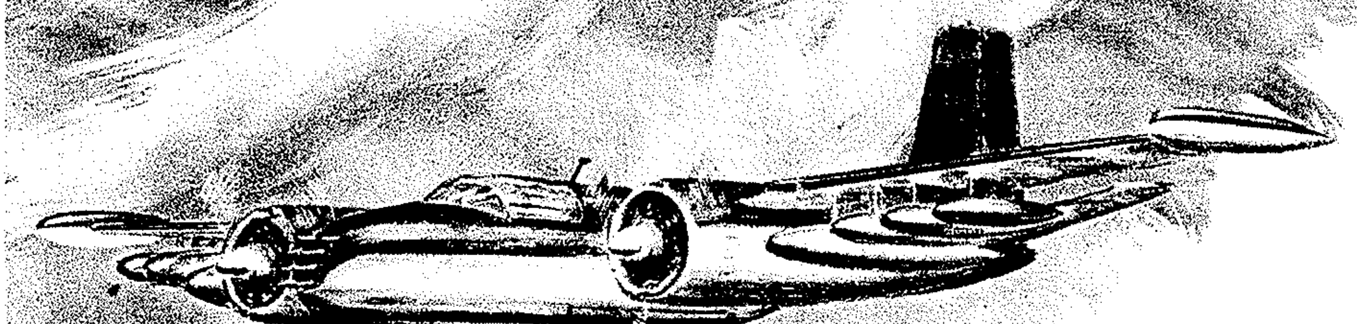
T.O. 1A-26A-1
(FORMERLY T.O. 1B-26K-1)

FLIGHT MANUAL



USAF SERIES
A-26A
AIRCRAFT

(ON MARK)

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THIS PUBLICATION REPLACES OPERATIONAL SUPPLEMENT T.O. 1A-26A-1S-17 DATED 6 JUNE 1969.

BASIC AND ALL CHANGES HAVE BEEN MERGED TO MAKE THIS A COMPLETE PUBLICATION.

COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS PUBLICATION TO THE ATTENTION OF ALL AIR FORCE PERSONNEL CLEARED FOR OPERATION OF THE SUBJECT AIRCRAFT.

SEE SAFETY OF FLIGHT SUPPLEMENT INDEX T.O. 0-1-1-5A FOR CURRENT STATUS OF SAFETY OF FLIGHT SUPPLEMENT(S).

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

26K-1-T-0-1A

AFLC/HAFB, Ogden 200

18 FEBRUARY 1966

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Dates of issue for original and changed pages are:

Original . . . .0 . . . . 18 February 1966
Change . . . .1 . . . . 30 December 1967
Change . . . .2 . . . . .31 July 1967
Change . . . .3 . . . . 30 November 1967
Change . . . .4 . . . . 1 July 1968
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TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 278 CONSISTING OF THE FOLLOWING:

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T.O. 1A-26A-1CL-1   18 February 1966, Changed 1 September 1969

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4-14A Added	3
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SCOPE

This manual contains the necessary information for safe and efficient operation of the B-26K aircraft. These instructions provide a general knowledge of the airplane, its characteristics, and specific normal and emergency operating procedures. Your flying experience is recognized, and therefore basic flight principles are avoided.

SOUND JUDGMENT

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

PERMISSIBLE OPERATIONS

The flight manual takes a "positive approach," and normally states only what you can do. Unusual operations or configurations (such as asymmetrical loading) are prohibited unless specifically covered herein. Clearance must be obtained from the Flight Manual Manager before any questionable operation is attempted which is not specifically permitted in this manual.

HOW TO BE ASSURED OF HAVING THE LATEST DATA

Refer to T.O. 0-1-1-5A, which is issued weekly, and devoted solely to the listing of all current Flight Manuals, Safety of Flight Supplements, and Checklists. Its frequency of issue and brevity assure an accurate, up-to-date listing of these publications.

STANDARDIZATION AND ARRANGEMENT

Standardization assures that the scope and arrangement of all Flight Manuals are identical. The manual is divided into ten fairly independent sections to simplify reading it straight through or using it as a reference manual.

SAFETY OF FLIGHT SUPPLEMENTS

Information involving safety will be promptly forwarded to you by Safety of Flight Supplements. Supplements covering loss of life will get to you in 48 hours via TWX, and those concerning serious damage to equipment, within 10 days by mail. The title page of the Flight Manual and the title block of each Safety of Flight Supplement should be checked to determine the effect they may have on existing supplements. You must remain constantly aware of the status of all supplements: current supplements must be complied with, but there is no point in restricting your operation by complying with a replaced or rescinded supplement.

CHECKLISTS

The Flight Manual contains only amplified checklists. Condensed (abbreviated) checklists have been issued as separate technical orders: the latest T.O. number of the abbreviated checklist is 1A-26A-1CL-1. Line items in the Flight Manual and checklists are identical with respect to arrangement and item number. Whenever a Safety of Flight Supplement affects the condensed (abbreviated) checklist, write in the applicable change on the affected checklist page. As soon as possible, a new checklist page, incorporating the supplement, will be issued. This will keep handwritten entries of Safety of Flight Supplement information in your checklists to a minimum.

HOW TO GET PERSONAL COPIES

Each flight crewmember is entitled to personal copies of the Flight Manual, Safety of Flight Supplements, and Checklists. The required quantities should be ordered before you need them to assure their prompt receipt. Check with your supply personnel - it is their job to fulfill your Technical Order requests. Basically, you must order the required quantities on the Publication Requirements Table (T.O. 0-1-1-5). T.O. 00-5-2 gives detailed information for properly ordering these publications. Make sure a system is established at your base to deliver these publications to the flight crews immediately upon receipt.

FLIGHT MANUAL AND CHECKLIST BINDERS

Loose-leaf binders and sectionalized tabs are available for use with your manual. These are obtained through local purchase procedures, and are listed in the Federal Supply Schedule (FSC Group 75, Office Supplies, Part 1). Binders are also available for carrying your condensed (abbreviated) checklist. These binders contain plastic envelopes into which individual checklist pages are inserted. They are available in three capacities and are obtained through normal Air Force supply under the following stock list numbers: 7510-766-4268, -4269, and -4270, for 15-, 25-, and 40-envelope binders respectively. Check with your supply personnel for assistance in securing these items.

WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to "Warnings," "Cautions," and "Notes" found throughout the manual.

WARNING

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

CAUTION

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

NOTE

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

YOUR RESPONSIBILITY - TO LET US KNOW

Every effort is made to keep the Flight Manual current. Review conferences with operating personnel and a constant review of accident and Flight Test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this manual or any phase of the Flight Manual program are welcomed. These should be forwarded through your Command Headquarters, in accordance with T.O. 00-5-1, to OOAMA (OONEAF), Hill Air Force Base, Utah. 84401.

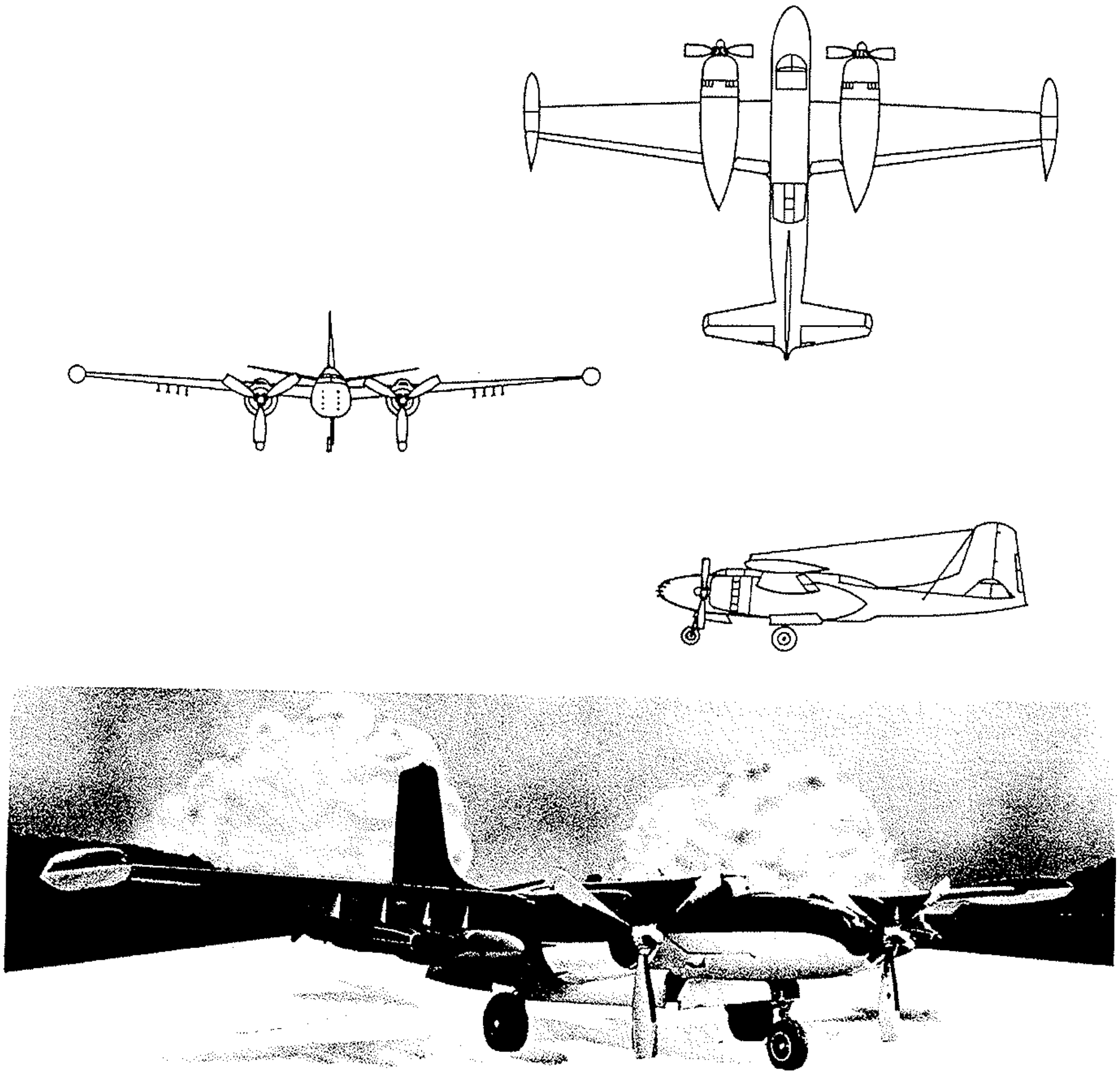

Figure 1-1

SECTION I

DESCRIPTION

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THE AIRCRAFT

The B-26K is a light bombardment type, twin engine, midwing monoplane, equipped with tricycle landing gear.

The aircraft is powered by two Pratt and Whitney engines that drive Hamilton-Standard hydromatic propellers.

The aircraft is equipped with dual controls, propeller reversing and autofeather capabilities, an antiskid brake system, a water injection system, wing tip fuel tanks, complete anti-icing and deicing systems, and an all purpose (gun) nose, with quick-change capabilities to a bombardier (glass) nose for reconnaissance missions.

Aircraft Dimensions

Overall dimensions of the aircraft are as follows:

Wing Span: 71 feet 6 inches
Length:
Gun Nose: 51 feet 7 inches
Glass Nose: 52 feet 1 inch
Height: (to top of Rotating Beacon on Vertical Fin) 19 feet 0 inch
Tread: 19 feet 6 inches
Horizontal Stabilizer Span: 23 feet 1 inch
Propeller diameter: 12 feet 4 inches
Propeller ground clearance: 12-1/2 inches

For minimum turning radius and ground clearance, see figure 2-3.

Aircraft Weight

Empty - 25,130 pounds (approx)
Maximum Gross - 43,380 pounds

For information regarding aircraft takeoff and landing gross weights, refer to Section V.

Flight Crew

The normal flight crew of the B-26K consists of a pilot and other authorized crew member(s), as specified in Section VIII, according to the aircraft configuration and type of mission to be flown.

Movement of Flight Personnel

Flight personnel may move from the flight deck to the glass nose through a crawlway located along the right side of the pilot compartment. Access is gained by removing the copilot flight controls, and unlocking and swinging out the hinged section of the copilot instrument panel.

Emergency access to the aft (gunner) compartment in flight is gained through the bomb bay compartment.

WARNING

To prevent injury to personnel during a crash landing, crew members or passengers shall not occupy the glass nose during takeoff and landing.

GENERAL ARRANGEMENT DIAGRAM

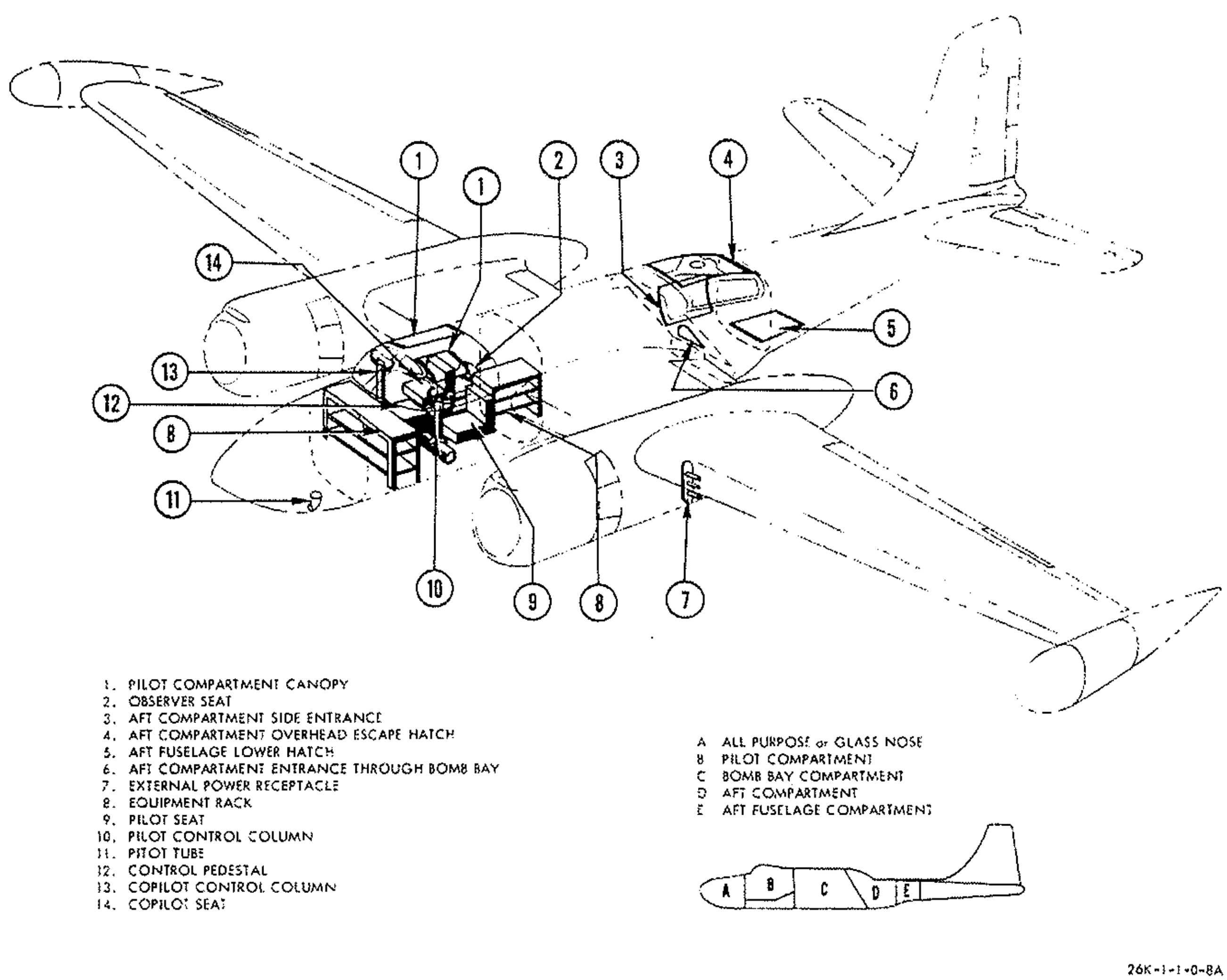


Figure 1-2

ENGINES

The aircraft is powered by two Pratt and Whitney R-2800-52W, radial 18 cylinder, double row, air cooled engines, equipped with water-alcohol injection and manual mixture controls. These engines are rated at 2500 BHP for takeoff, and drive Hamilton-Standard hydromatic, constant speed, full feathering, reversible propellers.

Antidetonant Injection (ADI) System (Water-Alcohol)

The aircraft is equipped with an ADI system, consisting of a 21-gallon supply tank located in each wing tip, pumps in each engine nacelle, and regulators on each engine. ADI pressure gages are installed on the pilot instrument panel, and a dual quantity indicator is installed in the auxiliary panel located behind the pilot. This system is armed by a guarded switch located on the right side of the pilot forward control pedestal. An arming light is located directly below the switch, and illuminates when the system is armed. When the system is activated, a momentary engine surge and then loss of engine RPM will be noticed. This happens as ADI pressure reaches the regulators and a small amount of fluid is briefly injected in to the engines. As the throttles are opened, ADI fluid will automatically be metered to the engines when the manifold pressure reaches 44 to 48 inches Hg. At this time, an ADI pressure drop of approximately 2 PSIG will be noticed from the normal reading of 24 PSIG. This pressure drop is an indication that ADI fluid is flowing to the engines. If this pressure drop does not occur, immediately reduce the manifold pressure to dry takeoff settings, and dearm the ADI system. Pressure operated valves in the water injection system prevent flow of ADI fluid to the engines if the engine oil pressure is less than 55 PSIG. When the system is dearmed, gage readings of 8 to 12 PSIG are normal. A rapid drop below this range indicates a leak in the system. The system receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel. The pressure-indicating system receives power from 26 VAC bus through a circuit breaker on the aft circuit breaker panel. System operation is contained in Section VII.

ANTIDETONANT INJECTION (ADI) SYSTEM (typical)

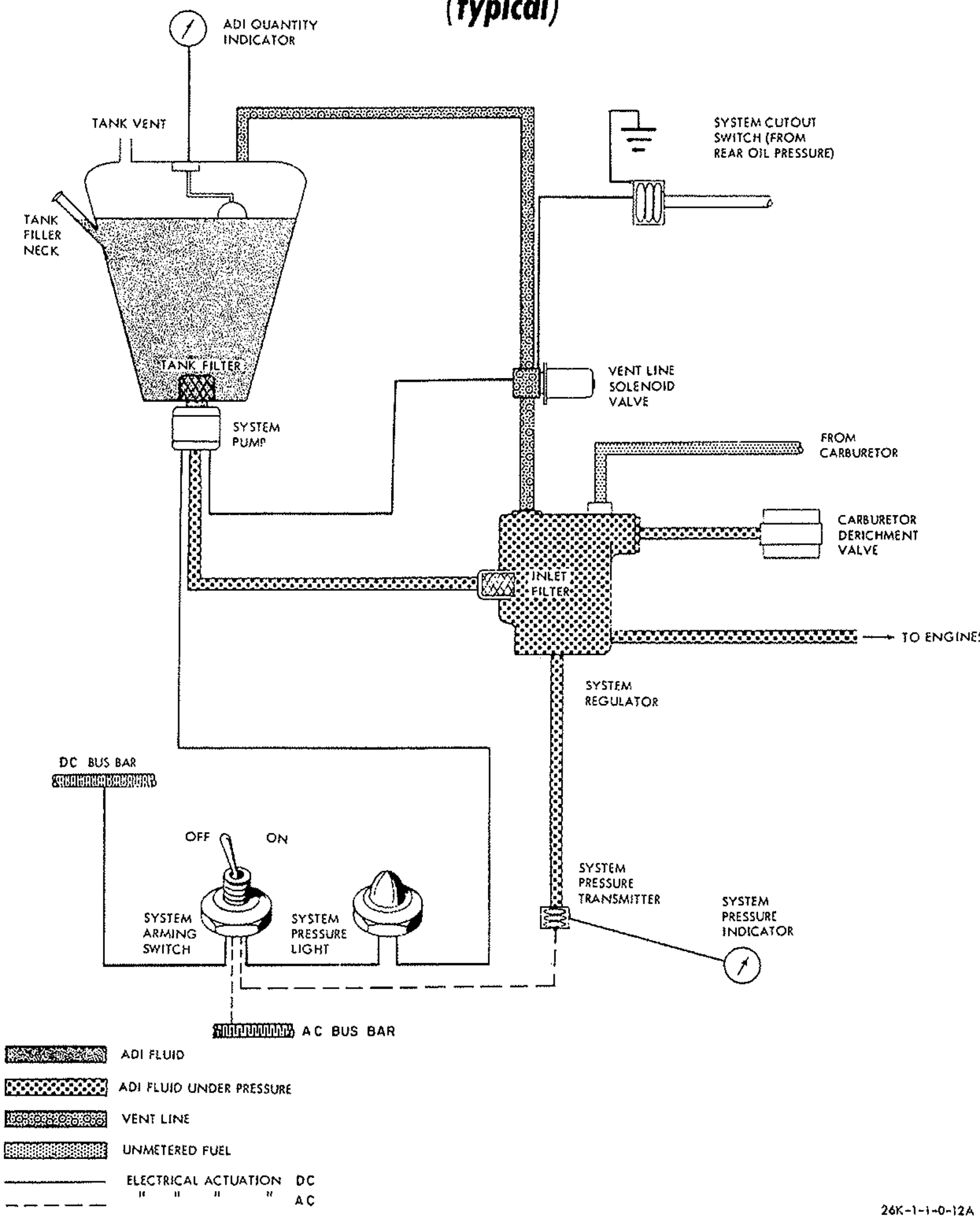


Figure 1-3

Throttles

Two throttles are located on the control pedestal. Throttle positions are marked OPEN, CLOSED, and REV. When the throttles are in OPEN position, the maximum allowable fuel-air mixture at sea level is delivered to the engines. When the throttles are moved to the CLOSED position, the engines operate at minimum (idle) RPM. Provision is made for propeller reversing, by pulling up the throttle reverse detent latches, and moving the throttles into the REV position. An indication of propeller blade movement into the reverse range is provided by two amber propeller reverse indicator lights located between the firewall shutoff valve handles. The pilot microphone switch is located on the outboard side of the left throttle handle.

NOTE

During propeller reverse operation, the amber reverse indicator lights may flicker through the initial (-9 degrees) travel of reverse range. The momentary flicker is common with the system function during propeller reverse operation

Throttle Lock Lever

A throttle lock lever, adjacent to the throttles, may be used to lock the throttles in any desired position, employing a friction arrangement.

Mixture Levers

Two fuel mixture levers are located on the control pedestal. Positions marked are AUTO RICH, AUTO LEAN, and IDLE CUTOFF. The AUTO RICH position provides an automatic rich mixture for any power setting. The AUTO LEAN position provides automatic leaning of the fuel mixture for fuel economy. At the IDLE CUTOFF position, fuel flow is shut off at the carburetors. Provision is also made for manual setting of the mixture levers to any desired position. Lever detents are provided at the AUTO RICH and IDLE CUTOFF positions. System operation is contained in Section VII.

Carburetor Air Temperature Control Levers

Two carburetor air temperature control levers are located on the control pedestal. With the levers in the HOT position, carburetor heat doors close off the inlet ducts and all carburetor air is received from the engine section of the nacelles. Intermediate positions of the levers provide a mixture of hot and cold air that may be used to regulate carburetor air temperatures to the desired level. A decrease in manifold pressure will occur when the carburetor air temperature levers are in the HOT position. When the levers are in the COLD position, ram air is supplied directly to the carburetors. Lever detents are provided in the HOT, COLD, and two intermediate positions. Carburetor air temperature control lever shall be positioned in the HOT position when the aircraft is not in use.

Supercharger (Blower) Levers

Two supercharger levers are located on the control pedestal. These levers mechanically control two speed, integral, engine superchargers. Two positions for each lever, HIGH and LOW, are indicative of the blower operation speeds. During operation, the levers should be shifted at regular intervals to eliminate the accumulation of sludge on the clutch faces. System operation is contained in Section VII.

Cowl Flap Switches

Two cowl flap switches, located on the control pedestal, provide for manual operation of the cowl flaps. Switch positions are OPEN, OFF, and CLOSE. The switches operate a reversible 28 VDC electric motor which receives power from the DC bus bar through a circuit breaker on the pilot circuit breaker panel. Position of the cowl flaps must be visually determined by the pilot, as there is no position indicator installed.

Carburetor Air Filter System

Deleted

Carburetor Air Filter Switches

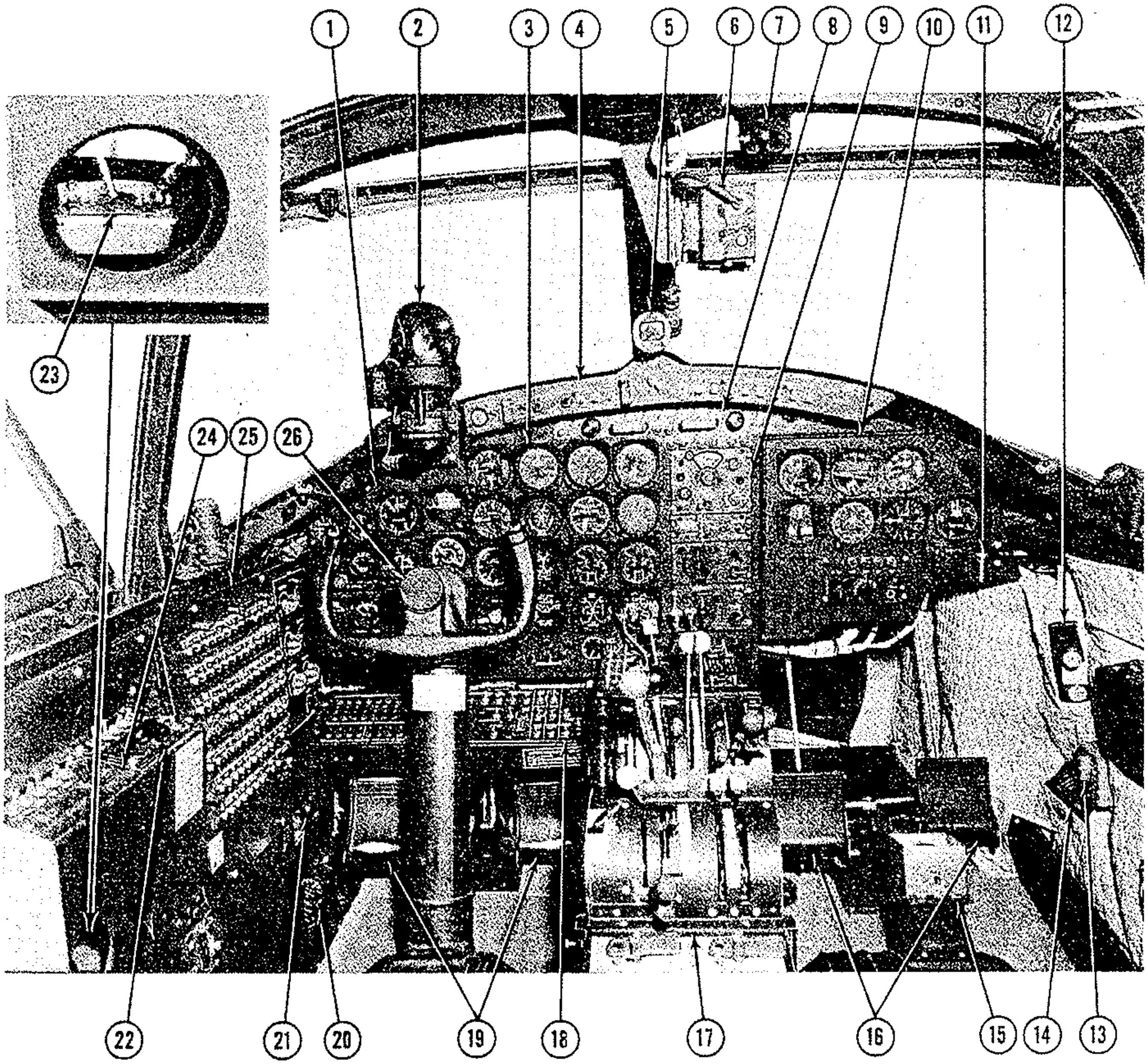
Deleted

Ignition System

The ignition system is a low tension, high altitude type, comprised essentially of one double tandem, low tension magneto, two distributors, thirty-six shielded ignition harnesses, eighteen double high tension coils, shielded spark plugs, and one induction vibrator for each engine. The system is completely independent of the aircraft electrical system, with the exception of the induction vibrators.

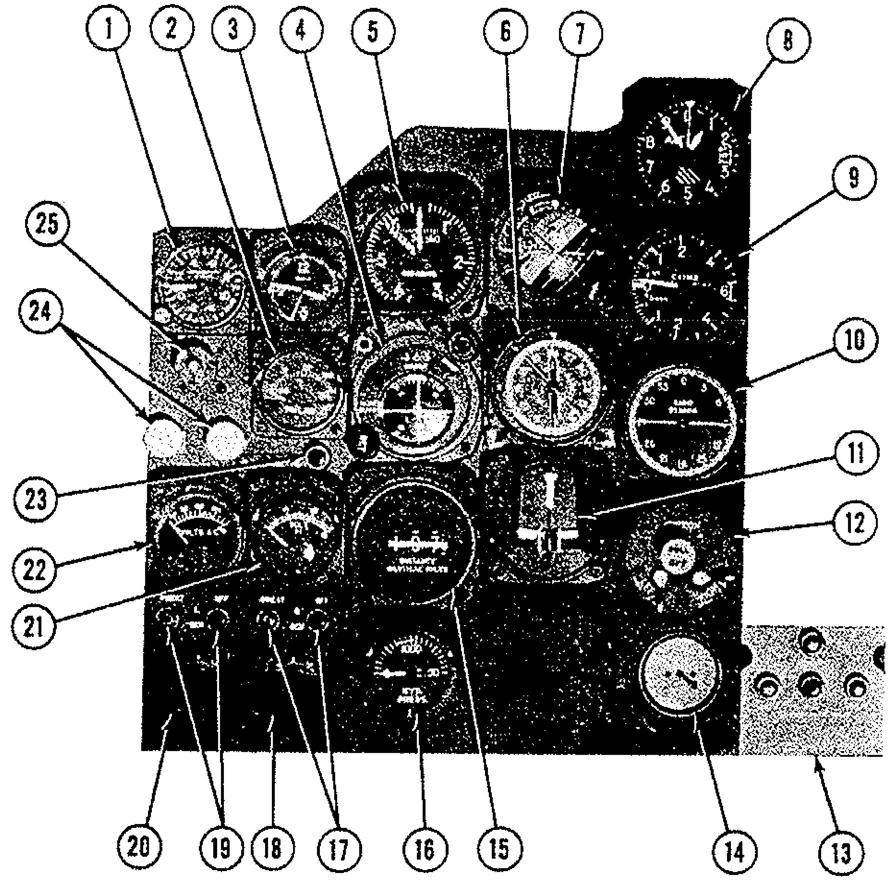
Ignition Switches

Three ignition switches are located on the lower part of the pilot instrument panel. The master ignition switch has ON and OFF positions. With this switch in the ON position, the magnetos on both engines are controlled by their respective ignition switch. When the master ignition switch is at OFF, the magnetos on both engines are grounded. Both the right and left ignition switches have positions marked BOTH, L, R, and OFF. With either the left or right switch at the OFF position, the circuits to the respective magnetos are grounded, and the magnetos become inoperative. With either the left or right ignition switch at L, current is supplied from the left magneto and left distributor of the respective engine, firing the rear spark plugs of all cylinders. With



1. PILOT INSTRUMENT PANEL
2. GUNSIGHT
3. CENTER INSTRUMENT PANEL
4. ARMAMENT PANEL
5. MAGNETIC COMPASS
6. KB-3 GUN CAMERA
7. FREE AIR VENT
8. ENGINE FIRE EXTINGUISHER CONTROL PANEL
9. NAVIGATION RADIO CONTROL PANEL
10. COPILOT INSTRUMENT PANEL
11. COPILOT INSTRUMENT PANEL LOCK
12. COPILOT DEFROSTER AND FOOT WARMER CONTROLS
13. COPILOT RADIO FILTER
14. COPILOT OXYGEN PRESSURE GAGE AND FLOW INDICATOR
15. COPILOT CONTROL COLUMN BASE (COLUMN AND WHEEL REMOVED)
16. COPILOT RUDDER/BRAKE PEDALS
17. CONTROL PEDESTAL
18. PILOT SUBPANEL
19. PILOT RUDDER/BRAKE PEDALS
20. PILOT OXYGEN PRESSURE GAGE AND FLOW INDICATOR
21. PARKING BRAKE LEVER
22. PILOT INTERPHONE CONTROLS
23. STATIC PRESSURE SELECTOR VALVE
24. PILOT NAVIGATION RADIO MONITOR PANEL
25. PILOT CIRCUIT BREAKER PANEL
26. PILOT CONTROL WHEEL AND COLUMN

Figure 1-4. Pilot Compartment (Forward View)



1. ACCELEROMETER
2. FREE AIR TEMPERATURE GAGE
3. CLOCK
4. COURSE INDICATOR
5. AIRSPEED INDICATOR
6. RADIO MAGNETIC INDICATOR
7. ATTITUDE INDICATOR (ELECTRIC)
8. ALTIMETER
9. VERTICAL VELOCITY INDICATOR
10. TACAN BEARING INDICATOR
11. TURN AND SLIP INDICATOR
12. IGNITION SWITCHES
13. GEAR WARNING LIGHTS
14. WING FLAP POSITION INDICATOR
15. RANGE INDICATOR
16. HYDRAULIC PRESSURE INDICATOR
17. RH GENERATOR WARNING LIGHTS
18. RH LOADMETER
19. LH GENERATOR WARNING LIGHTS
20. LH LOADMETER
21. DC VOLTMETER
22. AC VOLTMETER
23. INVERTER FAILURE LIGHT
24. MANIFOLD GAGE DRAIN BUTTONS
25. WINDSHIELD ALCOHOL CONTROL VALVE

Figure 1-5. Pilot Instrument Panel

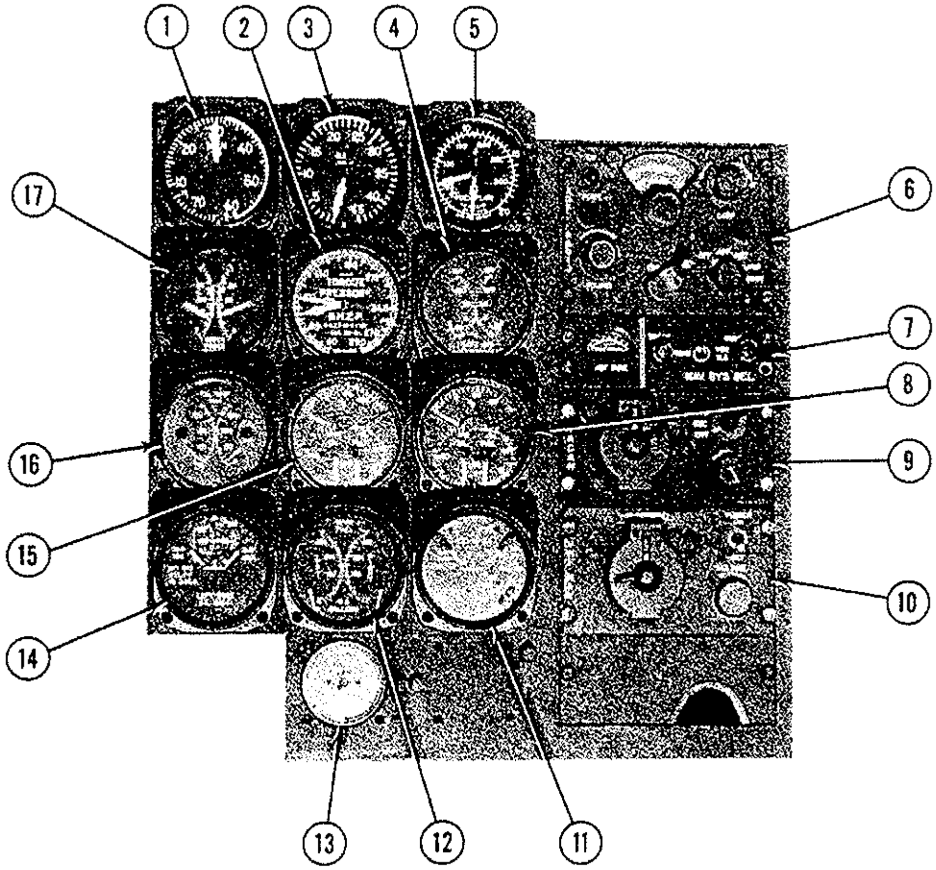
either the left or right ignition switch at R, current is supplied from the right magneto and right distributor of the respective engine, firing the front spark plugs on all cylinders. With either switch in the BOTH position, current is supplied from both magnetos and distributors of the respective engine, firing all spark plugs.

Starter Switch

A starter switch, mounted on the overhead electrical panel, provides direct cranking of either engine. The switch has L, R, and OFF positions, and is spring loaded to OFF. When the switch is held at L, or R, the corresponding meshing solenoid engages, and the engine is turned over. An induction vibrator supplies a "hot" ignition spark to aid in starting the engine when the starter switch is in the engaged position. The circuit receives power from the 28 VDC bus bar through the pilot circuit breaker panel.

Primer Switches

A single, three position primer switch is located on the overhead electrical panel. The switch is positioned L, OFF, R, and is spring loaded to OFF. With the



1. MANIFOLD PRESSURE GAGE
2. BMEP INDICATOR
3. TACHOMETER
4. CARBURETOR AIR TEMPERATURE INDICATOR
5. FUEL FLOW INDICATOR
6. ADF RADIO CONTROL PANEL
7. NAVIGATION SYSTEM SELECTOR
8. RH ENGINE GAGE UNIT
9. TACAN CONTROL PANEL
10. VHF NAV CONTROL PANEL
11. RH AUX, RH TIP AND BOMB BAY FUEL TANK QUANTITY INDICATOR
12. MAIN FUEL TANK QUANTITY INDICATOR
13. SUCTION GAGE
14. LH AUX, LH TIP FUEL TANK QUANTITY INDICATOR
15. LH ENGINE GAGE UNIT
16. CYLINDER HEAD TEMPERATURE INDICATOR
17. ADI PRESSURE GAGE

Figure 1-6. Center Instrument and Navigation Radio Control Panels

switch held in either the L or R position, the respective engine solenoid valve is opened, allowing fuel to flow into the blower section of that engine. The primer circuit receives power from the 28 VDC bus bar through a circuit breaker located on the pilot circuit breaker panel.

Tachometer

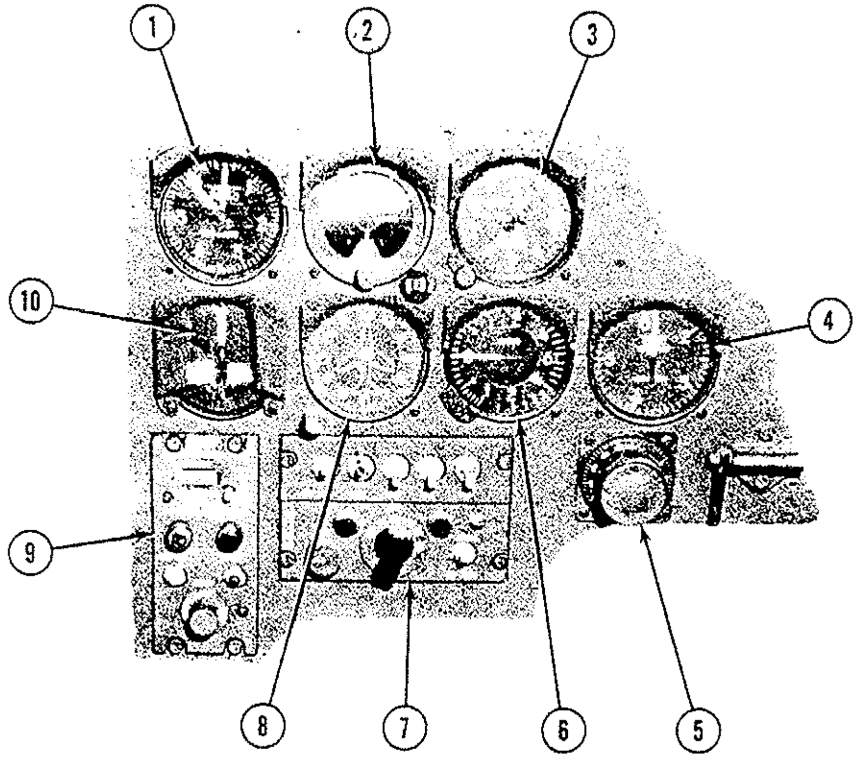
A dual indicating tachometer, located on the center instrument panel, indicates the RPM of each engine in 100 RPM increments. Each tachometer needle is actuated by electrical current from the respective tachometer-generator connected to the engine crankshaft.

Manifold Pressure Gage

A dual indicating manifold pressure gage, located in the center instrument panel, indicates in inches of mercury the intake manifold pressure of each engine. Two push-to-drain manifold pressure gage drain valve buttons, decaled L and R, are located to the left of the pilot instrument panel. These buttons are used to clear the manifold pressure gage lines of condensation and foreign matter.

Cylinder Head Temperature Gage

A dual indicating cylinder head temperature gage, located on the center instrument panel, indicates



1. AIRSPEED INDICATOR
2. ATTITUDE INDICATOR (VACUUM)
3. ALTIMETER
4. TRUE AIRSPEED INDICATOR
5. FORWARD OBLIQUE CAMERA INTERVALOMETER CONTROL
6. VERTICAL VELOCITY INDICATOR
7. INTERPHONE CONTROL
8. HEADING INDICATOR
9. FORWARD OBLIQUE CAMERA CONTROL
10. TURN AND SLIP INDICATOR

Figure 1-7. Copilot Instrument Panel

temperature in degrees centigrade. Electrical current generated by a thermocouple on the No. 16 cylinder on each engine, actuates the gage.

Carburetor Air Temperature Gage

A dual indicating carburetor air temperature gage, located on the center instrument panel, indicates in degrees centigrade the temperature in the throat of each carburetor. The circuit receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Engine Gage Unit

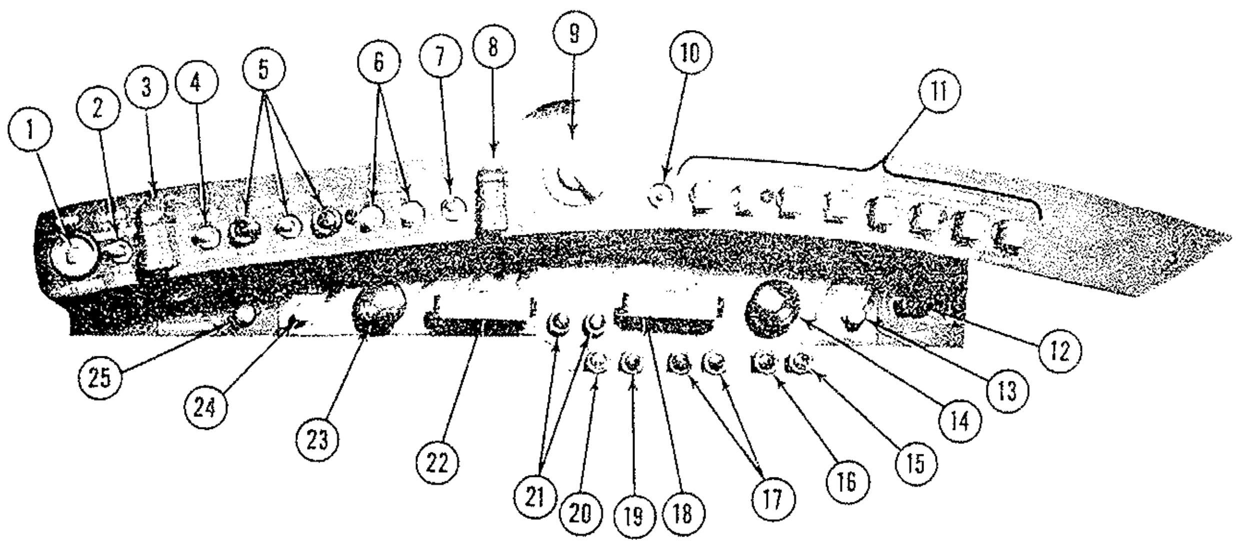
Two engine gage units, located on the center instrument panel, contain oil pressure, fuel pressure, and oil temperature indicators for each engine. The oil pressure indicators indicate in pounds per square inch the oil pressure for the respective engine. The indicator is energized by hydrostatic pressure. The oil temperature indicators show oil temperature for each engine, in degrees centigrade. The indicator receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel. The fuel pressure indicators indicate, in pounds per square inch, the fuel pressure at the carburetor inlet of each engine. Fuel pressure from a transmitter in each engine section actuates the indicator. Fuel and oil pressure warning lights, red for fuel and amber for oil, are located on the engine fire extinguisher control panel. The fuel pressure warning light will illuminate at 15 PSIG. The oil pressure warning light will illuminate at 35 PSIG.

BMEP Indicator

A dual indicating BMEP (brake mean effective pressure) unit is located on the center instrument panel. This instrument indicates the actual power output of each engine, in PSIG. This instrument receives power from the 115V, 400 cycle AC system through the 26 VAC step down transformer, and is protected by a circuit breaker on the pilot circuit breaker panel. System operation is contained in Section VII.

Fuel Flow Indicator

A dual indicating fuel flow instrument, located on the center instrument panel, indicates in pounds per hour, and gallons per hour, the flow of fuel to the engines. Power for this instrument is received from the 115V, 400 cycle AC system, through the 26 VAC step down transformer, and is protected by a circuit breaker on the pilot circuit breaker panel.



1. WING JETTISON BUTTON
2. BOMB FUSE ARMING SWITCH
3. BOMB BAY JETTISON SWITCH
4. GUN CHARGING SWITCH
5. BOMB BAY DOOR SWITCH AND WARNING LIGHTS
6. BOMB BAY FRONT AND REAR RACK ARMING SWITCHES
7. PILOT-BOMBARDIER RELEASE SWITCH
8. MASTER ARMAMENT SWITCH
9. GUN SELECT SWITCH
10. GUNSIGHT FILAMENT SWITCH
11. EXTERNAL STORES SELECTOR SWITCHES
12. COCKPIT HEATER TEMPERATURE CONTROL
13. RH ENGINE FIRE EXTINGUISHER SWITCH
14. RH PROPELLER MANUAL FEATHER BUTTON
15. RH OIL WARNING LIGHT
16. RH FUEL WARNING LIGHT
17. VACUUM PUMP FAILURE WARNING LIGHTS
18. RH FIREWALL SHUTOFF VALVE HANDLE
19. LH FUEL WARNING LIGHT
20. LH OIL WARNING LIGHT
21. PROPELLER REVERSE LIGHTS
22. LH FIREWALL SHUTOFF VALVE HANDLE
23. LH PROPELLER MANUAL FEATHER BUTTON
24. LH ENGINE FIRE EXTINGUISHER SWITCH
25. SPARE BULB HOLDER

Figure 1-8. Engine Fire Extinguisher Control and Armament Panels

ADI (Water) Pressure Gage

A dual indicating water pressure gage is located on the center instrument panel. This instrument indicates in PSIG the water pressure in the ADI system. This instrument receives power from the 115V, 400 cycle AC system through the 26 VAC step down transformer, and is protected by a circuit breaker on the pilot circuit breaker panel.

PROPELLERS

The engines drive Hamilton-Standard hydromatic, three blade, constant speed, reversible, full feathering propellers. Constant speed is maintained by a cable controlled governor, mounted on each engine nose section. Engine oil under pressure is metered by the governor to change the blade angles.

Propeller Levers

Two propeller levers, located on the control pedestal, provide for manual control of the propeller governors. Lever positions are marked INCREASE and DECREASE. The levers may be set to any desired intermediate position within the speed range of 1200 to 2800 RPM.

Propeller Lever Lock Handle

A propeller lever lock handle, located adjacent to the propeller levers, may be used to hold the propeller levers in any desired position by use of a friction arrangement.

Manual Feathering System

Two propeller feathering buttons, marked L and R, are located directly below the armament panel to the outboard sides of the firewall shutoff handles. Depressing either button starts the corresponding feathering pump, and feathers the propeller. After the pump starts, the feathering button will remain in until the propeller feathers.

CAUTION

If the feathering button remains depressed for more than 30 seconds after feathering action was initiated, manually return the button to the normal position to preclude damage to the feathering motor.

The feathering action can be stopped at any time by pulling the button out. When unfeathering, the button

AUTOFEATHER SYSTEM

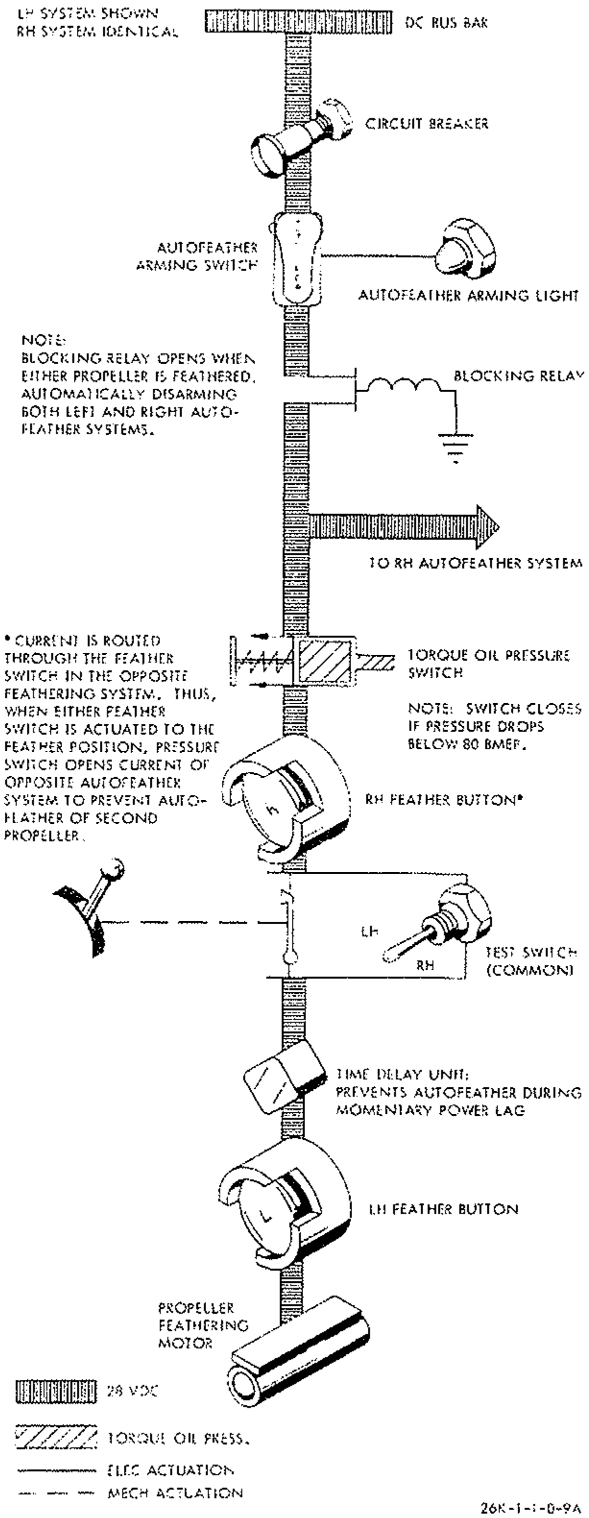


Figure 1-9

must be pulled out and held until 800 RPM is reached, at which time the button may be released and the propeller governor will control the RPM. The propeller feathering circuits receive power from the 28 VDC system through the autofeather circuit breaker on the pilot circuit breaker panel.

Automatic Feathering System

The propeller autofeather system automatically feathers the propeller in the event of engine failure after sufficient power has been applied. System operation causes the appropriate manual feathering button to be magnetically drawn into feathering position if engine torque pressure falls below 80 BMEP. The system is powered by 28 VDC through the autofeather switch, a torque pressure sensing unit in the nose case of each engine, and microswitches on the throttle quadrant that close as the throttles are advanced. If torque pressure at one of the engines falls due to failure, the torque pressure sensing unit switch will close and connect DC power to a solenoid and holding coil at the corresponding manual feathering button. The feathering button will be drawn in after a 3 second time delay, and the propeller will feather. An interlock circuit prevents both propellers from feathering simultaneously. The system will not feather the second propeller if one propeller has already been feathered either automatically or manually.

Autofeather Arming Switch and Light

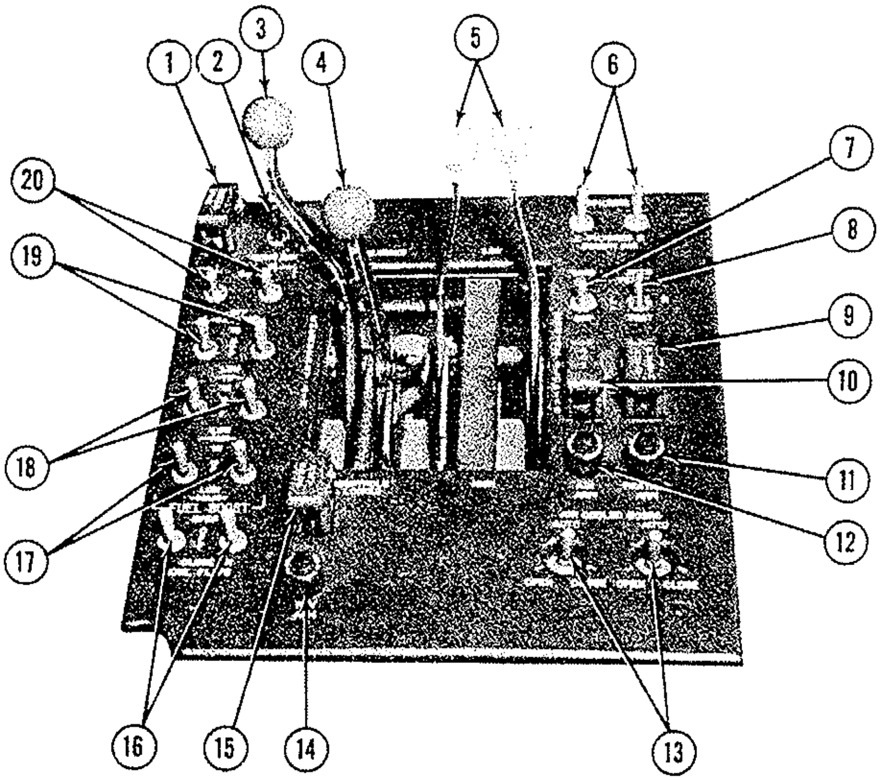
A guarded autofeather system arming switch is located on the right side of the control pedestal (forward section). This switch controls 28 VDC power from the main bus bar to the autofeather system in each nacelle, and has positions marked ON and OFF. With the switch in the ON position, DC power is supplied to the red arming light located below the arming switch, and to the torque sensing switches in each engine, thus arming the system. With the switch in the OFF position, the system is dearmed and the arming light will go out.

Propeller Reverse Arming Switch and Light

A guarded propeller reverse arming switch is located on the control pedestal (forward section). This switch controls 28 VDC power from the main bus bar to the propeller reverse system in each propeller. With the switch in the ARMED position, DC power is supplied to the red arming light located aft of the arming switch. With the switch in the OFF position, the system is dearmed regardless of throttle position.

OIL SUPPLY SYSTEM

Oil for each engine is supplied through an independent oil supply system which includes a self sealing oil tank in each nacelle, an oil cooler and air scoop in the wing (outboard of the nacelle), and an engine driven pump. The total capacity of the oil tank is 39 U.S. gallons. However, the tank is only serviced to 30 U.S. gallons to provide a 5-inch air space for expansion. A standpipe provides a reserve supply of 1.25 U.S. gallons for the propeller feathering system.



1. TIP TANK DUMP SWITCH
2. BOMB BAY FUEL BOOST PUMP SWITCH
3. EMERGENCY AIR BRAKE LEVER
4. CONTROL LOCK
5. SUPERCHARGER LEVERS
6. CARBURETOR AIR FILTER SWITCHES
7. CARBURETOR ALCOHOL SWITCH
8. AUTOFEATHER SYSTEM TEST SWITCH
9. AUTOFEATHER ARMING SWITCH
10. ADI ARMING SWITCH
11. AUTOFEATHER ARMING LIGHT
12. ADI ARMING LIGHT
13. OIL COOLER DOOR SWITCHES
14. PROPELLER REVERSE ARMING LIGHT
15. PROPELLER REVERSE ARMING SWITCH
16. COWL FLAP SWITCHES
17. MAIN TANK FUEL BOOST PUMP SWITCHES
18. AUXILIARY TANK FUEL BOOST PUMP SWITCHES
19. TIP TANK FUEL BOOST PUMP SWITCHES
20. EXTERNAL WING FUEL TRANSFER PUMP SWITCHES

Figure 1-10. Control Pedestal (Forward Section)

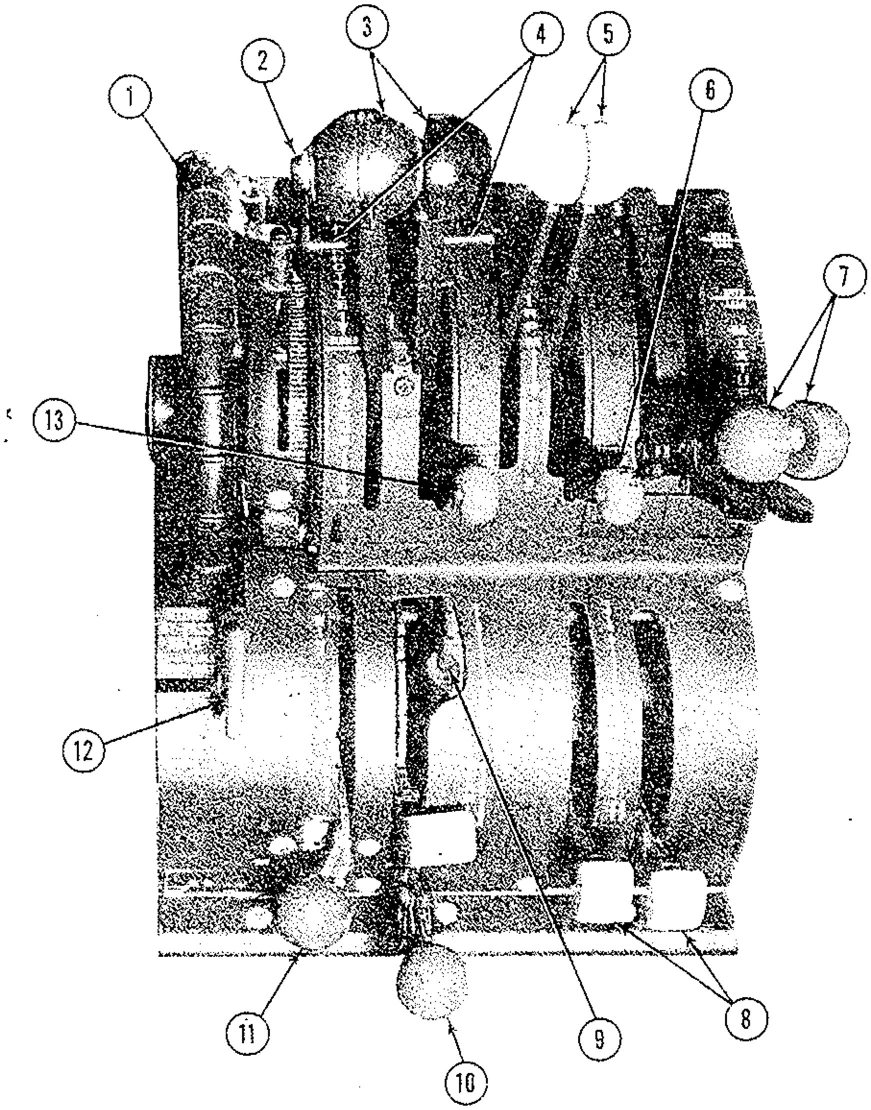
Oil temperature is regulated by oil coolers, and electrically controlled oil cooler doors. The operation of the doors is accomplished automatically by thermostats, or by manually operated switches. An oil dilution system is provided for diluting the oil with gasoline to facilitate cold weather starting.

Oil Cooler Door Switches

Two oil cooler door switches, mounted on the control pedestal, are used to control oil temperature. Each switch has four positions, OPEN, CLOSE, AUTO, and an unmarked OFF. The switches are spring loaded to OFF from the OPEN and CLOSE positions. With a switch in the OPEN or CLOSE position, the corresponding oil cooler door will be opened or closed by a reversible electric motor. When a switch is moved from OPEN or CLOSE to OFF, the oil cooler will remain in any desired setting. With either switch in the AUTO position, the respective door is automatically controlled by a thermostat, located in the oil return line between the oil cooler and tank, to maintain a preset temperature. The oil cooler door circuits receive power from the 28 VDC bus bar through two circuit breakers on the pilot circuit breaker panel. It takes approximately 15 seconds for the door to travel through the full range of operation.

Oil Dilution Switches

Two oil dilution switches are located on the overhead electrical panel. Controlling two solenoids in the oil dilution system, these switches have OFF and ON positions, and are spring loaded to OFF. When a switch is placed in the ON position, the corresponding solenoid valve is opened, and gasoline is injected into the oil inlet line. The circuits receive power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel, and are deenergized when the switches are placed in the OFF position. Oil dilution procedures are contained in Section IX.



1. ELEVATOR TRIM CONTROL
2. MICROPHONE BUTTON
3. THROTTLES
4. PROPELLER REVERSE SPRING LATCHES
5. PROPELLER LEVERS
6. PROPELLER LEVERS LOCK
7. MIXTURE CONTROL LEVERS
8. CARBURETOR AIR TEMPERATURE LEVERS
9. LANDING GEAR DETENT BUTTON
10. LANDING GEAR LEVER
11. WING FLAP LEVER
12. HYDRAULIC BYPASS VALVE HANDLE
13. THROTTLE LOCK

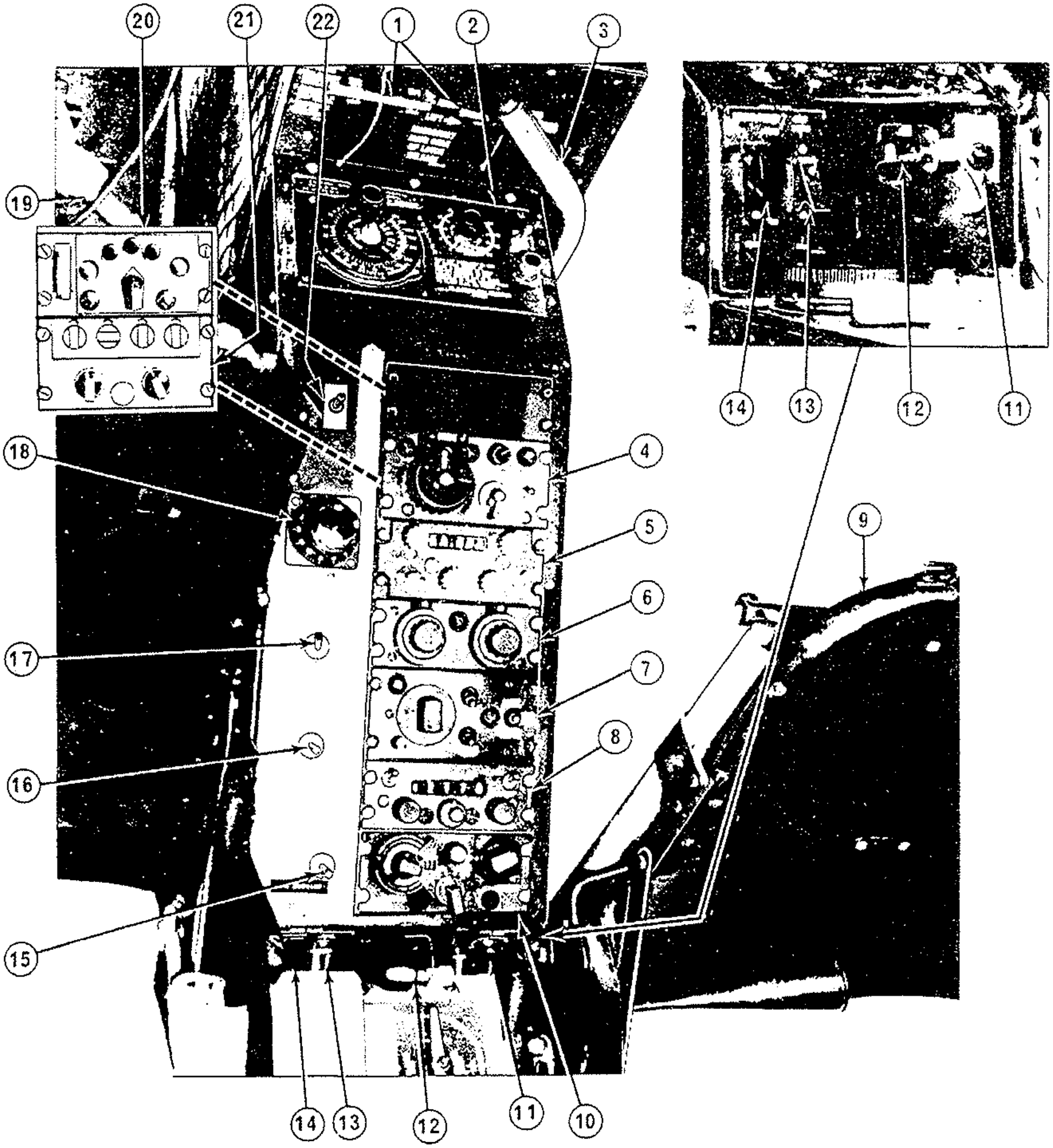
Figure 1-11. Control Pedestal (Lever Quadrant)

FUEL SUPPLY SYSTEM

The fuel supply system consists essentially of two main tanks located in the engine nacelles, two auxiliary tanks located in the wings inboard of the engines, two wing tip tanks, a bomb bay tank, engine driven fuel pumps, electrical fuel boost pumps, fuel transfer pumps, fuel selector valves, fuel dump valves for the tip tanks, and necessary connecting lines and fittings. Provision is made for the installation of a long range ferry tank, and wing drop tanks on the inboard pylons.

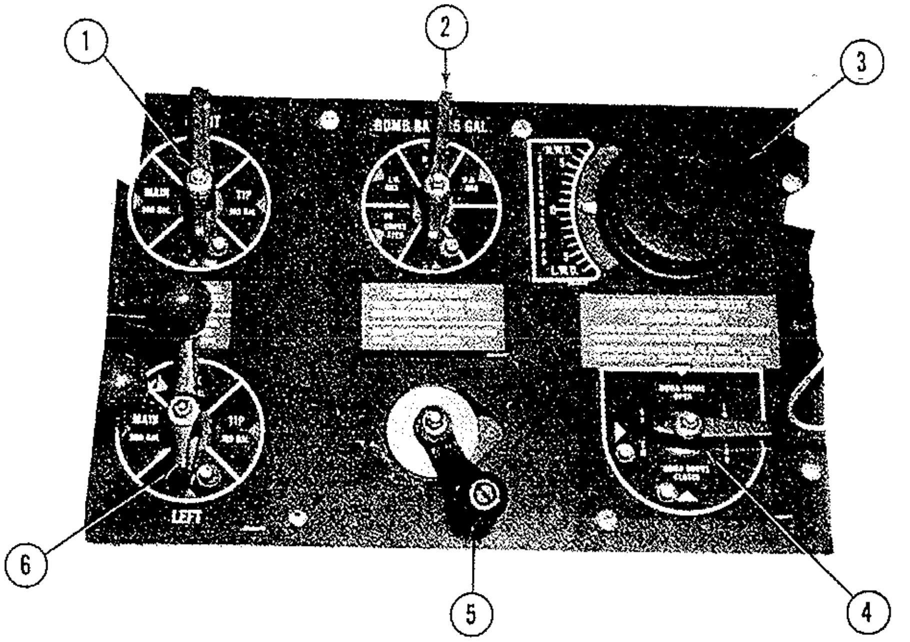
CAUTION

The bomb bay fuel tank shall not be filled to exceed 100 U.S. gallons in order to preclude a fire hazard caused by fuel flow from the bomb bay tank vent into the bomb bay.



1. MAIN LANDING GEAR EMERGENCY UPLATCH RELEASE HANDLES
2. BOMB INTERVALOMETER
3. HYDRAULIC HAND PUMP HANDLE
4. FM CONTROL PANEL (AN/ARC-44)
5. HF CONTROL PANEL
6. SIF CONTROL PANEL
7. IFF CONTROL PANEL
8. VHF CONTROL PANEL
9. PILOT SEAT
10. UHF CONTROL PANEL
11. PEDESTAL LIGHT CONTROL
12. PEDESTAL LIGHT
13. WING FLAP LIMIT SWITCH
14. WING FLAP MASTER CONTROL SWITCH
15. FM SQUELCH SWITCH
16. P-2 STRIKE CAMERA APERTURE ROTARY SWITCH
17. P-2 STRIKE CAMERA DOOR CONTROL SWITCH
18. P-2 STRIKE CAMERA INTERVALOMETER
19. FIRE AXE
20. KY-8 CONTROL PANEL (AFTER T. O. 1A-26A-536)
21. FM-622A CONTROL PANEL (AFTER T. O. 1A-26A-533)
22. RADAR TRANSPONDER SST-181X

Figure 1-12. Aft Control Pedestal



1. RH WING FUEL SELECTOR VALVE HANDLE
2. BOMB BAY FUEL SELECTOR VALVE HANDLE
3. AILERON TRIM CONTROL
4. EMERGENCY HYDRAULIC SELECTOR VALVE HANDLE
5. RUDDER TRIM CONTROL
6. LH WING FUEL SELECTOR VALVE HANDLE

Figure 1-13. Control Pedestal (Center Section)

Fuel for engine priming and oil dilution is supplied by the fuel system. For fuel grades and specifications, see figure 1-25.

Left and Right Fuel Tanks Selector Valve Handles

Two fuel selector valve handles, labeled RIGHT and LEFT, are located on the control pedestal. Handles are positioned MAIN, AUX, TIP, ALL OFF. When the left fuel selector valve handle is placed at MAIN ON, fuel is supplied to the left engine from the left main fuel tank. When the handle is placed at AUX or TIP, fuel is supplied to the left engine from the left auxiliary tank, or the left wing tip tank respectively. When the handle is placed at ALL OFF, the left fuel tank selector valve is closed, and no fuel will flow from the left main, auxiliary, or wing tip tanks. The right fuel selector valve handle and system operate in exactly the same manner.

Bomb Bay Tank and Crossfeed Selector Valve Handle

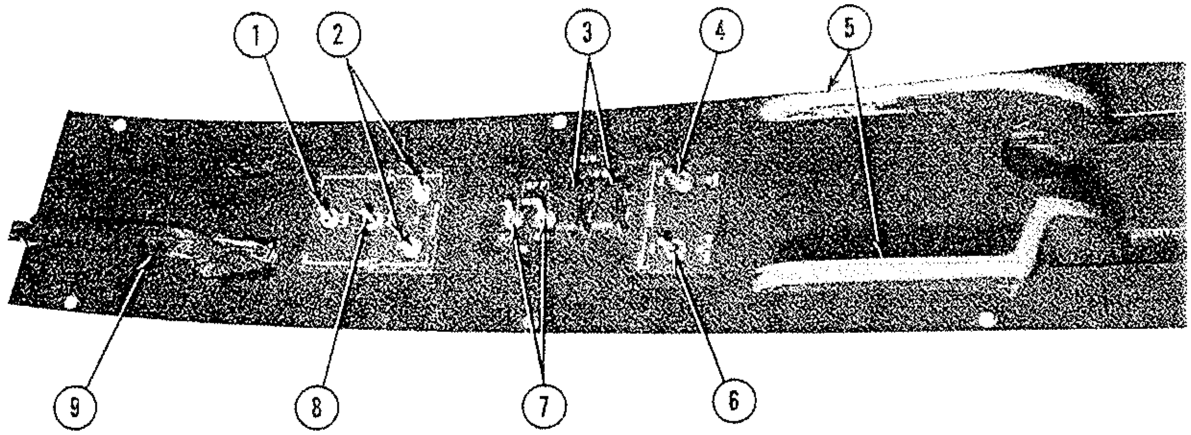
Fuel flow from the bomb bay tanks and for crossfeed is controlled by a handle located on the control pedestal. The handle mechanically positions the fuel selector valve. The handle has LH ENG, BOTH ENG, RH ENG, ON CROSS FEED, and OFF positions. When the bomb bay tank and crossfeed handle is at LH ENG, fuel is supplied to the left engine from the bomb bay tank; at BOTH ENG, fuel is supplied to the left and right engines from the bomb bay tank; at RH ENG, fuel is supplied to the right engine from the bomb bay tank. With the handle at ON CROSS FEED, fuel may be supplied to both engines from any one of the main, auxiliary, or wing tip tanks. When using crossfeed from the right main, auxiliary, or wing tip tanks, the left wing fuel selector valve handle should be at ALL OFF; when using crossfeed from the left wing fuel section, the right wing fuel selector valve handle should be at ALL OFF. With the bomb bay tank and crossfeed handle at OFF, the selector valve is closed, and no fuel will flow from the bomb bay tank.

Fuel Boost Pump Switches

Seven fuel boost pump switches are located on the left side of the control pedestal. Individual switches are provided for the left and right main, auxiliary, bomb bay, and wing tip tank fuel boost pumps. Switch positions are HIGH, OFF, and LOW. With a switch in the HIGH position, fuel pressure is 21 to 24 PSIG. In the LOW position, fuel pressure is 10 to 15 PSIG. HIGH or LOW positions are selected as required to augment pressure supplied by the engine driven fuel pumps. With a switch in the OFF position, the corresponding fuel boost pump circuit is deenergized. The circuits receive power from the 28 VDC bus bar through circuit breakers on the pilot circuit breaker panel.

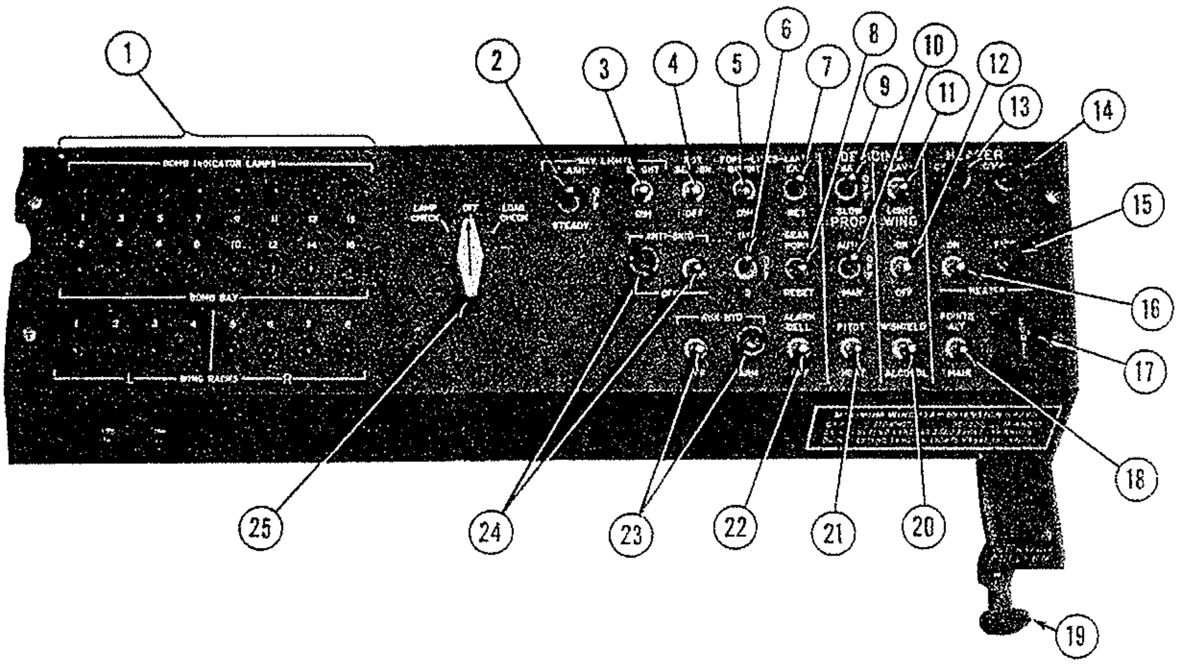
Fuel Transfer Pump Switches

Two fuel transfer pump switches marked L WING and R WING (EXT. STORES) are located on the control pedestal. The two stores switches provide for the transfer of fuel from the drop tanks to the main fuel tanks. As indicated, there are individual switches for each drop tank. Power is received from the 28 VDC bus bar through circuit breakers on the pilot circuit breaker panel.



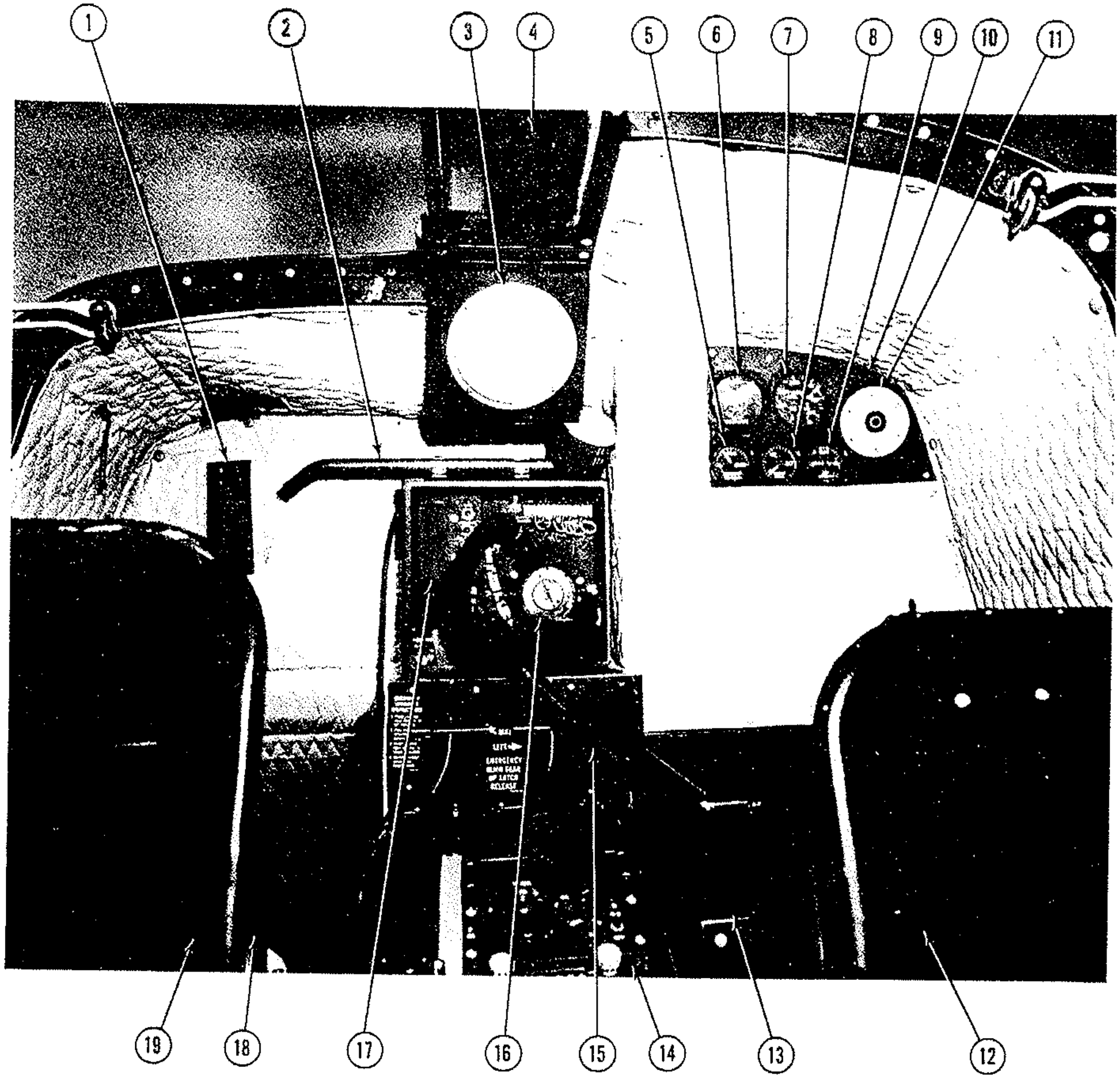
1. ENGINE PRIMER SWITCH
2. OIL DILUTION SWITCHES
3. GENERATOR SWITCHES
4. COCKPIT DOME LIGHT SWITCH
5. RIGHT AND LEFT CANOPY LATCH HANDLES
6. NOSE GEAR INSPECTION LIGHT SWITCH
7. BATTERY SWITCHES
8. ENGINE STARTER SWITCH
9. CANOPY EMERGENCY RELEASE HANDLE

Figure 1-14. Overhead Electrical Panel



1. BOMB INDICATOR LIGHTS
2. NAVIGATION LIGHTS CONTROL SWITCH
3. NAVIGATION LIGHTS INTENSITY SWITCH
4. ROTATING BEACON SWITCH
5. FORMATION LIGHTS SWITCH
6. INVERTER SELECTOR SWITCH
7. LANDING LIGHTS SWITCH
8. GEAR HORN CUTOFF SWITCH
9. PROPELLER DEICING CYCLE SWITCH
10. PROPELLER DEICING AUTO-MAN. SWITCH
11. WING DEICING CYCLE SWITCH
12. WING DEICING ON-OFF SWITCH
13. HEATER CYCLE LIGHT
14. HEATER OVERHEAT WARNING LIGHT
15. HEATER FIRE WARNING LIGHT
16. HEATER SWITCH
17. HEATER CO_2 RELEASE SWITCH
18. HEATER POINTS SWITCH
19. PILOT FOOT WARMER CONTROL
20. WINDSHIELD ALCOHOL SWITCH
21. PITOT HEATER SWITCH
22. ALARM BELL SWITCH
23. AUXILIARY HYDRAULIC PUMP ARMING SWITCH AND LIGHT
24. ANTISKID ARMING SWITCH AND LIGHT
25. BOMB INDICATOR LOAD AND LIGHT CHECK SWITCH

Figure 1-15. Pilot Subpanel



1. HYDRAULIC FLUID RESERVOIR SIGHT GAGE AND FILLER NECK
2. HYDRAULIC FLUID RESERVOIR FILLER
3. COCKPIT DOME LIGHT
4. OVERHEAD ELECTRICAL PANEL
5. EMERGENCY AIR PRESSURE INDICATOR
6. ADI FLUID QUANTITY INDICATOR
7. FERRY TANK FUEL QUANTITY INDICATOR
8. DEICING PRESSURE INDICATOR
9. GUN AIR PRESSURE INDICATOR
10. AUXILIARY INSTRUMENT PANEL
11. GEAR WARNING HORN
12. PILOT SEAT
13. EQUIPMENT RACK
14. CONTROL PEDESTAL (AFT SECTION)
15. HYDRAULIC HAND PUMP HANDLE
16. OBSERVER OXYGEN REGULATOR
17. OBSERVER INTERPHONE CONTROL
18. OBSERVER SEAT
19. COPILOT SEAT

Figure 1-16. Pilot Compartment (Aft View)

FUEL SUPPLY SYSTEM

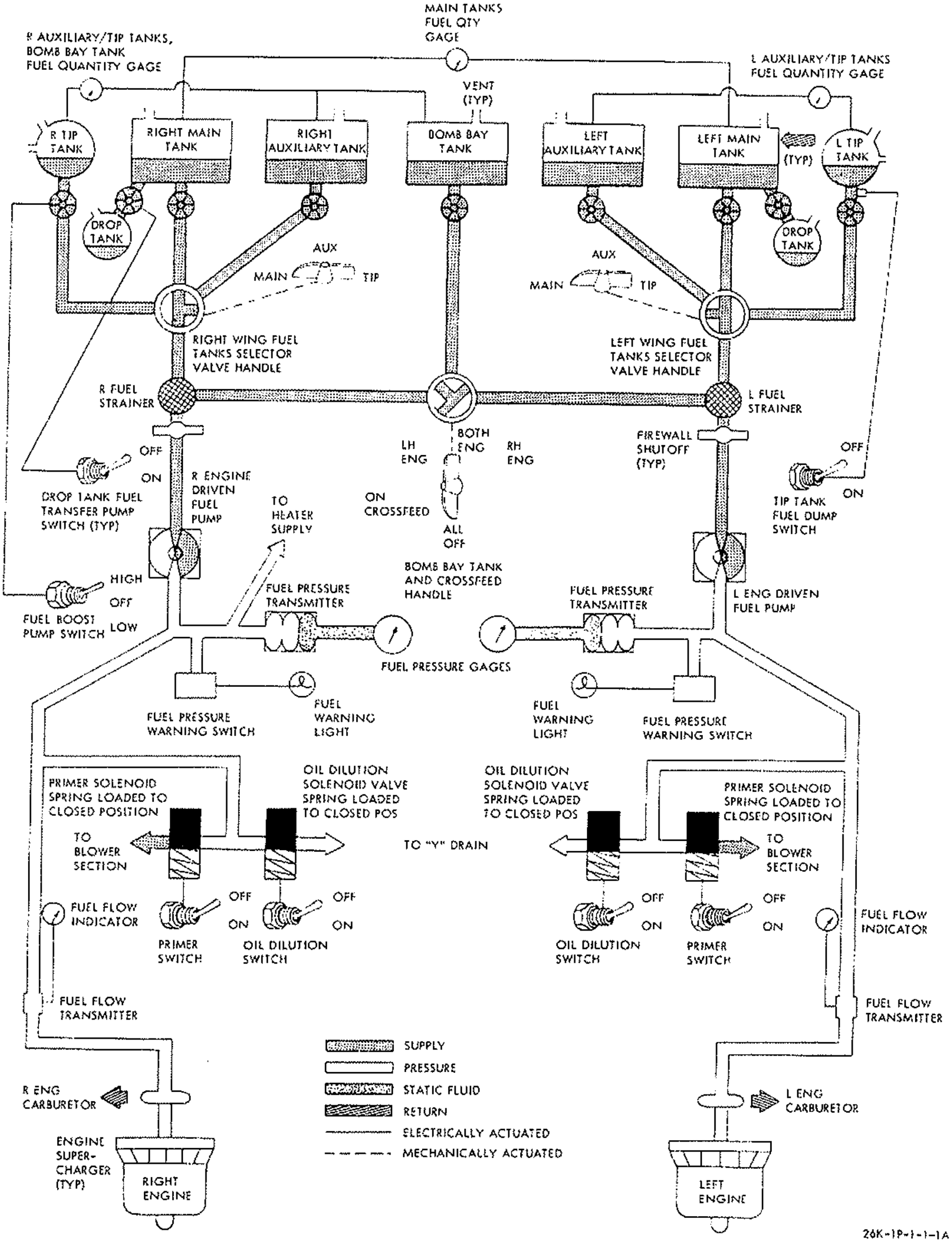


Figure 1-17

FUEL QUANTITY DATA

	TANKS	NO.	FULLY SERVICED (EACH) U.S. GALLONS	FULLY SERVICED (EACH) †POUNDS	USABLE QUANTITY (EACH) U.S. GALLONS
NORMAL FUEL SYSTEM	MAIN	2	300	1800	290
	AUXILIARY	2	100	600	95
	WING TIP	2	165	990	150
	BOMB BAY	1	*100	600	100
ADDITIONAL TANK PROVISIONS	WING DROP	2	230	1380	225
	LONG RANGE (FERRY)	1	675	4050	675
TOTAL FUEL TANKS	NORMAL FUEL TANKS		1230	7380	1170
	ADDITIONAL FUEL TANKS		1135	6810	1125
	ALL FUEL TANKS		2365	14190	2295

NOTE:
ALL FUEL QUANTITIES ARE BASED ON STANDARD DAY CONDITIONS.

* ALTHOUGH THE CAPACITY OF THE BOMB BAY TANK IS 125 GALLONS, IT IS NEVER SERVICED WITH MORE THAN 100 GALLONS TO MINIMIZE THE POSSIBILITY OF FIRE.

† A STANDARD CONVERSION FACTOR OF 6 POUNDS FOR 1 GALLON IS USED FOR 115/145 GRADE FUEL.

26K-1-1-0-4A

Figure 1-18

Fuel Quantity Gages

Fuel quantity gages are provided for all fuel tanks except the wing drop tanks. Located on the center instrument panel are a dual indicating main fuel tank gage, and two wing fuel gages. Each wing fuel gage shows auxiliary fuel tank and wing tip tank fuel quantities for the respective wing. In addition, fuel quantity for the bomb bay tank is shown on the RH wing fuel quantity gage. Fuel quantity for the bomb bay long range ferry tank, when the tank is installed, is shown on a gage located on an auxiliary instrument panel behind the pilot seat. All fuel quantities are shown in U.S. gallons. The gages are actuated by electric current from a transmitter in each tank. Power is received from the 28 VDC bus bar through circuit breakers on the pilot circuit breaker panel.

Wing Tip Tank Fuel Dump Switches

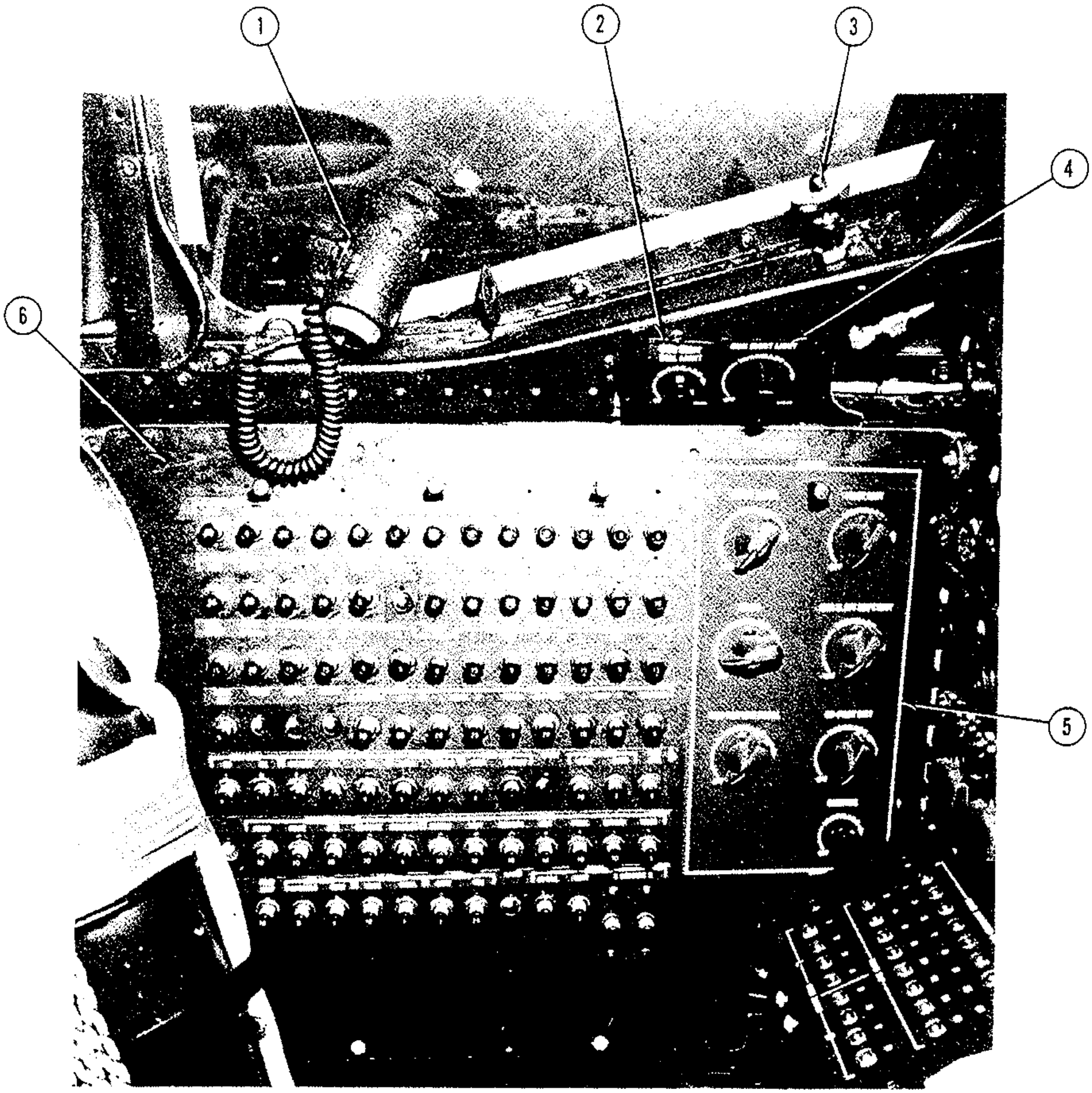
The wing tip tanks are provided with fuel dumping capabilities. Simultaneous dumping of both wing tip tanks is activated by a single guarded switch located on the pilot forward control pedestal. The switch controls an electronic bleed valve in each tip tank. When the bleed valves are opened, the tanks are emptied by suction through an opening in the aft end. The tanks require approximately 5 minutes to dump. Wing tip fuel dumping can be terminated at any time by returning the switch to OFF. Power is received from the 28 VDC bus bar through circuit breakers on the pilot circuit breaker panel.

CAUTION

Do not land aircraft with fuel in wing tip tanks.

Wing Drop Tank Release

The wing drop tanks are installed on external stores stations 4 and 5, which are the most inboard stations. These tanks may be released by placing the wing pylon selector switches numbers 4 and 5, located above the copilot instrument panel, to BOMB RELEASE position, turning the master armament switch to ON and depressing the bomb release button. However, the wing jettison button will clear all stores from the wing.



1. PILOT INSTRUMENT SPOTLIGHT
2. GUNSIGHT DIAL LIGHT RHEOSTAT
3. PILOT WINDSHIELD WIPER VALVE CONTROL
4. GUNSIGHT LIGHT RHEOSTAT
5. PILOT COMPARTMENT LIGHT RHEOSTATS
6. PILOT CIRCUIT BREAKER PANEL

Figure 1-19. Pilot Circuit Breaker Panel

WARNING

Do not attempt to drop empty tanks above 145 KIAS. Tanks may strike and damage wing flaps if released at higher airspeeds.

ELECTRICAL POWER SUPPLY SYSTEMS

The electrical power supply systems consist of a basic 28 volt DC system, and a supplementary 115 volt, 400 cycle AC system. The ground return of all electrical circuits, other than those near the magnetic compass, is furnished by the aircraft structure. Circuit breakers and fuses are provided for individual circuit protection.

DC Electrical System

The 28 VDC is supplied by two 300 ampere generators, and two 24 volt batteries in parallel. The primary point for connection to DC power is the bus bar system in the wings and fuselage. One DC voltmeter is installed in the lower left corner of the pilot instrument panel and indicates bus voltage. Overheat and generator inoperative warning lights for each generator are installed in the panel directly below the DC voltmeter. Two loadmeters are mounted on the pilot instrument panel directly below the generator warning lights. In case of emergency, the electrical equipment essential for flight will operate on one generator. A voltage regulator for each generator controls the voltage output, and balances the load of the two generators by means of a paralleling coil in each regulator. Overvoltage relays are located adjacent to the voltage regulators below the auxiliary instrument panel. They are resettable, and access may be gained by unsnapping the covering material.

Battery Switches

Two battery switches are located on the overhead electrical panel. Switch positions are marked ON and OFF. With the switches in the ON position, the left and right batteries are connected to the 28 VDC bus bar system. With the switches in the OFF position, the batteries are disconnected from the system. The battery switches must be in the OFF position when an external power source is used, as a voltage line drop can cause the batteries to supplement the external power source and drain the batteries. One battery is installed in the left engine nacelle, and one in the right. The batteries are sufficient to keep the electrical system functioning, if unnecessary electrical load is turned off. The batteries are rated at a maximum of 36 ampere hours each. The amount of electrical equipment considered unnecessary is at the discretion of the pilot, depending upon flight conditions and the needs of the aircraft. The batteries are used for engine starting when an external power source is not available.

Generator Switches

Two guarded generator switches, with positions marked ON and OFF, are located on the overhead electrical panel. When the generator switches are in the guarded ON position the generators are connected to the 28 VDC bus bar. With the switches in the OFF position, the generators are disconnected from the bus bar.

External Power Receptacle

An external power receptacle located in the outboard side of the left nacelle provides a means of connecting an external DC power source for engine starting and ground checks. When available, external power should always be used for engine starting.

AC Electrical System

The AC electrical system is furnished by two 115 volt, 400 cycle inverters, each rated at 2500 VA. The inverters are located in the aft fuselage compartment. Only one inverter operates at a time, and is controlled by a three position, center-off switch, located on the pilot subpanel. An inverter failure light, which illuminates when AC power is not being supplied to the system, is located on the left side of the pilot instrument panel. An AC voltmeter is located on the left side of the pilot instrument panel.

HYDRAULIC POWER SUPPLY SYSTEM

The hydraulic power supply system is used to operate the landing gear, wheel brakes, windshield wipers, bomb bay doors and spoilers. The entire system contains approximately 8 U.S. gallons of hydraulic fluid. A normal system pressure is 1000 PSIG. A hydraulic fluid reservoir with a capacity of 1.75 U.S. gallons supplies fluid, by gravity, to the engine driven hydraulic pumps and to the emergency hydraulic fluid reservoir. A sight gage on the hydraulic fluid reservoir is used to check the fluid level. An emergency hydraulic fluid reservoir supplies fluid to the hydraulic hand pump should the main hydraulic fluid reservoir be damaged or depleted. The emergency hydraulic fluid reservoir is divided into three separate cells, each with an inspection window. One cell supplies fluid to open the bomb bay doors; one cell supplies fluid to extend the landing gear; one cell supplies fluid to close the bomb bay doors. The engine driven pumps supply hydraulic fluid under pressure to the main hydraulic system at the rate of 121 to 140 gallons per hour. A hydraulic pressure accumulator stores fluid under the pressure determined by the pressure regulator. Pressure in excess of 1200 ±25 PSIG is prevented by a pressure relief valve. A schematic diagram of the hydraulic power supply system is shown in figure 1-22. For hydraulic fluid specification, see figure 1-25.

Auxiliary Hydraulic Pump

An auxiliary hydraulic pump is mounted in the right hand engine nacelle aft of the firewall, and provides an additional source of hydraulic pressure to the system at the rate of 165 (minimum) gallons per hour. The pump is electric, and receives power from the 28 VDC system main bus bar through a circuit breaker on the pilot circuit breaker panel. In addition to its function as an emergency hydraulic

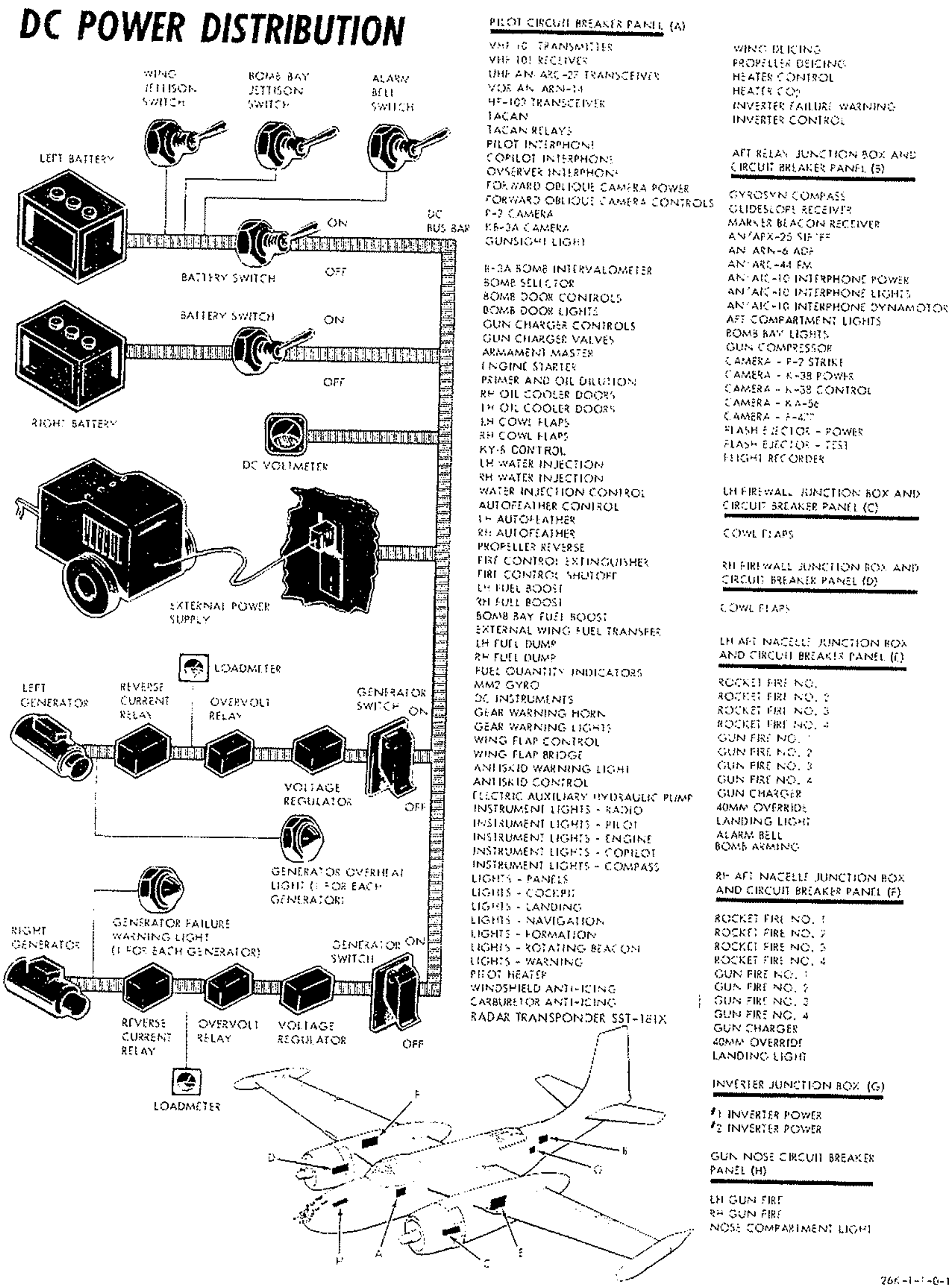

DC POWER DISTRIBUTION
WING JETTISON SWITCH
BOMB BAY JETTISON SWITCH
ALARM BELL SWITCH
LEFT BATTERY
ON
DC BUS BAR
BATTERY SWITCH
OFF
BATTERY SWITCH
ON
OFF
RIGHT BATTERY
DC VOLTMETER
EXTERNAL POWER SUPPLY
LOADMETER
LEFT GENERATOR
REVERSE CURRENT RELAY
OVERVOLT RELAY
GENERATOR SWITCH
ON
VOLTAGE REGULATOR
OFF
GENERATOR OVERHEAT LIGHT (1 FOR EACH GENERATOR)
RIGHT GENERATOR
GENERATOR FAILURE WARNING LIGHT (1 FOR EACH GENERATOR)
GENERATOR SWITCH
ON
REVERSE CURRENT RELAY
OVERVOLT RELAY
VOLTAGE REGULATOR
OFF
LOADMETER
PILOT CIRCUIT BREAKER PANEL (A)
VHF 101 TRANSMITTER
VHF 101 RECEIVER
UHF AN/ARC-27 TRANSCEIVER
VOR AN/ARN-14
HF-103 TRANSCEIVER
TACAN
TACAN RELAYS
PILOT INTERPHONE
COPILOT INTERPHONE
OVSERVER INTERPHONE
FORWARD OBLIQUE CAMERA POWER
FORWARD OBLIQUE CAMERA CONTROLS
P-2 CAMERA
KB-3A CAMERA
GUNSIGHT LIGHT
B-3A BOMB INTERVALOMETER
BOMB SELECTOR
BOMB DOOR CONTROLS
BOMB DOOR LIGHTS
GUN CHARGER CONTROLS
GUN CHARGER VALVES
ARMAMENT MASTER
ENGINE STARTER
PRIMER AND OIL DILUTION
RH OIL COOLER DOORS
LH OIL COOLER DOORS
LH COWL FLAPS
RH COWL FLAPS
KY-8 CONTROL
LH WATER INJECTION
RH WATER INJECTION
WATER INJECTION CONTROL
AUTOFEATHER CONTROL
LH AUTOFEATHER
RH AUTOFEATHER
PROPELLER REVERSE
FIRE CONTROL EXTINGUISHER
FIRE CONTROL SHUTOFF
LH FUEL BOOST
RH FULL BOOST
BOMB BAY FUEL BOOST
EXTERNAL WING FUEL TRANSFER
LH FUEL DUMP
RH FUEL DUMP
FUEL QUANTITY INDICATORS
MM2 GYRO
DC INSTRUMENTS
GEAR WARNING HORN
GEAR WARNING LIGHTS
WING FLAP CONTROL
WING FLAP BRIDGE
ANTISKID WARNING LIGHT
ANTISKID CONTROL
ELECTRIC AUXILIARY HYDRAULIC PUMP
INSTRUMENT LIGHTS - RADIO
INSTRUMENT LIGHTS - PILOT
INSTRUMENT LIGHTS - ENGINE
INSTRUMENT LIGHTS - COPILOT
INSTRUMENT LIGHTS - COMPASS
LIGHTS - PANELS
LIGHTS - COCKPIT
LIGHTS - LANDING
LIGHTS - NAVIGATION
LIGHTS - FORMATION
LIGHTS - ROTATING BEACON
LIGHTS - WARNING
PITOT HEATER
WINDSHIELD ANTI-ICING
CARBURETOR ANTI-ICING
RADAR TRANSPONDER SST-181X
WING DEICING
PROPELLER DEICING
HEATER CONTROL
HEATER CO2
INVERTER FAILURE WARNING
INVERTER CONTROL
AFT RELAY JUNCTION BOX AND CIRCUIT BREAKER PANEL (B)
GYROSYN COMPASS
GLIDESLOPE RECEIVER
MARKER BEACON RECEIVER
AN/APX-25 SIF IFF
AN/ARN-6 ADF
AN/ARC-44 FM
AN/AIC-10 INTERPHONE POWER
AN/AIC-10 INTERPHONE LIGHTS
AN/AIC-10 INTERPHONE DYNAMOTOR
AFT COMPARTMENT LIGHTS
BOMB BAY LIGHTS
GUN COMPRESSOR
CAMERA - P-2 STRIKE
CAMERA - K-38 POWER
CAMERA - K-38 CONTROL
CAMERA - KA-56
CAMERA - F-477
FLASH EJECTOR - POWER
FLASH EJECTOR - TEST
FLIGHT RECORDER
LH FIREWALL JUNCTION BOX AND CIRCUIT BREAKER PANEL (C)
COWL FLAPS
RH FIREWALL JUNCTION BOX AND CIRCUIT BREAKER PANEL (D)
COWL FLAPS
LH AFT NACELLE JUNCTION BOX AND CIRCUIT BREAKER PANEL (E)
ROCKET FIRE NO. 1
ROCKET FIRE NO. 2
ROCKET FIRE NO. 3
ROCKET FIRE NO. 4
GUN FIRE NO. 1
GUN FIRE NO. 2
GUN FIRE NO. 3
GUN FIRE NO. 4
GUN CHARGER
40MM OVERRIDE
LANDING LIGHT
ALARM BELL
BOMB ARMING
RH AFT NACELLE JUNCTION BOX AND CIRCUIT BREAKER PANEL (F)
ROCKET FIRE NO. 1
ROCKET FIRE NO. 2
ROCKET FIRE NO. 3
ROCKET FIRE NO. 4
GUN FIRE NO. 1
GUN FIRE NO. 2
GUN FIRE NO. 3
GUN FIRE NO. 4
GUN CHARGER
40MM OVERRIDE
LANDING LIGHT
INVERTER JUNCTION BOX (G)
#1 INVERTER POWER
#2 INVERTER POWER
GUN NOSE CIRCUIT BREAKER PANEL (H)
LH GUN FIRE
RH GUN FIRE
NOSE COMPARTMENT LIGHT
F
D
B
G
H
A
C
E
26K-1-1-0-11A

Figure 1-20

AC POWER DISTRIBUTION

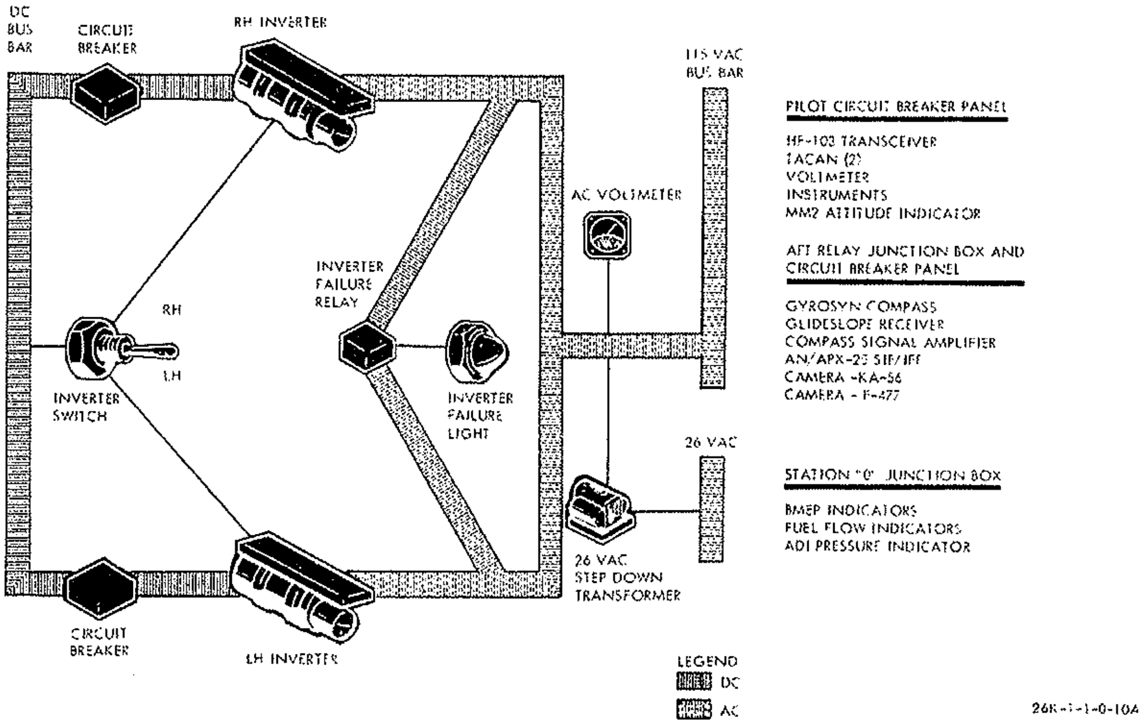


Figure 1-21

pump, the pump will, when armed, assist the engine driven pumps in supplying pressure for normal operation of the hydraulic system. Pump operation is controlled by a pressure switch which automatically energizes the pump whenever the pressure switch is armed, and the system pressure falls below 850 PSIG. The pump remains in operation until the pressure rises to 950 PSIG, then automatically shuts off. The arming switch for the auxiliary hydraulic pump is located on the pilot subpanel.

Emergency Hydraulic Hand Pump Handle

An emergency hydraulic hand pump handle is located behind the pilot seat. This handle is used to manually operate the hydraulic hand pump which supplies hydraulic pressure in the event of engine driven and electric auxiliary pump failure. Pressure to the emergency hydraulic system is supplied by moving the handle fore and aft.

Hydraulic Bypass Valve Handle

A manually operated hydraulic bypass valve is used to relieve the pressure load on the hydraulic pumps when the system is not under demand. With the handle out, fluid is routed directly to the main hydraulic reservoir, bypassing the normal hydraulic system. This reduces wear on the hydraulic pressure regulator, and the heat factor within the hydraulic system. The hydraulic bypass valve handle is located on the left side of the control pedestal.

Emergency Hydraulic Selector Valve Handle

An emergency hydraulic selector valve handle, located on the control pedestal, has positions marked SYSTEM, BOMB DOORS OPEN, LANDING GEAR DOWN, and BOMB DOORS CLOSED. With the handle at SYSTEM, fluid to the hydraulic hand pump is supplied from the main hydraulic reservoir. The fluid, under pressure from the hydraulic hand pump, is utilized to increase pressure in the main hydraulic pressure accumulator. With the handle in the BOMB DOORS OPEN, LANDING GEAR DOWN, or BOMB DOORS CLOSED position, fluid is supplied to the hydraulic hand pump from the respective emergency hydraulic fluid reservoir cell, to accomplish the desired action. To operate the emergency hydraulic system, the emergency selector valve handle must first be set for the desired operation, as the emergency system utilizes the main hydraulic lines as return lines. During normal operation, the handle should be left in the SYSTEM position.

HYDRAULIC POWER SUPPLY SYSTEM

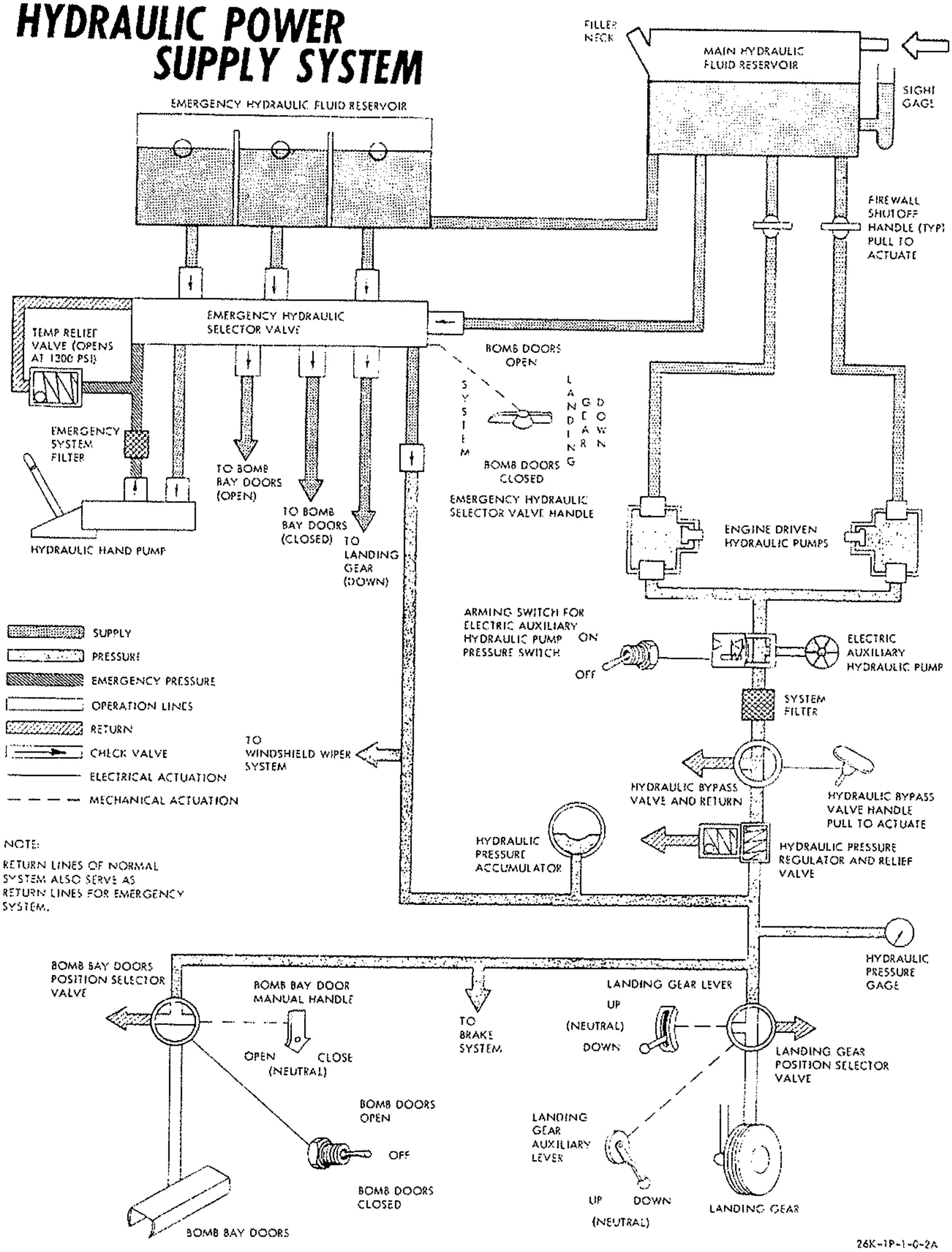


Figure 1-22

Hydraulic Windshield Wiper System

Windshield wipers are provided for the left and right windshields. The wipers are individually controlled by two turn-to-increase type valves. The pilot windshield wiper control valve is located on the left side of the pilot compartment above the pilot compartment lights control panel. The copilot control valve is located on the right side of the pilot compartment above the copilot heater controls.

