ON" "RIGHT DROP TANK STAND-BY" "LEFT OR CENTERLINE DROP TANK STAND-BY"	234 150 150	534

*It is not possible to connect the left-hand drop tank and the centerline tank to the fuel system simultaneously.

FUEL SELECTION. The fuel selector valve control (3, figure 1–11) is located on the left-hand control shelf outboard of the sight unit control panel. The selector control has four positions: "OFF," "LEFT OR CENTER DROP TANK STAND-BY," "ON," and "RIGHT DROP TANK STAND-BY." The two stand-by positions are emergency positions, to be used if the fuel transfer system fails.

FUEL TRANSFER SYSTEM. Fuel is transferred from the external tanks to the main cell by placing the FUEL TRANSFER switch (4, figure 1–11), located forward of the fuel selector control, in either "LEFT TANK" or "RIGHT TANK" position. A float valve located in the main fuel cell controls transfer fuel flow.

AUXILIARY FUEL PUMP. The auxiliary submerged fuel boost pump, located in the main fuel cell, furnishes fuel to the engine-driven main fuel pump and may be used to supply fuel to the engine if the main fuel pump fails. The AUXILIARY FUEL PUMP switch (6, figure 1–11), located on the left-hand control shelf below the SUPERCHARGER control, has three positions: "OFF," "HIGH," and "LOW."

FUEL TANK PRESSURE DUMP CONTROL. The fuel TANK PRESSURE control (6, figure 1–4), located under the right-hand rudder pedal, is actuated by the pilot's foot. The control releases main fuel cell pressure for crash landings or before going into combat.

DROP TANK RELEASE. A manual EMERGENCY BOMB OR DROP TANK RELEASE (1, figure 1–11) is located on the left-hand control shelf aft of the fuel selector valve control. Pushing the release forward in the left-hand, center, or right-hand slot releases the respective external tank. When one external tank is dropped, pressurization is lost at the remaining tank.

FUEL QUANTITY GAGE. The fuel quantity gage (20, figure 1–12), located in the bottom row of instruments on the right-hand side of the instrument panel, indicates the amount of fuel remaining in the main fuel cell.

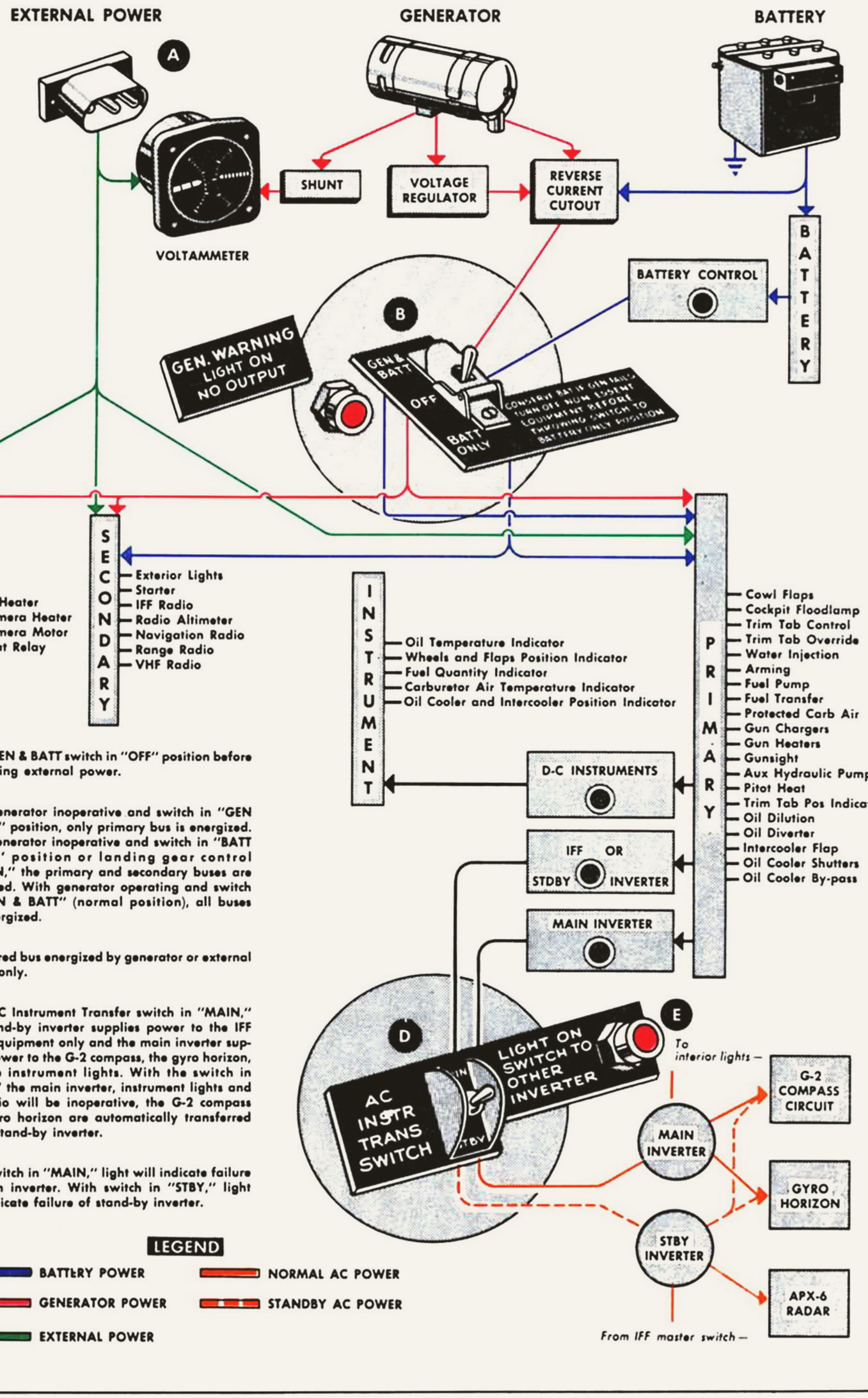
FUEL RESERVE WARNING LIGHT. The FUEL WARNING light (21, figure 1–12), adjacent to the fuel quantity gage, goes on when the fuel remaining in the main cell drops to 50 gallons or less. The lamp may be tested by pressing in on the lamp cover.

FUEL PRESSURE GAGE. The fuel pressure gage (22, figure 1–12) is part of the engine gage unit and indicates the pressure of the fuel entering the carburetor.

FUEL TRANSFER WARNING LIGHT. The FUEL TRANSFER warning light (5, figure 1–11), adjacent to the FUEL TRANSFER switch, goes on when an external tank from which fuel is being transferred is empty. When the light goes on the FUEL TRANSFER switch should be placed in the other transfer position or returned to the OFF position. The lamp may be tested by pressing in on the lamp cover with the FUEL TRANSFER switch in either transfer position.

ELECTRICAL POWER SUPPLY SYSTEM.

D-C POWER SUPPLY. *(See figure 1–9.)* Direct current is supplied by a 30-volt 200-ampere generator and a 24-volt 17-, 24-, or 36- ampere-hour battery, or by external power supplied through the external power receptacle. The GEN & BATT switch (26, figure 1–13), located on the right-hand control shelf inboard of the PRIME and START switches, has three positions: "OFF," "BATT ONLY," and "GEN & BATT." A GEN WARNING light (3, figure 1–13), adjacent to the voltammeter, goes on when the generator is not operating at a charging potential. The lamp may be tested by pressing in on the lamp cover. All circuit breakers (24, figure 1–13) accessible during flight are located on the forward vertical panel of the right-hand control shelf and are the manual-reset push-pull type. In an emergency the circuit breakers may be manually pulled out to shut off power to a particular item or system. A voltammeter (4, figure 1–13), located above the starting switch, indicates the bus voltage and generator output in amperes. When the GEN WARNING light is on, the voltammeter shows battery current only. All electrical equipment except the G-2 compass, gyro horizon, IFF radar, and most of the interior lights are supplied with direct current.



A Place GEN & BATT switch in "OFF" position before connecting external power.

B With generator inoperative and switch in "GEN & BATT" position, only primary bus is energized. With generator inoperative and switch in "BATT ONLY" position or landing gear control "DOWN," the primary and secondary buses are energized. With generator operating and switch in "GEN & BATT" (normal position), all buses are energized.

C Monitored bus energized by generator or external power only.

D With AC Instrument Transfer switch in "MAIN," the stand-by inverter supplies power to the IFF radio equipment only and the main inverter supplies power to the G-2 compass, the gyro horizon, and the instrument lights. With the switch in "STBY," the main inverter, instrument lights and IFF radio will be inoperative, the G-2 compass and gyro horizon are automatically transferred to the stand-by inverter.

E With switch in "MAIN," light will indicate failure of main inverter. With switch in "STBY," light will indicate failure of stand-by inverter.

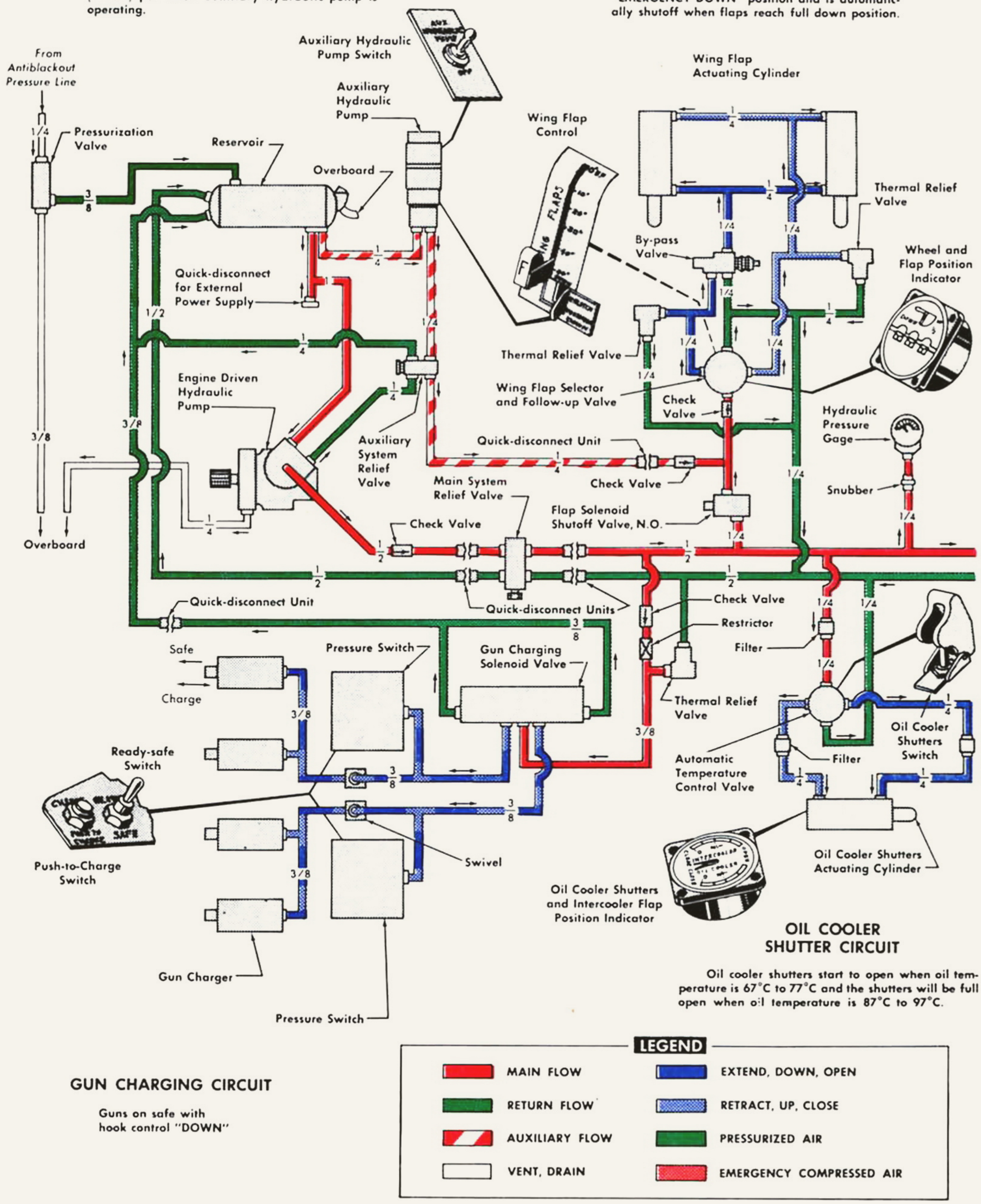
Figure 1–9. Electrical Bus Diagram

HYDRAULIC POWER SUPPLY CIRCUIT

Normal hydraulic system pressure 1500 psi. Hydraulic system pressure increases to 1750 (± 100) psi when auxiliary hydraulic pump is operating.

WING FLAP CIRCUIT

Auxiliary hydraulic pump automatically operated when WING FLAPS switch is placed in "EMERGENCY DOWN" position and is automatically shutoff when flaps reach full down position.



OIL COOLER SHUTTER CIRCUIT

Oil cooler shutters start to open when oil temperature is 67°C to 77°C and the shutters will be full open when oil temperature is 87°C to 97°C.

GUN CHARGING CIRCUIT

Guns on safe with hook control "DOWN"

LEGEND

MAIN FLOW	EXTEND, DOWN, OPEN
RETURN FLOW	RETRACT, UP, CLOSE
AUXILIARY FLOW	PRESSURIZED AIR
VENT, DRAIN	EMERGENCY COMPRESSED AIR

Figure 1–10. Hydraulic System (Sheet 1 of 2)

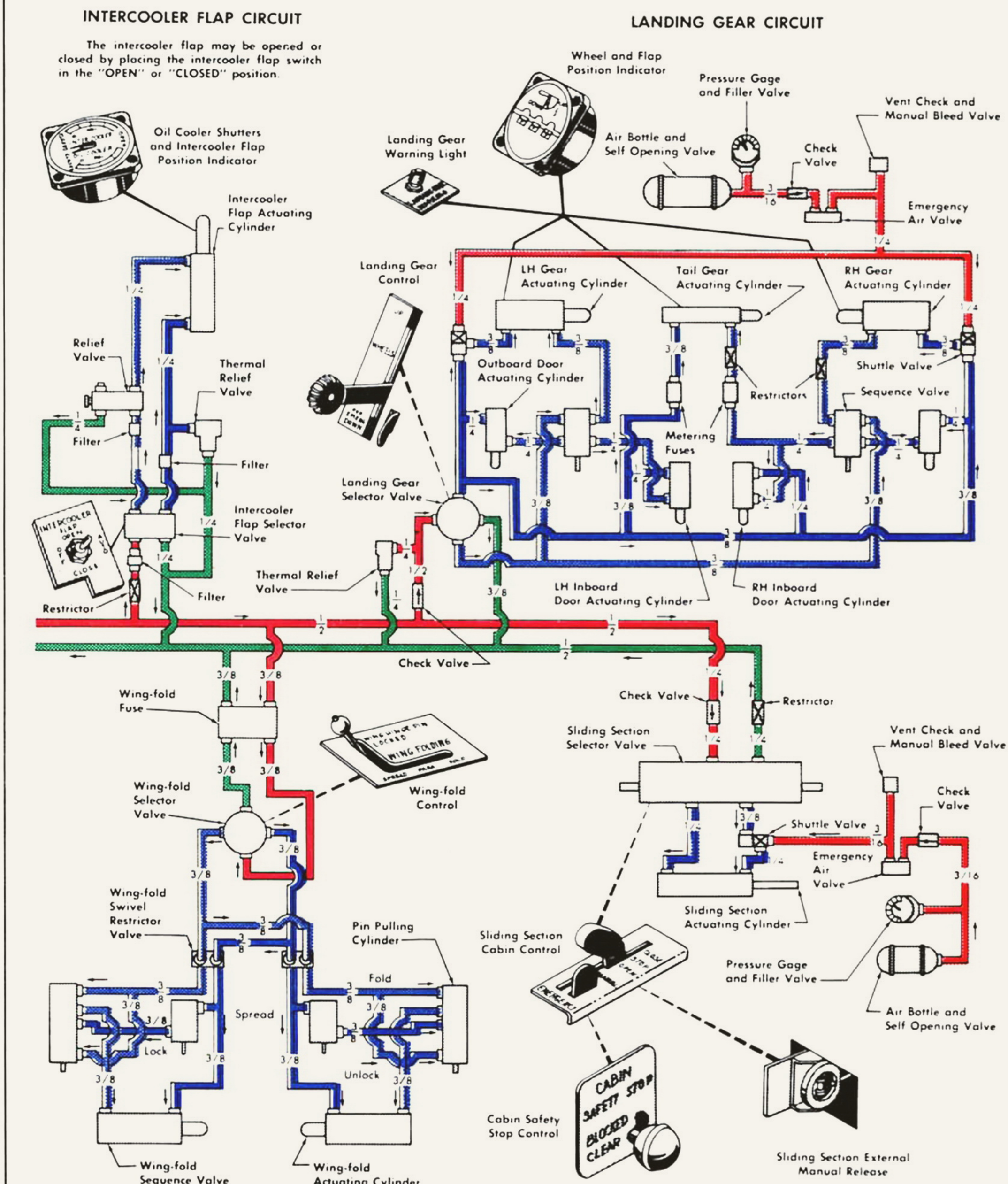


Figure 1–10. Hydraulic System (Sheet 2 of 2)

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A-C POWER SUPPLY. *(See figure 1–9.)* Alternating current is supplied by the main inverter which normally supplies the G-2 compass, the gyro horizon, and the interior lighting (except the portable floodlamps which are d-c powered). The stand-by inverter supplies a-c power to the IFF system. The inverters are controlled by the AC INSTR TRANS switch (25, figure 1–13) located at the base of the inclined panel of the right-hand control shelf, which is normally in the "MAIN" position. If the main inverter fails, the inverter warning light (23, figure 1–13), adjacent to the AC INSTR TRANS switch, goes on. The G-2 compass and gyro-horizon power load is transferred to the stand-by inverter by changing the AC INSTR TRANS switch from "MAIN" to "STBY." When the AC INSTR TRANS switch is in the "STBY" position, the instrument lights and IFF become inoperative and then the inverter warning light will indicate failure of the stand-by inverter.

EXTERNAL POWER SUPPLY. An external power receptacle is located on the right-hand side of the fuselage, forward and above the trailing edge of the wing.

WARNING

Place GEN & BATT switch in "OFF" while external power is connected.

HYDRAULIC POWER SUPPLY SYSTEM.

GENERAL. *(See figure 1–10.)* The 1,500-psi main hydraulic system is normally supplied by an engine-driven pump which takes fluid from a standpipe in the hydraulic reservoir. The system may also be supplied by the electrically operated auxiliary pump which takes fluid from the bottom of the reservoir, or by an external pump using either the system reservoir or an external reservoir. The auxiliary hydraulic pump supplies hydraulic fluid at 1,750 (±100) psi. The main hydraulic system supplies the following subsystems: wing flap, wing-fold, oil cooler shutters, intercooler flap, landing gear, canopy, and gun charging. The capacity of the entire system (including the reservoir) is 7.7 US gallons. Refer to the servicing diagram (figure 1–14) for the hydraulic fluid specification.

AUXILIARY HYDRAULIC PUMP SWITCH. The AUX HYDRAULIC PUMP switch (6, figure 1–13) is located outboard of the voltammeter on the right-hand control shelf. The switch turns on the auxiliary pump when it is placed in the "AUX HYDRAUL PUMP" position and automatically returns to the "OFF" position if the switch becomes overloaded.

HYDRAULIC PRESSURE GAGE. The hydraulic pressure gage (19, figure 1–12) is located in the bottom row of instruments on the instrument panel. The gage indicates the pressure in the main system.

FLIGHT CONTROL SYSTEM.

GENERAL. The flight controls are the conventional stick-and-pedal type with cable and push rod linkage. The rudder and elevators have electrically and mechanically actuated combination spring tabs that serve to lighten the control forces as well as to provide directional and longitudinal trim. The ailerons have mechanically actuated automatic balance tabs to lighten control forces and an electrically actuated trim tab to provide lateral trim.

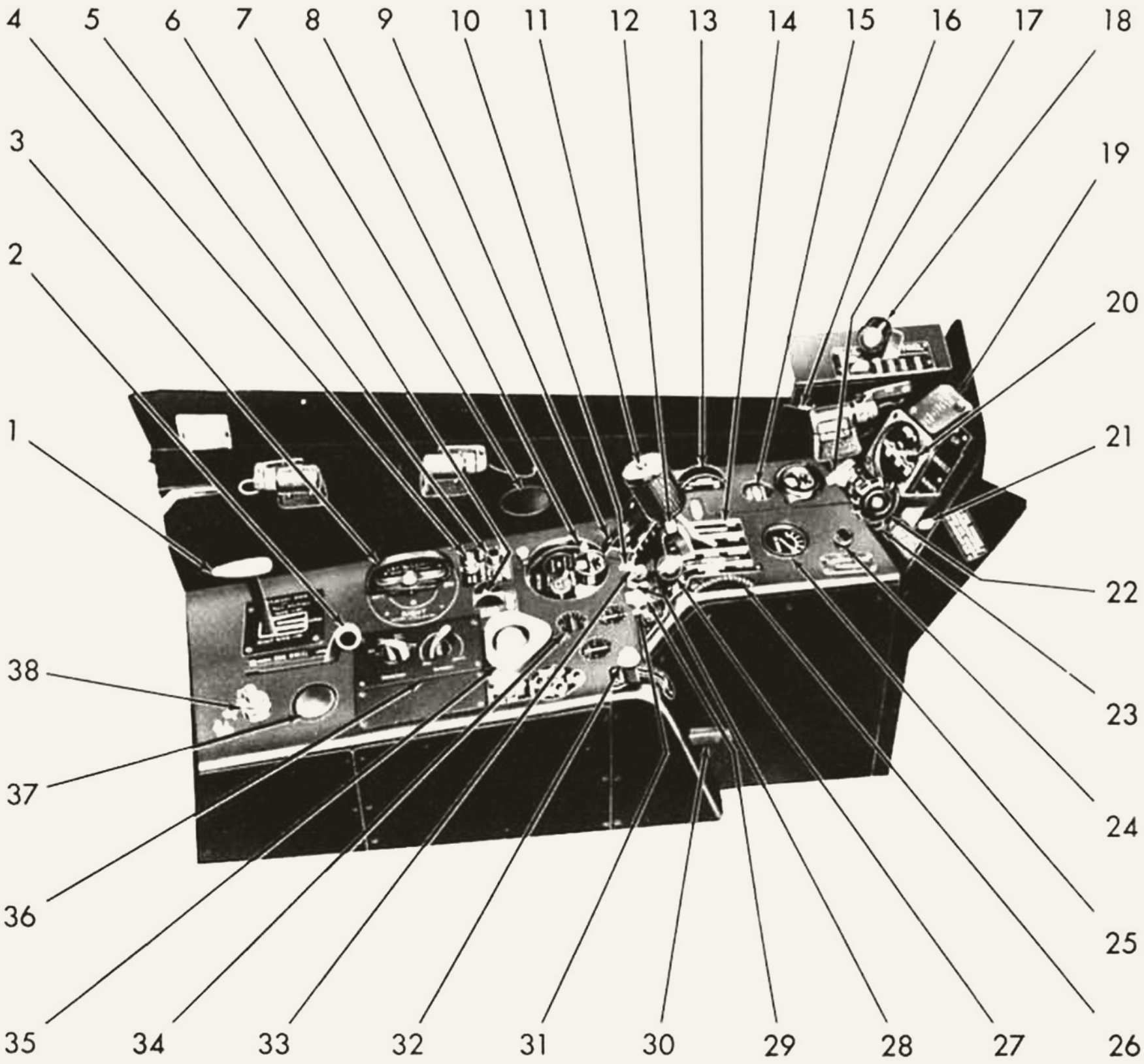
RUDDER PEDALS. The hanging rudder pedals (7,-figure 1–4) have a 6-inch fore and aft adjustment controlled by a PEDAL ADJUSTMENT knob (18, figure 1–12), located on the right-hand side of the instrument panel. The pedals may be folded aft to provide a padded leg rest. Pushing forward on the toe of a pedal actuates the brakes on that side of the airplane.

CONTROL STICK. The control stick is equipped with a conventional pistol grip which contains three armament trigger switches.

TRIM TAB SWITCHES. The tabs are electrically controlled from the composite switch unit (35, figure 1–11), located on the left-hand control shelf forward of the gunsight control panel. The forward "LEFT-NOSE-RIGHT" toggle controls the rudder tab. The top toggle controls the elevator and aileron tabs. If the elevator and aileron switches become inoperative, place the guarded TRIM TABS OVERRIDE switch (35, figure 1–11), located inboard of the housing, in the "OVERRIDE" position and use the four push-button switches (35, figure 1–11) to actuate the aileron and elevator tabs. Tab position indicators (34, figure 1–11), located forward of the composite switch unit, show the degree of trim being used. The indicator is not accurate while the GEN WARNING light is on.

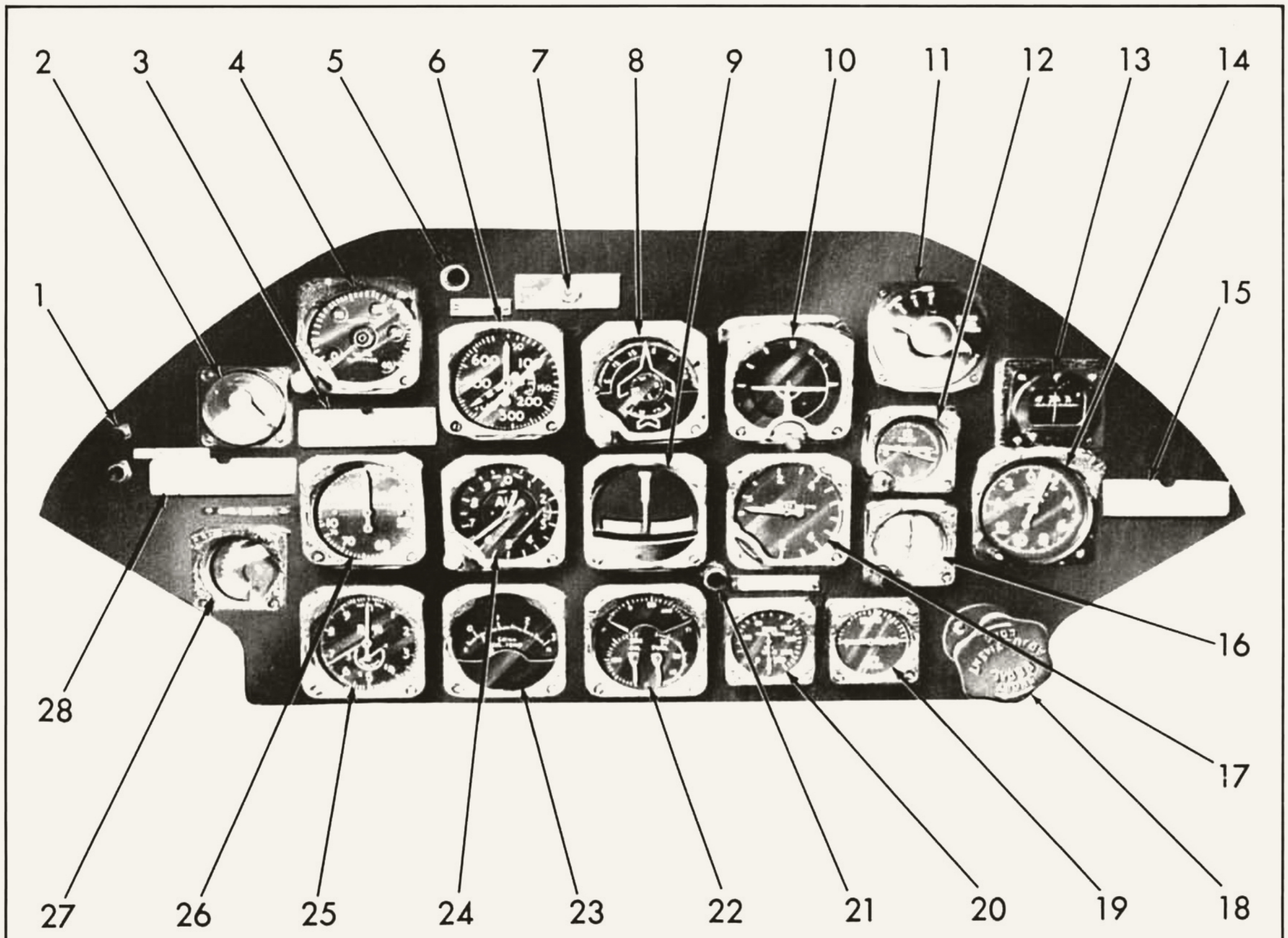
TURN-AND-BANK INDICATOR. The turn-and-bank indicator (9, figure 1–12), located in the middle row of instruments on the instrument panel, is the conventional needle-ball type. It is vacuum-powered by the engine-driven vacuum pump. The indicator shows the direction, rate, and coordination of turns.

CLIMB INDICATOR. The climb indicator (17, figure 1–12), located in the middle row of instruments on the instrument panel, shows the rate of ascent and descent.



1. Emergency Bomb or Drop Tank Release
2. Tail Wheel Lock Control
3. Fuel Selector Valve Control
4. Fuel Transfer Switch
5. Fuel Transfer Warning Light
6. Auxiliary Fuel Pump Switch
7. Ash Tray
8. Oxygen Regulator
9. Wing Flaps Control
10. Emergency-Down Latch, Wing Flaps
11. Throttle Control
12. Propeller Control
13. Master Water Injection Switch
14. Supercharger Control
15. Oxygen Repeater Indicators
16. Catapult Handgrip Flap
17. Oil Cooler Switch
18. Cabin Control
19. Landing Check-off List
20. Landing Gear and Flaps Position Indicator
21. Emergency-Down Latch, Landing Gear
22. Wheels Control
23. Oil Low-level Warning Light
24. Landing Gear Warning Light
25. Intercooler Flap and Oil Cooler Shutters Position Indicator
26. Friction Adjustment Control
27. Mixture Control
28. Oil Cooler Shutters Switch
29. Protected Carburetor Air
30. Tow Target Release
31. Cowl Flaps Switch
32. Shoulder Harness Lock
33. Intercooler Flap Switch
34. Trim Tabs Position Indicators
35. Trim Tabs Switches
36. Gunsight Selector and Dimming Controls
37. Anti-G Suit Valve
38. Anti-G Suit Quick-Disconnect

Figure 1–11. Left-hand Controls

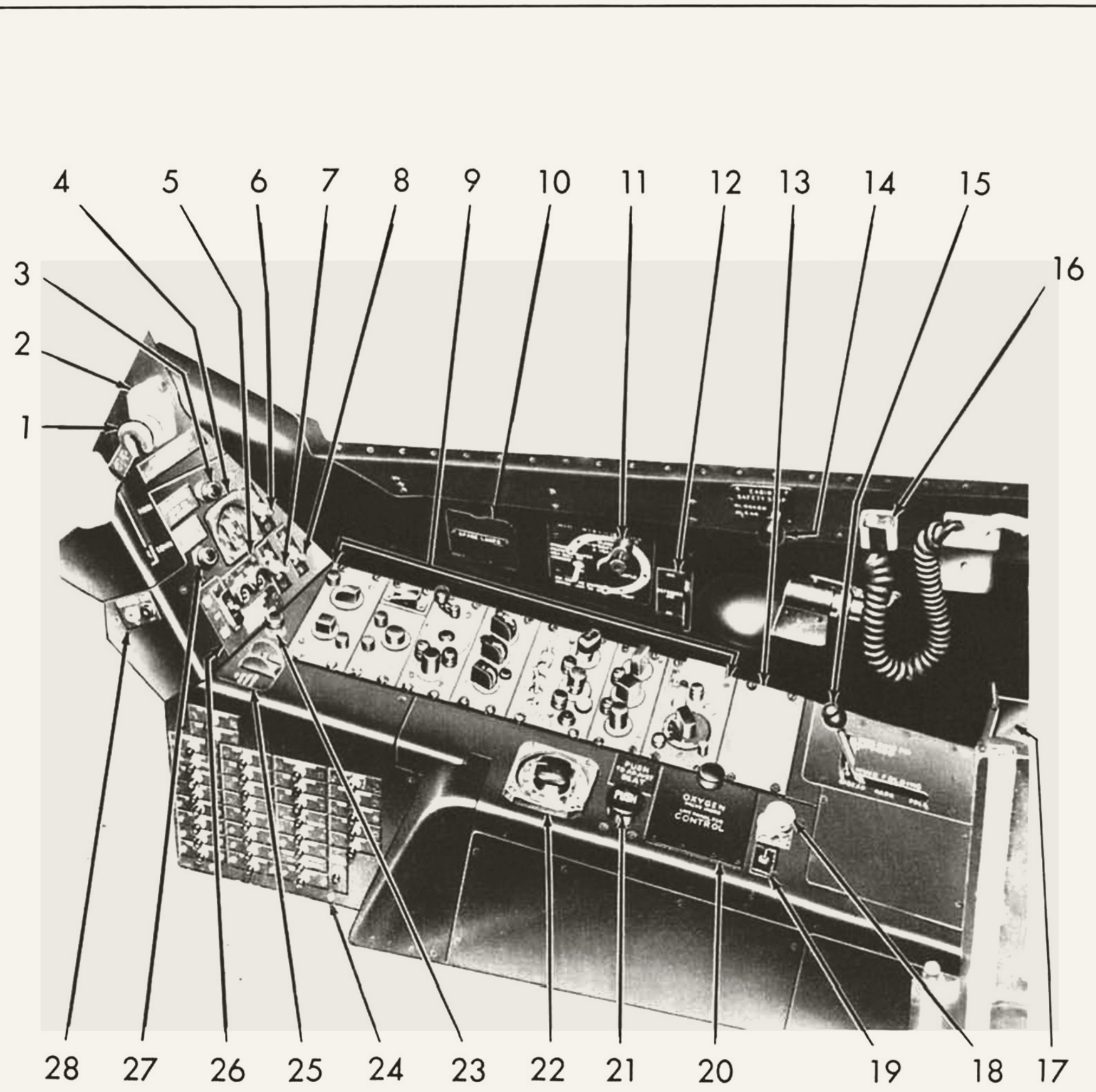


1. Spare Lamps Container
2. Ignition Switch
3. Compass Correction Card
4. Radio Altitude Indicator
5. Altitude Low-limit Warning Light
6. Airspeed Indicator
7. G-2 Compass Switch
8. G-2 Compass Indicator
9. Turn-and-Bank Indicator
10. Gyro Horizon Indicator
11. Rocket Selector Switch
12. Standard Clock
13. Stand-by Compass
14. Accelerometer
15. Compass Correction Card
16. Elapsed-time Clock
17. Climb Indicator
18. Pedal Adjustment Knob
19. Hydraulic Pressure Gage
20. Fuel Quantity Gage
21. Fuel Reserve Warning Light
22. Engine Gage Unit
23. Engine Cylinder Temperature Gage
24. Altimeter
25. Tachometer Indicator
26. Manifold Pressure Gage
27. Carb Air Temp Gage
28. Airspeed Correction Card

Figure 1–12. Instrument Panel

AIRSPEED INDICATOR. The airspeed indicator (6, figure 1–12), located in the top row of instruments on the instrument panel, indicates the speed of the airplane through the air. The striped hand indicates the maximum allowable airspeed at any altitude at which the airplane is flying. An airspeed correction card (28, figure 1–12) on the left-hand side of the instrument panel gives the calibrated airspeeds for various indicated airspeeds.

ACCELEROMETER. The accelerometer (14, figure 1–12), located in the middle row of instruments on the instrument panel, provides visual indication of positive or negative stresses along the normal axis of the airplane.



1. Arresting Hook Control
2. Take-off Check List
3. Gen Warning Light
4. Voltammeter
5. Prime and Start Switches
6. Aux Hydraul Pump Switch
7. Oil Dilution Switch
8. Pitot Heat Switch
9. Radio and Lights Control
10. Spare Lamps
11. Air Distributor Control
12. Defogger Air Control
13. Blank Panel and Radio Card
14. Cabin Safety Control
15. Wing Folding Control
16. Microphone and Headphone Receptacle
17. Map Case
18. Portable Equipment Receptacle
19. Cowl Flaps Override Switch
20. Oxygen Shutoff Valve Access Door
21. Push-to-Adjust Seat Control
22. Altitude Limit Switch
23. Inverter Warning Light
24. Circuit Breaker Panel
25. A-C Instr Trans Switch
26. Gen & Batt Switch
27. Hook Warn Light
28. Voltmeter Test Jacks

Figure 1–13. Right-hand Controls

LANDING GEAR SYSTEM.

GENERAL. The landing gear is normally actuated by hydraulic pressure but, if the hydraulic system fails, compressed air may be used. A mechanical ground lock prevents retraction of wheels while the airplane is on the ground. Six position-indicating microswitches, four on the main landing gear and two on the tail wheel gear, are actuated when the gear is up and locked and when it is down and locked. A seventh microswitch, located on the left-hand landing gear scissors, overrides the cockpit COWL FLAPS switch and opens the cowl flaps when the airplane is on the ground. The tail wheel gear mechanically actuates the lower cockpit access step.

CAUTION

Do not attempt to retract the landing gear after use of the air system since damage to the hydraulic reservoir will result.

LANDING GEAR CONTROL. The WHEELS control lever (22, figure 1–11) is located on the forward end of the left-hand control shelf. The control may be placed in three positions: "UP," "DOWN," and "EMERGENCY DOWN." A latch (21, figure 1–11) must be displaced before the wheels control lever can enter the "EMERGENCY DOWN" position. The control actuates a microswitch which is connected to the landing gear warning light and the secondary bus relay.

TAIL WHEEL LOCK CONTROL. The TAIL WHEEL lock control (2, figure 1–11) is located on the aft end of the left-hand control shelf. The "LOCK" position is forward and the "UNLOCK" position is aft.

LANDING GEAR POSITION INDICATOR. The landing gear position indicator (20, figure 1–11) shows the position of each main gear wheel and the tail wheel. The indicator is combined with the flap position indicator located on the left-hand control shelf outboard of the landing gear control.

LANDING GEAR WARNING LIGHT. The landing gear warning light (24, figure 1–11) is located on the left-hand control shelf aft of the landing gear control. The light goes on when the WHEELS control is moved and stays on until the landing gear is locked in the position selected by the control. The lamp may be tested by pressing in on the lamp cover.

ARRESTING HOOK SYSTEM.

GENERAL. The arresting hook is retracted and extended with the tail wheel when the HOOK control is in the "DOWN" position. On the deck, after the HOOK control is placed in the "UP" position the hook may be manually raised to the parked position by the deck crew. The hook will then be retracted with the tail wheel after take-off.

Note

To prevent excessive jarring, avoid lowering the hook after the landing gear is extended.

ARRESTING HOOK CONTROL. The HOOK control (1, figure 1–13) is located on the right-hand control shelf, inboard of the voltammeter. The control has two positions, "UP" and "DOWN." When the control is in the "DOWN" position, the MASTER ARMT switch breaker is opened and the guns are automatically safetied. When the exterior lights are on and the landing gear is down, the approach light will blink until the arresting hook is lowered. For field-carrier landing practice, a hook by-pass switch in the radio compartment may be closed to energize a holding relay which allows the approach light to operate without blinking when the hook is up. The holding relay operates until the hook is lowered or until the exterior lights circuit breaker is opened (pulled out).

ARRESTING HOOK WARNING LIGHT. The HOOK WARN light (27, figure 1–13), adjacent to the HOOK control, goes on when the control is placed in the "DOWN" position and stays on until the hook is down and locked. The lamp may be tested by pressing in on the lamp cover.

WING FLAPS.

GENERAL. The wing flaps are conventional hydraulically actuated flaps that may be positioned in 10-degree increments from 0 to 50 degrees down. The flap hydraulic system has a by-pass valve which allows the flaps to blow up when the air loads on the flaps become excessive.

WING FLAPS CONTROL. The WING FLAPS control (9, figure 1–11) is located on the left-hand control shelf outboard and aft of the throttle. The control positions are marked in 10-degree increments from 0 to 50 degrees. Before the control lever can enter the "EMERG DOWN" position, a latch (10, figure 1–11) must be displaced.

WING FLAPS POSITION INDICATOR. The flaps position indicator (20, figure 1–11) is combined with the wheel position indicator located on the left-hand control shelf outboard of the landing gear control. The indicator shows the position of the wheels and wing flaps.

CAUTION

The wing flaps are limited to a 30-degree deflection when 11.75-inch rockets are carried on the center section pylons.

BRAKE SYSTEM.

The multiple-disk wheel brakes are actuated by independent left- and right-hand hydraulic systems. Master hydraulic cylinders are connected to the rudder pedals so that pressing forward on the upper part of the pedal actuates the cylinder and the resulting hydraulic pressure compresses the disk brakes.

WING-FOLDING SYSTEM.

The wings are hydraulically folded and spread and the hinge pin is locked by the WING FOLDING control (15, figure 1–13), which is located on the aft end of the right-hand control shelf. The control has four positions in an L-shaped slot, marked "FOLD," "PARK," "SPREAD," and "WING HINGE PIN LOCKED." A red warning flag at each wing-folding joint is raised until the wing hinge pin is locked. Jury struts are furnished with each airplane for holding the folded wing securely. If there is any possibility of a parked airplane being exposed to wind or propeller blast, the jury struts must be installed when the wings are folded. Failure of the wing-folding system may result from stresses being imposed on an unsupported folded wing.

COCKPIT SLIDING SECTION.

GENERAL. The cockpit sliding section is normally operated manually or by hydraulic power. In emergencies it may be operated by compressed air.

WARNING

Under no condition shall personnel outside the cockpit reach into the cockpit to actuate the sliding section by means of hydraulic power. A slip, loss of balance, or poor timing may result in serious injury or death.

INTERNAL CONTROL. The cockpit sliding section CABIN CONTROL (18, figure 1–11) is located on the forward left-hand side of the cockpit, above the flap and wheel indicator. The control has five positions: "CLOSE," "STOP," "OPEN," "MANUAL," and "EMERGENCY." Placing the control in either "OPEN" or "CLOSE" hydraulically moves the cockpit sliding section toward the selected position. Placing the control in "STOP" holds the cockpit sliding section in intermediate positions. Placing the control in the "MANUAL" position frees the cockpit sliding section so that it can be opened by pushing on it. Before the sliding section can be closed if it is fully opened in "MANUAL," a CABIN SAFETY control (14, figure 1–13), located on the right-hand side of the cockpit above the wing-fold control, must be moved from "BLOCKED" to "CLEAR." Pulling the spring guard inboard and placing the CABIN CONTROL in the "EMERGENCY" position opens the sliding section with compressed air.

EXTERNAL MANUAL RELEASE. The external manual release is a pull ring stowed behind a small door on the right-hand side of the fuselage above the wing root. This control is only used after a crash landing when the CABIN CONTROL has been left in the "CLOSE" position. Pulling the external control places the CABIN CONTROL in the "MANUAL" position and the sliding section can then be opened by pushing aft on the external actuating handle. Do not use actuating handle for a handhold when entering cockpit.

PILOT'S SEAT.

GENERAL. The pilot's seat is an adjustable bucket seat and back. A ferrying bucket is furnished as loose equipment to be placed in the seat when the parakit is not being used. The seat is equipped with arm rests which may be folded out of the way when not in use.

CONTROL. A PUSH-TO-ADJUST-SEAT control (21, figure 1–13), located on the right-hand control shelf forward of the oxygen access door, frees the seat for height adjustment when depressed. The seat may be raised or lowered in increments of 1 inch through a range of 7 inches vertical travel and 1 inch forward travel.

SAFETY BELT. The seat is equipped with a conventional lap safety belt.

SHOULDER HARNESS. The pilot's seat is equipped with a shoulder harness attached to an inertia reel behind the seat. The inertia reel may be locked by moving the control (32, figure 1–11), located on the left-hand control shelf inboard of the trim tab indicator, forward and down. When the control is in the "UNLOCK" position the shoulder harness restricts sudden forward movements in excess of 2.5g acceleration; thus, the pilot is protected but is still allowed free movement. Since the shoulder harness locks in position at any time the control is moved to "LOCK," to obtain maximum protection the pilot should lock the harness while leaning against the seat.

INSTRUMENTS.

GENERAL. Information on instruments associated with a particular system has been included with the text pertaining to that system.

GYRO HORIZON. A gyro horizon indicator (10, figure 1–12) is located in the upper row of instruments on the instrument panel. The electrically driven gyro horizon reflects the flight attitude of the airplane. The knob below the face of the indicator permits adjustment of the airplane image for load conditions of the airplane. The gyro horizon power is supplied by the a-c electrical system.

ALTIMETER. A sensitive barometric altimeter (24, figure 1–12) is located in the middle row of instruments on the instrument panel. The altimeter indicates the barometric altitude of the airplane. The knob below the face of the indicator permits adjustment for barometric pressures.

