AEROSTAR

MODEL 601

FAA APPROVED

AIRPLANE FLIGHT MANUAL

REPORT: VB-1209

NOTE

This airplane must be operated in compliance with the OPERATING LIMITATIONS set forth herein.

Mfrs. Serial No. ______________________

Registration No. ______________________

Approved by ______________________
M. C. Beard, Chief
Aircraft Engineering Division

Date of Approval JUL 26, 1976

PIPER AIRCRAFT CORPORATION
VERO BEACH, FLORIDA

AIRPLANE FLIGHT MANUAL IDENTIFICATION

This Airplane Flight Manual has had the identification of Report: VB-1209 added to it by the revision dated 6/1/82. Any reference to this manual should include this report number.

AIRPLANE FLIGHT MANUAL APPLICABILITY

This Airplane Flight Manual applies to the Piper model PA-60-601 or 601 Aerostar having airframe (A/F) sequence numbers 0826 and up.

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SECTION 1

GENERAL SPECIFICATIONS

AIRCRAFT

The Aerostar Model 601 is an all metal, six place, fully retractable tricycle gear, mid-wing, turbo-charged twin engine monoplane of semi-monocoque construction.

ENGINES

Two turbocharger equipped Lycoming, six cylinder, IO-540-P1A5, IO-540-G1B5, or IO-540-S1A5, direct drive, horizontally opposed, air cooled, fuel injection engines, rated at 290 BHP @ 2575 rpm, with turbochargers installed in accordance with Supplemental Type Certificate No. SE6WE.

PROPELLERS

Two Hartzell, Model HC-C3YR-2/C8468-8R or HC-C3YR-2UF/FC8468-8R full-feathering, constant speed, 78 in. diameter propellers, controlled by a Hartzell full-feather type propeller governor.

DIMENSIONS

Wing Span	36.7 ft	Wing Area	178.0 sq ft
Length	34.8 ft	Baggage Space (Total)	30.0 cu ft
Height	12.1 ft		

WEIGHTS

Baggage Capacity	240 lbs	Fuel Capacity (165.5 gals usable)	993 lbs
Empty Weight	*	Oil Capacity (24 qts)	45.0 lbs
Empty Weight CG	*	Wing Loading	33.6 lb/sq ft
Ramp Weight	6025 lbs		
Gross Weight	6000 lbs	Power Loading	10.3 lb/hp
Useful Load	*		

*Refer to Section - 7 - Weight and Balance.

FUEL CAPACITY

(Minimum Grade 100/130 or 100LL Aviation Fuel)

Wing Total Capacity (65 Gal. Each)	130 Gals.	Aircraft Total Capacity	173.5 Gals.
Wing Total Usable (62 Gal. Each)	124 Gals.	Aircraft Total Usable	165.5 Gals.
Fuselage Total Capacity	43.5 Gals.		
Fuselage Total Usable	41.5 Gals.		

Refer to section 9, Fuel System

The full amount of usable fuel is based on the airplane sitting on a level ramp, laterally level, and longitudinally (approximately 1½° Nose up) with each wing tank fueled to 0.6 in. below filler neck. The wing tanks are extremely sensitive to attitude and if not level, they cannot be fueled to the full usable capacity.

OIL CAPACITY

(Each Engine) . . . . 12.0 qts

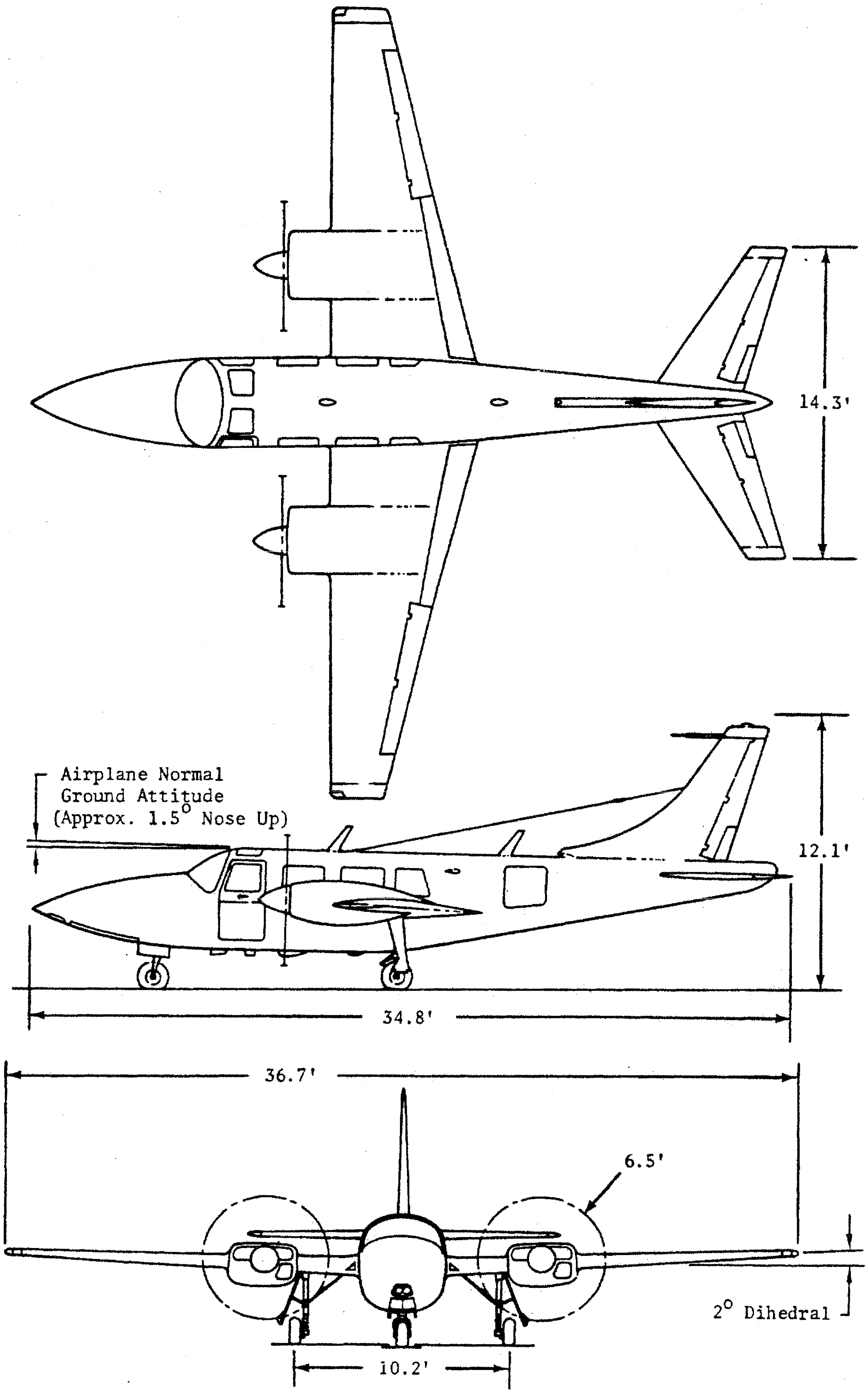

Figure 1-1. General Dimensions

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SECTION 2
OPERATING LIMITATIONS

AUTHORIZED OPERATION

The Aerostar Model 601 is a normal category airplane approved for day and night, VFR or IFR operations. Flight into known icing conditions is prohibited, and the anticollision lights must be turned off when entering clouds or fog. The approved types of operation were established during type certification and are valid only when the required equipment specified in Section 6 of this manual is installed and operating.

MANEUVERS

Acrobatic maneuvers, including spins, are unauthorized.

FLIGHT LOAD FACTOR

The positive Limit Load Factors are as follows:

Flaps Retracted 4.0 g's
Flaps Extended 2.0 g's

MAXIMUM ALTITUDE

Maximum altitude 30,000 feet.

AIRSPEED LIMITATIONS

			KTS CAS/IAS
1.	Vne	- Never Exceed Speed	243-241
2.	Vno	- Maximum Structural Cruising Speed	217-215
		Decrease Vne and Vno by 4 kts for each 1000 feet above 24,000 feet.	
3.	Va	- Maneuvering Speed	167-166
4.	Vf	- Maximum Speed for Lowering Full Flaps	149-148
5.	Vf20°	- Maximum Speed for Lowering 20° of Flaps	175-174
6.	Vle	- Maximum Speed for Gear Extended	157-156
7.	Vlo	- Maximum Speed for Gear Retraction	130-130
		- Maximum Speed for Gear Extension	157-156
8.	Vmc	- Minimum Single Engine Control Speed	80-84

POWER PLANT LIMITATIONS

Engines	2 Lycoming IO-540-S1A5 or IO-540-P1A5 to incorporate turbosuperchargers in accordance with STC-SE81WE.
Fuel	100/130 or 100LL Min. Grade Aviation Fuel
Takeoff and Maximum Continous Power	290 BHP @ 29.5 in. Hg. MAP and 2575 rpm
Maximum Normal Operating Power (Top of Tachometer Green Arc)	278 BHP @ 29.5 in. Hg. MAP and 2475 rpm

No leaning fuel mixture above 75% power permitted. Refer to Section 5 for RPM - Manifold Pressure Envelope for Continuous Operation.

Maximum Cylinder Head Temperature	260°C
Maximum Oil Temperature	118°C
Oil Pressure	
Normal	55-95 psi
Minimum (Idling)	25 psi
Maximum (Starting)	115 psi

Fuel Pressure	
Normal	18-40 psi
Idling	12-18 psi
Minimum (Idling)	12 psi
Maximum	40 psi
Propellers	2 Hartzell HC-C3YR-2/C8468-8R or HC-C3YR-2UF/FC8468-8R Full Feathering

WEIGHT AND CENTER OF GRAVITY LIMITATIONS

WEIGHT

Maximum Ramp Weight	6025 lbs
Maximum Takeoff Gross Weight	6000 lbs
All weight in excess of 5900 lbs must be fuel in the wings	
Maximum Landing Gross Weight	6000 lbs
Fuel (165.5 gals usable)	993 lbs
Oil (6 gals)	45 lbs
Baggage Compartment	240 lbs

CENTER OF GRAVITY

Forward	157.66	to 4600 lbs.*
	160.67	@ 6000 lbs. (MAX TAKEOFF)*
	160.72	@ 6025 lbs. (MAX RAMP)*
Aft	167.88	@ 3600 lbs.*
	167.88	@ 6000 lbs. (MAX TAKEOFF)*
	167.88	@ 6025 lbs. (MAX RAMP)*

* Straight line variation between points

LOADING SCHEDULE

See Section 7 of this manual, Weight and Balance.

INSTRUMENT DIAL MARKINGS

Note: Instrument Dial Markings are in IAS.

AIRSPEED INDICATOR

	Marking	KTS IAS	KTS CAS
Never Exceed Speed	Red Line	241	243
Caution Range	Yellow Arc	215-241	217-243
Normal Operating Range	Green Arc	86-215	79-217
Flap Operating Range	White Arc	77-148	71-149
One-Engine-Inoperative Best Rate-of-Climb Speed	Blue Line	109	109
Minimum Single Engine Control Speed	Red Line	84	80

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POWER PLANT INSTRUMENTS

	Red Line Minimum	Yellow Arc Caution	Green Arc Normal	Red Line Maximum
Manifold Pressure			12-29.5 in. Hg	29.5 in.Hg
Tachometer			2000-2475 rpm	2575 rpm
Oil Temperature			24-118°C	118°C
Oil Pressure	25 psi (Idling)		55-95 psi	115 psi
Cylinder Head Temperature	100°C		100-260°C	260°C
Hydraulic Pressure			900-1100 psi	1300 psi
Fuel Pressure	12 psi (Idling)	12-18 psi	18-40 psi	40 psi
Gyro Pressure			4.8-5.2 in-Hg	
Fuel Quantity Indicator (Fuselage Tank Gage)		0-12 gal.		

FUEL SYSTEM LIMITATIONS

1.. Do not add fuel to wing tanks unless fuselage tank is full.

NOTE

If all tanks are to be filled to capacity, fueling sequence is optional

2. Each operating engine fuel selector must be in the ON position for take-off, climb, descent, approach, and landing.
3. Takeoff prohibited with 12 gallons or less fuel in fuselage tank or LOW FUEL Warning Light illuminated or inoperative.
4. The Fuel Selector X-FEED (Crossfeed) position to be used in level coordinated flight only.
5. Double X-Feed (Crossfeed) prohibited except in emergency when LOW FUEL Warning Light is illuminated.
6. Fuel Boost Pump must be ON when fuel pressure indication is less than 18 psi and engine is operating above idle power.

PLACARDS

1. 156 KTS, MAX GEAR DOWN SPEED,130 KTS GEAR RETRACTION SPEED
2. 166 KTS DESIGN MANEUVERING SPEED
3. 15 KTS DEMONSTRATED CROSSWIND VELOCITY
4. SHUT OFF LEFT ENGINE BEFORE ENTERING OR LEAVING CABIN
5. COMPASS CALIBRATION CARD
6. THIS AIRPLANE APPROVED FOR DAY/NIGHT VFR/IFR NONICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH THE AIRPLANE FLIGHT MANUAL. NO ACROBATIC MANEUVERS, INCLUDING SPINS, APPROVED
7. THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS
8. DECREASE VNE AND VNO BY 4 KTS FOR EACH 1000 FT ABOVE 24,000 FT
9. NO SMOKING WHILE OXYGEN IS IN USE
10. AFTER EMER GEAR EXTEND CYCLE GEAR HANDLE TO BLEED HYD PRESS. CHECK HANDLE IN DOWN POSITION
11. X-FEED LEVEL FLIGHT ONLY
    TAKE OFF PROHIBITED WITH LOW FUEL LIGHT ON
    DOUBLE X-FEED LIMITED TO LEVEL FLIGHT EMERGENCY ONLY
12. READ FUEL QUANTITY IN LEVEL FLIGHT ONLY
13. 100/130 OR 100LL MINIMUM GRADE AVIATION FUEL.
    DO NOT ADD FUEL TO WING TANKS UNLESS FUSELAGE TANK IS FULL
    EACH WING TOTAL USABLE FUEL 62 U. S. GAL
    DO NOT INSERT NOZZLE OVER 3 INCHES
14. 100/130 OR 100LL MINIMUM GRADE AVIATION FUEL
    FUSELAGE TOTAL USABLE FUEL 41.5 U. S. GAL
15. TOTAL USABLE FUEL 165.5 U.S. GAL
    FUSELAGE USABLE FUEL 41.5 U.S. GAL
    EACH WING USABLE FUEL 62 U.S. GAL
16. BAGGAGE COMPARTMENT LOAD IN ACCORDANCE WITH AIRPLANE FLIGHT MANUAL MAXIMUM STRUCTURAL CAPACITY 240 POUNDS

SECTION 3

NORMAL OPERATING PROCEDURES

Although procedures and performance data are given in this manual for both maximum continuous power (2575/29.5 in. Hg. MAP) and maximum normal operating power (2475/29.5 in. Hg. MAP) the pilot should use the full maximum continuous power rating of the engine when safety considerations so dictate.

Normal procedures associated with those optional systems and equipment which require aircraft Flight Manual Supplements are presented in Section 11 (Supplements).

PREFLIGHT INSPECTION CHECKLIST (See Figure 3-1)

1. (a) Remove control lock.
   (b) Check emergency exit for security.
   (c) Ensure required documents are in order and in aircraft.
   (d) Check fuel quantity indicator. Ensure all pointers are below the zero mark. Turn Battery Switch ON and check fuel quantity (aircraft should be in level attitude for the indicator to read accurately).
   (e) Set trim tabs to neutral position.
   (f) Turn battery switch OFF and check magneto switches OFF.
   (g) Check brake pedal for excessive travel and set parking brakes.
   (h) Check hydraulic shutoff valve in OPEN position.
   (i) Check oxygen masks for condition and accessibility.
   (j) Check oxygen system for proper quantity and flow.
   NOTE: Reference Section 5 for oxygen duration capability.

2. (a) Check windshield for cleanness and condition.
   (b) Check entry door for condition.

3. (a) Check landing lights for condition.
   (b) Check fresh air inlet for obstructions.

4. (a) Check nose gear tire for inflation and condition.
   (b) Check strut for cleanness and 1-to 3-inch extension.
   (c) Check steering cylinder and lines for leakage and wear.

5. (a) Check main landing gear tire for condition and inflation.
   (b) Check strut for cleanness and 1-to 3-inch extension.
   (c) Check brake linings and disc for wear.
   (d) Check strut door and fuselage wheel well door for security.
   (e) Check general condition of main gear actuator and plumbing lines in wheel well area.

6. (a) Check oil level, and filler cap for security.

7. (a) Check propeller and spinner for nicks, cracks, and security.
   (b) Check engine cowling for security.

8. (a) Check condition of wing leading edge and wing tip light.
   (b) Check wing fuel level. See Wing Tank Fuel Loading Chart SECTION 5- USABLE FUEL.
   (c) Check filler cap "O" ring for condition.
   (d) Check filler cap receptacle for condition.
   (e) Check that filler cap locking tab provides positive lock ensuring security.

PREFLIGHT INSPECTION CHECKLIST (Contd)

CAUTION

1. Wing filler caps that do not form a proper seal will cause uneven or reduced fuel feeding and or siphoning from tanks and prematurely deplete the fuselage tank.

2. When opening a wing filler cap in a warm environment use caution as the fuel may be under pressure.

9. (a) Check freedom of movement of aileron and security of hinge bolts.

10. (a) Check flap tracks for wear and cleanness.
    (b) Check security of actuator attachment and flap track rollers.

11. (a) Check fuselage fuel tank vent for obstruction.

12. (a) Check pitot-static boom ports for obstructions.

13. (a) Check general condition of empennage surfaces.
    (b) Check elevator, rudder, and trim tab hinges for condition and security.
    (c) Check hinge bolts and actuator rods for condition and security.
    (d) Check battery for security and general condition.

14. (a) Check baggage compartment for condition and security.
    (b) Stow control lock.
    (c) Check towbar on board and properly stowed.
    (d) Check ELT in ARM position.
    (e) Check hydraulic fluid level in reservoir located behind aft baggage compartment curtain.
    (f) Check baggage compartment door is closed and locked.

15. (a) Check fuselage tank for fuel and filler cap for security.
    (b) Check fuel vents for obstruction (fuselage top and bottom).
    (c) Drain sumps and check for water.
    (d) Check for presence of oxygen system overpressure discharge indicating disc.

NOTE

If night flight is planned, check operation of all lights, and make sure a flashlight with fresh batteries is available.

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PREFLIGHT INSPECTION CHECKLIST (Contd)

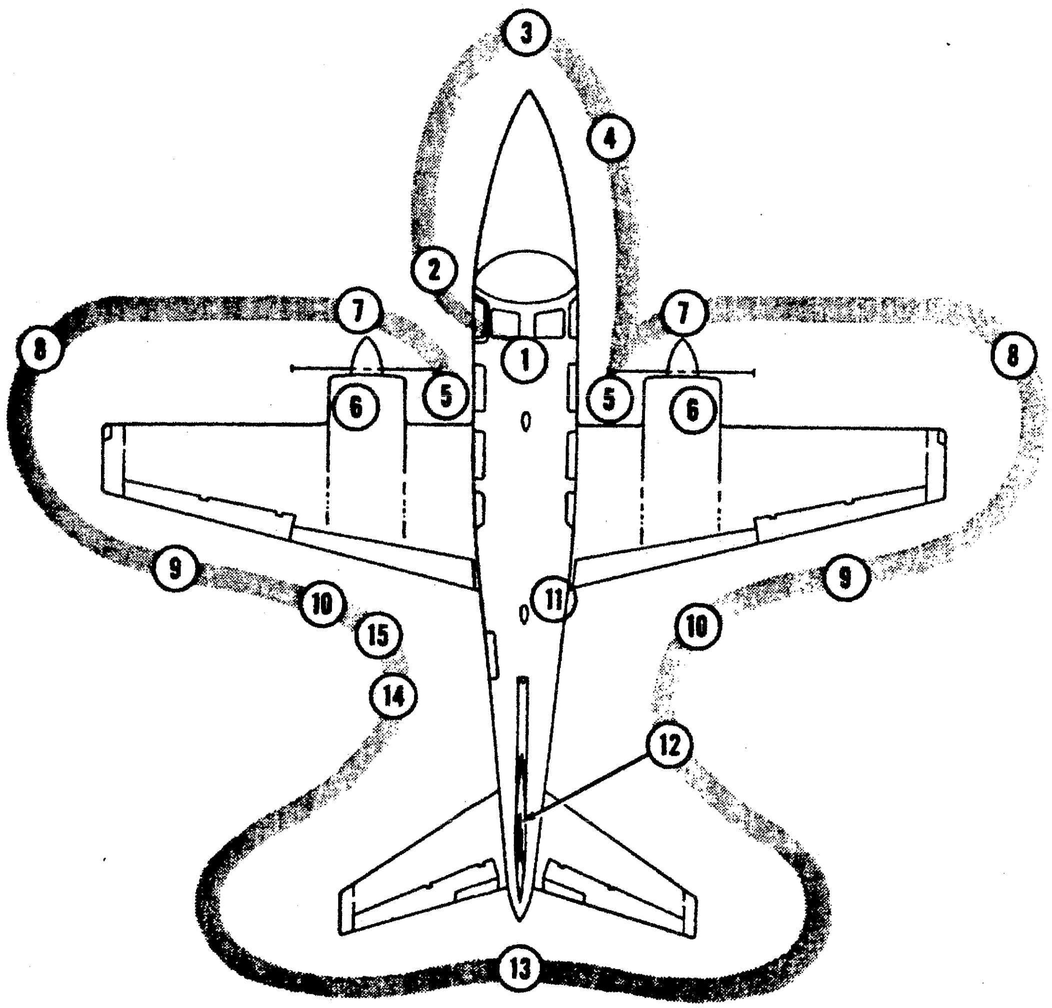


Figure 3-1. Preflight Inspection

BEFORE STARTING ENGINES

1. Preflight Inspection - COMPLETED.
2. Seats - LOCKED.
3. Cabin Door - CLOSED and LOCKED - Pin Indicators - CHECK ON GREEN MARK.
4. Landing Gear Handle - DOWN.
5. Flap Handle - UP.
6. Brakes - TEST for firm pedal.
7. Flight Controls - FREE-PROPER MOVEMENT.
8. Parking Brake - SET.
9. Switches - ALL OFF.
10. Battery Switch - ON (If external power is used, turn battery switch OFF after external power is connected.)

CAUTION

The battery switch must be ON prior to disconnecting the external power unit.

11. Landing Gear Down Lock Lights - CHECK 3 GREEN ON (check iris open).
12. Landing Gear Up Lock Light - Push to Test (check iris open).
13. Elevator Trim Tab - NEUTRAL.

NOTE

Check for normal gage indication during nose up and nose down trim actuation. If gage indication is not normal switch is inoperative and flight should be discontinued.

14. Rudder Trim Tab - NEUTRAL.
15. Hydraulic Shutoff Valve - OPEN.
16. Fuel Quantity Indicator - CHECKED.
17. Low Fuel Warning Light - OUT.
18. All Warning Lights - PUSH TO TEST.
19. Circuit Breaker Panel - BREAKERS IN.
20. Altimeter - SET.
21. Clock - SET.

STARTING ENGINES

It is recommended the right engine be started first since the hydraulic pump is installed on that engine.

NOTE

When using external power for starting, it is desirable to start both engines, turn battery switch and both alternator switches ON before disconnecting power unit. Run engines at or below 1200 RPM for five minutes to prevent batteries from charging at an excessive rate.

1. Prop Control - FULL FORWARD (high rpm).
2. Mixture Control - IDLE CUTOFF.
3. Throttle - CRACKED ½" OPEN.
4. Battery Switch - CHECK ON (unless on external power).

STARTING ENGINES (cont)

5. Low Fuel Warning Light - OUT.
6. Left Fuel Selector - ON, X-FEED, ON (listen for valve actuation; verify Warning Light illuminates with X-FEED selected.)
7. Right Fuel Selector - ON, X-FEED, ON (listen for valve actuation; verify Warning Light illuminates with X-FEED selected.)
8. Right Propeller - CLEAR.
9. Right Fuel Boost Pump - ON (increase pressure).
10. Right Mixture Control - FULL RICH: check for fuel flow indication, and return to idle cutoff.
11. Right Starter Switch - ENGAGE.
12. Mixture Control - FULL RICH AS ENGINE FIRES.
13. Throttle - SET FOR 1000 RPM.
14. Oil Pressure - CHECK for 25 psi minimum in 30 sec. If no oil pressure indicated, shut engine down and determine cause.
15. Right Boost Pump - OFF.
16. Gyro Pressure - CHECK right warning button out of view.
17. Right Alternator Switch - ON (unless on external power).
18. Hydraulic Pressure - CHECK 900-1100 psi.
19. Repeat steps 1 - 3 and 8 - 17 for left engine.
20. Battery Switch - ON (before external power disconnected).
21. Alternator Switches - BOTH ON - Warning Lights out (if installed).
22. External Power - DISCONNECT (if connected).
23. Position Lights - ON (as required).
24. Radios - ON (as required).

WARM UP AND GROUND TEST

NOTE

For high density altitude ground operations it may be necessary to lean the mixtures manually. If required, the following procedure is recommended:

Low rpm (below 1500) - Lean as required for smooth engine operation.

1500 rpm Propeller Check - Lean to approximately 1150° EGT.

2100 rpm Magneto Check - Lean to approximately 1300° EGT.

Advance mixtures to FULL RICH position prior to takeoff and, or any high power static runups.

1. Warm up at 1000 - 1400 rpm (avoid prolonged idling).
2. Check engine temperatures in the green.
3. During ground taxi make independent check of upper and lower half of nose gear steering switch for steering response.

NOTE

If steering response is noted from either half independently, switch is inoperative and flight should be discontinued.

4. Head aircraft into the wind.
5. Prop Control - FULL FORWARD (high rpm).
6. Mixture - FULL RICH.
7. Throttle - Set for 1500 rpm.
8. Engine Instruments - Check operation and indication.

WARM-UP AND GROUND TEST (Contd)

9. Alternator - CHECK VOLTAGE 28±2 volts by depressing button on voltammeter indicator.

NOTE

If alternator does not come in, advance throttle to 2000 rpm and reduce load until it comes on the line. (After initial excitation, alternators will remain on the line, regardless of rpm or load.)

The aircraft is equipped with a common bus. Therefore, to individually check each alternator's voltage output, it is necessary that the left alternator switch be OFF to check the right alternator, and conversely, the right alternator switch be OFF to check the left alternator.

To determine actual alternator load,total the left and right amp readings. Do not read main position for actual alternator load.

10. Propeller Control - MOVE to full feather until rpm drops to 1000, then move to full forward position. Repeat 3 or 4 times on cold engines.
11. Throttle - SET for 2100 rpm.
12. Magnetos - CHECK for 175 rpm maximum drop, and 50 rpm maximum magneto differential.
13. Gyro Pressure - CHECK 4.8-5.2 in-Hg-both warning buttons out of view.
14. Throttle - Retard to 1000-1400 rpm.
15. Repeat items 5 through 14 for other engine.

BEFORE TAKEOFF

1. Cabin Door - CLOSED and LOCKED. Pin Indicators - CHECK ON GREEN MARK.
2. Controls - FREE.
3. Mixture Controls - FULL FORWARD (full rich).

NOTE

When conducting a high density altitude takeoff, it may be necessary to lean the mixtures manually at rpm below 1500. With the mixtures leaned as required, advance power to a minimum of 1500 rpm, then advance mixtures to a FULL RICH position.

4. Fuel Selectors - CHECK in ON position.
X-Feed Warning Light OUT, LOW FUEL Warning Light OUT.

WARNING

TAKEOFF PROHIBITED WITH 12 GALLONS OR LESS FUEL IN FUSELAGE TANK OR LOW FUEL WARNING LIGHT ILLUMINATED OR INOPERATIVE.

5. Prop Controls - FULL FORWARD (high rpm).
6. Boost Pumps - ON (check increase in fuel pressure).
7. Instruments - CHECK - SET
8. Radios - SET AS DESIRED.
9. Flaps - SET FOR TAKEOFF (0° to 20° as desired).
10. Trim Tabs - SET.
11. Pitot Heat - ON (as desired)
12. Seats - LOCKED.
13. Seat Belts and Shoulder Harnesses - FASTENED.
14. Parking Brake - RELEASE (depress pedals and ensure handle is in full forward position).
15. Advance throttles to 29.5 inches MAP and 2575 RPM for take-off.

NOTE

Above 27 inches MAP a rapid rise in MAP can be expected when the Automatic Waste Gate Control engages the Turbochargers. Advance throttles slowly. DO NOT EXCEED 29.5 INCHES MAP.

AFTER TAKEOFF

1. Wheels - BRAKE.
2. Gear - UP.
3. Flaps - UP.
4. Strobe lights - ON (as required)
5. Power - MAP as desired NOT TO EXCEED 29.5 INCHES, RPM 2575.
6. Climb - MAXIMUM RATE, 0° flaps, 117 kts. CAS., MAXIMUM ANGLE 0° flaps, 100 kts. CAS.

When safely clear of obstacles and terrain and safety considerations will allow -

7. Power - REDUCE to 2475 RPM (Maximum Normal Operating Power).

NOTE

No leaning fuel mixture above 75% power permitted.

8. Trim for climb speed of 117-148 kts. CAS as desired.
9. Boost pumps - AS REQUIRED, ON during climb above 10,000 feet.

NOTE

It is recommended that Boost Pumps be left ON for climb to ensure uninterrupted engine operation in the event of engine driven fuel pump failure.

CAUTION

Turn Boost Pumps ON at first indication of fluctuating or low (18 psi) fuel pressure/fuel flow, or during climb above 10,000 feet.

CRUISE

NOTE

Refer to Section 9 Fuel System Description. Reference appropriate charts in section 8 for Cruise Power settings, fuel flow and range information.

1. Power - SET as desired. (Refer to Section 5 for RPM-Manifold Pressure Envelope for Continuous Operation.)
2. Boost Pumps - As Required.

NOTE

It is recommended that Boost Pumps be turned OFF for cruise unless the engine driven pump(s) fail to maintain stable fuel pressure(s) at or above 18 psi.

CAUTION

Turn Boost Pumps ON at first indication of fluctuating or low (18 psi) fuel pressure/fuel flow.

3. Mixtures - SET for proper fuel/air ratio below 75% MCP.

CRUISE (Contd)

NOTE

Mixture(s) should be reset whenever Boost Pump(s) are turned ON or OFF. Enrichen mixture(s) and relean for proper fuel flow.

4. Fuel Quantity Indicator - Monitor frequently (especially if utilizing X-FEED or Autopilot).

CAUTION

The fuselage tank usable fuel is the only fuel available throughout the complete aircraft maneuvering envelope and, consequently, sufficient fuel must be available in the fuselage tank for take off, climb, maneuvering descent and landing phases of flight.

NOTE

1. The Fuel Quantity Indicator consists of 3 gages each displaying their respective tank quantities continuously. Fuel gaging system malfunction is indicated by the pointer pegging either below the zero mark or above the full scale (in the event of power loss or electronic failure). Wing tank fuel quantities above 50 gallons are ungageable.

2. When reading Fuel Quantity the aircraft should be in a level coordinated attitude for the gages to read accurately. The wing fuel tank quantity readings are especially sensitive to aircraft attitude. In uncoordinated flight the wing tank gages will display less than actual fuel in the low wing and more than actual in the high wing.

3. The cabin heater obtains its total fuel supply from the fuselage fuel tank. When operating, the heater fuel consumption is approximately 0.6 gph.

5. Low Fuel Warning Light - MONITOR for illumination.

CAUTION

The Low Fuel Warning Light first illuminates continuously when 12 gallons of fuel remain in the fuselage fuel tank. The light will remain on as fuel is further depleted and until the fuselage fuel tank is again serviced above 12 gallons. In turbulence or during climbs and descents intermittent illumination may occur when the fuselage fuel tank has slightly more than 12 gallons of fuel remaining. The fuel system is designed so that during normal operation the wing fuel tanks should be empty when the fuselage fuel tank quantity is 12 gallons. Should the fuselage fuel quantity gage display a quantity greater than 12 gallons when the Low Fuel Warning Light continuously illuminates, the Pilot should consider the remaining usable fuel quantity to be 12 gallons or less and land as soon as feasible.

CRUISE (Contd)

NOTE

See Emergency Operating Procedures, Section 4 if an immediate landing is not feasible.

6. Lateral Trim: The Crossfeed System may be utilized to laterally balance the wing fuel due to uneven fueling or to offset asymmetrical engine fuel consumption.

CAUTION

1. Fuel System Limitations outlined in Section 2 must be adhered to for Crossfeed operation.
2. When either X-FEED (Crossfeed) Selector is in the X-FEED position the selected engine is obtaining its total fuel supply from the opposite wing fuel tank. Frequently monitor selected wing fuel tank quantity.

To achieve lateral trim proceed as follows: (For engine on lighter wing side)

a. Fuel Selector - X-FEED.

After achieving lateral trim, proceed as follows:

b. Fuel Selector - Return to ON position.

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - FASTENED.
2. Boost Pumps - ON.
3. Mixture - FULL RICH.
4. Fuel Selectors - ON.
5. Landing Gear Horn - CHECK before lowering gear.
6. Landing Gear - DOWN below 157 kts CAS. X-FEED Warning Light OUT.
7. Landing Gear Down Lock Lights - CHECK 3 GREEN ON (check iris open): Visually check main landing gear down.
8. Brakes - CHECK.
9. Hydraulic Pressure - CHECK 900-1100 psi.
10. Flaps - 20° below 175 kts CAS - FULL DOWN below 149 kts CAS.
11. Power - MAP as required, RPM - 2400-2575 as desired.

FINAL APPROACH

1. Reduce power to obtain desired approach rate.
   Full Flaps - 100 kts CAS.
   Zero Flaps - 113 kts CAS.
2. Obstacle Clearance - recommend use power approach with full flaps. Adjust power to control rate of descent.
3. For maximum braking, hold elevator full back, and retract flaps. On rough fields, remember excessive braking may put major stress on nose gear.

AFTER LANDING

1. Prop Controls - FULL FORWARD.
2. Flaps - UP.
3. Boost Pumps - OFF.
4. Trim Tabs - NEUTRAL.
5. Cabin Heater - OFF.
6. Unnecessary Avionics Equipment - OFF.
7. Pitot Heat - OFF.
8. Strobe Lights - OFF.

STOPPING ENGINES

1. Parking Brake - SET.
2. With engines at idle, check magnetos for grounding by momentarily switching to OFF, then back to BOTH.
3. Idle engines until there is a marked decrease in cylinder head temperature.
4. All Radios and Lights - OFF.
5. Mixture Controls - IDLE CUTOFF.
6. When engines stop, left and right magneto switches OFF.
7. Fuel Selector Valve Switches - OFF.
8. Alternator Switches - OFF.
9. Battery Switch - OFF.
10. Install Control Locks.

NOTE

If airplane is going to be parked for and extended period in the sun, or if fueled outside on a cold day and brought into a warm hangar, it is recommended that wing tanks only be fueled to within approximately 1.0" from the bottom edge of the filler neck and the airplane be parked in a wings level attitude.

SECTION 4

EMERGENCY OPERATING PROCEDURES

ENGINE FAILURE DURING TAKEOFF

LOSS OF ENGINE BEFORE LIFTOFF

Close throttles and stop aircraft.

LOSS OF ENGINE AFTER LIFTOFF

If sufficient landing area still ahead, pull throttles back and effect an immediate landing. Without sufficient area ahead, proceed as follows:

1. Prop Controls - FULL FORWARD (high rpm).
2. Throttles - Advance to 29.5 inches MAP.
3. Landing Gear - UP.
4. Flaps - UP.
5. Determine Inoperative Engine.
   NOTE: (Airplanes equipped with single hydraulic pump driven by right engine). If right engine has failed, landing gear will retract only if right engine is allowed to windmill approximately 8 seconds after placing landing gear handle in the up position.
6. Inoperative Engine - FEATHER by pulling inoperative engine prop control full aft to the FEATHER position with a rapid motion.
7. For obstacle clearance, establish best angle of climb speed, 100 kts, CAS.
8. After obstacle clearance, establish best rate of climb speed, 109 kts, CAS.
9. Operative Engine Boost Pump - ON.
10. Trim Aircraft.
11. Inoperative Engine:
    (a) Mixture - IDLE CUTOFF.
    (b) Boost Pump - OFF.
    (c) Fuel Selector Valve - OFF.
    (d) Magneto Switch - OFF.
    (e) Alternator Switch - OFF.
12. Land as soon as possible.

ENGINE FAILURE BELOW SE MINIMUM CONTROL SPEED (Vmc)

Normal procedures do not require operation below the single engine minimum control speed, however, should this condition inadvertently arise and engine failure occur, power on the operating engine should immediately be reduced and the nose lowered to attain a speed above 84 kts IAS, the single engine minimum control speed. Continue with the procedure given for Engine Failure During Flight.

ENGINE FAILURE DURING FLIGHT

1. Mixture Controls - FULL RICH.
2. Prop Controls - FULL FORWARD.
3. Throttles - ADVANCE to 29.5 inches MAP.
4. Boost Pumps - ON.
5. Fuel Selectors - CHECK in ON position.
   If failed engine does not restart, proceed as follows:
6. Inoperative Engine - DETERMINE.

ENGINE FAILURE DURING FLIGHT (Contd)

NOTE

Aircraft will tend to yaw into inoperative engine. Also check for cooler engine temperatures which should be on inoperative engine. Never feather either engine until you have positively identified the inoperative one.

7. Inoperative Engine - FEATHER by pulling inoperative engine prop control full aft to the FEATHER position with a rapid motion.
8. Inoperative Engine:
   a. Mixture Control - IDLE CUTOFF.
   b. Boost Pump - OFF.
   c. Fuel Selector - OFF.
   d. Magneto Switch - OFF.
   e. Alternator - OFF.
9. Electrical Load - REDUCE as required.
10. Aircraft Attitude - TRIM for single engine flight.
11. Inoperative Engine - INVESTIGATE, if cause of engine failure can be determined and corrected, proceed with restart using procedure given for Restarting Feathered Engine in Flight. If cause for engine failure cannot be determined proceed as follows:
12. Aircraft - LAND as soon as possible. With the operating engine's fuel selector in the ON position the only fuel available to the engine is the fuselage fuel tank and the operating engine's wing fuel tank. If it should be required to obtain fuel from the inoperative engine's wing fuel tank the crossfeed system may be utilized only in level coordinated flight. To utilize the Crossfeed system, proceed as follows:
13. Operative Engine:

CAUTION

1. Fuel System Limitations outlined in Section 2 must be adhered to for Crossfeed operation.
2. When either X-FEED (Crossfeed) Selector is in the X-FEED position the selected engine is obtaining its total fuel supply from the opposite wing fuel tank. Frequently monitor selected wing fuel tank quantity. Maintain level coordinated flight.

   a. Boost Pump - CHECK ON.
   b. Fuel Selector - X-FEED. After utilizing required fuel from inoperative engine's wing fuel tank and prior to initiating descent, proceed as follows:
   c. Fuel Selector - ON.

RESTARTING FEATHERED ENGINE IN FLIGHT

1. Fuel Selector Valve - ON.
2. Boost Pump - ON.
3. Mixture Control - IDLE CUTOFF.
4. Throttle - CRACKED 1/2" OPEN.
5. Magneto Switch - BOTH.
6. Prop Control - FULL FORWARD (high rpm).
7. Engage Starter Switch.
8. As engine rotates, move mixture control to FULL RICH.
9. After engine starts, turn boost pump OFF.
10. Warm up engine at 2000 rpm/15 in. MAP.
11. Oil Pressure - CHECK 25 psi minimum in 30 seconds or shut down.
12. Alternator Switch - ON.

RESTARTING FEATHERED ENGINE IN FLIGHT (Contd)

13. When temperatures are in normal range, increase power as desired.
14. Retrim Aircraft.

LANDING AND GO-AROUND WITH ONE ENGINE INOPERATIVE

With the right engine inoperative, a loss of the hydraulic pressure source occurs and a no-flap landing is recommended.

NOTE

FOR LANDING GEAR EXTENSION PROCEDURES, SEE HYDRAULIC PUMP FAILURE.

LANDING

1. Follow normal landing checklist; except proceed as follows:
2. Approach field with excess altitude and speed of 113 kts CAS.
3. Extend landing gear within gliding distance of the field. X-FEED Warning Light OUT.
4. Do not use flaps until landing is assured.

GO-AROUND

WARNING

FOR AIRCRAFT NOT EQUIPPED WITH AUXILIARY HYDRAULIC PUMP, WITH THE RIGHT ENGINE FEATHERED, A LOSS OF HYDRAULIC PRESSURE SOURCE OCCURS AND THE LANDING GEAR CANNOT BE RETRACTED. A GO-AROUND SHOULD NOT BE ATTEMPTED IF THE LANDING GEAR HAS BEEN EXTENDED.

1. Mixture (operating engine) - FULL RICH.
2. Prop (operating engine) - FULL FORWARD.
3. Throttle (operating engine) - ADVANCE TO 29.5 IN. MAP.
4. Landing Gear - UP.
5. Flaps - UP.
6. Airspeed - ESTABLISH CLIMB SPEED.

ENGINE FIRE IN FLIGHT

1. Mixture Control - IDLE CUTOFF.
2. Fuel Selector Valve - OFF.
3. Boost Pump - OFF.
4. Hydraulic Shutoff Valve - CLOSED (for <u>right</u> engine fire only).
5. Propeller - FEATHER.
6. Magneto Switch - OFF.
7. Alternator Switch - OFF.
8. Land as soon as possible.

FUEL PUMP FAILURE IN FLIGHT

1. Boost Pump - ON (If fuel pressure is lost before boost pump is turned on, the engine will stop running.)
2. If engine stops running, follow normal air restart procedure, except leave boost pump ON.
3. Mixture control may have to be reset when operating on boost pump.

NOTE

If both engine-driven fuel pump and boost pump fail, engine will be inoperative. Perform an in-flight engine shutdown, and land as soon as possible.

HYDRAULIC FAILURE IN FLIGHT

HYDRAULIC PUMP FAILURE

Pump failure will be indicated by a slight drop in hydraulic gage pressure. The accumulator will maintain system pressure until actuation of flaps, gear, or if on the ground, nose wheel steering. To help retain accumulator pressure, set the flap handle to the NEUTRAL position immediately after trouble is noted, THE FOLLOWING PROCEDURE MUST BE FOLLOWED TO LOWER THE GEAR, THEN MAKE NORMAL LANDING.

1. Slow aircraft to 130 kts.
2. Flaps - As required. Return handle to NEUTRAL position.
3. Landing Gear Control Handle - DOWN. Landing gear will freefall to down and locked position.
4. Landing Gear Down Lock Lights - CHECK 3 GREEN ON (check iris open). Visually check main landing gear down.
5. Cycle gear handle to UP and DOWN position. (This neutralizes the pressure in the accumulator and allows the down lock to be fully effective.)
6. Check gear handle is in DOWN position and RECHECK gear down lock lights - 3 GREEN ON.

COMPLETE HYDRAULIC SYSTEM FAILURE

Failure of the primary hydraulic system downstream of the hydraulic system accumulator, will be indicated by a "zero" pressure gage reading. An immediate positioning of the flap handle in NEUTRAL will "lock-up" the remaining fluid pressure in the system, and may help preclude a gradual lowering of the landing gear due to bleed-off of accumulator pressure. Complete hydraulic system failure will also result in loss of the switch operated nose gear steering; however, differential braking is effective for directional control after touchdown. Since the brake system is independent of the hydraulic system, no loss of brakes will occur due to hydraulic system failure.

NOTE

Prior to landing, follow procedure for lowering gear as outlined under hydraulic pump failure.

SPLIT FLAP CONDITION

Fluid pressure failure to either flap will result in flap retraction from air loads imposed on their surfaces. A line restrictor prevents the flaps from rapid retraction; however, a tendency of the airplane to roll toward the failed side will occur. In this event, proceed as follows:

1. Flap Handle - Immediately move to UP position.
2. Accomplish normal flaps-up landing.

ALTERNATOR FAILURE

1. Alternator Switch - OFF.

NOTE

The other alternator will supply power automatically as long as the total system load does not exceed 55 amps. If system load exceeds 55 amps, reduce load until good alternator comes on the line.

2. Should both alternators fail, place both alternator switches in the OFF position. Reduce system load as far below 55 amps as possible. Try to re-excite each alternator separately by turning its switch ON. If neither alternator will come on the line, turn both alternator switches OFF and turn off all electrical equipment unnecessary for safety of flight to preserve battery power.

BRAKE SYSTEM FAILURE

The brake system is a closed system independent of the hydraulic system. A failure in either a line or master cylinder will result in the loss of that wheel brake. Should the situation warrant, nose wheel steering as well as opposite rudder can be utilized to maintain directional control during one wheel braking.

LOSS OF ELEVATOR CONTROL IN FLIGHT

The airplane has been demonstrated capable of making a controlled landing using only elevator trim and engine power. Flaps should be set to 20° DOWN. Maintain an approach speed of 109 kts CAS.

RUNAWAY TRIM

In the event of a runaway elevator or rudder trim, the system can be deactivated by depressing the appropriate trim switch in the direction opposite to that of the malfunction (e.g. if the aircraft nose pitches up, depress the upper portion of the elevator trim switch for nose down actuation). This action will deactivate the system by causing its circuit breaker to pop. The affected circuit breaker should not be reset until the cause of the malfunction can be determined.

The elevator trim system can also be deactivated by the elevator trim disconnect switch located on the center console if the aircraft is so equipped.

EMERGENCY DESCENT

EMERGENCY DESCENT DURING NON-TURBULENT CONDITIONS

1. Throttles - FULL CLOSED.
2. Props - FULL FORWARD.
3. Airspeed - 217 kts. CAS.

After reaching desired safe altitude, continue as follows:

4. Throttles - ADVANCE slowly to 15 in. MAP.
5. Props - ADJUST to 2000 RPM.
6. Engine Temperatures - NORMAL.
7. Props - INCREASE.
8. Throttles - ADVANCE.
9. Mixtures - SET.

EMERGENCY DESCENT DURING TURBULENT CONDITIONS

1. Throttles - FULL CLOSED.
2. Props - FULL FORWARD.
3. Flaps - 20° DOWN.
4. Landing Gear - DOWN.
5. Flaps - FULL DOWN.
6. Airspeed - MAINTAIN flaps full down limitation 149 kts. CAS.

After reaching desired safe altitude, continue as follows:

7. Throttles - ADVANCE slowly to 15 in. MAP.
8. Props - ADJUST to 2000 RPM.
9. Landing Gear - UP.
10. Flaps - UP.
11. Engine Temperatures - NORMAL.
12. Props - INCREASE.
13. Throttles - ADVANCE.
14. Mixture - SET.

LOW FUEL WARNING LIGHT ILLUMINATED
OR 12 GALLONS OR LESS IN FUSELAGE TANK

A. Land as soon as feasible - assume 12 gals. or less fuel available.

WARNING

DO NOT USE X-FEED FOR DESCENT AND LANDING

1. Boost pumps - ON
2. Fuel selectors - BOTH ON
3. Aircraft - LAND

B. If an immediate landing is not feasible and there is fuel remaining in both wing tanks.

1. MAINTAIN LEVEL COORDINATED FLIGHT
2. Boost pumps - ON
3. Power-REDUCE to max range
4. Determine wing fuel quantity - LEFT and RIGHT WING TANKS
5. Fuel selectors - BOTH X-FEED
6. At first indication of fuel pressure drop or power interruption.
   a. Fuel selectors - BOTH ON
   b. Aircraft - LAND

CAUTION

When the low fuel warning light first illuminates continously there is a maximum of 12 gallons usable fuel remaining in the fuselage tank. THERE MUST BE FUEL IN THE FUSELAGE TANK TO ENSURE AN UNINTERRUPTED ENGINE FUEL SUPPLY.

If the Aircraft is not in a level coordinated flight attitude engine power interruptions may occur on one or both engines when the fuselage tank is empty or single or double X-FEED is selected, due to unporting of the respective engine's fuel supply intake port. Should a power interruption occur, immediately re-establish a level coordinated flight attitude. Power will surge and should recover fully within approximately 10 seconds after fuel is restored.

Should it be determined or suspected that the fuselage tank fuel quantity has been depleted, maximum usable wing fuel is obtained in coordinated flight at a level or slightly nose up attitude. Avoid nose down descents (up to 22 gallons unusable in each wing with approximately 14° nose down attitude). Avoid uncoordinated flight (power interruptions/surging can be experienced with up to 42 gallons in one wing in uncoordinated flight).

Keep turn and bank indicator as closely centered as possible and avoid rapid throttle movements.

Refer to Section 9 Fuel System Description.

SECTION 5
OPERATIONAL DATA

AIRCRAFT STALL CHARACTERISTICS

STALL CONDITIONS	MAXIMUM ALTITUDE LOSS
Power Off Stalls (Gear and Flaps Up or Down)	200 ft
Power On Stalls (Gear and Flaps Up or Down)	300 ft
Single Engine Stalls	90 ft (10° Pitch Down Angle)

USABLE FUEL

Fuselage tank fuel must be available for take off, climb, descent, approach, landing and uncoordinated flight maneuvers or engine power loss due to fuel starvation may occur. For flights not requiring full tanks, do not add fuel to wing tanks unless fuselage tank is full, dividing the remainder of the fuel required equally between the left and right wing fuel tanks.