Hydraulic Pressure Gage

A hydraulic pressure gage, located on the lower part of the pilot instrument panel, indicates in pounds per square inch the operating pressure of the hydraulic system.

FLIGHT CONTROL SYSTEM

Conventional type flight controls are provided for the pilot and copilot. Movable flight control surfaces are mechanically operated through two way cable systems. Ailerons are controlled by the control wheel on the control column; the elevators by the forward and aft motion of the control column. The rudder is controlled by adjustable rudder/brake pedals. Mechanically controlled trim tabs are installed on the elevators, rudder, and left aileron. The copilot flight control column and rudder pedals may be removed to permit access to the glass nose compartment. This may be accomplished by releasing the two attaching pins at the base of the column, and removing the column; removing the rudder pedals by releasing their respective attaching pins; unlocking and swinging out the hinged section of the copilot instrument panel.

WARNING

With the copilot control column removed, it is possible for foreign objects to fall into existing cavity and jam the controls. A protective cover has been designed to keep out debris and should be installed any time the control column is removed.

Aileron Trim

An aileron trim tab control, located on the control pedestal, mechanically controls the left aileron trim tab. Turning the control clockwise trims the aircraft to the right, counterclockwise trims the aircraft to the left. Degrees of deflection are shown on an indicator attached to the tab control. The trim tab on the right aileron is of the fixed type, and may be preset prior to flight.

Elevator Trim

An elevator trim tab control wheel, located on the left side of the control pedestal, mechanically controls the movement of the elevator trim tabs. Turning the wheel forward, or counterclockwise, trims the aircraft down; aft, or clockwise, trims the aircraft up. Degrees of tab deflection are shown on an indicator attached to the wheel base.

Rudder Trim

A rudder trim tab handle installed on the control pedestal mechanically moves the rudder trim tab. Turning the handle clockwise trims the aircraft to the right, and counterclockwise to the left. Rudder trim tab deflection in degrees is shown on an indicator mounted beneath the handle.

Flight Control Lock Lever

A flight control lock lever, located on the control pedestal, is used to lock the controls in their neutral position, and the throttle levers in the idle RPM range, when the aircraft is parked. Lever positions are marked LOCKED and UNLOCKED. A lever stop, adjacent to the lever, prevents the lever from inadvertently being placed in the LOCKED position. The stop must be pressed before the lever can be moved. To lock the controls, press the lever stop, move the lever to the LOCKED position, and move the controls to the neutral position.

WING FLAP SYSTEM

The two wing flaps on each wing are synchronously raised or lowered by a drive unit installed in the bomb bay. Wing flap position is shown on an indicator located on the lower part of the center instrument panel. The flaps lower fully in approximately 16 seconds, and rise from their full downward position in approximately 15 seconds. Full downward travel of the flaps is 52 degrees. The drive unit is electrically actuated by the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Wing Flap Lever

A wing flap lever, located on the left side of the control pedestal, has prepositioned settings with lever detents provided. Manual setting of the wing flaps in any position is provided for by stopping the lever in the position desired. Settings marked are FULL UP, 15°, 20°, 38°, and FULL FLAPS.

Wing Flap Master Control Switch

The wing flap master control switch is located below the aft control pedestal and is a four position switch, which governs the operation of the flaps by manual or preselected means. In the DOWN position, this switch permits control of the flaps by the primary wing flap lever. In the UP position, this switch permits manual selection of flap settings by use of the other two switch positions, also marked UP and DOWN.

Wing Flap Limit Switch

A wing flap limit switch, located adjacent to the wing flap master control switch, overrides the primary wing flap lever. The switch is a two position type, with positions marked FULL and LIMITED. In the FULL position, normal flap travel is available. With the switch in the LIMITED position, downward travel of the flaps is limited to 38 degrees.

CAUTION

In order to avoid serious damage, the switch should always be in the LIMITED position when external stores are being carried that would interfere with the full 52 degree extension of the flaps.

Wing Flap Position Indicator

A wing flap position indicator, located on the pilot instrument panel, indicates the position of the wing flaps, in degrees. The instrument is marked with the following increments: UP, 5°, 10°, 15°, 20°, 40°, FULL DOWN. This instrument receives power from the 28 VDC bus bar, through a circuit breaker on the pilot circuit breaker panel.

LANDING GEAR SYSTEM

The landing gear system incorporates two fully retractable main landing gear, and a fully retractable nose landing gear. The main gear retract into the engine nacelles, and the nose landing gear retracts into the fuselage. Wheel well doors enclose each landing gear as it is retracted. Extension and retraction of the landing gear is accomplished by hydraulic actuating cylinders which are mechanically controlled by the landing gear lever on the control pedestal. The extending movement of all three landing gear is downward, and forward. The landing gear extend fully in approximately 6 seconds, and retract fully in approximately 7 seconds. As each landing gear is extending, the doors open and assume a downward position, with surfaces paralleling the sides of the fuselage. A faired, nonretracting tail skid protects the fuselage tail section from possible damage during a tail low landing.

Landing Gear Lever and Detent Pin

A manually operated landing gear lever, located on the control pedestal, mechanically actuates the landing gear position selector valve to retract or extend the landing gear. The lever has positions marked UP, NEUTRAL, and DOWN. With the lever at UP or DOWN, hydraulic fluid is directed to the main and nose landing gear actuating cylinders, causing the gear to extend or retract. Placing the lever at NEUTRAL relieves the hydraulic system of pressure. A spring latch installed on the lever must be released before the lever can be moved. The detent pin, which is electrically controlled by a retraction release switch located on the left main shock strut, prevents movement of the landing gear lever to the UP position while the aircraft is on the ground. If the detent pin fails to retract after takeoff, or if it becomes necessary to retract the gear on the ground, it will be necessary to manually depress the detent pin before the landing gear lever can be raised. The detent pin and retraction release switch receive power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

CAUTION

When the landing gear lever is placed in the DOWN position, insure that the latching mechanism is properly seated in the detent.

Landing Gear Auxiliary Lever

A landing gear auxiliary lever, recessed in the panel to the left of the observer seat, provides an alternate means of mechanically actuating the landing gear position selector valve. The auxiliary lever has three positions, UP, NEUTRAL, and DOWN, and moves synchronously with the landing gear lever. When the landing gear lever fails to operate the landing gear, the landing gear position selector valve can be actuated to retract or extend the landing gear by placing the auxiliary lever at UP or DOWN.

Landing Gear Emergency Uplatch Release Handles

Three landing gear emergency uplatch release handles, one for each landing gear, are provided for emergency releasing of the uplatches. The uplatch handle for the nose gear is located on the left side of the control pedestal, and the handles for the two main gear are located behind the aft control pedestal, adjacent to the hydraulic hand pump handle. Pulling the emergency uplatch release handles releases the landing gear uplatches. Full extension and locking of the landing gear can then be accomplished by use of the electric auxiliary hydraulic pump or the hydraulic hand pump.

Landing Gear Warning Horn Silencer Switch

A landing gear warning horn silencer switch is located on the pilot subpanel, directly below the instrument panel. The switch has positions marked RESET (on) and GEAR HORN (off), and is spring loaded to RESET. A landing gear warning horn, located on the auxiliary instrument panel, sounds when one or both throttles are closed past the one-quarter open position, and any landing gear is not down and locked. The horn can be silenced by momentarily moving the switch to GEAR HORN. The landing gear warning horn circuit receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Landing Gear Position Indicator Lights

Four landing gear position indicator lights are located toward the bottom of the center instrument panel. A green light for each landing gear illuminates when the respective gear is down and locked. A single red light illuminates whenever a landing gear is in any position other than full up and locked or full down and locked. The lights receive power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel, and are the press-to-test type. The red light will also illuminate with the gear in the full up position when either or both throttles are retarded past the 1/4 open position.

Landing Gear Ground Safety Locks

Access is provided in the landing gear linkage and detent pin for the installation of landing gear ground safety locks, to prevent accidental retraction of the

LANDING GEAR GROUND SAFETY LOCKS

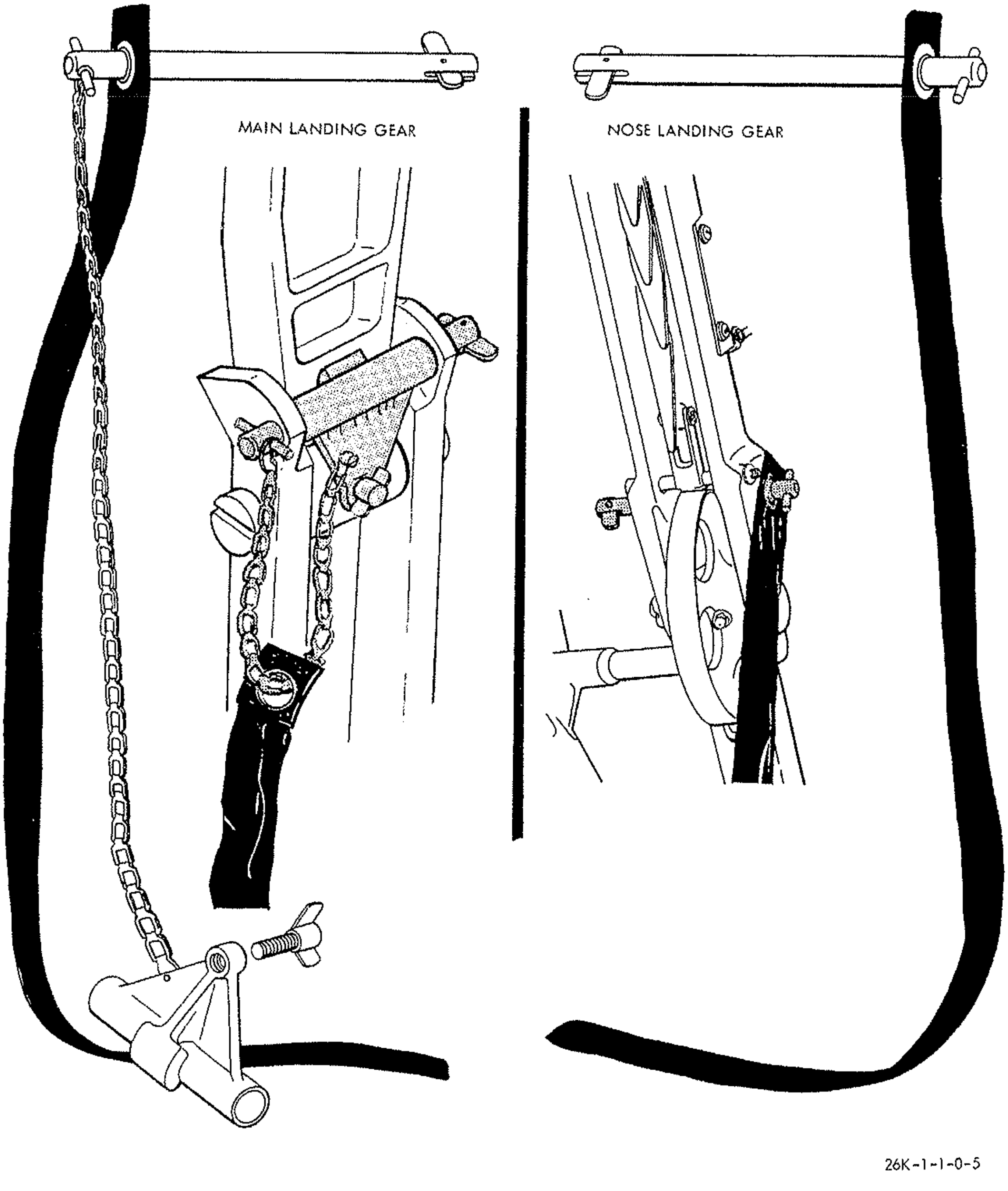


Figure 1-23

gear while the aircraft is on the ground. The detent pin on the landing gear lever prevents movement of the lever to the UP position. The nose and main landing gear ground safety locks are manually installed after the aircraft is parked. The locks have red streamers attached, making them easy to spot.

BRAKE SYSTEM

The brake system utilizes pressure from the main hydraulic system to operate the multiple disk brakes located on each main landing gear. In the event of a hydraulic system failure, an emergency air brake system is available. The hydraulic brake system incorporates dual toe operated brake pedals, a parking brake handle, an antiskid system, brake control valves, and connecting lines. Operating pressure is 850 pounds.

Brake Pedals

Application of toe pressure on the rudder brake pedals opens the pressure ports of each brake control valve, allowing hydraulic fluid under pressure to reach the brake actuating cylinders. When the brakes are released, the hydraulic fluid flows back to the reservoir. The brakes are actuated with a force proportional to pedal pressure. The copilot rudder brake pedals are removable to permit access to the glass nose.

Antiskid Braking System

The antiskid braking system is armed by a switch located on the pilot subpanel, and a yellow arming light extinguishes when the system is ON and the aircraft is on the ground. Operation of this system is entirely automatic in that hydraulic pressure to the brake is instantaneously released when a wheel begins to skid, and is automatically restored when the skid stops. In addition to the arming switch on the subpanel, a microswitch located on the right main landing gear strut automatically arms the antiskid system and extinguishes the arming light when the strut is compressed. Electrical power is supplied by the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Parking Brake Handle

A parking brake handle is located below the pilot circuit breaker panel. The parking brakes are set by depressing the brake pedals and pulling aft on the parking brake handle. Pressure on the brake pedals should be released before releasing the parking brake handle. Parking brakes can be released by depressing the brake pedals.

Emergency Air Brake System

The emergency air brake system is independent of the hydraulically operated brake system, and is used when the main hydraulic system fails. The system consists of an air bottle, pressure gage, air brake valve, and shuttle valves interconnected by tubing. The shuttle valves close the brake hydraulic system when the emergency air brake system is utilized. The emergency air brake system is completely independent of the hydraulic brake system to the shuttle valves, and common with it thereafter.

Emergency Air Brake Lever

An emergency air brake lever, located on the control pedestal, is connected by cables to the air brake valve. Lever positions are RELEASE, NEUTRAL (unmarked), and ON. With the lever in the ON position, air pressure is supplied directly to both brakes simultaneously through the air brake valve. Placing the lever at NEUTRAL traps the air pressure applied in the brake lines. Air pressure is released when the lever is moved to the RELEASE position. The emergency air brake system does not provide for differential braking, and the brake hydraulic lines must be bled of air after air brake application before further hydraulic brake operation. Normally, four brake applications are available.

Emergency Air Brake Pressure Gages

One emergency air brake pressure gage is located on the auxiliary instrument panel, and another in the right hand wheel well. These gages indicate the pressure in the air bottle in PSIG. The air bottle may be recharged through a filler valve located on the left side of the right engine nacelle.

Desired pressure is 850 PSIG. If the pressure drops below 650 PSIG, the bottle must be recharged.

INSTRUMENTS

Free Air Temperature Gage

A free air temperature gage, located on the left side of the pilot instrument panel, indicates in degrees centigrade the outside air temperature. The gage is connected to a resistor bulb located on the lower left side of the fuselage, near the junction of the nose section. The gage receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Clock

A manual winding eight day clock is installed in the left side of the pilot instrument panel.

Vertical Velocity Indicator

Vertical velocity indicators, located on the pilot and copilot instrument panels, show rate of climb or descent in feet per minute. The indicators are operated by the pilot-static system.

Airspeed Indicator

Airspeed indicators are provided for the pilot and copilot, and are located on their respective instrument panels. The airspeed indicators are operated by the pilot-static system, and the readout is in knots.

BRAKE SYSTEM

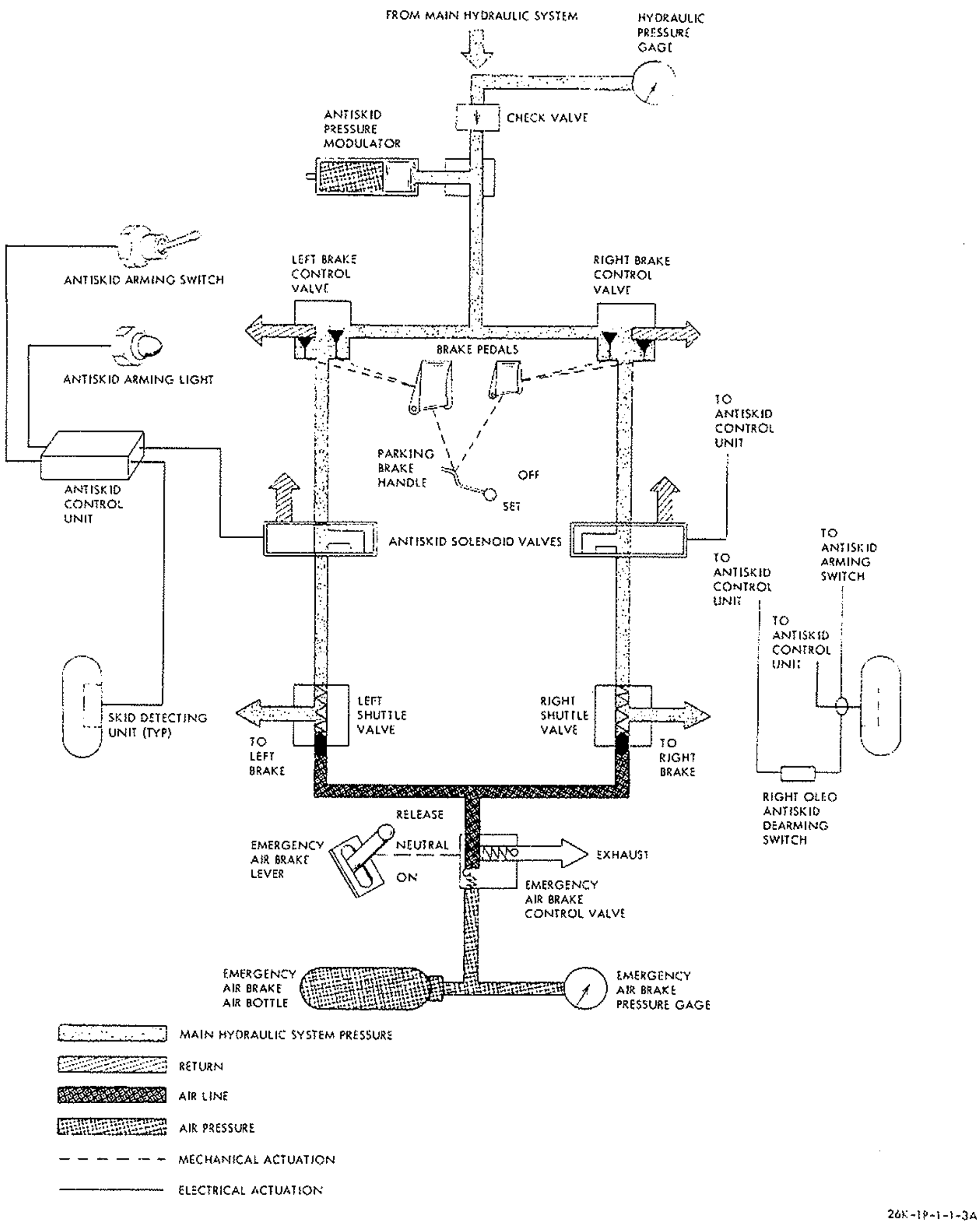


Figure 1-24

True Airspeed Indicator

A true airspeed indicator, located on the copilot instrument panel, indicates in knots the true airspeed of the aircraft. This instrument receives its initial information through the pitot-static system. The indicated airspeed is then combined with free air temperature and pressure altitude in the true airspeed indicator, and converted into true airspeed.

Altimeters

Altimeters are located on the pilot and copilot instrument panels. The aircraft is equipped with altimeters which incorporate, in addition to the standard 100-foot and 1000-foot pointers, a 10,000-foot pointer which is an extension of a segmented disk. This disk serves as a warning indicator with a striped section which appears through the segmented disk at altitudes below 16,000 feet. Field barometric pressure may be manually set into the altimeters by rotating the barometric scale with the adjusting knob adjacent to the dial face. The altimeters are operated by the pitot-static system.

Turn and Slip Indicator

Vacuum operated turn and slip indicators are provided for the pilot and copilot. Located on their respective instrument panels, these indicators are used in making coordinated turns at a predetermined rate. The turn indicator shows the direction and rate at which the aircraft is turning about a vertical axis. A full needle width turn on this instrument indicates a standard 2 minute/3 degree per second turning rate. Operation of the turn indicator is based upon a vacuum actuated gyroscope. The slip indicator consists of a spirit level containing a ball of metal or glass in a tube filled with a compass liquid. In a properly executed, coordinated turn, the ball remains in the center of the tube. Movement of the ball away from the center of the tube indicates in which direction the aircraft is slipping.

Attitude Indicators

The airplane is equipped with an MM2 attitude indicator, located on the pilot instrument panel, and a vacuum driven attitude indicator, located on the copilot instrument panel. The MM2 displays information received from an electrically operated K-4B gyro control assembly. Power is received from the 400 cycle, 115 VAC system, through a circuit breaker on the pilot circuit breaker panel.

WARNING

A slight reduction in electrical power or failure of certain components within the system will not cause the warning flag to appear even though the system is not functioning properly. Therefore, it is imperative that the attitude indicator is periodically cross checked with the copilot attitude indicator and/or other flight instruments.

Heading Indicator

A heading indicator, installed on the copilot instrument panel, is used to establish a fixed reference for maintaining flight direction. The instrument indicates magnitude of turn and assists in maintaining aircraft alignment. The indicator is a vacuum actuated gyroscopic instrument. Presentation is of a rotating card type. The instrument is spill proof in turbulence or maneuvers, and does not require caging. A knob is provided for setting and correcting of the instrument, as drift is inherent in the indicator, and occasional realignment is necessary.

Magnetic Compass

A magnetic compass, located above the center section of the armament panel, augments the radio magnetic indicator (RMI) described in Section IV to provide magnetic heading information.

PITOT-STATIC SYSTEM

The pitot-static system supplies static and impact air pressures necessary for the operation of the vertical velocity indicators, airspeed indicators, and altimeters. Pitot (impact) pressure is supplied through the pitot head on the left side of the nose section. Static pressure is obtained through two orifices, one on each side of the fuselage section between the aft compartment and the horizontal stabilizer. An alternate source of static pressure is located on the left side of the pilot compartment adjacent to the pilot seat. The heating element in the pitot tube is controlled by a two position switch located on the pilot subpanel. Power is supplied from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Static Pressure Selector Switch

A static pressure selector switch, located on the left sidewall below the navigation-radio monitor panel, selects the source of static pressure. The switch has AIRSPEED TUBE and ALTERNATE SOURCE positions, and is safety wired to the AIRSPEED TUBE position. In this position, static pressure is taken from the outside source. With the switch positioned at ALTERNATE SOURCE, static pressure is taken from the pilot compartment. The ALTERNATE SOURCE position is used only when the normal static source is inoperative. Vertical velocity indication will vary slightly for a short period of time when the switch is positioned at ALTERNATE SOURCE.

WARNING

When the ALTERNATE SOURCE position is used, the airspeed indicator reads approximately 7 KIAS higher than normal, and the altimeter indicates approximately 200 feet higher than normal.

VACUUM SYSTEM

The vacuum system provides power for the gyroscopic instruments and photo system. Two engine driven vacuum pumps operate continuously. Two vacuum warning lights, located on the engine fire extinguisher control panel, indicate the failure of either vacuum pump. In the event of a pump failure, a check valve automatically closes the line to the failed pump.

Suction Gage

A suction gage, located on the center instrument panel, indicates in inches of mercury the amount of vacuum supplied to the vacuum actuated instruments.

FIRE EXTINGUISHER SYSTEM

The engine fire extinguisher system consists of two 86 cubic inch bottles containing an extinguishing agent. The bottles, with an adjacent filler valve and pressure gage, are located in the left wheel well.

Fire Extinguisher Switches

The fire extinguisher switches are located on the engine fire extinguisher control panel, on either side of the firewall shutoff valve handles. These switches are of the lever-lock type, and are positioned SHOT 1, OFF, SHOT 2. To discharge the extinguishing agent to the engine corresponding with the switch, pull the toggle and move the switch to the SHOT 1 position. If the fire does not extinguish, SHOT 2 may then be used. A total of two shots to either engine (but not to both), or one shot to both engines is available. When the left-hand FIRE EXT switch is positioned to SHOT #1, the forward sphere is discharged into the left-hand engine area. The aft sphere is discharged into the left-hand engine area when the left-hand switch is positioned to SHOT #2. The right-hand FIRE EXT switch discharges the spheres into the right-hand engine area, the aft sphere being discharged by positioning the right-hand switch to SHOT #1, and the forward sphere being discharged by positioning the switch to SHOT #2.

Hand Fire Extinguishers

The aircraft is equipped with two hand fire extinguishers for use in combating interior fires. One extinguisher, located in the pilot compartment under the copilot seat, is a carbon dioxide (CO_2) type. The other extinguisher, located in the aft compartment on the right forward bulkhead, is type A20 Bromochloromethane (CB) or equivalent.

WARNING

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

Firewall Shutoff Valve Handles

Two firewall shutoff valve handles, which operate electrical switches, are located on the engine fire extinguisher control panel. When a handle for the respective engine is pulled, the propeller is feathered, and shutoff valves are actuated to shut off the supply of fuel, engine oil, and hydraulic oil to the disabled engine. When desired, the handle may be pushed in, and all systems to that engine will be restored. However, the propeller must be unfeathered by use of the manual feathering button. Procedures for unfeathering are contained in Section III.

EMERGENCY EQUIPMENT

Emergency Alarm Bell Switch

The emergency alarm bell switch, located on the pilot subpanel, has ON and OFF positions, and is guarded at OFF. Placing the switch at ON actuates the alarm bell located in the aft compartment. The bell is used to alert the crew members during an emergency. The alarm bell circuit receives power from the left battery through a circuit breaker on the firewall junction box. The alarm bell may be operated regardless of the position of the battery switches.

Fire Axes

One fire ax is located in the pilot compartment on the base of the observer seat. Another ax is located in the aft compartment on the right forward bulkhead.

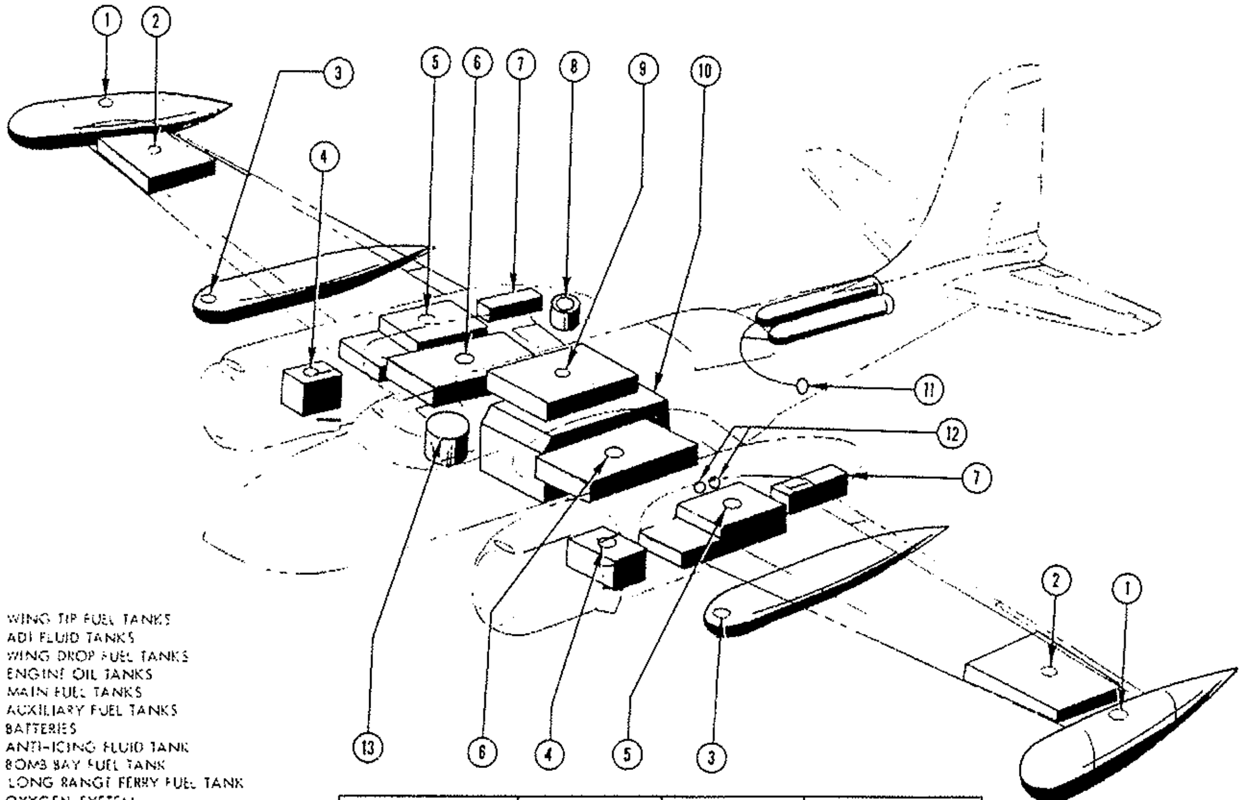
First Aid Kits

The aircraft is equipped with two first aid kits. One kit is located in the pilot compartment on the base of the observer seat, and the other is located in the aft compartment on the right forward bulkhead.

Emergency Exits

The canopy in the pilot compartment is released by pulling downward on the canopy emergency release handle located on the forward end of the overhead electrical panel. Pulling the handle downward releases the latching mechanism and hinge pins, allowing the canopy to fall free of the aircraft. The side entrance door to the aft compartment is used as an emergency exit for bail out. The door is released by pulling up on a hinge pin rod, located on the forward part of the door. When the rod is pulled up, the door is easily pushed into the slipstream, and carried away from the aircraft. The overhead escape hatch of the aft compartment is used for ditching and crash landing, and is released by pulling downward on a red emergency release handle forward on the hatch. Pulling the handle releases the hinge pins, allowing the hatch to fall free of the aircraft. Alternate emergency exits from the aft and pilot compartments are through the bomb bay escape hatches. In addition to the pilot compartment switches, the bomb bay doors may be opened from the aft compartment by actuating the bomb bay jettison switch, located on the left forward bulkhead to the right of the master camera control access panel.

SERVICING DIAGRAM



1. WING TIP FUEL TANKS
2. ADI FLUID TANKS
3. WING DROP FUEL TANKS
4. ENGINE OIL TANKS
5. MAIN FUEL TANKS
6. AUXILIARY FUEL TANKS
7. BATTERIES
8. ANTI-ICING FLUID TANK
9. BOMB BAY FUEL TANK
10. LONG RANGE FERRY FUEL TANK
11. OXYGEN SYSTEM
12. FIRE EXTINGUISHING AGENT SPHERES
13. MAIN HYDRAULIC FLUID RESERVOIR

FLUID	GRADE	SPECIFICATION	NATO DESIGNATION
FUEL	115/145	MIL-G-5572	F-22
ALTERNATE FUEL	100/130	MIL-G-5572	F-18
OIL	TYPE II	MIL-L-22851	O-126
HYDRAULIC	- -	MIL-H-5606	H-515
ADI	TYPE I (50-50)	AMS-3006A	S-747
ANTI-ICING	- -	MIL-F-5566	S-737
FIRE EXTINGUISHING AGENT	CB	MIL-B-4394	

26E-1-1 0-7

Figure 1-25

WARNING

- When the canopy is released in flight, the front edge tends to dish downward into the pilot compartment. Occupants are cautioned to lower their heads.
- The hydraulic bypass valve handle must be in to provide system pressure to open the bomb bay doors.

SEATS

The pilot and copilot seats are all metal structures mounted on adjustable frames. Seat adjustment is made by two levers located on the right side of the pilot seat, and left of the copilot seat. The lever on the lower front inboard side is used to adjust the seat vertically. The lever in back of the inboard arm rest is used for fore and aft adjustment. Both seats are equipped with a safety belt and shoulder harness. An observer seat is located directly behind the copilot seat, and is jettisonable through the bomb bay escape hatch in an emergency. The seat is bicycle type, nonadjustable, on a metal frame, and is equipped with a safety belt. Access for one seat is provided in the aft compartment. The seat is installed when the type of mission to be flown requires an occupant in the aft compartment. The seat is nonadjustable, and is equipped with a safety belt and floor mounted shoulder harness.

Shoulder Harness Lock Lever

A shoulder harness inertia reel lock lever, with LOCKED and RELEASED positions, is located on the left side of the pilot's seat, and on dual control aircraft, on the left side of both pilot's and navigator's seats. A latch positively retains the lever at either position. By pressing down on the top of the lever, the lever is released and may then be moved freely from one position to the other. When the lever is at RELEASED position, the reel harness cable will extend to allow the pilot to lean forward; however, the reel harness cable will automatically lock when an impact force of 2 to 3 G's is encountered. When the reel is locked in this manner, it will remain locked until the handle is moved to the LOCKED position, and then returned to the RELEASED position. When the lever is at LOCKED position, the reel harness cable is manually locked so that the pilot or navigator is prevented from leaning forward. The LOCKED position may be used during takeoff and landing or when a crash landing is anticipated. This position provides an added safety precaution over and above that of the automatic safety lock.

CANOPY

A Plexiglas canopy encloses the pilot compartment. The canopy is divided into two sections which hinge open to provide access to the pilot compartment.

Canopy Latching Handles

A canopy latching handle for each side of the canopy is located at the aft end of the overhead electrical panel. The handles have LATCH and RELEASE positions. With the canopy sections closed, the handles are pushed up to the LATCH position, and pulled down to the RELEASE position to unlatch the sections.

Canopy External Release Handle

An external canopy release handle is flush mounted and located above the overhead electrical panel. The forward end of the handle is marked PUSH, and the aft end is marked PULL. When the forward end is pushed, the aft end pulled, the handle pivots at the center, actuating the latching mechanism of the left hand canopy for release. The right hand canopy does not open through use of the external release handle. When the canopy is closed, the aft end is pushed downward until the handle is flush with the fuselage, thus latching the canopy.

AUXILIARY EQUIPMENT

Section IV of this manual contains information on the following equipment: Heating System, Deicing System, Anti-Icing System, Communication and Navigation Equipment, Lighting Equipment, Oxygen System, Armament System, Photo Reconnaissance Equipment, Miscellaneous Equipment.

SECTION II

NORMAL PROCEDURES

TABLE OF CONTENTS

PREPARATION FOR FLIGHT

Flight Restrictions

For operating restrictions and limitations, refer to Section V.

Flight Planning

Cruise control data, such as required fuel, airspeed, power settings, etc., necessary to complete the proposed mission, should be determined by use of the operating data in the Appendix.

Takeoff and Landing Data Card

The Takeoff and Landing Data Card in T.O. 1A-26A-1CL-1 shall be completed in sufficient detail to permit fulfillment of mission requirements. Refer to figure 2-8 and adjacent text for explanation of contents.

Weight and Balance

Check aircraft weight and balance, referring to T.O. 1-1B-40, Manual of Weight and Balance. Check takeoff and anticipated landing gross weights. Insure that Form 365F, Weight and Balance Clearance, is satisfactory and that the weight grades of fuel, oil, and special equipment carried are suited to the assigned missions. Refer to Section V for weight limitations.

CHECKLISTS

T.O. 1A-26A-1 contains only the amplified procedures. The checklist is issued as T.O. 1A-26A-1CL-1. For purposes of standardization, checklists will be used as a challenge and reply procedure to assure completeness of the checks. The pilot is responsible for accomplishment of all items on these checklists; however, he may delegate the accomplishment of certain items, which are coded (N), to a qualified crew member occupying the copilot seat and items marked (F) to the occupant of the aft compartment. The appropriate checklist will be read by a qualified crew member and accomplishment of an item will be indicated by the proper response; the checklist will be held up until this response is given. Some items are coded (P-N-F) and indicate an individual or coordinated action by applicable crew members. Those steps applicable to the pilot only do not have an identifying symbol.

The term CLIMATIC, as used in the checklist, indicates equipment operation, or settings, which may be necessary for other than daylight VFR conditions. This includes IFR, night, cold weather, tropic, and desert conditions. The equipment operation or settings will vary depending on the prevailing conditions. In practice, the response to items marked CLIMATIC will be the required switch or control position.

THRUFLIGHT CHECKLIST

Items preceded by an asterisk (*) are considered to be a thruflight checklist. These items must always be checked before every flight even when the aircraft is assigned missions which require intermediate stops by the same flight crew, and no maintenance is performed during these stops. While these items must be accomplished during an intermediate stop, the remaining items may be accomplished at the discretion of the pilot. All items under BEFORE TAKEOFF and subsequent checks must be accomplished for all flights. However, items preceded by (#) on the After Takeoff and Descent Checklist are the only items that need be accomplished when a closed traffic pattern is used during Local training flights.

ENTRANCE TO AIRCRAFT

Normal entrance to the pilot compartment is gained by climbing a retractable ladder on the right side of the aircraft, and entering through the Plexiglas canopy opening. Entrance to the aft compartment is gained through the side entrance or through the aft compartment entrance in the bomb bay.

PREFLIGHT

The pilot is responsible to insure that interior and exterior inspections are completed, and that each crew member has accomplished individual inspection requirements as outlined in this manual.

NOTE

The aircrew visual inspections described in this section are predicated on the assumption that maintenance personnel have completed all the requirements of the Preflight, Postflight Inspection Work Cards, T.O. 1A-26A-6WC-1PRPO. Therefore, duplicate inspections and operational checks of systems have been eliminated except for items required in the interest of flying safety.

Crew and Passenger Briefing Check

A pretakeoff briefing will be conducted by the pilot or his appointed representative, and will cover the following items:

1. Pilot's name.
2. Type mission.
3. Destination.
4. Route of flight.
5. Altitude.
6. Estimated time en route.
7. Weather en route and at destination.
8. Personal equipment.
9. Use of oxygen and any applicable survival equipment.
10. Use of seat belts and shoulder harness.
11. Smoking regulations.
12. Location of emergency equipment and exits to be used on the ground and in the air.
13. Use of parachute and bail out procedures.
14. Ditching or forced landing signals and procedures.
15. Communication procedures between compartments, normal and emergency.
16. Caution on use of electronic equipment (radios, razors, etc.).

Before Exterior Inspection Check (P-N-F)

*1. Form 781 - CHECKED.

*2. Crew and passenger briefing - COMPLETED.

EXTERIOR INSPECTION

The exterior inspection should be accomplished as shown in figure 2-2. In addition, the following should be accomplished: Check for cuts, scratches, loose rivets, and fluid leaks; check all drain plugs for leakage; check all vents and ports clear; check that all access doors, fuel caps, and panels are secure; check ground areas around aircraft for clearances.

Exterior Inspection Check

Nose Section (A) (figure 2-2)

*1. Pitot tube - COVER REMOVED.

2. Armament or camera compartment - ALL HATCHES AND ACCESS DOORS SECURED.

*3. Nose gear torque arm disconnect - SAFETIED.

*4. Nose gear ground safety lock - REMOVED.

Right Wing (B)

1. Wing pylons and stores - CHECKED.
   a. Fuel quantity - CHECKED.
   b. Initiators - CHECKED.
   c. Fuses - CHECKED.
   d. Safety pins - REMOVED.

*2. Right main gear safety lock - REMOVED.

Aft Section (C)

1. Top hatch - SECURED.
2. Camera compartment window - CHECKED and SECURED.
3. Circuit breakers - CHECKED.
4. Side entrance hatch - SECURED.
5. Lower hatch - SECURED.

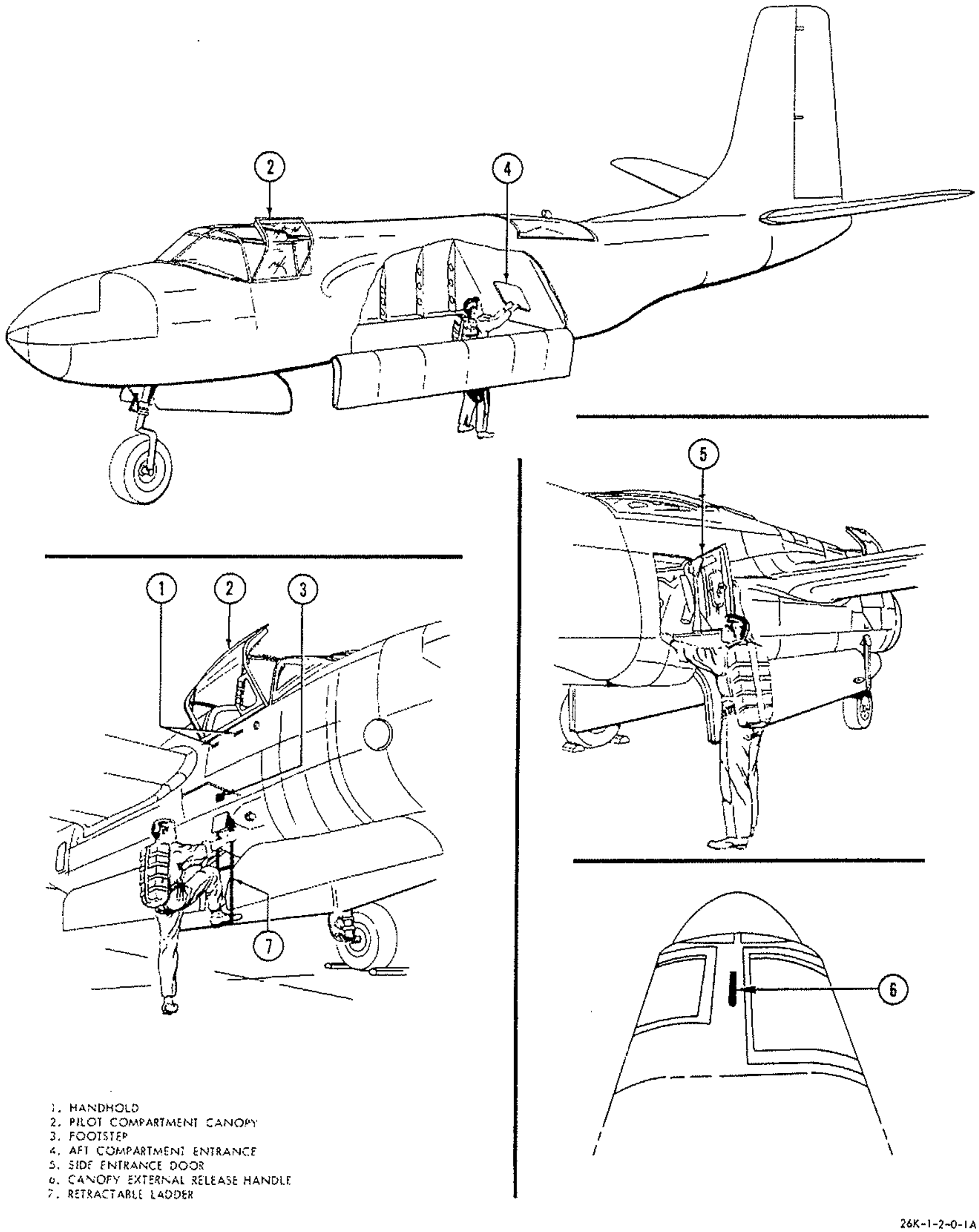

2
4
5
1
2
3
7
6
1. HANDHOLD
2. PILOT COMPARTMENT CANOPY
3. FOOTSTEP
4. AFT COMPARTMENT ENTRANCE
5. SIDE ENTRANCE DOOR
6. CANOPY EXTERNAL RELEASE HANDLE
7. RETRACTABLE LADDER
26K-1-2-0-1A

Figure 2-1

EXTERIOR INSPECTION

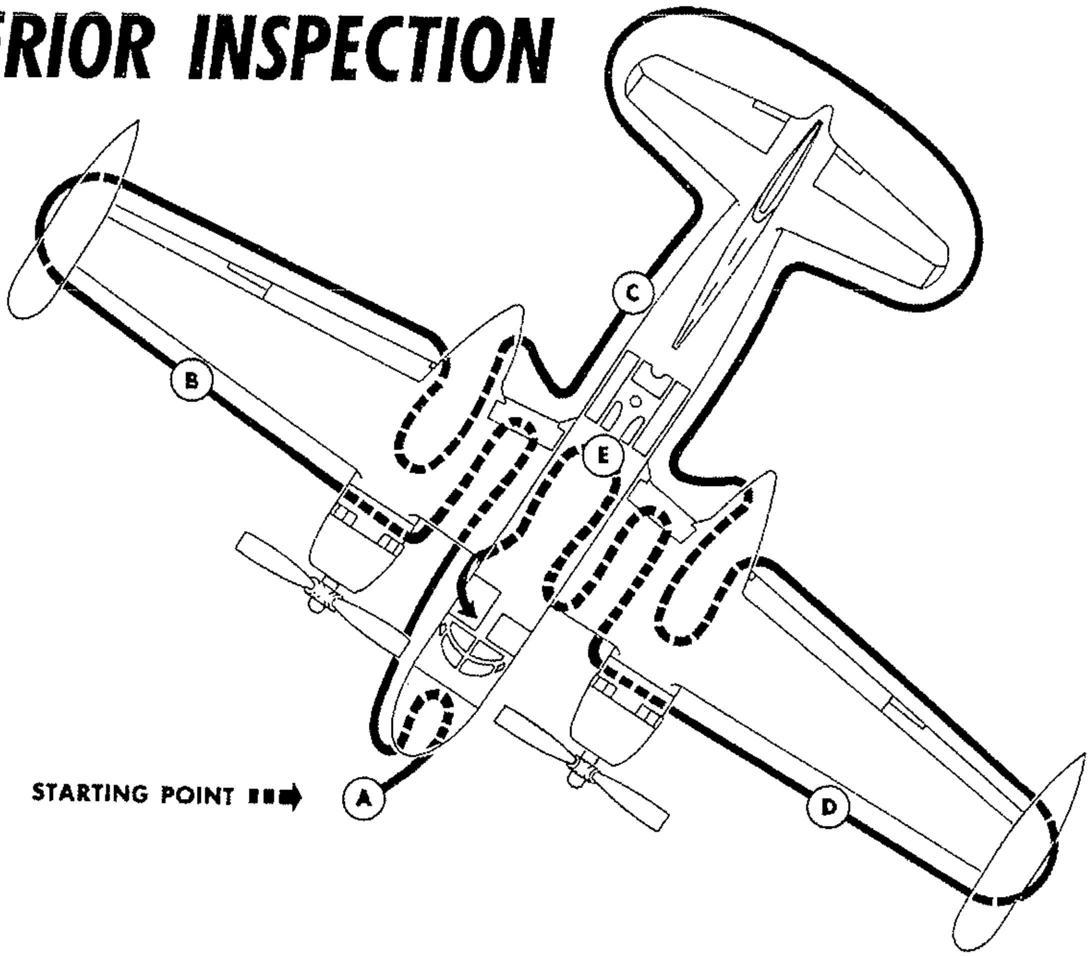


Figure 2-2

Left Wing (D)

*1. Left main landing gear safety lock - REMOVED.

2. Wing pylons and stores - CHECKED.

   a. Fuses - CHECKED.

   b. Initiators - CHECKED.

   c. Fuel quantity - CHECKED.

   d. Safety pins - REMOVED.

Bomb Bay (E)

1. Camera equipment (when installed) - CHECKED.

2. Internal ordnance - CHECKED.

   a. Initiators - CHECKED.

   b. Fuses - CHECKED.

   c. Safety pins - REMOVED.

*3. Bomb bay door ground safety locks - REMOVED.

INTERIOR INSPECTION

Before Starting Engines Check (N)

1. Armament switches - SET.

   a. Bomb fuse arming switch - OFF.

   b. Bomb bay jettison switch - OFF.

   c. Guns ready/holdback switch - OFF.

   d. Bomb bay door switch - OFF.

   e. Bomb bay front and rear arming switch - OFF.

   f. Pilot bombardier release switch - PILOT.

   g. Master armament switch - OFF.

   h. Gun-camera switch - OFF.

   i. Gunsight filament switch - OFF.

j. External stores selector switches - OFF, ARROWS SET.

The toggle should be aligned for the type of stores installed. Check to see that the switch remains in the OFF position.

k. Bomb intervalometer - TRAIN and ZERO.

2. Ignition switches - OFF.

3. Landing gear lever - DOWN.

4. Static pressure selector - AIRSPEED TUBE.

*5. Circuit breaker panel - CHECKED.

*6. Oxygen pressure - CHECKED.

Check for 425 ± 25 PSIG.

7. Pilot compartment lights - OFF.

*8. Accelerometer - SET.

9. Clock - SET.

10. Windshield alcohol valve - OFF.

11. Pilot subpanel switches - SET.

a. Navigation lights control switch - SET.

b. Navigation lights brightness switch - SET.

c. Rotating beacon switch - OFF.

d. Formation lights switch - OFF.

e. Landing lights switch - OFF.

f. Propeller deice cycle switch - OFF.

g. Wing deice cycle switch OFF.

h. Antiskid arming switch - OFF.

i. Inverter switch - OFF.

j. Landing gear warning horn switch - RESET.

k. Propeller deicing AUTO-MAN switch - OFF.

l. Wing deicing switch - OFF.

m. Heater switch - OFF.

n. Auxiliary hydraulic pump arming switch - OFF.

o. Pitot heat switch - OFF.

p. Windshield alcohol switch - OFF.

q. Heater points switch - MAIN.

*12. Alarm bell - CHECKED.

Confirm that all occupants are able to hear bell.

13. Engine fire extinguisher switches - OFF.

14. Firewall shutoff handles - IN.

15. Navigation equipment - OFF.

a. ADF - OFF.

b. TACAN - OFF.

c. VOR - OFF.

16. Tip tanks fuel dump switch - OFF.

17. Fuel boost and transfer pump switches - OFF.

18. Cowl flap switches - OFF.

19. Emergency air brake lever - SAFETIED.

*20. Flight controls - UNLOCKED AND CHECKED.

Check movements of all control surfaces visually.

21. Supercharger levers - LOW.

22. Carburetor air filter switches - UNFILTERED.

23. Carburetor alcohol switch - OFF.

24. ADI arming switch - OFF.

25. Autofeather arming switch - OFF.

*26. Oil cooler door switches - AUTO.

*27. Mixture levers - IDLE CUTOFF.

*28. Propeller levers - FULL INCREASE.

*29. Throttles - 1/4 OPEN.

30. Wing flap lever - UP.

*31. Carburetor air temperature levers - COLD.

*32. Left and right fuel tank selector valve handles - MAIN.

33. Bomb bay crossfeed valve handle - OFF.

34. Emergency hydraulic selector valve handle - SYSTEM.

35. Wing flap limit switch and override - AS REQUIRED.

CAUTION

When carrying external stores that prohibit full downward travel of the flaps, insure that the limit switch is set in the proper position to limit downward travel of the flaps 38 degree maximum.

36. Camera switches - SET.

a. Forward oblique camera intervalometer - OFF.

b. Forward oblique camera control switch - OFF.

c. P-2 strike camera aperture control switch - CLOSED.

d. P-2 strike camera control switch - OFF.

e. P-2 strike camera intervalometer - OFF.

37. Command radios and IFF SIF - OFF.

a. UHF - OFF.

b. VHF - OFF.

c. IFF - OFF.

d. SIF - SET.

e. HF - OFF.

f. FM - OFF.

g. KY-8 - OFF
Place power switch OFF (down), and position the mode selector switch to PLAIN mode.

*38. Hydraulic fluid reservoir level - CHECKED.

Check the hydraulic fluid quantity at the NORMAL level when the system indicates 0 PSIG. If the system is pressurized, the fluid level may be as much as 3 inches below the NORMAL indication.

39. Bomb bay door manual handle - NEUTRAL.

*40. Emergency air brake pressure gage - CHECKED.

Check for 650 to 850 PSIG.

41. Nose gear inspection and dome light switches - OFF.

*42. Generator switches - ON.

*43. Canopy emergency release - CHECKED.

Check that the emergency canopy release handle is safetied and the release pins bordering the canopy are safetied.

44. Publications - ABOARD.

a. T.O. 1B-26K-1 - CHECKED.

b. T.O. 1B-26K-5 - CHECKED.

c. T.O. 1B-26K-6 - CHECKED.

d. T.O. 1B-26K-6WC-1PRPO - CHECKED.

e. FLIP charts - CHECKED.

Insure that current sets of the following are aboard: Terminal, Low Altitude; Enroute, Low Altitude; Enroute Supplement.

*45. Entrance ladder - STOWED and SECURED.

STARTING ENGINES

The following procedures and techniques shall be rigidly adhered to in the operation of the aircraft. Ascertain that all loose material, ground equipment, and personnel not required for engine starting are at a safe distance from the aircraft. Maintain visual contact with the ground crew.

Starting Engines Check

*1. Seat belt and shoulder harness - SECURED. (P-N-F)
*2. Parking brake - SET.
*3. Fire guard - POSTED.
*4. Master ignition switch - ON.
*5. Battery switches or APU - ON.

To insure both batteries are capable of supplying electric power to the DC bus bar, proceed as follows:

a. Turn one battery ON and check voltage; turn battery OFF.
b. Turn second battery ON and check voltage.
c. Turn first battery back ON, insuring both battery switches are on.

Battery switches should remain OFF when an auxiliary power unit is used. Minimum battery voltage of approximately 18V is required to close the battery relay. The relay must be closed before the generators can recharge the batteries.

*6. Right engine - STARTED. (P-N)

WARNING

If fire occurs during engine start, follow the procedures outlined under Engine Fire on Ground, Section III.

a. Right main fuel boost pump switch - LOW, PRESSURE CHECKED.

Check for 10 to 15 PSIG.

CAUTION

When engines are not running, always place fuel boost pump switch in LOW position and allow fuel pressure to stabilize before shifting to HIGH position, to prevent damage to carburetor diaphragm.

b. Starter switch - RIGHT ENGINE.

Allow a cold engine to turn 15 blades, or an engine that has been operated within 1 hour to turn 6 blades, to check for liquid lock.

CAUTION

- Discontinue starting if there is evidence of propeller balk or stall, as damage to the engine may result from liquid lock.
- To preclude starter overheating when using an auxiliary power unit, do not exceed 1 minute of continuous cranking. To conserve battery power when batteries are used for starting, do not exceed 30 seconds' continuous cranking. If start is not made allow a 1 minute cooling period. If a second attempt is not successful, a 5 minute wait for cooling is required.

c. Right ignition switch - BOTH.

d. Primer switch - RIGHT ENGINE.

Begin priming immediately after engaging right ignition switch. Prime intermittently if engine is warm, continuously if engine is cold. Adjust throttle to 1000 RPM and run engine on primer until fuel and oil pressure warning lights go out.

e. Right mixture lever - AUTO-RICH.

Hold prime on until a slight RPM drop is indicated.

f. Primer switch - OFF.

g. Right main fuel boost pump switch - OFF.

NOTE

When the engines are hot, it may be necessary to leave the boost pump at low boost position longer than normal to prevent engine failure from momentary fuel starvation.

*7. Engine instruments - WITHIN LIMITS.

Insure that all engine instrument readings do not exceed limitations as set forth in Section V.

CAUTION

If oil pressure does not read 40 PSIG within 30 seconds, shut down the engine and investigate.

*8. Comm radio - ON.

*9. Suction gage - CHECKED.

Check for 5 ±0.2 inches Hg, and vacuum warning light out.

*10. Hydraulic pressure gage - CHECKED.

Check for 1000 PSIG.

*11. Bomb bay doors switch - CLOSED.

a. Bomb bay door close light - ON.

b. Hydraulic pressure gage - CHECKED.

Check for pressure buildup

c. Bomb bay door switch - OFF.

*12. Left engine - STARTED. (P-N)

Repeat steps 6 through 9 for left engine.

*13. Engine instruments - WITHIN LIMITS.

ENGINE GROUND OPERATION

WARNING

During ground operation, if the fuel pressure drops below the operating limits but the engine continues to operate normally, stop the engine immediately by retarding the mixture control to IDLE CUTOFF. DO NOT restart the engine until corrective action has been accomplished, as fire may result from fuel leakage.

Prolonged engine operation in the range of 1150 to 1500 RPM at zero forward speed is to be avoided because of harmful propeller vibratory stresses.

Engine Warmup

Do not exceed 1100 RPM until the oil temperature is 40°C. Do not attempt to rush engine warmup by closing cowl flaps. Observe cylinder head temperature closely, as engine temperatures rise more rapidly during low RPM operation on the ground than at higher RPM settings in the air.

NOTE

When operating on airfields away from home station where altitude is higher, or during prolonged periods of ground idle, the carburetor mixture shall be manually leaned to best power (maximum RPM rise) to reduce spark plug fouling.

BEFORE TAXIING

1. Left and right fuel selector valve levers - AUX. (N)

NOTE

Selected tanks should be allowed to feed for at least 1 minute to insure proper feeding.

*2. External power - DISCONNECTED (if used).

*3. Battery switches - ON.

*4. Auxiliary hydraulic pump switch - ON.

*5. Inverters - CHECKED, ONE ON.

a. Inverter switch - #1.

Check for 115 ±10 VAC.

b. Inverter switch - #2.

Check for 115 ±10 VAC.

c. Inverter switch - AS DESIRED.

*6. Generators - CHECKED.

Check voltage 28 ±0.5 VDC. Loadmeters parallel ±5%.

*7. Comm Nav equipment - ON. (N)

a. ADF - ANT.

b. TACAN - REC.

c. VOR - ON.

d. UHF - T R+G.

e. VHF - ON.

f. IFF - STANDBY.

g. HF - ON.

h. FM - ON.

i. KY-8 - ON

Place power switch ON (up), and position the mode selector switch to PLAIN mode.

8. Left and right fuel selector valve levers - TIP (if serviced). (N)

*9. Alarm bell and interphone - CHECKED.

*10. Ignition grounding - CHECKED.

a. Throttles - IDLE (650 -50, -0 RPM).

b. Master ignition switch - OFF MOMENTARILY, then ON.

WARNING

If an engine does not cease firing, shut down engines and keep personnel clear of affected propeller until difficulty has been remedied. If the propeller is rotated by hand, there is a possibility of the engine firing.

c. Ignition switches - (One at a time) from BOTH to R, then to BOTH. From BOTH to L, then to BOTH. To OFF momentarily, then BOTH. Proper connection of ignition leads will be indicated by a slight drop in RPM when operating on each magneto, and the engine will cease to fire in the OFF position.

CAUTION

Perform this check as rapidly as possible to prevent severe backfiring when ignition switch is turned ON again.

*11. Taxi clearance - RECEIVED.

Call control tower (if available), for taxi clearance, runway in use, wind, altimeter setting, and time information.

*12. Flight instruments - CHECKED. (P-N)

a. Check outside air temperature indicator for correct ambient temperature.

b. Check vertical velocity and turn and slip indicators for static conditions.

c. Check airspeed indicators for approximately 25 KIAS.

d. Set attitude indicators and check warning flags retracted. If sufficient time has not elapsed since application of power, flags may still be visible, and indicators must be checked later.

e. Set altimeters and check against local altimeter reading. The altimeters should read field elevation ±75 feet.

WARNING

It is possible to misset the altimeters by 10,000 feet, and still have the correct indication on the barometric scale. This happens when the barometric knob is continuously rotated after the barometric scale is out of view, until eventually the numbers reappear in the barometric window. If the given altimeter setting is then established, the instrument will read 10,000 feet in error. To prevent this possibility, pay particular attention to the 10,000 foot pointer when setting the altimeter. As described in Section I of this manual, the altimeters are equipped with a low altitude warning symbol, which shows at altitudes below 16,000 feet and aids in precluding the possibility of this error.

f. Check RMI with the magnetic compass. If the heading indicator has not slaved to the correct indication, the fast slave mode may be activated by changing the inverter selection to interrupt power to the system.

g. Set heading indicator to magnetic heading.

h. Reset accelerometer.

*13. Wheel chocks - REMOVED.

Reduce engines to IDLE power while chocks are removed. See figure 2-3 for minimum turning radius and ground clearance.

TAXIING

Check with ground crew to insure that taxi route out of parking area is clear of obstructions. In close quarters, a guide should be provided by ground personnel. Release parking brakes and apply sufficient power to start the aircraft rolling. Check brakes before taxi speed is allowed to build up. Directional control of the aircraft is accomplished by using rudder, differential throttle application, brakes, or a combination of the three. Sudden or severe application of brakes should be avoided. When making a turn, keep both main wheels rolling to minimize wear and avoid damage to tires and landing gear.

When taxiing in a congested area, proceed slowly and cautiously. When stopping, depress the brake pedals, and, as the aircraft slows, gradually release brake pressure so that when the aircraft stops very little pressure is being applied to the pedals. Insure that the aircraft has stopped prior to setting parking brakes.

Taxiing Check

*1. Brakes - CHECKED.

*2. Hydraulic pressure gage - CHECKED.

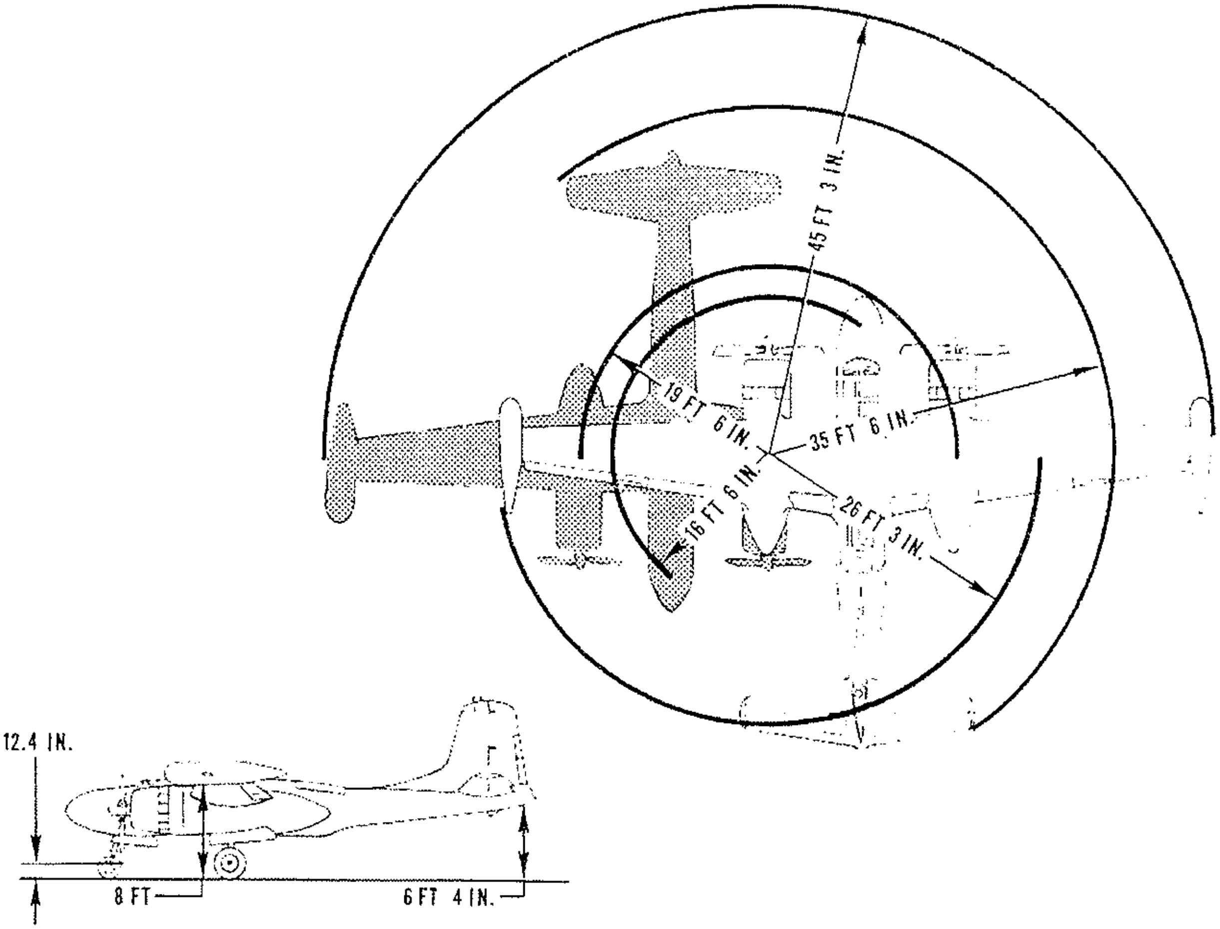
*3. Flight instruments - CHECKED. (P-N)

The pilot and other crew member will check the turn and slip and heading indicators for proper turn indications while taxiing. Check that the RMI agrees closely with the magnetic compass headings and that the attitude indicators have erected.

4. Bomb bay fuel tank selector valve handle - BOTH (if serviced). (N)

5. Left and right fuel tank selector valve handles - OFF (if bomb bay tank serviced). (N)

MINIMUM TURNING RADIUS



AND GROUND CLEARANCE

Figure 2-3

26F-1-2-6-3A

Crosswind Taxiing

A strong crosswind will cause the aircraft to windvane. To prevent this, increase power on the upwind engine. This will counteract the crosswind unless a very strong wind is present. The downwind brake may be used as an additional aid.

CAUTION

Do not perform runup check with the nose wheel cocked. Possible damage may occur because of side stresses.

ENGINE RUNUP

Park the aircraft as nearly aligned into the wind as possible, with the nose wheel centered.

Engine Runup Check

*1. Parking brakes - SET.
2. Left and right fuel tank selector valve handles - MAIN. (N)
3. Bomb bay fuel tank selector valve handle - OFF. (N).
*4. Comm./Nav equipment - CHECKED. (N)
   a. ADF - CHECKED.
   b. TACAN - CHECKED.
   c. VOR - CHECKED.
   d. UHF - CHECKED.
   e. VHF - CHECKED.
   f. HF - CHECKED.
   g. FM - CHECKED.
   h. KY-8- CHECKED.
5. Anti-ice/Deice equipment - CLIMATIC.

a. Select ON-HEAVY position, observe inflation and deflation then turn switch OFF.

b. Select MANUAL position and check for an indication on the loadmeter. Release the switch.

*6. Manifold pressure gage drain - PURGED.

To eliminate condensation in the manifold pressure line, depress each purge valve button for 10 seconds with the manifold pressure less than the field barometric pressure.

*7. Engine instruments - CHECKED.

Check temperatures and pressures within operating limits.

*8. Mixture Levers - AUTO-RICH.

*9. Throttles - 1700 RPM.

*10. Propeller levers - CHECKED.

Exercise propellers at least 3 times between 1700 - 1200 ±50 RPM.

11. Propeller reverse - CHECKED.

CAUTION

Propeller reversing check should not be performed until the engine oil temperature is at least 40°C to avoid imposing a severe load on the propeller system.

a. Propeller reverse switch - ARMED.

b. Throttles - IDLE RPM. Lift detents and ease throttles into reverse range.

c. Loadmeters - CHECK for increase, then decrease.

d. Propeller reverse lights - CHECK ON.

NOTE

During propeller reverse operation, the amber reverse indicator lights may flicker through the initial (-9 degrees) travel of reverse range. The momentary flicker is common with the system function during propeller reverse operation.

e. Throttles - FORWARD PITCH RANGE (1500 RPM).

f. Loadmeters - CHECK for increase, then decrease.

g. Propeller reverse lights - CHECK OFF.

h. Propeller reverse switch - OFF.

*12. Autofeather system - CHECKED. (P-N)

a. Throttles - 1500 RPM.

b. Autofeather arming switch - ARMED.

c. Autofeather test switch - RIGHT ENGINE. Check light ON in feather button. After a 3 second time delay, the right feather button should depress.

d. Immediately move autofeather test switch to LEFT ENGINE to check operation of the interlock circuit that prevents simultaneous feathering of both propellers.

e. Right feather button - PULL OUT after a 200 to 300 RPM drop. (N)

NOTE

If RPM increases, and then decreases, or remains constant, the propeller was, or is, in reverse range.

f. Autofeather arming switch - OFF.

g. Repeat cycle for left engine.

CAUTION

During static ground operation of either engine, if it is necessary to operate the engine at a speed greater than 1000 RPM, both engines should be operated simultaneously at the same power setting to prevent damage to the nose strut.

13. Carburetor air temperature levers - CHECKED.

a. Throttles - 1500 RPM.

b. Carburetor air temperature levers - HOT: check temperature indicator for increase.

c. Carburetor air temperature levers COLD: check temperature indicator for decrease.

NOTE

Maximum CAT limits may be momentarily exceeded during this check.

*14. Throttles - FIELD BAROMETRIC PRESSURE.

Check tachometer for 2200 ±50 RPM and fuel flow indicator for 600 ±50 PPH.

NOTE

- Fuel flow may vary due to changes of temperature, humidity, pressure, and field elevation.
- When engine power check is performed with aircraft headed into the wind, add 2 RPM per 1 knot of wind velocity: subtract 2 RPM per 1 knot of wind velocity when headed downwind.

15. Supercharger levers - CHECKED.

a. Throttles - FIELD BAROMETRIC.

b. Supercharger levers - HIGH: check manifold pressure rise and BMEP indicators for significant change.

c. Supercharger levers - LOW: check manifold pressure and BMEP indicators for significant change opposite to those noted in "b".

NOTE

Maximum CAT limits may be momentarily exceeded during this check.

*16. Ignition system - CHECKED.

a. Throttles - FIELD BAROMETRIC.

b. Ignition switches checked (one at a time) from BOTH to R, to BOTH, to L, to BOTH. Normal drop is 50 to 75 RPM, and should not exceed 100 RPM, nor a maximum difference of 40 RPM between left and right magnetos. Normal BMEP drop is 5 to 7 PSIG, and should not exceed 10 PSIG, nor a maximum difference of 4 PSIG between left and right magnetos.

CAUTION

If prolonged holding is anticipated for any reason, manually lean the mixture from AUTO-RICH toward IDLE CUT-OFF until best power is obtained (maximum RPM rise), to reduce spark plug fouling. Another ignition system check will be performed prior to takeoff, when time since the last check exceeds 10 minutes. Be sure mixture levers are returned to AUTO-RICH for subsequent ignition check. See Section VII, "Ground Running", for engine "Clearing Out" procedure. Mixture levers must be placed in AUTO-RICH immediately before takeoff.

BEFORE TAKEOFF

Before Takeoff Check

1. Crew briefing - COMPLETED.

   a. Duties of each during takeoff.

   b. Abort procedure, ground and flight.

   c. Power control or assistance.

   d. Climb instructions.

   e. Engine failure procedure.

   f. Departure information.

   g. Radio control and usage.

   h. Any other items necessary for successful mission or flight.

2. Trim tab controls - SET.

   Set rudder trim 1° right and elevator trim 1° nose up.

3. Wing flap lever - SET.

   Normal setting for takeoff is 15° DOWN.

4. ADI arming switch - ARMED.

   Check ADI pressure indicator for approximately 24 PSIG, arming light ON and ADI quantity gage for a minimum of 5 gallon per tank.

5. Autofeather arming switch - ARMED (if desired).

   It is the pilot's option whether to use the autofeathering system. Check red arming light ON, if used.

WARNING

Very rapid advancement of the throttles may cause a momentary illumination of the feathering buttons. Extremely rapid advancement of the throttles may initiate a feathering operation that can only be stopped by manual operation of the applicable feather button once feathering is initiated. Under normal throttle movement these conditions should not occur. Therefore, a momentary illumination of a feathering button will alert the pilot of possible autofeathering operation.

6. Engine instruments - CHECKED.

   Check that instruments are within limits.

7. Flight instruments - CHECKED.

   Check that instruments are erected, aligned, and that no OFF flags are visible.

8. IFF/SIF - AS REQUIRED. (N)

9. Mixture levers - AUTO-RICH.

10. Fuel boost pump switches for selected tanks - HIGH. Check fuel pressure indicator 22-23 PSIG.

11. Cowl flap switches - 1/4 OPEN.
    Close cowl flaps to 1/4 open position.

12. Rotating beacon - AS REQUIRED.

13. Navigation lights - BRIGHT - STEADY.

14. Pitot heat switch - AS REQUIRED.

15. Antiskid arming switch - ARMED.

    Check arming light OFF.

16. Flight controls - CHECKED.

17. Canopy - CLOSED and LOCKED. (P-N)

TAKEOFF

WARNING

To prevent injury to personnel in the event of a crash landing, crew members or passengers shall not occupy the glass nose compartment during takeoff or landing.

After takeoff clearance is received from the control tower, taxi onto the runway, align the aircraft with the runway, and check heading indicator, RMI and magnetic compass for correct indications. Maintain directional control during initial takeoff roll by use of differential throttle application until the rudder becomes effective. Do not use brakes during takeoff roll except as a necessary means of maintaining directional control. Plan the takeoff according to the following variables affecting takeoff techniques: Wing, length of runway, gross weight, type and condition of runway, and height and distance of the nearest obstacle.

TAKEOFF PATTERN - NORMAL

(typical)

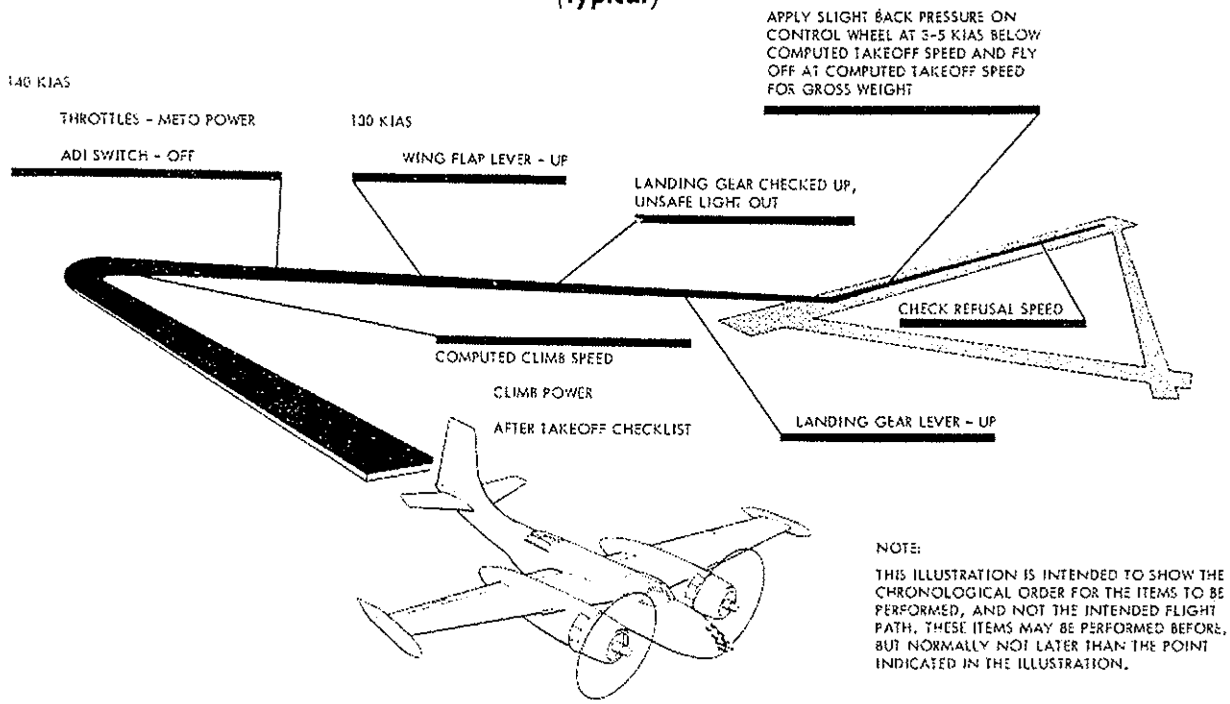


Figure 2-4

TAKEOFF PATTERN - MAXIMUM PERFORMANCE

(typical)

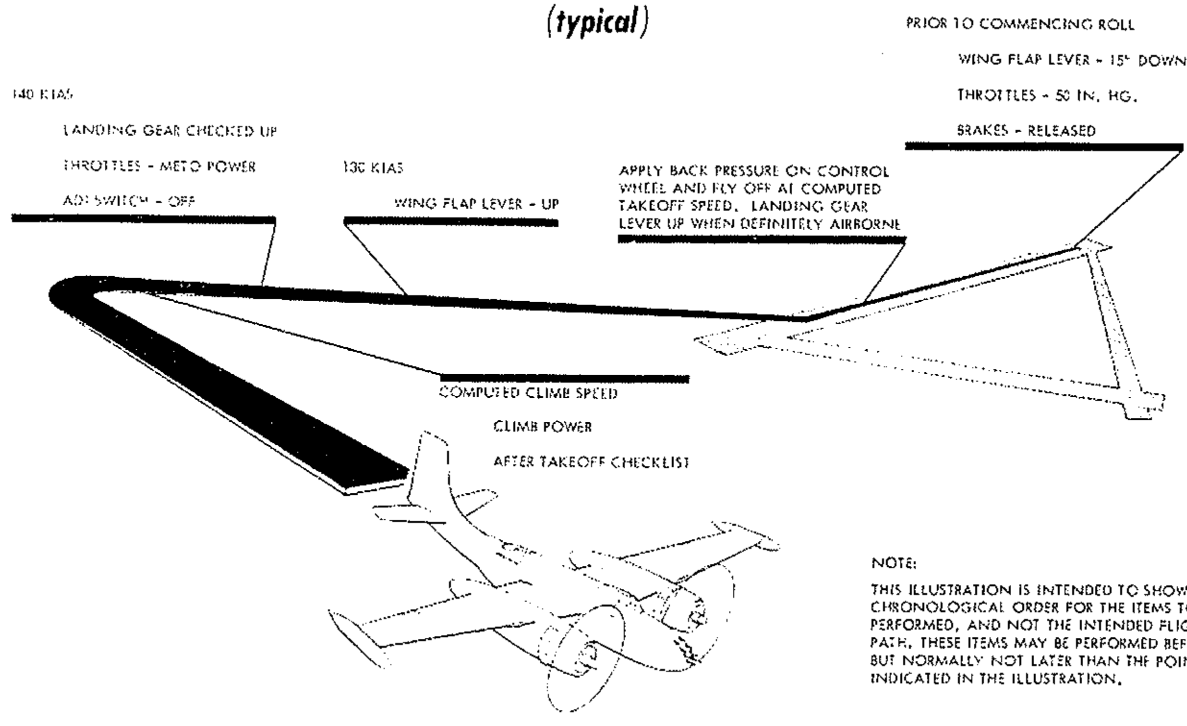


Figure 2-5

Normal Takeoff.

Taxi into takeoff position. Advance throttles to field barometric pressure. Release the brakes, using throttles to maintain initial directional control. As soon as the aircraft is rolling straight, equalize the throttles and advance them smoothly and in a positive manner to maximum power. Check engine instruments for readings within normal operating limits. During takeoff run, maintain directional control with throttles and rudder, using brakes in an emergency only. At 3 to 5 KIAS below computed takeoff speed, raise weight off the nose wheel; then as speed increases, allow the aircraft to fly itself off. Do not pull the aircraft off the runway.

Crosswind Takeoff

The following procedures, in addition to the normal takeoff procedures, apply when making a crosswind takeoff.

Advance throttles, leading with the upwind throttle as required. As speed increases and rudder becomes more effective, gradually equalize throttles and advance to takeoff power. To avoid skipping, do not raise the nose wheel until reaching the computed takeoff speed; then fly the aircraft off smoothly. After takeoff, counteract drift by making a coordinated turn into the wind.

Maximum Performance Takeoff

A maximum performance takeoff requires excellent feel of the aircraft near stalling airspeeds. It is directly related to slow flying; consequently, the pilot should be familiar with this maneuver before attempting a maximum performance takeoff. Use the following procedure for maximum performance (short field) takeoffs.

Set wing flaps switch at 15° DOWN. Hold brakes and advance throttles to 50 inches Hg. Release brakes, maintaining directional control with rudder and power. Use brakes as a last resort. Advance throttles to full power and take the weight off the nose wheel as soon as elevator control permits. At 85 percent of power off stall speed, increase the back pressure on the control wheel to lift the aircraft off the runway. When definitely airborne, retract the landing gear. When the obstacle is cleared, accelerate to 130 KIAS, raise the wing flaps, accelerate to normal climb speed, and reduce power to climb settings. In a severe cross-wind condition, roll the aileron control wheel into the wind, while maintaining the aircraft in a wings level attitude, until reaching takeoff speed. This procedure will help in maintaining directional control. When airborne, correct for drift by crabbing in order to maintain a track over the runway.

Night Takeoff

When making a night takeoff, in addition to normal takeoff procedures, the following procedures apply.

Pilot compartment lighting should be reduced to a minimum. Normally landing lights should be ON unless weather conditions preclude their use. Apply power in the normal manner, and maintain directional control by reference to runway lights and the heading indicator. After takeoff allow airspeed and vertical velocity to increase gradually to climb values before power is reduced. Retract landing lights, if used.

TAKEOFF PRECAUTIONS

The term "maximum power" is used to indicate the maximum allowable power settings under existing conditions. Refer to Wet Takeoff BMEP at Various Conditions of Temperature and Humidity Chart in the Appendix. At temperatures below standard, the limiting value of BMEP may be attained prior to the limiting manifold pressure.

NOTE

- Manifold pressure or BMEP, whichever is reached first, will be the governing factor in establishing maximum power.
- Manifold pressure will be reduced approximately 1 inch for each 10°C CAT below standard, by limiting maximum power to 253 BMEP wet, or 222 BMEP dry. The CAT expected at takeoff is arrived at by adding 5°C to OAT (or, preferably, to runway temperature if available) to compensate for the rise in CAT due to ram effect during takeoff roll.

The crew member in the copilot seat will cross-check all flight instruments on night and instrument takeoffs and during climb under these conditions. He will report immediately any failure or suspected malfunction of flight instruments, particularly the pilot instruments.

Cylinder Head Temperature (CHT) Management

Minimum CHT, within limits, should be secured prior to takeoff for the following reasons:

1. The power available at 2800 RPM increases with decreasing CHT at approximately 30 BHP (3 BMEP) per 20°C, below 260°C.

2. Increasing temperatures are conducive to common types of spark plug fouling, which can be reduced through control of maximum CHT.

3. CHT will rise 40° to 60°C during takeoff. Minimum CHT can be maintained by a brief engine runup to perform the necessary checks, and by keeping the cowl flaps fully open until ready to apply takeoff power. Pretakeoff CHT should not exceed 150°C with ambient temperature of 40°C or less, and should never exceed 170°C. For cold weather operation, pretakeoff CHT should not be less than 140°C.

Manifold Pressure Control

As the aircraft accelerates during takeoff, and up to the point of the first power reduction, increasing ram effect will cause a rise in manifold pressure of from 1 to 3 inches Hg. This increase in manifold pressure should be anticipated to prevent exceeding limitations.

ADI (Water-Alcohol) System Management

When ADI is used during takeoff, the ADI system pressure, fuel flow, manifold pressure, and BMEP indicators must be monitored by the crew, and any discrepancies must be reported to the pilot immediately. As the throttles are advanced beyond 44 to 48 inches Hg, the ADI pressure should drop to a normal indication of approximately 22 PSIG, as a result of ADI flow. If the pressure drop does not occur in either engine, power will be reduced to dry takeoff settings (60 inches Hg or 222 BMEP), and the ADI arming switch placed in the OFF position. If the ADI pressure drops below 18 PSIG during takeoff, carburetor enrichment in excess of 1800 PPH may occur, resulting in power loss as indicated by the BMEP. The ADI arming switch should then be placed in the OFF position, and manifold pressure restricted to 60 inches Hg. The approximate fuel flow indication for standard day, sea level conditions is as follows:
Wet - 1500 to 1600 PPH; Dry - 1800 to 1900 PPH.

AFTER TAKEOFF

NOTE

When a closed traffic pattern is used during local training flights, only those items preceded by "#" on the After Takeoff and Descent checklists need be accomplished. The Cruise checklist may be omitted.

After Takeoff Check

#1. Landing gear lever - UP.

CAUTION

Do not use brakes to stop wheel rotation after take-off, as abnormal stress will be placed on the main landing gear.

#2. Wing flap lever - UP.

#3. Throttles - SET.

#4. Propeller levers - SET. (N)

#5. Engine instruments - CHECKED.

Check within operating limits.

#6. ADI arming switch - OFF. (N)

Check for increased fuel flow, and decrease in ADI pressure.

#7. Autofeather arming switch - OFF. (N)

#8. Landing gear lever - NEUTRAL. (N)

9. Auxiliary hydraulic pump switch - OFF.

10. Antiskid arming switch - OFF.

11. Cowl flaps - AS REQUIRED.

12. Altimeters - SET. (P-N)

NOTE

- As soon after takeoff as flight conditions permit, positive operation of the IFF/SIF should be established with an Air Traffic Control Facility if the route of flight will require use of the system. Consult appropriate FLIP documents for IFF/SIF traffic control requirements and procedures.
- As soon after takeoff as flight conditions permit, the TACAN should be cross-checked with ground radar, VOR, or ADF. When using TACAN for instrument departures, letdowns, or approaches, utilize the same facility, if possible, to verify TACAN bearing information.

CLIMB

Climb power settings and recommended airspeed to be used are located in the Appendix. Where climb performance is not critical, a climb speed of 160 KIAS is recommended for all gross weights, loadings, power settings and single engine operation.

Throttles should be adjusted to provide equal manifold pressure on both engines, as selected from the appropriate climb chart for existing CAT and pressure altitude, in the Appendix. BMEP difference among engines with equal manifold pressure, RPM, CAT, and fuel flow is due entirely to unequal accessory loads, engine conditions, and/or instrument accuracy.

It is important that fuel flow be monitored throughout the climb to ascertain that it is within prescribed limits. The minimum fuel flow limit is not an engine limit at normal climb power. It is, however, a carburetor limit designed to obviate damage which might otherwise result at high power, where the margin between safe fuel flow and detonation is diminishing. At climb power, therefore, it is considered safe to continue operation when the fuel flow is 50 PPH below the minimum shown in the chart, providing the CHT and CAT limits are observed. If the climb fuel flow falls more than 50 PPH below the published minimum, power should be reduced by increments of 100 BHP until the fuel flow is not more than 50 PPH below the limit for that particular power setting. CHT and CAT limits must still be monitored. For a carburetor whose fuel flow is below published minimum, a complete report should be made on Form 781, and corrective maintenance accomplished at the next landing. En route power must be set according to climb chart manifold pressure rather than BMEP in order that the chart fuel flow limits be valid. The effects of any existing mechanical discrepancy are thus largely eliminated from evaluation of climb carburetion.

CRUISE

Level off upon reaching cruising altitude, and maintain climb power settings until desired crusing airspeed is attained. For information regarding power settings, fuel consumption, and airspeeds refer to Appendix.

Cruise Check

1. Power - AS REQUIRED.
2. Cowl flap switches - AS REQUIRED.

   A cylinder head temperature of 200°C is desired.
3. Fuel boost pump switches - AS REQUIRED.

   Turn switches LOW one at a time and check fuel pressure indicator for 22-23 PSI, then OFF or as desired.
4. Carburetor air temperature levers - AS REQUIRED. (N)
5. Supercharger levers - AS REQUIRED.

During prolonged flight in either high or low ratio, the superchargers should be shifted to the other ratio every 2 hours for a short period to prevent sludge from accumulating on the supercharger clutches.

6. Fuel quantity gages - CHECKED. (N)
7. Mixture levers - AS REQUIRED. (P-N)
8. Engine instruments - CHECKED.
9. Hydraulic bypass valve handle - OUT. (N)

Inflight

For information on flight characteristics, refer to Section VI.

For information and checklists of the gunnery, bombing, and photo systems operation, refer to Section IV.

DESCENT

In making a normal descent from cruising altitude, reduce power as required to maintain desired airspeed and rate of descent. Maintain engine temperatures within normal operating ranges. Place mixture levers in AUTO RICH position to assist in maintaining temperatures within limits, and in preventing backfiring due to lean mixture and low cylinder head temperatures. Position carburetor air temperature levers as required to maintain carburetor air temperature within limits.

CAUTION

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

Accomplish Descent checklist prior to turning initial for an overhead pattern, initial approach fix for a nonprecision approach, or downwind for a standard traffic pattern.

WARNING

Whenever a mission involves carriage of chemical or biological (C/B) munitions, and it is suspected or known that the aircraft has become contaminated with munition content (agent) by enemy fire, collision, malfunction, or otherwise, the following procedures must be employed before landing, if possible, to allow time for the ground crew response: The pilot shall contact air traffic control and declare his aircraft contaminated with C/B munition agent and clearly state the unclassified designator for the agent. Also, the pilot shall request disaster preparedness (decontamination team) provide for isolated parking and decontamination. No other ground crew personnel shall be permitted to approach the aircraft until it is certified decontaminated to the maintenance officer.

Descent Check

1. Altimeters - SET. (P-N)

2. Left and right fuel tank selector valve handles - MAIN. (N)

3. Bomb bay crossfeed valve handle - OFF. (N)

4. Hydraulic bypass valve handle - IN and LOCKED (N)

5. Hydraulic fluid level - CHECKED. (N)

6. ADI quantity - CHECKED. (N)

7. Emergency air brake pressure - CHECKED. (N)

8. Mixture levers - AUTO RICH. (N)

9. Propeller levers - AS REQUIRED. (N)

10. Supercharger levers - LOW.

11. Fuel boost pump switches for selected tanks - HIGH. (N)

12. Tip tank fuel dump switch - CHECKED. (N)

Place switch in ON position, ascertain tanks are empty by visual check, then return switch to OFF.

13. Antiskid switch - ON.

14. Auxiliary hydraulic pump switch - ON.

#15. Wing flap lever - AS REQUIRED.

#16. Crew briefing - COMPLETED.

Include expected approach, duties, alternate, and special instructions appropriate to mission. Review and/or update approach and landing data.

Before Landing

If approach conditions make it advisable to use carburetor heat, the heat should be retained at 20°C and carefully monitored to avoid excessive CAT in the event of a go around. If carburetor heat is not needed during an approach, it should be removed at least 2 minutes prior to landing, to allow the mixture control to adjust properly to ambient air temperature, and therefore not cause unduly lean mixture in the event of a go around. ADI should be switched ON 5 to 10 seconds before expected use, to bleed the system, if it becomes necessary to use full wet takeoff power in the event of a go around.

WARNING

To prevent injury to personnel in the event of a crash landing, crew members or passengers shall not occupy the glass nose during takeoff or landing.

Before Landing Check

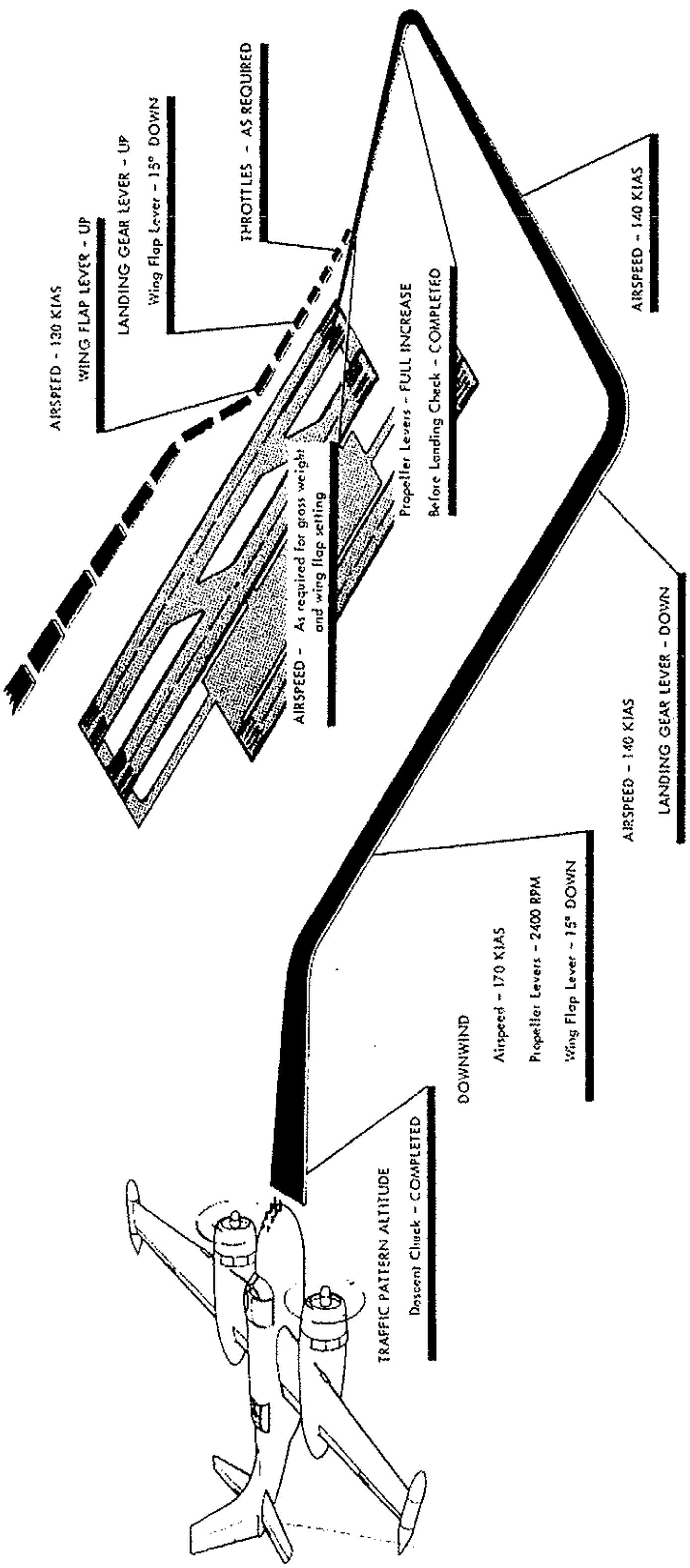
1. Pilot compartment heater switch - OFF.
2. Propeller levers - 2400 RPM (N).
3. Wing flap lever - 15° DOWN.
4. Landing gear lever - DOWN.
   Check warning lights and horn.

CAUTION

When the landing gear lever is placed in the DOWN position, insure that the lever latching mechanism is properly seated in the detent.

5. Hydraulic pressure indicator - CHECKED.
6. Propellers - FULL INCREASE (on final) (N).
7. Wing flap lever - AS REQUIRED.

LANDING and GO AROUND PATTERN
STANDARD
(typical)



NOTE:
THIS ILLUSTRATION IS INTENDED TO SHOW THE CHRONOLOGICAL ORDER FOR THE ITEMS TO BE PERFORMED, AND NOT THE INTENDED FLIGHT PATH. THESE ITEMS MAY BE PERFORMED BEFORE, BUT NORMALLY NOT LATER THAN THE POINT INDICATED IN THE ILLUSTRATION.

Figure 2-6

LANDING

A power on approach is recommended for a normal landing in this aircraft. The use of power reduces the glide angle, lowers the stalling speed, and assures a safer, more accurate landing. Maintain 140 KIAS until wings are level on final approach. Reduce airspeed gradually to the approach speed (same as landing obstacle clearances speed) which will be the minimum airspeed to maintain until initiating the flare for landing. Refer to Appendix for approach and landing data.

Gust Correction

When gusty winds exist, a correction factor should be added to the approach and touchdown speeds to compensate for maneuver loads which the pilot may impose on the aircraft while correcting for gusts. The gust correction factor is determined by taking one-half of the reported gust velocity, that is, one-half of the amount the wind is gusting over a constant wind. For example, if the wind is reported at 30 knots with gusts to 42 knots, the gust velocity would be 12 knots; one-half of 12 is 6, which is a gust correction in knots that should be added to approach and touchdown speeds. The maximum gust correction that should be added is 10 knots.

Normal Landing

In order to attain the results stated in landing charts in the Appendix, it is necessary that these procedures be closely followed.

Landing Check

The following steps are to be committed to memory due to the hazard involved in reading checklists during the landing roll. They are to be accomplished after the aircraft is on the runway.

Note

Although the landing check list includes the sequence of action and procedures for propeller reversing, it may not be necessary to employ routine propeller reversing on each landing. Runway conditions may be such (i.e., narrow runway or low RCR factor) that a recovery from a malfunction during reversing would be extremely difficult or impossible. Under such conditions, if runway length permits a safe stop using brakes only, reverse need not be used.

1. PROPELLER REVERSE ARMING SWITCH - ARMED. (N)

WARNING

DO NOT arm the propeller reverse system until the main and nose landing gear are on the runway, as it is possible to enter the reverse range while still in flight.

2. THROTTLES - MAXIMUM REV.

Propeller reversing is much more effective at higher airspeeds. Reversing at low air speed may result in pronounced control buffeting, and starvation of air to the carburetors. When reversing, pause momentarily at the reverse idle position before applying an appreciable amount of reverse thrust. This reduces the yawing tendency in the event of different rates of propeller blade actuation or engine power response. If excessive yawing is encountered, return both throttles to the idle position. Directional control sequence is rudder then brakes if adverse yaw is encountered. Experience has shown that it is possible to maintain directional control after landing when one propeller is in reverse range and the other propeller is in forward range. However, both throttles must be in the idle position. If a throttle is brought into forward thrust but the propeller stays in the reverse range, yaw is aggrevated by the use of power. If directional control difficulty is still experienced, placing both mixtures to idle cutoff will assist the pilot in alleviating the difficulty. Propellers should normally be returned to forward thrust before the airspeed has decreased to 50 knots. Below 40 KIAS, rudder and elevator control buffeting is encountered, and exhaust fumes plus reverse propeller wash tend to starve the carburetor, thus enriching the fuel-air mixture at low RPM, to the point that torching may occur at the IDLE throttle position. Torching when encountered may be corrected by manual leaning.

3. BRAKES - AS REQUIRED.

CAUTION

Do not use brakes until nose wheel is on the runway. Braking before the nose wheel touches down causes the wheel to be slammed violently to the runway, causing structural damage.

4. THROTTLES - FORWARD PITCH.

Move throttles to a position slightly above IDLE RPM when necessary reversing action has been completed.

Note

DO NOT dearm the propeller reversing system until the throttles have been returned to forward pitch range, and there is definite indication that the propeller blades have returned to forward pitch. If the system is dearmed too soon, a malfunction may occur in the system and it will be necessary to rearm the system and repeat the entire propeller reversing procedure before the system will return to normal.

5. ANTISKID SWITCH - OFF.

Night Landing

Night landing procedures differ little from those for day landing. Because of reduced visibility, alertness and constant scanning outside the pilot compartment are of prime importance. Pilot compartment illumination should be adequate in that all necessary instruments and controls are visible, but not so bright that outside visibility is impaired. The use of landing lights if fog, haze, or smoke is present, is not recommended. Glare from the lights in these conditions tends to give the pilot a false depth perception. At night, or during periods of poor visibility, land with nose wheel lower than usual. Landing the aircraft in this attitude, with the risk of the nose wheel striking the ground at a higher airspeed, is safer than the risk of landing the aircraft at a lower airspeed in an attitude that may result in a stall, and pitch forward.

Crosswind Landing

Refer to Appendix for Crosswind Takeoff and Landing Chart.

To preclude undershooting or overshooting the final approach leg, allow for drift while turning final approach. Set up drift correction as soon as possible,

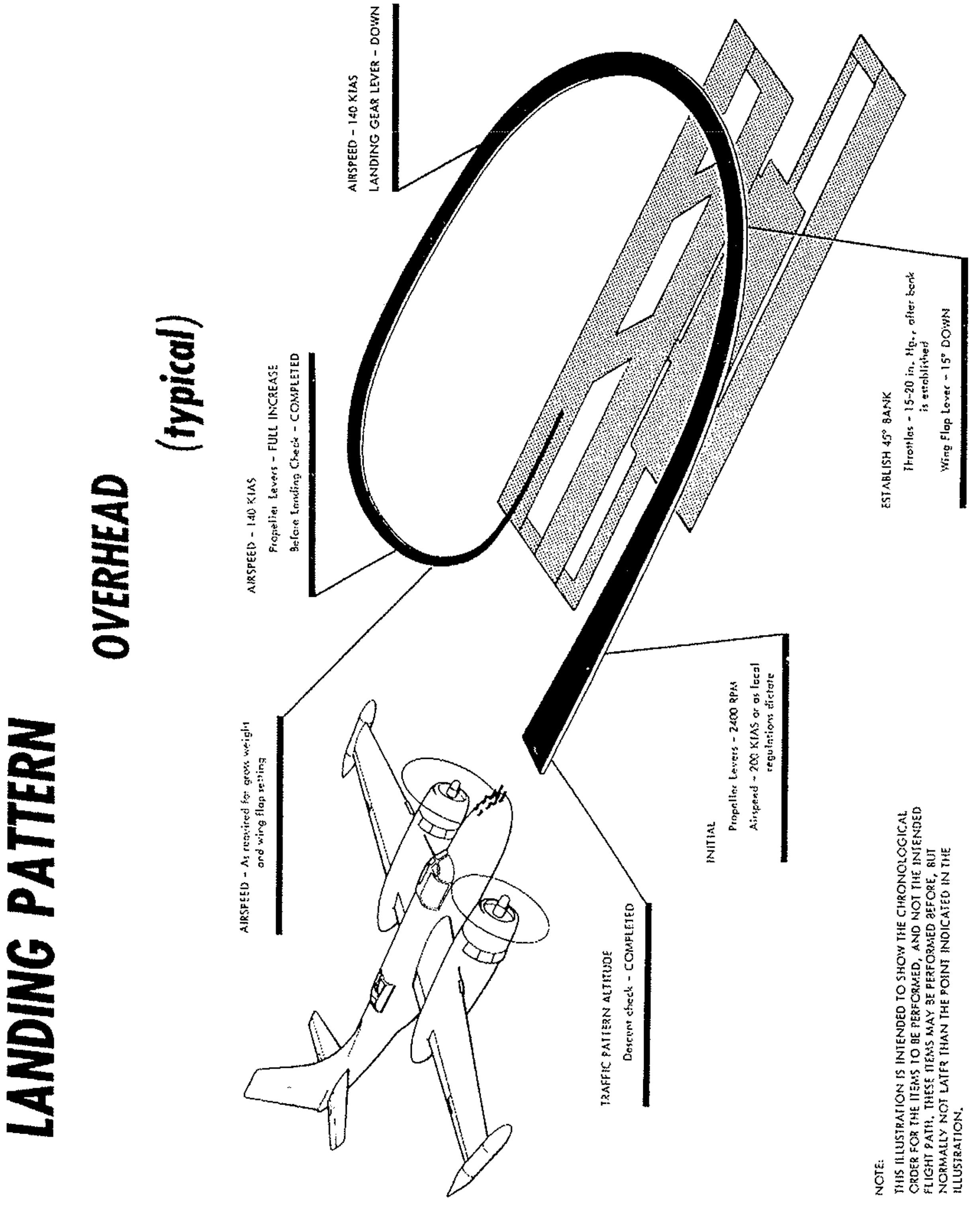

LANDING PATTERN
OVERHEAD
(typical)
AIRSPEED - 140 KIAS
LANDING GEAR LEVER - DOWN
AIRSPEED - 140 KIAS
Propeller Levers - FULL INCREASE
Before Landing Check - COMPLETED
ESTABLISH 45° BANK
Throttles - 15-20 in. Hg., after bank is established
Wing Flap Lever - 15° DOWN
AIRSPEED - As required for gross weight and wing flap setting
INITIAL
Propeller Levers - 2400 RPM
Airspeed - 200 KIAS or as local regulations dictate
TRAFFIC PATTERN ALTITUDE
Descent check - COMPLETED
NOTE:
THIS ILLUSTRATION IS INTENDED TO SHOW THE CHRONOLOGICAL ORDER FOR THE ITEMS TO BE PERFORMED, AND NOT THE INTENDED FLIGHT PATH. THESE ITEMS MAY BE PERFORMED BEFORE, BUT NORMALLY NOT LATER THAN THE POINT INDICATED IN THE ILLUSTRATION.

Figure 2-7

holding a straight path to the runway. If crosswind is strong or gusty, use less than normal flaps. Make a normal flareout, but maintain the wing low attitude. Do not level the wings during flareout or touchdown. During landing roll, the aircraft has a tendency to windvane. Lower the downward aileron and use full rudder, if necessary, to hold a straight course. As a last resort, make cautious use of downwind brake, and smooth use of upwind engine.

No Flap Landing

The standard landing pattern is recommended for a zero degree wing flap approach and landing except that the base leg should be a little further from the end of the runway than normal to allow for maneuvering space. Low, flat approaches will require use of higher power and result in restricted visibility due to the nose high attitude. Refer to the Appendix for approach and touchdown speeds.

Minimum Run Landing

Short runways or ice coated runways may call for minimum run landings. Stalls with gear and flaps down, and slow flying are the basis for any short field or minimum run landing.

Fly base leg as for a normal power on approach. Set rate-of-descent, aiming at a point slightly short of the runway. Correct for undershooting or overshooting early during approach by varying power settings. Make corrections to hold airspeed constant by varying the attitude of the aircraft. Begin flareout 20 to 40 feet above ground, holding normal approach speed until that time. Reduce power as flareout commences. As the aircraft approaches a landing attitude, ease in power as for slow flight. Plan approach so that the aircraft will be in this attitude for as short a time as possible. The aircraft should be slow flying just before touchdown. Upon ground contact, reduce power completely, use propeller reversing, and apply brakes as required.

Landing on Steel Mat Runways

When landing on steel mat runways, touch down in center of the mat to avoid sharp edges. Apply brakes cautiously and intermittently to prevent "humping" of the pierced steel planking (PSP), and to avoid excessive wear on the tires.

Landing on Slippery Runways

Normal landing procedures may be used when executing landings on wet or icy runways. However, extreme caution must be exercised. Prior to landing, determine the stopping distance by referring to the latest Runway Condition Reading (RCR). Maintenance of directional control calls for a cautious application of brakes, and careful use of power. The first 2000 feet of the landing roll are the most critical in that the airplane has a skimming tendency until the lift of the wing has dissipated. The antiskid system is very effective during these runway conditions, as it assists the pilot during the landing operation by automatically preventing wheel skidding. This provides the greatest possible braking efficiency and reduces landing roll and tire wear.

NOTE

If a RCR is not available, use a factor of 12 for wet runways and a factor of 5 for icy runways.

Touch and Go Landing

WARNING

A significant element of danger is involved in making touch and go landings due to the many rapid actions which must be performed while rolling on the runway at high speed or flying near the ground. The pilot should thoroughly brief the crew on coordination and procedures to be used.

The following steps are to be committed to memory, and are to be accomplished after the aircraft is on the runway.

Touch and Go Landing Check

1. WING FLAP LEVER - 15° DOWN.
2. TRIM TABS - SET.

   Set for takeoff condition.

3. THROTTLES - MAXIMUM DRY POWER.

   Maximum power should not be applied until all other actions have been completed.

GO AROUND

The most important step in a go around procedure is determining the necessity for a go around, and starting it soon enough. After the decision is made, the following procedure should be followed.

Go Around Check

1. Carburetor air temperature levers - COLD. (N)
2. Propeller levers - AS REQUIRED.
3. Throttles - AS REQUIRED.

CAUTION

Do not abruptly open the throttles, as this will overspeed the engine, and may cause damage.

4. Landing gear lever - UP.

   Check airspeed first and insure that the aircraft will not touch down.

5. Wing flap lever - AS REQUIRED.

AFTER LANDING

Normally, cowl flaps should be full open during ground operation to prevent excessive temperatures which may not be evident in cylinder head temperature indications. Generator output should be insured by taxiing at 800 to 900 RPM.

After Landing Check

1. Parking brakes - SET.
2. Cowl flap switches - OPEN, then OFF.
3. Fuel boost pump switches - OFF.
4. Propeller reverse arming switch - OFF.
5. Wing flap lever - UP.
6. Trim tab controls - NEUTRAL.
7. Unnecessary Comm Nav equipment - OFF. (P-N)
8. Camera switches - OFF. (N-F)
9. Rotating beacon switch - OFF.
10. Navigation lights - BRIGHT - FLASHING.
11. Pitot heat, anti-ice and deice switches - OFF.

Postflight Check

CAUTION

Do not perform any runup check with the nose wheel cocked. Possible damage may occur because of side stresses.

1. Idle speed - CHECKED.

   Check for 650 +50, -0 RPM.
2. Ignition grounding - CHECKED.

   Refer to step 10 Before Taxiing Checklist.
3. Manifold pressure gage drain - PURGED.
4. Mixture levers - AUTO-RICH.
5. Ignition system - CHECKED.

   Refer to step 16 in Engine Runup Checklist.
6. Inverter switch - OFF.

ENGINE SHUTDOWN

Critical engine temperatures rise immediately after shutdown and may not begin to drop for 15 to 30 minutes, even though the temperature indications begin to drop immediately. If a temperature below 2°C is anticipated prior to the next engine start, and the ground time is expected to exceed 3 hours, dilute the engine oil in accordance with procedures located in Section IX.

Engine Shutdown Check

1. Parking brakes - SET.

   CAUTION

   Do not leave parking brakes set if brakes are overheated.
2. Throttles - 1000 RPM.

   Set throttles at 1000 RPM for at least 30 seconds.
3. Auxiliary hydraulic pump switch - OFF.
4. Cylinder head temperature - CHECKED.

   Check CHT for 150°C or less.
5. Right mixture lever - IDLE CUTOFF.
6. Bomb bay doors - OPENED.
   a. Bomb bay doors switch - OPEN.
   b. Bomb bay open light - ON.
   c. Hydraulic pressure gage - CHECKED 1000 PSIG.
   d. Bomb bay door switch - OFF.
7. Suction gage - CHECKED.
8. Left mixture lever - IDLE CUTOFF.
9. Ignition switches - OFF.

   Turn ignition switches to OFF after propellers have stopped rotating.
10. Throttles - CLOSED.
11. Carburetor air temperature levers - HOT.
12. Propeller lever lock handle - RELEASE.
13. Radios - OFF.
14. KY-8 - OFF.

    Place power switch OFF (down), and position mode selector switch to PLAIN mode.
15. All electrical equipment - OFF.

BEFORE LEAVING AIRCRAFT

Before Leaving Aircraft Check

1. Wheel chocks - IN PLACE.
2. Parking brakes - RELEASED.
3. Flight control lock lever - LOCKED.
4. Left and right fuel tank selector valve handles - OFF.
5. Battery switches - OFF.
6. Ground safety locks - INSTALLED.
7. Form 781 - COMPLETED. (P-N-F)

NOTE

In addition to the established requirements for reporting any system defects, unusual and excessive operations, the flight crew will also make entries in Form 781 to indicate when any limits in the Flight Manual have been exceeded.

STRANGE FIELD OPERATION

When the aircraft is operated at strange field locations where normal maintenance is not available, the pilot is responsible for accomplishment of the Preflight/Postflight Work Cards, T.O. 1A-26A-6WC-1PRPO.

TAKEOFF AND LANDING DATA

The combined Takeoff and Landing Data card (figure 2-8), located in the abbreviated Checklist, T. O. 1B-26K-1CL-1, should be completed during the preflight mission planning phase. Comments relative to filling out the card are as follows:

Conditions

The headwind component is computed from the Takeoff and Landing Crosswind chart. Drag index is computed from the store drag numbers and gross weight chart. Information for other items is obtained from local facilities.

Takeoff Data

Lines A, B, and C are computed from the brake horsepower available for takeoff charts.

Line D is computed from the Takeoff Speeds chart.

Line E is computed from the Takeoff Factor chart.

Line F is computed from the Climbout Factor chart.

Line G is computed from the Takeoff Ground Run chart.

Line H is computed from the Air Distance Over 50 Foot Obstacle Height chart.

Lines I and J are computed from the Velocity During Takeoff Ground Run chart. The speed selected for the time or distance check will be at least 10 KIAS below takeoff speed.

Line K is computed from the Refusal Speed chart.

Line L is computed from the Single Engine Rate of Climb chart.

Landing Data (Immediately After Takeoff)

Line A is to be computed for anticipated conditions but should not exceed maximum allowable landing weight.

Line B is computed from the Approach and Landing Speeds chart.

Line C is computed from the Landing Descent Factor charts.

Line D is computed from the Landing Factor charts.

Line E is computed from the Landing Ground Roll charts.

Line F is computed from the Landing Air Distance chart and the Landing Ground Roll charts.

Landing Conditions

The headwind component is computed from the Takeoff and Landing Crosswind chart. Information for all other items is obtained from local facilities.

Landing Data

Computations are the same as shown under Landing Data (Immediately After Takeoff).

T. O. 1B-26K-1 CL-1

TAKEOFF AND LANDING DATA CARD

CONDITIONS

OAT ______ °C + 5°C= ______ °C CAT RCR ______
DEWPOINT ______ °F PRESSURE ALT ______
WIND ______ HEADWIND COMP ______
RUNWAY LENGTH ______ SLOPE ______
GROSS WT ______ DRAG INDEX ______

TAKEOFF DATA

A	PREDICTED/MAX MAP	______	______
B	95% PREDICTED BMEP	______	______
C	PREDICTED BMEP	______	______
D	TAKEOFF SPEED ______ OBSTACLE CLR SPEED		______
		WET	DRY
E	TAKEOFF FACTOR	______	______
F	CLIMBOUT FACTOR	______	______
G	GROUND RUN	______	______
H	AIR DIST OBST HT	______	______
	ACCELERATION CHECK POINT	______	______
I	DISTANCE OR TIME	______	______
J	ACCELERATION SPEED	______	______
K	TAKEOFF WT CAPABILITY	______	______
L	SINGLE ENG RATE OF CLIMB	______	______

T. O. 1B-26K-1CL-1

LANDING DATA (IMMEDIATELY AFT T/O)

A GROSS WEIGHT ______
B APPROACH SPEED ______ TOUCH DN SPEED ______
C LANDING DESCENT FACTOR ______

		REVERSE	BRAKES ONLY
D	LANDING FACTOR	______	______
E	LANDING GND ROLL	______	______
F	LANDING DIST 50' OBST	______	______

LANDING CONDITIONS

OAT ______ PRES ALT ______ RCR ______
HEADWIND COMP ______
RUNWAY LENGTH ______ SLOPE ______

LANDING DATA

GROSS WEIGHT ______
APPROACH SPEED ______ TOUCH DN SPEED ______
LANDING DESCENT FACTOR ______

	REVERSE	BRAKES ONLY
LANDING FACTOR	______	______
LANDING GND ROLL	______	______
LANDING DIST 50' OBST	______	______

Figure 2-8. Takeoff and Landing Data Card

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

INTRODUCTION

This section describes procedures for meeting emergencies that can reasonably be expected to occur. No attempt has been made to cover every conceivable malfunction or emergencies that are complicated by failure of other systems. A sound knowledge of these procedures and the basic airplane systems will, however, provide the necessary background to properly evaluate and cope with multiple emergencies and those situations not covered herein.