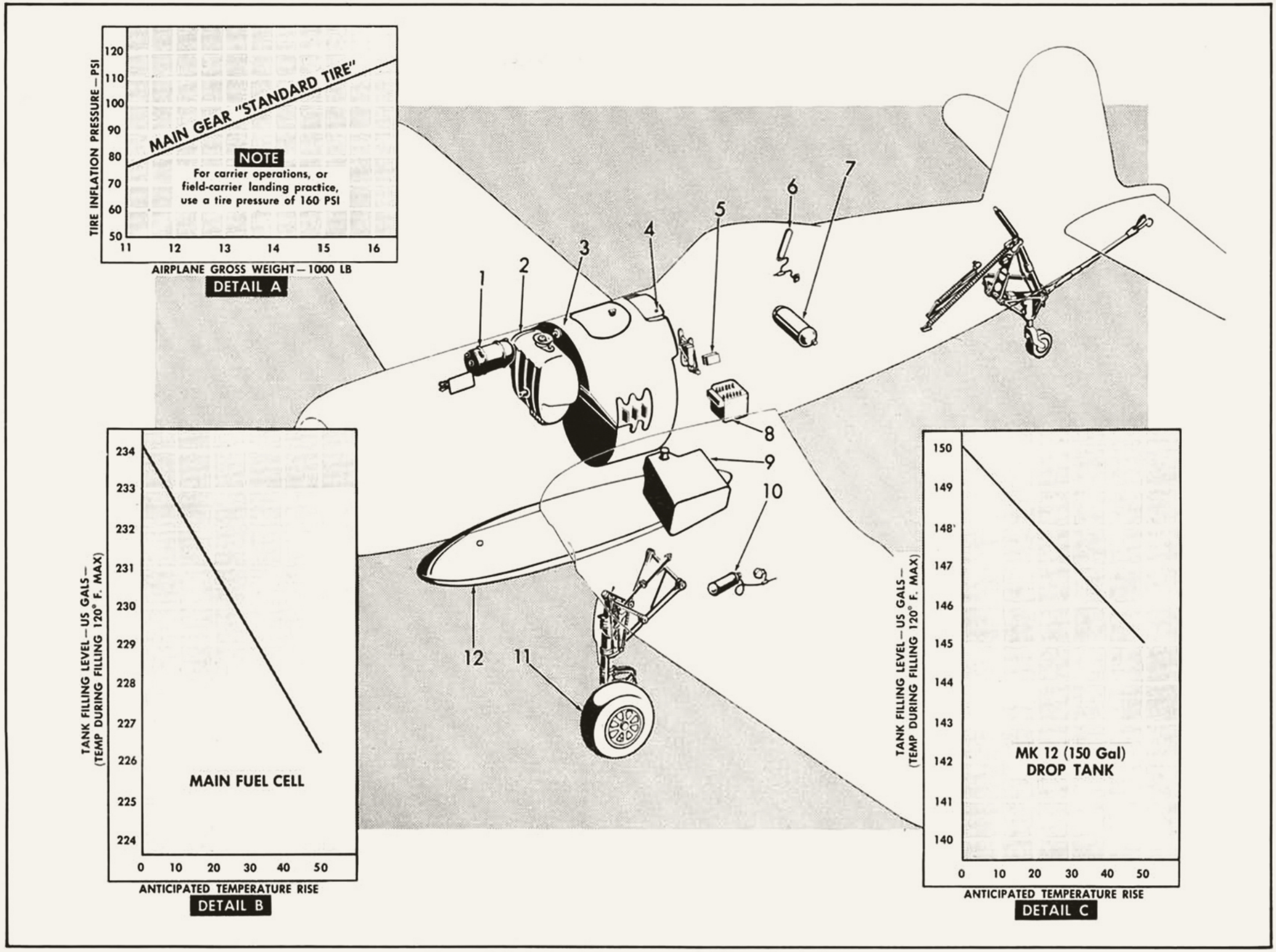


Figure 1–14. Servicing Diagram (Sheet 1 of 2)

ITEM	NAME	OPERATION
1	Hydraulic Reservoir	Fill hydraulic system with 7.7 US gallons (6.4 Imperial gallons or 29.14 liters) of H-2 hydraulic fluid (MIL-F-7083). Reservoir capacity is 8.75 quarts (1.82 Imperial gallons or 8.28 liters) to full mark.
2	Oil Tank	Fill oil tank with 27.5 US gallons (22.62 Imperial gallons or 104.09 liters) of MIL-L-6082A grade 1065 oil for winter operation and grade 1100 oil for summer operation.
3	Fuel Cell	Fill fuel cell with 234 US gallons (193.9 Imperial gallons or 885.8 liters) of MIL-F-5572, grade 115/145 fuel. Grade 100/130 fuel may be used as an alternate.
4	Grounding Jack	Connect fueling system ground line to jack or insert fuel nozzle into filler so that it makes good contact with airplane.
5	External Power Receptacle	Use external power for ground operation of electrical equipment. Power supply should be 2 KW, 28.5V direct current using an AN2551 plug.
6	Canopy Compressed Air Bottle	Replace emptied bottle and valve (CV4-601165) with bottle filled to capacity (30.6 cubic inches).
7	Oxygen Cylinder	Replace emptied cylinder (BuAer SK-1084-514) and valve (BuAer 9606) with cylinder filled to capacity (514 cubic inches).
8	Battery	Check specific gravity and water level. For normal operation, use one 24-amphhr battery (AN3151-2) or one 36-amphhr battery (AN3150-2). For cold weather operation, use two 24-amphhr batteries (AN3151-2) or one 36-amphhr battery (AN3150-2).
9	Water Tank	Fill water tank with 14 US gallons (11.65 Imperial or 52.99 liters) of MIL-A-6091 or AN-M-32 water injection fluid.
10	Landing Gear Compressed Air Bottle	Replace emptied bottle and valve (CV4-601162) with bottle filled to capacity (96 cubic inches).
11	Tires	Check and inflate tires to correct pressure. See Detail A.
12	External Fuel Tanks	Fill external tanks with 150 US gallons (124.85 Imperial gallons or 567.8 liters) of MIL-F-5572, grade 115/145 fuel. Grade 100/130 fuel may be used as an alternate.

Figure 1–14. Servicing Diagram (Sheet 2 of 2)

CLOCKS. Two clocks are located on the right-hand side of the instrument panel. The standard 8-day clock (12, figure 1–12) is set and wound by means of the projecting knob. The elapsed-time clock (16, figure 1–12) is wound, set, started, and stopped by means of the projecting knob.

AUXILIARY SYSTEMS.

The following auxiliary equipment is covered in section IV: heating and ventilating, pitot heat, communications and associated electronics, lighting, oxygen, navigation, armament, and miscellaneous equipment.



SECTION II

NORMAL PROCEDURES

BEFORE ENTERING AIRPLANE.

FLIGHT RESTRICTIONS. Refer to section V.
CRUISE CONTROL. Refer to appendix I.
WEIGHT AND BALANCE. Obtain the take-off and the anticipated landing weights. See that the required fuel, ammunition, bombs, and rockets have been loaded. Refer to the Handbook of Weight and Balance, AN 01-1B-40, for general information on loading; for specific information on tactical loading, refer to Form F.

EXTERIOR INSPECTION. Consult the yellow sheet for the status of the airplane. Refer to the inspection diagram (figure 2–1) for the exterior inspection procedure.

ENTRANCE. Two steps are provided on the right-hand side of the fuselage for entrance to the cockpit. The steps are extended with the landing gear but may be manually retracted by pushing up on the bottom step. If the steps are retracted, open the upper step with the hand; the bottom step will drop into place. The canopy is opened by pushing aft with the external actuating handle. Do not use the actuating handle as a handgrip when entering the cockpit.

ON ENTERING AIRPLANE.

On entering the airplane make the following checks:

Cockpit	Clean — no loose dirt, rags, or tools
Windshield	Clean
Control lock	Removed
Parachute	Complete with parakit if over-water flight is anticipated
Parachute harness	On and fastened
Seat	Normal flight position
Shoulder harness	Fastened with lap belt
Microphone and head set	Connected to airplane receptacle
Rudder pedals	Adjusted to comfortable length
Controls	Free and correct movement
FUEL TRANSFER switch	"OFF"
AUXILIARY FUEL PUMP switch	"OFF"
OIL COOLER SHUTTERS switch	"AUTO"
MASTER WATER INJECTION switch	"OFF"
Ignition switch	"OFF"
Armament switches	"OFF" or "SAFE"
GEN & BATT switch	"OFF"
Oxygen	Checked. (Refer to Oxygen System, Section IV.)

Note the manifold pressure gage reading for use in the engine test.

BEFORE STARTING ENGINE.

Have the propeller turned through 5 revolutions (20 blades). If external power is being used, it is recommended that this be done with the starter. The recommended fuel for this airplane is grade 115/145. Grade 100/130 may be used, subject to the limitations given in section V.

STARTING ENGINE.

The recommended procedure for starting the engine is with external power. In emergencies, the airplane battery may be used. To start the engine, proceed as follows:

PROPELLER control	Full "INCREASE"
MIXTURE control	"IDLE CUT-OFF"
THROTTLE control	Set to give 800 to 1,000 rpm
GEN & BATT switch	"OFF" if external power is used, "GEN & BATT" if battery is used
Fuel selector control	"ON"
AUXILIARY FUEL PUMP switch	"LOW" (Fuel pressure 10 to 12 psi)
Ignition switch	"OFF"

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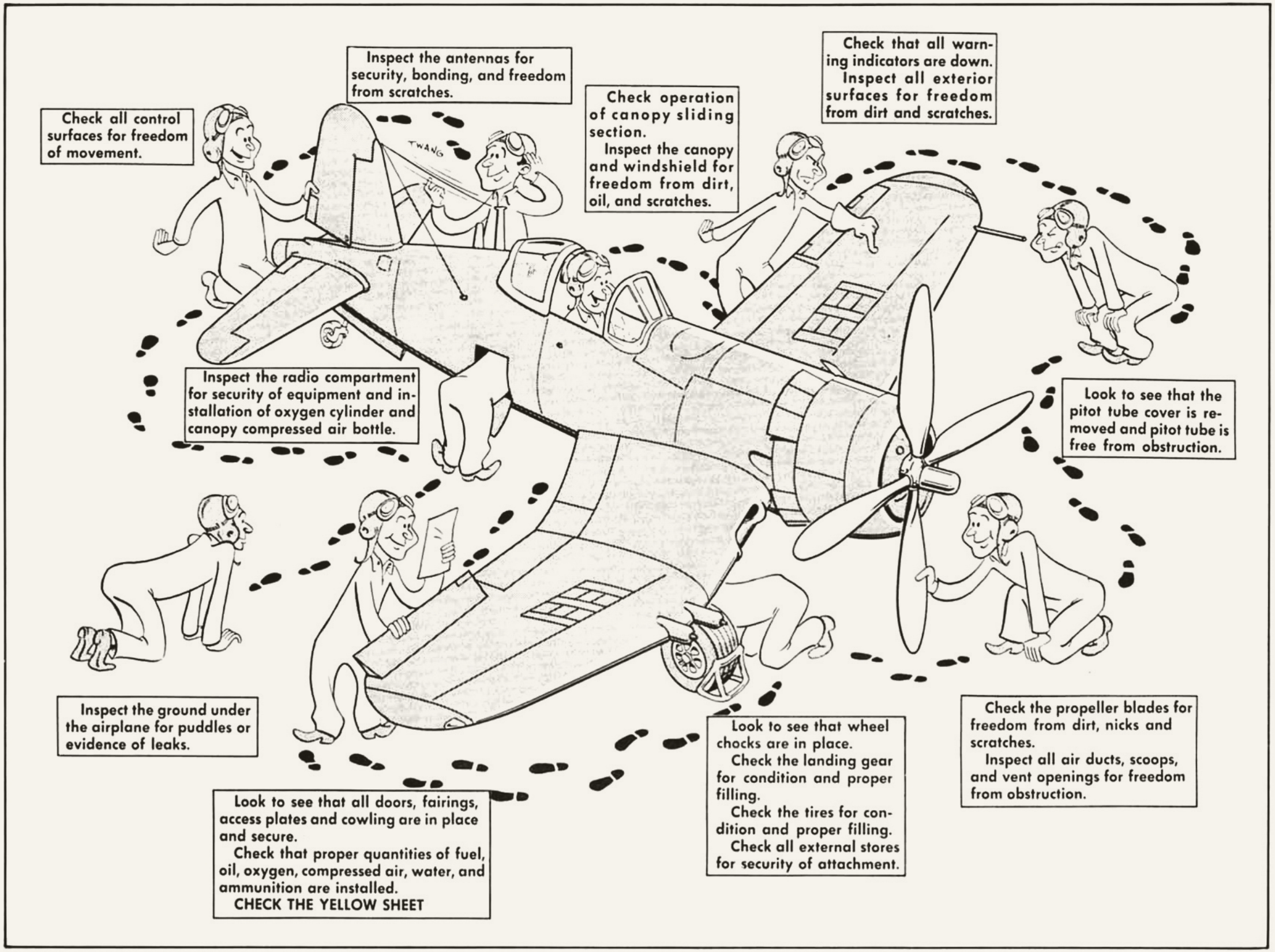


Figure 2–1. Exterior Inspection Diagram

Energize the starter and after two revolutions (8 blades) turn the ignition switch "ON" and prime the engine. When the engine begins to fire regularly on prime, move the MIXTURE control *SLOWLY* to "AUTO-RICH." *Do not pump or move the throttle abruptly.* There will be a lapse of time, after moving the MIXTURE control to "AUTO-RICH," until the fuel feeds from the discharge nozzle; therefore, it is important to keep the engine firing steadily (at least 350 to 400 rpm) by using the prime switch until normal carburetion is established. If the engine stops firing, move the MIXTURE control to "IDLE CUT-OFF" and continue cranking and priming until the engine starts. Refer to section III for the procedure to follow in case of a fire. Idle the engine at 600 to 800 rpm until the oil pressure reaches a minimum of 25 psi. If the oil pressure does not register almost immediately, stop the engine. Normally, the engine should start in about 30 seconds. If the START switch is held on for 1 minute and the engine does not start, wait 3 to 5 minutes to allow the starter to cool and the excess fuel to drain from the intermediate rear section fuel drain before making a second attempt. After the second and successive starting failures, allow 5 minutes for starter cooling. The ground crew should check for fire in the exhaust pipe outlets. No trace of smoke from the upper exhaust pipe outlets indicates underpriming. Excessive black smoke from the exhaust pipe outlets indicates overpriming. If the engine is overprimed, clear the cylinders as follows:

MIXTURE control	"IDLE CUT-OFF"
AUXILIARY FUEL PUMP switch	"OFF"
Ignition switch	"OFF"
THROTTLE control	Full "OPEN"

Clear the engine by turning it through four revolutions with starter.

WARNING

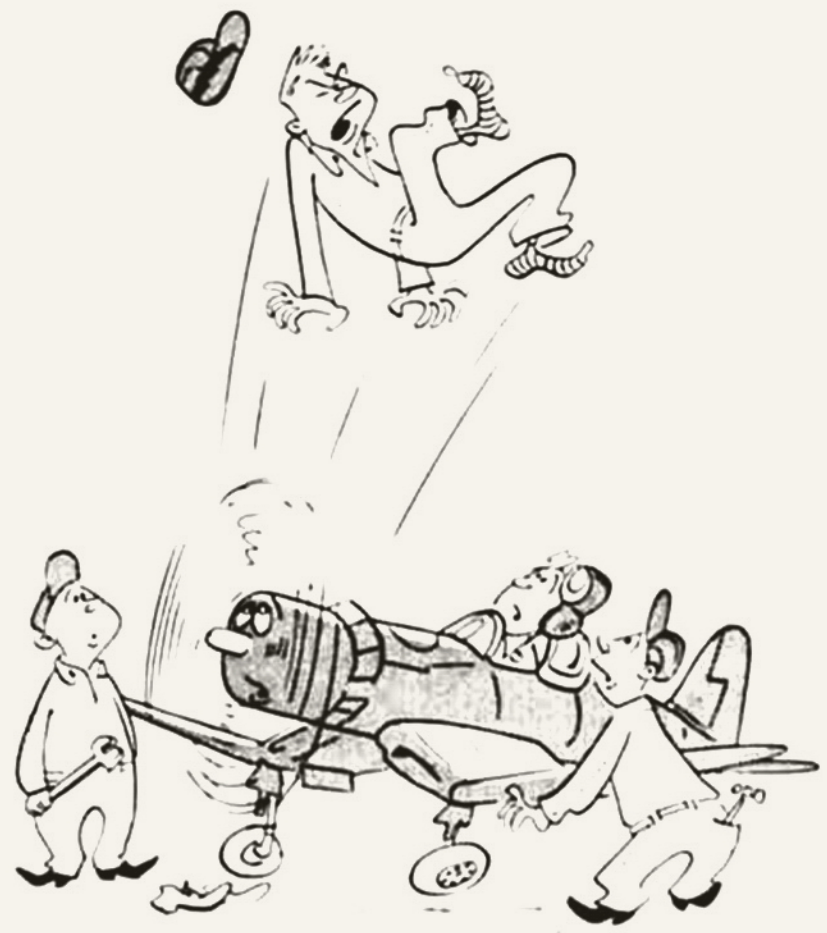
Never allow a hot engine to be pulled through by hand.

ENGINE GROUND OPERATION.

Do not run the engine past 1,500 rpm with the wings folded and the jury struts removed. To warm up the engine, proceed as follows:

PROPELLER control	Full INCREASE
THROTTLE control	1,000 rpm minimum to prevent fouling plugs
AUXILIARY FUEL PUMP switch	"OFF" after the engine is turning over satisfactorily
MIXTURE control	"AUTO-RICH"
External power	Disconnected
GEN & BATT switch	"GEN & BATT"

Warm up the engine until the oil temperature reaches 40°C.



WARNING
Never Allow a Hot Engine to Be Pulled Through by Hand!

Note

When oil temperature is below 40°C, the OIL LOW-LEVEL warning light may be on. It should go off as soon as normal operating oil temperature is reached.

GROUND TESTS.

To test the airplane for satisfactory performance, proceed as follows:

Fuel selector control	"ON"
Radio altimeter	On, low-range
Hydraulic pressure gage	1,500 (±50) psi
Circuit breakers	In
VHF or UHF radio	On
IFF	On
WING FOLDING control	"WING HINGE PIN LOCKED"
Both wing-folding warning flags	Down

Check the GEN WARNING light while advancing the THROTTLE control. The warning light should go out above 1,400 rpm. As the throttle is advanced farther, the voltammeter should stabilize at approximately 27.5 volts. Reduce the THROTTLE control to 1,200 rpm. To check the stand-by inverter, turn off the AN/APX-6 IFF and place the AC INSTR TRANS switch in the "STBY" position. The INVERTER WARNING light should light up and remain on until the stand-by inverter picks up speed. Return the AC INSTR TRANS switch to "MAIN." Without stopping between positions, smoothly shift the supercharger to low ratio and after 2 minutes return the supercharger to neutral ratio to desludge the clutches. Close and open the canopy sliding section hydraulically and manually. Actuate the flaps through the normal

positions, checking the flaps and indicator. If security permits, check the communication radio. If a night flight is anticipated, check the interior and exterior lights.

TAXIING.

Use S-turns while taxiing to gain forward vision. Use the brakes as sparingly as possible and reduce power when necessary to avoid taxiing too fast. Use the tail wheel lock when taxiing cross wind or behind other idling airplanes. Do not taxi behind an airplane whose engine is turning up any faster than idling speed.

WARNING

Before take-off, make sure that both wing-folding warning flags are down.

BEFORE TAKE-OFF.

IDLE MIXTURE CHECK.

THROTTLE control	400 to 550 rpm
PROPELLER control	Full "INCREASE"
MIXTURE control	"AUTO-RICH"
AUXILIARY FUEL PUMP switch	"LOW"

While observing the tachometer, place the MIXTURE control handle in the "IDLE CUT-OFF" position and back into "AUTO-RICH" before the engine dies. If a momentary rise of not more than 20 rpm is observed before normal drop-off, the mixture strength is correct. If a greater rise in rpm is noted, the mixture is too rich. If there is no rise in rpm, the mixture is too lean. A momentary drop in manifold pressure of ¼ of an inch will indicate a momentary rise of 10 rpm. If the mixture indicated is not correct, combat or carrier operations should be prohibited until the trouble is remedied.

MAGNETO CHECK. To check the magnetos, set the THROTTLE control to give 2,200 rpm with the PROPELLER control in the full "INCREASE" position and the MIXTURE control in "AUTO-RICH." While watching the tachometer, move the ignition switch from "BOTH" to "R" and back to "BOTH." Move the ignition switch from "BOTH" to "L" and back to "BOTH." Normal drop-off in either the "R" or "L" position is 50 to 75 rpm and should not exceed 100 rpm. Difference in drop-off between "R" and "L" should not exceed 30 to 40 rpm. If the above conditions cannot be met, the ignition system is defective and the airplane should be grounded until the trouble is remedied.

IGNITION SAFETY CHECK. To check the ignition, set the THROTTLE control to give 1,000 rpm with the PROPELLER control in the full "INCREASE" position and the MIXTURE control in "AUTO-RICH" position. Move the ignition switch from "BOTH" to "OFF" and immediately back to "BOTH." The engine should cut out while the switch is in the "OFF" position. If engine does not cut out, the ignition system is defective and airplane should be grounded.



PROPELLER CHECK. To check the propeller governor, set the THROTTLE control to give 2,000 rpm with the PROPELLER control in the full "INCREASE" position and MIXTURE control in "AUTO-RICH." Move the propeller control to the full "DECREASE" position. The engine speed should drop to 1,200 rpm. Return the PROPELLER control to full "INCREASE." Engine speed should return to 2,000 rpm. If these rpm are not obtained, the propeller governor is defective and the airplane should be grounded until the trouble is remedied.

ENGINE CHECK.

THROTTLE control	Set to give manifold pressure equal to local barometric pressure (manifold pressure before starting engine)
PROPELLER control	Full "INCREASE"
Fuel pressure gage	16 to 18 psi
Oil pressure	85 psi
Oil temperature	40°C to 85°C
Cylinder temperature	150°C
Tachometer	2,000 to 2,200 rpm

If the above conditions are not met, the engine is not delivering full power and the airplane should be grounded until the trouble is remedied.



Figure 2–2. Take-off Check List

COCKPIT CHECK

TAIL WHEEL control	"LOCK"
Fuel selector	"ON"
FUEL TRANSFER SWITCH	"OFF"
AUXILIARY FUEL PUMP switch	"HIGH"
Rudder tab	6 degrees "NOSE RIGHT"
Elevator tab	2 degrees "NOSE UP" with no flap; 3 to 4 degrees "NOSE UP" with full flap
Aileron tab	4 degrees "RIGHT WING DOWN"

Note

To obtain accurate readings on the tab position indicator, the GEN WARNING light must be off.

OIL COOLER SHUTTERS switch	"AUTO"
INTERCOOLER FLAP switch	"OFF"
WING FLAPS control	As desired
SUPERCHARGER control	"NEUTRAL"
MIXTURE control	"AUTO-RICH"
PROPELLER control	Full "INCREASE"
Friction adjustment control	Set to prevent the THROTTLE control from creeping back
MASTER WATER INJECTION switch	"OFF"
AC INSTR TRANSFER switch	"MAIN"
G-2 compass	Set to magnetic heading of airplane
HOOK control	"UP"
GEN & BATT switch	"GEN & BATT"
WING FOLDING control	"WING HINGE PIN LOCKED"
TAKE-OFF check list	All items checked
Shoulder harness control	"LOCKED"
Cabin control handle	"OPEN"

TAKE-OFF.

NORMAL. With the brakes held and the control stick full back, advance the THROTTLE control to give approximately 2,400 rpm. Release the brakes and advance the THROTTLE control to take-off power as the airplane starts to roll. As the speed increases, use forward control stick pressure to raise the tail. At about 80 knots, start easing back on the control stick.

Note

Take-off power is the same as military power. See figure A-22 for engine operation information.

MINIMUM RUN. For a minimum run take-off, use a full 50 degrees of flap. Start the control stick back at approximately 75 knots.

OBSTACLE CLEARANCE. If an obstacle is to be cleared after a take-off, use 30 degrees of flap and retract the landing gear as soon as airborne.

AFTER TAKE-OFF.

LANDING GEAR. After the airplane is airborne and insufficient runway remains for an emergency landing, apply the brakes to stop wheel spin, and retract the landing gear. Braking the wheels prevents damage to the scuff plate in the wheel wells.

THROTTLE AND PROPELLER. When all obstacles have been cleared, reduce the THROTTLE (figure A–13) to reduce engine rpm to 2,600 rpm.

FLAPS. Raising the flaps with the airplane at too slow an airspeed will cause dangerous settling of the airplane; however, the best rate of climb is with the flaps up. When the flaps are used on the take-off, they should therefore be raised as soon as a safe altitude and speed are reached.

MIXTURE. After the wheels and flaps are raised, place the MIXTURE control in the "AUTO-LEAN" position.

FUEL SYSTEM. After a take-off, if external tanks are carried, the FUEL TRANSFER switch should be placed in either the "LEFT TANK" or "RIGHT TANK" position and the AUXILIARY FUEL PUMP switch should be placed in the "LOW" position.

CLIMB.

After a take-off at normal gross weight, trim the airplane for best climb at 150 knots with 41.5-inch manifold pressure and 2,600 rpm for normal rated power or 58.5-inch manifold pressure and 2,800 rpm for military rated power. Refer to figures A–13 and A–14 for reductions in airspeed for best climb as altitude increases. Watch cylinder head and oil temperatures for overheating. Refer to section V for temperature limitations. If oil temperature exceeds 90°C, open intercooler flap by placing INTERCOOLER FLAP switch in "OPEN."

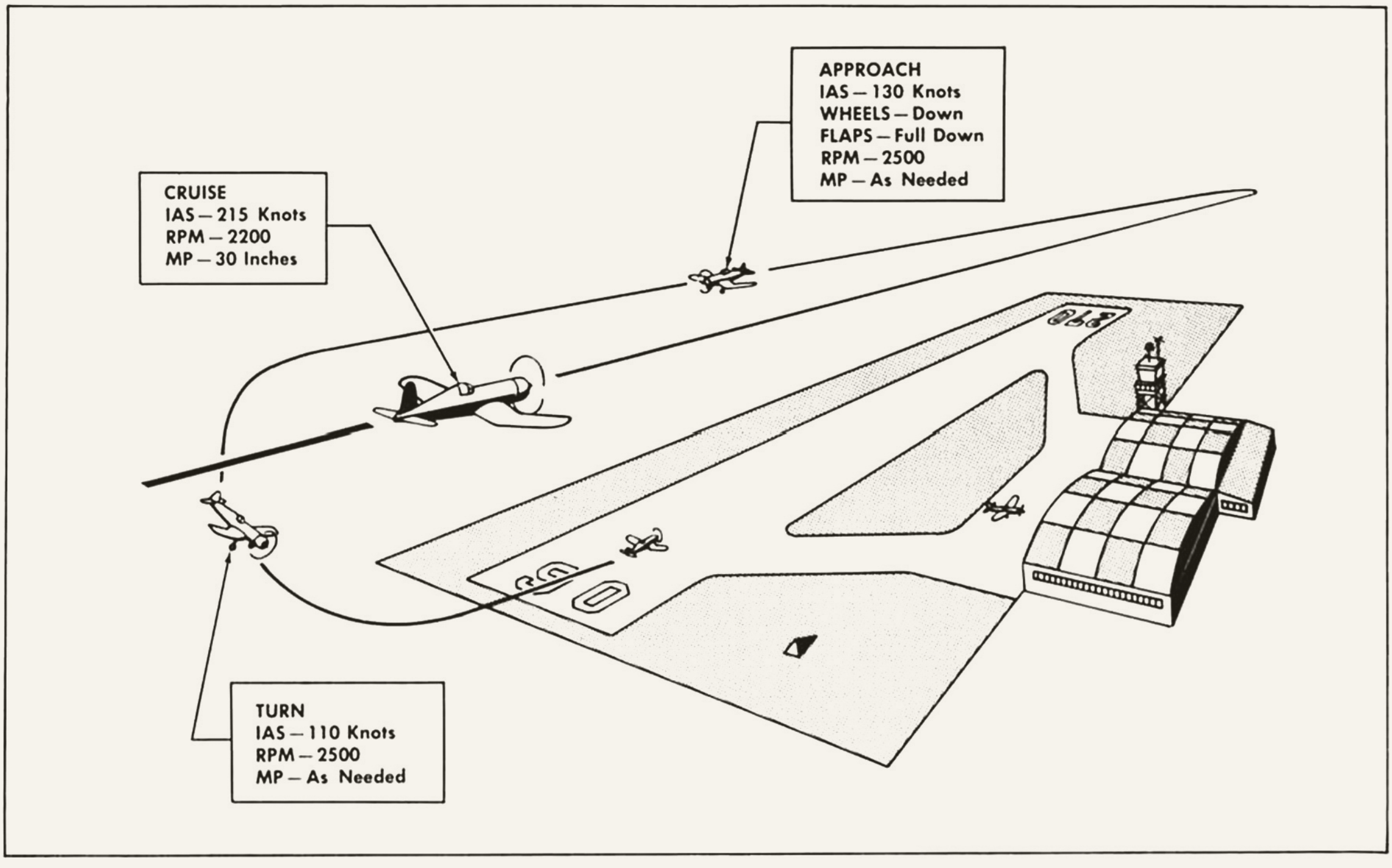


Figure 2–3. Typical Landing Pattern Diagram

FLIGHT CHARACTERISTICS.

Refer to section VI.

SYSTEMS OPERATION.

Refer to section VII.

DESCENT.

Before a prolonged descent at reduced power (20 inches of mercury, minimum), place the MIXTURE control in the "AUTO-RICH" position. During the descent, advance the THROTTLE control occasionally to clear the engine. Watch the cylinder head temperature for overcooling. To prevent the engine cutting out at the end of a descent, advance the THROTTLE control slowly, well in advance of need.

Note

Additional "NOSE RIGHT" trim (up to 20 degrees) may be used for landing if necessary.

TRAFFIC PATTERN CHECK.

See figure 2–3 for typical landing pattern diagram and figure 2–4 for landing check list.

On entering the traffic pattern, make the following checks:

TAIL WHEEL control ..... "LOCK" for field, "UNLOCK" for carrier
Fuel selector control ..... "ON" (main tank)
AUXILIARY FUEL PUMP switch ..... "HIGH"
FUEL TRANSFER switch ..... "OFF"
Cowl flaps ..... Open for field, closed for carrier
MASTER WATER INJECTION switch ..... "OFF"
Armament switches ..... "OFF" or "SAFE"
Shoulder harness control ..... "LOCKED"
Seat ..... Normal flight position
WING FLAPS control ..... As required
SUPERCHARGER control ..... "NEUTRAL"
PROPELLER control ..... 2,500 rpm position
MIXTURE control ..... "AUTO-RICH"
WHEELS control ..... "DOWN"
Wheel position indicator ..... Down
CABIN CONTROL (canopy) ..... "OPEN"
Arresting HOOK control ..... "UP" for field, "DOWN" for carrier

At night the following additional checks should be made:

Exterior lights ..... All BRIGHT
Interior lights ..... FLT and NON-FLT on

WAVE-OFF.

In the event of a wave-off, advance the THROTTLE control promptly but smoothly. Raise the wheels and open the cowl flaps at once. Raise the wing flaps as soon as a safe speed and altitude have been reached. Retrim the airplane.

LANDING.

FIELD. The airplane will make either wheel or three-point landings. Care must be exercised to avoid over-correcting since the controls remain effective through the early part of the landing run.

CROSS-WIND LANDING. When a cross-wind landing must be made, use not more than 30 degrees of wing flap and make a wheel landing. Avoid weather cocking by use of the rudder and brakes.

MINIMUM RUN LANDING. To make a minimum run landing, use full-flap nose-high power approach. Bring the airplane in over the runway at a minimum safe altitude, close the throttle, and land. Use the brakes as necessary. Refer to figure A–23 for the landing distances for various conditions.

AFTER LANDING.

After the landing run has slowed, raise the flaps and unlock the tail wheel.

STOPPING ENGINE.

AUXILIARY FUEL PUMP switch ..... "OFF"
OIL COOLER SHUTTERS switch ..... "AUTO"
INTERCOOLER FLAP switch ..... "OFF"
WING FLAPS control ..... "UP"
PROPELLER control ..... Full "INCREASE"
MIXTURE control ..... "IDLE CUT-OFF"
Ignition switch ..... "OFF" after engine stops turning over
THROTTLE control ..... "CLOSED"

Note

Leaving the THROTTLE control in "OPEN," particularly in cold weather, may cause the manifold pressure regulator to stick in the increase position.

BEFORE LEAVING AIRPLANE.

GENERAL.

Fuel selector control ..... "OFF"
FUEL TRANSFER switch ..... "OFF"
GEN & BATT switch ..... "OFF"
Auxiliary switches (radio, lights, etc.) ..... "OFF"
Oxygen air control valve ..... "100% OXYGEN" and turn off oxygen shutoff valve
Control lock ..... Installed if the airplane is to be parked for an extended period
Jury struts ..... In place if the airplane is to be parked with wings folded where exposed to wind or propeller blast
Canopy sliding section ..... Partially open
Yellow sheet ..... Filled out and signed



Figure 2–4. Landing Check List

COWL FLAPS. After the engine has cooled, the cowl flaps may be closed by the following procedure:

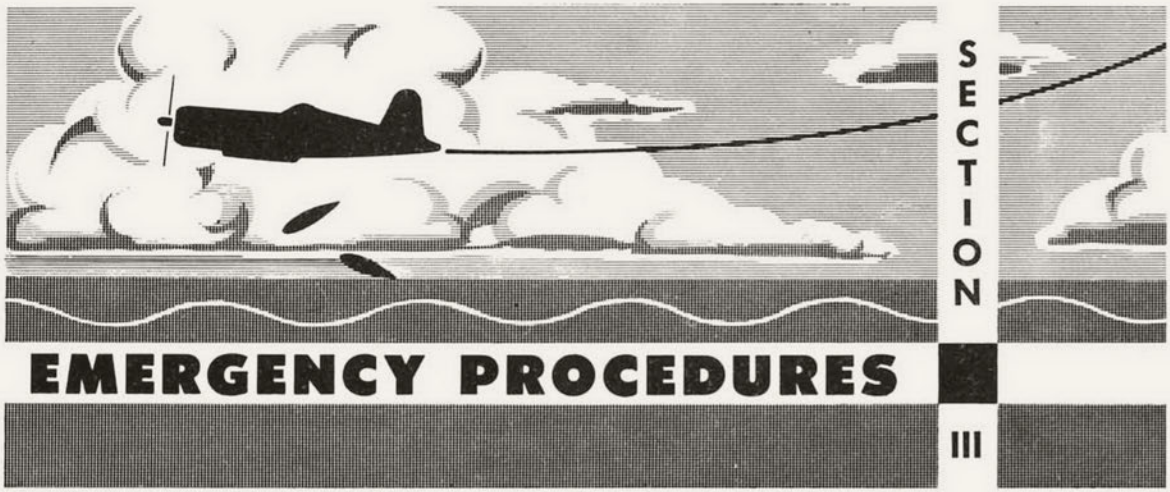
GEN & BATT switch ..... "GEN & BATT"
COWL FLAPS OVERRIDE switch ..... "OVERRIDE"
COWL FLAP switch ..... "CLOSE" until flaps are closed
GEN & BATT switch ..... "OFF" before returning the COWL FLAPS OVERRIDE switch to "NORMAL"

With the COWL FLAPS OVERRIDE switch in "NORMAL," the flaps will open again when the GEN & BATT switch is placed in the "GEN & BATT" position. If the engine cover is to be installed, pull out COWL FLAPS circuit breaker to prevent opening cowl flaps before covers are removed.

OIL COOLER SHUTTERS AND INTERCOOLER FLAP. The oil cooler shutters and the intercooler flap may be closed, after the engine has cooled, by the following procedure:

GEN & BATT switch ..... "GEN & BATT"
AUX HYDRAUL PUMP switch ..... "AUX HYDRAUL PUMP"
OIL COOLER SHUTTERS ..... "CLOSE"
INTERCOOLER FLAP switch ..... "CLOSE" until flap is closed
AUX HYDRAUL PUMP switch ..... "OFF"
GEN & BATT switch ..... "OFF"
OIL COOLER SHUTTERS switch ..... "AUTO"

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SECTION III

EMERGENCY PROCEDURES

ENGINE FAILURE.

DURING TAKE-OFF. If the engine fails during a take-off before leaving the ground, close the THROTTLE and use the brakes as required. If the engine fails immediately after clearing the runway, drop the nose to hold flying speed, close the THROTTLE, and land straight ahead, turning only enough to avoid obstacles. As many as possible of the following operations should be completed before landing.

External tanks or bombs	Manually released
Landing gear	Up
Flaps	Full down
Seat	Lowered
GEN & BATT switch	"OFF"
Ignition switch	"OFF"
Fuel selector	"OFF"

SEIZURE DURING FLIGHT. If the engine seizes during flight and the propeller stops, turn on the auxiliary hydraulic pump to gain hydraulic pressure for operating the flaps and the landing gear.

POWER LOSS DURING FLIGHT. If there is a loss of power with the propeller turning, check the fuel pressure. If the fuel pressure has dropped considerably below normal and external tanks are carried, switch the fuel selector valve to another tank and proceed as follows:

AUXILIARY FUEL PUMP switch	"HIGH"
THROTTLE control	¼ "OPEN"
MIXTURE control	IDLE CUT-OFF until fuel pressure is built up
PRIME switch	Depress, if necessary

If external tanks are not carried and the fuel pressure drops, causing loss of power, place the AUXILIARY FUEL PUMP switch in the "HIGH" position.

MAXIMUM GLIDE. For maximum glide, drop any external load and hold an airspeed of 140 knots with the landing gear and flaps up, which will give a gliding ratio of approximately 14 to 1. With the landing gear and flaps down, hold an airspeed of 85 knots, which will give a gliding ratio of approximately 5 to 1.

PROPELLER FAILURE.

The only anticipated propeller malfunction is that due to a propeller governor failure. If there is governor failure resulting in overspeeding, retard the THROTTLE and PROPELLER controls. If there is a loss of rpm, try to increase rpm by advancing the PROPELLER and the THROTTLE controls. In cases of propeller governor failure where sustained flight is possible, treat the landing as an emergency, as power may not be available to take a wave-off.

FIRE.

ENGINE. If an induction system fire should break out while starting the airplane, keep the engine running. The fire will probably be drawn into the cylinders. If this should fail, have the ground crew apply carbon dioxide and stop the engine. If an engine fire breaks out in flight, the pilot must decide from the intensity of the fire, the altitude, and the terrain below, whether he will bail out or stay with the airplane. If it is decided to try to stay with the airplane and put out the fire, stop the engine using the following procedure:

Fuel selector control	"OFF"
AUXILIARY FUEL PUMP switch	"OFF"
MIXTURE control	"IDLE CUT-OFF"
THROTTLE control	Full "CLOSED"
Ignition switch	"OFF"
COWL FLAP switch	"OPEN" until flaps are full open
IFF MASTER switch	"EMERGENCY"

If the fire goes out, do not attempt to restart the engine.

FUSELAGE OR WING. In case of a fire in the aft fuselage or a wing, prepare to abandon the airplane.

ELECTRICAL. In case of an electrical fire, which can usually be recognized by a characteristic acrid odor and white smoke, place the GEN & BATT switch in

the "OFF" position and pull out all the circuit breaker buttons, starting with BATTERY CONTROL. After all circuit breakers are opened, place the GEN & BATT switch in the "GEN & BATT" position and depress IFF RADIO, IFF OR STANDBY INVERTER, MAIN INVERTER, and UHF RADIO circuit breaker buttons. Place the IFF MASTER switch in the "EMERGENCY" position. If the fire diminishes, other circuit breaker buttons may be depressed as the equipment is needed.

Note

If a circuit breaker button does not stay in, do not hold it in.

SMOKE ELIMINATION. If smoke fills the cockpit, reduce speed below 260 knots and open the canopy sliding section. Use oxygen mask with "100% OXYGEN."

LANDING EMERGENCIES.

GEAR RETRACTED. If a landing is to be made with the landing gear retracted, proceed as follows:

External tanks or bombs	Released
Landing flaps	Down as needed
Shoulder harness	Locked
Seat	Normal flight position
Canopy	Full open
Fuel TANK PRESSURE release	"DUMP"

If power is available, make a power-on approach and land in a normal landing attitude.

GEAR PARTIALLY RETRACTED. If the landing gear cannot be raised or extended from a partially retracted position, make a power-on approach and land in a normal landing attitude.

FLAT TIRE. If there is a possibility that a tire is flat, a one-wheel landing should be made on the good tire. Hold the flat tire off the ground as long as possible. Do not use the brakes until the flat tire touches, then balance the drag of the flat tire with the brake of the opposite wheel.

SOFT GROUND. When a landing must be made where there is a possibility of the ground being soft enough to cause a nose-over, make a gear-retracted landing.

EMERGENCY ENTRANCE. When the canopy sliding section has been left closed with the CABIN CONTROL in the "CLOSE" position, entrance from the outside may be gained by opening the small emergency door located forward of the handgrip on the right-hand side of the fuselage, pulling the emergency release ring and pushing the canopy aft by means of the external handle.

DITCHING.

GENERAL. The decision whether to ditch the airplane or to bail out must be left to the pilot. The airplane may be ditched satisfactorily; therefore, the altitude and location of the airplane, and the other circumstances of the emergency will be the deciding factors.

PREPARATION.

External bombs or tanks	Released
Parachute	Unbuckled
Shoulder harness	Locked
Canopy sliding section	Open
Wing flaps	Down
Landing gear	Up
Anti-g suit	Disconnected
Oxygen mask	Disconnected from airplane breather tube
Head set	Disconnected
Heated flying suit	Disconnected
IFF MASTER switch	"EMERGENCY"

LANDING TECHNIQUE. Head into the wind and make a normal attitude landing, with power on if power is available.

EXIT. Leave the airplane immediately, taking the parakit.

BAIL-OUT.

Bail-out procedures for this airplane are similar to those for any low-wing propeller-driven airplane; the pilot may either dive out over the trailing edge of the wing, or roll the airplane over and drop out. If a bail-out is to be made at an oxygen altitude, place the air valve control in the "100% OXYGEN" position and inhale deeply several times before leaving the airplane. To bail out, proceed as follows:

Parachute	Buckled securely
Anti-g suit	Disconnected
Oxygen mask	Disconnected from airplane breather tube
Head set	Disconnected
Heated flying suit	Disconnected
IFF MASTER switch	"EMERGENCY"
Canopy sliding section	Open
Seat	Highest position
Shoulder harness and lap belt	Released

Slow the airplane as much as possible and then leave promptly. If the roll-over technique is used, trim the airplane "NOSE DOWN" before roll to help hold the airplane in inverted flight.

OXYGEN SUPPLY SYSTEM OPERATION.

If symptoms occur which suggest the onset of anoxia, immediately depress the SAFETY PRESS button. If for any reason the regulator becomes inoperative and a constant pressure or flow of oxygen is not obtained by use of safety pressure, disconnect the breathing tube, use the oxygen bail-out equipment, and descend below 10,000 feet.

Whenever excessive carbon monoxide or other noxious or irritating gas is present or suspected, regardless of the altitude, the air valve should be set at "100% OXYGEN" position and undiluted oxygen should be used until danger is passed or the flight is completed.

If it is necessary to remove the mask from the face for a short time at high altitude, use the following procedure:

a. Take three or four deep breaths of 100 percent oxygen.

b. Hold breath and remove mask from face.

c. As soon as practicable, replace mask to face and take three or four deep breaths of 100 percent oxygen.

d. Reset air valve lever to "NORMAL OXYGEN" position.

Do not exhaust oxygen supply below 300 psi except in an emergency.

FUEL SYSTEM EMERGENCY OPERATION.

TRANSFER FAILURE. If there is a failure of the fuel transfer system, proceed as follows:

FUEL TRANSFER switch	"OFF"
Fuel selector control	Desired stand-by position

Do not take off with the fuel control in either stand-by position. While operating with the fuel selector control in either stand-by position, operation will probably be unsatisfactory above 12,000 feet. Keep an accurate mental check on the amount of fuel remaining. If there is sufficient altitude available, use a tank until the fuel pressure starts to fluctuate. DO NOT run a tank dry below 3,000 feet because fuel pressure will be lost and there will not be sufficient time to restart the engine.

FUEL PRESSURE LOSS. If an auxiliary tank runs dry with the fuel control handle in a stand-by position, the fuel pressure may be regained by proceeding as follows:

Fuel selector control	"ON" (main tank)
Auxiliary fuel pump	"HIGH"
Throttle	¼ Open
Mixture control	"IDLE CUT-OFF" until approximately 6-psi fuel pressure is built up
Airplane	Steep glide
PRIME switch	Depress, if necessary

FUEL PUMP FAILURE. If the engine-driven fuel pump fails, proceed as follows:

Auxiliary fuel pump	"HIGH"
Fuel selector control	"ON" (main tank)

ELECTRICAL SYSTEM EMERGENCY OPERATION.

If there is a generator failure, as indicated by the GEN WARNING light, all nonessential electrical equipment should be turned off before placing the GEN & BATT switch in the "BATT ONLY" position. Any piece of equipment which does not have an off-on switch may be turned off by pulling out its circuit breaker button. If there is a main inverter failure, as indicated by the inverter warning light and by failure of the G-2 compass and gyro horizon, place AC INSTR TRANS switch in the "STBY" position.

Note

The IFF radar system will not operate when the AC INSTR TRANS switch is in the "STBY" position.

HYDRAULIC SYSTEM EMERGENCY OPERATION.

The auxiliary hydraulic pump may be used to build up hydraulic pressure if the main system pressure drops. The primary use of the emergency hydraulic system is to operate the wing flaps in case of a main hydraulic failure. If the main system failure is due to a loss of fluid, there will be enough fluid available for one emergency operation only; therefore, if the emergency hydraulic system is used to actuate some other component, there will be no fluid left to lower the flaps.

CONTROL SYSTEM EMERGENCY OPERATION.

If there is a loss of flight control, it may be possible to keep the airplane in the air by using the trim tabs. Before deciding to attempt a landing after an indication of even slight damage to a control system, make a simulated landing, at an altitude permitting bail-out, to test control response. Do not try landing the airplane with tabs alone.

LANDING GEAR SYSTEM EMERGENCY OPERATION.