NOTE

The full amount of usable fuel is based on the airplane sitting on a level ramp, laterally level, and longitudinally (approximately $1\frac{1}{2}^{\circ}$ nose up) with each tank fueled to maximum usable capacity. The wing tanks are extremely sensitive to attitude and if not level, they cannot be fueled to the full usable capacity.

WING TANK FUEL LOADING CHART

Approximate usable fuel quantity for given depth below filler neck rim.

DEPTH	APPROX USABLE FUEL QUANTITY
0.6 in.	62 gal.
1.0 in.	60 gal.

AIRSPEED SYSTEM POSITION ERROR

GEAR & FLAPS UP

CAS (KTS)	IAS (KTS)	CAS (KTS)	IAS (KTS)
77	85	104	105
83	89	122	122
87	91	139	138
91	95	174	173
96	98	243	241

GEAR DOWN-FLAPS FULL DOWN

CAS (KTS)	IAS (KTS)
69	76
74	78
78	81
87	88
130	129
142	140
149	148

Note: Instrument error not included.

ALTERNATE STATIC SYSTEM

When aircraft is equipped with alternate static system its use will result in the same indicated airspeed (within ±2 kts) and the same indicated altitude (within ±30 feet) as the normal system.

OXYGEN SYSTEM USAGE SCOTT 8500 SERIES

PERSONS USING	MINIMUM DURATION IN HOURS AND MINUTES AT FOLLOWING ALTITUDES **					
	8,000 Ft	10,000 Ft	15,000 Ft	20,000 Ft	25,000 Ft	30,000 Ft
1	47:19	35:34	22:11	16:07	12:44	10:51
2	23:39	17:47	11:05	8:03	6:22	5:26
3	15:46	11:51	7:24	5:22	4:15	3:37
4	11:50	8:53	5:33	4:02	3:11	2:43
5	9:28	7:07	4:26	3:13	2:33	2:10
6	7:53	5:56	3:42	2:41	2:07	1:49

** CYLINDER CAPACITY 115 CU FT (3257 LITERS AT 70°F AND 760 MM Hg) CHARGED TO 1850 PSIG.

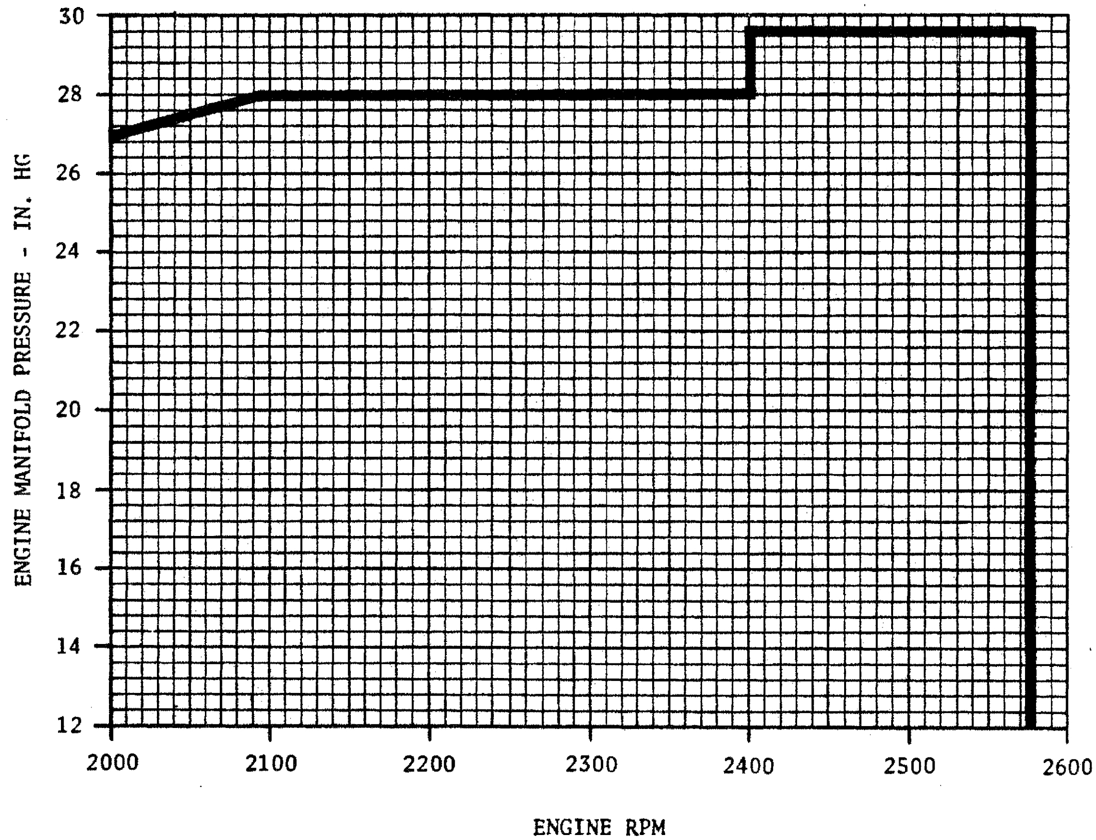
FAA APPROVED 7/26/76
Revised 8/22/79

RPM-MANIFOLD PRESSURE ENVELOPE FOR CONTINUOUS OPERATION

LYCOMING IO-540-P1A5, IO-540-G1B5 or IO-540-S1A5 ENGINE WITH
HARTZELL HC-C3YR-2/C8468-8R or HC-C3YR-2UF/FC8468-8R PROPELLER

NOTE
For efficient engine operation while turbocharged, engine speed should be kept above the following speeds :

2200 rpm for altitudes below 20,000 ft
2300 rpm for altitudes above 20,000 ft



NOISE CHARACTERISTICS

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of any airport.

Certification Noise Levels

The certificated noise level of 80.0 dB(a) represents a level flyover at 1000 feet AGL at 2475 engine RPM. This noise level reflects correction of as-measured data to a reference 77°F, 70% R. H. acoustic day as well as a 1.4 dB(a) credit resulting from the aircraft takeoff and climb characteristics. The related airplane gross weitht is 6000 pounds and the FAR Part 36 limit is 80.0 dB(a).

The above statement not withstanding, the noise level stated above has been verified by and approved by the Federal Aviation Administration in noise level test flights conducted in accordance with FAR 36. "Noise Standards: Aircraft type and Airworthiness Certification." The aircraft noise is in compliance with all FAR 36 noise standards applicable to this type.

SECTION 6
REQUIRED OPERATING EQUIPMENT

The approved types of operation stated in Section 2 are valid only when the following minimum equipment is installed and operating. In all cases, current requirements of FAR 91 take precedence in establishing operating equipment requirement.

See Section 7 for equipment installed in this aircraft.

Type of Equipment	Qty Req'd	Required for: Day VFR	Night VFR	Day IFR	Night IFR
<u>Flight Instruments</u>					
Airspeed Indicator	1	X	X	X	X
Altimeter	1	X	X	X	X
Magnetic Compass	1	X	X	X	X
Gyroscopic Rate of Turn Indicator	1			X	X
Slip-Skid Indicator	1			X	X
Clock	1			X	X
Artificial Horizon	1			X	X
Directional Gyro	1			X	X
<u>Engine Instruments</u>					
Tachometer	2	X	X	X	X
Oil Pressure Indicator	2	X	X	X	X
Oil Temp Indicator	2	X	X	X	X
Fuel Press Indicator	2	X	X	X	X
Fuel Flow Indicator	2	X	X	X	X
Manifold Press. Indicator	2	X	X	X	X
<u>Utility Equipment</u>					
Low Fuel Warning Light	1	X	X	X	X
Fuel Qty. Indicator	1	X	X	X	X
Voltammeter	1	X	X	X	X
Flap Position Indicator	1	X	X	X	X
Elev/Rud Trim Indicator	1	X	X	X	X
<u>Electrical Equipment</u>					
Wing Position Lights	2		X		X
Tail Position Lights	1		X		X
Strobe Lights	3		X		X
Landing Lights	2		X		X
Instrument Lights	16		X		X
Alternator 28V, 70A	2	X(1)	X(1)	X(1)	X(1)
Gear Position Lights	4	X	X	X	X
Gear Warning Horn	1	X	X	X	X
<u>Pneumatic Equipment</u>					
Pump	2			X	X
Gyro Pressure Indicator	1			X	X

REQUIRED OPERATING EQUIPMENT (Contd)

Type of Equipment	Qty Req'd	Required for: Day VFR	Night VFR	Day IFR	Night IFR
Miscellaneous Equipment					
Seat Belts	1/seat	X	X	X	X
Shoulder Harness (Pilot & Co-pilot	1/seat	X	X	X	X
Avionics Equipment					
VHF Com System	1			X	X
VHF NAV System	1			X	X
VOR/LOC Indicator	1			X	X
Emergency Locator Transmitter	1	X	X	X	X

FAA APPROVED 7/26/76
Revised 8/22/79

SECTION 7

WEIGHT AND BALANCE

This section has been included to enable the pilot to determine whether or not his aircraft will remain within the Weight and Center of Gravity (CG) limitations for a planned flight, based upon a particular loading configuration.

It is the responsibility of the pilot to insure that the airplane is loaded properly. The charts, graphs, instructions, and plotter should be checked to assure that the airplane is within the allowable weight vs. center of gravity envelope.

Misloading carries consequences for any aircraft. An overloaded airplane will not take off, climb or cruise as well as a properly loaded one. The heavier the airplane is loaded, the less climb performance it will have.

Center of gravity is a determining factor in flight characteristics. If the CG is too far forward in any airplane, it may be difficult to rotate for takeoff or landing or properly trim for approach to landing. If the CG is too far aft, the airplane may rotate prematurely on takeoff or tend to pitch up during climb. Longitudinal stability will be reduced. This can lead to inadvertent stalls and even spins; and spin recovery may become more difficult or even impossible as the center of gravity moves aft of the approved limit.

CAUTION

SOME COMBINATIONS OF OPTIONAL EQUIPMENT, PARTICULARLY WITH ELECTRIC AIR CONDITIONING, MAY REQUIRE ADDITIONAL WEIGHT IN THE CABIN WHEN OPERATING WITH LIGHT CABIN LOAD, SUCH AS PILOT ONLY, TO PREVENT THE CG FROM BEING AFT OF THE APPROVED LIMIT.

In this section are three basic charts and illustrations. They are used to compute the forward and rearward CG points of a desired loading configuration. The Loading Stations Diagram (Fig. 7-1) will aid in picturing where in relation to the aircraft's CG range a loaded item will fall. The Loading Tables (Fig. 7-2) are used to determine the specific moment — 1000 in.-lb for the items to be loaded, and the Center of Gravity Weight and Moment Envelope (Fig. 7-3) gives the weight and CG limits for the airplane. Weighing Instructions, Weight and Balance Report, and Aircraft Equipment List are included in this section.

To determine whether or not a particular loading configuration meets all weight and balance requirements, the most forward and rearward CG points must be computed. The most forward CG point is determined by computing the desired loading configuration with minimum fuel (the CG location at landing). The most rearward CG point is determined by computing the desired loading configuration with maximum fuel (the CG location at takeoff). If these two points, when plotted on the Center of Gravity Weight and Moment Envelope (Fig. 7-3), fall within the limits of the envelope, the airplane meets all weight and balance requirements. If the points do not fall within these limits, the load must be rearranged.

The I.A.A. has determined usable wing fuel quantities based on the wing tanks fueled to 0.6 in. below the filler necks. There are an additional 4 gallons of usable fuel (2 gallons each wing) not accounted for in the event the wing tanks have been fueled to the filler neck. Consequently, in the event the wing tanks are fueled to the filler neck, the 4 gallons should be included for weight and balance computations. However, it may not be used for flight planning purposes.

The following sample problem is given to show one way of computing the required CG points and determining whether or not a desired loading configuration does indeed meet all of the weight and balance requirements.

SECTION 7

WEIGHT AND BALANCE

This section has been included to enable the pilot to determine whether or not his aircraft will remain within the Weight and Center of Gravity (CG) limitations for a planned flight, based upon a particular loading configuration.

It is the responsibility of the pilot to insure that the airplane is loaded properly. The charts, graphs, instructions, and plotter should be checked to assure that the airplane is within the allowable weight vs. center of gravity envelope.

Misloading carries consequences for any aircraft. An overloaded airplane will not take off, climb or cruise as well as a properly loaded one. The heavier the airplane is loaded, the less climb performance it will have.

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CAUTION

SOME COMBINATIONS OF OPTIONAL EQUIPMENT, PARTICULARLY WITH ELECTRIC AIR CONDITIONING, MAY REQUIRE ADDITIONAL WEIGHT IN THE CABIN WHEN OPERATING WITH LIGHT CABIN LOAD, SUCH AS PILOT ONLY, TO PREVENT THE CG FROM BEING AFT OF THE APPROVED LIMIT.

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To determine whether or not a particular loading configuration meets all weight and balance requirements, the most forward and rearward CG points must be computed. The most forward CG point is determined by computing the desired loading configuration with minimum fuel (the CG location at landing). The most rearward CG point is determined by computing the desired loading configuration with maximum fuel (the CG location at takeoff). If these two points, when plotted on the Center of Gravity Weight and Moment Envelope (Fig. 7-3), fall within the limits of the envelope, the airplane meets all weight and balance requirements. If the points do not fall within these limits, the load must be rearranged.

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The following sample problem is given to show one way of computing the required CG points and determining whether or not a desired loading configuration does indeed meet all of the weight and balance requirements.

SAMPLE PROBLEM

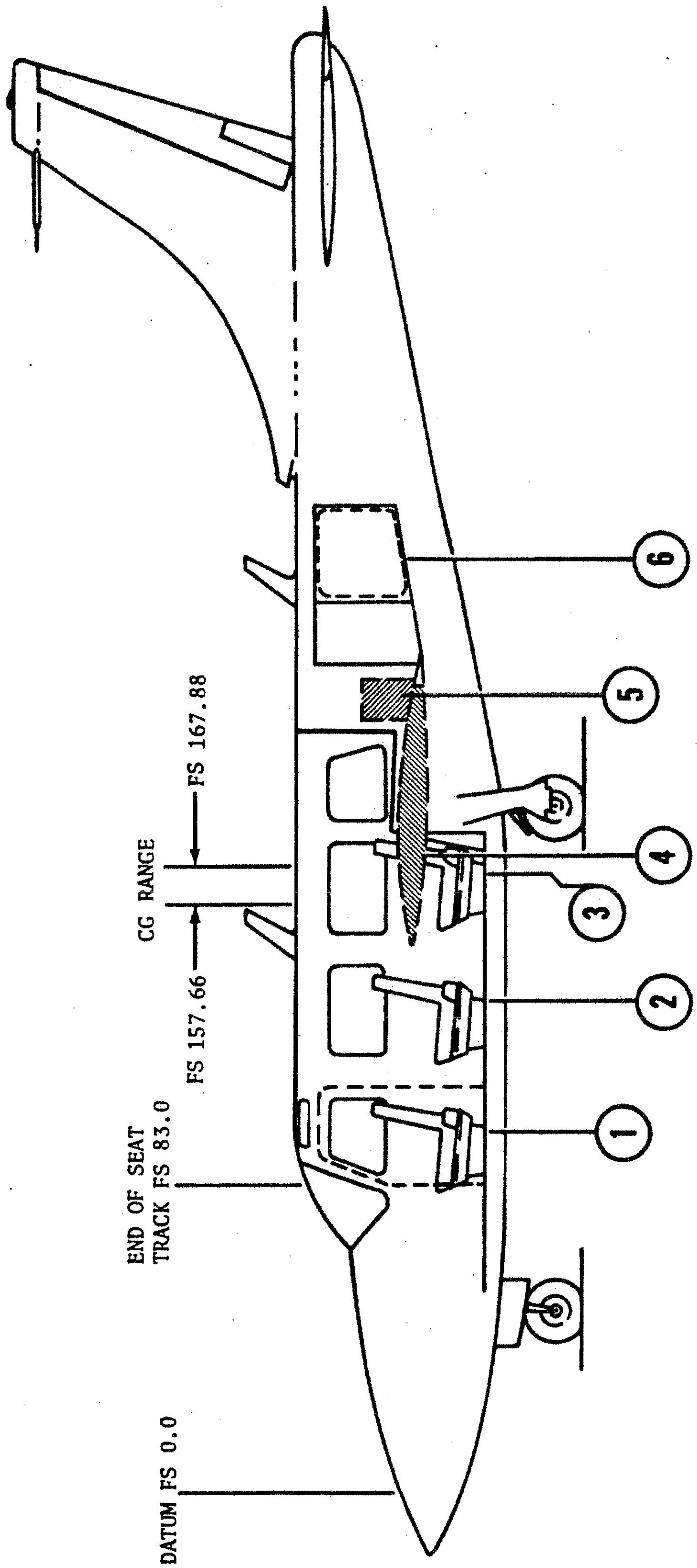
Consider an airplane with a licensed empty weight of 4145 lbs and a moment of 678,930 lb-in. (from Weight and Balance Report). The flight to be conducted will have a pilot, copilot, one front seat passenger, two rear seat passengers and 180 lbs. of baggage. The fuel loading will be full fuselage tank (41.5 gal.) and 50 gal. in each wing tank.

SOLUTION

Find the corresponding moment for the weight of each loaded item from the appropriate Loading Table (Fig. 7-2) and enter them on the computation guide below. After computation, enter this point (Point I) on the Center of Gravity Weight and Moment Envelope (Fig. 7-3). Since the point falls within the envelope, the loading is satisfactory. To determine landing weight and C.G., subtract the weight of the fuel to be consumed and the corresponding moments and calculate a landing point. Since all fuel comsumption moves the C.G. forward, we shall spotcheck that our landing C.G. will be within the envelope by removing all fuel. If this point (Point II) falls within the envelope we are assured that our landing C.G. will be in compliance.

ITEM	WEIGHT (lbs)	MOMENT ~1000 in-lb
AIRCRAFT LICENSED EMPTY WEIGHT AND MOMENT (from Aircraft Weight and Balance Report)	4145	678.93
PILOT (Arm 96 in.)	170	16.32
COPILOT (Arm 96 in.)	170	16.32
FRONT SEAT PASSENGERS (1) (Arm 132 in.)	170	22.44
REAR SEAT PASSENGERS (2) (Arm 165 in.)	340	56.10
BAGGAGE (Maximum 240 lbs) (Arm 250 in.)	180	45.00
WING FUEL (100 gals.) (Arm 170 in.)	600	102.00
FUSELAGE FUEL (41.5 gals) (Arm 213 in.)	249	53.04
POINT I - Most Rearward CG location (Ramp Weight)	6024	990.15
SUBTRACT FUEL LISTED ABOVE		
Wing Fuel (100 gals.)	-600	-102.00
Fuselage Fuel (41.5 gals.)	-249	-53.04
POINT II - Most forward CG location (Zero Fuel Weight)	5175	835.11

RELEASED 7/26/76
Revised 9/3/80



	NOMINAL	LOADING RANGE
(1) PILOT-COPILOT - ARM	96.0 in.	94.0 - 102.0 in.
(2) FRONT PASSENGERS - ARM	132.0 in.	127.0 - 135.0 in.
(3) REAR PASSENGERS - ARM	165.0 in.	161.0 - 165.0 in.
(4) WING FUEL - ARM	170.0 in.	-
(5) FUSELAGE FUEL - ARM	213.0 in.	-
(6) BAGGAGE - ARM	250.0 in.	224.0 - 265.0 in.

Figure 7-1. Loading Stations Diagram

OCCUPANTS

WEIGHT (lbs)	PILOT-COPILOT ARM 96 in.	EACH FRONT PASSENGER ARM 132 in.	EACH REAR PASSENGER ARM 165 in.
	MOMENT ~ 1000 in-lb		
90	8.64	11.88	14.85
100	9.60	13.20	16.50
110	10.56	14.52	18.15
120	11.52	15.84	19.80
130	12.48	17.16	21.45
140	13.44	18.48	23.10
150	14.40	19.80	24.75
160	15.36	21.12	26.40
170	16.32	22.44	28.05
180	17.28	23.76	29.70
190	18.24	25.08	31.35
200	19.20	26.40	33.00
210	20.16	27.72	34.65
220	21.12	29.04	36.30
230	22.08	30.36	37.95

WING FUEL (@ 6.0 lbs/gal)

GALLONS	WEIGHT (lbs)	MOMENT ~ 1000 in-lb	GALLONS	WEIGHT (lbs)	MOMENT ~ 1000 in-lb
5	30	5.10	70	420	71.40
10	60	10.20	75	450	76.50
15	90	15.30	80	480	81.60
20	120	20.40	85	510	86.70
25	150	25.50	90	540	91.80
30	180	30.60	95	570	96.90
35	210	35.70	100	600	102.00
40	240	40.80	105	630	107.10
45	270	45.90	110	660	112.20
50	300	51.00	115	690	117.30
55	330	56.10	120	720	122.40
60	360	61.20	125	750	127.50
65	390	66.30	130	780	132.60

FUSELAGE FUEL (@ 6.0 lbs/gal)

GALLONS	WEIGHT (lbs)	MOMENT ~ 1000 in-lb	GALLONS	WEIGHT (lbs)	MOMENT ~ 1000 in-lb
5	30	6.39	30	180	38.34
10	60	12.78	35	210	44.73
15	90	19.17	40	240	51.12
20	120	25.56	41.5	249	53.04
25	150	31.95			

Figure 7-2. Loading Tables (Sheet 1 of 2)

BAGGAGE (ARM 250.0 in.)

WEIGHT (lbs)	MOMENT ~1000 in-lb	WEIGHT (lbs)	MOMENT ~1000 in-lb
10	2.50	140	35.00
20	5.00	150	37.50
30	7.50	160	40.00
40	10.00	170	42.50
50	12.50	180	45.00
60	15.00	190	47.50
70	17.50	200	50.00
80	20.00	210	52.50
90	22.50	220	55.00
100	25.00	230	57.50
110	27.50	240	60.00
120	30.00		
130	32.50		

Figure 7-2. Loading Tables (Sheet 2 of 2)

CENTER OF GRAVITY WEIGHT AND MOMENT ENVELOPE

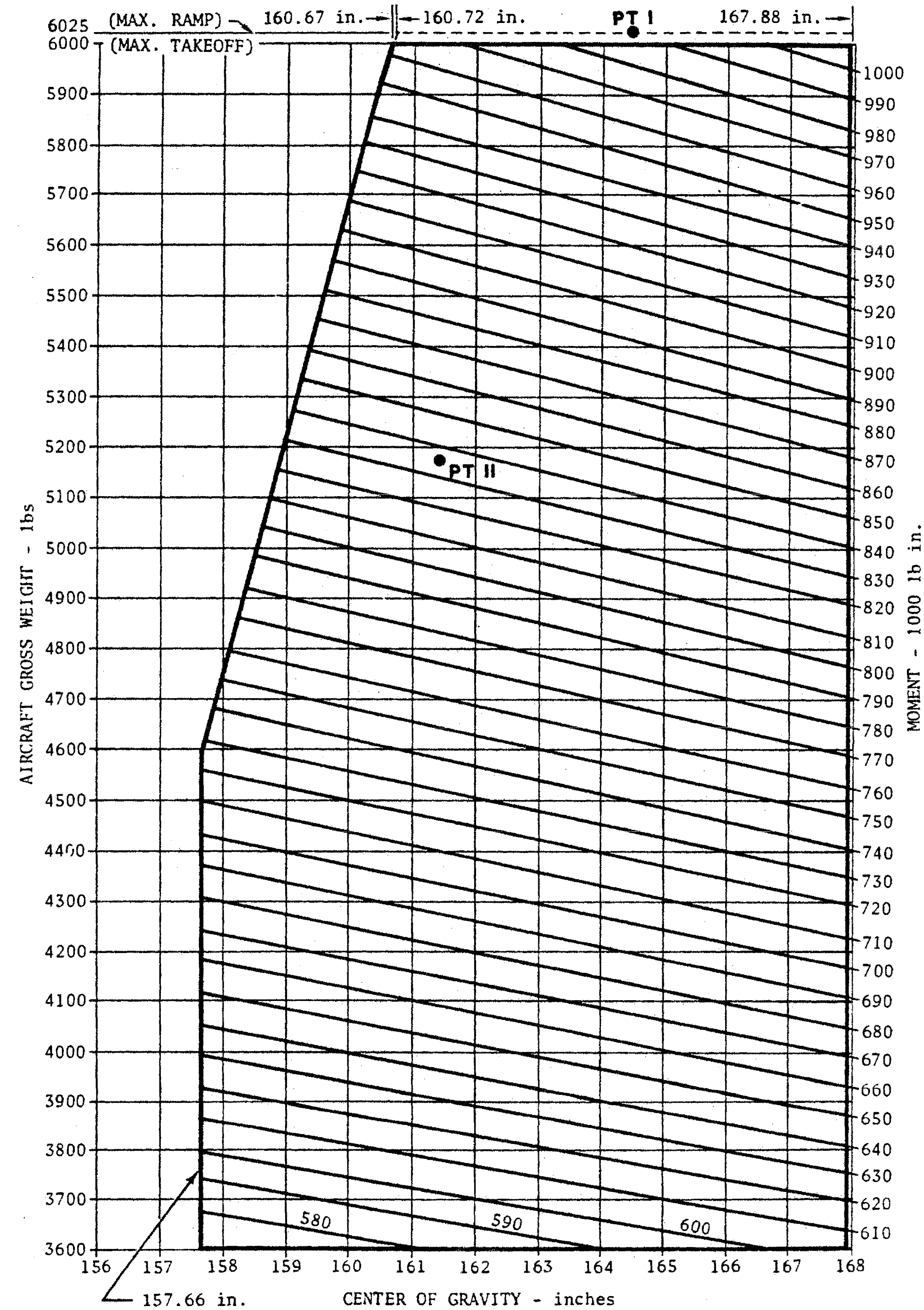


Figure 7-3

WEIGHT AND BALANCE PLOTTER

The Weight and Balance Plotter furnished with this airplane is a weight and center of gravity computing device. The face of the plotter displays the slots used for plottting and the graphic center of gravity envelope, as well as instructions for its use. On the back of the plotter is printed an example loading computation. The center of gravity envelope on the face shows all allowable flight moment conditions between 3500 and 6000 pounds, with the limits outlined in red.

The Empty Weight and C.G. location is taken from the Weight and Balance Report or the latest FAA major repair or alteration form.

CAUTION

It is the responsibility of the owner and pilot to ascertain that the airplane always remains within the allowable center of gravity weight and moment envelope while in flight.

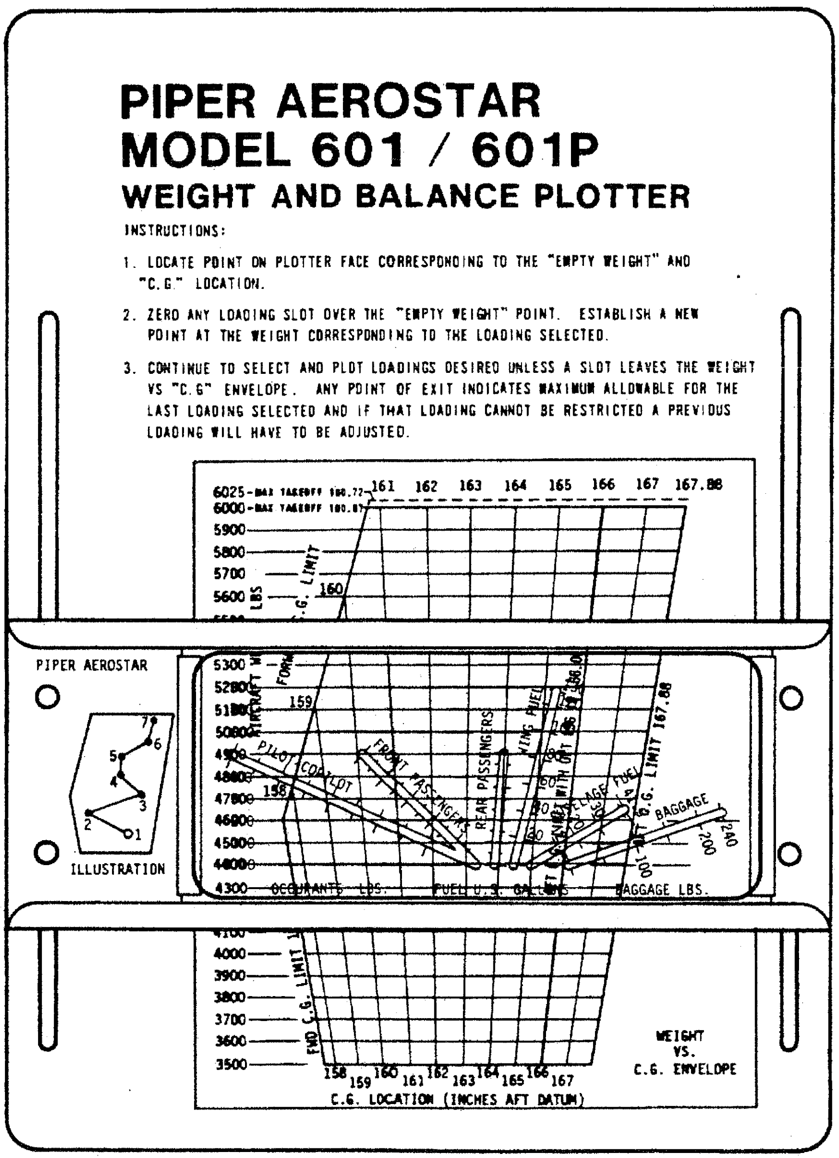


Figure 7-4. Weight and Balance Plotter (Sheet 1 of 2)

PIPER AEROSTAR
MODEL 601 / 601P
WEIGHT AND BALANCE PLOTTER

IT IS THE RESPONSIBILITY OF THE OWNER AND THE PILOT TO ASCERTAIN THAT THE AIRPLANE ALWAYS REMAINS WITHIN THE ALLOWABLE WEIGHT VS CENTER OF GRAVITY ENVELOPE WHILE IN FLIGHT.

1. LOCATE THE POINT ON PLOTTER FACE CORRESPONDING TO THE EMPTY WEIGHT AND C.G. LOCATION.
2. POSITION ZERO WEIGHT END OF PILOT COPILOT LOADING SLOT OVER EMPTY WEIGHT AND C.G. LOCATION POINT. ESTABLISH A NEW POINT CORRESPONDING TO PILOT COPILOT WEIGHT.
3. POSITION ZERO WEIGHT END OF BAGGAGE LOADING SLOT OVER POINT DETERMINED BY 2 ABOVE. ESTABLISH A NEW POINT CORRESPONDING TO BAGGAGE WEIGHT.

IN SIMILAR MANNER, LOCATE WEIGHT AND C.G. POINT AS REQUIRED FOR

4. FORWARD PASSENGERS.
5. AFT PASSENGERS.
6. FUSELAGE FUEL.
7. WING FUEL.

IF WEIGHT OR C.G. POSITION IS OUTSIDE ENVELOPE, LOADING WILL HAVE TO BE ADJUSTED.

DO NOT LEAVE PLOTTER EXPOSED TO DIRECT RAYS OF SUN OR EXCESSIVE HEAT

Figure 7-4. Weight and Balance Plotter (Sheet 2 of 2)

WEIGHING INSTRUCTIONS

TERMINOLOGY

ARM	- The horizontal distance in inches from the datum to the center of gravity of an item.
MOMENT	- The product of a weight multiplied by its arm.
EMPTY WEIGHT	- The total weight of the airframe, powerplant, required equipment, optional and special equipment, hydraulic fluid, unusable fuel and full oil.
USEFUL LOAD	- Gross Weight minus the empty weight.
UNDRAINABLE FUEL	- The fuel trapped in the lines and tanks after the fuel system has been drained.

AIRCRAFT CONDITION FOR WEIGHING

The aircraft is weighed with undrainable fuel, full oil, full hydraulic fluid, flaps up and gear down. A scale of minimum 3000 lbs capacity will be required under each main wheel, and a scale of minimum 1000 lbs capacity will be required under the nosewheel.

DEFUELING

Since the aircraft must be weighed with only undrainable fuel in the system, the fuel system must be drained. This can easily be accomplished as follows:

WARNING

FUEL VAPORS ARE EXTREMELY FLAMMABLE. WHENEVER POSSIBLE, DEFUELING SHOULD BE ACCOMPLISHED OUTDOORS. SHOULD CIRCUMSTANCES REQUIRE DEFUELING INSIDE, PRECAUTIONS MUST BE TAKEN TO ENSURE THERE IS ADEQUATE VENTILATION.

1. Place the aircraft in level flight attitude.
2. Ensure fuel shutoff valves are closed.
3. Disconnect the fuel supply line to the injector at the firewall.
4. Attach a line from the firewall to a suitable container.
5. Connect an external electrical power unit to the aircraft.
6. Turn the fuel selector valve and boost pump ON, and pump out all fuel.
7. When tanks are empty, turn boost pump OFF, and reconnect the fuel supply line to the injector.
8. Drain the remaining fuel in the sumps through the three sump drain valves.

LEVELING

After the aircraft is defueled and placed on the scales, it must be leveled. This is accomplished as follows:

1. LONGITUDINAL LEVELING - Place a spirit level aft along the seat track just aft of the pilot's seat. Exact level is obtained by either inflating the nose strut, or deflating the nose tire until the bubble in the spirit level is centered.
2. LATERAL LEVELING - Place a spirit level across the seat tracks just aft of the pilot's seat. Exact level is obtained by deflating the main tire on the high side of the aircraft until the bubble in the spirit level is centered.
3. Recheck to ensure aircraft is exactly level longitudinally and laterally.

MEASURING

Under normal circumstances, no measuring is necessary to arrive at the empty weight and CG location when the aircraft is weighed on scales. However, should a situation arise where a measurement is desired or necessary, datum can be located by measuring 150.0 inches forward of the wing leading edge inboard of either engine nacelle. (See the Aircraft Equipment List for the arms of installed equipment.)

WEIGHING PROCEDURES

The following suggestions are given to help ensure the aircraft is accurately weighed:

1. Thoroughly clean the aircraft before weighing.
2. Weigh the aircraft inside a closed building to prevent error in scale reading due to the wind.
3. Ensure the aircraft is exactly level.
4. Ensure all items are installed in the aircraft in their proper location.
5. Inventory the aircraft to ensure the equipment list accurately reflects what is installed i. the aircraft.
6. Use scales that are properly calibrated. Zero each scale before using.
7. Do not set brakes while taking scale reading.
8. Note tare when the aircraft is removed from the scales.

WEIGHT AND BALANCE REPORT (Form CR101)

The Weight and Balance Report (Form CR101) is used to show the factory delivered empty weight, empty weight CG, empty weight moment, and useful load. Subsequent forms are used to show changes to the empty weight and balance as optional equipment is installed, or as service changes or major repairs are accomplished. All weight and Balance forms should be kept in this Section of the FAA Approved Flight Manual.

WEIGHT AND BALANCE REPORT

MODEL **SER NO.** **REG NO.** **DATE**

WEIGHING CONDITIONS

1. FUEL: Undrainable OIL: Full HYDRAULIC FLUID: Full
2. See Weight and Balance Instructions in Section 7 of the FAA Approved Flight Manual before filling out this form. Completed forms should be inserted and kept in Section 7 of the FAA Approved Flight Manual.

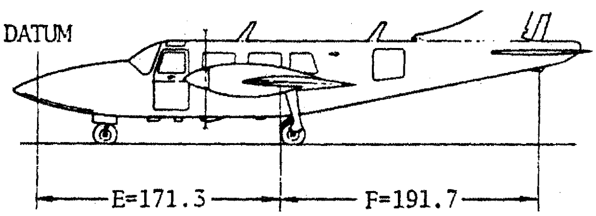
WEIGHING POINTS - WING JACK PAD/TAIL TIE DOWN LOAD CELL READINGS

WEIGH POINT		GROSS	TARE	NET
WING JACK PAD (R)				
WING JACK PAD (L)				
TAIL TIE DOWN	T			–
EMPTY WEIGHT	W			

AS WEIGHED CG

$$CG = E + \frac{(F) \times (T)}{W}$$

$$CG = 171.3 + \frac{(191.7) \times (- \quad)}{(\quad)} = \quad in.$$



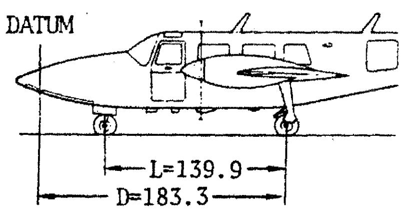
WEIGHING POINTS - NOSE & MLG SCALE READINGS

WEIGH POINT		GROSS	TARE	NET
NOSE WHEEL	N			
LEFT MAIN				
RIGHT MAIN				
EMPTY WT	W			

AS WEIGHED CG

$$CG = D - \frac{(N) \times (L)}{W}$$

$$CG = 183.3 - \frac{(\quad) \times (139.9)}{(\quad)} = \quad in.$$



AIRCRAFT WEIGHT AND CG CALCUALTIONS

ITEM	WEIGHT	ARM	MOMENT
AIRCRAFT AS WEIGHED ABOVE			
OPTIONAL EQUIPMENT ADDED OR SUBTRACTED (these items must also be entered on the Aircraft Equipment List).			
+ Unusable Fuel	+24.0	204.4	+4906
ACTUAL EMPTY WEIGHT			
ACTUAL EMPTY WEIGHT CG			
ACTUAL EMPTY WEIGHT MOMENT			

USEFUL LOAD = GROSS WEIGHT - EMPTY WEIGHT = ( ) - ( ) = lbs

NOTES:
- It is the responsibility of the Aircraft owner and the pilot to ensure the Aircraft is loaded properly (See Section 7 of the FAA Approved Flight Manual).
- This weight and balance information was determined with the equipment installed as shown on the Aircraft Installed Equipment List in Section 7 of the FAA Approved Flight Manual.

AUTHORIZED SIGNATURE

TITLE/CERTIFICATE NO.

Form CR101-568

Revised 9/3/80

AEROSTAR MODEL 601 AIRCRAFT INSTALLED EQUIPMENT LIST

INSTALLED	QTY RQD	DESCRIPTION/PART NO.		WEIGHT EACH	ARM
		AVIONICS			
( )	1	Emergency Locating Trans.	ELT-10	3.00	259.00
		BRAKE SYSTEM			
( )	4	Master Brake Cylinder	980014-1	.56	58.00
( )	2	Parking Brake Valve	980080-501	.34	59.60
( )	2	Brake Assembly	30-88	7.70	183.08
		ELECTRICAL EQUIPMENT			
( )	1	Flight Hour Meter	M5614	1.0	68.0
( )	1	Map Light	2180	.6	99.3
( )	1	Volt Ammeter	980031-501	.60	75.45
( )	1	Wing Tip/Strobe Light	A650-PG-D-28	.40	153.00
( )	1	Wing Tip/Strobe Light	A650-PR-D-28	.40	153.00
( )	1	Tail/Strobe Light	A500D-V-28	.30	396.00
( )	1	Power Supply	A413A-HDA-DF-28	3.20	224.00
( )	2	Landing Light	4596	.46	6.50
( )	6	Instrument Light	313 with 1813/8-C-LW1 Boot	.006	79.60
( )	10	Instrument Light	313 with 1813/8-R2 Boot	.006	79.60
( )	2	Instrument Post Light	A8970B-1-327	.01	97.00
( )	2	Battery	S25M	21.50	374.00
( )	3	Gear Position Light	MS25041-3	.03	74.57
( )	1	Gear Position Light	MS25041-4	.03	74.57
( )	1	Gear Warning Horn	64-0110-1	.58	54.50
( )	1	Pitot-Static Tube	AN5816-2	.86	366.70
( )	2	Tachometer Generator	AN5531-2	2.70	158.00
( )	2	Switch, Alternator Inop	A-00258-2	.10	175.00
		ENGINE INSTALLATION			
( )	2	Engine	IO-540-S1A5	431.67	141.4
( )	2	Propeller	HC-C3YR-2UF/FC8468-8R	76.0	119.0
( )	2	Prop Spinner Assy	C-3258P	5.09	116.0
( )	2	Magneto Left	S6LN-1208	5.85	158.7
( )	2	Magneto Right	S6LN-1209	5.75	158.7
( )	2	Prop. Governor	F-6-35	5.67	128.0
( )	2	Fuel Pump	RG17980J	1.70	159.60
( )	2	Fuel Injection System Servo		8.50	159.2
( )	2	(Model RSA-10ED1)	2524491-X		
( )	2	Alternator, 24V/70 amp	ALU8421	13.00	128.2
( )	2	Starter	MHB-4016	18.00	132.20
( )	2	Overboost Valve	470930015	.20	161.30
( )	2	Turbocharger	RJ0080-102-1	14.15	160.00
( )	2	Turbocharger	RJ0080-102-2	14.15	160.00
( )	2	Oil Cooler	300079-1	4.40	127.34
( )	2	Turbo Controller Valve	RJ8007-3	2.00	169.0
( )	2	Turbo Gate Actuator	RJ8003-4	2.00	164.0
( )	2	Scavenge Pump	RJ1025-2	2.00	159.60
		FUEL SYSTEM			
( )	2	Fuel Boost Pump	980016-1	2.73	221.88
( )	4	Fuel Shut-Off Valve	980004-1	1.53	214.90
( )	1	Fuel Quantity Indicator	980112-1	.50	73.00
( )	2	Fuel Level Transmitter (Wing)	980116-1	.28	177.90
( )	1	Fuel Level Transmitter (Fuselage)	980096-1	1.03	211.50
( )	2	Fuel Cap (Wing)	980015-1	.45	164.40
( )	1	Fuel Cap (Fuselage)	980015-1	.45	214.00
( )	2	Relief Valve (Wing)	2375	.30	164.00
( )	1	Control Monitor	980113-1	.75	175.00
( )	1	Low Fuel Warning Switch	980095-1	.35	215.00

RELEASED 7/26/76
Revised 9/3/80

AEROSTAR MODEL 601 AIRCRAFT INSTALLED EQUIPMENT LIST (Contd)

INSTALLED	QTY RQD	DESCRIPTION/PART NO.		WEIGHT EACH	ARM
		HEATING SYSTEM			
( )	1	Heater	D34D51	16.50	290.00
( )	1	Combustion Air Blower	89D22	4.15	272.60
( )	1	Fuel Pump	05D92	1.80	223.00
( )	1	Vent Air Blower	B33D07	5.95	300.00
( )	1	Fuel Regulator & Shut-off	A14D11-7.0	.80	280.00
		HYDRAULIC SYSTEM			
( )	1	Hydraulic Pump	980008-1/980076-1	3.00	158.2
( )	1	Pressure Regulating Valve	980007-1	1.30	266.05
( )	1	Hydraulic Shut-Off Valve	980004-1	1.53	206.25
( )	1	Hydraulic Press. Gage	980030-1	.50	74.03
( )	1	Accumulator	980075-1	3.00	265.40
( )	1	Control Valve, Flap	980012-1	.82	124.10
( )	1	Control Valve, Gear	980010-1	.82	124.10
( )	2	Control Valve Door, MLG	980011-1	.80	181.0
( )	2	Actuator, Flap	980017-1	1.45	195.50
( )	2	Actuator, MLG	400037-503	6.75	180.70
( )	2	Actuator, MLG Door	980018-1	1.40	195.00
( )	1	Actuator, NLG	450590-1	1.71	33.60
( )	1	Actuator, NLG Steering	450580-1	1.30	39.65
( )	1	Steering Control Valve	980009-1	1.30	55.00
( )	1	Steering Valve	980045-1	.50	55.00
		INSTRUMENTS - ENGINE			
( )	1	Manifold Press. (Dual)	980034-1	1.08	72.30
( )	1	Tachometer (Dual)	660055-505	1.61	72.30
( )	2	3-Way Gage	980169-501	1.20	73.72
( )	1	Fuel Flow (Dual)	65840-0106	1.00	72.81
( )	1	Fuel Pressure (Dual)	980174-501	1.20	73.30
( )	1	Exhaust Gas Temp (Dual)	980110-507	1.19	74.03
		INSTRUMENTS - FLIGHT			
( )	1	Airspeed Indicator	980061-509	1.00	73.64
( )	1	Altimeter	980025-1	.92	72.00
( )	1	Rate of Climb	980026-1	1.59	72.70
( )	1	Turn Coordinator	980024-501	2.14	72.70
( )	1	Clock	980029-1	.38	74.06
( )	1	Magnetic Compass	980006-1	.82	70.46
( )	1	Artificial Horizon	RCA22-7	2.90	72.00
( )	1	Directional Gyro	RCA11A-8	2.90	70.00
( )	1	Air Temperature Gage	2716	.16	92.00
		INSTRUMENT - PANEL EQUIPMENT			
( )	1	Flap Position Indicator	980035-501	.50	74.43
( )	1	Elev/Rudder Trim Indicator	980036-1	.45	75.16
		INTERIOR			
( )	2	Sun Visor	700081	1.00	90.00
( )	1	Seat	700525-521	23.50	96.00
( )	1	Seat	700525-527	23.50	100.00
( )	2	Restraint System	500790-xxx	2.20	98.50

AEROSTAR MODEL 601 AIRCRAFT INSTALLED EQUIPMENT LIST (Contd)

INSTALLED	QTY RQD	DESCRIPTION/PART NO.		WEIGHT EACH	ARM
		OXYGEN SYSTEM			
( )	1	Regulator Assembly	8883-4	1.31	86.75
( )	1	Cylinder Assembly	6350-A34-CC-C	44.91	209.00
		PNEUMATIC SYSTEM			
( )	2	Air Pump	241CC	2.30	158.00
( )	2	Inlet Filter	1J2-6	.36	150.00
( )	2	Pressure Regulator	2H30-6	.29	169.00
( )	1	Manifold	1H24-10	.63	175.00
( )	1	In-Line Filter	1J4-4	.53	175.00
( )	1	Gage	980082-1	.51	75.00
		WHEEL AND TIRE			
( )	1	Wheel, NLG	40-76B	5.30	43.36
( )	1	Tire, NLG	6.00-6-6 Ply Type III Type G-101 Tread	7.40	43.36
( )	1	Tube, NLG	6.00-6	1.70	43.36
( )	2	Wheel, MLG	40-124	12.10	183.08
( )	2	Tire, MLG	6.50-8 Type III 8 ply, Type G-101 Tread	10.50	183.08
( )	2	Tube, MLG	6.50-8	2.10	183.08

The above factory installed equipment items checked ( ) conform to the approved Engineering Drawings at time of installation. (pages 7-12 thru 7-14)

____

Inspector - Date
PIPER AIRCRAFT CORPORATION
SANTA MARIA DIVISION

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SECTION 8
PERFORMANCE

INTRODUCTION

This section contains the performance information necessary to safely operate the airplane and plan each flight. Safe and efficient operation of the airplane requires the pilot to be thoroughly familiar with and understand the information provided in this section.

Although procedure and performance data are given in this manual for both Maximum Continuous Power (2575 RPM/29.5 in. Hg MAP) and Maximum Normal Operating Power (2474 RPM/29.5 in. Hg MAP) the pilot should use the full Maximum Continuous Power Rating of the engine when safety considerations so dictate.

Performance information presented in this section is based on actual flight tests and reflects an airplane maintained in good condition and piloted utilizing average pilot skills. Critical conditions which must be met to duplicate the performance presented have been incorporated on applicable presentations. In some cases, additional detailed information regarding individual presentations may be found with the sample flight solutions for the associated presentation.

The sequence in which the presentations appear in this section coincides with the sequence that they would most likely occur in flight planning. A graphical format was favored to minimize efforts and errors associated with interpolation methods.

SAMPLE FLIGHT CALCULATIONS

The following sample calculations explain how to apply the performance presentations. The sample calculation examples correspond to the examples that appear on the individual performance presentations.

The sample flight is broken down into the following phases which are treated in separate subsections; Departure, Climb, Cruise, and Arrival.

NOTE

Pressure altitude is frequently referenced in performance computations. If meteorological data is not available, pressure altitude may be determined by setting 29.92 in Hg. (1013.2 mb) in the Kollsman window of the altimeter and reading the indicated altitude.

CONDITIONS

AIRPLANE DATA:

Takeoff gross weight	5500 pounds
Usable Fuel	120 gallons

DEPARTURE AIRPORT CONDITIONS:

Active runway heading	020°
Runway length	5000 ft
Temperature	20°C (68°F)
Pressure Altitude	2000 ft
Wind direction	050° (magnetic)
Wind velocity	12 knots

CRUISE CONDITIONS:

Leg distance	600 n.m.
Cruise pressure altitude	15,000 ft
Cruise true OAT	-5°C (23°F)
Power setting	2200 RPM, 26 in.Hg MAP
Fuel mixture	Best Power

ARRIVAL AIRPORT CONDITIONS:

Active runway heading	240°
Runway length	3500 ft
Temperature	15°C (59°F)
Pressure altitude	3000 ft
Wind direction	240° (magnetic)
Wind velocity	10 knots (headwind)
Landing weight	4900 pounds

SOLUTIONS

- DEPARTURE

WIND COMPONENTS

1. Determine the angle between the runway heading and prevailing wind direction, wind angle = (050 - 020) = 30°.
2. Locate the intersection of the 12 knot wind velocity arc and 30° wind angle radial on Figure 8-2.
3. Proceed horizontally and read a headwind component of 10 knots.
4. Proceed vertically and read a crosswind component of 6 knots.

NOTE

The maximum demonstrated crosswind component is 15 knots. If winds are gusty, use peak gust value for determining crosswind and tailwind components. Use steady value to determine headwind component.

- TAKEOFF

Full power should always be used for takeoff. When advancing throttles above 27 inches MAP, a rapid rise in MAP can be expected when the automatic waste gate control engages the turbochargers. ADVANCE THROTTLES SLOWLY. DO NOT EXCEED 29.5 INCHES MAP.