In any emergency situation, contact should be established with an appropriate ground station as soon as possible after completing the initial corrective action. Include position, altitude, course, ground speed, and the nature of the emergency and pilot's intentions in the first transmission, and thereafter keep the ground station informed of the progress of the flight and of any changes or developments in the emergency.

WARNING

All odors not identifiable by the flight crew shall be considered toxic. Immediately go on 100 percent oxygen. Properly ventilate the aircraft and land as soon as practicable. Do not take off when unidentified odors are detected.

The pilot should make full use of other crew members in combatting an emergency so that his primary attention may be directed to the control of the airplane. Although certain items require immediate action, the difficulty may be compounded by hurried commands to the crew. Analyze the situation carefully before taking any corrective action and give the proper commands clearly and concisely, allowing time for acknowledgment and execution before issuing further instructions. Certain actions are of such urgency that they must be performed immediately, from memory, to prevent further damage and avoid aggravating the emergency. These "Immediate Action" items are printed in capital letters. The remaining steps are considered to be less urgent and must be accomplished by direct reference to the checklist.

ENGINE FAILURE

The aircraft can be flown and landed with one engine inoperative, if the pilot understands single engine flight principles, and fully masters single engine procedures. Pilot response to any single engine condition must be immediate and positive if control of the aircraft is to be maintained. The primary factors in safe single engine flights are airspeed and directional control. The unbalanced engine thrust, which yaws the aircraft into the inoperative engine, must be neutralized by holding rudder or by inducing the required amount of rudder trim. As airspeed is decreased, more rudder trim is necessary to counteract the unbalanced thrust. When the airspeed is decreased to the point where full rudder is necessary to maintain directional control, any further reduction of airspeed without a reduction of power will result in the loss of directional control. Refer to Section VI for single engine flight characteristics.

Performance

The minimum speed for single engine operation is 125 KIAS. At aircraft weights over 38,000 pounds, a descent must be established to maintain airspeed. For level flight and climb operation, the aircraft weight must be reduced by release of external stores and or dumping of tip tank fuel. Refer to Appendix for operating values.

Drag increase of a windmilling propeller will not permit level flight at weights of 35,000 pounds or greater. It may be necessary to jettison internal stores to reduce weight.

A double engine failure is not likely. The aircraft can be controlled throughout descent and landing. Glide data for various propeller conditions is shown in figure 3-1.

Single engine performance is reduced during operations at or approaching Air Force hot atmosphere conditions. Pilots must be continually aware that single engine absolute, service, and cruise ceilings, as well as single engine go around capabilities, are significantly reduced under high ambient temperature conditions. The performance reduction is of particular concern when operating over or from high ground elevations.

Engine Failure During Takeoff (Takeoff Refused)

If an engine should fail during the takeoff run before the aircraft becomes airborne, abort the takeoff.

1. Throttles - CLOSED.
2. Brakes - AS REQUIRED.

If more drag is needed to assist stopping on the remaining runway, proceed as follows:

3. Mixture levers - IDLE CUTOFF.
4. Canopy - OPENED.
5. Cowl flap switches - OPEN.

Abort With Both Engines Operating

If a hazardous condition occurs during the takeoff roll and the decision is made to abort, accomplish the following procedures:

1. Propeller reverse arming switch - ARMED.
2. Throttles - REV.
3. Brakes - AS REQUIRED.

If more drag is needed to assist stopping on the remaining runway, proceed as follows:

4. Cowl flap switches - OPEN.
5. Canopy - OPENED.

NOTE

If the runway is not of sufficient length and it becomes necessary to retract the gear, do not forget that it will be necessary to push in the detent pin before the gear handle can be raised. In addition, turn off the fuel selector valves and the master ignition switch.

WARNING

If carrying external stores, and it becomes necessary to retract the gear, jettison all stores. If carrying wing drop tanks with fuel, it is essential that the jettisoning be accomplished as soon as possible because of the possibility of a fuel fire. Jettisoning fuel tanks early could prevent a possible fire in the area where the aircraft comes to rest.

Engine Failure After Takeoff (Continued Flight Impossible)

WARNING

Land straight ahead. Change direction only as necessary to avoid obstruction. With reduced power, the aircraft may be turned slightly to avoid an immediate obstruction. Do not attempt to turn back to the field. A controlled crash landing is not as hazardous as an uncontrolled roll into the ground.

1. THROTTLES - RETARDED.

   Retard throttles as necessary to maintain control.

2. GLIDE - ESTABLISHED.
3. LANDING GEAR LEVER - UP.
4. EXTERNAL STORES - JETTISONED.
5. Fuel boost pump switches - OFF.
6. Mixture levers - IDLE CUTOFF.

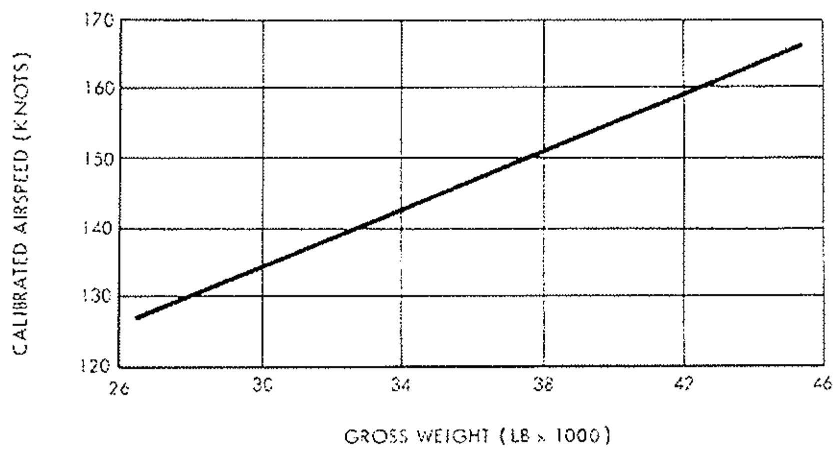
   Move mixture levers to IDLE CUTOFF just prior to touchdown.

7. Wing flap lever - AS REQUIRED.
8. Fuel tank selector valve handles - OFF.
9. Master ignition switch - OFF.
10. Battery switches - OFF.
11. Helmet Visors - LOWERED.

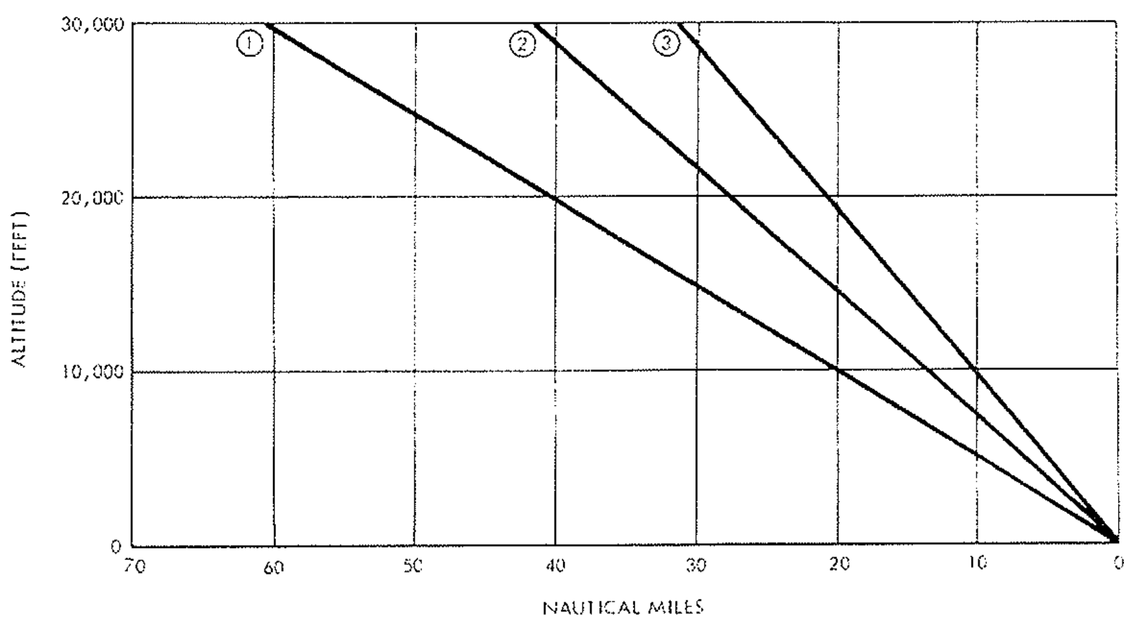
NOTE

Visor may be raised prior to landing if it restricts visibility.

GLIDE SPEED



GLIDE RANGE



① - 2 PROPELLERS FEATHERED
② - 1 PROPELLER FEATHERED AND 1 PROPELLER WINDMILLING
③ - 2 PROPELLERS WINDMILLING

Figure 3-1. Glide Range and Glide Speed Chart

12. Canopy and hatches - JETTISONED.

13. Land - STRAIGHT AHEAD.

ENGINE FAILURE DURING TAKEOFF OR INFLIGHT.

WARNING

If an engine fails immediately after takeoff, quickly determine whether airspeed and altitude will permit continued flight. Pilot response in this situation must be immediate and positive if control of the aircraft is to be maintained. Sudden loss of an engine at high power settings requires a corrective rudder pedal force of approximately 300 pounds. If practicable, the aircraft should be held in level flight until the airspeed increases to 140 KIAS, before a climb is started. If takeoff is continued, or engine failure occurs during cruising flight, hold aircraft on desired heading, maintain at or above minimum single engine airspeed, and proceed as follows:

1. THROTTLE FOR FAILED ENGINE - CLOSED.

2. FIREWALL SHUTOFF VALVE HANDLE FOR FAILED ENGINE - PULLED.

WARNING

When the firewall shutoff valve handle has been actuated and the feathering cycle is not completed, a runaway propeller will occur due to a lack of engine oil pressure necessary to control the propeller.

3. POWER - ADJUSTED.
4. LANDING GEAR LEVER - UP.
5. WING FLAP LEVER - UP.
6. EXTERNAL STORES - JETTISONED AS REQUIRED.
7. Mixture lever for failed engine - IDLE CUTOFF.
8. Propeller feathering button for failed engine - CHECKED.

CAUTION

If 30 seconds has passed since feathering action was taken, insure that feathering button has returned to normal position. If the button is still depressed, manually pull button back to normal position to preclude possible damage to the feathering motor, which could compound the emergency by overloading the generator on the operating engine with resultant generator overheat and possible fire.

9. Internal stores - JETTISONED AS REQUIRED.

WARNING

- Internal stores should be jettisoned by actuating the bomb bay jettison switch to prevent inadvertent dropping of armed stores.
- Hydraulic bypass valve handle must be IN and LOCKED.

10. Fuel tank selector valve handle for failed engine - OFF.

11. Cowl flap switches - AS REQUIRED.

Cowl flap switches as required for operative engine; closed for failed engine.

12. Ignition switch for failed engine - OFF.

13. Oil cooler door switch for failed engine - CLOSED.

14. Power - ADJUSTED.

15. Trim - AS REQUIRED.

16. Electrical equipment - AS REQUIRED.

Turn off generator for failed engine and turn off all unnecessary electrical equipment.

ENGINE FIRE DURING TAKEOFF OR INFLIGHT

1. FIREWALL SHUTOFF VALVE HANDLE FOR AFFECTED ENGINE - PULLED.

WARNING

When the firewall shutoff valve handle has been actuated and the feathering cycle is not completed, a runaway propeller will occur due to a lack of engine oil pressure necessary to control the propeller.

2. POWER - ADJUSTED.

3. LANDING GEAR LEVER - UP.

4. WING FLAP LEVER - UP.

5. EXTERNAL STORES - JETTISONED AS REQUIRED.

6. FIRE EXTINGUISHER SWITCH - FIRE SHOT 1 AFTER ENGINE STOPS.

7. FIRE EXTINGUISHER SWITCH - FIRE SHOT 2 IF FIRE PERSISTS.

8. Internal stores - JETTISONED AS REQUIRED.

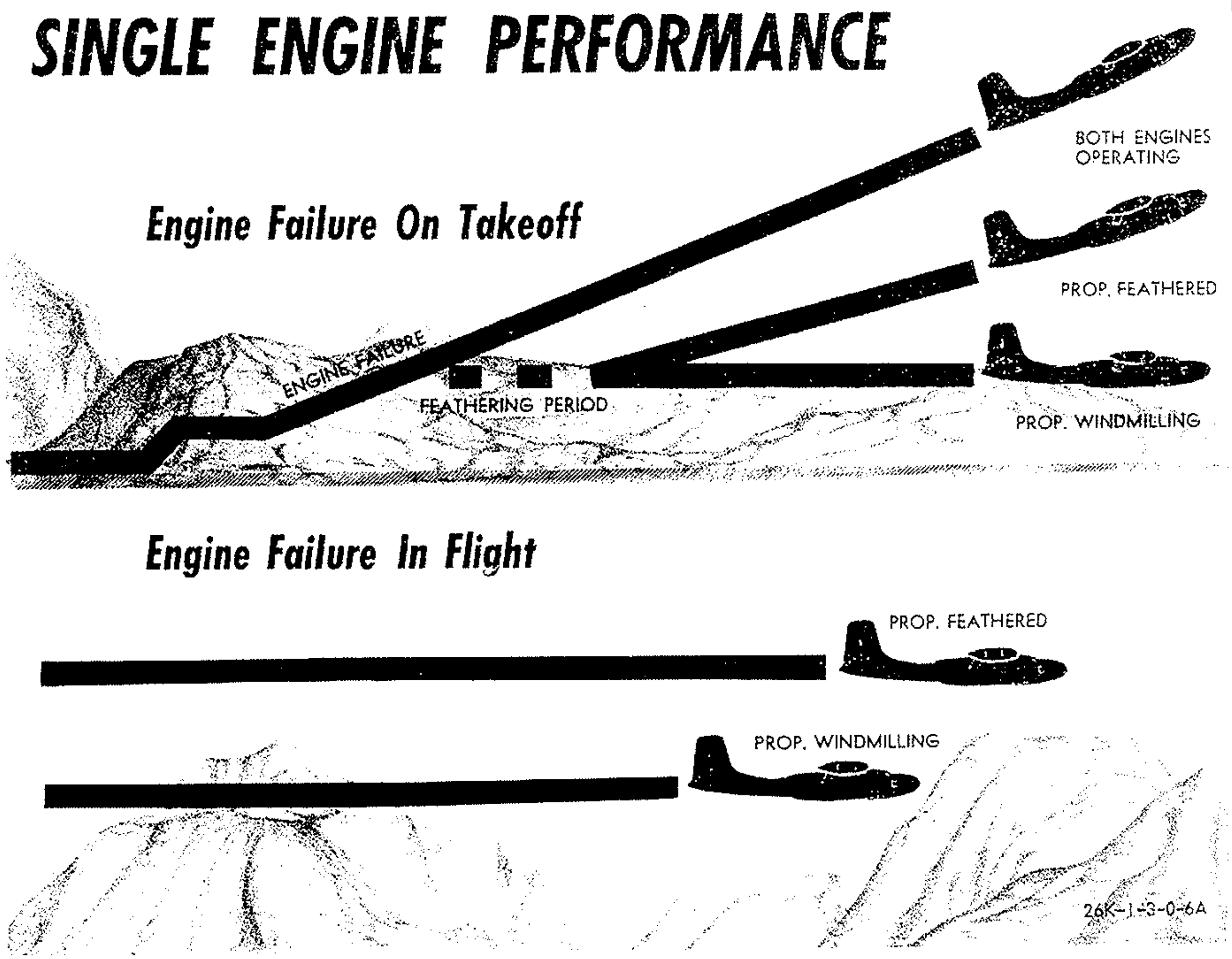


Figure 3-2

WARNING

Internal stores should be jettisoned by actuating the bomb bay jettison switch to prevent inadvertent dropping of armed stores.

Hydraulic bypass valve handle must be IN and LOCKED.

9. Fuel tank selector valve handle for failed engine - OFF.

10. Bomb bay fuel tank selector valve handle - CROSSFEED OFF.

11. Cowl flap switches - AS REQUIRED.

12. Ignition switch for failed engine - OFF.

13. Mixture lever for failed engine - IDLE CUTOFF.

14. Propeller lever for failed engine - DECREASED.

15. Oil cooler door switch for failed engine - CLOSED AND OFF.

16. Power - ADJUSTED.

17. Trim - AS REQUIRED.

18. Electrical equipment - AS REQUIRED.

Turn off generator for failed engine and turn off all unnecessary electrical equipment.

19. If fire persists - ABANDON AIRCRAFT.

FUEL PRESSURE DROP/VISIBLE FUEL LEAK - ENGINE OPERATING NORMALLY.

During Ground Operation

If the fuel pressure drops below operating limits, or a visible (known) fuel leak exists but the engine continues to operate normally, stop the aircraft and shut down the engine immediately by moving the affected boost pump switch to OFF and the mixture lever to IDLE CUTOFF.

During Flight

If the fuel pressure drops below the operating limits but the engine continues to operate normally, the cause may be one or more of the following: Primer leakage, oil dilution solenoid valve leakage, engine driven fuel pump bypass valve leakage, clogged pressure line, instrument failure, or line leakage. Possible courses of action, depending on the cause of the pressure drop, are listed below.

WARNING

Whenever fuel pressure drops and the engine continues operating normally, the first concern of the crew must be to guard against the outbreak of an engine fire. The greatest danger lies in the fact that the crew develops a false sense of security because no fire exists at the time that the fuel pressure drop is noticed nor after several hours of flight. However, when the throttle is retarded (as in preparation for a landing), an engine fire develops and the results are usually disastrous. What has happened is that a fuel leak existed, but the cooling and dispersing effect of the airflow through the engine nacelle at cruising speed has prevented the start of a fire. When the throttle was retarded, the airspeed dropped and the airflow was reduced sufficiently to permit ignition of the leaking fuel. Any change in the airflow pattern, such as feathering the propeller or entering a climb, can start a fire if a fuel leak exists. Increasing the power is less likely to start a fire since airspeed will be increased, but even here there is a possibility of fire since the exhaust heat and flame pattern may change sufficiently to outweigh the increase in cooling airflow. Accordingly, it must be the objective of the crew to eliminate the fuel before any change is made to the airflow or exhaust pattern. The most effective means of accomplishing this is by moving the mixture lever to IDLE CUTOFF before any throttle reduction, propeller feathering, or any other engine shutdown procedure is initiated. An additional advantage of moving the mixture lever to IDLE CUTOFF is that it provides the most rapid means of eliminating exhaust stack flames and reducing exhaust heat.

a. Cut the engine immediately by means of the mixture lever. Do this if the power is not necessary to sustain flight or to reach a safe destination.

b. Keep the affected engine in operation at or above cruising speed while maintaining watch for fire. This can be done if it cannot be determined whether or not an actual leak exists and the engine is required to either sustain flight or maintain the required altitude for arrival at a safe destination. However, prior to power reduction for entrance to the landing pattern, cut the affected engine completely (by means of a mixture lever - not by retarding the throttle) and accomplish single engine or a partial power landing. Unless the added power is absolutely essential to effect a safe landing, do not reduce airspeed until the affected engine is shut down.

c. Continue operating the engine normally. This may be done if it can be reasonably ascertained that the indicated fuel pressure drop has not resulted from a fuel leak.

NOTE

All other factors being equal, course "a" is generally the best. However, action to be taken depends entirely upon the circumstances existing at the time. Such factors as the known condition of the aircraft and the remaining engine, stage and requirements of the mission, and the power requirements of the aircraft should all be considered.

In case propeller is to be feathered in flight because of low fuel pressure or a known fuel leak, proceed as follows:

1. FUEL BOOST PUMP SWITCH FOR FAILED ENGINE - OFF.
2. MIXTURE LEVER FOR FAILED ENGINE - IDLE CUTOFF.
3. FIREWALL SHUTOFF VALVE FOR FAILED ENGINE - PULLED.

WARNING

When the firewall shutoff valve handle has been actuated and the feathering cycle is not completed, a runaway propeller will occur due to a lack of engine oil pressure necessary to control the propeller.

4. POWER - ADJUSTED.
5. LANDING GEAR LEVER - UP.
6. WING FLAP LEVER - UP.
7. EXTERNAL STORES - JETTISONED AS REQUIRED.
8. Throttle for failed engine - CLOSED.
9. Propeller feathering button for failed engine - CHECKED.

CAUTION

If 30 seconds has passed since feathering action was taken, insure that feathering button has returned to normal position. If the button is still depressed, manually pull button back to normal position to preclude possible damage to the feathering motor, which could compound the emergency by overloading the generator on the operating engine with resultant generator overheat and possible fire.

10. Internal stores - JETTISONED AS REQUIRED.

WARNING

- Internal stores should be jettisoned by actuating the bomb bay jettison switch to prevent inadvertent dropping of armed stores.
- Hydraulic bypass valve handle must be IN and LOCKED.

11. Fuel tank selector valve handle for failed engine - OFF.

12. Cowl flap switches - AS REQUIRED.

Cowl flap switches as required for operative engine; closed for failed engine.

13. Ignition switch for failed engine - OFF.

14. Oil cooler door switch for failed engine - CLOSED.

15. Power - ADJUSTED.

16. Trim - AS REQUIRED.

17. Electrical equipment - AS REQUIRED.

Turn off generator for failed engine and turn off all unnecessary electrical equipment.

RESTARTING ENGINE INFLIGHT

If an attempt is made to start the failed engine, proceed as follows:

WARNING

To prevent a fire from recurring in an engine that has been shut down because of fire, do not attempt to restart.

1. Airspeed - 140 KIAS.

2. Firewall shutoff valve handle - IN.

3. Starter - ENGAGED.

Turn engine 6 blades with starter.

4. Fuel tank selector valve handle - DESIRED TANK.

5. Throttle for inoperative engine - CLOSED.

6. Propeller lever for inoperative engine - DECREASED.

7. Mixture lever for inoperative engine - IDLE CUTOFF.

8. Fuel boost pump switch for selected tank - LOW.

9. Ignition switch for inoperative engine - BOTH.

10. Feathering button for inoperative engine - PULL, 800 RPM, RELEASED.

11. RPM - STABILIZED AT 1200.

12. Mixture lever - AUTO RICH.

After desired fuel and oil pressures are attained, move mixture lever to AUTO RICH.

13. Propeller lever - 1700 RPM.

14. Throttle - 17 inches Hg.

Warm up engine until oil temperature reaches 40°C.

15. Cowl flap switch - AS REQUIRED.

16. Oil cooler door switch - AUTO, or AS REQUIRED.

17. Generator switch - ON.

18. Trim - AS REQUIRED.

SINGLE ENGINE LANDING

Single engine landings are not much more difficult to accomplish than normal landings, and are performed in much the same manner. However, pilot response to any single engine condition must be immediate and positive to insure that control of the aircraft is maintained. With the operating engine at 2600 RPM, maintaining familiar key points over the ground will decrease the necessity of a go around due to being too close to runway on downwind or base legs or too high or low on final approach. A straight in approach may be flown if necessary.

Different consideration must be given in each single engine landing as to the proper point in the pattern to lower the landing gear. The gear can be extended at any point in the pattern, including final approach when it is reasonably assured that a landing can be accomplished. Care should be taken not to lower the landing gear too late. The desired flap setting should be made only when landing is assured (at approximately 300 feet). When this setting is made, the aircraft is definitely committed to land.

WARNING

Do not allow airspeed to fall below minimum single engine airspeed.

CAUTION

Pilot compartment heater, if in use, should be shut down while the aircraft is still airborne, to preclude a possible fire hazard.

Descent Check

1. Altimeter - SET.

2. Fuel tank selector valve handle for operating engine - MAIN, or FULLEST TANK.

3. Bomb bay crossfeed valve handle - OFF.

4. Hydraulic bypass valve handle - IN and LOCKED.

5. Hydraulic fluid level - CHECKED.

6. ADI quantity - CHECKED.

7. Emergency air brake pressure - CHECKED

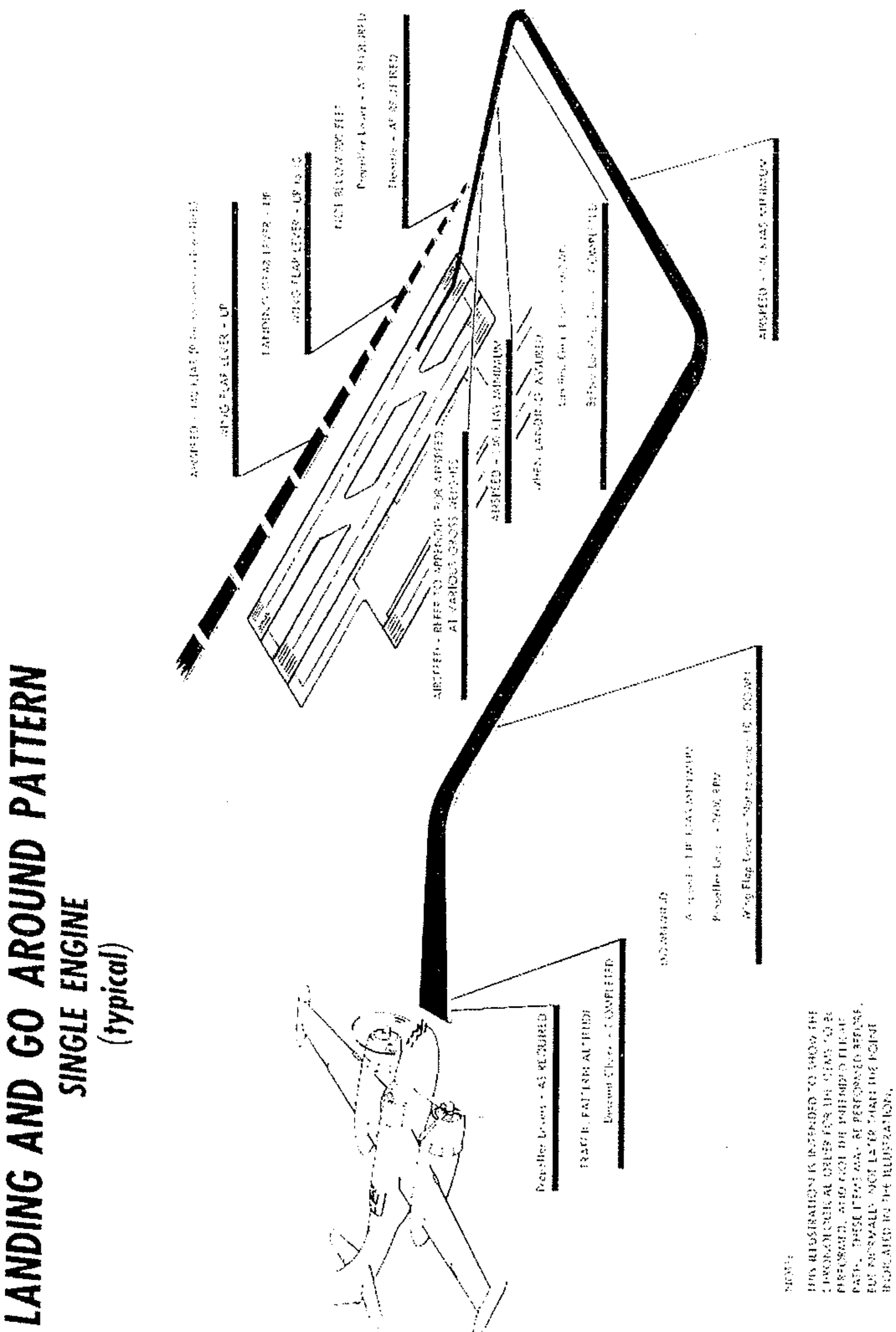

LANDING AND GO AROUND PATTERN
SINGLE ENGINE
(typical)
Propeller Levers - AS REQUIRED
TRAFFIC PATTERN ALTITUDE
Descent Check - COMPLETED
AIRSPEED - REFER TO APPENDIX FOR AIRSPEED AT VARIOUS GROSS WEIGHTS
WHEN LANDING IS ASSURED
Before Landing Check - COMPLETED
WING FLAP LEVER - UP
LANDING GEAR LEVER - UP
NOTE:
THIS ILLUSTRATION IS INTENDED TO SHOW THE CHRONOLOGICAL ORDER FOR THE ITEMS TO BE PERFORMED, AND NOT THE INTENDED FLIGHT PATH. THESE ITEMS MAY BE PERFORMED BEFORE, BUT NORMALLY NOT LATER THAN THE POINT INDICATED IN THE ILLUSTRATION.

Figure 3-3

8. Mixture lever for operating engine - AUTO RICH

9. Propeller lever for operating engine - AS REQUIRED.

10. Supercharger levers - LOW.

11. Fuel boost pump switch for selected tank - HIGH.

12. Tip tank fuel dump switch - CHECKED.

13. Antiskid switch - ON.

14. Auxiliary hydraulic pump switch - ON.

15. Wing flap lever - AS REQUIRED.

Do not exceed 10° DOWN.

16. Crew briefing - COMPLETED.

Before Landing

1. Pilot compartment heater switch - OFF.

2. ADI arming switch - ARMED (N).

3. Propeller lever for operating engine - FULL INCREASE (N).

4. Landing gear lever - DOWN.

5. Hydraulic pressure gage - CHECKED.

6. Wing flap lever - AS REQUIRED.

WARNING

At this point, you have definitely committed yourself to land. Do not attempt go around as the altitude remaining is insufficient.

CAUTION

Do not taxi with one engine inoperative.

SINGLE ENGINE GO AROUND

The decision to make a single engine go around should be made above 300 feet, before lowering full flaps, and before decreasing airspeed below minimum single engine airspeed of 125 KIAS. If the decision to go around is made, the airspeed should be allowed to increase to 140 KIAS in level flight before attempting to climb.

1. Propeller lever for operative engine - AS REQUIRED.

2. Throttle for operative engine - AS REQUIRED.

WARNING

Excessive rudder force will be required if full power is applied rapidly to the operating engine.

3. Landing gear lever - UP.

4. Wing flap lever - UP.

5. Trim - AS REQUIRED.

6. Airspeed - 125 KIAS MINIMUM.

7. Cowl flap switch for operative engine - AS REQUIRED.

8. ADI arming switch - AS REQUIRED (N).

LANDING WITH BOTH ENGINES INOPERATIVE

Landings with both engines inoperative should be made in a manner similar to single engine landings, except that the approach must be varied to compensate for the greatly reduced glide ratio. Actuate the electric auxiliary hydraulic pump and determine if sufficient hydraulic pressure is available for landing gear extension. If the pressure is not available, a gear up landing will have to be made.

LANDING EMERGENCY - WHEELS UP (EXCEPT DITCHING)

CAUTION

When either main landing gear cannot be fully extended for a landing on prepared surfaces, the gear shall be retracted and a wheels up landing made in order to provide minimum risk of post impact fire and minimum damage to the aircraft. If the nose gear only cannot be fully extended for a landing on prepared surfaces, then the main gear shall be extended and a normal approach for landing made. After touchdown on the main gear, the nose shall be lowered to the runway before elevator control is lost. For landing on unprepared surfaces the gear shall not be extended. A hard surface is preferable to sod or dirt.

1. Crew warning - ACKNOWLEDGED.

2. Alarm bell - SIX SHORT RINGS.

3. IFF/SIF - MODE 3, CODE 77 and EMERGENCY.

4. Unnecessary electrical equipment - OFF.

5. Loose equipment - STOWED or JETTISONED.

6. Droppable stores - JETTISONED.

7. Crew crash landing positions - ASSUMED.

See figure 3-7.

8. Fuel - REDUCED TO MINIMUM.

Dump tip tanks and, if possible, circle landing area until remaining fuel is reduced to a minimum.

9. Shoulder harness - LOCKED.

10. Helmet Visors - LOWERED

NOTE

Visor may be raised prior to landing if it restricts visibility.

11. Canopy and escape hatches - JETTISONED.

WARNING

- When the canopy and hatches have been jettisoned, loose articles, dirt, and ashes will be blown around the cockpit. Wind noise will be considerable; therefore, it is of the utmost importance that the crew briefing and radio calls be completed prior to this action.
- At touchdown, the crew should anticipate and guard against the possibility of smoke and fire.
- During the first part of the landing, rudder control will be effective and will be the only means of directional control.

12. Approach - NORMAL.

13. Wing flap lever - FULL DOWN.

When landing is assured, place the flap lever to FULL DOWN.

14. Landing gear lever - UP.

WARNING

Do not feather propellers as the tips will not bend aside on impact, but will dig into ground, breaking engine mounts and rupturing wing tanks, adding to the fire hazard.

15. Crew warning - ACCOMPLISHED.

Just before touchdown, warn crew over interphone, and sound one long ring on alarm bell.

16. Mixture levers - IDLE CUTOFF.

17. Engine fire extinguisher switches - ACTUATED, AFTER TOUCHDOWN.

a. Left fire extinguisher switch - FIRE SHOT 1.

b. Right fire extinguisher switch - FIRE SHOT 1.

18. Battery and generator switches - OFF.

19. When stopped - ABANDON AIRCRAFT.

Assist any injured crew members and leave aircraft immediately.

LANDING WITH FLAT TIRE

If a tire should blow out during the takeoff roll, and the takeoff is continued, do not retract the landing gear as further damage may result and the gear may fail to extend.

Nose Wheel Tire Flat

Make a normal approach and flareout. After the main landing gear touches the ground, attempt to hold the nose wheel off as long as there is elevator control. When the nose wheel contacts the ground, decelerate and bring the aircraft to a stop as rapidly as possible, using brakes and maximum propeller reverse procedure. While the aircraft is moving forward with the nose wheel on the ground, moderate to severe shimmy, and directional control difficulty will be encountered.

Main Wheel Tire Flat

Make a normal approach and landing, applying brake on the good wheel to keep the aircraft on the runway. Use power on the flat tire side to aid in maintaining directional control if necessary. Although differential power application in the propeller reversing range is available, it is definitely not recommended in this situation.

SINGLE ENGINE PRACTICE MANEUVERS

Simulated Single Engine Conditions

In practice maneuvers, a single engine condition with feathered propeller may be simulated by setting the propeller lever at 2600 RPM and the throttle at 16 inches Hg. This keeps the cylinder head temperature within normal operating range and the emergency shutdown procedure steps can be called out and the motions gone through without actually feathering the propeller. Avoid prolonged high RPM with low manifold pressure as damage to the master rod bearings may occur.

CAUTION

If actual feathering is desired for practice, the propeller should not be feathered longer than 15 minutes (5 minutes in cold weather) due to oil congealing.

Simulated Engine Failure During Takeoff - Before Gaining Minimum Single Engine Airspeed

To simulate engine failure during takeoff before gaining minimum single engine airspeed, perform the following procedure at least 8000 feet above the terrain.

Establish takeoff configuration, with the propeller levers in FULL INCREASE position, airspeed at 100 to 105 KIAS, advance throttles to takeoff power. As the aircraft accelerates through liftoff speed, retract the landing gear and wing flaps, then close one throttle to simulate engine failure.

NOTE

The aircraft would normally have attained an altitude of 50 to 100 feet. To maintain directional control, it will be necessary to reduce power on the operating engine with a consequent loss of altitude which would require making a crash landing straight ahead.

Accomplish as much of the Engine Failure After Takeoff (Continued Flight Impossible) procedure as possible before simulated ground level altitude is reached.

Simulated Engine Failure During Takeoff - After Gaining Minimum Single Engine Airspeed

To simulate engine failure during takeoff after gaining minimum single engine airspeed, perform the following procedure at least 5000 feet above the terrain.

Establish takeoff configuration, with propeller levers in FULL INCREASE position, airspeed at 100 to 105 KIAS. Advance throttles to takeoff power. As the aircraft accelerates through minimum single engine airspeed, close one throttle to simulate engine failure, then advance the throttle to 16 inches Hg to simulate propeller feathering.

NOTE

Under these conditions, directional control, airspeed, and a climb attitude can be maintained.

Accomplish the Engine Failure During Takeoff or Inflight procedure and note that a safe single engine climb attitude can be maintained.

Simulated Single Engine Turns

The aircraft may be turned safely in either direction providing minimum single engine airspeed is maintained. Roll into the turn smoothly. Maintain a constant airspeed throughout the turn. The value of constant airspeed cannot be overemphasized, as it is the key to safe single engine turns.

NOTE

As long as a constant airspeed is maintained, the thrust of one engine is balanced by the trimmed rudder.

Effect of Propeller Pitch On Trim

If it is impossible to feather the propeller because of failure of the feathering motor, drag can be reduced by moving the inoperative engine propeller lever to full DECREASE RPM. To determine drag effect from an unfeathered propeller, establish simulated single engine flight and set the corresponding propeller lever at full DECREASE RPM. Trim the aircraft (operative engine at 2600 RPM and 42 inches Hg), then advance the inoperative engine propeller lever to INCREASE RPM. As the propeller changes to low pitch or flat blade angle, additional drag causes the aircraft to turn into the dead engine. Pull the propeller lever back again to DECREASE RPM and the turning tendency will stop.

Effect Of Airspeed On Trim

The effect of airspeed on trim in single engine flight will be demonstrated as follows:

Simulate single engine flight and trim the aircraft at a constant airspeed and power setting. With feet on floor, ease back on control column. As the airspeed decreases, the trim becomes less effective because of the decreased flow of air over the control surfaces, and the aircraft will turn into the inoperative engine. Move the control column forward until the original airspeed is exceeded, and as the trim becomes effective with increased airflow over the control surfaces, the aircraft will turn into the operative engine.

Effect Of Power Reduction On Trim

The effect of power reduction on trim in single engine flight may be demonstrated as follows: Simulate single engine flight and trim the aircraft at a constant airspeed and power setting. Place feet on floor and pull the control column back slowly. As the airspeed decreases, gradually reduce power on the operative engine to prevent the aircraft from turning into the inoperative engine. It is possible to maintain directional control in this manner up to the point of a stall. This demonstrates the importance of reducing power to maintain directional control in case of engine failure during takeoff or slow flying.

Single Engine Acceleration Characteristics

Due to less total power being available, single engine acceleration will be slower and more time should be allowed for airspeed to build up. When acceleration is desired, care should be taken to maintain level flight or nose low attitude until desired airspeed is obtained.

WARNING

Excessive rudder force will be required if full power is applied rapidly to the operating engine.

Single Engine Stalls

The aircraft can be stalled when only one engine is operating provided power is reduced to maintain directional control. The practice stall will show the limits of operation with one engine inoperative, and will also show the difficulties encountered in counteracting the thrust of the operative engine below minimum single engine airspeed.

With a minimum altitude of 5000 feet above the terrain, set one engine at climb power and simulate feathering of the other engine. Pull the nose up slowly and smoothly, using coordinated control movements. Reduce power on operating engine as required to maintain directional control. The first indication of an approaching stall is a downward trend of the vertical velocity and altimeter. Continue slow, even back pressure on the control column until the aircraft stalls completely, as evidenced by tail buffeting. At this point, close the throttle and lower nose. As the aircraft picks up airspeed, gradually increase the power and resume level flight. Refer to Section VI for information regarding aft CG stalls.

SINGLE ENGINE GO AROUND

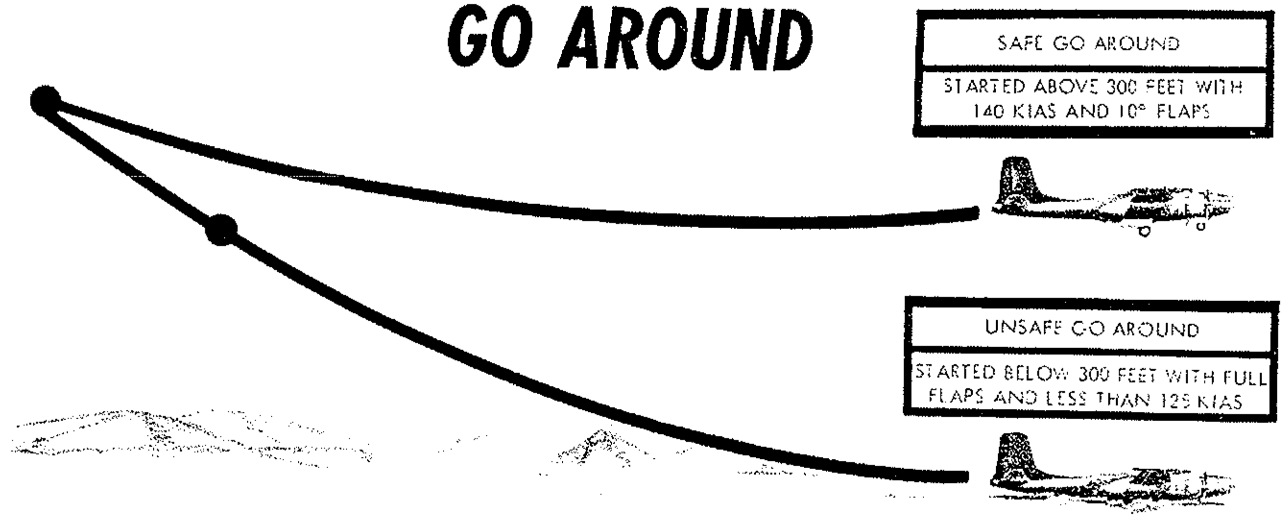


Figure 3-4

Simulated Single Engine Landing

Practice single engine landings by simulating feathering one engine in the traffic pattern and perform engine failure procedure. Fly a rectangular traffic pattern, utilizing the single engine landing procedures.

Simulated Single Engine Go Around

To simulate single engine go around procedures, establish a single engine landing approach at 500 feet above simulated field elevation, then start the single engine go around procedure. During these maneuvers, notice carefully the altitude lost and amount of power that may be required on the operative engine to maintain directional control.

NOTE

When proper technique is used, only 100 to 200 feet of altitude is lost.

To show the effect of a go around below 300 feet, with full flaps and below minimum single engine airspeed, simulate a single engine landing approach at 300 feet above a simulated field elevation of at least 5000 feet above the terrain. Lower full flaps, reduce power, and slow the aircraft to 105 KIAS in preparation for landing, start the single engine go around procedure and gain minimum single engine airspeed as soon as possible.

WARNING

Excessive rudder force will be required if full power is applied rapidly to the operating engine.

NOTE

An altitude of 500 to 600 feet will probably be lost in the go around attempt. This maneuver should emphasize the importance of maintaining minimum single engine airspeed and using only 10° of flaps until landing is assured.

PROPELLER FAILURE

Overspeeding Propeller

If an overspeeding propeller is encountered on take-off or in flight, attempt to reduce and control RPM by use of the propeller lever.

Runaway Propeller

If the propeller continues to overspeed, indicating a runaway condition due to possible propeller governor failure or malfunction, proceed as follows:

Propeller Overspeeding Check

1. THROTTLE FOR AFFECTED ENGINE - RETARDED.
2. AIRSPEED - 140 KIAS.
3. LANDING GEAR LEVER - UP.
4. WING FLAP LEVER - UP.
5. FEATHERING BUTTON - AS REQUIRED.

Depress the propeller feathering button momentarily until RPM drops to approximately 2400, then pull out until RPM goes up to 2800; repeat this procedure until power on affected engine is no longer needed and the propeller can be safely feathered.

6. Land - AS SOON AS PRACTICABLE.

If the propeller overspeeding occurs at cruising airspeed, reduce airspeed immediately and feather the propeller. If the propeller will not feather, follow the applicable steps in the procedure given for takeoff configuration.

NOTE

The two most important factors to be considered in the event of propeller overspeeding are the true airspeed of the aircraft, and the power to the engine. The rate of windmilling is a function of true airspeed. Therefore, it is essential that, if the propeller cannot be feathered, the true airspeed be reduced as soon as possible.

Propeller Feathering Failure

In the event of autofeather system failure, manual feathering of the propeller must be accomplished. If the propeller fails to feather manually, proceed as follows:

WARNING

If the firewall shutoff handle has been actuated to attempt feathering of the overspeeding propeller, it is necessary to reposition the handle IN to provide lubrication and prevent engine seizure.

1. Propeller lever for affected engine - DECREASED.

At this setting, windmilling drag will be at a minimum, although considerably greater than when the propeller is feathered.

2. Airspeed - 146 KIAS MINIMUM.

Adjust power on operating engine as required. Do not hesitate to use maximum power to avoid critical airspeed or altitude.

3. Landing gear lever - UP.
4. Wing flap lever - UP.
5. Land - AS SOON AS POSSIBLE.

Declare an emergency and prepare to land by taking the safest, most direct route to the field. Make as few turns as possible, disregarding the normal traffic pattern. When turns are necessary, make them into the operative engine, if possible.

WARNING

To avoid an uncontrollable roll, do not, under any circumstances, increase power on the operative engine during a turn into the engine with the windmilling propeller. Maintain a minimum airspeed of 146 KIAS.

6. Landing gear lever - DOWN, ON FINAL APPROACH.

Maintain power until effect of extending landing gear on airspeed has been determined.

7. Airspeed - 137 KIAS MINIMUM.

WARNING

If airspeed cannot be maintained at 137 KIAS or above, make a gear up landing with the failed engine shut down.

8. Wing flap lever - AS REQUIRED.

Use flaps when landing is assured.

Inadvertent Propeller Reversal

Results of control flight tests in other type aircraft, with one propeller in reverse pitch, indicate that control of the aircraft can be maintained if corrective action is taken immediately. It cannot be accurately predicted, however, what effects would be encountered should a propeller suddenly and unexpectedly go into reverse pitch at cruising speeds and power settings in this aircraft. Controllability of the aircraft is expected to be most critical at low airspeeds and high power settings. The propeller noise resulting from overspeeding as the blade angle passes through flat pitch is unmistakable. The higher the airspeed, the higher the noise level. Deceleration of the aircraft, and probably yaw and buffeting or bucking effect would be promoted at high airspeed. Closing the throttle of the affected engine will cause the engine to stall out, and the propeller to start windmilling backward. This will be indicated by a zero reading on the tachometer. The amount of control then required should be approximately the same as that required for a normal windmilling propeller condition. If a subsequent propeller reversal occurs, close the throttle for the affected engine and feather the propeller.

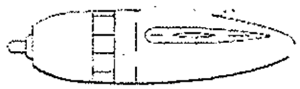
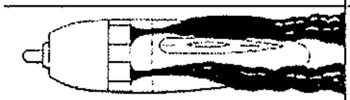
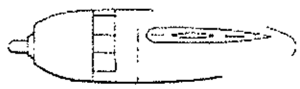
NOTE

- If altitude permits, close both throttles before feathering the propeller, to reduce higher speed and multiple yaw. Immediately restore power to the engine which continues to retain RPM. If the propeller will not feather out of reverse pitch, continued windmilling backwards will cause oil starvation and probable engine seizure. In reference to procedures for counteracting erratic propeller operation, the following may be of value:

  If a propeller will not feather because the feather button will not stay pushed in, manually push and hold the button in until the feathering is completed.

- In the event a propeller should reverse immediately after takeoff, make certain the throttle for the affected propeller is forward of the reverse range, and feather the propeller. The same pump accomplishes feathering and reversing. Therefore, the throttle must be forward of the reversing range before power is available to the pump for the feathering operation.

SMOKE AND FLAME IDENTIFICATION CHART

SMOKE AND FLAME PATTERN	POSSIBLE INSTRUMENT INDICATION	DANGER	CAUSE AND REMEDY
 PUFFS OF BLACK SMOKE FROM EXHAUST AND ROUGH ENGINE	HIGH CYLINDER HEAD AND CARBURETOR AIR TEMPERATURES, FLUCTUATING MANIFOLD PRESSURE, RPM, AND FUEL FLOW.	LOSS OF POWER; ENGINE FAILURE.	CAUSE: DETONATION, AFTERFIRE OR BACKFIRE FROM LEAN MIXTURE OR CARBURETOR FAILURE. REMEDY: ENRICH MIXTURE, REDUCE POWER AND TEMPERATURE, MONITOR ENGINE INSTRUMENTS.
 THIN WISPS OF BLUISH-GREY SMOKE FROM COWL FLAPS AND EXHAUST AREAS		SLIGHT POSSIBILITY OF FIRE.	CAUSE: SLIGHT OIL LEAK. REMEDY: OBSERVE ENGINE CLOSELY, FEATHER PROPELLER IF VOLUME OF SMOKE INDICATES NECESSITY.
 VARIABLE GREY SMOKE AND POSSIBLE LIGHT FLAME FROM COWL FLAPS AND EXHAUST AREAS	HIGH CYLINDER HEAD TEMPERATURE, FLUCTUATING MANIFOLD PRESSURE AND RPM AND LOW OIL PRESSURE	ENGINE FAILURE AND FIRE.	CAUSE: CYLINDER HEAD OR EXHAUST STACK FAILURE. REMEDY: PERFORM FEATHER PROCEDURE. ALERT CREW.
 HEAVY BLACK SMOKE FROM EXHAUST	SUDDEN DROP IN MANIFOLD PRESSURE AND RPM WITH HIGH CYLINDER HEAD TEMPERATURE	UNCONTROLLED FIRE.	CAUSE: INITIAL INDUCTION FIRE FROM BURNING FUEL. REMEDY: PERFORM FIRE AND FEATHER PROCEDURE. ALERT CREW.
 DENSE WHITE SMOKE FROM EXHAUST AND/OR COWL FLAP AREAS	VERY HIGH CYLINDER HEAD AND CARBURETOR AIR TEMPERATURES. FLUCTUATING ENGINE INSTRUMENTS.	UNCONTROLLED FIRE.	CAUSE: INDUCTION CASING BURNING AND/OR BURNED THROUGH. REMEDY: PERFORM FIRE AND FEATHER PROCEDURE. ALERT CREW.
 BLACK SMOKE FROM ACCESSORY SECTION	SUDDEN DROP IN MANIFOLD PRESSURE AND RPM WITH HIGH CYLINDER HEAD TEMPERATURE.	UNCONTROLLED FIRE.	CAUSE: OIL LEAK AND OIL FIRE. REMEDY: PERFORM FIRE AND FEATHER PROCEDURE. ALERT CREW.
 BLACK SMOKE AND ORANGE FLAME FROM ACCESSORY SECTION	VARIABLE FUEL PRESSURE, HIGH CARBURETOR AIR TEMPERATURE	UNCONTROLLED FIRE.	CAUSE: GASOLINE LEAK AND FIRE. REMEDY: PERFORM FIRE AND FEATHER PROCEDURE. ALERT CREW.

26B-1-3-0-1A

Figure 3-5

Propeller Pitch Hunting Or Oscillation

If RPM oscillation is encountered during takeoff, return to the field immediately and determine the cause of trouble. If RPM oscillation is encountered during flight, the cause may be a fuel system malfunction, or a propeller governor malfunction. Change fuel tanks and use fuel boost pumps. If the oscillation continues, exercise the propeller lever from full INCREASE RPM to full DECREASE RPM several times. If this procedure does not correct the condition, land as soon as possible and investigate the malfunction.

Power Loss

Serious damage to the engine may result from overspeeding if power is restored suddenly while the propeller is in low pitch. If a momentary power loss occurs, perform the following procedures:

1. Throttles - RETARDED.
2. Propeller lever for affected engine - DECREASED.

NOTE

If power loss has resulted from fuel exhaustion, reestablish fuel pressure by proper setting of the fuel system controls.

3. Mixture lever for affected engine - AUTO RICH.
4. Power for affected engine - INCREASED SLOWLY.

If power loss cannot be controlled by this method, accomplish ENGINE FAILURE DURING TAKEOFF OR INFLIGHT procedures.

FIRE

Engine Fire On Ground

If a fire develops during starting, keep the engine running, as fire may be drawn through the engine and extinguished. If engine has not started when fire occurs, open throttle and keep engine turning with starter. Perform the following procedures:

1. THROTTLE - AS REQUIRED.

NOTE

If an induction fire occurs, advance the throttle to FULL OPEN, keep the engine turning with the starter and discontinue priming.

2. MIXTURE LEVER - IDLE CUTOFF.
3. IGNITION SWITCH - OFF.
4. Fuel boost pump switch - OFF.
5. Fuel tank selector valve handle - OFF.

If fire persists:

6. Ground portable fire extinguisher - DISCHARGED.

Signal the ground crew to discharge the portable fire extinguisher.

7. Engine fire extinguisher - ACTUATED.
8. Other engine, if operating - SHUTDOWN.
9. Crew - ABANDON AIRCRAFT.

CAUTION

Do not attempt to restart an engine after discharging the fire extinguisher.

Fuselage Fire

WARNING

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

1. All ventilation ducts - CLOSED.
2. Crew - EXTINGUISH FIRE.

Attack fire immediately with available fire extinguishers. Crew members not engaged in fighting the fire will use 100 percent oxygen (if available) and aid those engaged in fighting the fire if they are in distress.

3. Oxygen - 100 PERCENT.

Until fumes or toxic effects have been eliminated.

4. Land - AS SOON AS PRACTICABLE.

If fire cannot be controlled, abandon aircraft.

Wing Fire

1. Electrical equipment to affected wing - OFF.
2. Aircraft - SIDE SLIP AWAY FROM THE FIRE.
3. Land - AS SOON AS POSSIBLE.

If fire becomes uncontrollable before a landing is possible, abandon the aircraft.

Electrical Fire

1. Battery and generator switches - OFF.
2. Crew - EXTINGUISH FIRE.

Combat fire with hand fire extinguisher where possible.

3. Electrically operated equipment - OFF.
4. Generator and battery switches - ON, one at a time.
5. Necessary electrical equipment - ON, one at a time.

When the source of smoke or fire has been found, deenergize affected circuit by turning off defective equipment and placing circuit breaker off.

6. Land - AS SOON AS PRACTICABLE.

Smoke and Fume Elimination

To eliminate smoke and fumes, proceed as follows:

1. Hydraulic bypass valve handle - IN and LOCKED.
2. Bomb bay door switch - OPEN.
3. Pilot compartment right canopy ventilating window - OPEN.
4. All ventilation ducts - OPEN.
5. Oxygen - 100 PERCENT.

Overheated Brakes

During training flights when frequent landings are being made, or when excessive braking is required in an emergency stop, it is possible to overheat the brake system and cause a fire. To avoid the possibility of retracting a gear with hot brakes into the wheel well and having it burst into flames, it is desirable to have a visual brake inspection while taxiing or prior to takeoff. If the brakes have been used excessively during taxiing or repeated landings, it may be desirable to leave the gear down for cooling while making the entire pattern around the field.

Brake Fire

In the event of an actual brake fire, proceed as follows:

1. Emergency equipment - SUMMONED.

Upon detecting or being informed of a brake fire, notify the control tower (if available), to dispatch emergency equipment.

2. Aircraft - STOPPED.

After the aircraft is stopped, release the pedal of the burning brake and hold the aircraft by means of the opposite brake.

3. Engine opposite burning brake - SHUTDOWN.

4. Throttle for affected side - SLIGHTLY ABOVE IDLE.

Advance the throttle of the affected side slightly above IDLE RPM, in an attempt to keep fire away from combustible fluids.

When emergency equipment arrives:

5. Operating engine - SHUTDOWN.

6. Crew - ABANDON AIRCRAFT.

Pilot Compartment Heater Fire

If the pilot compartment heater fire warning light illuminates:

1. Heater master switch - OFF.

2. Heater CO_2 fire extinguisher - DISCHARGED.

CAUTION

Under most CO_2 discharge conditions, fog is formed momentarily and may be mistaken for smoke; therefore, caution must be used to determine if fire persists.

Follow procedure outlined in Smoke and Fume Elimination paragraph, to ventilate pilot compartment.

BAIL OUT

When the decision is made to bail out, proceed as follows:

1. Crew - NOTIFIED.

Order the crew to prepare for bail out over the interphone on CALL position and by three short rings on the alarm bell.

2. Crew equipment check - ACKNOWLEDGED.

The crew will check bail out and survival equipment and tighten parachute straps.

3. IFF/SIF - MODE 3, CODE 77 AND EMERGENCY.

4. KY-8 - ZEROIZE

WARNING

To safeguard classified security equipment, actuate red guarded ZEROIZE switch on left side of KY-8 control panel.

5. Position report - TRANSMITTED.
6. Airspeed - 146 KIAS.
7. Bomb bay door switch - OPEN.
8. Wing flap lever - 15° DOWN.

Trim the aircraft slightly nose down and head toward an uninhabited area.

9. Alarm bell - ON.

Sound one long ring on alarm bell and order occupants of aft compartment to jettison escape hatch and bail out. See figures 3-6 and 3-8.

10. Helmet Visors - LOWERED.
11. Aft compartment occupants - BAIL OUT.
12. Canopy - JETTISONED.

WARNING

- When the canopy is jettisoned in flight the front edge tends to dish downward into the pilot compartment. Occupants are cautioned to lower their heads.
- An alternate bail out exit is through the bomb bay escape hatch.

13. Pilot compartment occupants - BAIL OUT.

The normal sequence of bail out is copilot position, observer position, and pilot position. See figures 3-6 and 3-8.

NOTE

To bail out from the pilot compartment in level flight, dive out head first and aim at a point approximately halfway back on the upper surface of the wing and halfway out to the nacelle. Release survival kit after parachute is fully deployed.

Overwater Bail Out

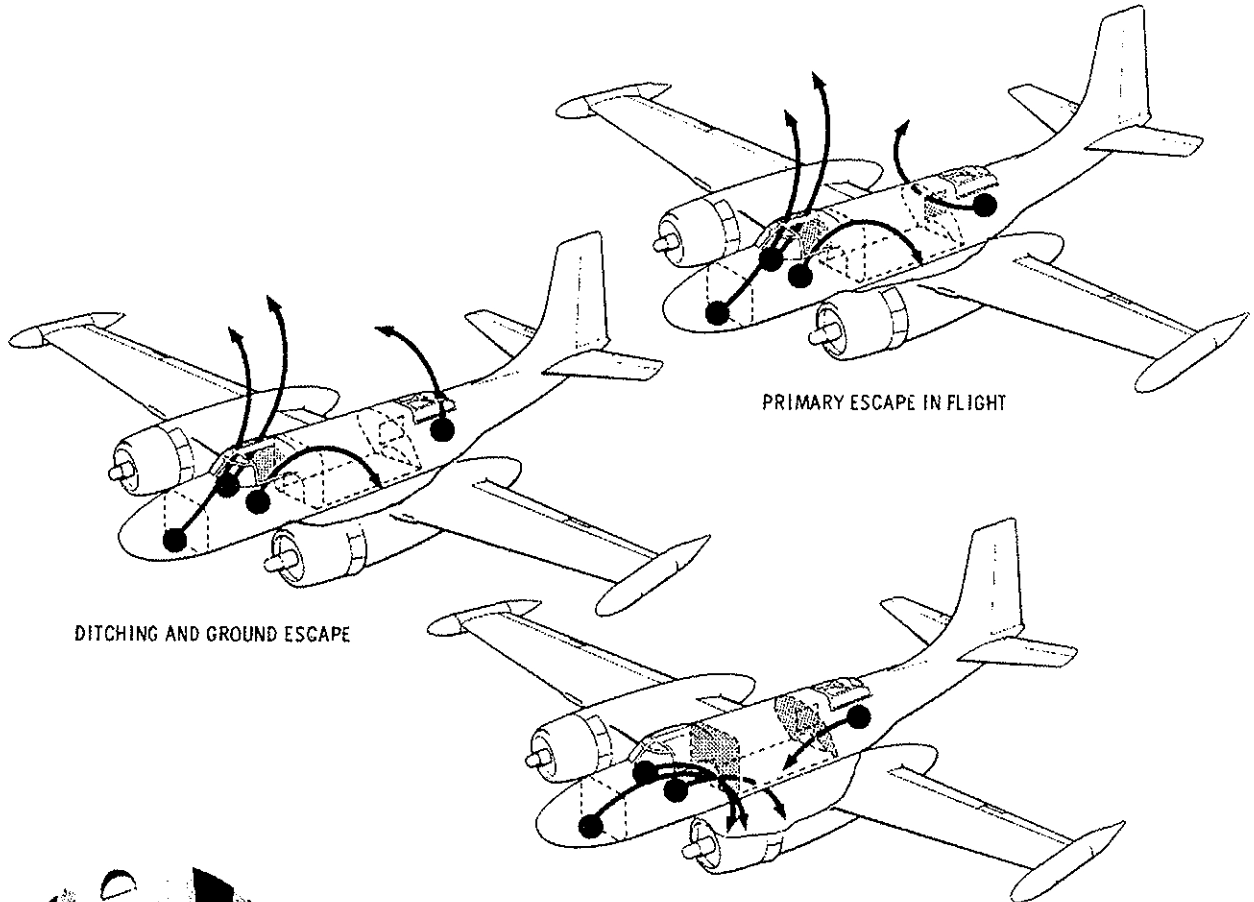
If overwater bail out is necessary and surface help is available, it is much easier for rescue crews to find and rescue two or three men together than when strung out in a line. All crew members should try to bail out as close together as possible. Always head the aircraft in a direction to allow crew to drop into the course and just ahead of the rescue vessel. If surface help is not available, it is still important to keep the crew as close together in the water as possible. Individual crew members can aid each other, especially in regard to injured crew members.

When the crew is alerted to prepare for bail out, each crew member will check to see that his one-man dinghy is properly affixed to his parachute.

EMERGENCY DESCENT

Emergency descent is a maximum performance maneuver in which damage to the aircraft and engines is considered secondary to getting the aircraft down to lower altitude. If it becomes necessary to make an emergency descent from altitude, proceed as follows:

EMERGENCY ESCAPE ROUTES



EMERGENCY ESCAPE MECHANISMS

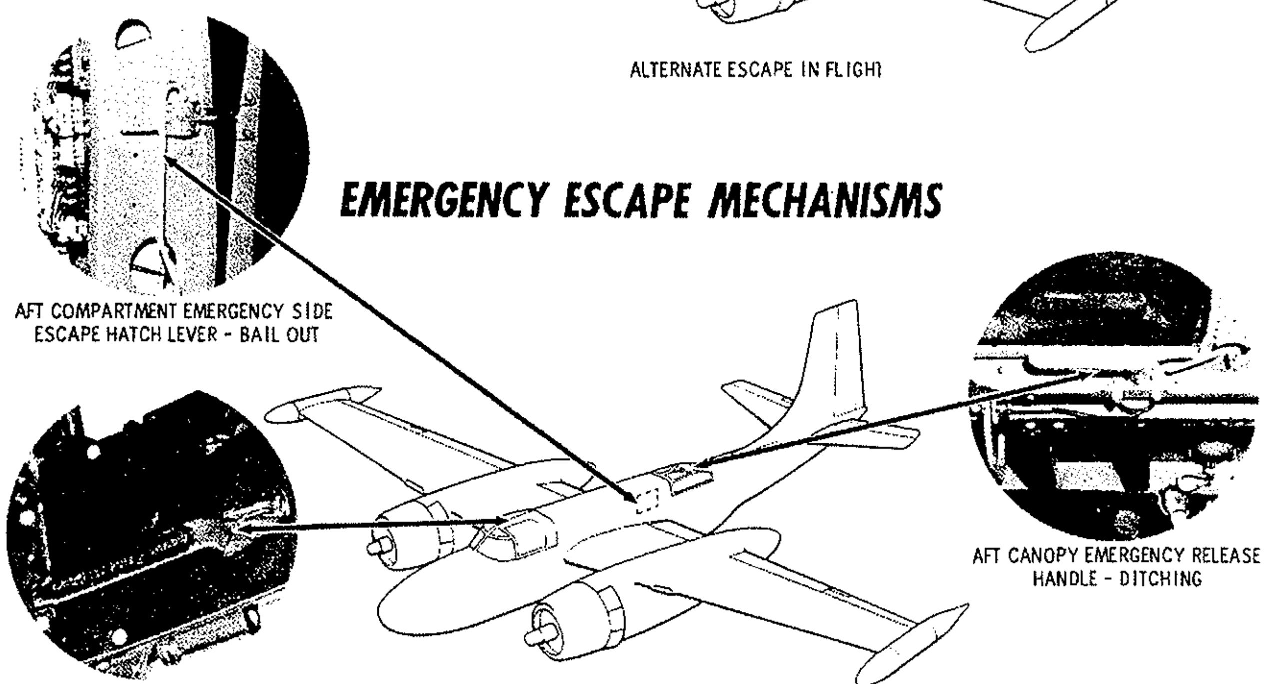


Figure 3-6

DITCHING AND CRASH LANDING STATIONS

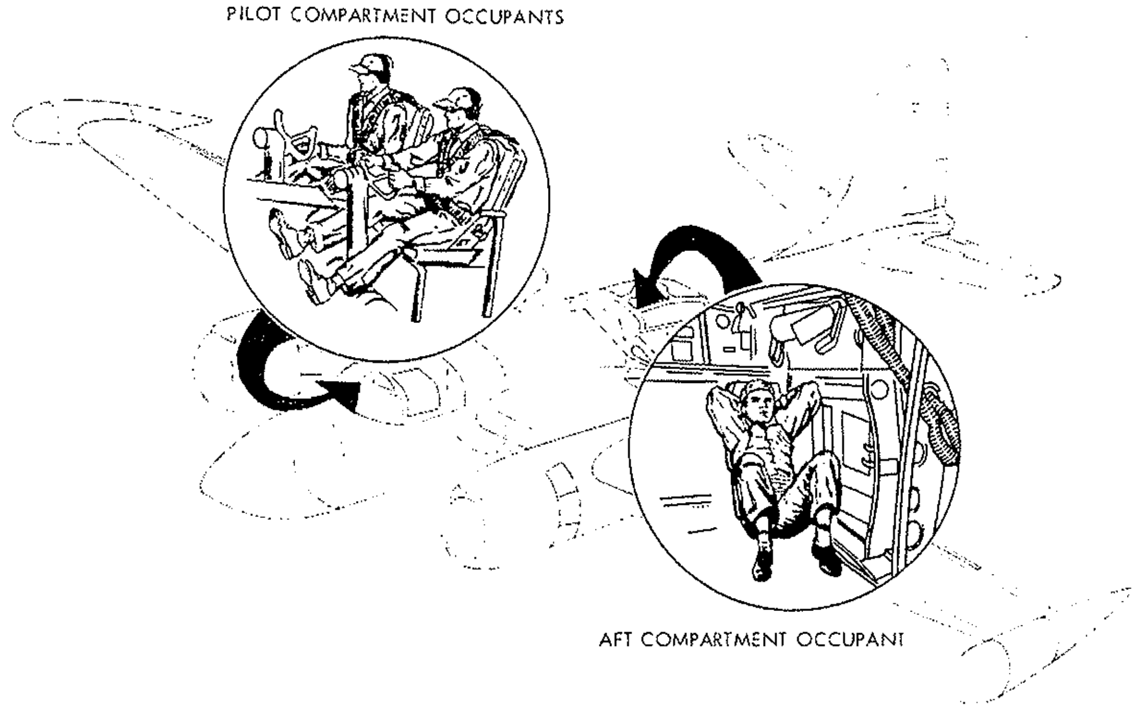


Figure 3-7

Emergency Descent Check

1. Mixtures - AUTO RICH.
2. Propeller levers - FULL INCREASE.
3. Throttles - CLOSED.
4. Carburetor air temperature levers - AS REQUIRED.
5. Hydraulic bypass valve handle - IN and LOCKED.
6. Bomb bay door switch - OPEN.
7. Cowl flap switches - OPEN.
8. Airspeed - 218 KIAS.
9. Wing flap lever - 25° DOWN.
10. Airspeed - 180 KIAS.
11. Wing flap lever - FULL DOWN.
12. Airspeed - 140 KIAS.
13. Landing gear lever - DOWN.

When the desired altitude is reached:

14. Landing gear lever - UP, then NEUTRAL.
15. Wing flap lever - UP.
16. Bomb bay door switch - CLOSE, then OFF.
17. Cowl flap switches - CLOSE, then OFF.
18. Propeller levers - AS REQUIRED.
19. Throttles - AS REQUIRED.
20. Carburetor air temperature levers - AS REQUIRED.

EMERGENCY EXITS AND ENTRANCES

The emergency exits are shown in figure 3-6 and may also be used as emergency entrances. External releases are provided in each hatch for ground use. If necessary, gain entrance by breaking through areas designated for emergency rescue by markings on fuselage exterior.

METHODS OF BAIL OUT

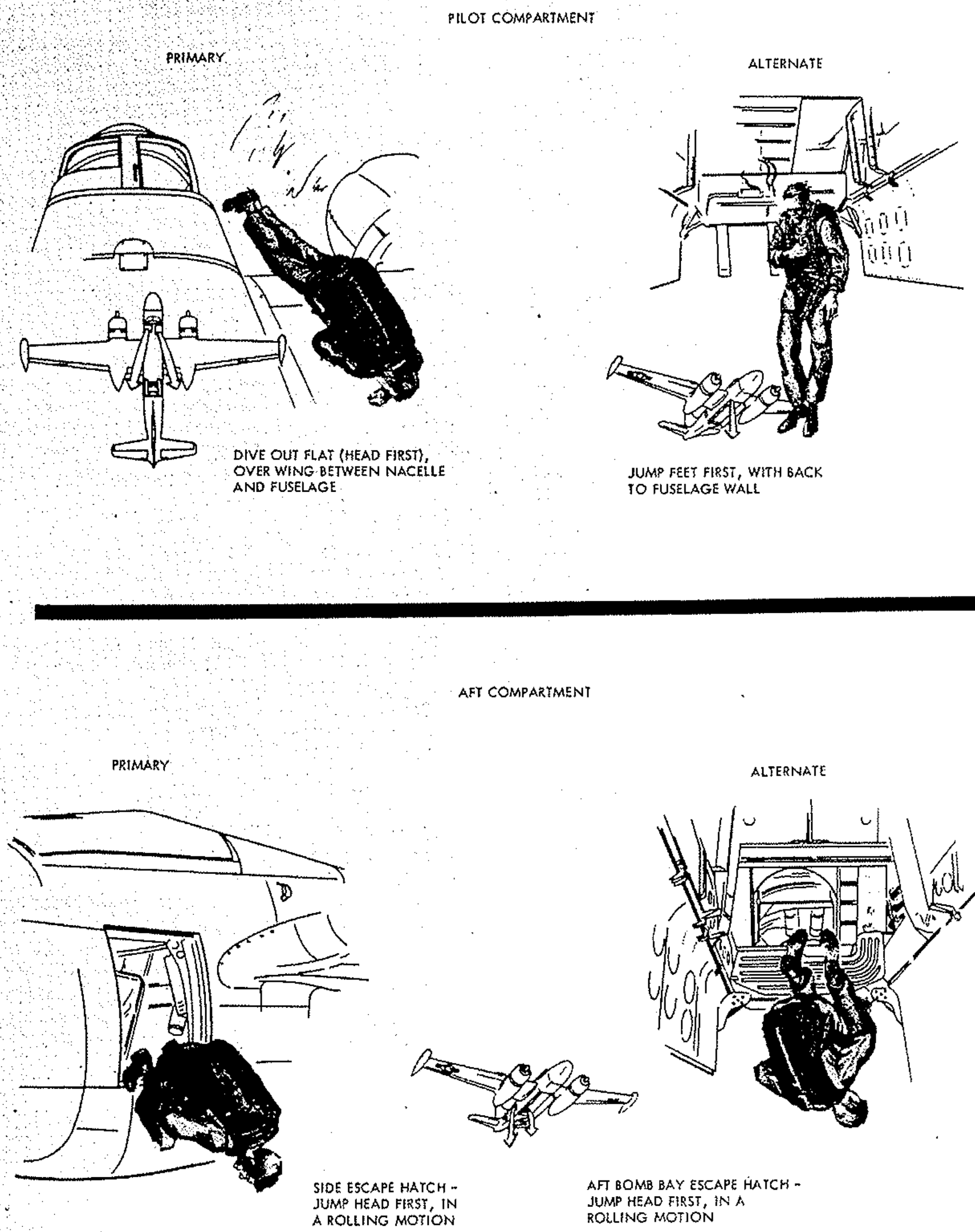


Figure 3-8

DITCHING

If there is sufficient altitude, bail out is preferred to ditching because the aircraft has a tendency to nose under upon contact with the water. Ditching requires more coordinated effort on the part of the crew than any other emergency procedure. The ditching drill should be practiced until each crew member is so familiar with his duties that the necessary actions become nearly automatic. Before each overwater flight, all essential emergency and ditching equipment should be thoroughly checked and stowed in the proper place.

Ditching Check

1. Crew - NOTIFIED.

Warn crew of the existing emergency over interphone and by six short rings of the alarm bell. Give the command "PREPARE FOR DITCHING" and receive acknowledgment from each crew member.

2. IFF SIF - MODE 3, CODE 77 AND EMERGENCY.
3. Position report - TRANSMITTED.
4. Hydraulic bypass valve handle - IN and LOCKED.
5. Bombs and external stores - JETTISONED.
6. Bomb bay doors - CLOSED.
7. Landing gear lever - UP.
8. Wing flap lever - DOWN (25° to 38°).
9. Helmet Visors - LOWERED.

NOTE

Visor may be raised prior to water contact if it restricts visibility.

10. Canopy and hatches - JETTISONED.

WARNING

When the canopy is jettisoned in flight, the front edge tends to dish downward into the pilot compartment. Occupants are cautioned to lower their heads.

11. Seat belt and harness - FASTENED.
12. Crew warning - ACCOMPLISHED.

Before touchdown, warn crew by interphone to brace for impact and give one long sustained ring of the alarm bell.

Ditching Stations

After accomplishing assigned ditching duties, crew members will take their ditching stations as shown in figure 3-7. Unbuckle parachute and remove any entangling equipment which may delay exit. The crew members should, if possible, use cushions to protect head and face on impact. Just prior to touchdown each crew member should brace himself and not relax until the aircraft has come to a complete stop. Do not mistake impact of the tail for the much greater shock which occurs as the nose strikes the water.

WARNING

Serious injuries have occurred when crew members have not taken proper ditching stations or have relaxed before final impact.

Ditching Procedures

Ditch before fuel is completely exhausted in order to have power available for landing. Power will allow the pilot to choose the spot for ditching, to obtain the best possible water conditions, and to choose the most favorable attitude. Make a normal approach, using from 25° to 38° flaps to insure control and permit a safe margin of airspeed after leveling off. Unless the wind is high or water is rough, select approach heading parallel to the swells. Touch down on the upslope or crest of the swell if at all possible. If the sea surface is irregular or if the wind speeds are 30 MPH or higher, plan to ditch into the wind to take advantage of slower forward airspeed. Use power to control approach and touch down tail first.

NOTE

- If one engine is inoperative, use only enough power to flatten approach and to maintain a safe margin of rudder control.
- There will be a slight impact as the aft fuselage section strikes the water, followed by a severe impact with sudden deceleration in most cases. The nose will submerge as the aircraft comes to rest.

Night Ditching

The basic rules, in addition to the following, will apply, except that night ditching shall be conducted with the aid of flight instruments to establish the proper attitude of the aircraft. Make an instrument letdown at the lowest possible rate of descent. The landing lights will aid in judging height in leveling off. Maintain an upwind heading; make use of the known prevailing winds and the wind fix previously established. Hold wings level. Avoid digging a wing tip into the sea and cartwheeling the aircraft.

NOTE

On a moonlight night, land toward the moon and into the wind as much as possible. Landing toward the moon provides much better visibility.

Abandoning the Aircraft

Hold ditching positions until the aircraft comes to a complete stop, then leave the aircraft as quickly as possible. The aircraft will sink quite rapidly, but has been known to remain afloat approximately 1 minute. Do not inflate life jackets until outside the aircraft.

ELECTRICAL SYSTEM EMERGENCY OPERATION

Generator Failure

Should one generator fail, turn related generator switch OFF and operate only necessary electrical equipment for continued flight. If both generators fail, turn both battery switches OFF to conserve remaining electrical power for emergency use and for landing. With complete electrical system failure, the pointers of the electrically operated instruments will either remain in the position they were in at the time of power failure or they will drop to zero.

NOTE

> If a generator out light appears, it is possible that the overvoltage regulator may be tripped. It is possible to reset the overvoltage regulator by depressing the rubber covered plunger located adjacent to the voltage regulator, directly behind the pilot seat. This should be reset only once in flight. If this action does not correct the condition, turn related generator switch off.

Generator Overheat Check

1. Generator switch - OFF.
2. Unnecessary electrical equipment - OFF.
3. Generator overheat light - CHECKED.

   After a 1-minute cooling period, check the generator overheat light.

If generator overheat light does not go out, proceed as follows:

4. Associated engine - SHUTDOWN.

If light stays on after several minutes of cooling:

5. Land - AS SOON AS PRACTICABLE.

If light goes out:

6. Engine - STARTED.

   Attempt to shear the generator shaft by starting the engine.

If light comes on:

7. Engine - SHUTDOWN.
8. Land - AS SOON AS PRACTICABLE.

Circuit Breaker Failure

If a circuit breaker opens, disconnecting power to any circuit, an overload or short is indicated in that circuit. If, after being reset, the circuit breaker opens, do not use the circuit unless the safety of the aircraft and crew depends on its continued operation; if necessary, manually hold the circuit breaker closed.

CAUTION

> Manually holding a circuit breaker closed constitutes a possible fire hazard and should be done only in an emergency.

ENGINE OIL SYSTEM FAILURE

The indications of oil system failure that may lead to engine failure are loss of oil pressure, oil temperature increase, and loss of oil quantity indication. High oil temperatures may result from failure of the oil cooler door to function in AUTOMATIC. If the oil cooler door switch is on AUTOMATIC, move switch to OPEN and hold in that position to make certain that the door will open and that the temperature drops. However, in the event of congealed oil, opening the oil cooler will only aggravate the trouble; in this case, the door should be closed and a close watch maintained of the oil temperature. As soon as the temperature shows a further rise, open the door slightly and wait for the temperature to stabilize, gradually opening the door as the congealed oil thins out.

If a propeller has been feathered for a considerable length of time, it is probable that oil in the oil cooler is congealed. After unfeathering the propeller and starting an engine, check the BMEP and fuel flow for a positive indication of engine power. Also check the engine temperature and pressure instruments for indication within limits. If the engine oil temperature indicator continues to rise above normal limit, a congealed oil cooler is indicated and the oil cooler air exit door should be closed by manual operation of the oil cooler door switch.

NOTE

> If the oil cooler door switch is left in the AUTOMATIC position, heating of the congealed oil in the cooler will be delayed since excessive engine oil temperature causes the oil cooler door to remain fully open.

Continue to monitor the oil temperature indicator until the oil temperature decreases to normal; then place the oil cooler door switch in the AUTOMATIC position.

HYDRAULIC SYSTEM EMERGENCY OPERATION

In event of failure of both engine driven hydraulic pumps, hydraulic pressure may be supplied to the system as follows:

1. Auxiliary hydraulic pump switch - ON.

If the hydraulic pressure remains too low:

2. Emergency hydraulic selector valve handle - SYSTEM.
3. Hydraulic hand pump handle - ACTUATED.

BRAKE SYSTEM EMERGENCY OPERATION

Hydraulic Brake System Emergency Operation

If the normal hydraulic system fails, the use of propeller reversing should be sufficient to bring the aircraft to a complete stop. However, if brake application is also desired, the hydraulic hand pump may be used provided there is sufficient fluid in the reservoirs and hydraulic lines are intact. When time permits, operate the hydraulic hand pump handle before depressing the brake pedals to build up hydraulic pressure in the accumulator. To assure adequate braking force after the first brake application, continue to operate the hydraulic hand pump handle.

Hydraulic Brake Failure Check

1. Brake pedals - DEPRESS and HOLD.

CAUTION

Pressure to the brakes will be lost if pedals are released.

2. Hydraulic hand pump - ACTUATED.

NOTE

Hydraulic pressure is supplied directly to deboost and metering valves. The hydraulic pressure gage will indicate exact pressure reading when fluid is pumped with brake pedals depressed.

Emergency Air Brake System Operation

In the event of complete failure of the hydraulic brake system, the use of propeller reversing should be sufficient to bring the aircraft to a complete stop. In addition, the emergency air brake system may be used as follows:

1. Ground speed - MINIMUM.

Lose as much speed as possible before using air brakes.

2. Emergency air brake lever - ACTUATED.

To apply brakes, pull emergency air brake lever to ON and then to NEUTRAL. Repeat this cycle until desired braking action is obtained.

CAUTION

When using the emergency air brake system, both brakes are applied at once; selective braking is not possible.

NOTE

- The air bottle normally contains four applications of the brakes.
- Do not attempt to taxi with brakes inoperative. Have the aircraft towed to the parking area.

BOMB BAY DOORS EMERGENCY OPERATION

Electrical Failure

1. Bomb bay door manual handle - AS REQUIRED.

Select OPEN, NEUTRAL, or CLOSE as required.

Hydraulic Failure

1. Emergency hydraulic selector valve handle - AS REQUIRED.

Select bomb doors OPEN or CLOSED as required.

2. Hydraulic hand pump - ACTUATED.

Actuate hand pump until desired position is obtained.

3. Emergency hydraulic selector valve handle - SYSTEM.

GUN BAY DOOR OPEN INFLIGHT

The inadvertent opening of a gun bay door during flight presents no unusual flight or trim characteristics. Normally, the door, if it becomes unlatched, will open approximately 6 to 8 inches. In the event a gun bay door comes open during flight, proceed as follows:

1. Airspeed - 160 KIAS OR LESS.

NOTE

Do not feather the propeller on the side with the gun bay door open unless it appears that the gun bay door is tearing off and may hit the propeller.

2. Ordnance - JETTISONED AS REQUIRED.
3. Tip tank fuel - DUMPED.
4. Land - AS SOON AS PRACTICABLE.

A straight in approach is recommended. Do not reverse propellers unless absolutely necessary.

LANDING GEAR SYSTEM EMERGENCY OPERATION

1. Airspeed - 140 KIAS MAXIMUM.
2. Hydraulic bypass valve handle - IN and LOCKED.
3. Auxiliary hydraulic pump switch - ON.

If the normal landing gear lever is malfunctioning:

4. Landing gear auxiliary lever - DOWN.

If landing gear does not extend:

5. Landing gear auxiliary lever - UP.

6. Landing gear emergency uplatch release handles - PULL and HOLD.

Note

If unable to release the gear from the uplocks, attempt to reduce the weight of the gear on the uplocks by flying a zero "g" parabolic arc, while pulling the landing gear emergency uplatch release handles.

7. Landing gear lever - DOWN.

If landing gear extends:

8. Landing gear emergency uplatch release handles - RELEASED.

If landing gear fails to extend:

9. Landing gear emergency uplatch release handles - RELEASED.

10. Emergency hydraulic selector valve handle-LANDING GEAR DOWN.

11. Hydraulic hand pump - ACTUATED.

When landing gear is extended:

12. Landing gear position - CHECKED.

Check the landing gear down and locked, both visually and by landing gear position indicator lights.

13. Emergency hydraulic selector valve handle-SYSTEM.

NOTE

Landing gear can be pumped down manually although the uplatches have not been manually released.

a. On aircraft utilizing external conventional munitions, the following Warning shall apply:

WARNING

Following an attempted release or jettison, any conventional munition that does not separate from the aircraft should be considered armed and susceptible to inadvertent release during landing impact.

b. On aircraft utlizing external dispensers and launchers for convetional munitions, the following Warning shall apply:

WARNING

Following a normal release of conventional munitions, all bomb dispensers and rocket launchers should be considered as still containing one or more bombs and/or rockets. If visual examination cannot positively affirm a safe condition, jettison before returning to base. However, this requirement shall not apply apply for training dispensers, type SUU-25 flare dispenser, or type LAU-32B/A and LAU-59/A launchers.

SECTION IV
AUXILIARY EQUIPMENT

TABLE OF CONTENTS

HEATING AND VENTILATING SYSTEMS

CAUTION

During any landing emergency the heater, if in use, should be shut down while the aircraft is still airborne, to preclude a possible fire hazard.

Heating System

A 100,000 BTU surface combustion heater is installed in the aircraft. Heater ignition is accomplished by a spark plug type ignition system. A ram air switch is incorporated to prevent heater operation when insufficient ram air is being supplied to the heater. The ram air switch automatically shuts down operation of the heater at airspeeds below 90 knots. The heater incorporates a thermostatic control which permits selection of any desired temperature range. Also provided is an overheat control which temporarily shuts down the heater when the outlet air temperature exceeds 350°F. In addition, a fire warning light, located on the pilot subpanel, illuminates when the heater temperature exceeds 450°F. A fire extinguishing system is available in this event. The fuel for the heater is supplied from the right engine driven fuel pump. Electrical power is supplied from the 28 VDC bus through circuit breakers on the pilot circuit breaker panel.

Heater Controls

The heater controls are located on the pilot subpanel. To operate the heater, turn the heater master switch ON, and set the temperature control, located toward the top of the pilot instrument panel, to the desired temperature. The calibrations on the temperature control indicate the temperature at which the air leaves the heater, and not the pilot compartment temperature. As the heater operates, a green cycle light will illuminate intermittently. The cycle light indicates proper heater operation. If the heater fails to deliver hot air to the pilot compartment, the heater ignition points switch, located below the heater master switch, may be placed in the ALTERNATE position. In the event of temperature control malfunction, an overheat switch will automatically shut off the heater if the outlet temperature exceeds 350°F. This is indicated by the illumination of an amber overheat light. After cooling, the overheat circuit will deactivate, and the heater may again be operated.

Heater Fire Detection and Extinguishing System

A red fire warning light is located adjacent to the heater master switch. If this light illuminates, the heater master switch should immediately be turned off, and the heater CO_2 fire extinguisher discharged. The guarded switch for the fire extinguisher is located directly below the fire warning light. When the CO_2 fire extinguishing agent is used, the pilot compartment should be ventilated by means of the ventilation system and the window in the copilot canopy section. The bomb bay doors may also be opened as an aid in ventilation.

Ventilating System

The heater air ducts are routed to positions on the pilot compartment floor forward of the pilot and copilot, and to the windshield for defrosting. Each leg of the duct is equipped with a butterfly shutoff valve. The pilot duct control is located to the left of the control pedestal, and below the pilot subpanel. The controls for the copilot duct, and windshield defroster, are located on the right hand side wall of the pilot compartment, adjacent to the copilot seat. When the heater is not operating, ram air is available through these ducts for ventilating purposes. A free air vent, located on the copilot overhead windshield section, may be used for added ventilation.

ANTI-ICING SYSTEMS

Windshield Anti-Icing System

The formation of ice on the windshield is prevented by alcohol from a 12-gallon tank located in the right engine nacelle, supplied by an electrically driven pump, and distributed to the windshield by means of spray bars. The electric pump is controlled by an on-off switch, marked WINDSHIELD ALCOHOL, and located on the pilot subpanel. Power for the pump is from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel. The amount of windshield alcohol being supplied is controlled by a needle valve located on the left side of the pilot instrument panel. Turning the valve clockwise increases the flow of alcohol through the spray bars. The system is very effective over the lower half of the windshield, but a great deal of alcohol is required to protect the upper area. Therefore, in heavy icing or if prolonged flight in icing conditions is anticipated, it may be advisable to

ANTENNA LOCATIONS

1. AN ARN–14C VOR ILS GLIDE SLOPE ANTENNA
2. HF–103 ANTENNA
3. AN ARN–6 ADF LOOP ANTENNA
4. AN ARC–27 UHF ANTENNA
5. VHF–101 ANTENNA
6. AN ARN–6 ADF SENSE ANTENNA
7. AN APX–25 IFF SIF ANTENNA
8. AN ARN–14C VOR ILS LOCALIZER ANTENNA
9. MARKER BEACON ANTENNA
10. AN ARC–44 FM ANTENNA
11. AN ARN–21C TACAN DISTANCE ANTENNA
12. FM–622 A ANTENNA (BAR) AFTER T.O. 1A–26A–533
13. FM–622 A ANTENNA (WHIP) AFTER T.O. 1A–26A–533
14. RADAR TRANSPONDER ANTENNA

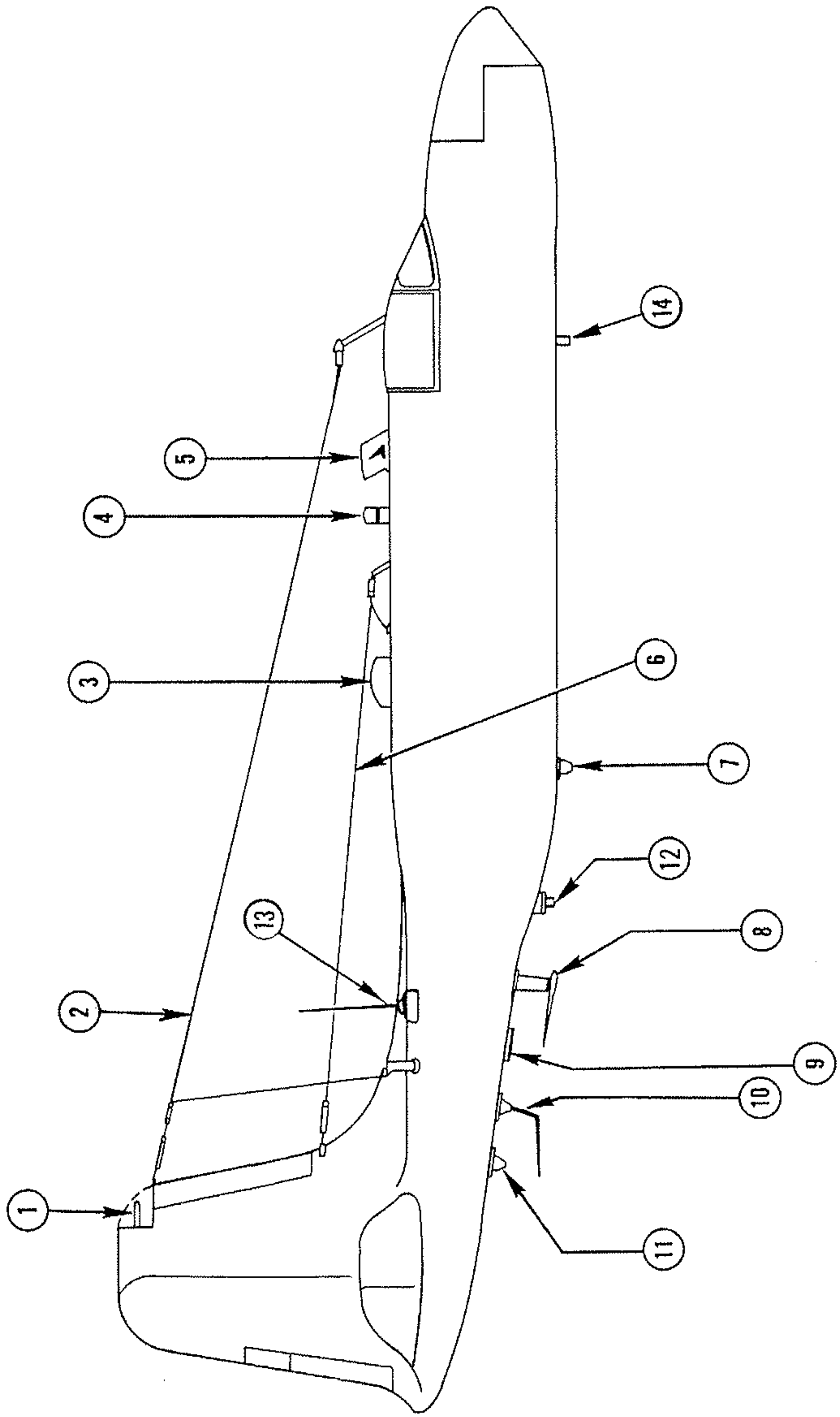


Figure 4-1

protect only the lower portion of the windshield and accept the loss of vision through the upper areas of the windshield to conserve alcohol.

Carburetor Anti-Icing System

The engine heated air supplied to the carburetor is normally more than adequate in preventing carburetor icing. If, however, the carburetor heat for some reason fails to prevent ice, the alcohol injection system is effective in preventing and eliminating carburetor ice formation. Because the carburetor and windshield alcohol is supplied from the same 12-gallon tank, it is recommended that the carburetor heat be used to its fullest extent in keeping the carburetor ice free. The carburetor alcohol system should be used only after the full HOT position of the carburetor air temperature levers has failed to prevent the formation of carburetor ice. An electrically driven pump supplies the alcohol to the carburetors from the 12-gallon alcohol supply tank located in the right engine nacelle. The system is activated by a spring-loaded momentary-contact toggle switch located on the right side of the control pedestal. The system receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

NOTE

A slight degradation in deicing effectiveness will occur when using the alternate alcohol.

DEICING SYSTEMS

Pitot Heater

Ice is prevented from forming on the pitot tube head by an electrical heating unit incorporated in the pitot head itself. A pitot heater switch is located on the pilot subpanel, and receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel. Ground operation of the unit should be limited to short maintenance checks and use during extremely cold weather to prevent burning out the heater.

Propeller Deicing System

Formation of ice on the propeller blades is prevented by electrically heated boots installed on the leading edges. Electric current is supplied intermittently, with two cycles available, to the boots on the propeller blades. Two propeller anti-icing switches are located on the pilot subpanel. The system switch is a three position toggle switch marked AUTO, OFF, MANUAL. The cycle rate switch, also a three position toggle switch, is marked FAST, OFF, SLOW. The propeller deicing system is normally operated by placing the system switch in the AUTO position, and placing the cycle rate switch in the desired position, according to the rate of ice formation. If ice continues to collect on the propeller blades with the system in AUTO, move the system switch to the MANUAL position and retain until the boots heat to a degree sufficient to remove the ice accumulation. The system receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Airfoil Deicing System

The airfoil deicing system consists of high pressure pneumatic deicer boots on the leading edges of the wings, vertical and horizontal stabilizers, an electronic timer for system cycling, two control switches, and a vacuum pressure pump. The electronic timer alternately cycles the wing boots simultaneously, then the empennage boots. The timer receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel. The system receives pressure from the reverse side of the vacuum pump. A deicer pressure gage is located on the auxiliary instrument panel behind the pilot. Normal pressure for the system is 18 to 21 PSIG. The gage will indicate pressure only during the inflation cycle.

The airfoil deice system is controlled by two switches, located on the pilot subpanel. One switch is an on-off switch, and the other controls the cyclic rate of the boots. The cyclic switch position decaled HEAVY cycles the boots at 1 minute intervals, and the LIGHT position cycles the boots every 4 minutes. It should be emphasized that the wing and tail pneumatic boots function as a deice system, and not an ice preventive system. For proper operation of the system, the wing deice boots should be allowed to accumulate approximately 1/4 to 1/2 inch of ice before the boots are cycled. If the deice boots are cycled too frequently in an icing environment, it is possible for ice to form, by bridging over the cycling boot, rendering the system ineffective in removing ice. For this reason it is recommended that the airfoil deice system be operated manually, by placing the cyclic switch to HEAVY and using the on-off switch to obtain one or two cycles as required. It would be a severe icing condition to require 4 minute cycle intervals, and an extremely severe condition to require 1 minute cycle intervals.

COMMUNICATION AND NAVIGATION EQUIPMENT

NOTE

No transmission shall be made on emergency (distress) frequency channels except for emergency purposes in order to prevent transmission of messages that could be construed as actual emergency messages.

COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT

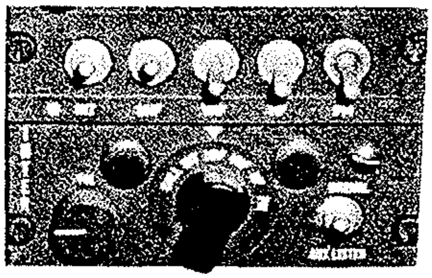
TYPE	DESIGNATION	FUNCTION	OPERATOR	RANGE	STATION
VHF RADIO	VHF-101	SHORT RANGE 2-WAY COMMUNICATION	PILOT/ COPILOT	LINE OF SIGHT	AFT CONTROL PEDESTAL
UHF RADIO	AN/ARC-27	SHORT RANGE 2-WAY COMMUNICATION	PILOT/ COPILOT	LINE OF SIGHT	AFT CONTROL PEDESTAL
LIAISON RADIO	HF-103	LONG RANGE 2-WAY COMMUNICATION	PILOT/ COPILOT	TO 2000 MILES	AFT CONTROL PEDESTAL
FM RADIO	AN/ARC-11 OR FM-622A	2-WAY COMMUNICATION/ NAVIGATION HOMING	PILOT/ COPILOT	LINE OF SIGHT	AFT CONTROL PEDESTAL
AUTOMATIC DIRECTION FINDER	AN/ARN-6	RADIO COMPASS FOR NAVIGATION HOMING	PILOT/ COPILOT	20 to 2000 MILES	NAVIGATION RADIO CONTROL PANEL
TACAN	AN/ARN-21C	NAVIGATION/ DISTANCE MEASURING	PILOT/ COPILOT	LINE OF SIGHT	NAVIGATION RADIO CONTROL PANEL
VOR/ILS	AN/ARN-14C	NAVIGATION/ INSTRUMENT APPROACH	PILOT/ COPILOT	LINE OF SIGHT	NAVIGATION RADIO CONTROL PANEL
GLIDE SLOPE RECEIVER	AN/ARN-18	INSTRUMENT APPROACH	PILOT	SPECIFIC PATTERN	PILOT INSTRUMENT PANEL
MARKER BEACON	51Z-2	INSTRUMENT APPROACH/ NAVIGATION	PILOT/ COPILOT	SPECIFIC PATTERN	INSTRUMENT PANEL
IFF/SIF	AN/APX-25	IDENTIFICATION AND CONTROL FROM GROUND RADAR STATIONS	PILOT/ COPILOT		AFT CONTROL PEDESTAL
INTERPHONE	AN/AIC-10	INTERCREW COMMUNICATION	ANY CREW MEMBER	WITHIN AIRCRAFT	EACH CREW MEMBER STATION
RADAR TRANSPONDER	SST-181X	RADAR BEACON	PILOT/ COPILOT		AFT CONTROL PEDESTAL

Figure 4-2

Microphone Button

A microphone button is located on the left throttle and on each cord attached to the interphone control panel. They are used to key the UHF, VHF, HF, and FM transmitters and the manual interphone at the pilot, copilot and aft compartment positions. The microphone button located at the observer position has only manual interphone capability.

Interphone System AN/AIC-10



The interphone system provides a means of communication between crew stations in the aircraft. The system is powered by the 28 VDC bus and provides high intelligibility of speech and signal communications at all altitudes. It provides the crew with simplified control over the radio receivers and transmitters. It also permits maximum flexibility of communication facilities, intercommunication between crew stations, external communications, monitoring of received radio signals (including simultaneous monitoring of the receivers), and a call facility for use in establishing communication between the crew members. The set incorporates an amplifier, a dynamotor, three AIC-10 control panels, and a relay assembly for "hot mike" operation. In order to utilize the "hot mike" feature, it is necessary to place the interphone and UHF monitor switches to the ON position and select the UHF position with the rotary selector switch. Only the pilot and copilot positions have the capability of transmitting through the "hot mike" feature. However, all crew positions can receive "hot mike" transmission through the normal interphone system. In addition, a navigation radio monitor panel provides a means of identifying each navigation aid. There are two monitor panels, one located adjacent to the pilot interphone control panel and the other to the right of the copilot seat. Each panel has four monitoring switches with two positions, ON (up) and OFF (down) that provide individual or simultaneous reception of audio signals from the TACAN, VOR, ADF, and MARKER BEACON. There is no volume control knob on this panel as the volume is adjusted by the volume control knob on each individual navigation aid control panel and/or the AN/AIC-10 control panels.

Interphone Control Panel

The control panels are located to the left of the pilot position and on the lower part of the copilot instrument panel in the cockpit and on the top right side of the forward bulkhead in the aft compartment. The control panel acts as a master control box for the associated radio and communication equipment. It does not contain an on-off switch as it is energized whenever the 28 VDC bus is energized. The following controls are provided.

Volume Control

The volume control is used to adjust audio signal intensity. It permits a comfortable listening level which will permit monitoring radio and interphone communications simultaneously.

Monitoring Switches

Five monitoring switches provide individual or simultaneous reception of audio signals:

INT - For interphone reception.
UHF - Command radio and "hot mike" audio reception.
VHF - Command radio reception.
HF - Radio reception.
FM - Radio reception.

Function Selector Switch

A rotary function selector switch permits selection of the six placarded functions:

CALL - For intercommunication, permitting the user in an emergency to interrupt or override any signals received in the pilot headset, in case another crew member is operating the interphone system with the rotary selector knob set on any position.

INT - For manual transmission and reception of intercommunication signals, using the MIC button on the throttle or other control panel MIC buttons and the reception of other signals as selected by the monitoring switches.

UHF - This function is used in the transmission and reception of the UHF radio or the two way "hot mike" intercommunication and the reception of other signals as selected by the monitoring switches.

VHF - For transmission or reception with the VHF radio and the reception of other signals as selected by the monitoring switches.

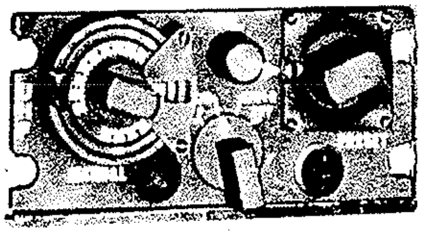
HF - For transmission or reception with the HF radio and the reception of other signals as selected by the monitoring switches.

FM - For transmission or reception with the FM radio and the reception of other signals as selected by the monitoring switches.

Normal-Aux Listen Switch

The normal-aux listen switch has two positions, NORMAL and AUX-LISTEN. When in the NORMAL position, all audio signals pass through the AN/AIC-10 amplifier, thus allowing the volume control knob on the AN/AIC-10 panel to adjust audio signal intensity. The AUX-LISTEN position is used when the amplifier fails. With the switch in this position, no talk capability is available and only one channel may be monitored at a time. The switches preceding the one for the desired position must be OFF. Consequently, audio signal intensity must be adjusted with the individual receiver volume control.

UHF Command Radio AN/ARC-27, or AN/ARC-136.



The UHF command radio is used for two-way communications for air-air and air-ground purposes, and operates in a frequency range of 225.0 to 399.9 mc. The UHF radio equipment includes a receiver-transmitter unit, and a control panel mounted on the aft control pedestal. The control panel provides manual or preset channel selection. The emergency (guard) and twenty preset channels may be set manually by positioning switch actuators located on a memory drum in the control head. When the channel selector is put in position M, three concentric manual frequency selectors can be used to select any one of 1750 available frequencies. With the channel selector in position G, the operator can initiate transmission and reception on the guard channel. A function switch provides the operator with the facilities for selecting the mode of operation. An audio volume control, marked VOL, provides adjustment of the radio level to the interphone system. Power to the UHF command radio is supplied from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel.

NOTE

After compliance with T.O. 1A-26A-536 (Installation of KY-8 Ciphony Equipment), the AN/ARC-27 radio is modified sufficient to cause the designation to be changed to AN/ARC-136. The operation of either radio is the same except that only the AN/ARC-136 radio will function in conjunction with the KY-8 equipment to transmit or receive cryptic speech.

Function Switch

The function switch has four positions: OFF, T/R, T/R+G, and ADF. When the switch is in the OFF position the equipment is deenergized. When the switch is in the T/R position, transmission and reception are through the main transmitter-receiver only and on the channel selected by the channel selector. When the switch is in the T/R+G position, conditions are the same as when in the T/R position except that the guard channel is monitored simultaneously by the guard receiver. The ADF position is not operable in this aircraft.

Operation of the UHF Radio

1. Place the interphone function selector switch to the UHF position.

2. Place the UHF monitoring switch on the interphone control panel to the up position.

3. Place the UHF radio function switch in the desired position.

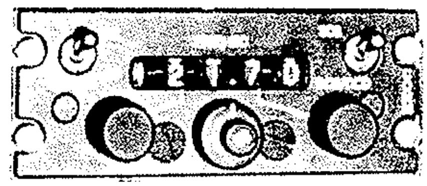
4. Select frequency or channel as desired.

5. Allow at least 1 minute for warmup.

To turn equipment off:

6. Turn the function switch to the OFF position.

VHF Command Radio VHF-101



The VHF communication system consists of a VHF transmitter, a VHF receiver, and a control panel. The VHF system provides communication facilities in the frequency range of 116.0 to 149.95 mc, with reception possible up to 151.95 mc. There are 680 crystal controlled channels available for transmission and 720 channels available for reception. All channels may be selected at intervals of 50 kc from the control panel located on the aft control pedestal. Power to the VHF command radio is supplied from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel.

Control Panel

The control panel, located on the aft control pedestal, provides operating controls for the VHF command radio system. The controls consist of a frequency indicator, a power on-off switch, an SCS-DCS/DCD switch, two frequency selector knobs, and a dual control for squelch and volume control. The two frequency selector knobs are used to select the operating frequency. The selected frequency appears as a direct reading number in the frequency indicator window. The power on-off switch controls power application to the system. The volume control, marked VOL, adjusts the receiver volume level to the interphone system. The squelch control, marked SQ, is used to adjust the squelch threshold on the receiver output. The SCS-DCS/DCD switch is provided to select the mode of operation. When the SCS (single channel simplex) is selected, the receiver and transmitter are tuned to the same frequency, and the receiver is disabled during operation of the transmitter. The DCS/DCD mode of operation is not operable in this aircraft.

Operation of the VHF Radio

1. Place the interphone function selector switch to the VHF position.

2. Place the VHF monitoring switch on the interphone control panel to the up position.

3. Place the VHF power switch to the ON position.

4. Select the SCS mode of operation.

5. Select the desired operating frequency.

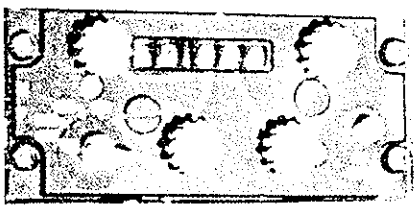
6. Allow 1 minute for warmup.

7. Adjust the SQ and VOL controls to a comfortable operating level.

To turn equipment off:

8. Place the VHF power switch to OFF.

HF-103 Command Radio



The HF-103 radio is a long range set used for air-air or air-ground purposes. This radio operates over a range of 2-25 mc in 1000 cycle steps, giving a total of 23,000 available channels. The HF system consists of a transmitter-receiver unit, a control panel located on the aft control pedestal, an antenna tuner, and a fixed wire antenna. Power to the HF command radio is supplied from both the 28 VDC and 115 VAC systems through circuit breakers on the pilot circuit breaker panel.

Function Switch

The function switch controls on-off, single sideband (USB, LSB) and AM operation. The set output is 400 watts PEP (peak envelop power) when in one of the two single sideband modes, and 100 watts carrier power when in AM operation.

Frequency Selector Knobs

The frequency is set manually by use of the four frequency selector knobs. The first knob selects megacycles, the second 100 kilocycles, the third 10 kilocycles, and the fourth kilocycles. A time delay of 8 seconds is required for automatic tuning after changing frequency.

RF Sensitivity Knob

A knob is used to control the input to the set (RF gain) and to control the background noise level. The knob should be positioned to give the best reception. Background noise will be heard at all times. If the volume control is turned down to reduce the noise, the sensitivity of the receiver may be lowered too far to pick up communications from distant stations.

Operation of the HF-103 Radio

1. Place the interphone function selector switch to the HF position.

2. Place the HF monitoring switch on the interphone control panel to the up position.

3. Turn the set on by placing the function selector switch to the desired mode.

4. Allow 2 minutes for warmup.

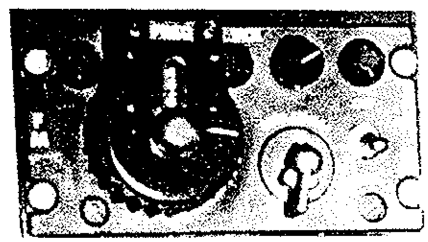
5. Turn the frequency selector knobs to the desired frequency.

6. Actuate the MIC button, then allow the antenna to tune itself. During the tuning cycle there will be a loud tone produced by the HF antenna tuner. Do not transmit while this tone is audible.

To turn equipment off:

7. Place the function selector switch to OFF.

FM Radio AN/ARC-44



The FM radio is an airborne frequency modulated (FM) radio transmitter-receiver, operating in a frequency range of 24.0 to 59.0 mc. The primary function of the system is to provide air-air and air-ground communication. An auxiliary function, if installed, enables the pilot to use the equipment to home on any signal within its frequency range. The basic equipment consists of a transmitter-receiver unit, a dynamotor, and a contol panel located on the aft control pedestal. The auxiliary homing equipment consists of a keyer and external antenna array. An FM homer toggle switch, and an FM squelch toggle switch are located on the aft control pedestal. Power to the FM radio is supplied from the 28 VDC bus through a circuit breaker on the aft circuit breaker panel.

Control Panel

The control panel contains the frequency selector, the power switch, and the receiver volume control. It also contains a remote-local switch, to provide control selection in dual installations. This switch must be in the LOCAL position at all times for proper operation in this aircraft. The frequency selector is used to select the desired frequency, which appears as a direct reading number in the frequency indicator window. An on-off switch controls power application to the equipment. A volume control, marked VOL, controls the receiver audio level to the interphone system.

FM Squelch Switch

The FM squelch switch, located on the control panel, disables the squelch in the UP position for better reception of weak signals.

Operation of the FM Radio

1. Place the interphone function selector switch to the FM position.

2. Place the FM monitoring switch on the interphone control panel to the up position.

3. Place the power switch in the ON position.

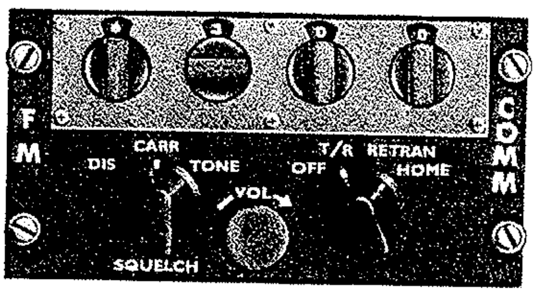
4. Allow 1 minute for warmup.

5. Select the desired frequency.

To turn equipment off:

6. Place the power switch in the OFF position.

FM-622A Radio (After T.O. 1A-26A-535)



The FM-622A adio is an airborne frequency modulated (FM) radio transmitter - receiver, operating in a frequency range of 30 to 75.95 mc, and is divided into two bands with 50 kc intervals for selecting 920 channels. The primary function of the system is to provide air-air and air-ground communication. An auxiliary function enables the pilot to use the equipment to home on any signal within its frequency range. The basic equipment consists of a transmitter-receiver unit, two relays, and a control panel located on the aft control pedestal. A suitable external antenna array is utilized to facilitate operation of the homing reception. Power to the FM radio is supplied from the 28 VDC bus through a circuit breaker on the aft circuit breaker panel.

NOTE

After compliance with T.O. 1A-26A-536 (Installation of KY-8 Ciphony Equipment), this radio set will function in conjunction with the KY-8 equipment to transmit or receive cryptic speech.

Control Panel

The control panel contains four frequency selector knobs, a three position (DIS-CARR-TONE) squelch switch, a volume control, and a four position (OFF-T/R- RETRAN-HOME) mode selector switch. The frequency is set manually by use of the four frequency selector knobs. The first knob selects tens, thesecond selects units, the third selects tenths, and the fourth selects hundredths megacycles. The frequency selected appears as a direct reading number in the windows above each knob. The squelch selects the desired squelch mode as follows:

DIS (disable - squelch circuits are disabled for better reception of weak signals.
CARR (carrier) - squelch circuits operate normally in presence of any carrier.
TONE - squelch opens (unsquelches) only on selected signals containing a 150 cps tone modulation.

The volume control, marked VOL, controls the audio output level to the interphone system. The mode selector switch applies power to the radio set and selects the mode of operation as follows:

OFF - turns off primary power.
T/R (Transmit/receive) - operates in normal communication mode.
RETRANS (retransmit) - operates as a two-way relay station (two radio sets are required).
HOME - operates as a homing facility.

Operation of the FM-622A Radio

1. Place the interphone function selector switch to the FM position.
2. Place the FM monitoring switch on the interphone control panel to the up position.
3. Place the mode selector switch in the desired mode.
4. Select the desired frequency.

NOTE

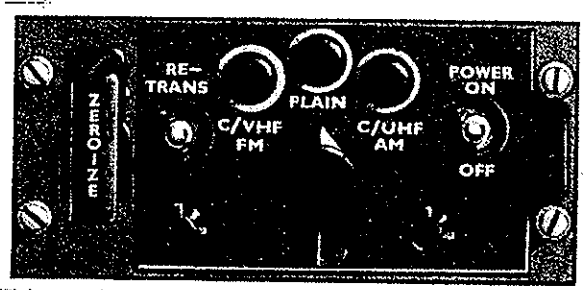
A channel changing tone should be heard in the headset while radio set is tuning. When the tone stops, the radio set is tuned.

5. Set the SQUELCH control for the desired mode.
6. After a 20-second warmup, depress the push-to-talk switch and adjust VOL control for comfortable volume.

To turn equipment off:

7. Place the mode selector switch to OFF.

KY-8 Secure Speech Equipment (After T.O. 1A-26A-536)



This equipment is not a complete system, but when used with the AN/ARC-136 or FM-622A radio it performs the encryption and decryption functions necessary to secure voice communications. The basic equipment consists of a unit installed in the aft fuselage and a control panel located on the aft control pedestal. Power is received through whichever radio is being used.

Control Panel

The control panel contains an ON-OFF power switch, a three position mode selector switch with green indicator lights marked, C/VHF FM, PLAIN and C/UHF AM, which enables selection of the desired mode. It also contains a retransmit switch marked RETRANS for delayed communication, and a cover guard switch marked ZEROIZE. In case of an emergency (imminent crash), the ZEROIZE switch is utilized to cancel the daily key. With KY-8 power on and mode selected to C/VHF FM the KY-8 ciphers communication through the FM-622A radio. In the C/UHF AM mode, the KY-8 ciphers communication through the AN/ARC-136 radio. In PLAIN mode both radios operate in normal manner, the same as if KY-8 power switch is off.

Operation of KY-8 (cockpit)

1. Power switch - ON
2. Delay (RETRANS) switch - OFF (down)
3. MOde selector switch - PLAIN
4. Make test transmission

WARNING

> If operation does not proceed as outlined below, switch to PLAIN mode. DO NOT PASS CLASSIFIED TRAFFIC IN EITHER CIPHER MODE.

5. Mode selector switch - C/VHF FM (with FM-622A radio), or C/UHF AM (with ARC-136 radio).
6. Microphone button - Depressed. Beep should be heard within seconds.
7. System is ready for operation.

To turn equipment off:

8. Place power switch in the OFF position.

FM Homing Reception (If Installed)

After the equipment is started, and homing operation is desired, place the FM home switch in the UP position, and turn the frequency selector to the desired frequency. The coded D and U signals or the steady 400 cps on-course tone should be present in the headset. The coded D (_ . .) indicates the station being received is to the left of the aircraft. The coded U (. . _) indicates the station being received is to the right of the aircraft. A steady 400 cps tone indicates the station being received is directly ahead of, or behind the aircraft. Turning either right or left and correcting for the off-course signal heard, directs the aircraft toward the station.

Radio Navigation Instruments and Related Items

Radio Magnetic Indicator (RMI)

A radio magnetic indicator, located on the pilot instrument panel, displays VOR or TACAN and ADF bearing information. The indicator is a dual pointer instrument with a rotating compass card. Information from the TACAN, VOR, ADF and the J-2 compass is directed to this indicator. The rotating compass card provides magnetic heading information. The number one bearing indicator is connected to the ADF and the number two bearing indicator is connected to the VOR or TACAN. There are no provisions incorporated for slaving of the compass system; however, fast slaving action may be accomplished by interrupting the AC power source. This can be accomplished by switching inverters, turning the inverter OFF momentarily or pulling and resetting an appropriate circuit breaker. The instrument receives power from the 115 VAC system through circuit breakers on the pilot circuit breaker panel.