RETRACTION. Mechanical down locks prevent the retraction of the landing gear as long as the weight of the airplane is on the gear. If the landing gear control is inadvertently placed in the "UP" position before a take-off, the gear will not retract after take-off until the control is first placed in the "DOWN" position and then moved back to the "UP" position.

EXTENSION. To extend the landing gear when normal procedure fails, proceed as follows:

Speed	110 knots
WHEELS control	"EMERGENCY DOWN"

CAUTION

Do not attempt to retract the landing gear after use of the emergency air system because damage to the hydraulic reservoir will result.

If the landing gear will not extend with compressed air, reset the WHEELS control to the "DOWN" position and turn on the auxiliary hydraulic pump.

CAUTION

If the failure is due to a lack of hydraulic fluid, extending the landing gear with the emergency pump will use the emergency fluid, and there will be none left to lower the wing flaps.

WING FLAP EMERGENCY OPERATION.

When there is insufficient hydraulic pressure to operate the wing flaps, proceed as follows:

Airspeed ..... 100 knots
■ WING FLAPS control ..... "EMERG DOWN"

The flap extension will be a full 50 degrees. If the loss of hydraulic pressure is caused by a loss of fluid, there will be only enough fluid available for one emergency extension of the wing flaps. The wing flaps are designed to start blowing up at 100 to 115 knots. If the blow-up feature is inoperative, restrict airspeed to 130 knots with the flaps fully extended.

CANOPY SLIDING SECTION EMERGENCY OPERATION.

INTERIOR. To open the sliding section from the cockpit in an emergency, move the cabin control latch inboard and pull the CABIN CONTROL aft into the "EMERGENCY" position.

EXTERIOR. To open the sliding section from the outside when the control handle is in the "CLOSE" or "STOP" position, open the emergency panel below the cockpit on the right-hand side of the fuselage, and pull the ring. The canopy sliding section can then be opened by pushing it aft.

OIL SYSTEM EMERGENCY OPERATION.

A loss of engine oil will be signalled by the oil low-level warning light. When the light goes on, place the guard-covered OIL COOLER by-pass switch in the "BY-PASS" position and prepare to make an emergency landing. If the leakage is in the oil coolers, no more oil will be lost and the airplane can be kept in the air if power is reduced to prevent exceeding the temperature limits. If oil is being lost at another point, the oil level will continue to drop and engine failure will result.



SECTION IV

Description and Operation of AUXILIARY EQUIPMENT

HEATING AND VENTILATING.

Fresh air for ventilation is taken through an inlet in the left-hand wing root and is passed through a fuel-fed heater (figure 4–1) to the cockpit. The distribution of fresh air in the cockpit is controlled by an AIR DISTRIBUTOR control (11, figure 1–13) and a DEFOGGER AIR control (12, figure 1–13) located above the right-hand control shelf. The AIR DISTRIBUTOR control has four positions: "VENT" for ventilator flow only, "W'DSH'LD" for windshield flow only, "W'DSH'LD & VENT" for both, and "OFF." The DEFOGGER AIR control has maximum and minimum air flow positions marked "MAX" and "MIN." The ventilator (8, figure 1–4), located below the rudder pedals, has two foot-operated controls. The right-hand foot control adjusts the amount of air flow. Rotating the control forward opens the ventilator and rotating the control aft closes it. The left-hand foot control adjusts the direction of the air flow forward and aft. When heating is desired, the HEATER switch adjacent to the AIR DISTRIBUTOR control is placed in the "ON" position. The heater will not operate until the airspeed of the airplane reaches 120 knots. Two thermal switches are incorporated in the heater circuit. One thermal switch controls ignition and fuel cycling to maintain heater outlet temperature below 250° F. The other thermal switch shuts off heater operation if a heater malfunction permits the outlet temperature to reach 350° F.

PITOT TUBE HEAT.

The pitot tube heat is used to prevent the formation of ice on the pitot tube head. The PITOT HEAT switch (8, figure 1–13) is located on the right-hand control shelf outboard of the OIL DILUTION switch.

Table I. Communication and Associated Electronic Equipment

Type	*Designation*	*Function*	*Range*	*Location of Controls*
VHF communication	AN/ARC-1	Two-way voice communication	Line of sight	RH control shelf
UHF communication (may be substituted for AN/ARC-1)	AN/ARC-27	Two-way voice communication	Line of sight	RH control shelf
Low-frequency navigation	AN/ARC-5	Receives radio range signals	20 to 200 miles	RH control shelf
Homing navigation	AN/ARR-2A	Receives homing signals	Line of sight	RH control shelf
Radio altimeter	AN/APN-1	Indicates altitude from ground to airplane	0 to 4,000 feet	RH control shelf and instrument panel
IFF identification	AN/APX-6	Identifies airplane for interrogating stations	Line of sight	RH control shelf

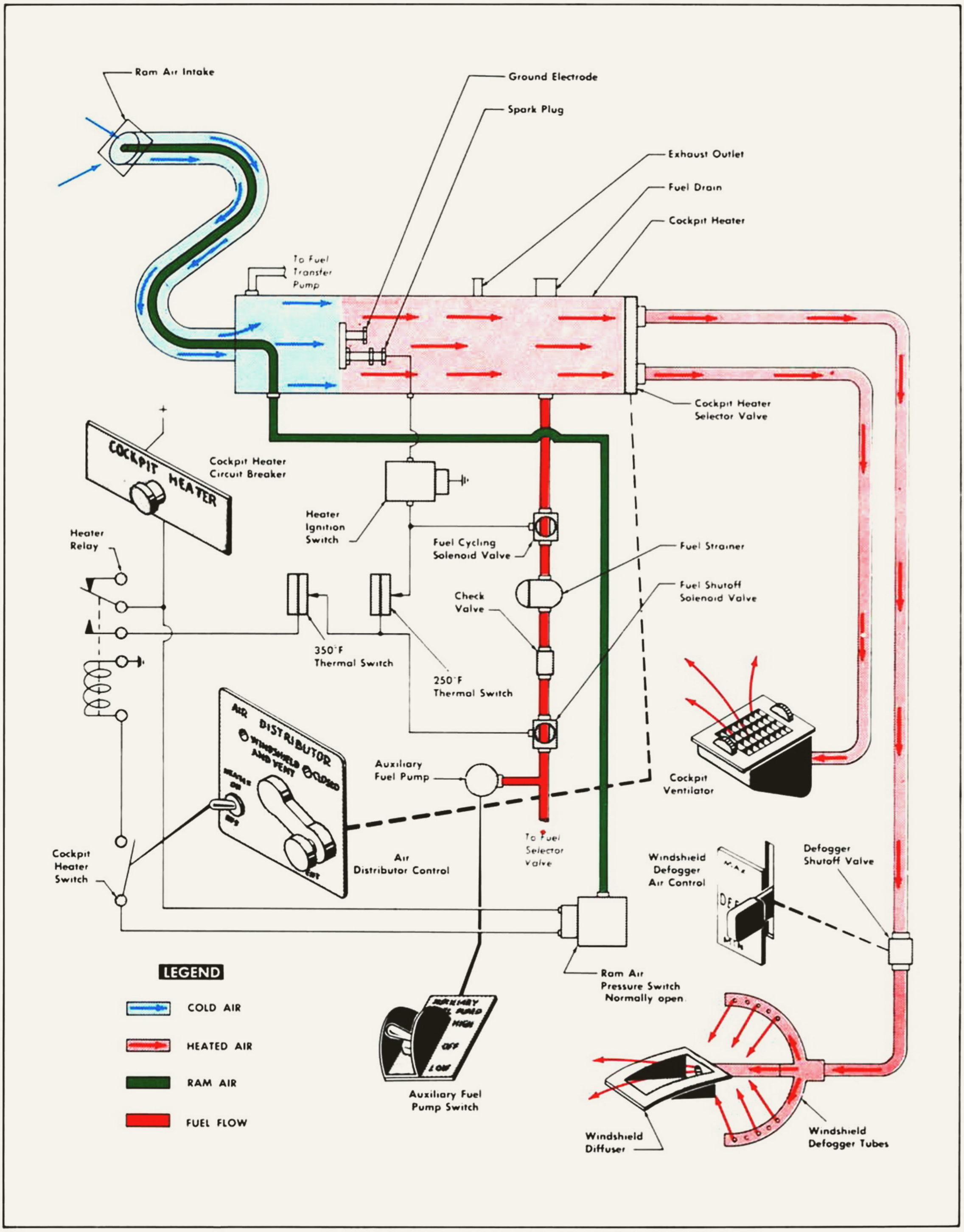
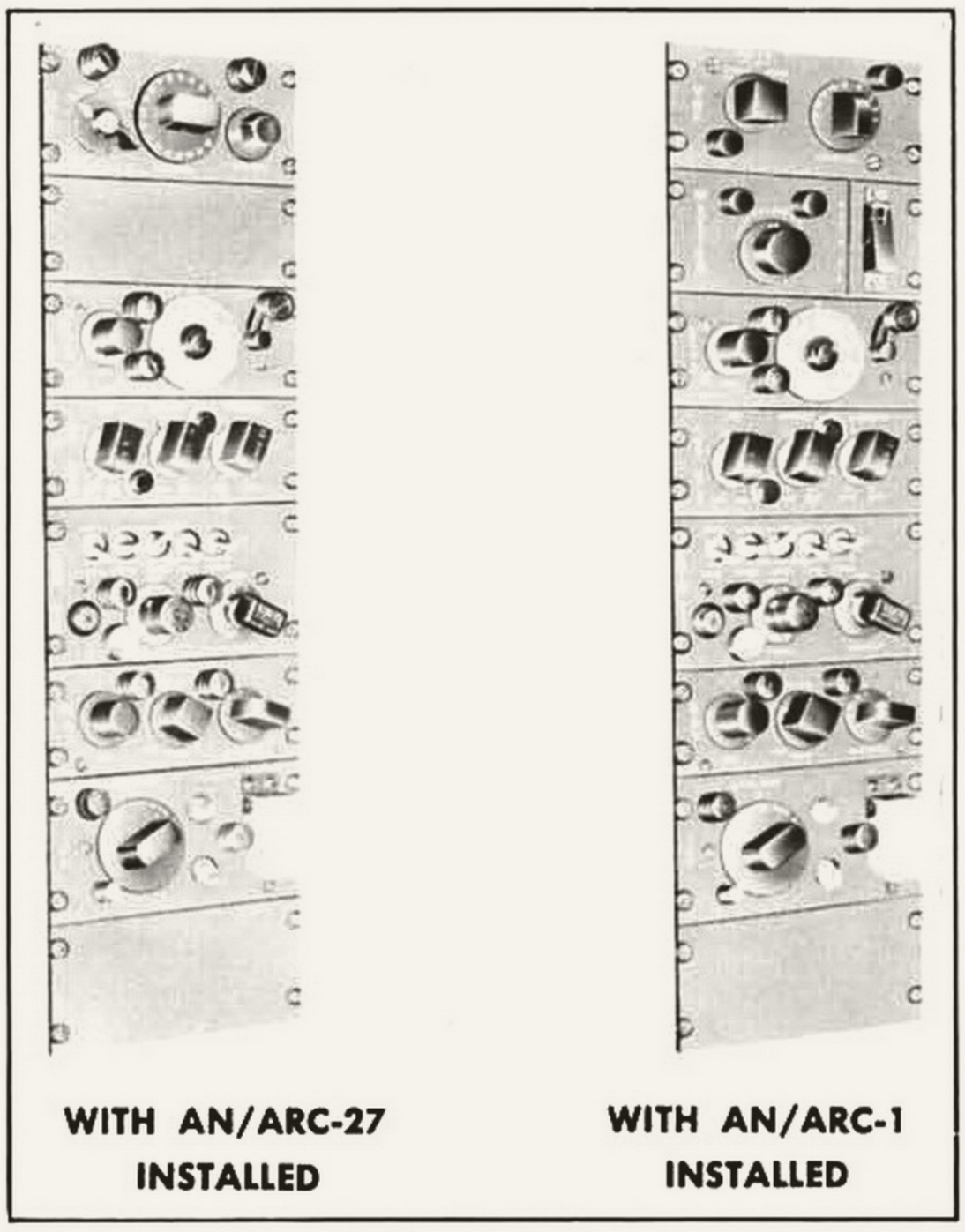


Figure 4–1. Heating and Ventilating System Diagram



WITH AN/ARC-27 INSTALLED

WITH AN/ARC-1 INSTALLED

Figure 4–2. Radio Controls

COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT.

GENERAL. *(See figure 4–2.)* Either AN/ARC-1 vhf or AN/ARC-27 uhf equipment may be installed in the airplane. When AN/ARC-1 equipment is installed (addition of a master radio control panel to the right-hand control shelf) the GEN & BATT switch and the MASTER radio control switch must be on before communication, radio range, and navigation equipment will operate. When AN/ARC-27 equipment is installed, it is necessary only to have the GEN & BATT switch on to operate the communication, radio range, and navigation equipment. When external power is used to operate electronic equipment, the GEN & BATT switch should be "OFF." The microphone and headphone receptacle (16, figure 1–13) is clipped to the right-hand side of the cockpit. The microphone switch is on the top of the THROTTLE control ranging grip.

AN/ARC-1 VHF COMMUNICATION RADIO SYSTEM. *(See figure 4–2.)* The controls for the vhf system are located on the right-hand control shelf. To operate the set, place the MASTER radio control toggle switch in the "ON" position, turn the CHANNEL switch to the desired channel and the GUARD-MAIN T/R switch to "GUARD T/R," "MAIN T/R," or "MAIN T/R & G REC." Adjust the volume with the VOLUME control on the MASTER radio control panel. If reception or transmission fails on a particular channel, try other channels.

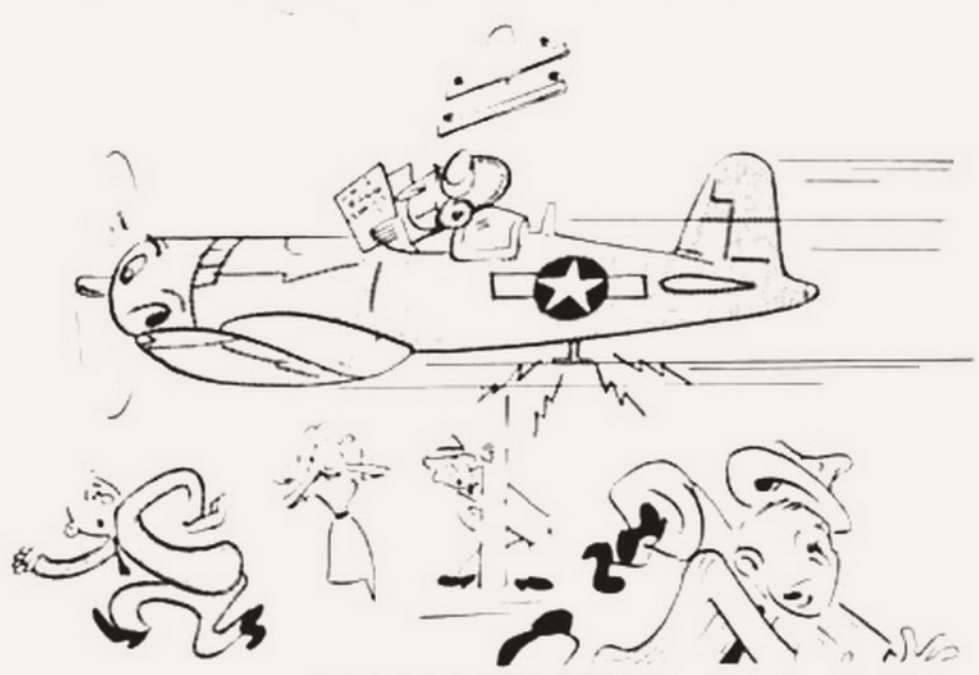
AN/ARC-27 UHF COMMUNICATION RADIO SYSTEM. *(See figure 4–2.)* The controls for the uhf system are located on the right-hand control shelf. To operate the uhf system, place the T/R control in the "T/R" or "T/R + G REC" position, and turn the CHANNEL control to the desired channel. Adjust the VOLUME control for a comfortable volume level. If reception or transmission on a particular channel fails, try other channels. A list of uhf channel frequencies is located forward of the WING FOLDING control.

AN/ARR-2A NAVIGATION RADIO SYSTEM. *(See figure 4–2.)* The navigation receiver controls are located on the right-hand control shelf. To operate, turn the AN/ARC-1 (if installed) MASTER radio control switch to "ON." Set the CHANNEL switch to the desired channel, place the PITCH control in the "NAV" position, and turn the sensitivity control (VOL) to the lowest usable level to avoid erroneous course indications.

AN/ARC-5 RANGE RADIO SYSTEM. *(See figure 4–2.)* The range receiver controls are located on the right-hand control shelf. To operate, turn the AN/ARC-1 (if installed) MASTER radio control switch to "ON." Set the frequency dial to the desired frequency and turn the sensitivity control (VOL) to the lowest usable level to avoid erroneous course indications.

AN/APN-1 RADIO ALTIMETER SYSTEM. The radio altitude indicator (4, figure 1–12) is located in the top row of instruments on the instrument panel. To operate the radio altimeter system, turn the lower control on the face of the indicator in the direction indicated. Turn the upper control to the desired range.

An altitude limit switch (22, figure 1–13) is located on the right-hand control shelf inboard of the radio controls. The limit switch sets the altitude below which the altitude warning light, located on the instrument panel adjacent to the indicator, will go on.



CAUTION

Do not use the 400 to 4,000-foot range of the radio altimeter when flying below 600 feet. The system is not calibrated for such use and inaccuracies would result. The radio altimeter is also inaccurate during AN/ARC-27 uhf transmission.



MASTER SWITCH	CODE TOGGLE SWITCH	FUSELAGE LIGHTS	WING LIGHTS	TAIL LIGHTS	FORMATION LIGHTS	APPROACH LIGHT
"OFF"	—	Off	Off	Off	Off	Off
"CODE"	"AUTO" "MAN"	Code Key (See note 1)	Steady	Steady	Steady	(See note 2)
"FLASH"	"AUTO" "MAN"	Steady Key (See note 1)	Flash	Flash (See note 3)	Steady	(See note 2)
Steady	"AUTO" "MAN"	Steady Key (See note 1)	Steady	Steady	Steady	(See note 2)

Note 1. Code indicator light operates. Since indicator light is connected to "MAN" side of CODE toggle switch, light will function with fuselage lights on or off.

Note 2. Approach light flashes when landing gear is locked down, and is steady when arresting hook is locked down. When hook by-pass holding relay is closed by momentary switch in radio compartment, approach light is steady with landing gear locked down. Lowering arresting hook control handle or opening exterior lights circuit breaker will open holding relay.

Note 3. Yellow tail light, because of current induced when arresting hook is put in down position, burns steadily in conjunction with approach light. White tail light continues to flash in conjunction with wing tip lights.

Figure 4–3. Exterior Lights Control Panel

AN/APX-6 IFF IDENTIFICATION RADAR SYSTEM. *(See figure 4–2.)* The IFF system controls are located on the right-hand control shelf. Unless instructed otherwise by local authority, turn the IFF on as follows:

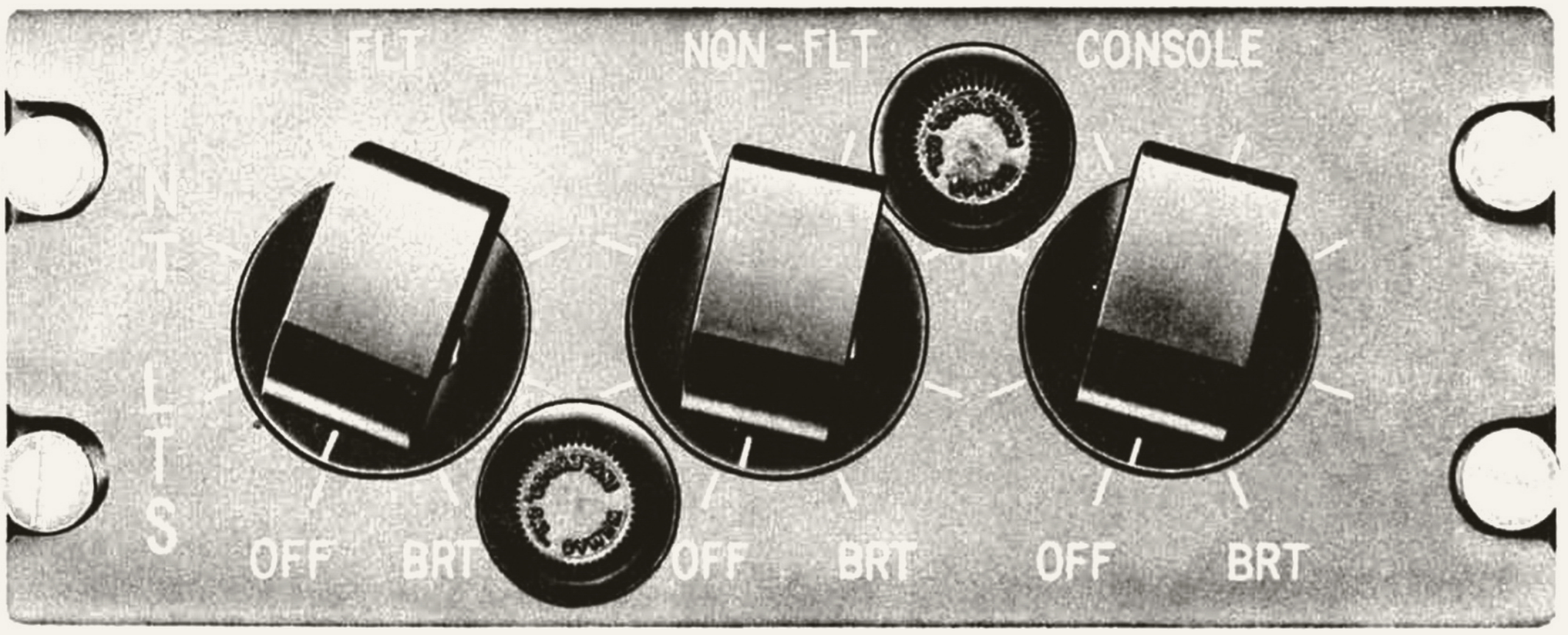
MASTER control ..... "NORM"
MODE switches ..... "OUT"

To transmit an emergency signal, depress the dial stop and rotate the MASTER control to the "EMERGENCY" position.

LIGHTING SYSTEM.

GENERAL. The lighting system is made up of an exterior system and an interior system. The exterior lights consist of the fuselage (upper and lower), wing, tail, approach, and formation lights. All exterior lights are d-c powered. The interior lights are divided into flight instrument lights, non-flight instrument and control lights, and cockpit and console lights. All interior lights except the utility floodlights are a-c powered.

EXTERIOR. The exterior lighting controls are located on the right-hand control shelf. The control panel includes FUSEL, WING, TAIL, and FORM toggle switches, which may be placed in the "OFF," "DIM," or "BRIGHT" positions. The MASTER SWITCH controls the "STEADY," "FLASH," "CODE," or "OFF" condition of the exterior lights. The rotary FUSEL code selector switch controls the code letter to be sent. The panel also includes a code key button, a code toggle switch with "AUTO" and "MAN" positions, and a code indicator light. For switch positions, refer to table II.



INDIVIDUAL LIGHTS CONTROLLED BY FLIGHT SWITCH	INDIVIDUAL LIGHTS CONTROLLED BY NONFLIGHT SWITCH	INDIVIDUAL LIGHTS CONTROLLED BY CONSOLE SWITCH
Interior lights panel Standby compass Altimeter Radio altimeter Airspeed indicator G-2 compass Gyro horizon Turn and bank indicator Climb indicator Clock	Voltammeter Altitude limit switch Check list Wheel and flap position indicator Accelerometer Manifold pressure gage Carburetor air temperature indicator Tachometer indicator Engine cylinder temperature indicator Engine gage unit Fuel quantity indicator Hydraulic pressure indicator	ARC-5 set control panel ARC-1 vhf panel ARC-1 — master panel ARC-27 set control panel ARR-2A set control panel APX-6 set control panel Exterior lights panel Cockpit

Figure 4–4. Interior Lights Control Panel

INTERIOR. The interior lighting controls (figure 4–4) are located on the right-hand control shelf. To turn on the instrument lights necessary for flight, turn the FLT control to a position which provides a comfortable intensity level. When the flight lights are on, the warning lights will automatically be dimmed. To light the remaining instruments, turn the NON-FLT control to the desired setting. To turn on the cockpit lights, turn the CONSOLE control to the desired setting. The two utility floodlamps (1, figure 1–4) are attached to the right- and left-hand sides of the windshield, and may be used as emergency lights. The floodlamps contain rotary switches for dimming and turning off the individual lights. Spare lamp bulbs are in holders (1, figure 1–12) in the left-hand side of the instrument panel and in a container (10, figure 1–13) in the right-hand cockpit lining.

OXYGEN SYSTEM.

GENERAL. The diluter-demand oxygen system regulator (8, figure 1–11) is located on the left-hand control shelf aft of the wing flap control. The two-position air valve control allows either normally diluted or 100 percent oxygen to be supplied to the mask on demand. The SAFETY PRESS button, when depressed, allows oxygen under pressure to be supplied to the mask.

Note

In order to utilize the safety pressure feature of this oxygen system, type A-13A pressure breathing oxygen mask must be used.

A shutoff valve is located below an access door marked OXYGEN VALVE INSIDE (20, figure 1–13) on the right-hand control shelf. The breathing tube with a quick-disconnect fitting is stowed beneath the seat

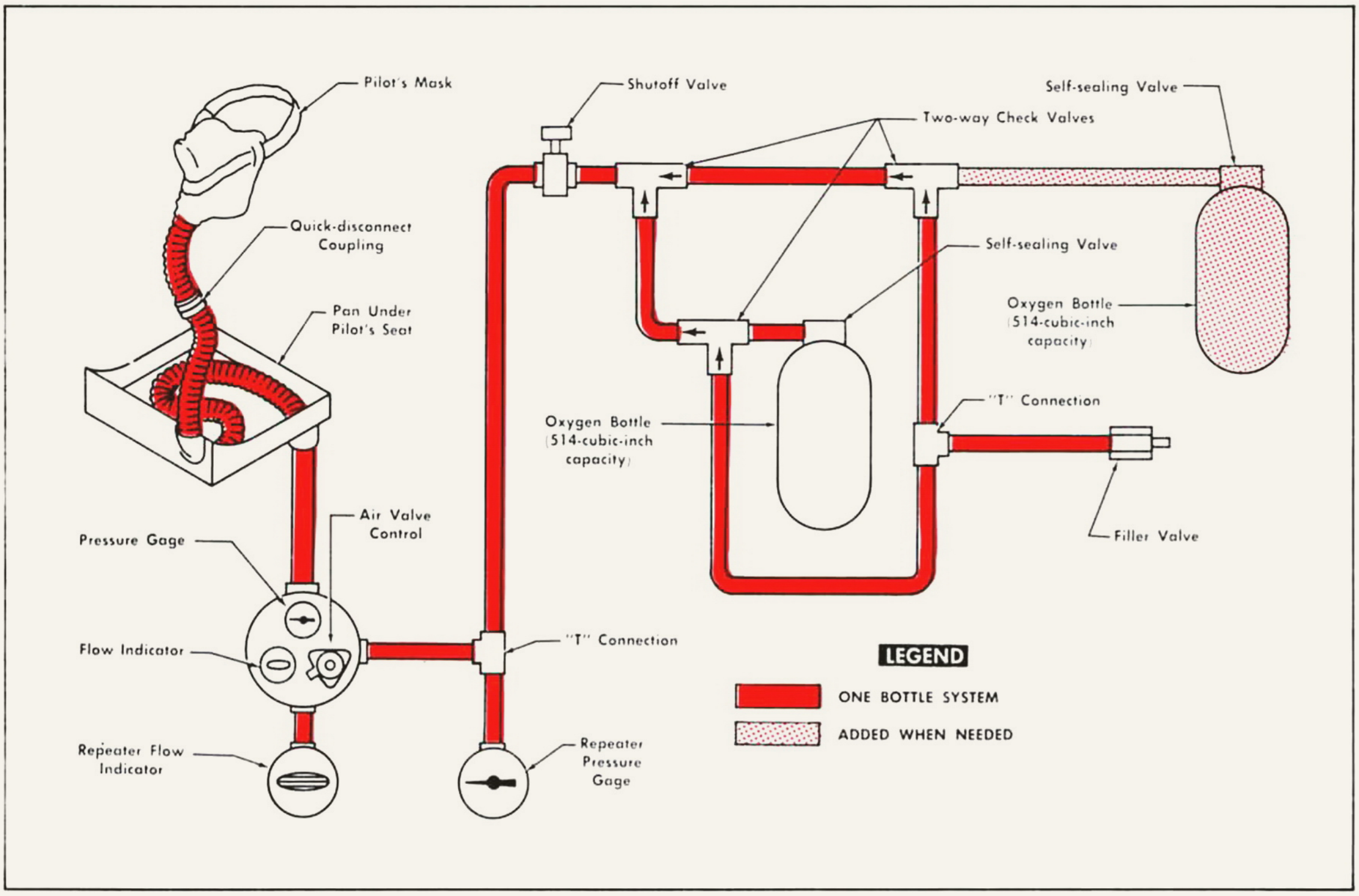


Figure 4–5. Oxygen System Schematic

with the quick-disconnect fitting projecting from a horn on the front of the seat pan. A repeater flow indicator and pressure gage (15, figure 1–11) are located forward of the MASTER WATER INJECTION switch on the left-hand control shelf. The oxygen bottle is located in the radio compartment on the forward bulkhead. A filler check valve is located in the oxygen line near the centerline of the same bulkhead.

PREFLIGHT CHECK. Be sure that the oxygen shutoff valve is open and that the pressure gages read 1,800 (±50) psi, including a full bottle. Test the oxygen regulator for leakage by obstructing the outlet of the breather tube. If the flow indicators open in less than 30 seconds, excessive leakage exists and the regulator should be replaced. Check mask fit by putting on the oxygen mask and attaching to the helmet, as in flight. Connect the oxygen mask to regulator couplings and depress the SAFETY PRESS button. Take a deep breath and hold. If flow indicator opens (all black

Cylinder Pressure (psi)	OXYGEN DURATION — HOURS							
	Altitude in Feet							
	5,000	10,000	15,000	20,000	25,000	30,000	35,000	40,000
1,800	7.5	9.0	8.5	6.9	4.1	3.1	4.2	4.2
1,500	6.0	7.5	6.7	5.5	3.2	2.4	3.3	3.3
1,200	4.5	5.4	5.1	4.1	2.4	1.8	2.5	2.5
900	3.0	3.6	3.4	2.7	1.6	1.2	1.6	1.6
600	1.5	1.8	1.7	1.3	0.8	0.6	0.8	0.8
300	Descend below 10,000 feet							

NOTES:
1. This chart is for one oxygen cylinder (514 cu. in. capacity). For two oxygen cylinders, double the duration times.
2. Data based on air valve in "NORMAL OXYGEN" position.

Figure 4–6. Oxygen Duration Chart

showing) a leak is indicated. Tighten mask straps until flow indicator closes (white face showing). Release SAFETY PRESS button. *Do not use a mask that leaks.* Fully engage mask and breather tube couplings and check force required to disconnect. Force should not be less than 10 pounds.

OPERATING INSTRUCTIONS. Oxygen shall be used constantly while above 5,000 feet at night and above 10,000 feet during the day. During all flights the air valve shall be set to the "NORMAL OXYGEN" position except during flights above 30,000 feet and under emergency conditions, as directed in section III. When flights above 30,000 feet are planned, the use of 100 percent oxygen from the ground up is recommended. The SAFETY PRESS button should be depressed at all times when flying above 35,000 feet, or at any time anoxia is suspected. Routine use of the safety pressure at lower altitudes is not recommended because of the high oxygen consumption.

CAUTION

If the SAFETY PRESS button is depressed when the mask is not securely on the face, oxygen will be rapidly exhausted.

During a flight requiring oxygen, frequently check oxygen flow and pressure indicators. At altitudes above approximately 41,000 feet the flow indicator will not blink, but the positive pressure in the mask is an unmistakable indication that oxygen is being delivered. While on oxygen, occasionally check mask for leakage by use of the SAFETY PRESS button, as described for a preflight check. On completion of flight, place air valve control in the "100% OXYGEN" position, and turn off the shutoff valve below the right-hand control shelf.

NAVIGATION EQUIPMENT.

G-2 COMPASS. The G-2 compass indicator (8, figure 1–12), located in the top row of instruments on the instrument panel, gives the pilot the gyro-stabilized magnetic heading of the airplane. The center dial gives an unstabilized magnetic heading. The indicator may be operated as a free-directional gyro by placing the G-2 COMPASS switch (7, figure 1–12), located above the indicator, in the "FREE DG" position. While the indicator is being operated as a directional gyro, precession errors must be corrected from time to time. To operate the system under compass control, place the G-2 COMPASS switch in the "COMPASS CONTROL" position. Allow 3 minutes after power is turned on for the gyro to reach full speed. Depress the resetting knob and set the direction indicator dial to the heading of the airplane as given by the center dial. Hold for 2 seconds and release straight out. The direction indicator dial will align itself correctly in about 2 minutes. The G-2 compass power is supplied by the a-c electrical system.

STAND-BY COMPASS. The stand-by compass (13 figure 1–12), located in the top row of instruments on the instrument panel, is a direct-reading magnetic compass. The stand-by compass is used if the G-2 system fails.

COMPASS CORRECTION CARDS. Two compass correction cards (3, 15, figure 1–12) are located on the right- and left-hand sides of the instrument panel to give magnetic deviations for various magnetic headings.

ARMAMENT.

GENERAL. All armament circuits except the gun charging, gun heating, and gun camera heating circuits are supplied with electrical power through the master armament circuit. The MASTER ARMT switch breaker, located in the gunnery switch box (2, figure 1–4) on the left-hand side of the cockpit cowl, controls the master armament circuit. The MASTER ARMT switch breaker is opened when the arresting hook control is placed in the "DOWN" position, and it must be manually reset if the armament system is to be used.

FIRE CONTROL. The airplane is equipped with a MK 6, Mod 0, fire control system, which incorporates a MK 8 lead-computing sight (3, figure 1–4). The system is controlled by the MASTER ARMT switch breaker, the ranging throttle grip (11, figure 1–11), the span lever on the face of the sight, the SELECTOR and DIMMING switches (36, figure 1–11) on the left-hand control shelf, and the DIVE ANGLE switches in the gunnery switch box on the cockpit cowl. To operate the fire control system as a gun sight, proceed as follows:

MASTER ARMT switch breaker	"ON"
Span lever	Span of expected target
DIVE ANGLE switches	"GUNS"
SELECTOR switch	"FIXED & GYRO" or "GYRO"
DIMMER switch	As desired
Ranging throttle grip	Rotate as needed to keep gyro image diameter equal to target span

To operate the fire control system as a rocket sight, proceed as follows:

MASTER ARMT switch breaker	"ON"
DIVE ANGLE switches	"ROCKETS" and "ABOVE 35°" or "BELOW 35°," depending on expected dive angle
SELECTOR switch	"FIXED & GYRO" or "GYRO"
DIMMER switch	As desired

Light for the computing sight reticle images is provided by two lamp bulbs in the base of the sight. To replace a burned-out lamp bulb, open the lamp cover below the crash pad and remove the defective lamp

bulb. Insert one of the replacement lamp bulbs provided, with the frosted spot toward the interior of the sight, and close the cover.

GUNNERY EQUIPMENT. The four MK 3 20-mm wing guns are hydraulically charged and electrically fired. A maximum total of 924 rounds of ammunition may be provided. A gun camera, enclosed in the right-hand wing leading edge, is actuated when the guns or rockets are fired. The guns and gun camera are electrically heated. The gunnery switches are located in the gunnery switch box on the left-hand side of the cockpit cowl, except for the trigger switch, which is located on the control stick. To charge the guns, proceed as follows:

GUNS READY-SAFE switch ..... "READY"
PUSH-TO-CHARGE button ..... Depress

The guns may also be charged by placing the GUNS READY-SAFE switch in the "SAFE" position for 1 second and then in the "READY" position.

To fire all the guns after charging, proceed as follows:

MASTER ARMT switch breaker ..... "ON"
GUNS READY-SAFE switch ..... "READY"
FIRING switches ..... "ON"
Trigger switch ..... Depress

To secure the guns, proceed as follows:

MASTER ARMT switch breaker ..... "OFF"
GUNS READY-SAFE ..... "SAFE"
FIRING switches ..... "OFF"

If the trigger should stick, causing uncontrolled firing, place the MASTER ARMT switch breaker in the "OFF" position. To stop a runaway gun, place the GUNS READY-SAFE switch in the "SAFE" position. To clear a stoppage, charge the guns.

CAUTION

If a stoppage occurs during use of high-explosive incendiary ammunition, do not cycle the gun chargers more than twice.

BOMBING EQUIPMENT. Bombs, 11.75-inch rockets, or MK 12 droppable fuel tanks may be carried on the two center section pylons and on the centerline pylon.

CAUTION

When 11.75-inch rockets are carried on the center section pylons, the flaps are limited to a 30-degree deflection.

The center section pylons can carry bombs weighing as much as 1,600 pounds. The centerline pylon can carry bombs weighing as much as 2,000 pounds. The BOMB AND ROCKET arming switch and BOMB RACKS switches are located in the bomb and rocket switch box (4, figure 1–4) on the right-hand side of the cockpit cowl. The bomb, 11.75-inch rocket, and fuel tank release button is located on the upper left-hand side of the control stick grip. To drop the bombs, 11.75-inch rockets, or fuel tanks, proceed as follows:

MASTER ARMT switch breaker ..... "ON"
BOMBS OR ROCKETS arming switch ..... "NOSE AND TAIL ARM" or "TAIL ARM" as desired; "SAFE" for drop tank
BOMB RACKS switches ..... "ON" as desired
Release button ..... Depress

To drop the bombs, 11.75-inch rockets, or fuel tanks when the electrical release system is inoperative or in an emergency when speed is essential, the manual EMERGENCY BOMB OR DROP TANK RELEASE (1, figure 1–11), located on the left-hand control shelf, may be used. Push the manual EMERGENCY BOMB OR DROP TANK RELEASE forward into the center right- or left-hand slot to release the pylon stores. If the arming circuits are inoperative, the bombs or 11.75-inch rockets will be dropped unarmed. To secure the centerline and center section pylons, proceed as follows:

MASTER ARMT switch breaker ..... "OFF"
BOMBS OR ROCKETS arming switch ..... "SAFE"
BOMB RACKS switches ..... "OFF"

ROCKET EQUIPMENT. Ten 3.5- or 5-inch HPAG or HVA rockets, ten 250-pound bombs, or six 500-pound bombs may be carried below the wing outer panels. The rocket system is controlled by the MASTER ARMT switch breaker, the ROCKET READY-SAFE switch and the BOMBS OR ROCKETS arming switch in the bomb and rocket switch box, the rocket selector switch (11, figure 1–12) in the top row right-hand side of the instrument panel, and the rocket firing button on the lower left-hand side of the control stick grip. Salvo firing is not possible. To fire rockets or release bombs from the outer panel racks, proceed as follows:

MASTER ARMT switch breaker ..... "ON"
ROCKETS READY-SAFE switch ..... "READY"
BOMBS OR ROCKETS arming switch ..... "NOSE AND TAIL ARM" or "TAIL ARM"
Rocket selector switch ..... No. "1" for singles, No. "6" for pairs
Rocket firing button ..... Depress

To secure the outer panel rockets or bombs, proceed as follows:

MASTER ARMT switch breaker ..... "OFF"
ROCKETS READY-SAFE switch ..... "SAFE"
BOMBS OR ROCKETS arming switch ..... "SAFE"

Table II. Rocket Firing Sequence

Note

Rocket stations are consecutively numbered from the left-hand outboard station to the right-hand outboard station.

Rocket Selector Switch Position	*Energized Rocket Station(s)*
1, *Start Singles*	1
2	9
3	3
4	7
5	5
6, *Start Pairs*	1, 10
7	2, 9
8	3, 8
9	4, 7
10	5, 6

TOW TARGET EQUIPMENT. The tow target equipment is furnished as loose equipment to be installed as needed. When installed, the latch projects from the bottom of the fuselage aft of the cockpit. The release control (30, figure 1–11) is below the shoulder harness lock control on the side of the left-hand control shelf. Pulling up the release handle mechanically releases the tow target line.

MISCELLANEOUS EQUIPMENT.

ANTI-G SUIT SYSTEM. The anti-g suit quick-disconnect fitting (38, figure 1–11) is located on the left-hand control shelf, inboard of the tail wheel lock. The fitting is covered with a cap when not in use. Compressed air for operating the system is supplied from the positive pressure of the engine-driven vacuum pump. The system operates automatically after the suit is connected.

CAUTION

When you are using an anti-g suit you will have an increased resistance to the effects of high acceleration. If you have previously depended on "greying out" to judge the severity of a maneuver, you must develop a new sense of feel to avoid structural failure of the airplane. Combat maneuvers should be practiced with the aid of the accelerometer until you can accurately judge accelerations while wearing an anti-g suit.

UTILITY RECEPTACLE. A utility receptacle marked "PORT EQUIP" (18, figure 1–13) is located on the right-hand control shelf. The receptacle supplies electrical power to the pilot's heated flying suit.

MAP CASE. The map case (17, figure 1–13), for holding maps and flight data, is mounted aft of the right-hand control shelf.

BAGGAGE COMPARTMENT. A baggage compartment for stowage of 100 pounds of nonmagnetic gear is located in the radio compartment. The radio compartment access door is below and aft of the cockpit on the right-hand side of the fuselage. It is opened with four flush latches. The zipper fasteners on the canvas baggage cover must be safety wired together after stowing gear.

HEADREST. A fixed headrest is bolted to the pilot's seat bulkhead for catapulting operations.

RELIEF TUBE. The relief tube horn is secured in a cup on the forward side of the control stick base. The slack in the hose is taken up by an elastic cord below the cockpit floor.

CHECK LISTS. An edge-lighted check list (19, figure 1–11 and 2, figure 1–13) is mounted on the forward inclined end of each control shelf. One lists the operations for landing, the other for take-off.

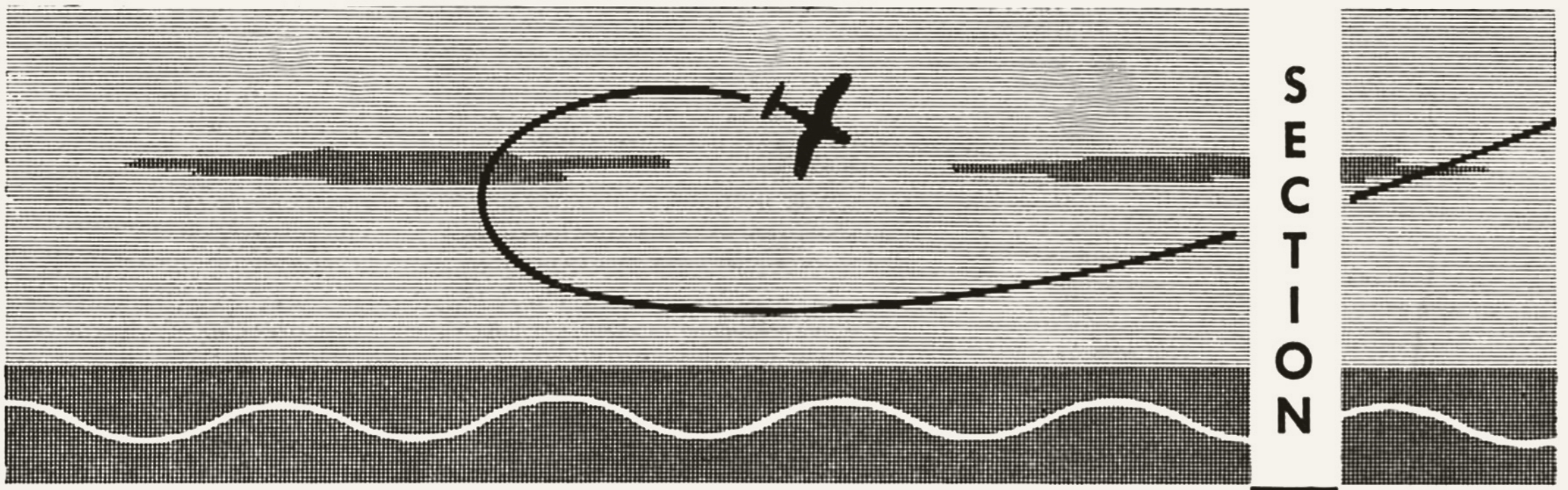
CATAPULT HANDGRIP. A handgrip is located behind a flap (16, figure 1–11) in the side of the cockpit ahead of the throttle. The handgrip may be extended to give the pilot a fixed grip against which the throttle control lever may be steadied during catapulting.

REAR-VISION MIRRORS. Three rear-vision mirrors are mounted on the forward frame of the canopy.

ASH TRAY. An ash tray (7, figure 1–11) is installed in the cockpit lining above the left-hand control shelf.

CONTROL LOCK. A control lock is provided for use when the airplane is to be parked for an extended period. To install the lock, set the rudder pedals in the full aft position and insert the forward tubes of the lock into the bottom tubes of the rudder pedals. Position the control stick in the retaining clamps of the lock, and rotate the spring-loaded pins into the locking position.

VOUGHT F4U-7 CORSAIR FLIGHT HANDBOOK - 36KHJ7032013



OPERATING LIMITATIONS V

GENERAL.

Notice must be taken of the cockpit instrument markings since they represent limitations that are not necessarily repeated in the text. Where necessary, a further explanation of an instrument's markings will be found under the heading dealing with its limitation.

INSTRUMENT MARKINGS.