Maximum Normal Operating Power should be selected after obstacle clearance, when safety considerations will allow, and maintained throughout the climb to cruise altitude. NO LEANING FUEL MIXTURE ABOVE 75% POWER IS PERMITTED. Climb speed of 140 - 148 KIAS will provide additional cylinder cooling.

TAKEOFF DISTANCE

Total Takeoff Distance to 50-Foot Obstacle, Flaps 20°:

1. Enter Figure 8-3 with an OAT of 20°C (68°F).
2. Proceed vertically to the 2000-foot pressure altitude curve.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing the takeoff gross weight of 5500 pounds.

4. Proceed horizontally to the wind reference line and then, following the slope of the nearest headwind component guideline, proceed to the vertical grid line representing 10 knots wind component.

5. Proceed horizontally to the distance scale and read a distance of 2200 feet.

6. Refer to the speed schedule table at the top of the chart. For a takeoff weight of 5500 pounds read a takeoff speed of 85 KIAS and a 50-foot obstacle speed of 88 KIAS.

Total Takeoff Distance to 50-Foot Obstacle, Flaps Up:

Applying Figure 8-5 and a process similar to that used above yields a distance of 2650 feet, a takeoff speed of 92 KIAS and a 50-foot obstacle speed of 96 KIAS for the flaps UP condition.

NOTE

For takeoff weights intermediate of those shown in the speed schedule table interpolate to obtain the proper speed. Takeoff distances to 50-foot obstacle are based on initiating landing gear retraction at or beyond the 50-foot obstacle height.

Takeoff Ground Roll, Flaps 20°:

1. Enter Figure 8-4 with an OAT of 20°C (68°F).

2. Proceed vertically to the 2000-foot pressure altitude curve.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing the takeoff gross weight of 5500 pounds.

4. Proceed horizontally to the wind reference line and then, following the slope of the nearest headwind component guideline, proceed to the vertical grid line representing 10 knots wind component.

5. Proceed horizontally to the distance scale and read a distance of 1800 feet.

6. Refer to the speed schedule table at the top of the chart. For a takeoff weight of 5500 pounds read a takeoff speed of 85 KIAS.

Takeoff Ground Roll, Flaps Up:

Applying Figure 8-6 and a process similar to that used above yields a distance of 2150-feet and a takeoff speed of 92 KIAS for the flaps UP condition.

NOTE

For takeoff weights intermediate of those shown in the speed schedule table interpolate to obtain the proper speed.

ACCELERATE - STOP DISTANCE

Accelerate-Stop Distance, Flaps 20°:

1. Enter Figure 8-7 with an OAT of 20°C (68°F).

2. Proceed vertically to the 2000-foot pressure altitude curve.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing the takeoff gross weight of 5500 pounds.

4. Proceed horizontally to the wind component reference line and then, following the slope of the nearest headwind component guideline, proceed to the vertical grid line representing 10 knots wind component.

5. Proceed horizontally to the distance scale and read a distance of 3300 feet.

6. Refer to the speed schedule table at the top of the chart and read an Engine Failure Speed of 85 KIAS for a takeoff weight of 5500 pounds.

Accelerate-Stop Distance, Flaps Up:

Applying Figure 8-8 and a process similar to that used above yields a distance of 4000 feet and an Engine Failure Speed of 92 KIAS (106 MPH) for the flaps UP condition.

NOTE

For takeoff weights intermediate of those shown in the speed schedule table interpolate to obtain the proper speed.

- CLIMB

All climb performance charts present optimum performance and are based on a nominal fuel flow of 26 GPH per operating engine.

Do not exceed applicable engine temperature limitations. For maximum engine service life cylinder head temperature should be maintained below 246°C during continuous climb operation.

TWIN ENGINE RATE OF CLIMB-MAXIMUM NORMAL OPERATING POWER

1. Enter Figure 8-9 with an OAT of 20°C (68°F).
2. Proceed vertically to the 2000 foot pressure altitude curve.
3. Proceed horizontally to the weight reference line and then following the curvature of the nearest weight guideline proceed to the vertical grid line representing a gross weight of 5500 pounds.
4. Proceed horizontally to the Rate of Climb Scale and read a rate of climb of 1550 feet per minute.
5. Refer to the speed schedule table at the top of the chart and read a Best Rate of Climb Speed of 113 KIAS for a gross weight of 5500 pounds.

NOTE

For gross weights intermediate of those shown in the speed schedule table interpolate to obtain the proper speed.

SINGLE ENGINE RATE OF CLIMB - MAXIMUM CONTINUOUS POWER

1. Enter Figure 8-10 with an OAT of 20°C (68°F).

2. Proceed vertically to the 2000-foot pressure altitude curve.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing a gross weight of 5500 pounds.

4. Proceed horizontally to the rate of climb scale and read a rate of climb of 260 feet per minute.

5. The single engine best rate of climb speed is 109 KIAS for all weights.

BALKED LANDING RATE OF CLIMB - MAXIMUM CONTINUOUS POWER

1. Enter Figure 8-11 with an OAT of 20°C (68°F).

2. Proceed vertically to the 2000-foot pressure altitude curve.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing a gross weight of 5500 pounds.

4. Proceed horizontally to the rate of climb scale and read a rate of climb of 640 feet per minute.

5. The balked landing climb speed is 87 KIAS for all weights.

SINGLE ENGINE SERVICE CEILING

1. Enter figure 8-12 with an OAT of - 16°C (3°F).
2. Proceed vertically to the 5000-pound gross weight reference line.
3. Proceed horizontally to the service ceiling scale and read a single engine service ceiling pressure altitude of 17,000 feet.
4. Refer to Note 2 of the presentation and calculate a mean sea level (MSL) single engine service ceiling of 17,500 feet, as follows:

    (Altimeter Setting - 29.92) = (30.42 - 29.92) in.Hg
    = 0.5 in.Hg

    Adding 100 feet per 0.1 in.Hg yields,
    17,000 + 5 (100) = 17,500 feet MSL

TIME, FUEL AND DISTANCE TO CLIMB - MAXIMUM NORMAL OPERATING POWER

1. Enter Figure 8-13 at the initial climb altitude OAT of 20°C (68°F).
2. Proceed vertically to the curve representing the initial pressure altitude of 2000 feet.
3. Proceed horizontally to the curve representing the climb gross weight of 5500 pounds.
4. Proceed vertically to the time, fuel and distance to climb scales and read 1 minute, 1 gallon and 2 nautical miles respectively.
5. Re-enter Figure 8-13 at the final climb altitude OAT of -5°C (23°F).
6. Proceed vertically to the point representing the final climb pressure altitude of 15,000 feet.
7. Proceed horizontally to the curve representing the climb gross weight of 5500 pounds.

8. Proceed vertically to the time, fuel and distance to climb scales and read 11 minutes, 11 gallons and 25 nautical miles respectively.

9. Subtract the initial time, fuel and distance to climb results from the final time, fuel and distance to climb results and obtain 10 minutes, 10 gallons and 23 nautical miles respectively.

NOTE

Time, Fuel and Distance to Climb is based on climbing at the best rate of climb speed.

Fuel to climb does not include start, taxi, or takeoff fuel.

Distance to climb is based on zero wind.

- CRUISE

When operating at power settings within the boxes, do not lean beyond the fuel flow shown in the power chart to establish peak EGT or for any other reason.

OPERATING AT FUEL FLOWS LEANER THAN THOSE PRESCRIBED IN THE AIRPLANE FLIGHT MANUAL CAN CAUSE ENGINE DAMAGE DUE TO DETONATION.

NOTE

If peak EGT or 1650°F is reached before the allowable fuel flow is obtained; FURTHER LEANING IS PROHIBITED.

When operating outside the boxes, lean to peak EGT (not exceeding 1650°F) and enrich 100°F for best power cruise. For economy cruise, lean to peak EGT (not to exceed 1650°F). Then, for best power or economy cruise, increase indicator fuel flow by one (1) gallon per hour per engine to assure maximum engine service life and allow for minor manifold pressure and fuel flow gauge fluctuations.

Periodically reset the mixture in flight to ensure the engines are still properly leaned. Always enrich the mixture to FULL RICH before adding power and adjust as required when descending in altitude.

If power charts do not show the exact altitude, MAP or RPM as selected for the flight, proceed as follows:

For Altitude - Read the power charts above and below the selected altitude and use the highest fuel flow shown for your selected power setting. Assure MAP is the same as selected MAP.

For RPM - Read RPM above and below your selected RPM in the altitude power chart for your flight altitude. Use the higher fuel flow shown. Assure MAP is the same as selected MAP.

Do not exceed applicable engine temperature limitations. For maximum engine service life, cylinder head temperatures should be maintained below 205°C for economy cruise power settings.

CAUTION

IMPROPER LEANING IS THE MOST FREQUENT CAUSE OF CYLINDER DAMAGE. CHANCES FOR DETONATION INCREASE WITH THE AIRCRAFT ALTITUDE, HIGHER POWER SETTINGS, LEAN MIXTURES (LOWER FUEL FLOWS) AND HIGH AMBIENT TEMPERATURES. ENGINE DAMAGE DUE TO DETONATION IS RAPID AND PROBABLY NOT DETECTABLE BY ENGINE TEMPERATURE INSTRUMENTATION.

SUMMARY

1. Never lean fuel mixture above 75% power.
2. Never exceed 1650°F or peak EGT when leaning.

3. When leaning mixture:

   a. Establish desired MAP and RPM values from Airplane Flight Manual Cruise Performance Power Chart applicable to flight altitude.

NOTE

As aircraft accelerates after level-off, slight increases in MAP and RPM can be expected. Readjust as required.

   b. Retard mixture control SLOWLY and in small increments, monitoring EGT and fuel flow. Allow EGT to stabilize after each incremental leaning.

   c. Monitor for engine roughness and immediately enrich mixture if roughness occurs.

   d. When operating at power settings within the boxes, do not lean beyond the fuel flow shown in the power chart to establish peak EGT or for any other reason.

   e. When operating outside the boxes, lean to peak EGT (not exceeding 1650°F) and enrich 100° for best power cruise. For economy cruise, lean to peak EGT (not to exceed 1650°F). Then, for best power or economy cruise, increase indicator fuel flow by one (1) gallon per hour per engine to assure maximum engine service life and allow for minor manifold pressure and fuel flow gauge fluctuations.

CRUISE PERFORMANCE

1. Locate the 15,000-foot Cruise Performance Presentation for Best Power, Figure 8-14.

2. Locate the row representing the cruise power setting of 2200 RPM and 26 in.Hg MAP.

3. Proceed horizontally to the temperature day column closest to the cruise altitude OAT of - 15°C (6°F), standard day in this case. Read a percent power of 62.3%, a true airspeed of 211 knots and a fuel flow of 15.6 GPH per engine.

NOTE

Additional accuracy may be obtained by interpolating between the temperature day columns bracketing the actual OAT.

For accurate results use true OAT (i.e. indicated OAT corrected for ram temp rise).

4. Refer to Note 1 of the associated cruise presentation and calculate a weight corrected initial cruise true airspeed of 214.5 knots as follows:

   a. Calculate an initial cruise gross weight of approximately 5410 pounds (5500 pound takeoff gross weight less 5 gallons fuel for start, taxi and takeoff and 10 gallons for climb at 6 pounds per gallon).

   b. From Note 1 of the 15,000-foot cruise presentation, determine that the true airspeed increases by approximately 3 knots per each 500 pounds of weight below 6000 pounds.

   c. Calculate the weight corrected true airspeed as follows:

$$TAS = 211 + \left(\frac{6000 - 5410}{500}\right) \times 3$$

$$= 211 + 3.5$$

$$= 214.5 \text{ knots}$$

RANGE PROFILE

1. Locate the Range Profile presentation, Figure 8-16, for 2200 RPM.

2. Enter the presentation with the cruise pressure altitude of 15,000 feet.

3. Proceed horizontally to the Best Power curve representing 26 in. MAP.

4. Proceed vertically to the range scale and read a range of 957 nautical miles for a ramp fuel load of 165.5 gallons (zero wind, standard day conditions and 6000-pound takeoff gross weight).

To determine range for ramp fuel loads other than 165.5 gallons add the segment distances for climb, cruise and descent allowing for start, taxi, takeoff, climb, descent and reserve fuel as appropriate.

Reserve fuel is based on a Twin Engine fuel flow of 20.6 GPH at 45% power leaned to economy.

Range profile presentations allow 5 gallons of fuel for start, taxi and takeoff.

ENDURANCE PROFILE

1. Locate the Endurance Profile, Figure 8-17, for 2200 RPM.

2. Enter the Presentation with the cruise pressure altitude of 15,000 feet.

3. Proceed horizontally to the Best Power curve representing 26 in. MAP.

4. Proceed vertically to the endurance scale and read an endurance of 4.53 hours for a ramp fuel load of 165.5 gallons (zero wind, standard day conditions and 6000-pound takeoff gross weight).

To determine endurance for ramp fuel loads other than 165.5 gallons, add the segment times for climb, cruise and descent allowing for start, taxi, takeoff, climb, descent and reserve fuel as appropriate.

Reserve fuel is based on a Twin Engine fuel flow of 20.6 GPH at 45% power leaned to economy.

Endurance profile presentations allow 5 gallons of fuel for start, taxi and takeoff.

ARRIVAL

HOLDING TIME AND FUEL CHART

1. Enter Figure 8-18 with a required holding time of 45 minutes (for example).
2. Proceed horizontally to the reference line and then vertically to the fuel quantity required scale and read a fuel requirement of 15.5 gallons (93 pounds).

Due to inaccuracies inherent to reading graphical presentations a more accurate solution may be obtained by multiplying the holding time in hours by the holding fuel flow 20.6 GPH (twin engine).

TIME, FUEL AND DISTANCE TO DESCEND

1. Enter Figure 8-19 with the initial descent altitude of 15,000 feet.
2. Proceed horizontally to the reference line and then vertically to the time, fuel and distance to descend scales and read 11.5 minutes, 4.6 gallons and 45 nautical miles respectively.

3. Re-enter Figure 8-19 with the level-off altitude of 3000 feet.

4. Proceed horizontally to the reference line and then vertically to the time, fuel and distance to descend scales and read 2.5 minutes, 1 gallon and 10 nautical miles respectively.

5. Subtract the level-off time, fuel and distance to descend results from the initial time, fuel and distance to descend results and obtain 9 minutes, 3.6 gallons and 35 nautical miles respectively.

LANDING DISTANCE

Total Landing Distance from 50-Foot Obstacle, Flaps 45°:

1. Enter Figure 8-20 with an OAT of 15°C (59°F).

2. Proceed vertically to a point representative of 3000 feet pressure altitude.

3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing a landing weight of 4900 pounds.

4. Proceed horizontally to the wind component reference line and then, following the slope of the nearest headwind guideline, proceed to the vertical grid line representing a wind component of 10 knots.

5. Proceed horizontally to the distance scale and read a total landing distance from a 50-foot obstacle of 1625 feet.

6. Refer to the Approach Speed Table at the top of the chart and interpolate as follows to determine the approach speed for a landing gross weight of 4900 pounds:

$$\text{Approach Speed} = \left(\frac{4900-4500}{5000-4500}\right) \times (89-85) + 85$$

$$= 88 \text{ KIAS}$$

Landing Ground Roll, Flaps 45°:

1. Enter Figure 8-21 with an OAT of 15°C (59°F).
2. Proceed vertically to a point representative of 3000 feet pressure altitude.
3. Proceed horizontally to the weight reference line and then, following the curvature of the nearest weight guideline, proceed to the vertical grid line representing a landing weight of 4900 pounds.
4. Proceed horizontally to the wind component reference line and then, following the slope of the nearest headwind guideline, proceed to the vertical grid line representing a wind component of 10 knots.
5. Proceed horizontally to the distance scale and read a landing ground roll of 980 feet.

Total Landing Distance From 50-Foot Obstacle, Flaps Up:

Applying Figure 8-22 and a process similar to that used above yields a total landing distance from 50-foot obstacle of 2000 feet and an approach speed of 101 KIAS .

Landing Ground Roll, Flaps Up:

Applying Figure 8-23 and a process similar to that used above yields a landing ground roll of 1300 feet.

CAUTION

LANDING DISTANCE PRESENTATIONS ARE BASED ON ESTABLISHING IDLE POWER AT THE 50-FOOT OBSTACLE HEIGHT, MAINTAINING THE SCHEDULED APPROACH SPEED UNTIL TRANSITIONING TO THE FLARE AND EXECUTING A FLARE WITHOUT FLOATING. IF LANDING DISTANCE IS NOT CRITICAL A MORE COMFORTABLE APPROACH AND FLARE MAY BE EXECUTED BY MAINTAINING PARTIAL POWER TO THE FLARE. THE AIR DISTANCE (TOTAL DISTANCE MINUS GROUND ROLL) FROM THE 50-FOOT OBSTACLE HEIGHT MAY INCREASE BY AS MUCH AS 250 PERCENT.

STALL SPEEDS

KNOTS

CONDITION:

1. ZERO THRUST

WEIGHT POUNDS	CONFIGURATION		BANK ANGLE							
			0°		20°		40°		60°	
	FLAPS	GEAR	KNOTS		KNOTS		KNOTS		KNOTS	
			IAS	CAS	IAS	CAS	IAS	CAS	IAS	CAS
6000	UP	UP	86	79	85	82	94	90	111	111
	20°	DOWN	81	75	82	77	87	85	103	104
	45°	DOWN	77	71	77	73	83	81	99	100
5500	UP	UP	83	76	82	79	91	87	108	108
	20°	DOWN	78	72	79	74	85	83	101	102
	45°	DOWN	74	68	74	70	80	78	95	96
5000	UP	UP	79	72	78	75	86	82	101	101
	20°	DOWN	74	68	75	70	80	78	96	97
	45°	DOWN	71	65	71	67	76	74	91	92
4500	UP	UP	75	68	73	70	82	78	97	97
	20°	DOWN	71	65	72	67	76	74	91	92
	45°	DOWN	67	61	67	63	72	70	86	87

NOTE

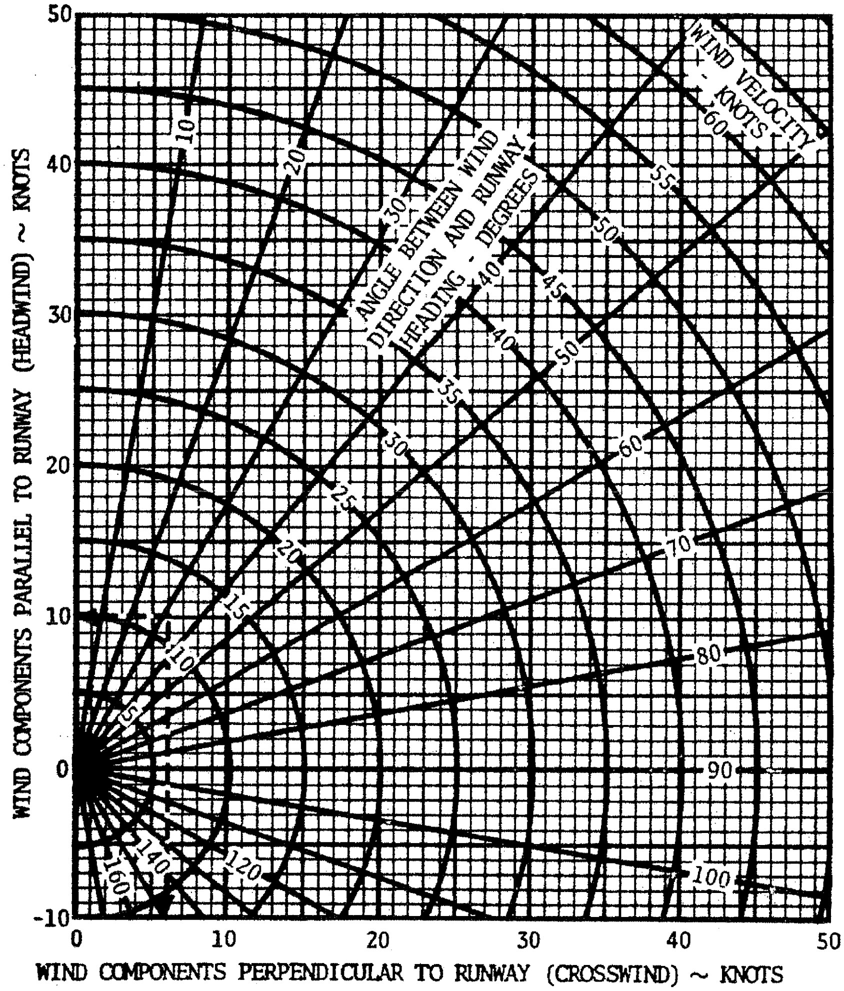
1. ZERO INSTRUMENT ERROR ASSUMED.
2. MAXIMUM ALTITUDE LOSS DURING STALL RECOVERY
   a) POWER OFF, 200 - FEET
   b) POWER ON, 300 - FEET
   c) SINGLE ENGINE, 90 - FEET

STALL SPEEDS
Figure 8-1

WIND COMPONENTS

EXAMPLE:

RUNWAY HEADING	020°	WIND COMPONENT PARALLEL TO RUNWAY	10 KNOTS (HEADWIND)
WIND DIRECTION	050° (MAGNETIC)	WIND COMPONENT PERPENDICULAR TO RUNWAY	6 KNOTS (RIGHT CROSS-WIND)
WIND VELOCITY	12 KNOTS		
ANGLE BETWEEN WIND DIRECTION AND RUNWAY HEADING	30°		



WIND COMPONENTS
Figure 8-2

TOTAL TAKEOFF DISTANCE TO 50 - FOOT OBSTACLE

FLAPS 20°

CONDITIONS

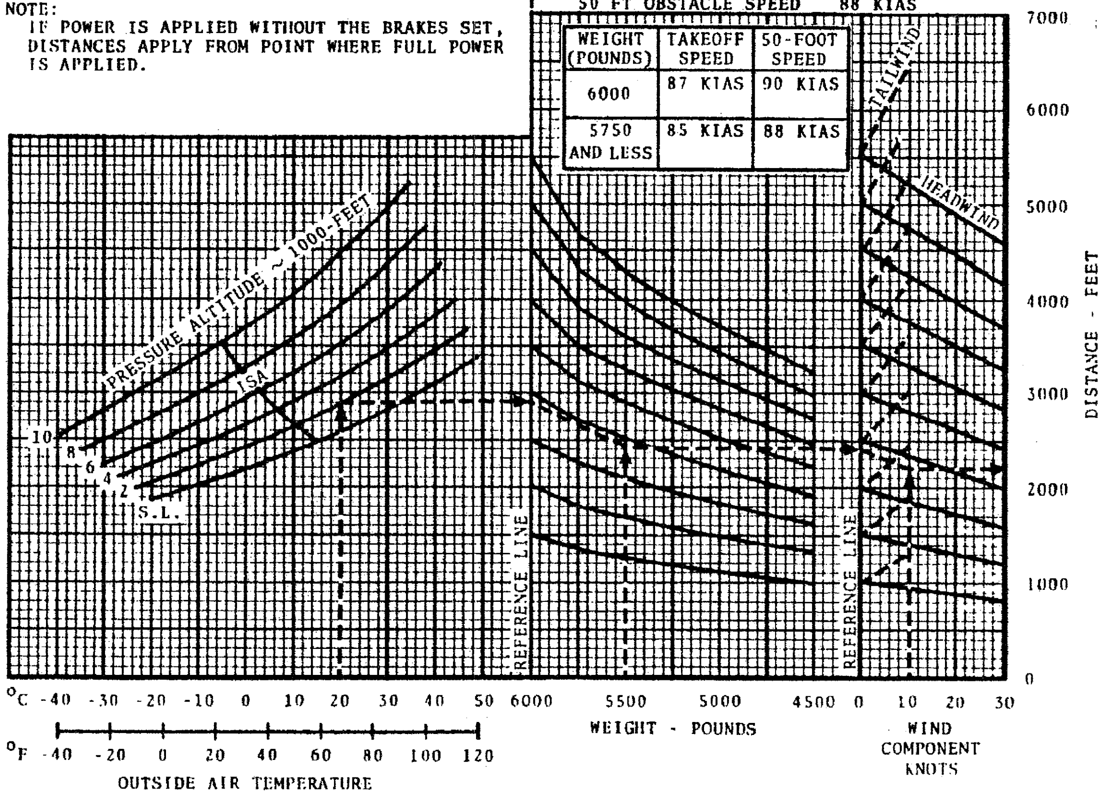
1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - 20°.
3. LANDING GEAR EXTENDED (RETRACTION INITIATED AT OR BEYOND 50-FOOT OBSTACLE).
4. LEVEL, PAVED, DRY RUNWAY.

NOTE:
IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10KTS (HEADWIND)
TOTAL DISTANCE TO 50-FOOT OBSTACLE	2200 FT (FLAPS 20° DOWN)
TAKEOFF SPEED	85 KTS
50 FT OBSTACLE SPEED	88 KIAS

WEIGHT (POUNDS)	TAKEOFF SPEED	50-FOOT SPEED
6000	87 KIAS	90 KIAS
5750 AND LESS	85 KIAS	88 KIAS



TOTAL TAKEOFF DISTANCE TO 50-FOOT OBSTACLE, FLAPS 20° DOWN
Figure 8-3

TAKEOFF GROUND ROLL

FLAPS 20°

CONDITIONS:

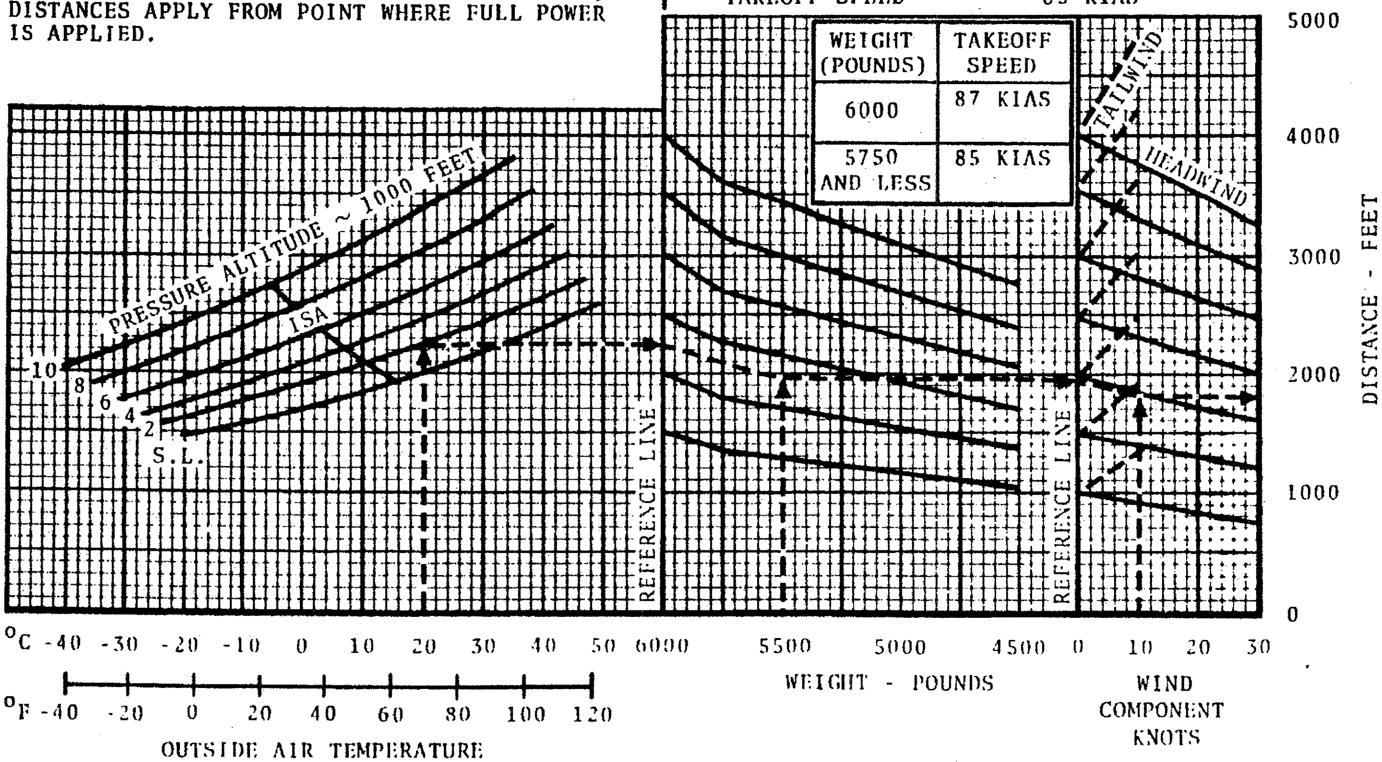
1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - 20°.
3. LEVEL, PAVED, DRY RUNWAY.

NOTE:
IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10 KTS (HEADWIND)
TAKEOFF GROUND ROLL	1800 FT
TAKEOFF SPEED	85 KIAS

WEIGHT (POUNDS)	TAKEOFF SPEED
6000	87 KIAS
5750 AND LESS	85 KIAS



TAKEOFF GROUND ROLL, FLAPS 20° DOWN
Figure 8-4

TOTAL TAKEOFF DISTANCE TO 50 - FOOT OBSTACLE

FLAPS UP

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - UP.
3. LANDING GEAR EXTENDED (RETRACTION INITIATED AT OR BEYOND 50-FOOT OBSTACLE).
4. LEVEL, PAVED, DRY RUNWAY.

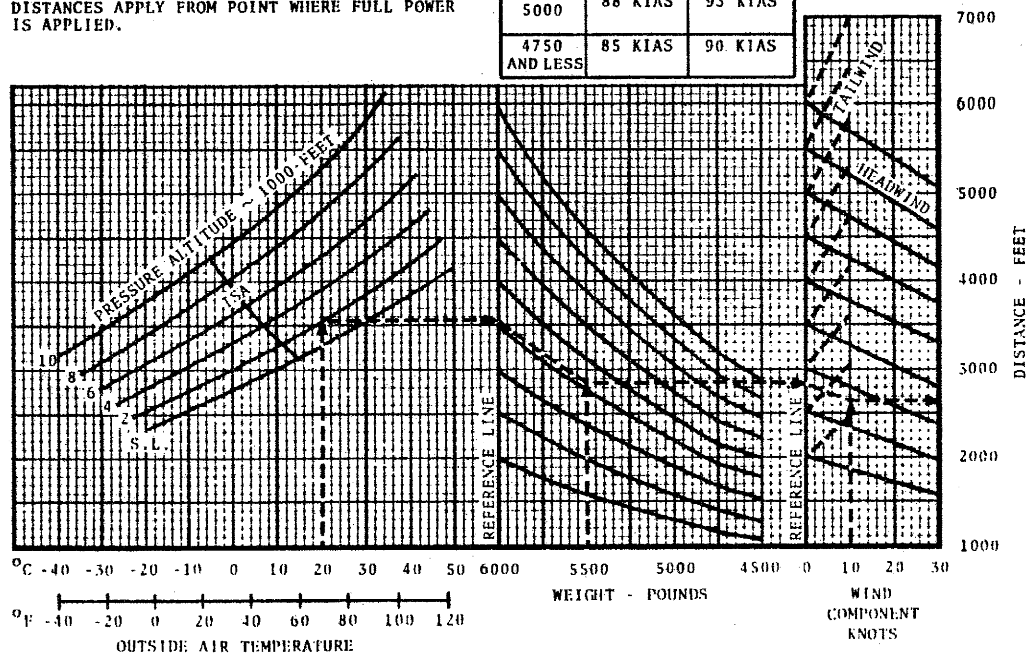
NOTE:

IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10 KTS (HEADWIND)
50 FT OBSTACLE	2650 FT
TAKEOFF SPEED	92 KIAS
50-FT OBSTACLE SPEED	96 KIAS

WEIGHT (POUNDS)	TAKEOFF SPEED	50-FOOT SPEED
6000	96 KIAS	100 KIAS
5500	92 KIAS	96 KIAS
5000	88 KIAS	93 KIAS
4750 AND LESS	85 KIAS	90 KIAS



TOTAL TAKEOFF DISTANCE TO 50-FOOT OBSTACLE, FLAP UP
Figure 8-5

TAKEOFF GROUND ROLL

FLAPS UP

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - UP.
3. LEVEL, PAVED, DRY RUNWAY.

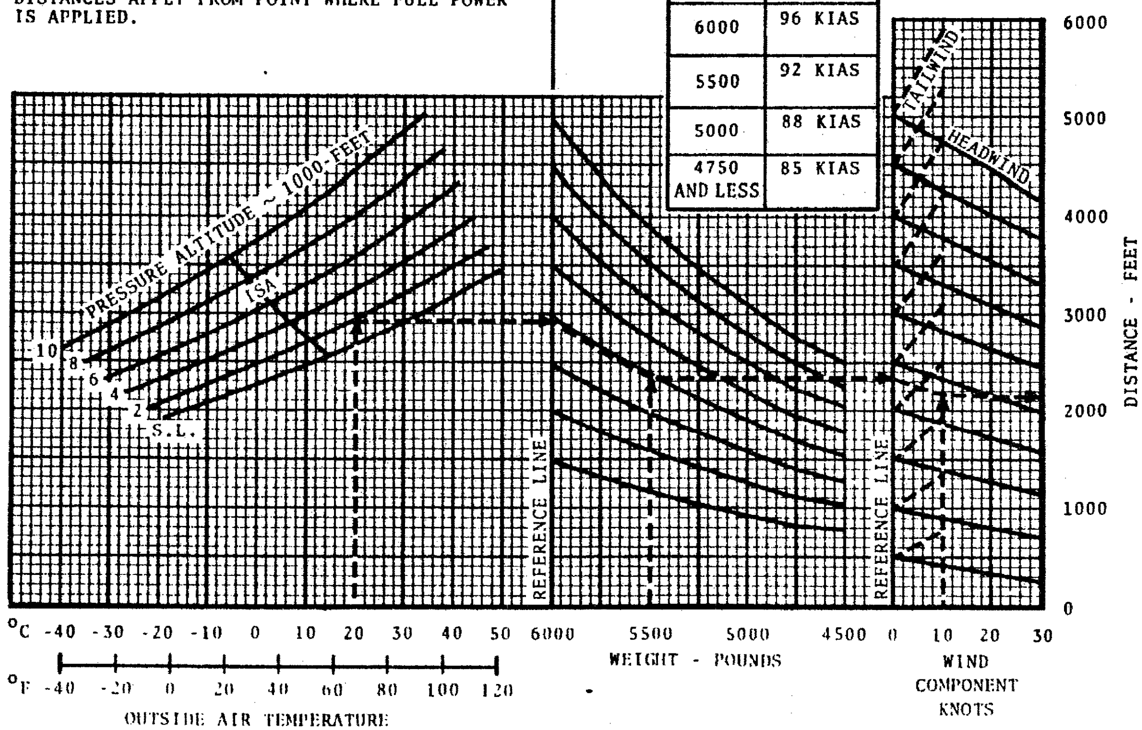
NOTE:

IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10 KTS (HEADWIND)
TAKEOFF GROUND ROLL	2150 FT
TAKEOFF SPEED	92 KIAS

WEIGHT (POUNDS)	TAKEOFF SPEED
6000	96 KIAS
5500	92 KIAS
5000	88 KIAS
4750 AND LESS	85 KIAS



TAKEOFF GROUND ROLL, FLAPS UP
Figure 8-6

ACCELERATE - STOP DISTANCE

FLAPS 20°

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - 20°.
3. LEVEL, PAVED, DRY RUNWAY.
4. ENGINE FAILURE AT ENGINE FAILURE SPEED.
5. IDLE POWER AND MAXIMUM EFFECTIVE BRAKING AFTER ENGINE FAILURE.

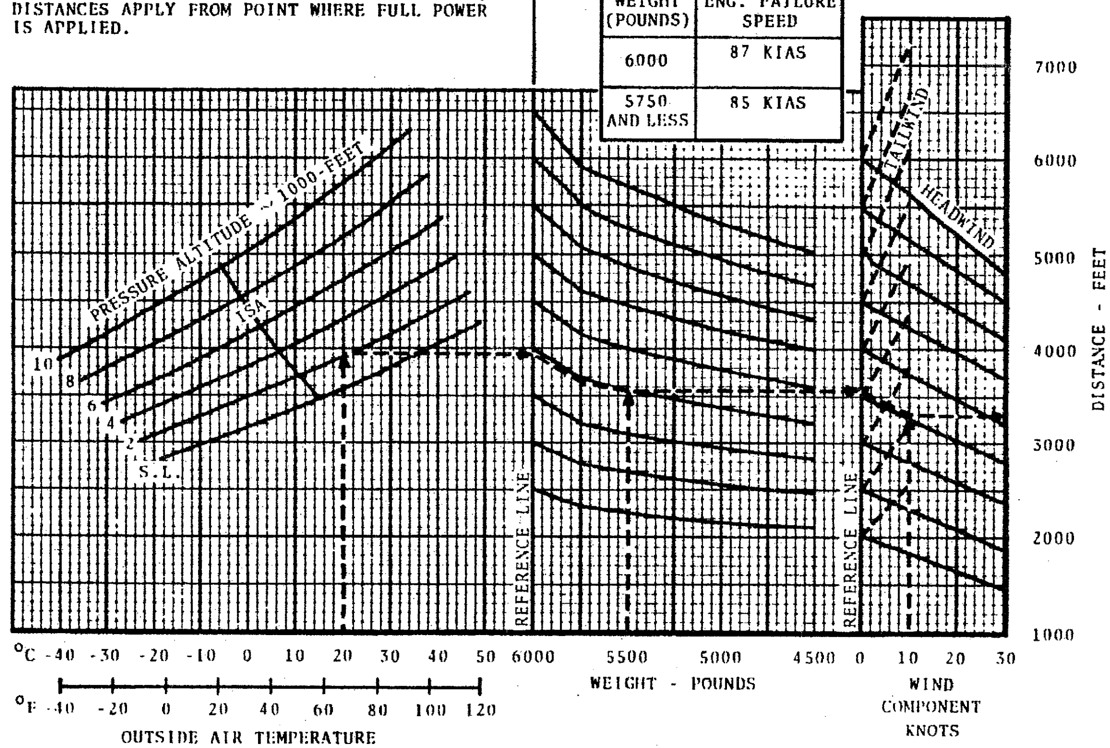
NOTE:

IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10 KTS (HEADWIND)
ACCELERATE STOP DISTANCE	3300 FT
ENGINE FAILURE SPEED	85 KIAS

WEIGHT (POUNDS)	ENG. FAILURE SPEED
6000	87 KIAS
5750 AND LESS	85 KIAS



ACCELERATE - STOP DISTANCE, FLAPS 20° DOWN
Figure 8-7

ACCELERATE - STOP DISTANCE

FLAPS UP

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP PRIOR TO BRAKE RELEASE.
2. FLAPS - UP.
3. LEVEL, PAVED DRY RUNWAY.
4. ENGINE FAILURE AT ENGINE FAILURE SPEED.
5. IDLE POWER AND MAXIMUM EFFECTIVE BRAKING AFTER ENGINE FAILURE.

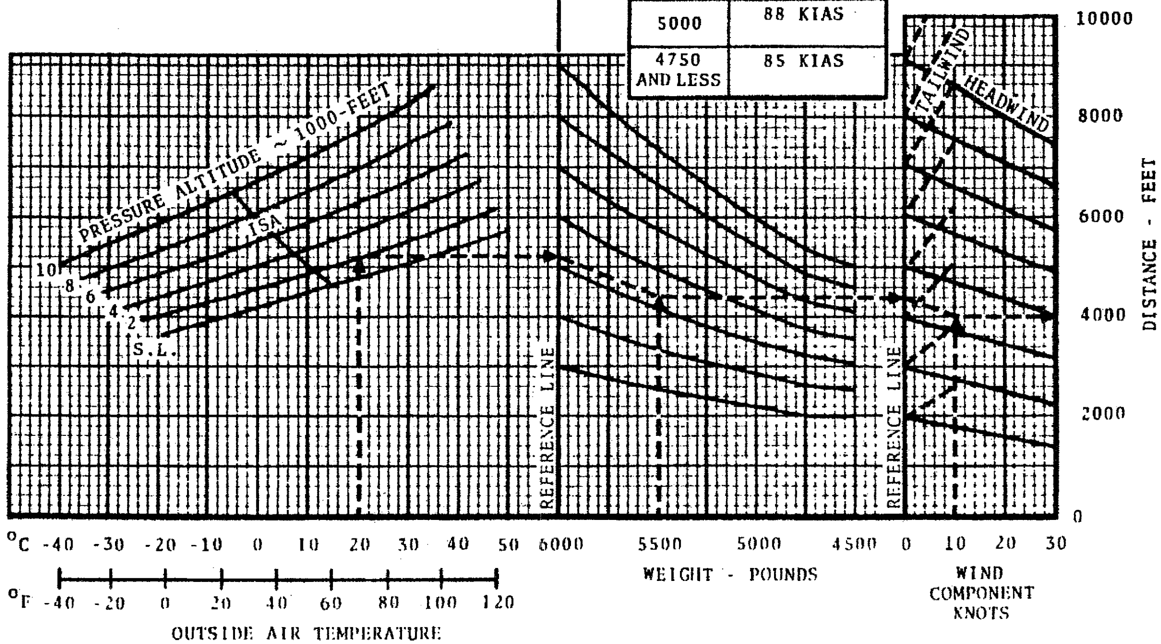
NOTE:

IF POWER IS APPLIED WITHOUT THE BRAKES SET, DISTANCES APPLY FROM POINT WHERE FULL POWER IS APPLIED.

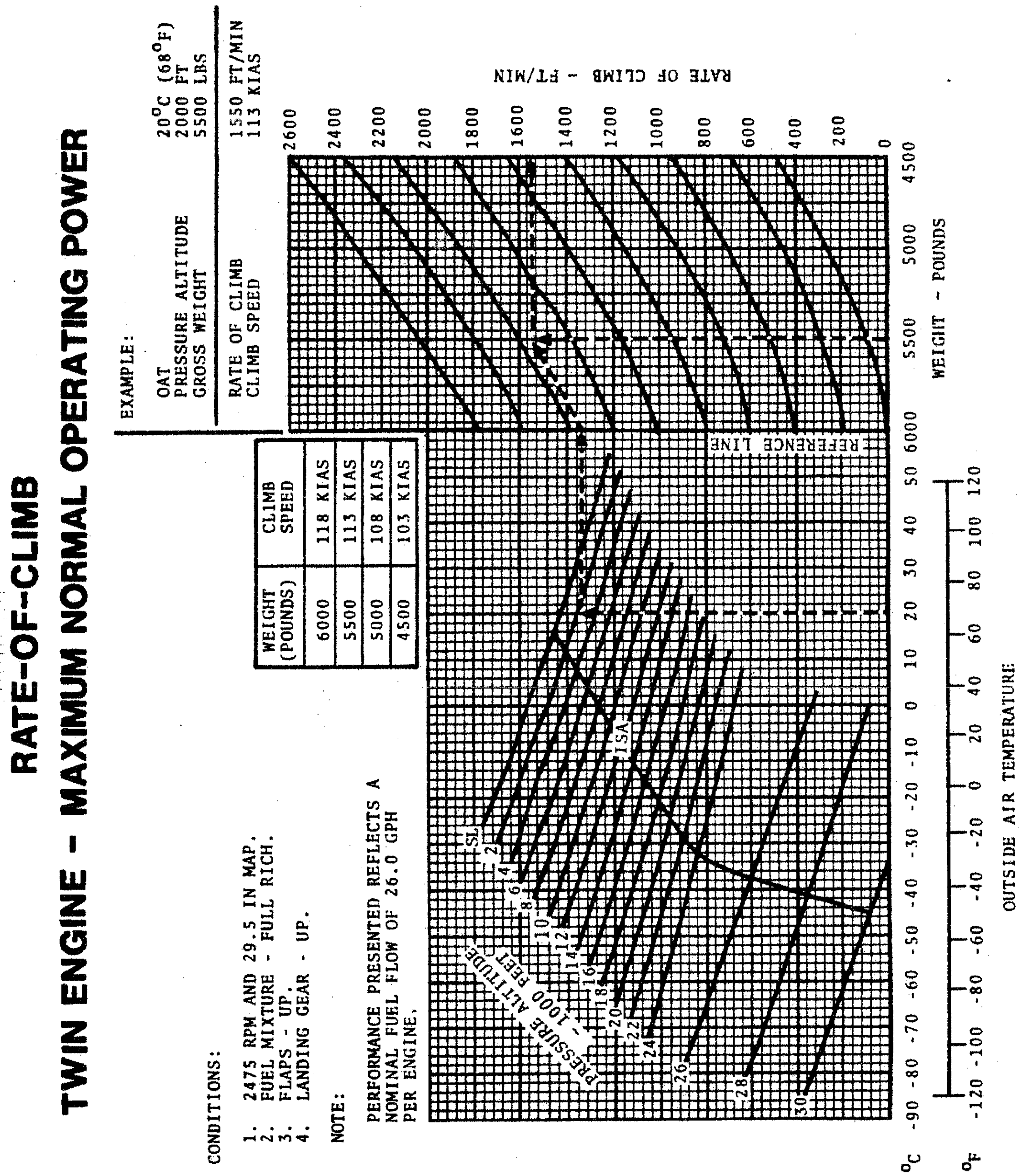
EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
WIND COMPONENT	10 KTS (HEADWIND)
ACCELERATE - STOP DISTANCE	4000 FT
ENGINE FAILURE SPEED	92 KIAS

WEIGHT (POUNDS)	ENG. FAILURE SPEED
6000	96 KIAS
5500	92 KIAS
5000	88 KIAS
4750 AND LESS	85 KIAS



ACCELERATE - STOP DISTANCE, FLAPS UP
Figure 8-8



Rate-Of-Climb, Twin Engine - Maximum Normal Operating Power
Figure 8-9

RATE-OF-CLIMB
SINGLE ENGINE - MAXIMUM CONTINUOUS POWER

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP (OPERATING ENGINE).
2. FUEL MIXTURE - FULL RICH.
3. FLAPS - UP.
4. LANDING GEAR - UP.
5. INOPERATIVE ENGINE PROPELLER-FEATHERED.

NOTE:

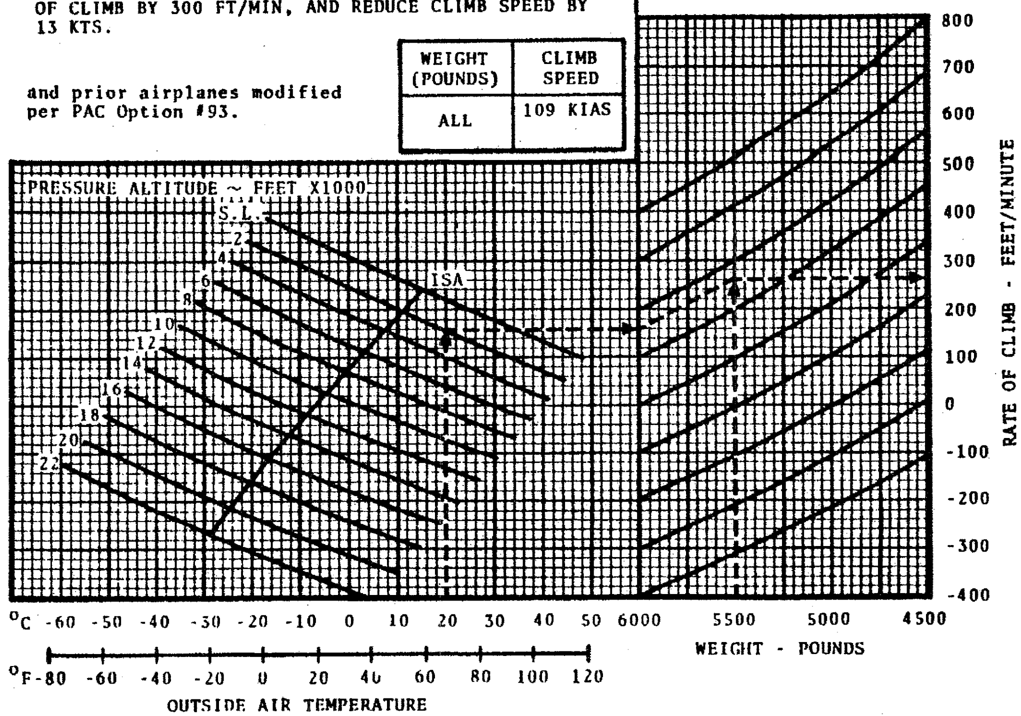
1. PERFORMANCE PRESENTED REFLECTS A NOMINAL FUEL FLOW OF 26.0 GPH. DECREASE THE CHART RATE OF CLIMB BY 8 FT/MIN FOR EACH 1 GPH OF FUEL FLOW ABOVE 26.0 GPH.
2. WHEN LANDING GEAR IS EXTENDED, DECREASE CHART RATE OF CLIMB BY 300 FT/MIN, AND REDUCE CLIMB SPEED BY 13 KTS.

and prior airplanes modified per PAC Option #93.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
RATE OF CLIMB	260 FT/MIN
CLIMB SPEED	109 KIAS

WEIGHT (POUNDS)	CLIMB SPEED
ALL	109 KIAS



Rate-Of-Climb, Single Engine - Maximum Continuous Power
Figure 8-10

RATE-OF-CLIMB
BALKED LANDING - MAXIMUM CONTINUOUS POWER

CONDITIONS:

1. 2575 RPM AND 29.5 IN MAP.
2. FUEL MIXTURE - FULL RICH.
3. FLAPS - 45°.
4. LANDING GEAR - DOWN.