TACAN Bearing Indicator

A TACAN bearing indicator, located on the pilot instrument panel, displays the magnetic bearing to or from a selected TACAN station regardless of the position of the TACAN-VOR ILS selector switch. The indicator is a single pointer instrument with a fixed compass card. The instrument receives power from the 115 VAC system through a circuit breaker on the pilot circuit breaker panel.

Course Indicator ID-351 or ID-249

A course indicator, located on the pilot instrument panel, receives information from the VOR, ILS or TACAN receiver and displays course information on the course deviation indicator (CDI) and glide slope information on the glide slope indicator (GSI). The position of the TACAN-VOR ILS selector switch determines which signals are displayed on the CDI. A course set knob in the lower left corner of the indicator is used to select the desired course in the course selector window at the top of the instrument. The GSI is operated by the glide slope receiver for glide path guidance during ILS operation. TO and FROM indicators are shown in a window at the upper left corner of the instrument. The instrument is provided with two warning flags (one for course and one for glide slope) which operate any time a signal is unreliable, weak, or nonexistent. The instrument receives power from the 28 VDC and 115 VAC systems through circuit breakers on the pilot circuit breaker and aft circuit breaker panels. Failure of the DC power source will render both CDI and GSI inoperative. Failure of the AC power source will render the GSI and heading pointer inoperative, but navigation is still possible on the VOR or ILS as the TO-FROM indicator and the CDI operate on DC power.

Range Indicator ID-310

The ID-310 range indicator is located on the pilot instrument panel. The instrument has a single window through which the slant range distance between the airplane and the TACAN station is indicated in nautical miles. While the indicator is searching for the correct range, the numbers appearing in the window are partially covered by a range warning bar to prevent the pilot from reading incorrect ranges. The instrument receives power from the 115 VAC system through a circuit breaker on the pilot circuit breaker panel.

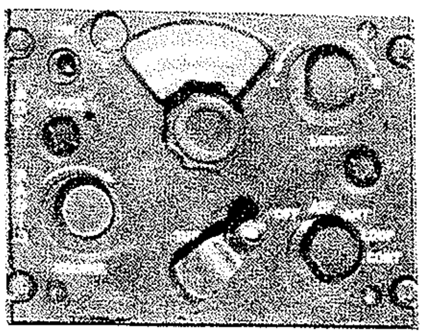
Marker Beacon 51Z-2

The aircraft is equipped with a 75 mc receiver for marker beacon reception. A single light located on the course indicator automatically illuminates in the proximity of ground marker beacons. An aural signal for identification and timing purposes is also received when the marker beacon switch on the navigation radio monitor panel is in the up position. Power is supplied from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel.

TACAN-VOR ILS Selector Switch

Course selection and method of navigation selection are made by a TACAN-VOR ILS selector switch located on the navigation radio control panel. Indicator lights show which system is selected.

Radio Compass AN/ARN-6



The radio compass is a lightweight airborne radio compass set that automatically provides a visual bearing to the direction from which an RF is being received. The ADF can be used for position plotting, homing, maintaining a course, aural reception of amplitude modulated signals, and aural identification of keyed CW stations. The radio compass operates in a frequency range of 100 to 1750 kc, divided into four bands as follows: 100 to 200 kc; 200 to 410 kc; 410 to 850 kc; 850 to 1750 kc. The control panel is located on the navigation radio control panel. It provides a tuning crank, a volume control, a tuning meter, a band selector switch, a function selector switch, and a carrier wave (CW) switch. The number one bearing pointer, located on the RMI, shows the bearing of incoming signals relative to the aircraft heading. Audio is supplied to the filter located adjacent to each panel. Power is supplied to the radio compass from the 28 VDC and 115 VAC systems through circuit breakers on the aft compartment circuit breaker panel.

Function Switch

The function switch is used to turn the set on and select the type of operation. The CONT position is inoperative in this aircraft. When the switch is in the ADF position, the set functions as an automatic direction finder. When the switch is in the ANT position, the antenna is switched from the loop to the sensing antenna. When the switch is in the LOOP position, the loop can be manually rotated by the use of the loop left-right switch. The OFF position deenergizes the set.

Loop L-R Switch

The loop L-R switch is provided to permit manual control of the loop when the function switch is in the LOOP position.

Volume Control

The volume control provides selection of the desired level of audio reception.

Band Switch

The band switch provides selection of any one of the four frequency bands which will be indicated on the adjacent tuning dial.

Voice-CW Switch

The voice-CW switch provides selection of a continuous carrier wave or voice reception.

Tuning Crank

The tuning crank is used to tune the desired station for maximum signal strength as indicated on the tuning meter.

Tuning Meter

The tuning meter, located on the TACAN-VOR/ILS navigation selector panel, indicates relative signal strength and tuning accuracy.

Operation of the Radio Compass

1. Place the ADF switch on the navigation radio monitor panel up.
2. Place the function switch to ANT position.
3. Place the voice-CW switch to VOICE.
4. Select the desired frequency band.
5. Tune the desired frequency for best audible signal.
6. Identify the station.
7. Place the function switch to ADF position.
8. Retune for maximum tuning needle deflection.

NOTE

Do not attempt to interpret the ADF bearing pointer except when the airplane wings are level. Dip error of the radio compass during turns will cause erroneous ADF bearing indications.

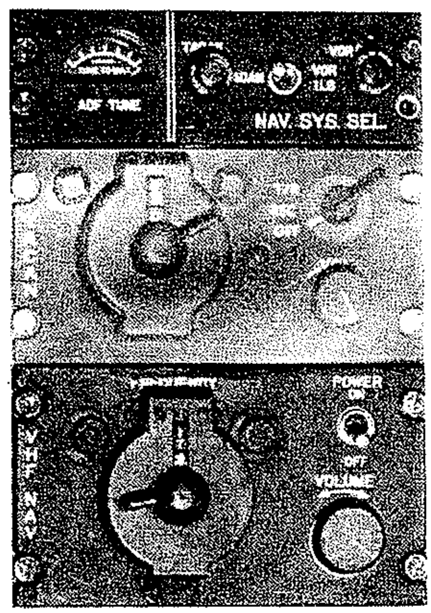
To turn equipment off:

9. Place the function selector switch to OFF.

RADAR TRANSPONDER SST-181X

The radar transponder is a solid state transponder which provides extended tracking range of precise tracking radars.The equipment receives a single pulse interrogation from a radar set and transmits a single or double pulse reply,at the selection of the pilot,of greater signal strength in the same frequency band. The switch is located on the aft control pedestal and is marked SINGLE OFF DOUBLE.

VHF Omnirange/ILS Receiver AN/ARN-14C



The basic purpose of the VOR/ILS AN/ARN-14C is to enable the pilot to select, identify, and maintain a predetermined fixed bearing with reference to a VOR or localizer ground station. The control panel for this equipment is located on the navigation radio control panel. Glide slope frequencies in the UHF range of 329.3 to 335.0 mc for the ILS are automatically paired with their respective localizer VHF frequencies. VOR courses are selected on the course indicator, located on the pilot instrument panel, through relays controlled by the TACAN-VOR/ILS selector switch. The number two bearing pointer, located on the RMI, indicates the magnetic bearing to the ground station. Course identity tone is supplied through the navigation radio monitor panels when the VOR selector switch is in the up position. Power to the VOR/ILS system and course indicator relays is supplied from the 28 VDC and 115 VAC systems through circuit breakers on the pilot circuit breaker panel.

VOR Control Panel

The VOR control panel contains the following controls and indicators:

Power Switch - The set may be energized or de-energized by placing the power switch in either the ON or OFF position.

Volume Control - Audio level may be adjusted by moving the volume control knob clockwise or counter-clockwise as desired.

Frequency Selector Knobs - The frequency selector knobs allow selection of, and frequency within, the operating range of 100 kilocycle steps, or a total of 280 channels. Reading vertically downward, the numbers represent hundreds, tens, units, and tenths of megacycles. Frequencies from 108.0 to 135.9 megacycles may be selected.

Operation of the VOR/ILS Receiver

1. Place the VOR switch on the navigation radio monitor panel up.

2. Place the VHF NAV power switch to ON.

3. Set frequency selector knobs to desired frequency.

4. Place TACAN-VOR/ILS selector switch to VOR/ILS.

5. Set volume controls as desired.

6. Observe the bearing indicator, course deviation indicator and the TO-FROM indicator for proper operation.

To turn equipment off:

7. Place the VHF NAV power switch to OFF.

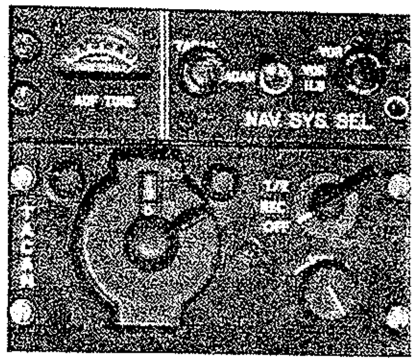
NOTE

If a localizer frequency is selected, azimuth determination will be available on the course indicator only. The pointer of the RMI is inoperative on those frequencies.

Glide Slope Receiver AN/ARN-18

The glide slope receiver, powered by both the AC and DC electrical system, has no external controls. It is designed to operate in conjunction with the ARN-14C receiver. The glide slope receiver supplies signals to the glide slope on the course indicator for glide path guidance during ILS operation. The glide slope receiver is automatically energized and tuned to the correct glide path frequency when a localizer frequency is selected on the ARN-14C receiver control panel.

TACAN AN/ARN-21C



The AN/ARN-21C TACAN set is an airborne navigation interrogator-responder which operates in conjunction with a surface TACAN (tactical air navigation) beacon-transponder. This equipment provides the aircraft with magnetic bearing information in degrees, to the ground beacon, and a range indication of slant range distance in nautical miles to the ground beacon. An aural beacon identity is available to enable the pilot to identify the TACAN beacon. Power is supplied to the TACAN system from the 28 VDC and 115 VAC systems through circuit breakers on the pilot circuit breaker panel.

Control Panel

A control panel is located on the navigation radio control panel and identified by the letters TACAN placarded on the left inboard edge. The panel contains the following controls and indicators:

Function Switch - The function switch has three positions, OFF, REC, and T/R. When the switch is in the OFF position, the set is deenergized. Moving the switch to the REC position energizes the set, presenting bearing information on the bearing indicator and course information on the course indicator. With the switch in the T/R position, the equipment functions the same as in the REC position, and in addition, slant range is presented in nautical miles on the ID-310 range indicator.

Volume Control - Audio level may be adjusted by rotating the knob placarded VOL clockwise or counter-clockwise as desired.

Channel Selector - The channel selector is used to select any one of the 126 available channels. Channel selection is accomplished by setting the desired channel number into the window, using the concentric knobs. The outer knob selects the first two digits and the inner knob selects the third digit of a desired channel.

Operation of the TACAN

1. Place the TACAN switch on the navigation radio monitor panel up.

2. Place the TACAN function switch as desired.

3. Set the channel selector to desired channel.

4. Place the TACAN-VOR/ILS selector switch to TACAN.

With this switch in the VOR/ILS position, course information is not presented on the course indicator.

5. Adjust volume for identification.

6. Observe the bearing indicator, course deviation indicator, to-from indicator, and the range indicator for proper operation.

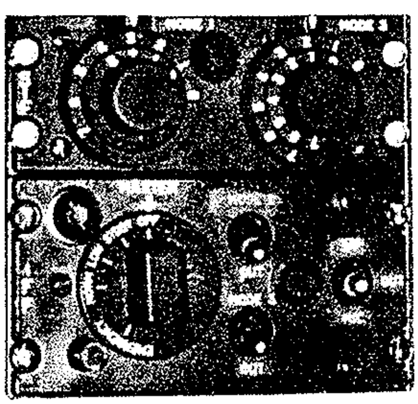
To turn equipment off:

7. Place the TACAN function switch to OFF.

NOTE

It is possible that improperly adjusted or malfunctioning ground or airborne TACAN equipment may cause airborne equipment to "lock-on" to a false bearing; the error will probably be plus or minus 40 degrees, but can be any value which is a multiple of 40 degrees and can be to either side of the correct bearing. The possibility of a wrong 40 degree "lock-on" is inherent in the TACAN system and can only be completely avoided by the use of other navigation equipment in addition to TACAN. After takeoff, the TACAN should be cross checked with ground radar, airborne radar or VOR. When using TACAN for instrument departures, penetrations or letdowns, utilize airborne radar monitor or ground radar monitor when possible to verify TACAN bearing information.

IFF/SIF Transponder AN/APX-25



The IFF/SIF is an airborne pulse-type transponder which enables the airplane to identify itself whenever it is challenged by an interrogating system. The SIF feature permits the airplane to not only reveal itself as friendly when interrogated, but also to identify itself. The system is operated in conjunction with search radar which automatically actuates the transmission of a coded reply. A reply is received and portrayed on a plan position indicator (PPI), or letter symbol indicator, which enables selective identification and location of the aircraft.

Control Panel, IFF

The IFF control panel, located on the aft control pedestal, permits turning the equipment on and selecting the various modes of operation. The controls and indicators are as follows:

Emergency Dial Stop - The emergency dial stop must be depressed in order to rotate the master switch clockwise from NORM to the EMERGENCY position.

Master Switch - The master switch is a five position rotary switch, permitting selection of the operational conditions. The positions are OFF, STDBY, LOW, NORM, and EMERGENCY. The switch functions are as follows:

OFF - The switch in the OFF position deenergizes the set.

STDBY - With the switch in the STDBY position, power is turned on, and the set is ready for immediate operation. However, the transponder receiver is not energized.

LOW - When the switch is in the LOW position, the transponder receiver operates the same as it does in the NORM position but at reduced sensitivity.

NORM - When the switch is in the NORM position, the transponder receiver is fully sensitized and operated with maximum performance. Transmittal power from the transponder is the same for both the LOW and NORM positions.

EMERGENCY - When the switch is in the EMERGENCY position, a distinctive emergency reply is transmitted upon response to either Mode 1 or both Mode 1 and Mode 3 interrogation.

Mode 2 Switch - The Mode 2 switch has two positions, OUT and MODE 2. When the switch is in the MODE 2 position, there are 400 possible reply codes available. The number and interval of these codes must be preset on the coder prior to flight.

Mode 3 Switch - The Mode 3 switch has two positions, OUT and MODE 3. When the switch is in the MODE 3 position, there are 64 possible reply codes available to the pilot, as selected by the MODE 3 dial on the control panel.

I/P-OUT-MIC Switch - The I/P-OUT-MIC switch operates in SIF Mode as follows:

I/P - Holding the switch in the I/P spring loaded position causes a double Mode 1 or Mode 3 code train to be transmitted in response to each mode interrogation. This response will continue for 30 seconds, after the switch is released to OUT from the I/P position.

MIC - Placing the switch in the MIC position results in the same equipment function as in the I/P position except that the response is initiated by the microphone button.

Control Panel, SIF

The SIF control panel, located on the aft control pedestal, is used to select the codes in both Mode 1 and Mode 3 transponder operation. The panel contains two coaxial dials, labeled MODE 1 and MODE 3. Their description and operation are as follows:

MODE 1 Dial - The MODE 1 dial consists of two coaxial knobs, the outer knob of which is numbered 0 through 7. The inner knob is numbered from 0 through 3. This makes possible 32 different selected responses for Mode 1 operation. The set will respond to Mode 1 interrogations according to the code set on the Mode 1 dial whenever the master switch on the IFF panel is in the NORM or LOW position. Mode 1 operation, as selected, will operate independently of, or concurrently with, Modes 2 and 3 operation.

MODE 3 Dial - The MODE 3 dial also consists of two coaxial knobs. Both the outer and inner dials are placarded from 0 through 7, making possible 64 different selected responses for Mode 3 operation. The set will respond to Mode 3 interrogations according to the code set on the Mode 3 dial provided the master switch is in the NORM or LOW position and the MODE 3 switch on the IFF control panel is in the MODE 3 position. Mode 3 operation, as selected, will operate independently of, or concurrently with, Modes 1 and 2 operation.

LIGHTING EQUIPMENT

Exterior Lighting

The exterior lighting consists of standard navigation and formation lights, and retractable landing lights located on the bottom wing surfaces between the engines and tip tanks. A rotating beacon is located on top of the vertical stabilizer. All exterior lighting switches are located on the pilot subpanel.

NOTE

> The rotating beacon should be turned OFF during flight through conditions of reduced visibility where the pilot could experience vertigo as a result of the rotating reflections of the light against the clouds.

Interior Lighting

All flight instruments are equipped with "eyebrow" type lights, and all switch panels are edge lighted. Rheostat controls for these lights are located on the pilot circuit breaker panel. Instrument spotlights, with adjustable focusing and red filters, are mounted on brackets on either side of the pilot compartment. Switches for the spotlights are integral. A pilot compartment dome light and nose gear inspection light are provided. Switches for these lights are located on the overhead electrical panel. Power is received from the 28 VDC bus bar through circuit breakers on the pilot circuit breaker panel.

OXYGEN SYSTEM

A gaseous, diluter-demand type oxygen system is installed in the aircraft. The system is supplied by six type F2 oxygen cylinders located in the top of the aft fuselage compartment. Normal operating pressure for the oxygen system is 425 ±25 PSIG.

NOTE

> As an aircraft ascends to high altitudes, where the temperature is normally quite low, the oxygen cylinders become chilled. As the cylinders grow colder, the oxygen gage pressure is reduced, sometimes rather rapidly. With a 100°F decrease in temperature in the cylinders, the gage pressure can be expected to drop 20 percent. This rapid fall in pressure is occasionally a cause for unnecessary alarm. All the oxygen is still there, and as the airplane descends to warmer altitudes, the pressure will tend to rise again, so that the rate of oxygen usage may appear to be lower than normal. A rapid fall in oxygen pressure while the aircraft is in level flight, or while it is descending, is not ordinarily due to falling temperature, of course. When this happens, leakage or loss of oxygen must be suspected.

Diluter-Demand Regulators

Five diluter-demand regulators are installed on each aircraft. Three regulators are located in the pilot compartment at crewmember stations, and two additional regulators are located in the aft compartment.

Flow Indicators and Pressure Gages

A blinker type flow indicator is installed at each pilot compartment crewmember station, and two in the aft compartment on the forward bulkhead. Pressure gages are located at the pilot and copilot stations, adjacent to the flow indicators. A pressure gage for the aft compartment is located on the left forward bulkhead, adjacent to the flow indicator.

Normal Operation

Normal operation of the oxygen system is as follows:

a. Diluter-demand regulator control - NORMAL OXYGEN.

b. If pure oxygen is required: diluter-demand regulator - 100% OXYGEN.

Emergency Operation

In an emergency, the diluter-demand system is controlled by a safety wired red knob on the regulator.

OXYGEN DURATION CHART

MAN HOURS AVAILABLE WITH TYPE AN6004 DEMAND REGULATOR BASED ON CAPACITY OF SIX TYPE F-2 CYLINDERS (FIGURES TO BE DIVIDED BY NUMBER OF CREW MEMBERS)

ALTITUDE FEET	PRESSURE GAGE (PSI)							
	400	350	300	250	200	150	100	BELOW 100
25,000	11.5 9.4	10.0 8.1	8.3 6.8	6.7 5.3	5.0 4.1	3.3 2.7	1.6 1.3	DESCEND BELOW 10,000 FEET
20,000	13.2 7.0	11.6 6.2	9.7 5.2	7.8 4.1	5.8 3.1	3.9 2.1	1.9 1.0	
15,000	16.0 5.5	13.9 4.9	11.7 4.0	9.2 3.1	7.0 2.4	4.7 1.6	2.3 0.8	
10,000	20.9 4.7	18.0 4.0	14.9 3.3	11.9 2.7	9.0 2.0	6.0 1.3	3.0 0.7	

NOTE: TOP FIGURES - REGULATOR DILUTER LEVER NORMAL
BOTTOM FIGURES - REGULATOR DILUTER LEVER 100%

Figure 4-3

To operate the system, break the safety wire and turn the red knob to the OPEN position. This will supply a continuous flow of 100 percent oxygen.

NOTE

If system pressure falls below 50 PSIG, the system must be purged prior to servicing.

AUXILIARY OIL TANK

On extended range ferry flights, the aircraft may be equipped with an auxiliary oil tank installed in the cockpit aft of the co-pilot seat. This tank is modified from a conventional oil drum with a top mounted handpump, two hand valves, and the necessary plumbing to each engine to provide additional oil needed on long-range flights. The tank is decaled with the necessary instructions for operation. Basically, the valve for the respective engine requiring oil is opened and the handpump manually operated to replenish the engine oil supply. In case of engine failure after the auxiliary oil supply has been depleted, oil from the failed engine can be transferred to the operating engine by reversing the handpump rotation, which will cycle oil back into the auxiliary tank for subsequent pumping into the operating engine.

AIRCRAFT ARMAMENT SYSTEMS

WARNING

Only bombs, jettisonable stores, or wing drop fuel tanks may be carried on pylon stations 4 and 5, as these stations are located inside the propeller arc.

Armament Switches and Controls

The armament panel, located above the engine fire extinguisher control panel, contains the majority of switches necessary for selection and control of the aircraft armament system.

Wing Jettison Button

This unguarded red button is mounted on the armament panel directly in front of the pilot. When depressed, it will cause all external stores (including fuel tanks) to be jettisoned, whether airborne or on the ground. The wing jettison button receives power directly from the left battery, and functions independently of the position of the armament master switch or the battery switches.

WARNING

Bombs will be jettisoned either ARMED or UNARMED depending on the position of the bomb fuse arming switch. After T.O. 1A-26A-509, the bomb fuse arming switch will not function unless the master armament switch is on.

Bomb Fuse Arming Switch

This three position toggle switch determines which of the two fuses of the bombs on the wing pylons or the nose fuse of the bombs in the bomb bay will be armed when the bomb is released. In the OFF position, bombs are dropped safe as neither fuse is armed (arming wires stay with bomb instead of aircraft). In the NOSE AND TAIL position, both fuses are armed as the bomb drops. In the TAIL ONLY position, only the tail fuse is armed as the bomb drops. The switch receives power from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel and functions independently of the position of the armament master switch.

After T.O. 1A-26A-509, this switch receives power through a circuit breaker on the left wheelwell circuit breaker panel, and functions only when the master armament switch is on.

WARNING

In most cases, bombs loaded in the internal bomb bays will be armed directly to the fuse arming hook of the B-7 or B-11 bomb shackle instead of to the AN-A2 arming solenoid which is controlled by the bomb fuse arming switch. Thus, except when jettisoned, bombs released from the bomb bay will be ARMED, even though the bomb fuse arming switch is OFF. The only way to release internal stores unarmed (SAFE) when the arming wires are connected to the bomb shackle, is by means of the bomb bay jettison switch. If the nose fuse is armed to the AN-A2 solenoid and the bomb fuse arming switch is in NOSE AND TAIL, bombs carried internally will drop ARMED, whether released normally or jettisoned. Bombs carried externally on the wind pylons will drop ARMED if the bomb fuse arming switch is in NOSE AND TAIL or TAIL ONLY, whether released normally or jettisoned.

Bomb Bay Jettison Switch

This red guarded toggle switch on the armament panel is used in an emergency to open the bomb bay doors and jettison the full load of bombs carried internally. Safety switches activated by the bomb bay door prevent release until both doors are within a few degrees of full open. Although the actual jettison appears to be instantaneous, the electrical sequencing is such that the lower bombs must drop first. Bombs carried internally will jettison unarmed unless the fuse arming wires are connected to the AN-A2 arming solenoids and the bomb fuse arming switch is set to arm the applicable fuses. The bomb bay jettison switch is wired directly to the left battery and will function regardless of the position of the battery switches or the armament master switch. However, continuous hydraulic pressure is necessary to open the doors as the normal system pressure of 1000 PSIG will drop off before the doors are sufficiently open to release the bombs. There is another bomb bay jettison switch located on the forward bulkhead of the aft compartment that is identical to the switch in the cockpit in appearance and operation. It allows the aft compartment occupant to open the bomb bay doors for an emergency exit.

Note

The bomb bay jettison switch will override the bomb bay door switch.

Gun Charging Switch

The gun charging switch is a three-position toggle switch that determines the position of the bolts of the guns, and is decaled READY, OFF, and HOLD-BACK. When the switch is held in the HOLD-BACK position, the gun bolts are drawn to the rear completely out of battery position, by pneumatic gun chargers, and power to the gun firing solenoids is interrupted. With the gun bolts in HOLD-BACK, the gun barrels are allowed to cool rapidly, as air can then pass through gun barrels. When the switch is OFF, the gun charging mechanism is deactivated and the bolts return to battery position. When the switch is put to READY, electrical power is routed through the gun select switch to the gun-firing solenoids, making the guns ready to operate. The bolts return to battery position when firing ceases. A time delay relay in the charging mechanism provides a one-second holding time for power application to the primary (high amp actuating) coil in the gun charging solenoids, after which time the time delay relay circuit is broken, and the gun charging solenoid is held open by a continuous duty (low amp) holding coil. This is designed to prevent burn-out of the B-2A gun charging solenoids. Thus, if the switch is held in HOLD-BACK, the bolts will remain retracted, until electrical power is interrupted (moving switch to READY or OFF), or until sufficient air pressure has leaked off to allow the bolt springs to overcome the air pressure. After T.O. 1A-26A-520, a blocking diode is installed in the charging circuit to prevent gunfire holdback relay failure due to feedback voltage from the gun charging solenoid. Even with the system designed against solenoid (relay) burn-out, there is a good potential for burn-out of the various relays in the charging system under normal voltage loads. Consequently, it is recommended the switch be held in HOLD-BACK no longer than 30 seconds. If a B-2A gun charging solenoid burns out, the bolts of the guns in the bank it controls will return to the battery position and these guns cannot be recharged. Power is supplied from the 28 VDC bus through circuit breakers on the pilot circuit breaker panel.

Bomb Bay Door Switch and Indicator Lights

The bomb bay door switch is decaled OPEN, OFF, CLOSE. When the switch is moved to the OPEN or CLOSE position a solenoid unit built into the bomb bay door position selector valve is activated to open or close the doors. Electrical power is supplied from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel. The yellow indicator light to the left of the switch will illuminate when the doors are open. The green indicator light to the right of the switch will illuminate as long as the doors are closed and the spoilers are up. If either the spoilers creep down, or the door starts to open, the green light will go out.

Bomb Bay Front and Rear Rack Arming Switches

These two position toggle switches are used to select from which rack the bomb will drop. Either front or rear, or both, racks may be selected. In the OFF position, bombs will not be released from the rack. In the ON position, bombs will drop from the rack upon receipt of impulses from the intervalometer. When both racks are selected, the release sequence is: Right rear, left front, left rear and right front. The switches receive power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Pilot-Bombardier Release Switch

This two position toggle switch is operable in BOTH positions.

Master Armament Switch

This red guarded toggle switch must be in the ON position before any armament can be expended through the normal system. In the OFF position it protects the armament system against inadvertent

release. It interrupts the electrical power between the release or firing controls on the pilot control column and the rest of the system. It also protects the aircraft rocket fire circuitry from internal electrical shorts which could result in inadvertent rocket firing. The nose guns may be charged, but not fired, with this switch OFF. When the switch is ON, all functions of the armament system can be employed.

WARNING

The wing jettison switch, bomb bay jettison switches, and bomb fuse arming switch all function independently of the position of the armament master switch. After T.O. 1A-26A-509, the bomb fuse arming switch will not function unless the master armament switch is on.

Gun Select Switch

This three position function switch, located in the center of the armament panel, is decaled OFF, CAMERA ONLY, and GUNS & CAMERA. In the OFF position neither guns nor camera will operate. The KB3 gun camera, located to the right of the magnetic compass, will operate when either the gun trigger or the rocket trigger is depressed with the gun select switch in the CAMERA ONLY or GUNS & CAMERA position. The guns will fire only when the gun select switch is in the GUNS & CAMERA position.

External Stores Selector Switches

Eight switches are provided on the right hand side of the armament panel to supply power to the individual pylons as selected for either dropping or firing the particular stores. These are three position, center-off switches. With the switches in the up position, the pylons are armed for firing guns, rockets, or multiple stores dispensers. With the switches in the down position, the pylons are armed for dropping the stores. In order to prevent inadvertent jettison of gun-rocket pods or multiple stores dispensers, each of the eight switches is fitted with a rectangular metal toggle on which an arrow is inscribed. These toggles may be rotated so as to permit operation of the pylon selector switches in one direction only. The toggles should be appropriately aligned prior to takeoff for the type of store installed. As an additional visual aid, a white dot is painted on the armament panel above and below each switch, the dots being so spaced vertically that when the toggle is pointing at either dot, the other one is blocked out of sight by the asymmetrically mounted toggle. Power is supplied from the 28 VDC bus through circuit breakers in the left hand and right hand aft nacelle circuit breaker panels.

NOTE

It is possible for a toggle to slip on its switch pole, or for the face of the armament panel to be recessed, allowing the switch to be operated in either direction regardless of the direction of the arrow.

Bomb Indicator Load and Light Check Switch

The bomb indicator load and light check switch is located on the pilot subpanel. The switch is a three position function switch, spring loaded to the center-off position, which controls the bomb indicator lights. This switch enables the pilot to check the number of bomb racks that are in the cocked position, on the wings and in the bomb bay. In the OFF position, the circuits are not completed. In the LAMP CHECK position, all the lights are grounded to check for any malfunctioning light. In the LOAD CHECK position, the lights are connected through the bomb racks and the wing pylons. Pylons or racks that are cocked will illuminate the respective light. Although there are 24 loading stations in the bomb bay, only 16 lights are provided as this is the maximum number of stations that may be loaded at any one time. Closely adjacent stations indicate through the same light. The light and load check circuitry receives power from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel.

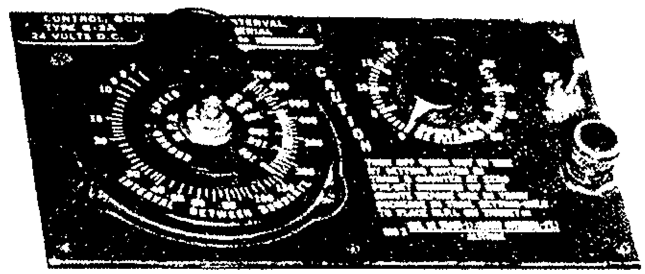
CAUTION

The load check circuit may cause release of a bomb from the bomb bay if the bomb bay doors are open. There is a sensitive (low trip voltage) solenoid in AN-A4 release unit which can be activated by high battery voltage and any stray voltage through the bomb release button.

Bomb Intervalometer

NOTE

Convert knots TAS to MPH.



A B-3A bomb intervalometer is located on the aft control pedestal. It is a timing device used to actuate either selectively, or in train, electrical bomb release mechanisms at preset intervals of 1 to 20 per second. The intervalometer receives power from the 28 VDC bus bar through a circuit breaker on the pilot circuit breaker panel.

Interval Control Knob and Indicator Dial

The interval control knob and indicator dial, located on the left side of the intervalometer, operate together indicating spacing between bombs, in feet, at various ground speeds of the aircraft. The movement of the knob permits selection of 21 different bomb spacings.

Counter Knob and Pointer

The counter knob and pointer, located on the right side of the intervalometer, is used to select the number of bombs to be released in train.

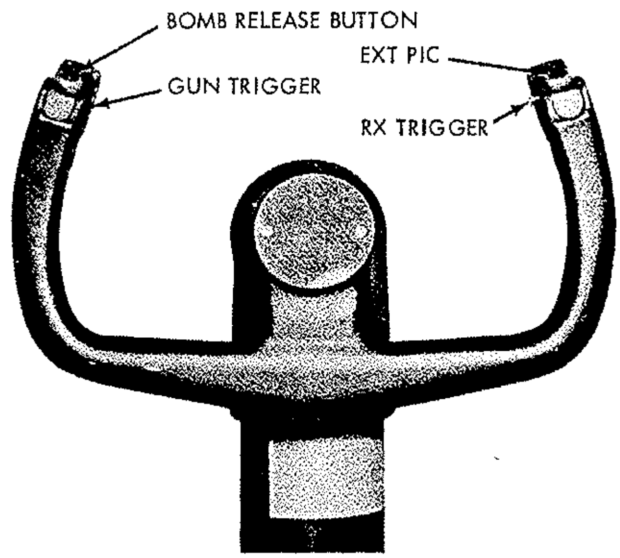
Select-Train Switch

The select-train switch, located on the right side of the intervalometer, has SEL and TRAIN positions. When placed in the SEL position, bombs can be released individually by the bomb release button. When releasing bombs from the TRAIN position, the counter knob must be set at a number at least equal to the number of bombs to be released. In the TRAIN position, the selected number of bombs set on the counter will be released at the interval set into the intervalometer. Internal bombs may be released from the SEL position with the counter set at zero.

Indicator Light

The amber indicator light, located on the right side of the intervalometer, illuminates when the SEL-TRAIN switch is in SEL, and the counter knob set at any position or the SEL-TRAIN switch in TRAIN position, and the counter knob set above zero. Illumination of the light indicates that the intervalometer is ready for operation.

Pilot Control Wheel Switches



Gun Trigger

A snap action switch on the left horn of the pilot control wheel is used to fire the guns and operate the gun camera.

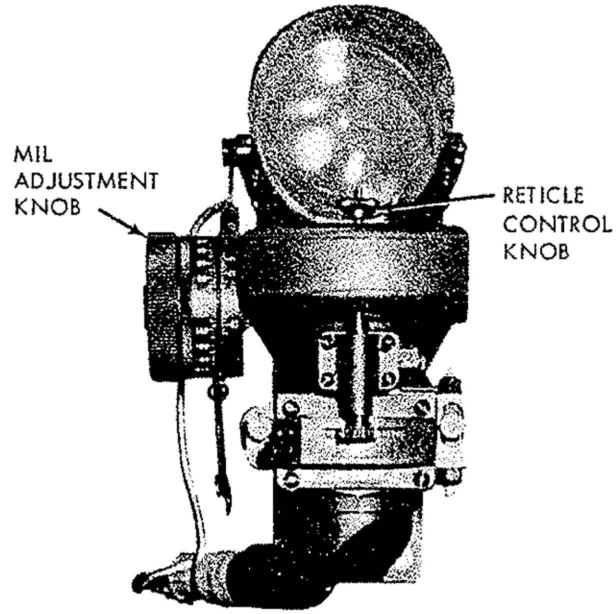
Rocket Trigger

A snap action switch on the right horn of the pilot control wheel is used to fire rockets, externally mounted gun pods, operate the gun camera and release stores from pylon mounted multiple stores dispensers.

Bomb Release Button

A pushbutton, located on the left horn of the pilot control wheel, is used to release stores from the bomb bay and pylons.

Gunsight



The Mark 20 MOD 4 gunsight enables accurate aiming for impact prediction of both forward firing and free-fall weapons. It is a noncomputing, reflex type, providing variable vertical deflection of the tracking index (pipper) to allow for aircraft speed, angle-of-attack, range-to-target, aircraft altitude and type of weapon delivery. The sight is mounted on the glare shield directly in front of the pilot and consists of an adjustable reflector assembly, lens, reticle, and lamp housing. In addition, an inclinometer is provided immediately behind the reflector plate. The reticle image is projected onto the reflector and is superimposed on the pilot's field of vision through the reflector. Collimating lenses within the sight focus the light rays forming the reticle image at infinity; parallax correction for the position of the pilot's head does not cause misalignment between the sight reticle image and the target. Three reticle image patterns, each with its own light filter, are available to allow the pilot to select the desired image for sighting conditions.

Gunsight Filament Switch

This switch, located on the armament panel, is marked FIL No. 1, OFF, FIL No. 2 and is used to turn on the gunsight lamp, and provides for selection of the alternate filament of the dual filament lamp. In case both filaments are burned out, the lamp may be replaced by depressing the spring latches at the top of the lamp housing, releasing the lamp housing from the body of the sight. The lamp receives power from the 28 VDC bus through a circuit breaker on the pilot circuit breaker panel.

Gunsight Light Rheostat

This rheostat provides the desired degree of reticle brightness and is mounted just above the pilot circuit breaker panel. When the sight is not in use, the rheostat should be turned off.

Reticle Control Knob

Selection of one of three types of reticles and corresponding filters is accomplished by rotating a reticle control knob located directly above the crash pad at the front of the sight. When the reticle is properly positioned, the reticle mechanism in the sight is locked by a spring loaded detent arrangement. The three reticles available are day, night, and combination. The day reticle pattern is designed for daylight operations, being more brilliant than the other two and containing more detailed markings. The circles are of 50 and 100 mil radius respectively. The "ladder" reference points are arranged in 10 mil graduations along the vertical, and enable the pilot to shift rapidly from one mode of attack to another, strafing to skip bombing, for instance, without adjusting the reflector plate. A yellow light filter used with this reticle allows the reticle pattern to be illuminated to a greater extent for better image visibility against light backgrounds. A night reticle is intended for specialized night operations where visibility of the target is limited. The pattern markings of this reticle are a pipper and two 90 degree arcs at 50 mil radius. A red-orange light filter used with it serves to protect the pilot's night vision. The combination reticle is designed for use under conditions of reduced visibility such as exist at dawn, dusk or in overcast conditions. The combination reticle provides a compromise between the night reticle and a minimum acceptable day reticle. A flashed opal light filter used with this reticle provides a constant degree of illumination through a considerably wider range of eye movement.

NOTE

During strafing attacks using tracer ammunition, it will be necessary to increase the illumination of the night reticle to visually retain the pipper against the bright tracer background.

Mil Adjustment Knob

This knob enables the pilot to manually adjust the reflector plate, making it possible to vary the depression of the sight line as required by delivery conditions. The scale of the knob is engraved at 5 mil intervals from 0 to 75 mils up (elevation) and from 0 to 350 mils down (depression). The scale on the gear housing of the sight body is engraved at 5 mil intervals from 0 to 50 mils up and 0 to 50 mils down. When the zero marks of the two scales are aligned, the zero detent is engaged. The sight line thus obtained is the zero sight line, which is originally established during boresighting-harmonization of the sight and guns, and will indicate bullet impact when the nose guns are fired under the harmonized conditions. The sight also has two other adjustable detents which may be easily set as desired by maintenance personnel by means of an adjustment plate on the inside of the knob. In addition, an adjustable pointer is provided as a further aid in sight adjustment within the smaller range of the scale on the gear housing.

Gunsight Dial Light Rheostat

This small rheostat, located immediately aft of the gunsight light rheostat, controls a small lamp mounted directly above the mil scale on the sight, to aid in sight adjustment at night.

Gun Air Pressure Indicator

The gun air pressure indicator indicates the pressure of the gun charging system and is located on the auxiliary instrument panel. The pressure is supplied by a compressor, located in the aft compartment, which operates automatically whenever the safety switch is ON. The normal operating range of the system is 800 to 1100 PSIG; however, the guns may be charged with the pressure as low as 500 PSIG. The system relief valves are set at 1400 PSIG.

Aperture Selector Switch

The aperture selector switch is a four position function switch mounted on the right side of the aft control pedestal. It must be set to BRIGHT, HAZY, or DULL depending on light conditions, in order to operate the gun camera. In the OFF position the gun camera will not operate.

Landing Gear Safety Circuitry

Armament system safety is provided through the electrical circuitry of the landing gear downlock indicator switches. This circuitry is designed primarily to prevent normal ordnance release when the aircraft is on the ground and all gears are down and locked. However, there are other combinations of gear positions that prevent normal ordnance release. These other combinations are:

a. Nose gear down and locked, and both main gear up and locked.

b. Nose gear unsafe, and both main gear up and locked.

c. Nose and left main gear down and locked, and the right main gear up and locked.

d. Nose and right main gear down and locked, and the left main gear up and locked.

Armament Ground Overide Switch

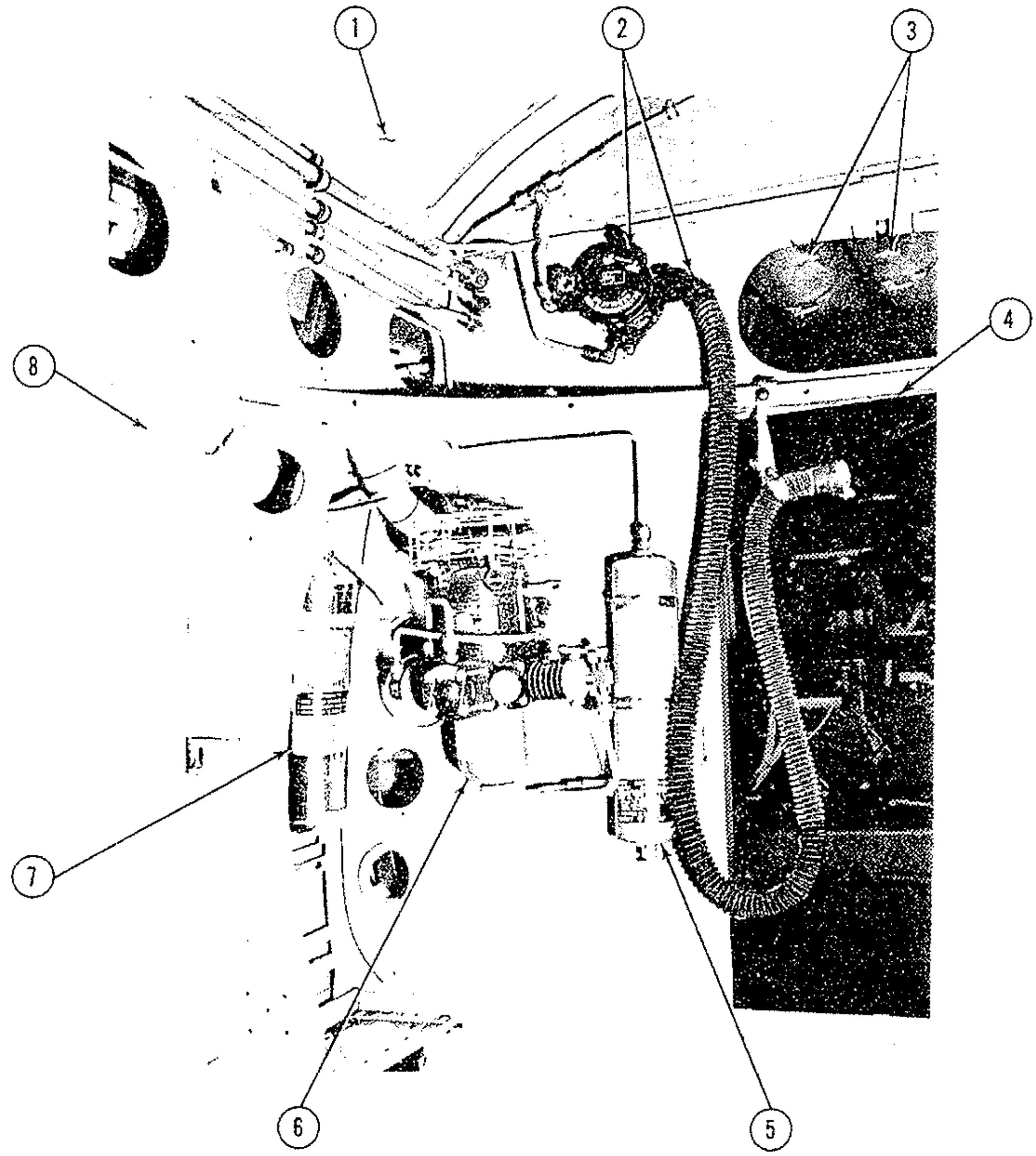
A guarded two position toggle switch, located in the nose wheel well beside the nose wheel well light, is used to test the armament system when the aircraft is on the ground, bypassing the landing gear downlock switches. When the switch is OFF, the landing gear downlock switches are not bypassed and the armament system is deenergized when the gear is down and locked. When the switch is ON, the landing gear downlock switches are bypassed and the armament system can be energized when the landing gear is down and locked.

Circuit Breaker Panels

Many of the armament system circuit breakers are on the pilot circuit breaker panel. Rocket and gunfire control (for externally mounted gun pods) circuit breaker panels are located in each main landing gear well immediately beneath the junction boxes. A gun compressor circuit breaker is located on the aft circuit breaker panel.

Gunnery System

Gunnery equipment installed in the aircraft consists of eight .50 caliber nose mounted machine guns. The guns are charged by a pneumatic charging system,



1. OVERHEAD HATCH
2. OXYGEN REGULATOR AND HOSE
3. OXYGEN CYLINDERS (IN AFT FUSELAGE COMPARTMENT)
4. ENTRANCE TO AFT FUSELAGE COMPARTMENT
5. GUN CHARGER COMPRESSED AIR TANK
6. GUN CHARGER AIR COMPRESSOR
7. FIRE EXTINGUISHER
8. SIDE ENTRANCE HATCH

Figure 4-4. Aft Compartment - Rear View

and are fired by a trigger located on the left side of the pilot control wheel. Various types of pod mounted guns can be carried externally on the wing pylons. These guns are fired by a trigger located on the right side of the pilot control wheel. Gun positions are numbered one through eight, the number one position being the top left and the number two position being the top right. Numbering continues in this fasion so that all odd numbers identify the left bank positions and all even numbers identify the right bank positions. Refer to T.O. 1A-26A-34-1-1 for operational (checklist) procedures for the gunnery system.

Bombing System

The bomb bay is designed to carry several combinations of bomb types and sizes, with a maximum of 16 bomb stations. There are eight underwing pylons that will adapt to several bomb carrying capabilities. Refer to T.O. 1A-26A-34-1-1 for operational (check-list) procedures for the bombing system.

WARNING

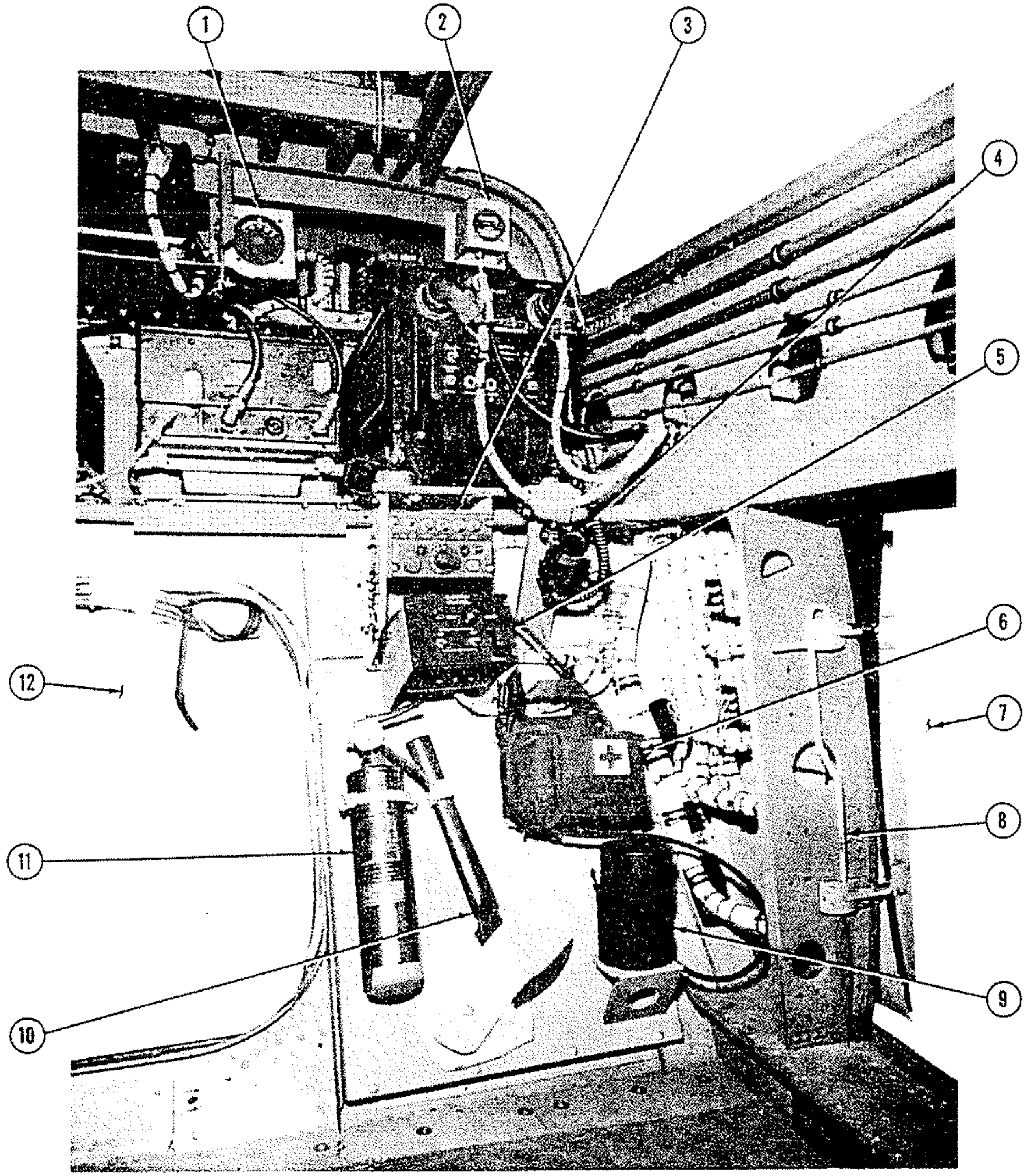
When dropping external stores at low altitude, especially napalm, do not open bomb bay doors. If the doors are open, and the intervalometer and bomb bay selector switches are ON armed, ordnance will be released from the bomb bay when the bomb release button is actuated.

Bomb Bay Doors

The bomb bay doors are hydraulically operated and electrically controlled during normal operation. In the event of electrical system failure, the doors can be operated by the bomb bay door manual handle, or with the emergency hydraulic system. Hydraulically operated bomb bay spoilers, installed in a slot between the bomb bay and the nose wheel well, work in conjunction with the bomb bay doors. The spoilers, designed to break up the air stream into the bomb bay, extend completely before the bomb bay doors open, and retract only after the doors are completely closed. Safety switches connected to each bomb bay door prevent inadvertent release of bombs before both bomb bay doors are fully opened.

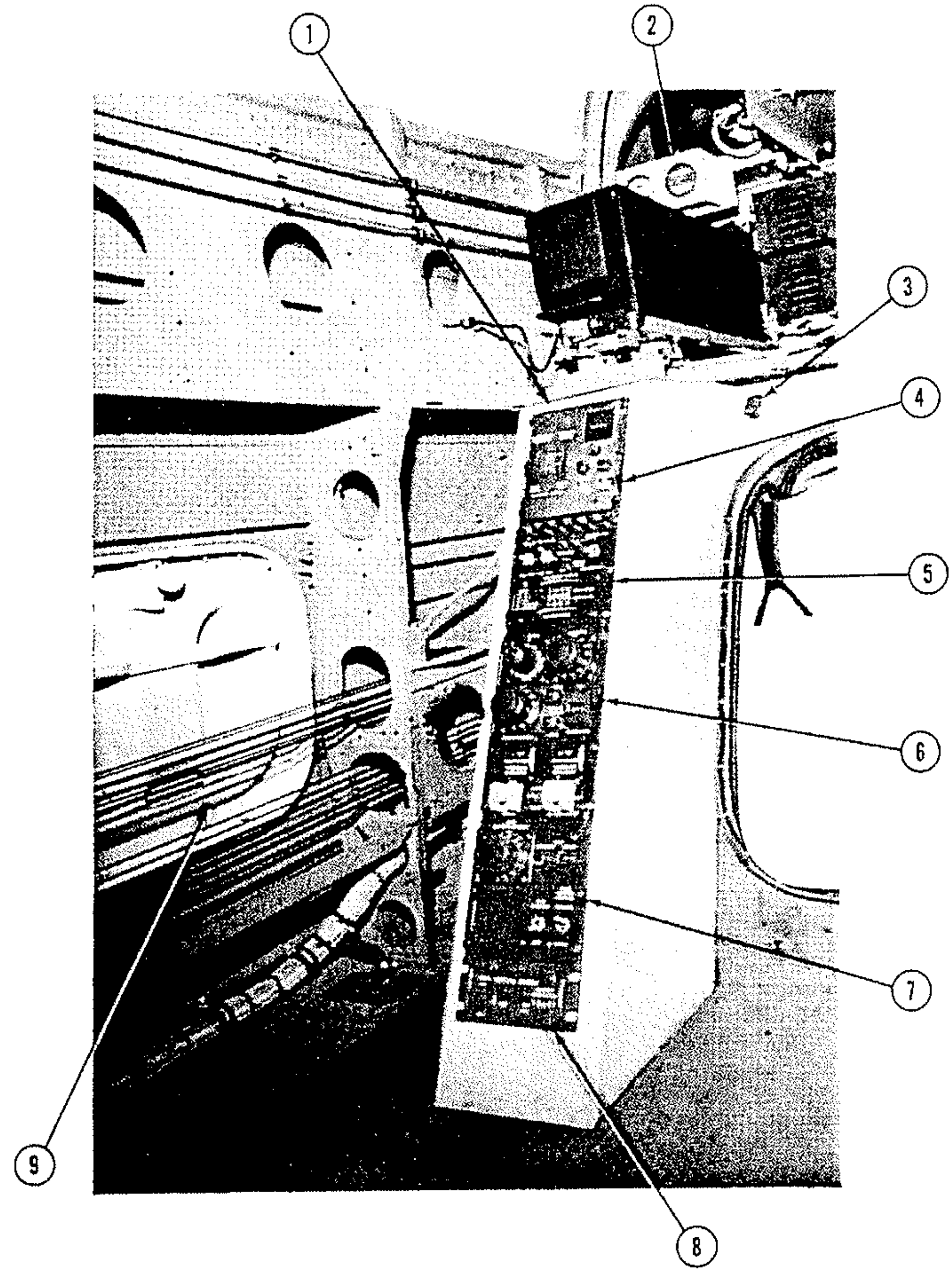
Bomb Bay Doors Emergency Operation

For bomb bay doors emergency operation refer to Section III.



1. DIRECTIONAL INDICATOR REPEATER
2. OXYGEN FLOW INDICATOR
3. INTERPHONE CONTROL PANEL
4. INSTRUMENT SPOTLIGHT
5. FLARE EJECTOR CONTROL PANEL
6. FIRST AID KIT
7. SIDE ENTRANCE HATCH
8. SIDE ENTRANCE HATCH EMERGENCY RELEASE
9. RELIEF CONTAINER
10. FIRE AXE
11. FIRE EXTINGUISHER
12. ENTRANCE TO BOMB BAY

Figure 4-5. Aft Compartment - Right Forward View



*1. MASTER CAMERA CONTROL CONSOLE
2. OXYGEN FLOW AND PRESSURE INDICATORS
3. BOMB BAY SALVO SWITCH
*4. KA-56 V/H CONTROL PANEL
*5. F-477 PRIMARY CONTROL PANEL
*6. F-477 SECONDARY CONTROL PANEL
*7. K-38 VERTICAL CONTROL PANEL
*8. KA-2 VERTICAL CONTROL PANEL
9. SIDE CAMERA HATCH

* AIRCRAFT WITH PHOTO RECONNAISSANCE CONFIGURATION ONLY

Figure 4-6. Aft Compartment - Left Forward View

Rocket and Multiple Stores Dispenser System

The aircraft can be equipped to fire rockets and multiple stores from pylon stations 1, 2, 3, 6, 7, and 8. Various types of dispensers can be mounted on these pylons and the operation accomplished through the normal armament system. Refer to T.O. 1A-26A-34-1-1 for operational (checklist) procedures for the rocket and multiple stores dispenser system.

PHOTO RECONNAISSANCE EQUIPMENT

The aircraft can be equipped with an F-492 camera system and a glass nose, for photo reconnaissance purposes. The camera system provides capability for high or low level, day or night, panoramic, vertical, or forward oblique photography. The panoramic and vertical cameras are installed on swing mounts in the bomb bay. The bomb bay doors have plates which can be removed to install glass windows and deflectors for photo use. Two flare ejectors are provided in the aft section of the bomb bay for night photography. The glass nose is equipped for forward oblique photography. A vacuum system is provided to hold film against the focal plane during exposure, and is available whenever either engine is running. Power to all cameras is supplied from the AC and DC bus bars. Individual station controls are provided for mode selection and camera operation.

Forward Oblique Camera

The forward oblique camera position has mounting provisions for the K-38 or KA-1 cameras with 36 inch focal length. The optical center of the camera, when mounted, is 12 degrees from the horizontal centerline of the aircraft.

Panoramic Camera

A KA-56A camera and junction box are installed on a swing mount housed in the front quarter section of the bomb bay. The camera and takeup cassette are rigidly mounted to the swing mounts, while the junction box is mounted on isolated mounts. This camera was designed primarily to provide horizon-to-horizon reconnaissance coverage with 56 percent overlap from low altitude at high aircraft velocities. In addition, it has inflight film processing capabilities and is an IMC-auto-cycle control camera with automatic exposure control.

Split Vertical Cameras

The two F-477 (night-day) cameras are installed on swing mounts and housed in the front middle quarter portion of the bomb bay. The F-477 cameras are shock mounted on the swing mounts to minimize aircraft vibration. The cameras have two modes of operation which are controlled by the DAY/NIGHT switch located on the secondary control panel. The system has the option of IMC in both the DAY and NIGHT modes. The cameras are pulse operated in the DAY mode, and must receive their pulse from the B-10A intervalometer on the secondary controls; the C-1 flash detector, housed in the forward bomb bay section, detects the flash from the flash bomb which is ejected by the B-10A intervalometer in the NIGHT mode.

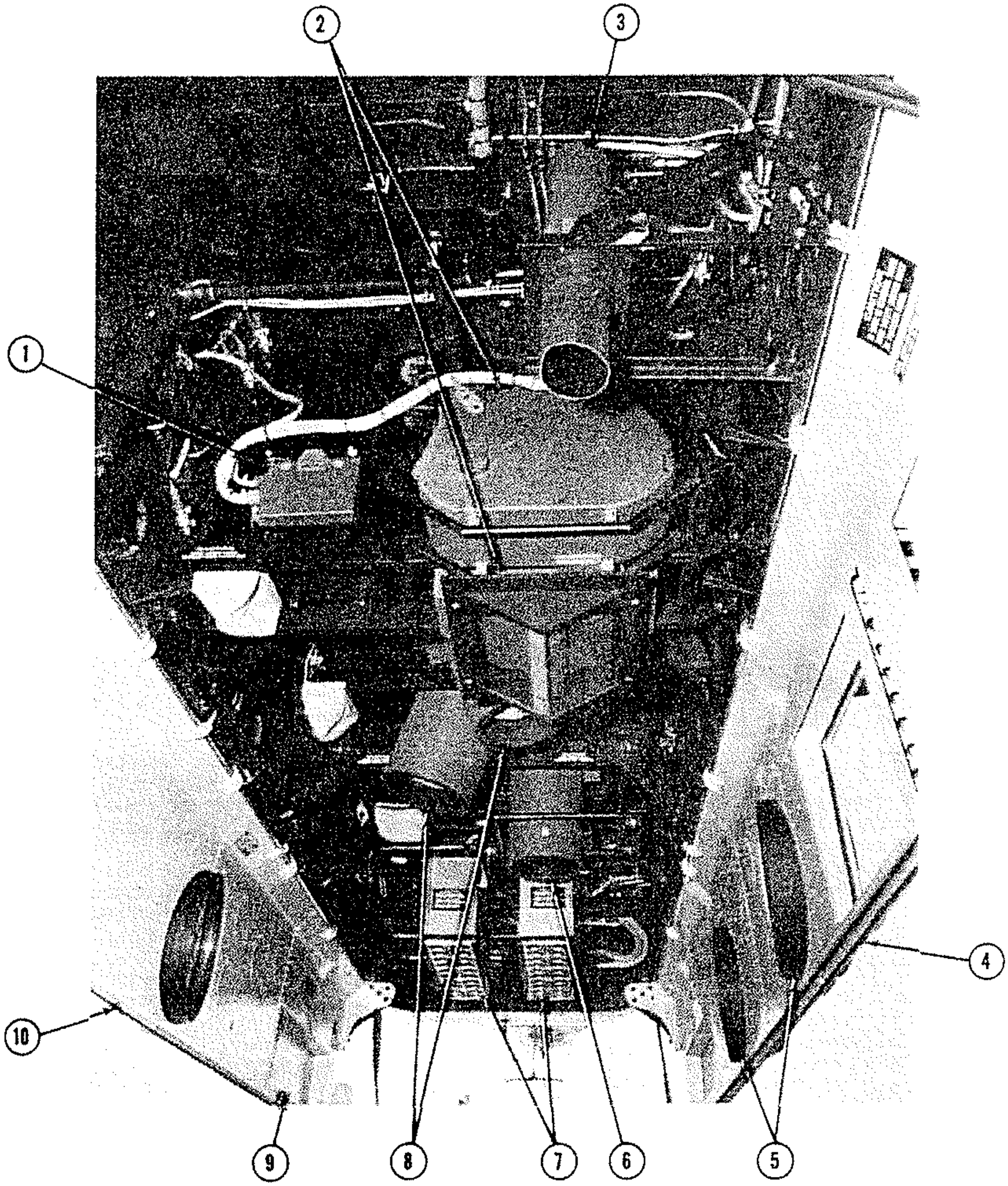
Vertical Camera

The vertical camera position is housed in the middle quarter of the aft bomb bay, and has mounting provisions for the following cameras: the KA-2 camera with a 6 or 12 inch focal length may be installed in this position with an IMC or a standard A-9B film magazine. The KA-1 or K-38 cameras with a 24 or 36 inch focal length may be installed in the vertical position with an A-8B film magazine; IMC is taken from the aft F-477 camera.

Photoflash Cartridge Ejectors

Two photo ejectors, either the A-6 or B-4 or combination of one A-6 and one B-4, are installed on a pallet in the rear aft portion of the bomb bay. Each bomb bay door has a section cut out to permit ejection of photoflash cartridges without opening the bomb bay doors. The openings are covered with panels when ejectors are not being utilized. The cartridge ejectors are racks for storing and ejecting photoflash cartridges in sequence at a controlled interval. Ejectors are controlled by the F-477 primary and secondary controls, which consist of the operate, day-night, rack selector switch, B-10A intervalometer, and the CN1-A1 count limiter. The additional control that is used in the night system is the ejector control which has the salvo switch, reset button, A & B type ejector, left or right bank switches.

The A-6 ejector has a capacity of 52 cartridges each, or 104 cartridges per pallet. The type B-4 ejector has a capacity of 20 cartridges each, or 40 cartridges per pallet. One each, type A-6 and B-4, can be carried simultaneously in the bomb bay.



1. KA-56 CAMERA JUNCTION BOX
2. KA-56 PANORAMIC CAMERA AND LENS
3. FLASH DETECTOR
4. LH BOMB BAY DOOR
5. BOMB BAY DOOR CAMERA WINDOWS
6. K-38 CAMERA
7. FLARE EJECTORS
8. F-477 SPLIT VERTICAL CAMERA
9. OPENING FOR FLARE EJECTION (COVER INSTALLED)
10. RH BOMB BAY DOOR

Figure 4-7. Bomb Bay With Cameras Installed - View Aft

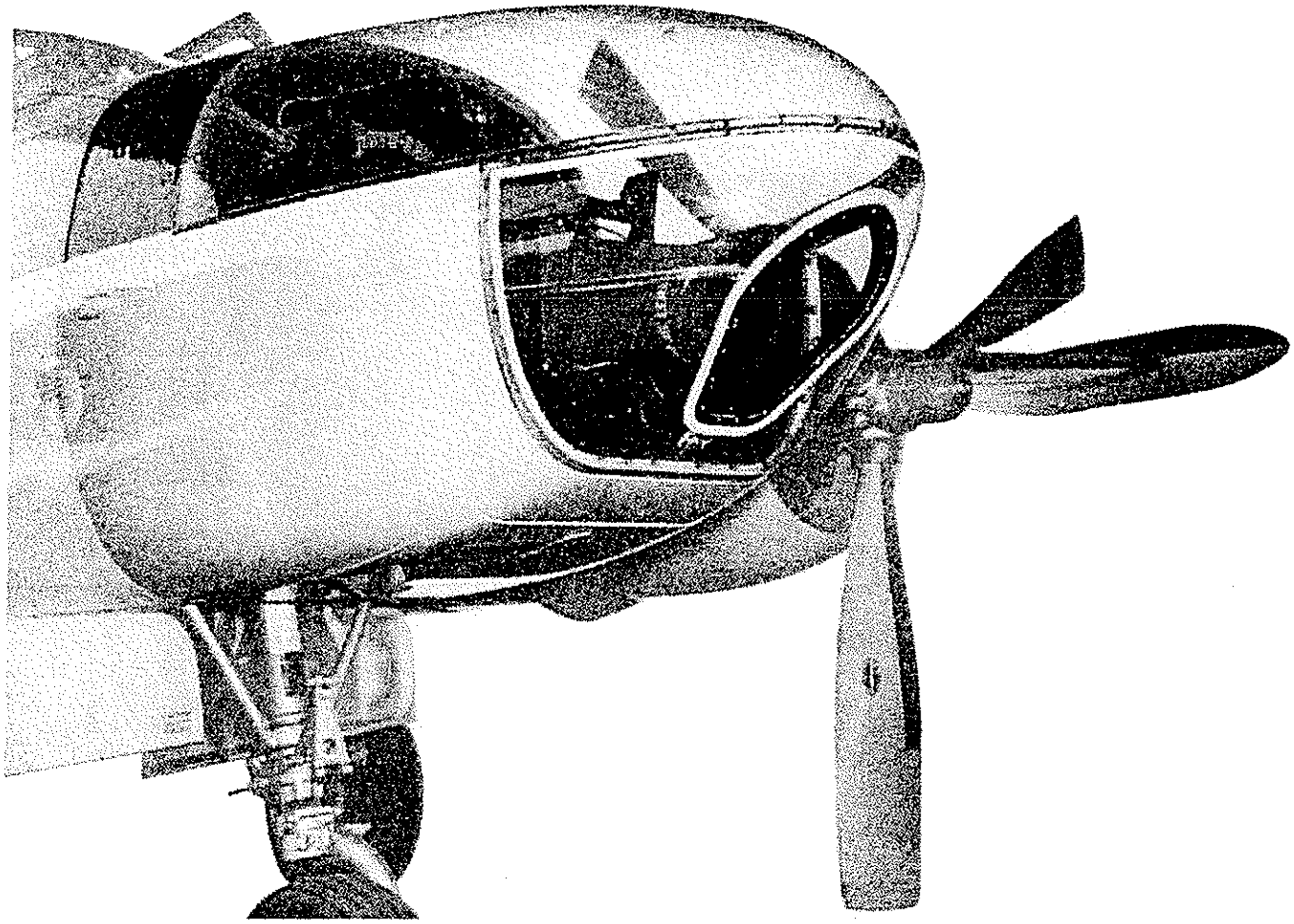


Figure 4-8. Glass Nose with Forward Oblique Camera Installed

Photoflash Detector

A photoflash detector, type C-1, is a light sensing device which reacts to light from released photoflash cartridges and provides the initial electrical impulse that automatically synchronizes the F-477 camera shutter with the peak of the flash during night missions.

Camera Station Controls

All the cameras of the system can be operated simultaneously or singly, as the mission requires. Furthermore, the camera operation can be initiated by the pilot or by the camera operator from the camera control station. When a camera operator is not to be on board, camera operation is programmed before departure.

Cockpit Camera Controls

The cockpit camera controls consist of a forward camera control panel, a B-9A intervalometer and an extra picture (EXT PIC) switch. The functions of the controls and indicators are as follows:

The extra picture switch is located on the right side of the pilot control wheel and is used by the pilot to start and stop camera operation in the bomb bay when the system is in remote operation.

The B-9A intervalometer for the forward oblique camera is located in the cockpit on the copilot instrument panel. This intervalometer can be set for the interval desired for the forward oblique camera.

The numbers remaining counter is manually set by the counter reset knob to reflect the number of film frames available. This counter will subtract one digit for each film frame exposed.

An amber intervalometer warning light illuminates approximately 3 seconds prior to intervalometer pulsing.

The green operate light illuminates during operation.

The test switch, when pressed, checks the operate light and counter.

The extra picture switch on the forward oblique camera control is used for random picture taking when the intervalometer is not being used and the system is in READY. It can also be used to take pictures between intervalometer pulses when the system is in INTV.

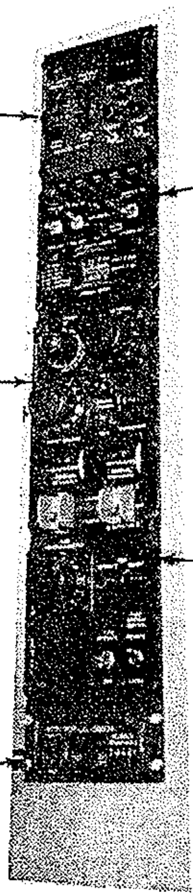
The off, ready, intervalometer and continuous switch is used for K-38 forward oblique operation. The READY position provides magazine preheat if desired. The INTV position provides operating pulse as set on the intervalometer. The CONT position permits camera operation continuously at its maximum cycling rate.

NOTE

- The CONT position should be avoided in this aircraft. The recycle rate of the forward oblique is such that the film may break and jam the camera.
- There will be a delay on the first exposure due to the interval set on the intervalometer; therefore, when using the INTV position, press the extra picture button at the start and stop of all photo runs.

Aft Compartment Camera Controls

Camera controls for cameras located in the bomb bay of the photo configured aircraft are in the aft compartment. A master camera control console contains control panels for the KA-56 panoramic, the F-477 primary, the F-477 secondary, and the K-38/KA-2 vertical cameras.



The functions of the controls and indicators on the KA-56A camera control panel are as follows:

V and H thumb wheels are used to manually set in the ratios of velocity and altitude.

The feet remaining counter should be properly reset to the amount of film loaded in the magazine. The counter will subtract one digit per foot, which provides a visual indication as to the amount of film footage remaining.

The fail, power, and operate press-to-test lights become energized when pressed, with the aircraft power on the KA-56A power switch OFF. During operation, the fail press-to-test light will illuminate if the film breaks, the camera is out of film, or the camera malfunctions.

The power switch applies power to the KA-56A camera.

The operate switch will cause the KA-56A camera to operate if the F-492 system control switch is in the LOCAL position. If the F-492 system control switch is in the REMOTE position, and the operate switch is ON, the KA-56A camera will not operate until the pilot depresses the extra picture switch.

The function of the controls on the E-1 shutter speed timer are as follows:

The CAM #1-BOTH-CAM #2 switch selects either camera 1 or camera 2, or both cameras.

The mode switch, which must be kept in the SYNCH position, has only this one function.

NOTE

This switch must be in the SYNCH position as there is no provision in the F-492 camera system for the advance open or recycle operation.

Two manual trip switches are used to trip the shutters in camera 1 or camera 2.

The functions of the control and indicators on the primary control panel are as follows:

The power switch turns on and off all power (28 VDC and 115V, 400 cps AC) for the F-477 day-night camera system. Also, it turns on the indirect illumination light for the V and H dials on the primary control panel. Before applying power, the operate and IMC switches on this primary control panel must be OFF and on the secondary control panel the ejector selector switch, T-1 shutter speed control, intervalometer and count limiter must be OFF.

The IMC-on-off switch in the ON position provides for operation of the IMC drive of the film in each of the magazines. This switch is interlocked through the primary control panel operate switch. It will not cause the IMC action to take place in the magazines until the primary control panel operate switch is turned ON.

The operate switch, when turned ON, activates the F-477 camera system if the remote local switch on the F-492 system control panel is in the LOCAL position. If the remote-local switch is in the REMOTE position, the pilot will activate the F-477 camera system with the extra picture switch. In the DAY mode with the operate switch ON, power is applied to the count limiter and intervalometer. It also applies power to the manual trip switch so that extra pictures can be taken. In the NIGHT mode, the operate switch, placed to ON, controls the ejector selector power and night ejection pulses to the A-OFF-B ejector selector switch on the secondary control panel.

The manual trip switch is a push to operate switch. It must be momentarily pressed and released. It must not be held in. It is coupled with the intervalometer output pulse circuit and overrides the intervalometer pulses to provide an extra picture pulse whenever an extra single picture must be taken. This manual trip switch overrides the cutoff effort of the count limiter and permits an extra picture to be taken at each press of the switch after the count limiter has terminated intervalometer pulses to the camera system. The extra picture pulses from the manual trip switch do not disturb the cutoff control "hold" from the limiter. This switch will not cause pictures to be taken if the operate switch is OFF.

WARNING

If the F-477 camera system is in the NIGHT mode, the operate switch is ON and the manual trip switch is pressed, a flash cartridge will be ejected.

The V and H dials are for controlling the rate of the film image motion compensation (IMC) in the magazines and are manually and individually adjusted by thumb-wheels on their edges. They are used only when IMC is required and are not used when operating in IMC-OFF conditions. The V (velocity or speed) dial is on the lower side. The dial numbers or graduations are multiplied by 100 (as indicated adjacent to this dial on the panel) to obtain speed reading in knots. The H (altitude) dial is on the upper side. The dial numbers or graduations are multiplied by 1000 (as indicated adjacent to this dial on the panel) to obtain altitude reading in feet. The hairline in the window across the face of the two dials is used to set the V and H numbers on the dials. It is indirectly illuminated by the V/H dial light whenever the power switch on the primary control panel is ON. The V and H dials can be adjusted at any time. If either or both are adjusted during a picture taking run, the IMC may be changed sufficiently during an exposure so as to degrade the exposed negative quality.

A DC power on light is energized by the contacts of a heavy duty system DC relay. This relay is turned on from the power switch at the primary control panel. This light shows that the relay has operated and applied DC control power to the F-477 camera system. At the same time, DC power is applied to the two cameras (bodies and lens cones) in like manner by the camera DC power relay, but no light is provided for this indication. AC power is simultaneously applied to the system in like manner by the AC power relay but no light is provided for this indication. The camera DC power and AC power relays are simultaneously turned on by the power switch on the primary control panel.

V/H dial lights are indirect illuminators for these two dials and the indicator hairline in the V and H window. These lights are turned on directly by the power switch when it is turned ON.

An operate light ON shows that the operate switch is ON and the operating functions are being sent from the two control panels into the F-477 camera system.

An exposure light blinks each time the intervalometer (on secondary control panel) pulses until the count limiter (on secondary control panel) cuts off these pulses from the camera system. Also, it blinks each time the manual trip (picture) switch is pushed.

Fuses for the F-477 camera system are located on the primary control panel.

The functions of the control and indicators on the secondary control panel are as follows:

A day-night switch selects the mode of operation. In the DAY position it directs the picture taking pulses from the intervalometer or manual trip (picture) switch to the E-1 timer to trip the camera shutters to make an exposure. In the NIGHT position it directs the pulses to the aircraft flash cartridge ejector mechanism as selected by and through the A-off-B ejector selector switch. This day-night switch is interlocked through the primary control panel operate switch. It will not operate these day or night channels until the primary control panel operate switch is ON.

An A-off-B ejector switch directs power to the selected A-6 or B-4 flash cartridge ejector mechanisms in the aircraft. Also, it directs the pulses that cause cartridge ejection and activate the cartridges remaining counters.

NOTE

When two ejector mechanisms are utilized, and the cartridges are exhausted from the first, a stepping relay will automatically transfer the pulses to the second mechanism.

A T-1 shutter speed control sets the speeds for the F-477 camera shutters to operate at 1/200, 1/100, 1/50, 1/25 or 1/10 second exposures by properly adjusting its dial. It controls the shutter speed timing circuits in the E-1 timer for the two cameras. When OFF, these circuits are not operative. This control, at any of the above positions other than OFF, also turns on the 115 VAC and 28 VDC power for the E-1 timer and C-1 flash detector. When these are on, the jewel light in the T-1 knob turns on from DC voltage sent back from the E-1. The power switch at the primary control panel must be ON to provide the required voltages for the E-1 and C-1. The T-1 control is connected by a separate cable directly to the E-1 timer.

The intervalometer is turned on by the primary control panel operate switch to provide repetitive picture pulses. The picture taking pulses coming from the intervalometer are shown by the exposure light (primary control panel) blinking at the time spacing set into the dial of the intervalometer. The intervalometer will send out pulses at time intervals from 0.5 to 12 seconds as set on its dial in 0.1 second steps. It can be turned to OFF at any time.

CAUTION

The intervalometer is redlined for 1.0 second minimum (shortest) cycle time for picture framing rates. It must not be set to timing intervals shorter (less) than 1.0 second.

The count limiter is turned on simultaneously with the intervalometer by the primary control panel operate switch. The count limiter receives pulses sent out from the intervalometer to the camera system. The limiter dial is set to the desired count limit of exposure pulses to go into the camera system from the intervalometer. When it has totalized these pulses, it sends out a cutoff signal which actuates the cutoff relay in the secondary control panel and cuts off any additional intervalometer pulses. The limiter cutoff signal is removed when the primary control panel operate switch is turned OFF. This restores the limiter for the next sequence of pictures when the operate switch is again turned ON. The limiter can limit the number of intervalometer pulses from 1 to 120 in step counts of one.

An exposures counter counts additively (electrically pulsed) each time magazine No. 1 winds up a frame of film after an exposure has been made. It will not count between exposures when film is being moved by IMC control. This counter is reset by manually rotating the number wheels.

NOTE

If IMC is allowed to run on long time intervals before or between actual exposure (IMC and operate switches ON), excessive film will be used up while the counter could show a presumably large reserve of unused film in the magazine.

The A and B cartridges remaining counters are connected into the circuit through the setting of the ejector selector switch in night mode of operation. The selected counter subtractively counts (electrically) each time the intervalometer sends out a night pulse to the camera system. It stops when the count limiter cuts off the intervalometer pulses to the camera system or when the primary control panel operate switch is turned to OFF, whichever occurs first. If, after the limiter cutoff occurs and the operate switch remains ON, an extra picture is taken by pressing the primary control panel manual trip (picture) switch, either of these counters (the selected one) will indicate that count.

Frame advance lights No. 1 and No. 2 are operated respectively by electric pulses from magazines No. 1 and No. 2 each time a frame of exposed film is wound up in each magazine after an exposure has been made. No. 1 light operates in conjunction with and from the same electric pulse from magazine No. 1 that operates the exposures counter.

A loose rack warning light illuminates if the flash cartridge racks in the aircraft pod are not properly secured. The light is connected continuously to the camera system 28 VDC supply in the primary control panel ahead of the power on-off switch. The 28 VDC supply is received directly from the aircraft system supply.

The functions of the controls and indicators on the F-492 system control panel are as follows:

A K-38 intervalometer can be set to pulse the K-38 camera at intervals from once every 2 seconds to once a minute.

A K-38 operate light will illuminate when the camera operates.

A K-38 ready light and test switch: with the mode switch in INTV, and the test switch depressed, the ready light will illuminate indicating the system is ready for operation.

A K-38 operate switch will start the camera if the remote-local switch is in the LOCAL position.

A remote-local switch, when in the REMOTE position, allows any camera of the F-492 camera system to be operated from the cockpit, provided that its operate switch is in the ON position. When in the LOCAL position, it allows any camera of the F-492 camera system to be operated from the camera control station when the operate switch is turned ON. This does not control the operation of the K-38 camera in the forward oblique position.

The functions of the controls and indicators on the ejector control panel are as follows:

The reset switch when pressed causes the stepping switch in the ejector to reset to the zero position. An amber press-to-test reset light will become energized when the reset switch is pressed.

NOTE

A second reset switch and light are located on the aft bomb bay bulkhead for ground service.

A and B rack selector switches permit rack selection. The left hand (LH) and right hand (RH) rack selector switches are placed in the up (A) position when two type A-6 ejectors are installed. The left hand (LH) and right hand (RH) switches are placed in the down (B) position when two type B-4 ejectors are installed. If one A-6 and one B-4 ejectors are installed, set the LH or RH switch to match the ejector location.

A guarded cartridge salvo switch has two positions. In the NORMAL position the cartridges will be ejected in response to the intervalometer pulses. When required, all the cartridges can be fired in rapid sequence by placing the switch in the SALVO position. For maximum speed when salvoing cartridges, the left and right bank switches should be set in opposite positions, one on "A" and one on "B." This will cause simultaneous sequencing of both the left and right racks regardless of type. If both racks are on "A" or on "B," the left rack will sequence followed by the right rack.

P-2 Strike Camera

The P-2 strike camera is a bomb damage assessment camera, and may be used in the role of reconnaissance. It is housed in the aircraft tail section and mounted on a rotary drum type mount. The camera angle may be manually adjusted from 30 degrees forward of the vertical to 50 degrees aft of the vertical prior to takeoff. The camera door is assembled in the camera mounts and is controlled by an open-close switch, located on the aft portion of the pilot control pedestal. The circuit breaker for the door is located in the aft circuit breaker panel, while the camera circuit breaker is on the pilot circuit breaker panel. The DC power to the camera and B-9A intervalometer are controlled by the remote control unit. This unit also controls the three position (BRIGHT/HAZY/DULL) lens diaphragm motor.

The bomb release button on the pilot control wheel activates the operate relay. The P-2 camera will continue to be pulsed by the B-9A intervalometer as long as the button is depressed.

The camera has a capacity of 50 feet of film which will give 240 2-1/4 by 2-1/4 inch negatives, and a total running time of 40 seconds at minimum interval.

P-2 Strike Camera Checklist. (N-F)

1. Camera status - CHECKED.

   Check that camera has been loaded and that preflight has been accomplished.

Inflight Operation

1. Circuit breakers - CHECKED.
2. Bright/Hazy/Dull control - AS REQUIRED.
3. Intervalometer - SET.
4. Camera door - OPENED.
5. Camera - OPERATED.

   The camera will operate when the master armament switch is ON and the bomb release or rocket switch is depressed.

Postflight

1. Camera door - CLOSED.
2. Bright/Hazy/Dull control - OFF.
3. Intervalometer - OFF.

Photo System Checklist

The photo system checklist is made up of three checklists. A Forward Oblique Camera Checklist, a Bomb Bay Photo Equipment (Day Operation) Checklist, and a Bomb Bay Photo Equipment (Night Operation) Checklist which are to be accomplished by the Navigator and/or Photo Systems Operator as indicated by (N) and (F), respectively. When either or both of these individuals are not a part of the aircrew and photo equipment is to be utilized, the pilot will designate an individual to accomplish applicable portions of the checklist.

Forward Oblique Camera Checklist

1. Power off check - COMPLETED. (N-F)
   a. Window - CLEANED.
   b. Trip camera - MANUAL.
   c. Advance film - MANUAL.
   d. Camera mounts - SECURED.
   e. Camera - SECURED.
   f. Camera power cable - CONNECTED.
   g. Vacuum hose - CHECKED.
   h. Magazine - SECURED.
   i. F-Stop - SET.
   j. Shutter speed - SET.
   k. Filter - CLEAN AND SECURED.
   l. Data card - COMPLETED.
2. Power on check - COMPLETED. (N-F)
   a. Circuit breaker - IN.
   b. Rotary switch - READY.
   c. Press-to-test switch - CHECKED.
   d. Extra picture switch - OPERATED.

      Cycle camera 5 times.
   e. Intervalometer - SET.

      Set for 5 seconds.
   f. Rotary switch - INTERVALOMETER.

      Check that camera cycles at least 5 times at 5 second intervals and that counter and indicator lights operate properly.
   g. Rotary switch - OFF.
   h. Intervalometer - OFF.
   i. Exposure counter - SET.
3. Inflight operation - COMPLETED. (N)
   a. Circuit breaker - IN.
   b. Rotary switch - READY.

c. Intervalometer - SET.

d. Rotary switch - INTERVALOMETER.

At the start of photo run place rotary switch to INTERVALOMETER and depress EXT PIC switch. The EXT PIC switch may be used in lieu of the intervalometer.

e. Rotary switch - READY.

At the end of photo run place rotary switch to READY.

4. Equipment shutdown - COMPLETED. (N)

a. Extra picture switch - OPERATED.

Cycle camera 5 times.

b. Rotary switch - OFF.

c. Intervalometer - OFF.

Bomb Bay Photo Equipment (Day Operation) Checklist. (F)

Power Off, Aft Compartment

1. KA-56A control panel - CHECKED.

a. Power switch - OFF.

b. Operate switch - OFF.

2. F-477 primary and secondary control panels - CHECKED.

a. Power switch - OFF.

b. IMC switch - OFF.

c. Operate switch - OFF.

d. T-1 timer - OFF.

e. Intervalometer - OFF.

f. Count limiter - OFF.

g. Cartridge selector switch - OFF.

3. Vertical control panel - CHECKED.

a. Operate switch - OFF.

b. Rotary switch - OFF.

c. Intervalometer - OFF.

4. Aft compartment circuit breaker panel - CHECKED.

a. K-38 circuit breaker - IN.

b. F-477 circuit breaker - IN.

c. KA-56A circuit breaker - IN.

Power OFF, Bomb Bay

1. KA-56A camera - CHECKED.

a. Window - SECURED AND CLEANED.

b. Advance film - MANUAL.

c. Mount pins - IN AND LOCKED.

d. Camera - SECURED.

e. Camera power cable - CONNECTED.

f. Takeup cassette - SECURED.

g. Supply cassette - CHECKED AND SECURED.

h. Prism cover - REMOVED.

i. Junction box - SECURED.

j. Data card - COMPLETED.

2. Split vertical cameras - CHECKED.

a. Windows - SECURED AND CLEANED.

b. Mount pins - IN AND LOCKED.

c. Cameras - SECURED.

d. Camera power cables - CONNECTED.

e. Vacuum hoses - CHECKED.

f. Magazines - SECURED.

g. Magazine cables - CONNECTED.

h. F-Stop - SET.

i. Filters - CLEAN AND SECURED.

j. E-1 amplifier - SECURED.

k. Data cards - COMPLETED.

3. Vertical camera - CHECKED.

a. Window - CLEANED AND SECURED.

b. Mount pins - IN AND SECURED.

c. Camera - SECURED.

d. Camera power cable - CONNECTED.

e. Vacuum hose - CHECKED.

f. Magazine - SECURED.

g. F-Stop - SET.

h. Shutter speed - SET.

i. Filter - CLEANED AND SECURED.

j. Data card - COMPLETED.

Power On

1. KA-56A camera controls and indicators - CHECKED.

a. Feet remaining counter - SET.

b. V/H indicator - SET.

Set desired ground speed and altitude.

c. Local/Remote switch - LOCAL.

d. Power switch - ON.

Allow 10 seconds for warmup.

e. Operate switch - ON.

Check that camera cycles at least 5 times at 5 second intervals and counter and indicator lights operate properly.

f. Operate switch - OFF.

g. Power switch - OFF.

2. Split vertical camera controls and indicators - CHECKED.

a. Night/Day switch - DAY.

b. Exposure counter - SET.

c. Intervalometer - SET.

Set for 5 seconds.

d. Count limiter - OFF.

e. T-1 timer - SET.

f. Power switch - ON.

Allow 10 seconds for warmup.

g. Operate switch - ON.

Check that camera cycles at least 5 times at 5 second intervals and counter and indicator lights operate properly.

h. Operate switch - OFF.

i. T-1 timer - OFF.

j. Power switch - OFF.

k. Intervalometer - OFF.

3. Vertical camera controls and indicators - CHECKED.

a. Local/Remote switch - LOCAL.

b. Rotary switch - INTERVALOMETER.

c. Intervalometer - SET.

Set for 5 seconds.

d. Exposure counter - SET.

e. Press-to-test switch - PRESS.

f. Extra picture - PRESS.

g. Operate switch - ON.

Check that camera cycles at least 5 times at 5 second intervals and counter and indicator lights operate properly.

h. Operate switch - OFF.

i. Rotary switch - OFF.

j. Intervalometer - OFF.

4. Inflight operation for desired camera - COMPLETED.

a. KA-56A camera controls and indicators - OPERATED.

(1) V/H indicator - SET.

Set desired ground speed and altitude.

(2) Power switch - ON.

Allow 10 seconds for warmup.

(3) Operate switch - ON.

Turn operate switch ON at the start of each photo run and observe counters and indicator lights for proper operation.

(4) Operate switch - OFF.

Turn operate switch OFF at the end of each photo run.

b. Split vertical camera controls and indicators - OPERATED.

(1) Power switch - ON.

Allow 10 seconds for warmup.

(2) T-1 timer - SET.

(3) V/H indicator - SET.

Set desired ground speed and altitude.

(4) IMC switch - ON (IF REQUIRED).

(5) Operate switch - ON.

Turn IMC switch ON and then turn operate switches ON at start of each photo run and observe counters and indicator lights for proper operation.

(6) Operate switch - OFF.

c. Vertical camera controls and indicators - OPERATED.

(1) Intervalometer - SET.

(2) Rotary switch - INTERVALOMETER.

(3) Operate switch - ON.

Turn operate switch ON at start of each run and observe counter and indicator lights for proper operation.

(4) Operate switch - OFF.

Turn operate switch OFF at end of each photo run.

Equipment Shutdown

1. KA-56A camera - SHUTDOWN.

a. Operate switch - ON.

Allow camera to cycle 10 times.

b. Operate switch - OFF.

c. Power switch - OFF.

2. Split vertical cameras - SHUTDOWN.

a. Operate switch - ON.

Allow cameras to cycle 10 times.

b. Operate switch - OFF.

c. IMC switch - OFF.

d. T-1 timer - OFF.

e. Power switch - OFF.

f. Count limiter - OFF.

g. Intervalometer - OFF.

3. Vertical camera - SHUTDOWN.

a. Operate switch - ON.

Allow camera to cycle 10 times.

b. Operate switch - OFF.

c. Intervalometer - OFF.

d. Rotary switch - OFF.

Bomb Bay Photo Equipment (Night Operation) Check-list. (F)

Power Off, Aft Compartment

1. Aft circuit breaker panel - CHECKED.

a. F-477 circuit breaker - IN.

b. K-38 circuit breaker - IN.

c. A-6 circuit breaker - IN.

2. F-477 primary and secondary control panels - CHECKED.

a. Exposure counter - SET.

Set exposure counter at 000.

b. Power switch - OFF.

c. IMC switch - OFF.

d. Operate switch - OFF.

e. T-1 timer -OFF.

f. Intervalometer - OFF.

g. Count limiter - OFF.

h. Cartridge rack selector switch - OFF.

i. Salvo switch - SAFETIED.

j. Day/Night switch - NIGHT.

k. Local/Remote switch - LOCAL.

Power Off, Bomb Bay

1. C-1 photo flash detector - CHECKED.

a. C-1 hose shield - INSTALLED AND SECURED.

b. C-1 detector - SECURED.

c. C-1 mount - SECURED.

d. Power cables - CONNECTED AND SECURED.

2. Split vertical cameras - CHECKED.

a. Windows - SECURED AND CLEANED.

b. Mount pins - IN AND LOCKED.

c. Cameras - SECURED.

d. Camera power cables - CONNECTED.

e. Vacuum hoses - CHECKED.

f. Magazines - SECURED

g. Magazine cables - CONNECTED.

h. F-Stops - SET.

i. Filters - REMOVED.

j. Data cards - COMPLETED.

3. Cartridge racks - CHECKED.

a. Bomb bay door panels - REMOVED.

b. Racks - LOADED AND SECURED.

Record number and type of cartridges installed.

c. Cables - CONNECTED.

4. E-1 amplifier - CHECKED.
   a. E-1 junction box - SECURED.
   b. Camera selector switch - BOTH.
   c. Mode selector switch - SYNCH.
   d. Power cables - CONNECTED.
   e. Fuses - CHECKED.

WARNING

A power on preflight will not be accomplished prior to takeoff.

Before takeoff

1. Report - COMPLETED.

   Report to pilot that the system is cold.

WARNING

Anytime the loose rack light comes on, cancel the mission.

Inflight

WARNING

Insure that the aircraft is in a safe area prior to initiating this checklist.

1. Split vertical inflight operation - COMPLETED.
   a. F-477 circuit breaker - IN.
   b. A-6 circuit breaker - IN.
   c. K-38 circuit breaker - IN.
   d. Local/Remote switch - LOCAL.
   e. Day/Night switch - NIGHT.
   f. Ejector switch - A OR B POSITION.
   g. Rack selector - LEFT OR RIGHT.
   h. V/H indicator - SET.
   i. Cartridge counters - SET.
   j. Exposure counter - SET.

      Set exposure counter to 000.

   k. Power switch - ON.

      Allow 10 seconds for warmup.

   l. T-1 timer - SET.
   m. Intervalometer - SET.

      Count limiter - SET.

   o. IMC switch - ON.
   p. Operate switch - ON.

Turn IMC switch to ON then turn operate switch ON at start of each photo run and observe counter and indicator lights for proper operation.

   q. Operate switch - OFF.

CAUTION

If cartridges do not eject on first photo run, press reset button (observe light) on rack ejector control and recheck steps a through n.

NOTE

At the end of mission, inform pilot of number of flash cartridges remaining to determine if SALVO is desired.

If SALVO is required:

CAUTION

Insure that the aircraft is in a SAFE area prior to salvoing the cartridges.

1. Salvo switch - UP.

   Cartridges will salvo in sequence.

2. Salvo Switch - OFF.
3. Reset button - ACTUATED.

   Observe light for proper operation.

4. Salvo switch - UP.

   Any remaining cartridges will salvo.

5. Salvo switch - OFF.

NOTE

Steps 3, 4, and 5 are required due to the possibility of a cartridge misfiring during the photo mission.

Equipment Shutdown

1. Before landing check - COMPLETED.
   a. Operate switch - OFF.
   b. IMC switch - OFF.
   c. T-1 timer - OFF.
   d. Power switch - OFF.
   e. Intervalometer - OFF.
   f. Count limiter - OFF.
   g. Ejector switch - OFF.

SECTION V

OPERATING LIMITATIONS

TABLE OF CONTENTS

INTRODUCTION

The purpose of this section is to cover all important limitations that must be observed during normal operation. The instrument limitations must be particularly noted since these limitations are not necessarily repeated in the text covering the operation of that particular system. When deemed necessary, an additional explanation of instrument limitations is covered in the text under appropriate headings.

MINIMUM CREW REQUIREMENTS

The minimum crew required for this aircraft consists of a pilot and one crew member familiar with the mechanical systems of the aircraft. Additional crew members, as required, will be added at the discretion of the commander.

PROPELLER LIMITATIONS

Prolonged engine operation in the range of 1150 to 1500 RPM, at zero forward speed, is to be avoided because of harmful propeller vibratory stresses.

ENGINE LIMITATIONS

Engine Overspeeding

If an engine overspeed condition occurs and the RPM exceeds 2950, the engine must be inspected upon landing. If overspeed is in excess of 3400 RPM, the engine must be replaced.

Engine Power Time Limits

METO power is the maximum power at which the engine may be operated continuously. At engine ratings above normal power, specific time limits are imposed. Operation at maximum power is limited to 5 minutes. This power setting, however, may be maintained for 30 minutes if necessary, in which case it is designated military power. The distinction is entirely in the time limit. In considering the above time limits, it should be noted that the engine can be run continuously under overload conditions of power and speed (military power) for a much longer period than the 30 minute time limit. However, the period of reliable operation is thereby reduced to an unreasonably short time. By imposing a time limit, the cumulative effect of the overloads is distributed evenly over the period between engine overhauls, and the useful life of the engine is lengthened accordingly. When the use of military power is absolutely required for longer than 30 minutes (assuming an engine failure occurs more than 30 minutes from the first suitable landing field, and military power is required on the remaining engine to sustain flight), the 30 minute limit may be exceeded. A notation of this action should be made on Form 781.

Engine Overboost Due to Excessive Manifold Pressure

Overboost above the maximum manifold pressure specified under normal and alternate fuel grade operating limits is not permitted; however, should overboost occur due to control malfunction, the following limits will apply:

5 to 9 inches Hg overboost for 5 to 15 seconds - Inspection of engine.

10 or more inches Hg for any period of time - Removal of engine.

Overboost of any magnitude, at or above normal rated power, for periods in excess of 15 seconds - Removal of engine.

AIRSPEED LIMITATIONS

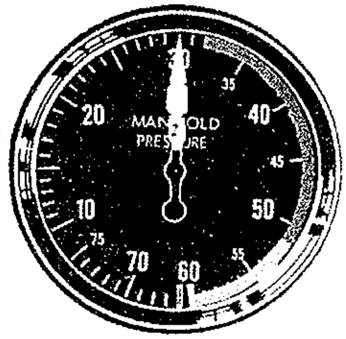
Maximum allowable - 335 KIAS or 0.67 Mach, whichever occurs first.

INSTRUMENT MARKINGS

FUEL GRADE 115/145

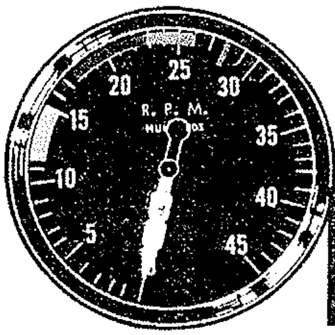
CYLINDER HEAD TEMPERATURE INDICATOR

- +260° C. - MAXIMUM ALLOWABLE TEMPERATURE
- +150° C. to +232° C. - NORMAL OPERATING RANGE
- +30° C. - MINUMUM ALLOWABLE TEMPERATURE



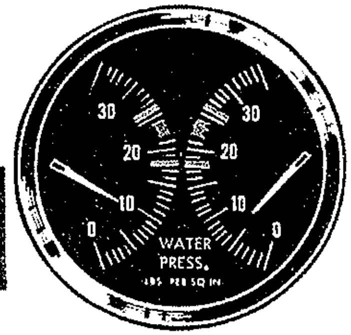
MANIFOLD PRESSURE GAGE

- 62 inches Hg. - MAXIMUM OPERATION (WET)
- 60 inches Hg. - MAXIMUM OPERATION (DRY)
- 51.5 to 60 inches Hg. - MAXIMUM CONTINUOUS OPERATION
- 32 to 51.5 inches Hg. - NORMAL OPERATING RANGE



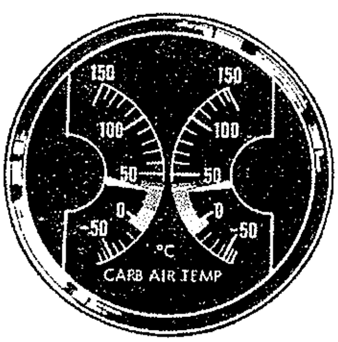
TACHOMETER

- 2800 RPM - MAXIMUM ALLOWABLE
- 2300 to 2600 RPM - AUTO-RICH RANGE
- 1750 to 2300 RPM - AUTO-LEAN NORMAL CRUISE RANGE
- 1150 to 1500 RPM - AVOID PROLONGED OPERATION AT ZERO FORWARD SPEED



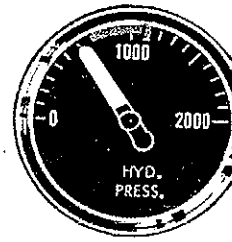
ADI PRESSURE INDICATOR

- 26 PSI - MAXIMUM ALLOWABLE PRESSURE
- 22 PSI to 24 PSI - NORMAL OPERATING RANGE
- 18 PSI - MINIMUM ALLOWABLE PRESSURE



CARBURETOR AIR TEMPERATURE INDICATOR

- +38° C. - MAXIMUM ALLOWABLE
- +15° C. to +38° C. - NORMAL OPERATING RANGE
- -10° C. to +15° C. - CAUTION RANGE (ICING)

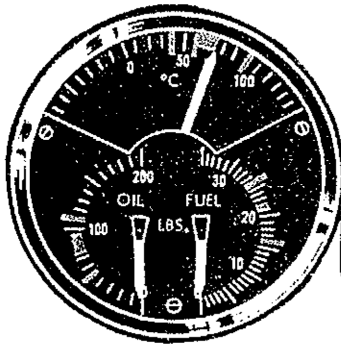


HYDRAULIC PRESSURE INDICATOR

- 1100 PSI - MAXIMUM ALLOWABLE PRESSURE
- 700 PSI to 1050 PSI - NORMAL OPERATING RANGE

Figure 5-1. Instrument Markings (Sheet 1 of 2)

26K-1-5-0-1A



ENGINE GAGE UNIT
FUEL PRESSURE INDICATOR

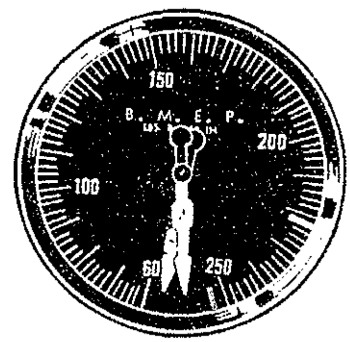
26 PSI - MAXIMUM ALLOWABLE PRESSURE
22 PSI to 23 PSI - NORMAL OPERATING RANGE
16 PSI - MINIMUM ALLOWABLE PRESSURE

OIL PRESSURE INDICATOR

110 PSI - MAXIMUM ALLOWABLE PRESSURE
75 PSI to 95 PSI - NORMAL OPERATING RANGE
50 PSI - MINIMUM ALLOWABLE PRESSURE (25 PSI MINIMUM ALLOWABLE FOR IDLE)

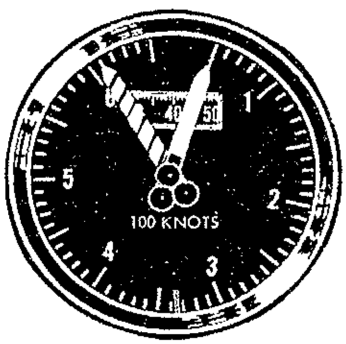
OIL TEMPERATURE INDICATOR

+100° C. - MAXIMUM ALLOWABLE TEMPERATURE
+60° C. to +75° C. - NORMAL OPERATING RANGE
+40° C. - MINIMUM ALLOWABLE TEMPERATURE



B. M. E. P. INDICATOR

253 - MAXIMUM ALLOWABLE (WET)
222 - MAXIMUM ALLOWABLE (DRY)



AIRSPEED INDICATOR

335 KIAS - MAXIMUM ALLOWABLE AIRSPEED

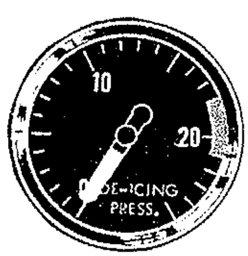
FUEL GRADE
115/145

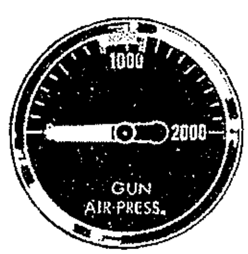
EMERGENCY AIR PRESSURE

850 PSI - MAXIMUM ALLOWABLE PRESSURE
650 PSI to 850 PSI - NORMAL OPERATING RANGE
650 PSI - MINIMUM ALLOWABLE PRESSURE

SUCTION GAGE

5.25 inches Hg. - MAXIMUM ALLOWABLE READING
4.8 inches Hg. to 5.2 inches Hg. - NORMAL OPERATING RANGE
4.75 inches Hg. - MINIMUM ALLOWABLE READING





DEICING PRESSURE INDICATOR

18 PSI to 21 PSI - NORMAL OPERATING RANGE

GUN AIR PRESSURE INDICATOR

1100 PSI - MAXIMUM ALLOWABLE PRESSURE
800 PSI to 1100 PSI - NORMAL OPERATING RANGE
800 PSI - MINIMUM ALLOWABLE PRESSURE

Figure 5-1. Instrument Markings (Sheet 2 of 2)

26K-1-5-0-1A

ENGINE MANIFOLD PRESSURE AND POWER LIMITS

DATA AS OF: 2-15-59
BASED ON: Estimated data

ENGINES: R2800-52W
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

FUEL GRADE: 115/145

Power Condition	RPM	Blower	Mixture	MAP Limit (In. Hg)	BMEP Limit (psi)	BHP
Takeoff (Wet)	2800	Low	Rich	*62.0 at SL *61.5 at 3800 feet	253 253	2500 2500
Takeoff (Dry)	2800	Low	Rich	*60.0 at SL *58.5 at 5300 feet	222 222	2200 2200
METO	2600	Low	Rich	51.5 at SL 50.0 at 7000 feet	207 207	1900 1900
METO	2600	High	Rich	50.0 at 10,000 feet 47.5 at 16,000 feet	190 190	1750 1750
Maximum Cruise	2300	Low	Lean		153	1240
Maximum Cruise	2300	High	Lean		147	1200

FUEL GRADE: 100/130

Power Condition	RPM	Blower	Mixture	MAP Limit (In. Hg)	BMEP Limit (psi)	BHP
Takeoff (Wet)	2800	Low	Rich	*59.5 at SL *58.5 at 5000 feet	243 243	2400 2400
Takeoff (Dry)	2800	Low	Rich	*53.0 at SL *51.0 at 9900 feet		
METO	2600	Low	Rich	49.0 at SL 47.0 at 9300 feet	196 196	1800 1800
METO	2600	High	Rich	47.5 at 10,000 feet 45.5 at 16,000 feet	185 185	1700 1700
Maximum Cruise	2300	Low	Lean		153	1240
Maximum Cruise	2300	High	Lean		147	1200

NOTE:
1. Observe MAP limit or BMEP limit, whichever is reached first.
2. For maximum cruise MAP see the Power Settings for Cruise charts, Part 2 of Appendix.
   Maximum cruise low blower - 155 bmep (except when at 1240 bhp and 2300 rpm - 153 bmep)
   Maximum cruise high blower - 150 bmep (except when at 1200 bhp and 2300 rpm - 147 bmep)

* Takeoff MAP may be increased by existing vapor pressure up to 1.5 in. Hg.

Figure 5-2. Engine Manifold Pressure and Power Limits

Bomb bay doors - 335 KIAS or 0.67 Mach, whichever occurs first.

Flaps: 0 to 25 degrees - 218 KIAS maximum;
26 to 52 degrees - 180 KIAS maximum.

Landing lights - 165 KIAS maximum.

Empty pylon tank release - 145 KIAS maximum.

Full pylon tank release - 250 KIAS maximum.

Landing gear extended - 140 KIAS maximum.

Landing sink rate at gross weight of 31,000 pounds or less - 540 FPM maximum.

Landing sink rate for gross weights exceeding 31,000 pounds - 360 FPM maximum.

PROHIBITED MANEUVERS

Spins or acrobatic maneuvers are prohibited.

Extreme asymmetric maneuvers are prohibited. Excessive single rudder input forces can result in a rudder lock condition at speeds in excess of 175 KIAS whereby the rudder is driven to the full stop position. In the event such a condition is encountered, corrective action should be accomplished by applying differential power rather than opposite rudder force. At high speeds heavy corrective rudder pedal forces may result in damaging tail loads.

MANEUVER LIMITATIONS

The symmetrical load factor capability is 4.4G from the minimum flying weight to 33,000 pounds, decreases linearly to 3.75G at 36,000 pounds, then is constant to the maximum gross weight. This applies for both asymmetric and symmetrically loaded wing store configurations. Asymmetry between left and right wings should not differ by more than one store.

The rolling pullout load factor capability is 3.2G from the minimum flying weight to 33,000 pounds, decreases linearly to 2.8G at 36,000 pounds, then is constant to the maximum gross weight. See strength summary diagrams, figure 5-4, for symmetrical and unsymmetrical maneuvers.

CENTER OF GRAVITY LIMITATIONS

Forward - 18% MAC.

Aft - 32% MAC.

At the aft CG limits neutral to negative stability may be encountered. Flights with high drag store loadings at speeds below 165 KIAS should be conducted with caution. Refer to Section VI for stall characteristics under these conditions.

WEIGHT LIMITATIONS

1. Wigh external stores - 43,380 pounds maximum.

2. All weight in excess of 36,000 pounds must consist of wing loading. Wing loading is primarily comprised of wing tip tank fuel, external stores, and wing internal fuel.

3. Without wing loading - 36,000 pounds maximum.

4. Landing weight - 36,380 pounds maximum.

5. Inboard wing pylon stations 4 and 5 shall not exceed 1530 pounds per pylon excluding pylon weight. This provides for fuel tank carriage at stations 4 and 5.

6. Wing pylon stations 1, 2, 3, 6, 7, and 8 shall not exceed 900 pounds per pylon excluding pylon weight.

7. Total external stores load shall not exceed 7560 pounds in order to preclude wing overloading.

8. The forward and aft bomb bays are limited to 2100 pounds each. This allows for 4200 pounds total internal stores capability.

TAXI LIMITATIONS

Prepared surfaces - No restriction.

Trough depressions up to 7 inches deep:

Tip tanks full - Do not taxi at weights over 42,500 pounds.

Tip tanks empty - Do not taxi at weights in excess of the maximum gross weight of 43,380 pounds.

Do not operate on surfaces with a trough depression exceeding 7 inches deep.

LANDING LIMITATIONS

Land on prepared surfaces only.

Landing with stores permitted up to gross weight of 36,380 pounds.

Wing tip fuel tanks must be emptied prior to landing.

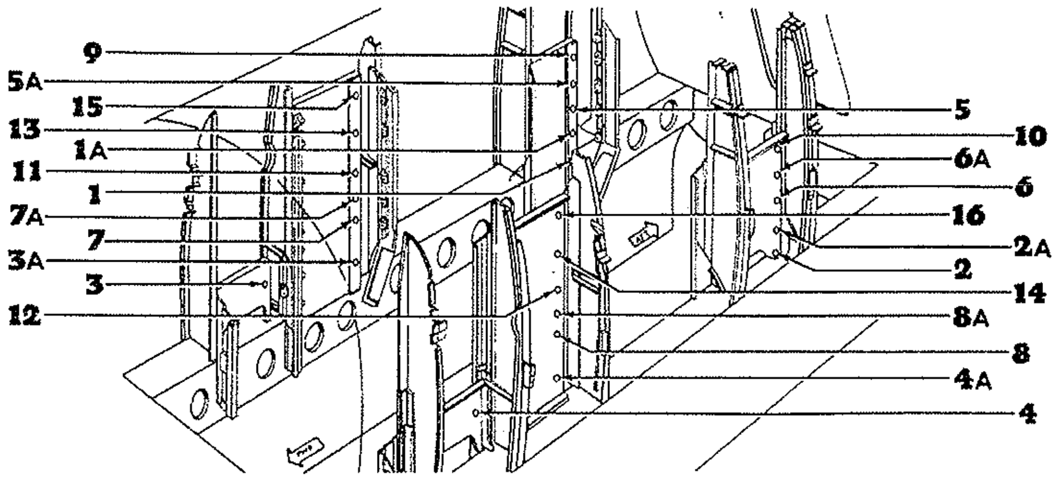
SPECIAL CONFIGURATION LIMITATIONS

1. External stores shall be carried and released within the limitations of figure 5-6. Maneuvers shall be confined within the envelopes outlined in figures 5-4 and 5-5. Aircraft performance shall be calculated, using the drag index numbers and stores weights presented in figure A1-5.

Note

Only the stores listed in figures 5-3 and 5-6 are certified for carriage and release, singly or in combination, by this

2. Flap deflection is limited to 38 degrees when



STORES (MUNITION DESCRIPTION)		BOMB BAY STATIONS (ACCEPTABLE FOR LOADING)	JETTISON/RE-LEASE SPEED (MAX)	LOAD FACTOR	DIVE ANGLE RELEASE	APPROX WEIGHT
			KIAS	"G"	DEGREES	POUNDS
GENERAL PURPOSE BOMBS	AN-M30A1 (100-LB) (2)	1, 2, 3A, 4A, 5, 6, 7, 8	335	(1)	20	120
		9, 10, 11, 12, 13, 14, 15, 16	335	(1)	0	120
	AN-M57A1 (250-LB) (2)	1, 2, 3A, 4A, 5A, 6A, 7A, 8A	335	(1)	20	272
	M117A1 (750-LB) (4)	3, 4	270	(1)	0	823
		7, 8	270	2.5	20	823
	MK-81 (250-LB) (5)	3A, 4A, 7A, 8A	300	(1)	20	260
		1, 2	300	(1)	40	260
FRAGMENT BOMBS	AN-M81 (260-LB) (2)	1, 2, 3A, 4A, 5A, 6A, 7A, 8A	335	(1)	20	262
	AN-M88 (220-LB) (2)	1, 2, 3A, 4A, 5A, 6A, 7A, 8A	335	(1)	20	230

Figure 5-3. Internal Stores Carriage and Release Limits (Sheet 1)

STORES (MUNITION DESCRIPTION)		BOMB BAY STATIONS (ACCEPTABLE FOR LOADING)	JETTISON/RE-LEASE SPEED (MAX) KIAS	LOAD FACTOR "G"	DIVE ANGLE RELEASE DEGREES	APPROX WEIGHT POUNDS
FRAGMENT BOMBS (Cont)	AN-M1A4 (100-LB)	1, 2, 3A, 4A, 5, 6, 7, 8	335	①	20	125
		9, 10, 11, 12	335	①	0	125
	M28A2 (100-LB)	1, 2, 3A, 4A, 5, 6, 7A, 8A	335	①	20	116
SMOKE BOMBS	M47A4 (100-LB)	1, 2, 3A, 4A, 5, 6, 7, 8	335	①	20	105
		9, 10	335	①	0	105
PRACTICE BOMBS	BDU-33/B BDU-33A/B (25-LB)	③	③	③	③	30
PHOTO-FLASH CART-RIDGE EJECTORS	A-6 (Uses M112A1 Cartridge) B-4 (Uses M123A1 Cartridge)	These Photoflash Cartridge Ejectors used with their respective explosive cartridges are certified for carriage in the aft bomb bay for day/night photo reconnaissance. No specific flight limits for the munition aspect of these cartridges are required beyond the Camera Equipment Operation (Section IV) and the Aircraft Operating Limitations (Section V).				

① See figure 5-4, Strength Summary, and figure 5-5, Operating Flight Limits, Charts. Lower limits govern in cases where unsymmetrical maneuver limits are less than the limits established in Load Factor column.

② The acceptable bomb bay stations, and the approximate weights shown above are listed on the basis of using box fins only. Conical fins are not certified for use on AN-M30A1, AN-M57A1, AN-M81, and AN-M88 bombs.

③ When using practice bombs, the specific carriage and release limits shall follow the same parameters as those for the particular munition for which a practice mission is employed.

④ The M117A1 bomb is limited to carriage of two such munitions at any one time in order to preclude over loading the aircraft.

⑤ Physical size of the MK-81 bomb will not permit simultaneous loading at forward and aft bomb bay stations.

Figure 5-3. Internal Stores Carriage and Release Limits (Sheet 2)

230 gallon external fuel tanks are carried because of structural clearance.

3. No forward firing armament may be carried on pylon stations 4 and 5 because of propeller arc.

4. A maximum of two LAU-3 rocket pods can be salvo fired simultaneously and symmetrically.

5. A load factor of 1.0G is imposed for release of external stores.

6. Carriage and release limitations for internal stores are shown in figure 5-3 and are based on limitations of the bomb bay as well as turbulent airflow and slow release effects.

7. Ferry Configuration Limitations.

A typical ferry configuration consists of full normal fuel (1230 gallons), bomb bay ferry fuel (675 gallons), two 230 gallon drop tanks, three crew members and 450 pounds in the aft compartment.

a. The symmetrical load factor capability is 3.0G at all weights.

b. The rolling pullout load factor is 2.4G at all weights.