See figure 5–1 for instrument markings. All instruments are marked for 115/145 fuel.

ENGINE LIMITATIONS.

Cylinder temperatures — maximum
- Take-off and military power ..... 243°C
- Normal rated in "AUTO-RICH" ..... 243°C
- Normal rated in "AUTO-LEAN" ..... 228°C
- Maximum continuous in any power except above ..... 228°C
- Desired for continuous operation ..... Below 200°C

Oil pressures — minimum
- 2,600 rpm at 85°C ..... 75 psi
- 2,250 rpm at 85°C ..... 60 psi
- 1,200 rpm at 85°C ..... 50 psi
- Idling ..... 25 psi
- Desired at 2,200 rpm and 60°C ..... 85-90 psi

Oil temperatures
- Minimum for take-off and flight ..... 40°C
- Desired ..... 60°C-75°C
- Maximum, level flight ..... 85°C
- Maximum, climb ..... 98°C

Carburetor air temperatures
- Desired ..... 32°C
- Maximum — dry ..... 38°C
- Maximum — water injection ..... 54°C

Engine rpm
- Maximum during dive ..... 3,120 rpm (30 sec)
- Minimum for sustained cruise ..... 1,200 rpm (minimum for generator cut-in, 1,400 rpm)

Manifold pressures — maximum
- Take-off and military power (limited to 15 minutes)
  - Neutral blower ..... 59.5 in.
  - Low and high blower ..... 54.5 in.
- Combat power — water injection (limited to 5 minutes) ..... 70.0 in.
- Neutral blower with 100/130 fuel ..... 54.5 in. (15 min)

Note

For all engine speeds above normal rated power (2,600 rpm), the required MIXTURE position is "AUTO-RICH."

AIRSPEED LIMITATIONS.

The airspeed limit of the airplane will be indicated at all times by the striped maximum-allowable airspeed pointer of the airspeed indicator. In order to avoid exceeding the airspeed limitations in a dive, the pull-out must be started well before the airspeed limit is reached. See figure 6–3 for airspeeds at which relatively severe pull-outs are to be started.

Other airspeed restrictions are as follows:
- Retracting or extending the landing gear ..... 270 knots
- Landing gear extended as a dive brake ..... 350 knots
- Wing flaps, blow-up operative, 0 to 50 degrees ..... 200 knots
- Wing flaps, blow-up inoperative, 50 degrees ..... 130 knots
- Wing flaps, blow-up inoperative, 40 degrees ..... 145 knots
- Wing flaps, blow-up inoperative, 30 degrees ..... 170 knots
- Wing flaps, blow-up inoperative, 20 degrees or less ..... 200 knots
- Canopy sliding section open ..... 300 knots
- Aileron, full throw ..... 300 knots
- Aileron, one-half full throw ..... 350 knots
- Cowl flaps and intercooler flap ..... No restriction

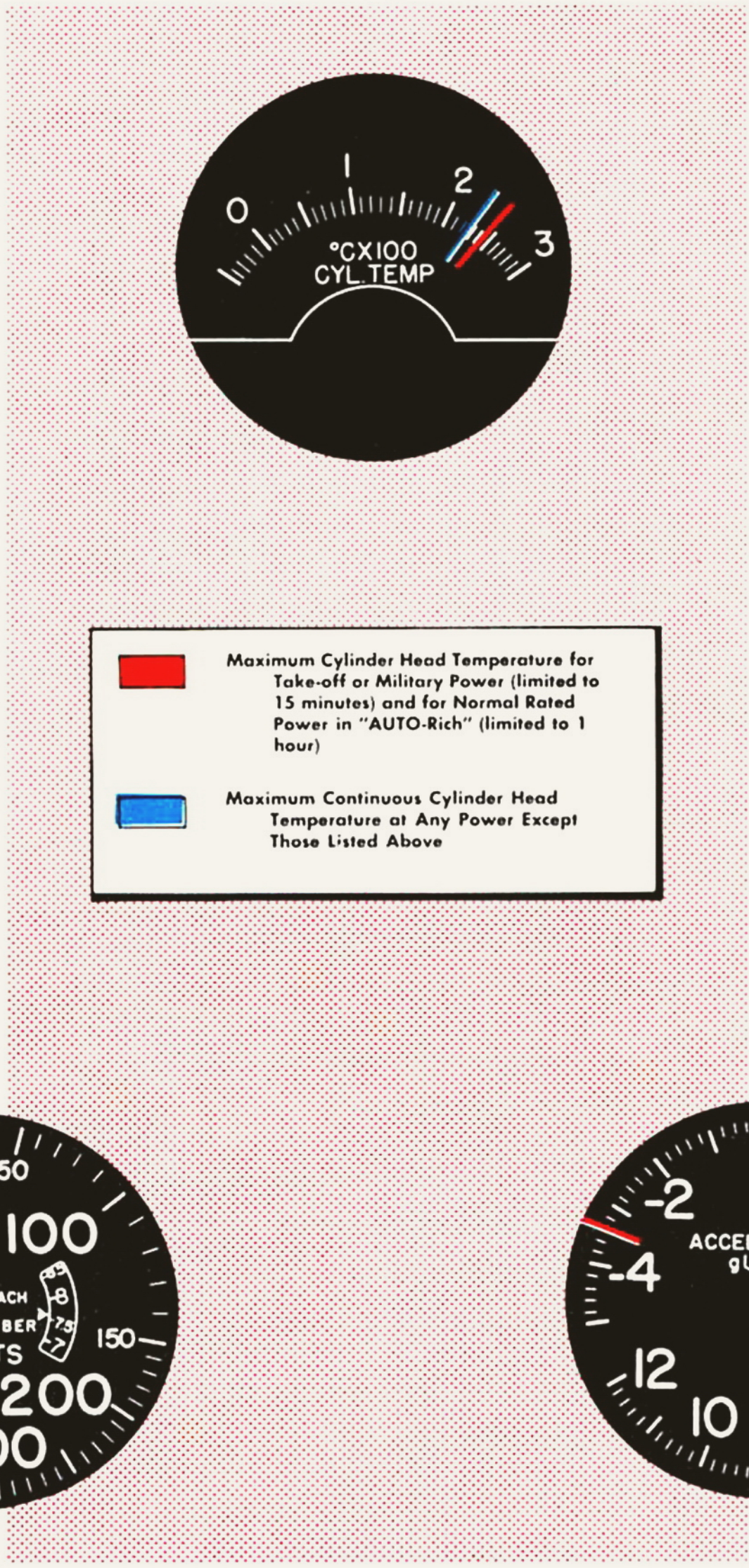
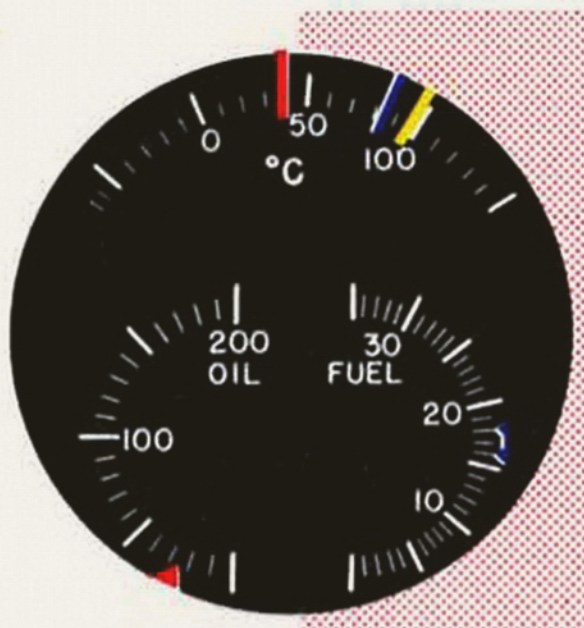


Figure 5–1. Instrument Markings Diagram (Sheet 1 of 2)





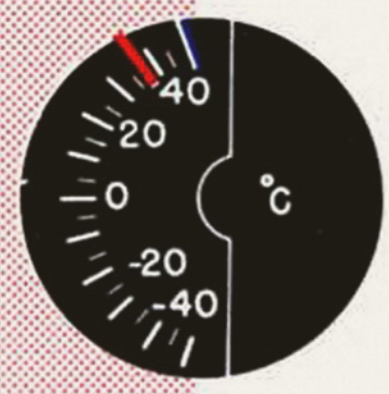
- Minimum Oil Temperature for Take-off and Flight
- Maximum Oil Temperature for Level Flight
- Maximum Oil Temperature for Climb
- Normal Fuel Pressure
- Minimum Oil Pressure for Idling

- Maximum Manifold Pressure for Combat Power (limited to 5 minutes)
- Maximum Manifold Pressure in Neutral Blower (limited to 15 minutes)
- Maximum Manifold Pressure in Low or High Blower (limited to 15 minutes)

NOTE

All limitations shown are for 115/145 fuel.





- Maximum RPM During Dive (limited to 30 seconds)
- Maximum RPM During Take-off and Normal Operations

- Maximum Carburetor Air Temperature — Dry
- Maximum Carburetor Air Temperature — Water Injection

Figure 5–1. Instrument Markings Diagram (Sheet 2 of 2)

WEIGHT LIMITATIONS.

The maximum recommended gross weights are as follows:

Field Take-off	19,400 pounds
Field Landing	15,000 pounds
Arrested Landing	13,000 pounds
Catapulting	18,500 pounds

MANEUVER RESTRICTIONS—NO EXTERNAL BOMBS, ROCKETS, OR TANKS.

All aerobatic maneuvers except spins are permitted when the airplane is not carrying an external load. The maximum accelerations at various altitudes and speeds permitted at a gross weight of 13,200 pounds are given in figure 5-2.

Accelerations for other weights are such as to maintain a constant product of gross weight and acceleration, except that accelerations of 7.5g positive and 3.4g negative must not be exceeded at gross weights less than 12,000 pounds.

The limit of actual accelerations and speeds that can be withstood with safety is indicated by a general buffeting or shaking. It is dangerous to continued increasing the acceleration or speed once buffeting begins, because of the increased loads on the tail.

CAUTION

If buffeting starts reduce airspeed and acceleration immediately.

It is recommended that a pilot flying this airplane become familiar with the diving and pull-out characteristics gradually, while maintaining absolute control over speed. Limit inverted flight to 10 seconds.

MANEUVER RESTRICTIONS WITH EXTERNAL BOMBS, ROCKETS, OR TANKS.

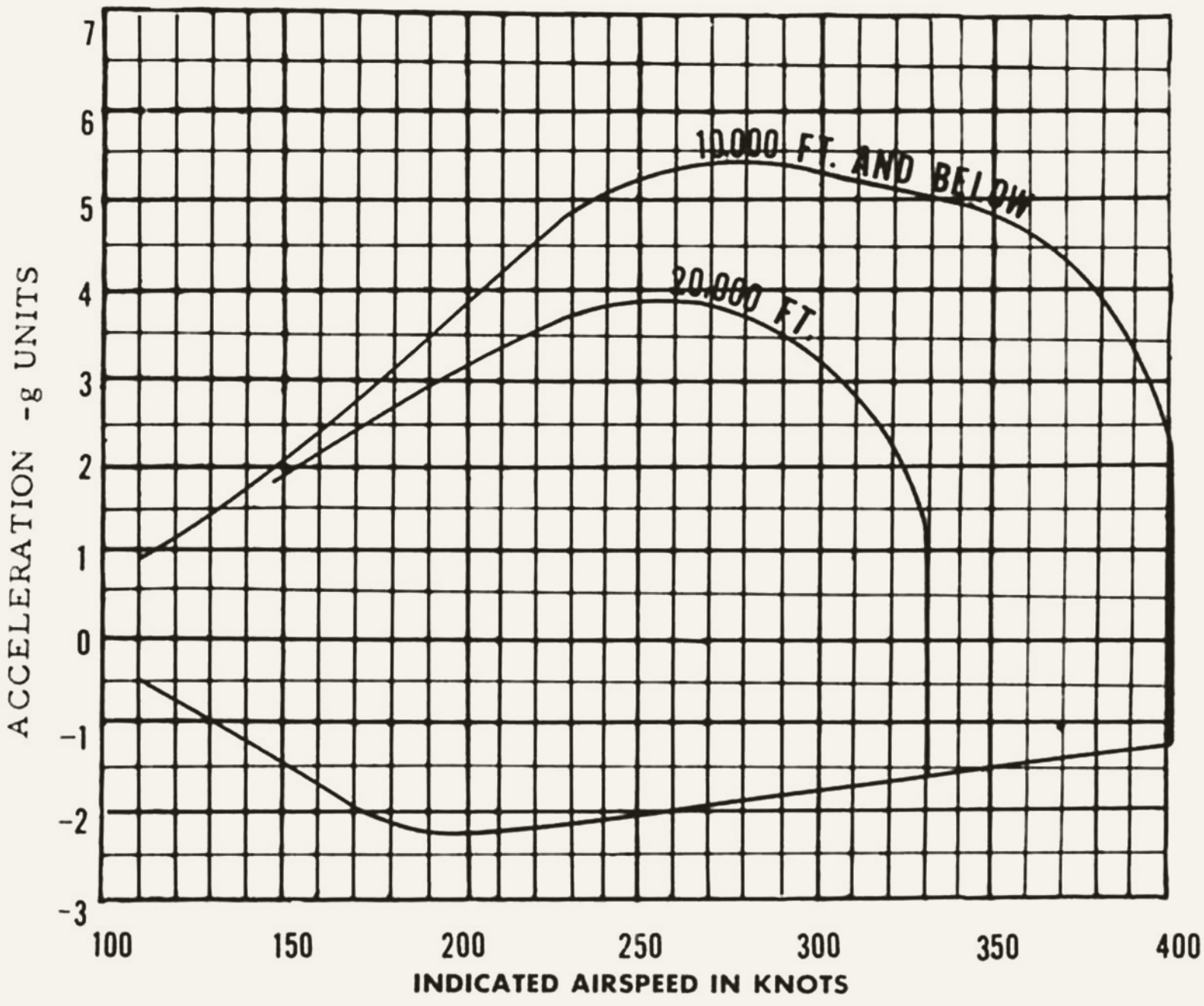
Loops, snap-rolls, chandelles, and Immelmann turns are prohibited when the airplane is carrying external loads. Except in an emergency, arrested landings are not permitted with fuel in the external tanks, with a 2000-lb. bomb, or with rockets. When carrying a 2000-lb. bomb, the maximum permissible positive acceleration is 5.0g or that indicated in figure 5-2, whichever is less. Catapulting, deck take-off, and landing with combinations involving unsymmetrical load to the left shall be avoided because of insufficient rudder and aileron control near stalling speed. Sway braces shall not be carried on wing center section pylons when the airplane is catapulted without stores on these pylons.

ARRESTING DECELERATIONS.

The maximum permissible arresting hook load is 46,800 pounds and the maximum permissible longitudinal deceleration for arrested landing is 3.6g. The ultimate barrier engagement force is 58,500 pounds, and the ultimate-strength longitudinal deceleration for barrier engagement is 4.5g.

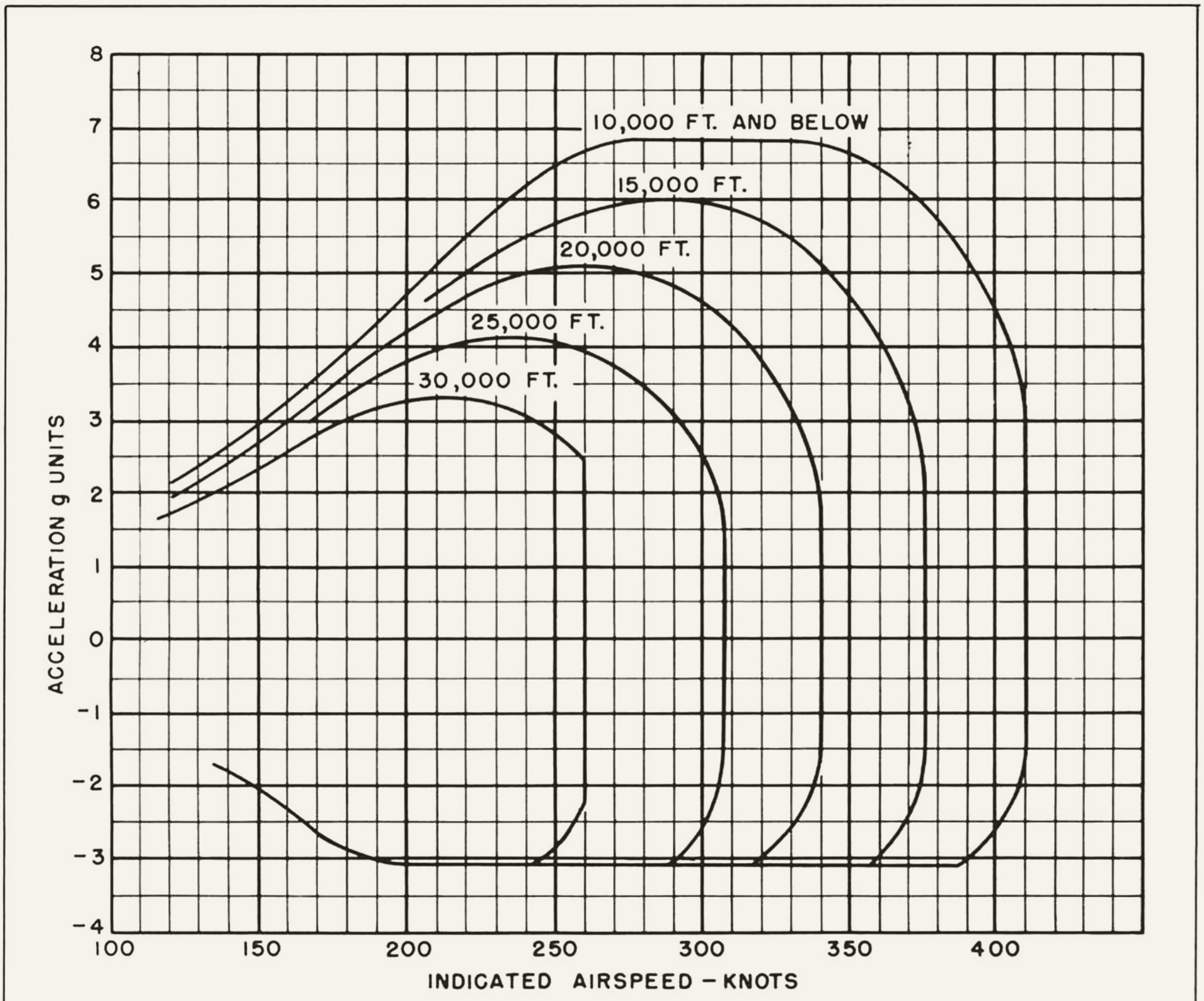
STALLS WITH AERO 14A ROCKET LAUNCHERS.

On the basis of flight test information obtained on the F4U-4 airplanes, it is anticipated that the F4U-7 airplanes, when equipped with the Aero 14A rocket launchers with or without external stores, will not have sufficient right rudder control to avoid spins during accelerated stalls in left turns. Because of these rudder control characteristics and because of inadequate stall warning in these configurations, pilots are cautioned to exercise care in low-speed steady and maneuvering flight.



OPERATING FLIGHT STRENGTH DIAGRAM
For Symmetrical Flight in Moderate Turbulence
F4U-7 Airplanes
Gross Weight 13,200 Pounds or Less

Figure 5-2. Operating Flight Strength Diagram (Sheet 1 of 2)



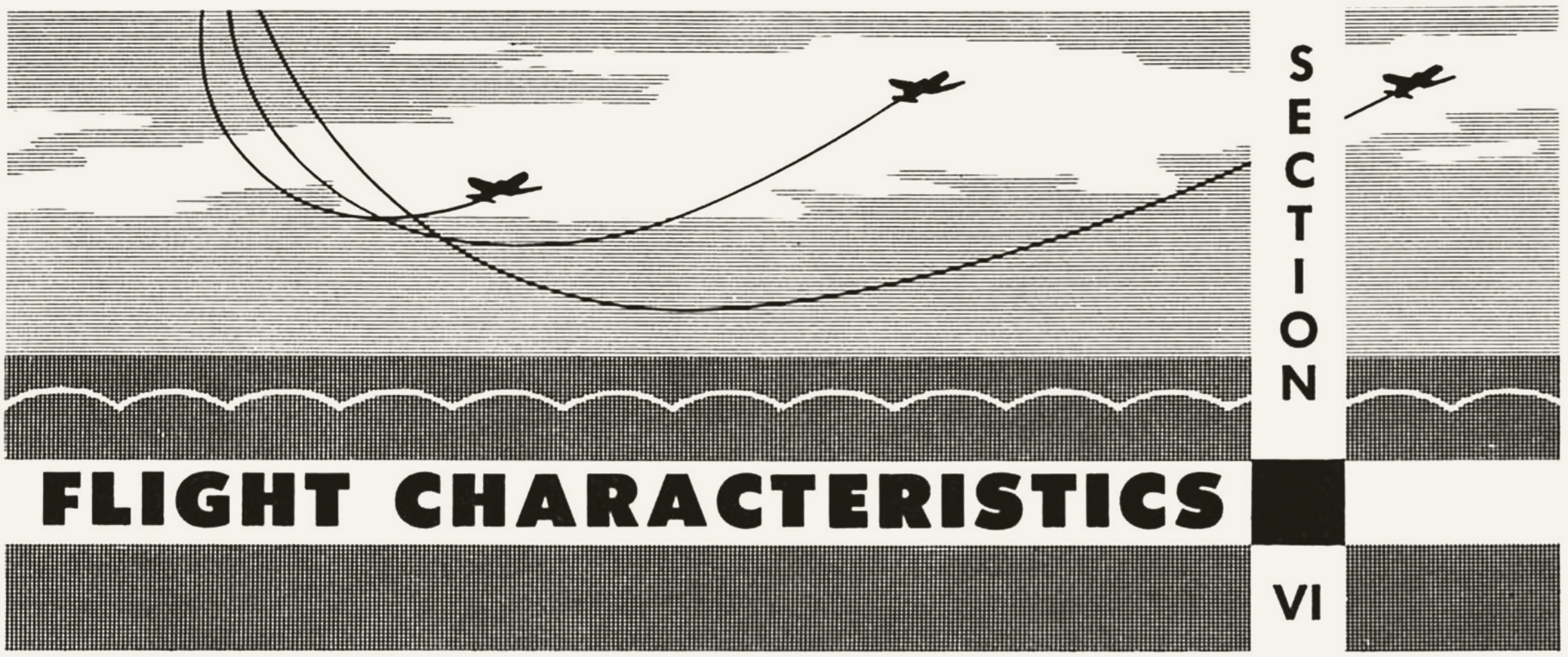
OPERATING FLIGHT STRENGTH DIAGRAM

F4U-7 AIRPLANES

SMOOTH AIR

GROSS WEIGHT 13,200 POUNDS

Figure 5-2. Operating Flight Strength Diagram (Sheet 2 of 2)



SECTION VI

FLIGHT CHARACTERISTICS

GENERAL.

The flight characteristics of this airplane are those that would normally be expected of a propeller-driven high-performance fighter. Extension of the landing gear, cowl flaps, and wing flaps changes the trim only slightly.

STALLS.

The stalling characteristics of this airplane are consistent with those experienced on earlier model F4U-type airplanes and are not considered abnormal. Stall warning, as indicated by slight airframe buffeting, occurs at speeds very close to the actual stall and therefore will not provide a positive and early indication to the pilot. With power on, the variation of elevator control force and/or position in approaching the stall is very slight and therefore does not provide a large degree of feel or a change in angle of attack or airspeed. For these reasons, FLIGHT IN CLOSE PROXIMITY TO THE STALL AT LOW ALTITUDES SHOULD BE AVOIDED OR APPROACHED WITH CAUTION.

CAUTION

Pilots should thoroughly familiarize themselves with the stall characteristics of this airplane in both clean and landing configurations in straight and level flight and in turns of various banks, as well as stalls in the landing configuration, using various flap positions and power settings while simulating approach and landing conditions.

At the stall with power off, the airplane exhibits a moderate nose-down pitch and roll-off in either direction. With power on and flaps down, a roll-off to the left at the stall is violent and is accompanied by a loss in altitude of 600 to 900 feet. On the basis of flight test information obtained on the F4U-4 airplanes, it is anticipated that the F4U-7 airplanes, when equipped with the Aero 14A rocket launchers with or without external stores, will not have sufficient right rudder control to avoid spins during accelerated stalls in left turns. Because of these rudder control characteristics and because of inadequate stall warning in these configurations, pilots are cautioned to exercise care in low-speed steady and maneuvering flight. Refer to the paragraph on Maneuver Restrictions — No External Bombs, Rockets, or Tanks.

SPINS.

WARNING

No intentional spinning of this airplane is permitted.

GENERAL. The spinning and spin recovery characteristics of this airplane are somewhat more severe than those of the earlier F4U-type airplanes. Satisfactory recovery from spins of five turns in each direction in the clean condition and from one turn in the landing condition has been adequately demonstrated for all presently required spin entry conditions. The number of turns required for recovery from 5-turn spins in each direction varies between 1½ and 3½ turns in the clean condition, depending upon the type of entry and number of turns in the spin. In the landing condition from a 1-turn spin, in both directions, the average recovery requires ¼ turn. Spins in either direction are, in general, oscillatory in character. A lateral-directional oscillation combines with the initial longitudinal oscillation if the airplane is held in the spin for more than 2 turns. However, the oscillation should

not be interpreted to mean that a flat spin is developing. Recovery should be normal with forces within the capabilities of the average pilot. Tabs, especially the elevator tab, should be used if the recovery forces are too high. Inverted spins will probably be to the right. Recovery from an inverted spin requires the application of full controls, but the control forces will be about one-half of those required for a normal spin.

NORMAL SPIN RECOVERY TECHNIQUE. To recover from a normal spin, proceed as follows:

THROTTLE control	*Full* "CLOSED"
PROPELLER control	*Full* "DECREASE"
Rudder control (pedals)	*Full* opposite to direction of turn
Elevator control (stick)	*Full* forward
Aileron control (stick)	Neutral

Apply opposite controls sharply, leading with *full* opposite rudder followed ½ turn later by *full* forward movement of the control stick. An increase in the rudder pedal force will be noted when the stick is moved forward but full rudder pedal throw should be reapplied and held if any movement has occurred. The aileron position during recovery is not considered critical and, in general, should be retained in neutral. The rate of rotation will increase significantly upon application of controls for recovery, which is a good sign that recovery is starting. Hold full reversed controls until rotating stops and the airplane is thrown to an inverted attitude with considerable negative g. This recovery condition is very positive and should not be confused with an inverted spin. At this point, the controls should be neutralized and the airplane pulled out in a symmetrical pull-out. The airplane must be eased out of the ensuing dive. Avoid a rapid aft stick movement as a high-speed stall may result with an accompanying spin re-entry requiring more altitude for recovery. If unable to hold full opposite controls and the stick walks back, return controls with the spin for a brief interval, and repeat full recovery control motion.



WARNING

Check the Turn-and-Bank Indicator for Direction of Spin Before Applying Corrective Controls!

Note

Full forward stick (against the stops) must be applied and held for spin recovery. It is further recommended that the airplane in a well-developed spin should be abandoned only if the recovery controls cannot be applied and held, and/or the airplane reaches an altitude below 5,000 feet.

INVERTED SPIN RECOVERY TECHNIQUE. Inverted spins will probably be to the right. The needle of the turn-and-bank indicator will show the direction of the spin. *Check the direction of the needle of the turn-and-bank indicator before applying corrective controls.* Recovery from a well-developed inverted spin requires the application of full controls, but the control forces will be about one-half of those required for a normal spin. To recover from an inverted spin, proceed as follows:

THROTTLE control	Full "CLOSE"
PROPELLER control	Full "DECREASE"
Turn-and-bank indicator	Check for direction of spin
Elevator control (stick)	Full aft
Rudder control (pedals)	*Full* opposite to direction of turn
Aileron control (stick)	Neutral

Neutralize the controls immediately after the rotation stops to prevent entering a normal spin. Ease the airplane out of the ensuing dive to avoid an accelerated stall.

Note

If an attempted maneuver results in an inverted nose-high attitude with insufficient speed and a high power setting, pull the THROTTLE and PROPELLER controls full aft and allow the airplane to fall out of the maneuver. Avoid excessive use of controls.

LEVEL FLIGHT.

Stability is good during level flight at all speeds within the limits of the airplane. Moderate trim changes are needed to adjust for changes in speed.

FLIGHT CONTROLS.

There are no unusual control reactions in this airplane. Flight test data on the F4U-5 airplane indicate that stick force versus acceleration does not vary appreciably with Mach number within the airplane restrictions (figure 5–2). Stick force per g increases with forward movement of the center of gravity.

STALL CHART

STANDARD DAY

MODEL: F4U-7 **ENGINE: R-2800-18W**

TAKE-OFF CONFIGURATION

Weight — 11,000 Pounds		Weight — 13,000 Pounds		Weight — 15,000 Pounds	
Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots
0°	66	0°	72	0°	77
10°	67	10°	73	10°	79
20°	71	20°	76	20°	82
30°	77	30°	83	30°	89

LANDING CONFIGURATION

Weight — 11,000 Pounds		Weight — 13,000 Pounds		Weight — 15,000 Pounds	
Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots
0°	76	0°	82	0°	89
10°	77	10°	83	20°	90
20°	81	20°	89	10°	94
30°	88	30°	96	30°	102

CLEAN CONFIGURATION

Weight — 11,000 Pounds		Weight — 13,000 Pounds		Weight — 15,000 Pounds	
Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots	Angle of Bank	Stalling Speed — Knots
0°	86	0°	93	0°	100
10°	87	10°	95	10°	102
20°	91	20°	99	20°	107
30°	99	30°	108	30°	116

REMARKS:

1. Take-off configuration — wheels down, flaps 50 degrees down, take-off power.
2. Landing configuration — wheels down, flaps 50 degrees down, power off.
3. Clean configuration — wheels and flaps up, power off.

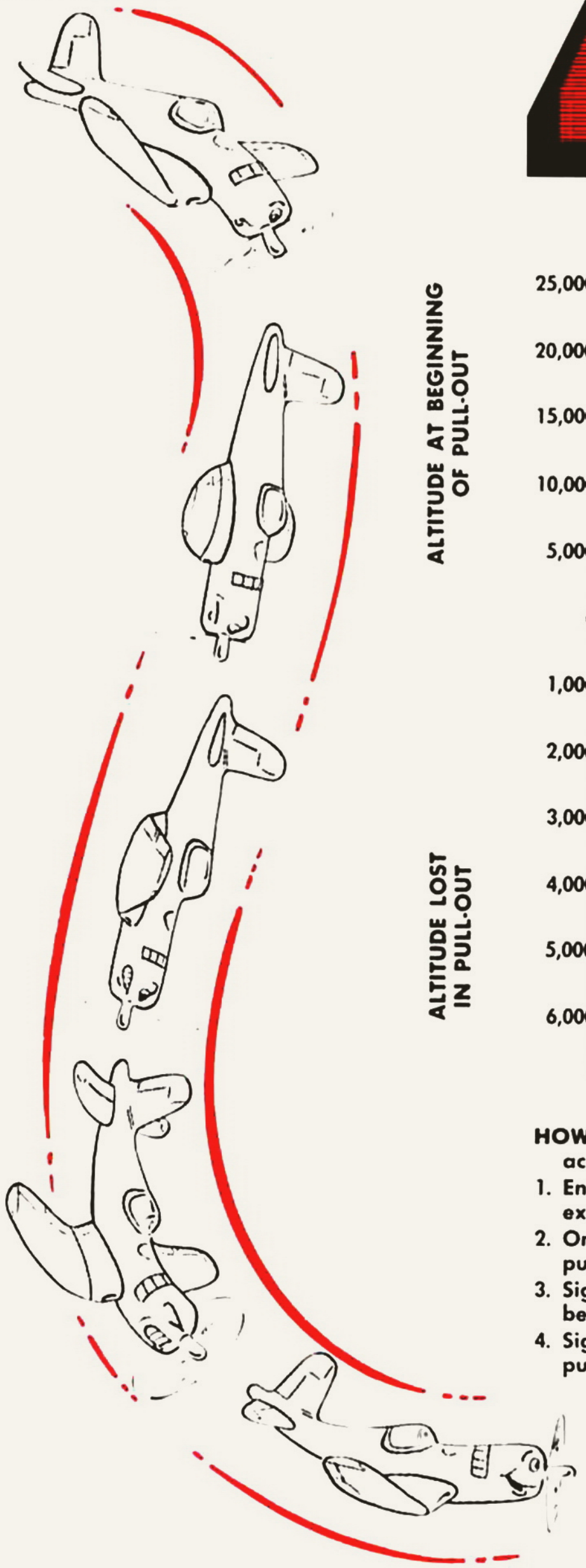
DATA AS OF: 15 November 1951.

DATA BASIS: Estimate. based on Project TED No. BIS 21103, NATC "Service Acceptance Trials (Performance Phase and Carbon Monoxide Survey) for the F4U-5 Airplane" Dated 29 September 1950.

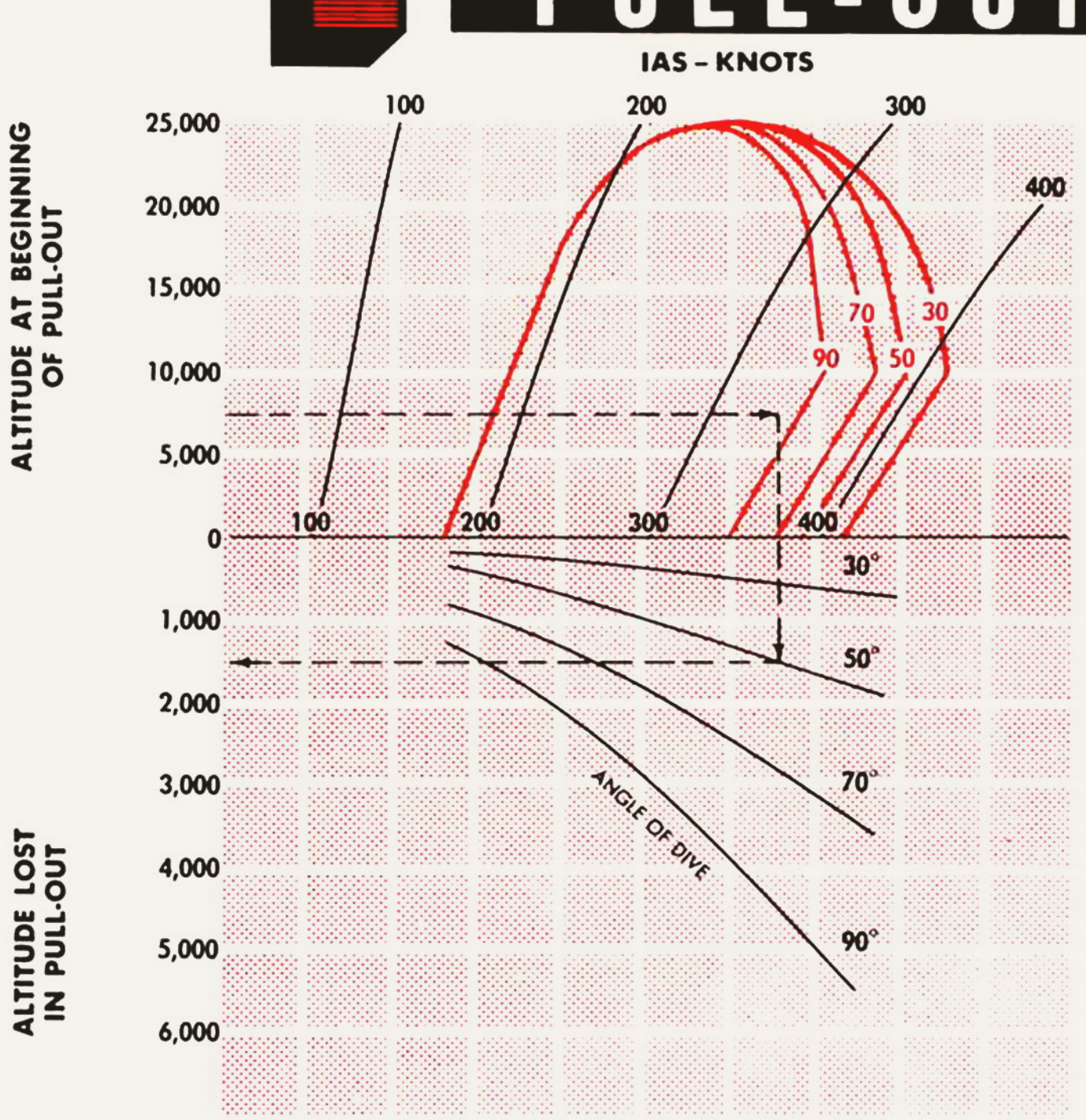
Figure 6–1. Stall Chart

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CONSTANT 4 g PULL-OUT



ABOVE 25,000 FT AIRPLANE STALLS BEFORE REACHING 4g's



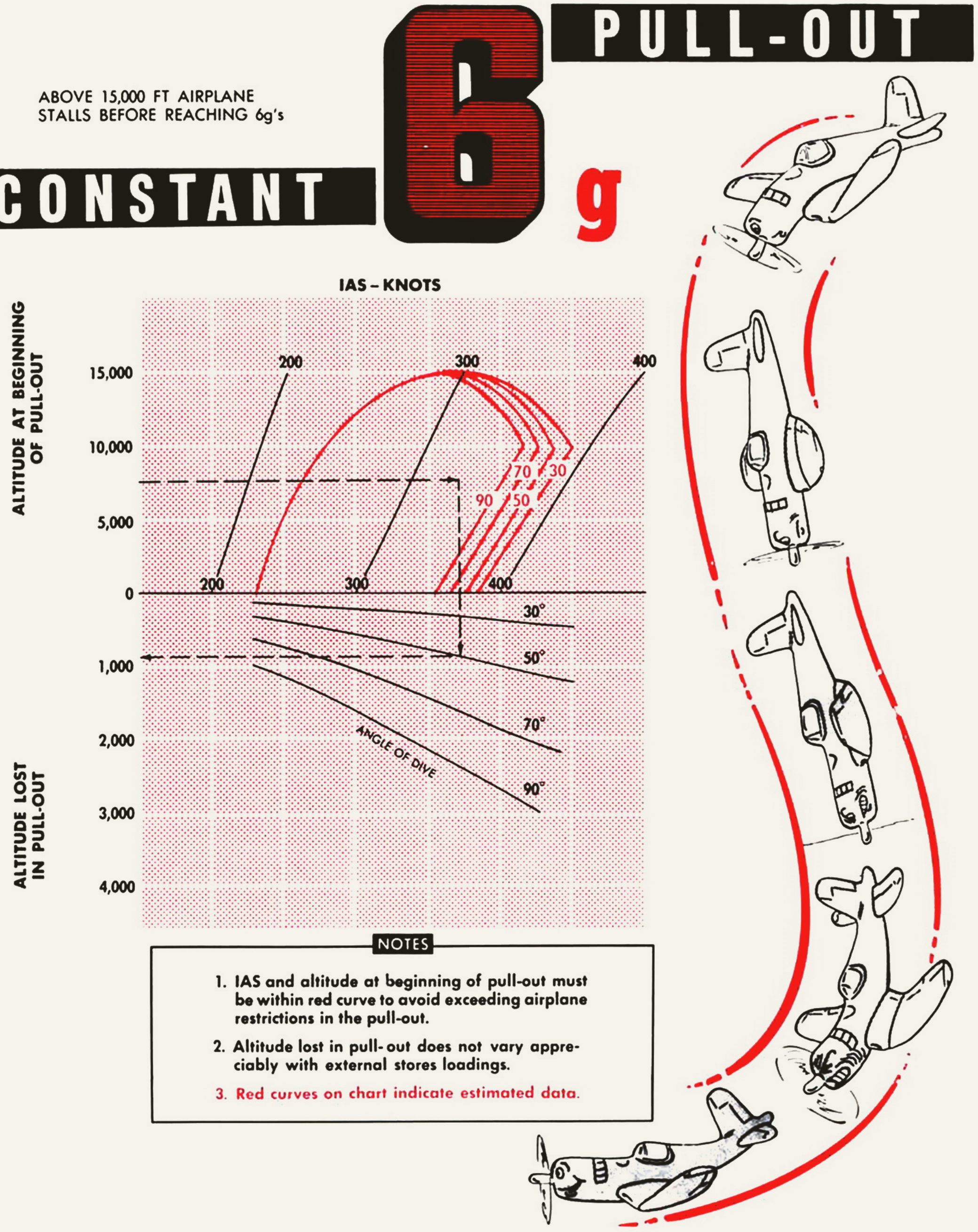
HOW TO USE CHARTS: Select appropriate chart, depending upon acceleration (4g or 6g) to be held in pull-out; then –

1. Enter chart at line nearest actual altitude at start of pull-out (for example 7,500 feet).
2. On scale along altitude line, select point nearest the IAS at which pull-out is started (330 knots IAS).
3. Sight vertically down to point on curve of dive angle (50°) directly below airspeed.
4. Sight back horizontally to scale at left to read altitude lost during pull-out (constant 4g pull-out, 1500 ft; constant 6g pull-out, 900 ft).

Figure 6–2. Dive Recovery Chart (Sheet 1 of 2)

ABOVE 15,000 FT AIRPLANE
STALLS BEFORE REACHING 6g's

CONSTANT 6g PULL-OUT



NOTES

1. IAS and altitude at beginning of pull-out must be within red curve to avoid exceeding airplane restrictions in the pull-out.
2. Altitude lost in pull-out does not vary appreciably with external stores loadings.
3. Red curves on chart indicate estimated data.

Figure 6–2. Dive Recovery Chart (Sheet 2 of 2)

MANEUVERING FLIGHT CHARACTERISTICS.

Flight characteristics during maneuvers are normal. To reduce turn radii, use 20 degrees of wing flap at 200 knots or less. Pilots unfamiliar with this airplane should enter slow rolls at 180 knots and loops or Immelmanns at 280 knots.

DIVES.

Flight characteristics are normal and control forces are not excessive during dives. Use of the landing gear as a speed brake within the airspeed limit requires some nose-up trim adjustment and is permissible only with the gear fully extended and locked except in emergency. See figures 6–2 and 6–3 for dive recovery data.

EXTERNAL LOADS EFFECTS.

With loads on either the centerline pylon or the center section pylons no buffeting is likely to occur at speeds and accelerations within the limits of the airplane. With loads on all three pylons, buffeting will probably occur at speeds between 300 to 350 knots. When buffeting occurs, reduce speed to prevent damage to the wing flaps.