NOTE:

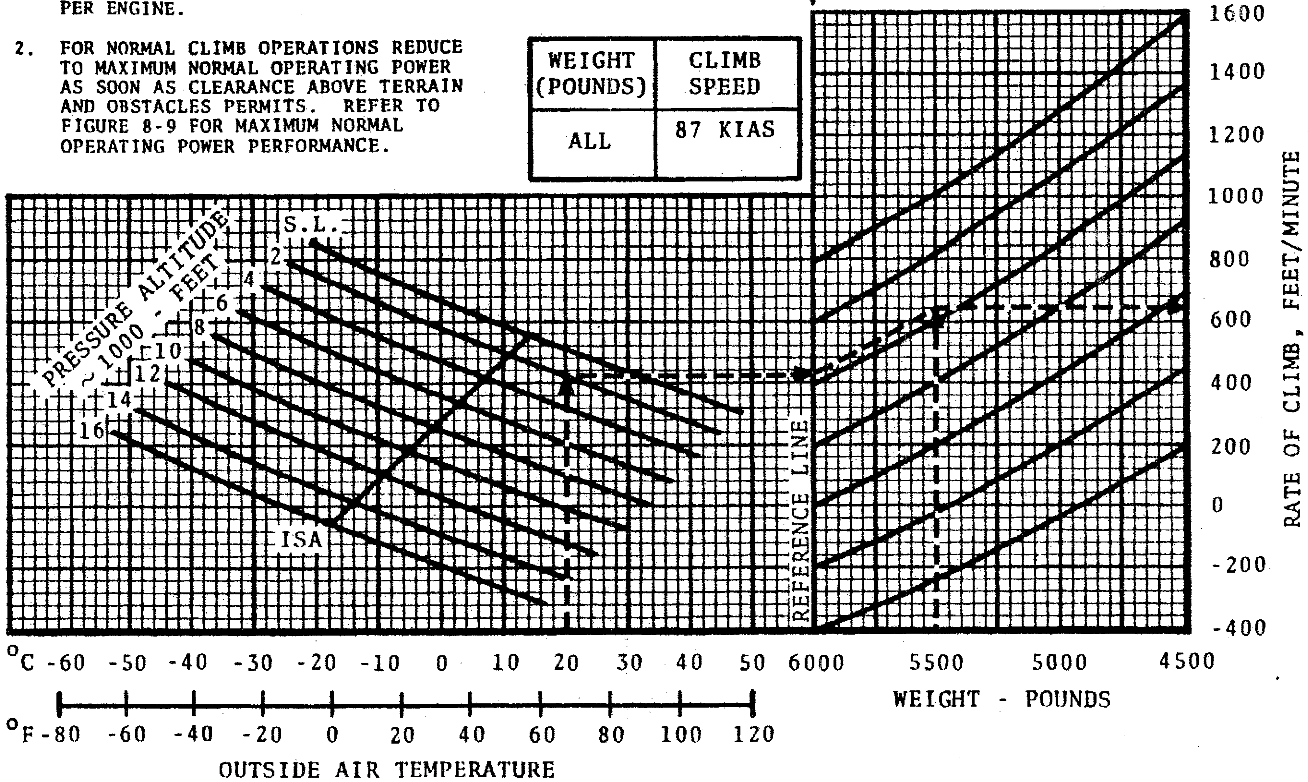
1. PERFORMANCE PRESENTED REFLECTS A NOMINAL FUEL FLOW OF 26.0 GPH PER ENGINE.

2. FOR NORMAL CLIMB OPERATIONS REDUCE TO MAXIMUM NORMAL OPERATING POWER AS SOON AS CLEARANCE ABOVE TERRAIN AND OBSTACLES PERMITS. REFER TO FIGURE 8-9 FOR MAXIMUM NORMAL OPERATING POWER PERFORMANCE.

EXAMPLE:

OAT	20°C (68°F)
PRESSURE ALTITUDE	2000 FT
GROSS WEIGHT	5500 LBS
RATE OF CLIMB	640 FT/MIN
CLIMB SPEED	87 KIAS

WEIGHT (POUNDS)	CLIMB SPEED
ALL	87 KIAS



Rate-Of-Climb, Balked Landing - Maximum Continuous Power
Figure 8-11

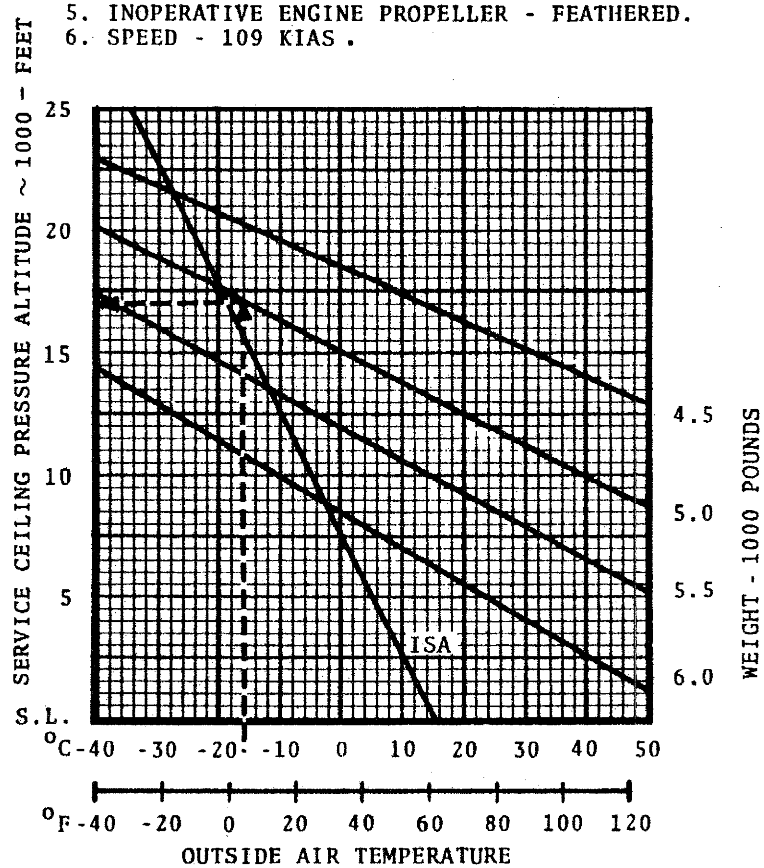
SERVICE CEILING
SINGLE ENGINE - MAXIMUM CONTINUOUS POWER

CONDITIONS:

1. 2575 RPM AND 29.5 IN. MAP (OPERATING ENGINE).
2. FUEL MIXTURE - FULL RICH.
3. FLAPS - UP.
4. LANDING GEAR - UP.
5. INOPERATIVE ENGINE PROPELLER - FEATHERED.
6. SPEED - 109 KIAS .

EXAMPLE:

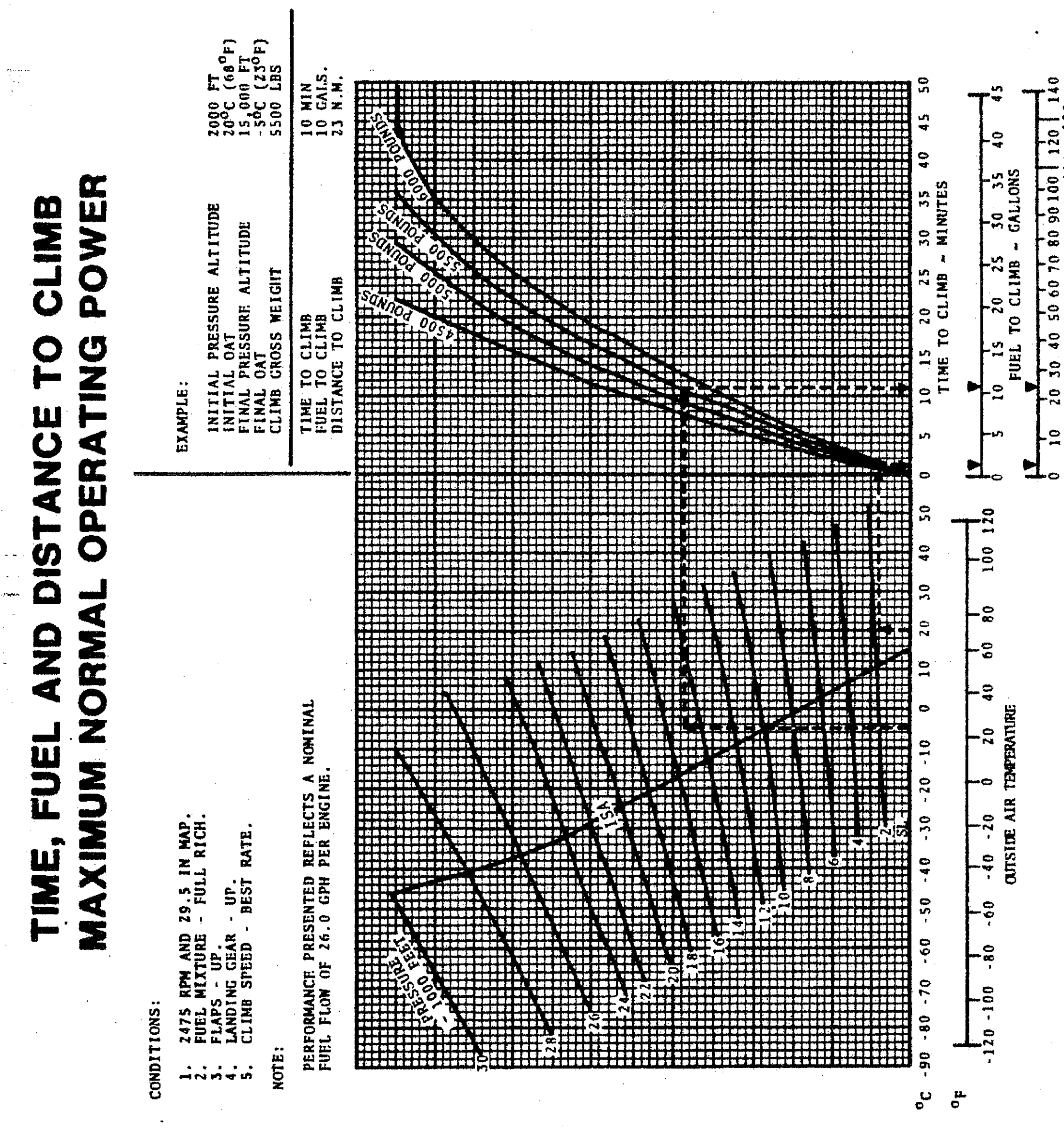
OAT (+4^{o}C TEMP DEV)	-16^{o}C (3^{o}F)
GROSS WEIGHT	5000 LBS
ALTIMETER SETTING	30.42 IN. H.G.
SERVICE CEILING	17,000 (P.A.) 17,500 (MSL)



NOTES:

1. PERFORMANCE PRESENTED REFLECTS A NOMINAL FUEL FLOW OF 26.0 GPH (OPERATIVE ENGINE).
2. SERVICE CEILINGS PRESENTED ARE PRESSURE ALTITUDES (ALTIMETER SET AT 29.92). CORRECT CHARTED SERVICE CEILING BY ADDING (SUBTRACTING) 100-FEET FOR EACH 0.1 INCH HG THAT ALTIMETER SETTING IS GREATER (LESS) THAN 29.92 INCHES HG TO OBTAIN MSL ALTITUDE.
3. SINGLE ENGINE SERVICE CEILING IS BASED ON A RATE OF CLIMB CAPABILITY OF 50 FEET PER MINUTE.

Service Ceiling, Single Engine - Maximum Continuous Power
Figure 8-12



Time, Fuel and Distance to Climb - Maximum Normal Operating Power
Figure 8-13

CRUISE PERFORMANCE, BEST POWER

5,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 1.5 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

5,000 FEET										
RPM	MAP	COLD DAY -15°C (5°F)			STANDARD DAY 5°C (41°F)			HOT DAY 25°C (77°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	26.5				75.0	209	19.6	70.5	209	18.7
	26.0				73.4	207	19.3	69.2	207	18.5
	25.0	74.9	204	18.6	70.3	204	17.7	66.2	203	17.0
	24.0	71.6	201	18.0	67.1	200	17.2	63.2	199	16.5
	23.4	69.6	199	17.6	65.0	197	16.8	61.3	196	16.1
	23.0	68.2	197	17.4	63.9	196	16.6	60.1	194	15.9
	22.0	64.8	193	16.7	60.6	192	16.0	57.0	190	15.4
	21.0	61.4	189	16.1	57.4	187	15.5	53.9	184	14.9
	20.3	59.0	186	15.8	55.0	183	15.1	51.7	181	14.6
	20.0	58.0	184	15.6	54.1	182	14.9	50.8	179	14.4
2300	27.5				75.0	209	19.3	70.5	209	18.5
	27.0				73.2	207	19.0	69.0	207	18.2
	26.0	74.8	204	18.3	70.3	204	17.4	66.2	203	16.7
	25.0	71.6	201	17.7	67.3	200	16.9	63.4	199	16.1
	24.2	69.0	198	17.2	65.0	197	16.4	61.0	196	15.7
	24.0	68.4	197	17.1	64.2	196	16.3	60.4	195	15.6
	23.0	65.2	193	16.5	61.1	192	15.7	57.5	190	15.1
	22.0	62.0	189	15.9	58.1	188	15.2	54.6	186	14.6
	21.0	58.7	185	15.3	55.0	183	14.7	51.6	180	14.1
	20.0	55.5	180	14.9	51.9	178	14.2	48.8	175	13.7
2200	28.7				75.0	209	19.0	70.5	209	18.2
	28.0				73.2	207	18.7	69.1	207	17.9
	27.0	74.4	204	19.0	69.9	203	18.1	66.0	203	17.3
	26.0	71.4	201	17.4	67.1	200	16.6	63.3	199	15.8
	25.3	69.3	198	17.0	65.0	197	16.2	61.3	196	15.5
	25.0	68.4	197	16.8	64.3	197	16.0	60.5	195	15.3
	24.0	65.3	194	16.2	61.3	193	15.5	57.8	191	14.9
	23.0	62.3	190	15.6	58.4	188	15.0	55.0	186	14.4
	22.0	59.3	186	15.1	55.0	183	14.4	52.2	181	13.9
	21.0	56.2	181	14.6	52.6	179	14.0	49.9	177	13.5
	20.0	53.0	176	14.1	49.6	174	13.5	46.6	171	13.0

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

SEA LEVEL

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 1.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

SEA LEVEL										
RPM	MAP	COLD DAY -5°C (23°F)			STANDARD DAY 15°C (59°F)			HOT DAY 35°C (95°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	26.0				75.0	200	19.6	70.5	199	18.7
	25.0				71.6	196	18.0	67.3	196	17.2
	24.0	72.8	193	18.2	68.2	193	17.4	64.1	192	16.6
	23.0	69.2	189	17.5	65.0	189	16.8	60.9	188	16.1
	22.0	65.6	186	16.9	61.4	185	16.1	57.6	183	15.5
	21.0	62.0	181	16.2	58.0	180	15.6	54.4	178	15.0
	20.0	58.4	177	15.6	55.0	176	15.1	51.1	173	14.5
2300	27.0				75.0	200	19.3	70.4	199	18.5
	26.0				71.7	196	17.7	67.5	196	16.9
	25.0	73.0	193	18.0	68.5	193	17.1	64.4	192	16.3
	24.0	69.6	190	17.3	65.0	189	16.4	61.4	188	15.8
	23.0	66.2	186	16.7	62.0	185	15.9	58.3	184	15.3
	22.0	62.8	182	16.0	58.8	181	15.3	55.2	180	14.7
	21.0	59.3	178	15.4	55.5	177	14.8	52.1	175	14.2
	20.8	58.7	177	15.3	55.0	176	14.7	51.7	174	14.1
	20.0	56.0	174	14.9	52.3	172	14.3	49.0	169	13.7
2200	28.0				75.0	200	19.0	70.5	199	18.2
	27.0				71.4	196	18.4	67.3	196	17.6
	26.0	72.9	193	17.7	68.5	193	16.8	64.5	192	16.1
	25.0	69.7	190	17.1	65.4	189	16.2	61.6	189	15.5
	24.8	69.1	189	16.9	65.0	189	16.2	61.2	188	15.4
	24.0	66.5	187	16.4	62.3	186	15.6	58.7	185	15.0
	23.0	63.2	183	15.8	59.3	182	15.1	55.7	180	14.5
	22.0	60.0	179	15.3	56.2	178	14.6	52.8	176	14.0
	21.5	58.4	177	15.0	55.0	176	14.4	51.4	174	13.8
	21.0	56.8	175	14.7	53.1	173	14.1	49.9	171	13.5
	20.0	53.5	170	14.2	50.1	168	13.6	47.0	166	13.1

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

10,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 2.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

10,000 FEET										
RPM	MAP	COLD DAY -25°C (-13°F)			STANDARD DAY -5°C (23°F)			HOT DAY 15°C (59°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	27.0				73.8	218	19.4	69.6	217	18.7
	26.0	75.0	215	19.7	70.8	214	18.9	66.7	212	18.2
	25.0	72.4	211	18.1	68.1	211	17.3	64.3	209	16.6
	24.0	69.3	207	17.6	65.0	206	16.8	61.4	205	16.1
	23.0	66.1	203	17.0	62.1	202	16.3	58.5	200	15.7
	22.0	62.9	199	16.4	59.0	197	15.7	55.5	195	15.2
	21.0	59.6	194	15.8	55.9	192	15.2	52.5	189	14.7
	20.7	58.6	192	15.6	55.0	190	15.1	51.6	186	14.6
	20.0	56.4	189	15.3	52.8	186	14.7	49.6	183	14.2
2300	28.0				73.7	218	19.1	69.0	216	18.8
	27.0	74.8	214	19.3	70.4	213	18.5	66.4	212	17.8
	26.0	72.2	211	17.8	68.0	210	17.0	64.2	209	16.3
	25.0	69.2	207	17.2	65.0	206	16.4	61.5	205	15.8
	24.0	66.2	203	16.7	62.2	202	15.9	58.7	200	15.3
	23.0	63.2	199	16.1	59.4	198	15.4	55.9	195	14.9
	22.0	60.0	195	15.6	56.3	193	14.9	53.0	190	14.4
	21.5	58.6	192	15.3	55.0	190	14.7	51.7	188	14.2
	21.0	57.1	190	15.0	53.5	188	14.5	50.4	185	13.9
	20.0	54.0	185	14.5	50.6	182	14.0	47.5	179	13.5
2200	28.0	74.6	214	19.1	70.3	213	18.3	65.7	211	18.1
	27.0	71.7	210	18.5	67.4	209	17.7	63.5	208	17.0
	26.0	69.2	207	17.0	65.0	206	16.2	61.6	205	15.5
	25.0	66.5	204	16.4	62.5	203	15.7	59.0	201	15.1
	24.0	63.7	200	15.9	59.9	199	15.2	56.5	196	14.7
	23.0	60.8	196	15.4	57.1	194	14.8	53.9	192	14.2
	22.2	58.6	193	15.0	55.0	190	14.4	51.7	187	13.9
	22.0	58.0	192	14.9	54.4	189	14.3	51.2	186	13.8
	21.0	55.1	187	14.4	51.6	184	13.8	48.5	181	13.3
	20.0	52.2	182	13.9	48.9	179	13.4	46.0	175	13.0

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

15,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 3.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

15,000 FEET										
RPM	MAP	COLD DAY -35°C (-30°F)			STANDARD DAY -15°C (6°F)			HOT DAY 5°C (42°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	29.0				73.9	228	22.8	69.5	227	22.8
	28.0				71.1	225	21.4	67.0	223	21.4
	27.0	73.3	223	20.1	68.5	221	20.1	64.5	219	20.1
	26.0	71.3	220	19.0	66.5	218	18.8	62.6	214	18.8
	25.3	69.4	217	18.6	65.0	215	18.1	62.5	214	18.1
	25.0	68.5	216	18.4	64.3	214	17.8	62.4	214	17.4
	24.0	65.8	212	16.9	62.0	210	16.2	58.6	208	15.7
	23.0	62.9	208	16.4	59.2	205	15.8	55.9	203	15.2
	22.0	59.9	203	15.9	56.3	200	15.3	53.1	197	14.8
	21.6	58.7	200	15.7	55.0	198	15.1	52.0	194	14.6
	21.0	56.9	197	15.4	53.5	195	14.8	50.4	191	14.3
	20.0	53.9	192	14.9	50.6	189	14.4	47.6	184	13.9
2300	28.0	72.6	222	20.0	68.3	221	20.0	64.3	218	20.0
	27.0	70.9	219	18.6	66.2	217	18.4	62.2	215	18.4
	26.4	69.0	217	18.2	65.0	215	17.8	61.1	213	17.6
	26.0	68.4	216	18.1	64.3	214	17.4	60.4	212	17.1
	25.0	65.6	212	17.6	61.8	210	16.9	58.2	208	16.4
	24.0	63.4	208	16.1	59.7	206	15.5	56.5	204	15.0
	23.0	60.7	204	15.7	57.1	202	15.1	54.0	199	14.5
	22.2	58.5	200	15.3	55.0	198	14.7	51.9	195	14.2
	22.0	57.9	199	15.2	54.5	197	14.6	51.4	194	14.1
	21.0	55.1	194	14.7	51.7	191	14.2	48.8	188	13.7
	20.0	52.2	189	14.2	49.0	185	13.7	46.2	180	13.3
2200	28.0	70.4	219	18.3	66.6	217	17.5	62.3	215	17.3
	27.4	68.9	216	18.0	65.0	215	17.3	61.3	213	16.8
	27.0	68.0	215	17.8	64.0	214	17.2	60.6	212	16.5
	26.0	66.0	212	16.3	62.3	211	15.6	59.0	209	15.1
	25.0	63.5	208	15.9	59.9	207	15.2	56.7	204	14.7
	24.0	60.9	204	15.4	57.4	202	14.8	54.3	200	14.3
	23.0	58.3	200	15.0	55.0	198	14.4	51.9	195	13.9
	22.0	55.7	195	14.5	52.4	192	14.0	49.5	189	13.5
	21.0	53.1	190	14.1	49.9	187	13.6	47.1	183	13.1
	20.0	50.5	185	13.7	47.4	182	13.2	44.6	177	12.8

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

20,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 4.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

20,000 FEET										
RPM	MAP	COLD DAY -45°C (-48°F)			STANDARD DAY -25°C (-12°F)			HOT DAY -5°C (24°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	28.0	71.4	230	21.8	67.6	229	21.8	63.0	225	21.8
	27.0	69.1	227	20.5	65.0	224	20.5	61.5	223	20.5
	26.0	66.9	223	19.2	62.8	220	19.2	59.3	219	19.2
	25.0	65.3	220	17.9	60.7	217	17.9	57.2	214	17.9
	24.0	62.4	215	17.4	58.9	213	16.8	55.0	209	16.8
	23.0	59.6	210	16.9	56.0	207	16.4	53.0	204	15.9
	22.4	58.4	208	15.7	55.0	205	15.1	52.1	201	14.7
	22.0	57.3	206	15.5	54.0	203	14.9	51.1	198	14.5
	21.0	54.5	200	15.0	51.3	197	14.5	48.4	192	14.0
	20.0	51.6	194	14.5	48.6	189	14.0	45.8	185	13.7
2300	28.0	68.2	225	21.2	63.9	222	21.2	59.6	219	21.2
	27.0	66.2	222	20.0	62.3	219	20.0	58.4	216	20.0
	26.0	64.2	218	18.7	60.4	216	18.7	57.0	213	18.7
	25.0	62.3	215	17.4	58.3	212	17.4	55.0	209	17.4
	24.0	60.2	212	16.7	56.1	208	16.7	52.9	204	16.7
	23.0	58.3	208	15.3	55.0	205	14.7	52.1	202	14.2
	22.0	55.7	203	14.8	52.5	200	14.3	49.7	195	13.8
	21.0	53.1	197	14.4	50.1	195	13.9	47.3	189	13.4
	20.0	50.6	192	14.0	47.6	187	13.5	44.9	182	13.1
2200	28.0	66.8	223	19.3	62.9	221	19.3	59.5	219	19.3
	27.0	64.4	219	18.0	60.6	216	18.0	57.3	214	18.0
	26.0	63.0	216	16.9	58.9	213	16.8	55.6	210	16.8
	25.0	60.6	212	16.5	57.3	210	15.9	54.0	207	15.6
	24.0	59.0	209	15.1	55.7	207	14.5	52.8	204	14.0
	23.7	58.3	207	15.0	55.0	205	14.4	52.1	201	13.9
	23.0	56.0	205	14.7	53.5	202	14.2	50.6	197	13.7
	22.0	54.3	200	14.3	51.5	197	13.8	48.4	192	13.3
	21.0	51.9	195	13.9	48.9	190	13.4	46.2	186	13.0
	20.0	49.5	190	13.5	46.6	185	13.1			

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

25,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 5.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

25,000 FEET										
RPM	MAP	COLD DAY -54°C (-66°F)			STANDARD DAY -34°C (-30°F)			HOT DAY -14°C (6°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	28.0	67.1	233	23.1	62.6	228	23.1	58.3	224	23.1
	27.0	65.9	231	22.1	61.2	227	22.1	57.1	222	22.1
	26.0	65.0	230	21.2	59.6	224	21.2	55.5	218	21.2
	25.0	61.9	223	20.1	58.1	221	20.1	54.2	214	20.1
	24.0	59.8	219	19.0	56.2	216	19.0	52.8	210	19.0
	23.4	58.5	216	18.1	55.0	213	18.1	51.8	207	18.1
	23.0	57.8	215	17.6	54.3	212	17.6	51.2	205	17.6
	22.0	55.9	211	16.4	52.6	208	16.0	49.3	201	16.0
	21.0	53.5	205	15.9	50.3	200	15.4	47.4	194	15.0
	20.0	51.6	200	14.5	48.6	196	14.0	45.9	187	13.7
2300	28.0	65.4	230	21.5	60.9	226	21.5	56.7	222	21.5
	27.0	64.0	228	20.3	60.0	224	20.3	56.1	221	20.3
	26.0	62.3	224	19.1	58.6	222	19.1	55.2	217	19.1
	25.0	60.5	220	17.9	56.9	218	17.9	53.8	213	17.9
	24.0	58.7	217	16.8	55.0	213	16.8	52.0	207	16.8
	23.0	56.9	213	16.1	53.6	210	15.6	50.3	203	15.6
	22.0	54.6	208	15.7	51.4	204	15.2	48.4	197	14.8
	21.0	52.9	204	14.4	49.9	199	13.9	47.2	193	13.4
	20.0	50.5	197	14.0	47.6	193	13.5	44.9	184	13.1
2200	26.0	60.0	219	18.4	56.8	218	18.4	53.1	211	18.4
	25.0	58.4	216	17.2	55.0	213	17.2	51.9	207	17.2
	24.0	56.8	212	16.1	53.3	232	16.1	50.3	203	16.1
	23.0	55.0	209	15.5	51.9	205	15.0	49.0	199	14.6
	22.0	53.6	206	14.2	50.6	201	13.7	47.9	196	13.2
	21.0	51.4	199	13.8	48.5	195	13.3	45.9	187	13.0
	20.0	49.2	194	13.4	46.4	189	13.0			

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, BEST POWER

30,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 5.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 100°F, THEN INCREASE INDICATED FUEL FLOW 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

30,000 FEET										
	MAP	COLD DAY -64°C (-83°F)			STANDARD DAY -44°C (-47°F)			HOT DAY -24°C (-11°F)		
RPM	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	24.0	62.6	235	20.0	59.2	231	20.0	55.7	224	20.0
	23.0	62.1	234	18.7	58.6	230	18.7	55.6	224	18.7
	22.0	59.4	227	17.4	55.6	222	17.4	52.9	211	17.4
	21.5	58.6	226	16.9	55.0	220	16.7	52.1	210	16.7
	21.0	57.7	223	16.3	54.4	219	16.0	51.3	209	16.0
	20.0	56.2	220	15.2	53.0	216	14.6	50.2	207	14.2
2300	23.0	60.6	230	17.3	57.3	227	17.3	54.4	221	17.3
	22.0	59.0	226	15.4	56.0	222	14.8	53.3	218	14.7
	21.5	58.0	225	15.2	55.0	220	14.7	52.3	210	14.3
	20.0	54.0	214	14.6	51.0	210	14.2	48.3	203	13.6
2200	22.0	56.8	222	14.7	54.0	218	14.3	51.5	212	13.7
	21.0	54.8	217	14.2	52.0	213	13.9	49.5	208	13.4

Cruise Performance
Figure 8-14

CRUISE PERFORMANCE, ECONOMY

SEA LEVEL

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 1.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

SEA LEVEL										
RPM	MAP	COLD DAY -5°C (23°F)			STANDARD DAY 15°C (59°F)			HOT DAY 35°C (95°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG
2400	26.0				75.0	200	17.2	70.6	199	16.4
	25.0	75.0	195	16.3	70.5	195	15.5	66.5	195	14.8
	24.0	71.8	192	15.7	66.9	191	14.9	63.3	191	14.2
	23.3	69.9	190	15.3	65.0	189	14.6	61.4	188	13.9
	23.0	68.3	188	15.1	64.0	188	14.4	60.2	187	13.8
	22.0	64.7	185	14.5	60.7	184	13.9	57.0	182	13.4
	21.0	61.4	181	14.0	56.8	177	13.4	53.7	177	12.9
	20.4	59.5	178	13.6	55.0	176	13.1	52.0	174	12.6
	20.0	57.7	176	13.3	53.9	174	12.9	50.6	172	12.4
	19.0	54.1	171	13.0	50.6	169	12.4	47.3	166	12.0
	18.0	50.7	166	12.5	47.2	163	12.0			
	17.8	48.4	163	11.4	45.0	159	10.9			
2300	27.0				75.0	200	16.9	70.9	199	16.3
	26.0	75.0	195	16.1	70.2	195	15.3	66.7	195	14.6
	25.0	72.0	192	15.5	67.6	192	14.8	63.7	191	14.1
	24.0	68.7	189	14.9	65.0	189	14.3	60.8	187	13.6
	23.0	65.4	185	14.4	61.4	185	13.7	57.7	183	13.2
	22.0	62.1	182	13.9	58.1	180	13.2	54.5	178	12.7
	21.0	58.7	177	13.3	55.0	176	12.7	51.6	174	12.2
	20.0	55.5	173	12.8	51.8	171	12.3	48.5	168	11.8
	19.0	52.1	168	12.3	48.5	166	11.8			
	18.4	48.4	163	11.0	45.0	159	10.6			
2200	28.0				74.8	199	17.6	70.6	199	17.6
	27.0				71.1	196	15.9	67.2	195	15.3
	26.0	72.0	192	15.2	67.7	192	14.5	63.8	191	13.8
	25.0	68.9	189	14.7	65.0	189	14.0	61.1	188	13.4
	24.0	65.8	186	14.1	61.8	185	13.5	58.1	184	13.0
	23.0	62.6	182	13.6	58.7	181	13.1	55.1	179	12.5
	22.0	59.4	178	13.2	55.0	176	12.6	52.3	174	12.1
	21.0	56.3	174	12.7	52.6	172	12.1	49.3	170	11.6
	20.0	53.0	170	12.2	49.5	167	11.7	46.6	165	11.2
	19.0	48.1	162	10.7	45.0	159	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

5,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 1.5 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

5,000 FEET										
RPM	MAP	COLD DAY -15°C (5°F)			STANDARD DAY 5°C (41°F)			HOT DAY 25°C (77°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	26.6				75.0	209	17.2	70.8	209	16.4
	26.0				73.2	207	16.8	69.0	207	16.1
	25.0	73.8	203	16.1	69.1	203	15.2	65.3	202	14.6
	24.0	70.5	200	15.5	66.3	199	14.8	62.4	199	14.1
	23.6	69.2	198	15.3	65.0	197	14.6	61.1	196	13.9
	23.0	67.4	196	14.9	63.2	195	14.3	59.3	193	13.7
	22.0	64.0	192	14.4	60.0	191	13.8	56.4	189	13.3
	21.0	60.6	188	13.9	56.8	186	13.4	53.2	183	12.8
	20.5	58.7	185	13.6	55.0	183	13.1	51.5	180	12.6
	20.0	57.3	183	13.4	53.5	181	12.9	50.8	178	12.4
	19.0	53.8	178	12.9	50.4	175	12.4	47.1	172	12.0
	18.0	50.6	172	12.4	47.0	171	12.0			
	17.8	48.3	168	11.3	45.0	165	10.9			
2300	27.6				75.0	209	16.9	71.1	209	16.6
	27.0				73.0	207	16.5	68.9	206	15.9
	26.0	73.7	203	15.8	69.4	203	15.1	65.4	202	14.4
	25.0	70.6	200	15.3	66.5	199	14.6	62.7	198	14.0
	24.5	69.1	199	15.1	65.0	197	14.4	61.2	197	13.8
	24.0	67.6	196	14.8	63.5	196	14.1	59.7	194	13.5
	23.0	64.5	193	14.2	60.6	192	13.6	56.9	189	13.0
	22.0	61.4	189	13.7	57.5	187	13.2	54.0	185	12.6
	21.2	58.8	185	13.3	55.0	183	12.8	51.7	181	12.2
	21.0	58.1	184	13.2	54.3	182	12.7	51.1	179	12.1
	20.0	54.8	179	12.7	51.4	177	12.2	48.1	174	11.8
	19.0	51.7	174	12.2	48.2	171	11.6			
	18.5	48.4	168	11.0	45.0	165	10.6			
2200	28.0				73.4	207	17.6	69.2	207	17.6
	27.0				69.8	203	15.7	66.0	203	15.1
	26.0	70.5	200	16.0	66.4	199	14.2	62.7	198	13.6
	25.5	69.0	198	14.8	65.0	197	14.0	61.3	197	13.4
	25.0	67.6	196	14.5	63.6	196	13.8	59.9	194	13.2
	24.0	64.6	193	14.0	60.7	192	13.3	57.2	190	12.8
	23.0	61.7	189	13.5	57.9	188	12.9	54.4	185	12.4
	22.2	58.7	185	13.1	55.0	183	12.5	51.8	181	12.0
	22.0	58.5	184	13.0	54.8	182	12.4	51.5	180	11.9
	21.0	55.6	180	12.6	52.1	178	12.0	48.9	175	11.6
	20.0	52.6	176	12.1	49.1	173	11.6	46.3	170	11.2
	19.0	47.8	167	10.7	45.0	165	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

10,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 2.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

10,000 FEET

RPM	MAP	COLD DAY -25°C (-13°F)			STANDARD DAY -5°C (23°F)			HOT DAY 15°C (59°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	27.3				75.0	219	19.2	70.5	218	19.2
	27.0				74.1	218	18.8	69.6	217	18.8
	26.0				71.2	214	17.3	67.2	214	17.3
	25.0	71.5	210	15.7	66.9	209	14.9	63.5	208	14.3
	24.0	69.6	208	15.1	65.0	206	14.4	61.6	205	13.9
	23.0	65.2	202	14.6	61.4	201	14.0	57.8	199	13.5
	22.0	62.2	198	14.1	58.3	196	13.6	54.9	193	13.0
	21.0	58.9	193	13.7	55.0	190	13.1	51.9	188	12.6
	20.0	55.8	188	13.2	52.2	185	12.7	49.0	182	12.3
	19.0	52.5	182	12.7	49.0	179	12.2	46.1	176	11.9
	18.2	48.4	174	11.4	45.0	171	10.9			
2300	28.0				74.6	219	18.8	72.3	220	18.8
	27.0	75.0	214	17.2	70.8	214	17.2	67.0	213	17.2
	26.0	71.3	210	15.4	66.9	209	14.7	63.5	208	14.1
	25.2	68.4	208	14.9	65.0	206	14.4	61.5	205	13.8
	25.0	67.8	206	14.8	64.5	205	14.3	61.0	204	13.7
	24.0	65.4	202	14.4	61.6	201	13.8	58.1	199	13.3
	23.0	62.5	198	13.9	58.7	197	13.3	55.4	194	12.8
	22.0	58.9	194	13.4	55.8	192	13.0	52.4	188	12.5
	21.8	58.8	193	13.3	55.0	190	12.8	51.7	187	12.4
	21.0	56.6	189	13.0	53.0	187	12.5	49.7	183	12.0
	20.0	53.4	184	12.5	50.0	181	12.0	47.0	178	11.6
	19.0	50.5	179	12.1	47.1	175	11.7			
	18.8	48.3	174	11.0	45.0	171	10.6			
2200	28.0				73.3	217	18.1	69.6	217	18.1
	27.0	72.1	211	16.5	68.0	210	16.5	64.2	209	16.5
	26.2	69.1	209	14.8	65.0	206	14.0	61.6	205	13.5
	26.0	68.4	208	14.6	64.4	205	13.9	61.0	204	13.4
	25.0	65.8	203	14.2	62.0	202	13.5	58.4	200	13.0
	24.0	63.1	199	13.7	59.2	197	13.1	56.0	195	12.6
	23.0	60.1	195	13.3	56.8	193	12.8	53.3	190	12.2
	22.4	58.3	192	13.1	55.0	190	12.5	51.6	187	12.0
	22.0	57.4	191	12.9	53.8	188	12.3	50.8	185	11.8
	21.0	54.5	186	12.4	51.2	183	11.9	48.1	180	11.5
	20.0	51.8	181	12.0	48.4	178	11.5			
	19.3	48.3	174	10.7	45.0	171	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

15,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 3.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

15,000 FEET										
RPM	MAP	COLD DAY -35°C (-30°F)			STANDARD DAY -15°C (6°F)			HOT DAY 5°C (42°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	26.0	72.4	221	18.8	69.5	222	18.8	66.4	222	18.8
	25.0	68.8	216	17.4	65.0	215	17.4	61.1	213	17.4
	24.0	65.0	211	14.6	61.4	209	14.0	57.9	207	13.6
	23.0	62.2	206	14.1	58.5	204	13.6	55.4	202	13.1
	22.0	59.3	204	13.7	55.7	199	13.2	52.5	196	12.7
	21.8	58.6	200	13.6	55.0	198	13.1	51.9	194	12.6
	21.0	56.3	196	13.3	52.8	193	12.8	49.8	190	12.4
	20.0	53.2	191	12.8	50.0	187	12.4	47.1	184	12.0
	19.0	50.3	185	12.4	47.1	181	12.0			
	18.8	48.0	180	11.4	45.0	174	10.9			
2300	26.0	71.2	220	17.1	67.0	218	17.1	63.0	216	17.1
	25.6	69.0	216	16.4	65.0	215	16.1	61.3	213	15.9
	25.0	65.2	211	14.4	61.7	210	13.8	58.3	207	13.3
	24.0	62.7	207	14.0	59.0	205	13.4	55.9	203	12.9
	23.0	59.9	203	13.6	56.8	201	13.0	53.4	198	12.5
	22.4	58.1	200	13.3	55.0	198	12.8	51.7	194	12.3
	22.0	57.3	198	13.1	53.8	195	12.6	50.9	192	12.1
	21.0	54.4	193	12.7	51.3	190	12.2	48.2	187	11.8
	20.0	51.7	188	12.2	48.5	184	11.8			
	19.3	48.1	180	10.9	45.0	174	10.6			
2200	27.0	68.6	216	16.7	64.8	215	16.7	61.4	213	16.7
	26.0	65.2	211	14.1	61.7	210	13.5	58.4	208	13.0
	25.0	62.8	207	13.7	59.2	205	13.1	56.2	203	12.6
	24.0	60.2	203	13.3	56.8	201	12.8	53.7	198	12.3
	23.3	58.4	200	13.0	55.0	198	12.5	52.0	195	11.9
	23.0	57.8	199	12.9	54.3	196	12.4	50.3	191	11.8
	22.0	55.1	194	12.5	52.0	192	12.0	49.0	188	11.6
	21.0	52.6	189	12.1	49.4	186	11.7	46.7	184	11.3
	20.0	49.9	184	11.7	47.0	181	11.4			
	19.7	48.0	179	10.7	45.0	174	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

20,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 4.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

20,000 FEET										
RPM	MAP	COLD DAY -45°C (-48°F)			STANDARD DAY -25°C (-12°F)			HOT DAY -5°C (24°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	24.0	64.5	219	16.8	61.6	218	16.8	58.7	216	16.8
	23.0	60.1	211	15.9	56.7	209	15.9	53.0	204	15.9
	22.4	58.4	208	15.6	55.0	205	15.6	51.2	200	15.6
	22.0	56.7	205	13.3	53.4	202	12.9	50.6	199	12.4
	21.0	53.8	199	12.9	50.8	196	12.5	47.9	193	12.1
	20.0	51.1	193	12.5	48.0	190	12.1			
	19.4	48.0	187	11.4	45.0	181	10.9			
2300	24.0	60.9	213	16.2	58.4	212	16.2	54.4	207	16.2
	23.2	58.7	209	15.7	55.0	205	15.7	51.3	200	15.7
	23.0	57.7	207	13.2	54.4	204	12.7	51.6	201	12.2
	22.0	55.0	201	12.8	52.0	199	12.3	49.1	196	11.9
	21.0	52.6	196	12.4	49.4	193	11.9	46.8	187	11.6
	20.0	50.2	191	12.0	47.1	188	11.7			
	19.8	48.0	187	10.9	45.0	181	10.6			
2200	26.0	65.8	221	16.8	62.4	220	16.8	59.6	218	16.8
	25.0	62.5	216	15.6	59.8	215	15.6	57.1	213	15.6
	24.0	58.4	208	13.0	55.0	205	12.5	52.3	202	12.1
	23.0	56.2	204	12.0	52.9	201	12.2	50.1	198	11.7
	22.0	53.7	199	12.3	50.8	196	11.9	47.9	193	11.4
	21.0	51.5	194	11.9	48.4	191	11.5			
	20.0	48.0	187	10.7	45.0	181	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

25,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 5.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

25,000 FEET										
RPM	MAP	COLD DAY -54°C (-66°F)			STANDARD DAY -34°C (-30°F)			HOT DAY -14°C (6°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	22.0	56.0	211	16.6	52.7	208	16.0	49.2	200	16.0
	21.0	54.0	207	13.9	51.0	203	13.9	48.3	197	13.9
	20.0	51.0	200	12.5	48.0	193	12.1			
	19.5	48.0	191	11.2	45.0	184	10.9			
2300	22.0	55.2	209	14.4	52.2	206	14.4	49.2	200	14.4
	21.0	52.4	203	12.4	49.3	198	11.9	46.7	192	11.6
	20.0	49.9	198	12.0	47.1	192	11.7			
	19.8	47.8	191	10.9	45.0	184	10.6			
2200	24.0	57.1	214	16.1	53.1	207	16.1			
	23.0	55.5	210	13.5	52.7	206	13.4	49.9	202	13.4
	22.0	53.1	205	12.2	50.1	200	11.7	47.4	195	11.3
	21.0	51.0	200	11.9	48.1	195	11.5			
	20.3	47.8	191	10.7	45.0	184	10.3			

Cruise Performance
Figure 8-15

CRUISE PERFORMANCE, ECONOMY

30,000 FEET

NOTES:

1. 6000-POUNDS GROSS WEIGHT (INCREASE SPEEDS BY 5.0 KTAS FOR EACH 500-POUNDS BELOW 6,000 POUNDS).
2. WHEN OPERATING AT POWER SETTINGS WITHIN THE BOXES, DO NOT LEAN BELOW FUEL FLOWS SHOWN. WHEN OPERATING OUTSIDE THE BOXES LEAN TO PEAK EGT AND ENRICHEN 1 GALLON USING FUEL FLOWS SHOWN ONLY AS A GUIDE.
3. WHEN OPERATING ABOVE 75% POWER, 2400 RPM, OR MAXIMUM MAP SHOWN FOR A SELECTED RPM, USE FULL RICH MIXTURE.
4. PERCENT POWERS ARE PERCENT OF SEA LEVEL RATED POWER AND ARE APPROXIMATE.

30,000 FEET										
RPM	MAP	COLD DAY -64°C (-83°F)			STANDARD DAY -44°C (-47°F)			HOT DAY -24°C (-11°F)		
	(in. Hg)	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.	% POWER	KTAS	GPH PER ENG.
2400	22.0	60.1	229	17.4	56.2	222	17.4	53.4	219	17.4
	21.0	58.3	225	16.2	55.0	220	16.2	52.5	212	16.2
	20.0	56.2	220	14.9	53.0	216	14.9	50.0	207	14.9
2300	22.0	59.0	227	15.8	55.7	221	15.8	53.0	216	15.8
	21.7	58.0	225	15.2	55.0	220	15.2	52.0	210	15.2
	21.0	56.4	220	14.2	53.2	216	14.2	50.7	208	14.2
	20.0	53.7	213	13.0	50.7	209	12.7	48.3	205	12.7
2200	22.0	56.8	221	14.5	54.0	218	14.5	51.2	208	14.5
	21.0	53.5	212	12.1	50.6	209	11.5	48.3	205	11.4

Cruise Performance
Figure 8-15

RANGE PROFILE
BEST POWER & ECONOMY
2200 RPM

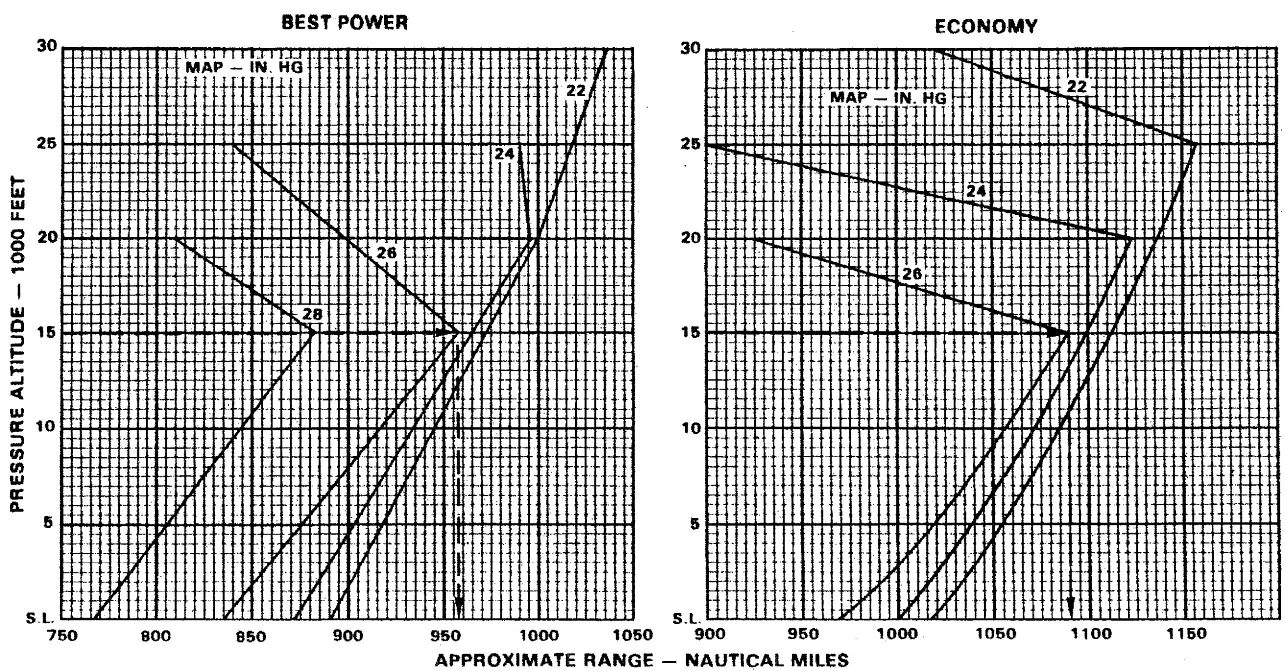
CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2200 RPM
MANIFOLD PRESSURE	26 IN. HG.
RANGE, BEST POWER	957 N.M.
ECONOMY	1091 N.M.

NOTES:

1. RANGE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. DISTANCES SHOWN ARE THE SUM OF CLIMB, CRUISE AND DESCENT DISTANCES AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.



Range Profile, Best Power and Economy
Figure 8-16

RANGE PROFILE
BEST POWER & ECONOMY

2300 RPM

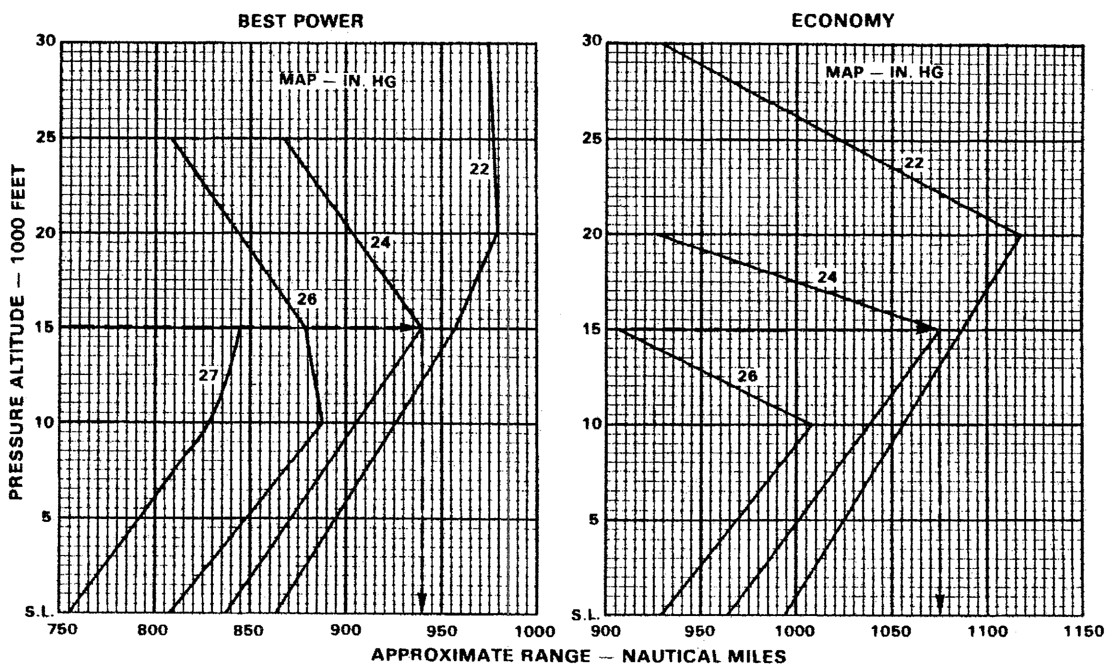
CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2300 RPM
MANIFOLD PRESSURE	24 IN. HG.
RANGE, BEST POWER	940 N.M.
ECONOMY	1075 N.M.