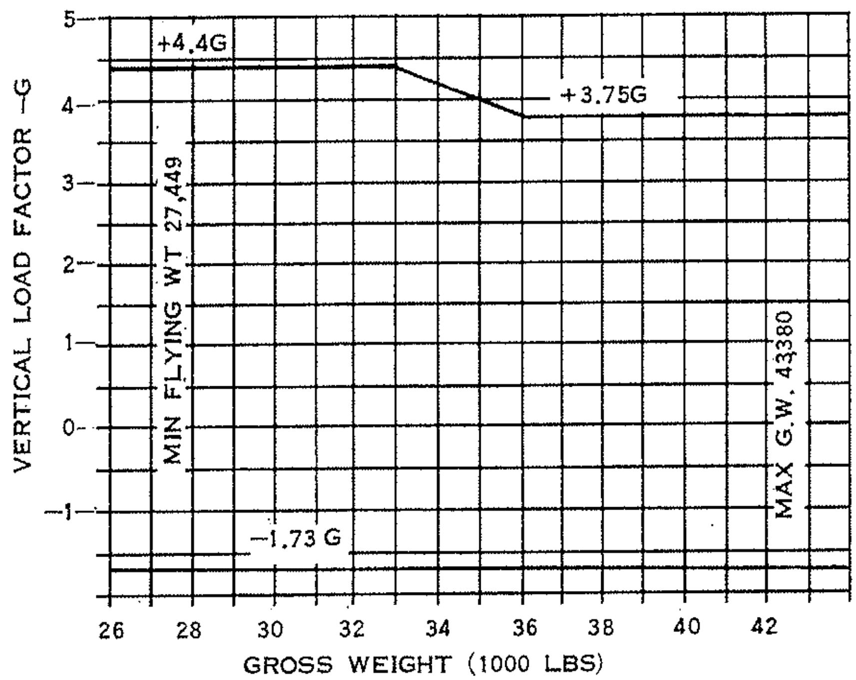
STRENGTH SUMMARY DIAGRAMS

MODEL A–26A

DATA BASIS: ESTIMATED

DATA AS OF 1 MAY 67

SYMMETRICAL MANEUVER



UNSYMMETRICAL MANEUVER

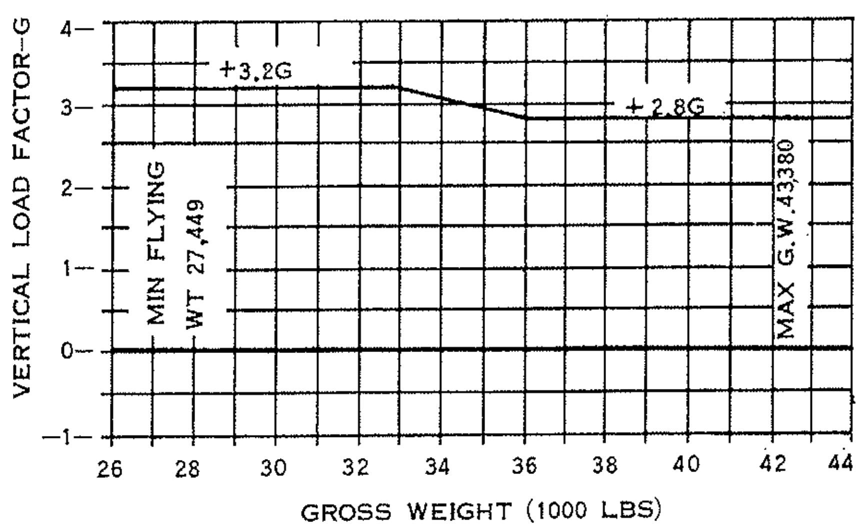


Figure 5-4. Strength Summary Diagrams

OPERATING FLIGHT LIMITS

MODEL A-26A

DATA BASIS: ESTIMATED

DATA AS OF 1 MAY 67

SYMMETRICAL MANEUVER ————

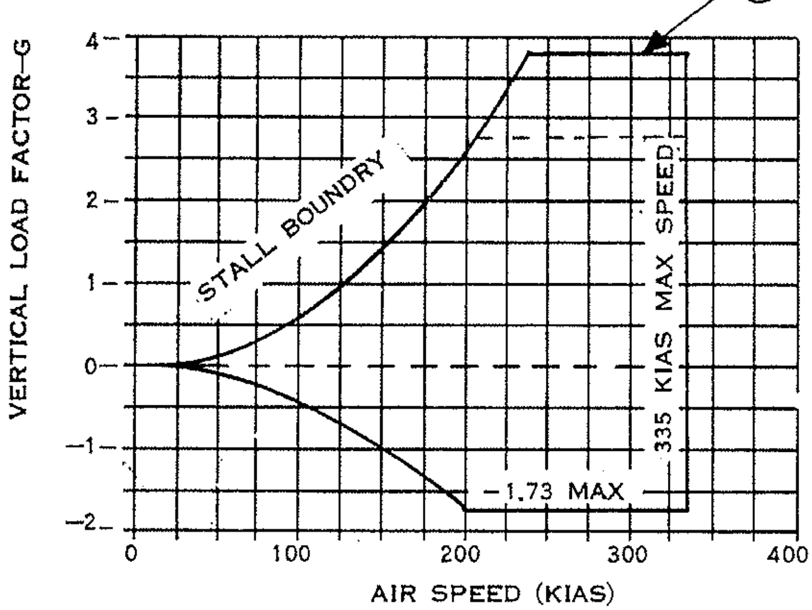
UNSYMMETRICAL MANEUVER — — — — —

CONDITIONS:
GEAR AND FLAPS UP

CONFIGURATION:
2 – 230 GAL WING TANKS
6 – BLU-1/B FIRE BOMBS
(DRAG INDEX = 70)

(1) ABOVE 36,000 LBS

GROSS WEIGHT 40,000 LBS



CONFIGURATION:
CLEAN AIRCRAFT
(DRAG INDEX -40)

(2) BELOW 33,000 LBS

GROSS WEIGHT 28,000 LBS

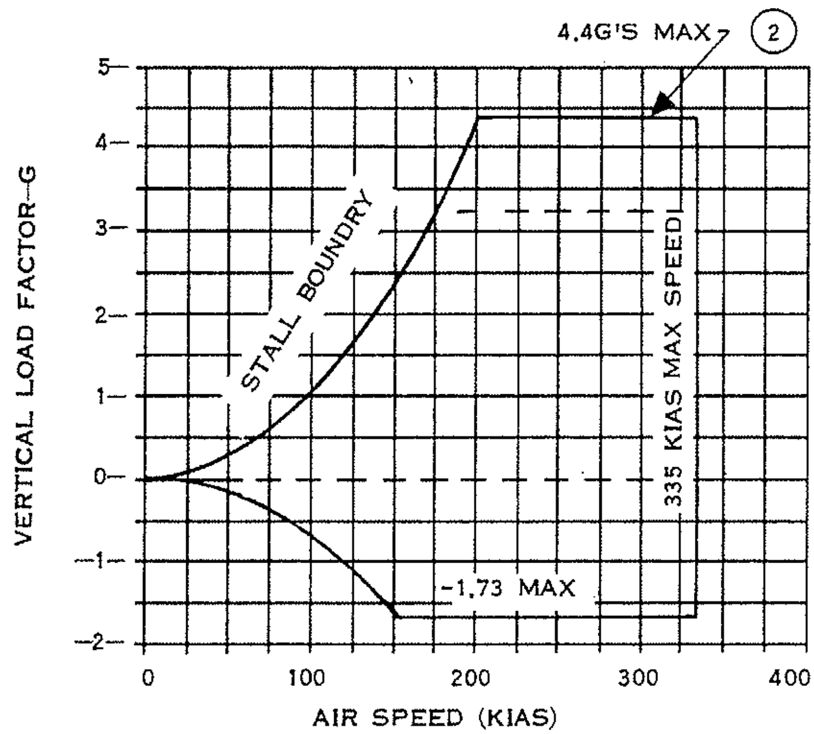


Figure 5-5. Operating Flight Limits

EXTERNAL STORES FLIGHT LIMITATION

STORES		CARRIAGE SPEED (MAX) KIAS	LOAD FACTOR "G"	JETTISON SPEED (MAX) ② KIAS	RELEASE SPEED (MAX) ③ KIAS	DIVE ANGLE RELEASE (MAX) DEGREES
WING TANKS	230 gal	335	3.0	145 Empty 250 Full	----	0
FIRE BOMBS	BLU-1/B, -1B/B, -1C/B	335	①	300	300	30
	BLU-10/B, -10A/B BLU-23/B Finned and Unfinned BLU-32/B Finned and Unfinned	335	①	335	335	30
	BLU-27/B Unfinned	270	3.0	270	270	30
	BLU-27/B Finned	335	3.0	270	270	30
GENERAL PURPOSE BOMBS	AN-M65A1	335	①	300	300	20
	AN-M64A1	335	①	300	300	30
	AN-M57A1	335	①	300	300	30
	AN-M30A1	335	①	300	300	30
	M117A1 Conical Fin M117A1/M1A1 (with 36-inch fuze extender) MK82 Low Drag MK82/MK1A1 (with 36-inch fuze extender)	335	①	300	300	40
	MK81 Low Drag	335	①	180 Min 300 Max	180 Min 300 Max	40
FRAGMENT BOMBS	M81	335	①	300	300	30
ROCKET LAUNCHERS	LAU-3/A LAU-32A/A LAU-32B/A LAU-59/A	335	①	300	335	40

Figure 5-6. External Stores Flight Limitations (Sheet 1)

STORES		CARRIAGE SPEED (MAX) KIAS	LOAD FACTOR "G"	JETTISON SPEED (MAX)② KIAS	RELEASE SPEED (MAX)③ KIAS	DIVE ANGLE RELEASE (MAX) DEGREES
DISPENSERS	CBU-14/A, -14A/A	300	3.0	260	180 Min 300 Max	20
	CBU-22/A, -22A/A	300	3.0	260	180 Min 300 Max	15
	CBU-25/A, -25A/A	300	3.0	260	180 Min 300 Max	20
	CBU-24B/B CBU-29B/B CBU-49B/B CBU-53/B CBU-54/B	335	①	335	335	30
Miscellaneous	M47A4 Smoke Bomb	335	①	300	300	30
	M129E1 Leaflet Bomb	335	①	300	300	0
	BLU-52/B, -52A/B Chemical Bomb	320	①	320	320	30
	MAU-63/A Rack	335	①	⑦	-	0
	MAU-63/A: MK-24 Flare LUU-1/B Signal Marker	335	①	⑦	120 Min 240 Max	0
	MAU-63/A: MK6-3 Signal Marker	335	3.0	⑦	300	20
	SUU-25B/A Flare Dispenser	335	①	120 Min 250 Max	250	15
	SUU-25B/A: MK-24 Flare LUU-1/B Signal Marker	335	①	120 Min 250 Max	250	15

Figure 5-6. External Stores Flight Limitations (Sheet 2)

STORES		CARRIAGE SPEED (MAX) KIAS	LOAD FACTOR	JETTISON SPEED (MAX) ② KIAS	RELEASE SPEED (MAX) ③ KIAS	DIVE ANGLE RELEASE (MAX) DEGREES
Miscellaneous (Cont)	BDU-33/B, -33A/B Practice Bomb	335	①	300	300	30
	MK-106 Practice Bomb	335	①	300	300	30

NOTES:

① See figure 5-4, Strength Summary, and figure 5-5, Operating Flight Limits, charts. Lower limits govern in cases where unsymmetrical maneuver limits are less than the limits established in Load Factor column.

② Jettison speeds quoted apply to releasing of unarmed bombs, full or empty dispensers, full or empty rocket launchers, or loaded or empty wing racks. The wing pylons are permanently attached to the aircraft wings and cannot be jettisoned.

③ Release speeds apply to the delivery of armed bombs, dispensing of CBU munitions, firing of rockets from a launcher, or releasing items from a wing rack. In the event 230-gallon tanks are carried at wing pylon stations 4 and 5, it is not recommended that stores be carried at adjacent stations 3 and 6 due to possible collision with the tanks before dropping clear of the aircraft.

4. When carrying the BLU-27/B finned firebomb or the BLU-52 series chemical bomb on any wing station, the wing flap deflection is limited to 25 degrees.

5. Special handling is required for the BLU-52 series chemical bombs. Handling instructions and requirements for special equipment should be obtained from the using activities headquarters.

6. See figure 5-3 for internal carriage limitations.

⑦ MAU-63/A bomb racks, loaded or unloaded, to be jettisoned only in emergencies.

8. Jettison speeds of the SUU-25B/A dispenser are valid for the full, partially full, or empty condition.

Figure 5-6. External Stores Flight Limitations (Sheet 3)

SECTION VI

FLIGHT CHARACTERISTICS

TABLE OF CONTENTS

GENERAL

Light to moderate control force is adequate for maneuvering the airplane under most normal flying conditions. The aircraft may be safely operated within its flight limits; however, caution must be exercised under some flight and loading conditions.

STALLS

The stall characteristics of the B-26K are influenced by center of gravity, engine power, and wing flap position. The position of the landing gear or the addition of wing stores has no appreciable effect on stall characteristics. Stall warning appears as light airframe buffet which increases in intensity as the aircraft approaches the stall. Stall characteristics are amplified in the following paragraphs. In this discussion the term "power on" refers to the power required to maintain level flight at 120 percent of the power off stall speed with the engine at 2400 or 2600 RPM. Recovery technique from all stalls is standard.

Forward CG Stalls (21 to 22% MAC)

Power Off

With a forward CG condition, stall warning appears only 2 to 3 KIAS above actual stall with the flaps up and decreases with flap extension. There is no stall warning with the wing flaps extended 52 degrees. A full stall is not likely because a pitching oscillation develops with the control column held aft against the stop. A mild rolling tendency occurs but the wings can be held level with aileron and rudder control.

Power On

Stall warning appears approximately 18 KIAS above actual stall in the zero degree flap configuration but decreases to no warning with maximum flap extension. The stall is defined by wing rolloff (usually to the left) rather than pitching downward. Accelerated stalls exhibit the same characteristics except for slightly faster roll at the stall. Recovery from an accelerated stall is aided by reducing engine power.

Mid CG Stalls (24 to 25% MAC)

Power Off

Stall warning appears approximately 8 KIAS above the actual stall in the zero degree flap configuration but decreases to no warning at maximum flap extension. A pitching oscillation develops with the control column held against the aft stop. A rolling tendency is evident but the wings can be held level with aileron and rudder control.

Power On

Stall warning appears approximately 18 KIAS above actual stall in the zero degree flap configuration but decreases to little or no warning at maximum flap extension. The stall is defined by wing rolloff with the direction of the roll usually to the left but not entirely predictable. The roll is more rapid than that which occurs under these conditions at a more forward CG location. Accelerated stalls exhibit similar characteristics except that rolloff is even more rapid. Recovery from an accelerated stall is aided by reducing engine power.

Aft CG Stalls (29 to 30% MAC)

Power Off

Stall warning appears approximately 10 KIAS above actual stall in the zero degree flap configuration but decreases to 5 KIAS at maximum flap extension. Stall is defined by wing rolloff with the direction of the roll unpredictable. The rolling tendency is reduced as the flaps are extended and it is possible to hold wings level at maximum flap extension by using ailerons and rudder. Under these conditions a pitching oscillation develops with the control column held full aft.

POWER OFF STALLING SPEEDS

MODEL: B-26K
DATE: 20 DEC. 1965
DATA BASIS: FLIGHT TEST

ENGINES: (2) R-2800-52W

CONDITIONS:
GEAR AND FLAPS - AS NOTED
THROTTLES - IDLE

NOTE:
POWER ON (1500 SHP PER ENGINE) STALL SPEED IS APPROX 10 KNOTS LOWER THAN POWER OFF STALL SPEED

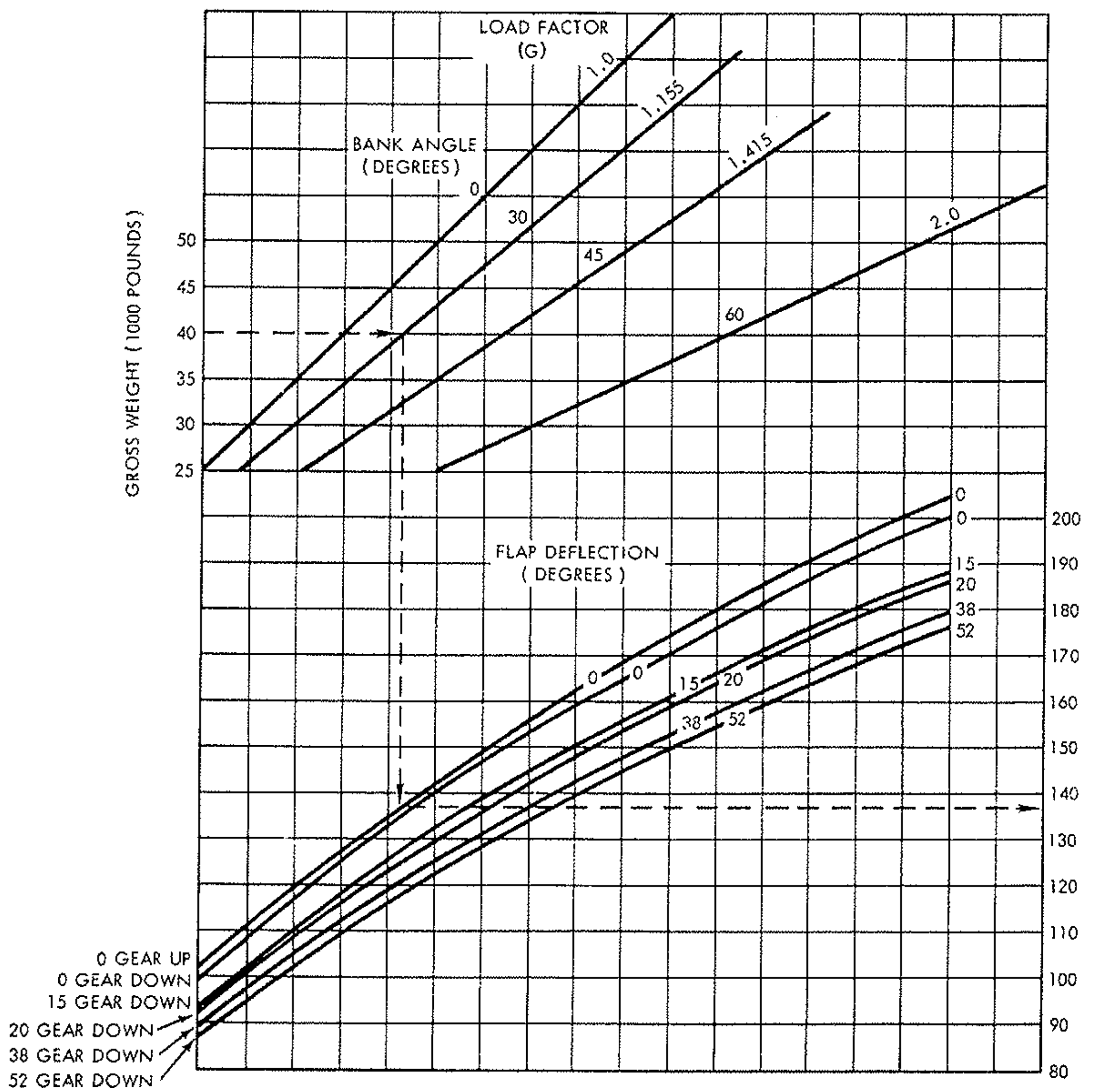


Figure 6-1. Power Off Stalling Speeds

Power On

Stall warning appears approximately 20 KIAS above actual stall in the zero degree wing flap configuration but decreases to approximately 8 KIAS at maximum flap extension. Stall is defined by a rapid wing roll-off, usually to the left, but not entirely predictable. The rolling tendency is reduced slightly at increased flap extensions. Accelerated stalls can produce very rapid wing rolloff at any flap position and may cause the aircraft to enter a spin. Recovery from accelerated stalls is aided by reducing engine power.

Practice Stalls

Stalls in various aircraft configurations should be practiced to become familiar with the characteristics of stall and to develop proper stall recovery technique. Engines should be set at 2400 RPM for both power off and power on stalls. For power on stalls, the power used should be that necessary to maintain level flight at a speed of 120 percent of the power off stall speed. Maintain terrain clearance of at least 8000 feet when practicing aft CG power on stalls.

Stall Recovery

Stall recovery should always be made by applying nose down elevator. Rudder and aileron then should be used as necessary to maintain directional and lateral control. Control effectiveness will increase as speed increases. After airspeed increases above the stall speed, apply smooth back pressure on the control column and add power as necessary to return to level flight. In the case of a power on stall where roll has developed, the same technique applies but power should be reduced as necessary to regain lateral and directional control. A stall with unbalanced power may cause severe roll. When this occurs, the throttles should be closed immediately and power reapplied symmetrically during recovery. If the stall has occurred during single engine operation, the power should be reapplied slowly during recovery at a rate that will allow adequate lateral and directional control.

SPINS

Intentional spins are prohibited in this airplane. If a spin is entered accidentally, the throttles should be closed immediately, the ailerons neutralized; apply nose down elevator and apply rudder against the spin. When the rotation stops, begin a gradual pullout while avoiding excessive airspeed buildup. Engine power can then be reapplied as required.

FLIGHT CONTROLS

Aileron, elevator, and rudder control forces are relatively light in the normal operating speed range. For a forward CG the control forces increase with increasing speed and are heavy at the limit airspeed. However, for an aft CG, the forces are light and do not insure against overstressing the airplane. Pilots must exercise caution and stay within the allowable load factor.

Conventional trim tab control is provided for ailerons, elevator, and rudder. The trim tabs are responsive throughout the operating speed range of the airplane.

LEVEL FLIGHT CHARACTERISTICS

Without external stores the aircraft is stable under all normal flight conditions. Changes of engine power will affect both rudder and elevator trim. The aircraft is easily trimmed throughout the allowable speed range. The addition of external stores decreases the stability and the aircraft becomes difficult to trim for hands off flight.

Trim tab control is sufficient to trim for single engine cruise flight.

MANEUVERING FLIGHT

Acrobatics are prohibited in this aircraft. Normal maneuvers can be accomplished with moderate pilot effort. With no external stores and at a forward CG, the stick force gradients are positive. As stores are added and the CG is moved aft, the stick force gradient decreases and actually reverses at the most aft CG loading. Caution must be exercised when maneuvering with aft CG loadings. Push stick forces as high as 20 pounds may be required to maintain 2G. Stick force gradients are positive at all CG loadings with the wing flaps extended 38 degrees.

WARNING

> Addition of external stores moves the CG aft, decreasing the stick force gradients. The gradient reverses at the aftmost CG loadings to a point that push stick forces may be required to maintain allowable positive load factors. The aircraft may be overstressed unless care is exercised.

DIVING

Maximum diving speed is 335 KIAS or 0.674 Mach number, whichever occurs first, for any gross weight or store loading. Abrupt pullouts should be avoided to prevent overstressing the airplane.

SINGLE ENGINE FLIGHT

At heavy gross weights with external wing stores there is insufficient single engine power available to maintain level flight. Any decrease in drag (reducing weight, jettisoning wing stores, feathering inoperative propeller, retracting gear or flaps, closing cowl flaps and oil cooler doors, reducing speed to maximum endurance speed) will reduce the power required to maintain level flight.

At 35,000 pounds' gross weight with gear and flaps up, no wing stores, inoperative engine propeller feathered, METO power will maintain 150 KIAS at 10,000 feet. METO power will not maintain level flight at any altitude with a windmilling propeller at 35,000 pounds' gross weight. Depending on speed, a windmilling propeller produces drag equivalent of 600 to 1000 shaft horsepower greater than that for a feathered propeller.

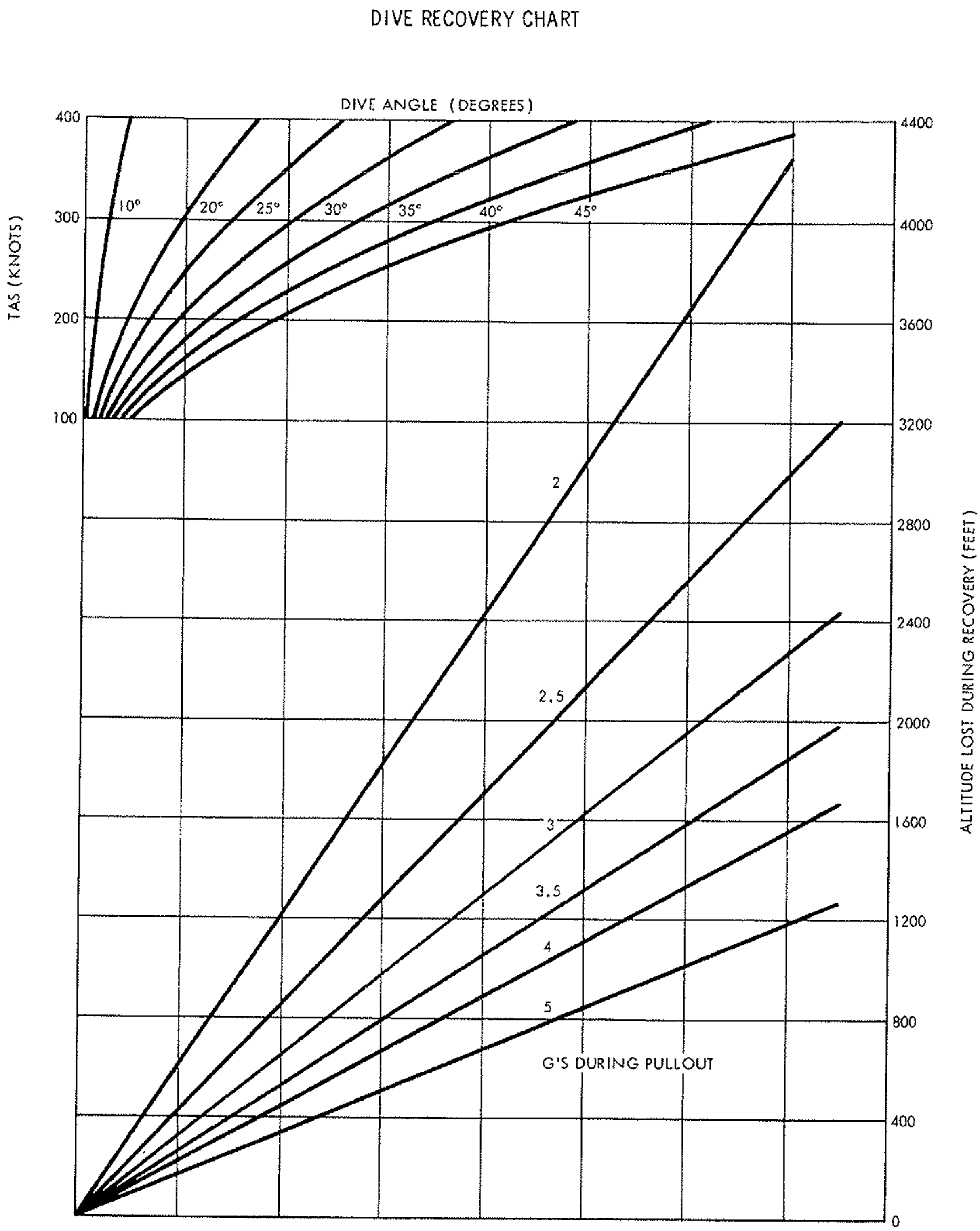


Figure 6-2. Dive Recovery Chart

Minimum control speed (MCS) is that speed required to provide sufficient control to enable the airplane to fly a straight flight path over the ground when an engine has failed. MCS is based on takeoff configuration, inoperative engine propeller feathered, wet maximum power on the good engine and no more than 5 degrees of bank angle away from the failed engine.

Minimum control speed for the B-26K is 125 KIAS. Rudder pedal forces as high as 300 pounds will be required to maintain straight flight under the conditions cited above without using rudder trim.

The value to be used as the minimum single engine airspeed in this manual is the MCS value of 125 KIAS.

CAUTION

> High rudder pedal forces (up to 300 pounds) are required to maintain a straight flight path if an engine fails after takeoff while at low airspeed. The forces may be relieved by rudder trim, but immediate pilot response to an engine failure is required to assure directional control.

In the event of an engine failure after takeoff while below 125 KIAS, power on the operating engine should be reduced until directional control is achieved. It should be noted that a single engine climbout with reduced power may not be possible. If an engine failure is experienced while on the ground, the takeoff should be aborted.

Single engine go arounds can be successfully accomplished from 125 KIAS at gross weights up to 30,500 pounds using 2600 RPM and 51.5 inches Hg MAP on the operating engine. All single engine go arounds should be initiated at a minimum altitude of 300 feet above the runway. High rudder forces will occur with power application but can be trimmed out. The initial rate of climb will be very low and 100 to 150 feet of altitude will have to be sacrificed to gain airspeed. Wing flaps should be retracted once a gain in airspeed is observed. At 140 KIAS either altitude or airspeed can be gained.

LANDING

Power on approaches are normal for this aircraft. Minimum control speed should be maintained and final flap setting delayed until landing is assured. The nose gear will tend to drop rapidly and firmly to the runway immediately following main gear contact. An effort should be made to control the pitchdown onto the nose wheel. Once the nose wheel is on the runway, propeller reversing and wheel braking can be used. Propeller reversing should be used immediately after landing because it is most effective at higher speeds. The propellers should be returned to the forward thrust range above 40 KIAS to minimize control surface buffeting. The antiskid braking system requires pilot modulation of brake pedal force to obtain a slow antiskid cycling rate.

SECTION VII

SYSTEMS OPERATION

TABLE OF CONTENTS

ENGINE

BMEP Indicators

BMEP indicators (engine torquemeters) are provided to indicate the power being delivered to the propellers. The indicators are sensitive instruments indicating torque in PSI. They are energized electrically by torque pressure transmitters installed in the nose case section of the engines. The BMEP circuit is powered by 26 VAC. The torque indication is originated by a master torque pressure piston and five subsidiary pistons installed in the forward accessory section of the engine in such a way that when power is transmitted to the propeller from the engine, the fixed reduction gear mounted on a spiral spindle shaft tends to move forward on the splines. The forward face of the gear pushes against the pistons, creating a pressure on oil supplied at the other end of the piston by the oil pressure boost pump. This develops pressure through a static fluid tube against torque pressure plates which actuate the torque pressure transmitters. The torque indicated on the BMEP indicator is therefore the torque applied to the propeller. Power delivered to auxiliary equipment and electrical equipment by the engine is not included in the BMEP indication. The indicated BMEP of the two engines will not necessarily be equal at any time, partly due to possible variation in accessory load and engine condition, but also because the tolerances of the installations are such as to allow a possible difference of 5 PSI or more. BHP may be calculated by using the following formula:

$$BHP = \frac{BMEP(PSI) \times RPM}{283}$$

The BMEP indicators provide the best indication of power failure and power changes. If a carburetor should ice, the decrease in power as shown on the BMEP indicator will usually be the first indication. If spark plugs begin to fail, or other failure begins, this power loss will be indicated by the BMEP indicator. BMEP will drop if the carburetor begins to ice, if fuel pressure fluctuates or drops below operating limits, if the ignition system is defective, or if cylinder head temperatures are too high and the mixture too lean. In general, any condition which prevents the engine from developing all of the power it should develop at a given power setting will be reflected in abnormally low BMEP indication. Refer to Carburetor Mixtures for use of BMEP indication for manual leaning.

Detonation

Detonation is one of the principal hazards associated with the operation of a high output engine. It is the result of sudden exploding of the charge in the combustion chamber as contrasted to the steady release of energy in the progressive and relatively slow burning which occurs during normal combustion. Detonation is accomplished by severe pressure waves in the combustion chamber. Abnormal heat is developed. Damage to the engine will result from continuous or frequent detonation and in the worst instances detonation leads rapidly to complete engine failure. Detonation as in an automobile engine can be heard as a sharp knocking. If other sounds could be filtered out, knocking would be audible in an airplane engine in which detonation was occurring. A rapid increase in cylinder head temperature, however, is the only warning of detonation. The following factors contribute to the tendency of an engine to detonate: (1) excessive manifold pressure; (2) insufficient cooling; (3) lean fuel-air mixtures; (4) excessive carburetor air temperatures; (5) faulty ignition system; and (6) fuel of low antiknock (octane) value. The first four of these factors can be controlled from the flight compartment. If engines are operated within the specified limits, on the recommended grade of fuel, and with carburetor and ignition systems in normal condition, there will be no detonation.

Water (Antidetonant) Injection (ADI)

As explained in Detonation, engine operation at excessive manifold pressures and insufficient cooling contributes to detonation. In the absence of water injection, the tendency to detonate at high power settings is suppressed by enriching the mixture beyond the best power fuel-air ratio to supply excess fuel for cooling. When water injection is used, the fuel-air ratio is automatically deriched to the best power range and a water-alcohol solution is introduced with the fuel entering the engine, to provide charge cooling and prevent detonation. This ability to operate safely in the high power range with best power mixtures provides more brake horsepower for a given throttle and RPM setting than would otherwise be available with the rich mixtures accompanying operation without water injection. The consumption of ADI fluid at takeoff power (2500 BHP) is approximately 1.5 gallons per minute for each engine. Considering the usable tank capacity of 21 gallons per engine, there is sufficient fluid to operate both engines for approximately 14 minutes.

Unmetered fuel pressure from the carburetor builds up pressure on a diaphragm of the metering pressure control valve and holds this valve open. When the ADI arming switch is on, water pressure is built up in the regulator valve chamber, which counteracts the pressure on the diaphragm and closes the valve. The same water pressure builds up on the carburetor derichment valve diaphragm. This valve closes and reduces fuel flow through the carburetor to a predetermined setting for best power-mixture ratio. As the unmetered fuel pressure increases in response to greater engine power requirements, the water pressure opens a metering pressure control valve. However, water does not enter the engine until sufficient metering force is developed to permit fuel pressure to build up and open a check valve in the regulator. At a predetermined power, the check valve begins to open, giving rapid increase in water-air ratio as the power is increased. When water starts to flow through the regulator main water jet, the pressure differential thus set up is transmitted to the diaphragm of the regulator enrichment valve. Further increase of pressure differential with increased airflow causes the enrichment valve to start opening. When the enrichment valve is completely open in response to power demands, the water-air ratio levels off to a constant value determined by the regulator enrichment jet. This enriching action, or increase in water-air ratio, corresponds to the action of the enrichment valve and jet in the pressure type carburetor.

Throttle Operation

Power changes should be made smoothly and gradually. If throttles are jerked or moved rapidly, backfiring and torching may result.

ENGINE SUPERCHARGERS

Engine Supercharger Shift Check

When making an engine supercharger shift check, pilots should make absolutely certain that superchargers are back in LOW before takeoff. Should the supercharger shift actuator fail to shift from HIGH back to LOW, and a takeoff be made in high supercharger, severe detonation caused by high compression and high temperature of the mixture might result in engine failure. To determine whether or not superchargers have actually shifted, pilots may observe two indications: manifold pressure and BMEP fluctuations. When shifting from HIGH back to LOW, an approximate 2-inch drop in manifold pressure and a fluctuation of BMEP indicate that the supercharger has actually gone back into LOW position.

Engine Supercharger Shift Operation

Two factors govern engine supercharger shifting - altitude, and carburetor air temperatures. The altitudes for shifting superchargers are given in the power schedule charts in the Appendix. These altitude values are determined from engine operating curves and comparative fuel consumption for each supercharger ratio at the same engine power output. They are based on use of low supercharger whenever the desired power can be maintained at the selected RPM with full throttle. Carburetor air temperature, as related to supercharger operation, is of critical importance. Carburetor air temperature is measured before fuel is injected and before the fuel-air mixture passes into the supercharger section. Due to the compressor action of the supercharger and other factors, considerable heat rise occurs in the fuel-air mixture before the charge is admitted to the cylinders. By controlling the carburetor air temperature to certain maximums, it is therefore possible to preclude detonation that originates from excessive carburetor heat. The low supercharger critical altitude (full throttle) for normal climb BHP is usually reached in the range of 12,000 to 15,000 feet, depending upon existing atmospheric conditions and variations in engine condition. Use the following procedures when shifting from LOW to HIGH supercharger to maintain the same condition of RPM and manifold pressure:

1. After passing the low supercharger critical altitude, continue full throttle climb until manifold pressure falls off 5 inches Hg.

2. Set throttle to reduce manifold pressure to approximately 25 inches Hg.

3. Place supercharger levers in HIGH position.

4. Set throttle to obtain desired manifold pressure.

CAUTION

Do not shift to high supercharger if carburetor air temperature exceeds limits. High supercharger operation above these temperature ranges will then cause excessively high mixture temperature with resulting detonation.

If the power desired for use with high supercharger is lower than that for low supercharger, shift to high supercharger when the manifold pressure falls to the value desired. During climb, watch cylinder head temperatures and do not exceed maximum permissible temperature. Maintain 200°C or less, opening cowl flaps and increasing airspeed for better cooling.

CARBURETORS

Carburetor Air Temperature

The engines on this aircraft require two different carburetor air temperature limits, one for low and one for high supercharger operation. Because of the higher temperature rise in the supercharger when operating in high ratio, carburetor heat must be held to a lower temperature. If this is not done, detonation will occur. For high supercharger carburetor heat limits, refer to Section IX. While eliminating ice from the carburetors these limits, of course, do not apply since this is considered an emergency situation of short duration.

Carburetor Mixtures

The carburetor used on the R2800-52W engine permits manual leaning of the fuel-air mixture strength for decreased fuel consumption and increased range. The manual mixture control mechanism of the carburetor provides a wide angle of adjustment between the AUTO RICH position and the IDLE CUTOFF position. This allows a closer, more accurate adjustment of the mixture ratio. Mixture strength may be adjusted manually, if desired, on the basis of BMEP drop from the best power position.

Manual Leaning

As automatic carburetor operation will not permit the attainment of maximum precision in the control of fuel flow and mixture strength, and since the AUTO LEAN mixture position is set to assure smooth engine operation rather than fuel economy, some method of manually leaning the cruise mixture is desirable. Basically, the manual leaning procedures outlined below provide for establishing the desired fuel-air ratio with as many factors as possible held constant, including airflow, cylinder head temperature, carburetor air temperature, manifold pressure, and RPM. Only fuel flow is varied and the resulting changes in power follow closely the fundamental relationship existing between the fuel-air ratio and power. The following procedures for manually leaning the cruise mixture and setting up economical fuel flows are based on a BMEP drop from the best power condition.

During Climb

Prior to reaching cruising altitude, determine the brake horsepower required to obtain the desired performance. Refer to the power schedule charts in the Appendix.

NOTE

For prolonged engine durability, it is recommended that 1200 BHP or less be used for normal cruise.

Cruise

After climbing to the desired cruising altitude, accelerate to cruising speed. As airspeed increases, adjust cowl flaps to establish cylinder head temperature at desired value for cruise.

1. Mixture control in AUTO RICH.

2. Adjust manifold pressure and RPM to cruise settings as obtained from power schedule charts in the Appendix.

CAUTION

- Manual leaning above 2 BMEP is not permitted above 1200 BHP.
- When using alternate fuel grade 100/130, do not exceed 1100 BHP in high supercharger.

3. After 3 to 5 minutes to allow for stabilization, move the mixture control levers (one at a time) toward AUTO LEAN until a maximum BMEP reading is obtained. This is the best power mixture setting. Note the pressure.

NOTE

Due to manufacturing and maintenance tolerances, the best power position of the mixture control levers will vary from engine to engine. The position may be found at the AUTO RICH position or in a range of travel from AUTO RICH to a point slightly above AUTO LEAN position.

4. If the best power peak cannot be determined or if the AUTO RICH position is thought to be leaner than the best power, it may be necessary to use prime to establish the setting. When prime is applied with mixture control in AUTO RICH, the following relationships apply, as shown in figure 7-1:

NOTE

Engage the engine primer and watch the BMEP gage for a rise, drop, or steady indication. Note the maximum BMEP reading and then disengage the primer.

a. If BMEP drops, AUTO RICH is at or richer than best power; if it is richer than best power, the BMEP will rise as the maximum is manually leaned from AUTO RICH (figure 7-1, condition 1).

b. If the BMEP does not change, AUTO RICH is near the lean end of the best power mixture range (figure 7-1, condition 2).

c. If the BMEP rises, or rises and then falls, AUTO RICH is leaner than best power (figure 7-1, condition 3 or 4).

5. After establishing the best power mixture setting, check the manifold pressure. If the resulting manifold pressure exceeds the maximum value, retard the throttle to the limiting value.

6. Further retard the mixture control until the desired BMEP drop from the peak value is obtained.

EFFECT OF PRIME ON POWER AT VARIOUS AUTO RICH MIXTURES

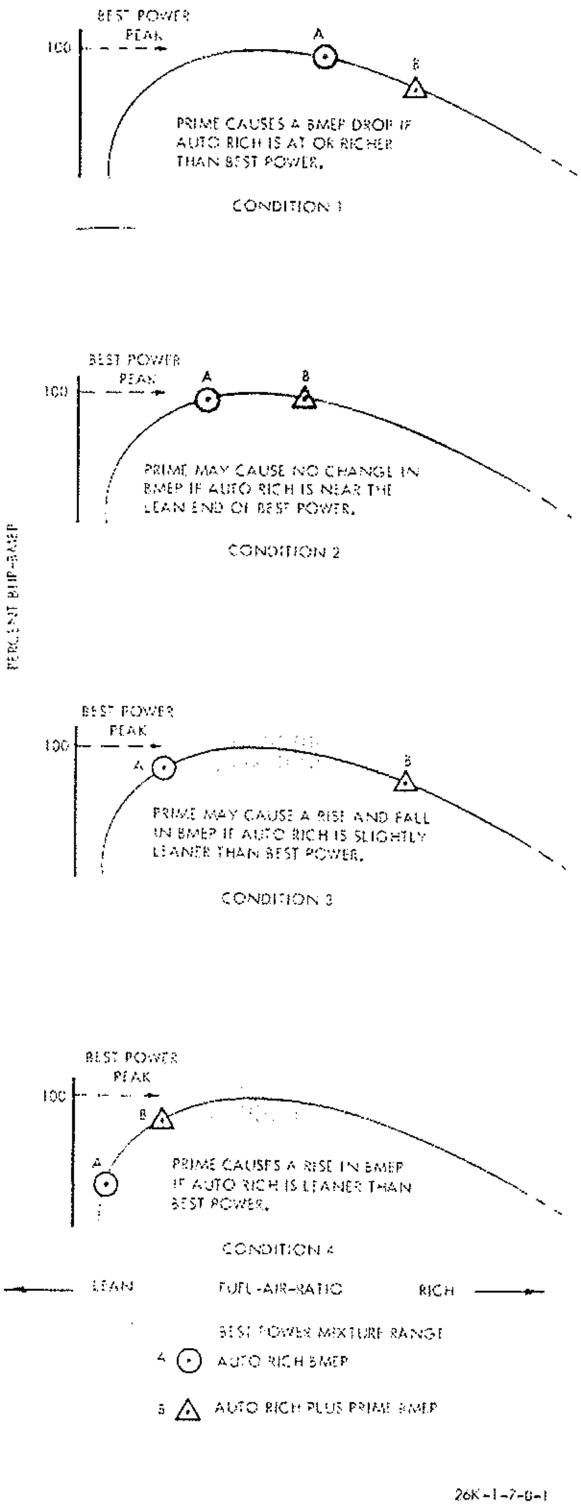


Figure 7-1

7. Periodically check to see that the specified manifold pressure and BMEP drop are maintained. The BMEP drop may be checked by energizing the primer and checking the specified PSI rise to the best power peak.

This procedure of setting power places final reliance upon the manifold pressure gages and tachometers, but uses the BMEP indicator as a primary power setting instrument within limits. Further, the BMEP indicators are the primary instruments for setting cruise power mixtures. This method of setting cruise mixtures by a given BMEP drop from best power will generally provide a power setting that is optimum for cruise powers. However, if the AUTO RICH setting is excessively lean (figure 7-1, condition 4), this drop could result in a setting of less than best economy which might result in unsatisfactory engine operation. If any evidence of engine leanness (such as engine roughness, surging and/or a low cylinder head temperature) is encountered, place the mixture controls in AUTO LEAN to attain smooth operation.

Change to Power Settings

Whenever changes are made to the power settings, it is advisable to check that the resulting BMEP is the specified amount below the maximum reading. Under most conditions, a 1-inch change in manifold pressure or a 100 RPM change will not appreciably affect the relative mixture setting. However, since a change in airspeed, altitude or temperature may affect the metering characteristics of the carburetors, the mixture settings should be periodically checked en route to ascertain that the BMEP drop is the correct amount below the maximum reading.

Manual Mixture Adjustment

During cruise operation above 1200 BHP in low supercharger, manual mixture adjustment to minimum fuel flow is used instead of manual leaning to BMEP drop. The procedure for manual adjusting of the mixture controls is as follows:

1. Set RPM and manifold pressure to desired power.

2. Manually adjust the mixture control levers to minimum fuel flow as specified on the fuel flow charts in the Appendix.

CAUTION

Engine roughness, detonation, and loss of power will result if fuel flow is below minimum for the desired power setting.

IGNITION SYSTEM

Spark Plug Fouling and Leading

Spark plug fouling is a principal cause of ignition trouble, which in turn is one of the most common engine maintenance and operating problems with aircraft engines using 115/145 or 100/130 grade fuel. These grades of fuel may contain a relatively high lead content. Such fouling might be defined as an accumulation of deposits which cause misfiring or prevent firing across the spark plug electrodes. The most common types of fouling are lead fouling and carbon fouling, with lead fouling the main troublemaker. Cause.

prevention, and cure of spark plug fouling are all linked to the chemistry and physics of the combustion cycle, which in turn are subject to wide variation under different ground and flight engine operating conditions. A logical treatment of the problem involves separate discussion of each aspect of typical engine operation including ground running, takeoff, climb, cruise, and descent. Prevention appears to be the most profitable line of attack on the problem.

Important Factors

Tetraethyl lead is the most important basic cause of lead fouling. Scavenger agents such as bromine in the tetraethyl lead are provided to combine with the lead during combustion, thereby removing the lead with the exhaust gases. However, under certain conditions of temperature and pressure, the lead will condense on the spark plug insulator as lead oxide or lead bromide. In the presence of excess carbon as a reducing agent, these may form metallic lead particles. All such deposits can prevent ignition or firing. Obviously the best solution is to remove or reduce the lead compounds presently contaminating the fuels. Other pertinent factors which influence plug misfiring include the type of ignition system, spark plug characteristics and length of time in operation, water injection operation (dry or wet takeoffs), general engine conditioning including the care and handling of spark plugs, the operating requirements and characteristics of the particular engine installation, and the specific engine operating conditions. In general, spark plug fouling involves a buildup of deposits through prolonged operation under a fixed set of conditions. Prevention and remedy for plug fouling, therefore, depend on taking action to vary these conditions, thereby upsetting the chemistry of the fouling cycle, to restore good ignition.

Ground Running

The most critical plug fouling range is between 650 and 1150 RPM, which is the most common range for ground idle operation. Therefore, during ground idling, particularly while awaiting runway clearance before takeoff it is recommended that carburetor mixtures be manually leaned to obtain best power (maximum RPM rise). As used here, the term "manually leaned" is intended as the full range of manual mixture control travel between AUTO-RICH and IDLE CUT-OFF. After each 10 minutes of ground operation, at low RPM (650-1150), the engines shall be "cleared out" by slowly advancing the throttles (2 to 3 seconds per 100 RPM) to field barometric pressure for one minute. Do not exceed 232°C CHT. After returning to idle RPM, repeat the manual leaning procedure. If time since last engine ignition system check exceeds 10 minutes, another ignition check shall be performed just prior to takeoff. Ascertain mixture levers are placed in AUTO-RICH for ignition system check and takeoff.

NOTE

If unacceptable spark plug performance is experienced, place mixture in AUTO RICH. Move throttles to 35 inches Hg, then move mixture to AUTO LEAN and allow cylinder head temperature to reach 160°C and hold for 30 seconds. Move mixture control to AUTO RICH. If engine power check is not satisfactory, repeat the above procedure. In event a second attempt to clear spark plugs fails to produce satisfactory results, do not attempt to take off.

Takeoff

Smooth and steady application of the throttle is preferable to a rapid or "jam" acceleration to takeoff power. The most common symptoms of spark plug fouling include erratic BMEP readings, loss of BMEP and associated backfiring and rough running; all of these are evidence of advanced stages of misfiring. When these symptoms develop, reduce manifold pressure as required to restore smooth operation. Turn off the water injection to further reduce spark plug load and facilitate firing.

Type and Cause of Fouling

Cruise conditions usually generate lead fouling rather than carbon fouling. Conditions favorable to lead fouling include long continued application of a given set of engine conditions typical of cruise flight, particularly those involving very lean mixtures. Associated contributing factors include abnormally cool cylinder head temperatures and low manifold pressure. Common symptoms include BMEP oscillation and backfiring or afterfiring.

Prevention of Fouling

A period change in engine conditions will usually forestall lead fouling. Here again, prevention is preferable to cure. Hourly intervals are frequently used and may accomplish results either by use of AUTO RICH for 5 minutes, a change of 3 to 5 inches of manifold pressure, or a change of 100 to 300 RPM. A reduction in power followed by an increase appears to be the preferable approach to prevention. One or more of these procedures which least affects the flight condition, should prove effective.

Detection of Fouling

Since there is no engine analyzing equipment aboard the aircraft, spark plug fouling may be detected only through engine instrument and other engine checks.

During ground run magneto checks, an excessive RPM drop is a strong indication of both carbon and lead fouling. An excessive BMEP drop and rough running engine during flight are an indication of fouling.

Cure of Fouling

Cure is less certain and includes a wider variety of procedures than prevention. If fouling is detected soon enough, however, it can usually be eliminated or held to a minimum by a sharp increase in combustion temperature. A sharp rise in combustion temperature can be obtained by going to normal power for a short period. Generally, plugs which are misfiring or completely fouled are apt to resume firing at lower power settings. Therefore, it is preferable to reduce power and then restore it, rather than attempt to reach a high power setting with malfunctioning plugs If spark plug fouling occurs in flight move mixture control to AUTO RICH. If this is not effective reduce manifold pressure slowly until plugs resume firing. This is usually observed when smooth engine operation is obtained. Maintain this power for one to two minutes. Slowly increase manifold pressure three to five seconds per 100 RPM until desired cruise power is established. Should rough engine operation be experienced before reaching desired cruise power, slowly decrease manifold pressure until smooth power is obtained and repeat process.

CAUTION

Whenever appreciable power changes are made, it is important to cushion the high inertia loads on the master rod bearings which occur under these conditions. As a rule of thumb, each 100 RPM requires at least one inch Hg manifold pressure (for example 23 inches Hg at 2300 RPM).

High power burnout procedures, with or without water, could chemically change the fouling deposits to an extent that there could be no inflight remedy and the only cure would be to change spark plugs. High power burnout procedures also introduce the possibility of destructive backfiring during the application of power.

Descent

If a fouling problem is encountered in descent, it can usually be cured by clearing the engine during final approach - with flaps and gear down, approach RPM, and a high power level set for 1 to 2 minutes prior to landing. When the cylinder head temperatures are up to the cruise range, the plugs will usually be clear and ready for any possible high power requirement.

Descent Power Setting

Flying conditions permitting, adjust the throttle and or propellers to maintain level flight cruise power during descent. If flying conditions in descent require a large reduction in power, reduce RPM as well as manifold pressure. For descents or other low power maneuvers it is important to cushion the high inertia loads on the master rod bearings which occur at conditions of high RPM and low manifold pressure. Avoid prolonged high RPM with low manifold pressure. Attempt to maintain a power setting of 1 inch Hg manifold pressure per 100 RPM. The engines cool rapidly during descent. Use the cowl flaps to maintain cylinder head temperature.

FUEL SYSTEM

Fuel System Operation

The fuel system is described in Section I. Additional information on operation of the fuel boost pumps and the crossfeed system in various unusual circumstances is provided in the following paragraphs. Refer to the Appendix for fuel consumption data.

Fuel Boost Pump Operation

In addition to using the boost pumps for starting takeoff, climb, and landing, they should be used in flight whenever fuel pressure fluctuates within limits. Sometimes, at high altitudes or with high fuel temperatures, engines will surge because of vapor lock. This may be brought about by "boiling" of the fuel at high temperatures or at high altitudes after rapid climb. The characteristics of the conditions are oscillation of fuel pressure and fuel flow, and flickering of the fuel pressure-low warning light. Boost pumps correct this trouble by decreasing the tendency of the fuel to vaporize in the lines, thus preventing fuel pump cavitation.

CAUTION

With sufficient downward fluctuation of fuel pressure, a power loss occurs. The propeller governor will turn the blades to flatter pitch in order to keep engine RPM up to the setting of the governor. If full fuel flow is then suddenly restored, the engine may tend to overspeed before the propeller can return to higher pitch. Proper fuel boost pump operation will prevent this. Accordingly, whenever boost pump operation is necessary, always select LOW boost position first and allow fuel pressure to be sensed before selecting HIGH boost position. This procedure will minimize the possibility of high pressure surges that could damage the carburetor diaphragm or create fuel leaks. If a visible or otherwise known fuel leak occurs, with or without a fuel pressure drop, immediately stop the boost pump supplying fuel to the affected engine. Likewise, a fuel boost pump must not be turned on if fuel pressure drops below operational limits while the engine continues to operate normally, as a fuel leak may be responsible for the pressure drop.

Fuel Crossfeed Operation

When operating on crossfeed, the main fuel selector valve handle for the tank not being used should be turned to OFF. Unless this is done, fuel may be inadvertently transferred from tank to tank.

When operating on crossfeed to the opposite engine, or to both engines, the fuel boost pump of the tank being used must be turned on if fuel pressure drops or fluctuates below operating limits and abnormal engine operation is evident. The fuel selector valve for the tank not being used must be closed to preclude fuel transfer from tank to tank. During the changeover from normal to crossfeed operation, or from crossfeed back to normal, it is very important to maintain constant fuel pressure at all times. If pressure is allowed to drop during the changeover, its resurgence will cause high pressure in the fuel system which might damage the carburetor diaphragm. To prevent this, maintain constant fuel pressure by adhering to the sequence of steps in the following procedure:

Two Engine Operation

1. Normal to Crossfeed:

a. Place both boost pump switches in LOW position.

b. Position the crossfeed valve handle to CROSSFEED.

c. Place the boost pump switch for the unused tank in OFF position.

d. Place the fuel selector valve handle for the unused tank in OFF position.

2. Crossfeed to Normal:

a. Place both boost pump switches in LOW position.

b. Place the fuel selector valve handle for the unused tank in ON position.

c. Turn the crossfeed valve handle to the OFF position.

d. Position boost pump switches as required.

Single Engine Operation

1. Normal to Crossfeed:

a. Place both boost pump switches in the HIGH position.

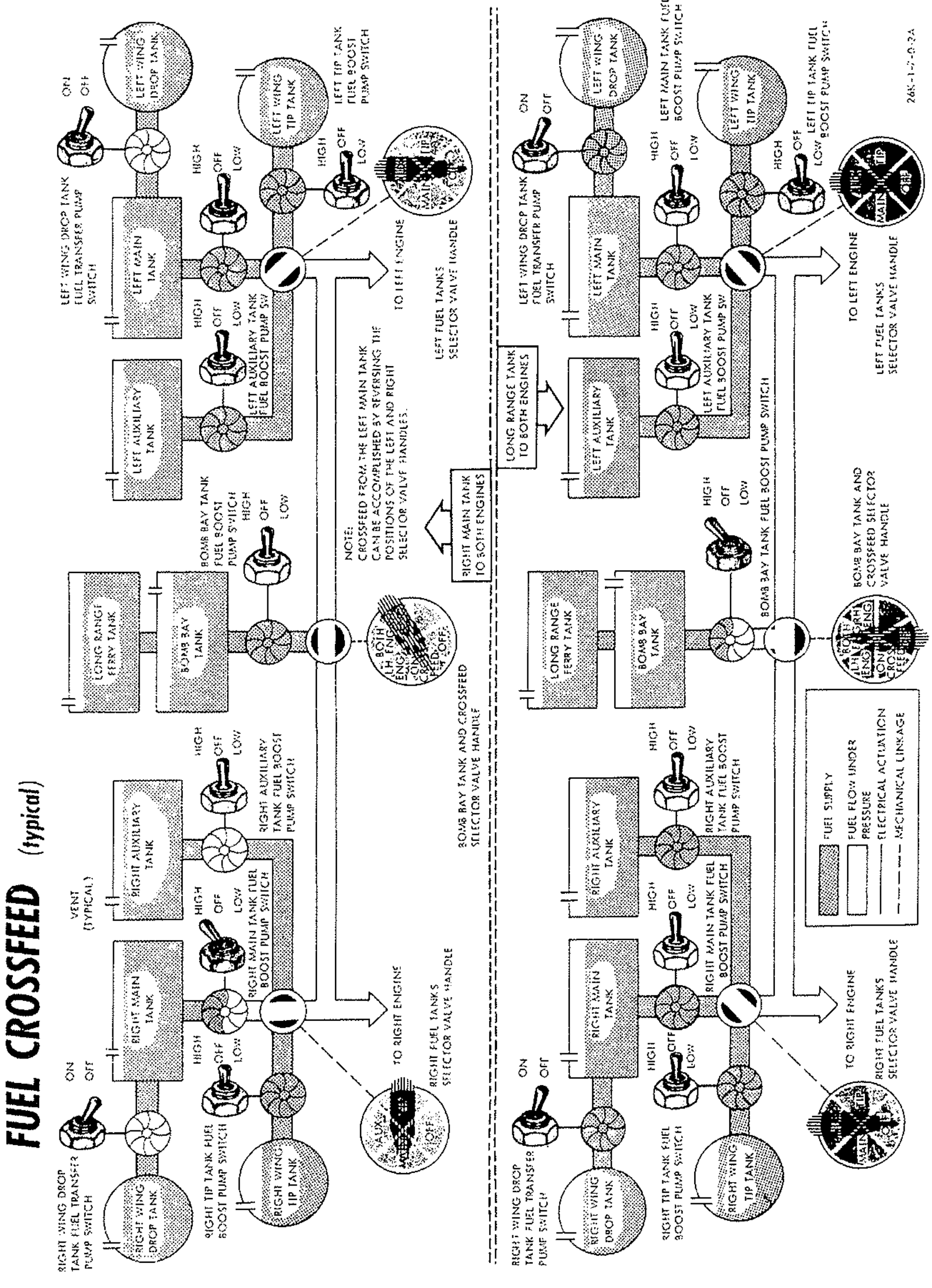

FUEL CROSSFEED (typical)
RIGHT WING DROP TANK FUEL TRANSFER PUMP SWITCH
ON
OFF
RIGHT WING DROP TANK
RIGHT MAIN TANK
VENT (TYPICAL)
RIGHT AUXILIARY TANK
LONG RANGE FERRY TANK
BOMB BAY TANK
LEFT AUXILIARY TANK
LEFT MAIN TANK
LEFT WING DROP TANK
LEFT WING TIP TANK
RIGHT WING TIP TANK
HIGH
OFF
LOW
RIGHT TIP TANK FUEL BOOST PUMP SWITCH
RIGHT MAIN TANK FUEL BOOST PUMP SWITCH
RIGHT AUXILIARY TANK FUEL BOOST PUMP SWITCH
TO RIGHT ENGINE
RIGHT FUEL TANKS SELECTOR VALVE HANDLE
BOMB BAY TANK AND CROSSFEED SELECTOR VALVE HANDLE
BOMB BAY TANK FUEL BOOST PUMP SWITCH
NOTE:
CROSSFEED FROM THE LEFT MAIN TANK CAN BE ACCOMPLISHED BY REVERSING THE POSITIONS OF THE LEFT AND RIGHT SELECTOR VALVE HANDLES.
RIGHT MAIN TANK TO BOTH ENGINES
LEFT AUXILIARY TANK FUEL BOOST PUMP SW
LEFT WING DROP TANK FUEL TRANSFER PUMP SWITCH
TO LEFT ENGINE
LEFT FUEL TANKS SELECTOR VALVE HANDLE
LEFT TIP TANK FUEL BOOST PUMP SWITCH
LONG RANGE TANK TO BOTH ENGINES
LEFT MAIN TANK FUEL BOOST PUMP SWITCH
BOMB BAY TANK AND CROSSFEED SELECTOR VALVE HANDLE
FUEL SUPPLY
FUEL FLOW UNDER PRESSURE
ELECTRICAL ACTUATION
MECHANICAL LINKAGE
26K-1-7-0-2A

Figure 7-2

b. Place both left and right fuel selector valve handles in MAIN position.

c. Turn the crossfeed valve handle to the CROSS-FEED position.

d. Place the boost pump switch for the unused tank in OFF position.

e. Place the fuel selector valve handle for the unused tank in OFF position.

2. Crossfeed to Normal:

a. Place the boost pump switch for the unused tank in HIGH position.

b. Check that both left and right fuel selector valve handles are in ON position.

c. Turn the crossfeed valve handle to the OFF position.

d. Place boost pump switch and fuel selector valve handle for the unused tank in the OFF positions.

Fuel System Management

The normal fuel system in the aircraft incorporates two main tanks in the wings, two wing tip tanks, two auxiliary tanks in the wings, and a bomb bay tank. Provisions are made for a 230 gallon drop tank under each wing, and a 675 gallon long range ferry tank in the bomb bay.

WARNING

If fuel in the auxiliary tanks and the bomb bay tank is retained for a period of approximately 30 days and the tanks are not reserviced, the fuel becomes unsatisfactory for use because of weathering and aging action. This action is dangerous because it increases the lead content of the fuel beyond the specification limit and may cause lead fouling, a critical power loss, or complete engine failure.

To prevent fuel from becoming weathered, approximately 50 gallons of fuel will be transferred from the bomb bay tank to the main tanks and fuel utilized from the auxiliary tanks for approximately 30 minutes on each flight.

Fuel Tank Selection - Normal Fuel System

Use main tanks for takeoff and continue flight on main tanks until 100 gallons have been consumed from each tank. Upon completion of this operation, transfer fuel from the bomb bay tank as follows:

WARNING

Do not attempt takeoff with main fuel selector valve handles in TIP positions. Fuel volume and pressure are not adequate to sustain engine operation at high power settings.

1. Bomb bay tank fuel boost pump switch - LOW.

2. Bomb bay tank and crossfeed valve handle - BOTH ENG.

3. Left and right fuel tanks selector valve handles - MAIN.

4. Bomb bay tanks and crossfeed valve handle - OFF, after bomb bay tank is empty.

5. Bomb bay fuel boost pump switch - OFF.

NOTE

Approximately 7 minutes is required to transfer fuel from the bomb bay tank to the main tanks.

When fuel transfer from the bomb bay tank to the main tanks has been completed, use fuel from the wing tip tanks as follows:

6. Left and right tip tanks fuel boost pump switches - LOW.

7. Left and right fuel tanks selector valve handles - TIP.

8. Bomb bay tanks and crossfeed valve handle - OFF.

9. Left and right wing tip tanks fuel boost pump switches - OFF, unless necessary to maintain fuel pressure.

After fuel in the wing tip tanks has been reduced to 25 gallons or less, use fuel from the auxiliary tanks as follows:

10. Left and right auxiliary tanks fuel boost pump switches - LOW.

11. Left and right fuel tanks selector valve handles - AUX.

12. Left and right auxiliary tanks fuel boost pump switches - OFF, unless necessary to maintain pressure.

After fuel from the auxiliary tanks has been depleted, use fuel from the main tanks as follows:

CAUTION

When burning any tank dry, carefully observe the fuel pressure gage. As soon as the fuel pressure begins to fluctuate, switch to another fuel tank.

NOTE

Since takeoffs and landings are made using the main fuel tanks, it will be necessary to switch to the main tanks even if fuel in the auxiliary tanks is not depleted, when landing is anticipated.

13. Left and right main tanks fuel boost pump switches - LOW.

14. Left and right fuel tanks selector valve handles - MAIN.

15. Left and right main tanks fuel boost pump switches - OFF, unless necessary to maintain pressure.

Fuel Tank Selection - Ferry and Wing Drop Tanks Installed

Use main tanks for takeoff and continue flight on main tanks until 200 gallons have been consumed from each tank; then use fuel from the bomb bay and long range ferry tank as follows:

1. Bomb bay tank fuel boost pump switch - LOW.

2. Bomb bay tank and crossfeed valve handle - BOTH ENG.

3. Left and right fuel tanks selector valve handles - MAIN.

After main fuel tanks quantity indicator shows approximately FULL, proceed as follows:

4. Bomb bay tank and crossfeed valve handle - OFF.

5. Bomb bay tank fuel boost pump switch - OFF.

Use main fuel tanks until 200 gallons have been consumed from each tank, then repeat above steps as necessary until all bomb bay ferry tank fuel has been depleted.

Continue on main fuel tanks until 200 gallons have again been consumed from each tank. Then transfer fuel from the wing drop tanks by placing left and right fuel transfer pump switches ON. When the transfer has been completed, return switches to OFF.

NOTE

Approximately 45 minutes is required to transfer fuel from the wing drop tanks to the main tanks.

After fuel from the bomb bay ferry and wing drop tanks has been depleted, return to normal fuel management operation, using fuel from the wing tip, auxiliary, and main fuel tanks as previously described in this section.

NOTE

Better aircraft stability is maintained by first using the fuel contained in the 675 gallon ferry tank.

BRAKES

Use of Landing Wheel Brakes

To reduce maintenance difficulties and accidents due to wheel brake failure, the importance of properly using aircraft landing wheel brakes should be emphasized.

It is absolutely necessary that aircraft brakes be treated with respect. Consideration must also be given to the wheel brake antiskid system. Although the antiskid system will give consistently shorter landing distances on dry runways, it should not be used to its maximum potential to purposely make all landing rolls as short as possible.

It is generally known that operating personnel stop the aircraft as quickly as possible regardless of the length of the runway, use the brakes consistently for speeding up turns, and drag the brakes while taxiing. To minimize brake wear, the following precautions should be observed insofar as is practicable:

1. When the antiskid system is inoperative use extreme care when applying brakes immediately after touchdown or at any time there is considerable lift on the wings, to prevent skidding the tires and causing flat spots. A heavy brake pressure can result in locking the wheel more easily if brakes are applied immediately after touchdown, than if the same pressure is applied after the full weight of the aircraft is on the wheels. A wheel once locked in this manner, immediately after touchdown, will not become unlocked as the load is increased as long as brake pressure is maintained. Proper braking action cannot be expected until the tires are carrying heavy loads.

a. Brakes themselves can merely stop the wheel from turning, but stopping the aircraft is dependent on the friction of the tires on the runway. For this purpose it is easiest to think in terms of coefficient of friction which is equal to the frictional force divided by the load on the wheel. It has been found that optimum braking occurs with approximately a 15 to 20 percent rolling skid; i.e. the wheel continues to rotate but has approximately 15 to 20 percent slippage on the surface so that the rotational speed is 80 to 85 percent of the speed which the wheel would have were it in free roll. As the amount of skid increases beyond this amount, the coefficient of friction decreases rapidly so that with a 75 percent skid the friction is approximately 60 percent of the optimum and, with full skid, becomes even lower.

b. There are two reasons for this loss in braking effectiveness with skidding. First, the immediate action is to scuff the rubber, tearing off little pieces which act almost like rollers under the tire. Second, the heat generated starts to melt the rubber and the molten rubber acts as a lubricant.

c. NACA figures have shown that for an incipient skid with an approximate load of 10,000 pounds per wheel, the coefficient of friction on dry concrete is as high as 0.8, whereas the coefficient is of the order of 0.5 or less with a 75 percent skid. Therefore, if one wheel is locked during application of brakes there is a very definite tendency for the aircraft to turn away from that wheel and further application of brake pressure will offer no corrective action. Since the coefficient of friction goes down when the wheel begins to skid, it is apparent that a wheel, once locked, will never free itself until brake pressure is reduced so that the braking effect on the wheel is less than the turning moment remaining with the reduced frictional force.

2. Antiskid systems are intended to prevent skids at high speed under light wheel loads. Therefore, brakes equipped with an antiskid system may be applied immediately after touchdown, but this should be done only when definitely necessary. The antiskid system will function to prevent tire skidding if it is operating properly; however, it is not designed to perform as an automatic braking system. Continuous braking from the point of touchdown will result in considerable overworking of the antiskid system beyond design limits in addition to causing excessive wear and extreme heating of the brakes.

3. If maximum braking is required after touchdown and the antiskid system is inoperative, lift should first be decreased as much as possible by raising the flaps and dropping the nose before applying brakes. This procedure will improve braking action by increasing the frictional forces between the tires and the runway. Propeller reversal should be used whenever possible to reduce braking action required.

4. For short landing rolls, a single, smooth application of the brakes with constantly increasing pedal pressure is most desirable. This procedure applies equally well for operation of emergency braking system.

5. On all landings, the full landing roll should be utilized to take advantage of aerodynamic braking and to use the brakes as little and as lightly as possible.

6. After the brakes have been used excessively for an emergency stop and are in the heated condition, the aircraft should not be taxied into a crowded parking area or the parking brakes set. Peak temperatures occur in the wheel and brake assembly from 5 to 15 minutes after a maximum braking operation. To prevent brake fire and possible wheel assembly explosion, the specified procedures for cooling brakes should be followed.

7. The brakes should not be dragged when taxiing, and should be used as little as possible for turning the aircraft on the ground.

SECTION VIII

CREW DUTIES

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INTRODUCTION

Each crew member has been especially trained in the normal duties for which he is responsible. The primary duties of each crew member are indicated by his title; for example, Pilot, Navigator, Photo Systems Operator. The additional or special duties for a crew member are those which are peculiar to the design and mission of the aircraft, and to support crew safety during ground and flight operations. It is the responsibility of each crew member to be familiar with every item of equipment at his station, and to be able to inspect it for any irregularities. Inspection of these items of equipment must always be carried out very thoroughly and conscientiously. The lives of the entire crew, and the success of every mission are dependent upon the proper condition and operation of all equipment involved.

PILOT

The pilot is responsible for issuing all orders and instructions concerning flight operations. He will accomplish necessary flight planning in coordination with the navigator and photo systems operator (if applicable). It is his responsibility to conduct a thorough inspection of the aircraft and all equipment prior to takeoff. In addition, it is the pilot's responsibility to insure that each crew member is properly briefed concerning individual responsibilities for the safe completion of the anticipated mission. Each crew member must know what personal and professional equipment is needed for the flight environment contemplated, and the pilot is responsible for insuring that each crew member has this equipment in his possession prior to flight. Checklists for the pilot are contained in Sections II, III, and IV.

NAVIGATOR

The navigator is responsible for directing the aircraft on the assigned mission. He will perform this function using pilotage, dead reckoning, and any navigational aids available. The navigator will normally occupy the copilot seat in the pilot compartment. In addition to his primary duties, the navigator will be proficient in the operation of all armament and photographic systems, communications equipment, and completely knowledgeable in all reconnaissance and ordnance delivery procedures. He will accomplish necessary flight planning in coordination with the pilot and photo systems operator (if applicable).

A specific checklist is not provided for the navigator; however, certain items of the aircrew checklist are designated for individual or coordinated action by the navigator when directed by the pilot, and are coded (N). In addition, armament, bombing, and photo checklists are published as coordinated checklists, in which maximum coordination is essential, for safe and effective mission accomplishment.

PHOTO SYSTEMS OPERATOR

The photo systems operator is responsible for the operation of the camera systems on board the aircraft. He will set up pulse intervals and operate the various camera systems under the direction of the navigator, and will assist in flight planning when mission requirements dictate.

A specific checklist is not provided for the photo systems operator; however, certain items of the photo systems operator checklist are designated for individual or coordinated action by the pilot, and are coded (F).

FLIGHT MECHANIC

When a flight mechanic or crew chief acts as second crew member in place of the navigator, the pilot will assume the navigation duties. The flight mechanic will perform duties as assigned by the pilot. He will be knowledgeable in the aircraft systems and procedures.

SECTION IX

ALL WEATHER OPERATIONS

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INTRODUCTION

This section contains special procedures and techniques to be used when operating the aircraft during adverse weather conditions. The special procedures and techniques discussed in this section either emphasize or add to those procedures and techniques presented in Sections II and III.

INSTRUMENT FLIGHT PROCEDURES

Flying the aircraft in instrument flight conditions requires normal instrument flight proficiency as well as a thoroughly prepared flight plan. The aircraft is inherently stable, and has excellent control characteristics during instrument flight conditions, so that no exceptional pilot ability is required. The aircraft is fully equipped for flight in all weather conditions, including icing. Procedures and techniques presented in this all weather section are based on the standard production model aircraft with all navigational, anti-icing and deicing equipment installed.

Preparation For Flight

Perform the preflight inspection as outlined in Section II. Special attention should be given to checking all flight instruments, command radios, and navigational equipment prior to flight. Insure that all required FLIP Enroute and Terminal publications are aboard the aircraft.

If flight into icing conditions is anticipated, the deice and anti-ice equipment will be checked during the Engine Runup.

Instrument Takeoff

Normal takeoff procedures, as outlined in Section II, should be used. However, as the takeoff progresses, the pilot cross check should transition from outside reference to the flight instruments. This rate of transition is directly proportional to the rate at which the outside reference deteriorates. Complete transition to flight instruments may be necessary prior to becoming airborne, when low ceilings and visibilities exist. Initiate rotation at same speed as for a normal takeoff. Rotate the aircraft to a takeoff attitude of approximately 5 degrees pitch attitude on the attitude indicator. As the aircraft leaves the ground, reference should be made to the attitude indicator for both pitch and bank until a definite climb is established. When the altimeter and vertical velocity show a definite climb, retract the landing gear.

After Takeoff

After establishing climb airspeed, the After Takeoff Check as outlined in Section II will be performed.

Instrument Cruising Flight

Turns during instrument flight are normally limited to standard rate and 30 degrees of bank should not be exceeded. For cruise airspeeds, power settings, fuel consumption, and the like, refer to the performance charts in the Appendix.

Descent

Normal en route and radar controlled instrument descent to traffic altitude can be made in cruising configuration and at cruising speed. Establish the desired rate-of-descent, and maintain airspeed by reducing manifold pressure. To prevent excessive power reduction or excessive airspeed during a rapid descent, the use of wing flaps for letdown may be desirable.

Holding

For short periods of holding, the recommended airspeed is 170 KIAS. For an extended period of holding, and if fuel consumption is a critical consideration, refer to the Appendix for the best airspeeds and power settings. When descending in the holding pattern, 15 degree wing flaps may be used to maintain desired airspeed without excessive power reduction.

Instrument Approaches

The aircraft is equipped to perform all standard types of instrument approaches. Letdown configuration is at the discretion of the pilot. However, items of aircraft configuration are to be initiated no later than outlined in the approach illustrations shown in figures 9-1 through 9-6.

INSTRUMENT APPROACH
VOR, ADF, TACAN
NORMAL (typical)

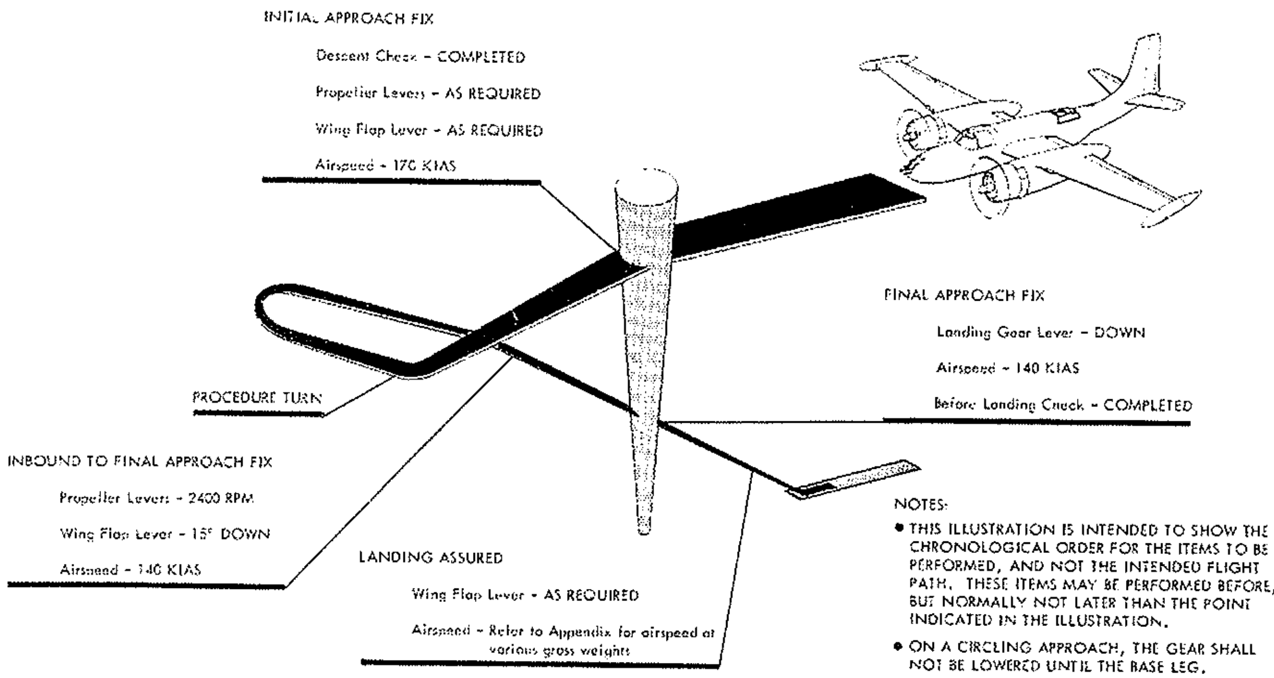

Figure 9-1

INSTRUMENT APPROACH
VOR, ADF, TACAN
SINGLE ENGINE (typical)

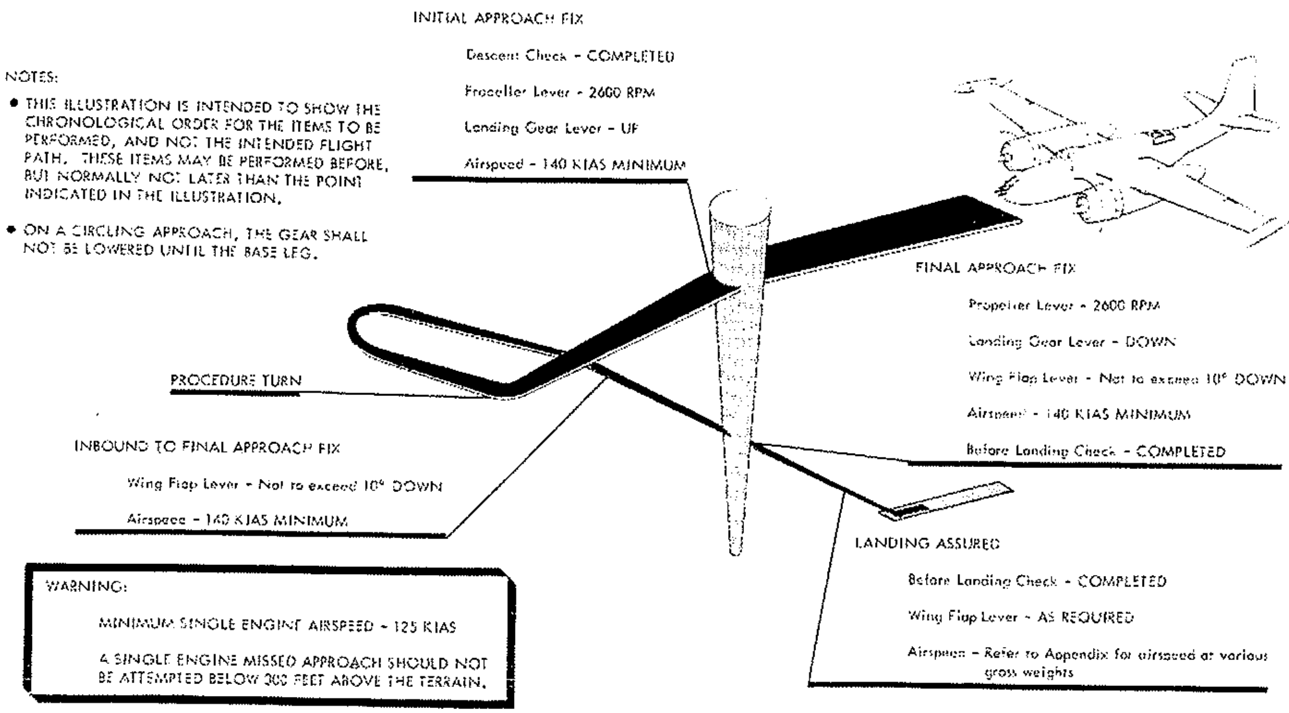

Figure 9-2

INSTRUMENT APPROACH
RADAR
NORMAL (typical)

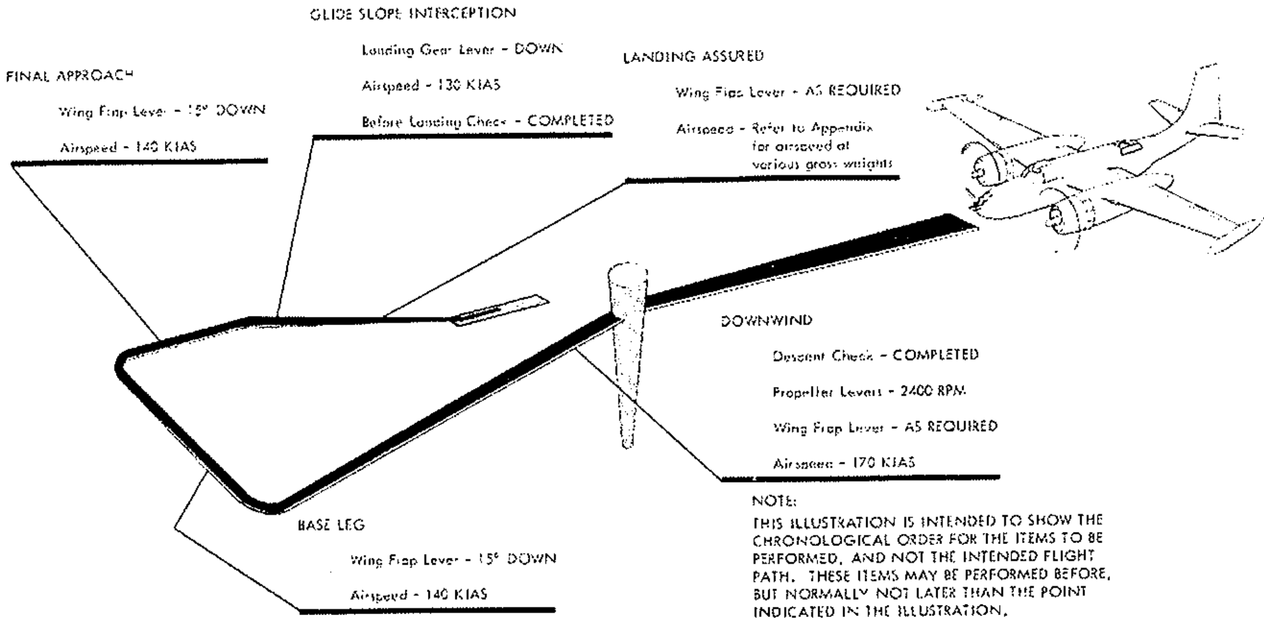

Figure 9-3

NOTE:
THIS ILLUSTRATION IS INTENDED TO SHOW THE CHRONOLOGICAL ORDER FOR THE ITEMS TO BE PERFORMED, AND NOT THE INTENDED FLIGHT PATH. THESE ITEMS MAY BE PERFORMED BEFORE, BUT NORMALLY NOT LATER THAN THE POINT INDICATED IN THE ILLUSTRATION.

INSTRUMENT APPROACH
RADAR
SINGLE ENGINE (typical)

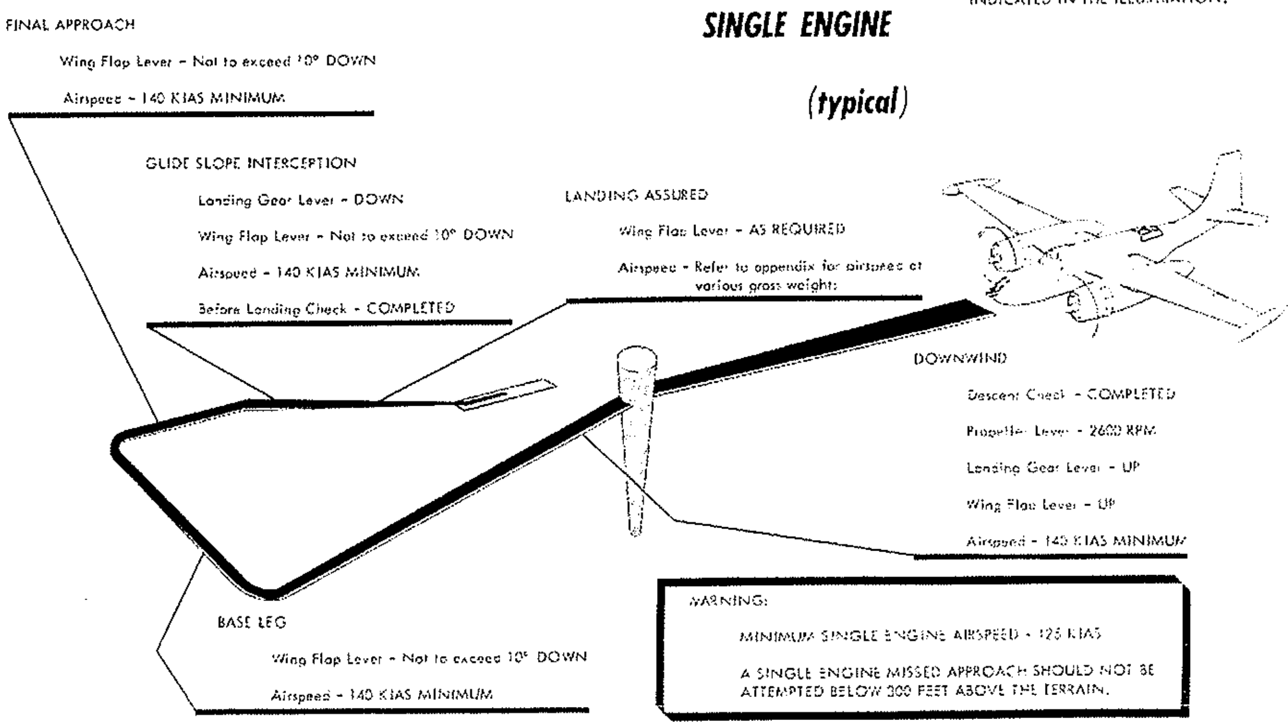

Figure 9-4

INSTRUMENT APPROACH ILS NORMAL (typical)

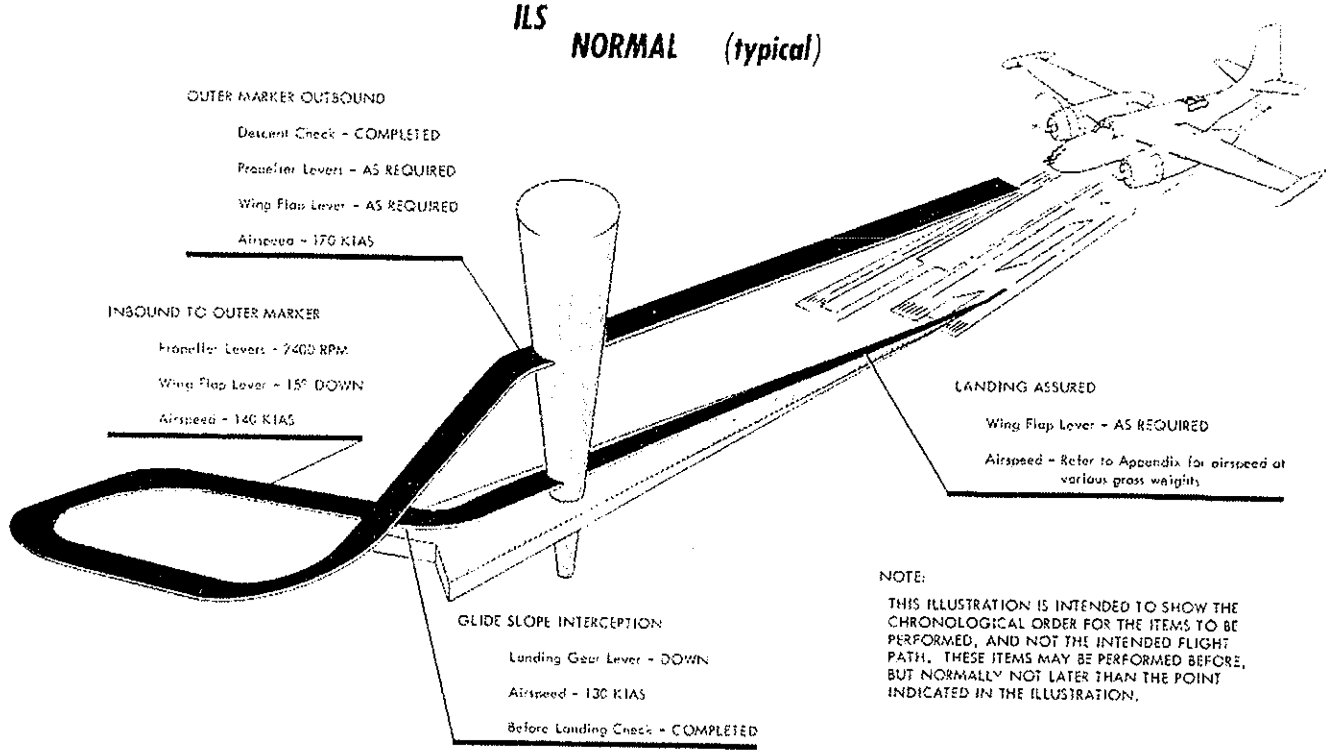

Figure 9-5

INSTRUMENT APPROACH ILS SINGLE ENGINE (typical)

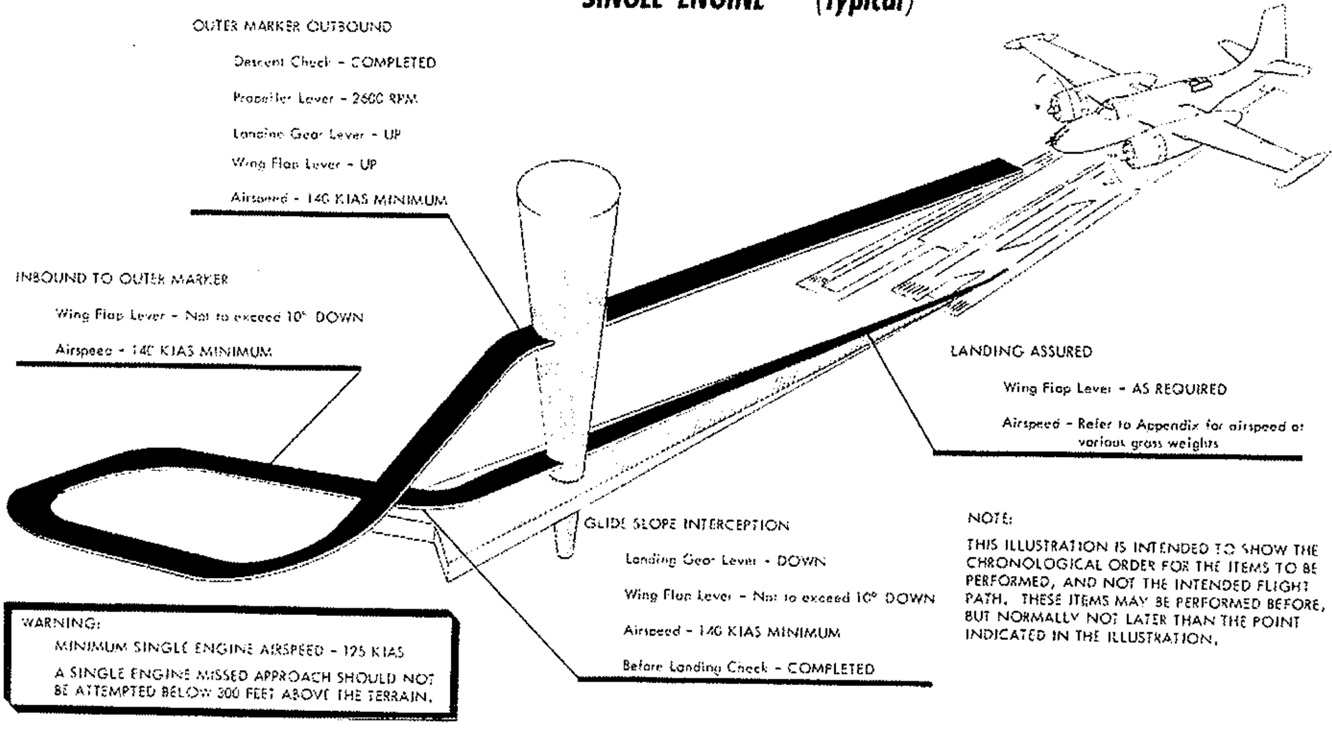

Figure 9-6

Circling Approach

The necessity of making a circling approach should be determined prior to commencing the approach. The circling approach shall be made under visual flight conditions, after completion of the normal instrument approach. While maneuvering into a landing position, the landing runway must be kept in sight at all times and airspeed maintained at 140 KIAS. The wing flaps shall be set at 15 degrees. The gear shall not be lowered until base leg, at which time normal procedures will be used to complete the landing.

Missed Approach

The pilot must be familiar with the missed approach procedure prior to commencing any approach.

WARNING

- A single engine missed approach should not be attempted below 300 feet above the terrain.
- On go arounds, a large amount of elevator trim is required as power is applied.

Apply power as required, and establish a takeoff attitude on the attitude indicator. The initial climb shall be straight ahead, and the gear shall not be retracted until a definite climb is indicated on the altimeter and vertical velocity indicators. After gear and flap retraction, and a normal climb is established, the published missed approach procedure will be followed, or as directed by the controlling agency.

Single Engine Operation

Single engine approaches during instrument weather conditions are safe and practicable, if the approved procedures for single engine operation, as outlined in Section III, are closely followed. The minimum single engine airspeed for this aircraft can be very critical at heavy aircraft weights and high power settings. Therefore, the requirement for maintaining the single engine airspeed, as given in Section III, cannot be overemphasized. Until the landing is assured, a minimum of 140 KIAS, and a maximum of 10 degrees wing flaps are recommended on a single engine final approach. A single engine go around, if necessary, must be initiated at least 300 feet above the ground.

ICE AND RAIN

Icing

The aircraft is equipped with complete deicing and anti-icing capabilities. The leading edges of the wings and empennage are deiced by pneumatic boots that, when inflated, break up ice accumulation. Ice is removed from the propeller blades by electrically heated boots, installed along the leading edge of each blade. Both sides of the windshield are protected from icing by an alcohol spray system. The carburetor is primarily protected from icing by engine heated air that can be directed to the carburetor, and is used to control carburetor air temperature. In addition, the carburetor is provided with an alcohol injection system that is effective in preventing and eliminating carburetor ice formation. These systems are described in Sections I and IV.

Rain

The windshield wipers are reasonably effective in providing adequate vision in moderate rain at approach airspeed. However, at normal cruise airspeeds the wipers are ineffective.

THUNDERSTORMS AND TURBULENCE

Flight through a thunderstorm should be avoided if at all possible. Since circumstances may force a routine flight to enter an area of severe turbulence, the pilot must be familiar with techniques recommended for flying the aircraft under such conditions. At night it is often impossible to detect individual storms and to find clear areas between storms. Power setting and pitch attitude required for optimum penetration airspeed should be established before entering the thunderstorm. The recommended airspeed for penetration is 80 KIAS above the power off stall speed for the gross weight of the aircraft at time of penetration.

Approaching the Storm

It is imperative that the aircraft be prepared prior to entering a thunderstorm or turbulent air. Prepare the aircraft as follows:

a. Mixture levers - AUTO RICH.

b. Propeller levers - 2200 RPM.

c. Throttles - ADJUSTED as necessary to maintain penetration airspeed.

d. Pitot heater switch - ON.

e. Propeller deicing switch - AUTO/SLOW, if required.

f. Carburetor air temperature levers - AS REQUIRED.

g. Flight instruments - CHECK for proper settings.

h. Radios - Turn OFF radio equipment affected by static.

i. Safety belt - TIGHTEN and store all loose equipment.

j. At night - Turn ON all pilot compartment lights full bright to minimize blinding effect of lightning.

During Penetration

The following procedures and techniques should be used during a thunderstorm or turbulent air penetration:

a. Maintain power setting and pitch attitude established prior to entering storm. Hold these constant throughout the penetration and the airspeed will be fairly constant regardless of the airspeed indicator erratic readings.

b. Devote all attention to flying the aircraft.

c. Maintain attitude, concentrating principally on holding wings level by reference to the attitude indicator.

d. Do not chase the airspeed indicator. Doing so will result in extreme aircraft attitudes. If a sudden gust should be encountered while the aircraft is in nose high attitude, a stall could easily result. Vertical gusts and heavy precipitation will cause erroneous reading of the airspeed indicator.

e. Use as little elevator control as possible in order to minimize stresses imposed on the aircraft.

f. Maintain the original heading, making turns only when absolutely necessary. The altimeter will be unreliable because of differential barometric pressure within the thunderstorm. Gains and losses of several thousand feet may be expected. Allowances for this error should be made in determining minimum safe altitude.

NOTE

Altitudes at or near the freezing level are usually the most turbulent.

NIGHT FLYING

Night flying in this aircraft presents no unusual problems. Night flying and instrument flying are identical in many respects in that takeoff, climb, and approach will require instrument reference when orientation becomes uncertain. Before night takeoff, or on a flight that will terminate after sunset, ascertain that all external and internal lights function properly, and that a flashlight is readily available in the aircraft. Turn off unnecessary pilot compartment lights, dim instrument and indicator lights to eliminate or reduce unnecessary glare and canopy reflections.

COLD WEATHER PROCEDURES

Most cold weather operating difficulties are encountered on the ground. The most critical periods in the operation of the aircraft are the postflight and preflight periods. Proper diligence on the part of crew members concerning ground operation is the most important factor in successful arctic operation. The following actions should be taken when temperatures reach 0°C and lower.

Before Entering Aircraft

1. Apply external heat to the engines and accessory sections. The following list of time requirements for engine heating at various temperatures gives estimates, which will vary with wind velocities and percentage of engine oil dilution. The tabulation is based on an oil dilution of approximately 25 percent and no wind.

-6° to -18°C -- (approximately) 30 minutes

-18° to -32°C-- 1/2 to 1 hour

-32° to -40°C -- 1 to 2 hours

-40° to -54°C -- 1-1/2 to 2-1/2 hours

2. Check the oil drains for oil flow. If no oil flow is obtainable, apply external heat to the drains and oil tanks. In addition to external heating, oil immersion heaters may be used. If the immersion heaters are to be effective in keeping the oil warm during the night, they should be placed in the oil tanks immediately after engine shutdown.

3. Remove all covers from aircraft, including pitot covers, and inspect for ice.

4. Clean shock struts and landing gear actuating cylinders of ice and dirt. Check inflation of landing gear struts, and, if necessary, service with dry air.

5. Check for engine stiffness periodically to determine when sufficient heat has been applied. Generally, if an engine is stiff enough to require more than three men to move a propeller, it is considered too stiff to start.

6. Check for operation of cowl flaps. If cowl flaps do not operate, apply heat as necessary.

7. Check for proper flow of windshield deicing fluid and for quantity of fluid in tanks.

8. Check the emergency airbrake for normal operating pressure, which should be 850 PSIG.

Before Starting Engines

1. Remove oil immersion heaters, if used.

2. Remove ground heater ducts.

3. Remove all covers.

Starting Engines

Start engines using normal procedures, reference Section II, except for the following variations:

1. Rather than short, rapid actuation of the primer switch, hold the switch in PRIME position for a longer period, to provide effective priming.

NOTE

HIGH boost may be used if necessary, provided LOW boost is used first.

2. Oil may be diluted slightly if pressure is too high for a prolonged period.

3. Carburetor heat should be applied immediately after starting, in order to assist vaporization and combustion. Do not exceed carburetor air temperature of 38°C.

4. Check all instruments for proper operation.

5. If the oil pressure gage does not indicate minimum pressure within 30 seconds, shut down engine and check for a frozen oil pressure transmitter. If the transmitter is frozen, apply heat as necessary.

6. Check movement of the control surfaces.

Warmup and Ground Tests

Use procedure outlined in Section II.

Taxiing Instructions

Use procedure outlined in Section II. However, taxi more slowly, and use caution, when applying brakes.

Before Takeoff

Make a thorough check for ease and proper operation of all controls important to a cold weather takeoff. These controls include carburetor heat, cowl flaps, oil cooler, and trim tabs.

WARNING

Remove all snow and ice accumulations before flight.

Takeoff

1. Pitot heaters, propeller and airfoil deicers should be ON if precipitation is encountered, or if icing conditions are anticipated, immediately after takeoff.

2. The pilot should be cognizant of the fact that the flight indicators tend to be unreliable at temperatures below -20°C. All flight instruments should be cross checked.

NOTE

If takeoff was made on snow or slush covered runway, exercise the landing gear through several complete cycles to prevent freezing in UP position.

During Flight

Adjust cowl flaps as required, in order to maintain proper cylinder head temperatures. Cross check all flight instruments, and be alert for any erroneous indication.

Preparation for Icing

Icing conditions may be anticipated by a close study of weather maps, forecasts, and indications en route. Prepare the aircraft for icing prior to entering any possible icing zone.

Carburetor Preheat

When icing conditions are anticipated, carburetor preheat should be used. A carburetor air temperature of 15°C will prevent severe power loss when entering heavy precipitation if preheat is applied several minutes in advance. The automatic mixture control requires approximately 5 minutes to adjust to large changes in temperature, and may tend to overcompensate for temperatures appreciably above standard. It is therefore desirable to enrich mixtures prior to application of carburetor preheat, and then delay resetting the chart BMEP drop until 5 minutes after the throttles have been opened, or RPM has increased to the new chart value. At any fixed position of the carburetor preheat control, carburetor air temperature (CAT) will fluctuate with power, airspeed, cowl flap opening, and air moisture content. It will be necessary to monitor the CAT in order that sufficient heat for ice prevention be maintained, and that the maximum temperature limits of 38°C in low blower, and 15°C in high blower not be exceeded, except as noted in the following paragraph.

Should carburetor icing occur, it is usually first indicated by a loss of BMEP and fuel flow, not necessarily accompanied by engine instability or loss of manifold pressure. The indication is the same as would be obtained by moving the mixture control toward IDLE CUTOFF. Corrective action for this most common type of icing consists of AUTO RICH mixture, FULL carburetor heat for 30 seconds, then slowly reducing heat to 15°C when it is established that cooler CAT increases fuel flow and BMEP, thus indicating that ice has been eliminated. When advanced stages of leanness have occurred, full prime may be of assistance in restoring power. The addition of carburetor preheat reduces BMEP. This is not to be construed as further icing. When ice has been thoroughly eliminated, and the CAT stabilized for 5 minutes, the mixture may be reset to chart BMEP drop. It is possible in some circumstances for ice to form in the airscoops on the carburetor upper deck screen, or in the supercharger intake throat in such a manner as to restrict airflow, and therefore cause a loss of manifold pressure, as well as fuel flow and BMEP. Corrective action is the same as above, with the addition of RPM and/or HIGH blower, if necessary to generate the required heat.

Another less common type of carburetor icing may be encountered when descending through warm moist air, with cold fuel in the tanks. The fuel, acting as a refrigerant, may cause ice to form and create a restriction between the air chambers of the carburetor, thus inducing excessive fuel flow, with resultant BMEP loss. Full carburetor preheat should be applied, but the mixtures in this case should be leaned to best power, as indicated by BMEP. Monitor both BMEP and fuel flow in this condition, since mixtures will lean out rapidly as ice is dispelled. Restore normal CAT and mixture as before.

Because of the reaction time required by the automatic mixture control following large temperature changes, the sudden removal of carburetor heat will cause the mixture to lean severely. For this reason, the mixture controls should be placed in AUTO RICH, and CAT reduced in increments. Allow temperatures to stabilize for 5 minutes before adjusting mixtures to desired value.

Carburetor Alcohol Deicing

If the presence of ice is still suspected after applying carburetor preheat, or if the carburetor preheat is inoperative, return the carburetor air temperature controls to full COLD position, and operate the carburetor alcohol system for a period of 1 minute.

NOTE

As a last resort, backfire the engine by manual leaning.

True Altitude

When flying in subzero temperatures, continually refer to the temperature correction chart to determine the true altitude, since the actual altitude will always be considerably less than the indicated altitude. This is especially important when flying over rough terrain, and when making instrument approaches.

Altimeter Error

There has been considerable discussion regarding the altimeter error due to mountain top velocity over mountain ranges or other rough terrain. There are several different lines of thought as to the magnitude of this error. It is known that altimeter error does exist from this source, and there is enough evidence to justify maintaining altitudes of not less than 2000 feet above the highest terrain during periods of high wind velocities and turbulence.

St. Elmo's Fire

St. Elmo's fire is static electricity of pale blue color, which appears on propeller hubs and blades and around the cockpit. It is recommended that all radios be turned off, except VHF and UHF (conditions permitting), to prevent a discharge through the set; otherwise, it is usually harmless. St. Elmo's fire does not affect the VHF or UHF equipment.

Approach and Landing

During descent for landing, monitor engine temperatures closely. Temperature inversions are common in winter, and ground temperature may be 15° to 30° colder than at altitude. Therefore, keep cylinder head temperatures above 150°C by maintaining sufficient power and closing cowl flaps to assure good fuel vaporization, thus minimizing the danger of backfiring and cutting out. The oil temperature should be maintained over 50°C. Monitor airspeed.

WARNING

The stalling speed of the aircraft increases when ice has formed on the wings. Maintain shallow angles of bank when making an approach with an iced up aircraft.

NOTE

At low temperatures, inadvertent asymmetrical propeller reversing is possible.

1. On wet or slippery surfaces the pilot must be prepared to maintain directional control with rudder, and appropriate use of throttles. Wheel brakes may be ineffective.

2. When landing on water covered or slush covered runways, the windshield wipers should be turned on prior to using reverse thrust.

3. When reversing on a snow covered runway, pilots should be aware that visibility may be restricted by snow being blown ahead of the aircraft.

4. After landing, the oil cooler doors should be opened so that the oil will cool sufficiently while taxiing to the ramp, to permit oil dilution.

Stopping of Engines

Oil dilution is required if the expected minimum temperature is below 2°C.

Oil Dilution Procedure

The aircraft is equipped with a system of oil dilution to facilitate cold weather starting. When a cold weather start is anticipated, the engine oil should be diluted with fuel before stopping the engines, provided that the engine oil temperature is maintained below 50°C. Above this temperature, dilution may not be effective, since the fuel introduced into the system will vaporize. When the oil temperature exceeds 50°C during the dilution period, stop the engine and wait until oil temperatures have fallen below 40°C before restarting the engine and resuming the dilution operation. During conditions of extremely low OAT, it may be necessary to break the dilution period into two or more short periods. If it is necessary to service the engine section oil tanks, the oil dilution period must be divided so that part of the dilution is accomplished before the oil tanks are serviced, and the remainder after the tanks are serviced. In order to allow for addition of the fuel, the oil tanks should not be completely filled.

Perform the oil dilution operation as follows (operation of the oil dilution system is indicated by a slow drop in oil pressure):

1. Turn the fuel boost pump switches for tanks selected to LOW, to supply adequate fuel pressure.

2. Operate each engine at 1000 to 1150 RPM.

3. Maintain oil temperature below 50°C, stopping any engine for a short period if the temperature exceeds this limit.

4. Operate the oil dilution switches for the following periods and temperatures:

2° to -12°C -- 3 minutes

-12° to -29°C -- 6 minutes

-29° to -40°C -- 9 minutes

-40° to -54°C -- 12 minutes

5. Exercise the propellers at 1500 RPM, from LOW to HIGH pitch three times, to dilute the oil in the propeller system. Reverse the propellers at least once during oil dilution.

6. When the dilution is complete, shut the engine down in a normal manner, continuing to hold the oil dilution switch ON until the engine has stopped.

7. When warming up an engine after oil dilution, it is preferable to allow the oil temperature to rise above 60°C, and to increase the engine speed during the runup, to dissipate as much of the dilutant fuel as possible and allow the oil to return to its normal viscosity. Below this temperature, and at low engine speeds, very little fuel will be driven out of the oil. It is also considered good practice to run the propellers to full increase and decrease at least three times, to heat the oil in the propeller domes. It is advisable to reverse the propellers at least once during the warmup period. Recheck the engine section oil tanks for proper quantity.

Before Leaving the Aircraft

1. Release parking brakes.

2. Have protective covers installed.

3. Have dirt and ice removed from landing gear struts.

4. Open canopy when moving aircraft into or out of a heated hangar.

5. Aircraft with synthetic rubber or nylon tires can develop a flat spot when parked in cold weather. Move the aircraft once a day to prevent this condition from occurring.

6. Unless access to the bomb bay is necessary, bomb bay doors should be closed.

DESERT AND HOT WEATHER PROCEDURES

Desert Procedures

Windblown sand is the main concern of operation in the desert. Many of the malfunctions which occur will be found to originate because of improper care on the ground. Since most of the procedures given in Section II apply as well to Desert Procedures, only specific information for care of the aircraft during ground and flight operation will be given in this section.

The aircraft must be given special treatment when based in the desert if the operation is to be successful. In order to minimize costly maintenance, adhere to the following instructions:

1. Keep ground operation of the aircraft to a minimum.

2. Cover all air intakes and ducts as soon as possible after landing, to prevent entrance of blowing sand.

3. Keep all equipment free of sand, dirt, or moisture.

4. Keep the aircraft dispersed as much as possible. The engines of one aircraft can add hours to maintenance problems of another when proper precautions, during taxiing or ground operation, are not followed.

Hot Weather Operation

Hot weather operation requires that the pilot be more cautious of stalling speeds and temperature limitations. The following should be kept in mind when operating in hot weather:

NOTE

> If CAT limit must be exceeded, reduce manifold pressure limit 1 inch Hg for each 6° above normal CAT limit.

1. Keep cylinder head temperatures as low as possible prior to takeoff.

2. Longer takeoff distances are required.

3. Use brakes sparingly.

4. Climb at not less than the speed shown in the climb charts (see Appendix).

Appendix I

PERFORMANCE DATA

TABLE OF CONTENTS

PART 1 INTRODUCTION

TABLE OF CONTENTS

ABBREVIATIONS.

Abbreviation	*Definition*
ADI	Antidetonation Injection
ADF	Automatic direction finder
ATC	Air traffic control
BHP	Brake horsepower
BMEP	Brake mean effective pressure
°C	Degrees centigrade
CAS	Calibrated airspeed
CAT	Carburetor air temperature
CHT	Cylinder head temperature
EAS	Equivalent airspeed
°F	Degrees fahrenheit
Ft	Feet
FT	Full Throttle
Hg	Mercury
IFF	Identification friend or foe
ILS	Instrument Landing System
In.	Inch(es)
KCAS	Knots calibrated airspeed
KIAS	Knots indicated airspeed
MAP	Manifold absolute pressure
MCS	Minimum control speed
METO	Maximum except takeoff
NM	Nautical mile
OAT	Outside air temperature
PSIG	Pounds per square inch, gage
Pt.	Point
RPM	Revolutions per minute
SIF	Selective identification feature
SL	Sea level
Std.	Standard
TACAN	Tactical air navigation
TAS	True airspeed
T/O	Takeoff
VOR	VHF Omnirange
Wt	Weight
δ	Delta; ratio of ambient air pressure to standard sea level air pressure
σ	Sigma; ratio of ambient air density to standard sea level air density

DEFINITIONS OF TERMS.

Acceleration Check Point — a predetermined point based on time/distance, at which the acceleration check speed should be attained.

Acceleration Speed — the minimum acceptable speed at the acceleration checkpoint.

Airspeed — the speed of the aircraft relative to the air through which it is moving.

Ambient Conditions — conditions of the air surrounding the aircraft at any given time under consideration.

Approach Speed — airspeed to be maintained on final approach to landing.

Auto-Lean — the mixture control lever at the lean detent.

Auto-Rich — the mixture control lever at the rich detent.

Best Economy Mixture — the fuel-air mixture which results in the most power for a given fuel flow.

Best Power Mixture — the fuel-air mixture which results in the most power for a given manifold pressure.

BMEP Drop — a loss in BMEP due to a manual adjustment of the mixture control and/or loss of engine power.

Calibrated Airspeed—indicated airspeed corrected for instrument and/or position error.

Compressibility Error — an error in the airspeed indicator reading and the outside air temperature indicator reading caused by air being slightly compressed by the moving aircraft.

Critical Engine Failure Speed — the speed at which engine failure permits acceleration to takeoff speed in the same distance that the aircraft may be decelerated to a stop.

Critical Field Length — the total length of runway required to accelerate on both engines to the critical engine failure speed, experience an engine failure, then continue to takeoff or stop.

Density Altitude — the altitude obtained from a standard density altitude chart for any given pressure altitude and temperature or for any density ratio factor $(1/\sqrt{\sigma})$.

Dew Point — the temperature at which condensation occurs in a cooling mass of air.

Dry Bulb Temperature — the air temperature as indicated by a thermometer with a dry bulb (true air temperature).

Dry Power — engine power being developed without the aid of water injection (ADI switch OFF).

Effective Wind (Headwind or Tailwind) — the component of the existing wind condition which acts opposite to or in the direction of travel.

Equivalent Airspeed—calibrated airspeed corrected for compressibility.

Ground Effect — the reduction in induced drag when the aircraft is near the ground.

High Blower — the engine supercharger in high gear ratio.

Inches Hg — a measure of air pressure which compares it to the weight of a column of mercury.

Indicated Airspeed — airspeed indicator reading uncorrected (assuming the mechanical error in the instrument is negligible).

Low Blower — the engine supercharger in low gear ratio.

Manual Lean — fuel-air mixture on the lean side of best power mixture, adjusted manually to give a prescribed BMEP drop from best power mixture.

Manual Rich — fuel-air mixture on the rich side of best power mixture, adjusted manually to reduce fuel flow to the prescribed minimum.

Nautical Miles Per Pound — the number of nautical miles traveled while consuming a pound of fuel.

Obstacle Clearance Speed — airspeed at a height of 50 ft for climbout or approach.

Operating Weight Empty — the weight of the aircraft and its contents, not including payload, fuel or regular engine oil, when the aircraft is loaded with all provisions necessary to complete a mission.

Position Error — the error in the airspeed indicator reading and the altimeter reading caused by the inability of the static orifices to experience the true ambient air pressure.

Power Off Stall Speed — the zero thrust stalling speed with wing flaps in the takeoff configuration.

Pressure Altitude — the altitude obtained from a standard atmosphere table for any given value of air pressure (measured in inches Hg). This is the altitude that an altimeter will show (after correcting for position error) when the barometric setting is at 29.92.

Ram — the increase in air pressure at the entrance to an airscoop due to the speed of the aircraft.

Recommended Long Range Cruise Speed—the higher speed for 99% maximum range at which it is recommended to fly the aircraft when long range is of more concern than high speed.

Refusal Distance — the distance required to accelerate to the refusal speed.

Refusal Speed — maximum speed to which the aircraft can accelerate and then stop in the available runway length.

Relative Humidity — the ratio of the amount of water vapor in a given mass of air to the maximum amount of water vapor that the mass of air could hold at the same temperature.

Rotation Speed — airspeed 3 to 5 KIAS prior to computed takeoff speed.

Specific Humidity — the ratio of the amount of water vapor in a given mass of dry air, measured in pounds.

Standard Atmospheric Conditions — an arbitrarily selected set of atmospheric conditions chosen to approximate the average atmosphere of the world.

Standard Day — a day on which standard atmospheric conditions are assumed to exist.

Takeoff Factor — a factor used to determine takeoff performance, based on power available corrected for pressure altitude and ambient temperature.

Takeoff Speed — airspeed at which main wheels leave the runway.

Touchdown Speed — the speed at which the aircraft comes in contact with the runway during a normal landing.

True Airspeed — the true speed of the aircraft is the equivalent airspeed corrected for the air density error.

True Altitude — altitude above sea level.

Vapor Pressure — the partial pressure of water vapor existing in the air.

Wet Bulb Temperature — the temperature indicated by a thermometer whose bulb has been kept moist with water and which has been circulated in the air. This temperature, along with the dry bulb temperature, is used in conjunction with a psychrometric chart to determine the degree of humidity.