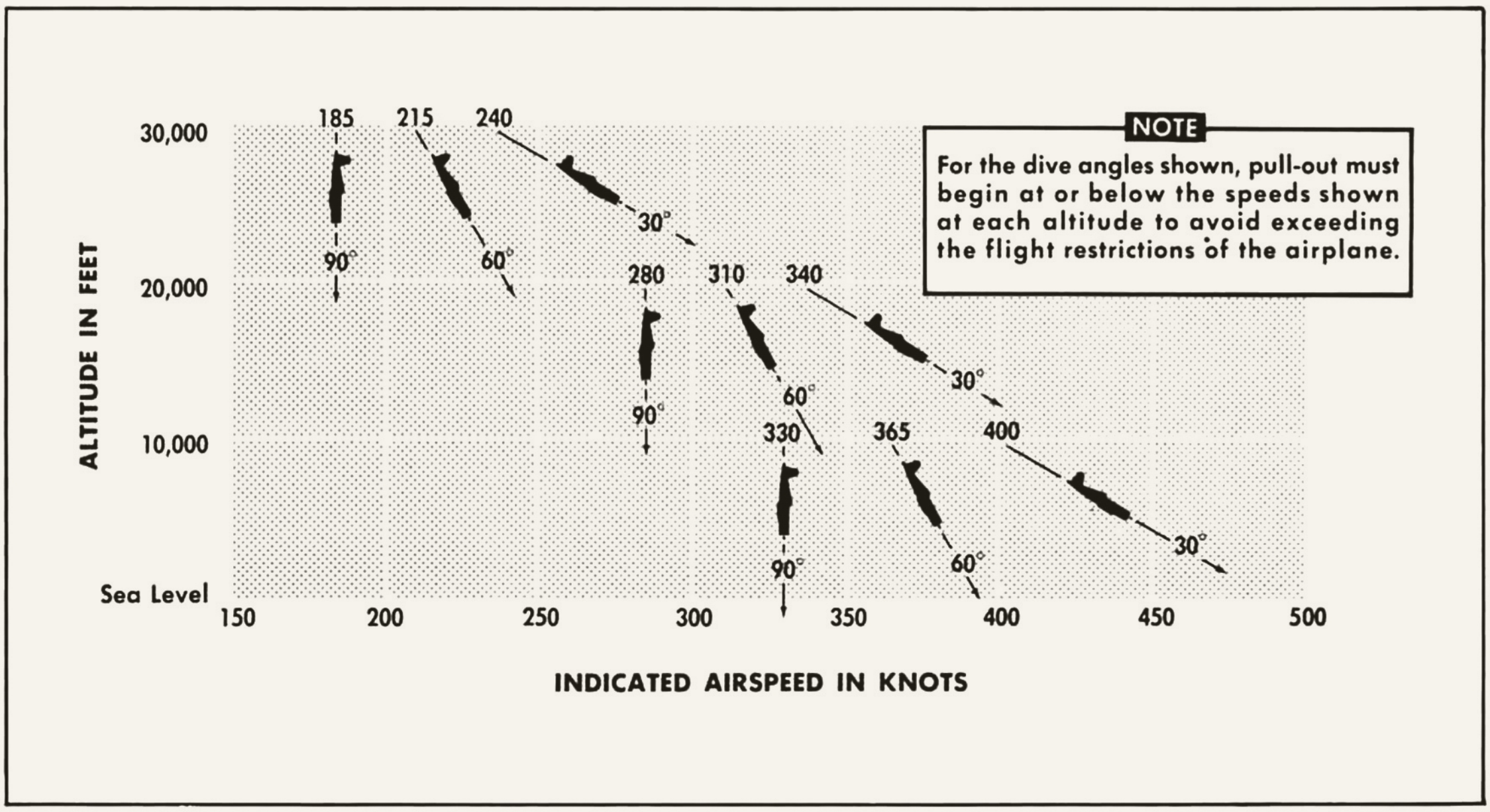
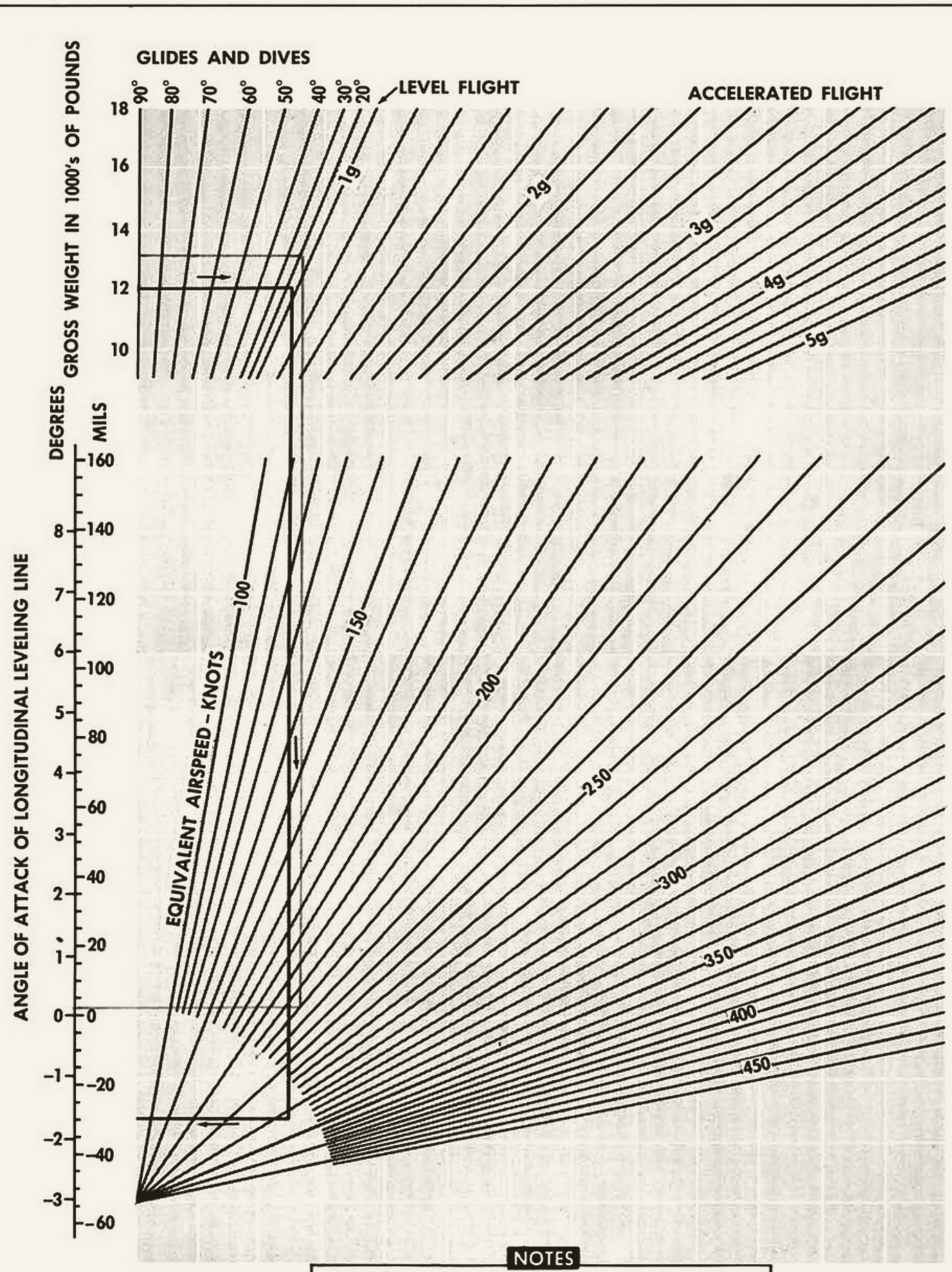


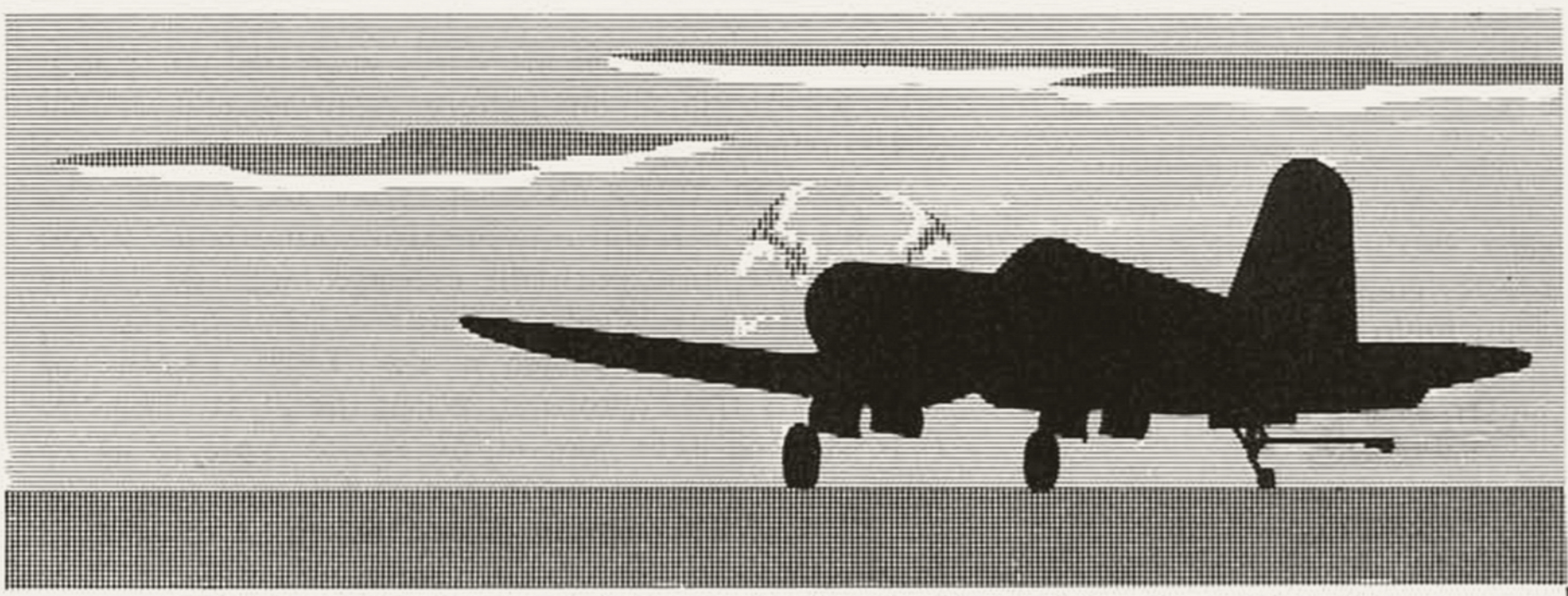
Figure 6–3. Limit Speeds for Various Dive Angles



NOTES

1. Combat Condition — Normal Fighter, 60 Percent Internal Fuel, Gross Weight = 12,772 pounds.
2. Subtract 0.75° (13.1 Mils) to Obtain Armament Datum Line.
3. Add 8.27 Degrees (144.3 Mils) to Obtain Rocket Datum Line.

Figure 6–4. Angle-of-Attack Chart



SECTION VII

SYSTEMS OPERATION

ENGINE.

MANUAL LEANING. Manual leaning to less than "AUTO-LEAN" is possible, but is not recommended because there is no way to judge the effect on engine output and fuel consumption.

SUPERCHARGER SHIFT CONSIDERATION. See figures A–5, A–6, and A–7 for altitudes and manifold pressures that will require supercharger shifting. To shift the supercharger from neutral to low or from low to high ratio, proceed as follows:

THROTTLE control.....Reduce setting to avoid exceeding manifold pressure limits
PROPELLER control.....Reduce to approximately 1,700 rpm
SUPERCHARGER control.....Shift smoothly to new position without stopping between positions

In shifting from high to low ratios or low to neutral, the THROTTLE control setting does not have to be reduced. When under combat power or in an emergency, the shift up may be made without changing the THROTTLE and PROPELLER controls.

To prevent sludging and the resultant damage to the supercharger, the supercharger clutches must be exercised before each flight and every 3 hours in the air during long flights when operating in one supercharger ratio. When operating in "LOW" or "HIGH" supercharger ratios, pulsations in rpm and manifold pressure may occur at periodic intervals. This surging usually occurs when the carburetor throttle is less than half open. To restore engine operation to normal, the THROTTLE control should be advanced as far as manifold pressure limits allow. When part-throttle operation is necessary, a selection of rpm and throttle adjustment should be made which will result in operating with a throttle opening beyond the one-half position. Moderate surging does not harm the engine.

PROTECTED CARBURETOR AIR. In the presence of high humidity, when the carburetor air temperature drops to 5°C, there is a possibility of ice forming in the air metering passages and bleeds of the carburetor. The protected air supply from the engine accessory compartment may be used when operating in neutral blower during icing conditions to prevent the formation of ice. Protected air may also be used for ground operation and take-off in the presence of dust or foreign particles in the air.

BACKFIRING. Backfiring is most likely to occur during a let-down at reduced power and may result in considerable damage to the engine air induction system. Operation with a rich mixture is the best way to prevent backfiring.

CYLINDER HEAD TEMPERATURE CONSIDERATIONS. Cylinder head temperatures are normally controlled by regulating the air flow by adjusting the position of the cowl flaps. Under abnormal conditions such as a descent with reduced power during cold weather, the cowl flaps may not keep the cylinder head temperatures within the recommended limits. Cylinder head temperatures may be increased by making sure the cowl flaps are closed, increasing the drag by lowering the landing gear and/or flaps, increasing power, or using a mixture leaner than "AUTO-RICH."

DETONATION. Detonation is indicated by a rapid rise in cylinder head temperatures and a loss of power. Operation with a richer mixture will help prevent detonation. To stop detonation, open the cowl flaps and reduce power.

SPARK PLUG FOULING. Fouling of the spark plugs usually results from operation with reduced power and a rich mixture. Increasing power and leaning the mixture will help to remove the carbon from the spark plugs.

GROUND OPERATION. To prevent fouling the spark plugs, the engine should not be operated any longer than necessary at less than 1,000 rpm. When possible, the rpm should be increased to 1,400 (or until

the GEN WARNING light goes out) to allow the generator to reach a charging potential.

FUEL SYSTEM.

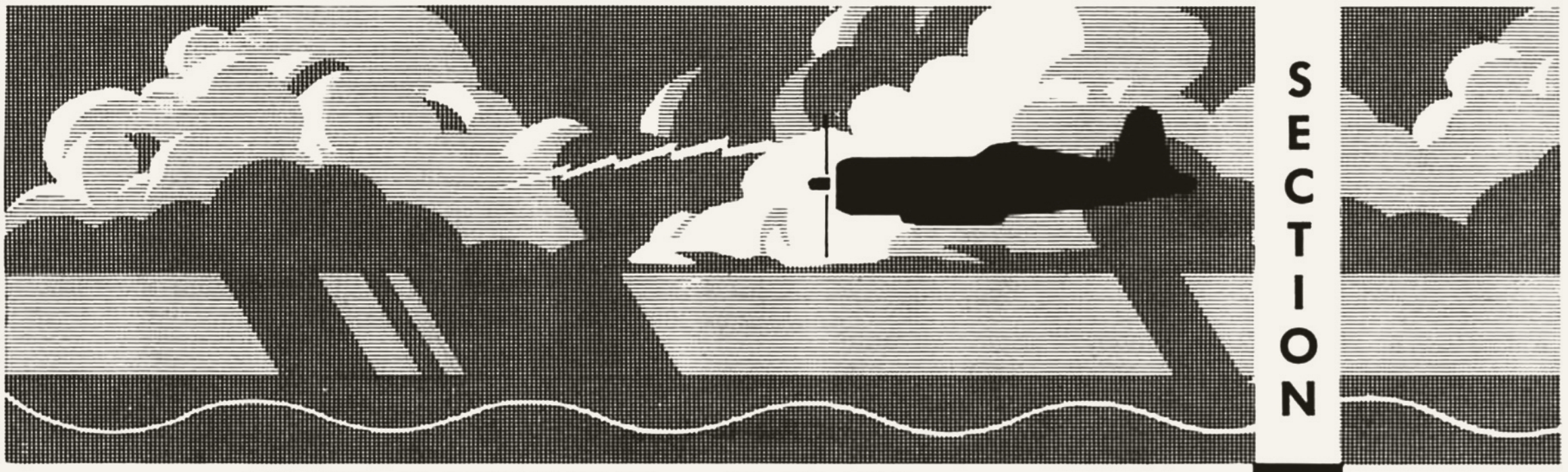
TANK SELECTION. Except in the event of a transfer system failure, the fuel selector control is normally left in the "ON" position for all flight operations. For the procedures to be followed in the event of a fuel transfer failure, refer to section III, Emergency Fuel System Operation.

AUXILIARY PUMP. The AUXILIARY FUEL PUMP switch is placed in the "HIGH" position for take-off and landing, and in the event of a main fuel pump failure (section III, Pump Failure). Normal and combat operations require the use of the "LOW" position.

TRANSFER. When external tanks are carried, the transfer system is put into operation after take-off and kept in operation until the external tanks are empty or until landing. Fuel is transferred by placing the FUEL TRANSFER switch in the "LEFT TANK" or "RIGHT TANK" position. When the FUEL TRANSFER warning light goes on, the switch is placed in the other tank position or in the "OFF" position. The "LEFT TANK" position causes fuel to be transferred from either the left-hand or centerline tank.

SECTION VIII
CREW DUTIES

(Not Applicable)



SECTION IX

ALL-WEATHER OPERATION

GENERAL.

No provisions have been made in this airplane for flight operations under extreme weather conditions.

NIGHT FLYING.

Although not designed as a night fighter, this airplane has all the stability and cockpit lighting necessary to permit successful tactical flights at night.

INSTRUMENT FLIGHT PROCEDURES.

The instrument flight procedures for this airplane are similar to those for any single-engine airplane. See figure 9–2 for suggested instrument approach pattern.

FLIGHT IN THUNDERSTORMS AND TURBULENCE.

Flight through thunderstorms should never be regarded lightly. However, when required, even violent thunderstorms may be traversed safely by (1) preparing the airplane and yourself before entering the storm, (2) staying within the penetration speeds given in figure 9–1, and (3) concentrating on maintaining attitude. To prepare the airplane, proceed as follows:

MIXTURE control	"AUTO-RICH"
PROPELLER control	Adjusted to 2,600 rpm
PROTECTED CARB AIR switch	"ON" if operating in neutral blower
G-2 compass switch	"COMPASS CONTROL"
PITOT HEAT switch	"ON"
Radio	Reduce volume to a minimum and turn off radios made unusable by static
Flight lights	On bright
Safety belt	Tight
Oxygen mask	Connected and used

Flying on instruments, enter the storm at a minimum safe altitude above terrain obstacles and prepare for a rough ride. Rely primarily on the gyro instruments and the airspeed indicator. *Concentrate on flying attitude.* Allow the airplane to ride the gusts, using the throttle only when high- or low-altitude limits are exceeded. The greatest danger from lightning lies in the possibility of a flash briefly blinding the pilot.

COLD WEATHER PROCEDURES.

GENERAL. This airplane is not equipped for flight operations during extreme cold or icing conditions. During moderate cold spells operations may be carried on successfully.

EXTERIOR CHECK. In addition to normal checks (section II, Exterior Inspection), be sure that all covers have been removed and that all exterior surfaces, intake openings, and vent holes are free of ice and frost.

INTERIOR CHECK. Make a normal cockpit check (section II, On Entering Airplane).

PRESTART PROCEDURES. Heat engine with portable heater to aid in starting, and have propeller turned through (section II, Before Starting Engine).

STARTING. It is important that external power be used for starting in cold weather. Use normal starting procedure (section II, Starting Engine); bear in mind that diluted oil increases fire hazard during starting.

WARM-UP AND GROUND TESTS. Warm up the engine thoroughly. Leaning the mixture to slightly less than "AUTO-LEAN" will aid in warming the engine. Do not close the cowl flaps for ground operation. Use the same ground tests as would be used for normal operation (section II, Ground Tests).

V (Knots) IAS				
Altitude (feet)	*Severe Turbulence*		*Moderate Turbulence*	
	Minimum Airspeed	*Maximum Airspeed*	*Minimum Airspeed*	*Maximum Airspeed*
0	150	300	110	400
10,000	150	300	110	400
15,000	150	300	110	370
20,000	155	270	115	335
25,000	160	250	125	295
30,000	165	220	130	255

Figure 9–1. Turbulent Air Penetration Chart

TAXIING. Use extreme caution if taxiing on ice or packed snow. If temperatures are near freezing, avoid taxiing through water or slush. Wet brakes may freeze in the air, and water thrown by the propeller may freeze on intakes, vent holes, and control surfaces.

BEFORE TAKE-OFF CHECK. In addition to the normal check (section II, Before Take-Off), make sure that the surface control and tab movements are free.

TAKE-OFF. If take-off is to be made from ice or packed snow, apply throttle slowly and do not hold brakes. Use 50 degrees of flap. When airborne, work the tabs, if wet, to prevent their freezing.

FLIGHT. No difficulties other than icing should be experienced in cold weather flight. Avoid severe icing conditions. Moderate icing conditions can be combated with pitot tube heat and protected carburetor air. During let-downs, cylinder head temperature may be maintained by increasing the drag through the use of wheels and/or flaps and adding power.

LANDING. The approach and landing must be smooth if a slippery runway is to be used. Use brakes sparingly.

STOPPING ENGINE. If temperatures below 2°C (35°F) are expected, dilute engine oil as follows:

Manual shut-off valve	Open
THROTTLE control	1,000 rpm
AUXILIARY FUEL PUMP switch	"LOW"
OIL DILUTION switch	"ON" for period determined from figure 9–3

If oil tank is to be serviced, divide dilution time into one-half before and one-half after servicing. During last minute of dilution, advance the THROTTLE control to give 1,600 rpm. Then with throttle constant, move PROPELLER control to obtain 1,200 rpm, then back to full "INCREASE." Repeat, and throttle the engine back to 1,000 rpm. Stop engine by using normal procedure (section II, Stopping Engine), and leave oil dilution switch on until engine stops turning. Close and safety manual shut-off valve.

CAUTION

Dilution will considerably increase the inflammability of vapors issuing from crankcase breather. At an ambient temperature of 60°F, the oil itself will burn at a dilution of 20 percent. Make sure that personnel with fire extinguishers are standing by in vicinity of airplane during dilution operation.

BEFORE LEAVING AIRPLANE. Leave the canopy slightly open to prevent moisture condensation and the subsequent formation of ice and frost. After the engine has cooled, close the cowl flaps and the canopy sliding section and install covers. Covering the control and wing surfaces will speed up preparation for flight by preventing formation of ice and frost on surfaces.

HOT WEATHER PROCEDURES.

Follow the same procedures for operations in hot weather as for operations in moderate weather.

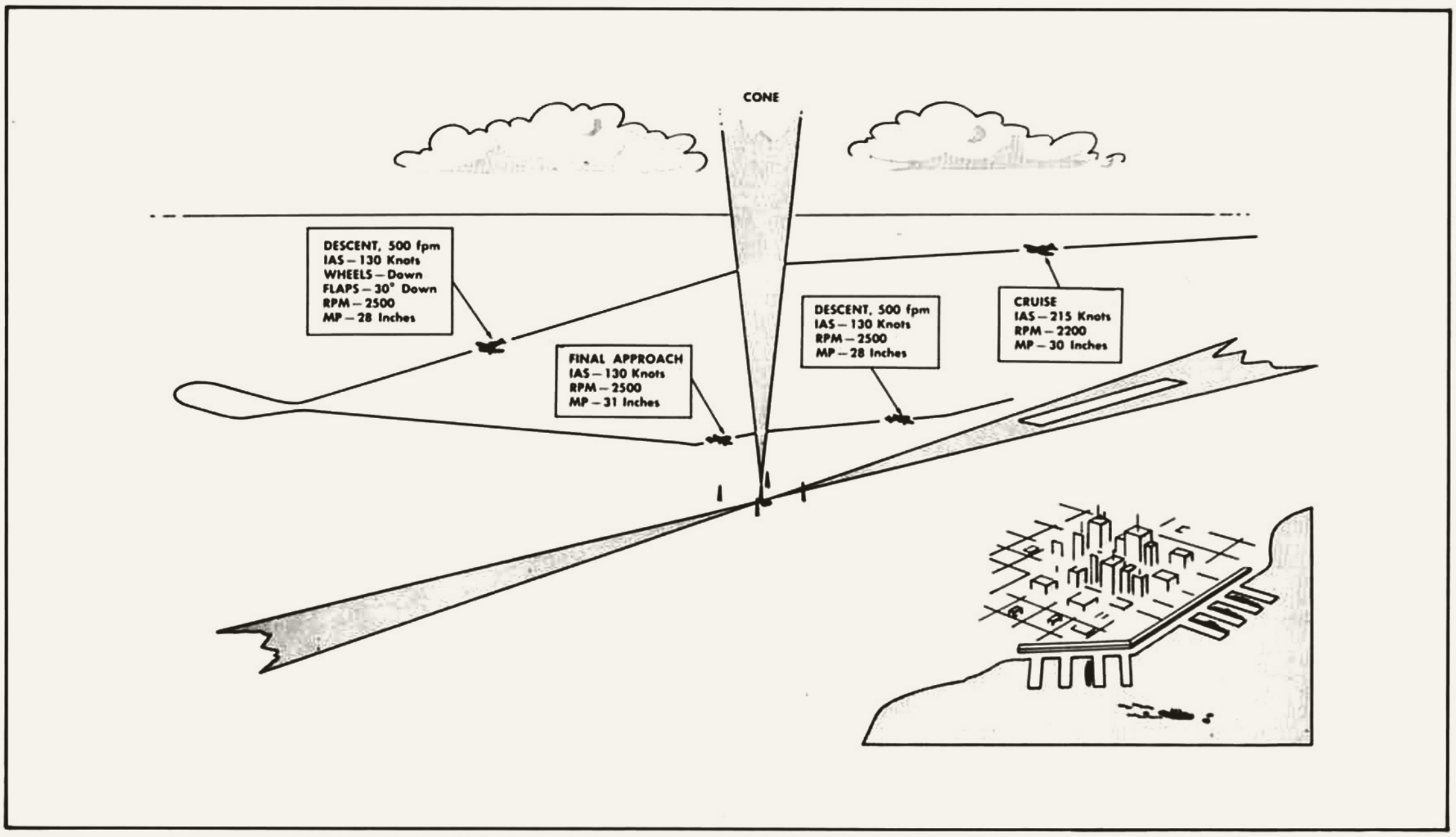


Figure 9–2. Suggested Instrument Approach Diagram

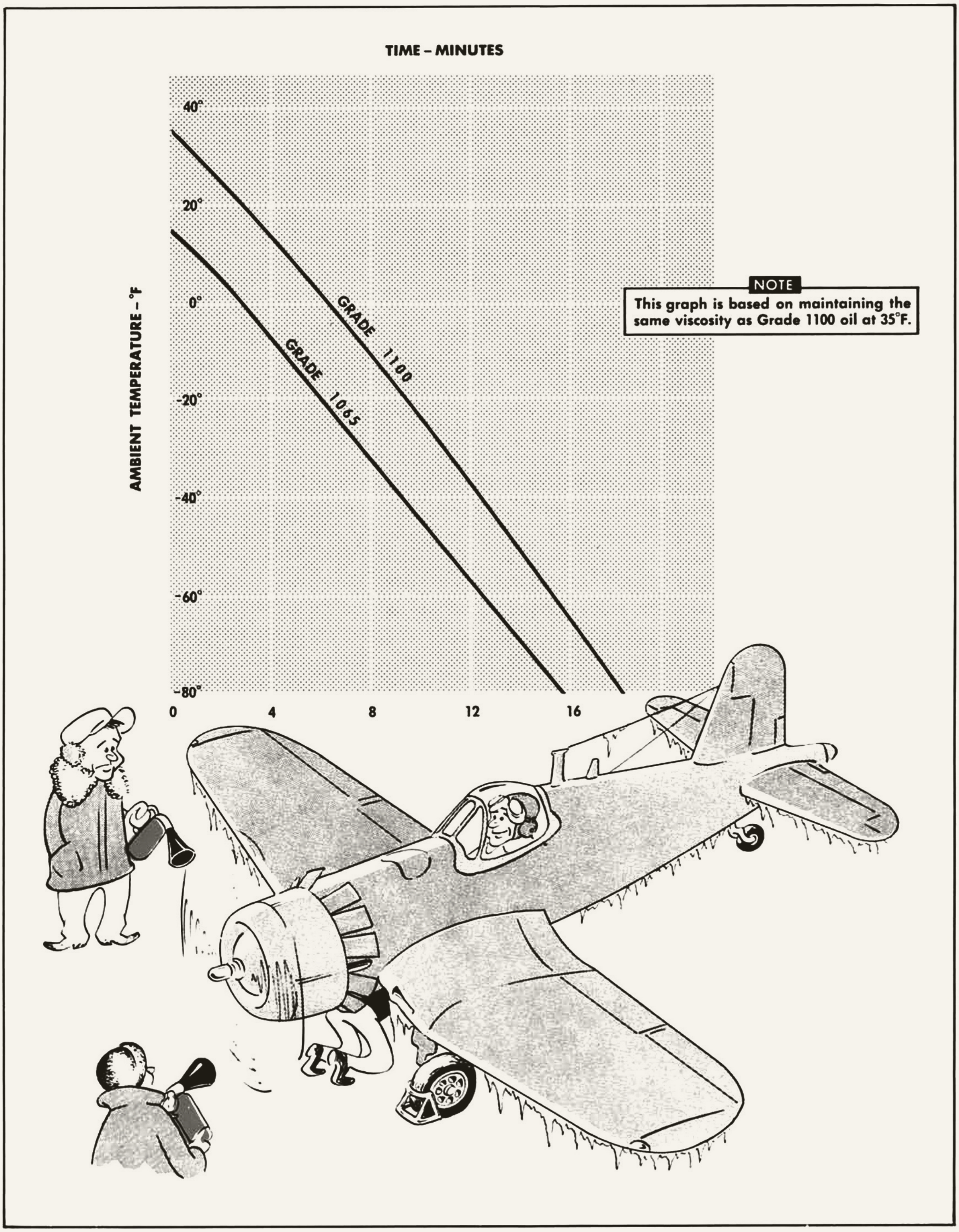
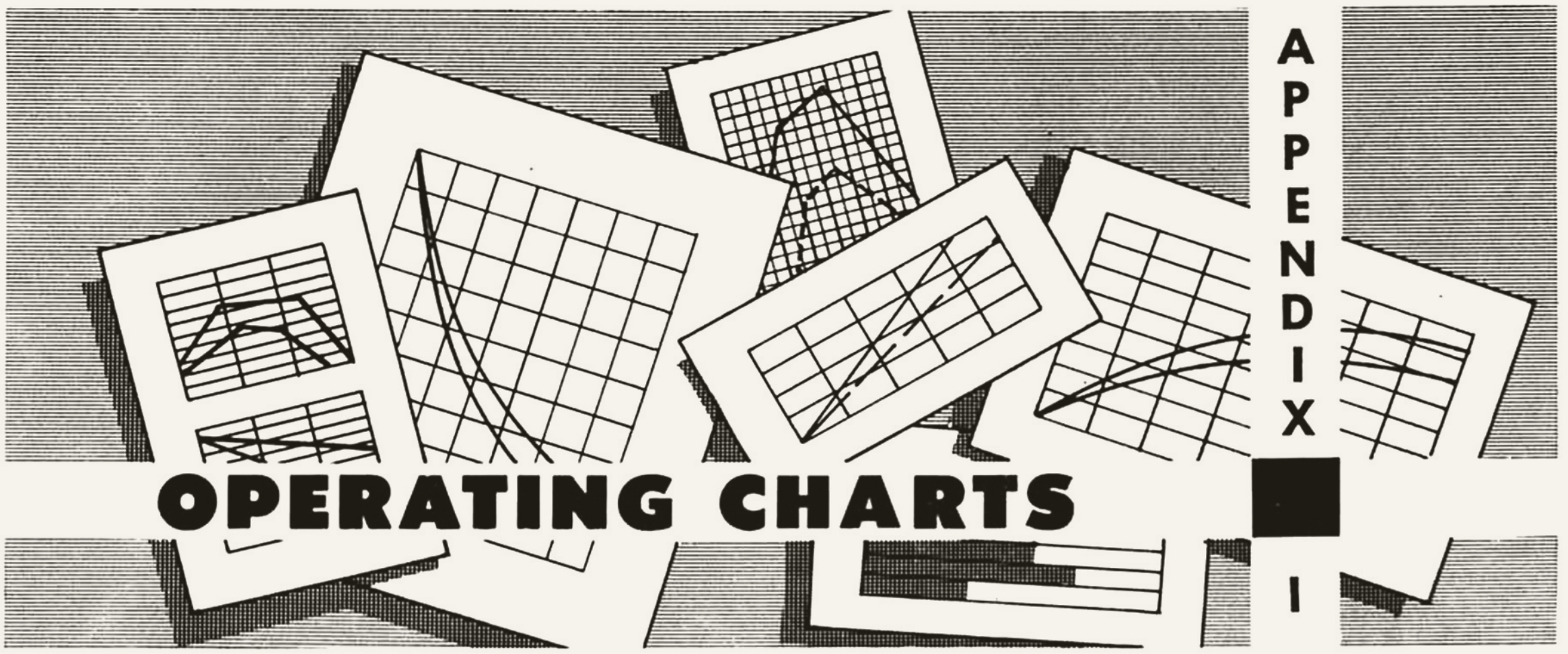


Figure 9–3. Oil Dilution Time Chart

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APPENDIX I

OPERATING CHARTS

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INTRODUCTION.

GENERAL. Appendix I contains the data from which the performance of the airplane can be predicted. This information is needed both for the planning of flights and for an understanding of the factors affecting the airplane's performance. A sample problem which has been devised to illustrate the use of the charts is located following the explanations of the charts. Notations on the charts are keyed to the discussions in the text to show the sequence of operations used. Where applicable, figures from the problem are used in the discussions of the charts. Table III, Abbreviations and Symbols, and table IV, External Stores Weights, are given to aid in the use of the charts.

POWER AND FUEL CONSIDERATIONS. A number of variable factors affect the power output and fuel consumption of the engine as follows:

a. Ram effect increases with forward velocity and increases the altitude at which full throttle operation for a specific rpm is necessary.

b. In general, for operation at a selected power, a higher rpm will produce higher fuel consumption due primarily to increased friction losses. Reducing the rpm will decrease the friction loss and increase the brake mean effective pressure (bmep) which will lead to exceeding the bmep limits of the engine if too low an rpm is used. The optimum operating schedule for any flight condition may be chosen by referring to figure A–17.

c. More engine power is required to drive the supercharger in high ratio than in low ratio. Therefore, in general, a higher power setting of both manifold pressure and rpm will be necessary to maintain the same speed in high ratio as in low ratio.

d. The position of the MIXTURE control affects fuel consumption and engine cooling. Minimum fuel will be used by the engine when the MIXTURE control is in the "AUTO-LEAN" position. With the mixture control in "AUTO-LEAN," the engine operating temperature normally will be higher than when in "AUTO-RICH."

CAUTION

Do not exceed normal rated power engine speed (2,600 rpm) with the MIXTURE control in the "AUTO-LEAN" position.

ALTERNATE FUEL. The use of grade 100/130 fuel imposes a manifold pressure limit of 54.5 inches in neutral blower operation only. In those charts where curves are not based on military power, the substitution of grade 100/130 fuel for grade 115/145 fuel will have no effect on performance data.

CHARTS.

AIRSPEED POSITION ERROR CORRECTION. *(See figure A–1.)* To obtain calibrated airspeed, use the Airspeed Position Error Correction Chart which gives the correction that is to be added to the indicated airspeed for various attitudes of the airplane. For example, the sample problem calls for a return cruising calibrated airspeed of 225 knots at a weight of 13,375 pounds. To find the indicated airspeed that gives the required calibrated airspeed, follow the weight lines to a point where a projection to the left (A to B) and a projection down (A to C) give a total of 225 knots. This point A gives an indicated airspeed of approximately 224 knots.

AIRSPEED COMPRESSIBILITY CORRECTION. *(See figure A–2.)* To obtain equivalent airspeed from calibrated airspeed, use the Compressibility Correction Chart which gives the necessary corrections for pressure altitude and temperature. For example, the sample problem calls for the return from the target at a 225-knot calibrated airspeed at an altitude of 15,000 feet. To find the equivalent airspeed, enter the chart at 225 knots on the calibrated airspeed scale and project vertically to 15,000 feet (A to B), then horizontally to the correction scale (B to C). Subtract the correction of 2.3 knots from the calibrated airspeed to obtain an equivalent airspeed of 222.7 knots.

Table III. Abbreviations and Symbols

BMEP	Brake mean effective pressure
CAS	Calibrated airspeed
CAT	Carburetor air temperature
EAS	Equivalent airspeed
F.T.	Full throttle
GPH	Gallons per hour
IAS	Indicated airspeed (instrument reading corrected for instrument error)
IN.	Inches of Hg (manifold pressure)
M	Mach number
MP	Manifold pressure
RPM	Revolutions per minute
SL	Sea level
STD	Standard
TEMP	Temperature
A - - - - B	Sample problem data
ΔEAS	Correction for equivalent airspeed (drag conversion)
ΔW	Change in weight
$1/\sqrt{\sigma}$	Reciprocal of the square root of the density ratio

DENSITY ALTITUDE. *(See figure A–3.)* To convert equivalent airspeed to true airspeed, use the Density Altitude Chart which gives the necessary correction for temperature and pressure altitude. The correction is a factor ($1/\sqrt{\sigma}$) by which the equivalent airspeed is multiplied to get true airspeed. For example, using the data given in the problem, assume a normal temperature of –15°C at a pressure altitude of 15,000 feet. Enter the chart at –15 on the temperature scale and project vertically to 15,000 feet (A to B) then horizontally to the right (B to C) to the ($1/\sqrt{\sigma}$) scale, which gives a correction factor of 1.26. Projection horizontally to the left (B to D) gives the density altitude. Multiply the equivalent airspeed of 222.7 knots by 1.26, giving a true airspeed of 281 knots for the return from the target.

STANDARD ALTITUDE TABLE. *(See figure A–4.)* The Standard Altitude Table gives various physical properties of the standard atmosphere. For example, the standard temperature at 1,000 feet is 13.019°C.

ENGINE OPERATING LIMITS. *(See figures A–5, A–6, and A–7.)* The Engine Operating Limits charts present (1) the power provided by the engine for any possible combination of control settings, and (2) the approved engine control setting limits. The curves are based on no ram and operation under NACA standard day conditions. Corrections as stated below must be made for other atmospheric conditions.

The horizontal lines of constant rpm and BHP indicate maximum allowed BHP permitted for the corresponding rpm. Interpolation between these lines is permitted. Manifold pressure values shown are limiting values for sea level and critical (full throttle) altitudes respectively. These manifold pressure values corresponding to the applicable rpm's may not be exceeded except as described below for carburetor air temperature (CAT) deviations. Interpolation between these limiting values is permitted to accompany the interpolation between rpm lines. The limit manifold pressure values for altitudes between sea level and critical altitudes will constantly decrease as altitude increases. Specific values may be determined as in the following example: If 34 inches manifold pressure and 2,200 rpm are chosen, extend the 2,200 rpm full throttle line until it intersects the 34 inches manifold pressure line extended. Through this intersection, which occurs at 1,260 BHP and 9,500 ft. altitude, draw a slope line parallel to the constant manifold pressure-rpm line. This slope line will then represent constant 34 inches manifold pressure and 2,200 rpm operation, intersecting the sea-level line at 1,080 BHP. The slope line also intersects the 1,170 BHP and 2,200 rpm limit line at 4,300 feet and thus defines the manifold pressure limit of 34 inches at 4,300 feet, and 4,300 feet as the highest altitude at which 2,200 rpm and 34 inches manifold pressure may safely be used. Interpolation between these limiting manifold pressure values may also be made along the constant BHP and rpm lines.

The effect of ram is to increase the altitude at which full throttle occurs at a particular rpm setting. The manifold pressure limit for these higher critical altitudes may be obtained by the method described above. For example, if ram permits 1,170 BHP to be obtained with 2,200 rpm at 14,000 feet altitude under standard CAT conditions, the manifold pressure limit of 31.5 inches is determined by passing a slope line parallel to the constant manifold pressure-rpm line through the 14,000 feet altitude and 1,170 BHP point and reading the manifold pressure (31.5 inches) at the intersection of the slope line and the no ram full throttle 2,200 rpm line.

In the power range below 2,500 rpm, manifold pressure limits are reduced ¼ inch for each 6°C decrease in CAT below standard temperature, and are increased ¼ inch for each 6°C increase in CAT above standard temperature up to 38°C in "LOW" and "HIGH" supercharger ratios. At this point, manifold pressure limits are decreased one inch for each 6°C increase in CAT above this temperature limit. At 2,500 rpm and above, manifold pressure limits are reduced ¼ inch for each 6°C decrease in CAT below standard temperature. In this power range, manifold pressure limits are not increased to compensate for power losses due to above-standard temperatures, and are reduced 1 inch for each 6°C increase in CAT above 38°C.

Standard temperature (15°C at sea level) decreases 2°C per 1,000 feet altitude. Standard temperature at 5,000 feet is 5°C.

TAKE-OFF. *(See figure A–8.)* The Take-off Chart gives the ground roll distance for take-off, incorporating the factors of temperature, altitude, gross weight, deviation from standard temperature, humidity, and headwind. A specific humidity nomograph and specific humidity correction for altitude are given in a separate part of the chart. Factors are also given at the bottom of the chart for obtaining the distance needed to clear a 50-foot obstacle. For example, use the sample problem and assume an air temperature of 20°C (A), an altitude at the field of 1,000 feet (A to B), and gross weight of 17,600 pounds (B to C). Deviation from standard air temperature is obtained by subtracting the standard temperature, which is given at the intersection of the standard temperature line and the given altitude line, from the observed air temperature (20°C −13°C = 7°C, D to E). Note that in going from gross weight to deviation from standard temperature, the projection goes to the 0°C line (C to D) and then to the deviation (D to E). (If the deviation were negative, the projection from point D would be upward and to the left.) From the temperature deviation, the projection drops to the specific humidity curves (E to F), then along the curves to the specific humidity value of 0.01 (F to G). The projection then drops to the headwind curves (G to H), along the curve to the assumed headwind value of 15 knots (H to I), and down to the ground roll distance of 1,700 feet (I to J). By interpolation, take-off equivalent airspeed is found to be 90 knots. To clear a 50-foot obstacle at 17,600 pounds, multiply the ground roll distance by the factor given at the bottom of the chart (200% x 1,700 ft = 3,400 ft). For an example of use of the nomograph, assume a dry bulb temperature of 30°C and a wet bulb temperature of 20°C. Project a straight line through the two temperatures to the specific humidity scale (A to B to C), which gives a value of 0.011. For an example of the method of obtaining the specific humidity at a take-off altitude higher than sea level, enter the specific humidity chart at an assumed sea-level humidity of 0.010 and project horizontally to an assumed altitude of 10,000 feet (A to B). From the altitude line, project vertically downward to the specific humidity at altitude scale (B to C), which gives a value of 0.0145.

CLIMB CURVES. *(See figures A–9 through A–12.)* The four Climb Curves give either distance and fuel or time and fuel needed for climbing with normal rated power and military rated power. For example, using the values from the sample problem, enter the normal rated power charts at 17,320 pounds and project upward along curves to 10,000 feet (A to B), then project horizontally to the distance or time scale (B to C), which, with normal rated power, gives 24 miles or 9½ minutes to climb to 10,000 feet. A vertical projection dropped to the weight scale (B to D) gives the weight reduction due to fuel being used in the climb. Since the problem starts the climb at 1,000 feet, subtract the time and distance to climb 1,000 feet from the above values, giving approximately 8½ minutes and 22 miles.

CLIMB CHARTS. *(See figures A–13 and A–14.)* The two climb charts are summaries of climbing performance for various configurations and altitudes. As an example, using the climb chart for military rated power, an airplane carrying three 1,000-pound bombs will climb to 10,000 feet in 5 minutes, travel 14 miles, and have a rate of climb at 10,000 feet of 1,550 feet per minute. The best calibrated airspeed for climbing at 10,000 feet is 145 knots and the required manifold pressure is 54.5 inches. The fuel used in climbing to 10,000 feet is 58 gallons.

EMERGENCY CLIMB. *(See figure A–15.)* The Emergency Climb Chart shows rate of climb immediately after take-off, using take-off power. Three configurations and three weights are considered. Curves terminate at the approximate stalling speed for the configuration. The effect of external stores is included where applicable. For example, using a weight of 17,600 pounds and assuming flaps and gear up, find the best climbing speed and rate of climb by interpolating between the values taken from the chart. Maximum rate of climb at 16,300 pounds is 2,350 feet per minute and at 19,300 pounds is 1,500 feet per minute. By interpolation, for 17,600 pounds, the expected rate of climb is 1,982 feet per minute. The best speed at 16,300 pounds is 125 knots, and at 19,300 pounds is 140 knots.

By interpolation, the best speed at 17,600 pounds is 132 knots.

EMERGENCY CEILING. *(See figure A–16.)* The Emergency Ceiling Chart shows the service ceiling at various weights for normal and military rated powers. Assuming a gross weight of 16,500 pounds, enter the chart from the weight scale and project vertically to the normal or military curves (A to B) then horizontally to the altitude scale (B to C) which reads 33,300 feet for military power.

NAUTICAL MILES PER GALLON OF FUEL. *(See figure A–17.)* The Nautical Miles per Gallon of Fuel Charts give the nautical miles obtained per gallon of fuel for various altitudes, airspeeds, weights and power settings, or the power settings necessary to make good a desired airspeed for a given weight. There are eight charts which separate the data by altitude. The gross weights include the effect of drag of typical external stores carried, making it necessary to consult the Drag Conversion Table (figure A–25) for the weights to be used. Using data from the sample to find the maximum range conditions at 10,000 feet, enter the chart at the adjusted weight of 17,572 pounds and move along the weight curves to the maximum range curve. Projecting vertically downward gives the true airspeed (A to B) and the calibrated (A to C). By interpolating between the given power setting lines, the power settings that will give the maximum range are found to be 32.5 inches and 2,170 rpm. By projecting from point A to the specific range scale, the specific range is found to be 1.97 nautical miles per gallon.

When the calibrated airspeed is not near the maximum range or maximum endurance lines, as during the return from the target in the sample problem, use the normal gross weight (13,350 pounds) of the airplane with the adjusted calibrated airspeed to find the required power settings. Using data from the sample problem, it is desired to make good 225 knots at 15,000 feet with one centerline pylon and ten rocket launchers. The Δ EAS adjustment from the Drag Conversion Chart is 10 knots, giving an adjusted calibrated airspeed of 235 knots which is used to enter the 15,000-foot altitude Nautical Miles per Gallon of Fuel chart at point A. Projecting vertically upward to 13,350 pounds (A to B) gives a power setting of approximately 2,500 rpm and 32 inches. Projecting downward along the power setting line to its intersection with the indicated airspeed (225 knots) at point C, then projecting horizontally to the specific range scale (C to D) gives 2.12 nautical miles per gallon of fuel.

In a case where a specified power setting is used which intersects the weight line away from the maximum range or endurance lines, Δ EAS adjustment is used with the normal gross weight of 13,350 pounds. To find the resulting airspeed, enter the chart along the power setting line and move to the normal weight curve position. A vertical projection downward to the calibrated airspeed scale gives the unadjusted airspeed. To obtain the actual calibrated airspeed, subtract Δ EAS from the unadjusted calibrated airspeed. To determine the specific range, project vertically upward to the intersection of the actual calibrated airspeed with the power setting line, then horizontally to the specific range scale.

For nonstandard temperatures at power settings below 2,400 rpm, increase manifold pressure ¼ inch for each 6°C increase in carburetor air temperature up to 38°C, then decrease manifold pressure 1 inch for each 6°C above 38°C. Decrease manifold pressure ¼ inch for each 6°C carburetor air temperature below standard throughout the entire power range. Use specific range charts corresponding to density altitude.

The effects of wind on speed and range for maximum range are considered as follows: In selecting maximum range speed for wind conditions, increase or decrease true airspeed for maximum range by ¼ of head or tail wind. To determine the effect of wind on specific range for any predetermined power setting, subtract or add head or tail winds respectively to true airspeed along power setting (fuel flow line) and read correct nautical miles per gallon and ground speed.

MAXIMUM RANGE. *(See figure A–18.)* The Maximum Range Chart gives miles per gallon, gallons per hour, power settings, and calibrated airspeed for obtaining maximum range. Using data from the sample problem, the maximum range settings may be found for a gross weight of 17,572 pounds and an altitude of 10,000 feet by entering the chart at the gross weight and projecting a vertical line upward (A to J). At the intersection of the 10,000-foot curves and the projected line (B, D, F, H, J), project lines horizontally to obtain the necessary information.