NOTES:

1. RANGE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. DISTANCES SHOWN ARE THE SUM OF CLIMB, CRUISE AND DESCENT DISTANCES AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.



Range Profile, Best Power and Economy
Figure 8-16

RANGE PROFILE
BEST POWER & ECONOMY

2400 RPM

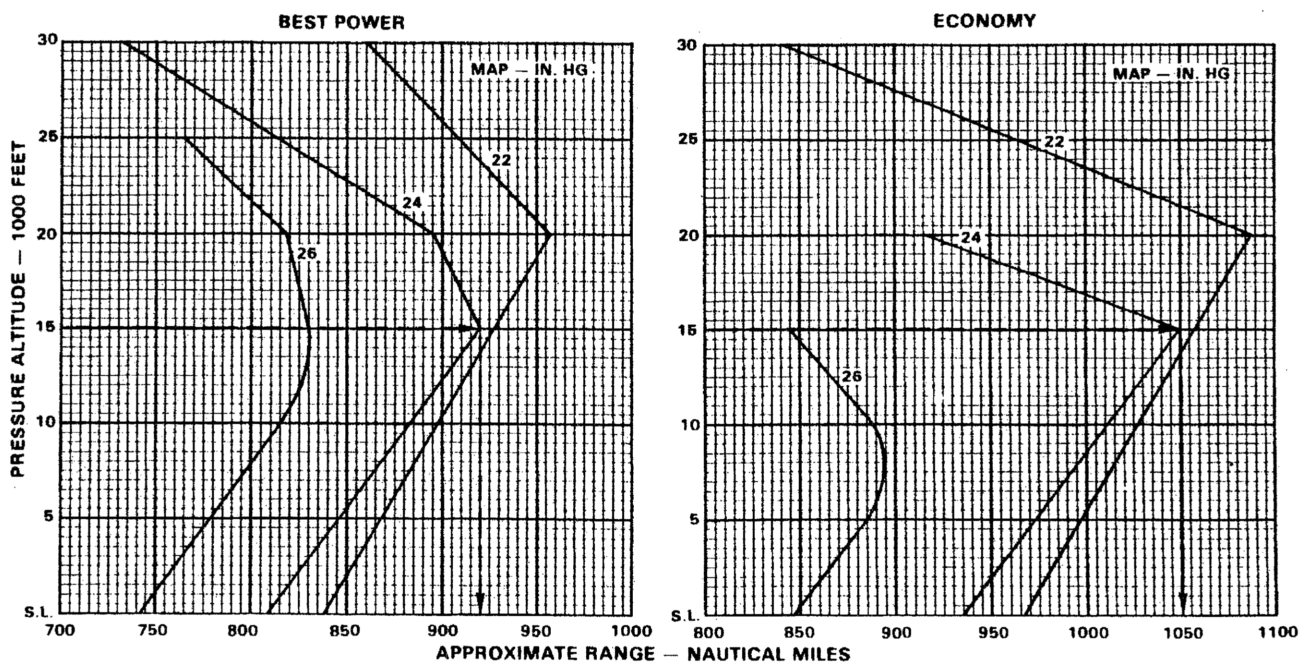
CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2400 RPM
MANIFOLD PRESSURE	24 IN. HG.
RANGE, BEST POWER	920 N.M.
ECONOMY	1050 N.M.

NOTES:

1. RANGE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. DISTANCES SHOWN ARE THE SUM OF CLIMB, CRUISE AND DESCENT DISTANCES AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.



Range Profile, Best Power and Economy
Figure 8-16

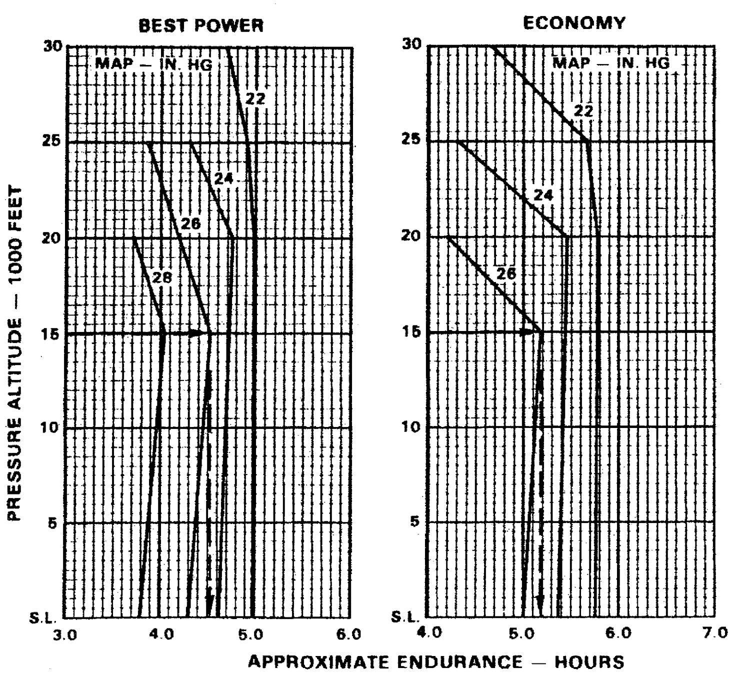
ENDURANCE PROFILE BEST POWER & ECONOMY

2200 RPM

CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2200 RPM
MANIFOLD PRESSURE	26 IN. HG.
ENDURANCE, BEST POWER	4.53 HRS.
ECONOMY	5.17 HRS.



NOTES:

1. ENDURANCE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. ENDURANCES SHOWN ARE THE SUM OF THE TIMES TO CLIMB, CRUISE AND DESCEND AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.

Endurance Profile, Best Power and Economy
Figure 8-17

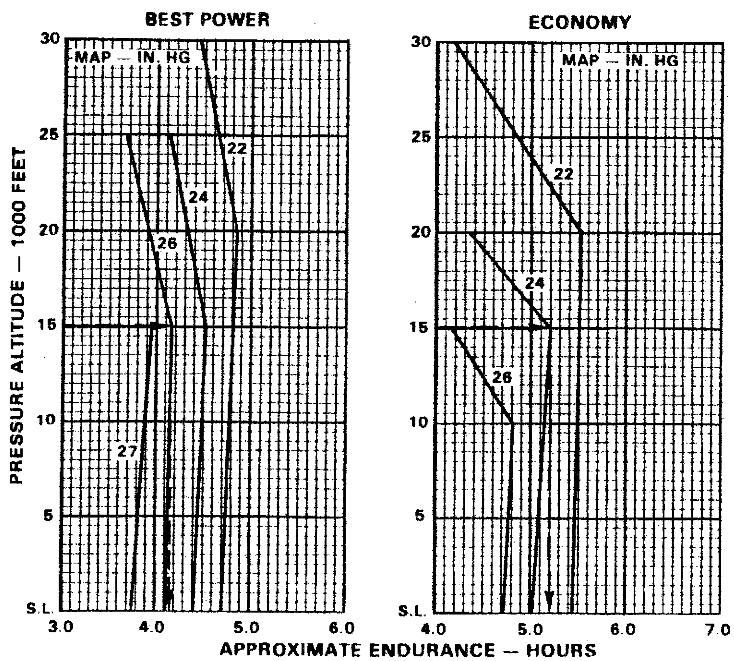
ENDURANCE PROFILE
BEST POWER & ECONOMY

2300 RPM

CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2300 RPM
MANIFOLD PRESSURE	24 IN. HG.
ENDURANCE, BEST POWER	4.18 HRS.
ECONOMY	5.20 HRS.



NOTES:

1. ENDURANCE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. ENDURANCES SHOWN ARE THE SUM OF THE TIMES TO CLIMB, CRUISE AND DESCEND AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.

Endurance Profile, Best Power and Economy
Figure 8-17

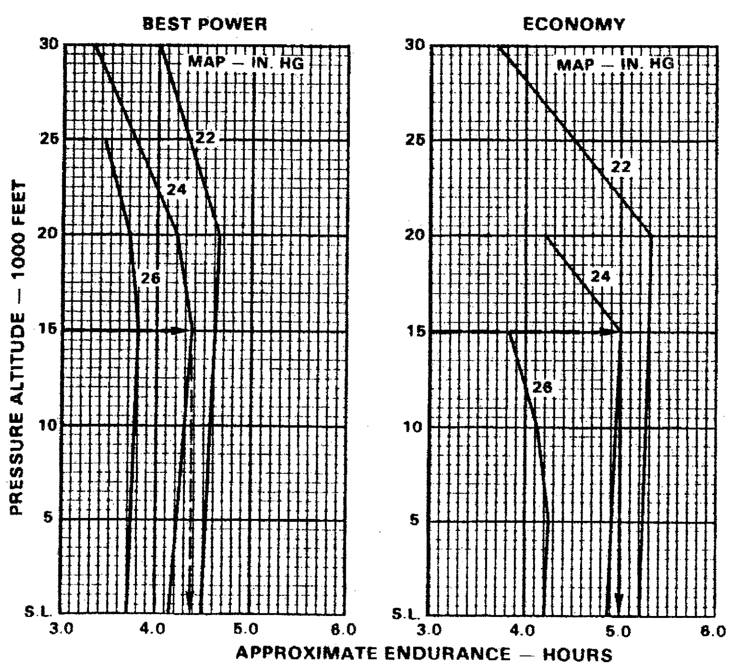
ENDURANCE PROFILE
BEST POWER & ECONOMY

2400 RPM

CONDITIONS:
1. 165.5 GALLONS USABLE FUEL.
2. 6000-POUND GROSS WEIGHT.
3. ZERO WIND.
4. STANDARD DAY.

EXAMPLE:

PRESSURE ALTITUDE	15,000 FEET
ENGINE RPM	2400 RPM
MANIFOLD PRESSURE	24 IN. HG.
ENDURANCE, BEST POWER	4.38 HRS.
ECONOMY	5.0 HRS.



NOTES:

1. ENDURANCE INCLUDES START, TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT AND 45 MINUTES RESERVE FUEL (REFER TO AMPLIFICATION OF THIS SECTION).
2. ENDURANCES SHOWN ARE THE SUM OF THE TIMES TO CLIMB, CRUISE AND DESCEND AND ARE PREDICATED ON OBTAINING THE PERFORMANCE PRESENTED IN THE ASSOCIATED PRESENTATIONS OF THIS SECTION.

Endurance Profile, Best Power and Economy
Figure 8-17

HOLDING TIME

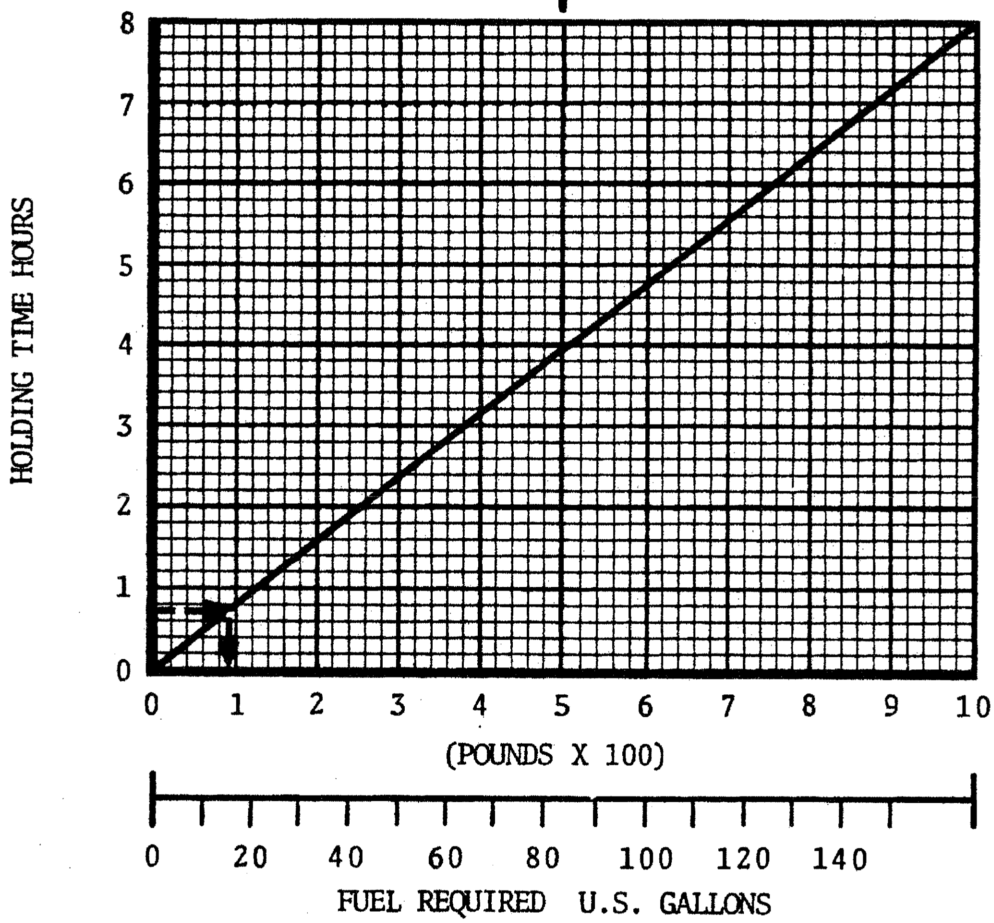
CONDITIONS:

1. 45% POWER
2. 2200 RPM
3. ECONOMY FUEL MIXTURE APPROXIMATELY (10.3 GPH PER ENGINE)

EXAMPLE:

HOLDING TIME - 45 MIN

HOLDING FUEL - 15.5 GALLONS

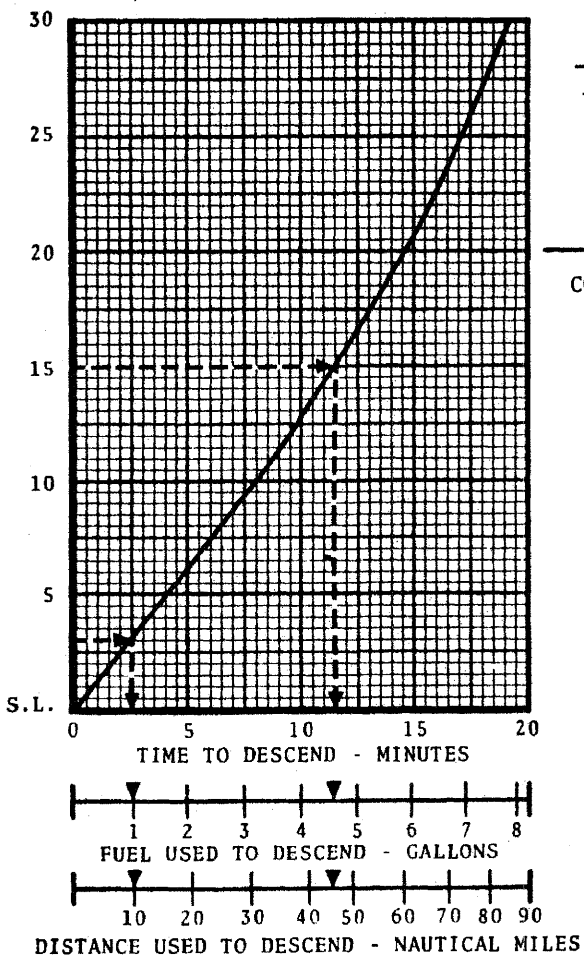


NOTE:

Refer to Cruise Presentations (Figures 14,15.) of this section for appropriate manifold pressure for obtaining 45% power.

HOLDING TIME
Figure 8-18

TIME, FUEL AND DISTANCE TO DESCEND



EXAMPLE:

INITIAL DESCENT ALTITUDE	15,000 FEET
LEVEL-OFF ALTITUDE	3000 FEET
TIME-TO-DESCEND	9 MINUTES
FUEL-TO-DESCEND	3.6 GALLONS
DISTANCE-TO-DESCEND	35 N.M.

CONDITIONS:

1. POWER - 2200 RPM AND 24.0 IN. HG MAP.
2. FUEL MIXTURE - ECONOMY.
3. LANDING GEAR - UP.
4. FLAPS - UP.
5. AIRSPEED - 215 KIAS.

TIME, FUEL AND DISTANCE TO DESCEND
Figure 8-19

TOTAL LANDING DISTANCE FROM 50 - FOOT OBSTACLE

FLAPS 45°

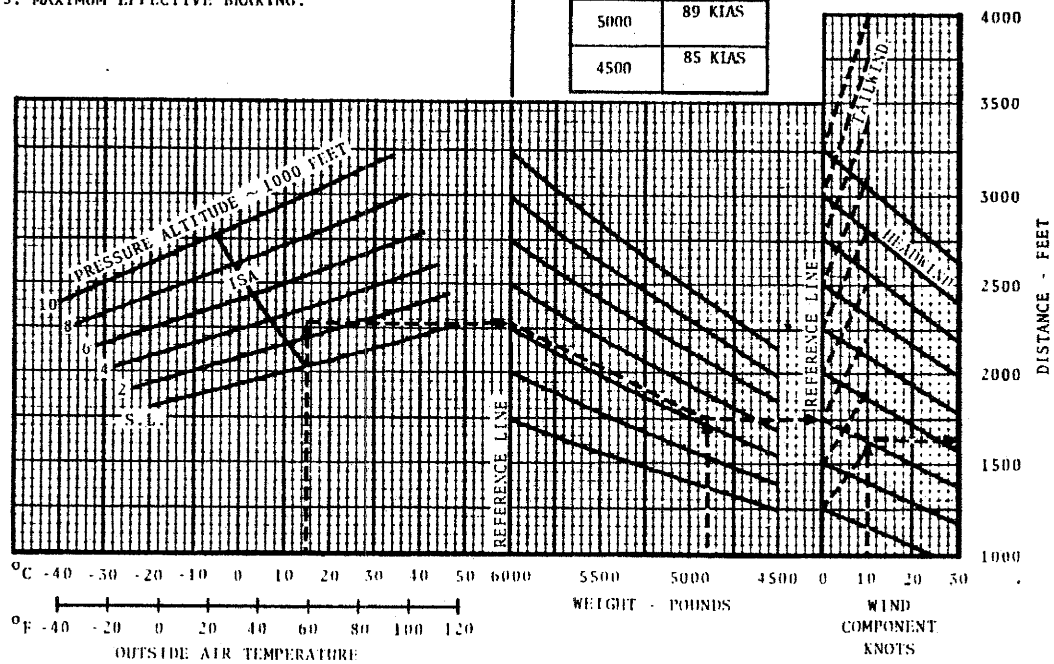
EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	3000 FT
GROSS WEIGHT	4900 LBS
WIND COMPONENT	10 KTS (HEADWIND)
TOTAL LANDING DISTANCE FROM 50-FOOT OBSTACLE	1625 FT
APPROACH SPEED	88 KIAS

WEIGHT (POUNDS)	APPROACH SPEED
6000	96 KIAS
5500	91 KIAS
5000	89 KIAS
4500	85 KIAS

CONDITIONS:

1. LANDING GEAR DOWN.
2. FLAPS - 45°.
3. IDLE POWER FROM 50-FOOT OBSTACLE.
4. LEVEL, PAVED, DRY RUNWAY.
5. MAXIMUM EFFECTIVE BRAKING.



TOTAL LANDING DISTANCE FROM 50-FOOT OBSTACLE, FLAPS 45° DOWN
Figure 8-20

LANDING GROUND ROLL

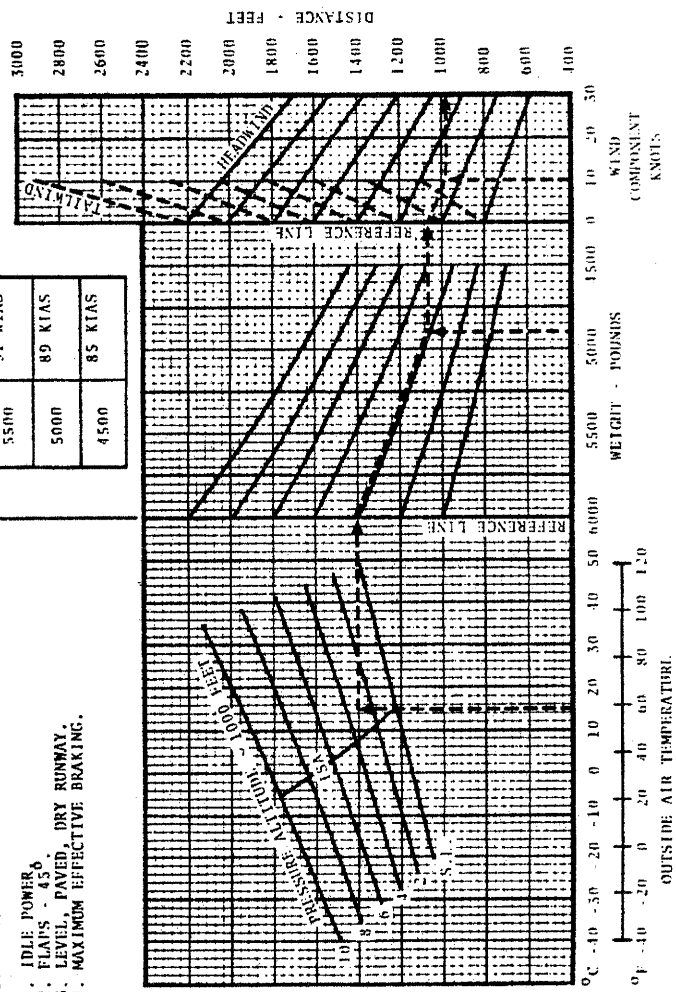
FLAPS 45°

EXAMPLE:

OAT 15°C (59°F)
PRESSURE 3000 FT
GROSS WEIGHT 4900 LBS
WIND COMPONENT 10 KTS (HEADWIND)

LANDING GROUND ROLL 980 FT
APPROACH SPEED 88 KIAS

WEIGHT	APPROACH SPEED
6000	96 KIAS
5500	91 KIAS
5000	89 KIAS
4500	85 KIAS



CONDITIONS:

1. IDLE POWER.
2. FLAPS - 45°.
3. LEVEL, PAVED, DRY RUNWAY.
4. MAXIMUM EFFECTIVE BRAKING.

LANDING GROUND ROLL, FLAPS 45° DOWN
Figure 8-21

TOTAL LANDING DISTANCE FROM 50 - FOOT OBSTACLE

FLAPS UP

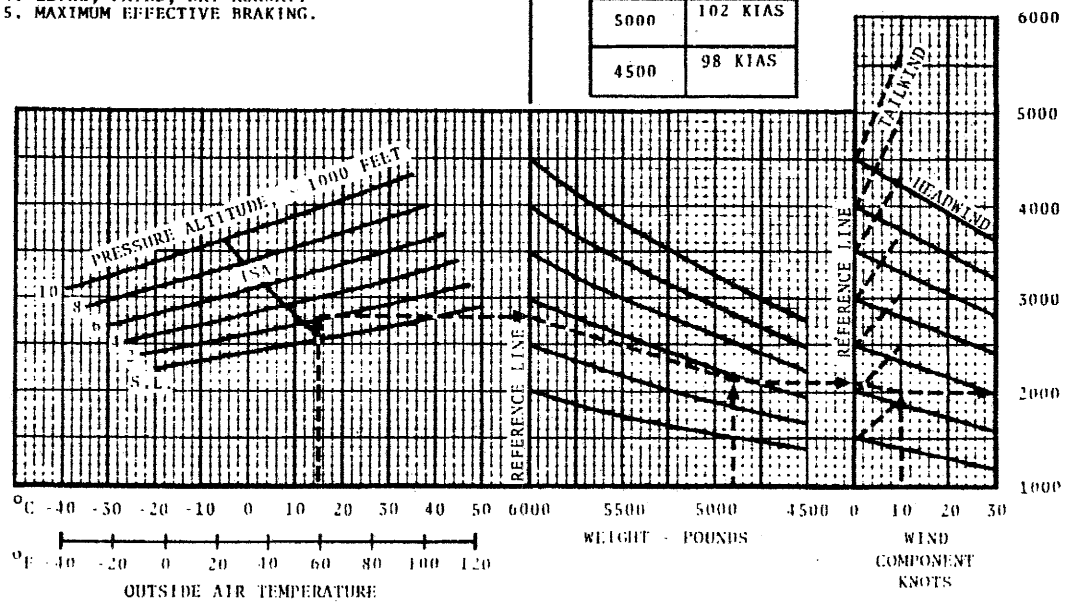
CONDITIONS:

1. LANDING GEAR DOWN.
2. FLAPS - UP.
3. IDLE POWER FROM 50-FOOT OBSTACLE.
4. LEVEL, PAVED, DRY RUNWAY.
5. MAXIMUM EFFECTIVE BRAKING.

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	3000 FT
GROSS WEIGHT	4900 LBS
WIND COMPONENT	10 KTS (HEADWIND)
TOTAL LANDING DISTANCE FROM 50-FOOT OBSTACLE	2000 FT
APPROACH SPEED	101 KIAS

WEIGHT (POUNDS)	APPROACH SPEED
6000	111 KIAS
5500	107 KIAS
5000	102 KIAS
4500	98 KIAS



TOTAL LANDING DISTANCE FROM 50-FOOT OBSTACLE, FLAPS UP
Figure 8-22

LANDING GROUND ROLL

FLAPS UP

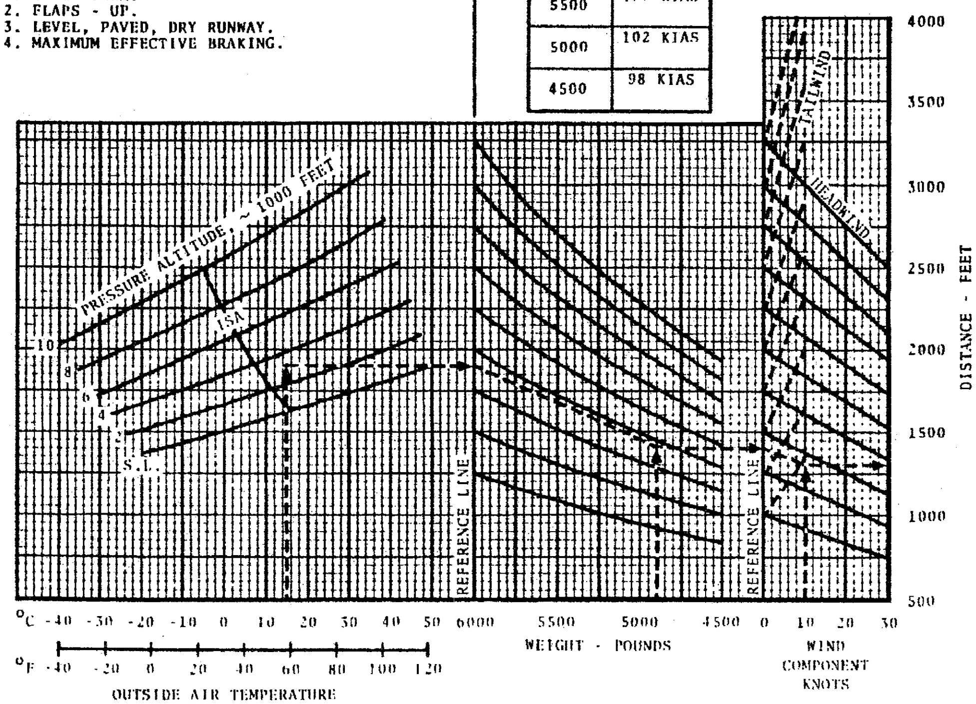
EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	3000 FT
GROSS WEIGHT	4900 LBS
WIND COMPONENT	10 KTS (HEADWIND)
LANDING GROUND ROLL	1300 FT
APPROACH SPEED	101 KIAS

WEIGHT (POUNDS)	APPROACH SPEED
6000	111 KIAS
5500	107 KIAS
5000	102 KIAS
4500	98 KIAS

CONDITIONS:

1. IDLE POWER.
2. FLAPS - UP.
3. LEVEL, PAVED, DRY RUNWAY.
4. MAXIMUM EFFECTIVE BRAKING.



LANDING GROUND ROLL, FLAPS UP
Figure 8-23

ZERO THRUST GLIDE DISTANCE

CONDITIONS:

1. LANDING GEAR - UP.
2. FLAPS - UP.
3. PROPELLERS - FEATHERED.
4. BEST GLIDE SPEED
5. ZERO WIND

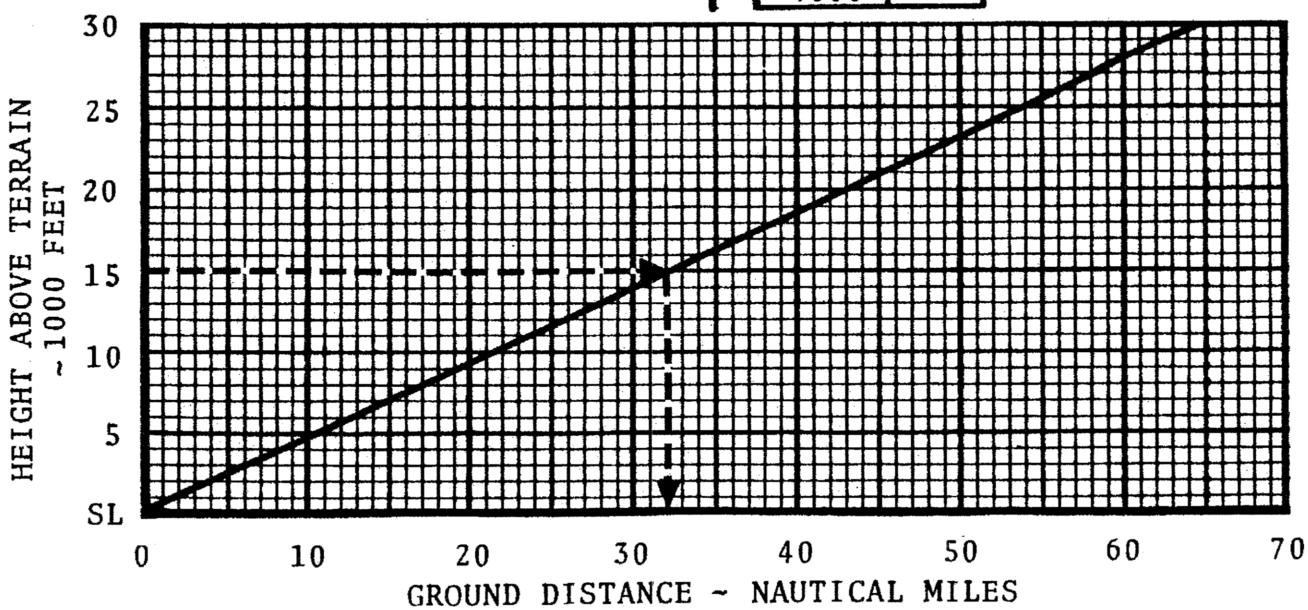
NOTE:

GLIDE RATIO IS 13:1

EXAMPLE:

HEIGHT ABOVE TERRAIN	15000 FT.
GROSS WEIGHT	5500 LBS.
GROUND DISTANCE	32 N.M.
GLIDE SPEED	110 KIAS

WEIGHT POUNDS	KIAS
6000	115
5500	110
5000	107
4500	104
4000	100



ZERO THRUST GLIDE DISTANCE
Figure 8-24

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SECTION 9

AIRPLANE & SYSTEMS DESCRIPTION

INTRODUCTION

This section presents descriptions and operational data on the airplane and its systems. Each Owner or Pilot will find information he needs to understand and operate the model 601 in a safe and efficient manner. Reference to elementary concepts is minimized, and included only when necessary for clarification.

AIRFRAME

The airframe of the Aerostar is of conventional all metal design utilizing no unusual materials or processes in its construction. Major structural components are of semi-monocoque design using relatively thick skins which results in more uniform contours and fewer stiffener type parts. All external skins are flush riveted, with the exception of portions of the control surfaces and flaps which employ a "low profile" type rivet.

FUSELAGE

The fuselage structure is designed to provide a uniform cross section for the length of the cabin. The primary structure of the cabin area is frame-longeron, stiffened sheet aluminum with skin doublers and gussets at cutouts and discontinuities.

Windows and windshield are of cast acrylic composition.

WINGS

Flight and ground loads on the wings are carried primarily by two main spars which extend full span and are continued through the fuselage by means of a wing carry-thru centersection. An additional rear spar extending from the wing root to tip provides mounting points for aileron and flap surfaces. The wings are attached to the fuselage-wing carry-thru structure by means of bolted multi-lug fittings. The wing structure outboard of the nacelle from the leading edge to the rear spar is sealed to provide integral fuel tanks. Wing flaps are of the single slotted Fowler type, supported at three points. Each "Frise" type aileron has three hinge points.

EMPENNAGE

The vertical and horizontal assemblies are of an interchangeable design. Each assembly is attached to the fuselage with two bolted fittings. Each control surface has three hinge points. A non-structural fiberglass dorsal fin incorporating the heater air intake scoop is attached to the vertical stabilizer and aft fuselage.

SEATING ARRANGEMENTS

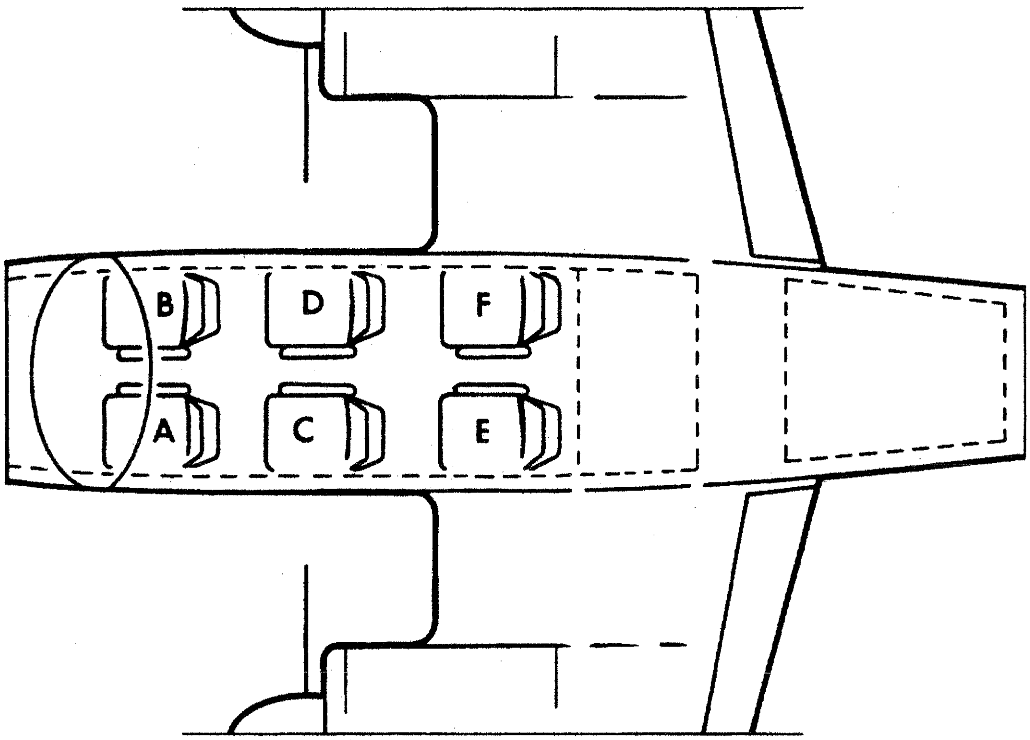
The Aerostar's standard seating is comprised of six contoured, fully upholstered, adjustable seats which can be readily removed for additional cargo space.

A writing table, swivel seat and a 3 place bench seat may be selected from option packages (Figure 9-1).

FLIGHT CONTROLS

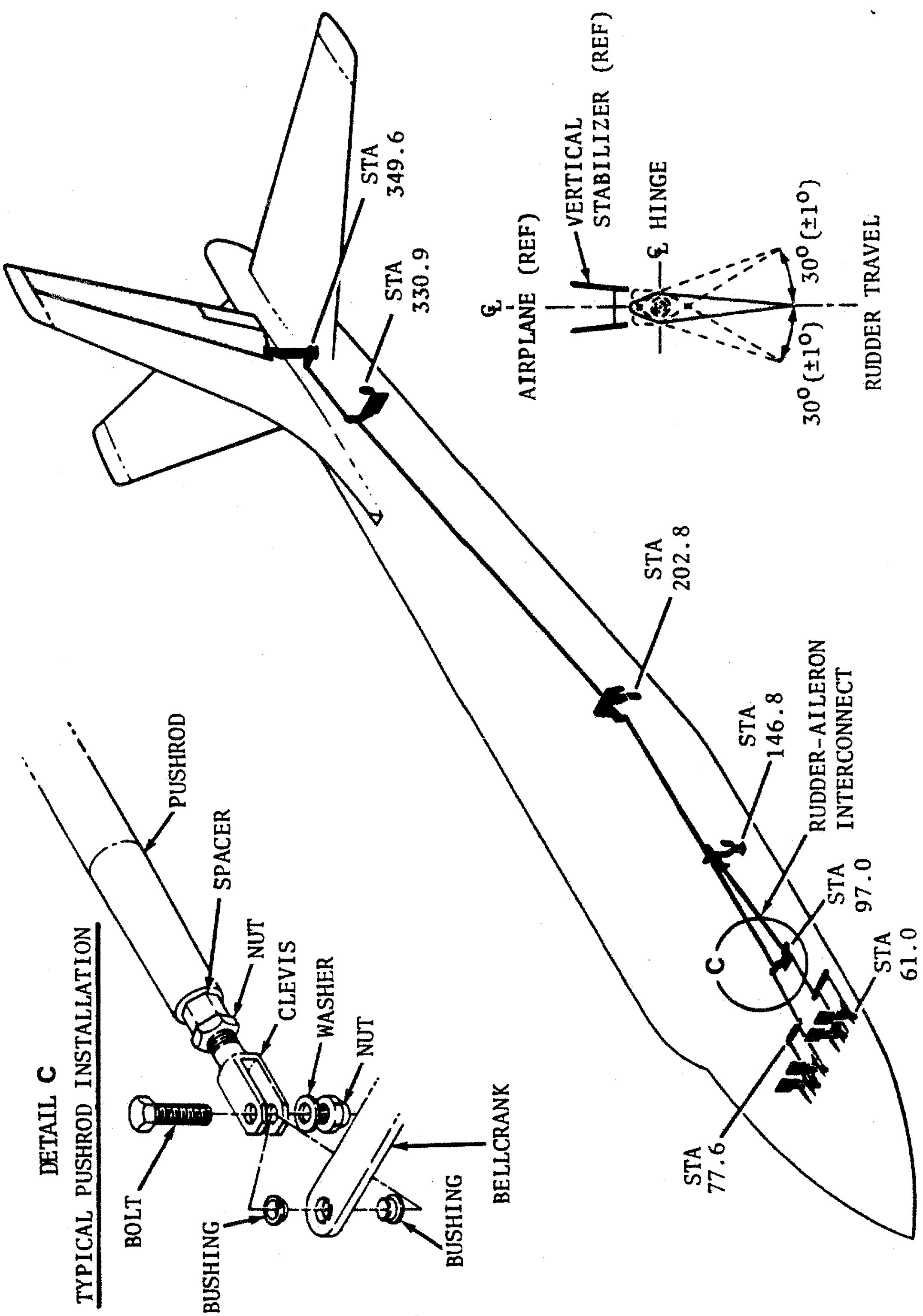
PRIMARY CONTROL SYSTEM

The Aerostar incorporates dual primary flight controls utilizing conventional elevator, aileron and rudder systems (Figure 9-2). The primary movable control surfaces are operated by means of a system of push-pull tubes, torque tubes and bellcranks. No cables are used anywhere in the system. All bearings within the system are permanently lubricated and require no servicing, and no adjustments should ever be required after the airplane leaves the factory.

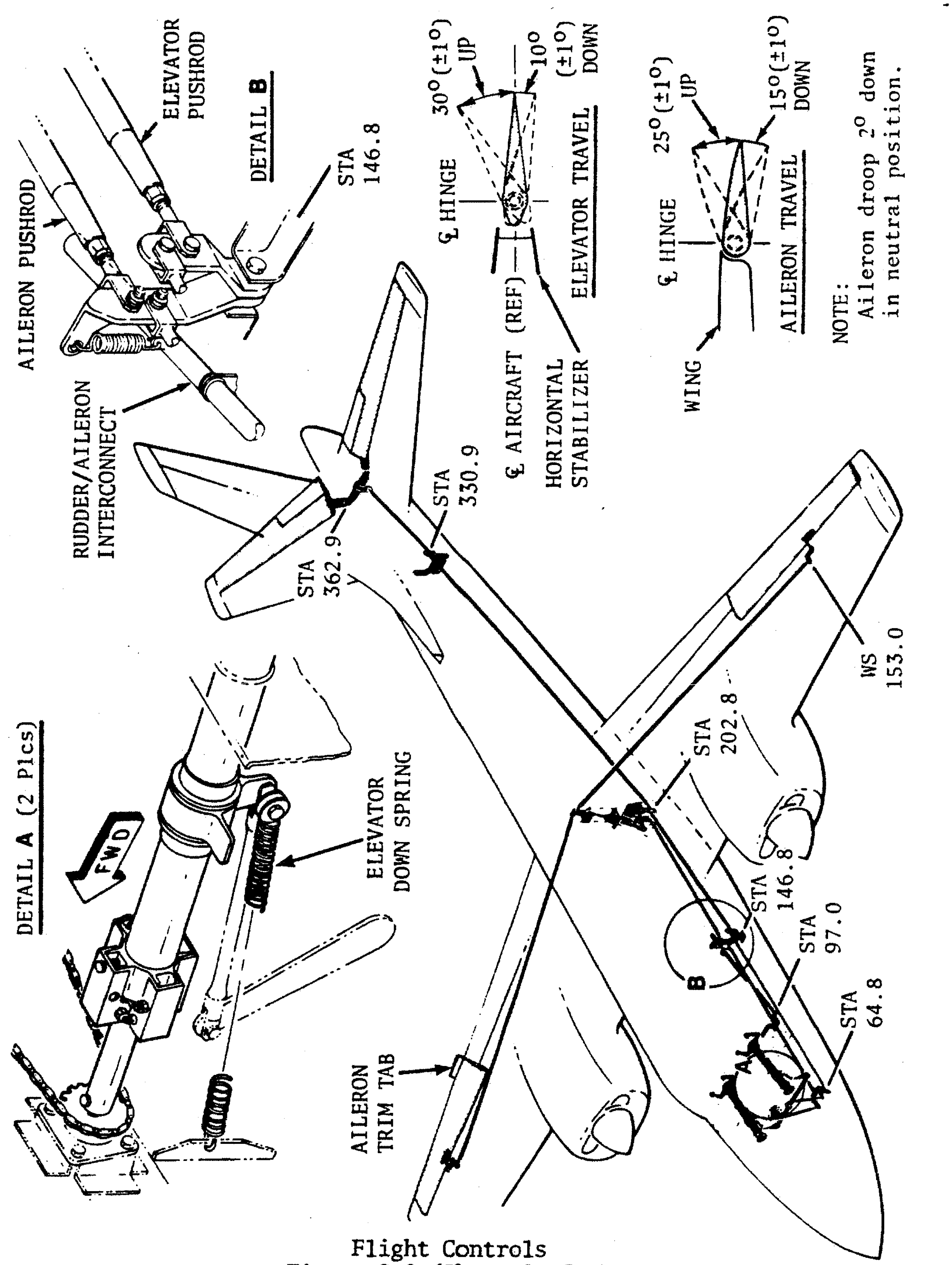


STANDARD ARRANGEMENT (SHOWN)	OPTIONAL ARRANGEMENTS
A Pilot	
B Copilot (reclining)	
C Passenger (reclining)	**C** Writing table
D Passenger (reclining)	**D** Swivel Seat (reclining)
E Passenger (reclining)	**E & F** Bench Seat (reclining)
F Passenger (reclining)	

Seating Arrangement
Figure 9-1



Flight Controls
Figure 9-2 (Sheet 1 of 2)



Flight Controls
Figure 9-2 (Sheet 2 of 2)

TRIM CONTROL SYSTEM

The elevator and rudder trim tabs are operated by 28V D.C. trim motors which are actuated by pedestal mounted, spring loaded rocker switches (Figure 9-3). The left elevator trim tab has an electric motor, the right elevator trim tab is driven by a flex cable interconnecting the two trim tabs. The aileron trim tab is a fixed type and is factory adjusted for level cruise flight. No readjustment of this tab should be required after the airplane leaves the factory.

INSTRUMENT PANEL

The Instrument Panel contains instruments and controls necessary for day or night IFR flight. Figure 9-3 depicts a typical panel arrangement and will vary due to optional equipment installations. The function and operation of instrument panel features not described here can be found in Supplements, under the applicable system.

WARNING LIGHTS

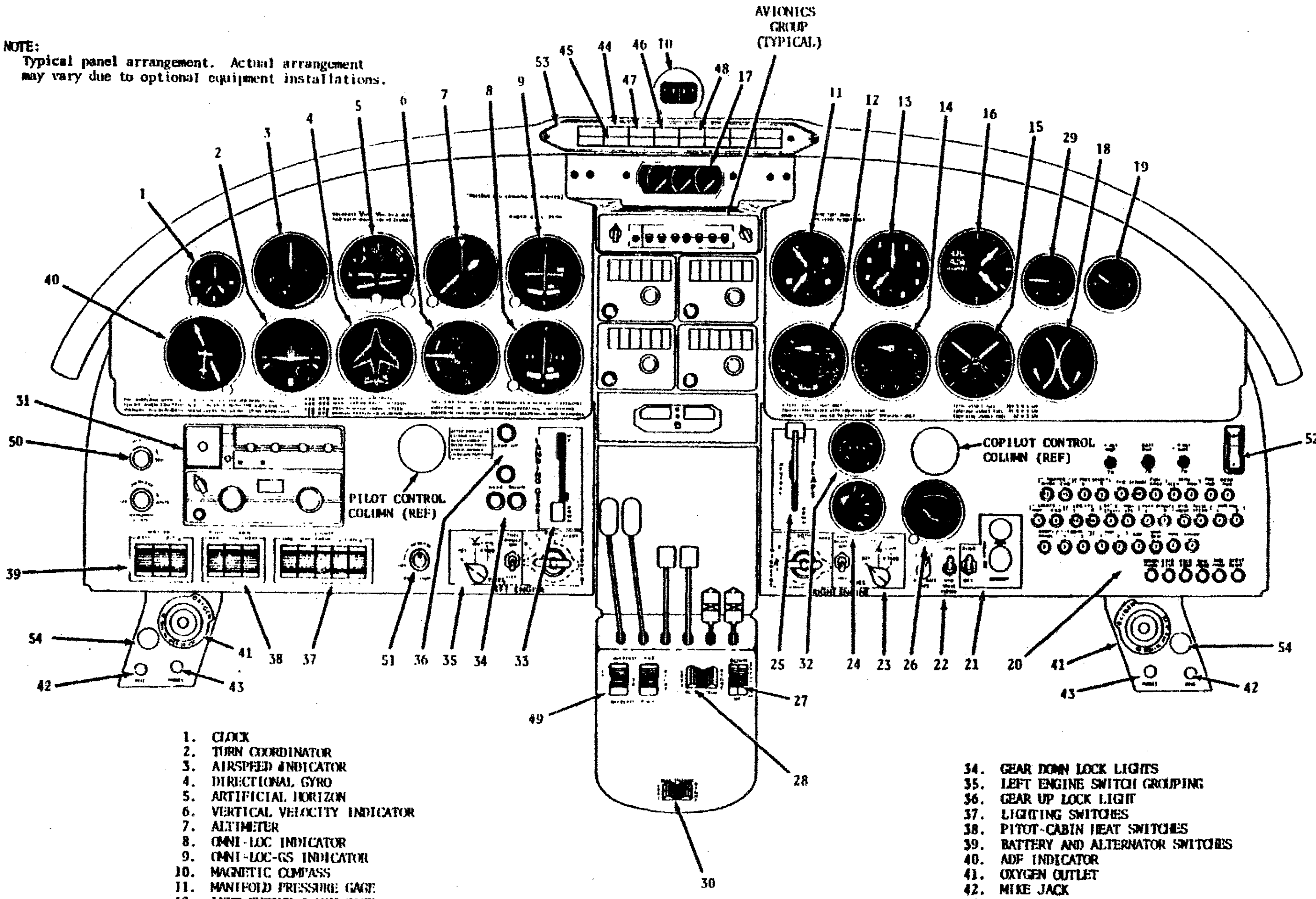
A number of items of interest to the pilot are annunciated by a warning light display in the cockpit in the applicable color of Red or Amber. If the optional annunciator panel is installed see FAA Approved Flight Manual Supplement. The light bulbs may be tested individually by pressing the warning light.