Wet Power — the power developed by an engine with the aid of water injection (ADI fluid).

Wind Gradient — the change in wind speed with altitude. Because of friction between the air and the ground surface, the wind speed generally diminishes as one nears the ground.

INTRODUCTION.

The data shown in the Appendix are provided to aid the flight crews in achieving maximum utilization of the aircraft consistent with safety. In most cases data are included to permit missions to be planned with allowances for more than one degree of safety. This is done so that the importance of the mission may be weighed against safety requirements.

It should be stressed that this data shows optimum performance expected from the aircraft when flown with careful pilot technique under stable atmospheric conditions. There are several factors (mechanical imperfections, improper pilot technique, turbulent air, etc.) which adversely affect performance, whereas very few factors can improve performance. This is one of the reasons for allowing performance margins when planning a mission.

FUEL GRADES.

The standard fuel grade for the aircraft is 115/145. The alternate fuel grade is 100/130. Takeoff data may be determined for both standard and alternate fuel grades.

INSTRUMENT ERRORS.

All instruments have some degree of mechanical error. Ordinarily this may be assumed to be negligible since the instruments are maintained within specified tolerances. However, the airspeed indicator, altimeter and outside air temperature indicator have other sources of error which, under certain circumstances, are great enough to require corrections to be made to the instrument readings. One of these errors, known as the position error, arises from the requirements that the airspeed indicator and altimeter must measure the ambient air pressure. This is done through the static orifices on the side of the fuselage for the pilot's and copilot's normal system and from inside the pilot's compartment for the alternate system. Because of the rapid motion of the aircraft through the air neither of these locations transmit the true ambient pressure at all speeds and angles of attack.

Position Error Correction Chart.

The position error correction chart (figure A1—1) indicates the airspeed and altimeter corrections to be added to the instrument readings to obtain calibrated airspeed and true pressure altitude. At an indicated airspeed of 160 knots and altimeter reading of 5000 feet, for instance, the corrections read from this chart show the calibrated airspeed to be 163 knots at a pressure altitude of 5050 feet.

Outside Air Temperature Indicator.

The outside air temperature indicator also has an error known as the compressibility error. This error arises from the fact that the outside air passes the temperature sensing element at a speed approximately equal to the speed of the aircraft. However, the very thin layer of air in immediate contact with the sensing element has been brought almost to rest (relative to the element). In doing this its temperature has risen due to a combination of compression and friction. The correction in °C to subtract from the indicated reading to obtain free air temperature is supplied by the Temperature Correction for Compressibility Chart (Figure A1—2). The correction from this chart at 5000 ft., 163 KCAS shows the free air temperature to be 4°C less than the indicated temperature reading.

DENSITY ALTITUDE CHART.

A density altitude chart (figure A1—3) has been included so that the density altitude and the reciprocal of the square root of the density ratio ($1/\sqrt{\sigma}$) may be determined for any pressure altitude under any temperature conditions.
Sheet one covers a range of density altitudes from −5,000 feet to 20,000 feet, and sheet two extends from 15,000 feet to 40,000 feet.

U. S. STANDARD ATMOSPHERE TABLE, 1962.

The U.S. standard atmosphere table (figure A1—4) shows values of the various atmospheric properties for a standard day. Sheet one lists the density ratio (σ), the reciprocal of the square root of the density ratio ($1/\sqrt{\sigma}$), the temperature, speed of sound, pressure and pressure ratio (δ) for every thousand feet of altitude from sea level to 45,000 feet. Sheet two lists only the reciprocal of the square root of the density ratio ($1/\sqrt{\sigma}$) for every 100 feet of altitude from 100 feet to 30,000 feet.

The standard atmosphere represents an approximation to the average atmosphere of the world. It is based on a temperature of 15°C and a pressure of 29.92 inches Hg for sea level conditions. The temperature variation with height is uniform from 15°C at sea level to −56.5°C at 36,089 feet. This altitude is assumed to be the beginning of the isothermal region or stratosphere. For all practical purposes, the temperature will remain constant as altitude is increased above 36,089 feet. U.S. standard atmosphere values have been used in preparation of all performance charts in this Appendix.

STORE DRAG NUMBERS AND GROSS WEIGHTS TABLE.

The store drag numbers and gross weight table (figure A1—5) presents a listing of required external stores. A drag number has been assigned to each external store and to the external effect of the Reconnaissance Version. The drag index for a given configuration is the sum of the store drag numbers. Incremental weights for each external store are also shown on this table, as well as average weights without stores for the strike, ferry and reconnaissance versions, for use in determining total aircraft weight.

Example

Determine drag index and takeoff weight for the basic aircraft plus two 230 gallon drop tanks, four BLU 27/B fire bombs, external, and four AN-M-30A1 bombs in the bomb bay.

Solution:	*Store Drag NO.*	*Gross Weight*
Basic Aircraft	0	34,800 lb
(2) 230 gal drop tanks	2 x 14 = 28	2 x 146 = 292
460 gal. external fuel		460 @ 6 lb/gal = 2,760
(4) BLU 27/B Fire Bombs	4 x 7 = 28	4 x 500 = 2,000
(4) AN-M-30A1 Internal	0	4 x 125 = 500
	Drag Index 56	T/O Gross Wt. = 40,352 lb

TAKEOFF AND LANDING CROSSWIND CHART.

The takeoff and landing crosswind chart (figure A1—6) shows the headwind (or tailwind) and crosswind components of wind velocities on the ground at any runway angle, and the maximum crosswind component for which takeoff or landing is recommended. For crosswind computations, enter this chart with maximum wind velocity including gusts. For headwind (or tailwind) computations, enter at wind velocity without gusts. Use 50 percent of reported headwinds and 150 percent of reported tailwinds with the wind correction grid on takeoff and landing performance charts.

TEMPERATURE CONVERSION CHART.

A temperature conversion chart (figure A1—7) is provided to facilitate the conversion of either fahrenheit temperatures to centigrade, or centigrade temperature to fahrenheit.

The appropriate scale is entered at the known temperature. The corresponding value may then be read from the other scale as indicated by the oblique line. For example, the chart shows that 50° fahrenheit is the same temperature as 10° centigrade.

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

POSITION ERROR CORRECTION CHART
FLAPS AND GEAR UP

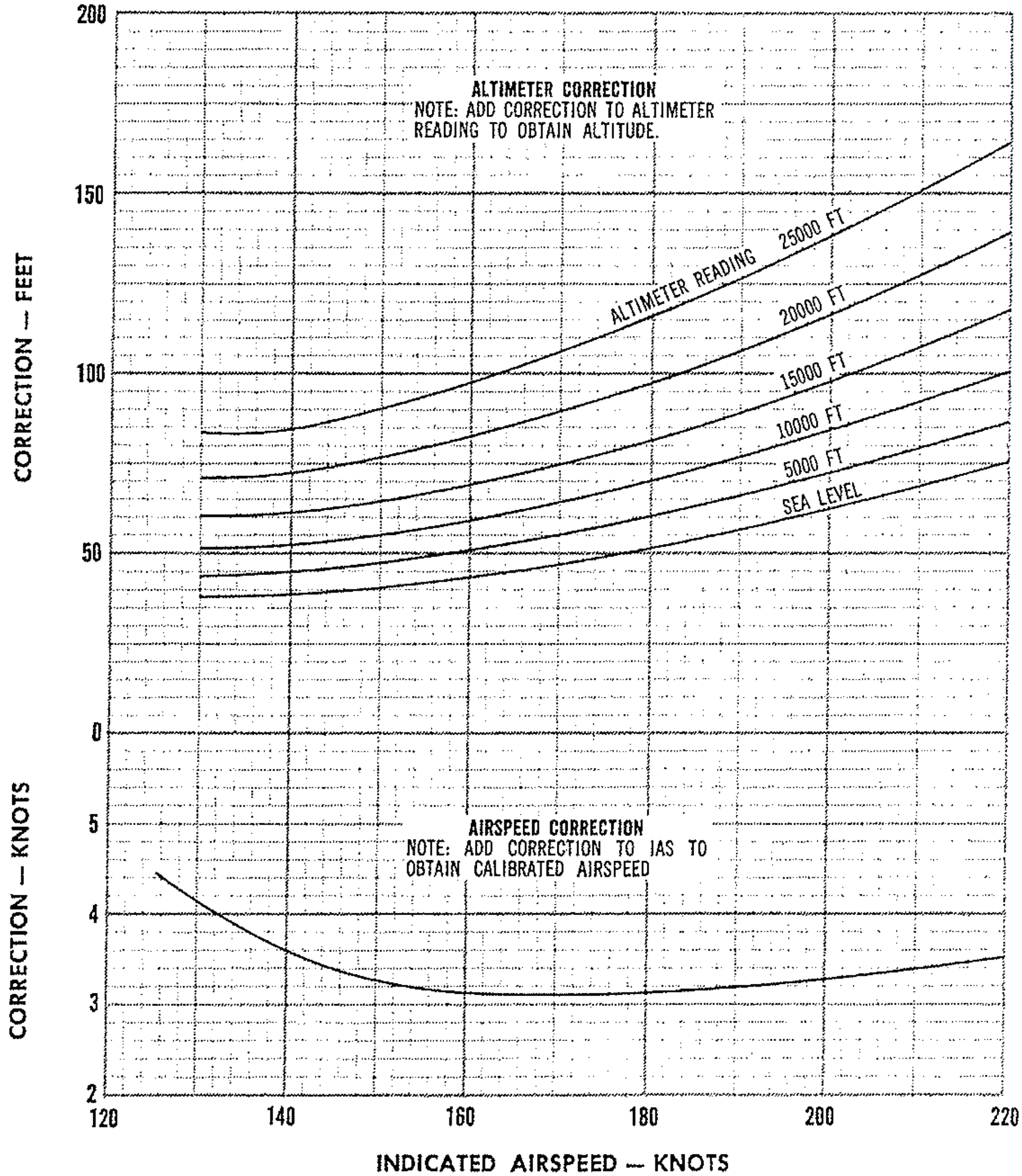

Figure A1—1

TEMPERATURE CORRECTION FOR COMPRESSIBILITY

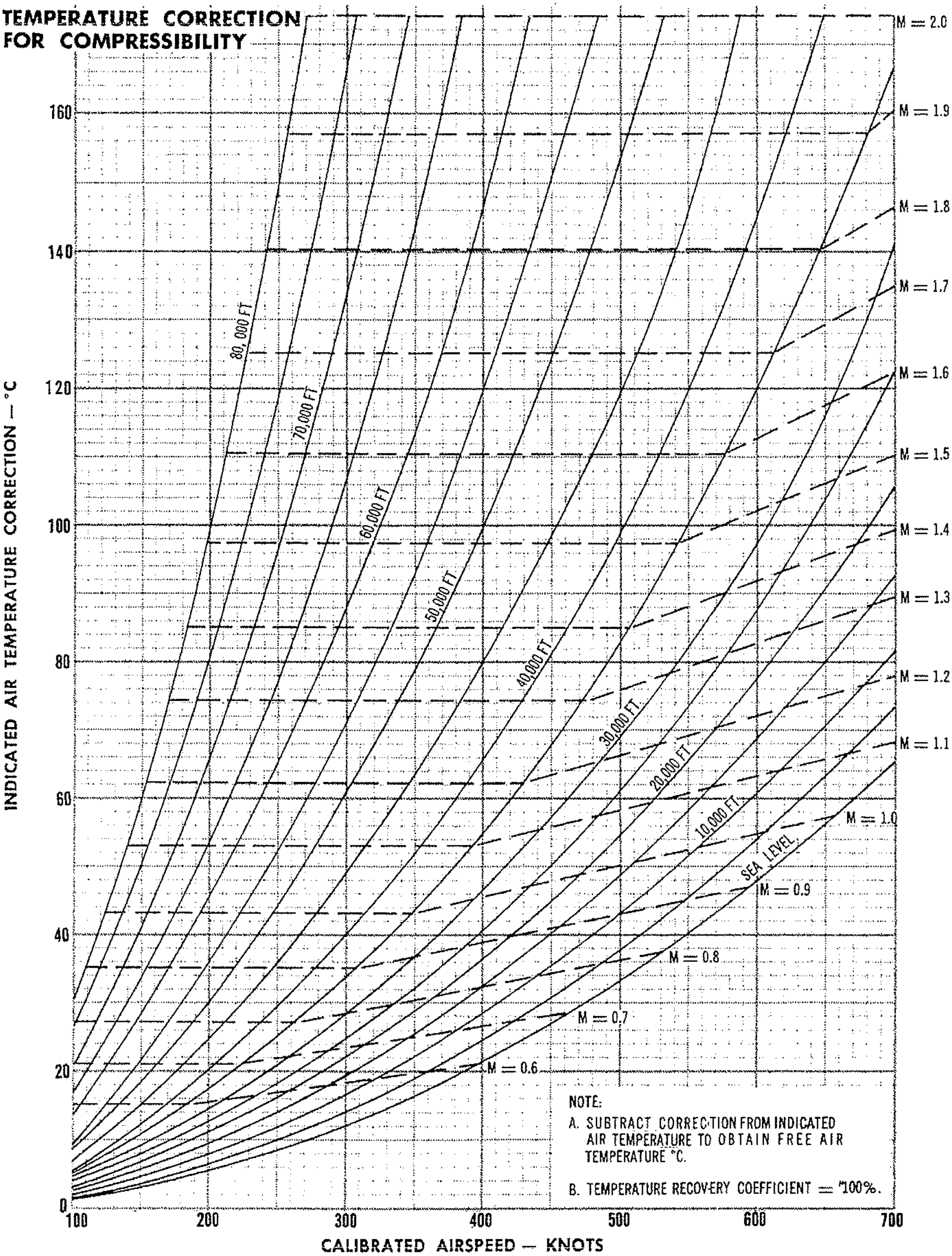

Figure A1—2

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DENSITY ALTITUDE CHART

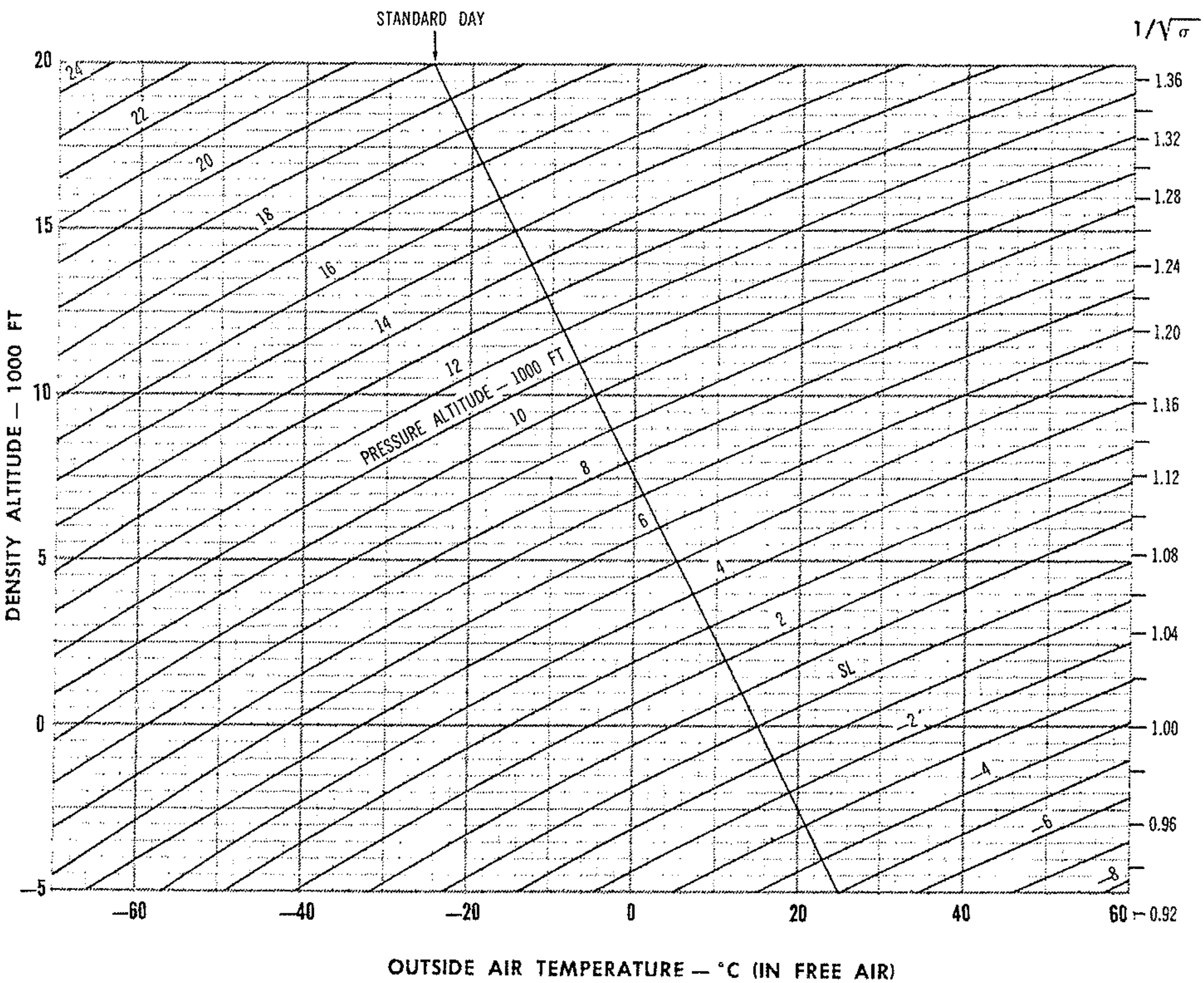


Figure A1—3 (Sheet 1 of 2)

DENSITY ALTITUDE CHART

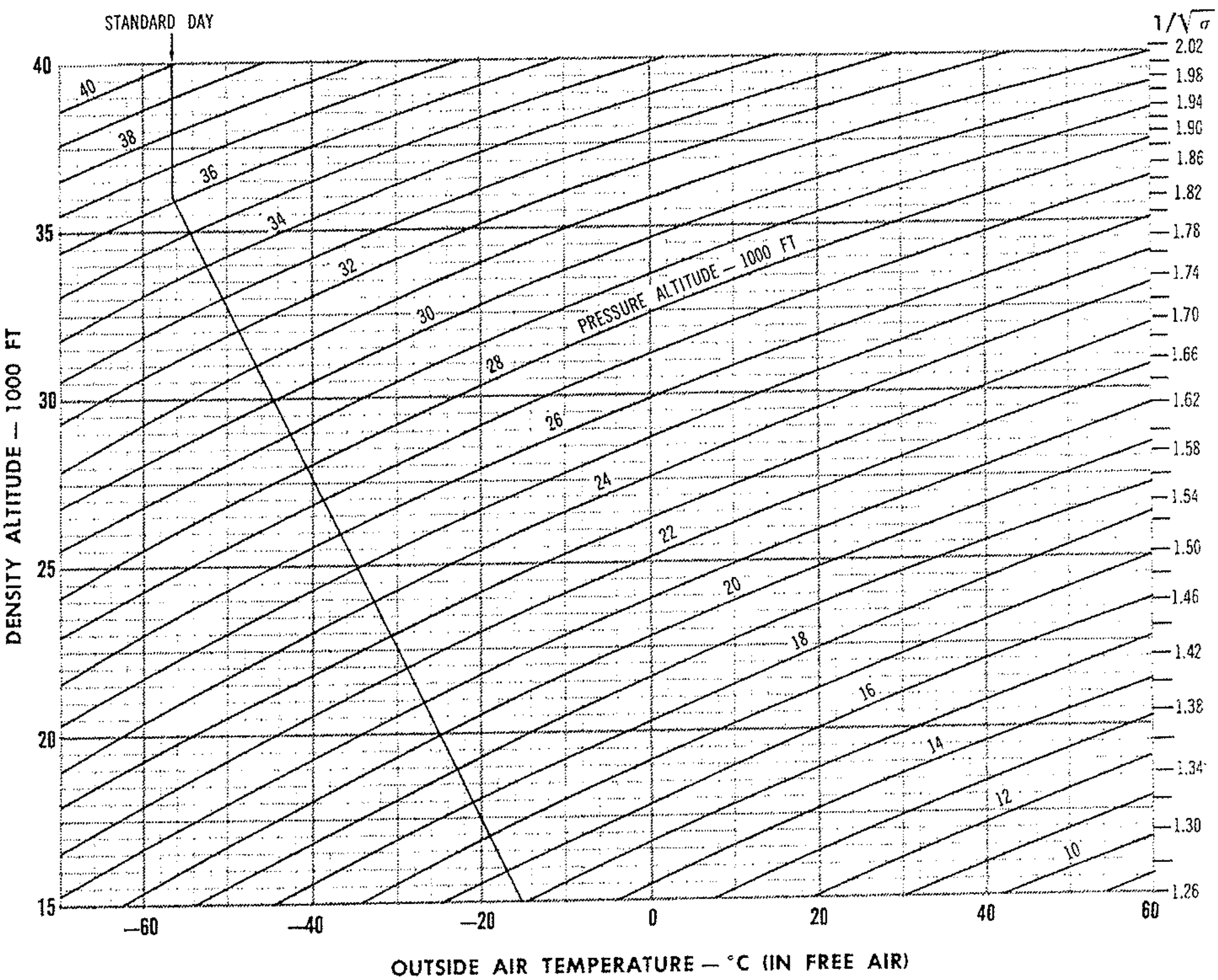


Figure A1—3 (Sheet 2 of 2)

U. S. STANDARD ATMOSPHERE TABLE, 1962

STANDARD SEA LEVEL CONDITIONS:

Temperature = 15°C (59°F)
Pressure = 29.921 in. Hg (2116.216 lb/sq. ft.)
Density = .0023769 slugs/cu. ft.
Speed of sound = 1116.89 ft/sec. (661.7 knots)

CONVERSION FACTORS:

1 in. Hg = 70.727 lb/sq. ft.
1 in. Hg = 0.49116 lb/sq. in.
1 Knot = 1.151 mph
1 Knot = 1.688 ft./sec.

Altitude (Feet)	*Density Ratio* σ	$\frac{1}{\sqrt{\sigma}}$	*Temperature* °C	°F	*Speed of Sound (Knots)*	*Pressure (In. Hg)*	*Pressure Ratio* δ
0	1.000	1.0000	15.000	59.000	661.7	29.921	1.0000
1000	.9711	1.0148	13.019	55.434	659.5	28.856	.9644
2000	.9428	1.0299	11.038	51.868	657.2	27.821	.9298
3000	.9151	1.0454	9.056	48.302	654.9	26.817	.8962
4000	.8881	1.0611	7.076	44.735	652.6	25.842	.8637
5000	.8617	1.0773	5.094	41.169	650.3	24.896	.8320
6000	.8359	1.0938	3.113	37.603	648.7	23.978	.8014
7000	.8106	1.1107	1.132	34.037	645.6	23.088	.7716
8000	.7860	1.1279	− 0.850	30.471	643.3	22.225	.7428
9000	.7620	1.1456	− 2.831	26.905	640.9	21.388	.7148
10,000	.7385	1.1637	− 4.812	23.338	638.6	20.577	.6877
11,000	.7155	1.1822	− 6.793	19.772	636.2	19.791	.6614
12,000	.6932	1.2011	− 8.774	16.206	633.9	19.029	.6360
13,000	.6713	1.2205	−10.756	12.640	631.5	18.292	.6113
14,000	.6500	1.2403	−12.737	9.074	629.0	17.577	.5875
15,000	.6292	1.2606	−14.718	5.508	626.6	16.886	.5643
16,000	.6090	1.2815	−16.699	1.941	624.2	16.216	.5420
17,000	.5892	1.3028	−18.680	− 1.625	621.8	15.569	.5203
18,000	.5699	1.3246	−20.662	− 5.191	619.4	14.942	.4994
19,000	.5511	1.3470	−22.643	− 8.757	617.0	14.336	.4791
20,000	.5328	1.3700	−24.624	−12.323	614.6	13.750	.4595
21,000	.5150	1.3935	−26.605	−15.889	612.1	13.184	.4406
22,000	.4976	1.4176	−28.587	−19.456	609.6	12.636	.4223
23,000	.4800	1.4424	−30.568	−23.022	607.1	12.107	.4046
24,000	.4642	1.4678	−32.549	−26.588	604.6	11.597	.3876
25,000	.4481	1.4938	−34.530	−30.154	602.1	11.103	.3711
26,000	.4325	1.5206	−36.511	−33.720	599.6	10.627	.3552
27,000	.4173	1.5480	−38.492	−37.286	597.1	10.168	.3398
28,000	.4025	1.5762	−40.474	−40.852	594.6	9.725	.3250
29,000	.3881	1.6052	−42.455	−44.419	592.1	9.297	.3107
30,000	.3741	1.6349	−44.436	−47.985	589.5	8.885	.2970
31,000	.3605	1.6654	−46.417	−51.551	586.9	8.488	.2837
32,000	.3473	1.6968	−48.398	−55.117	584.4	8.106	.2709
33,000	.3345	1.7291	−50.379	−58.683	581.8	7.737	.2586
34,000	.3220	1.7623	−52.361	−62.249	579.2	7.382	.2467
35,000	.3099	1.7964	−54.342	−65.816	576.6	7.041	.2353
36,000	.2981	1.8315	−56.323	−69.382	574.0	6.712	.2243
36,089	.2971	1.8347	−56.500	−69.700	573.7	6.683	.2234
37,000	.2843	1.8753	−56.500	−69.700	573.7	6.397	.2138
38,000	.2710	1.9209	−56.500	−69.700	573.7	6.097	.2038
39,000	.2583	1.9677	−56.500	−69.700	573.7	5.811	.1942
40,000	.2462	2.0155	−56.500	−69.700	573.7	5.538	.1851
41,000	.2346	2.0645	−56.500	−69.700	573.7	5.278	.1764
42,000	.2236	2.1148	−56.500	−69.700	573.7	5.030	.1681
43,000	.2131	2.1662	−56.500	−69.700	573.7	4.794	.1602
44,000	.2031	2.2189	−56.500	−69.700	573.7	4.569	.1527
45,000	.1936	2.2728	−56.500	−69.700	573.7	4.355	.1455

Figure A1—4 (Sheet 1 of 2)

U. S. STANDARD ATMOSPHERE TABLE, 1962

ALTITUDE IN 100-FOOT INCREMENTS AND $\frac{1}{\sqrt{\sigma}}$

Altitude (Feet)	$\frac{1}{\sqrt{\sigma}}$	*Altitude (Feet)*	$\frac{1}{\sqrt{\sigma}}$	*Altitude (Feet)*	$\frac{1}{\sqrt{\sigma}}$	*Altitude (Feet)*	$\frac{1}{\sqrt{\sigma}}$	*Altitude (Feet)*	$\frac{1}{\sqrt{\sigma}}$
100	1.0015	6100	1.0955	12100	1.2030	18100	1.3269	24100	1.4704
200	1.0029	6200	1.0971	12200	1.2049	18200	1.3291	24200	1.4729
300	1.0044	6300	1.0988	12300	1.2069	18300	1.3313	24300	1.4755
400	1.0059	6400	1.1005	12400	1.2088	18400	1.3335	24400	1.4781
500	1.0074	6500	1.1022	12500	1.2107	18500	1.3358	24500	1.4807
600	1.0088	6600	1.1039	12600	1.2127	18600	1.3380	24600	1.4833
700	1.0103	6700	1.1056	12700	1.2146	18700	1.3403	24700	1.4860
800	1.0118	6800	1.1073	12800	1.2166	18800	1.3425	24800	1.4886
900	1.0133	6900	1.1090	12900	1.2185	18900	1.3448	24900	1.4912
1000	1.0148	7000	1.1107	13000	1.2205	19000	1.3470	25000	1.4938
1100	1.0163	7100	1.1124	13100	1.2224	19100	1.3493	25100	1.4965
1200	1.0178	7200	1.1141	13200	1.2244	19200	1.3516	25200	1.4991
1300	1.0193	7300	1.1158	13300	1.2264	19300	1.3539	25300	1.5018
1400	1.0208	7400	1.1175	13400	1.2284	19400	1.3561	25400	1.5045
1500	1.0223	7500	1.1193	13500	1.2303	19500	1.3584	25500	1.5071
1600	1.0238	7600	1.1210	13600	1.2323	19600	1.3607	25600	1.5098
1700	1.0253	7700	1.1127	13700	1.2343	19700	1.3630	25700	1.5125
1800	1.0269	7800	1.1245	13800	1.2363	19800	1.3653	25800	1.5152
1900	1.0284	7900	1.1262	13900	1.2383	19900	1.3677	25900	1.5179
2000	1.0299	8000	1.1279	14000	1.2403	20000	1.3700	26000	1.5206
2100	1.0314	8100	1.1297	14100	1.2423	20100	1.3723	26100	1.5233
2200	1.0330	8200	1.1314	14200	1.2444	20200	1.3746	26200	1.5260
2300	1.0345	8300	1.1332	14300	1.2464	20300	1.3770	26300	1.5287
2400	1.0360	8400	1.1350	14400	1.2484	20400	1.3793	26400	1.5315
2500	1.0376	8500	1.1367	14500	1.2504	20500	1.3817	26500	1.5342
2600	1.0391	8600	1.1385	14600	1.2525	20600	1.3840	26600	1.5370
2700	1.0407	8700	1.1403	14700	1.2545	20700	1.3864	26700	1.5397
2800	1.0422	8800	1.1420	14800	1.2565	20800	1.3888	26800	1.5425
2900	1.0438	8900	1.1438	14900	1.2586	20900	1.3911	26900	1.5453
3000	1.0454	9000	1.1456	15000	1.2606	21000	1.3935	27000	1.5480
3100	1.0469	9100	1.1474	15100	1.2627	21100	1.3959	27100	1.5508
3200	1.0485	9200	1.1492	15200	1.2648	21200	1.3983	27200	1.5536
3300	1.0501	9300	1.1510	15300	1.2668	21300	1.4007	27300	1.5564
3400	1.0516	9400	1.1528	15400	1.2689	21400	1.4031	27400	1.5592
3500	1.0532	9500	1.1546	15500	1.2710	21500	1.4055	27500	1.5620
3600	1.0548	9600	1.1564	15600	1.2731	21600	1.4079	27600	1.5649
3700	1.0564	9700	1.1582	15700	1.2752	21700	1.4103	27700	1.5677
3800	1.0580	9800	1.1600	15800	1.2773	21800	1.4128	27800	1.5705
3900	1.0595	9900	1.1618	15900	1.2794	21900	1.4152	27900	1.5734
4000	1.0611	10000	1.1637	16000	1.2815	22000	1.4176	28000	1.5762
4100	1.0627	10100	1.1655	16100	1.2836	22100	1.4201	28100	1.5791
4200	1.0643	10200	1.1673	16200	1.2857	22200	1.4225	28200	1.5819
4300	1.0659	10300	1.1692	16300	1.2878	22300	1.4250	28300	1.5848
4400	1.0676	10400	1.1710	16400	1.2899	22400	1.4275	28400	1.5877
4500	1.0692	10500	1.1729	16500	1.2921	22500	1.4299	28500	1.5906
4600	1.0708	10600	1.1747	16600	1.2942	22600	1.4324	28600	1.5935
4700	1.0724	10700	1.1766	16700	1.2963	22700	1.4349	28700	1.5964
4800	1.0740	10800	1.1784	16800	1.2985	22800	1.4374	28800	1.5993
4900	1.0757	10900	1.1803	16900	1.3006	22900	1.4399	28900	1.6022
5000	1.0773	11000	1.1822	17000	1.3028	23000	1.4424	29000	1.6052
5100	1.0789	11100	1.1840	17100	1.3049	23100	1.4449	29100	1.6081
5200	1.0806	11200	1.1859	17200	1.3071	23200	1.4474	29200	1.6110
5300	1.0822	11300	1.1878	17300	1.3093	23300	1.4499	29300	1.6140
5400	1.0838	11400	1.1897	17400	1.3115	23400	1.4525	29400	1.6170
5500	1.0855	11500	1.1916	17500	1.3136	23500	1.4550	29500	1.6199
5600	1.0871	11600	1.1935	17600	1.3158	23600	1.4576	29600	1.6229
5700	1.0888	11700	1.1954	17700	1.3180	23700	1.4601	29700	1.6259
5800	1.0905	11800	1.1973	17800	1.3202	23800	1.4627	29800	1.6289
5900	1.0921	11900	1.1992	17900	1.3224	23900	1.4652	29900	1.6319
6000	1.0938	12000	1.2011	18000	1.3246	24000	1.4678	30000	1.6349

Figure A1—4 (Sheet 2 of 2)

STORE DRAG NUMBER AND GROSS WEIGHTS

Basic Aircraft: Clean aircraft with 8 pylons = Drag Index 0

STORES		DRAG INDEX (PER STORE)	APPROX WEIGHT (LBS)	LEFT WING PYLON STA 1	2	3	4	RIGHT WING PYLON STA 5	6	7	8
WING TANKS	230 gal	14	146 empty				X	X			
FIRE BOMBS	BLU-1/B, -1B/B, -1C/B	7	698	X	X	X	X	X	X	X	X
	BLU-10/B, -10A/B	4	250	X	X	X			X	X	X
	BLU-23/B Finned	5.5	505	X	X	X	X	X	X	X	X
	BLU-23/B Unfinned	5.5	490	X	X	X	X	X	X	X	X
	BLU-27/B Unfinned	7	828	X	X	X	X	X	X	X	X
	BLU-27/B Finned	7.5	847	X	X	X	X	X	X	X	X
	BLU-32/B Finned	5.5	555	X	X	X	X	X	X	X	X
	BLU-32/B Unfinned	5.5	540	X	X	X	X	X	X	X	X
GENERAL PURPOSE BOMBS	AN-M65A1	8	1104				X	X			
	AN-M64A1	6	561	X	X	X			X	X	X
	AN-M57A1	4	272	X	X	X			X	X	X
	AN-M30A1	2	125	X	X	X			X	X	X
	M117A1 Conical Fin	7.5	823	X	X	X	X	X	X	X	X
	M117A1/M1A1 (with 36 inch fuze extender)	7.5	838	X	X	X	X	X	X	X	X
	MK82 Low Drag	2	531	X	X	X	X	X	X	X	X
	MK82/M1A1 (with 36 inch fuze extender)	2	546	X	X	X	X	X	X	X	X
	MK81 Low Drag	1.2	260	X	X	X	X	X	X	X	X
FRAGMENT BOMBS	M81	4	260	X	X	X			X	X	X

Figure A1-5. (Sheet 1)

STORES		DRAG INDEX (PER STORE)	APPROX WEIGHT (LBS)	LEFT WING PYLON STA 1	2	3	4	RIGHT WING PYLON STA 5	6	7	8
ROCKET LAUNCHERS	LAU-3/A	6 (A) 16 (B)	427 full 71 empty	X X	X X	X X			X X	X X	X X
	LAU-32A/A	4 (A) 10 (B)	168 full 41 empty	X X	X X	X X			X X	X X	X X
	LAU-32B/A	4 (A) 10 (B)	178 full 51 empty	X X	X X	X X			X X	X X	X X
	LAU-59/A	4 (A) 10 (B)	178 full 51 empty	X X	X X	X X			X X	X X	X X
DISPENSERS	CBU-14/A, -14A/A	9.5	250	X	X	X	X	X	X	X	X
	CBU-22/A, -22A/A	9.5	226	X	X	X	X	X	X	X	X
	CBU-25/A, -25A/A	9.5	264	X	X	X	X	X	X	X	X
	CBU-24B/B CBU-29B/B CBU-49B/B CBU-53/B CBU-54/B	7.5	830	X	X	X	X	X	X	X	X
MISCEL-LANEOUS	M47A4 Smoke Bomb	2	105	X	X	X			X	X	X
	M129E1 Leaflet Bomb	7.5	180	X	X	X	X	X	X	X	X
	BLU-52/B, -52A/B Chemical Bomb	7.5	360	X	X	X	X	X	X	X	X
	MAU-63/A Rack (3)	12	145 empty	X	X	X	X	X	X	X	X
	MAU-63/A: MK24 Flare LUU-1/B Signal Marker	3.0 ea (30 total (2))	27 ea (307 total (2))	X	X	X	X	X	X	X	X
	MAU-63/A: MK6-3 Signal Marker	3.0 ea (30 total (2))	16 ea (241 total (2))	X	X	X			X	X	X

Figure A1-5. (Sheet 2)

STORES			DRAG INDEX (PER STORE)	APPROX WEIGHT (LBS)	LEFT WING PYLON STA 1	2	3	4	RIGHT WING PYLON STA 5	6	7	8
MISCEL-LANEOUS (Cont)	SUU-25B/A Flare Dis-penser		9.0	157 empty 350 full	X	X					X	X
	SUU-25B/A	MK24 Flare	enclosed in dispenser	360	X	X					X	X
		LUU-1/B Signal Marker										
	BDU-33/B, -33A/B Practice Bomb		1	24	X	X	X			X	X	X
	MK-106 Practice Bomb		1	5	X	X	X			X	X	X

NOTES: 1. Ⓐ With nose and tail fairings.

Ⓑ Empty, without nose and tail fairings.

② Loaded with six MK24 flares, six LUU-1/B signal markers, or six MK6-3 signal markers.

③ The MAU-63/A rack can be carried at any of the eight wing stations. Due to the high drag number of the MAU-63/A, it is recommended that no more than four such racks be used on the A-26A at any one time. Other symmetrically loaded stores (right wing and left wing) may be carried in conjunction with the MAU-63/A rack.

4. Refer to T.O. 1A-26A-33-1-2 for preparation and uploading instructions, and T.O. 1A-26A-34-1-1 for description and delivery instructions.

5. Clean aircraft with no pylons = drag index of minus 40.

AIRCRAFT GROSS WEIGHT

STRIKE VERSION: Basic aircraft, normal internal fuel, two-man crew, 2400 rounds of ammo and no external or bomb bay stores: 34,800 LB.

FERRY VERSION: Basic aircraft as above with maximum (ferry) internal fuel, no ammo: 38,580 LB.

RECONN VERSION: Basic aircraft with glass nose, normal internal fuel, two-man crew, all photo equipment in nose and bomb bay, no ammo: 34,430 LB.

Add 200 LB per additional crew member.

Add (or subtract) 31 LB per 100 rds ammo.

Figure A1-5. (Sheet 3)

TAKEOFF AND LANDING CROSSWIND CHART

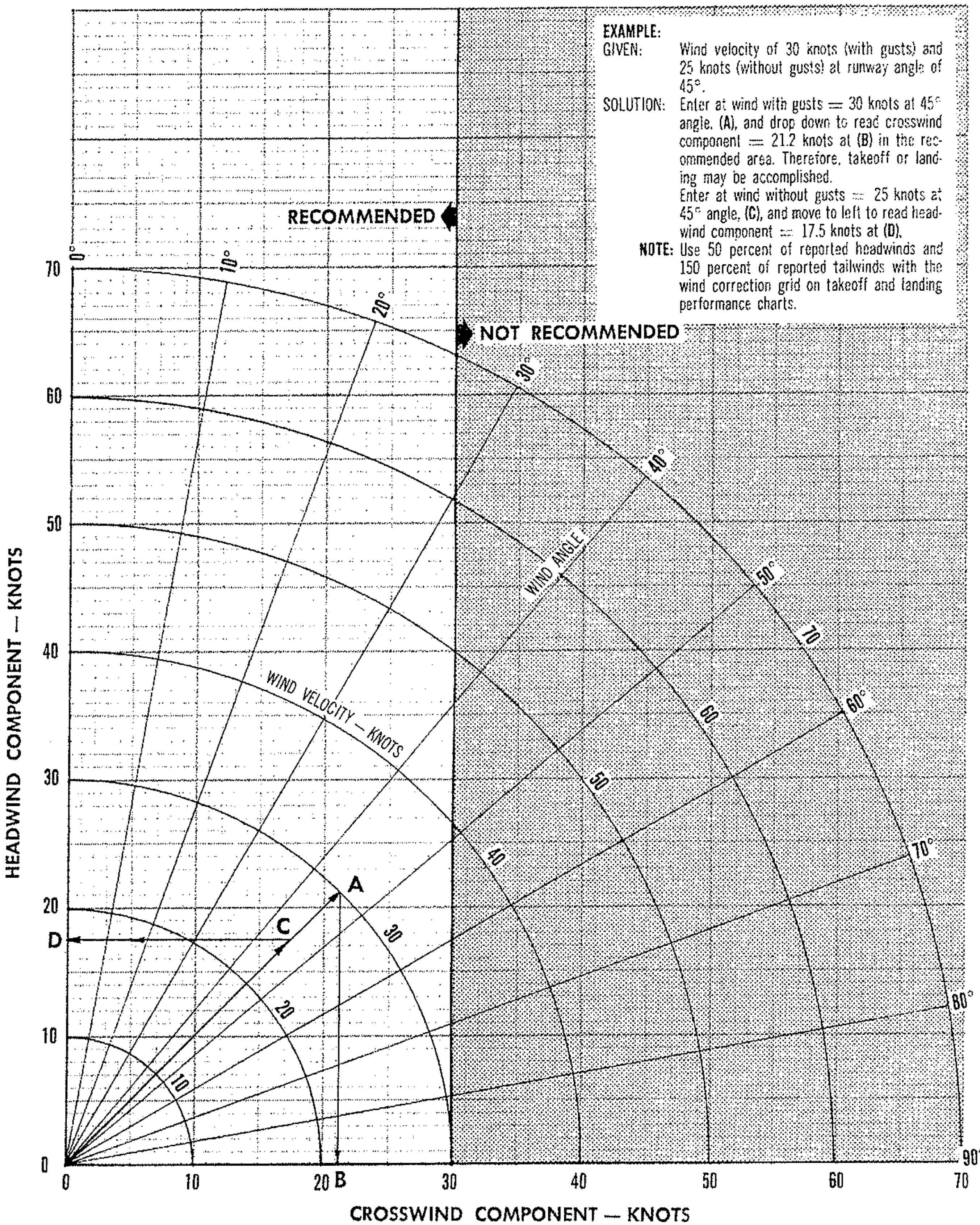


Figure A1—6

TEMPERATURE CONVERSION CHART

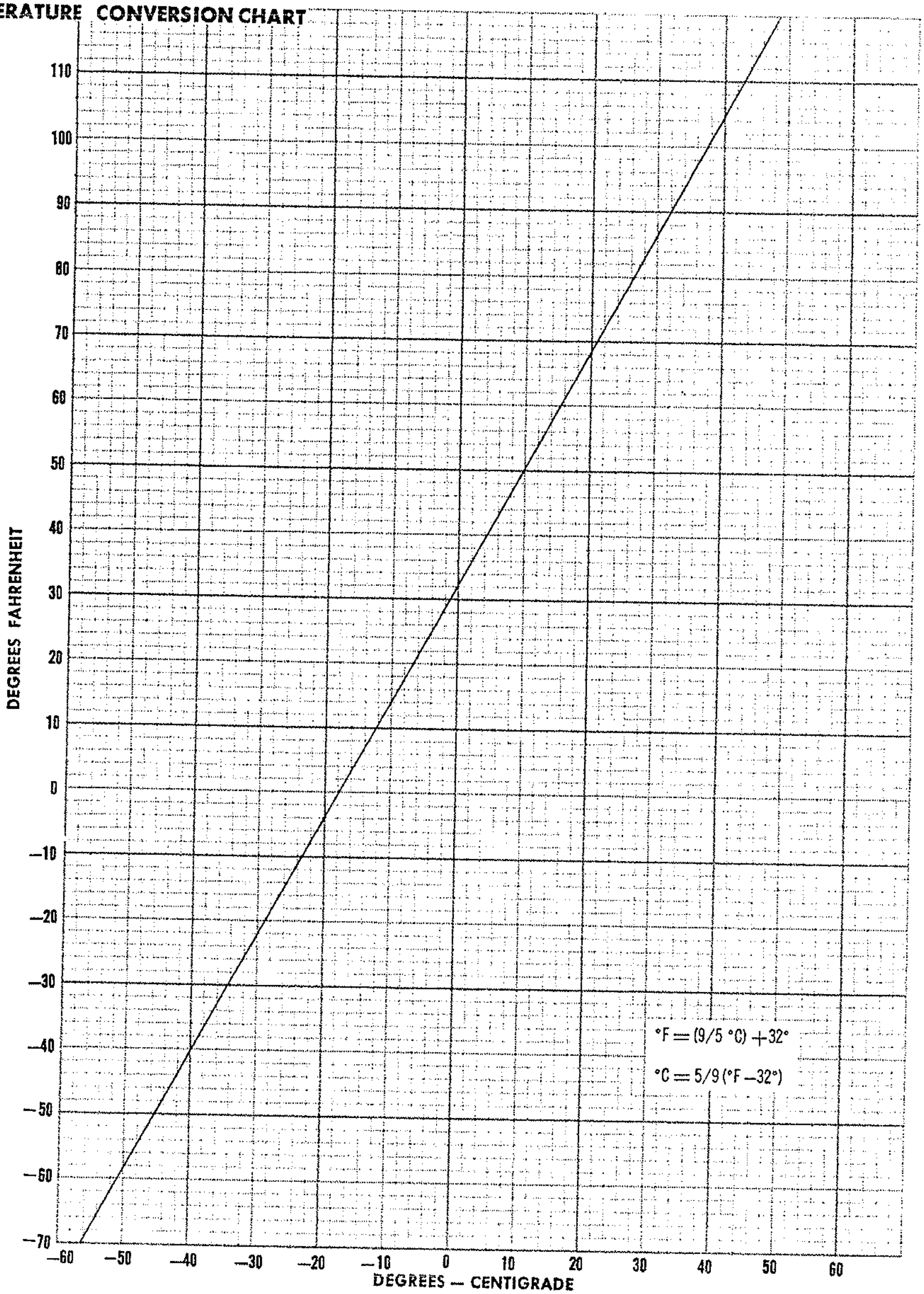


Figure A1—7

PART 2 ENGINE DATA

TABLE OF CONTENTS

INTRODUCTION.

The engine data shown in this part are provided to aid the prediction of takeoff, climb and cruise performance and to supply the information necessary for maximum and safe utilization of the engine. The individual charts are described in detail below.

The words "wet" or "dry" describing the power used for takeoff refer to whether or not water injection (ADI fluid) is used.

The engine torquemeters are connected to gages which are calibrated in terms of BMEP (brake mean effective pressure). If the BMEP and RPM are known it is possible to determine the brake horsepower by the following equation:

$$BHP = (BMEP \times RPM)/283$$

THE EFFECT OF TEMPERATURE ON ENGINE POWER.

The effect of temperature on engine power is accounted for by correction grids on many of the charts. If it is desirable to determine this effect for conditions not shown it may be approximated by the following equations:

$$BHP = BHP_{std}\sqrt{T_{std}/T}$$ For part throttle, constant manifold pressure operation,

$$BHP = BHP_{std}(T_{std}/T)$$ For full throttle operation,

where T and T_{std} are absolute temperature. Absolute temperature is equal to the temperature in degrees Centigrade plus 273. A 10°C temperature increase above standard results in approximately 1.7 percent power loss for part throttle, constant manifold pressure operation, and approximately 3.5 percent power loss for full throttle operation.

THE BMEP METHOD OF SETTING CRUISE MIXTURES.

Considerable experience with the R-2800 engines indicates that the most efficient method of setting cruise mixtures is the BMEP drop method. With this method it is possible to operate the engine much closer to the optimum fuel to air ratio than would result from the use of auto-lean. This, in turn, permits more range for a given amount of fuel. The Power Settings for Cruise Charts (figures A2—13 thru A2—19) are based on a given BMEP drop (usually 12 PSI) from best power mixture.

Upon reaching cruising altitude, climb power should be maintained until the indicated airspeed slightly exceeds that anticipated for the particular altitude, gross weight and cruise power to be used. This higher airspeed will afford a cushion so that the airspeed dissipation incurred during trim and power adjustments will not result in an airspeed at the start of cruise less than that anticipated for cruise.

From the charts referenced above for the selected brake horsepower determine the appropriate manifold pressure, RPM, blower ratio and BMEP drop. Cruise power will then be set in this sequence:

1. Set cruise RPM. (Mixture rich)
2. Shift blower, if required.
3. Set cowl flaps to the angle anticipated to yield 200°C cylinder head temperature when stabilized.
4. Adjust throttle to selected manifold pressure, allowing for any known gage error.

Note

For initial cruise setting after climb, maintain climb mixture setting, or Auto Rich setting, as necessary, for 5 minutes to allow stabilization prior to manual adjustment.

5. Manually lean the mixture for each engine individually as follows:
   a. Determine best power mixture by slowly leaning the mixture while carefully observing the BMEP until maximum BMEP is reached. Since the carburetor has been specifically designed to facilitate manual leaning, a rise of BMEP should be noted during the initial leaning process, indicating that the mixture is providing the maximum power output for the MAP and RPM setting used. If the initial rise is not observed, but instead an immediate drop of BMEP is noted, the carburetor is at or slightly on the lean side of best power even though the mixture is in the auto-rich position. If the carburetor is lean, return the mixture control to auto-rich and determine best power by applying intermittent prime and observing the BMEP. If a drop in BMEP is noted when using prime, the mixture is at best power. If a rise in BMEP is noted when using prime, the mixture is leaner than best power. With the use of prime, adjust the mixture control lever to find best power. When best power is found with the use of prime, manually lean to the prescribed BMEP drop. If best power cannot be found with the use of prime, do not lean beyond the auto-lean position.
   b. When the BMEP is stabilized with the mixture at best power setting (maximum BMEP), manually lean the mixture to the prescribed BMEP drop. Since the BMEP drop setting is based on a constant manifold pressure, it is essential that airspeed and altitude be held constant during this step. A change in airspeed at constant throttle affects ram and therefore manifold pressure and BMEP to the extent that an airspeed change of ten knots can result in as much as a five BMEP change. If loss of manifold pressure is experienced due to loss of ram, reset manifold pressure to original value.
6. Readjust cowl flaps to provide 200°C CHT. When stabilized, cross check engine instruments. With equal manifold pressure, RPM, carburetor air and cylinder head temperatures, equal engine airflow is normally obtained. With identical BMEP drop settings, fuel/air ratio and therefore fuel flows will also be equal, regardless of the condition of the ignition system. Any difference in fuel flow under these conditions must be due to instrument inaccuracy, either flowmeter or manifold pressure, or to a mechanical malfunction, such as a stuck valve or broken pushrod, which affects mixture flow. BMEP differences will be due entirely to unequal accessory loads, instrument inaccuracy and/or mechanical discrepancies.
7. Once cruise power has been set and stabilized, the maximum difference in indicated BMEP, after allowing for that due to unequal accessory loading, should not exceed 10 BMEP. If a greater discrepancy is noted, it should be recorded in the log with as complete a description as possible to assist in troubleshooting.

Mixtures adjusted in this manner should remain substantially the same regardless of small throttle adjustments necessary to counteract small changes in airspeed, altitude and/or CAT. Mixtures, however, should be periodically checked during cruise and adjusted as required. Power should be reset after appreciable change in CAT or altitude. If power change is in excess of 50 BHP from original power setting, reset mixtures as outlined in step 5. Mixture strength or BMEP drop can be quickly checked by applying prime in varying amounts to determine best power or peak BMEP.

This procedure affords the simplest and quickest adjustment to cruise power since it involves the fewest control movements. Another advantage is that by setting equal airflow (RPM, MAP, CAT and CHT) and fuel/air ratio (BMEP drop) on all engines, any discrepancies are in greater evidence and in flight troubleshooting is facilitated.

DISCUSSION OF CHARTS.

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF CHARTS.

Charts are provided showing the power available for takeoff in low blower with standard fuel grade, wet (figure A2—1), standard fuel grade, dry (figure A2—2), alternate fuel grade, wet (figure A2—3), and alternate fuel grade, dry (figure A2—4); and in high blower with standard grade fuel, wet (figure A2—5), and standard fuel grade, dry (figure A2—6). The powers determined from these charts are used to determine takeoff performance in Part 3. Results may be read in the form of predicted brake horsepower, predicted BMEP (corresponding to the predicted brake horsepower) or 95% of predicted BMEP. Generally, 95% of predicted BMEP is used to determine takeoff performance.

The high blower charts (figure A2—5 and A2—6) are included for use at high altitudes where maximum power available in low blower is less than that obtainable in high blower at 2600 RPM. A curve is included on the chart to indicate the altitude and CAT where high blower maximum power is equal to low blower maximum power.

These charts allow corrections to be made for altitude, carburetor air temperature and humidity. Because the carburetor air temperature is seldom known at the time these charts are used, assume that it is 5 degrees Centigrade above the outside air temperature. To prevent overboosting the engines when the carburetor air temperature is below standard, a correction scale, showing the amount by which the MAP limit should be reduced, is included on the applicable charts.

In allowing for the effect of humidity one scale corrects the power downward for the effect of humidity alone. Another scale corrects the power upwards to account for the allowable increase in MAP equal to the existing water vapor pressure up to 1.5 inches Hg. This later correction may only be made when the combination of pressure altitude and carburetor air temperature indicates that takeoff power may be developed with less than full throttle setting.

For takeoff ground run, with full throttle operation, the chart values for BMEP are based on ram available at approximately 70 knots IAS. At the start of the ground run, with no ram air, manifold pressures approximately 1 in. Hg below charted values may be expected. In part throttle operation, when manifold pressures are set at the start of ground run, an overboost of approximately 1 in. Hg MAP may be expected at climbout speeds unless the throttles are adjusted during the ground run.

Sample Problem I.

Conditions: Pressure Altitude: 1500 ft
Outside Air Temperature: 20°C
Dew Point: 45°F
Fuel grade: Alternate (100/130) with Water Injection

Find: BHP available, MAP and BMEP for takeoff.

Solution:

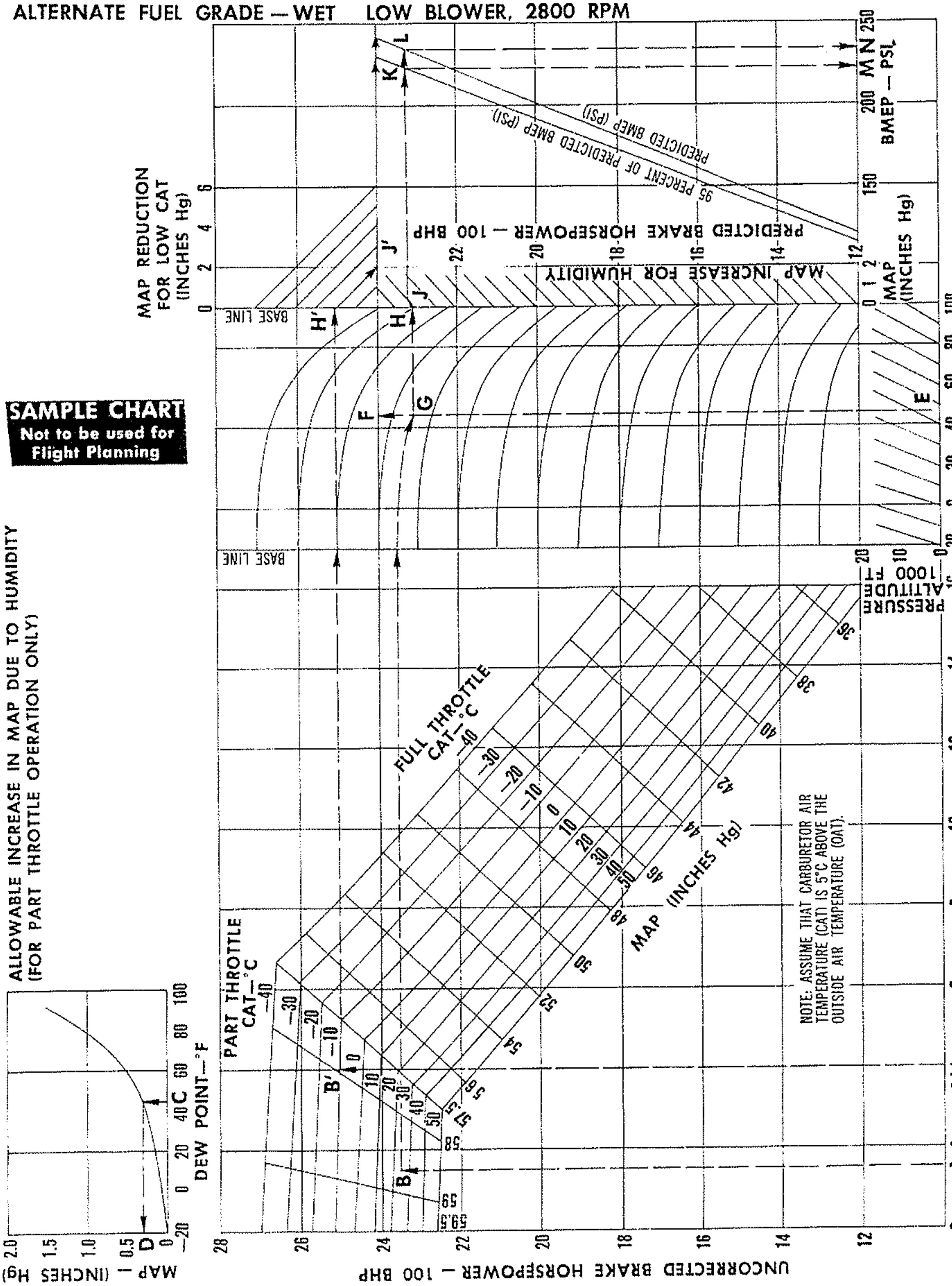
1. Enter sample chart Page A2-4 at 1500 ft pressure altitude, (A), move up to CAT = 25°C (5° above OAT of 20°C), (B) and read MAP = 58.7 in. Hg.
2. Enter sample chart at dew point = 45°F, (C) and read allowable increase in MAP due to humidity = 0.3 in. Hg at (D). MAP for takeoff will be 58.7 + 0.3 = 59.0 inches Hg.
3. Enter lower dew point scale on sample chart at 45°F, follow guide lines to 1500 ft pressure altitude and extend a vertical line upwards, (EF). From (B) move across to base line and follow guide lines until (EF) is intersected at (G). Continue horizontally to base line, (H), follow guide lines for 0.3 inch Hg increase in MAP to (J) and read predicted power per engine = 2322 BHP.
4. Continue to 95% of predicted BMEP line (K) and to predicted BMEP line (L) and drop down to the scale at (M) and (N) to read, respectively, 95% of predicted BMEP = 223 PSI and predicted BMEP = 235 PSI.

Sample Problem II.

Conditions: Pressure Altitude: 4000 ft
Outside Air Temperature: —15°C
Dew Point: —20°F
Fuel grade: Alternate (100/130) with Water Injection

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF

ALTERNATE FUEL GRADE — WET LOW BLOWER, 2800 RPM



Solution:

1. Enter sample chart Page A2-4 at 4000 ft pressure altitude, (A'), move up to CAT = –10°C (5° above OAT of –15°C) (B') and read MAP = 58.0 in. Hg.
2. Since there is no increase in MAP due to humidity for –20°F or less, proceed as in Sample Problem I to (H'). Follow the guide line to 2400 predicted BHP and read MAP reduction for low CAT = 2.0 in. Hg, (J'). MAP for takeoff = 58.0 – 2.0 = 56.0 in. Hg.
3. Continue as in Sample Problem I to read 95% predicted BMEP = 231 PSI and predicted BMEP = 243 PSI.

MINIMUM FUEL FLOW CHART — AUTO RICH OPERATION.

The minimum fuel flow chart (figure A2–7) shows the expected fuel flow for auto rich operation in both low blower ratio and high blower ratio. If fuel flows substantially exceed those shown on the chart a loss in power may result. In such a case it is permissible to manually lean the mixture to the fuel flow determined from the chart. In no case should the mixture be leaned to less than the chart fuel flows.

It is important that fuel flow be monitored throughout the climb to ascertain that it is within prescribed limits. The minimum fuel flow limit is not an engine limit at normal climb power. It is, however, a carburetor limit designed to obviate damage which might otherwise result at higher power, where margin between a safe fuel flow and engine detonation is diminishing. At climb power, therefore, it is considered safe to continue operation when the fuel flow is at or 50 pounds per hour below the minimum fuel flow shown on figure A2–7, providing CHT and CAT limits are observed. If the climb fuel flow falls more than 50 pounds per hour below published minimum, power should be reduced by increments of 100 BHP until the fuel flow is not more than 50 pounds per hour below the limit for that particular reduced power. CHT and CAT limits must still be monitored. For a carburetor whose fuel flow is below published minimums, a complete write-up should be made in the log and corrective maintenance accomplished at the next landing.

Sample Problem:

See figure A2–7.

Conditions: Engine power = 1200 BHP.
RPM = 2300.

Find: Minimum fuel flow (low blower).

Solution:

1. Enter the brake horsepower scale at 1200 BHP and proceed vertically upwards.
2. Enter the left hand scale at 2300 RPM and continue to the right to 1200 BHP.
3. At the intersection of 2300 RPM and 1200 BHP read the minimum fuel flow per engine, 675 pounds per hour.

ESTIMATED FUEL CONSUMPTION FOR CRUISE POWER CHARTS.

These two charts show the estimated fuel flows for cruise operation in low blower (figure A2–8) and high blower (figure A2–9) when using the BMEP drop method of cruise control. The charts are based on best economy mixture setting; however, an auxiliary graph is included so that the fuel flow may be determined when operating at any given BMEP drop from best power mixture setting.

Sample Problem:

Conditions: Engine power = 1150 BHP.
RPM = 2200.
BMEP Drop = 12.
Blower Range = Low blower.

Find: Estimated fuel consumption.

Solution:

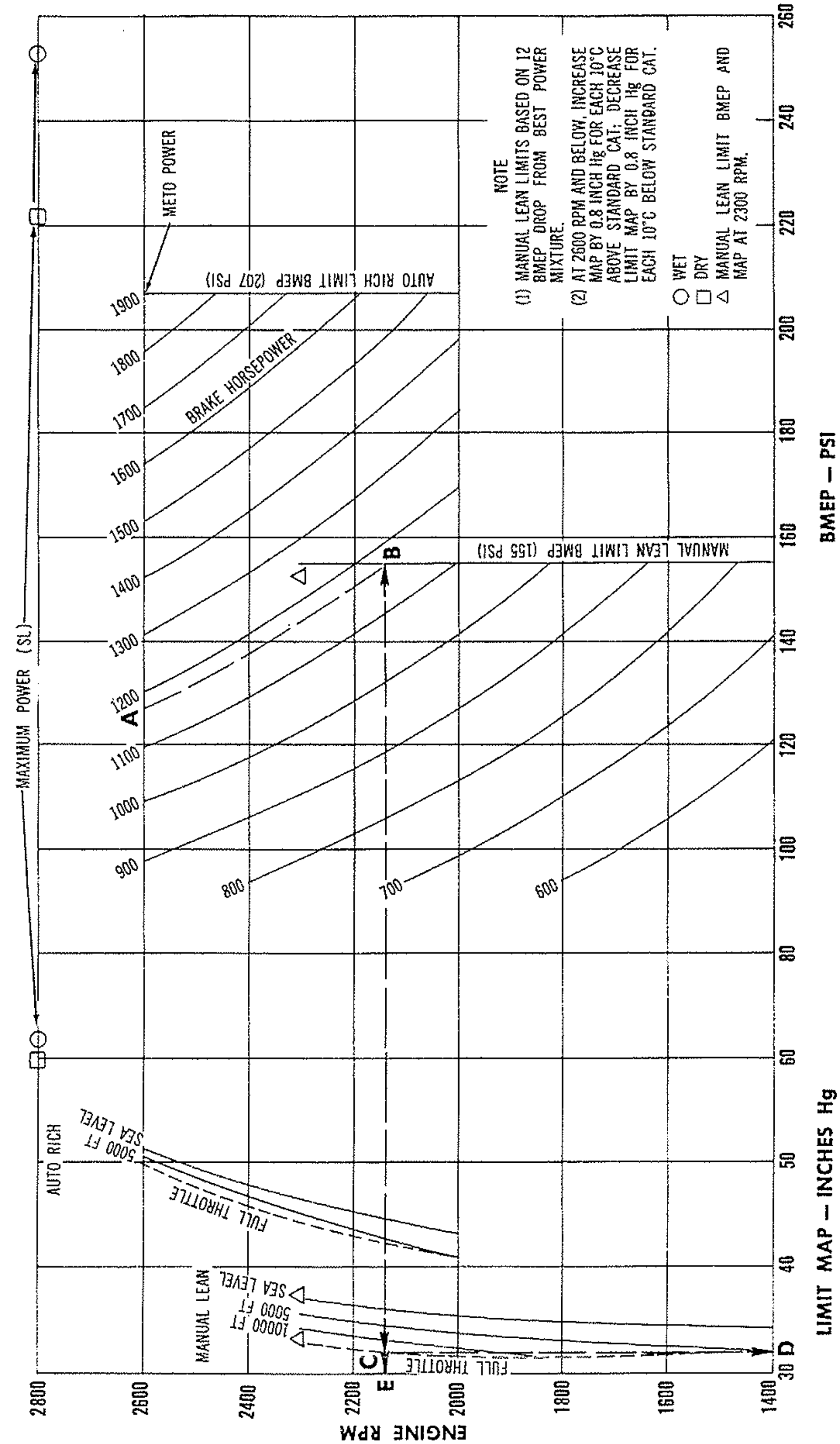
1. Enter the chart (figure A2–8) at 1150 BHP.
2. Read vertically to the 2200 RPM curve.
3. Read across to find fuel flow of 520 pounds per hour per engine.
4. To find fuel flow increment for BMEP drop, enter the auxiliary graph at 12 BMEP and read up to 2200 RPM.
5. Read across to find fuel flow increment of 2 pounds per hour.
6. Fuel flow for each engine is 520 + 2 = 522 pounds per hour per engine. Total fuel flow for both engines is 522 × 2 = 1044 pounds per hour.

POWER SCHEDULE CURVES.

The power schedule curves illustrate graphically the variation of limit MAP and limit BMEP with pressure altitude, RPM, and mixture setting in the METO power range of the engine. Limit MAP and BMEP values are also marked for Maximum Power on the 2800 RPM line of the low blower chart. In addition, the curves provide a means of determining the RPM and BMEP required to produce a desired BHP. Notice that any particular BHP may be obtained over a wide range of RPM and a corresponding BMEP range. Two separate curves are provided, one for low blower operation, and one for high blower, figures A2–10 and A2–11, respectively.

POWER SCHEDULE CURVE
LOW BLOWER
STANDARD DAY

SAMPLE CHART
Not to be used for Flight Planning



Sample Problem:

Conditions: Long range cruise power at 15000 ft pressure altitude is 1170 BHP (manual lean mixture). Carburetor Air Temperature is 15°C above Standard CAT.

Find: Limit BMEP, limit MAP and RPM.

Solution:

1. Enter the sample (low blower) chart (Page A2-6 at 1170 BHP (A) and follow the BHP guide line until the limit BMEP line is reached at (B). Limit BMEP = 155 PSI.
2. From (B) move horizontally to the altitude line representing manual lean 15000 ft, (C), and drop down to the scale to read standard limit MAP = 32 inches Hg, (D). Since CAT is 15°C above standard, increase limit MAP by 1.2 inches Hg (0.8 inch for each 10°C above Standard). Limit MAP = 32 + 1.2 = 33.2 inches Hg.
3. Continue horizontally to RPM scale, (E) and read 2140 RPM.

Power Settings for Climb Table.

Figure A2—12 tabulates the power settings necessary for climb at 1500 BHP/engine for various altitude and carburetor air temperature combinations. This table is based on a constant RPM and BMEP, and shows the manifold pressures necessary to maintain 1500 BMP at a given altitude and CAT.

Power Settings for Cruise Tables.

Figure A2—13 thru A2—19 show the engine settings necessary to develop a given brake horsepower for various pressure altitudes and carburetor air temperatures with manual lean mixture. Power settings shown above the heavy line on the table are for operation in high blower, and those below for low blower.

Each table is for a single brake horsepower. Tables are provided for each 100 brake horsepower from 700 through 1200 based on a 12 BMEP drop from best power mixture. An additional table is provided for 1240 BHP (maximum cruise power in low blower) based on a 2 BMEP drop from best power mixture, since the use of the 2 BMEP drop permits operation at higher altitudes, although at a higher fuel flow.

Sample Problem:

Find: Find power setting necessary to maintain 900 BPH/engine at a pressure altitude of 15000 ft and at carburetor air temperatures of 0°C and +20°C.

Solution:

1. Enter 900 BHP/engine table (figure A2—15) at 15000 ft pressure altitude and CAT of 0°C, disregarding the guide lines on the table, and read manifold pressure for these conditions = 27.4 in. Hg.
2. Enter the table at 15000 ft pressure altitude and CAT of +20°C disregarding the guide lines, and read manifold pressure = 28.3 in. Hg.
3. Follow the guide line from the 15000 ft 0°C CAT position to the right to find 2100 RPM in low blower at a 12 PSI-BMEP drop, fuel flow/engine = 417 Lb/Hr and nominal BMEP = 121 PSI.
4. Following the guide line from the 15000 ft, +20°C CAT position to the right results in the same RPM, fuel flow and BMEP conditions as above.

Note

From these examples it can be seen that the guide lines on these tables are used only after manifold pressure has been determined from the pressure altitude and CAT.

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF

STANDARD FUEL GRADE — WET
LOW BLOWER, 2800 RPM

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

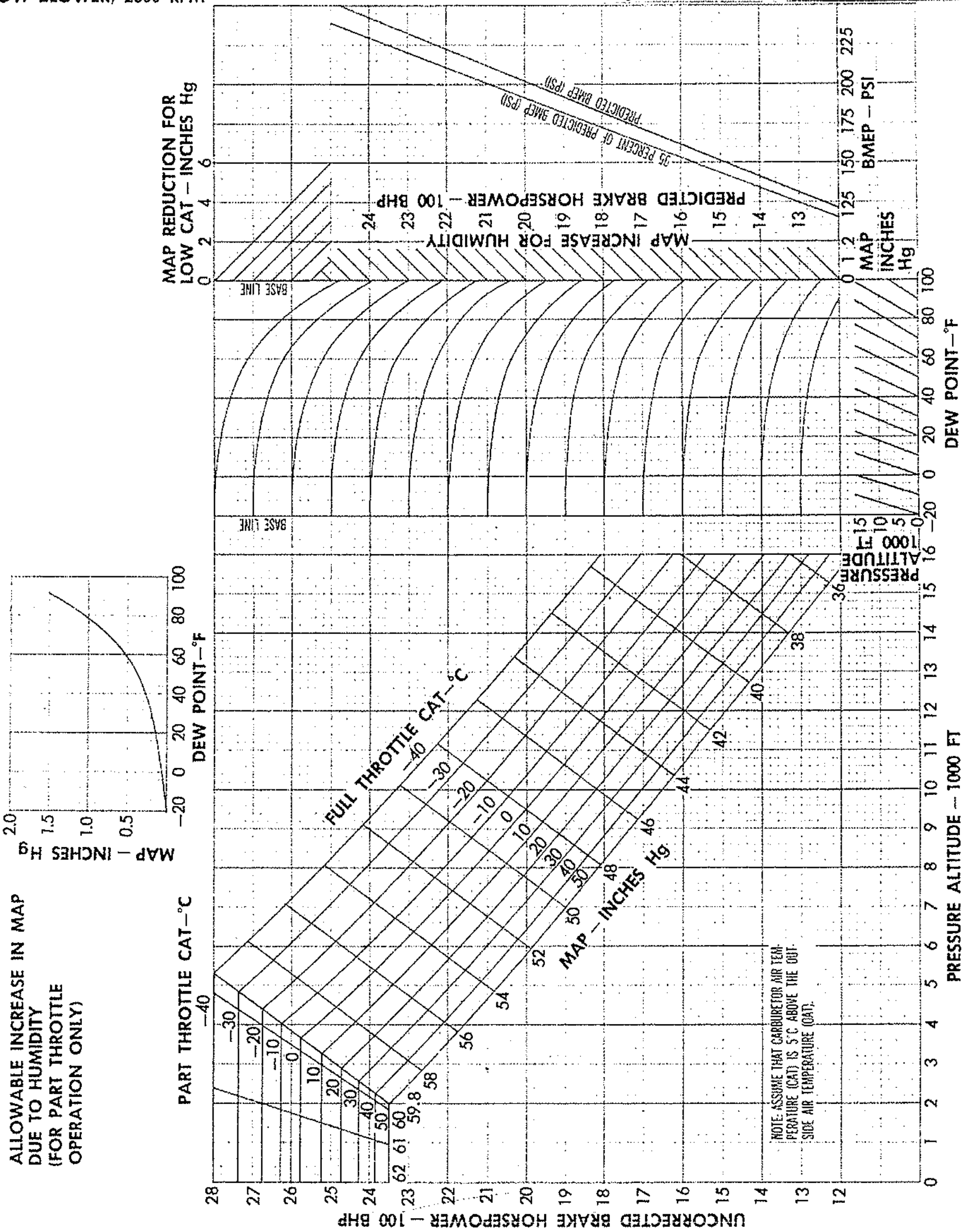


Figure A2—1

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF

STANDARD FUEL GRADE — DRY LOW BLOWER, 2800 RPM

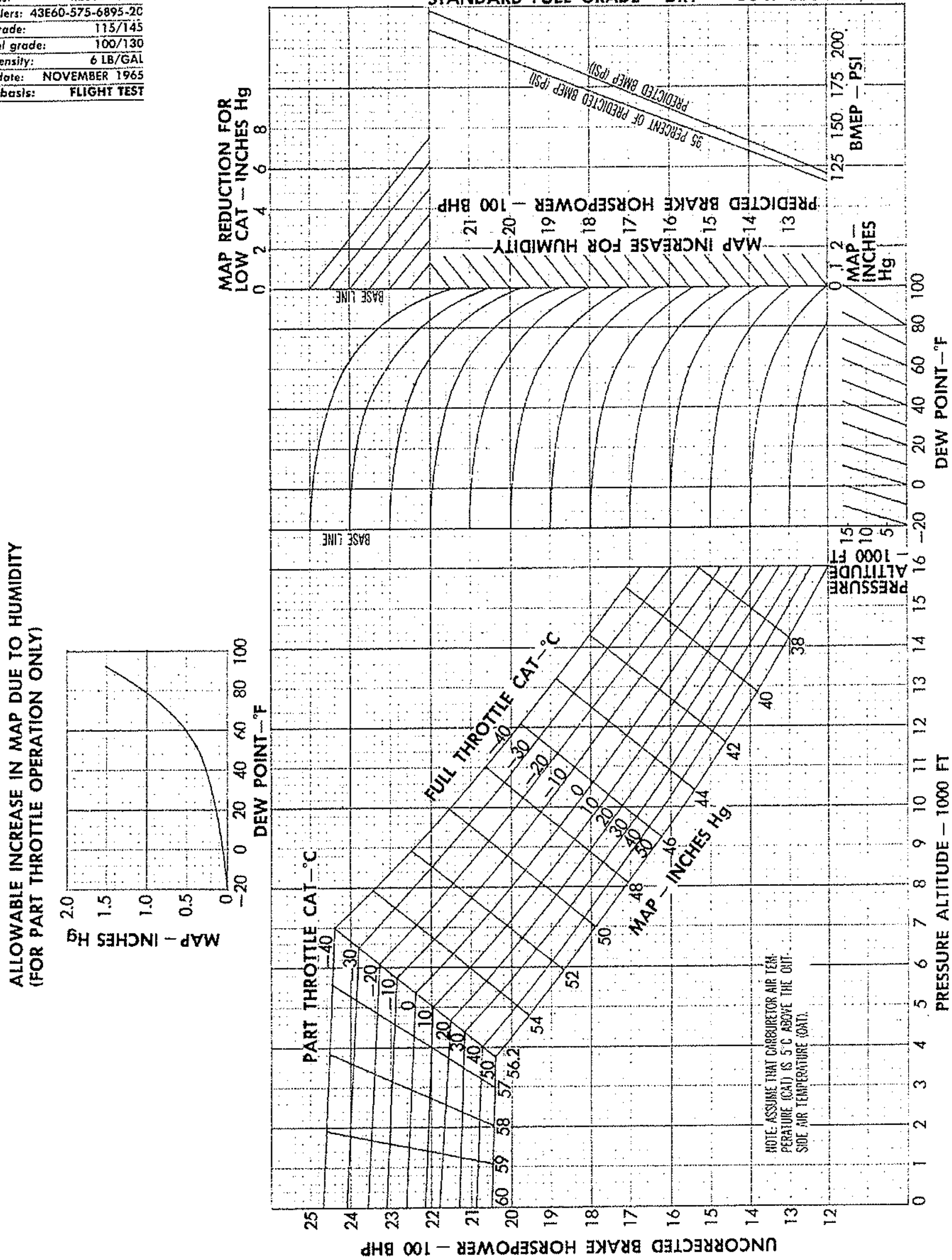


Figure A2—2

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF

ALTERNATE FUEL GRADE — WET
LOW BLOWER, 2800 RPM

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

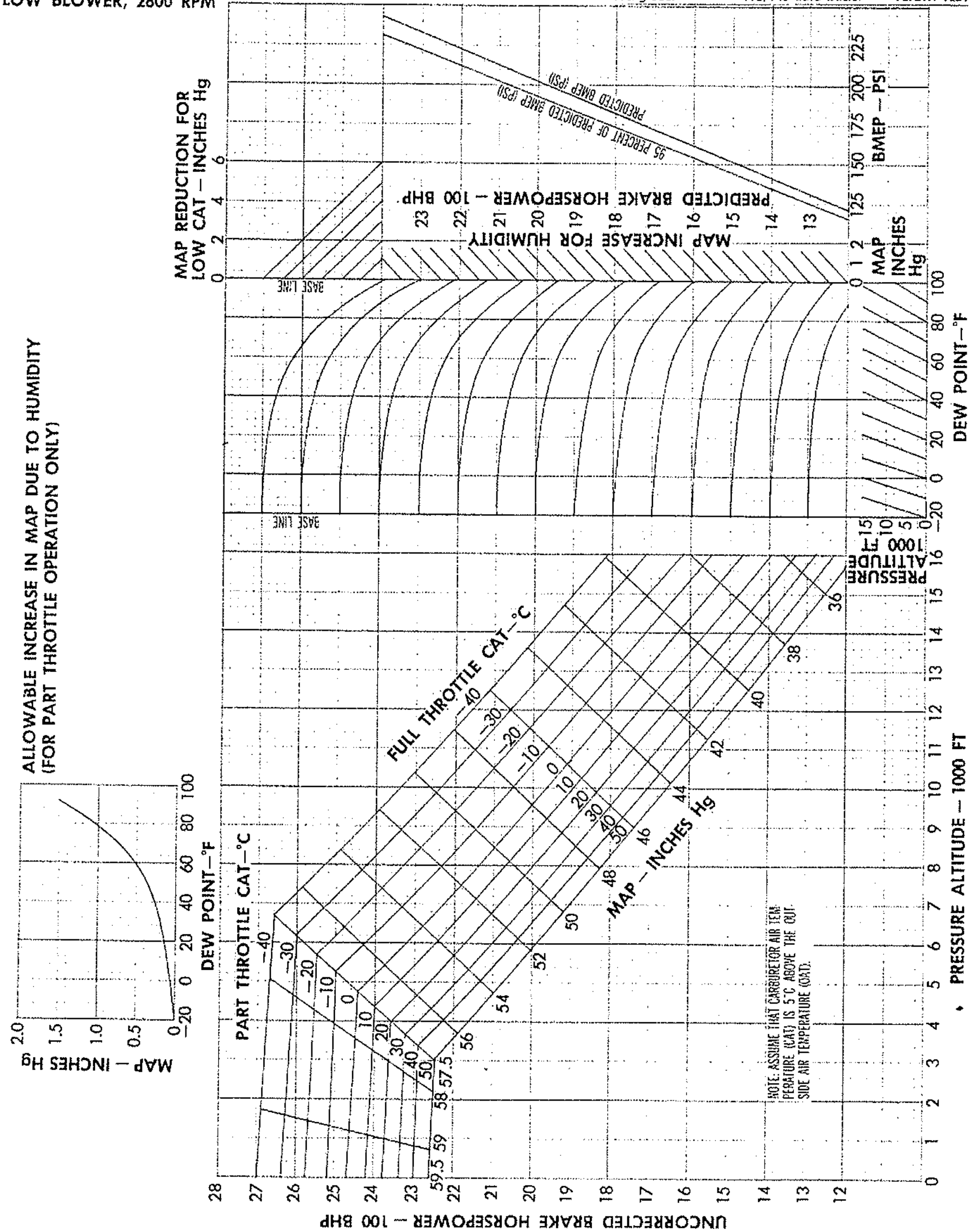


Figure A2—3

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF

ALTERNATE FUEL GRADE — DRY LOW BLOWER, 2800 RPM

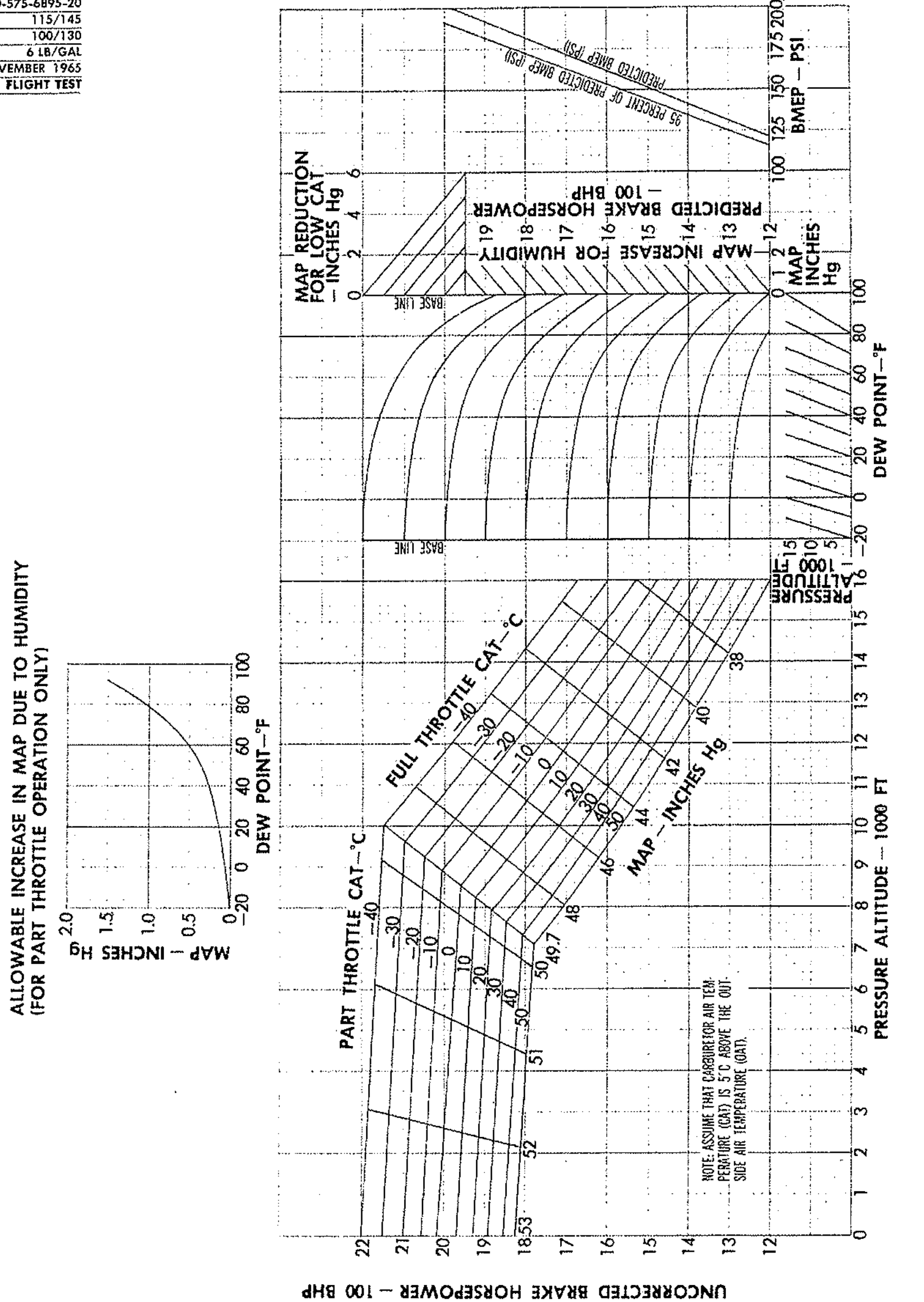


Figure A2—4

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF
STANDARD FUEL GRADE — WET
HIGH BLOWER, 2600 RPM

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

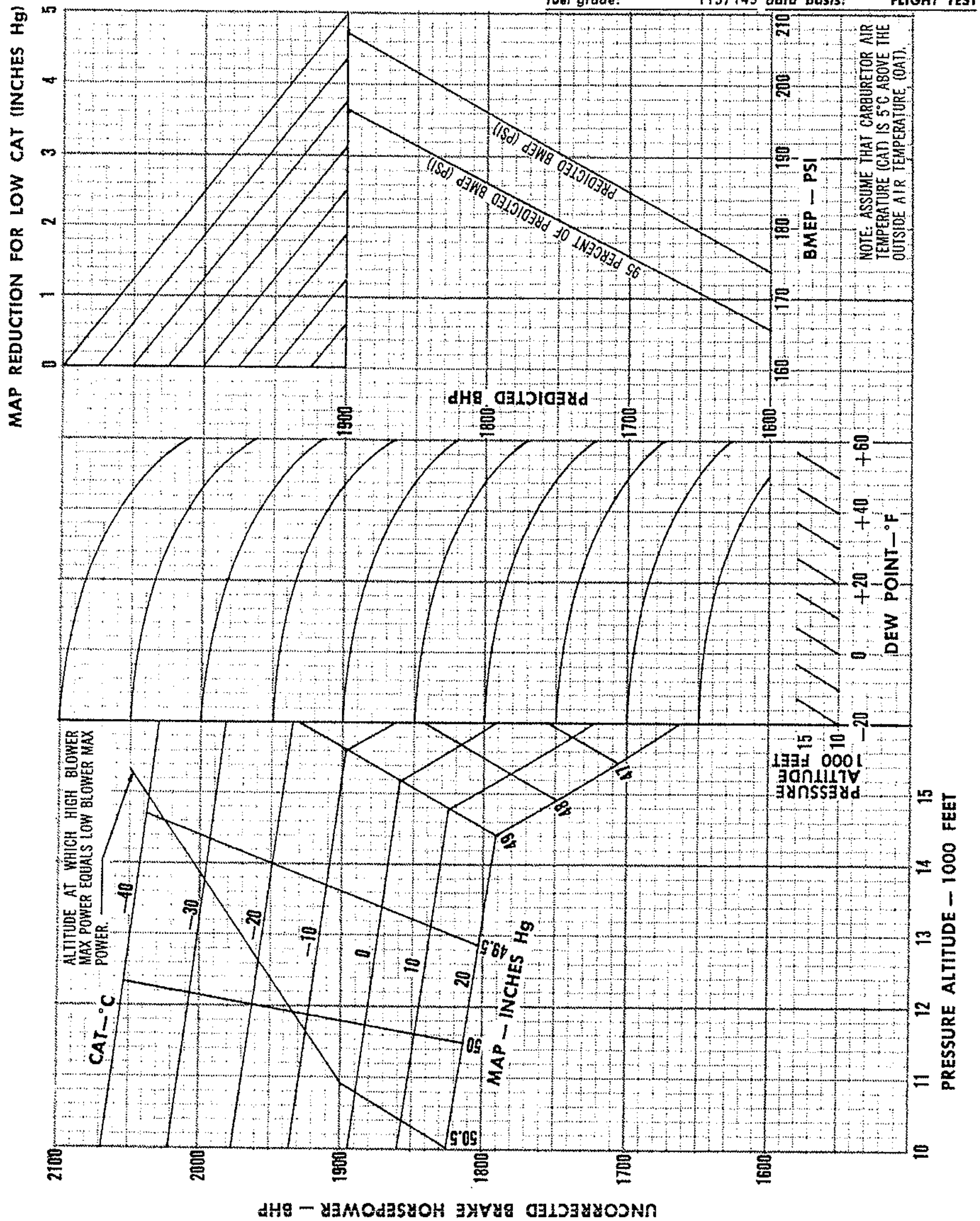


Figure A2—5

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

BRAKE HORSEPOWER AVAILABLE FOR TAKEOFF
STANDARD FUEL GRADE — DRY
HIGH BLOWER, 2600 RPM

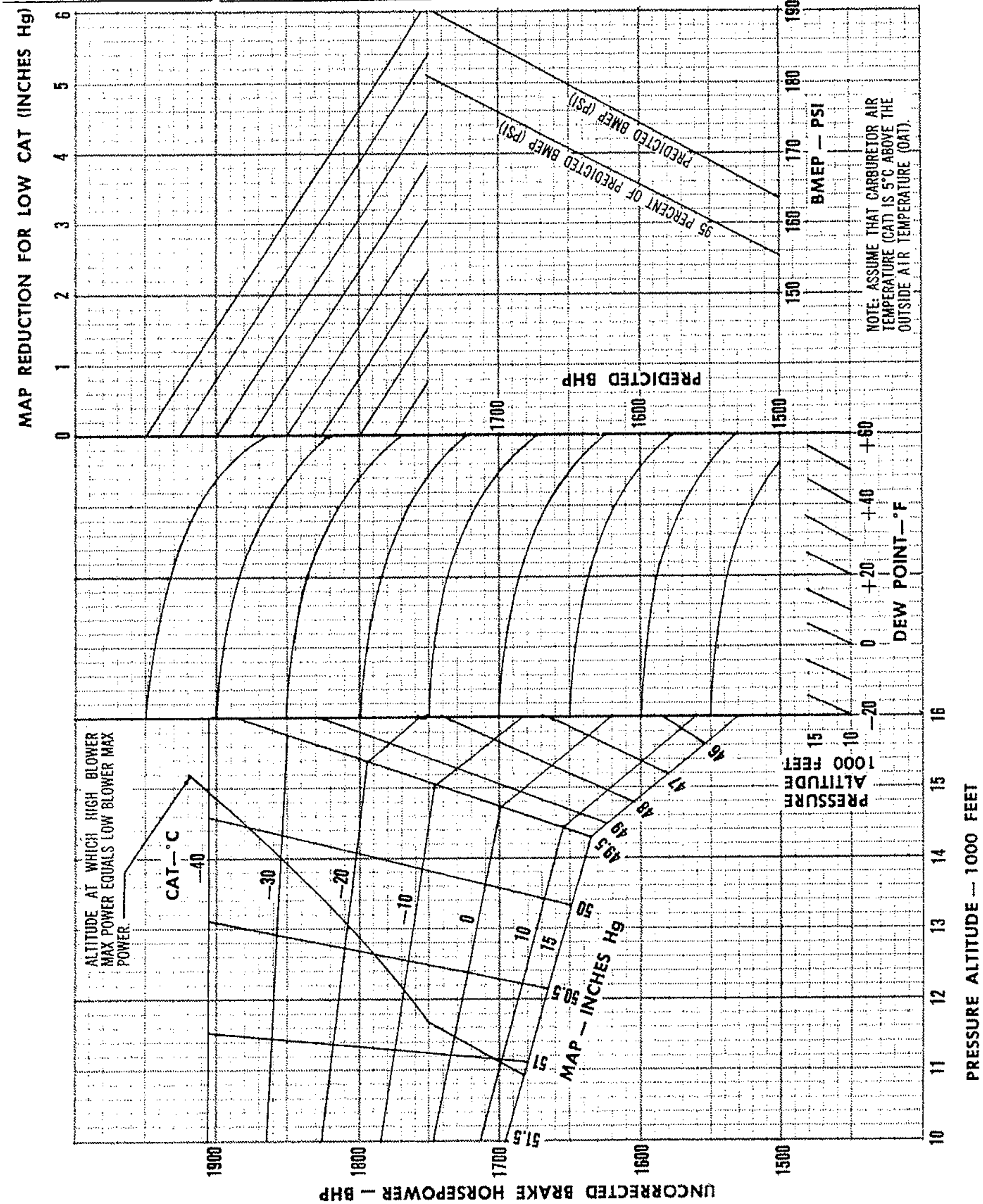
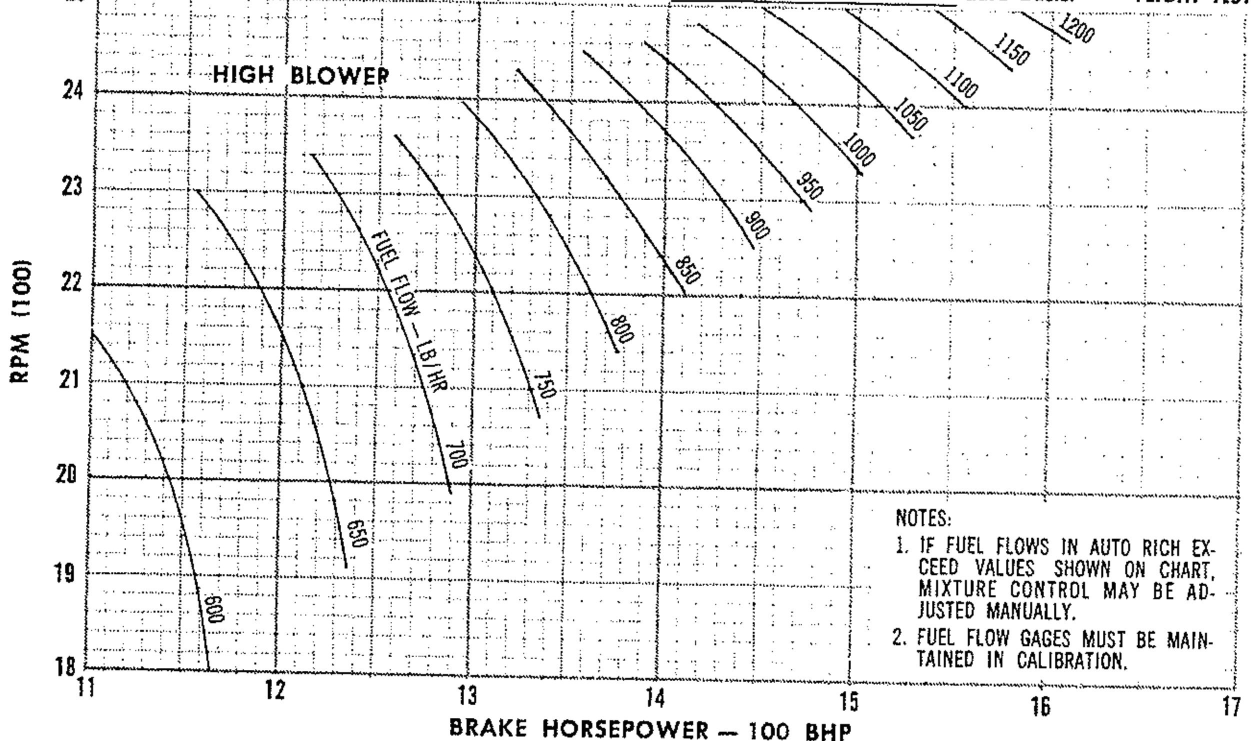


Figure A2—6

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

MINIMUM FUEL FLOW — AUTO RICH OPERATION



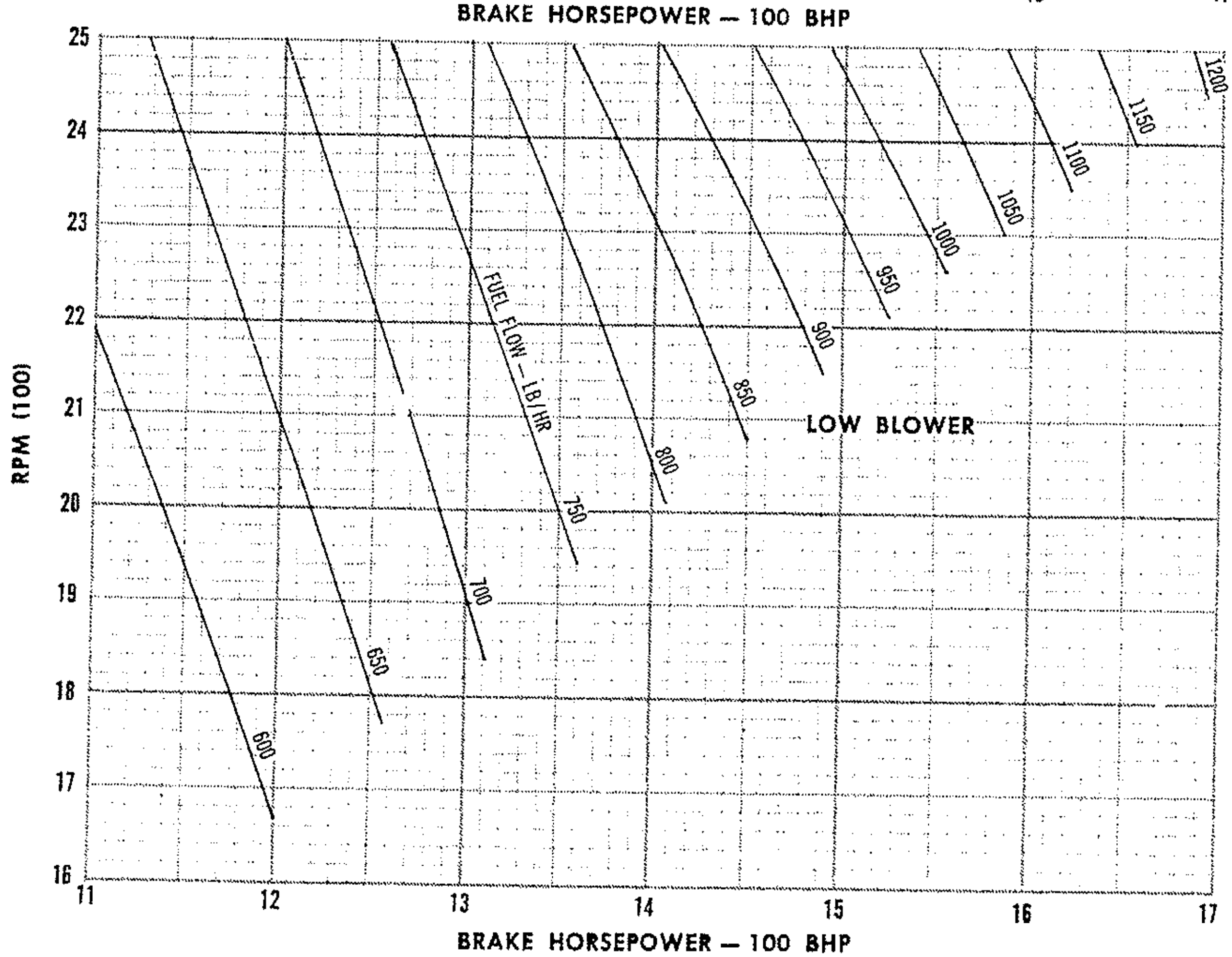


Figure A2—7

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

BEST ECONOMY FUEL CONSUMPTION FOR CRUISE POWERS LOW BLOWER

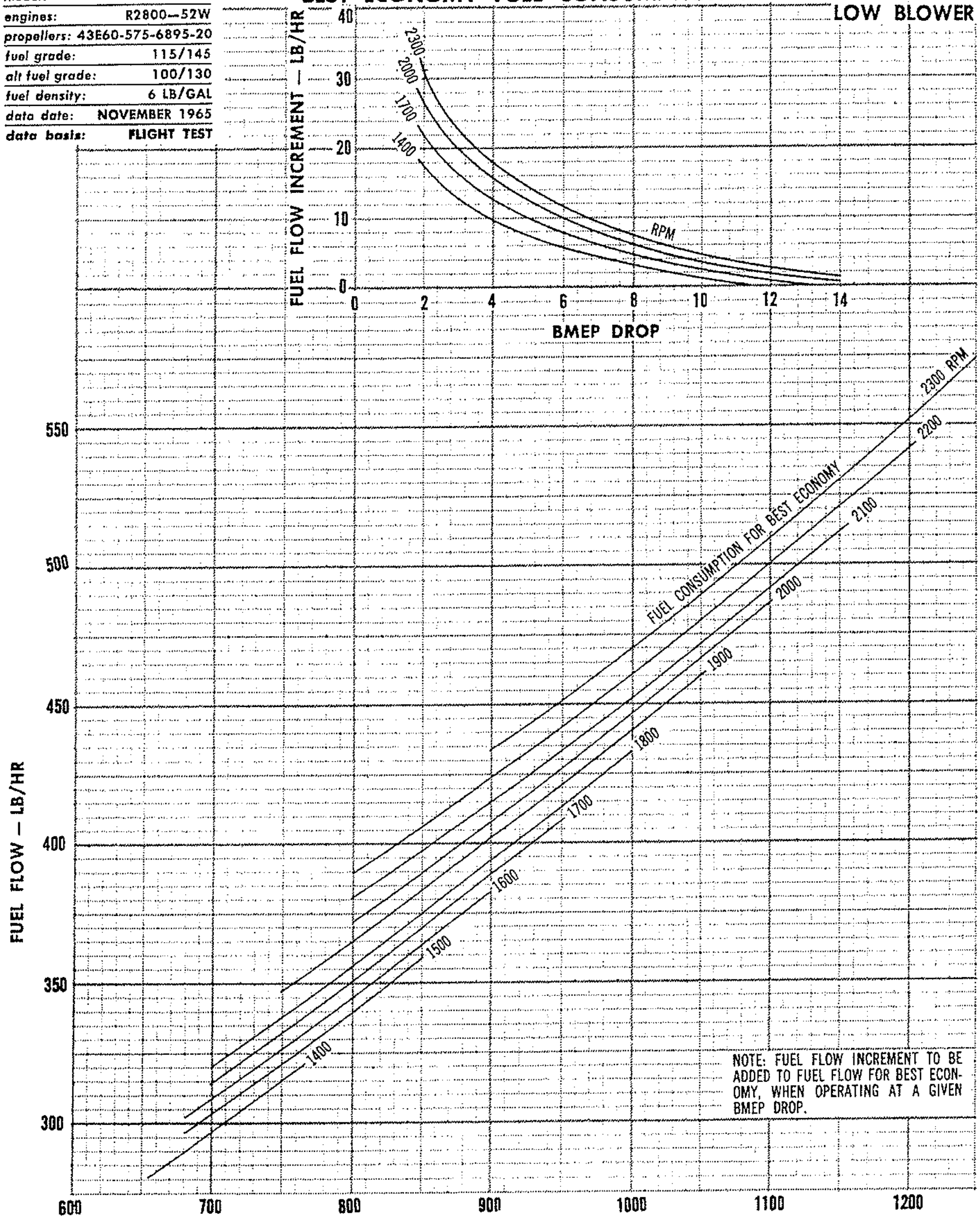


Figure A2—8

BEST ECONOMY FUEL CONSUMPTION FOR CRUISE POWERS
HIGH BLOWER

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

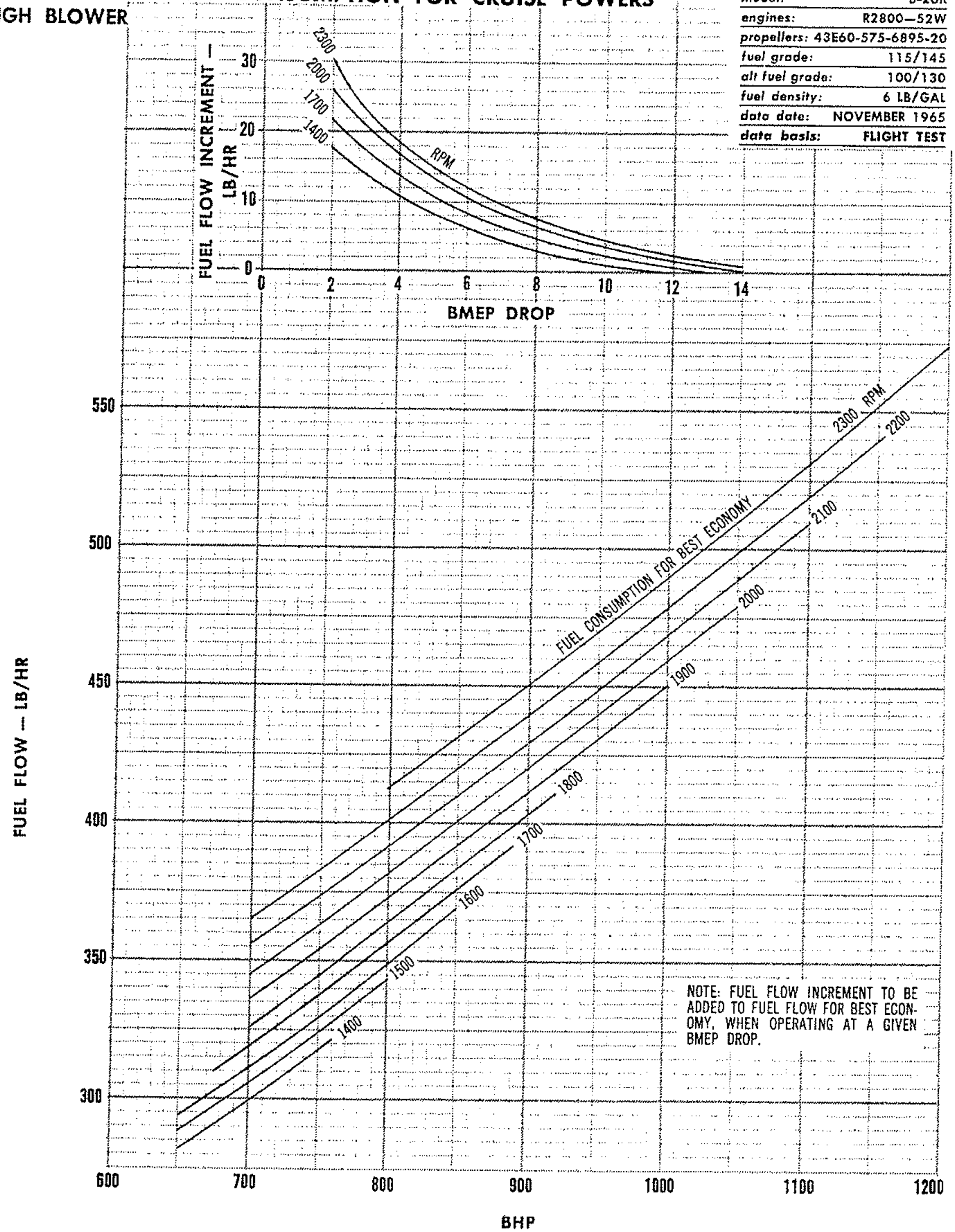


Figure A2—9

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

POWER SCHEDULE CURVE

LOW BLOWER STANDARD DAY

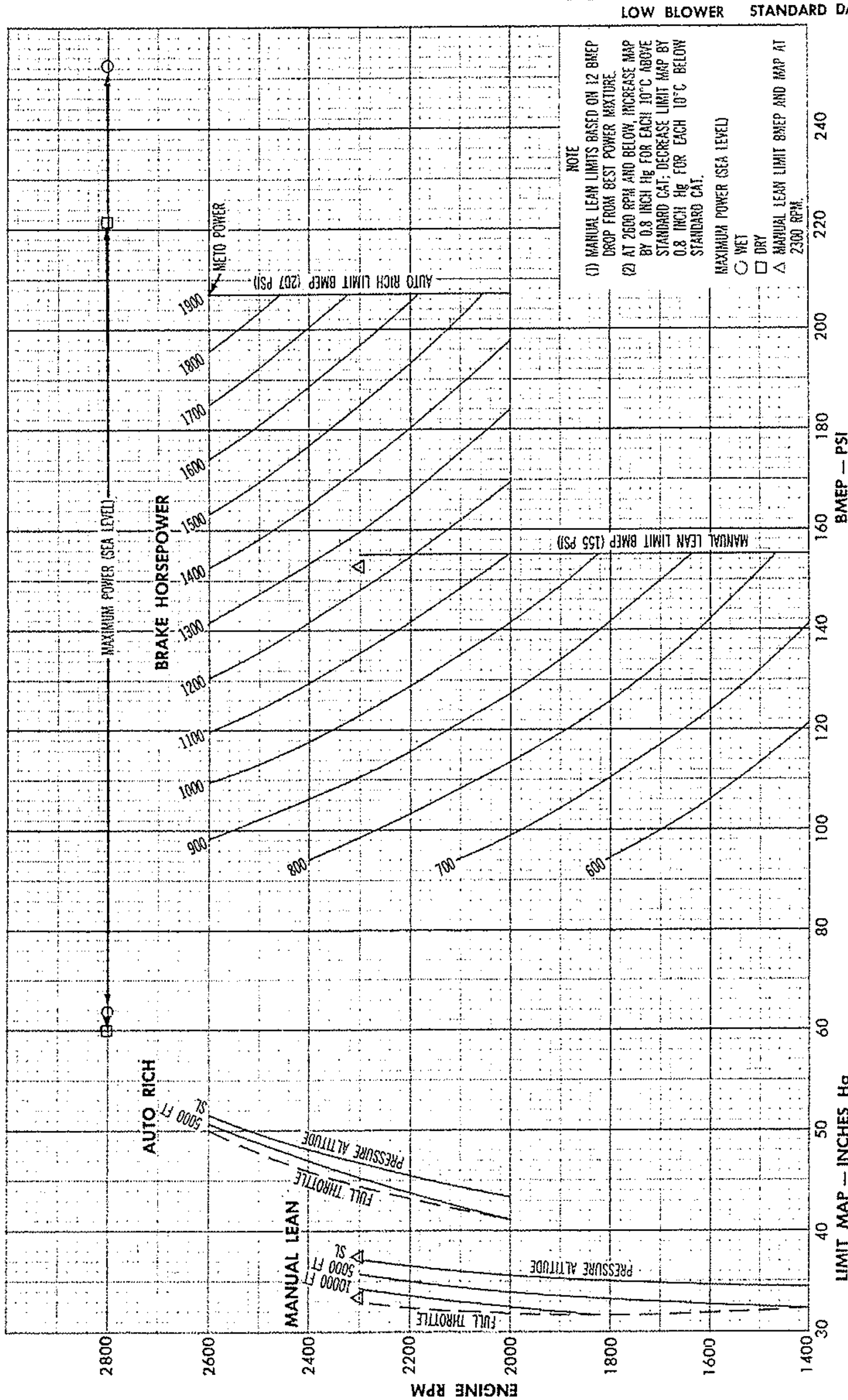


Figure A2—10

POWER SCHEDULE CURVE

HIGH BLOWER
STANDARD DAY

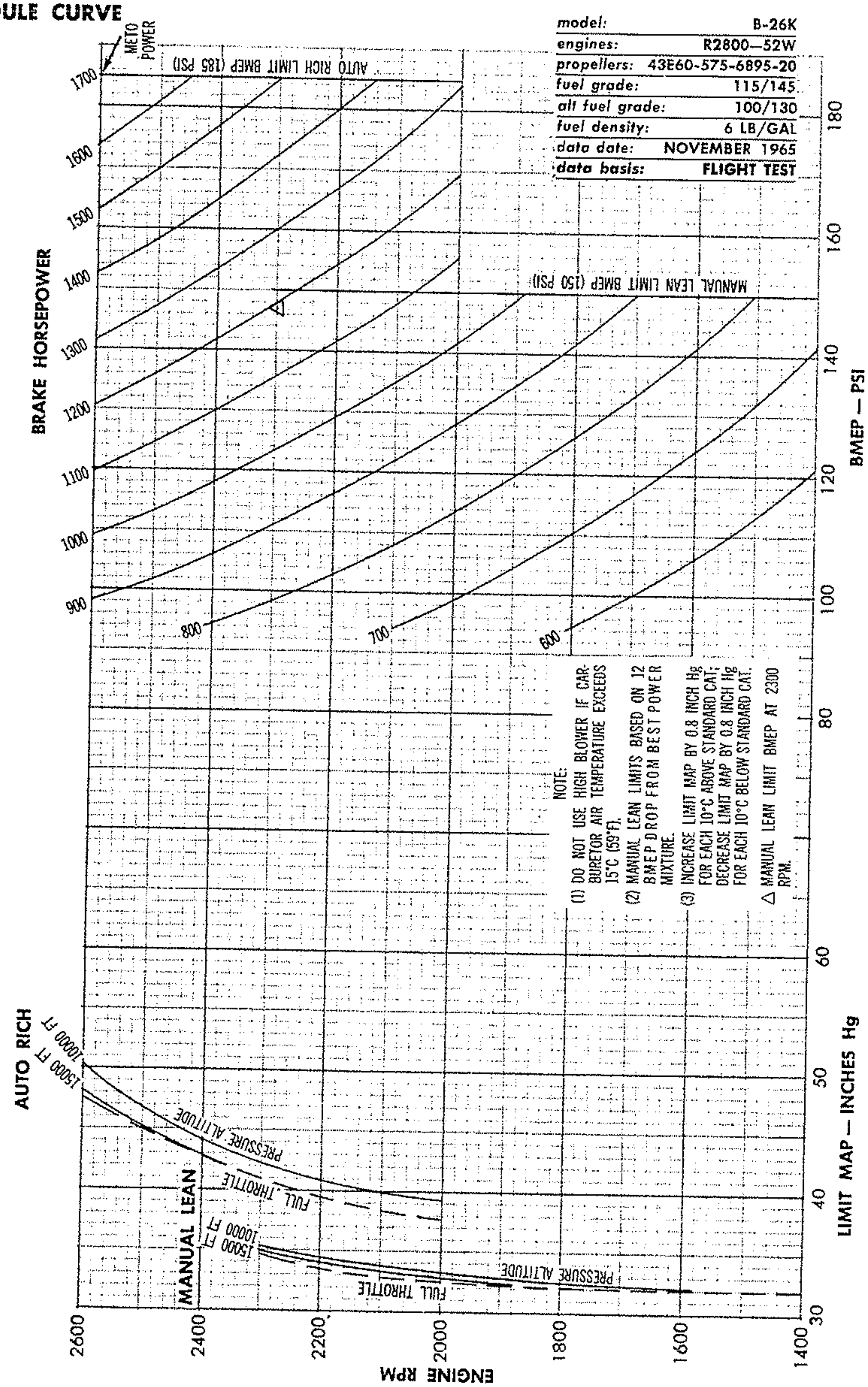


Figure A2—11

POWER SETTINGS FOR CLIMB AT 1500 BHP/ENGINE
2400 RPM*
177 BMEP* (NOMINAL)
INCLUDES RAM AIR EFFECTS AT RECOMMENDED CLIMB SPEEDS

Fuel Flow per Engine	*Low Blower*	*High Blower**
Minimum	975 (lb/hr)	1035 (lb/hr)

Pressure Altitude	*Manifold Pressure (In. Hg) at Carburetor Air Temp. °C*							
	−30°	−20°	−10°	0°	+10°	+20°	+30°	
18,000	40	*	*	*	*			*HIGH BLOWER*
16,000	40	40¾	41½	42¼	43	*	*	*HIGH BLOWER*
14,000	36¼	40¾	41½	42¼	43	43¾		*HIGH BLOWER*
12,000	36½	37¼	38	38¾	43	43¾		*HIGH BLOWER*
10,000	36¾	37½	38¼	39	39¾	40½	41	*LOW BLOWER*
8000	37	37¾	38½	39¼	40	40¾	41¼	*LOW BLOWER*
6000	37¼	38	38¾	39½	40¼	41	41½	*LOW BLOWER*
4000	37½	38½	39	39¾	40½	41¼	41¾	*LOW BLOWER*
2000	38	38¾	39¼	40	40¾	41½	42¼	*LOW BLOWER*
S. L.	38½	39¼	39¾	40½	41¼	42	42¾	*LOW BLOWER*

*Above full throttle altitude, increase RPM to maintain highest MAP shown under appropriate CAT. For a 100 RPM increase, fuel flow must increase 60 lb/hr and BMEP must decrease 7.