MAXIMUM ENDURANCE. *(See figure A–19.)* The Maximum Endurance Chart gives miles per gallon, gallons per hour, power settings, and calibrated airspeed for obtaining maximum endurance. The gross weights include the effect of drag of typical external stores carried, making it necessary to consult the Drag Conversion Table (figure A–25) for the weights to be used. To use the chart, project a vertical line up from the gross weight and, at the point of intersection with the desired altitude curves, project horizontal lines to obtain the necessary information.

LONG RANGE PREDICTION. *(See figures A–20 and A–21.)* The two Long Range Prediction Charts give the range and time for maximum range flight with a given amount of fuel. These charts are based on the maximum range calibrated airspeeds from the Nautical Miles per Gallon Charts (figure A–17). For example, assume a starting gross weight of 15,000 pounds and 133 1/3 gallons of fuel available. The weight change is 6 x 133 1/3, or 800 pounds, which is subtracted from the starting gross weight. Assuming a cruising altitude of 15,000 feet, project lines upward from 15,000 and 14,200 pounds to intersect the altitude curve for 15,000

feet, then project horizontally to the miles scale (A to B to C, and D to E to F). The difference in value between F and C gives the range (375 miles) or time (1 hour 54 minutes).

COMBAT ALLOWANCE. *(See figure A–22.)* The Combat Allowance Charts are summaries of the military and combat power conditions. An example of use of the charts is as follows: At 5,000 feet the military power conditions are 2,800 rpm, full throttle, neutral blower, and "AUTO-RICH." A time limit of 15 minutes and cylinder head temperature limits of 243°C must be observed. The last column shows a fuel consumption of 284 gallons per hour.

LANDING GROUND ROLL. *(See figure A–23.)* The Landing Ground Roll Chart gives the ground distance used in landing roll-out for various gross weights, altitudes, temperatures, and headwinds. For example, using data from the sample problem, the landing weight is 12,895 pounds; wind, 15 knots; temperature, 7°C above standard (refer to discussion of Take-Off Charts); and altitude of field, 1,000 feet. Enter the chart at an altitude of 1,000 feet and project horizontally to gross weight (A to B); drop a projection to the headwind curves (B to C), and move along the headwind curves to the wind velocity (C to D) and down to the ground roll scale (D to E). To obtain the distance necessary to clear a 50-foot object, the ground roll of 1,175 feet must be multiplied by 150 percent, which will give 1,763 feet. The effect of the temperature increases the distance by 7/20 of 10 per cent, which is 41 feet added to 1,175 feet, or 62 feet added to 1,763 feet.

STOPPING DISTANCE. *(See figure A–24.)* The Stopping Distance Chart gives the distance needed to stop for various indicated airspeeds and the minimum and maximum take-off weights. Distances for other weights may be obtained by straight-line interpolation or extrapolation. Assuming a landing weight of 12,200 pounds and a touch-down indicated airspeed of 85 knots (no wind), find the stopping distance by extrapolating from the values obtained from the charts. Projecting from the IAS scale to the curves (A to B) and down to the distance scale (B to C) gives stopping distances of 1,550 feet for 13,300 pounds and 2,200 feet for 19,300 pounds. Dividing the difference in distance by the difference in weight gives an effect of weight on landing distance of 0.108 feet per pound. When this effect is multiplied by the difference in actual landing weight (12,200 pounds) and the smaller landing weight (13,300 pounds), a distance of 119 feet is obtained, which is subtracted from smaller landing weight distance, giving a stopping distance of 1,431 feet.

DRAG CONVERSION. *(See figure A–25.)* The Drag Conversion Table presents the weight and airspeed adjustment factors required to use the climb and cruise charts for any combination of external stores. The weight adjustment factors are added to the normal gross weight of the airplane (13,350 pounds assumed for the purpose of the problem), which carries no external stores, pylons, or launchers. (Actual airplane weight is used for charts other than climb and cruise charts.) The Δ EAS adjustment factor is used when the calibrated airspeed is not near the maximum range or maximum endurance lines on the Nautical Miles per Gallon of Fuel Charts (figure A–17). For example, using data from the sample problem, it is necessary to obtain the weight adjustment factor from the drag conversion data in order to use the Climb Curves (figures A–9 through A–12). Add to the weight of the normal attack airplane (minus weight of fuel used for take-off) the weight adjustment factors given in the climb column for six 500-pound bombs (3,000 pounds) and one 150-gallon drop tank (1,150 pounds), which gives a total of 17,320 pounds. To obtain weight for entering the Nautical Miles per Gallon of Fuel Charts near maximum range or endurance settings, add to the normal gross weight of 13,350 pounds the weight adjustment factors in the long-range cruise column for six 500-pound bombs (3,700 pounds) and one 150-gallon drop tank (900 pounds), giving 17,950 pounds.

To use the Nautical Miles per Gallon of Fuel Charts when the desired airspeed is not near the maximum range or maximum endurance settings, add to the desired calibrated airspeed the Δ EAS values to obtain the calibrated airspeed that must be used to enter the chart to obtain the power settings. From the sample problem, the desired calibrated airspeed is 225 knots. Because this airspeed is not near the maximum range or endurance lines, a correction must be applied. Assuming that ten rocket launchers and one centerline pylon are carried, the calibrated airspeed is 225 knots plus 5 knots for the pylon and 5 knots for the launchers, giving 235 knots. This is the calibrated airspeed value used to enter the Nautical Miles per Gallon of Fuel Chart to find the power settings required to make good 225 knots. On this chart, the power settings are found at the intersection of 235 knots and 13,350 pounds. To find the specific range, project downward along the power setting line to its intersection with the indicated airspeed, then project horizontally to the specific range scale.

SAMPLE PROBLEM.

GENERAL. This sample problem is presented only as an aid in explaining the use of the charts. The problem does not consider possible distance gained during let-downs, nor the effect of wind except in taking off and landing. The problem is to fly to a target 200 miles away, drop bombs, and return. The altitude going out is 10,000 feet, and back is 15,000 feet. Stores carried are one 150-gallon tank on the centerline pylon and six 500-pound bombs on the outer panel launchers. A reserve fuel allowance of 20 percent is held for possible combat or emergency use, giving a total of 384 gallons minus 77 gallons (reserve) or 307 gallons net. Fuel is grade 115/145.

TAKE-OFF.

Fuel available (less reserve)	307 gal
Take-off weight (no adjustment)	17,600 lb
Altitude of field	1,000 ft
Air temperature	20°C
Specific humidity	0.01
Wind	15 knots
Distance (ground roll)	1,700 ft
Distance (to clear 50-ft obstacle)	3,400 ft
EAS at take-off	90 knots
Fuel used (warm up and take-off)	30 gal
Fuel remaining (less reserve)	277 gal

CLIMB — NORMAL RATED POWER.

Fuel available (less reserve)	277 gal
Climb weight (adjusted weight minus fuel used for take-off)	17,320 lb
Time to climb (10,000 ft minus 1,000 ft)	8½ min
Distance to climb (10,000 ft minus 1,000 ft)	22 miles
Fuel used for climb	33 gal
Fuel remaining (less reserve)	244 gal

CRUISE OUT — MAXIMUM RANGE.

Fuel available (minus reserve)	244 gal
Distance (200 mi minus 20 mi)	180 miles
Cruise weight (adjusted, minus fuel used previously)	17,572 lb
CAT	+13°C
CAT (standard)	–5°C
Δ CAT	18°C
Throttle:	
Standard condition	32.5 in.
due to CAT	+0.75 in.
Corrected	33.25 in.
RPM	2,170
Naut mi/gal	1.97
CAS	155 knots
TAS	178 knots
Fuel used for cruise	92 gal
Fuel remaining (less reserve)	152 gal

AT TARGET. Assume the bombs and fuel tank are dropped at 2,000 feet in one pass.

CLIMB — NORMAL RATED POWER.

Fuel available (less reserve)	152 gal
Weight (adjusted, minus fuel used from main tank)	13,720 lb
Time to climb (15,000 ft minus 2,000 ft)	7 min
Distance to climb (15,000 ft minus 2,000 ft)	19 miles
CAS	149 to 142.5 knots
Fuel used for climb	30 gal
Fuel remaining (less reserve)	122 gal

CRUISE BACK — FAST CRUISE*.

Fuel available (less reserve)	122 gal
Distance (200 mi minus 19 mi)	181 miles
Cruise weight (no adjustment)	13,375 lb
Weight for use with Δ EAS adjustment	13,350 lb
CAT	–21°C
CAT (standard)	–15°C
ΔCAT	–6°C
Throttle:	
Standard condition	32.0 in.
due to CAT	–0.25 in.
Corrected	31.75 in.
RPM	2,500
Naut mi/gal	2.12
CAS*	225 knots
TAS	281 knots
Fuel used for cruise	86 gal
Fuel remaining (less reserve)	36 gal

*Since there is sufficient fuel, a cruising speed faster than that for maximum cruise is chosen to show the use of Δ EAS correction with the Nautical Miles per Gallon of Fuel Chart.

LANDING.

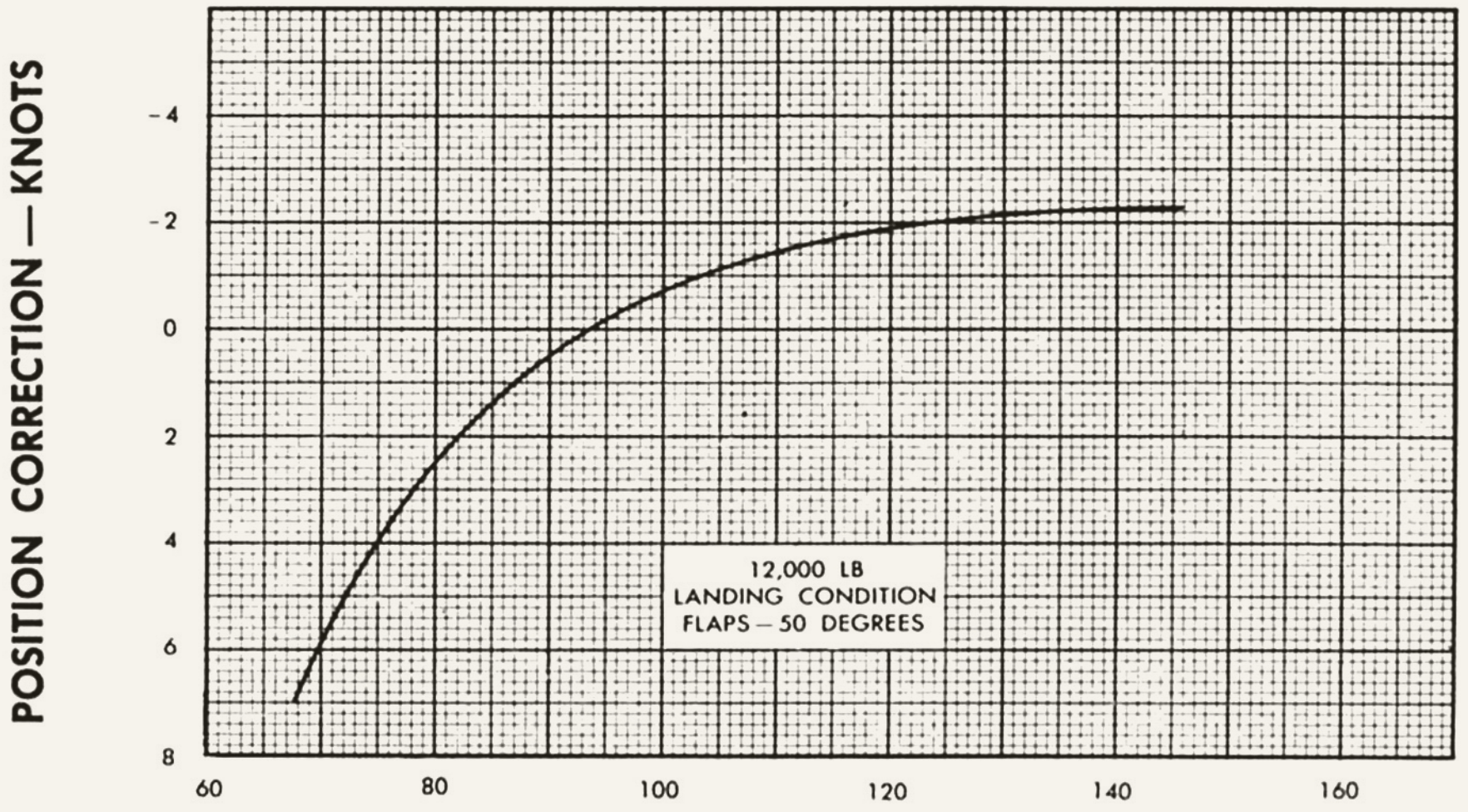
Fuel available (including reserve)	113 gal
Landing weight (no adjustment)	12,860 lb
Altitude of field	1,000 ft
Air temperature	20°C
Wind	15 knots
Distance (ground roll)	1,216 ft
Distance (to clear 50-ft obstacle)	1,825 ft

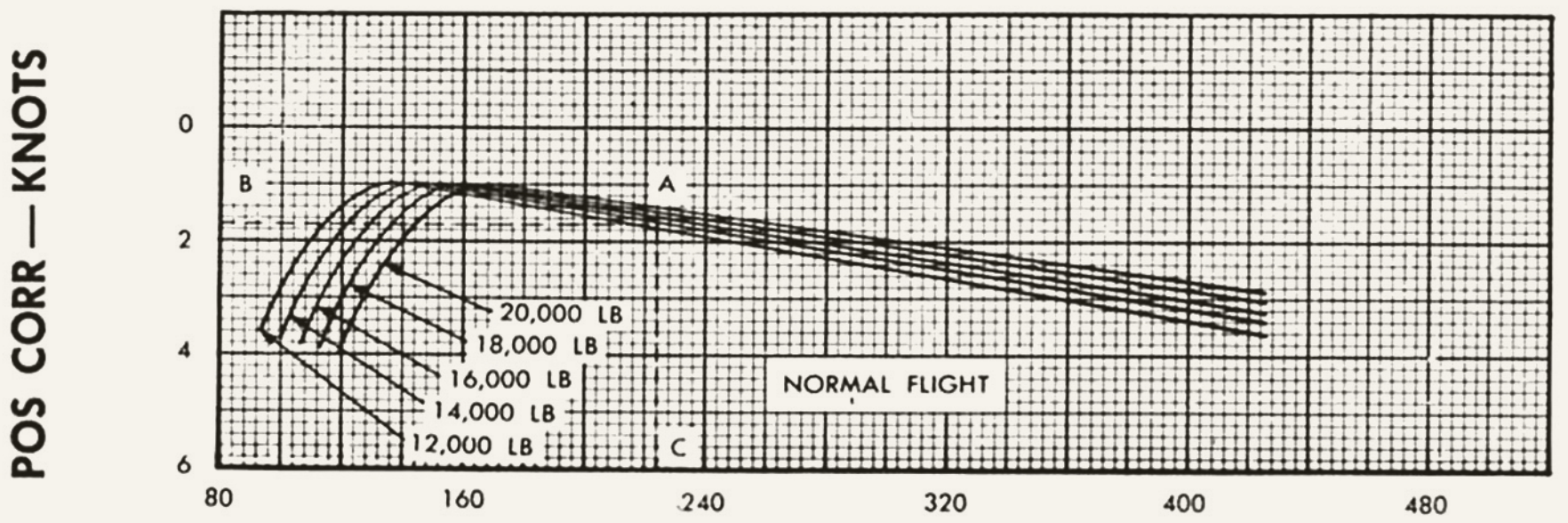
Table IV. External Stores Weights

Qty	*External Stores*	*Weight (Pounds)*
1	Center section pylon, bomb rack, and sway brace assembly	71.5
1	Centerline pylon, bomb rack, and sway brace assembly	89.5
10	Aero 14A launchers	145
10	3.5-inch rockets	550
10	5-inch rockets with 3¼-inch motors	995
10	5-inch rockets with 5-inch motors	1,545
1	11.75-inch rocket (Tiny Tim)	1,280
1	MK 12 auxiliary fuel tank (empty)	134

AIRSPEED POSITION ERROR CORRECTION

MODEL: F4U-7 ENGINE: R2800-18W



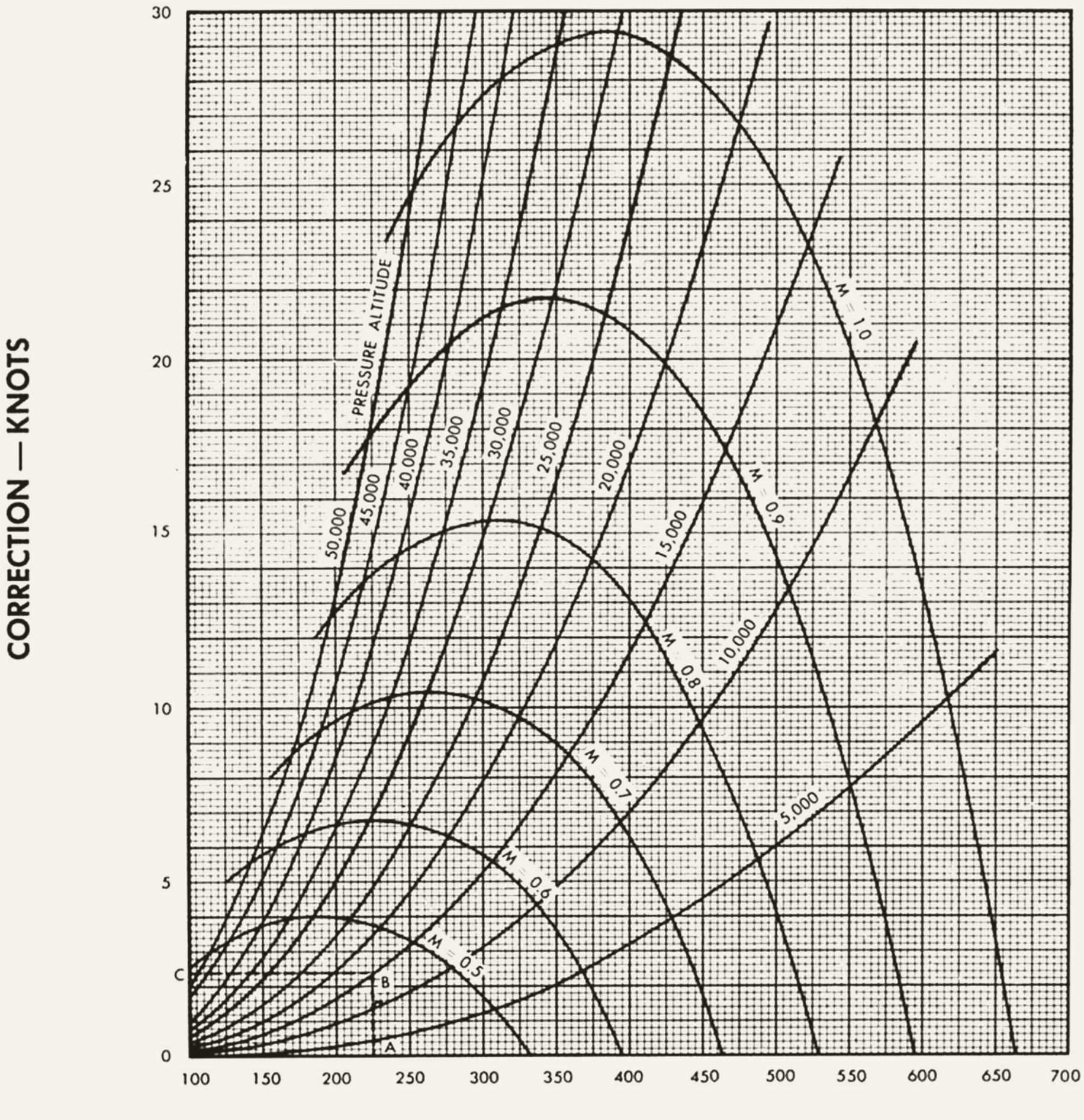


REMARKS: 1. Add correction to indicated airspeed (instrument reading corrected for instrument error) to obtain calibrated airspeed.

DATA BASED ON: Flight Test.
DATA AS OF: 1 AUGUST 1952

Figure A–1. Airspeed Position Error Correction

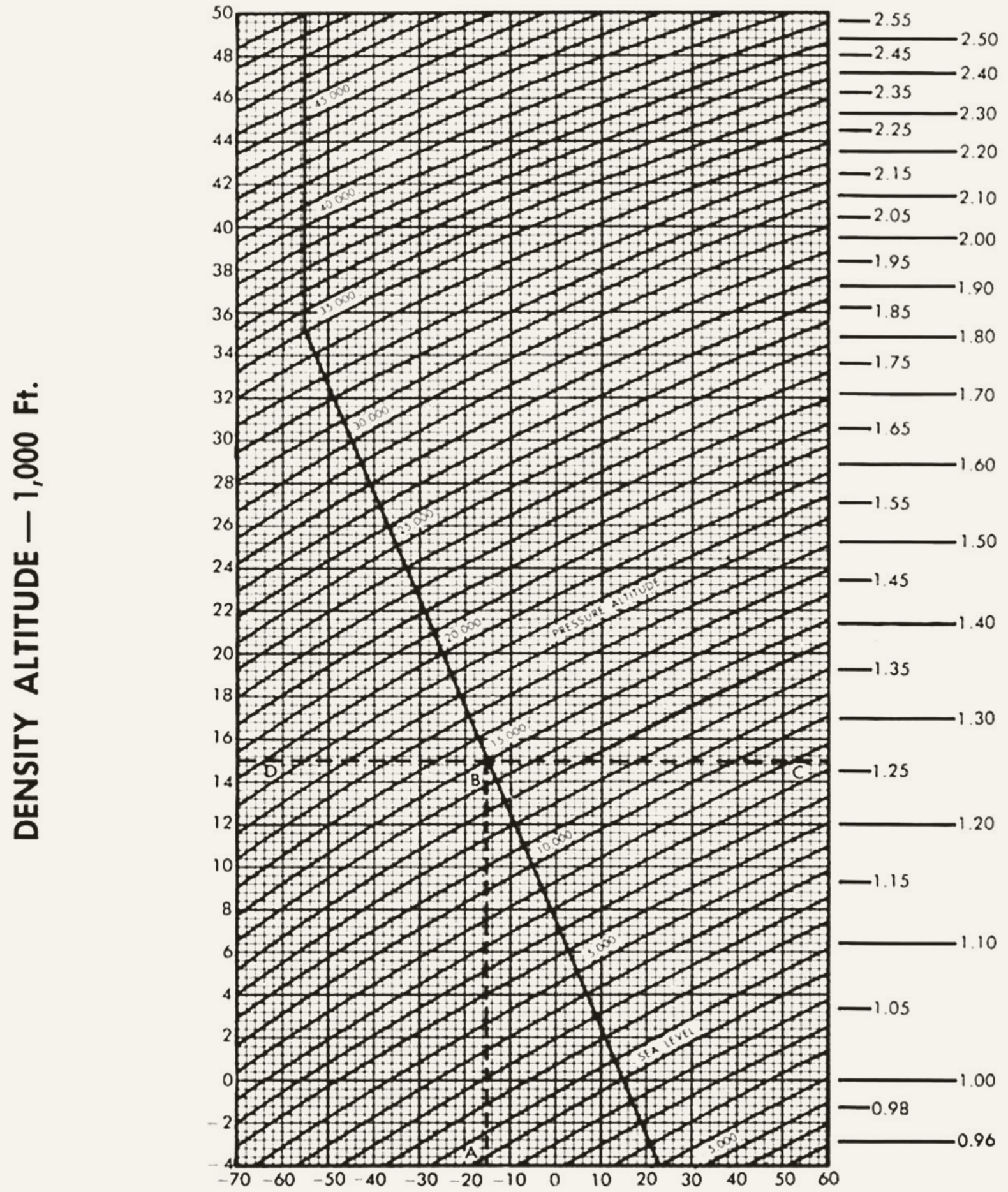
COMPRESSIBILITY CORRECTION TO CALIBRATED AIRSPEED



REMARKS: 1. EAS = CAS – Correction

Figure A–2. Airspeed Compressibility Correction

DENSITY ALTITUDE CHART



REMARKS: 1. TAS = $(1 / \sqrt{\sigma})$ (EAS)

Figure A–3. Density Altitude

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STANDARD ALTITUDE TABLE

STANDARD SEA LEVEL AIR:
T = 15° C
P = 29.921 in. of Hg
W = .07651 lb/cu ft

ρ_o = .002378 slugs/cu ft
1 in. of Hg = 70.732 lb/sq ft = 0.4912 lb/sq in.
a_o = 1116 ft/sec

ALTITUDE (FEET)	DENSITY RATIO ρ/ρ_o	$\frac{1}{\sqrt{\sigma}}$	TEMPERATURE DEG C	TEMPERATURE DEG F	SPEED OF SOUND RATIO a/a_o	PRESSURE IN. OF HG	PRESSURE RATIO P/Po
0	1.0000	1.0000	15.000	59.000	1.0000	29.92	1.0000
1000	.9710	1.0148	13.019	55.434	.997	28.86	.9644
2000	.9428	1.0299	11.038	51.868	.993	27.82	.9298
3000	.9151	1.0454	9.056	48.301	.990	26.81	.8962
4000	.8881	1.0611	7.075	44.735	.986	25.84	.8636
5000	.8616	1.0773	5.094	41.169	.983	24.89	.8320
6000	.8358	1.0938	3.113	37.603	.979	23.98	.8013
7000	.8106	1.1107	1.132	34.037	.976	23.09	.7716
8000	.7859	1.1280	−0.850	30.471	.972	22.22	.7427
9000	.7619	1.1456	−2.831	26.904	.968	21.38	.7147
10000	.7384	1.1637	−4.812	23.338	.965	20.58	.6876
11000	.7154	1.1822	−6.793	19.772	.962	19.79	.6614
12000	.6931	1.2012	−8.774	16.205	.958	19.03	.6359
13000	.6712	1.2206	−10.756	12.640	.954	18.29	.6112
14000	.6499	1.2404	−12.737	9.074	.950	17.57	.5873
15000	.6291	1.2608	−14.718	5.507	.947	16.88	.5642
16000	.6088	1.2816	−16.699	1.941	.943	16.21	.5418
17000	.5891	1.3029	−18.680	−1.625	.940	15.56	.5202
18000	.5698	1.3247	−20.662	−5.191	.936	14.94	.4992
19000	.5509	1.3473	−22.643	−8.757	.932	14.33	.4790
20000	.5327	1.3701	−24.624	−12.323	.929	13.75	.4594
21000	.5148	1.3937	−26.605	−15.890	.925	13.18	.4405
22000	.4974	1.4179	−28.586	−19.456	.922	12.63	.4222
23000	.4805	1.4426	−30.568	−23.022	.917	12.10	.4045
24000	.4640	1.4681	−32.549	−26.588	.914	11.59	.3874
25000	.4480	1.4940	−34.530	−30.154	.910	11.10	.3709
26000	.4323	1.5209	−36.511	−33.720	.906	10.62	.3550
27000	.4171	1.5484	−38.493	−37.287	.903	10.16	.3397
28000	.4023	1.5768	−40.474	−40.853	.899	9.720	.3248
29000	.3879	1.6056	−42.455	−44.419	.895	9.293	.3106
30000	.3740	1.6352	−44.436	−47.985	.891	8.880	.2968
31000	.3603	1.6659	−46.417	−51.551	.887	8.483	.2834
32000	.3472	1.6971	−48.399	−55.117	.883	8.101	.2707
33000	.3343	1.7295	−50.379	−58.684	.879	7.732	.2583
34000	.3218	1.7628	−52.361	−62.250	.875	7.377	.2465
35000	.3098	1.7966	−54.342	−65.816	.871	7.036	.2352
36000	.2962	1.8374	−55.000	−67.000	.870	6.708	.2242
37000	.2824	1.8818	−55.000	−67.000	.870	6.395	.2137
38000	.2692	1.9273	−55.000	−67.000	.870	6.096	.2037
39000	.2566	1.9738	−55.000	−67.000	.870	5.812	.1943
40000	.2447	2.0215	−55.000	−67.000	.870	5.541	.1852
41000	.2332	2.0707	−55.000	−67.000	.870	5.283	.1765
42000	.2224	2.1207	−55.000	−67.000	.870	5.036	.1683
43000	.2120	2.1719	−55.000	−67.000	.870	4.802	.1605
44000	.2021	2.2244	−55.000	−67.000	.870	4.578	.1530
45000	.1926	2.2785	−55.000	−67.000	.870	4.364	.1458
46000	.1837	2.3332	−55.000	−67.000	.870	4.160	.1391
47000	.1751	2.3893	−55.000	−67.000	.870	3.966	.1325
48000	.1669	2.4478	−55.000	−67.000	.870	3.781	.1264
49000	.1591	2.5071	−55.000	−67.000	.870	3.604	.1205
50000	.1517	2.5675	−55.000	−67.000	.870	3.436	.1149

REMARKS:

1. This table is based on NACA Technical Report No. 218

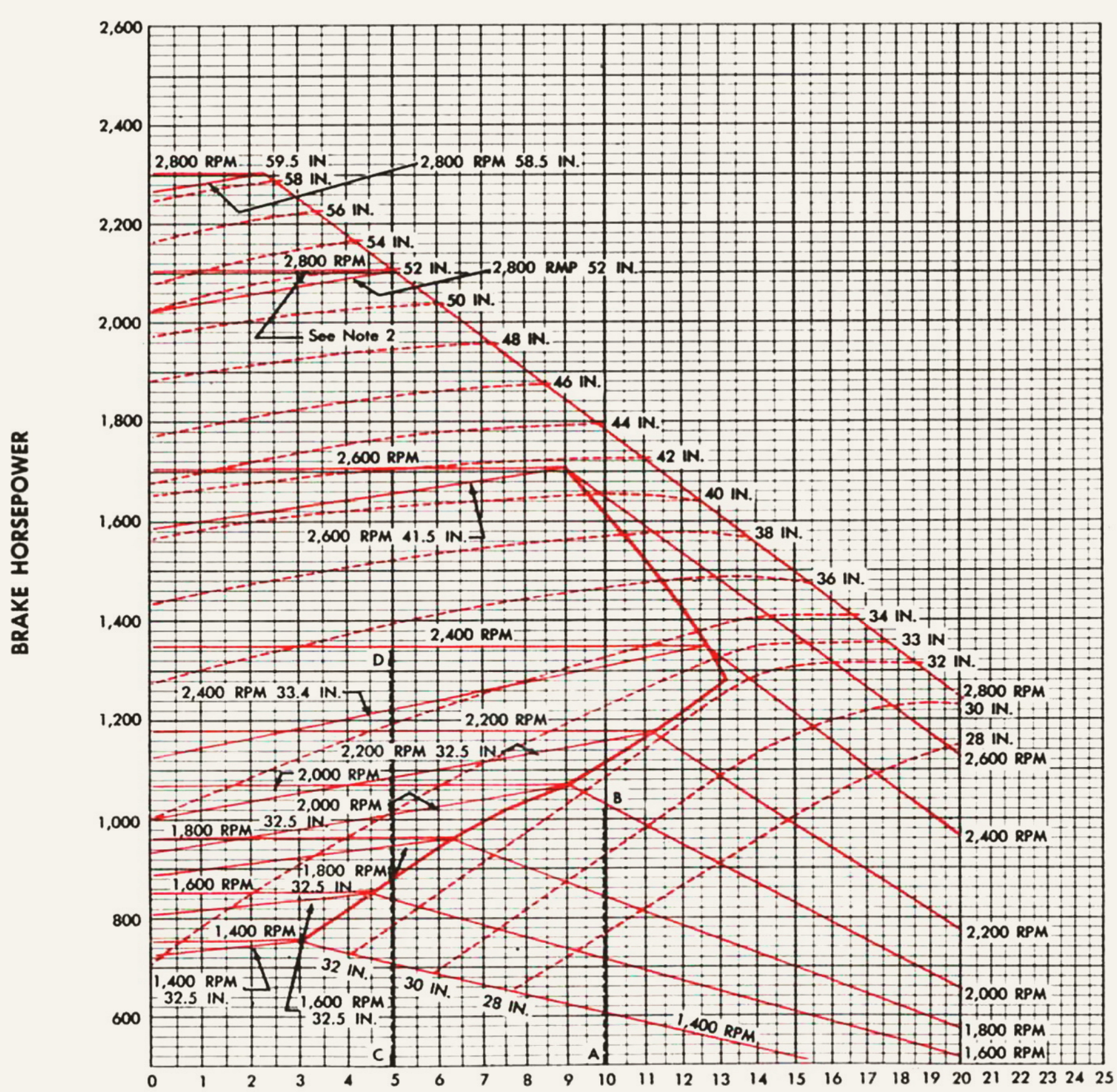
Figure A–4. Standard Altitude Table

ENGINE OPERATING LIMITS

NEUTRAL BLOWER – NO RAM

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS:

1. Use "AUTO-RICH" for all operations above 2,600 rpm. Cylinder head temperature limits must be observed and "AUTO-RICH" used when cooling is inadequate in "AUTO-LEAN."
2. When grade 100/130 fuel is used, the brake horsepower obtainable under military rated power (2,800 rpm) is limited to 2,100 horsepower.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145 – SEE NOTE 2.
FUEL DENSITY: 6 LB/GAL

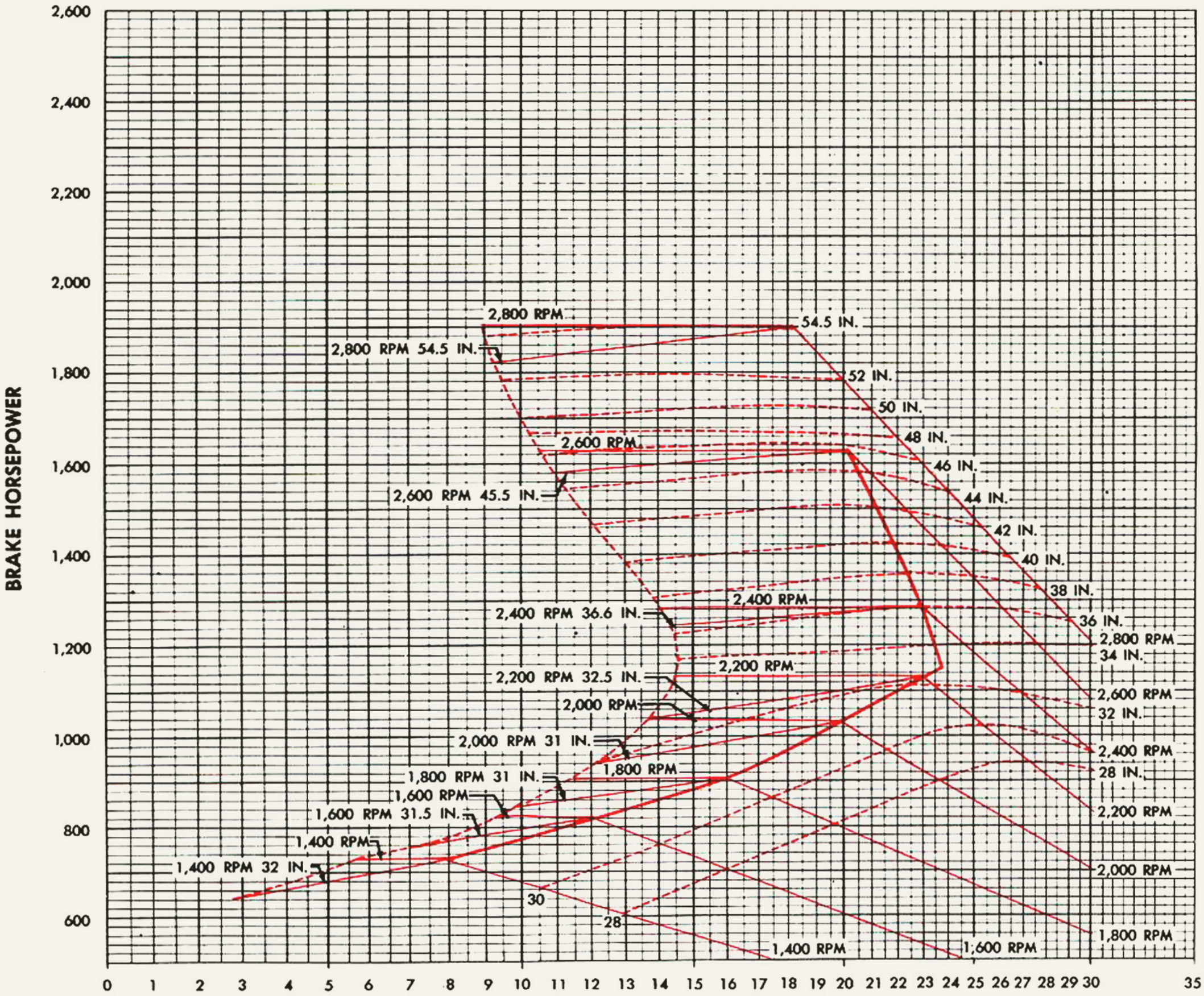
Figure A–5. Engine Operating Limits – Neutral Blower

ENGINE OPERATING LIMITS

LOW BLOWER – NO RAM

STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS: 1. Use "AUTO-RICH" for all operations above 2,600 rpm. Cylinder head temperature limits must be observed and "AUTO-RICH" used when cooling is inadequate in "AUTO-LEAN."

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–6. Engine Operating Limits — Low Blower

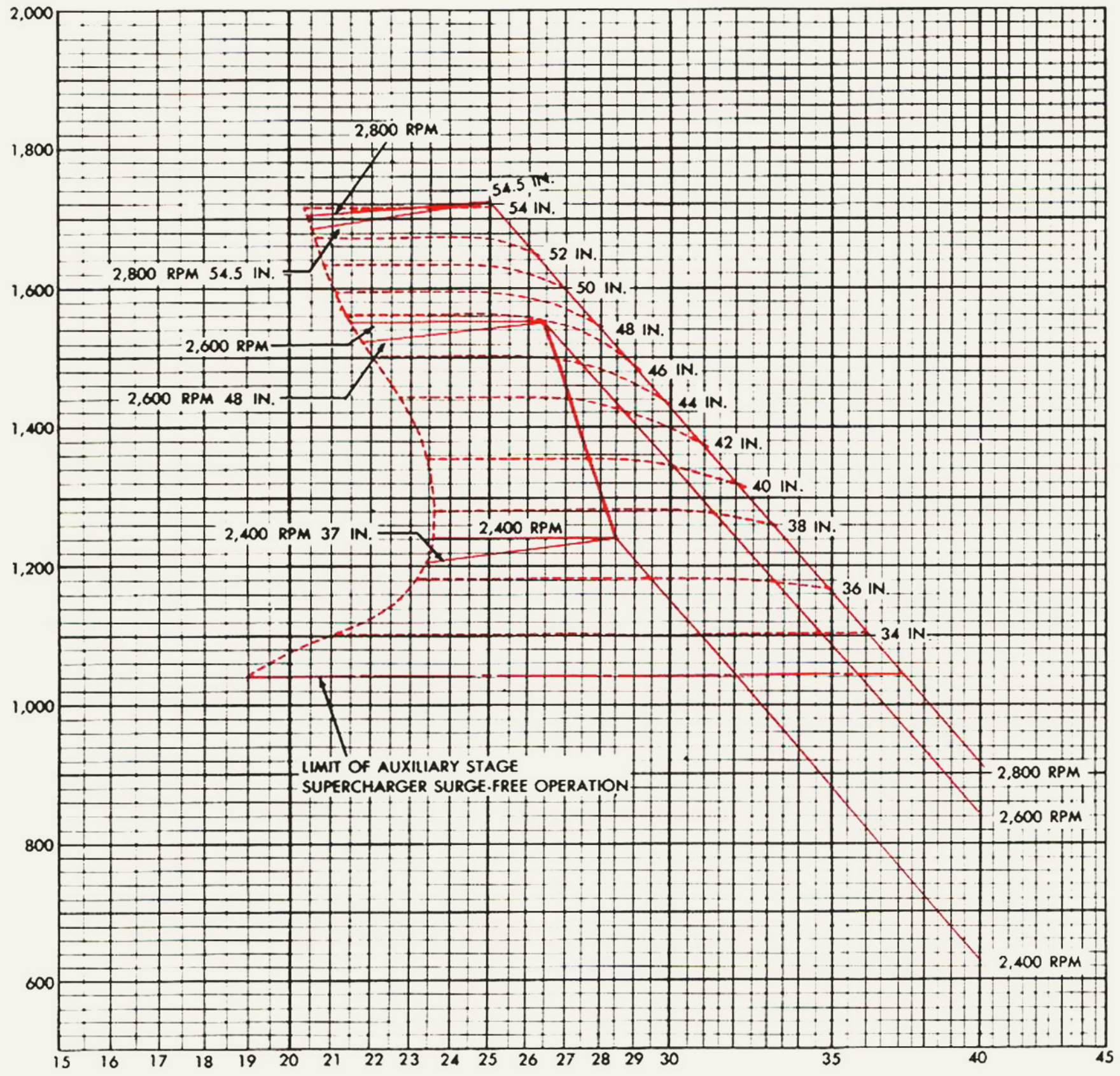
ENGINE OPERATING LIMITS

HIGH BLOWER – NO RAM

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



ALTITUDE – 1,000 FEET

REMARKS: 1. Use "AUTO-RICH" for all operations above 2,600 rpm. Cylinder head temperature limits must be observed and "AUTO-RICH" used when cooling is inadequate in "AUTO-LEAN."