When a hazardous condition exists, requiring immediate corrective action, a red warning light will illuminate. When an impending, possibly dangerous condition exists, requiring attention but not necessarily immediate action, an amber light will illuminate.

FLIGHT INSTRUMENTS

The standard flight instrument group consists of a Pneumatic Directional Gyro and Artificial Horizon powered by air pressure, a 28V D.C. Turn Coordinator and an Altimeter, Airspeed Indicator, Vertical Velocity Indicator, Magnetic Compass and an Eight Day Clock.

NOTE:
Typical panel arrangement. Actual arrangement may vary due to optional equipment installations.



1. CLOCK
2. TURN COORDINATOR
3. AIRSPEED INDICATOR
4. DIRECTIONAL GYRO
5. ARTIFICIAL HORIZON
6. VERTICAL VELOCITY INDICATOR
7. ALTIMETER
8. OMNI-LOC INDICATOR
9. OMNI-LOC-GS INDICATOR
10. MAGNETIC COMPASS
11. MANIFOLD PRESSURE GAGE
12. LEFT ENGINE 3-WAY GAGE
13. TACHOMETER INDICATOR
14. RIGHT ENGINE 3-WAY GAGE
15. FUEL PRESSURE GAGE
16. FUEL FLOW GAGE
17. FUEL QUANTITY INDICATOR
18. EXHAUST GAS TEMPERATURE GAGE
19. HYDRAULIC PRESSURE GAGE
20. CIRCUIT BREAKER PANEL
21. HEATER-DEFROSTER CONTROLS
22. HYDRAULIC SHUTOFF VALVE SWITCH
23. RIGHT ENGINE SWITCH GROUPING
24. FLAP POSITION INDICATOR
25. FLAP HANDLE
26. VOLTAMMETER
27. ELEVATOR TRIM SWITCH
28. RUDDER TRIM SWITCH
29. PNEUMATIC GAGE
30. NOSE STEERING SWITCH
31. TRANSPONDER AND ADF
32. ELEVATOR AND RUDDER TRIM INDICATOR
33. LANDING GEAR HANDLE
34. GEAR DOWN LOCK LIGHTS
35. LEFT ENGINE SWITCH GROUPING
36. GEAR UP LOCK LIGHT
37. LIGHTING SWITCHES
38. PITOT-CABIN HEAT SWITCHES
39. BATTERY AND ALTERNATOR SWITCHES
40. ADF INDICATOR
41. OXYGEN OUTLET
42. MIKE JACK
43. PHONE JACK
44. LEFT ALTERNATOR WARNING LIGHT
45. RIGHT ALTERNATOR WARNING LIGHT
46. LOW FUEL WARNING LIGHT
47. X-FEED WARNING LIGHT
48. HEATER FAILURE WARNING LIGHT
49. LEFT AND RIGHT TURBO SWITCHES (A/F 0001 THRU A/F 0341)
50. INSTRUMENT PANEL LIGHTS RHEOSTATS
51. RADIO & POST LIGHTS RHEOSTAT
52. AUX RADIO MASTER
53. ANNUNCIATOR PANEL
54. AIR VENT KNOB

Instrument Panel
Figure 9-3

WING FLAPS

Fowler type flaps are operated by two hydraulic actuating cylinders. The control valve for these cylinders is actuated by the panel mounted flap selector handle which allows selection of 0° to 45° as desired.

The wing flap handle (Figure 9-3) on the instrument panel is mechanically linked to the wing flap control valve under the cabin floor, which in turn, directs fluid to the wing flap actuating cylinders to raise and lower the flaps. A neutral position allows the pilot to stop the flaps at any intermediate setting. Flow control valves are installed in the flap system to provide equal fluid flow to the left and right flap actuators thereby ensuring symmetrical flap extension and retraction. A restrictor is also located at each cylinder's downline port to prevent a rapid asymmetric condition from occuring should the downline rupture when the flaps are extended. Actuation of the flaps results in minimal trim change.

The effect of the flap extension on stall speed is detailed in Section 8 of this manual.

LANDING GEAR

LANDING GEAR SYSTEM

The hydraulic actuated tricycle landing gear is fully retractable and is of the air-oil oleo type. Wheel well doors fully enclose the landing gear when in the UP position, and partially enclose the wheel wells when the gear is DOWN to help protect those areas from water spray, mud splatter, and melting snow or ice thrown up during taxi, takeoff and landing.

The landing gear handle (Figure 9-3), located on the pilot's lower instrument panel, is mechanically linked to the landing gear control valve under the cabin floor. Selecting UP or DOWN position directs hydraulic system pressure to the appropriate side of the landing gear actuating cylinders and to the main landing gear door control valves.

CAUTION

ALWAYS CHECK POSITION OF THE LANDING GEAR HANDLE PRIOR TO STARTING ENGINES. IF HYDRAULIC SYSTEM PRESSURE IS LOW, IT IS POSSIBLE FOR THE GEAR TO BE DOWN AND LOCKED EVEN THOUGH THIS HANDLE MAY BE IN THE UP POSITION. FOR AIRCRAFT EQUIPPED WITH AUXILIARY ELECTRIC HYDRAULIC PUMP, CHECK HANDLE POSITION AND PUMP SWITCH IS OFF PRIOR TO TURNING BATTERY SWITCH "ON".

For A/F 0356 and Subsequent, a springloaded solenoid prevents the gear handle from being moved to the gear UP position when the airplane is on the ground. The solenoid is energized to unlock the handle by a squat switch mounted on the nose landing gear scissors. The squat switch is activated as soon as the nose gear strut is extended such as rotation at take-off, or if the airplane is on jacks. Should the solenoid fail, a small tab protuding through the handle slot allows the pilot to override the locking feature by pushing the tab to the right as the handle is activated to the gear UP position.

NOTE

The gear handle safety lock may also become unlocked if the airplane is sitting on the ground in an extreme tail-down position which could extend the nose gear strut and allow the squat switch to actuate the solenoid valve when the battery switch is turned ON.

The door control valves are actuated by the main landing gear mechanical linkage and direct system pressure to the main landing gear door actuating cylinders to hold the wheel well doors closed when the gear is in either the fully extended or fully retracted position.

In the event of a hydraulic system pressure loss, the landing gear will drop from the full UP position due to gravity and the fact that all three landing gears are springloaded to the DOWN position. However, to ensure the gear is down and locked, the gear handle must still be placed in the full DOWN position since residual hydraulic fluid within the system can prevent the gear from being fully down and locked.

Four landing gear position lights (Figure 9-3) are installed on the left instrument panel. A single amber light is located above a cluster of three green lights. The lights are push-to-test type with adjustable iris shutters. The amber light illuminates and stays on when all three landing gear are in the full UP position. The three (3) green lights are arranged in a cluster with the nose gear light on top, and the respective main landing gear lights below. Each green light will only illuminate when its respective landing gear is in the full DOWN and LOCKED position. Time delay for a gear light to illuminate indicates the respective landing gear is in a transient position.

On A/F 0001 thru 0432 the three (3) green lights are wired directly to a down lock switch installed on its respective landing gear and will illuminate whenever a gear is down and locked regardless of gear handle position (with low hydraulic system pressure the gear can be down and locked indicating three (3) green lights with handle in UP position). Effective A/F 0433 and Subsequent, the nose landing gear green light is also wired to a switch installed on the gear handle mechanism; for this light to illuminate, it is necessary that the nose landing gear be in the down and locked position and the gear handle also be in the full DOWN position.

A landing gear warning horn will sound if the landing gear is not down and locked and either throttle is retarded below approximately 13 inches MAP. The horn is activated by switches connected to both throttle controls.

Effective A/F 0356 and Subsequent, the gear horn will also sound if the battery switch is ON and the gear handle is not in the full DOWN position when the airplane is on the ground. This system is activated by the nose landing gear down lock switch.

NOSE WHEEL STEERING

A nose wheel steering switch, (split rocker springloaded to Off), located on the center console, electrically operates a solenoid valve, mounted in the fuselage nose section, which in turn directs system hydraulic pressure to a combination steering actuator and shimmy damper mounted on the nose gear. When the steering switch is depressed, another electrically operated solenoid valve, located in the nose wheel steering valve return line, opens to allow fluid flow to return. Steering rate is controlled by a fixed orifice restrictor downstream of this solenoid valve. When the switch is released, the solenoid valve returns to its normally closed position, locking system pressure to both sides of the nose gear steering actuator to provide shimmy damping.

A centering cam inside the nose gear strut automatically centers the nose wheel when the strut fully extends such as; after rotation at takeoff, raising the nose when lowering the tail for hangar door clearance, and raising the aircraft on jacks. The centering cam starts engaging during the last approximate 2 inches of extension of the strut, at which point the wheel turning angle becomes continuously smaller as the strut continues to extend.

The steering rocker switch split feature is provided as a fail-safe device. The solenoid steering valve will not activate unless BOTH halves of the switch are depressed simultaneously. If during the taxi preflight, the nose steering system can be actuated with only one-half of the switch, the system is defective and must be repaired. The steering switch is automatically de-energized when the nose landing gear is not in the full down and locked position.

If hydraulic power is lost, steering can be accomplished by asymmetrical power and/or braking application.

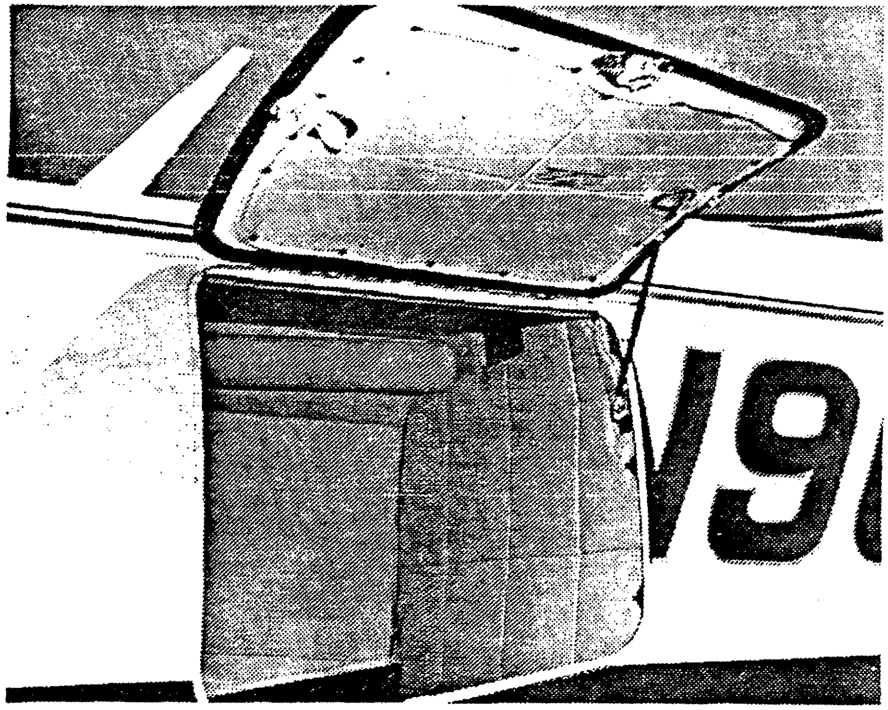
BAGGAGE COMPARTMENTS

BAGGAGE COMPARTMENT

The baggage compartment in the aft fuselage (Figure 9-4) has a capacity of 30 cubic feet, and a weight limitation of 240 lbs luggage or cargo. When loading, it is best to place heavier items as far forward in the baggage compartment as feasible to minimize shifting during flight. The compartment is fully upholstered, and there is provision for hanging garments. The baggage compartment aft bulkhead upholstery is removable to provide access for inspection, servicing and maintenance. Since the baggage compartment is not climate controlled, neither people nor animals should be allowed to remain in the baggage compartment during flight.

CAUTION

HAZARDOUS MATERIALS OF ANY KIND SHOULD NOT BE STOWED OR CARRIED IN THE AIRPLANE UNLESS IN COMPLIANCE WITH FAR 103.



Baggage Compartment
Figure 9-4

The baggage compartment door, located aft of the left wing, is equipped with one latch, A/F 0001 thru 0259, and three latches, A/F 0260 and Subsequent (Figure 9-4). The latch on the lower edge of the door incorporates a key-operated locking mechanism for convenience and protection. The lower latch may be operated by depressing the lower half to open, and the upper half to close. The two auxiliary latches, if installed, are located approximately at the center of the forward and aft edges of the door. They may be operated by depressing the larger inner disks to open and the smaller, outer disks to close. The door stay is an overcenter locking type. The baggage compartment door should be locked before each flight.

CABIN PACKAGE SHELF

The rear cabin shelf, approximately F.S. 176 to 204 may be used as storage for light personal belongings. DO NOT STOW HEAVY OR SHARP OBJECTS ON SHELF UNLESS PROPERLY SECURED.

SEATS, SEAT BELTS AND SHOULDER HARNESSES

SEATS

All seats can be adjusted horizontally along the seat tracks. Adjustments are made by pulling up on the seat position locking handle, located on the side of the seat, and sliding the seat to the desired position. Each occupant must push down on the position locking handle (forward handle), after adjustment, and try to slide forward and aft to ensure the seat is securely locked. The backs of the four passenger seats recline; the copilot's seat also reclines on later aircraft. The recline adjustment handle (aft handle) is located on the side of each seat. The backs of the pilot's seat and the right-hand passenger seats fold forward to facilitate cabin entry and access to the emergency exit. All seats are removable as described in Section 10, Handling, Servicing and Maintenance.

SEAT BELTS

All seats are equipped with a standard configuration type lap restraint bolted to the seat. The buckle half is adjustable and has a quick release spring-loaded clasp for easy operation. To fasten the seat belts, slide the connector half into the buckle, making sure that the release tab of the buckle faces away from the body. Once the belt has been fastened, pull the belt end attached to the buckle half until the belt fits snugly. To release the belt, grasp the release tab firmly and pull away from the body.

SHOULDER HARNESSES

Effective A/F 0266 and Subsequent, the Pilot and Copilot seats are equipped with a detachable, inertia reel type shoulder harness which retracts into a housing secured to the bulkhead frame above and outboard of each seat. The shoulder harness clips onto a raised button on the seat buckle. The connector half of the seat belts assembly is the adjustable portion for seats that have shoulder harness installations. (Pilot and co-pilot). Effective A/F 0826 and UP, an optional shoulder harness installation is available for the four passenger seats.

DOORS, WINDOWS AND EXITS

DOORS

The Aerostar Model 601 incorporates a split, clamshell cabin door with a recessed "D" ring handle on the inside of the upper door and a streamlined handle on the outside (Figure 9-5). The lower cabin door has a convenience latch located on the forward side of the door. To enter the cabin, unlock the upper door, turn handle until it latches over center, and pull the door out and up as far as it will go. This will automatically set the door holder assembly in an open position. Gently lower the door until it rests on the door stay. As a safety precaution, a locking tab on the side of the door stay assembly must be set (slide locking tab outboard) to preclude sudden inadvertent lowering of the door. To open the lower door ("air-stair"), (Figure 9-6) pull UP latch handle aft and lower the door until the cables are fully extended. To lower upper cabin door, slide locking tab inboard and lift UP on door to release door stay locking mechanism.

CAUTION

THE MAIN CABIN DOOR SHOULD NOT BE HELD OPEN BY THE DOOR HOLDER WHILE TAXIING OR WHEN IN RUNUP AREA AS AIR FLOW FROM WIND GUSTS OR OTHER AIRPLANES RUNNING UP COULD RESULT IN DOOR DAMAGE.

Do not attempt to open the cabin door in flight. However, should the cabin door inadvertently open in flight, reduce airspeed and land as soon as feasible.

CAUTION

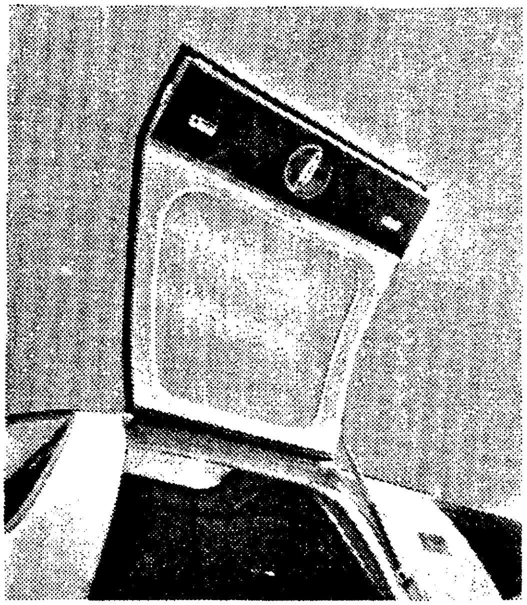
DO NOT ATTEMPT TO MANUALLY CLOSE (OR HOLD CLOSED) THE DOOR IN FLIGHT DUE TO THE POSSIBILITY OF INJURY CAUSED BY THE PROPELLER OR BY AIR LOADS ON THE DOOR.

WINDOWS AND WINDSHIELD

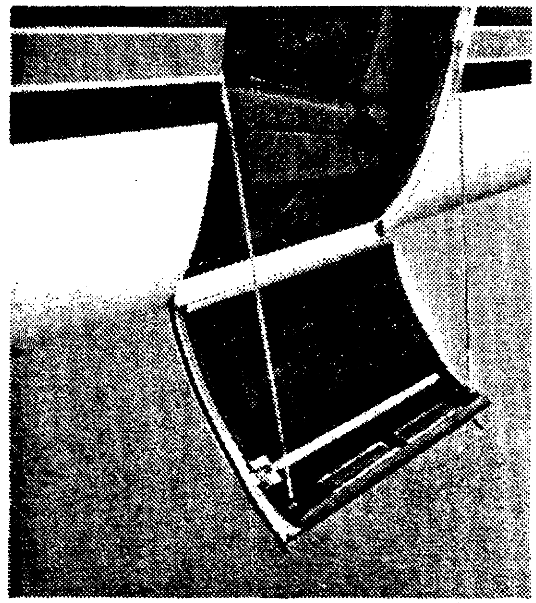
Each of the windows and the windshield of the Aerostar Model 601 are made from cast acrylic. They are large enough to provide a panoramic view and the non-split windshield provides distortion-free forward visibility. All windows are of a fixed type and cannot be opened.

EXITS

The emergency exit door is located adjacent to the rear seat on the right side of the airplane. To open the emergency exit door, remove the handle cover by grasping firmly and lifting. Pull on Red handle until it disengages door. Push the top of the door outward and away from the fuselage.



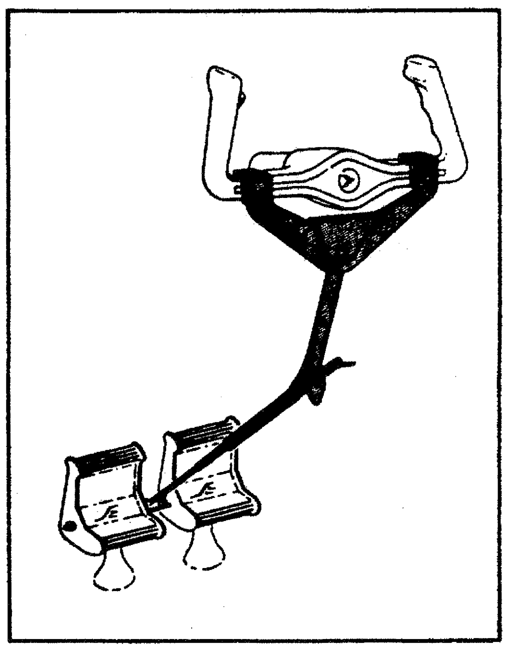
Upper Cabin Door
Figure 9-5



Lower Cabin Door
Figure 9-6

CONTROL LOCKS

A Control lock is provided with each Aerostar (Figure 9-7). When the control lock is installed, the flight control surfaces are locked. To install the control lock, proceed as follows: Extend the telescoping tube with the welded "J" shaped coupler to its full length. Unfold the two attaching arms until they lock forming a "Y" shape. Hook the "J" shaped coupler around the bolt heads on the inboard sides of both rudder pedals. Loop the "Y" shaped attaching arms around the control wheel and pull up on the "T" shaped handle until movement of the control wheel is completely restricted. To remove the control lock, loop index finger around the binding tab lock and pull upward until the attaching arms



Control Lock
Figure 9-7

clear the control wheel. Unlock the "J" shaped coupler from the rudder pedal bolt heads and pull control lock free.

ENGINE

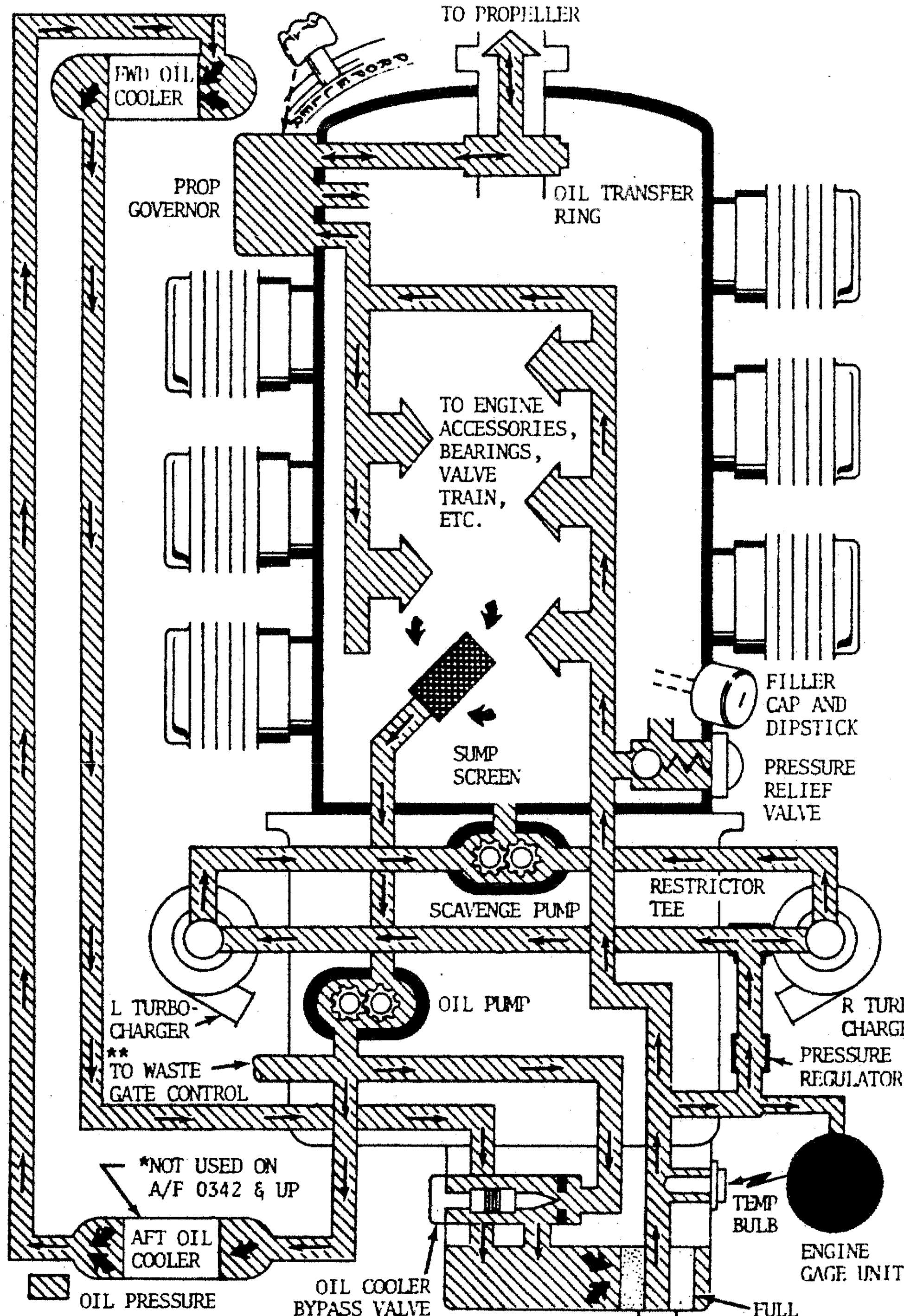
ENGINE COOLING

Two Avco Lycoming IO-540-series, 290 horsepower engines are installed on the airplane. They are six cylinder, horizontally opposed, direct drive, wet sump, fuel injected engines, driving Hartzell three bladed, constant speed, full feathering propellers. The engine installation meets all certification cooling requirements without the aid of cowl flaps for simpler aircraft operation and decreased aerodynamic drag. Cooling air enters the cowling, is directed around the cylinders by cylinder baffles, through the accessory section, and is exhausted through augmentor type exhaust chutes. Two blast tubes mounted on the rear baffle direct cooling air to the magnetos.

ENGINE OIL SYSTEM

The engine employs a full pressure, wet sump lubrication system (Figure 9-8). The sump is filled through a combination dipstick oil filler cap. Lubricating oil is drawn through the oil sump inlet screen by the engine oil pump and directly to the oil cooler(s) and a thermostatic bypass valve. When engine oil is cold, the thermostatic bypass valve will open allowing oil to flow directly to the full flow oil filter bypassing the cooler(s). As the oil warms up, the bypass valve will close thereby forcing more oil to circulate through the cooler(s) prior to entering the oil filter. From the oil filter, the oil passes through an oil pressure relief valve which regulates system oil pressure. The regulated oil is then routed through the main oil galleries to the various engine bearings and piston oil cooling nozzles, valve mechanisms, and moving parts. Gravity returns the oil to the sump.

The turbochargers are also lubricated by the regulated oil from the engine system. Oil circulated through the turbochargers is returned to the sump by a scavenge pump attached to the hydraulic pump accessory pad. Oil from the oil pump is also supplied directly to the waste gate control system (Reference Turbocharging System in this section).



Engine Oil System Schematic
Figure 9-8

Oil Coolers (A/F 0001 thru 0341): The engine oil system utilizes two drawncup type oil coolers for oil temperature control. One cooler is mounted on the nose cowling, the other on the right rear engine baffle.

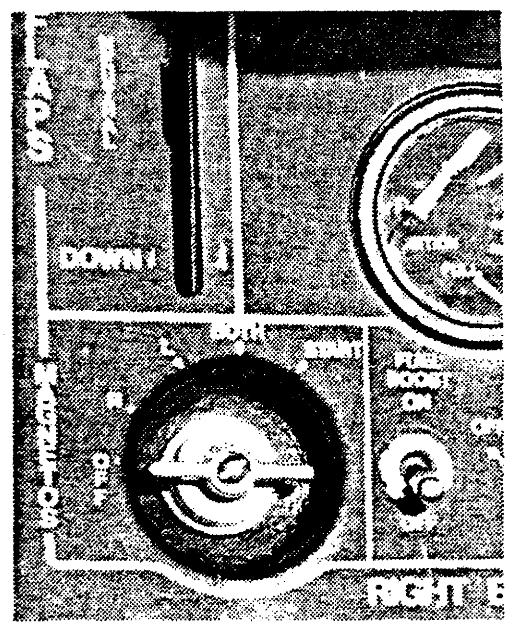
Oil Coolers (A/F 0342 and Subsequent): The system is the same as A/F 0001 thru 0341 except the aft oil cooler is removed from the system and the forward oil cooler is replaced with a larger, high capacity cooler.

ENGINE INSTRUMENTS

Instrumentation for each engine (Figure 9-3) consists of: mechanical oil pressure, mechanical fuel pressure, and electrical oil temperature presented on a 3-Way combination gage; an electrical cylinder head temperature gage; electrical exhaust gas temperature gage (Standard); electrical (mechanical, earlier airplanes) fuel flow gage; electric tachometer and a mechanical manifold pressure gage. Effective with A/F 0800 and UP the 3-Way combination gage consists of mechanical oil pressure, electrical oil temperature and electrical cylinder head temperature. Fuel pressure is displayed by an independent dual mechanical gage. The gages are placarded as to their operational parameters.

IGNITION SYSTEM

Each engine is equipped with a dual magneto ignition system. Additionally, a starting vibrator system simultaneously retards and intensifies the spark for easier starting. Each engine has its own combination ignition-starter switch (Figure 9-9). Moving the switch to the spring-loaded START position grounds the right magneto, activates the starter vibrator and engages the starter. When the engine starts, release the starter switch and allow it to spring back to the BOTH position, disengaging the operation of the induction vibrator system and ungrounding the right magneto.



Ignition - Starter Switch
Figure 9-9

POWER PLANT CONTROLS

All Power Plant Controls are located on the control pedestal (Figure 9-3). The lever knobs are shaped to standard configurations, and the control levers are of different lengths so they can be readily identified by touch.

AIR INDUCTION SYSTEM

Induction air is directed to the fuel injection regulator through two turbocharger plenums mounted on the rear engine baffle and a disposable type air filter in an airbox mounted on the nacelle firewall (Figure 9-10). An alternate air door is installed on each turbocharger plenum that will automatically open allowing continued turbocharged engine operation should the primary air inlets become blocked. In addition, there is an alternate air door on the main induction air filter box which will open automatically, drawing air from the engine accessory section, to allow continued normally aspirated engine operation should the other induction inlets become inoperative. A mode valve installed in each of the turbocharger plenums closes during turbocharging to prevent loss of compressed air through plenum inlets. Should the turbochargers fail, the mode valves will open thereby allowing ram intake air to flow directly to the filter airbox ensuring the engine will continue to operate in the normally aspirated mode.

FUEL INJECTION SYSTEM

The engine is equipped with a Bendix RSA-10ED1 fuel injection system. An engine-driven fuel pump supplies fuel under pressure to the fuel injection regulator, which measures air flow and meters the correct proportion of fuel to a flow divider. The flow divider then directs the fuel to each of the individual cylinder injector nozzles. A fuel vent system provides a common reference vent pressure to the fuel flow gage, fuel pressure gage, engine-driven fuel pump and injection nozzles. The vent source is taken downstream of the turbochargers to ensure proper vent pressure during normal aspiration or turbocharger operation.

TURBOCHARGING SYSTEM

The Aerostar 601 turbocharging system provides engine capability to maintain sea level manifold pressure to approximately 23,000 feet. Greater resultant airplane utility gives the owner the following advantages:

1. Higher TAS for given horsepower than could be expected at normally aspirated cruise altitudes.
2. The ability to top most bad weather conditions.
3. Choice of altitudes to take best advantage of prevailing winds.

4. Flights in positive control air space where congestion is not a problem, as in some low altitude environments.

5. Increased single engine ceiling to provide greater security over high terrain areas.

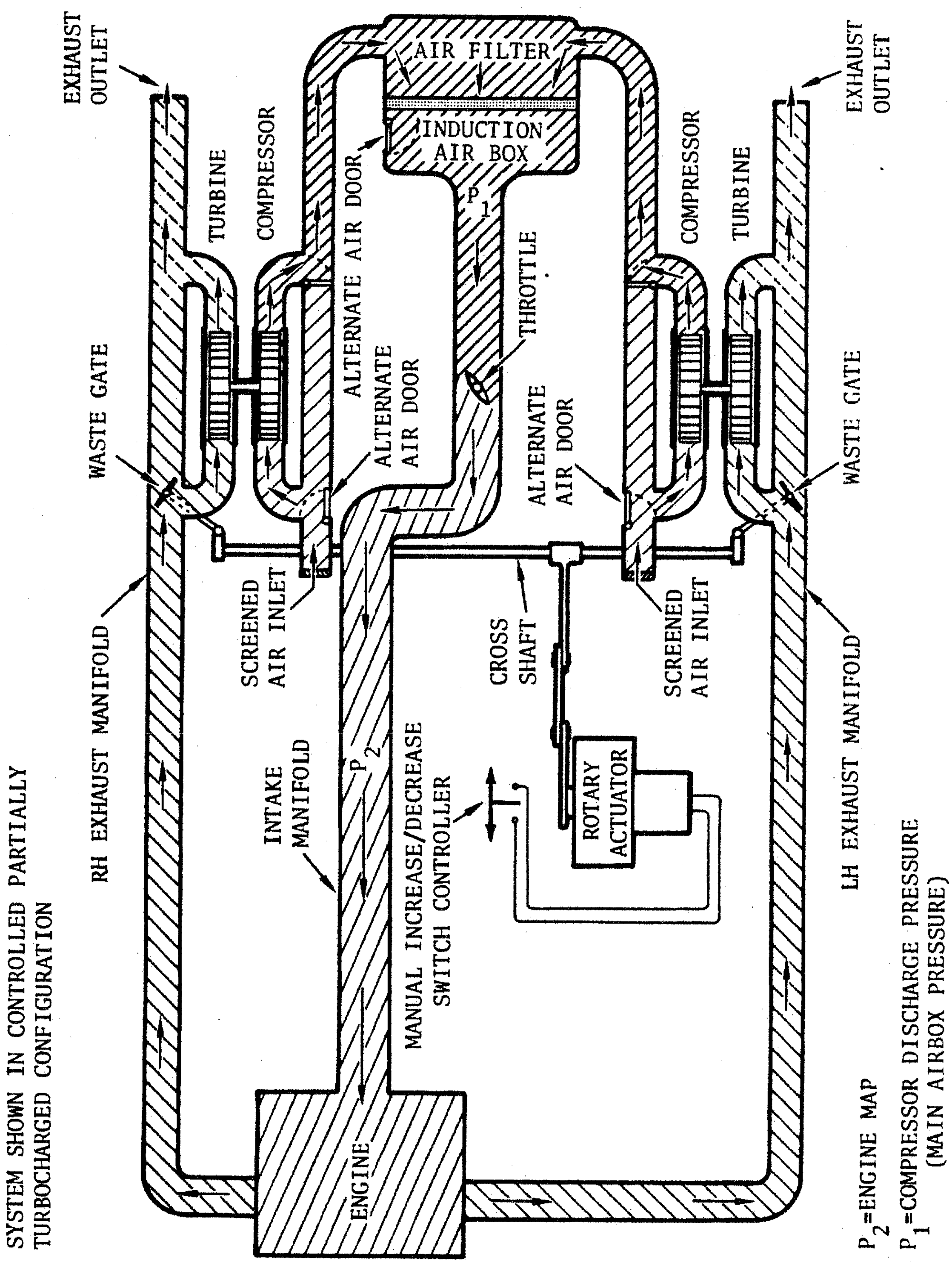
The turbochargers are exhaust-gas-driven engine accessories which raise the pressure of the induction air delivered to the engine. There is one turbocharger unit for each engine exhaust stack. Each unit consists of a compressor and a turbine connected by a common shaft; the compressor supplies pressurized air to the engine for high altitude operation. The turbine utilizes the flow of exhaust gases to drive the compressor.

A/F 0342 And Subsequent

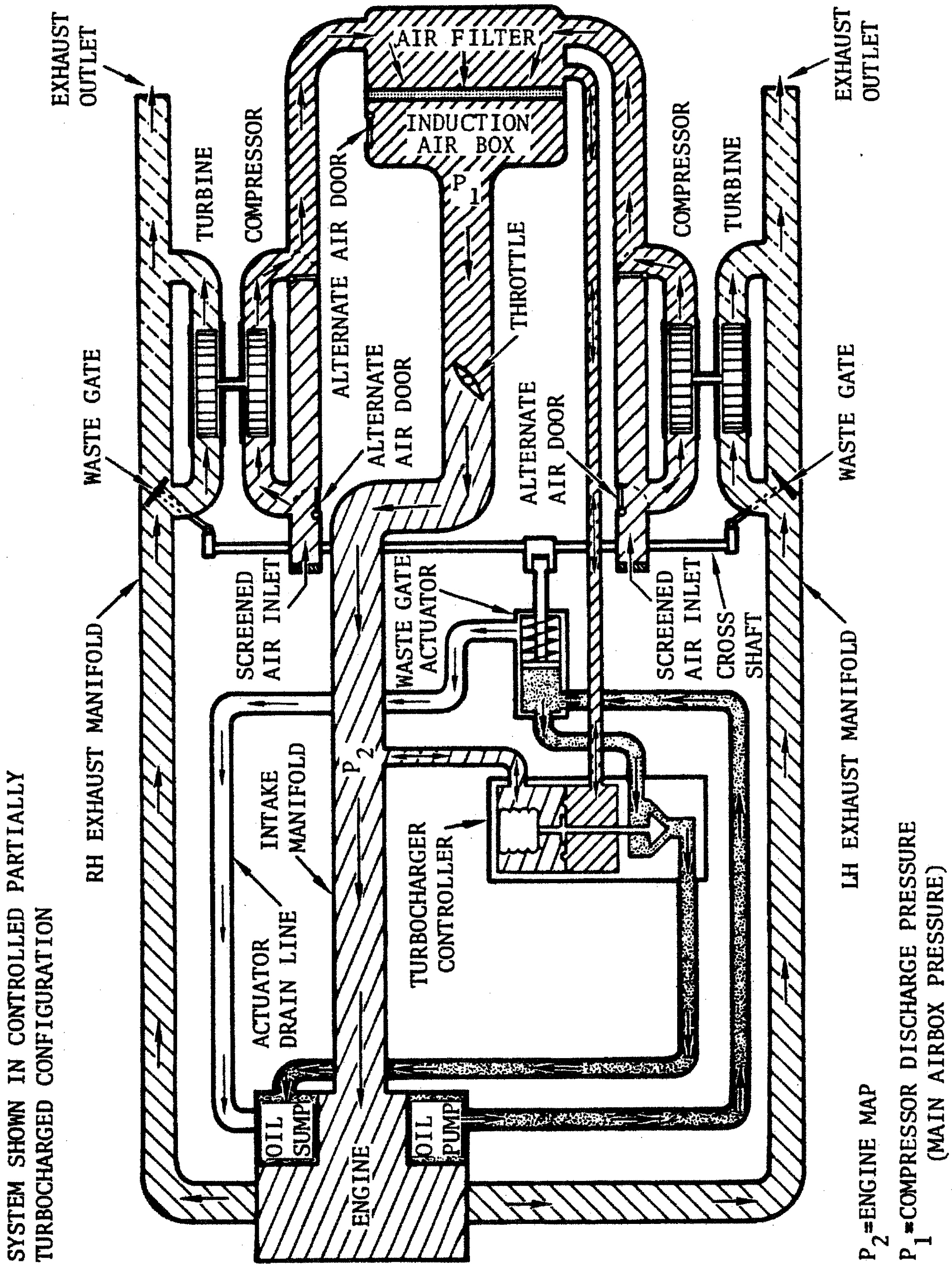
Turbocharging is controlled by means of an automatic turbo control system consisting of a Controller and an Actuator. The Controller senses the engine manifold pressure selected and compressor discharge pressure across a diaphragm which actuates an oil metering valve that regulates oil pressure within the Actuator. The Actuator is mechanically linked to the waste gate valves located in each exhaust stack. The pilot gives the Controller the first input by moving the engine throttle control to the desired manifold pressure. As this is being accomplished, the Controller senses a ratio change between manifold pressure and compressor discharge pressure. The controller is programmed to maintain a certain ratio. Therefore, the internal diaphragm of the controller now moves seeking this ratio, which in turn moves the oil metering valve allowing oil pressure to reposition the waste gate valves. As the waste gate valves move toward the closed or open position, more or less exhaust gases are diverted to the turbochargers causing the turbines to increase or decrease RPM accordingly. Since the turbines are directly connected to the compressors, the compressor discharge pressure will raise or lower until the desired programmed pressure ratio is obtained. The Actuator is provided with an oil drain line which returns engine oil to the sump in the event of leakage around the actuator piston seals. The actuator is also spring loaded to move the waste gates to the non-turbocharged mode as a fail safe system.

A/F 0001 thru 0341

Turbocharging is controlled through use of rocker-type turbo switches located on the control pedestal (Figure 9-3). The switches activate an electric motor which positions the system waste gates located in each exhaust stack (Figure 9-10).



Turbocharger System Schematic (A/F 0001 thru 0341)
Figure 9-10



Turbocharger System Schematic (A/F 0342 & UP)
Figure 9-10

Depressing the upper portion of the rocker switches closes the waste gates and increases manifold absolute pressure; (MAP). When the waste gates are fully closed, the exhaust gases pass through and drive the turbines, which in turn drive the compressors. Induction air is drawn into the compressors through the air inlets (Figure 9-10), compressed to the desired MAP, and routed into the cylinders through the induction manifold. When the turbines are in operation, air from the compressors closes the mode valves in the turbo plenums rerouting normal intake air. The amber indicating lights in the rocker switches come on when the waste gates are in any position other than fully open. Releasing the rocker switches activates a motor braking function which holds the waste gates in the selected position, giving complete turbocharger control.

Depressing the lower portion of the switches opens the waste gates and decreases MAP. As the waste gates open, some of the engine exhaust gases are routed around the turbines, through the exhaust bypass, and overboard. When the waste gates are fully open, the rocker switch lights are out.

NOTE

Waste gate transition time from fully open to fully closed is approximately 17 seconds.

OPERATION. At altitude above 2000 feet, the turbochargers should be operated whenever feasible for maximum component life. System operation eliminates waste gate carbon build-up and keeps the turbine bearings and seals properly lubricated.

At 29.5 in. MAP and 2575 rpm, maximum power attainable while turbocharging is 274 horsepower. At 29.5 in. MAP and 2575 rpm, normally aspirated engines develop 290 horsepower at sea level and drop to 274 horsepower at 2000 feet. Therefore, while use of the turbochargers at these conditions enables the engines to maintain 274 horsepower from 2000 to 26,000 feet, more power is attainable under normal aspiration at altitudes less than 2000 feet, and the turbochargers should not be used.

Check turbocharging system prior to flight as follows: with engines operating at not more than 2000 rpm, simultaneously depress upper portion of both rocker switches. Amber indicator lights should come on immediately. After a few seconds, both rpm and MAP will rise rapidly. As soon as any rise is noted, discontinue check, depress lower portion of both rocker switches and hold until waste gates are fully open (lights out). During this check, system response should be approximately the same for both engines.

Observe extreme caution advancing rpm when operating at high MAP. During turbocharger operation, an increase in rpm also increases MAP; a decrease in rpm lowers MAP. This is the opposite of the rpm-MAP relationship under normally aspirated conditions. To avoid over-boosting, reduce MAP to 25.0 in. or less BEFORE increasing rpm.

For aircraft equipped with manual wastegates and turbocharger over-boost protection, (optional A/F 0001 thru 0136, standard A/F 0137 thru 0341) an absolute pressure relief valve is mounted on the engine induction system main airbox. The valve is preset to relieve at approximately engine MAP of 30.0 in. Hg. Even with overboost protection installed, caution should be exercised to prevent fast advancing of throttles when engines are already at high MAP (25 in. Hg.) and specifically with aircraft at low altitude.

Use full open throttles for all steady-state turbocharger operations.

For transition from turbocharged operation to normally aspirated operation, decrease MAP by depressing lower portion of rocker switches until amber lights go out indicating that the waste gates are fully open. Aircraft is now normally aspirated and operation is conventional

For turbocharger operating procedures refer to Section 3, Normal Operating Procedures.

PROPELLER

Each engine drives a Hartzell, three bladed, hydraulically operated, all metal, constant speed, full-feathering propeller. A Hartzell governing system maintains selected engine speed regardless of engine load or aircraft attitude. The Governor is adjusted to provide 2575 rpm for takeoff, consequently during full power ground static runup the engine rpm can be less.

FUEL SYSTEM

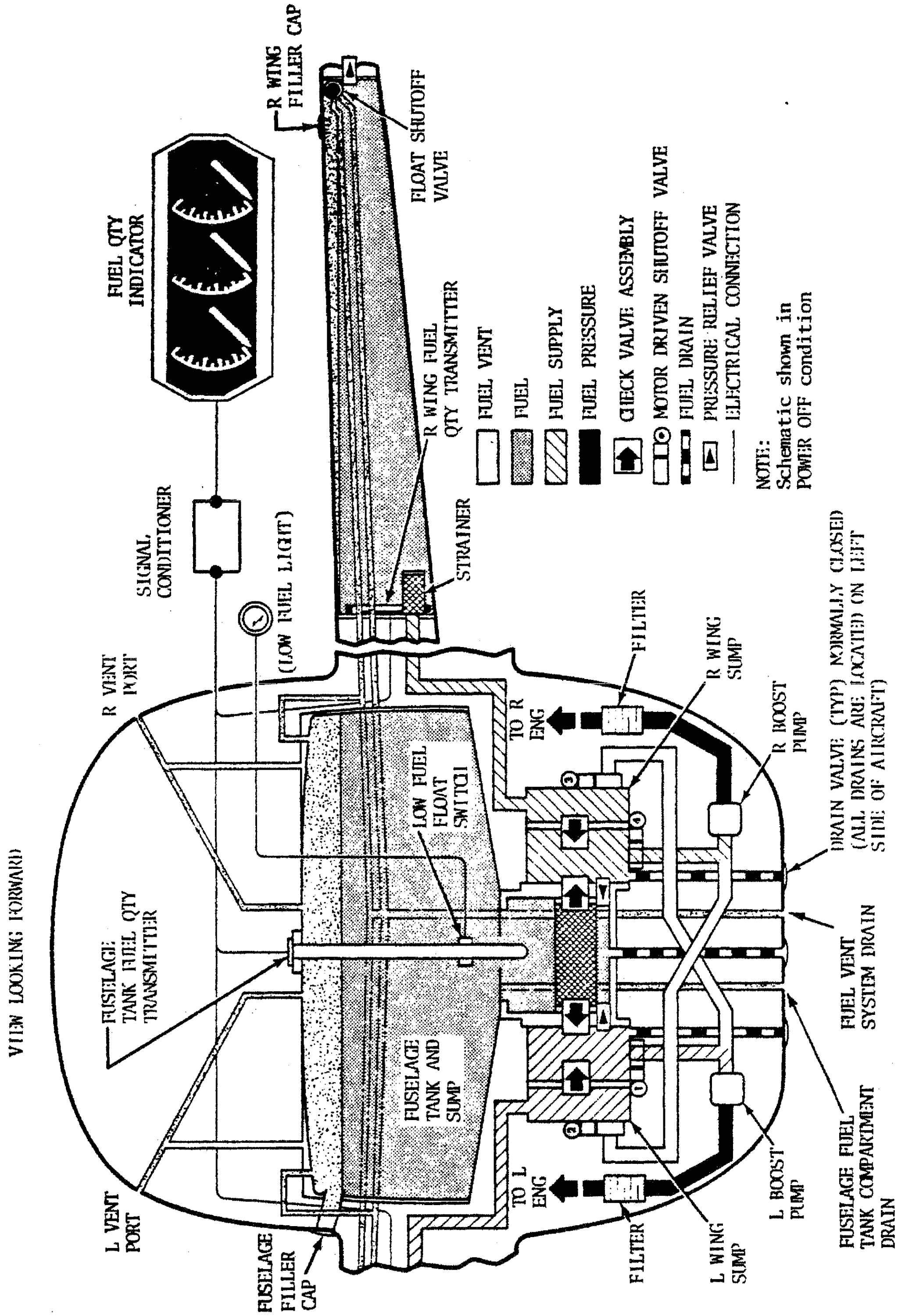
FUEL TANKS

Fuel is stored in large area, shallow, integral wet wing tanks located outboard of the engine nacelle, and a deep rectangular bladder-type fuselage fuel tank located between the rear cabin bulkhead and the forward bulkhead of the baggage compartment. Total capacity of this interconnected system is 173.5 gallons (165.5 gallons usable). Each wet wing fuel tank has a capacity of 65 gallons (62 gallons usable when fueled to 0.6 in. below filler neck). The fuselage fuel tank has a capacity of 43.5 gallons (41.5 gallons usable).

A multiple sump assembly is installed below the fuselage fuel tank (Figure 9-11). The center sump is the low point for the fuselage tank, and the two wing sumps are the low points of each wet wing tank. Each sump can be drained by depressing its respective drain valve located on the left lower side of the fuselage just aft of the wing (Figure 9-12). Fuel is fed to the left and right wing sumps through check valve assemblies. There are two check valves installed in each sump. With the fuel selector in the "ON" mode, the fuselage tank and wing tanks feed simultaneously through all check valves, each wing tank to its respective engine with the fuselage tank feeding to both engines. The check valves prevent backflow of fuel from one tank to another. A fuel strainer is located at the outlet of each wet wing tank on the inboard tank rib at approximately mid-chord and the fuselage tank strainer is located in the center sump. A fuel filter is installed in each engine fuel supply line between boost pump and engine.