Figure A2—12

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

POWER SETTINGS FOR CRUISE
700 BHP/ENGINE
MANUAL LEAN OPERATION

NOTE:
Do not operate in high blower above 15°C CAT.

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)*								*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
	−30	−20	−10	0	+10	+20	+30	+38				
25,000	21.9	22.4	22.8	23.3	23.1	23.5	23.9					
24,000	22.9	23.3	22.8	23.2	23.7	23.6	24.0					
23,000	22.9	23.3	23.8	23.3	23.7	24.1	24.0		HIGH 2200	12	368	90
22,000	23.0	23.4	23.9	24.3	24.8	24.2	24.6					
21,000	23.8	24.3	24.7	24.4	24.8	25.3	24.6		HIGH 2100	12	358	94
20,000	23.9	24.4	24.8	24.5	24.9	25.4	25.8					
19,000	24.8	25.3	24.9	25.4	25.9	26.3	25.8					
18,000	24.9	25.4	26.0	25.5	26.0	26.4	25.9	DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.	HIGH 2000	12	347	99
17,000	23.2	25.5	26.1	26.5	27.0	26.5	27.0					
16,000	23.5	23.9	26.2	26.7	27.1	27.6	27.1		HIGH 1900	12	338	104
15,000	23.7	24.1	24.5	25.0	27.3	27.7	28.2					
14,000	24.6	25.0	24.7	25.1	25.6	26.0	28.3					
13,000	24.8	25.3	25.8	26.3	25.9	26.3	26.8		HIGH 1800	12	327	110
12,000	25.6	26.1	26.5	26.5	27.0	26.7	27.2	27.5				
11,000	25.8	26.3	26.9	27.4	27.2	27.7	28.2	27.8	LOW 1800	12	322	110
10,000	26.8	26.6	27.1	27.6	28.2	28.0	28.5	28.9				
9,000	27.1	27.6	27.3	27.8	28.4	28.8	28.7	29.1				
8,000	27.3	27.9	28.4	28.9	28.6	29.0	29.5	29.4	LOW 1700	12	315	117
7,000	28.4	28.9	28.7	29.3	29.8	30.3	29.7	30.1				
6,000	28.6	29.2	29.8	30.3	30.0	30.5	31.0	30.3	LOW 1600	12	307	124
5,000	29.0	29.6	30.2	30.7	31.3	30.8	31.3	31.7				
4,000	29.3	29.9	30.5	31.1	31.7	32.2	31.7	32.1	LOW 1500	12	302	132
3,000	29.7	30.3	30.9	31.5	32.1	32.7	33.3	33.7				
2,000	30.0	30.7	31.3	31.9	32.4	33.0	33.6	34.0				
1,000	30.4	31.0	31.7	32.3	32.8	33.4	34.0	34.4	LOW 1400	12	297	142

Figure A2—13

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

POWER SETTINGS FOR CRUISE
800 BHP/ENGINE
MANUAL LEAN OPERATION

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

NOTE:
Do not operate in high blower above 15°C CAT.

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)* −30	−20	−10	0	+10	+20	+30	+38	*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
25,000	23.9	24.4	24.9	25.2	25.6	26.1	F.T.	DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.	HIGH 2300	12	415	98
24,000	23.9	24.5	24.9	25.5	25.8	26.2	26.7					
23,000	24.6	25.1	25.6	25.5	25.8	26.3	26.7					
22,000	22.6	23.1	25.7	26.2	25.9	26.3	26.8		HIGH 2200	12	404	103
21,000	23.2	23.3	23.7	26.4	26.8	27.3	26.8					
20,000	23.3	23.6	23.8	24.3	24.7	27.4	27.9		HIGH 2100	12	394	108
19,000	23.9	23.7	24.1	24.6	24.9	25.3	27.9					
18,000	24.0	24.4	24.3	24.8	25.2	25.5	26.0					
17,000	24.7	24.5	25.0	25.5	25.3	25.8	26.2	26.5	LOW 2200	12	391	103
16,000	24.8	25.3	25.2	25.6	26.1	26.0	26.5	26.9	LOW 2100	12	383	108
15,000	25.0	25.5	26.0	26.5	26.3	26.7	26.7	27.1				
14,000	26.1	25.6	26.1	26.7	27.1	26.9	27.4	27.8	LOW 2000	12	373	113
13,000	26.3	26.8	27.3	26.9	27.4	27.8	27.5	27.9				
12,000	27.2	27.0	27.5	28.0	28.6	28.0	28.5	28.9	LOW 1900	12	366	119
11,000	27.4	28.0	28.5	28.2	28.8	29.2	28.7	29.1				
10,000	28.1	28.2	28.7	29.2	29.0	29.5	30.0	30.4	LOW 1800	12	357	126
9,000	28.3	28.8	29.4	29.4	30.0	30.5	30.0	30.0				
8,000	28.7	29.2	29.8	30.3	30.2	30.7	31.2	30.8				
7,000	29.6	30.2	30.1	30.6	31.2	30.9	31.5	31.9	LOW 1700	12	351	133
6,000	29.9	30.5	31.1	31.0	31.5	32.0	32.6	32.1				
5,000	30.1	30.7	31.3	31.9	31.7	32.2	32.8	33.2	LOW 1600	12	344	142
4,000	30.4	31.0	31.6	32.2	32.8	33.4	32.9	33.3				
3,000	30.7	31.2	31.9	32.5	33.1	33.7	34.3	34.7	LOW 1500	12	339	151
2,000	31.0	31.6	32.3	32.9	33.5	34.0	34.6	35.0				
1,000	31.4	32.0	32.7	33.3	33.9	34.4	35.0	35.4				

Figure A2—14

POWER SETTINGS FOR CRUISE
900 BHP/ENGINE
MANUAL LEAN OPERATION

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

NOTE:
Do not operate in high blower above 15°C CAT.

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)*								*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
	-30	-20	-10	0	+10	+20	+30	+38				
25,000	26.7	27.2	F.T.					DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.				
24,000	26.6	27.2	27.7	28.2	F.T.							
23,000	26.7	27.3	27.8	28.2	28.8	29.3	F.T.					
22,000	26.7	27.3	27.8	28.3	28.8	29.2	29.7					
21,000	27.2	27.8	27.9	28.4	28.9	29.3	29.7					
20,000	25.0	27.8	28.3	28.9	28.9	29.4	29.9		HIGH 2300	12	453	111
19,000	25.0	25.5	26.1	28.8	29.4	29.9	29.9					
18,000	25.5	26.0	26.2	26.7	27.1	30.0	30.5		HIGH 2200	12	441	116
17,000	25.6	26.1	26.7	27.2	27.2	27.7	30.6					
16,000	26.3	26.8	26.8	27.3	27.7	27.8	28.3		HIGH 2100	12	431	121
15,000	26.4	26.9	27.5	27.4	27.9	28.3	28.5	28.9				
14,000	27.3	27.8	27.6	28.2	28.7	28.5	29.0	29.0	LOW 2200	12	426	116
13,000	27.4	28.0	28.5	28.3	28.8	29.3	29.2	29.6				
12,000	28.5	28.2	28.7	29.3	28.9	29.5	30.0	29.7	LOW 2100	12	417	121
11,000	28.7	29.3	29.8	29.6	30.1	29.7	30.2	30.6				
10,000	28.9	29.5	30.0	30.6	30.2	30.7	30.3	30.7	LOW 2000	12	410	127
9,000	29.9	30.5	31.1	30.7	31.3	30.9	31.5	31.9				
8,000	30.4	31.1	31.3	31.8	31.5	32.0	31.6	32.0	LOW 1900	12	402	134
7,000	30.6	31.2	31.9	32.1	32.7	32.3	32.9	33.3				
6,000	31.0	31.6	32.2	32.9	32.9	33.5	34.1	33.5	LOW 1800	12	395	142
5,000	31.1	31.8	32.4	33.0	33.6	34.2	34.3	34.7				
4,000	31.3	31.9	32.5	33.2	33.8	34.4	35.0	35.4	LOW 1700	12	388	150
3,000	31.5	32.1	32.7	33.4	34.0	34.6	35.2	35.6				
2,000	31.7	32.4	33.0	33.7	34.2	34.8	35.4	35.8				
1,000	32.0	32.6	33.3	33.9	34.5	35.1	35.7	36.1	LOW 1650	12	385	154

Figure A2—15

POWER SETTINGS FOR CRUISE
1000 BHP/ENGINE
MANUAL LEAN OPERATION

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

NOTE:
Do not operate in high blower above 15°C CAT.

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)*								*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
	−30	−20	−10	0	+10	+20	+30	+38				
23,000	29.1	29.7	F.T.	F.T.				DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.				
22,000	29.1	29.7	30.3	30.9	F.T.							
21,000	29.2	29.7	30.3	30.9	31.4	F.T.						
20,000	29.5	29.8	30.3	30.9	31.4	32.0	F.T.					
19,000	29.6	30.2	30.7	30.9	31.4	32.0	32.6					
18,000	27.0	27.5	30.8	31.3	31.5	32.0	32.6		HIGH 2300	12	492	123
17,000	27.2	27.7	28.3	31.4	31.8	32.0	32.6					
16,000	27.8	28.3	28.4	28.9	31.9	32.4	32.6		HIGH 2200	12	480	129
15,000	27.9	28.5	29.1	29.0	29.6	32.5	33.0					
14,000	28.8	29.4	29.2	29.7	29.7	30.1	33.0		HIGH 2100	12	470	135
13,000	28.9	29.5	30.1	29.8	30.4	30.2	30.8	31.2				
12,000	29.8	30.3	30.2	30.7	30.5	31.1	31.7	31.4	LOW 2200	12	463	129
11,000	30.4	30.6	31.2	30.9	31.4	31.3	31.9	32.3				
10,000	30.5	31.1	31.3	31.9	31.5	32.1	32.7	32.4	LOW 2100	12	454	135
9,000	30.7	31.3	32.0	32.1	32.6	32.2	32.8	33.2				
8,000	30.9	31.5	32.1	32.6	32.8	33.4	34.0	33.4	LOW 2000	12	447	141
7,000	31.1	31.7	32.3	32.9	33.5	34.2	34.2	34.6	LOW 1900	12	441	149
6,000	31.3	31.9	32.5	33.1	33.7	34.3	34.9	35.3				
5,000	31.4	32.1	32.7	33.3	33.9	34.5	35.1	35.5				
4,000	31.6	32.3	32.9	33.6	34.2	34.8	35.4	35.8				
3,000	31.9	32.5	33.1	33.8	34.3	35.0	35.6	36.0				
2,000	32.0	32.7	33.3	33.9	34.5	35.1	35.7	36.1				
1,000	32.3	32.9	33.6	34.2	34.8	35.4	36.0	36.4	LOW 1850	12	436	153

Figure A2—16

POWER SETTINGS FOR CRUISE

1100 BHP/ENGINE

MANUAL LEAN OPERATION

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

NOTE:
Do not operate in high blower above 15°C CAT.

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)* -30	-20	-10	0	+10	+20	+30	+38	*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
21,000	31.6	32.1	F.T.					DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.	HIGH 2300	12	533	135
20,000	31.6	32.1	32.8	33.4	F.T.							
19,000	31.7	32.1	32.8	33.5	34.0	F.T.						
18,000	31.9	32.2	32.9	33.4	34.1	34.6	F.T.					
17,000	32.0	32.4	33.1	33.5	34.0	34.6	35.1					
16,000	29.3	29.9	33.2	33.7	34.1	34.6	35.1					
15,000	30.1	30.1	30.6	33.8	34.3	34.6	35.1		HIGH 2200	12	520	142
14,000	30.2	30.7	30.7	31.3	34.4	35.1	35.1					
13,000	31.0	30.9	31.5	31.4	32.0	35.2	35.7		HIGH 2100	12	510	148
12,000	31.1	31.7	31.7	32.2	32.2	32.8	35.7					
11,000	31.2	31.9	32.5	32.3	32.9	33.0	33.6	34.0	LOW 2200	12	502	142
10,000	31.3	32.0	32.6	33.2	33.0	33.6	34.2	34.1				
9,000	31.5	32.1	32.8	33.4	34.0	33.7	34.3	34.7	LOW 2100	12	493	148
8,000	31.7	32.3	33.0	33.5	34.2	34.8	35.4	34.9				
7,000	31.9	32.5	33.1	33.7	34.3	35.0	35.6	36.0	LOW 2000	12	487	156
6,000	32.1	32.7	33.4	34.0	34.6	35.2	35.8	36.2				
5,000	32.2	32.8	33.5	34.1	34.7	35.3	35.9	36.3				
4,000	32.3	33.0	33.7	34.3	34.9	35.5	36.1	36.5				
3,000	32.6	33.3	34.0	34.6	35.2	35.8	36.4	36.8				
2,000	32.7	33.4	34.1	34.7	35.3	35.9	36.5	37.0				
1,000	32.8	33.5	34.2	34.8	35.4	36.0	36.7	37.2				

Figure A2—17

POWER SETTINGS FOR CRUISE
1200 BHP/ENGINE
MANUAL LEAN OPERATION

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS ALT 102A

NOTE:
Do not operate in high blower above 15°C CAT.

R2800-52W ENGINES
FUEL GRADE: 115/145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	*Manifold Pressure At Carburetor Air Temperature °C (In. Hg)*								*Blower and RPM*	*BMEP Drop (psi)*	*Fuel Flow Per Eng. (Lb./Hr.)*	*Nominal BMEP (psi)*
	−30	−20	−10	0	+10	+20	+30	+38				
23,000								DO NOT OPERATE IN HIGH BLOWER ABOVE 15°C CAT.				
22,000												
21,000												
20,000												
19,000	33.9	F.T.										
18,000	33.9	34.6	F.T.									
17,000	33.9	34.6	35.3	35.9	F.T.							
16,000	31.3	34.5	35.2	35.8	36.5	F.T.						
15,000	31.3	31.9	35.2	35.8	36.4	37.1	37.7					
14,000	31.7	32.1	32.7	33.3	36.4	37.0	37.6					
13,000	31.8	32.4	32.8	33.4	34.0	37.0	37.6		HIGH 2300	12	576	148
12,000	31.9	32.5	33.1	33.7	34.0	34.6	37.6					
11,000	32.0	32.7	33.3	34.0	34.6	34.8	35.4	35.8	LOW			
10,000	32.2	32.8	33.5	34.1	34.7	35.3	35.4	35.8	2300	12	554	148
9,000	32.3	33.0	33.7	34.3	34.9	35.5	36.1	36.5				
8,000	32.6	33.2	33.8	34.4	35.1	35.7	36.3	36.7				
7,000	32.7	33.3	34.0	34.6	35.2	35.9	36.5	37.0				
6,000	32.8	33.5	34.2	34.8	35.5	36.1	36.6	37.1				
5,000	33.0	33.7	34.4	35.0	35.6	36.3	36.9	37.3				
4,000	33.2	33.9	34.6	35.3	35.9	36.5	37.1	37.6				
3,000	33.4	34.0	34.7	35.4	36.0	36.6	37.2	37.7				
2,000	33.6	34.3	35.0	35.6	36.2	36.8	37.5	38.0	LOW			
1,000	33.8	34.5	35.2	35.8	36.4	37.0	37.7	38.2	2200	12	543	154

Figure A2—18

MODEL: B-26K
DATA AS OF: 10-15-64
BASED ON: PRATT & WHITNEY CRUISE CHARTS

POWER SETTINGS FOR CRUISE
1240 BHP/ENGINE
MANUAL LEAN OPERATION — 2 BMEP DROP

R2800-52W ENGINES
FUEL GRADE: 115-145
ALTERNATE FUEL GRADE: 100/130

Pressure Altitude (Feet)	Manifold Pressure At Carburetor Air Temperature °C (In. Hg)						Blower and RPM	BMEP Drop (psi)	Fuel Flow Per Eng. (Lb./Hr.)	Nominal BMEP (psi)
	−30°	−20°	−10°	0°	+10°	+20°				
17,000	30.3	30.9	F.T.				LOW			
16,000	30.4	31.0	31.6	F.T.			2300	2	598	153
15,000	30.5	31.1	31.7	32.4						
14,000	30.6	31.2	31.9	32.5	33.1					
13,000	30.7	31.3	32.0	32.6	33.2	33.7				
12,000	30.8	31.5	32.1	32.7	33.3	33.8				
11,000	30.9	31.6	32.2	32.8	33.4	33.9				
10,000	31.0	31.7	32.3	32.9	33.5	34.1				
9000	31.2	31.8	32.4	33.0	33.6	34.2				
8000	31.3	31.9	32.5	33.1	33.7	34.4				
7000	31.4	32.0	32.6	33.2	33.8	34.5				
6000	31.5	32.2	32.8	33.4	34.0	34.6				
5000	31.6	32.3	32.9	33.5	34.1	34.8				
4000	31.7	32.4	33.0	33.6	34.2	34.9				
3000	31.8	32.5	33.2	33.8	34.4	35.0				
2000	32.0	32.6	33.3	33.9	34.5	35.1				
1000	32.1	32.7	33.4	34.0	34.6	35.2				
S.L.										

Figure A2—19

PART 3 TAKEOFF

TABLE OF CONTENTS

TAKEOFF PLANNING.

This part covers the information and charts to be used to obtain takeoff speeds and distances. The terms used in the planning procedure are defined in the following paragraphs. Charts of takeoff performance are provided for normal technique and maximum performance. Takeoff performance is affected by a large number of variables, i.e., ambient temperature, pressure altitude, aircraft gross weight, and wind, as well as runway surface, use of brakes for directional control, fuel grade and water injection. Charts including these variables are provided for takeoff distance, acceleration distance and speed and refusal speed. Increases in any of these variables except wind tend to increase takeoff ground run to a point where takeoff may not be successfully made in the available runway length. The takeoff charts show distances for ground run, air distances required to clear a 50 foot obstacle height as well as takeoff and obstacle clearance speeds. The velocity during takeoff ground run chart shows the speed-distance relationship during the ground run portion of takeoff before rotation speed is reached. The refusal speed chart shows the combined distance travelled in acceleration to any given refusal speed plus the distance required for a full stop. The single engine rate of climb chart shows the rate of climb capability if only one engine is in operation in the climbout.

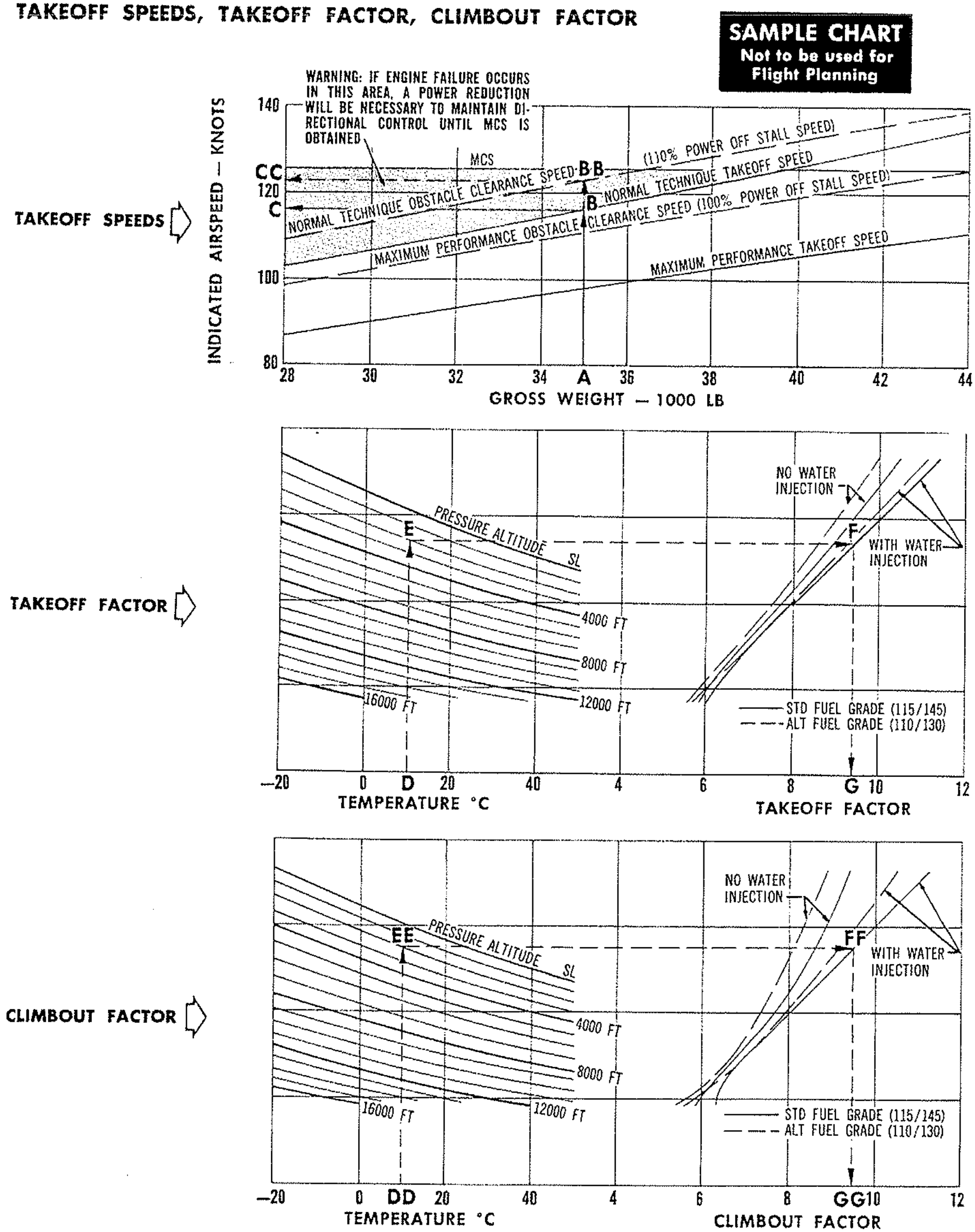
RUNWAY DISTANCE MARKING SYSTEM.

The numbering and placement of runway distance markers reflects the distance remaining to the end of the runway in 1000-foot increments. These markers are placed alongside the runway, and the appropriate markers become the acceleration check distance marker and the go, no-go distance marker. In accordance with the marker system on a runway length in excess of the 1000-foot interval (10,500), one half the length over the exact thousands of feet [½ (10,500 — 10,000)] must be added to the distances shown on the markers to determine the actual distance remaining; i.e., at marker No. 6, the distance remaining would be 6250 feet.

TAKEOFF FACTOR.

Takeoff factor is a temperature-altitude index which is read for the fuel grade and water injection conditions applicable to the takeoff. Takeoff ground run and refusal speeds are shown as a function of takeoff factor. The use of these charts is explained in the takeoff performance sample problem.

TAKEOFF SPEEDS, TAKEOFF FACTOR, CLIMBOUT FACTOR



CLIMBOUT FACTOR.

Climbout factor is temperature-altitude index in the airborne portion of the takeoff. Takeoff air distances and single engine rate of climb charts are shown as a function of climbout factor. The use of these charts is included in the Takeoff Performance Sample Problem.

ROTATION SPEED.

Airspeed 3 to 5 KIAS prior to computed takeoff speed.

TAKEOFF SPEED.

Takeoff speed is the airspeed at which the main wheels leave the runway. Indicated takeoff speeds at various gross weights are shown for normal and maximum performance techniques.

OBSTACLE CLEARANCE SPEED.

Obstacle clearance speed is the airspeed at a height of 50 foot. Indicated obstacle clearance speeds at various gross weights are shown for normal and maximum performance techniques.

TAKEOFF DISTANCES.

Ground run and air distance to clear a 50 foot obstacle height are plotted as functions of takeoff factor and climbout factor respectively, for normal takeoff technique and for maximum performance takeoff. The distances shown include the effect for external stores configuration in the gross weight lines. The variation in distance for winds and runway slope is also shown.

TAKEOFF ACCELERATION.

The velocity during takeoff ground run chart gives ground run distances and time/$\sqrt{\sigma}$ required to accelerate to any desired indicated air speed, based on normal takeoff techniques, and does not take into account substandard engines or excessive use of brakes for directional control. Check-point speeds may be determined for specific ground run distances from this chart as described below in the Takeoff Performance Sample Problem.

REFUSAL SPEEDS.

The highest indicated airspeed to which the aircraft can accelerate and then stop in the available runway length is the refusal speed. The refusal speed chart shows this speed as a function of takeoff factor, runway length, gross weight and runway condition reading (RCR).

TAKEOFF GROSS WEIGHT CAPABILITY.

The takeoff gross weight capability is established by the length of runway required to accelerate to computed takeoff speed and stop.

SINGLE ENGINE RATE OF CLIMB.

The single engine rate of climb chart provides rates of climb at the normal technique obstacle clearance speed or 125 KIAS, which ever is greater for the one engine out condition with flaps in takeoff position and gear up. Rates of climb are shown as functions of climbout factor, aircraft gross weight and drag index. The takeoff weight limit shall be based on the aircraft having a rate of climb capability of 100 feet per minute on a single engine with maximum takeoff power and inoperative engine feathered.

SAMPLE PROBLEM.

Takeoff Performance.

Use: Determine the following takeoff performance: takeoff speed, rotation speed, obstacle clearance speed, takeoff factor, climbout factor, ground run distance, total distance to clear a 50 foot obstacle height, acceleration velocity and time at a check marker, refusal speed, takeoff gross weight capability and single engine rate of climb.

Conditions: Configuration: Basic Aircraft + (2) 230 gal. wing pylon fuel tanks.
Fuel Grade: Standard (115/145)
Water Injection: Yes
Pressure Altitude: 2000 ft.
Outside Air Temperature: 10°C
Takeoff Gross Weight: 35000 lb.
Prevailing Wind: 20 knot headwind (use 50 percent of adjusted headwind component. See TAKEOFF and LANDING CROSSWIND CHART, pages A1-4 and A1-13).
Runway Slope: Zero Runway Slope Grade
Runway Condition Reading: 15.
Check Marker: 3000 ft.
Runway Length Available: 8000 ft.
Take-Off Procedure: Normal Technique

Solution:

1. Enter sample takeoff speed chart page A3-2 at a gross weight of 35000 lb., (A), follow a vertical path upward stopping at the normal technique takeoff speed line (B) and then move left to the scale and read takeoff speed = 116 KIAS. (C). Rotation speed is to be initiated 3 to 5 knots before takeoff speed; therefore plan to start rotation at 111 to 113 KIAS. In the same manner, read obstacle clearance speed as 122.5 KIAS; (B) to (BB) to (CC).

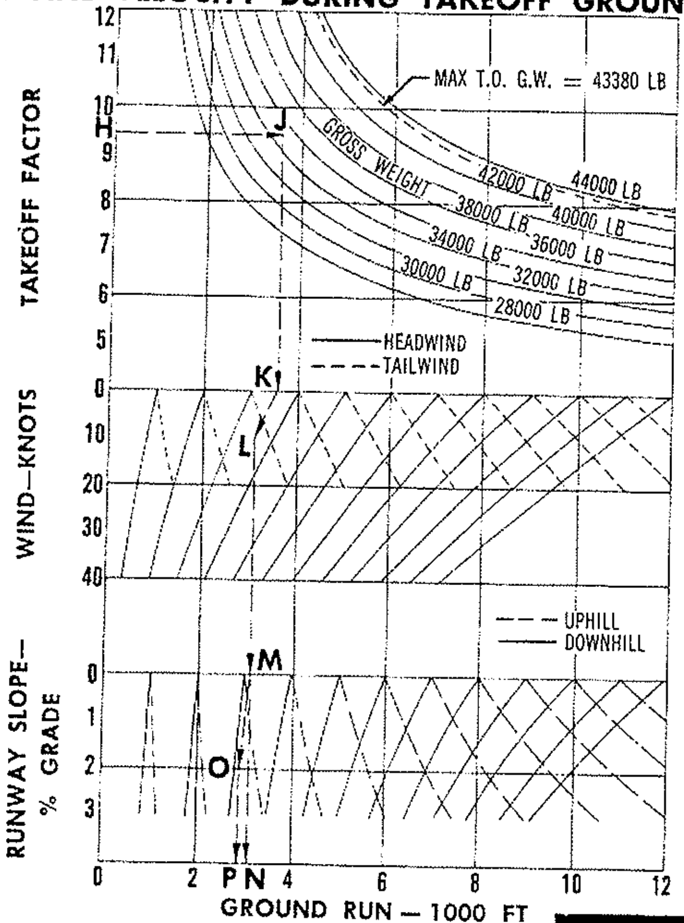
2. Enter sample takeoff factor chart page A3-2 at outside air temperature 10°C, (D), move vertically to the 2000 ft. pressure altitude, (E), to the right to the standard fuel grade with water injection line, (F), and drop down to takeoff factor scale to read takeoff factor = 9.4, (G).

3. In the same manner read sample climbout factor chart page A3-2 from (DD) to (EE) to (FF) to (GG) and read climbout factor = 9.5.

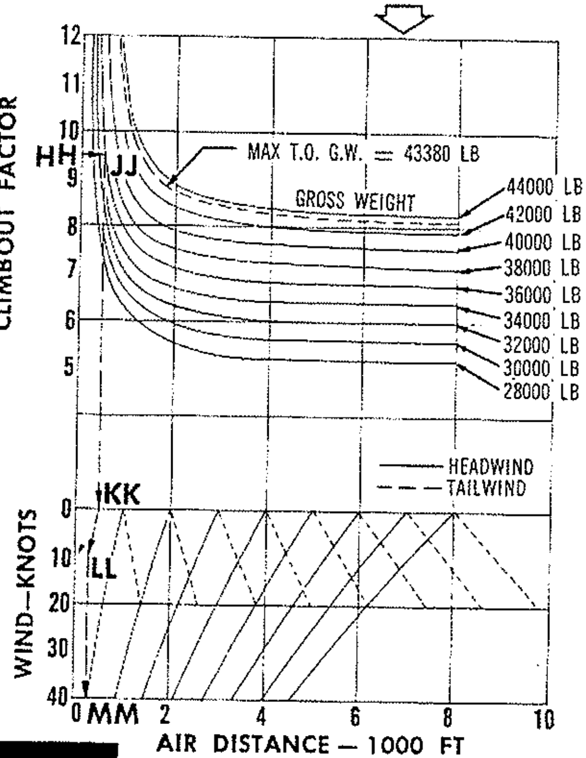
4. Enter sample normal tecnique takeoff ground run chart page A3-4 at takeoff factor (step 2) = 9.4, (H), move horizontally to takeoff gross weight = 35000 lb., (J), move down until the zero wind condition is reached at (K) and read ground run (no wind) =3580 ft. From (K) parallel the guide lines until the 10 knot headwind line is reached at (L), and proceed vertically to the zero % runway grade at (M.) From (M) move down to the ground run scale and read ground run distance =3120 ft., (N).

TAKEOFF GROUND RUN, AIR DISTANCE OVER 50 FT OBSTACLE HEIGHT, TIME AND VELOCITY DURING TAKEOFF GROUND RUN

TAKEOFF GROUND RUN

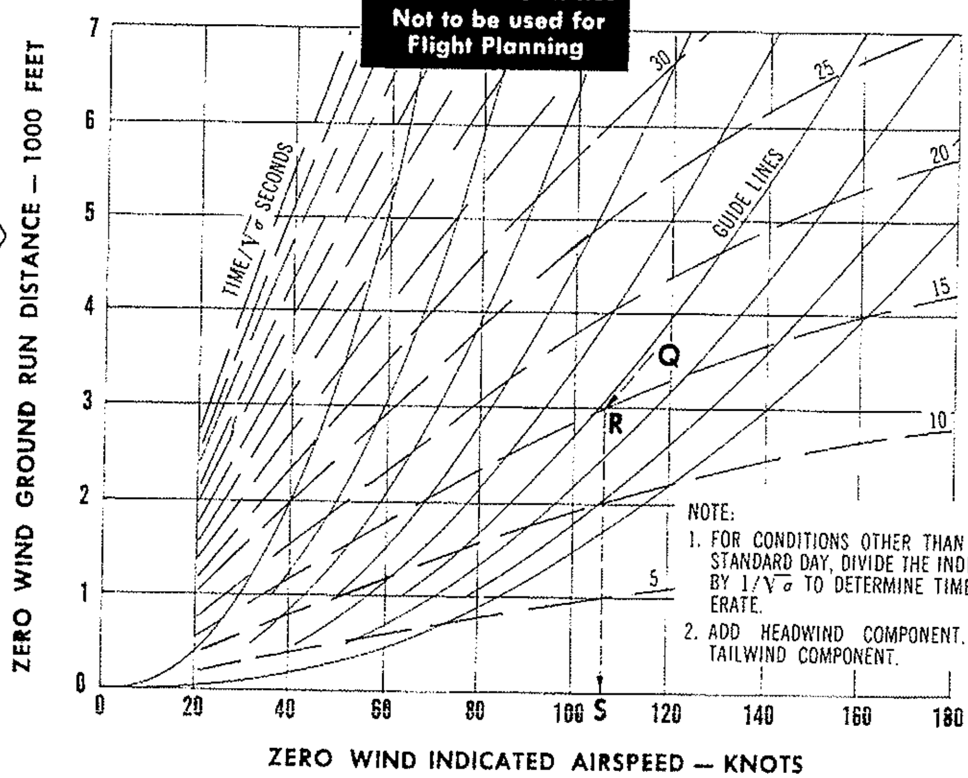


AIR DISTANCE OVER 50 FT OBSTACLE HEIGHT



SAMPLE CHART
Not to be used for Flight Planning

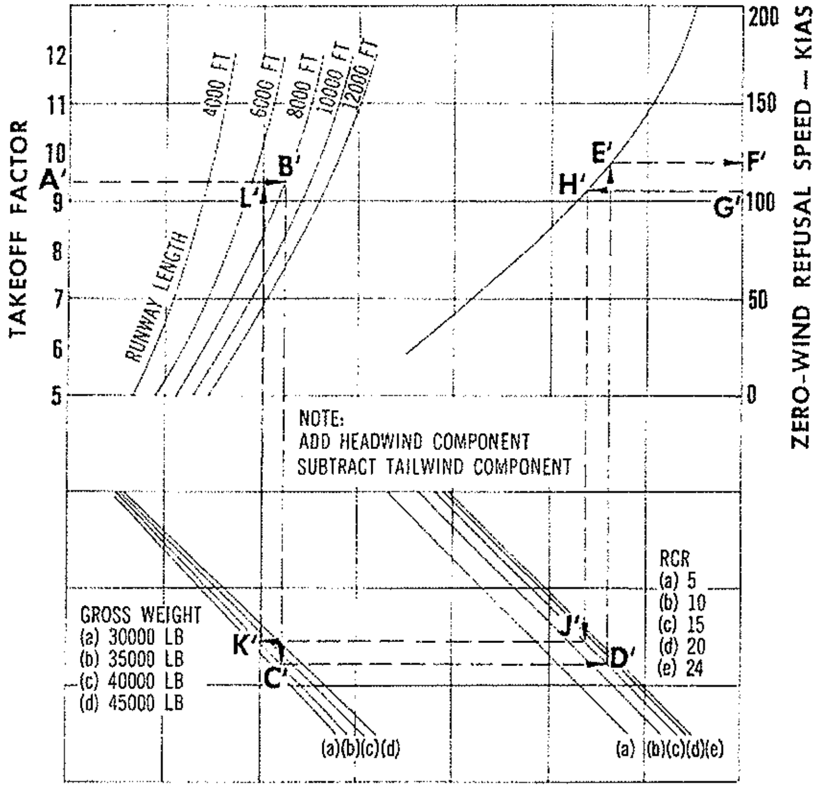
TIME AND VELOCITY DURING TAKEOFF GROUND RUN



NOTE:
1. FOR CONDITIONS OTHER THAN SEA LEVEL, STANDARD DAY, DIVIDE THE INDICATED TIME BY $1/\sqrt{\sigma}$ TO DETERMINE TIME TO ACCELERATE.
2. ADD HEADWIND COMPONENT, SUBTRACT TAILWIND COMPONENT.

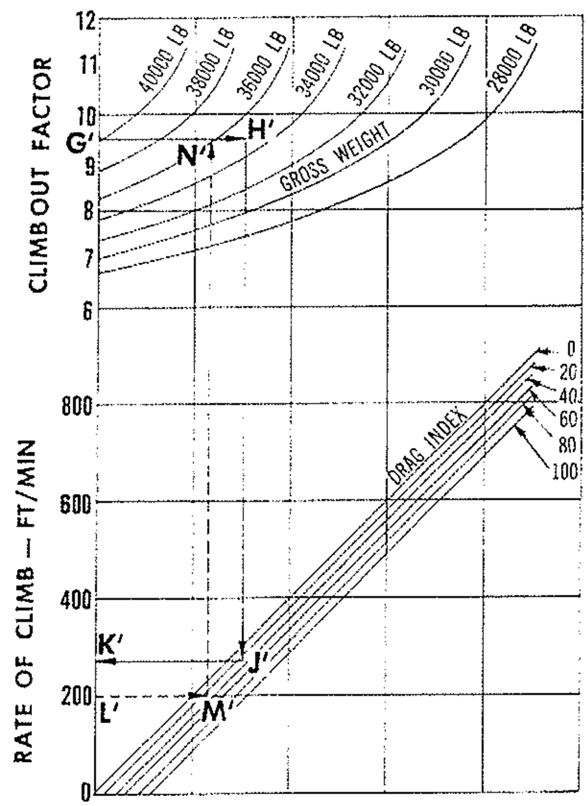
REFUSAL SPEED
SINGLE ENGINE RATE OF CLIMB

REFUSAL SPEED



SAMPLE CHART
Not to be used for Flight Planning

SINGLE ENGINE RATE OF CLIMB



NOTE: TO OBTAIN RATE OF CLIMB AT 125 KIAS, SUBTRACT 50 FT/MIN FOR EVERY 1000 LB GROSS WEIGHT LESS THAN 36000 LB.

Note

The sample problem initial conditions state no runway slope. However, if a correction for runway slope is required proceed as follows: For a 2% downhill slope correct the ground run distance by continuing from (M) (step 4) parallel to the downhill guide lines until the 2% condition is reached at (O), and proceed vertically downward to the ground run scale to read the corrected ground run = 2930 ft., (P).

5. Enter sample normal technique air distance chart page A3-4 at climbout factor (step 3) = 9.5, (HH), move horizontally to the takeoff gross weight = 35000 lb., (JJ), down to the zero wind condition at (KK) and parallel the guide lines until a 10 knot headwind is reached at (LL). From (LL) proceed vertically to the air distance scale and read air distance = 300 ft., (MM). Total distance to clear a 50 ft. obstacle = ground run + air distance = 3120 + 300 = 3420 ft.

6. Enter sample velocity during ground run chart page A3-4 at takeoff speed (step 1) = 116 KIAS and zero wind ground run distance (step 4) = 3580 ft. at (Q). Parallel the guide line to intercept the check distance of 3000 ft., (R), read indicated time = 15 seconds, and proceed vertically to read zero wind velocity = 106 KIAS, (S). To adjust the zero wind velocity for a 10 knot headwind component, add the headwind component to the zero wind velocity (106 + 10) = 116 KIAS, check speed at the 3000 ft. marker. To correct the time, enter density altitude chart figure A1—3 at 2000 foot pressure altitude and 10°C and read density altitude = 1800 feet. Enter standard atmosphere chart figure A1—4 at 1800 feet to find $1/\sqrt{\sigma}$ = 1.0269. Divide indicated time by $1/\sqrt{\sigma}$ to find time at check speed: 15/1.0269 = 14.6 seconds.

Note

To adjust for tailwind conditions subtract the tailwind component from the zero-wind velocity.

7. Enter sample refusal speed chart page A3-5 at takeoff factor (step 2) = 9.4 at A′ and move across to runway length available = 8000 ft., (B′). From B′ drop to takeoff gross weight = 35000 lb., (C′) and move across to RCR = 15 at D′. From D′ move up until curve is intercepted at E′ and then move across to scale and read refusal speed = 120 KIAS, (F′) for zero wind conditions. Add 10 knots to zero wind refusal speed to adjust for headwind component (120 + 10) = 130 KIAS.

Note

If RCR is not available, use 23 for dry runways, 12 for wet runways and 5 for icy runways.

8. Reenter sample refusal speed chart, page A3-5 at takeoff speed = 116 KIAS (step 1) less 10 knot headwind component = 106 KIAS, zero wind speed, (G′), move left to curve, (H′), down to RCR = 15, (J′), across to gross weight = 35000 lb, (K′) and up to intercept line A′ B′ at a runway length of 6600 ft, (L′). The takeoff gross weight capability under the given conditions is therefore established on runways of 6600 ft or more.

Note

Another way to determine takeoff gross weight capability is to compare the refusal speed for an available runway length with the takeoff speed. If the refusal speed is less than the takeoff speed, gross weight must be reduced to establish takeoff gross weight capability.

- Before reading rate of climb from the single engine rate of climb charts, determine drag index from figure A1-5 by adding the store drag numbers.

Stores	*Store Drag NO.*	*Drag Index*
(2) 230 gal. tanks	14 each	28

9. Enter sample single engine rate of climb chart page A3-5 at climbout factor (step 3) = 9.5, (G′). Move across to takeoff gross weight = 35000 lb., (H′), then move down to drag index = 28, (J′), across to scale and read single engine rate of climb = 270 FPM, (K′). Since the takeoff gross weight is 1000 pounds less than 36000 pounds, subtract 50 FPM: 270 −50 = 220 FPM.

Note

This chart is also used to determine the maximum allowable gross weight for takeoff, as follows:

Required: 200 FPM single engine rate of climb

Find: Maximum allowable takeoff weight for the (2) 230 gal. external fuel tanks configuration at 2000 ft. pressure altitude and 10°C.

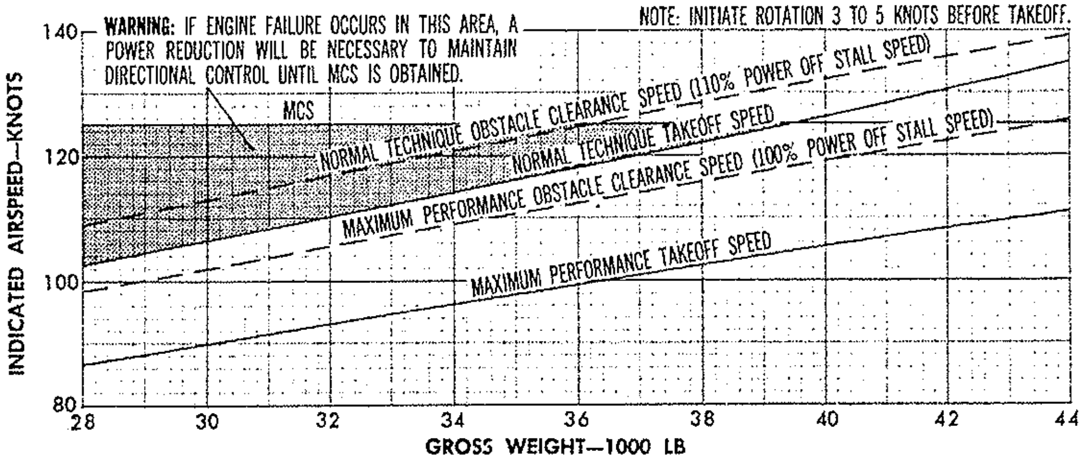
Enter chart at climbout factor = 9.5 as above and draw a horizontal line from (G′).

Enter chart at 200 FPM rate of climb, (L′) move to drag index = 28 (M′) and move up to intersect the line from (G′). This intersection determines the maximum allowable takeoff weight for the required conditions, or 36200 lb. (N′).

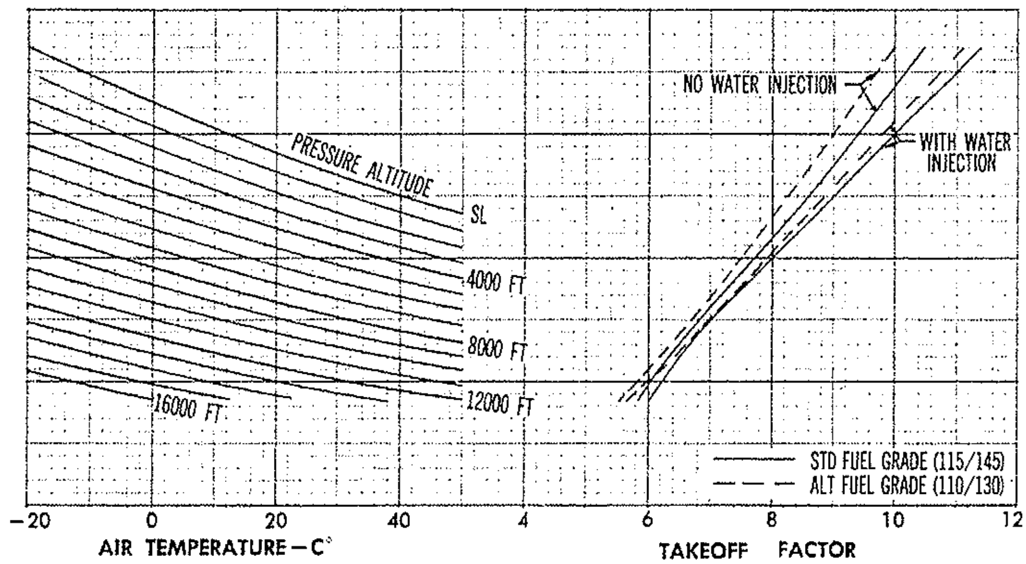
model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	**FLIGHT TEST**

TAKEOFF SPEEDS, TAKEOFF FACTOR, CLIMBOUT FACTOR

TAKEOFF SPEEDS
FLAPS—15°



TAKEOFF FACTOR



CLIMBOUT FACTOR

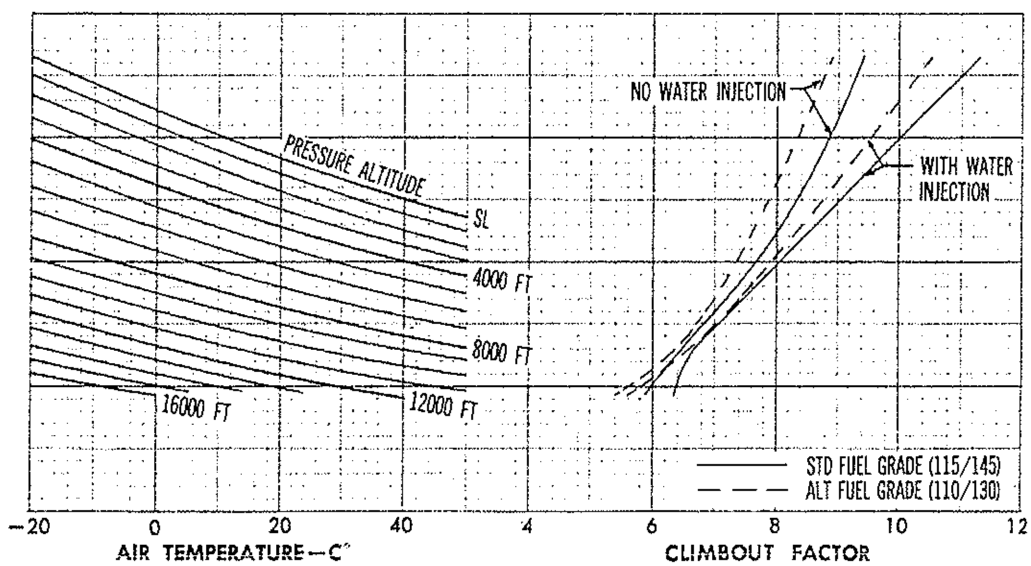


Figure A3—1

TAKEOFF GROUND RUN

NORMAL TECHNIQUE
FLAPS 15°
HARD SURFACE RUNWAY

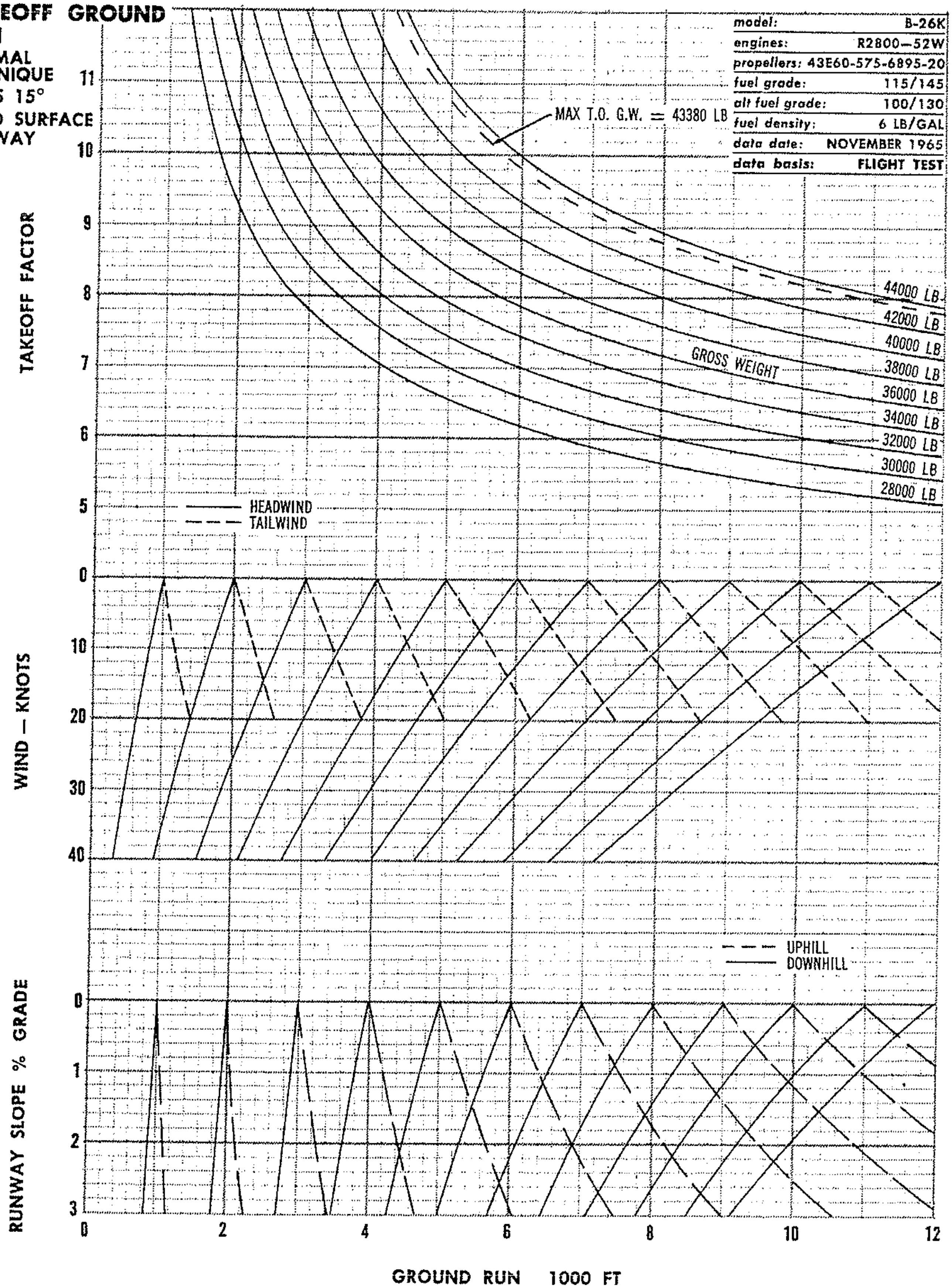


Figure A3—2

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

AIR DISTANCE OVER 50 FT OBSTACLE HEIGHT

NORMAL TECHNIQUE
FLAPS 15°

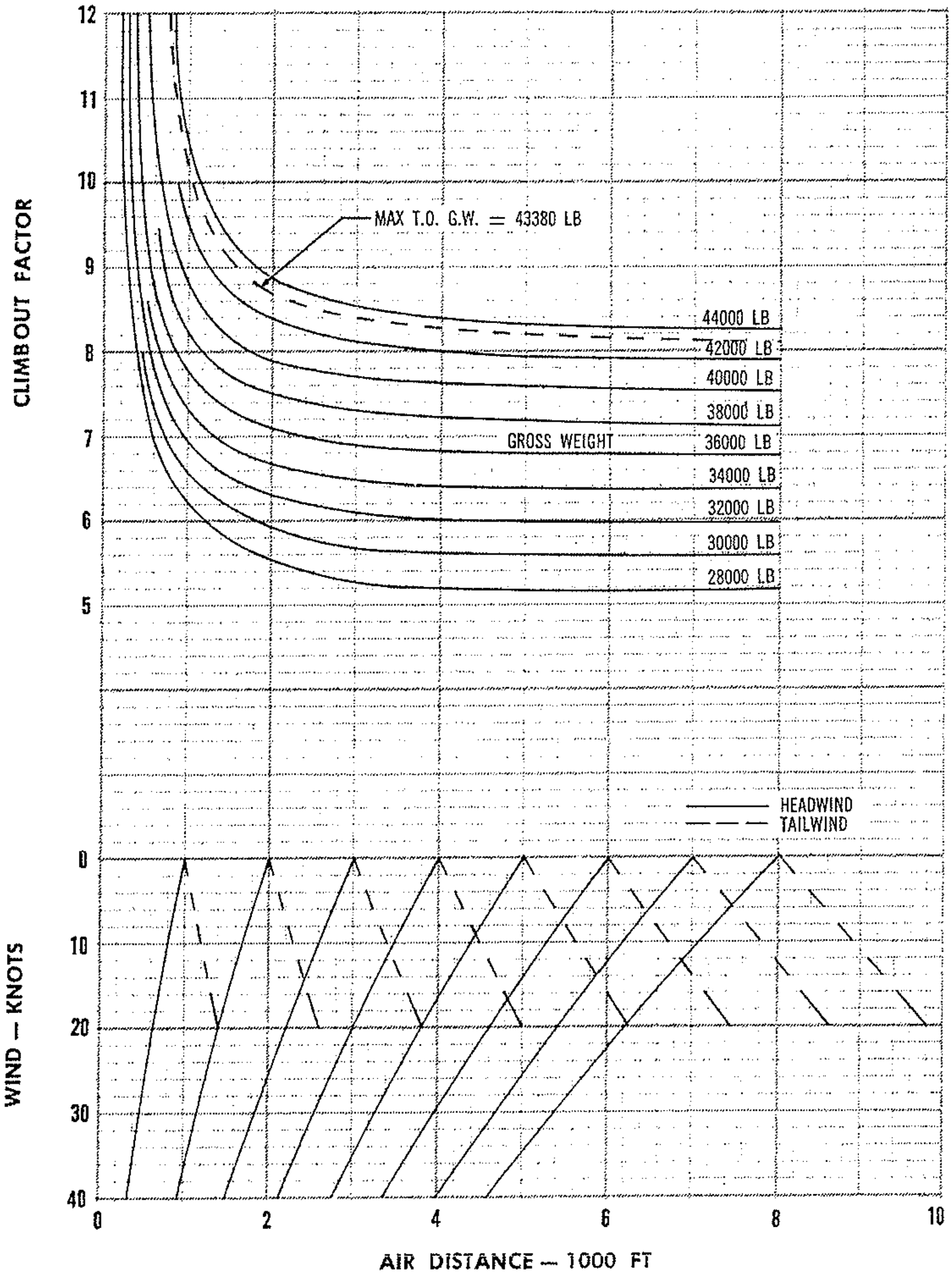


Figure A3—3

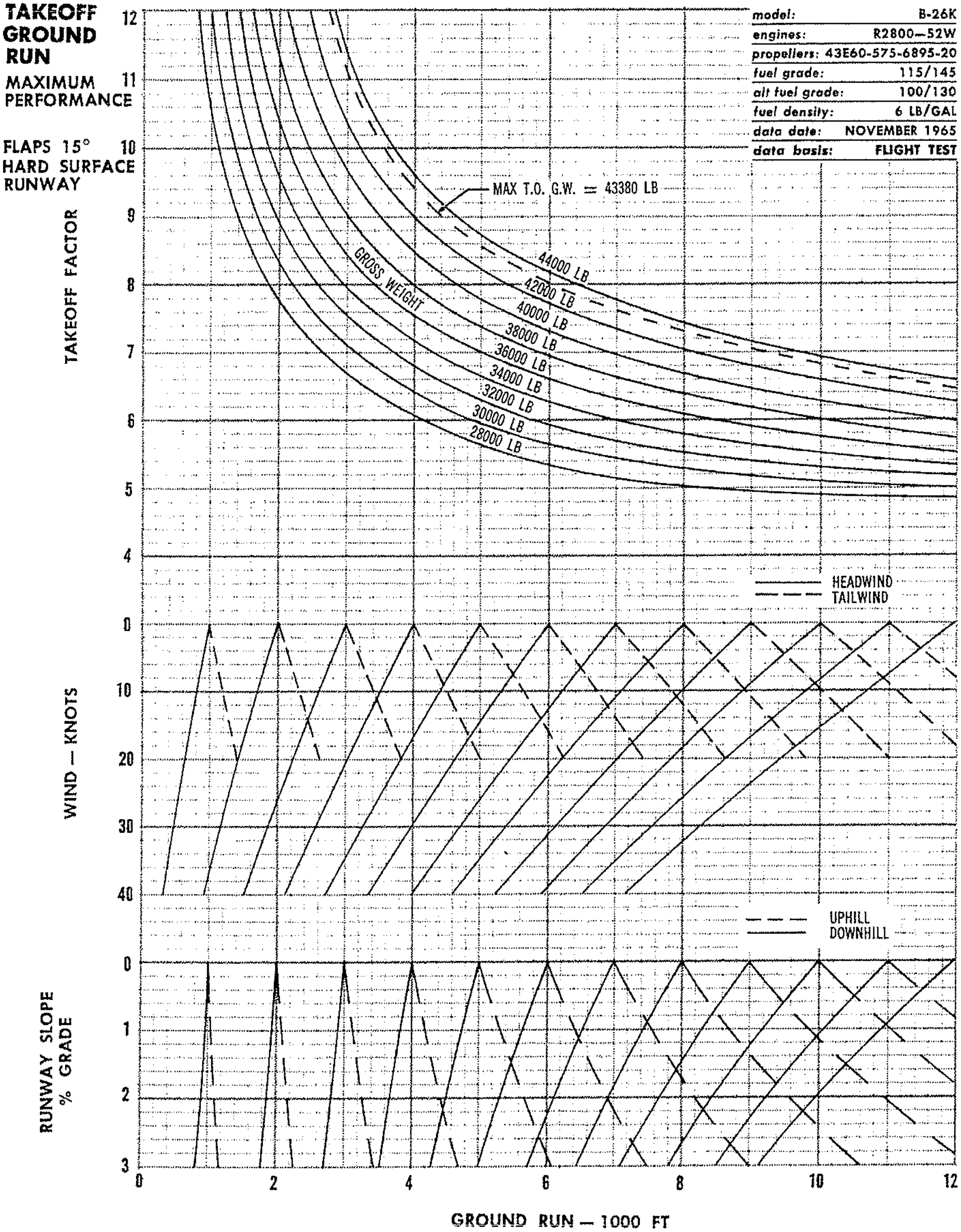

TAKEOFF GROUND RUN
MAXIMUM PERFORMANCE
FLAPS 15°
HARD SURFACE RUNWAY
model: B-26K
engines: R2800—52W
propellers: 43E60-575-6895-20
fuel grade: 115/145
alt fuel grade: 100/130
fuel density: 6 LB/GAL
data date: NOVEMBER 1965
data basis: FLIGHT TEST
MAX T.O. G.W. = 43380 LB
GROSS WEIGHT
44000 LB
42000 LB
40000 LB
38000 LB
36000 LB
34000 LB
32000 LB
30000 LB
28000 LB
TAKEOFF FACTOR
HEADWIND
TAILWIND
WIND — KNOTS
UPHILL
DOWNHILL
RUNWAY SLOPE % GRADE
GROUND RUN — 1000 FT

Figure A3-4

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

AIR DISTANCE OVER 50 FT OBSTACLE HEIGHT

MAXIMUM PERFORMANCE
FLAPS 15°

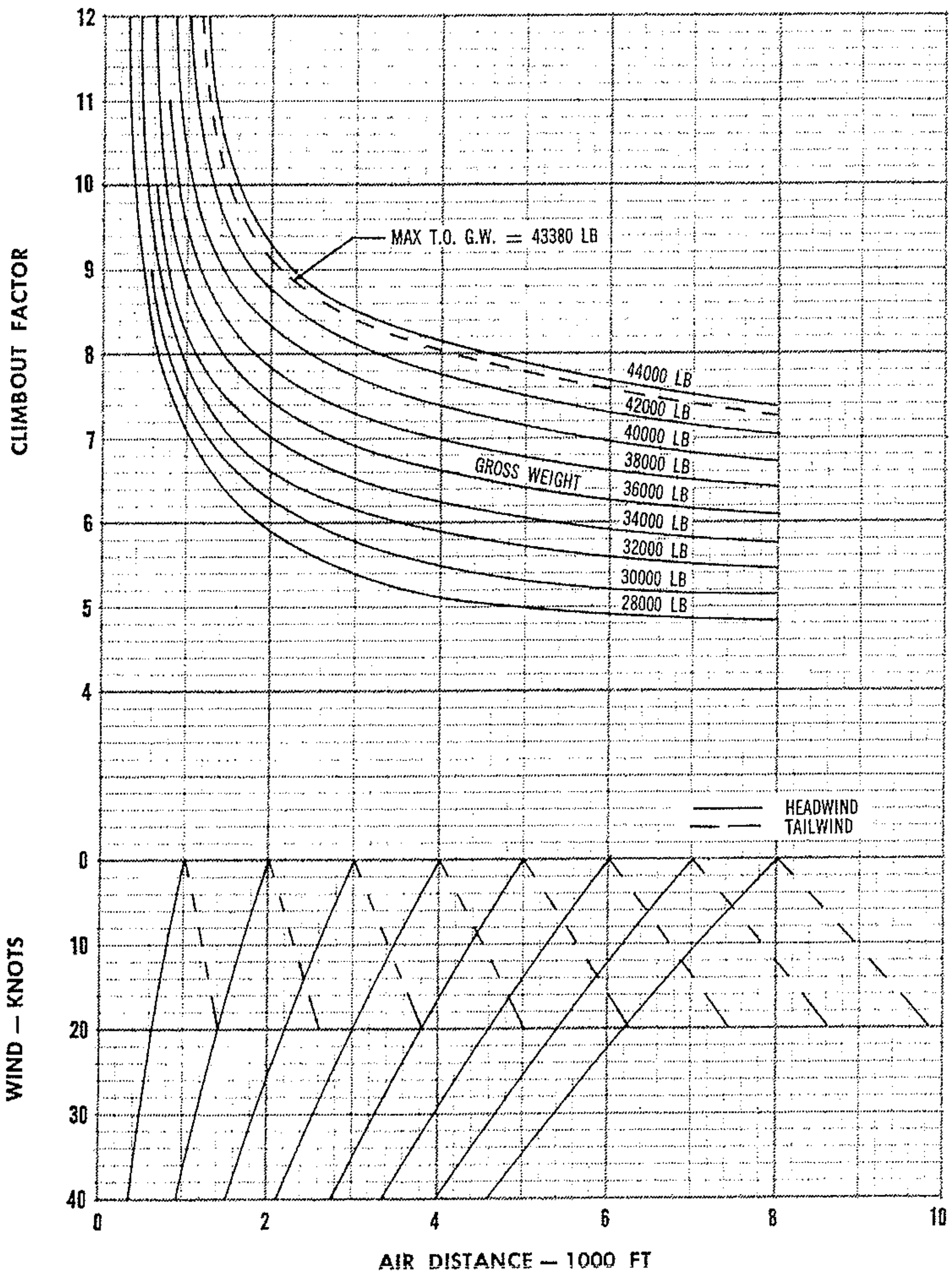


Figure A3—5

TIME AND VELOCITY DURING TAKEOFF GROUND RUN

HARD SURFACE RUNWAY
FLAPS—15°

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

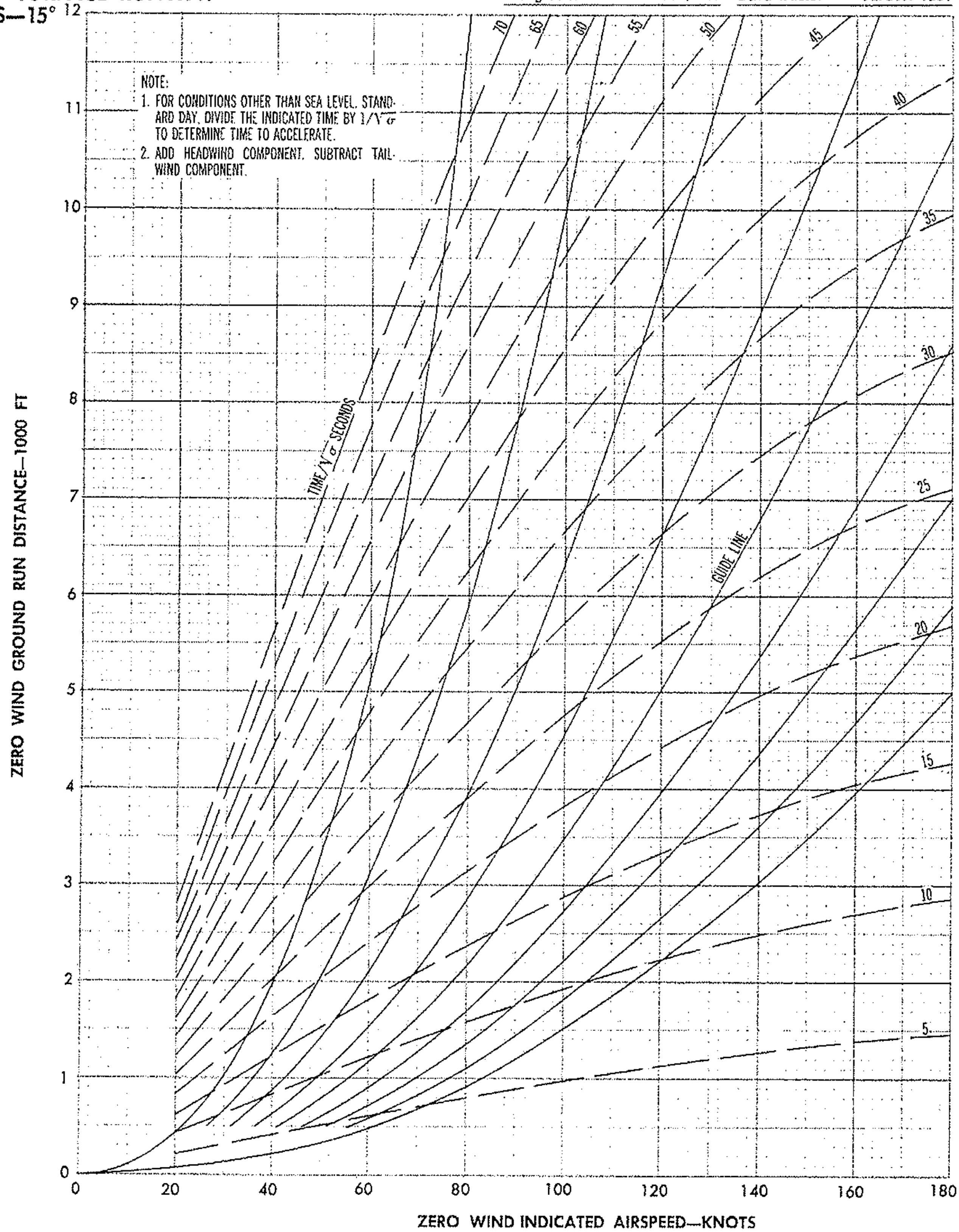


Figure A3—6

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

REFUSAL SPEED

BRAKES ONLY
FLAPS 15°

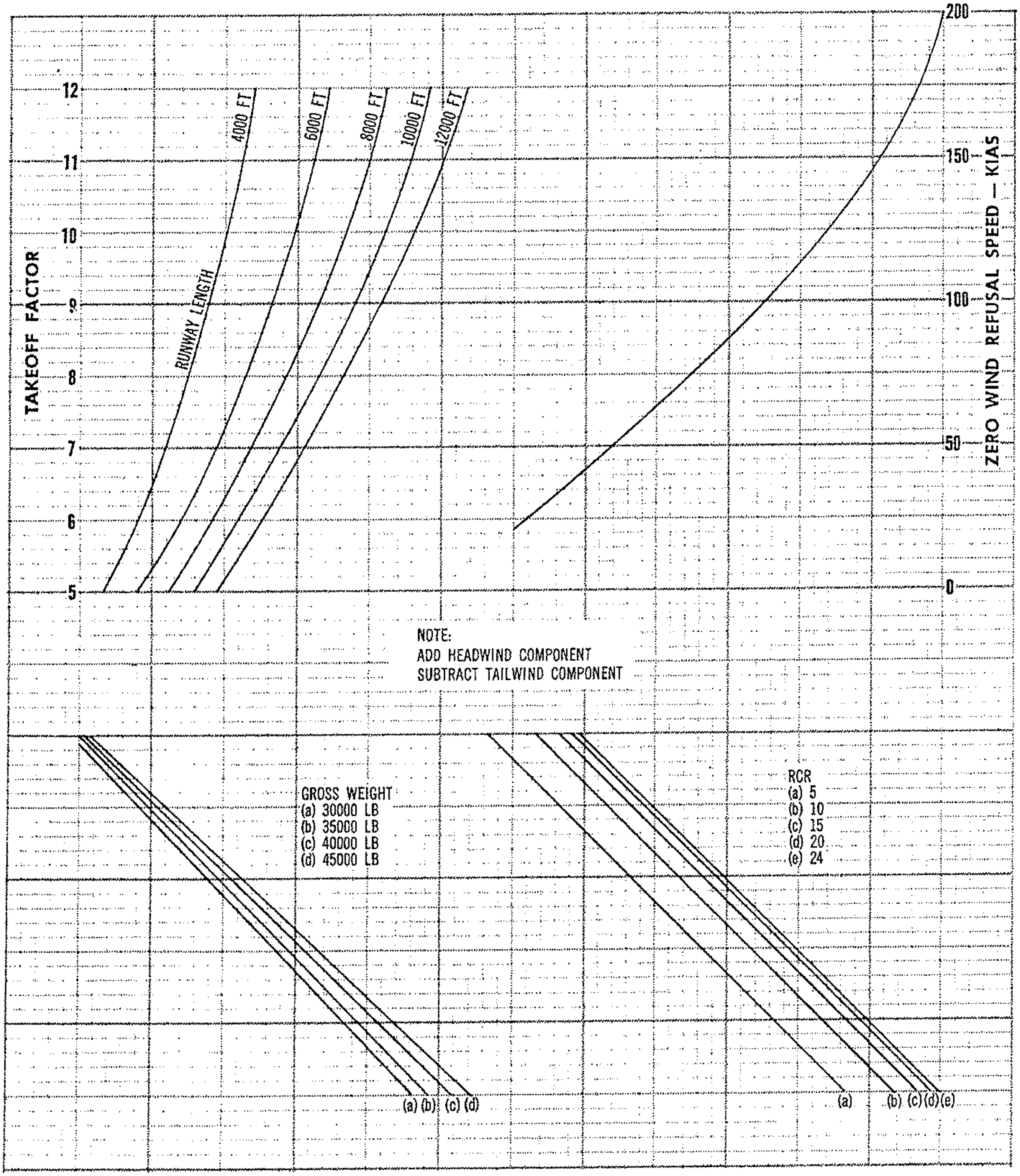


Figure A3—7

SINGLE ENGINE RATE OF CLIMB

ONE PROPELLER FEATHERED
FLAPS 15°
GEAR UP

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

NORMAL TECHNIQUE OBSTACLE CLEARANCE
SPEED OR 125 KIAS, WHICHEVER IS GREATER

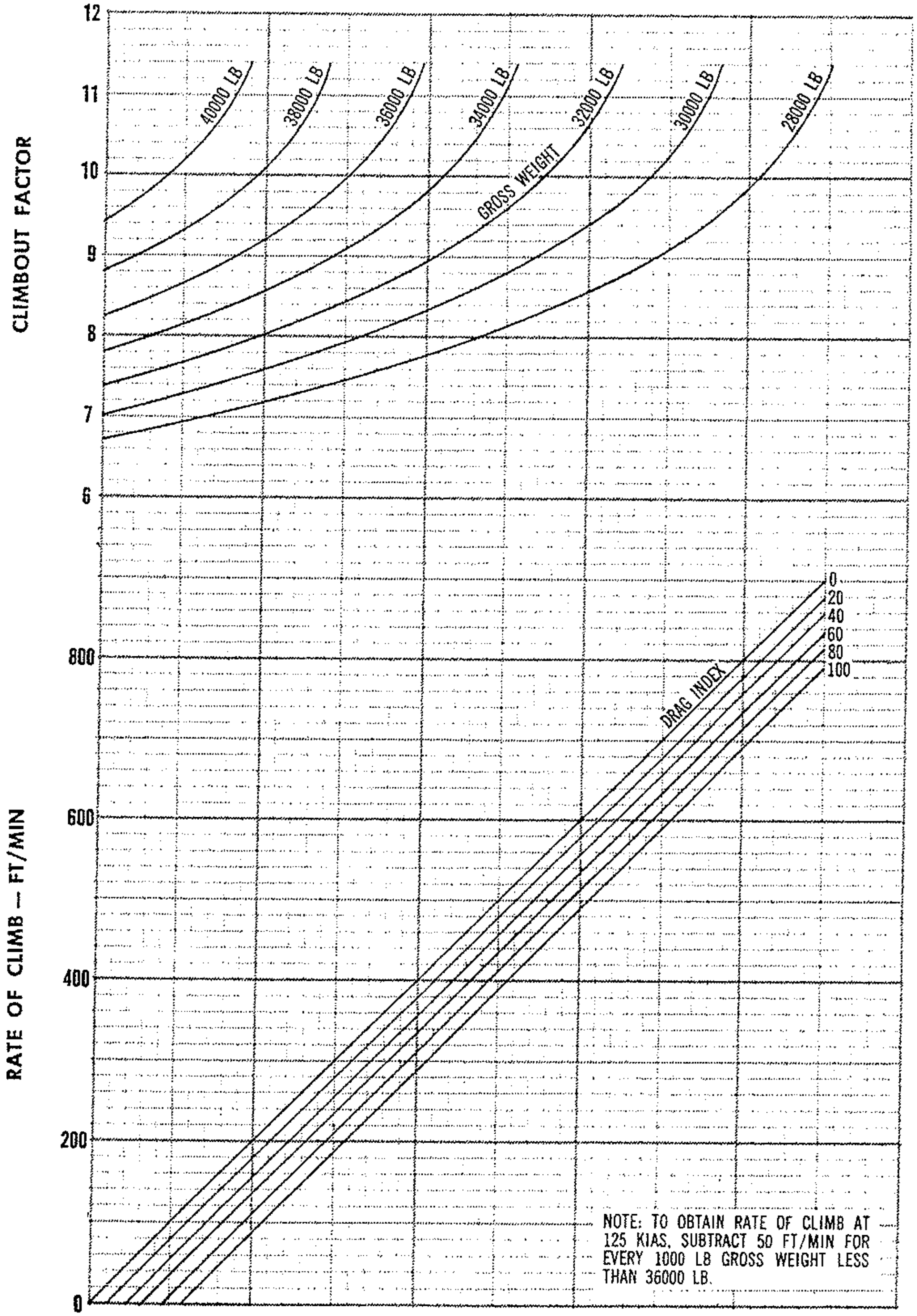


Figure A3-8

PART 4 CLIMB

TABLE OF CONTENTS

CLIMB CHARTS.

Charts in this part enable the pilot to determine the fuel, time, distance and speed schedule to climb between any two pressure altitudes for any combination of weight, drag index and temperature, with two engines operating at METO or 1500 BHP. The altitude range shown for 1500 BHP is limited to 20000 feet, since at 20000 feet 1500 BHP is METO. METO climb performance includes lines for standard day cruise ceiling. The limits of the performance shown approximate standard day service ceiling.

SINGLE ENGINE CLIMB.

Charts in this part enable the pilot to determine the fuel, time, distance and speed schedule to climb between any two pressure altitudes for any combination of weight, drag index and temperature while operating at METO, but with one engine out. The limits of the performance shown approximates standard day service ceiling for one engine operation.

CEILINGS

Cruise and service ceilings for various combinations of gross weight, drag index and temperature are shown for 2 engines operating at METO. Service ceilings for METO operation, but with one engine out, are also shown.

SAMPLE PROBLEM I.

Conditions:

Configuration: Basic Aircraft

Initial Gross Weight: 33000 lb.

Climb Power Setting: METO

Ambient Temperature: Standard Day

Find: Fuel, distance and time to climb from sea level to 17500 ft., and climb speed schedule.

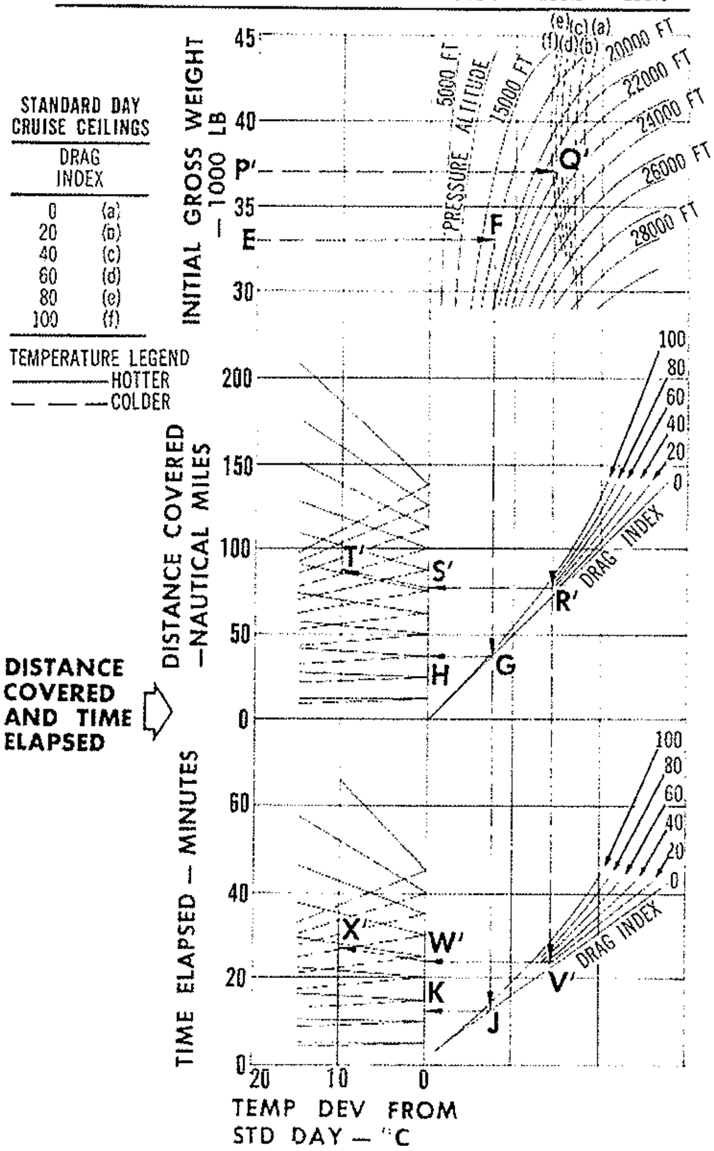
Solution:

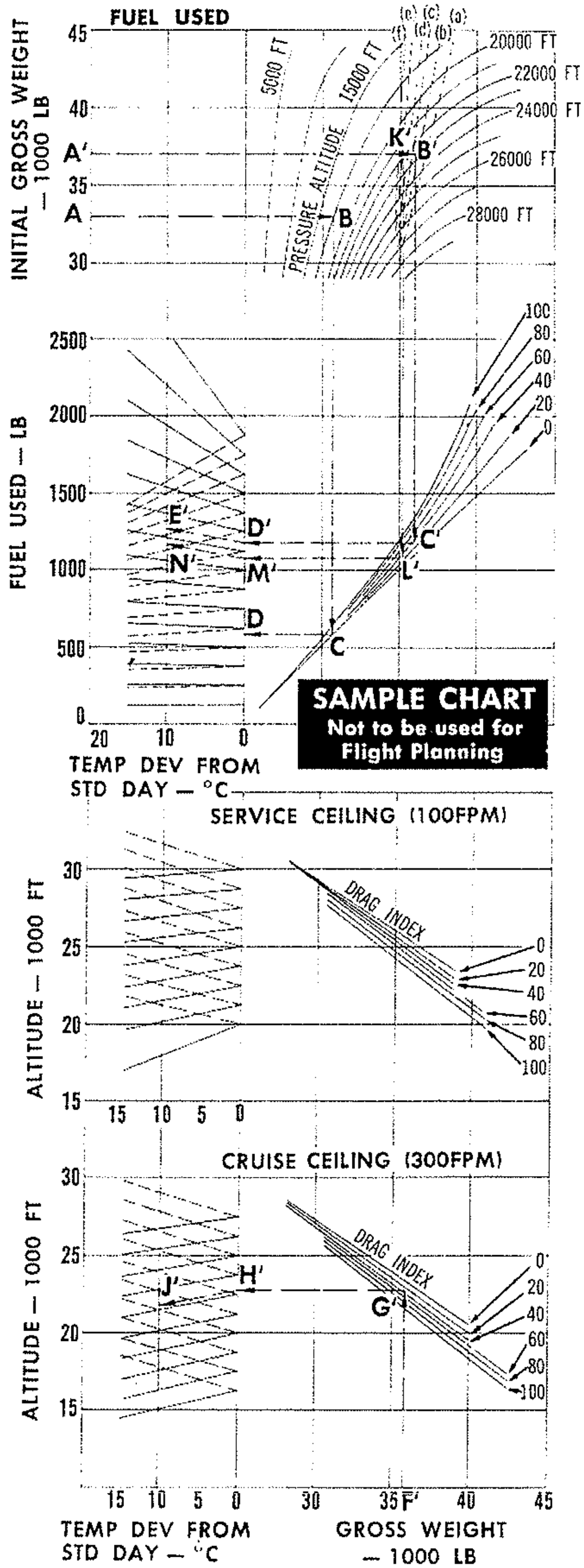
1. From figure A1-5 the Drag Index for the Basic Aircraft is 0.
2. Enter sample chart page A4-2 at a gross weight of 33000 lb., (A).
3. Move to the right to the final altitude of 17500 ft., (B).
4. Drop down to Drag Index = 0, (C).
5. Move to the left to the standard day condition (0°C temperature deviation) and read fuel used to climb = 575 lb., (D).
6. To find distance covered and time elapsed enter sample chart page A4-2 at intial gross weight, 33000 lb., (E).

TWO ENGINE METO CLIMB - FUEL USED, DISTANCE COVERED AND TIME ELAPSED

SPEED SCHEDULE FOR TWO ENGINE METO CLIMB — KCAS

ALTITUDE FEET	DRAG INDEX 0	DRAG INDEX 20	DRAG INDEX 40	DRAG INDEX 60	DRAG INDEX 80	DRAG INDEX 100
SEA LEVEL	164.5	162.0	159.0	156.5	153.5	151.0
5000	162.0	159.5	156.5	154.0	151.0	148.5
10000	159.5	157.0	154.0	151.5	148.5	146.0
15000	157.0	154.5	151.5	149.0	146.0	143.5
17500	155.8	153.3	150.3	147.8	144.8	142.3
20000	154.5	152.0	149.0	146.5	143.5	141.0
21000	154.0	151.5	148.5	146.0	143.0	140.5
22000	153.5	151.0	148.0	145.5	142.5	140.0
23000	153.0	150.5	147.5	145.0	142.0	139.5
24000	152.5	150.0	147.0	144.5	141.5	139.0
25000	152.0	149.5	146.5	144.0	141.0	138.5
26000	151.5	149.0	146.0	143.5	140.5	138.0
27000	150.0	148.5	145.5	143.0	140.0	137.5
28000	149.5	148.0	145.0	142.5	139.5	137.0
29000	149.0	147.5	144.5	142.0	139.0	136.5





7. Move to the right to the final altitude, 17500 ft., (F).
8. Drop down to the distance chart, stopping at drag index = 0, (G).
9. Move to the left to standard day condition (0°C temperature deviation) and read distance covered in climb, 37 NM (H).
10. From (G) continue down to the time chart, stopping at drag index = 0, (J).
11. Move to the left to standard day condition (0°C temperature deviation) and read time elapsed in climb, 12.2 min., (K).
12. Enter speed schedule table on sample chart page A4-2 for drag index = 0 and read the calibrated airspeed schedule versus altitude.

SAMPLE PROBLEM II.

Conditions:

Configuration: Basic Aircraft + (2) 230 gal. tanks

Initial Gross Weight: 37000 lb.

Climb Power Setting: METO

Ambient Temperature: At altitude, average temperature is 10°C hotter than standard day.

Find: Fuel used to climb from sea level to cruise ceiling, and cruise ceiling altitude.

1. Determine the drag index from table on figure A1-5 by adding the various store drag numbers.

Basic Aircraft	0
(2) 230 gal. tanks at 14 each	28
Drag Index =	28

2. Enter ample chart page A4-2 at a gross weight of 37000, (A′).
3. Move to the right to standard day cruise ceiling line for drag index = 28, (B′).
4. Drop down to drag index = 28, (C′).
5. Move to the left to the standard day condition (0° temperature deviation), (D′).
6. Follow the solid (hotter) guide line to a temperature deviation of 10°C and read estimated fuel used to climb, 1270 lb., (E′).

Note

The cruise ceiling lines shown on the climb curves are for standard day conditions. To determine the level-off altitude (cruise ceiling) when average temperature is 10°C hotter than standard day proceed as follows:

a. Compute estimated gross weight at end of climb = (Initial gross weight — estimated fuel used to climb) (37000 — 1270) = 35730 lb.
b. Enter cruise ceiling sample chart page A4-2 at final gross weight (35730 lb.), (F′); move up to configuration drag index = 28, (G′); move to the left to 0° deviation from standard day, (H′); follow the solid (hotter) guide line to a temperature deviation of 10°C and read level-off altitude = 21700 ft., (J′).

7. Re-enter climb chart page A4-2 at initial gross weight of 37000 lb., (A′).
8. Move to the right stopping at level-off altitude (note b) 21700 ft. (K′); drop down to drag index = 28, (L′); move to the left to the standard day condition (0° temperature deviation), (M′); follow the solid (hotter) guide line to a temperature deviation of 10°C and read fuel used to climb, 1160 lb., (N′).
9. Compute gross weight at end of climb (37000 — 1160) = 35840 lb.
10. Re-enter cruise ceiling curve and proceed as shown in note b to read level-off altitude = 21800 ft.

Note

Since there is no significant change in final altitude, the fuel used to climb = 1160 lb., as computed in step 8.

11. To find distance covered and time elapsed enter sample chart page A4-2 at initial gross weight, 37000 lb. (P′); move to the right stopping at the final altitude 21800 ft., (Q′); then proceed as shown in Sample Problem I to (R′), (S′) and (T′) to read distance covered = 86 NM and from (R′) to (V′), (W′) and (X′) to read time elapsed = 27 Min.

TWO ENGINE METO CLIMB FUEL USED

STANDARD DAY CRUISE CEILINGS	
DRAG INDEX	
0	(a)
20	(b)
40	(c)
60	(d)
80	(e)
100	(f)

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

SPEED SCHEDULE FOR TWO ENGINE METO CLIMB — KCAS

ALTITUDE FEET	DRAG INDEX 0	DRAG INDEX 20	DRAG INDEX 40	DRAG INDEX 60	DRAG INDEX 80	DRAG INDEX 100
SEA LEVEL	164.5	162.0	159.0	156.5	153.5	151.0
5000	162.0	159.5	156.5	154.0	151.0	148.5
10000	159.5	157.0	154.0	151.5	148.5	146.0
15000	157.0	154.5	151.5	149.0	146.0	143.5
17500	155.8	153.3	150.3	147.8	144.8	142.3
20000	154.5	152.0	149.0	146.5	143.5	141.0
21000	154.0	151.5	148.5	146.0	143.0	140.5
22000	153.5	151.0	148.0	145.5	142.5	140.0
23000	153.0	150.5	147.5	145.0	142.0	139.5
24000	152.5	150.0	147.0	144.5	141.5	139.0
25000	152.0	149.5	146.5	144.0	141.0	138.5
26000	151.5	149.0	146.0	143.5	140.5	138.0
27000	150.0	148.5	145.5	143.0	140.0	137.5
28000	149.5	148.0	145.0	142.5	139.5	137.0
29000	149.0	147.5	144.5	142.0	139.0	136.5

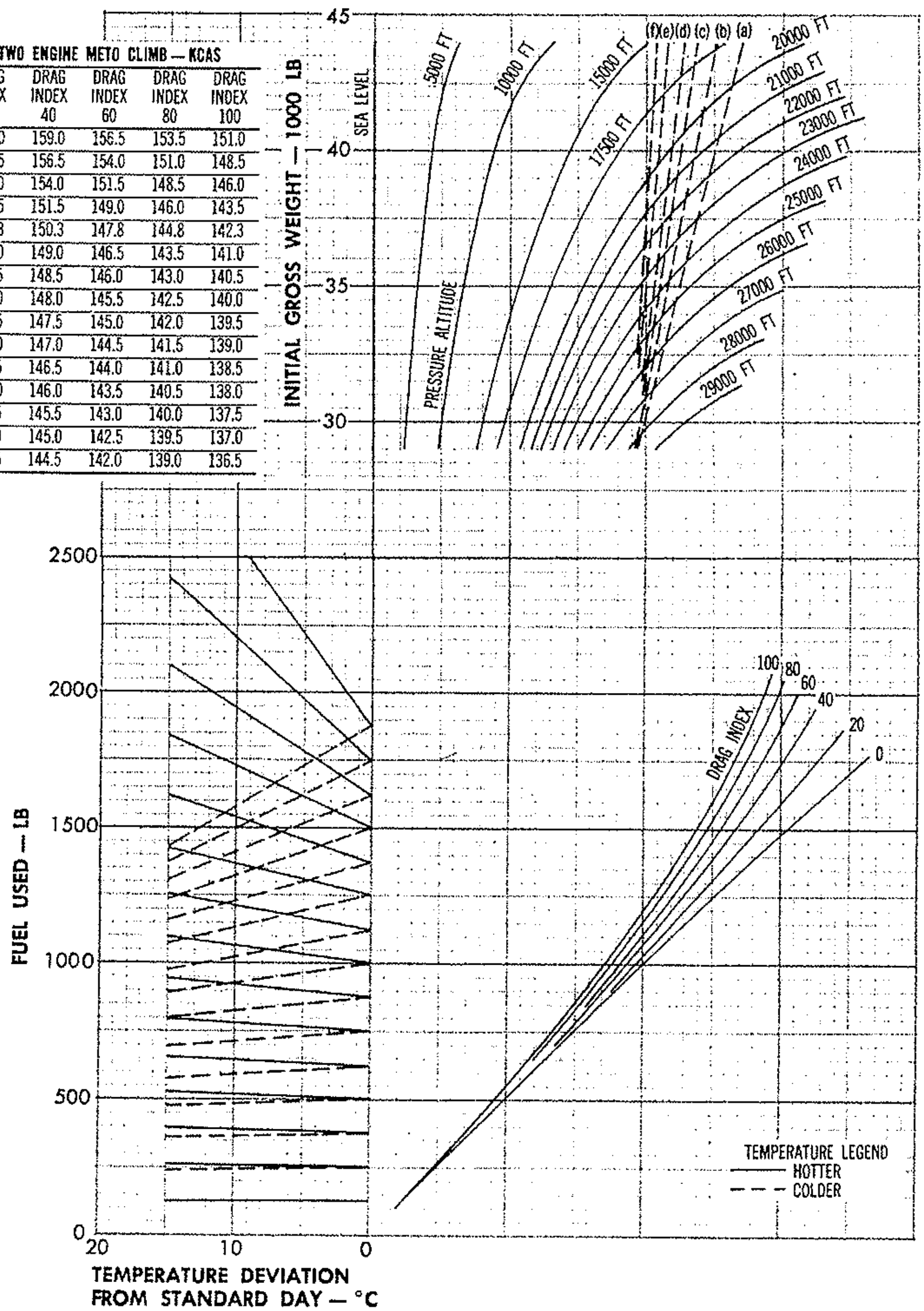


Figure A4—1 (Sheet 1 of 2)

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	**FLIGHT TEST**

TWO ENGINE METO CLIMB DISTANCE COVERED AND TIME ELAPSED

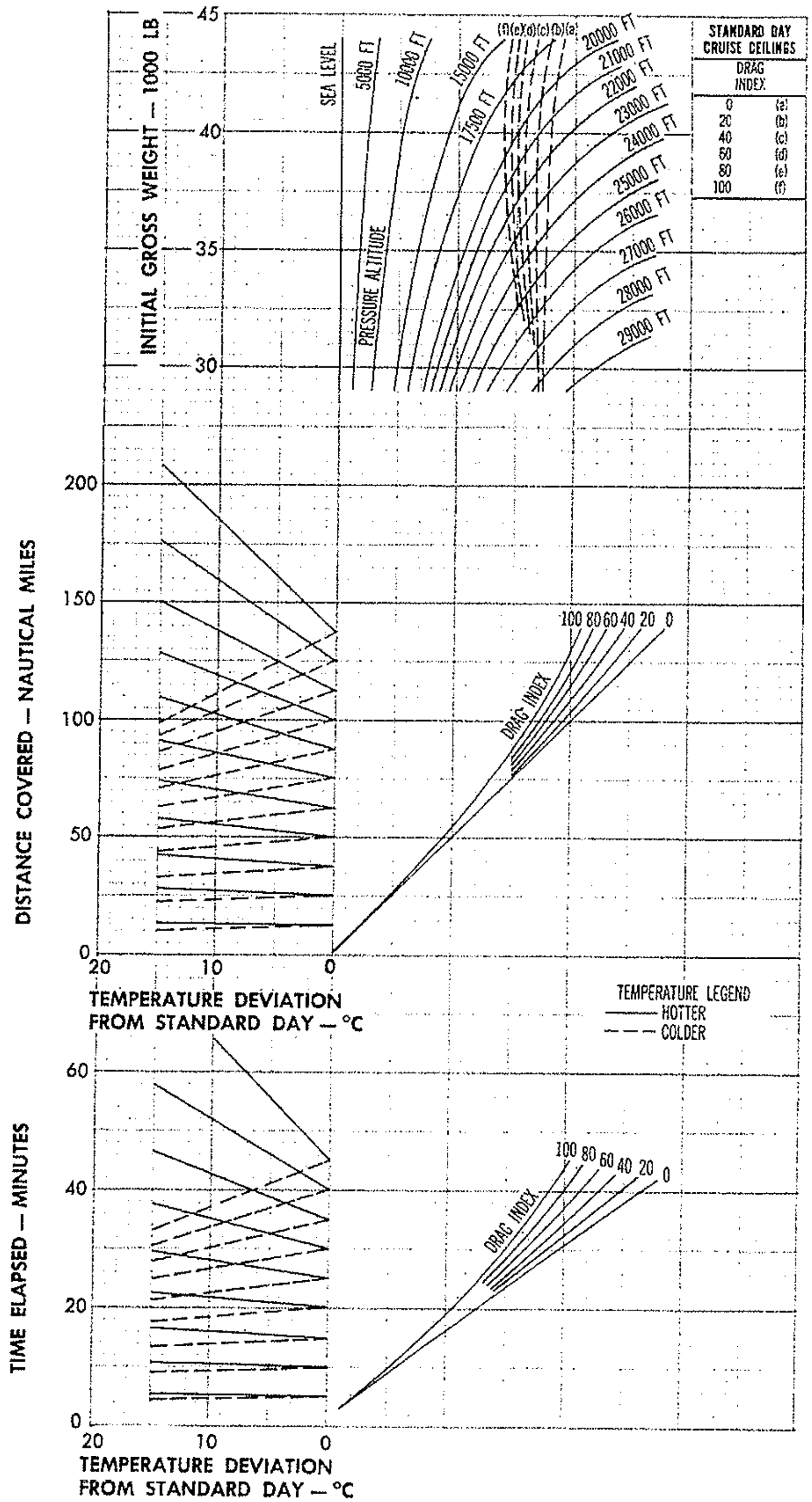


Figure A4—1 (Sheet 2 of 2)

TWO ENGINE 1500 BHP CLIMB FUEL USED

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

SPEED SCHEDULE FOR TWO ENGINE 1500 BHP CLIMB — KCAS

ALTITUDE FEET	DRAG INDEX 0	DRAG INDEX 20	DRAG INDEX 40	DRAG INDEX 60	DRAG INDEX 80	DRAG INDEX 100
SEA LEVEL	164.5	162.0	159.0	156.5	153.5	151.0
5000	162.0	159.5	156.5	154.0	151.0	148.5
10000	159.5	157.0	154.0	151.5	148.5	146.0
15000	157.0	154.5	151.5	149.0	146.0	143.5
20000	154.5	152.0	149.0	146.5	143.5	141.0

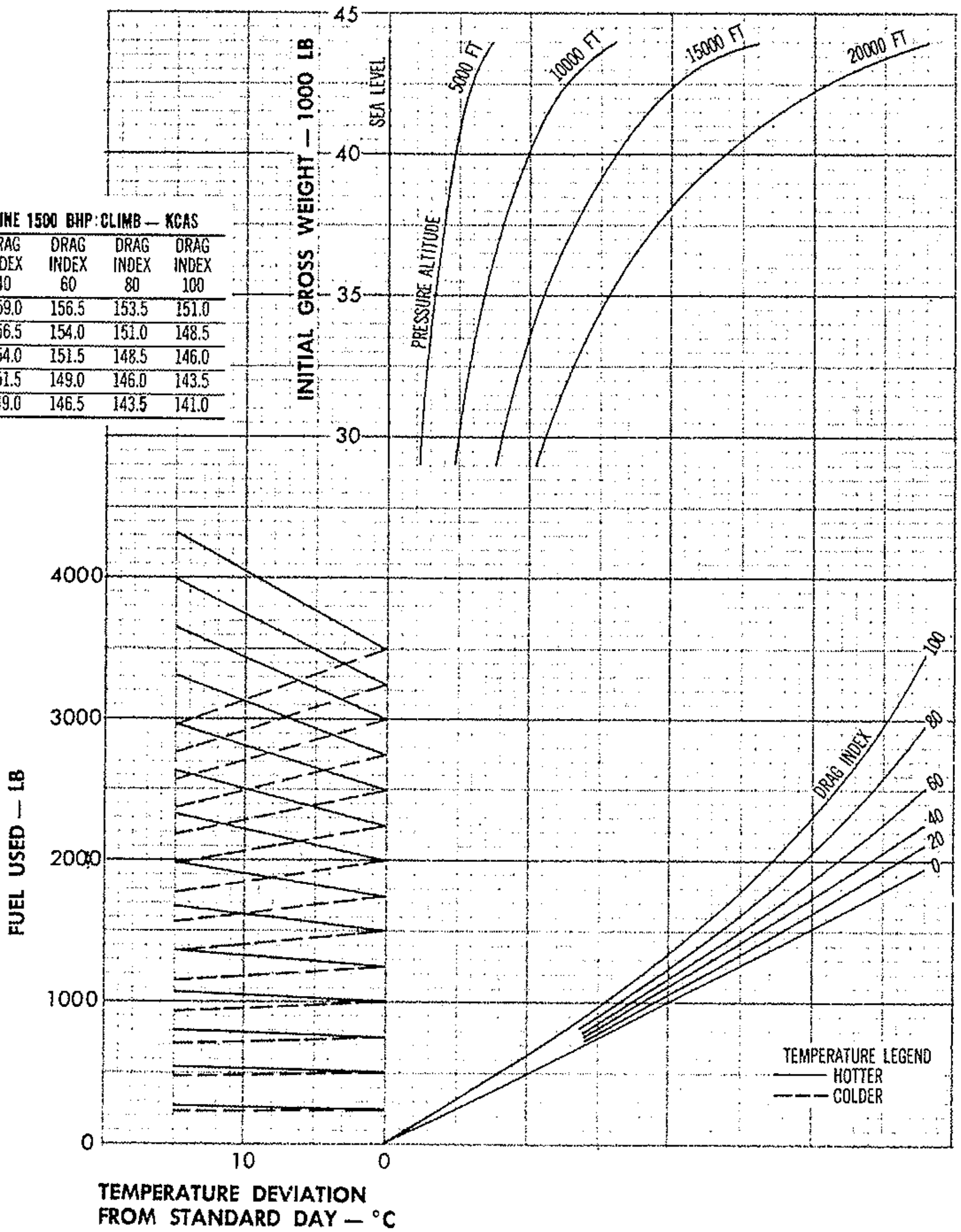


Figure A4—2 (Sheet 1 of 2)

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	**FLIGHT TEST**

TWO ENGINE 1500 BHP CLIMB DISTANCE COVERED AND TIME ELAPSED

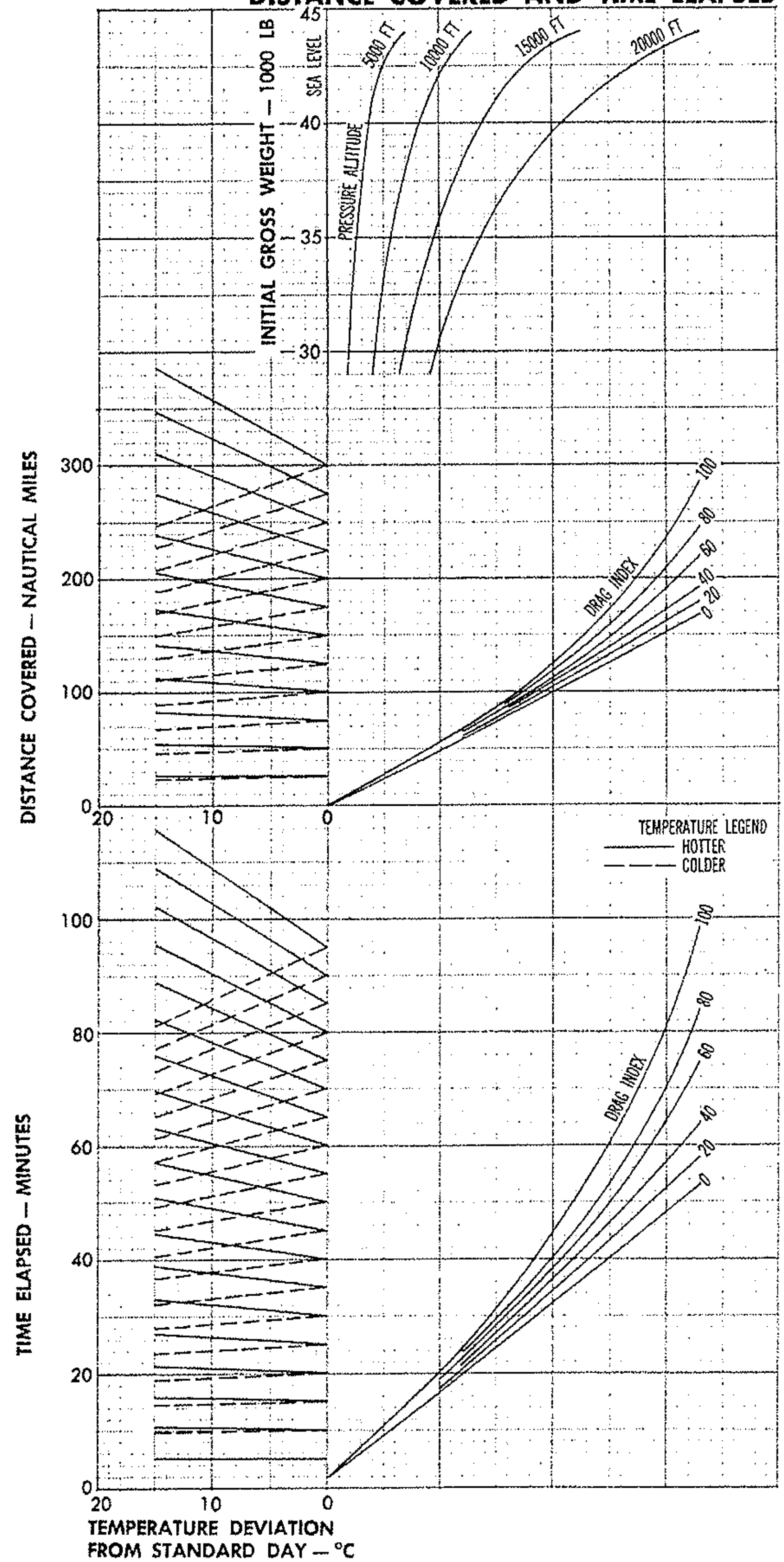


Figure A4—2 (Sheet 2 of 2)

TWO ENGINE METO CLIMB CEILINGS

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

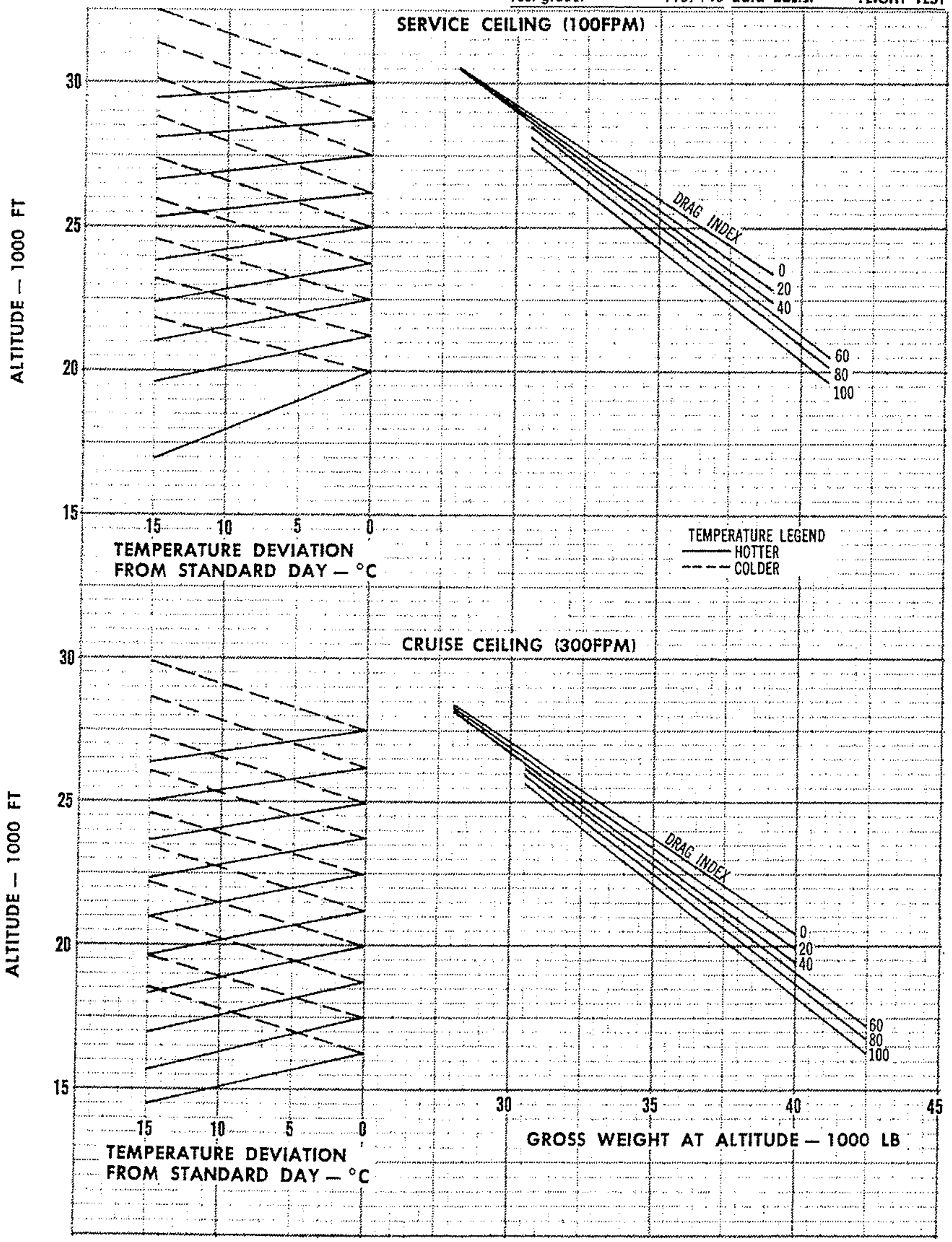


Figure A4—3

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

SINGLE ENGINE METO CLIMB

SERVICE CEILING (100FPM)
ONE PROPELLER FEATHERED

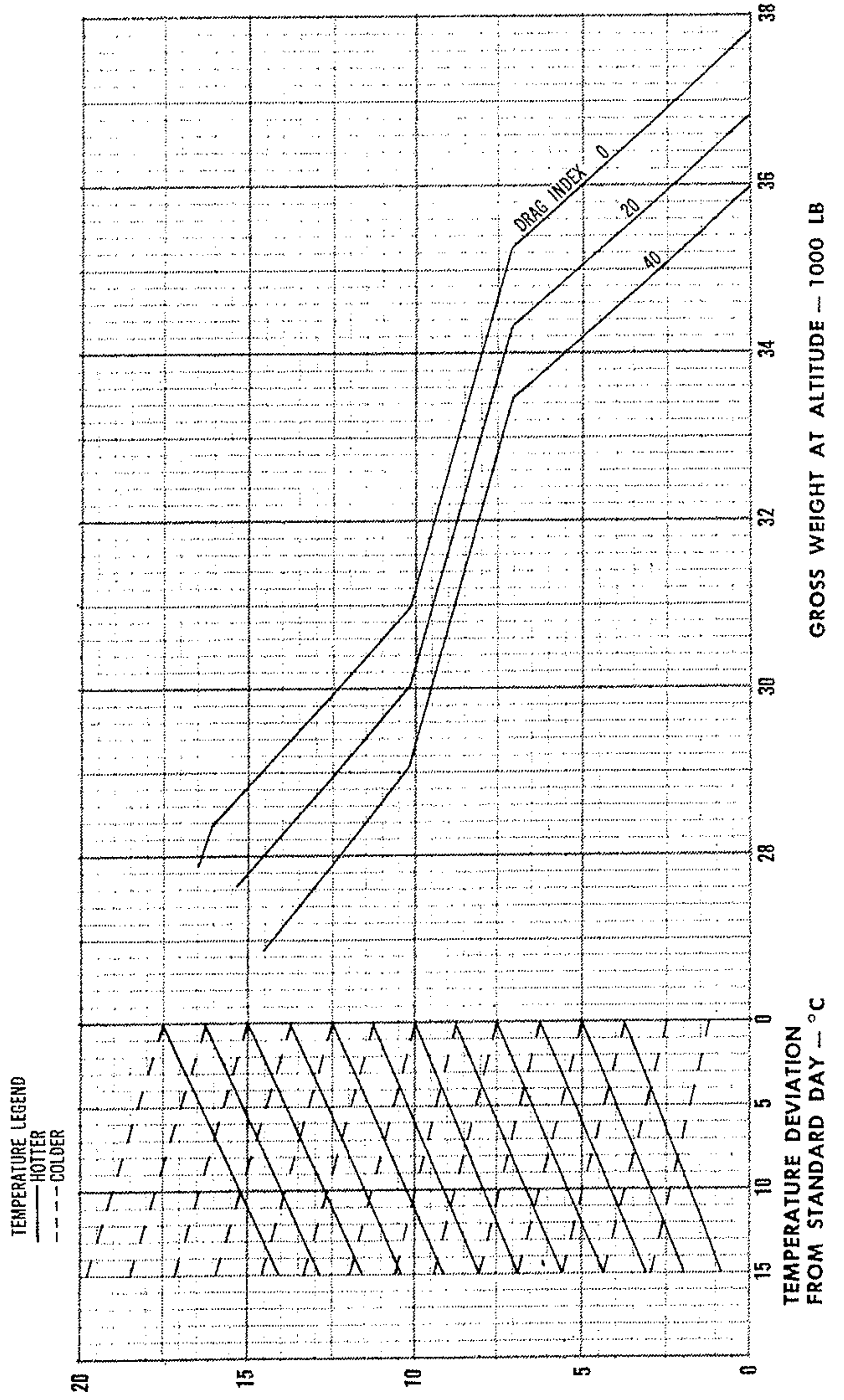
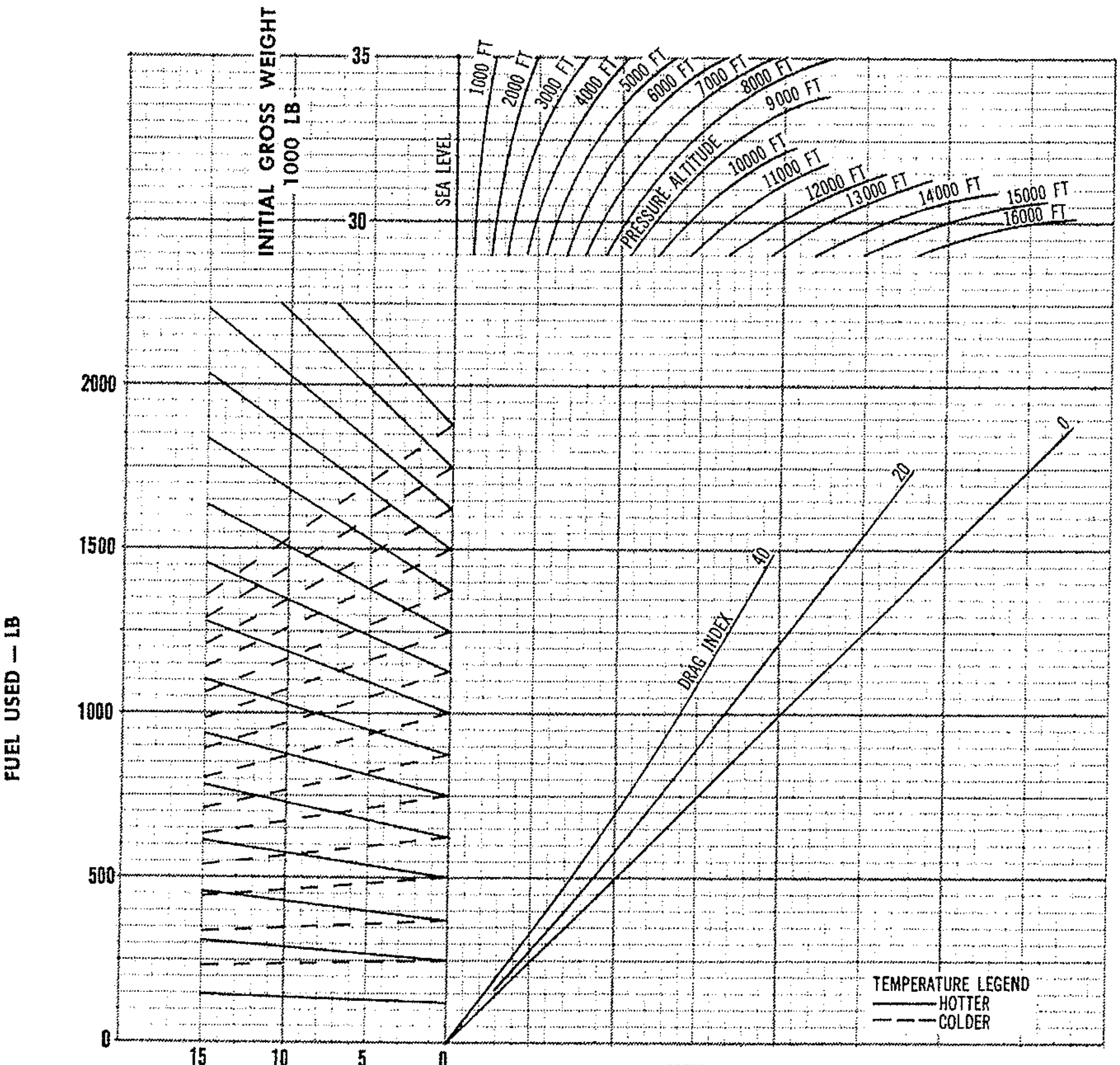


Figure A4—4

SINGLE ENGINE METO CLIMB FUEL USED

ONE PROPELLER FEATHERED

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST



SPEED SCHEDULE FOR ALL DRAG INDICES

ALTITUDE(FT)	SL	2000	4000	6000	8000	10000	12000	14000	16000
KCAS	155	154	153	152	151	150	149	148	147

Figure A4—5 (Sheet 1 of 2)

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

SINGLE ENGINE METO CLIMB DISTANCE COVERED AND TIME ELAPSED

ONE PROPELLER FEATHERED

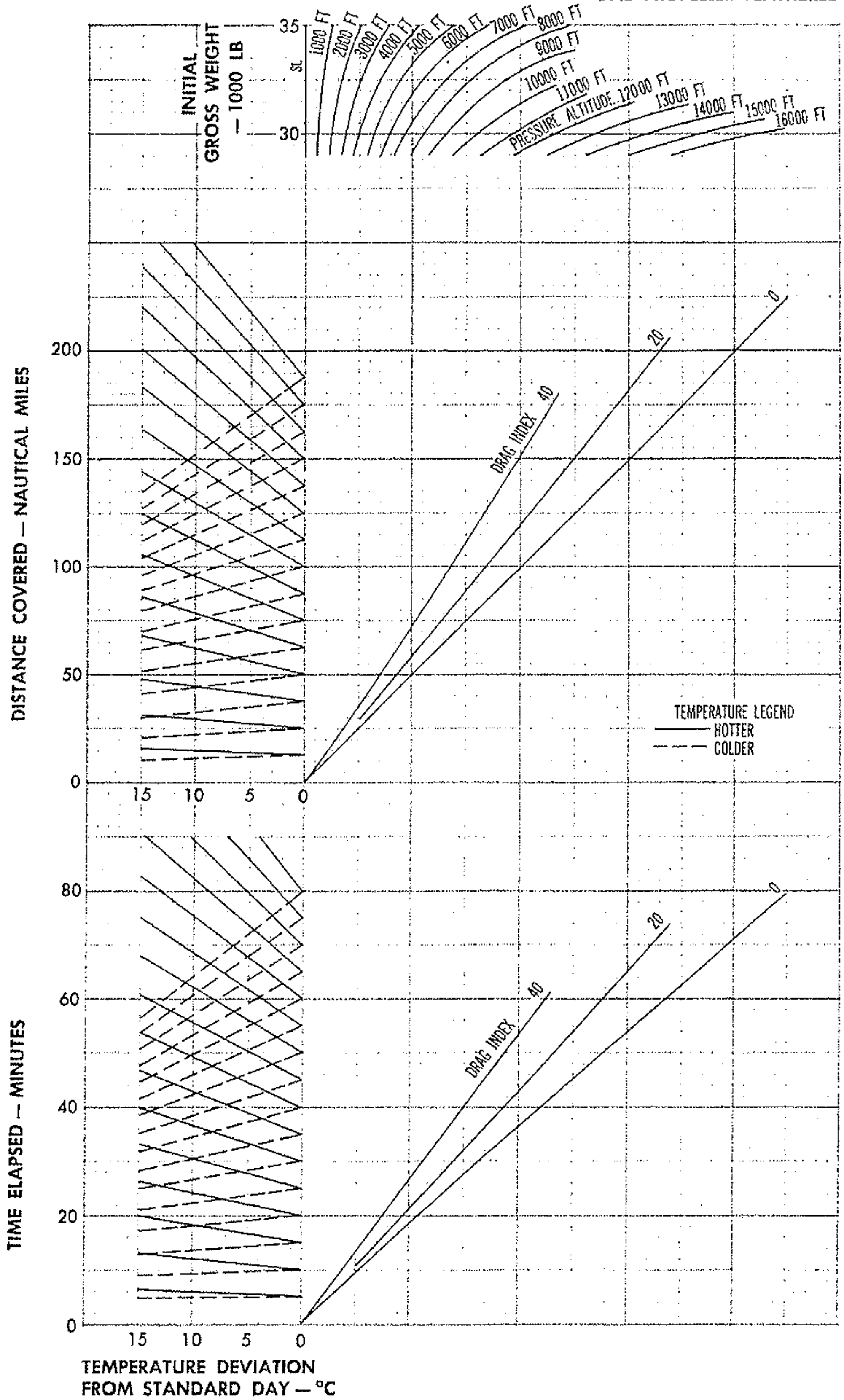


Figure A4—5 (Sheet 2 of 2)

PART 5 RANGE

TABLE OF CONTENTS

INTRODUCTION.