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

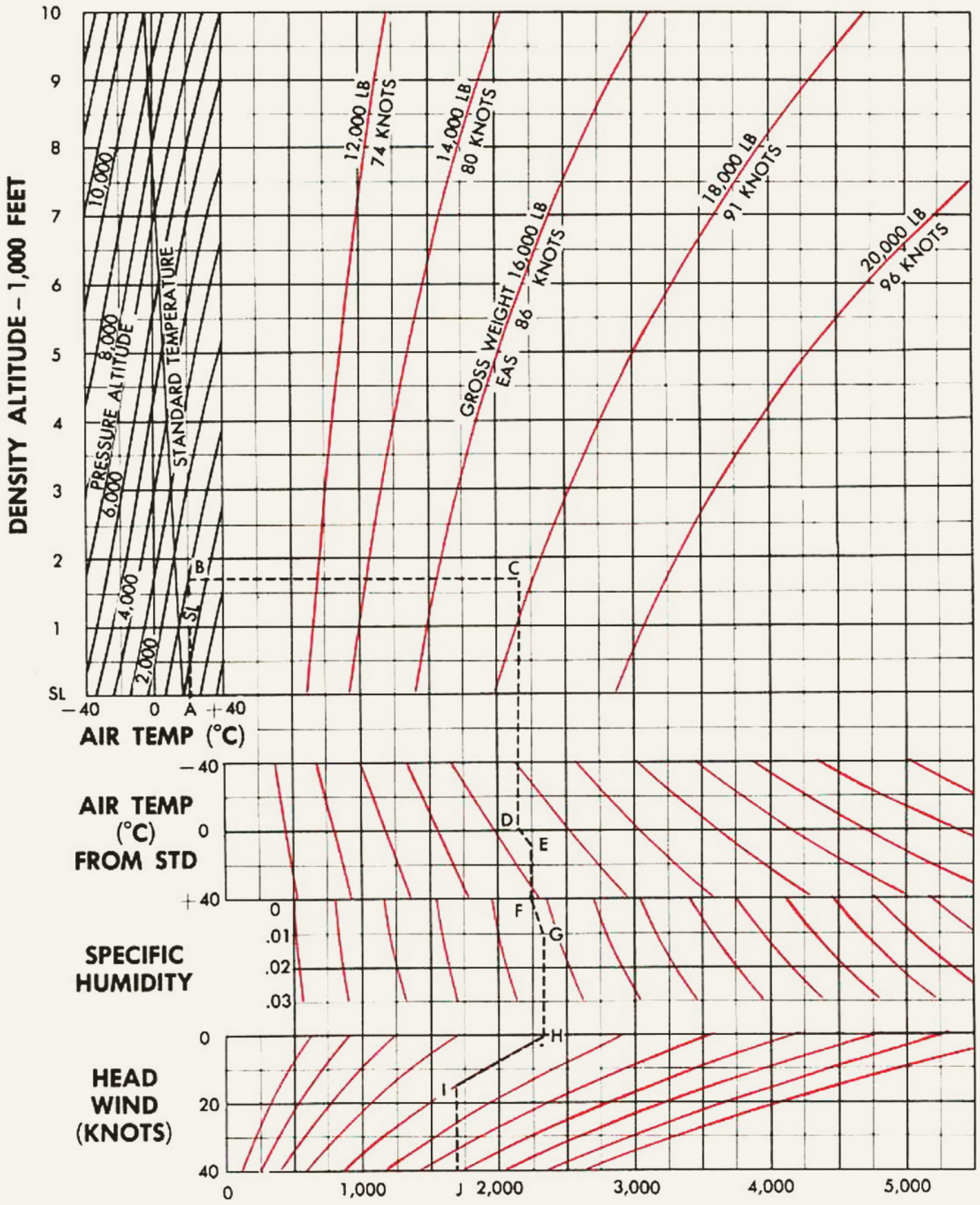
FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–7. Engine Operating Limits — High Blower

TAKE-OFF

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS: 1. Distance over 50-foot obstacle:

12,000 lb to 16,000 lb.	200 percent of ground run
18,000 lb, SL to 10,000	200 to 250 percent of ground run
20,000 lb, SL to 10,000	220 to 300 percent of ground run

2. When using 100/130 grade fuel, multiply the distance obtained from the chart by 115 percent.
3. Take-off distances shown are airplane requirements during normal service operations.
4. These distances include the effect of the drag of the stores included in the gross weight.
5. Flap deflection is 50 degrees.
6. Take-off rpm is 2,800.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145 – See Note 2
FUEL DENSITY: 6 Lb/Gal

Figure A–8. Take-off (Sheet 1 of 2)

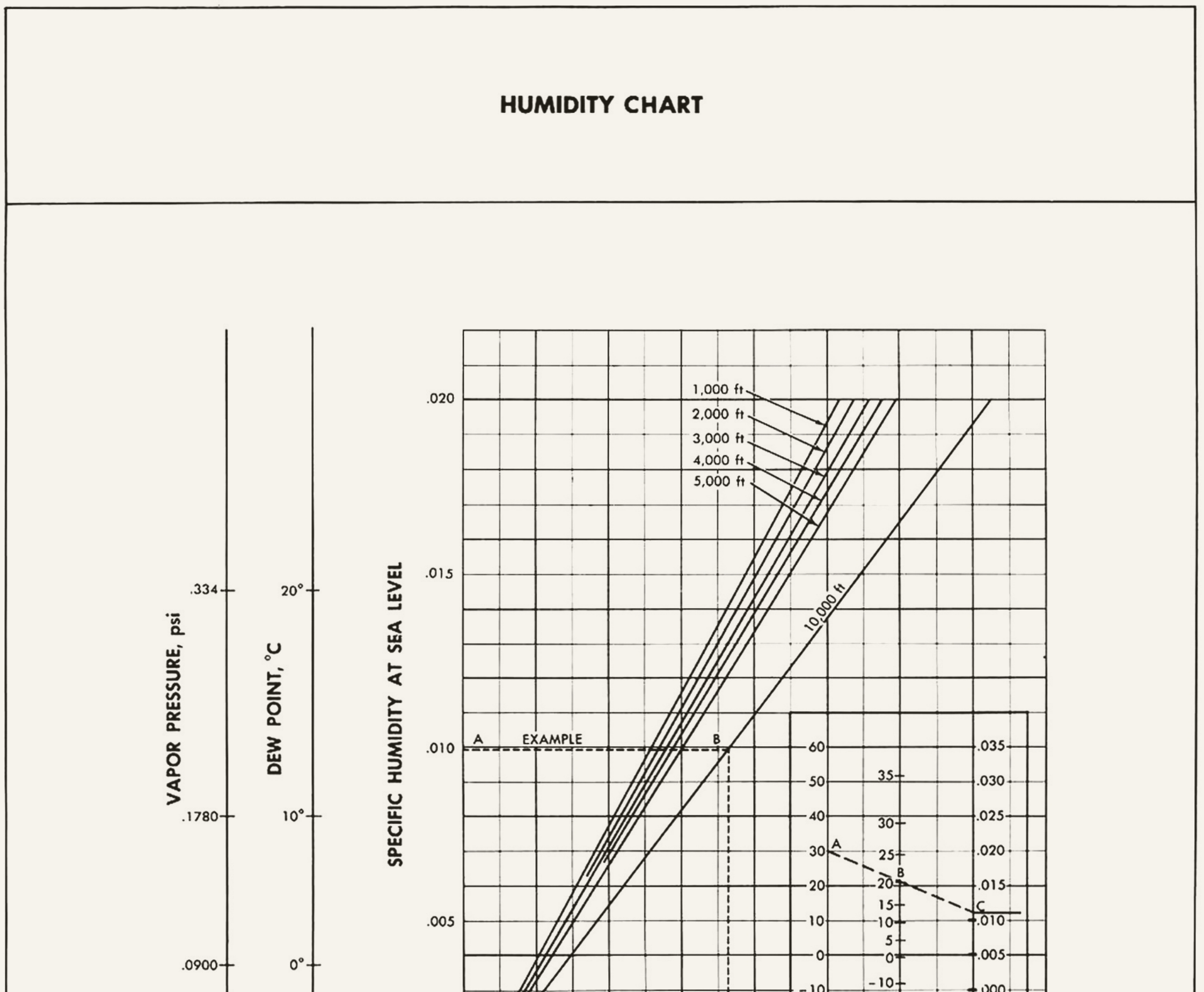


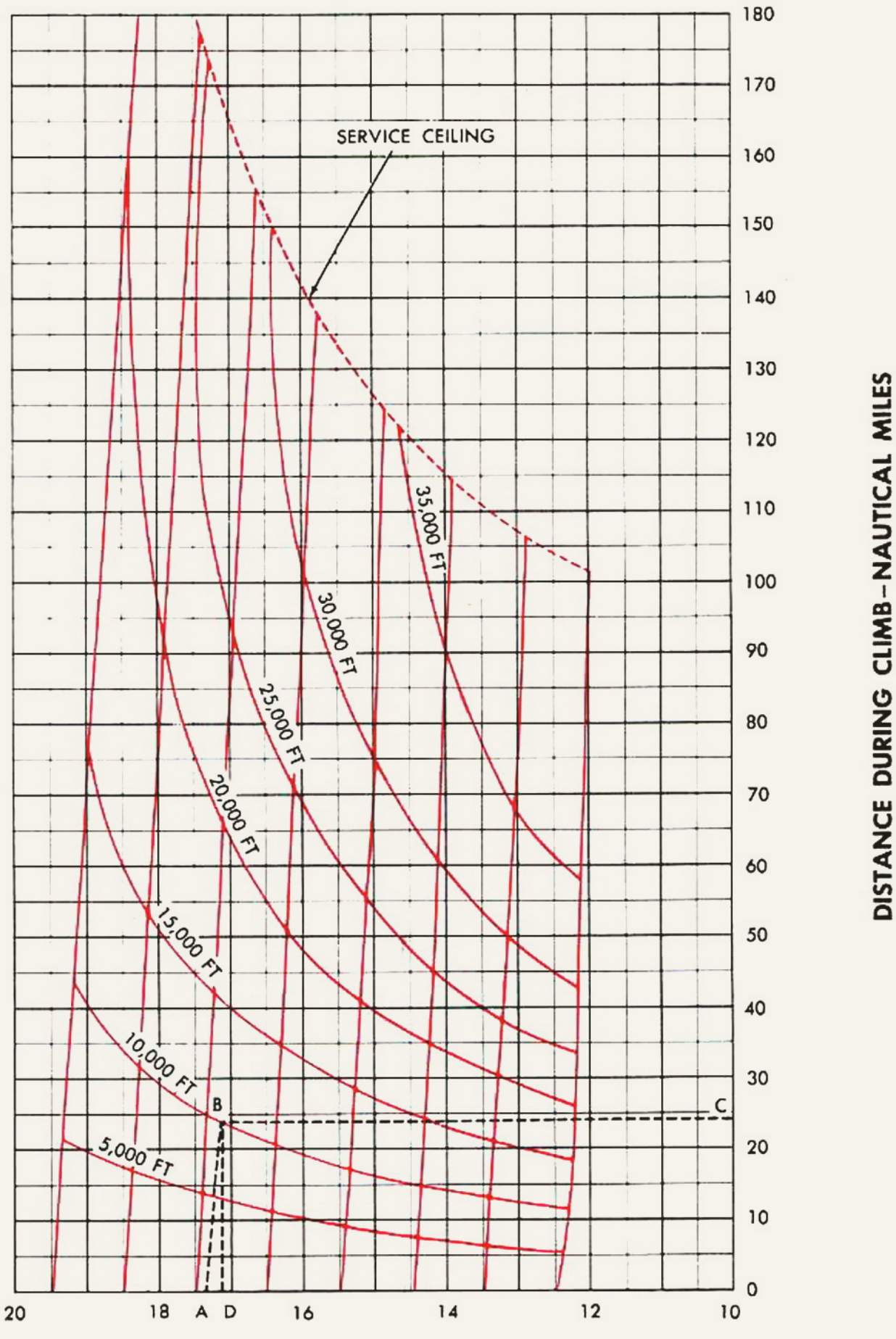
Figure A–8. Take-off (Sheet 2 of 2)

CLIMB CURVE — DISTANCE AND FUEL

NORMAL POWER

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS:
1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. Increase time by 10 percent for each 20°C above standard temperatures.
3. Climb at following speeds:
   Sea level — 150 Knots CAS
   30,000 ft — 135 Knots CAS

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–9. Climb Curve — Distance and Fuel — Normal Rated Power

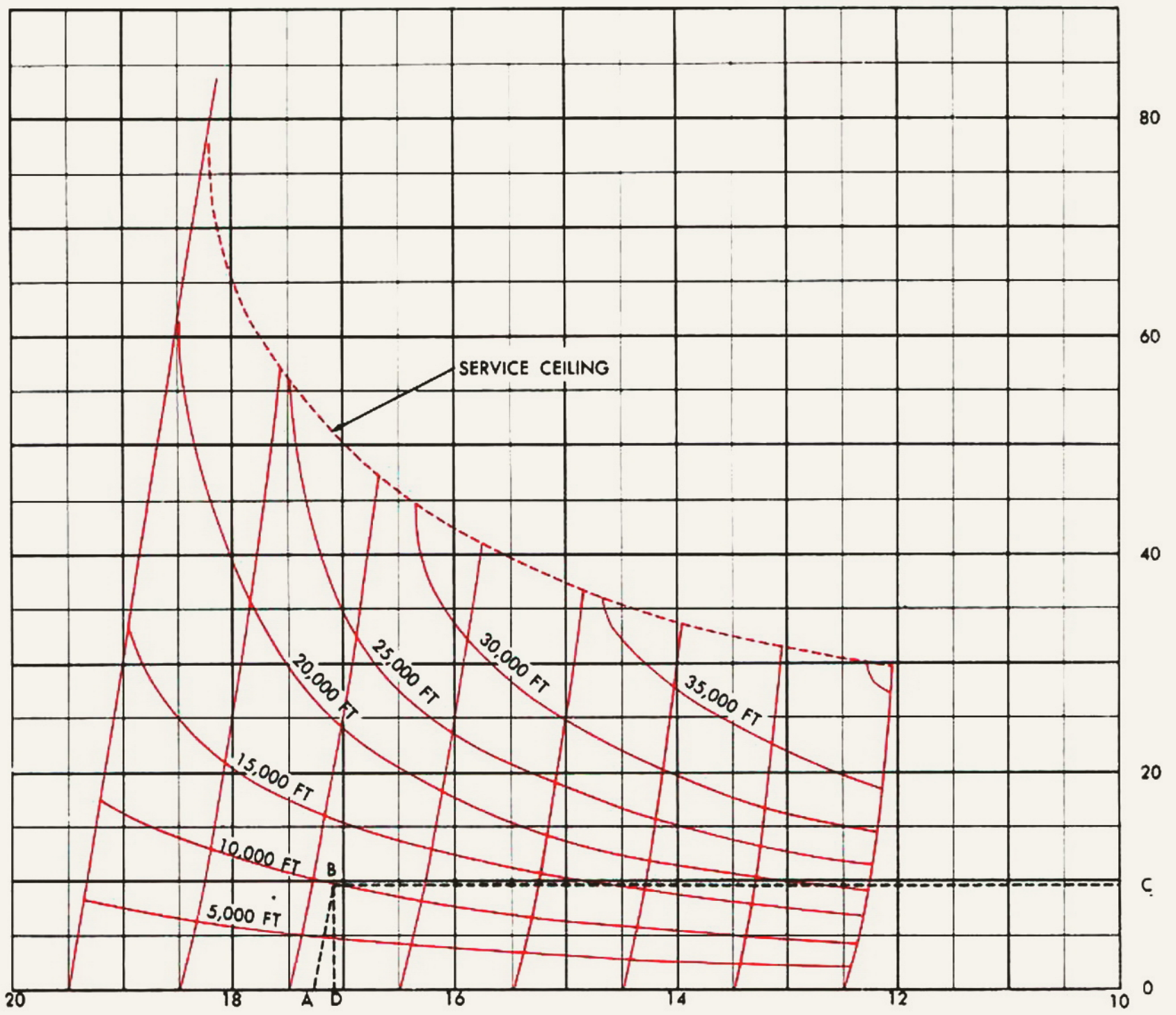
CLIMB CURVE — TIME AND FUEL

NORMAL POWER

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



GROSS WEIGHT – 1,000 POUNDS

REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. Increase time by 10 percent for each 20°C above standard temperatures.
3. Climb at following speeds:
   Sea level — 150 Knots CAS
   30,000 ft — 135 Knots CAS

DATA BASED ON: Estimates

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

Figure A–10. Climb Curve — Time and Fuel — Normal Rated Power

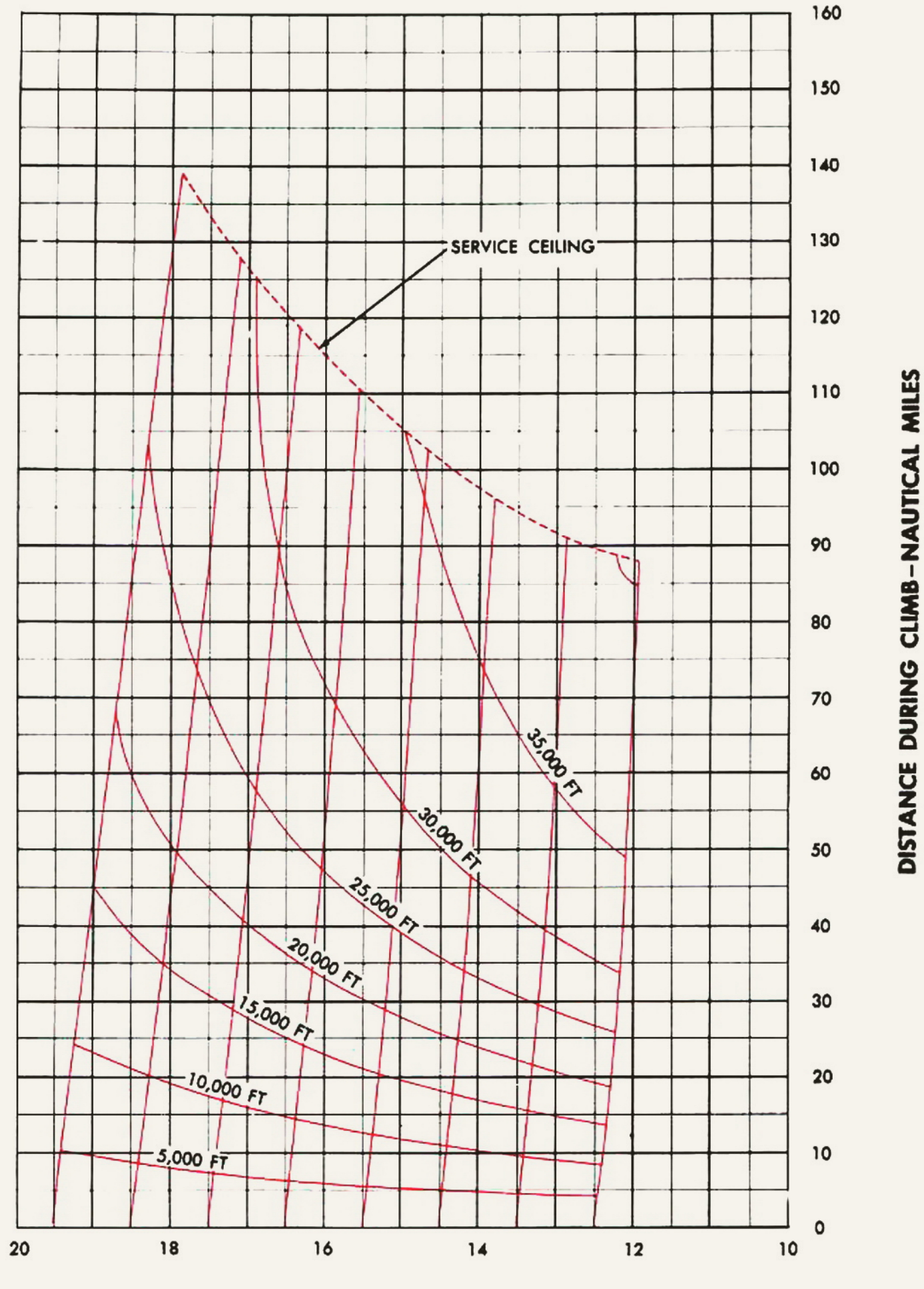
CLIMB CURVE — DISTANCE AND FUEL

MILITARY POWER

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS:
1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. Increase time by 10 percent for each 20°C above standard temperatures.
3. Climb at following speeds:
   Sea level — 150 knots CAS
   30,000 ft — 135 knots CAS

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–11. Climb Curve — Distance and Fuel — Military Rated Power

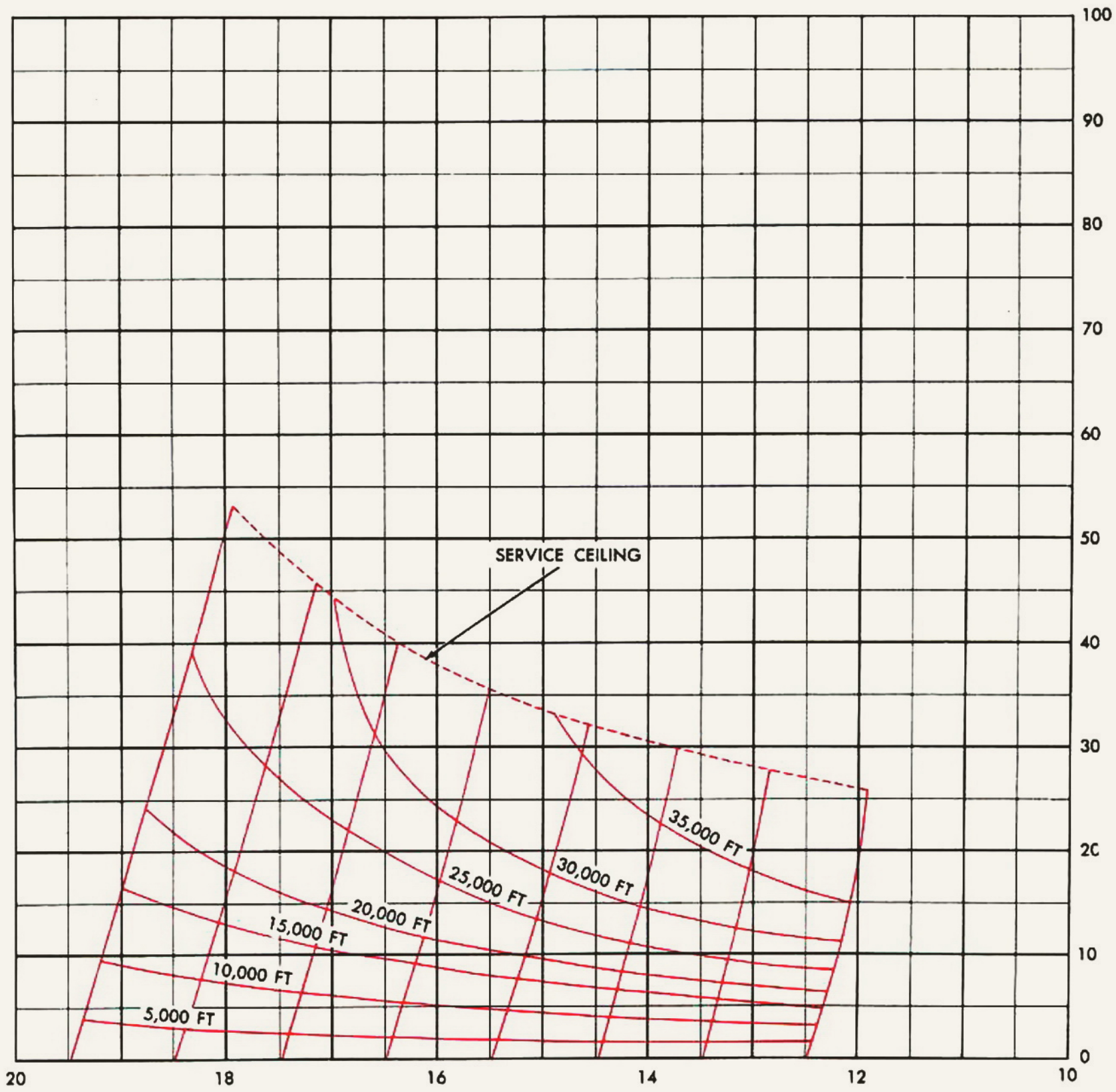
CLIMB CURVE — TIME AND FUEL

MILITARY POWER

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. Increase time by 10 percent for each 20°C above standard temperatures.
3. Climb at following speeds:
   Sea level — 150 Knots CAS
   30,000 ft — 135 Knots CAS

DATA BASED ON: Estimates

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

Figure A–12. Climb Curve — Time and Fuel — Military Rated Power

VOUGHT F4U-7 CORSAIR FLIGHT HANDBOOK - 36KHJ7032013

CLIMB CHART FOR NORMAL RATED POWER

STANDARD DAY

MODEL F4U-7 ENGINE: R2800-18W

Configuration: Three 1,000-lb bombs + six 500-lb. bombs

Weight: 19,500 lb

APPROXIMATE								APPROXIMATE			
Rate of Climb	From Sea Level			MP (In. Hg)	CAS (Knots)	PRESSURE ALTITUDE (Feet)	CAS (Knots)	MP (In. Hg)	From Sea Level			Rate of Climb
	Dist	Time	Fuel						Fuel	Time	Dist	
						30,000	140	FT	133	32	101	400
						25,000	140	44	104	24	70	690
150	161	63	220	45.5	140	20,000	140	45.5	85	18	51	935
215	76	35	134	45.5	140	15,000	140	45.5	69	13	35	950
470	43	17	84	FT	145	10,000	145	FT	55	8	20	1,200
580	21	8	56	41.5	145	5,000	145	41.5	43	4	11	1,285
600			31	41.5	150	SL	150	41.5	31			1,270

Configuration: Normal fighter — Clean

Weight: 13,300 lb

APPROXIMATE								APPROXIMATE			
Rate of Climb	From Sea Level			MP (In. Hg)	CAS (Knots)	PRESSURE ALTITUDE (Feet)	CAS (Knots)	MP (In. Hg)	From Sea Level			Rate of Climb
	Dist	Time	Fuel						Fuel	Time	Dist	
						40,000	130		105	28	98	120
695	66	22	98	FT	135	35,000	135	FT	86	18	58	915
1,380	49	17	83	FT	140	30,000	140	FT	74	14	43	1,630
1,665	37	13	72	45.5	140	25,000	140	45.5	65	11	33	1,915
1,910	29	10	64	45.5	140	20,000	140	45.5	57	9	25	2,160
1,870	20	8	52	45.5	140	15,000	140	45.5	50	6	18	2,105
2,125	12	5	45	FT	145	10,000	145	FT	44	4	11	2,370
2,180	6	2	38	41.5	145	5,000	145	41.5	37	2	5	2,430
2,120			31	41.5	150	SL	150	41.5	31			2,350

Configuration: Three 1,000-lb bombs

Weight: 16,500 lb

Configuration: Normal fighter with 40% fuel

Weight: 12,500 lb

DATA BASED ON: ESTIMATES

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

Figure A–13. Climb Chart — Normal Rated Power

CLIMB CHART FOR MILITARY RATED POWER

STANDARD DAY

MODEL: F4U-7 **ENGINE: R-2800-18W**

Configuration: Three 1,000-lb bombs + six 500-lb bombs

Weight: 19,500 lb

APPROXIMATE									APPROXIMATE			
Rate of Climb	From Sea Level			MP (In. Hg)	CAS (Knots)	PRESSURE ALTITUDE (Feet)	CAS (Knots)	MP (In. Hg)	From Sea Level			Rate of Climb
	Dist	Time	Fuel						Fuel	Time	Dist	
						30,000	140	FT	142	22	69	500
250	102	39	231	54.5	140	25,000	140	54.5	113	17	47	1,120
530	68	24	154	FT	140	20,000	140	FT	91	12	34	1,430
700	45	17	113	54.5	140	15,000	140	54.5	74	9	24	1,560
745	25	10	78	54.5	145	10,000	145	54.5	58	5	14	1,550
1,090	10	4	52	FT	145	5,000	145	FT	44	2	6	1,840
1,470			31	58.5	150	SL	150	58.5	31			2,300

Configuration: Three 1,000-lb bombs

Weight: 16,500 lb

Configuration: Normal fighter — clean

Weight: 13,300 lb

APPROXIMATE									APPROXIMATE			
Rate of Climb	From Sea Level			MP (In. Hg)	CAS (Knots)	PRESSURE ALTITUDE (Feet)	CAS (Knots)	MP (In. Hg)	From Sea Level			Rate of Climb
	Dist	Time	Fuel						Fuel	Time	Dist	
					130	40,000	130	FT	122	26	85	120
740	55	17	109	FT	135	35,000	135	FT	100	15	48	905
1,500	38	12	92	FT	140	30,000	140	FT	86	11	33	1,740
2,190	28	10	79	54.5	140	25,000	140	55	75	9	25	2,480
2,470	21	7	68	FT	140	20,000	140	FT	65	7	18	2,780
2,595	15	5	58	54.5	140	15,000	140	55	55	5	13	2,900
2,545	9	3	48	54.5	145	10,000	145	55	47	3	8	2,820
2,950	4	2	39	FT	145	5,000	145	FT	39	1	4	3,230
3,420			31	58.5	150	SL	150	59.5	31			3,730

Configuration: Normal fighter, 40% fuel

Weight: 12,500 lb

DATA BASED ON: ESTIMATES

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

Figure A–14. Climb Chart — Military Rated Power

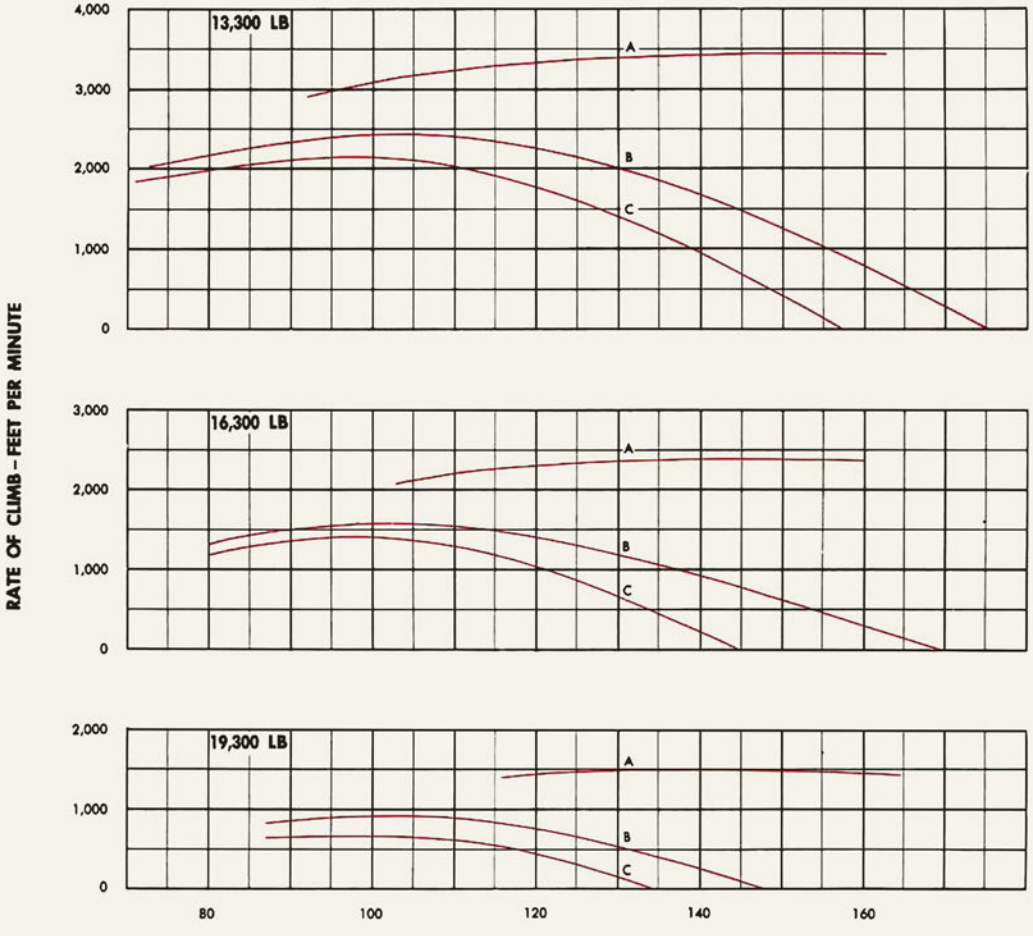
EMERGENCY CLIMB

SEA LEVEL – TAKE-OFF POWER

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS: 1. Configuration
A – Flaps and gear up
B – Flaps down 50° – gear up
C – Flaps down 50° – gear down

2. Decrease rate of climb by 10 percent for each 20°C increase in free air temperature.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–15. Emergency Climb

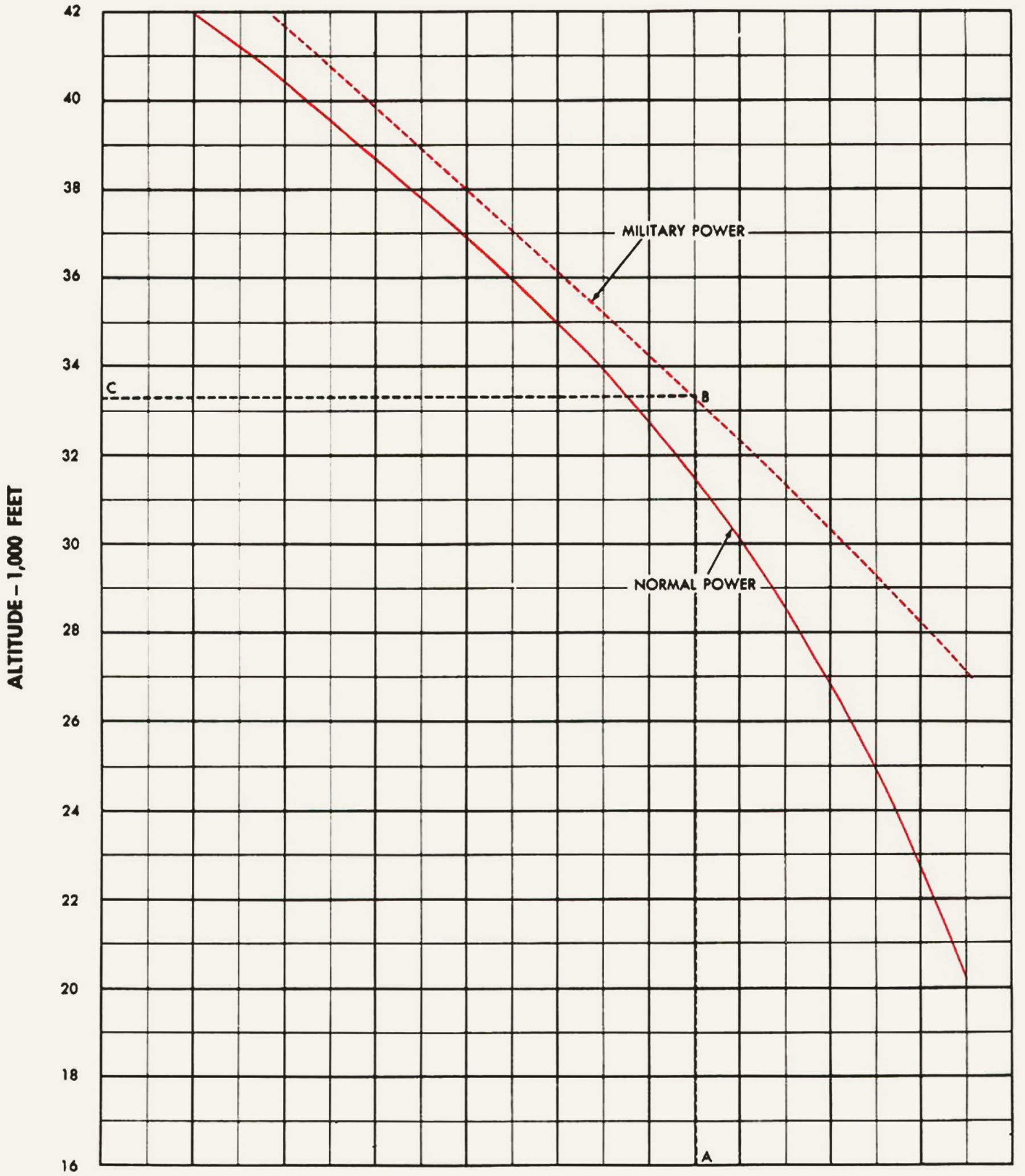
EMERGENCY CEILING

100 FT/MIN RATE OF CLIMB

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



DATA BASED ON: Estimates

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

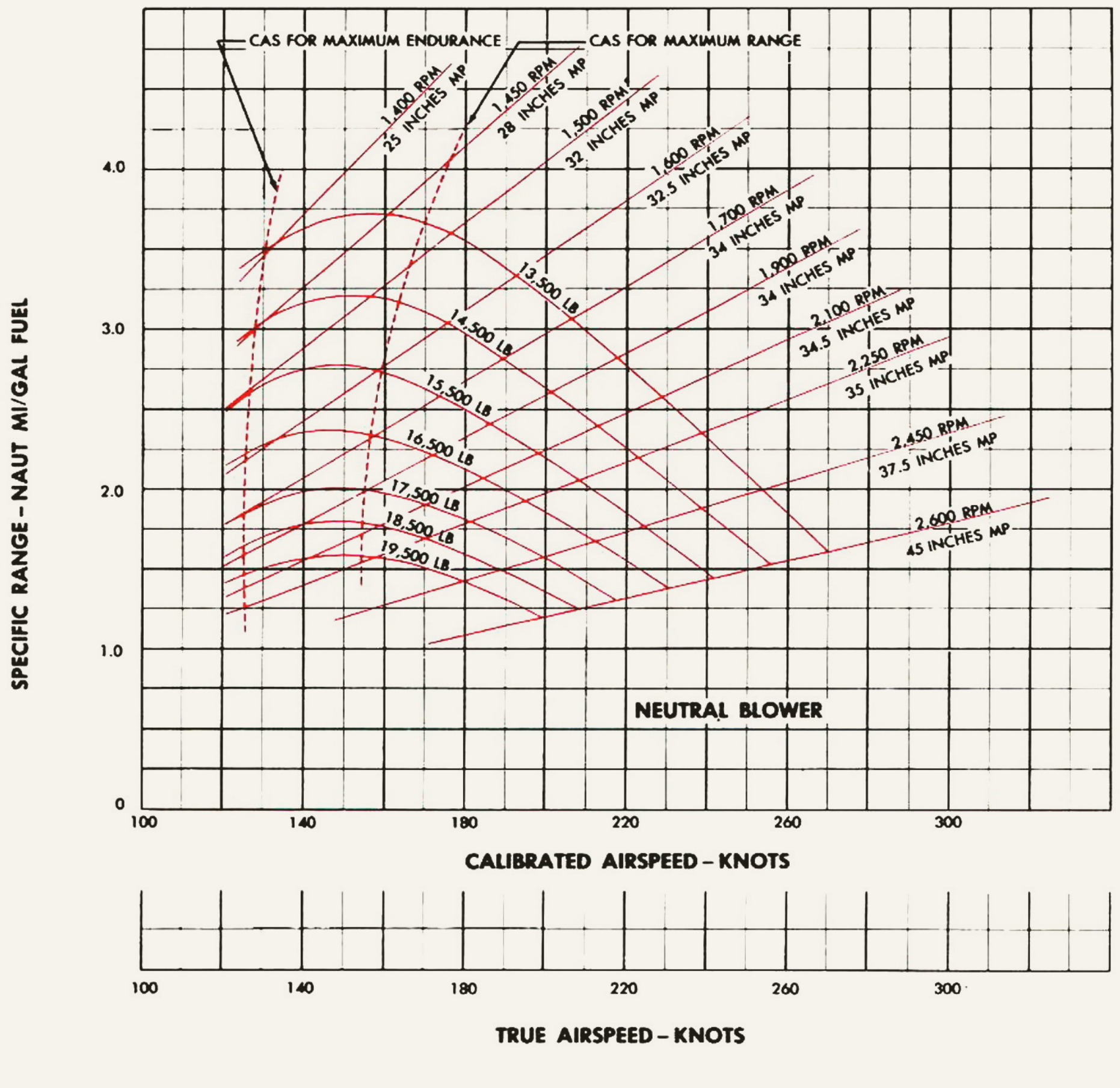
Figure A–16. Emergency Ceiling

NAUTICAL MILES PER GALLON OF FUEL

SEA LEVEL

STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS: 1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

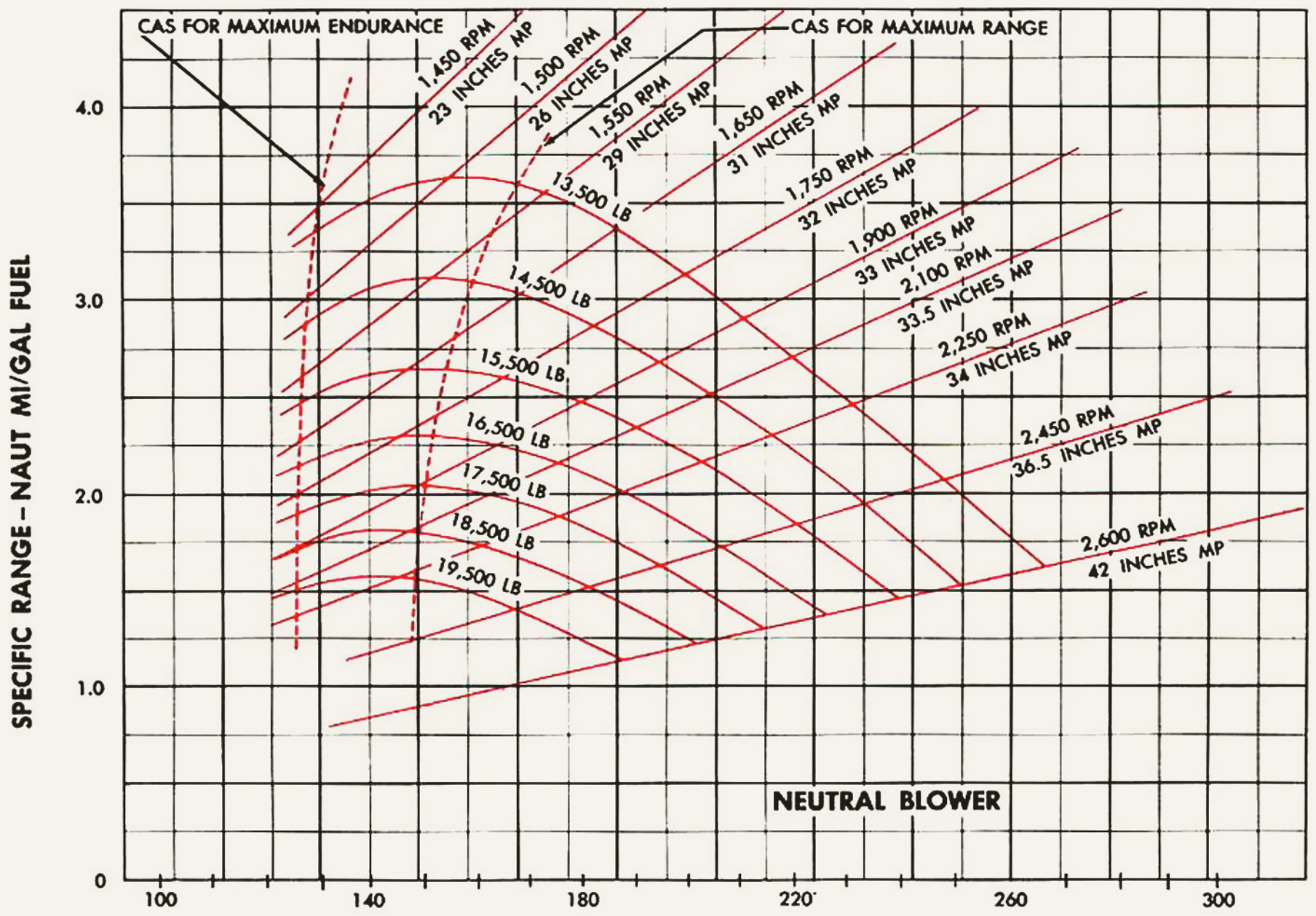
Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 1 of 8)

NAUTICAL MILES PER GALLON OF FUEL

5,000 FT ALT

STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS:
1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 2 of 8)

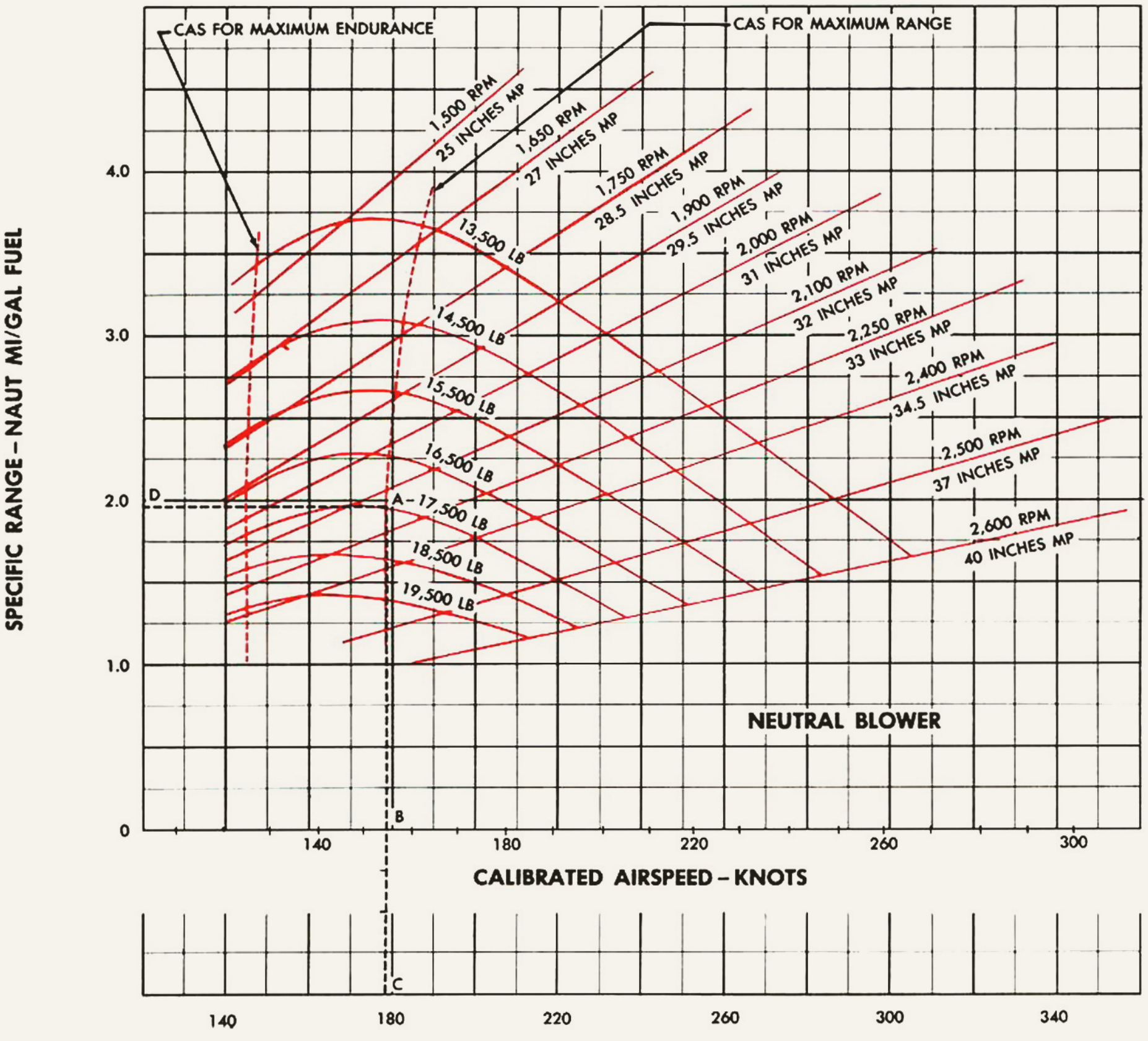
NAUTICAL MILES PER GALLON OF FUEL

10,000 FT ALT

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

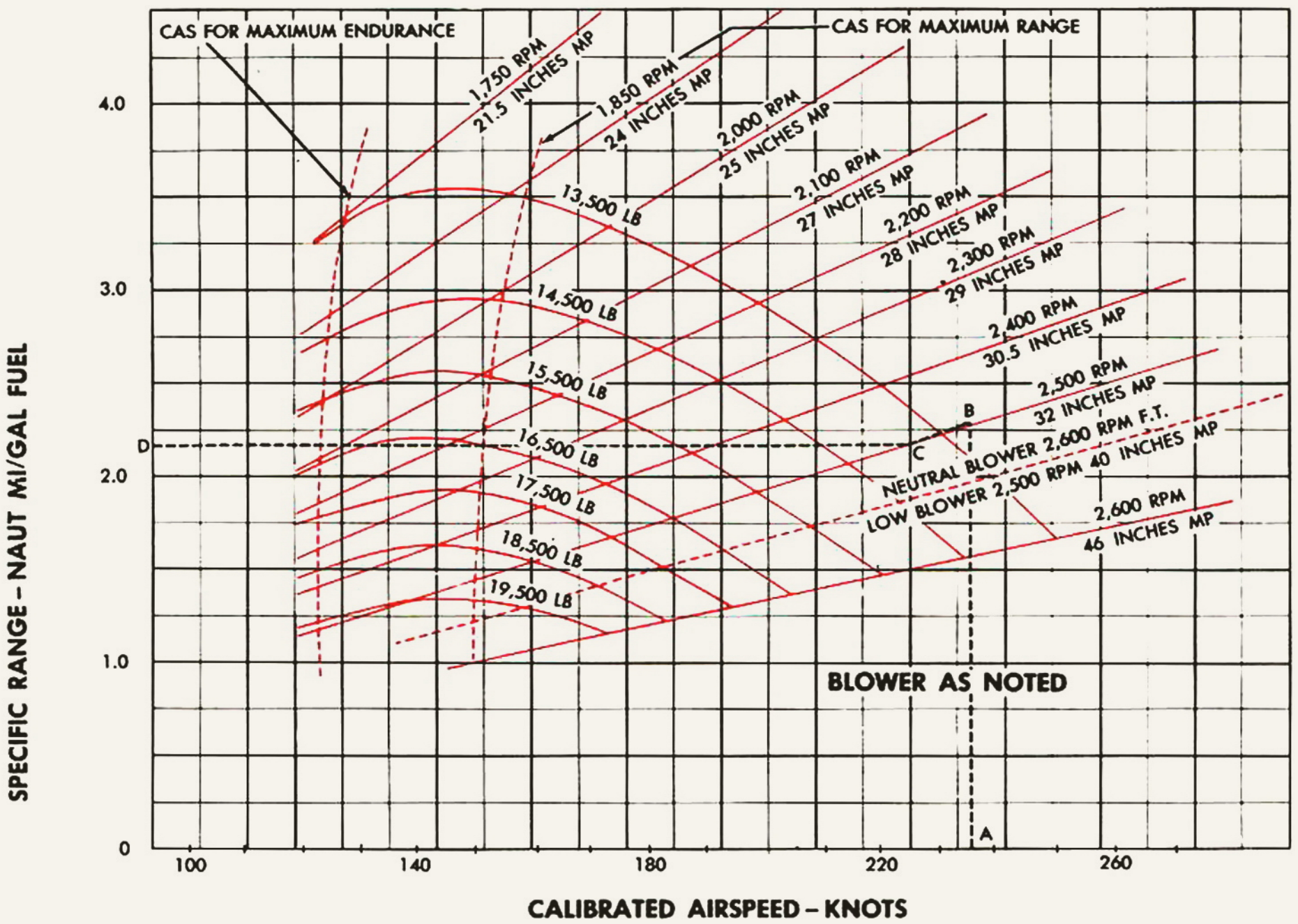
FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 3 of 8)