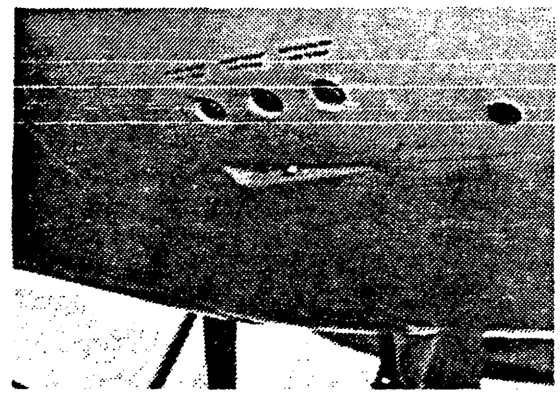
With the aircraft laterally level (dihedral angle is a nominal 2^{o}), as fuel is depleted, the common head of atmospheric pressure on all three fuel tanks will cause them to seek a common level. For example, if a flight is begun with a full fuselage tank and ten gallons in each wing tank, the fuel fed to the engines will initially come from the fuselage tank (assuming both fuel selectors "ON") until such time as its fuel level reaches the same level (head pressure) as the fuel in the wing tanks. At that point, each engine will then be fed simultaneously from its respective wing tank, and from the fuselage tank. Once the ten gallons in each wing tank is depleted, all fuel will be fed only from the fuselage tank. The system is designed so that under normal operating conditions, the wing fuel should be depleted when approximately 12-16 gallons remain in the fuselage tank. It is possible, however, with both fuel selectors in the ON position to have an uneven fuel depletion between left and right wing tanks due to uncoordinated flight especially during prolonged wing low constant

FAA APPROVED 12/05/78
Revised 8/22/79



FUEL SYSTEM SCHEMATIC (Not to Scale)
Figure 9-11

heading flight (e.g. heading or NAV coupled autopilot operation), with an unsecured (leaky) wing tank fuel filler cap, uneven fueling of the tanks or uneven fuel burn. Premature exhaustion of either wing tank is undesirable as the engine that was obtaining fuel from the exhausted wing tank will now obtain its total fuel supply from the fuselage tank. In the event an uneven fuel depletion between left and right wing tanks is noted, X-FEED (Crossfeed) is provided and must be used to reestablish wing fuel balance. The fuselage tank fuel supply is the least sensitive to aircraft attitude and maneuvering and must be available for takeoff, climb, descent, approach, landing and uncoordinated flight maneuvers or engine power loss due to fuel starvation may occur.



Drain Valves & Vent Drains
Figure 9-12

FUEL VENT AND EXPANSION SYSTEM

The three fuel tanks are vented through a dual, interconnected vent system, the airspace above the fuselage tank fuel level is vented to atmosphere on each side of the fuselage. The wing tanks are vented through dual interconnected lines opening into the fuselage tank airspace and overboard at the bottom of the fuselage. These wing vent lines are connected to a float type check valve located at each wing tip to prevent excessive fuel (under expansion pressure) from flowing overboard through the vent lines.

The airspace between the fuselage bladder cell and the aircraft structure is vented to atmosphere on each side of the fuselage, (Figure 9-11) and also has an overboard drain located on the bottom (Figure 9-12).

A pressure relief valve is located in each wing tip housing that allows fuel to drain overboard if the pressure in that respective tank reaches a preset pressure due to thermal expansion.

NOTE

L. Observe caution when opening a wing fuel filler cap, especially in a warm environment, as the fuel could be under pressure.
2. If the airplane is going to be parked for an extended period in the sun, or if fueled outside on a cold day and brought into a warm hangar, it is recommended that wing tanks only be fueled to within 1.0 inch from the bottom of the filler neck, and parked with the airplane laterally level. This will reduce the amount of fuel that can flow overboard through the pressure relief valves due to thermal expansion.
3. The approximate wing tank usable fuel quantity when fueled to a depth of 1.0 inch below the filler neck rim is 60 gallons and when fueled to a depth of 0.6 inch below the filler neck rim it is 62 gallons.

BOOST PUMPS

One electric boost pump is installed in each engine fuel supply line to provide fuel pressure for starting and to ensure uninterrupted fuel supply to the engines at any other time (takeoff, landing, changine fuel selector position), and serves as backup for the engine-driven fuel pump. The controlling switch for each pump is mounted on the instrument panel in each engine switch grouping (Figure 9-14). Boost pumps are to be turned ON at first indication of fluctuating or low (18 psi) fuel pressure/fuel flow, or climb above 10,000 feet. Engine operation, at other than idle conditions, in the 12 to 18 psi fuel pressure range can result in an unacceptable fuel/air ratio and could result in shorter engine life, engine damage, or engine failure.

FUEL SHUTOFF VALVES

Four fuel shutoff valves are mounted on the fuel sump assembly. The operation of the valves is controlled by two fuel selector switches (on for each engine) mounted on the instrument panel in each engine switch grouping (Figure 9-14).

NOTE

The fuel selector switches have detents at each of the three positions, however, when changing selection a visual verification is required to assure proper positioning.

The valves provide a positive means of shutting off fuel flow to the respective engines in case of engine fire, and by opening or closing a certain combination of valves, it is possible to select different fuel sources for either engine. When the fuel selectors are placed in the ON position, only valves 1 and 4 (Figure 9-13) are OPEN, allowing fuel to feed simultaneously through all check valves, each wing tanks to its respective engine and the fuselage tank to both engines. When the left engine fuel selector is placed in the X-FEED (Crossfeed) position, valve (1) closes and valve (3) opens, allowing the left engine to burn fuel only from the right wing tank bypassing the check valves. When the right engine fuel selector is placed in the X-FEED (Crossfeed) position valve (4) closes and valve (2) opens, allowing the right engine to burn fuel only from the left wing tank bypassing the check valves. Figure 9-13, Fuel Selection table, details the shutoff valve position corresponding to any selected switch position.

CROSSFEED SYSTEM

The fuel system incorporates a X-FEED (Crossfeed) supply system to correct fuel imbalance and lateral trim, and to utilize fuel from an inoperative engine wing tank for prolonged single engine operation. Crossfeed is selected by rotating either fuel selector switch (Figure 9-14) to the X-FEED (Crossfeed) position. Crossfeed selection allows an engine to draw its total fuel directly from the opposite wing tank bypassing the sump check valves.

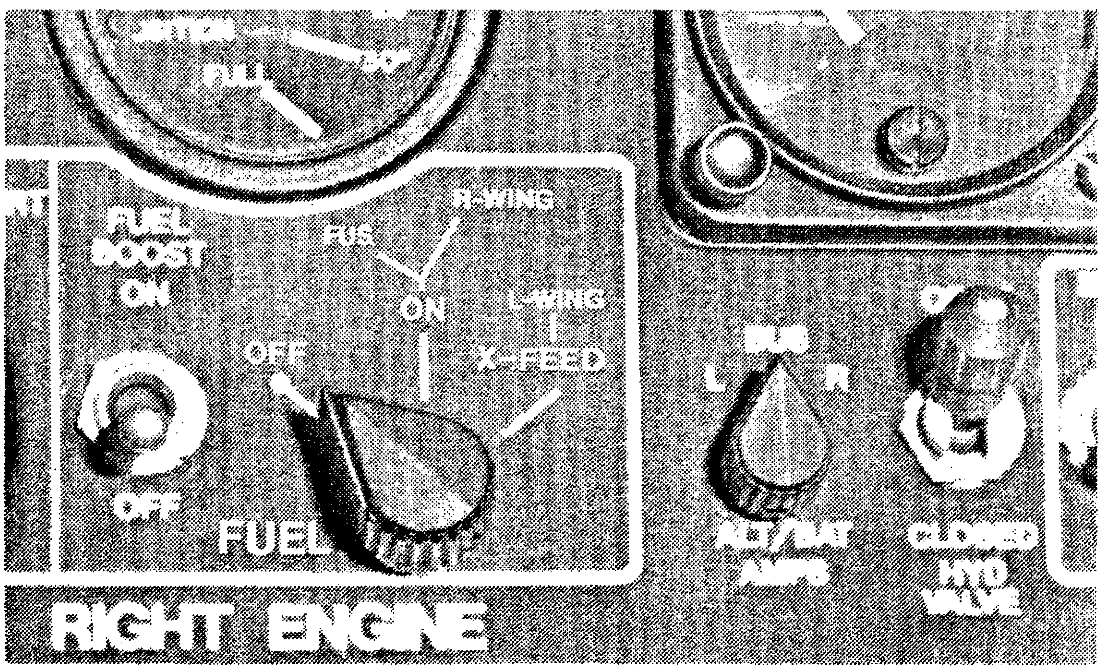
Double X-FEED (Crossfeed) must not be selected except in emergency when the LOW FUEL Warning Light is illuminated. The fuel selector X-FEED (Crossfeed) position is to be used in level coordinated flight only. Each operating engine fuel selector must be in the ON position for takeoff, climb, descent, approach and landing.

If the airplane is not in a level coordinated flight attitude engine power interruptions may occur on one or both engines when the fuselage tank is empty or single or double X-FEED is selected, due to unporting of the respective engine's fuel supply intake port. Should a power interruption occur, immediately reestablish a level coordinated flight attitude. Power will surge and should recover fully within approximately 10 seconds after fuel is restored.

Should it be determined or suspected that the fuselage tank fuel quantity has been depleted, maximum usable wing fuel is obtained in

SWITCH POSITION		TANKS FEEDING			VALVE POSITION			
		Left Wing	Fuselage	Right Wing	1	2	3	4
Left Engine	Off				Closed		Closed	
	On	X	X		Open		Closed	
	X-Feed			X	Closed		Open	
Right Engine	Off					Closed		Closed
	On		X	X		Closed		Open
	X-Feed	X				Open		Closed

Fuel Selection Table
Figure 9-13



Fuel Controls & Hydraulic Shutoff
Figure 9-14

coordinated flight at a level or slightly nose up attitude. Avoid nose down descents (up to 22 gallons unusable in each wing with approximately 14° nose down attitude). Avoid uncoordinated flight (power interruptions/surging can be experienced with up to 42 gallons in one wing in uncoordinated flight).

Keep turn and bank indicator as closely centered as possible and avoid rapid throttle movements.

On airplanes that are so equipped, the X-FEED (Crossfeed) Warning Light will illuminate if the landing gear is extended when one or both of the fuel selector switches are inadvertently left in the X-FEED (Crossfeed) position.

FUEL QUANTITY INDICATOR

A capacitance type fuel indicating system is installed. The system is comprised of a probe in each fuel tank, a signal conditioner and an indicator incorporating an individual display for each of the three tanks, left wing, fuselage and right wing. The indicator, located near the center of the panel, displays fuel quantity in U. S. Gallons.

Wing tank fuel quantities above 50 gallons are ungageable. The fuselage fuel quantity gage scale has a yellow arc from 0 to 12 gallons. Take off is prohibited with the fuselage tank indicated quantity within the yellow arc.

The fuel quantity system is designed and calibrated for highest accuracy when the airplane is in a normal Cruise Attitude. For this reason, when reading Fuel Quantity, the airplane should be in a laterally and longitudinally level coordinated attitude (approximately 2° nose up) for the fuel indicator to read accurately. The wing fuel tank quantity readings are extremely sensitive to airplane attitude and turbulence. During uncoordinated flight the low wing may read a lesser quantity than the high wing even if the actual fuel quantity in the low wing is greater.

NOTE

Some airplanes are equipped with a digital display fuel flow totalizer system which can be manually selected to indicate total fuel expended or fuel remaining. For the system to display fuel remaining the pilot must first input his estimated total fuel load and then the totalizer electronically subtracts fuel consumed from the initial quantity entered. Regardless of the system accuracy as a fuel consumed totalizer it should never be used as a primary fuel quantity indicator because;

- The displayed remaining fuel quantity is based on the initial estimated fuel load;
- It only shows estimated total remaining fuel load and not how the fuel load is distributed between the different fuel tanks;
- It only subtracts fuel consumed by the engines and consequently cannot indicate fuel that was mistakenly not added or fuel lost due to possible fuel system leaks.

LOW FUEL WARNING LIGHT

A panel mounted LOW FUEL Warning Light, activated by a float switch located in the fuselage tank is provided as standard equipment. Takeoff is prohibited with LOW FUEL Warning Light illuminated, or inoperative.

The LOW FUEL Warning Light first illuminates continuously when 12 gallons of fuel remain in the fuselage fuel tank and the light will remain on as fuel is depleted until fuselage fuel tank is again serviced above 12 gallons. In turbulence or during climbs and descents intermittent illumination may occur when the fuselage fuel tank has slightly more than 12 gallons of fuel remaining.

The fuel system is designed so that during normal operation the wing fuel tanks should be empty when the fuselage fuel tank quantity is approximately 12-16 gallons.

The LOW FUEL Warning system operates independently of the primary fuel quantity indicating system. Power for the Low Fuel Warning Light is provided through the Cabin Light circuit breaker, or Annunciator Panel circuit breaker if the optional Annunciator Panel is installed.

HEATER FUEL SYSTEM

The cabin heater obtains its total fuel supply from the fuselage fuel tank. When operating, the heater fuel consumption is approximately 0.6 gallons per hour.

HYDRAULIC SYSTEM

The Hydraulic System provides pressure for operation of the landing gear, main landing gear doors, flaps, and nose wheel steering (Figure 9-15). A hydraulic reservoir located just aft of the baggage compartment supplies hydraulic fluid to the hydraulic pump installed on the right engine. An electrically operated shutoff valve is installed in the fluid supply line to shut off fluid flow to the engine driven pump in the event of an engine fire, and helps facilitate maintenance of the system. The shutoff valve switch is located on the right instrument panel (Figure 9-14). Operation of the right engine with the hydraulic valve closed will cause damage to the hydraulic pump.

Hydraulic pressure is controlled by a pressure regulator, for an operating pressure of 900-1100 psi. A check valve is incorporated into the regulator to hold system pressure, should the pump fail, and a relief valve in the regulator prevents system pressure from exceeding 1300 psi. An accumulator dampens pressure pulsations in the system, and provides an auxiliary pressure source for actuation of the flaps, should the pump fail. A direct readout pressure gage is located on the right instrument panel (Figure 9-3)

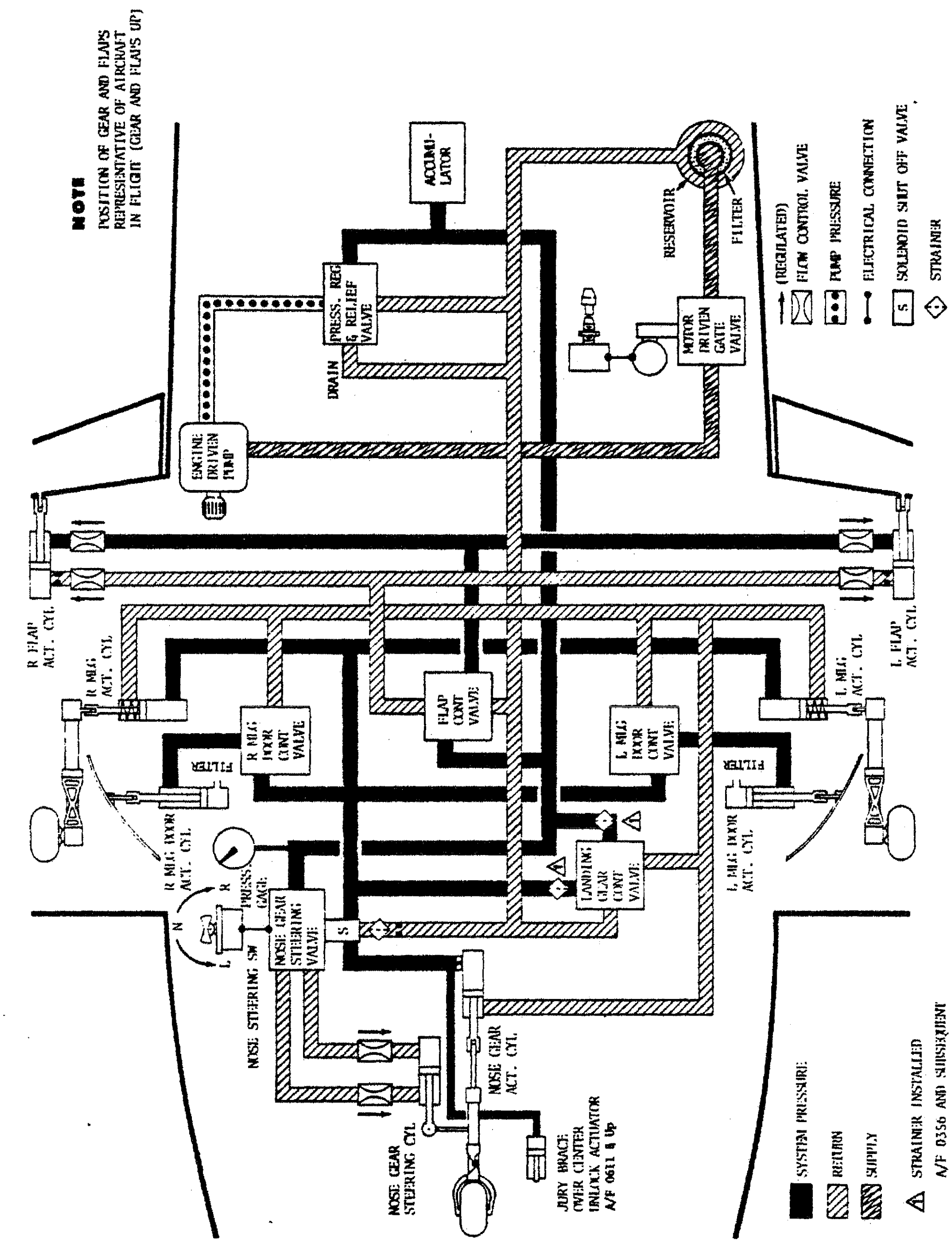
BRAKE SYSTEM

MAIN LANDING GEAR BRAKES

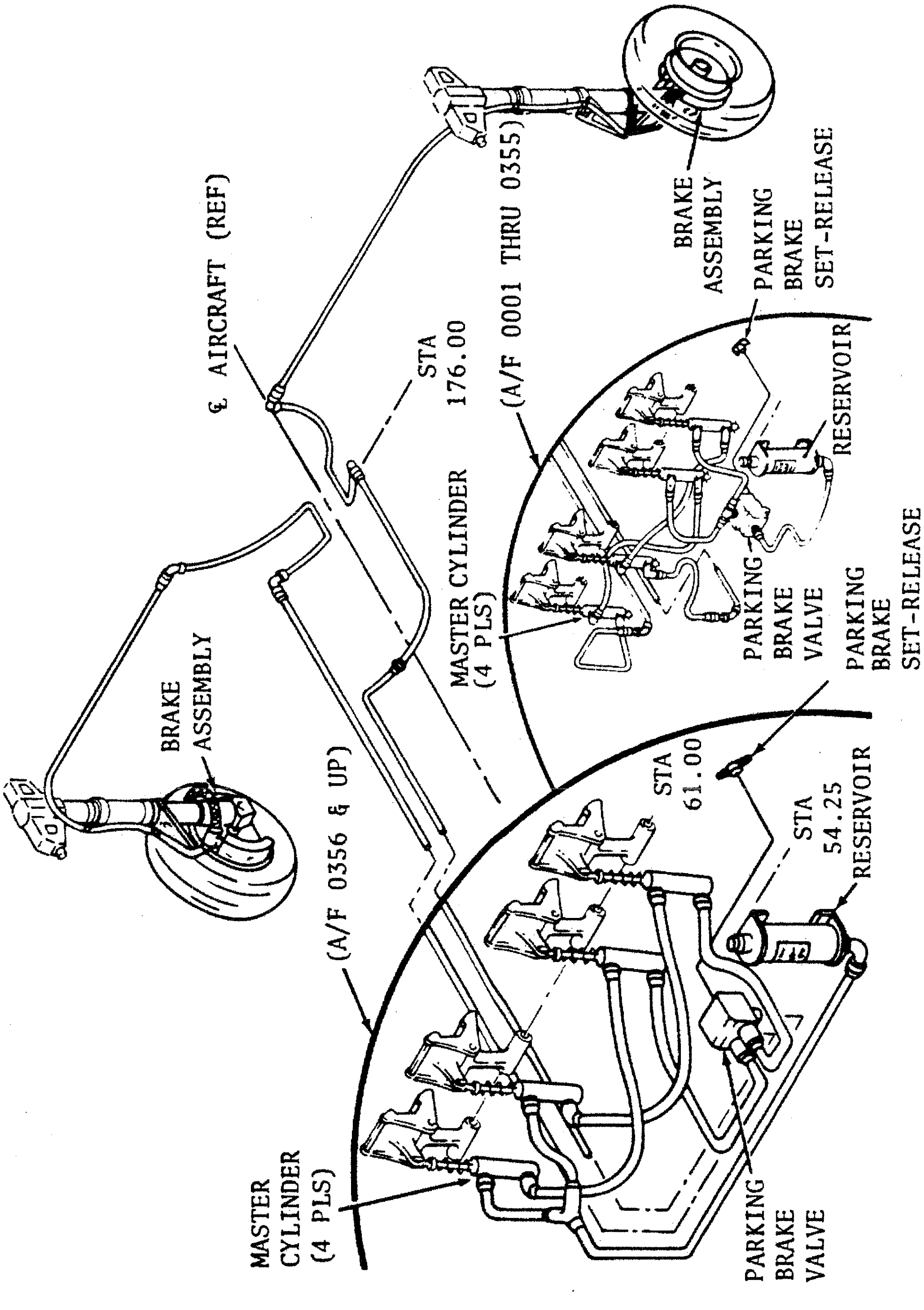
The Aerostar incorporates hydraulically actuated, disk brakes. The brake system is completely independent of the hydraulic system and incorporates independent wheel brake systems and a common brake fluid reservoir. Each rudder/brake pedal has its own brake master cylinder to generate pressure to the appropriate wheel brake (Figure 9-16).

PARKING BRAKE

A parking brake handle, located outboard below the Pilot's instrument panel, is mechanically linked to the parking brake valves. To set the parking brake, apply brakes, pull out the parking brake handle and rotate clockwise to lock. To release parking brake, rotate handle counterclockwise to unlock and push handle fully forward.



Hydraulic System Schematic
Figure 9-15



Brake System
Figure 9-16

ELECTRICAL SYSTEM

ALTERNATOR AND BATTERY SYSTEM

The Aerostar 601 is equipped with a 28V DC electrical system (Figure 9-17). Power to operate the various circuits and components is provided by two self exciting 70 amp alternators; one on each engine. Maximum continuous output from each is 55 amps. The voltage from each alternator is controlled by its voltage regulator and over-voltage relay. The voltage regulator senses the output of the alternator and automatically adjusts the alternator field current to increase or decrease the output voltage. Should one regulator become inoperative, the overvoltage relay will prevent any overvoltage condition of that alternator by interrupting the field current, shutting off the alternator. This alternator may be reactivated by turning it OFF (this resets the relay) and then back ON.

Each alternator system is separated from the battery and the other alternator system by isolation diodes. These diodes prevent reverse flow of current from a good alternator or the battery into an inoperative alternator.

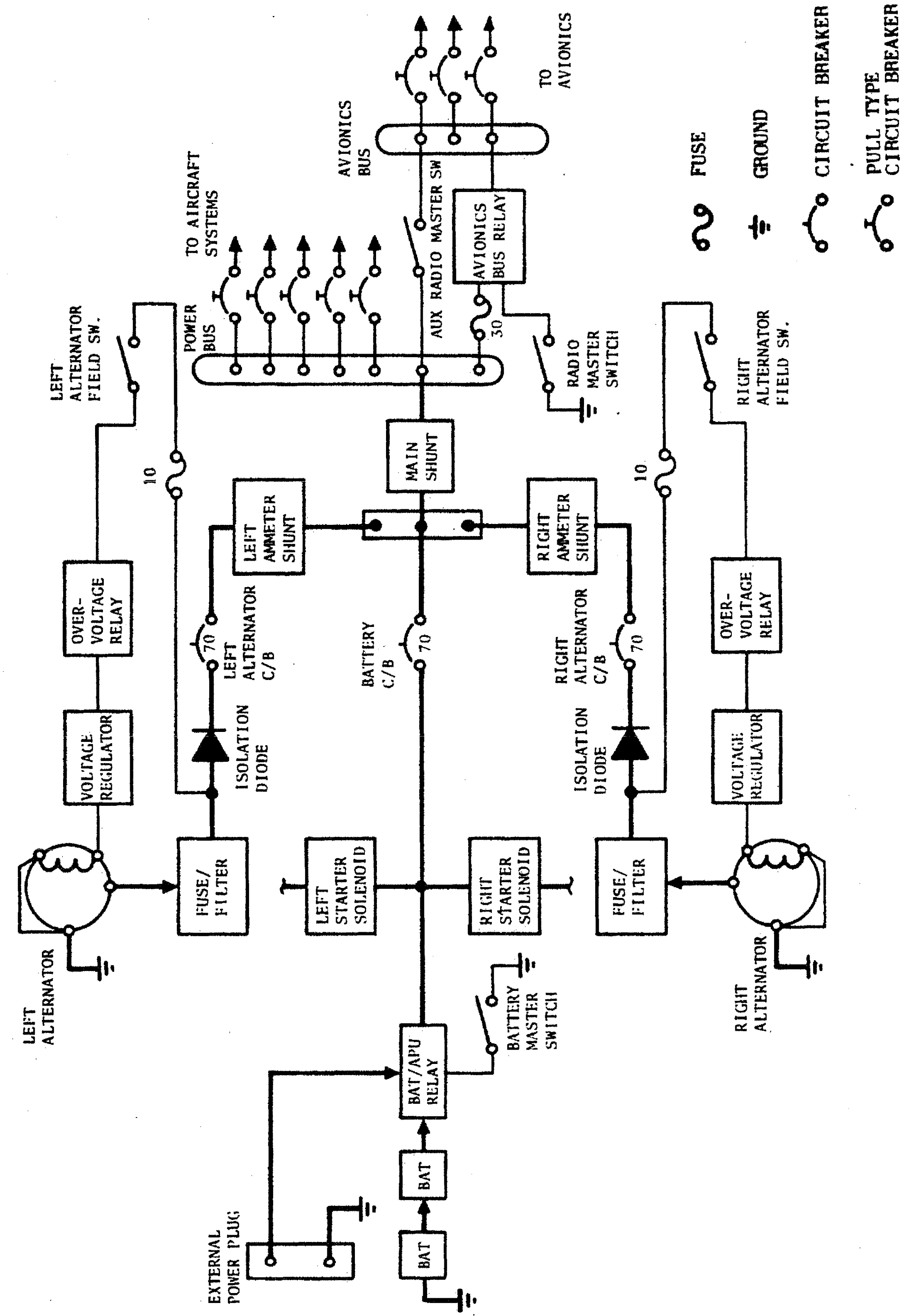
An Alternator Warning Light (if installed) will illuminate when the respective alternator fails or is turned off. Other system malfunctions that will illuminate the light, are:

1. Engine RPM too low - alternator not on the line.
2. Failure of alternator output fuse and/or filter.
3. Overvoltage relay open.
4. Voltage regulator failure.

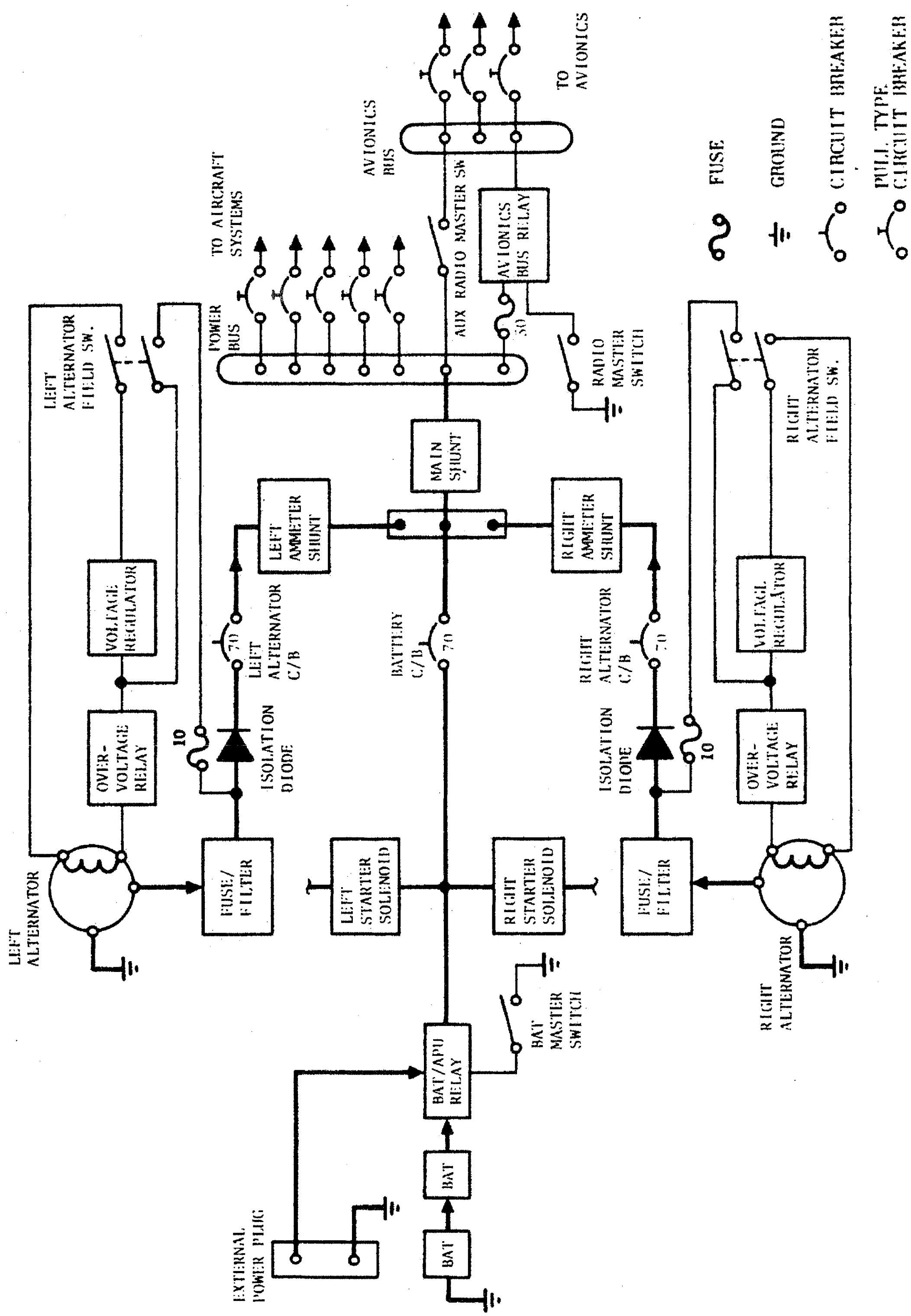
NOTE

Multiple failures may or may not illuminate the warning lights, however, these failures are readily determined by monitoring the voltammeter, if system loads are exceeded a circuit breaker should also open.

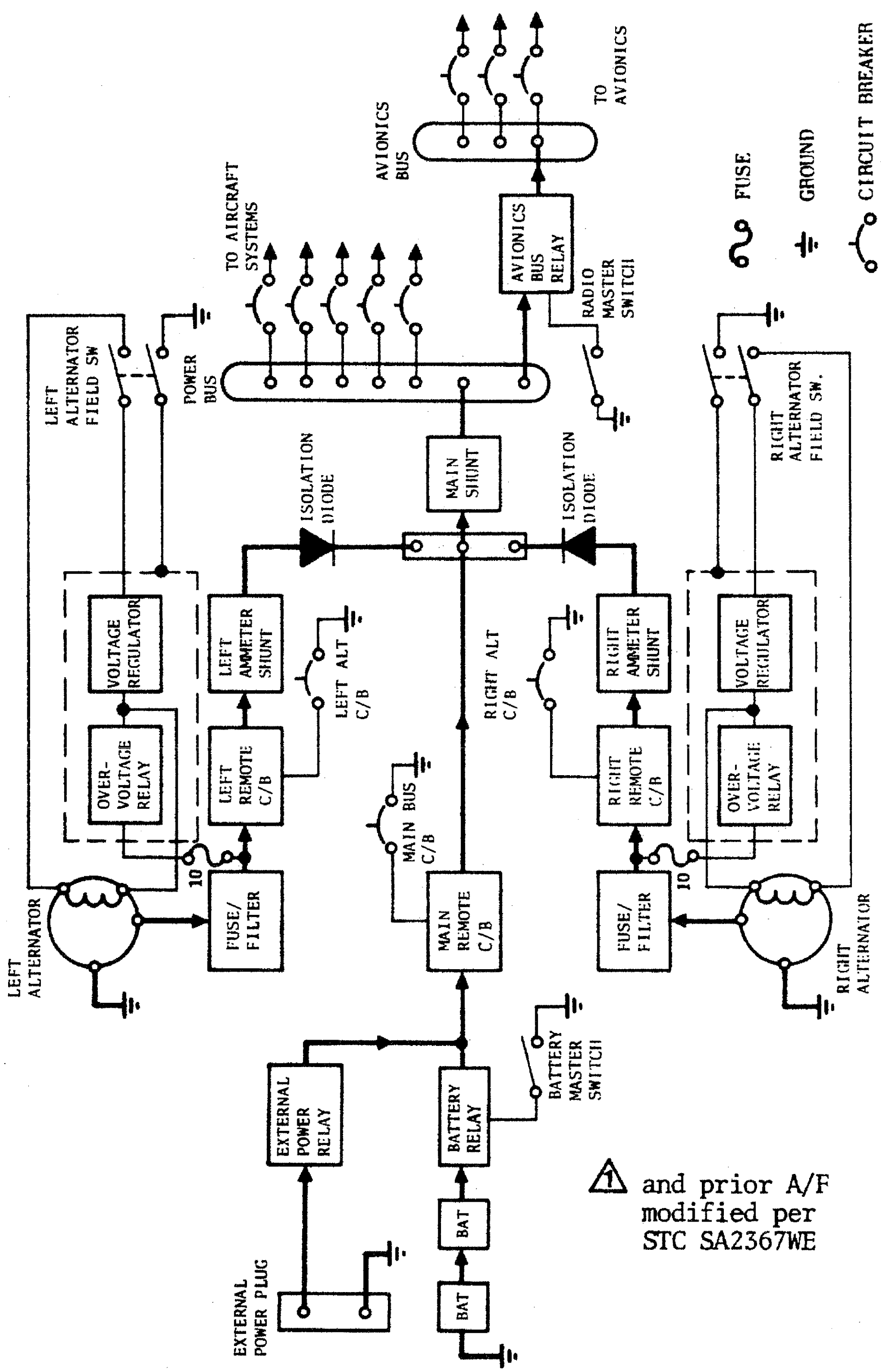
Additionally, there will be no annunciation if there is a total failure of the electrical system.



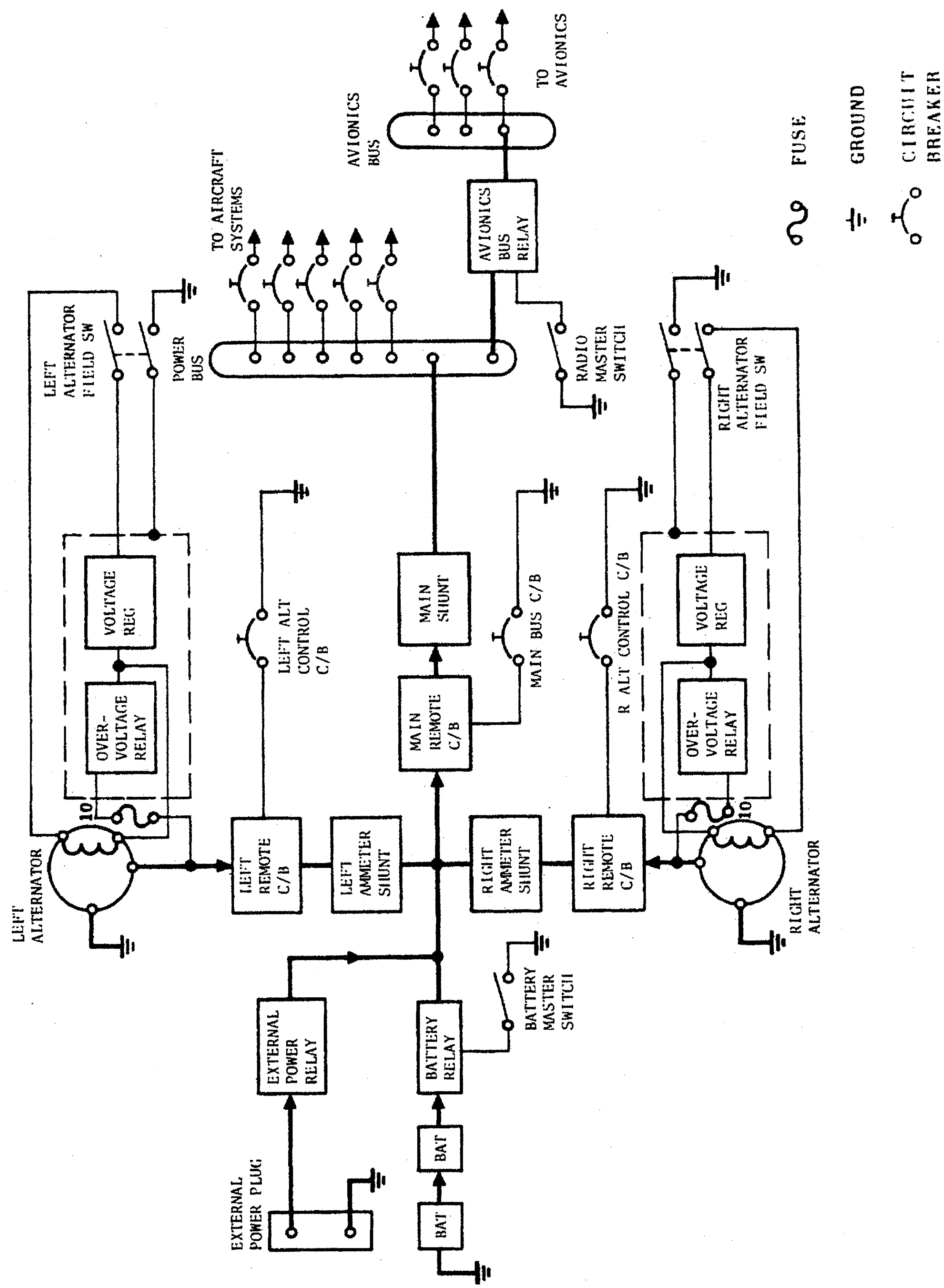
Electrical System Schematic (A/F 365 & UP)
Figure 9-17



Electrical System Schematic (A/F 0190 thru 0364)
Figure 9-17



Electrical System Schematic (A/F 0144 thru 0189) 1
Figure 9-17



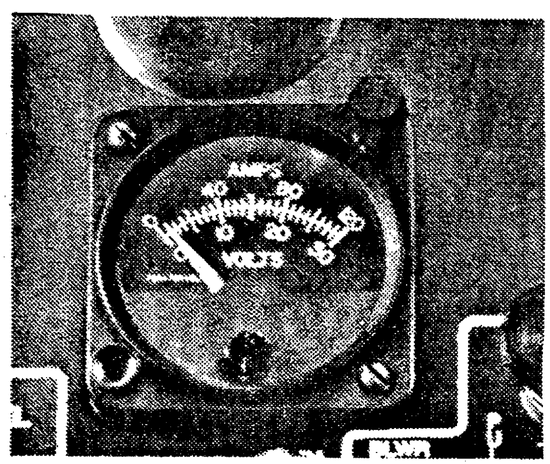
Electrical System Schematic (A/F 0001 thru 0143)
Figure 9-17

Individual Alternator Switches are provided to turn their respective system ON or OFF and to check alternator circuit operation. Should an alternator fail, or an engine not be running, the respective alternator should be turned OFF. Since the alternators are self exciting, battery power is not required for excitation.

Two 12 volt, lead acid batteries, located just forward of the tail cone, are connected in series to provide 24 volts for engine starting and a reserve source of power in the event of dual alternator failure. A DC external power receptacle, located just behind the access door on the underside of the tail, provides a means for connecting external power to the aircraft electrical system. The battery switch must be in the ON position prior to connecting external power, then switched OFF after external power unit is turned on. Since this will provide a direct connection to the main aircraft bus, care should be taken to ensure that all switches and equipment are turned off (except battery switch), before connecting the external power. This will protect the individual systems from a poorly regulated external power source which can damage the airplane's electrical equipment. Prior to turning on any electrical equipment, check to ensure the bus voltage does not exceed 30 volts. Turn battery switch ON prior to disconnecting external power source.

VOLTAMMETER

The voltammeter (Figure 9-18) is located on the copilot's lower panel and reads either voltage or amperage. A three position amperage selector switch, mounted adjacent to the voltammeter, is used to select the circuit to be read on the meter. Total operating equipment amperage load is displayed when the switch is in the BUS position. The appropriate alternator amperage load is displayed by moving the switch either left or right. If left and right alternator loads are added, the sum may be greater or less than displayed in BUS position. If greater, the battery is being charged; if less, battery is being discharged. The left and right positions are also useful in determining alternator load sharing, or paralleling. At lower load values (not to exceed 55 amps) one



Voltammeter
Figure 9-18

alternator may carry much more load than the other. This condition is acceptable if the lower load value alternator has any load indication and will carry the load when the higher load value alternator is turned off. This test is valid only when both engines are operating above 1800 RPM to assure 28V output for each alternator.

Depressing the button on the voltammeter, regardless of amperage selector switch position, will cause the meter to display system voltage. The voltammeter circuit is fuse protected (see FUSES, this section).

CIRCUIT BREAKERS

An equipment circuit breaker panel is located on the lower right instrument panel (Figure 9-3). Each of the push-to-reset type circuit breakers will pop out when excessive current flows through the circuit it protects. After allowing the circuit breaker to cool for 1 - 3 minutes, it may be reset by pushing it in until it clicks. Attempting to reset the circuit breaker before it has cooled sufficiently will not increase the reset time. Should a circuit breaker pop out a second time, it should be left out until the cause has been corrected, as a short is indicated and damage may occur to the circuit and its components.

NOTE

Effective A/F 0190 and UP, the circuit breakers are not only push to reset but also are of the pull to disable type, except for alternator and battery breakers.

The battery and each alternator is protected by either a 73 amp remote circuit breaker relay, reset by a 5 amp panel mounted circuit breaker (A/F 0001 thru A/F 0189), or a panel mounted 70 amp circuit breaker (A/F 0190 and Subsequent). After a 1 to 3 minute cooling period, both remote and panel mounted breakers may be reset.

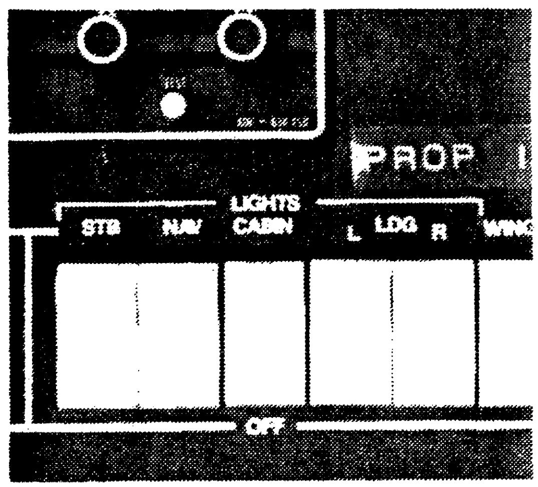
FUSES

The voltammeter circuit is protected by six 1-amp fuses mounted in the rear of the cabin (A/F 0001 thru 0212) or on a plate directly below the circuit breaker panel (A/F 0190 and Subsequent). The avionics bus is protected by one 30-amp fuse mounted forward of the copilot panel, inaccessible in flight. In the event of a failure of this fuse (as indicated by a simultaneous failure of all radios), the auxiliary radio master switch (Figure 9-3) may be used to obtain limited power (25 amps maximum) for radios (A/F 0190 and UP).

LIGHTING SYSTEM

EXTERIOR LIGHTING

Appropriate switches and circuit breakers on the instrument panel control all exterior lighting (Figure 9-3 and 9-19). Navigation lights or combination strobe/navigation lights (if installed) are located in the wing tips and on the tail cone. Dual taxi/landing lights for extended periods while on the ground should be avoided as this may cause overheating and possible deformation of the acrylic lens.



Lighting
Figure 9-19

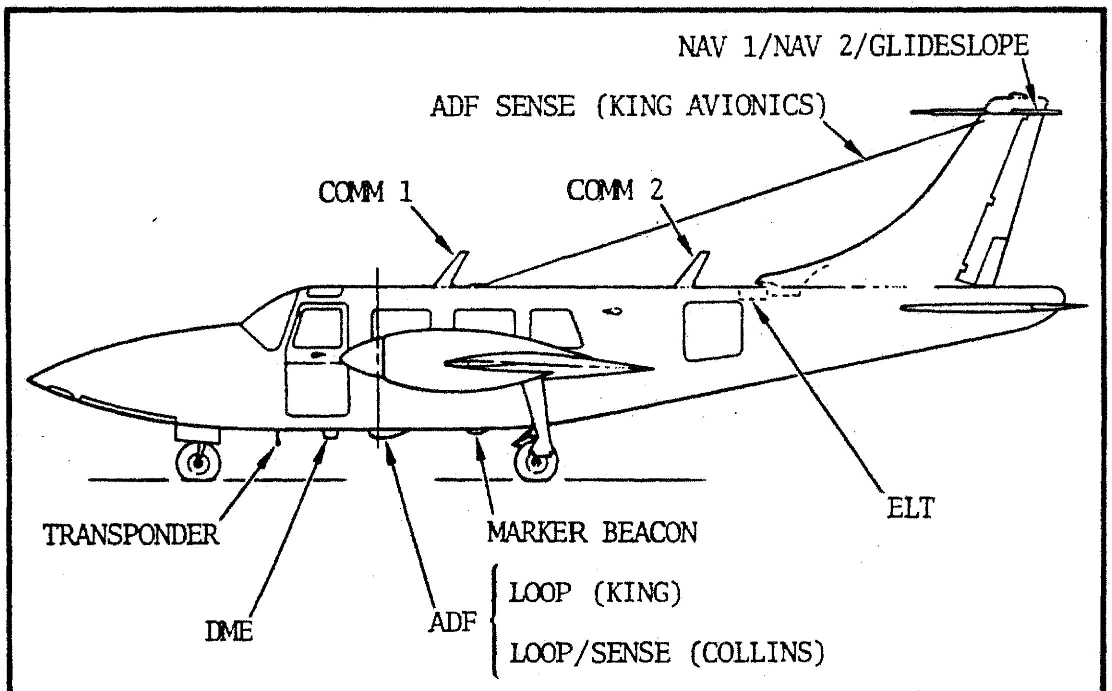
INTERIOR LIGHTING

The instrument panel is lighted by means of red and white (blue/white A/F 0653 & Up) lights located under the glareshield and side panels, and post lights. All red, all white (blue/white A/F 0653 & Up) or any combination thereof, may be selected by means of rheostats located on the pilot's lower panel (Figure 9-3). Full counterclockwise rotation of the knobs turns the lights off. The avionics equipment, post lights and some instrument lights are controlled by means of a rheostat, also located on the pilot's lower panel. The magentic compass is internally lighted, with the lighting controlled by the airplane battery switch. Cabin lighting is provided by individual passenger seat lights located in the headliner above each seat. Each light has a switch for individual control. The master cabin light switch is located on the pilot's lower panel. A dual intensity map light (if installed) is mounted overhead, between the pilot and co-pilot stations. The map light switch, adjacent to the map light, has a center OFF position and BRIGHT or DIM selection capability. The baggage compartment is illuminated when the baggage door is opened and the battery switch is ON.

AVIONICS

The airplane is equipped with antennas shown on figure 9-20, and all necessary coaxial cables routed beneath the floor to the forward cabin area. Included as standard equipment is a complete IFR avionics package including: Dual Nav/Comm, Glideslope, ADF, Marker Beacon, Transponder, DME and ELT. The microphone jacks, located on the pilot and copilot lower panels, are designed to use standard 100 ohm impedance microphones. Headphone jacks, adjacent to the microphone jacks, are designed to use standard 500 ohm impedance headphones. Care should be given to use microphones and head phones of the above values to prevent possible damage to the audio amplifier system and to obtain optimum performance.

Earlier airplanes are equipped with an AM/FM stereo receiver mounted on the headliner between the pilot and copilot stations, supplied with four stereo headsets (two 8 ohm impedance and two pneumatic). the stereo unit is equipped with a COM button which, when IN will allow aircraft communications to squelch the entertainment for the duration of the incoming transmission as indicated by an illuminated



Antenna Locations
Figure 9-20

red light on the stereo unit (with appropriate audio panel selector switch in PHONE position). When the COM button is OUT, incoming transmission will not be received through the stereo headsets.

HEATING, VENTILATING AND DEFROSTING SYSTEM

AIR DISTRIBUTION SYSTEM

During ground operation, outside air may be drawn into the cabin by activating the cabin ventilation fan (available as an option on A/F 0456 and Subsequent) or by activating the heater fan. When the cabin ventilation fan is activated outside air is drawn from the scoop mounted on the right hand nose section and distributed through adjustable overhead air outlets. When the heater fan is activated, (for A/F 0001 thru 0455, air knob must be pulled to allow air to enter the cabin floor ducting) the outside air is drawn from the dorsal fin air inlet and distributed through adjustable floor air outlets. Additional ventilation air is available at the pilot and copilot stations by means of outlets located on the forward cabin bulkhead. The control knobs are located below the instrument panels, extreme outboard. (Figure 9-3)

During flight, ram air is forced through the nose scoop and is directed to the adjustable overhead air outlets and to the cabin forward bulkhead outlets. Ram air is also forced through the inlet in the base of the dorsal fin and directed to the adjustable floor air outlets (for A/F 0001 thru 0455, air knob must be pulled to allow air to enter the cabin floor ducting).

The overhead air outlets and the floor air outlets (A/F 0213 and Subsequent) are directionally adjustable and may be closed or opened by turning the outlet rim either clockwise or counterclockwise.

HEATER SYSTEM

A 35,000 BTU, gasoline powered Janitrol heater supplies heat as required for cabin comfort. The heater is located in the fuselage, aft of the baggage compartment and obtains its fuel supply from the airplane fuel system fuselage tank. During continuous operation the heater fuel consumption is approximately 0.6 GPH. The heater air supply comes from the inlet at the base of the dorsal fin and is directed to the floor air outlets. In either mode of operation, some air may also be supplied by recirculation of cabin air through the plenum static air door (Figure 9-21).