This part contains speed, time and fuel predictions for constant altitude long range cruise both for normal (two engine) and for single engine operation. Two engine long range cruise information is limited to manual lean mixture and that for single engine to auto rich. Specific range charts are also presented for normal (two engine) operation from which RPM, fuel flow, nautical miles per pound and BHP can be determined for any calibrated airspeed throughout the cruise range, for both carburetor mixtures and blower ratios.

All range charts are shown as functions of aircraft gross weight, drag index, cruise pressure altitude and ambient temperature.

CONSTANT ALTITUDE LONG RANGE CRUISE.

Constant altitude long range cruise information is presented on two charts. The first chart supplies the recommended long range cruise speed and the time required to fly a given ground distance, taking into account aircraft weight and drag index as well as cruise pressure altitude, ambient temperature conditions and prevailing winds. Fuel required, average total fuel flow and brake horsepower required per engine are obtained from the second chart. In addition, for two engine long range cruise, an auxiliary chart of maximum speeds for manual lean operation is included to determine whether the cruise conditions required fall within the scope of the long range cruise charts. The use of these charts is illustrated in the following sample problem. The single engine constant altitude long range charts are read by the same method, omitting the reference to the auxiliary maximum speeds curve.

Sample Problem:

Conditions:

Configuration: Basic aircraft + (2) 230 gal drop tanks + (2) M64A1 general purpose bombs.

Initial gross weight: 35000 lb.

Cruise altitude: 15000 ft.

Winds: Average 50 knot headwind.

Ambient temperature: 15° warmer than Standard.

Find: Long range cruise speed, time and fuel required to fly 120 NM ground distance.

Solution:

1. Determine the drag index from figure A1–5 by adding the store drag numbers.

Basic Aircraft		= 0
(2) 230 gal drop tanks	14 x 2	= 28
(2) M64A1 general purpose bombs	5 x 2	= 10
	Drag Index	= 38

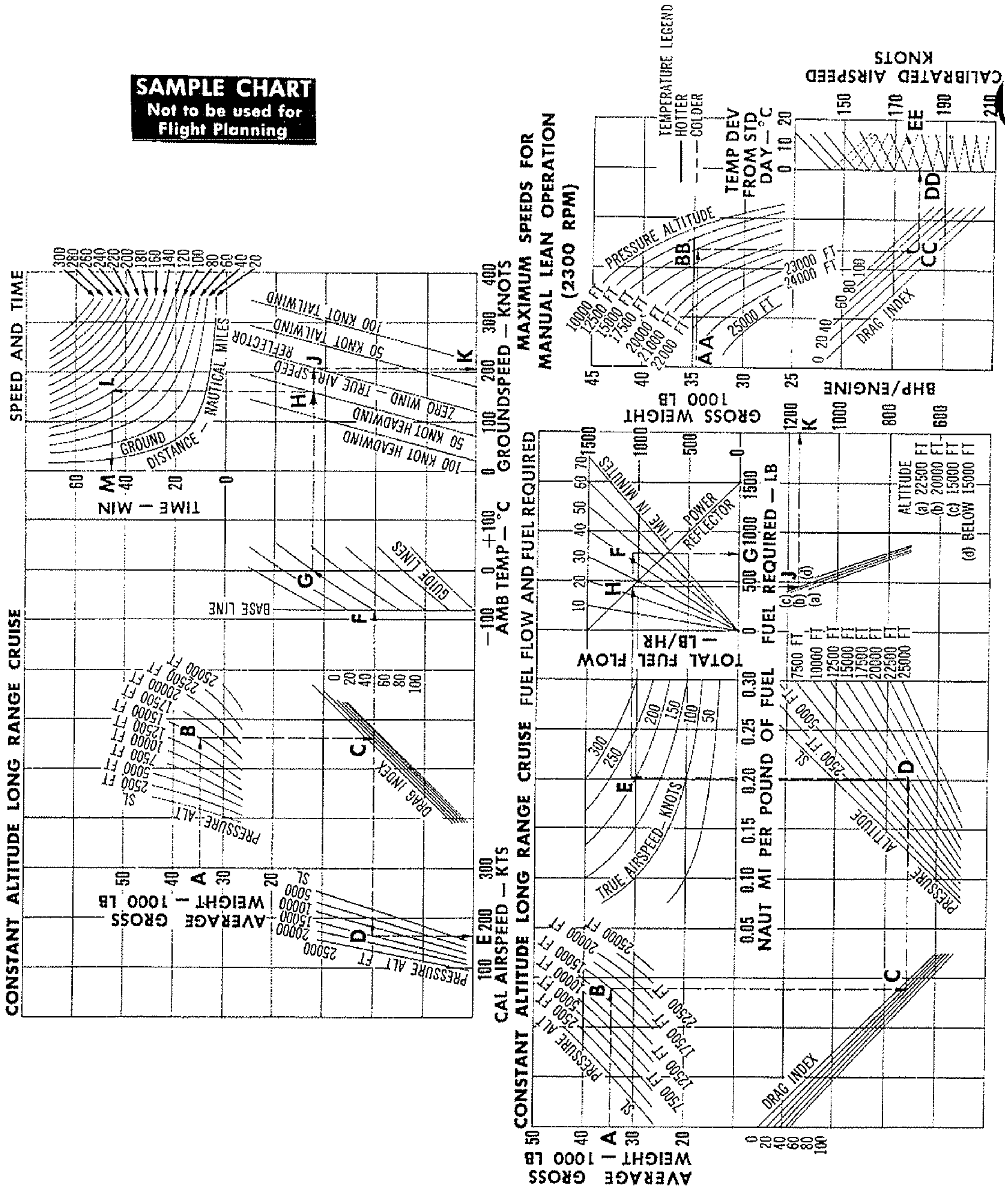
2. Read standard day temperature at 15000 ft pressure altitude from U. S. standard atmosphere table (figure A1–4) = −14.72°C. Ambient temperature = −14.72 + 15 = +0.28°C.
3. Estimate average gross weight:

   Initial gross weight = 35000 lb.

   Estimate fuel used = 1000 lb.

   Estimated final gross weight = 35000 − 1000 = 34000 lb.

   Estimated average gross weight = $\frac{35000 + 34000}{2}$ = 34500 lb.
4. Enter sample chart Page A5–2 at estimated average gross weight = 34500 lb. (A), move to the right and intercept pressure altitude = 15000 ft,


SAMPLE CHART
Not to be used for Flight Planning
CONSTANT ALTITUDE LONG RANGE CRUISE
SPEED AND TIME
TIME — MIN
GROUND DISTANCE — NAUTICAL MILES
GROUNDSPEED — KNOTS
100 KNOT TAILWIND
50 KNOT TAILWIND
REFLECTOR
ZERO WIND — TRUE AIRSPEED
50 KNOT HEADWIND
100 KNOT HEADWIND
AMB TEMP — °C
BASE LINE
GUIDE LINES
DRAG INDEX
PRESSURE ALT
AVERAGE GROSS WEIGHT — 1000 LB
CAL AIRSPEED — KTS
PRESSURE ALT FT
FUEL FLOW AND FUEL REQUIRED
TIME IN MINUTES
POWER REFLECTOR
TOTAL FUEL FLOW — LB/HR
FUEL REQUIRED — LB
ALTITUDE
(a) 22500 FT
(b) 20000 FT
(c) 15000 FT
(d) BELOW 15000 FT
TRUE AIRSPEED — KNOTS
NAUT MI PER POUND OF FUEL
PRESSURE ALTITUDE
MAXIMUM SPEEDS FOR MANUAL LEAN OPERATION (2300 RPM)
GROSS WEIGHT 1000 LB
BHP/ENGINE
TEMP DEV FROM STD DAY — °C
TEMPERATURE LEGEND
HOTTER
COLDER
CALIBRATED AIRSPEED KNOTS

(B), and project down to the drag index = 38, (C). Move to the left to intercept the pressure altitude = 15000 ft, (D), and drop down to read the calibrated airspeed = 163 kts at (E).

5. Determine maximum speed for manual lean operation under these conditions: Enter sample chart Page A5–2 at estimated average gross weight = 34500 lb, (AA), move to the right to intercept the pressure altitude = 15000 ft, (BB), and project down from (BB) to intercept the drag index = 38, (CC). From (CC) move to the right to the Standard Day (0°C temperature deviation), (DD). From (DD) parallel the solid (hotter) guide line to a temperature deviation of 15°C and read the calibrated airspeed = 174 kts (EE).

Note

Only if the *cruise speed* of step 4 is *less* than the *maximum speed* for *manual lean operation,* are the long range cruise charts applicable, since these charts encompass manual lean operation only. If the cruise speed of step 4 is greater than the maximum speed read in step 5, read cruise performance against airspeed from the specific range charts. (There is no optimization on the latter charts in terms of airspeed for maximum or 99% maximum range).

6. Re-enter sample chart Page A5–2 at (C) and proceed to the right to the ambient temperature baseline, (F). From (F), parallel the temperature guide lines to intersect ambient temperature = 0.28°C, (G), move to the right to intercept the 50 knot headwind line at (H) and continue to the zero wind-true airspeed reflector line, (J). From (J) drop down to the speed scale and read zero wind ground speed = TAS = 209 knots, (K). From (H) extend a vertical line upward to the required range = 120 NM, (L), and move to the left to the time scale to read cruise time = 45.0 Min, (M).

7. Enter sample chart Page A5-2 at estimated gross weight = 34500 lb, (A) move to the right to pressure altitude of 15000 ft, (B) drop down to the drag index = 38, (C), and then to the right to pressure altitude 15000 ft, (D). Move up to true airspeed = 209 knots at (E), to the right to time = 45.0 Min, (F), and drop down to the scale to read fuel required = 780 lb, (G). Continue from (E) to the Power Reflector line at (H), drop down to the 15000 ft line, (J) and then to the right to read BHP = 1175/Eng at (K).

8. Revise estimated average gross weight:

   Initial gross weight = 35000 lb.

   Fuel used reading = 780 lb.

   Final gross weight = 34220 lb.

   Average gross weight = $\frac{35000 + 34220}{2}$ = 34610 lb.

9. Reworking steps 4, 5, 6 and 7 with revised average gross weight = 34610 lb, the respective readings are:

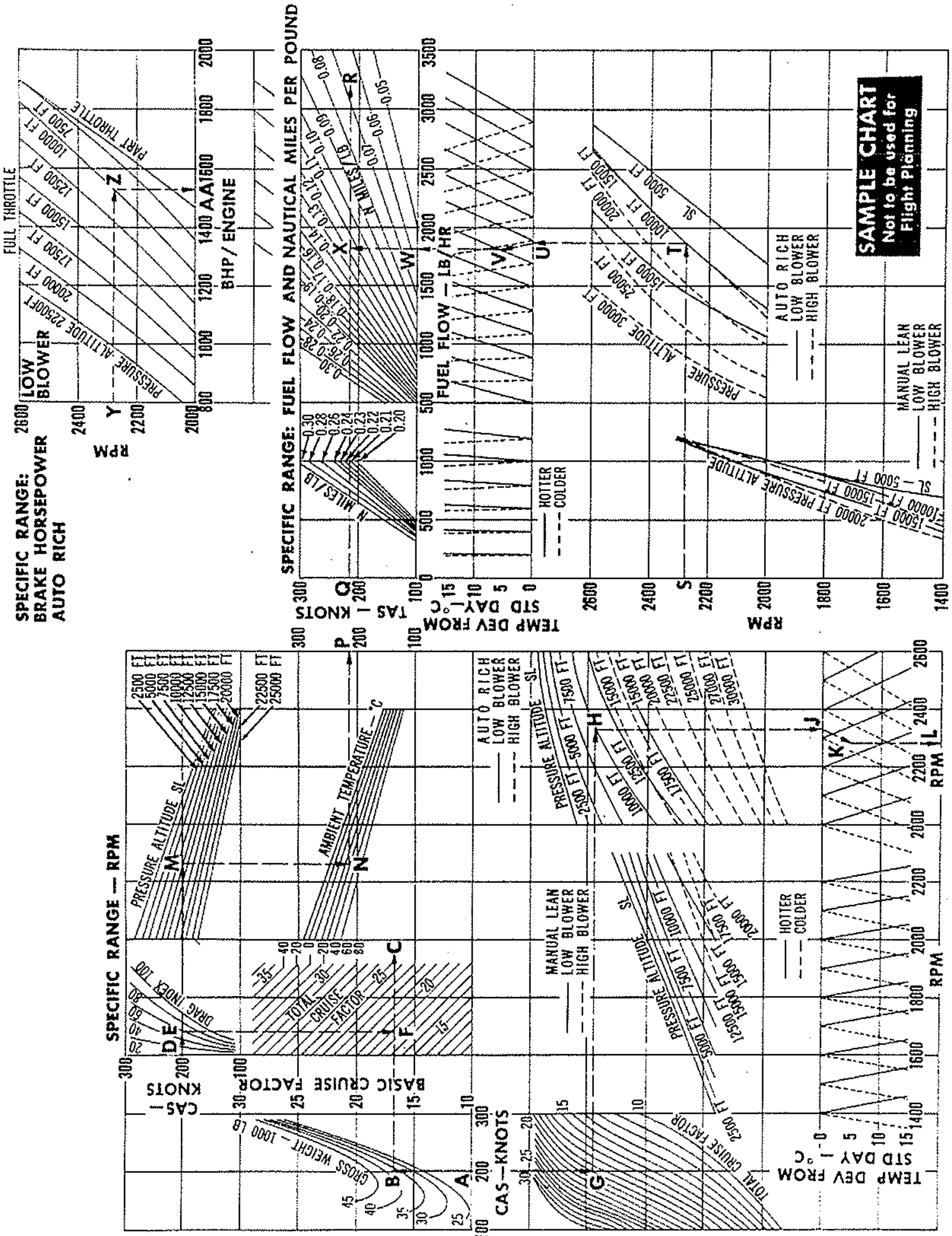
   True airspeed = 209 knots.

   Elapsed time — 45.0 Min.

   Fuel required = 780 lb.

   BHP required = 1175/Eng.

10. If fuel flow is required, it can be read at the intersection of the fuel flow scale and the line EF as 1040 lb/hr.


SPECIFIC RANGE: BRAKE HORSEPOWER
AUTO RICH
SPECIFIC RANGE: FUEL FLOW AND NAUTICAL MILES PER POUND
SPECIFIC RANGE — RPM
SAMPLE CHART
Not to be used for
Flight Planning

SPECIFIC RANGE.

Specific range information is presented on five charts and covers the entire cruise range of the aircraft with two engines operating. The first chart provides total cruise factor against calibrated airspeed for any aircraft weight and drag index, and the RPM required at any pressure altitude and ambient temperature deviation from standard day to obtain that cruise factor. True airspeed is also determined in this chart for use in reading specific range. The second chart supplies the total fuel flow required and the nautical miles per pound available. Brake horsepower per engine for both carburetor mixtures and blower ratios are found on the final two charts. The use of these charts is illustrated in the following sample problem.

Sample Problem:

Conditions: Configuration: Basic Aircraft plus (2) 230 gal drop tanks plus (4) M-117 Demolition Bombs.

Initial Gross Weight: 38000 lb

Cruise Pressure Altitude: 10000 ft

Cruise Speed: 200 KCAS

Ambient Temperature: 5° colder than Standard Day

Find: RPM, Total fuel flow, brake horsepower per engine and fuel required to fly 200 NM under zero wind conditions.

Solution:

1. Determine drag index from the store drag numbers of Figure A1—5.

Basic aircraft	0
(2) 230 gal drop tanks	2 x 14 = 28
(4) M-117 demolition bombs	4 x 7.5 = 30
Drag Index =	58

2. Find standard day ambient temperature from the U. S. standard atmospheric table, figure A1—4 for 10000 ft pressure altitude = —4.812°C. Ambient temperature = —4.812—5.0 = —9.8°C.

3. Estimate average gross weight in cruise.

   Initial gross weight = 38000 lb.

   Estimated fuel required = 1000 lb.

   Estimated fiinal gross weight = 38000 — 1000 = 37000 lb.

   Estimated average gross weight = $\frac{38000 + 37000}{2}$ = 37500 lb.

4. Enter sample chart Page A5-4 at 200 KCAS, (A), move up to gross weight = 37500, (B) and extend a line (BC) to the right. Enter upper calibrated airspeed scale at 200 KCAS, (D), move over to drag index = 58, (E), and drop from (E) to intercept line (BC) at (F) to read total cruise factor = 18.9.

5. Move down from (A) to total cruise factor = 18.9, (G), and to the right until pressure altitude = 10000 ft is intercepted at (H). This indicates that for the cruise conditions specified, auto rich carburetor mixture with low blower is required. Continue from (H) down to the 0°C temperature deviation line (standard day), (J) follow the dashed (colder) guide line to 5°C deviation from standard, (K), and then down to the scale at (L) to read RPM = 2280.

6. From the upper calibrated airspeed scale, continue from (D) to the 10000 ft. pressure altitude line, (M), down to ambient temperature = —9.8°C, (N) and to the right to read true airspeed = 215 knots at (P).

7. Enter sample chart Page A5-4 at true airspeed = 215 knots, (Q), and extend a line (QR) to the right. Enter at RPM = 2280, (S), over to the 10000 ft pressure altitude in auto rich, low blower, (T), up to the 0°C temperature deviation line (standard day), (U), follow the dashed (colder) guide line to 5°C deviation from standard, (V), and move up to read total fuel flow = 1830 lb/hr at the fuel flow scale, (W). Continue from (W) to intercept line (QR) at (X) to read nautical miles per pound = 0.1175.

8. Enter sample chart Page A5-4 in the low blower portion at RPM = 2280, (Y), move over to intercept pressure altitude = 10000 ft at (Z) and drop down to read BHP/engine = 1530 at (AA).

9. Compute fuel required = dist ÷ nautical miles per pound, = 200 ÷ 0.1175 = 1700 lb.

Note

This will give fuel required for zero wind conditions. If there are prevailing winds, the nautical miles per pound read from the chart have to be adjusted as follows:

NM/lb with wind = zero wind NM/lb x $\frac{(\text{TAS} \pm \text{wind velocity})}{\text{TAS}}$

where the minus sign is used for a headwind and the plus sign for a tailwind. If the prevailing winds for this problem consisted of 20 knot headwinds, then NM/lb with wind would $= 0.1175 \times \frac{(215-20)}{215} = 0.1066$, and the fuel required would be $200 \div 0.1066 =$ 1875 lb.

10. Revise average gross weight estimate.

    Initial gross weight = 38000 lb.

    Fuel required = 1700 lb.

    Final gross weight = 38000 − 1700 = 36300 lb.

    Average gross weight $= \frac{38000 + 36300}{2} = 37150$ lb.

11. Reworking steps 4 thru 9 with average gross weight = 37150 lb results in the following solution:

    Total cruise factor = 18.7.

    RPM = 2280.

    Total fuel flow = 1830 lb/hr.

    BHP/engine = 1530.

    Fuel required = 1700 lb.

12. If cruise time is required, time in hours = Distance ÷ (TAS ± wind velocity), where the minus sign is used for a headwind and the plus sign for a tailwind.

    Time in minutes = time in hours x 60.

    Time for zero wind cruise = (200 ÷ 215) x 60 = 55.8 min.

    Time with a 20 knot headwind = (200 ÷ 195) x 60 = 61.5 min.

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

CONSTANT ALTITUDE LONG RANGE CRUISE
SPEED AND TIME

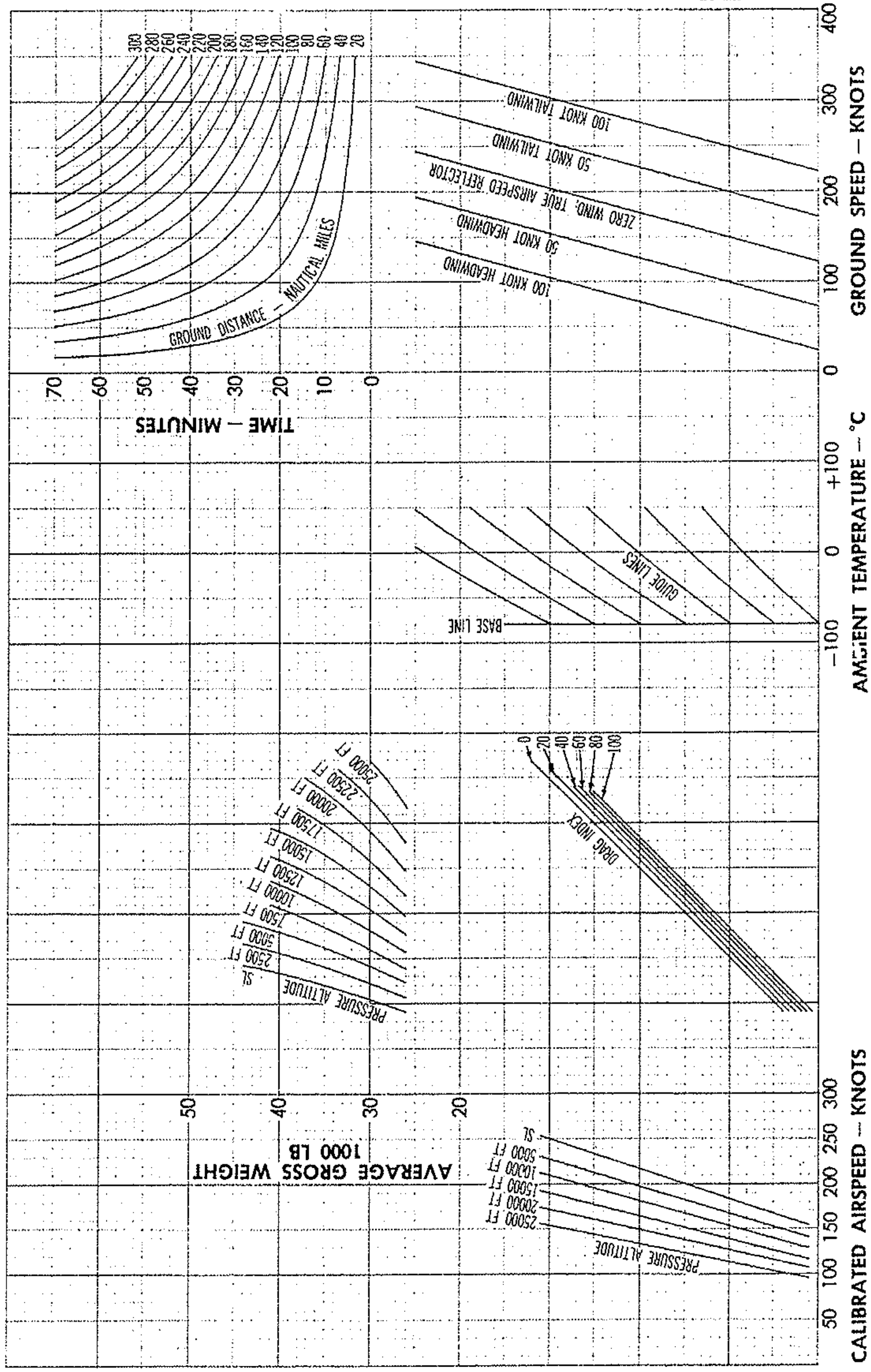


Figure A5—1

CONSTANT ALTITUDE LONG RANGE CRUISE
FUEL FLOW AND FUEL REQUIRED

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

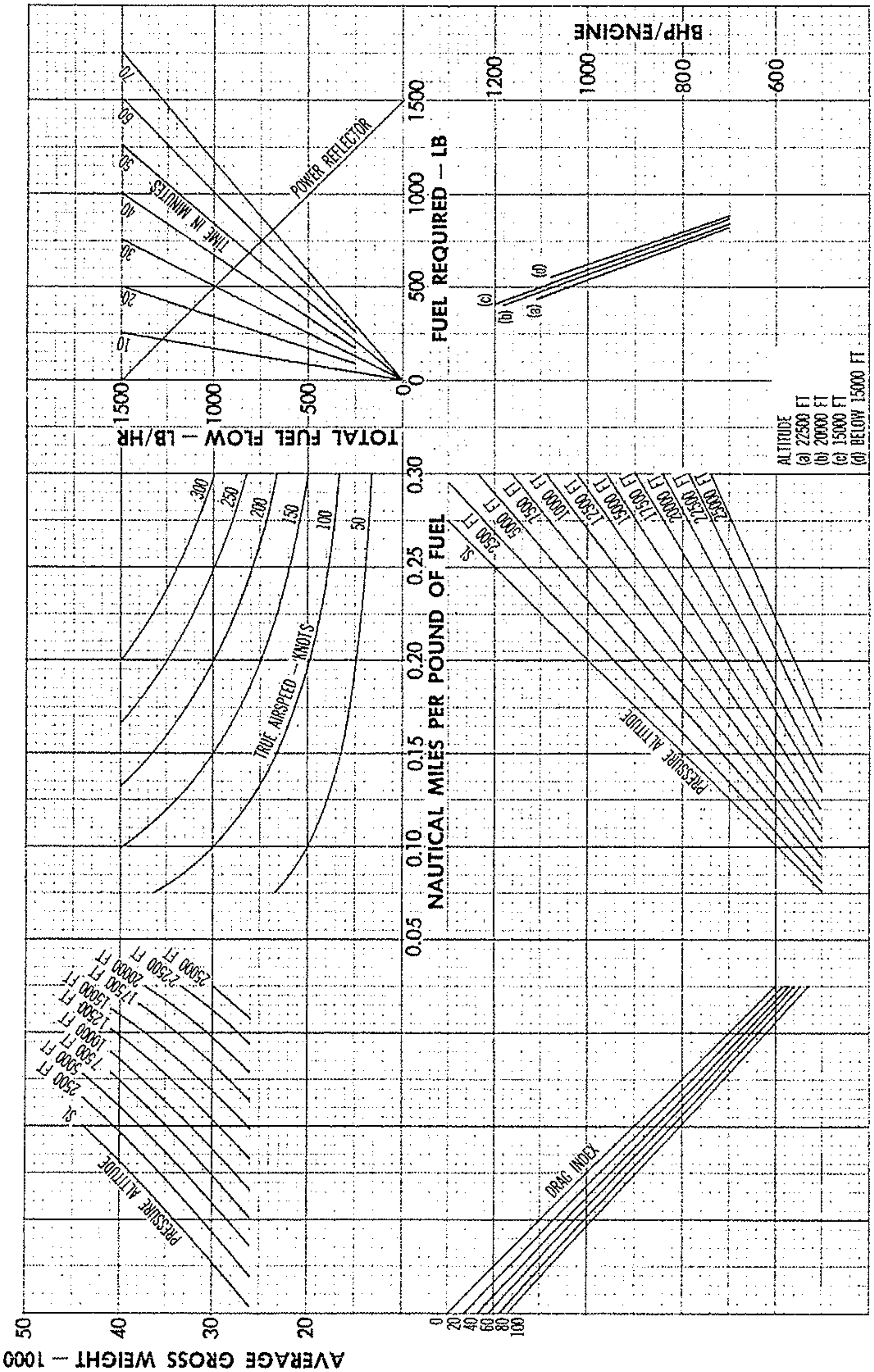


Figure A5—2

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

MAXIMUM SPEEDS FOR MANUAL LEAN OPERATION (2300 RPM)

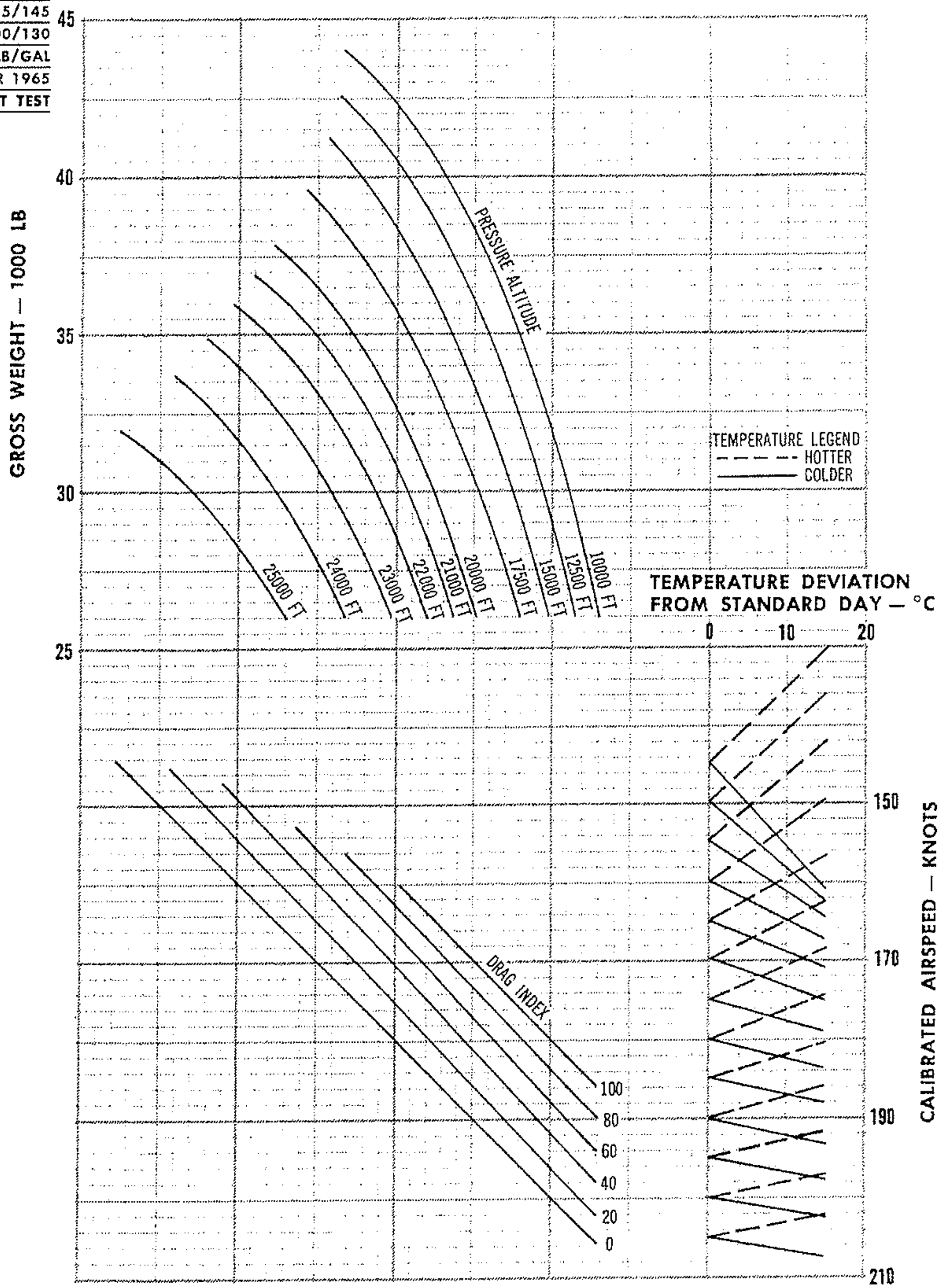


Figure A5—3

SPECIFIC RANGE — RPM

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

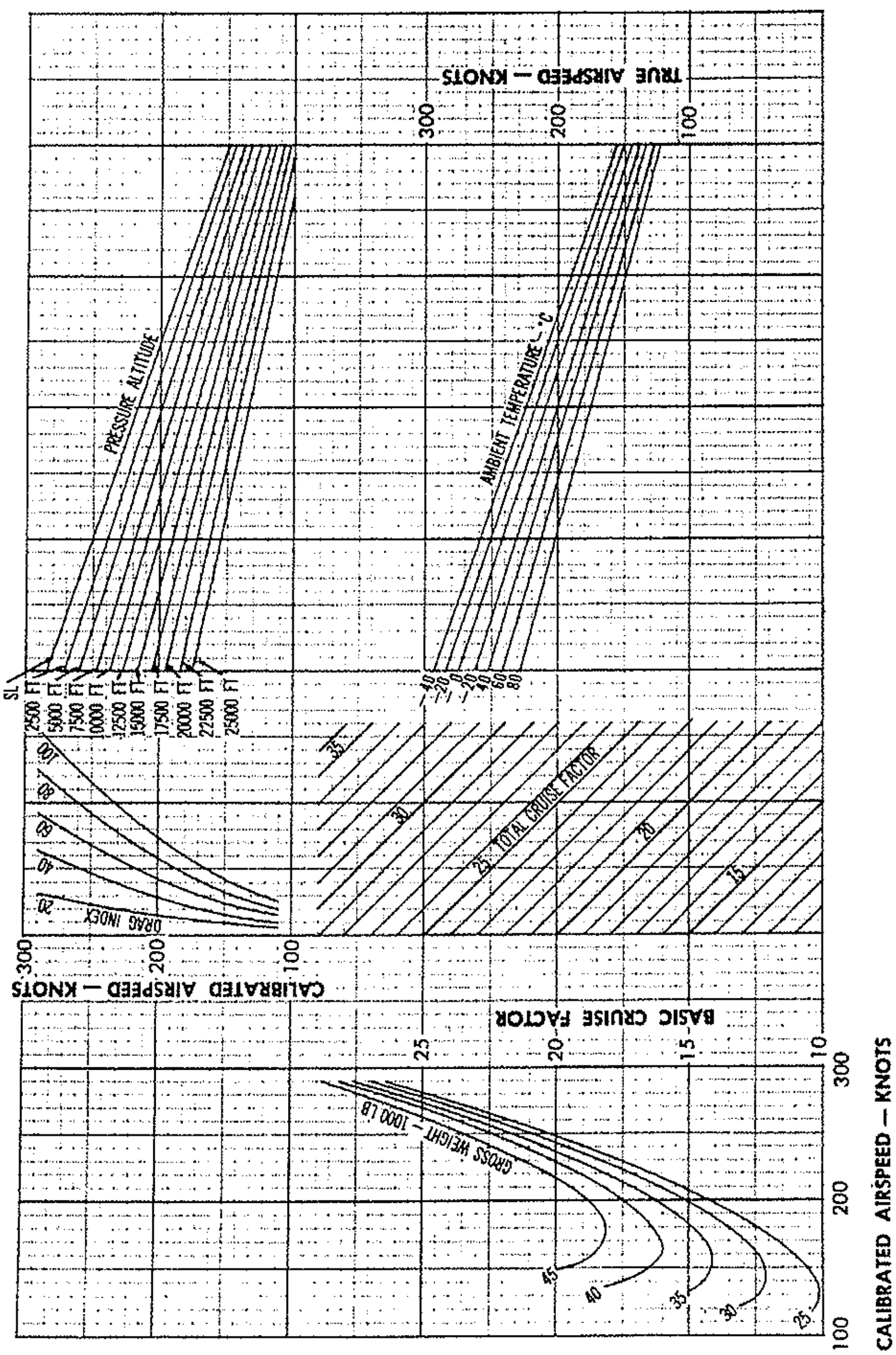


Figure A5—4 (Sheet 1 of 2)

SPECIFIC RANGE — RPM

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

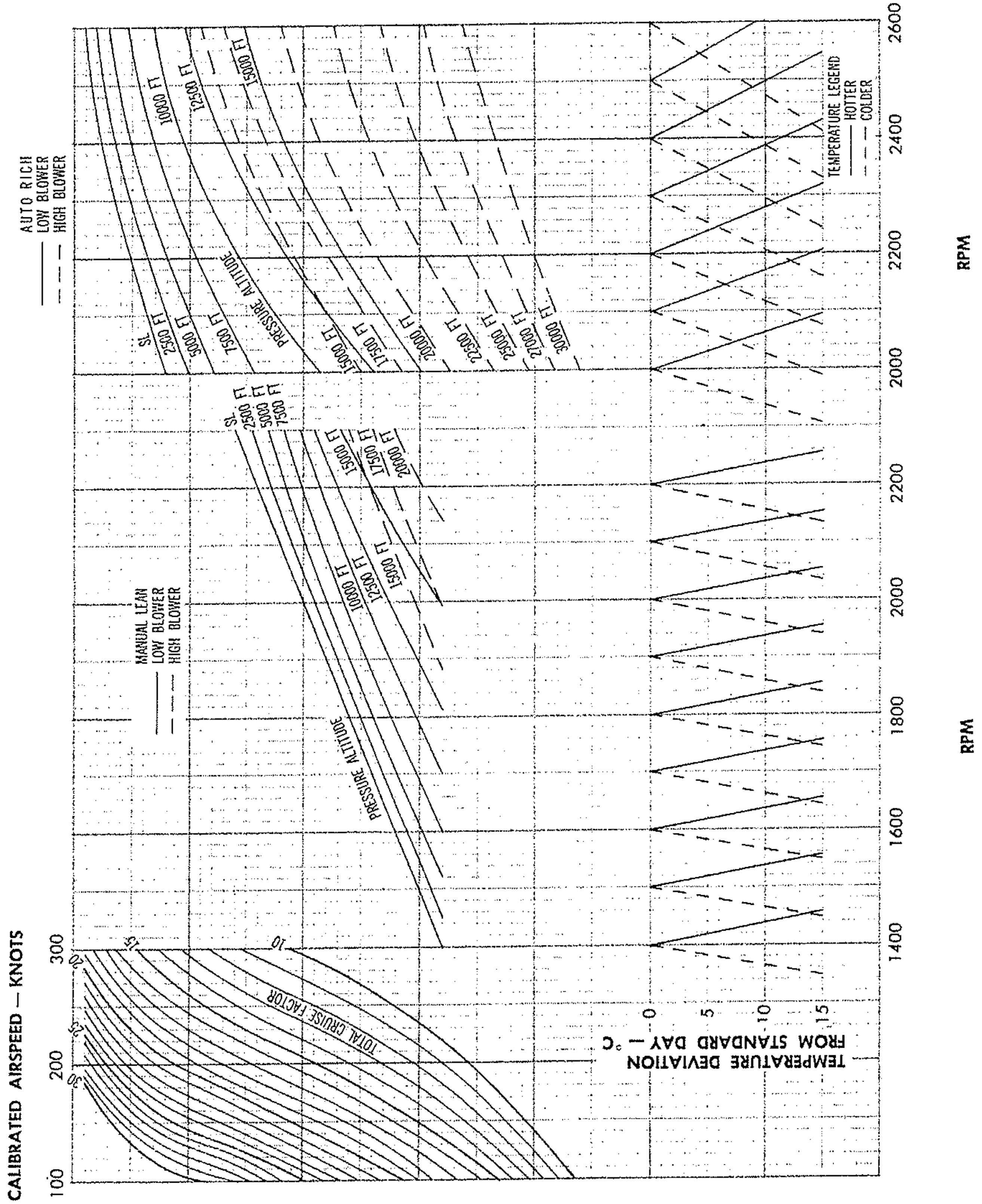


Figure A5—4 (Sheet 2 of 2)

SPECIFIC RANGE
FUEL FLOW AND NAUTICAL MILES PER POUND

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

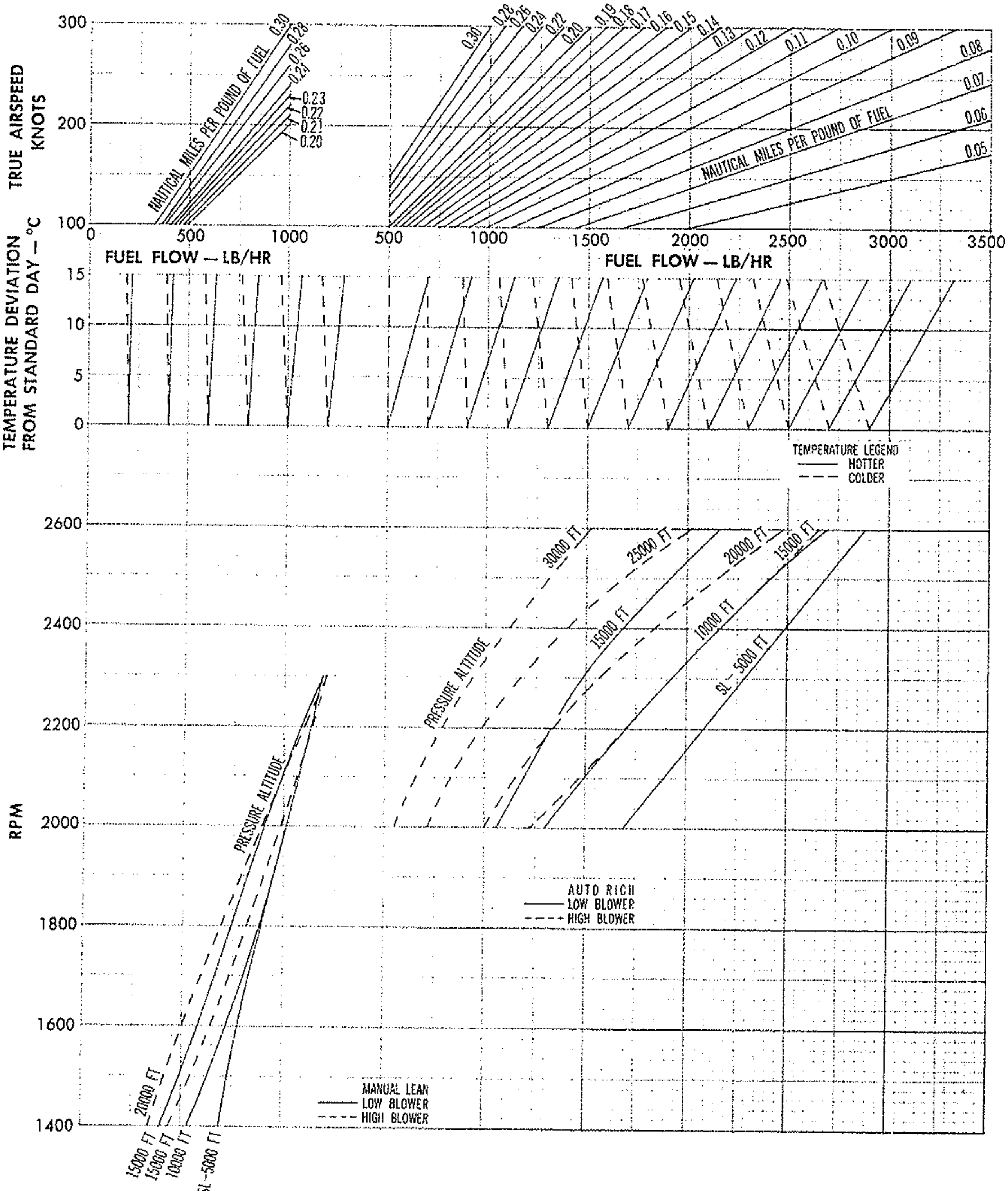
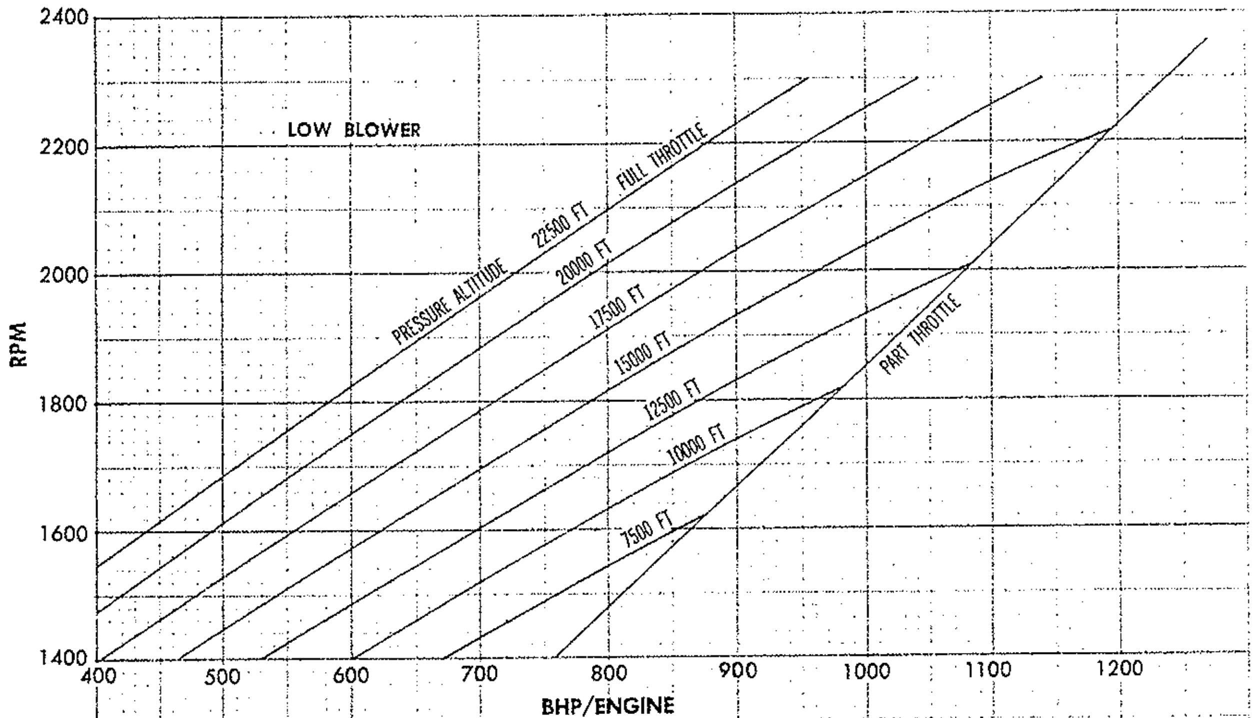


Figure A5—5

SPECIFIC RANGE: BRAKE HORSEPOWER
MANUAL LEAN

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST



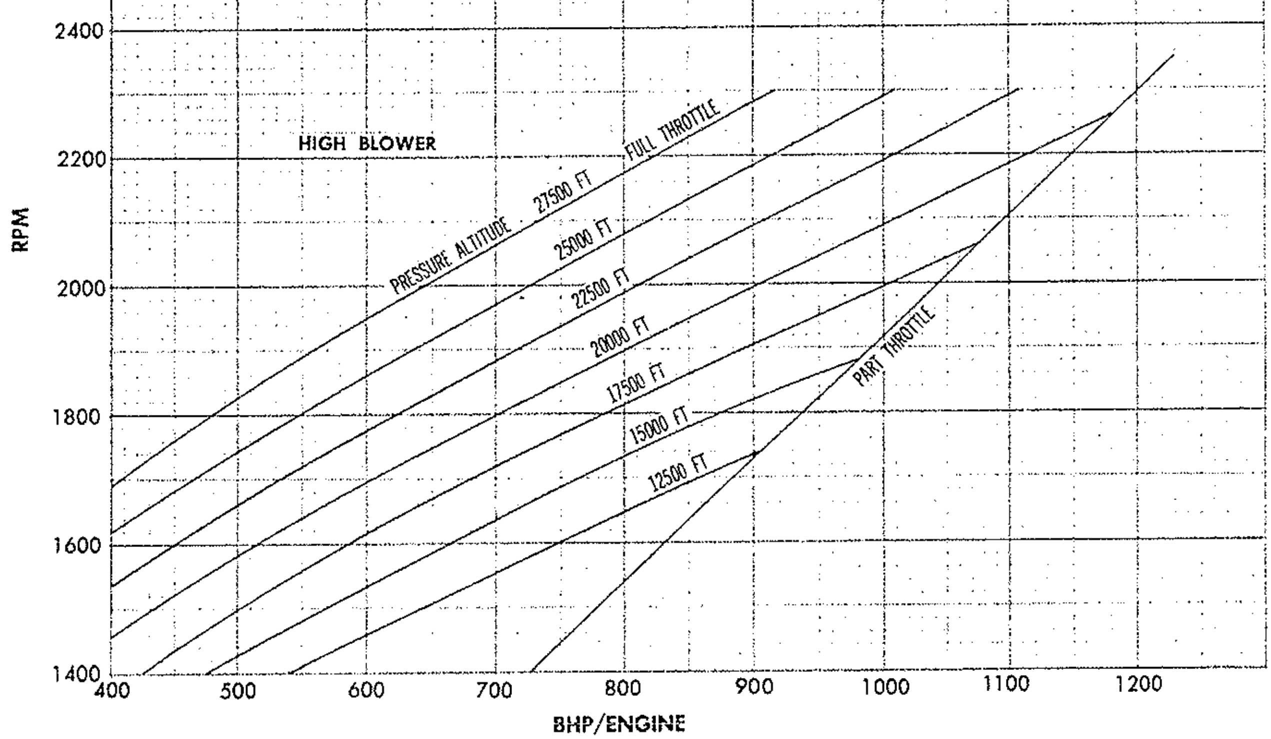


Figure A5—6

SPECIFIC RANGE: BRAKE HORSEPOWER AUTO RICH

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

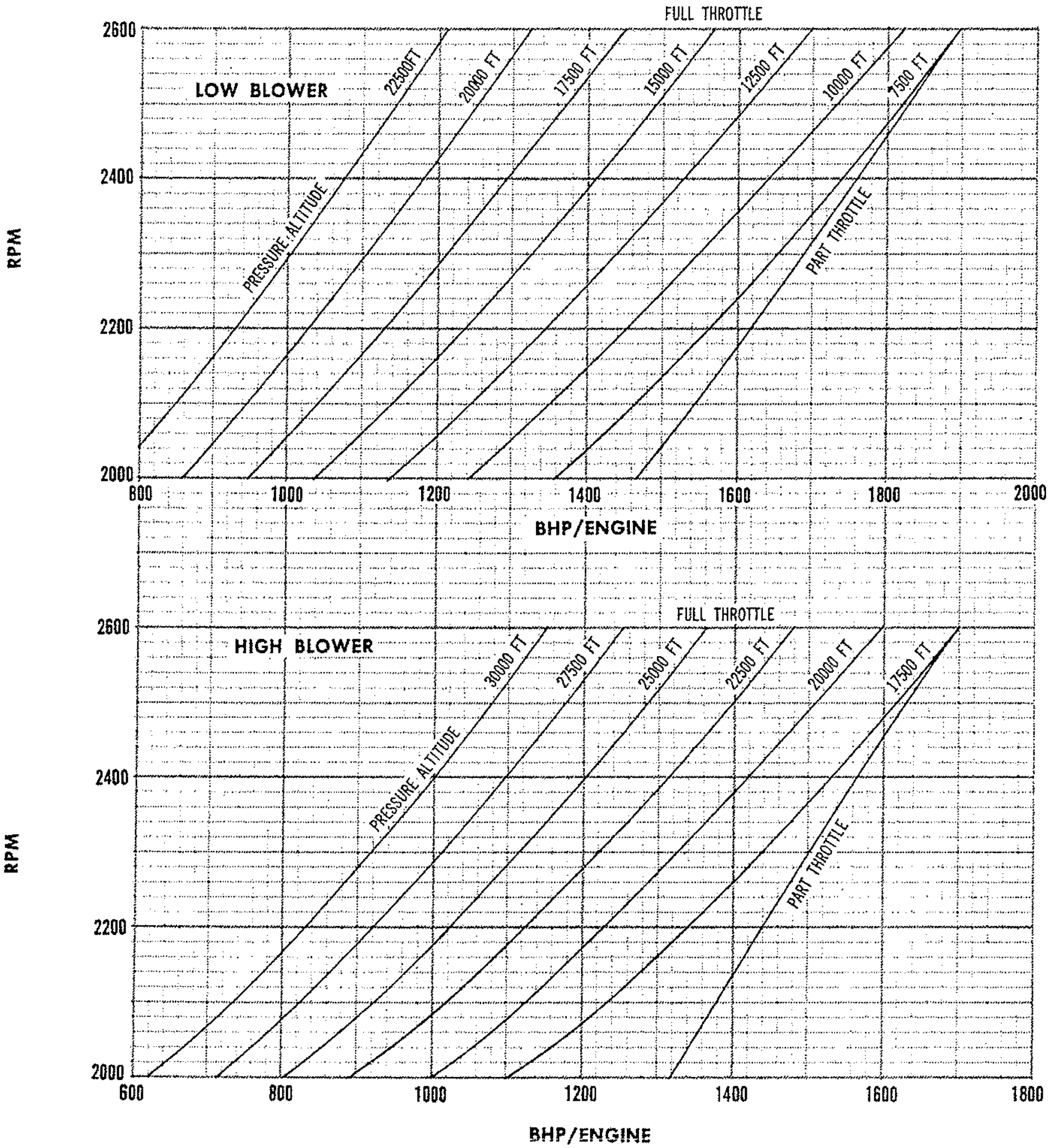


Figure A5—7

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

SINGLE ENGINE CONSTANT ALTITUDE LONG RANGE CRUISE
ONE PROPELLER FEATHERED
SPEED AND TIME

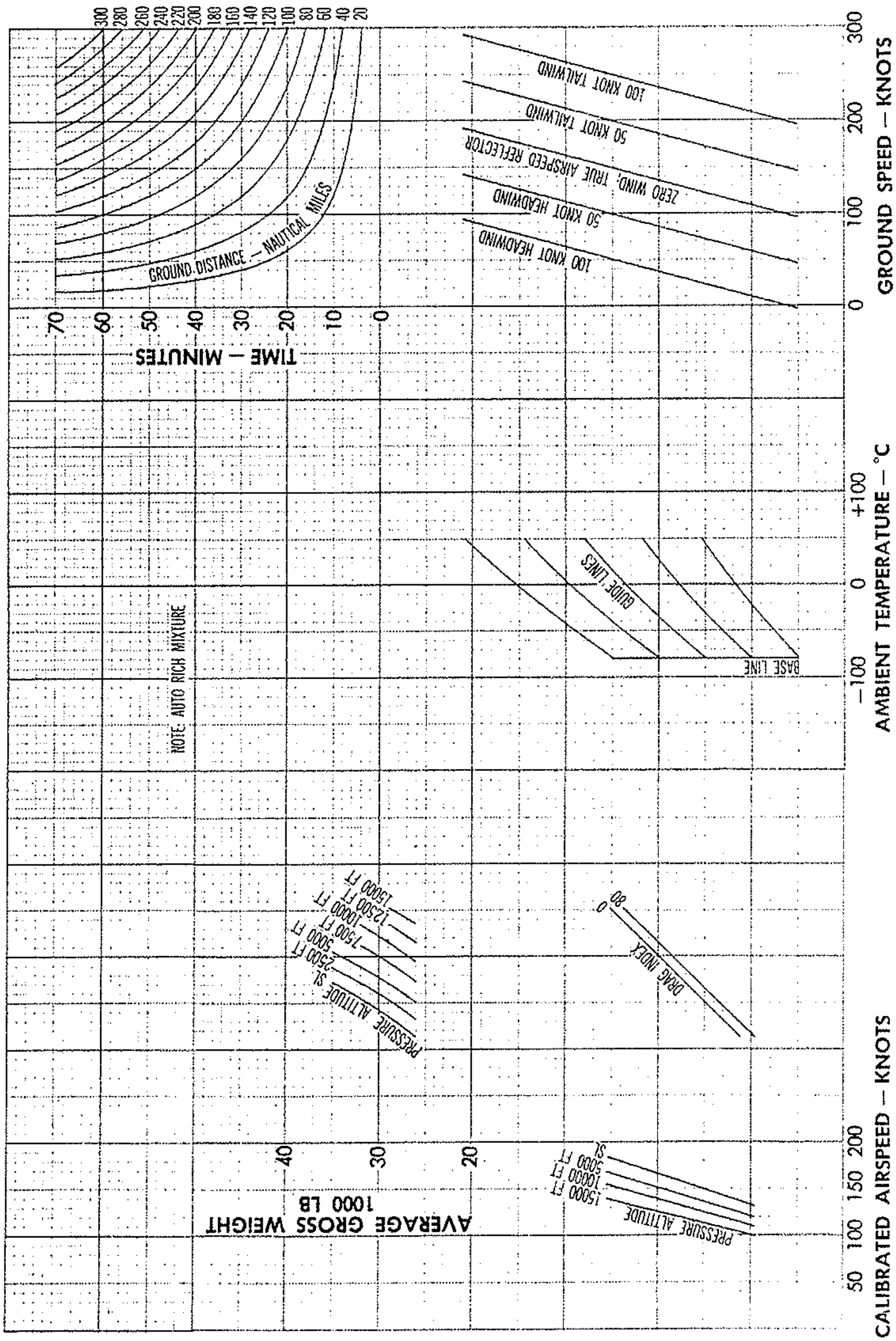


Figure A5—8

SINGLE ENGINE CONSTANT ALTITUDE LONG RANGE CRUISE
ONE PROPELLER FEATHERED
FUEL FLOW AND FUEL REQUIRED

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

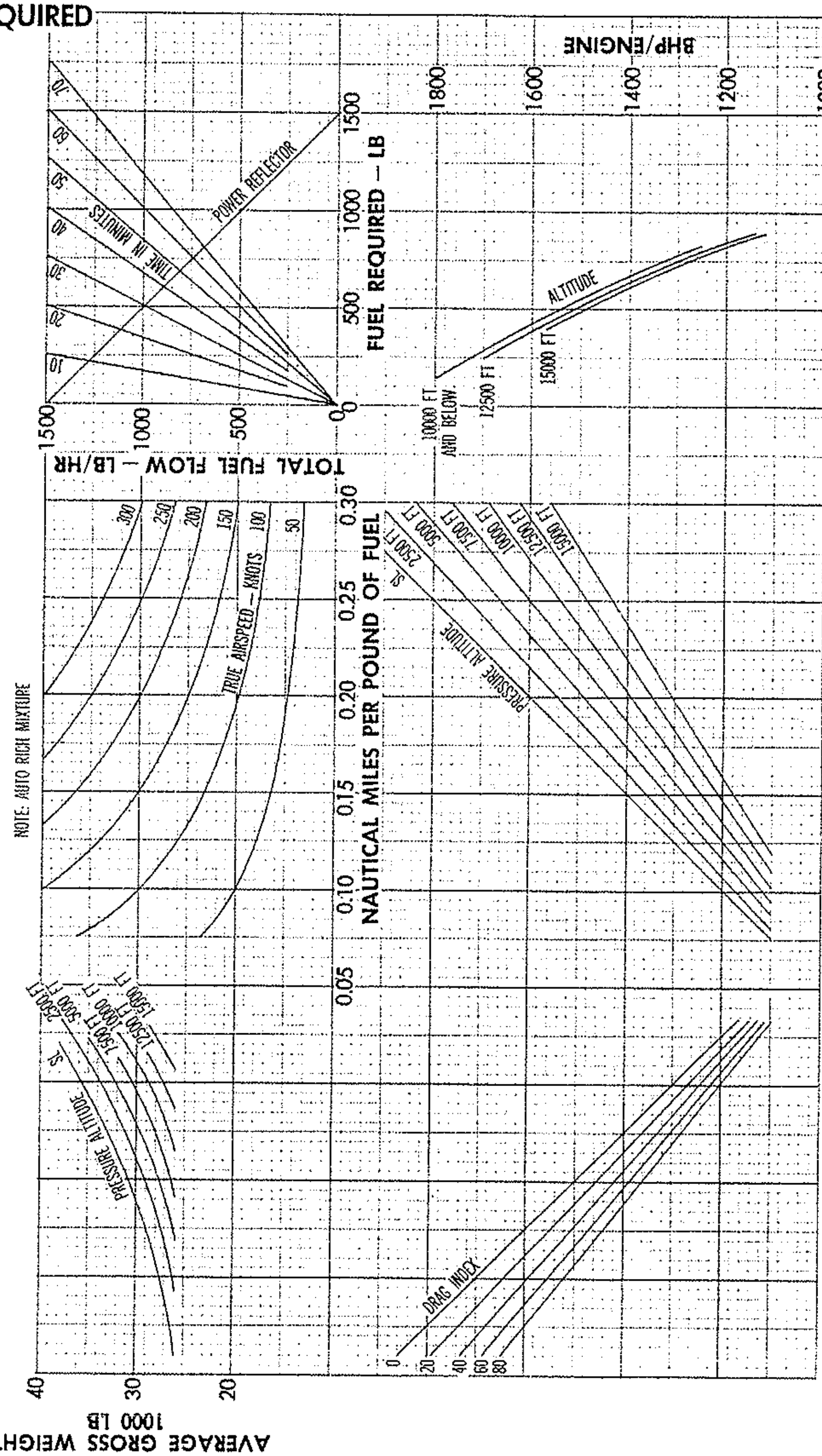


Figure A5—9

PART 6 ENDURANCE

TABLE OF CONTENTS

INTRODUCTION.

Charts in this part enable the pilot to determine maximum endurance speeds and brake horsepower required at any given conditions of gross weight, pressure altitude, drag index and bank angle, in addition to the fuel required for a specified loiter time or the loiter time available for a given fuel quantity.

Sample Problem:

Conditions: Configuration: Basic aircraft + (2) 230 gallon drop tanks + (4) BLU 27/B firebombs
Initial Gross Weight: 33000 lb
Pressure Altitude: 10000 ft
Ambient Temperature: 6°C colder than Standard Day
Bank Angle: 20°

Find: Speed and power setting for maximum endurance and fuel used during 60 minutes of loiter.

Solution:

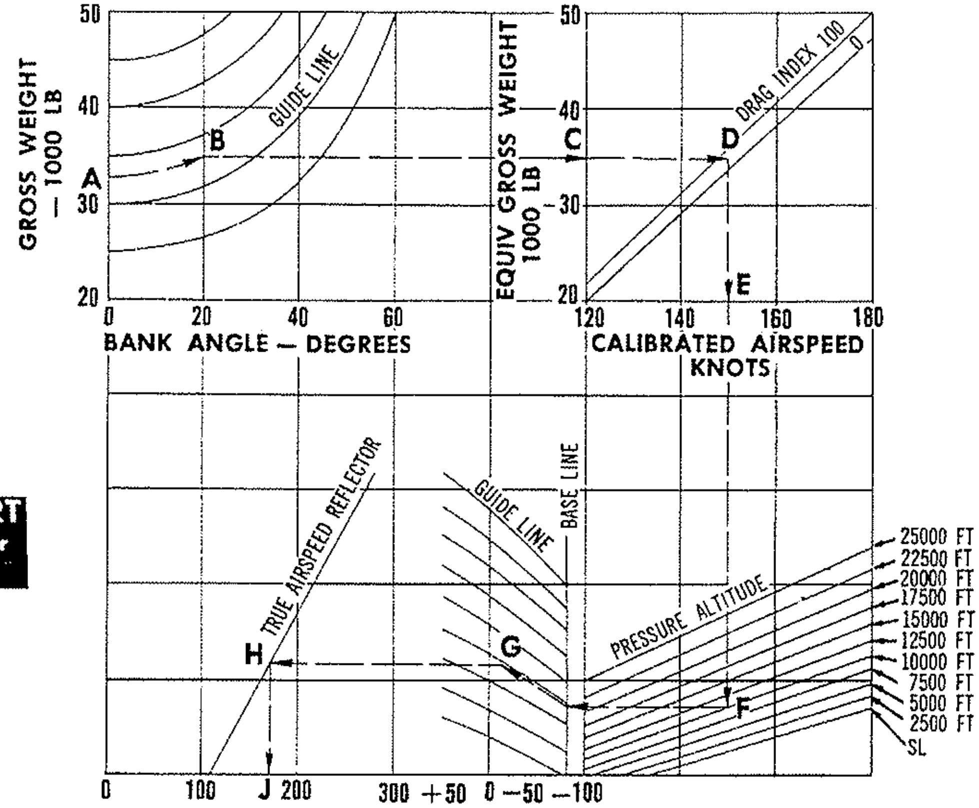
1. Determine the drag index from figure A1—5 by adding the various store drag numbers.

Basic Aircraft		= 0
(2) 230 Gallon Drop Tanks	2 x 14	= 28
(4) BLU 27/B Fire Bombs	4 x 7	= 28
	Drag Index	= 56

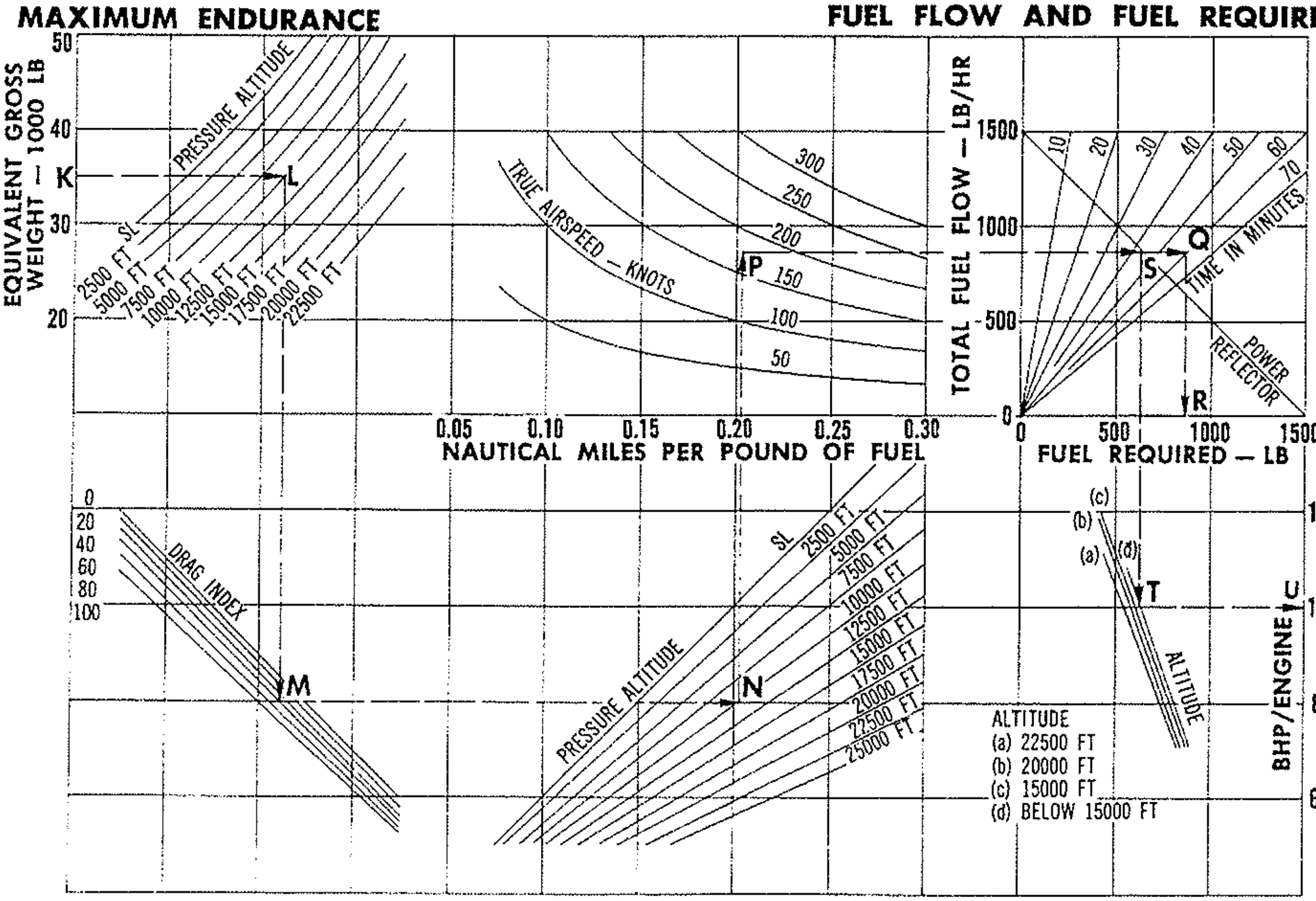
2. Determine standard day ambient temperature at 10000 ft pressure altitude from standard atmosphere table (figure A1—4) = −4.812°C. Ambient Temperature = Standard −6°C = −4.812-6.0 = −10.8°C.
3. Estimate average gross weight.
   Initial gross weight = 33000 lb.
   Estimated fuel used for 60 minutes = 750 lb.
   Estimated final weight = 33000 − 750 = 32250 lb.
   Estimated average gross weight = $\frac{33000 + 32250}{2}$ = 32625 lb.
4. Enter sample chart Page A6-2 at estimated average gross weight of 32625 lb (A) and follow guide lines to 20° bank angle, (B). Read equivalent gross weight = 35000 lb at (C).
5. Move to the right to drag index = 56, (D) and drop down to read calibrated air speed = 149.5 knots (E). Continue down to 10000 ft altitude line, (F).
6. Move to the left to base line and follow guide lines until the ambient temperature of −10.8°C is intersected at (G). Move to the left to true air speed reflector, (H), and down to the scale to read true airspeed = 172 knots, (J).
7. Enter sample chart Page A6-2 at equivalent gross weight = 35000 lb, (K). Move to the right to 10000 ft altitude line, (L) and drop down to drag index = 56, (M).
8. Move to the right to 10000 ft altitude line, (N) and up to true airspeed = 172 knots, (P).
9. Move to the right to the 60 minute time line, (Q), and down to the fuel required scale to read 860 lb, (R). Total fuel flow can be read where line (PQ) crosses the fuel flow scale as 860 lb/hr.
10. Continue from (P) to the power reflector line, (S), drop down to the line representing 10000 ft, (T), and over to the BHP scale at (V) to find power required = 1000 BHP/Eng.
11. Revise average gross weight estimate.
    Initial gross weight = 33000 lb.
    Fuel used for 60 minutes = 860 lb.
    Final gross weight = 32140 lb.
    Average gross weight = $\frac{33000 + 32140}{2}$ = 32570 lb.
12. Rework steps 4 thru 10, entering charts at gross weight = 32570 lb, and find true airspeed = 170 knots, fuel used for 60 minutes = 860 lb and power required = 1000 BHP/Eng.

MAXIMUM ENDURANCE SPEED

SAMPLE CHART
Not to be used for Flight Planning



MAXIMUM ENDURANCE FUEL FLOW AND FUEL REQUIRED



model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	**FLIGHT TEST**

MAXIMUM ENDURANCE SPEED

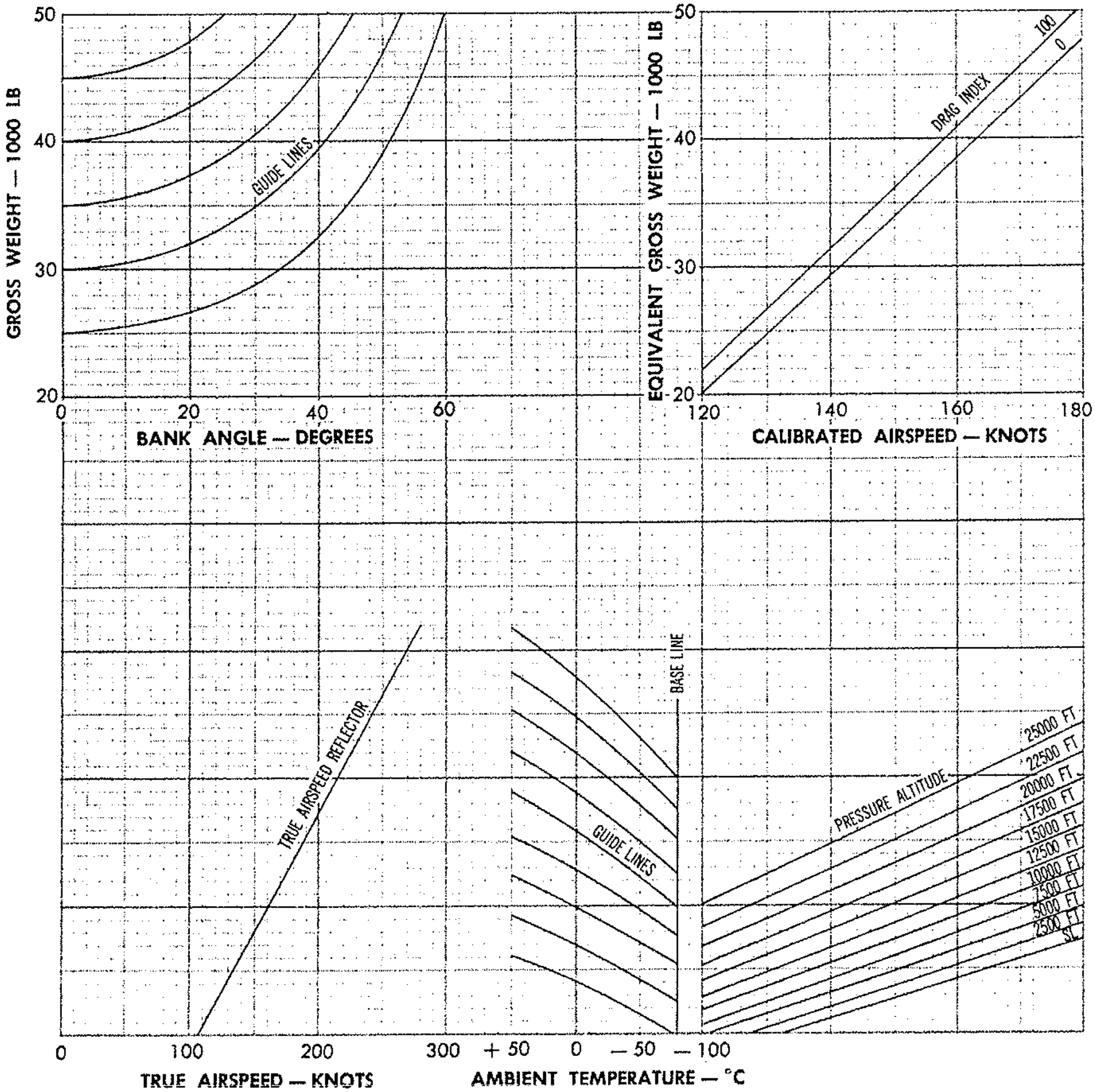


Figure A6—1

MAXIMUM ENDURANCE

FUEL FLOW AND FUEL REQUIRED

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

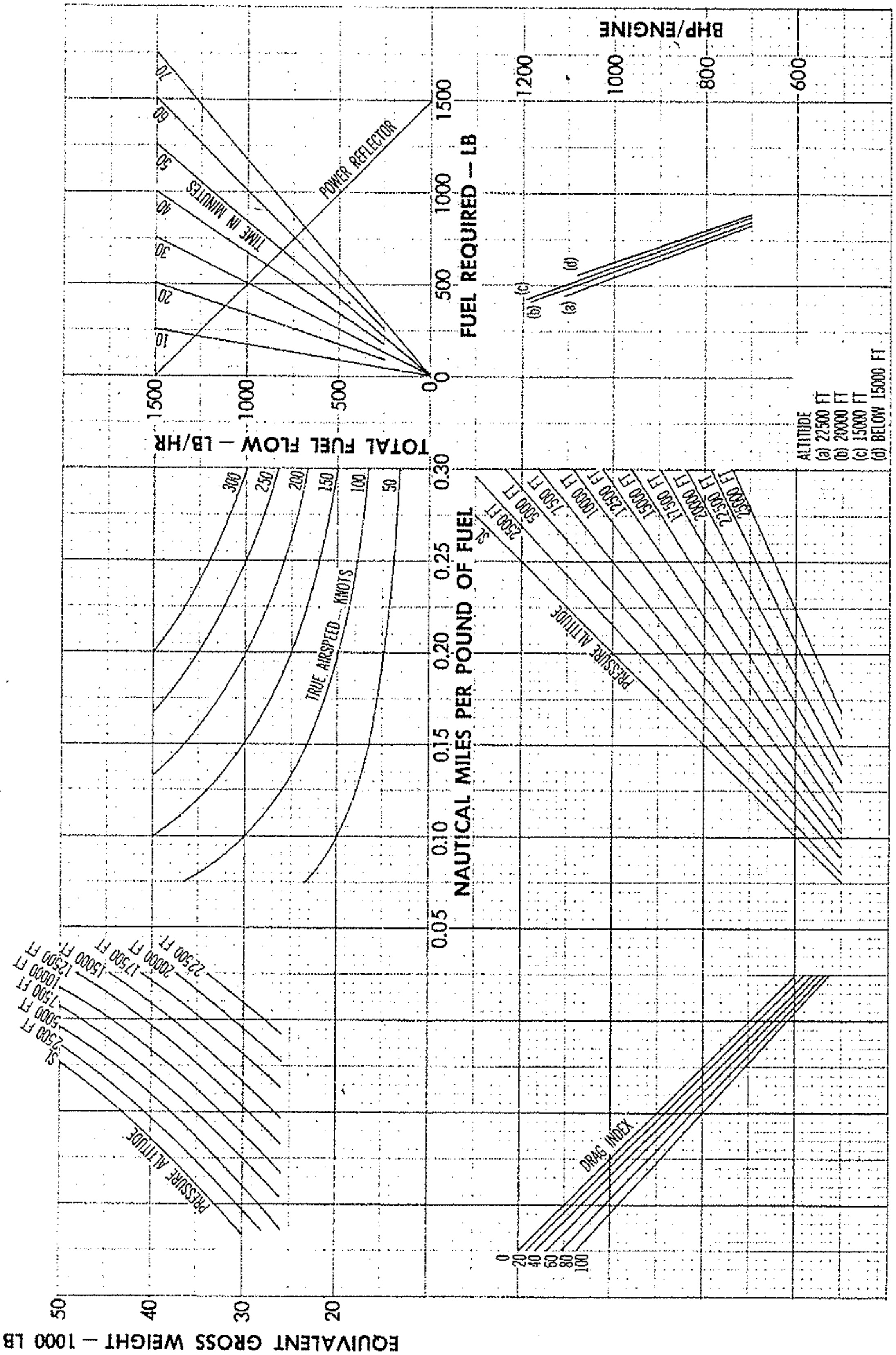


Figure A6—2

PART 7 LANDING

TABLE OF CONTENTS

LANDING DISTANCE.

DESCRIPTION.

Landing ground roll and air distance to clear a 50 foot obstacle are shown for the basic and externally loaded configurations. The distances are computed for two flap down conditions as well as flaps up, all with gear down. The following range of conditions are considered: Ambient temperatures from –20°C thru +50°C; pressure altitudes from sea level thru 16000 ft.; gross weights of 26000 lbs. thru 36000 lbs.; winds from 20 knot tailwind thru 40 knot headwind; runway slopes of zero thru 3 percent (uphill or down hill) and RCR (Runway Condition Reading) from 5 thru 24. Separate ground roll factors and charts are provided for the use of two engine reverse thrust with brakes and for brakes only.

The variation in landing distance caused by ambient temperature, pressure altitude and flaps configuration, is provided by means of landing factor charts, one each for ground roll with brakes only (Landing Factor I), ground roll with brakes and two engine reverse thrust (Landing Factor II) and air distance over a 50 foot obstacle (Landing Descent Factor). The landing distance charts are shown as functions of the appropriate landing factor, gross weight, wind, and runway slope and RCR for ground distances. The effect of external loading is included in the gross weight variation. Indicated airspeeds for approach obstacle clearance and touchdown are shown for all three flap configurations.

Use: The use of these charts is illustrated in the following example.

Conditions: Aircraft Landing Weight: 30000 lbs.

Maximum flap deflection (determined by external loading): 38°

Pressure Altitude: 2000 ft.

Ambient Temperature: 10°C

Prevailing Wind; 20 knot headwind (use 50 percent of adjusted headwind component See TAKEOFF and LANDING CROSSWIND CHART, pages A1-4 and A1-1

Runway Slope: 1% downhill

Reported RCR: 15

Note

If RCR is not available, use 23 for dry runways, 12 for wet runways and 5 for icy runways.

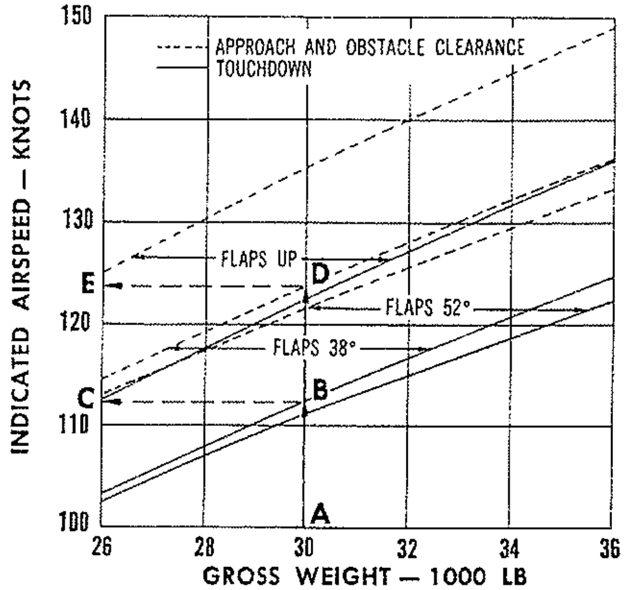
Find: Landing speeds, ground roll and total distance over a 50 foot obstacle, for landing with brakes plus two engine reverse thrust.

1. Landing Speeds.

Enter sample chart page A7-2 at Gross Weight = 30000 lbs., (A), move up to the touchdown line for 38° Flaps, (B) and to the left to the speed scale at (C), to read indicated airspeed at touchdown = 112 knots. Continue from (B) to the obstacle clearance line for 38° Flaps, (D) and to the left to the speed scale at (E), to read indicated airspeed at the 50 ft. obstacle height = 124 knots.

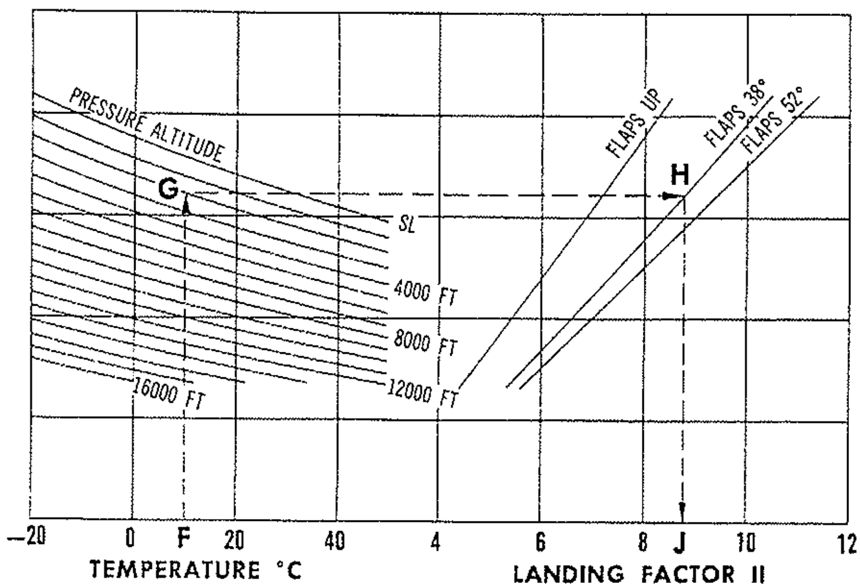
LANDING SPEEDS
LANDING FACTOR II, LANDING DESCENT FACTOR

LANDING SPEEDS

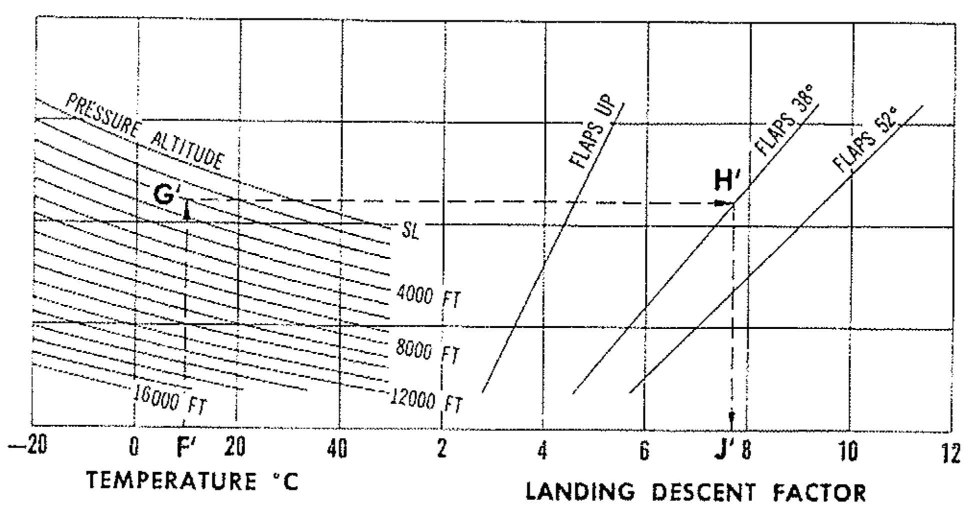


SAMPLE CHART
Not to be used for Flight Planning

LANDING FACTOR II

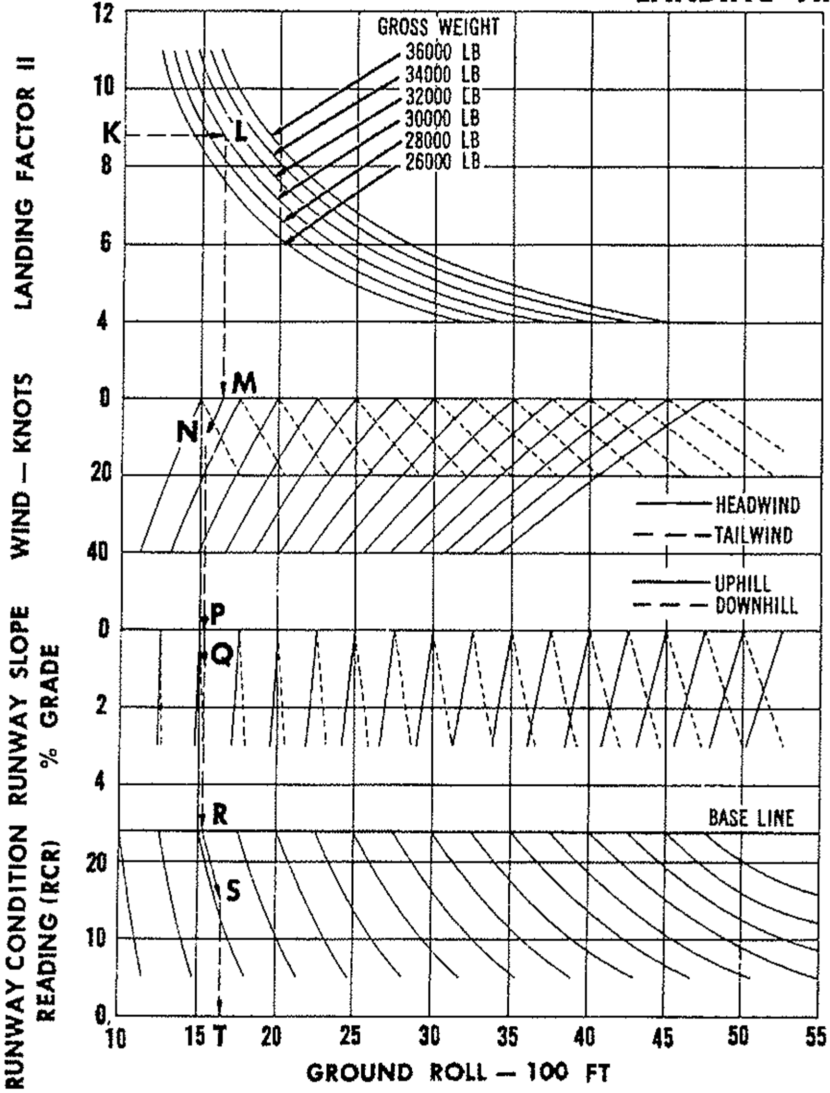


LANDING DESCENT FACTOR



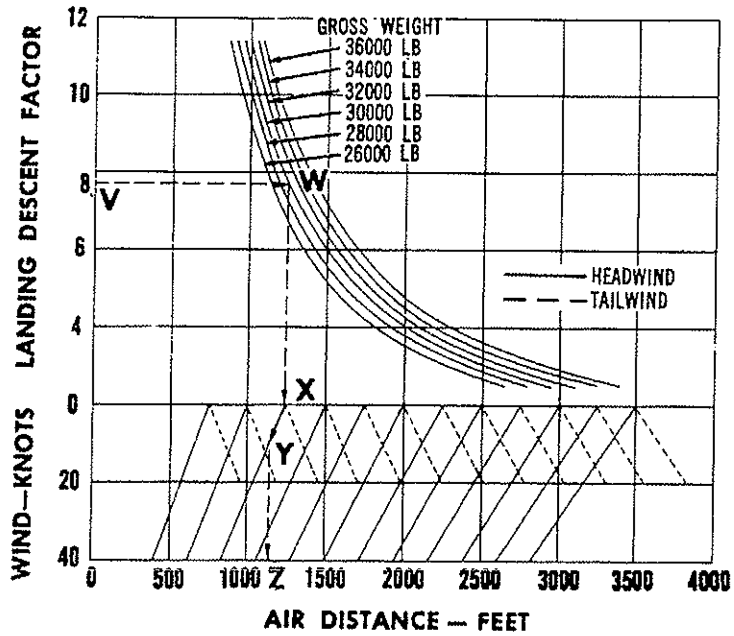
LANDING GROUND ROLL
LANDING AIR DISTANCE

LANDING GROUND ROLL



SAMPLE CHART
Not to be used for Flight Planning

LANDING AIR DISTANCE



2. Landing Factor II, Brakes plus two engine reverse thrust.

Enter sample chart page A7-2 at ambient temperature = 10°C, (F), move up to pressure altitude = 2000 ft., (G), to the right to the 38° flaps line, (H), and down to the scale at (J), to read Landing Factor II = 8.8.

3. Landing Descent Factor for Air Distance.

In the same manner follow sample chart page A7-2 from (F′) to (G′) to (H′) and read Landing Descent Factor = 7.7 at (J′).

4. Landing Ground Roll, Brakes plus reverse thrust.

Enter sample chart page A7-3 at Landing Factor II = 8.8, (K), move to the right to the 30000 lb. gross weight line, (L), and drop down to the zero wind horizontal at (M). Follow the solid (headwind) guide lines to intercept a 10 knot wind at (N) and drop down to the zero runway slope horizontal at (P). Follow the dashed (downhill) guide lines to intercept the 1% runway slope grade at (Q) and drop down to the RCR Base Line, (R). Follow the guide lines to RCR = 15, (S) and drop down to the scale at (T) to read landing ground roll, brakes plus reverse thrust = 1650 ft.

5. Landing Air Distance over a 50 ft. Obstacle Height.

Enter sample chart page A7-3 at Landing Descent Factor = 7.7, (V), move to the right to the 30000 lb. gross weight line. (W), and drop down to the zero wind horizontal at (X). Follow the solid (headwind) guide lines to intercept a 10 knot wind at (Y) and drop down to the scale at (Z) to read landing air distance = 1150 ft.

6. Landing Total Distance over a 50 ft. Obstacle Height.

Since total distance = ground roll plus air distance, the total distance required is: (1650 + 1150) = 2800 ft. for landing with brakes plus two engine reverse thrust.

Note

These ground roll charts are based on maximum braking. On a hard, dry runway (RCR = 23, 24), ground rolls with moderate or light braking can be approximated by reading ground roll for RCR = 17 or 10, respectively.

model:	B-26K
engines:	R2800—52W
propellers:	43E60-575-6895-20
fuel grade:	115/145
alt fuel grade:	100/130
fuel density:	6 LB/GAL
data date:	NOVEMBER 1965
data basis:	FLIGHT TEST

APPROACH AND LANDING SPEEDS

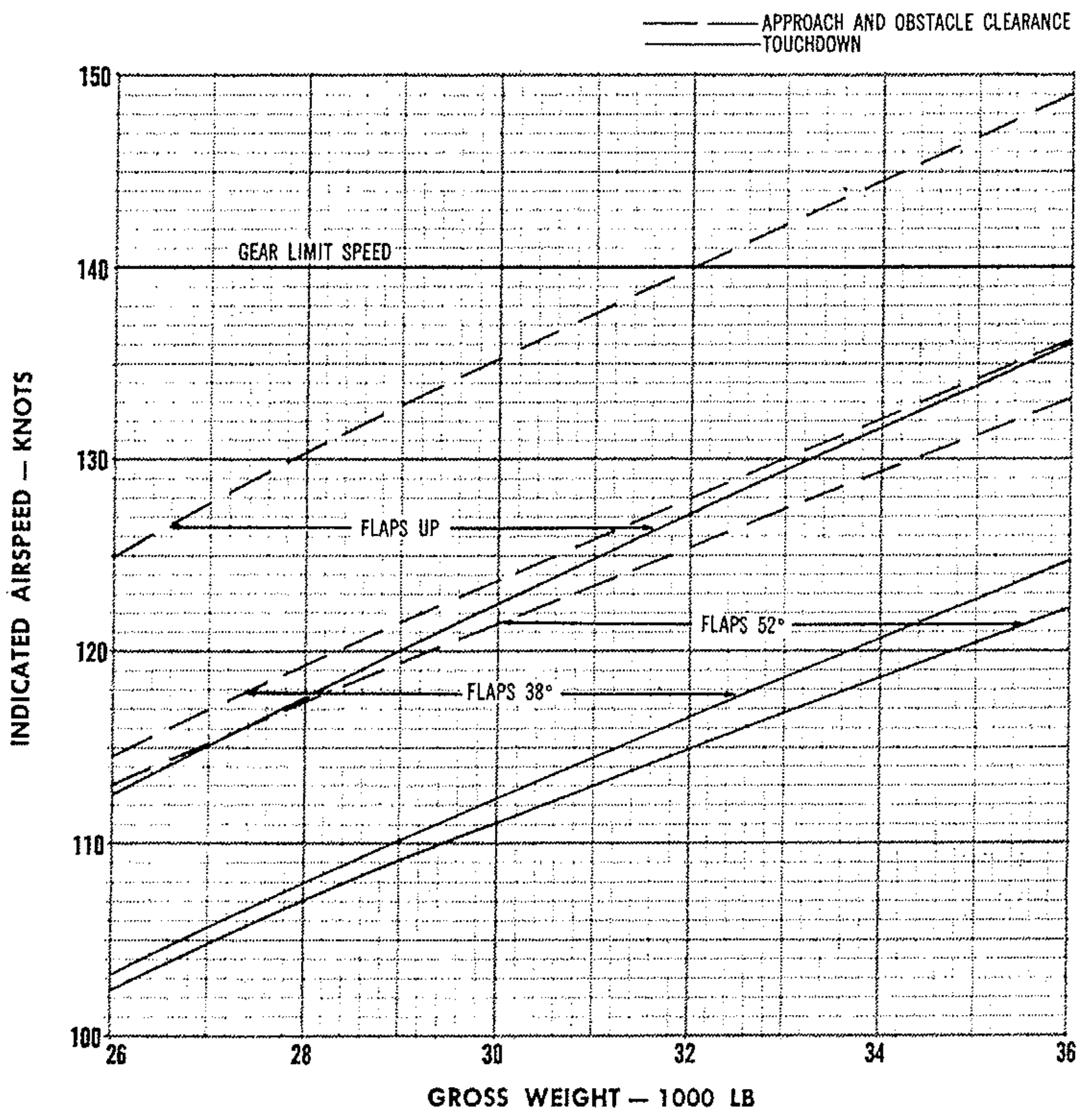


Figure A7-1

LANDING FACTOR I, LANDING FACTOR II, LANDING DESCENT FACTOR

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

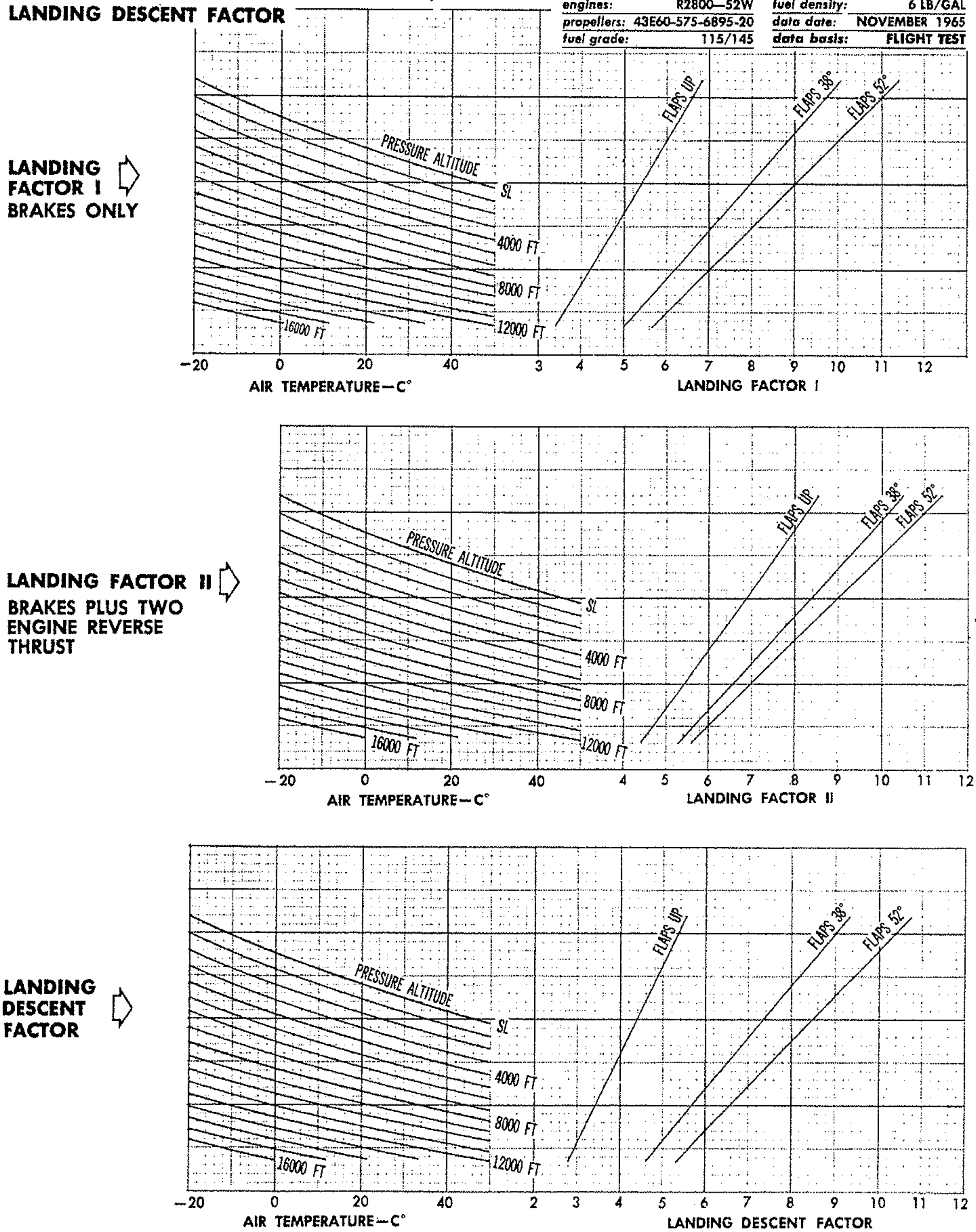


Figure A7—2

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

LANDING GROUND ROLL
BRAKES ONLY

MAXIMUM BRAKING

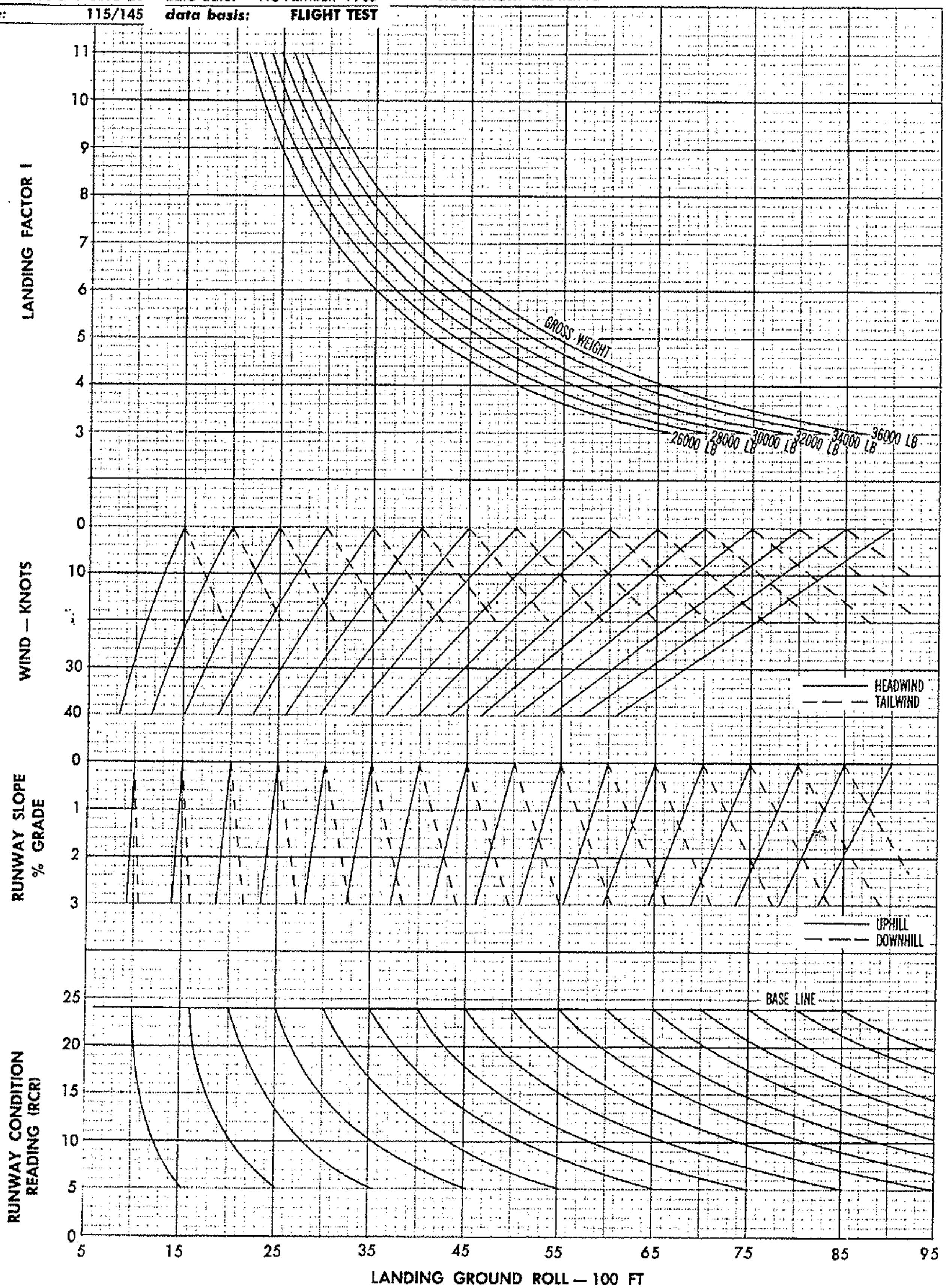


Figure A7—3

LANDING GROUND ROLL
BRAKES PLUS TWO ENGINE REVERSE THRUST

model:	B-26K	alt fuel grade:	100/130
engines:	R2800—52W	fuel density:	6 LB/GAL
propellers:	43E60-575-6895-20	data date:	NOVEMBER 1965
fuel grade:	115/145	data basis:	FLIGHT TEST

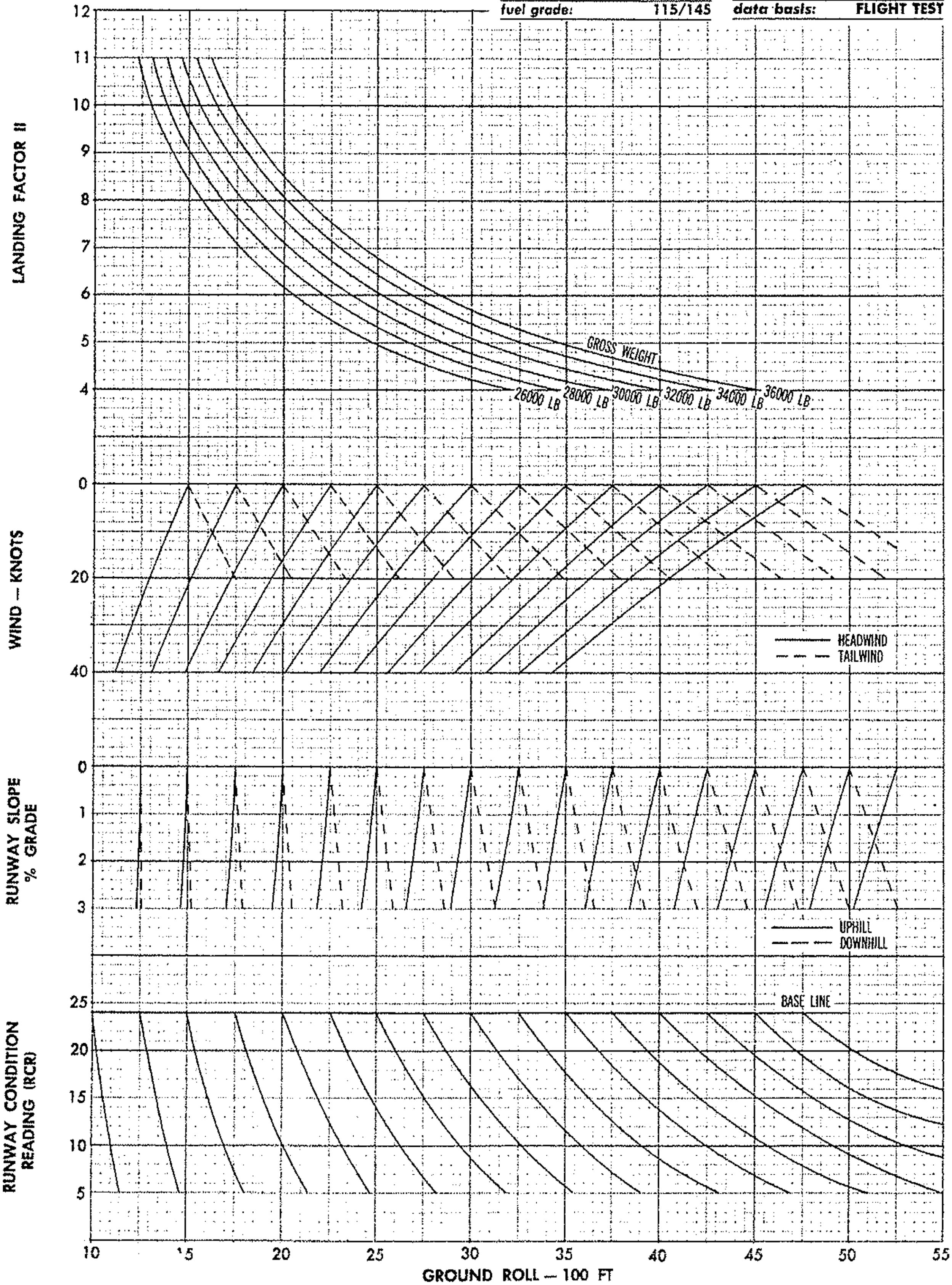


Figure A7—4

LANDING AIR DISTANCE

model:	B-26K	*alt fuel grade:*	100/130
engines:	R2800—52W	*fuel density:*	6 LB/GAL
propellers:	43E60-575-6895-20	*data date:*	NOVEMBER 1965
fuel grade:	115/145	*data basis:*	FLIGHT TEST

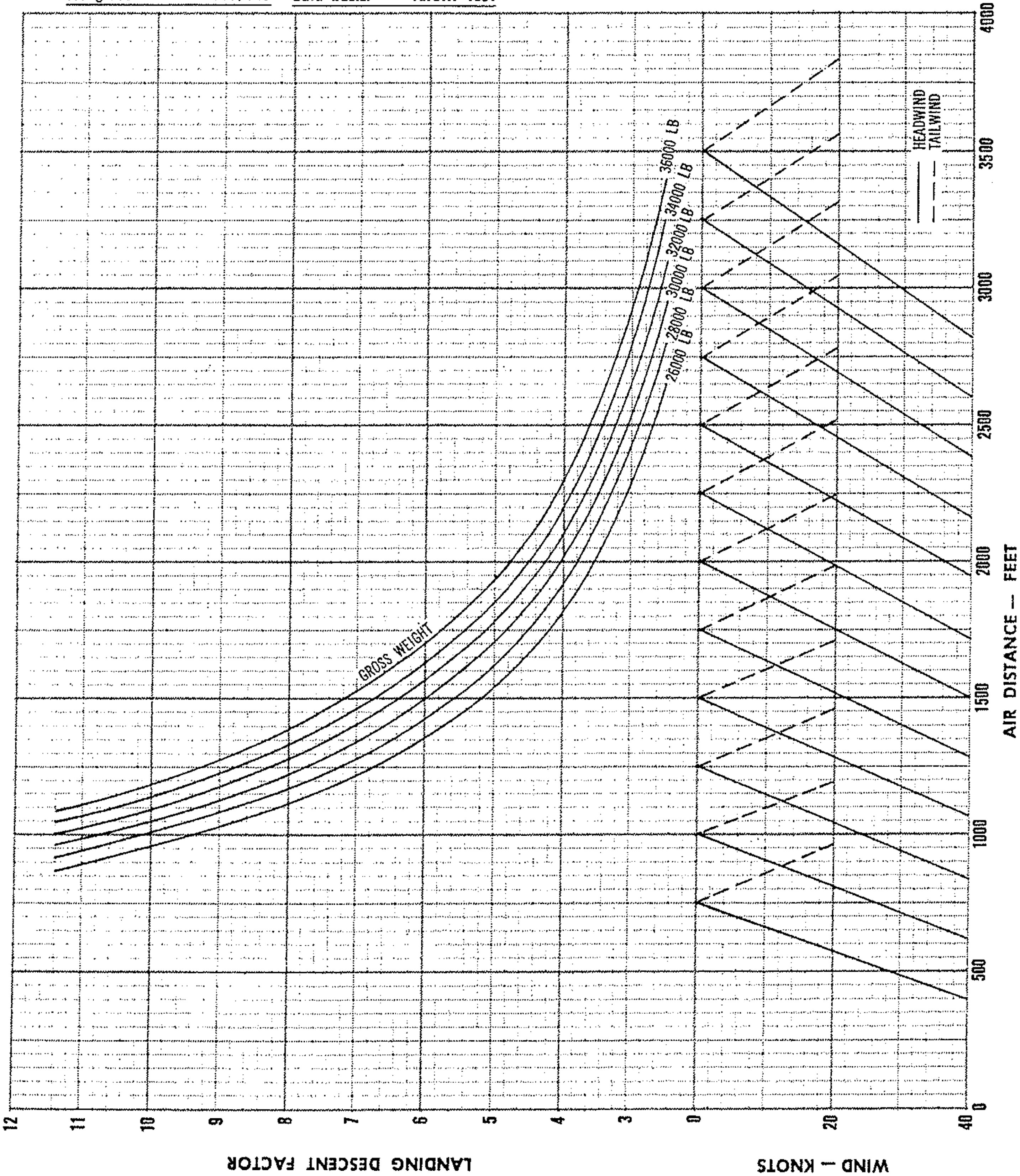


Figure A7—5

ALPHABETICAL INDEX

*DENOTES ILLUSTRATIONS OR TABLES

*DENOTES ILLUSTRATIONS OR TABLES

*DENOTES ILLUSTRATIONS OR TABLES

*DENOTES ILLUSTRATIONS OR TABLES

*DENOTES ILLUSTRATIONS OR TABLES