NAUTICAL MILES PER GALLON OF FUEL

15,000 FT ALT
STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS:
1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 4 of 8)

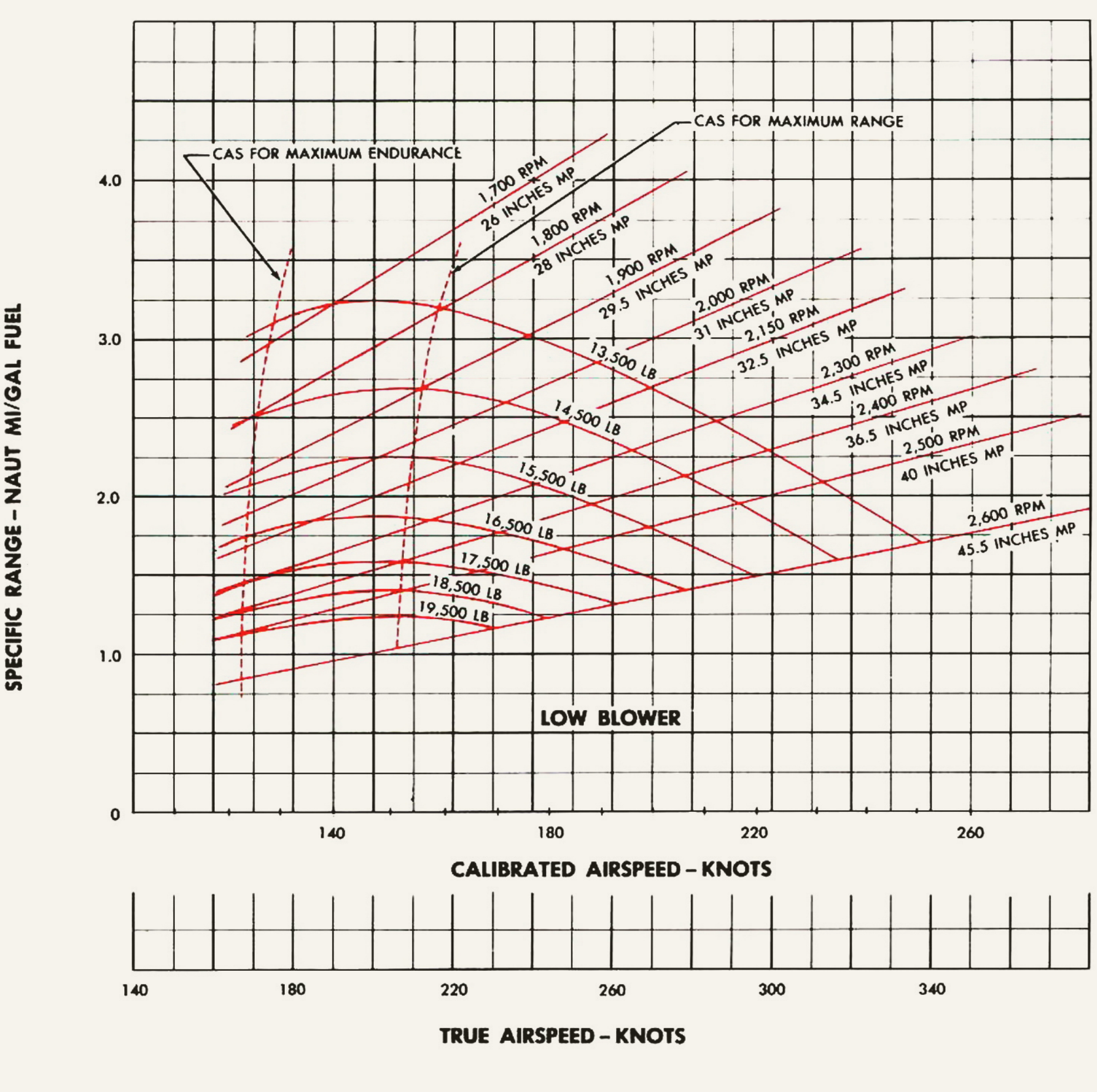
NAUTICAL MILES PER GALLON OF FUEL

20,000 FT ALT

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS: •1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates

DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145

FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 5 of 8)

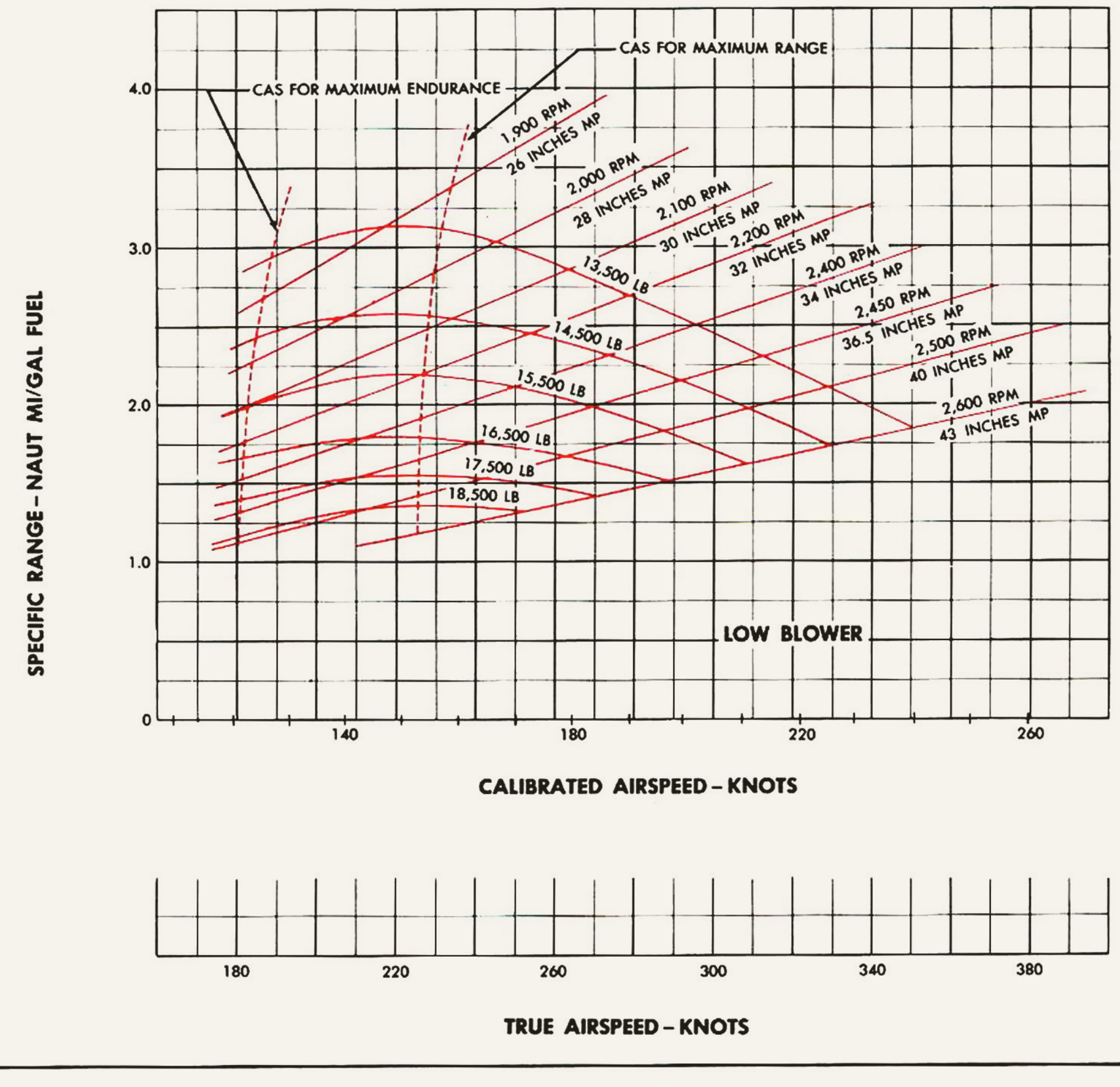
NAUTICAL MILES PER GALLON OF FUEL

25,000 FT ALT

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 6 of 8)

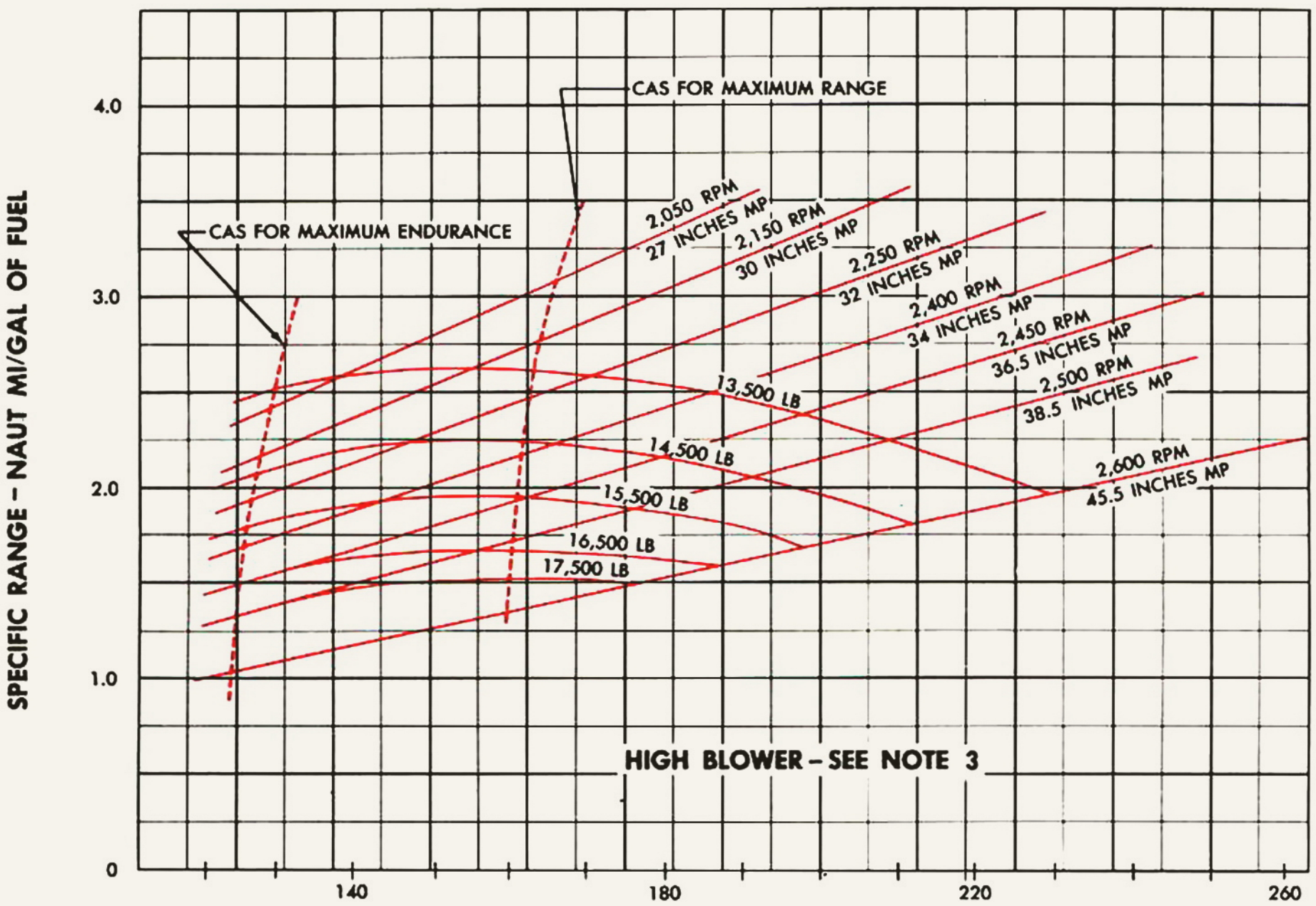
VOUGHT F4U-7 CORSAIR FLIGHT HANDBOOK - 36KHJ7032013

NAUTICAL MILES PER GALLON OF FUEL

30,000 FT ALT

STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.
3. AEL calibration tests on this engine indicate that auxiliary supercharger surge may be encountered below 2,400 rpm and 33 inches in high blower.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

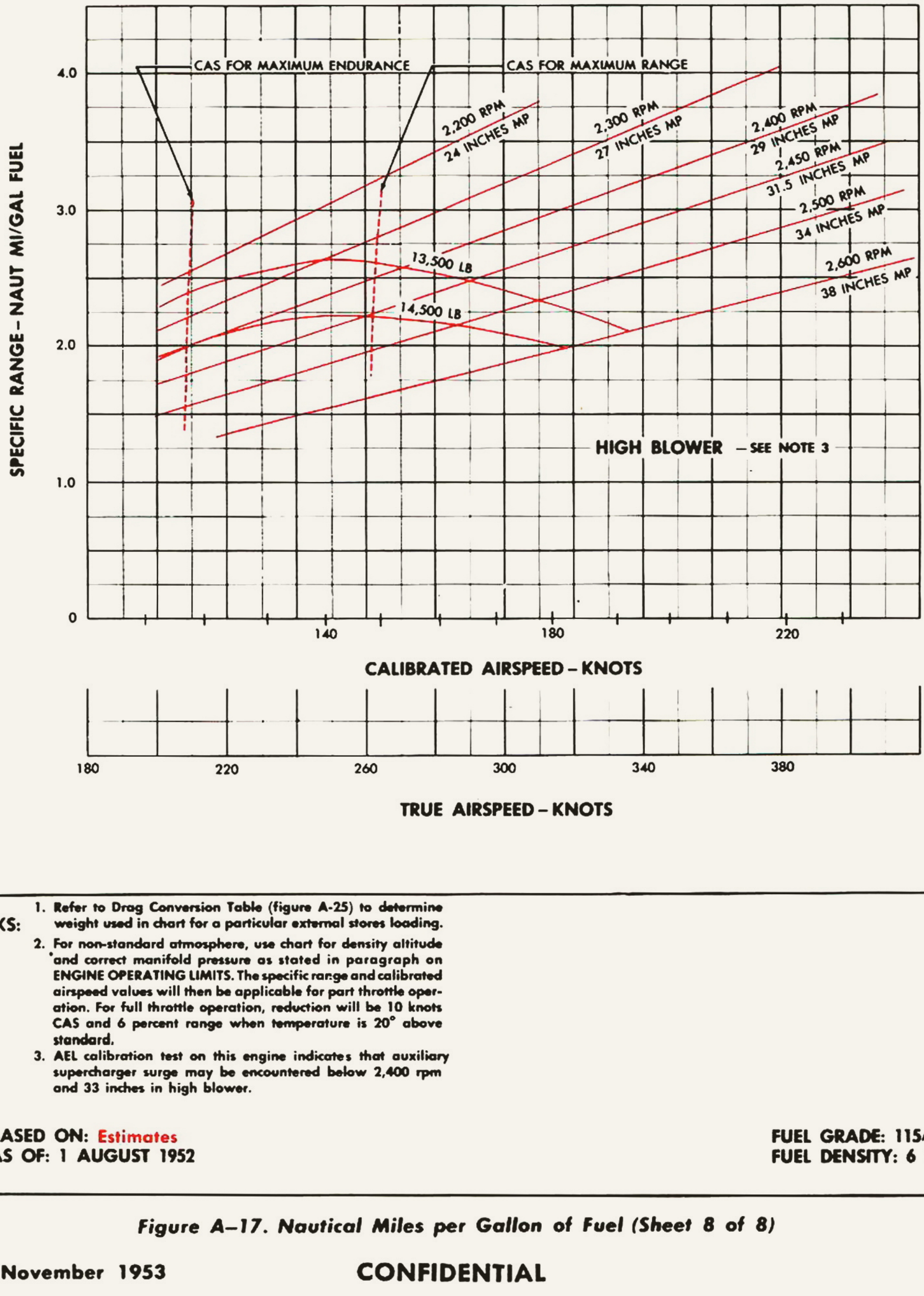
Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 7 of 8)

NAUTICAL MILES PER GALLON OF FUEL

35,000 FT ALT

STANDARD DAY

MODEL: F4U-7 ENGINE: R2800-18W



REMARKS:

1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.
2. For non-standard atmosphere, use chart for density altitude and correct manifold pressure as stated in paragraph on ENGINE OPERATING LIMITS. The specific range and calibrated airspeed values will then be applicable for part throttle operation. For full throttle operation, reduction will be 10 knots CAS and 6 percent range when temperature is 20° above standard.
3. AEL calibration test on this engine indicates that auxiliary supercharger surge may be encountered below 2,400 rpm and 33 inches in high blower.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

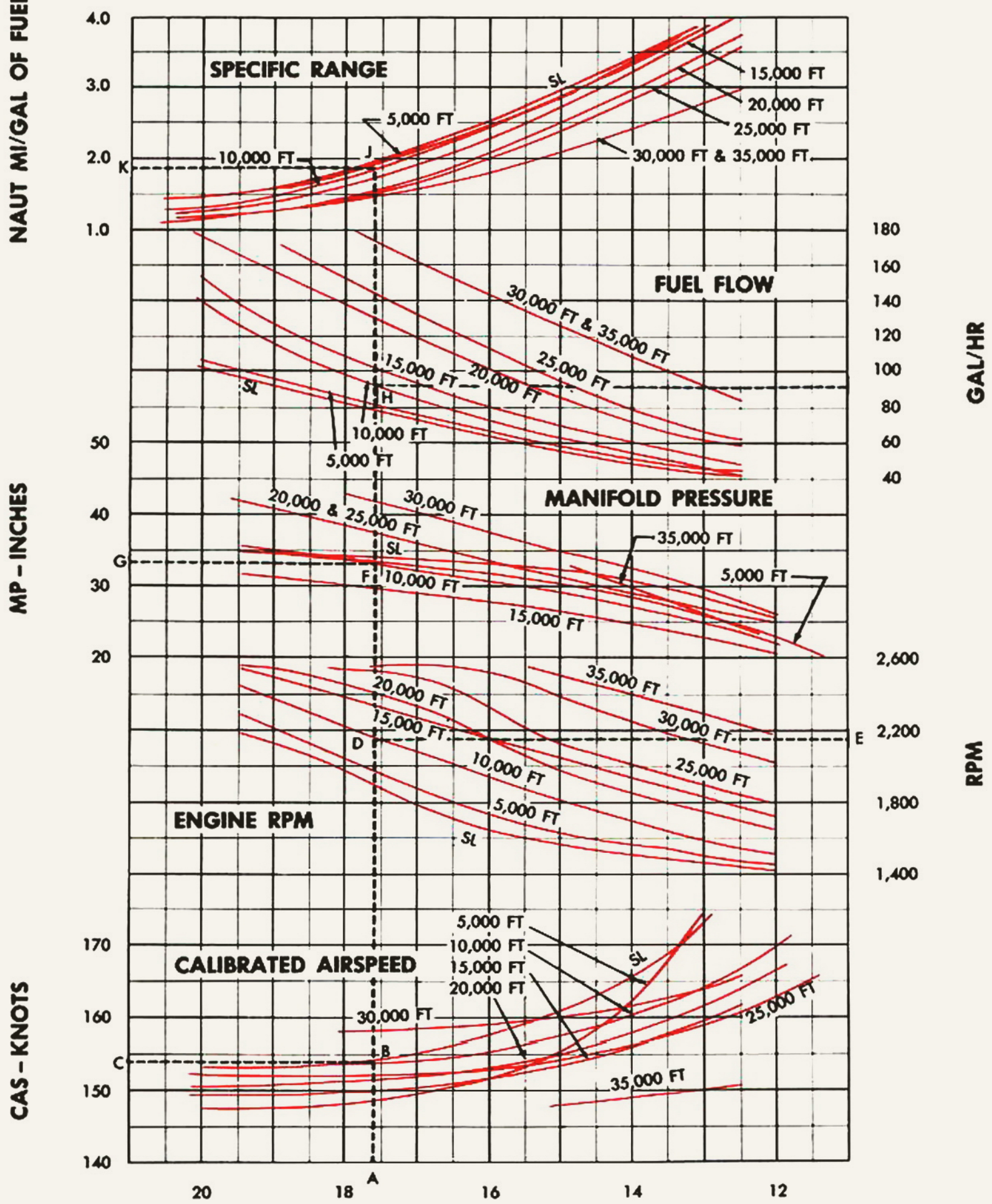
FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–17. Nautical Miles per Gallon of Fuel (Sheet 8 of 8)

MAXIMUM RANGE

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS: 1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

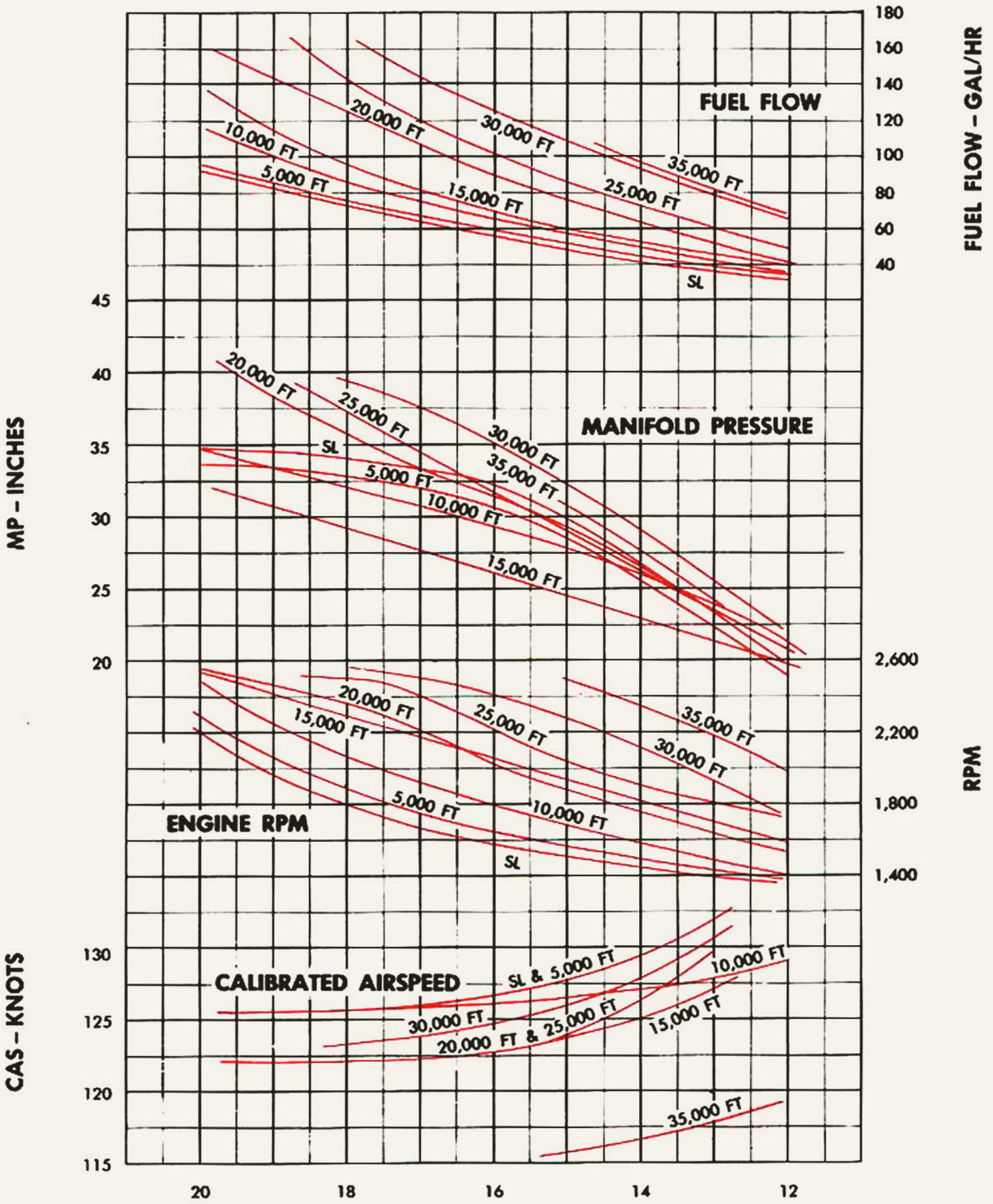
FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–18. Maximum Range

MAXIMUM ENDURANCE

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS: 1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

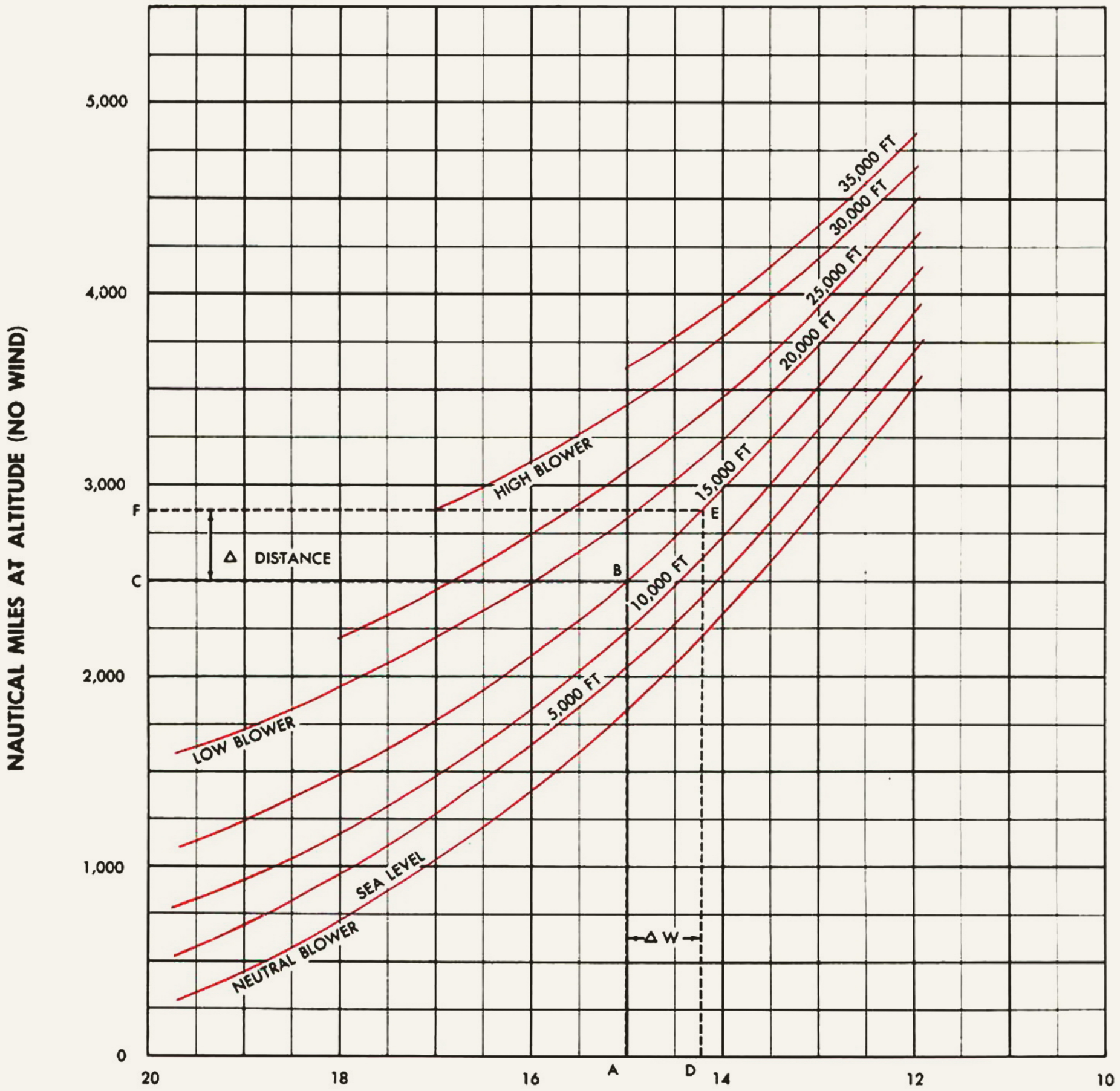
Figure A–19. Maximum Endurance

LONG RANGE PREDICTION — DISTANCE

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS: 1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

2. These curves based on CAS for maximum range.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

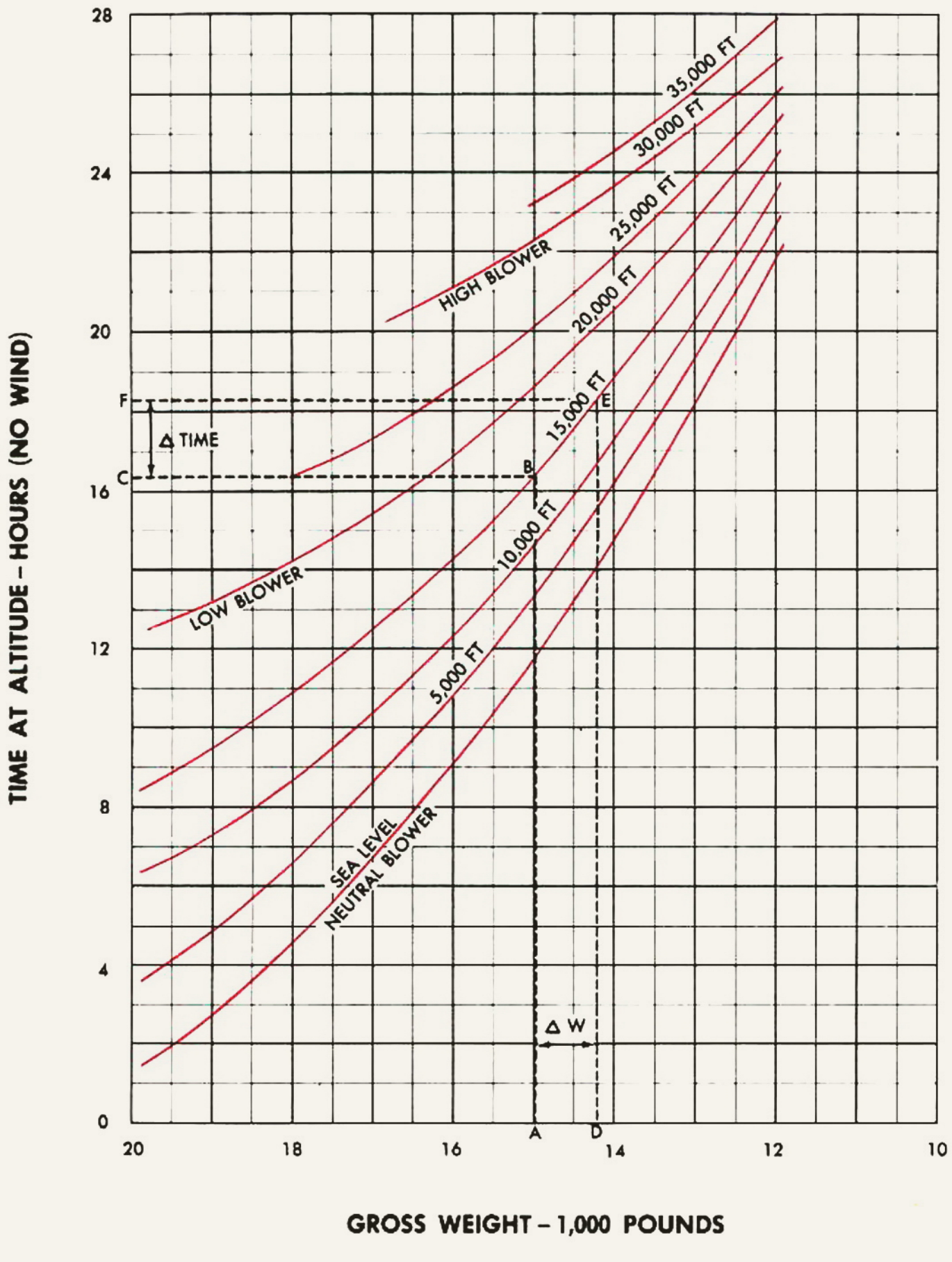
FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–20. Long-Range Prediction — Distance

LONG RANGE PREDICTION — TIME

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS: 1. Refer to Drag Conversion Table (figure A-25) to determine weight used in chart for a particular external stores loading.

2. These curves based on CAS for maximum range.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–21. Long-Range Prediction — Time

COMBAT ALLOWANCE CHART

MODEL: F4U-7 ENGINE: R-2800-18W

MILITARY RATED POWER

PRESSURE ALTITUDE FEET	RPM	MP IN. HG	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT MIN	LIMIT CYLINDER TEMP (°C)	FUEL FLOW GPH
SL	2800	59.5	NEUTRAL	AUTO-RICH	15	243	333
5,000	2800	F.T.	NEUTRAL	AUTO-RICH	15	243	284
10,000	2800	55	LOW	AUTO-RICH	15	243	270
15,000	2800	55	LOW	AUTO-RICH	15	243	278
20,000	2800	F.T.	LOW	AUTO-RICH	15	243	268
25,000	2800	F.T.	HIGH	AUTO-RICH	15	243	270
30,000	2800	F.T.	HIGH	AUTO-RICH	15	243	198

COMBAT RATED POWER

PRESSURE ALTITUDE FEET	RPM	MP IN. HG	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT MIN	LIMIT CYLINDER TEMP (°C)	FUEL FLOW GPH
SL	2800	F.T.	NEUTRAL	AUTO-RICH	5	243	296
5,000	2800	70	LOW	AUTO-RICH	5	243	362
10,000	2800	70	LOW	AUTO-RICH	5	243	290
15,000	2800	70	HIGH	AUTO-RICH	5	243	227
20,000	2800	70	HIGH	AUTO-RICH	5	243	180
25,000	2800	F.T.	HIGH	AUTO-RICH	5	243	136
30,000	2800	F.T.	HIGH	AUTO-RICH	5	243	97

DATA AS OF: 1 AUGUST 1952
DATA BASED ON: ESTIMATES

FUEL DENSITY: 6 LB/GAL
FUEL GRADE: 115/145

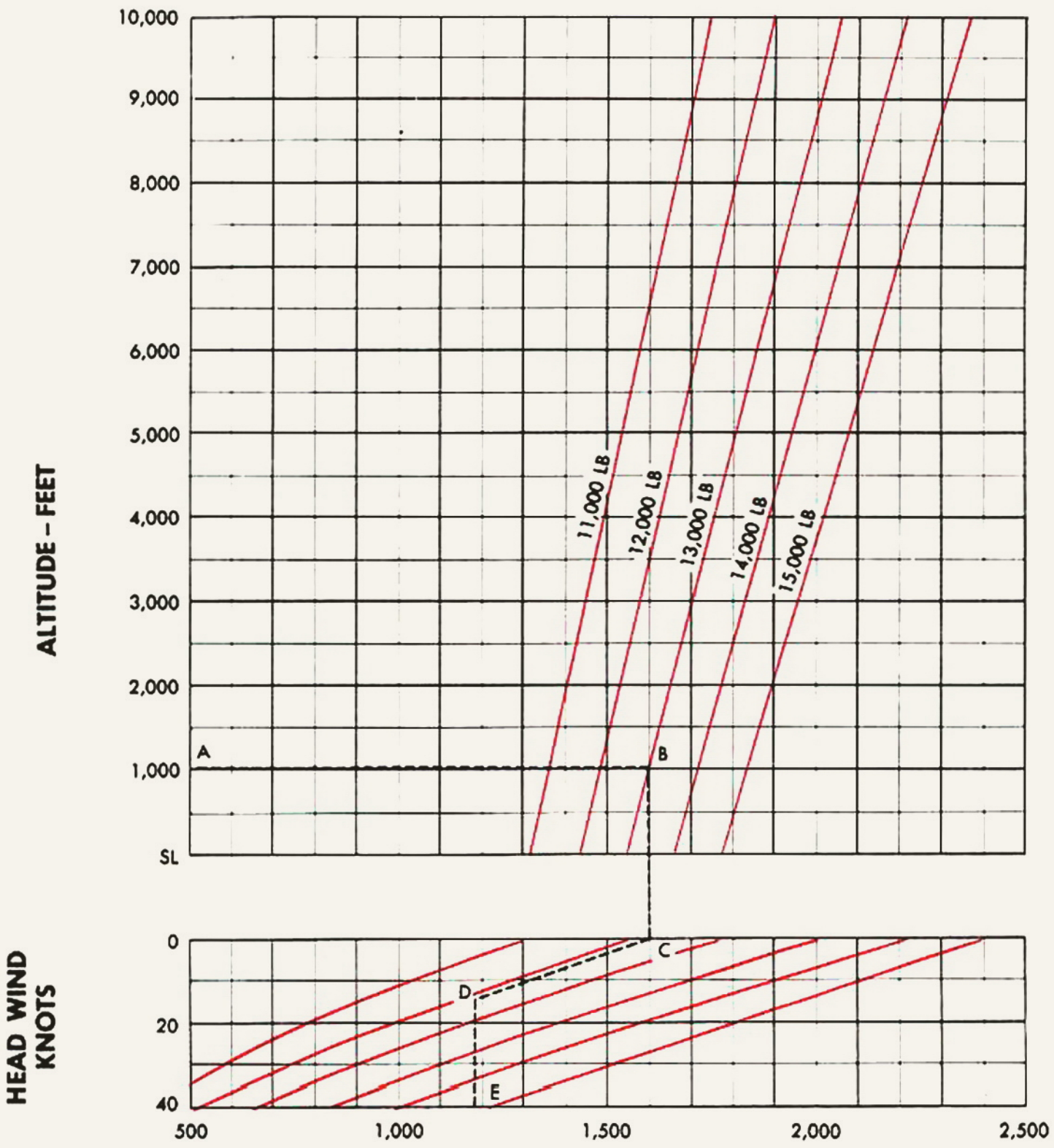
Figure A–22. Combat Allowance

LANDING GROUND ROLL

HARD SURFACE RUNWAY

STANDARD DAY

MODEL: F4U-7 **ENGINE: R2800-18W**



REMARKS:
1. Flap deflection is 50 degrees.
2. To clear 50-foot obstacle, multiply ground roll by 150 percent.
3. Increase distance by 10 percent for each 20°C above standard temperatures.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–23. Landing Ground Roll

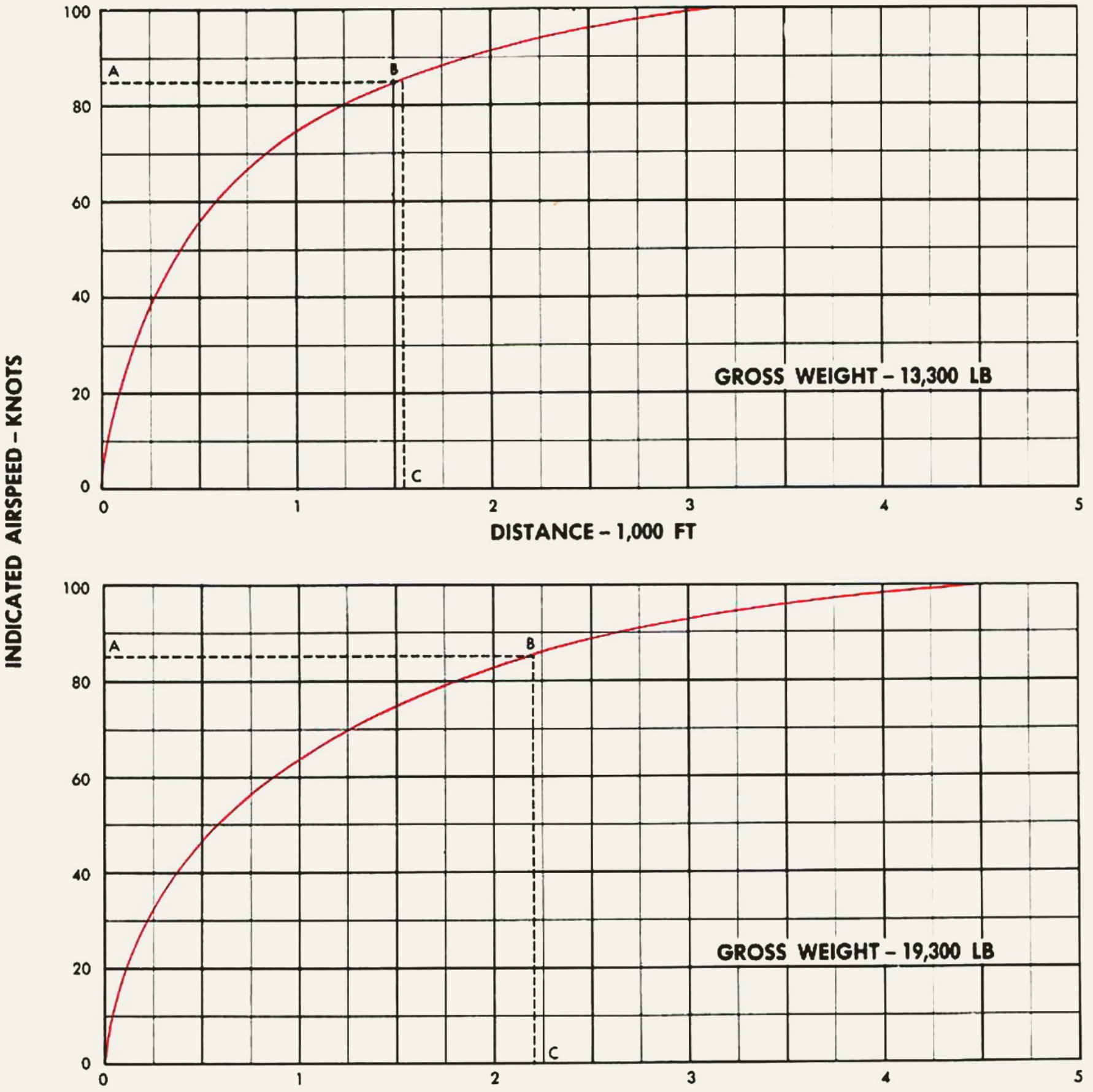
STOPPING DISTANCE

SL TO 6,000 FT – NO WIND

STANDARD DAY

MODEL: F4U-7

ENGINE: R2800-18W



REMARKS:

1. Brakes should be inspected after stops from high speeds at high gross weights.

DATA BASED ON: Estimates
DATA AS OF: 1 AUGUST 1952

FUEL GRADE: 115/145
FUEL DENSITY: 6 LB/GAL

Figure A–24. Stopping Distance

DRAG CONVERSION TABLE

MODEL: F4U-7 **ENGINE: R-2800-18W**

CHANGE IN AIRPLANE CONFIGURATION	EFFECT ON PERFORMANCE		
	CRUISE △ EAS FOR CONSTANT POWER (KNOTS) (See Note 2)	WT ADJUSTMENT FACTOR — LB	
		CLIMB	LONG RANGE CRUISE
Add one centerline pylon with sway braces	5	150	150
Add two center section pylons with sway braces	8	250	300
Add ten AERO 14-A launchers	5	250	150
Add one 150-gallon drop tank	13	1,150	900
Add one 1000-lb bomb	18	1,150	1,100
Add one 2000-lb bomb	25	2,000	1,750
Add ten 5-in. HVAR	18	1,450	1,200
Add one 11.75-in. aircraft rocket	10	1,400	950
Add six 500-lb bombs	52	3,000	3,700
Add ten 250-lb bombs	82	3,000	4,700

REMARKS:

1. Weight adjustment factor for long range cruise is applicable only in the region of recommended EAS and maximum endurance lines. EAS should be used for all other power regions.

2. △ EAS is approximate and becomes less accurate as more stores are combined.

3. The effect of the applicable pylons and launchers is included in the effect of the external stores.

DATA BASED ON: ESTIMATES

DATA AS OF: 1 May 1952

Figure A–25. Drag Conversion

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