To operate heater proceed as follows:

1. Open adjustable floor outlets (as many as possible, A/F 0213 and Subsequent). Pull air knob fully out (A/F 0001 thru 0455).

NOTE

Never operate heater with less than two open outlets and air knob fully out (A/F 0001 thru 0455).

2. Heater Fan Switch - ON.
3. Cabin Heat Switch - PRESS ON momentarily.
4. Heater Temp Knob - PULL to desired temperature.
5. Floor Outlets - ADJUST to desired flow.

To shut down heater proceed as follows.

1. Heater Fan Switch - OFF.

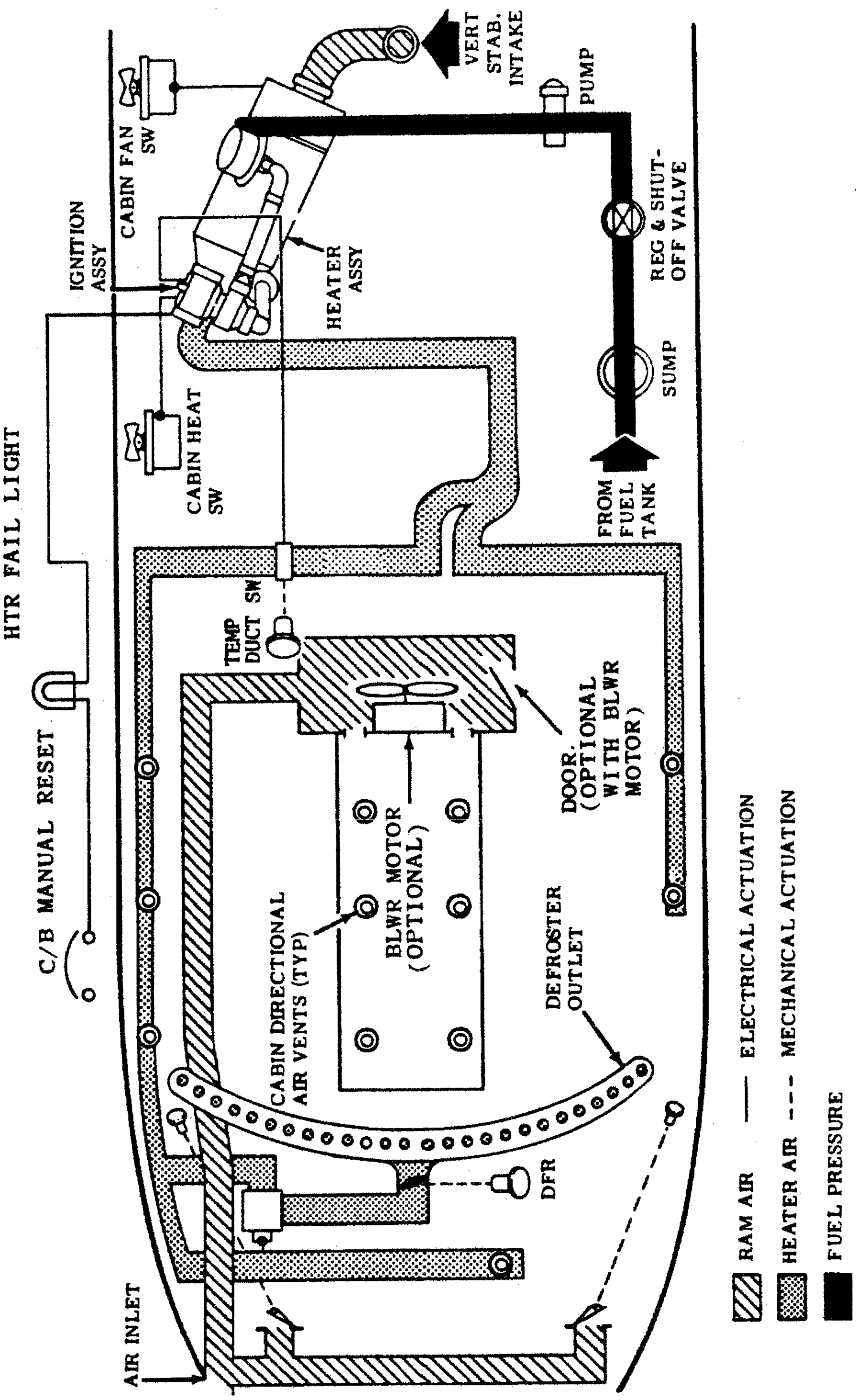
NOTE

Do not close floor outlets until heater has adequately cooled. For heater shutdown after landing, allow at least three minutes for heater to cool before turning off the BATT master switch.

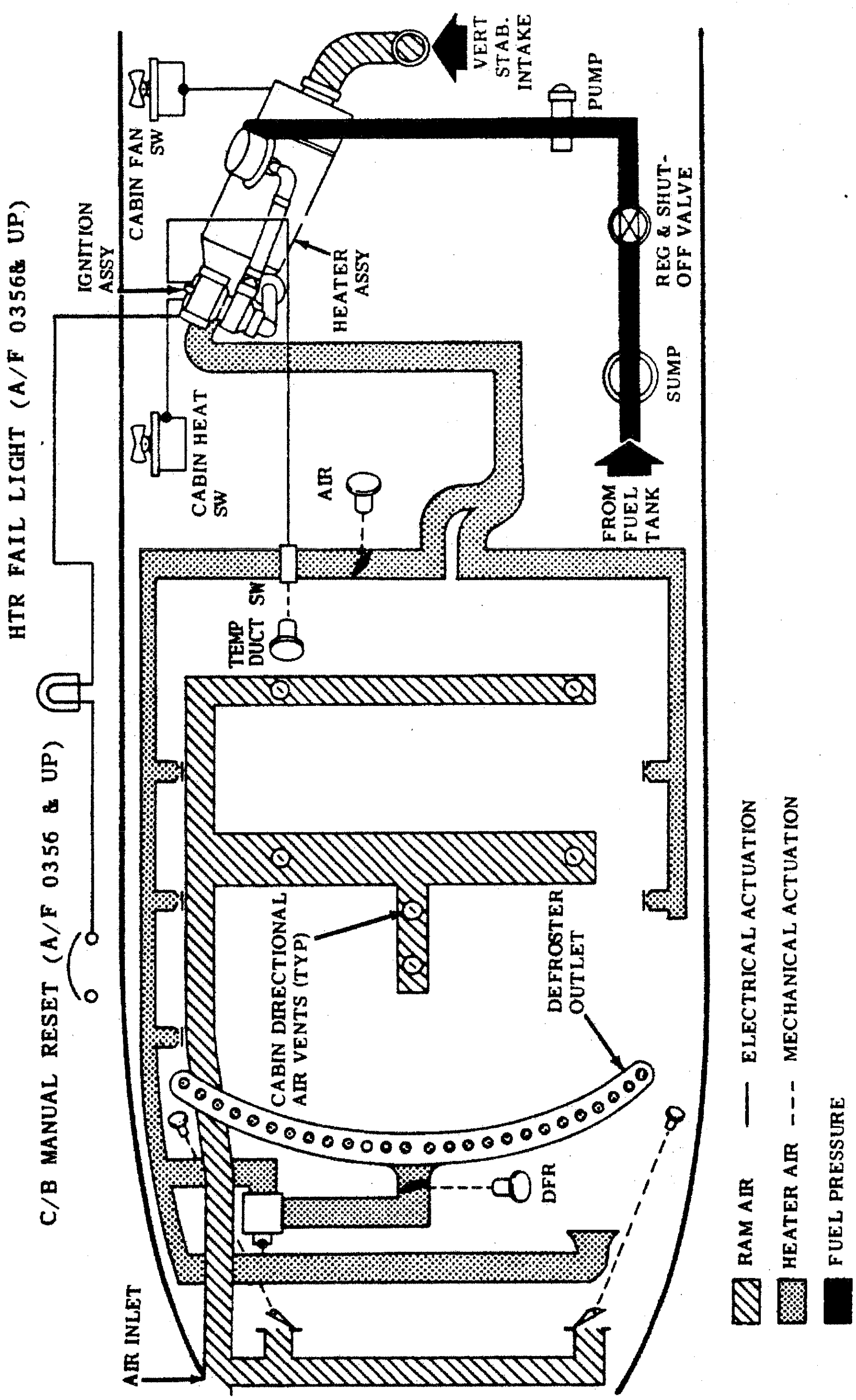
For ground operation the master BATT switch must be ON or the airplane must be on external power. Operating the heater or cabin fan on battery only is not recommended because of high current drain. The cabin FAN switch must be ON for all heater operation.

HEATER PROTECTION DEVICES

A Duct Switch, located within the cabin right side floor duct, controls the temperature within the ducts as selected by the pilot



Heating and Ventilating System Schematic (A/F 0456 and Subsequent)
Figure 9-21



Heating and Ventilating System Schematic (A/F 0001 thru 0455)
Figure 9-21

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using the "TEMP" Knob. This switch has a maximum temperature setting to prevent damage to ducts. Under normal operation this is the switch that controls the heater.

A cycling Switch, mounted at the heater outlet is preset to cycle the heater off in case the temperature exceeds the maximum normal heater operation temperature prior to the duct switch reaching its pilot selected setting. After the temperature drops, the cycling switch will automatically re-start the heater.

An Overheat Switch mounted on the heater case will turn off the heater if the temperature exceeds the maximum safe operating temperature. This is usually triggered by a hot spot caused by low airflow through the heater. When the overheat switch turns off the heater, an amber warning light identified as HTR FAIL will illuminate.

NOTE

The heater fail warning light and automatic reset feature only apply to A/F 0356 and Up. Earlier models have to be manually reset at the heater unless they have been modified by Service Letter SL6000-45.

The HTR FAIL warning light will stay on until the temperature drops to a safe limit, at which time the heater can be restarted by following the normal starting procedure and taking precautions noted below:

WARNING

PRIOR TO RESTARTING THE HEATER, ENSURE THE FOLLOWING STEPS ARE FOLLOWED:

a. Air Knob is full out (A/F 0001 thru 0455) and as many passenger floor outlets as possible are full open.

b. The heater temp Knob is only out half of its full extension.

c. Immediately shut off heater if HTR FAIL warning light comes on again after attempting a restart. Do not operate heater again until it has been serviced by a qualified repair station. Operating a defective heater may be a serious fire hazard.

qualified repair station. Operating a defective heater may be a serious fire hazard.

d. After the heater has restarted, wait approximately 5 minutes and then, if desired, the temperature knob may be pulled out for a higher temperature selection.

A Combustion Air Pressure Switch senses pressure differential between the exhaust stack and combustion air inlet tube. The switch will open and de-energize the heater circuit if the combustion air flow drops below a predetermined setting.

The heater electrical system is protected by a circuit breaker located on the circuit breaker panel (Figure 9-3).

WINDSHIELD DEFROSTING

The windshield DEFROST control (Figure 9-3) is attached to a butterfly valve in the windshield defrost ducting. Pulling control fully out opens the butterfly valve to allow bleed or ram air to be directed to the defroster outlet extending along the bottom of the windshield. The defroster blower switch located next to the defrost control on the instrument panel activates the blower to provide maximum defrosting and additional cabin heat distribution capability. Defrost air temperature is controlled by cabin air temp controls.

OXYGEN SYSTEM

The oxygen system consists of a 115 cubic foot oxygen storage cylinder with pressure relief valve, recharging filler valve, an altitude compensated regulator assembly, and six system outlet ports (Figure 9-22). Any constant flow mask may be used with this system. These are obtainable from your Aerostar Dealer.

The storage cylinder in the aft fuselage supplies high-pressure oxygen to the regulator assembly located on the upper right side of the cabin interior just below the copilot's side window. The regulator assembly, consisting of supply gage, altitude gage, and altitude adjusting valve, supplies low-pressure oxygen to the crew and passenger outlets. Oxygen to the outlets is controlled by the adjusting valve. This valve regulates oxygen pressure and flow rate available at the system outlets according to aircraft altitude. It also serves as the oxygen system shutoff valve when the system is not in use. The flow indicator depicts oxygen flow in terms of aircraft altitude and the pressure gage indicates the amount of oxygen pressure remaining in the cylinder. The cabin outlets incorporate a spring-loaded check valve which stops the flow of oxygen from the outlet when the mask is disconnected.

The oxygen storage cylinder pressure relief valve is incorporated into the oxygen dump outlet as a system protection factor. If cylinder pressure should exceed 2700 psi through thermal expansion or overcharging, a safety outlet disc in the cylinder valve assembly will rupture and blow the over-pressure visual indicating disc mounted on the lower left fuselage skin aft of the wing trailing edge. Oxygen supply will flow overboard through the dump outlet.

OXYGEN USAGE

The Aerostar 601 is one of the few executive transports designed with a normal cruise altitude in excess of 20,000 feet. Since oxygen is required for all occupants at altitudes above 10,000 feet, special attention should be given to the effects of high altitude flight on occupants without sufficient oxygen and the use of oxygen in flight.

EFFECTS OF FLIGHT WITHOUT OXYGEN

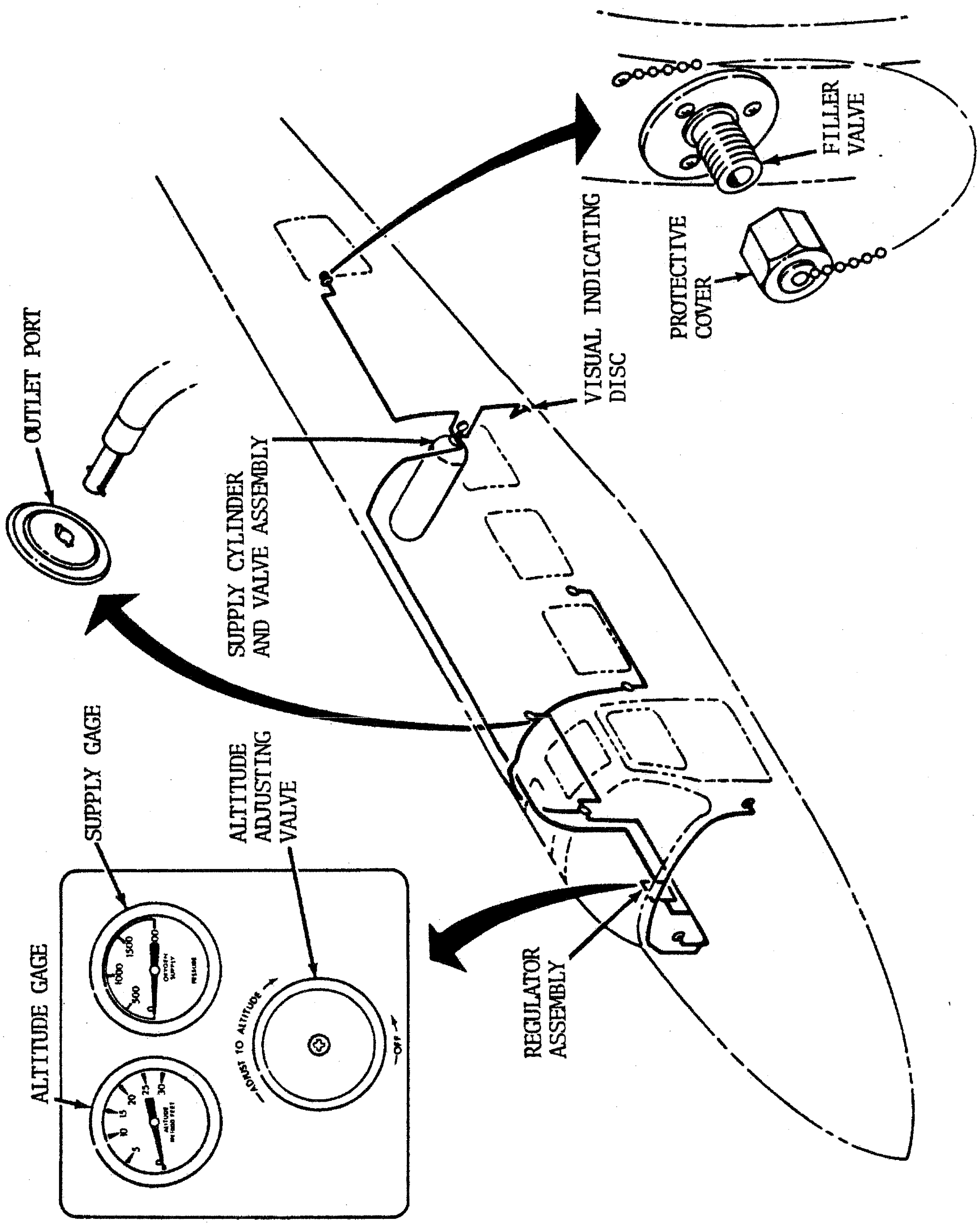
Insufficient oxygen available to the body tissues creates a physiological condition known as hypoxia. Some people are affected more severly and at lower altitudes than others. The information presented here reflects the symptoms of hypoxia on a theoretically average person in good physical condition.

NOTE

Altitudes referred to in the following are pressure altitudes:

5000 feet - Night vision slightly impaired. The retina of the eye is the most sensitive part of the body to lack of oxygen.

10,000 to 14,000 feet - Drowsiness, fatigue, headache, impaired judgement. Symptoms undetectable during flights of less than 1 hour duration, but can become progressively more noticeable and dangerous on longer flights. Symptoms nearly always occur during flights of 4 hours or longer.



Oxygen System
Figure 9-22

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15,000 to 18,000 feet - Euphoria and/or belligerence, overconfidence, impaired reasoning and judgement, narrowing of field of attention, poor muscle control, blurred vision, faulty memory, possibility of passing out. All symptoms become increasingly severe with time at altitude. Symptoms nearly always occur during flights of 30 minutes or longer.

20,000 to 35,000 feet - Same symptoms as '15,000 to 18,000 feet' only more pronounced. Symptoms usually occur within 15 minutes, with eventual unconsciousness.

35,000 to 40,000 feet - Immediate unconsciousness with little or no warning. Effect will usually occur within 15 to 45 seconds.

WHEN TO USE OXYGEN

Day

1. No oxygen required for flights below 10,000 feet.
2. No oxygen required for flights of 1-hour duration or less between 10,000 and 12,000 feet.
3. Use oxygen continuously on flights of more than 1-hour duration between 10,000 and 12,000 feet.
4. Use oxygen at all times on flights above 12,000 feet.

Night - Same rules as for day except use oxygen continuously on flights of more than 1 hour duration between 8000 feet and 10,000feet.

Remember - Smoking not permitted when oxygen is in use. All oil, grease, soap, lipstick, lip balm or other fatty materials which constitute a fire hazard must be kept away from oxygen under pressure.

OXYGEN SYSTEM CHECK

Perform system preflight check as follows:

1. Ensure there is sufficient oxygen supply for projected flight by taking psig reading and referring to Figures 9-23 and 9-24.
2. Inspect all masks and mask tubing for holes, tears, and cleanness.
3. Slowly open altitude adjusting valve to projected flight altitude by rotating knob clockwise.
4. Plug a mask into each system outlet and check for proper oxygen flow. The indicator in the mask tubing will not be visible when oxygen is flowing.

NOTE

To plug a mask into an oxygen outlet, insert plug on mask tubing into outlet and turn clockwise.

5. Remove masks from outlets and stow.
6. Turn altitude adjusting knob counterclockwise to OFF position. Indicator needle on altitude adjusting gage should remain at projected flight altitude.

CAUTION

Do not use excessive force when closing valve or valve seat may be damaged.

7. Depress any outlet check valve and bleed outlet system until no pressure is indicated on altitude adjusting gage.
8. Brief passengers on use of oxygen system.

WARNING

Smoking not permitted when oxygen is in use. all oil, grease, soap, lipstick, lip balm or other fatty materials which constitute a fire hazard must be kept away from oxygen under pressure

OXYGEN SYSTEM OPERATION

Supplemental oxygen should be used anytime the airplane is flown 10,000 feet or more above sea level. To operate the oxygen system, perform system preflight check given above and proceed as follows:

1. Slowly open altitude adjusting valve on regulator panel until altitude gage indicator corresponds to flight altitude.

NOTE

In a climb to altitude, the regulator may be adjusted in 5000-foot increments until cruise altitude is reached. Do not allow adjusted altitude to lag actual airplane altitude.

2. Plug masks into outlets.
3. Check system supply gage periodically for remaining supply.
4. Ensure altitude adjusting valve is readjusted to correspond to changes in aircraft altitude.

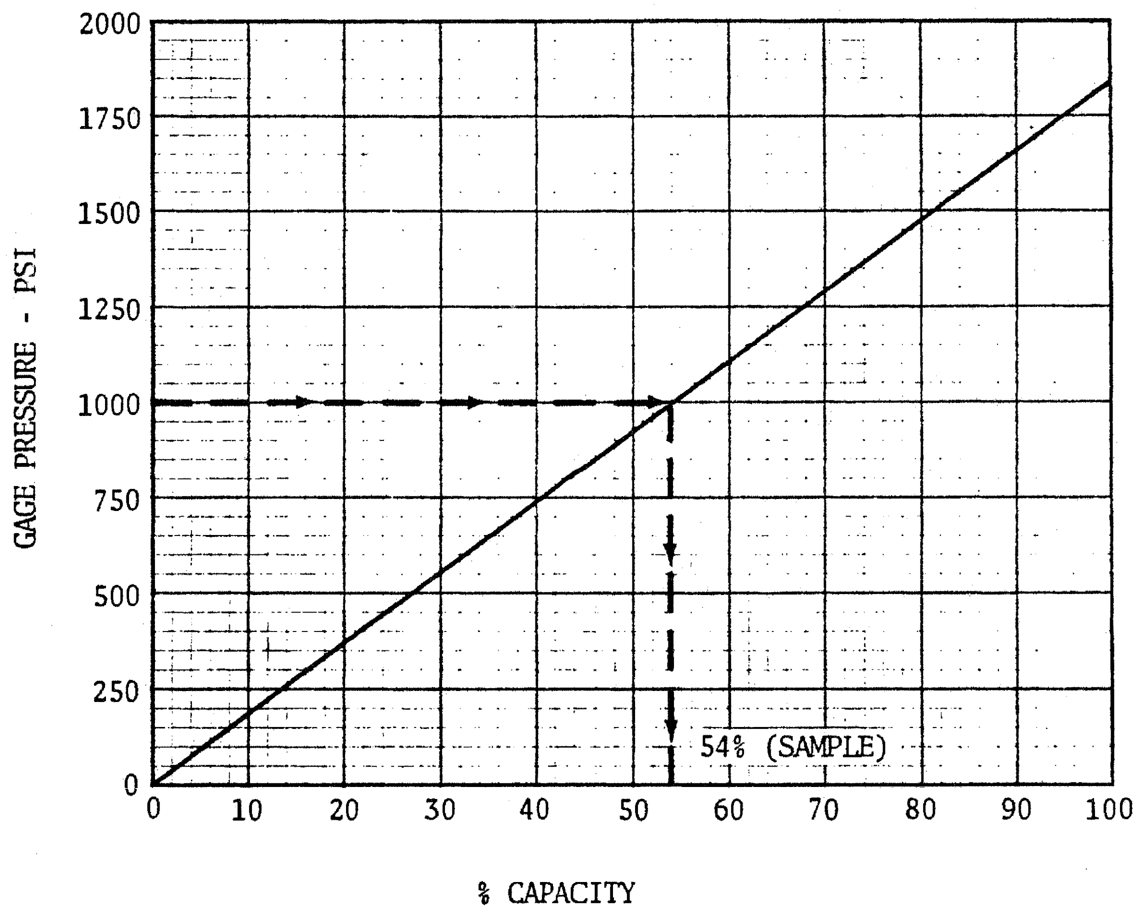
To discontinue oxygen system operation:

1. Disconnect and stow masks.
2. Rotate altitude adjusting valve knob counterclockwise to the extent of its travel.

PERSONS USING	MINIMUM DURATION IN HOURS AND MINUTES AT FOLLOWING ALTITUDES*					
	8,000 Ft	10,000 Ft	15,000 Ft	20,000 Ft	25,000 Ft	30,000 Ft
1	47:19	35:34	22:11	16:07	12:44	10:51
2	23:39	17:47	11:05	8:03	6:22	5:26
3	15:46	11:51	7:24	5:22	4:15	3:37
4	11:50	8:53	5:33	4:02	3:11	2:43
5	9:28	7:07	4:26	3:13	2:33	2:10
6	7:53	5:56	3:42	2:41	2:07	1:49

*CYLINDER CAPACITY 115 CU FT (3257 LITERS AT 70°F AND 760 MM Hg) CHARGED TO 1850 PSIG.

Oxygen Duration Chart
Figure 9-23



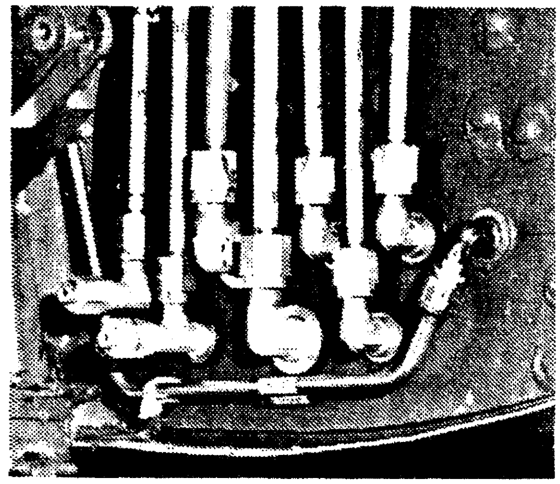
NOTE

TO USE ABOVE CHART, CHECK SUPPLY GAGE IN CABIN, CONVERT PRESSURE TO PERCENT OF CAPACITY, READ DURATION FROM DURATION CHART AND MULTIPLY BY PERCENT OF CAPACITY. THIS WILL GIVE OXYGEN DURATION WITH A PARTIALLY CHARGED SYSTEM.

Capacity VS Oxygen Pressure
Figure 9-24

PITOT STATIC PRESSURE SYSTEM

A pitot-static head is installed on a boom extending from the leading edge of the vertical stabilizer. Both pitot (P) and static (S) pressures are taken at the head and transmitted to the airspeed, altimeter, and rate of climb instruments, as required, through the pitot-static system lines. Low point drains are installed in the right wheel well (Figure 9-25). The pitot-static head incorporates an electric heating element, which is activated by a pitot heat switch located in the left instrument panel switch grouping (Figure 9-3).



Pitot-Static Drains
Figure 9-25

PNEUMATIC SYSTEM

The pneumatic system consists of two engine driven dry air pumps, two spring loaded pressure regulating valves located in the inboard wing bays, a manifold with check valves, and an in-line filter. The system can operate fully with one pump inoperative.

GYRO PRESSURE SYSTEM

The air from the pneumatic system in-line filter is routed under the cabin floor to an in-line pressure regulator located behind the instrument panel then to the gyros and overboard. A pressure gage mounted on the instrument panel shows the gyro system pressure in inches of mercury. The gage also has L and R red indicators that come into view when the air supply from either the L or R engine driven pump fails or drops below approximately 2.5 psig.

AUTOMATIC DEVICES IN THE CONTROL SYSTEM

RUDDER/AILERON INTERCONNECT

The rudder and aileron control systems are linked by means of a spring interconnect (Figure 9-2). This interconnect improves low speed lateral stability by providing low wing aileron input with opposite rudder deflection. Its purpose is to provide automatic aileron/rudder coordination.

ELEVATOR SPRINGS

Elevator down springs are attached to the Pilot and Copilot control columns and 54.25 bulkhead (Figure 9-2). These springs provide down elevator input, increasing up elevator force gradient to allow the Pilot to perceive deterioration of airspeed away from trim. An additional benefit of the elevator down springs is that they provide down elevator input when the airspeed has been reduced below trim speed and the elevator control input is released thereby lowering the nose of the airplane followed by airspeed increase (e.g. stall recovery). This feature is common to all Aerostar Models.

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SECTION 10

HANDLING, SERVICING & MAINTENANCE SUPPLEMENTS

INTRODUCTION

The Aerostar Model 601 has been carefully designed and manufactured to give the utmost in performance and reliability. However, like any other precision machine, continuous, careful attention must be given to the airplane if it is to be retained in a like-new condition.

Experience has shown that a program of careful preventive maintenance will increase the service life of the airplane, and help prevent minor maintenance problems from developing into conditions requiring more extensive repairs. This section is included to aid the owner in his own effective preventive maintenance program and in establishing proper servicing and maintenance procedures.

Piper Aerostar Dealers and Service Centers can provide additional helpful suggestions in the care and operation of the airplane, and are equipped with the experience, knowledge and equipment to handle any service problems that may arise. It is strongly recommended that the owner make full use of this service.

All correspondence regarding service or parts must have the airplane serial number. This information is vital where replacement parts are concerned. The serial number is on the manufacturer's identification placard located under the horizontal stabilizer on the left side of the airplane.

For the convenience of Aerostar customers a Maintenance Manual and Illustrated Parts Catalog are available and may be purchased through any Piper Aerostar Dealer. For more information about these publications, their current prices, and updating service please contact your nearest Piper Aerostar Dealer.

AIRPLANE INSPECTION PERIODS

Federal Aviation Administration regulations require that all airplanes have an annual inspection performed by an appropriately rated mechanic in accordance with FAR 91.169. If the airplane is used for hire, it must also be inspected in accordance with a 100-hour inspection program.

It is further recommended by Piper Aircraft Corporation that a 25 hour, 50 and 100 hour inspection be performed, whether or not the airplane is flown for hire, as part of a good preventive maintenance program. All Piper Aerostar Dealers and Service Centers follow a factory approved procedure in the performance of these inspections and have complete familiarity with Aerostar equipment to provide the best possible service at the lowest cost.

To expedite inspections performed by a qualified mechanic outside the realm of the Piper Aerostar service organization, a 50/100 hour Inspection form and Ground Run-Up Record form are available (Reference Aerostar Maintenance Manual). These inspection forms may be obtained by writing Piper Aircraft Corporation, Customer Service Department, 2560 Skyway Drive, Santa Maria, Ca. 93454.

Periodically, information is published concerning a particular airplane, its upkeep, and its safety. It is of the utmost importance that all material pertaining to a particular airplane be reviewed for applicability before beginning any scheduled inspection. Determine the status of pertinent Airworthiness Directives (if any) and review Airplane and Engine Log Books, Weight and Balance Reports, all FAA Form 337's (Major Repair and Alteration), if applicable, the Airplane Equipment List and Type Certificate Data Sheet, A17WE. Review all applicable Manufacturer's Service Documents for the airframe, engines, propellers, avionics, autopilots, etc., before performing the inspection.

The following is a list of PAC Service Documents and their definitions:

1. SERVICE BULLETINS: A Service Document issued by PAC to alert Owners/Operators and provide corrective action on items which PAC Engineering considers to be of a potentially hazardous nature. Service Bulletins are identified by sequential numbers.

2. SERVICE LETTERS: A Service Document issued by PAC to provide Owners/Operators with Service Instructions and also of product improvements for items which are not considered to be of a hazardous nature. Service Letters are identified by sequential numbers.

3. SERVICE TELEGRAMS: A Service Document issued by PAC to alert Owners/Operators of a potentially hazardous situation which requires immediate attention possibly prior to next flight. A Service Telegram may specify, and be followed, by a Service Bulletin containing additional corrective action. Service Telegrams are identified by a number consisting of the date i.e. 10/21/75 (Sent out October 21, 1975).

4. ENGINEERING LETTERS: A Service Document issued by PAC Engineering to Owners/Operators of a *very limited number* of airplanes relating to items in the same category as Service Bulletins and Service Letters. Engineering Letters are identified by sequential numbers.

PREVENTIVE MAINTENANCE BY A PILOT AND/OWNER

The schedules included in the Servicing Charts (Figure 10-1) will familiarize the owner and/or operator with basic recommended maintenance and inspection intervals. For further detailed information and appropriate forms, please consult the Aerostar Maintenance Manual. FAA Advisory Circular 43-12 and Federal Aviation Regulation 43 lists items which may be performed by owners and/or operators without the aid of a qualified mechanic.

NOTE

Pilots operating aircraft which are registered in countries other than the United States should refer to the appropriate regulations of the country that has certificated the airplane for information on preventive maintenance that may be performed by pilots.

Other than that which is specifically prescribed by the applicable regulations of the certificating authority, all maintenance must be performed by appropriately licensed personnel. Consult the nearest Piper Aerostar Dealer of Service Center for more information.

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
FUSELAGE NOSE SECTION (Forward of F.S. 54.25)			
1. Inspect structure.		X	X
2. Inspect equipment installations and system components.		X	X
3. Inspect ventilating air scoop and landing light window.		X	X
4. Inspect nose wheel, tire and strut.		X	X
5. Remove wheel, clean and inspect wheel bearings and pack with wheel bearing grease.		X	X
6. Service brake system hydraulic reservoir.		X	X
7. Service nose landing gear strut.			X
8. Lubricate nose gear trunion bushing and retract linkage.			X
9. Inspect and lubricate nose landing gear squat switch (if installed).			X
10. Inspect nose landing gear tire.		X	X
FUSELAGE STATION 54.25 to 204.00			
1. Inspect fuselage exterior. Inspect windows. Inspect beacon and antennas. Inspect cabin door.		X	X

Servicing Chart
Figure 10-1 (Sheet 1 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
2. Inspect the following:			
a. Pedestal, switches, and propeller, throttle, and mixture control levers.		X	X
b. Instrument panel shock mounts, instruments, and panels.		X	X
c. Heat and ventilating ducting and controls.			X
d. Rudder and brake pedals, cylinders, linkage and tubing. Inspect brake system tubing.			X
e. Oxygen system regulator, outlets and mask, if installed.		X	X
3. Inspect all under-floor installations			X
4. Lubricate rudder-aileron interconnect.			X
5. Inspect all components on Master Electrical Panel.			X
6. Lubricate cabin door hinges.		X	X
7. Lubricate cabin door latch mechanism (as required).		X	X
FUSELAGE STATION 204 TO TAIL CONE			
1. Inspect aft fuselage.			X
2. Inspect interior.		X	X

Servicing Chart
Figure 10-1 (Sheet 2 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
3. Inspect main wheel wells. Check hydraulic lines and fittings.		X	X
4. Lubricate landing gear door hinges.			X
5. Clean or replace fuel filters.			X
6. Check fuel sumps, gate valves and hoses.			X
7. Inspect area under fuselage fuel cell between F.S. 204 and F.S. 224.			X
8. Inspect baggage compartment.		X	X
9. Lubricate baggage door hinge		X	X
10. Check oxygen bottles, brackets and lines.		X	X
11. Inspect area above fuselage fuel cell.			X
12. Inspect aft fuselage section.		X	X
13. Inspect aft fuselage interior.		X	X
14. Service hydraulic system.		X	X
15. Clean hydraulic filter or replace.			X
16. Inspect dorsal air duct.			X
17. Inspect battery compartment.		X	X
18. Inspect heater assembly.			X
WINGS			
1. Inspect the wings, ailerons, and flaps.		X	X

Servicing Chart
Figure 10-1 (Sheet 3 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
2. Lubricate flap tracks and rollers.		X	X
3. Inspect the wing-to-fuselage connections.			X
4. Inspect the wing fittings.			X
5. Inspect wing tip fairing and navigation light installation.		X	X
6. Inspect fuel filler cap, check pull force on tab 16 lbs ± 3.		X	X
7. Inspect and lube flap actuator, tracks, rollers, aileron hinges and actuating linkage.		X	X
NACELLES			
1. Inspect firewall.			X
2. Inspect engine mount firewall attach points.		X	X
3. Inspect the following:			
a. Engine mount, complete.		X	X
b. Engine accessory case.		X	X
c. Engine accessories.		X	X
d. Fuel lines and fittings.		X	X
e. Hydraulic lines and fittings.		X	X
f. Ignition harness and magneto wiring.		X	X
g. Alternator, wiring and belt.		X	X
h. Fuel servo and controls.		X	X
i. Propeller governor and controls.		X	X

Servicing Chart
Figure 10-1 (Sheet 4 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
j. Exhaust and induction systems.		X	X
k. Baffles and seals.		X	X
l. Alternate induction air intake and filter assembly.		X	X
m. Flow divider, lines and fittings.		X	X
n. Injection nozzles.		X	X
o. Tachometer Generator.		X	X
p. Turbocharger waste gate control linkage return springs and induction boxes.		X	X
q. Starter and ring gear.		X	X
4. Clean oil screens.		X	X
5. Replace oil filters.		X	X
6. Fill engine oil sump, 12 qts.		X	X
7. Check magneto timing.			X
8. Clean, gap and test spark plugs.			X
9. Replace induction air filter if required			X
10. Check engine compression.			X
11. Inspect upper and lower engine cowling.		X	X
12. Lubricate propeller hub.			X
13. Inspect propeller hub, dome, air filler valve and blades. Dome air pressure should be set according to Hartzell Service Letter #21A.		X	X

Servicing Chart
Figure 10-1 (Sheet 5 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
MAIN LANDING GEAR			
1. Inspect the struts and service as required.		X	X
2. Inspect the brakes and service as required.		X	X
3. Wheel bearings: clean, inspect and pack with wheel bearing grease.			X
4. Lubricate landing gear trunion bushings.			X
5. Lubricate landing gear actuator rod end.			X
6. Operational check, complete landing gear system.			X
7. Inspect main wheel tires and service as required.		X	X
8. Lubricate side brace and scissor assembly.			X
EMPENNAGE			
Inspect the following:			
1. Stabilizers		X	X
2. Stabilizer attach fittings			X
3. Elevators, rudder and trim tabs		X	X
4. Trim tabs, check for following travel:			
a. Rudder: $37^{\circ} \pm 1^{\circ}$ Nose Right. $7^{\circ} \pm 1^{\circ}$ Nose Left.			
b. Elevator: $37^{\circ} \pm 1^{\circ}$ Nose Up. $9^{\circ} \pm 1^{\circ}$ Down.			

Servicing Chart
Figure 10-1 (Sheet 6 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
5. Hinges, bellcranks, horns, flexible control; rudder and elevator tab actuators, fairings, pitot head and boom, rotating beacon. Elevator Balance Weights.		X	X
6. Tail cone and aft navigation light.		X	X
ADDITIONAL AIRPLANE SYSTEMS			
Inspect and service as required:			
1. Autopilots			X
2. Hot props			X
3. Wing and empennage boots			X
4. Pneumatic System		X	X
5. Automatic and Manual Turbocharger Control System (601B)		X	X
FINAL OPERATIONAL TEST			
1. Perform complete ground run and operational test of engines, propellers and airplane systems.		X	X
2. Make appropriate entries in the Airplane and Engine Log books and determine that the following documents are in the airplane:		X	X
a. Certificate of Registration			
b. Certificate of Airworthiness			
c. Radio Station FCC License			

Servicing Chart
Figure 10-1 (Sheet 7 of 8)

ITEM	EACH 25 HRS	EACH 50 HRS	EACH 100 HRS
d. FAA Approved Airplane Flight Manual			
e. Airplane Log Book and two Engine Log Books.			

ITEM	As Required
Turbocharging System	1000 hrs.
Inspect Heater	100 hrs.
Overhaul Heater	500 hrs.
Overhaul Engines IO-540-P1A5 290HP	1200 hrs.
Overhaul Engines IO-540-G1B5 290HP	1400 hrs.
Overhaul Engines IO-540-S1A5	1800 hrs.
Overhaul Engines IO-540-K1F5	2000 hrs.
Overhaul Engines IO-540-K1J5	2000 hrs.
Overhaul Props	1500 hrs. or 4 yrs.
Oxygen Cylinder Remove & Hydro Test	3 yrs.
Oxygen Cylinder Remove & Condemn	24 yrs or 4380 Pressurizations whichever comes 1st.
Oxygen System Components Remove & Service	2 yrs or during Engine Overhaul

Servicing Chart
Figure 10-1 (Sheet 8 of 8)

ALTERNATIONS OR REPAIRS TO AIRPLANE

Alterations and/or repairs involving airworthiness must be accomplished by licensed, authorized personnel. Any deviation from this procedure is a violation of Federal Aviation Regulations. In addition, any alteration made to the airplane should be reported to the FAA in advance to ensure that the airworthiness of the airplane is not violated.

GROUND HANDLING

TOWING PROCEDURE

Towing procedures are basically the same as those used for other aircraft equipped with tricycle landing gear except for the nose gear turning limitation. The airplane may be towed forward or pushed aft on hard surfaces using a yoke type towbar attached to the nose gear axle flanges. Towing with a tractor is possible, however, extra care must be taken when so doing.

CAUTION

DO NOT EXCEED THE 30° TURN LIMIT WHILE TOWING AS STRUCTURAL DAMAGE MAY RESULT TO BOTH AIR-FRAME AND LANDING GEAR.

For further information on towing and its procedures, refer to Chapter 9 of the Aerostar Maintenance Manual.

PARKING

The airplane is normally parked on a cement apron during good weather conditions. If bad weather exists or is expected, the airplane should be moored. To park the airplane, set the parking brake, install the control lock (Section 9), and place chocks under the main wheels. Do not set the parking brake if brakes are overheated, or if wet, freezing weather conditions exist.

TIE DOWN OR MOORING

If strong or gusty winds are prevalent: Head airplane into the wind. Tie down nose gear, main gear, and tail and set parking brake except as mentioned above. When mooring airplane, use 3/4 inch manila rope and employ a clove hitch or other type of antislip knot (Figure 10-2). Leave sufficient slack to permit rope shrinkage. The airplane should be hangared or flown to another area when predicted wind velocity exceeds 60 knots.

JACKING AND LEVELING

- AIRPLANE JACKING

  The airplane may be raised by using conventional airplane jacks at the jack points provided under the wings (Figure 10-3). The jack pads, normally stowed in the baggage compartment, may be attached to the jack points using three AN3-5 bolts for each pad. Whenever possible the airplane should be on a smooth level surface, free from wind, before jacking.

- MAIN WHEEL JACKING

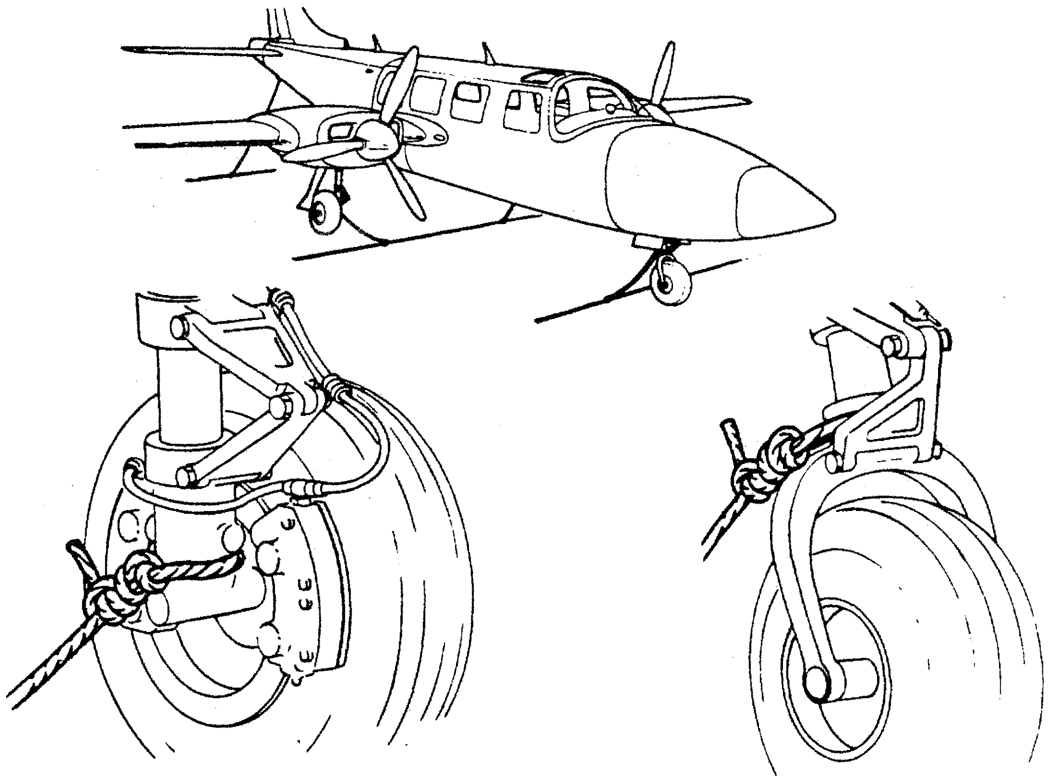
  The main wheel may be jacked to service tires and wheels as follows:

  1. Check the nose wheel and opposite main wheel.
  2. Set the parking brake.
  3. Position jack adapter on strut.

NOTE

For airplanes equipped with Cleveland wheels and brakes, remove the brake calipers before positioning the jack adapters. (Reference Aerostar Maintenance Manual, Chapter 7)

  4. Place a suitable jack under the jack adapter pad (Jack should be a minimum of 5,000 lb capacity.)
  5. Raise and lower as necessary



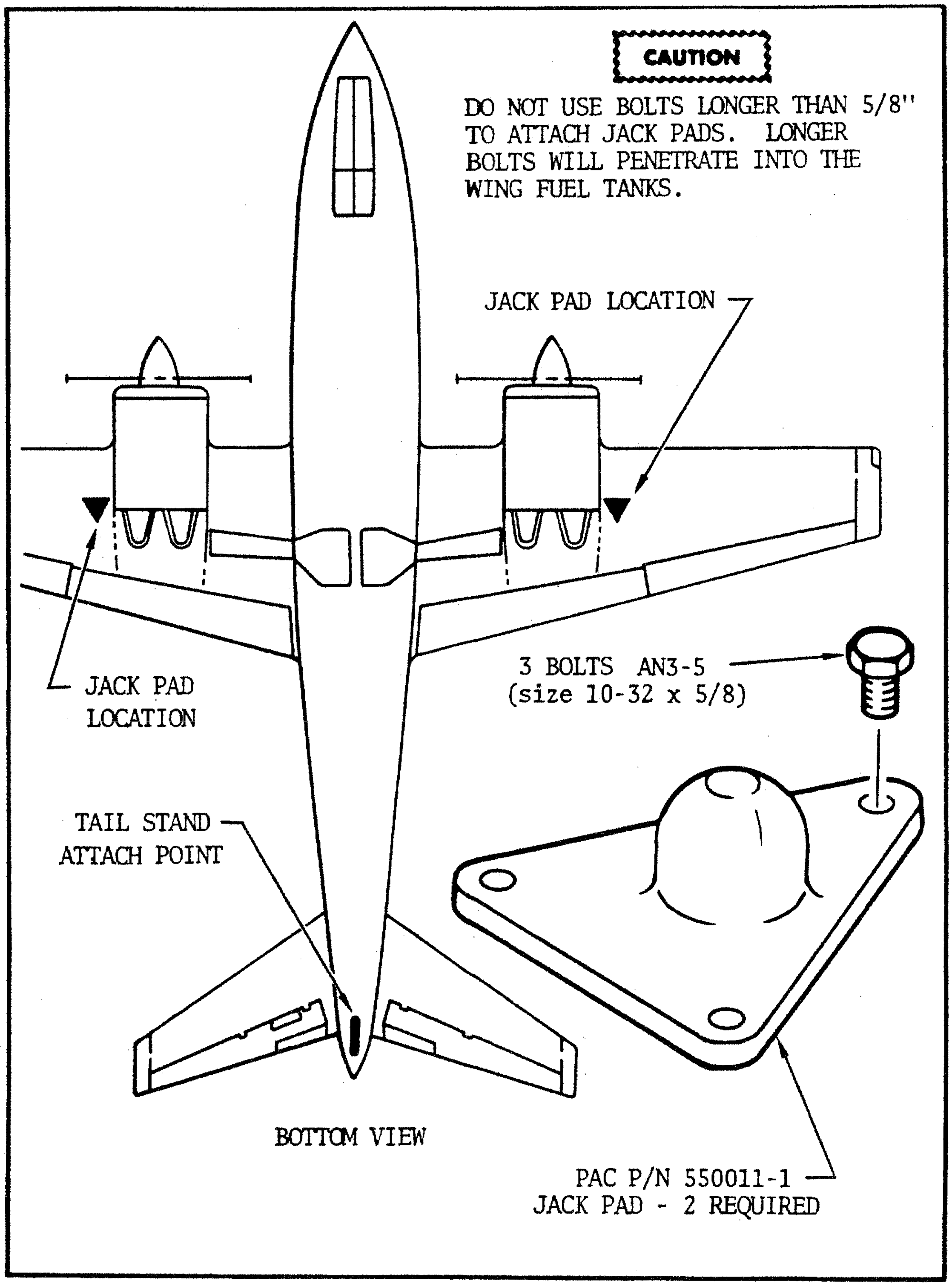
MAIN GEAR TYPICAL NOSE GEAR

CAUTION

DO NOT TIE ROPE AROUND THE TORQUE LINKS, AS STRUCTURAL DAMAGE MAY RESULT.

TIE DOWN INSTRUCTIONS
NOSE GEAR - TIE ROPE AROUND TOP OF STRUT FORK, BETWEEN TORQUE LINKS.
MAIN GEAR - TIE ROPE ABOVE AXLE AND BELOW TORQUE LINKS.
TAIL POINT - TIE ROPE THROUGH TIE-DOWN RING.
ENSURE ADEQUATE SLACK IS PROVIDED (AVOID THE USE OF CHAIN FOR TIE DOWNS WHENEVER POSSIBLE).

Airplane Mooring
Figure 10-2



Airplane Jacking Locations
Figure 10-3

- NOSE WHEEL LIFTING

The nose wheel is easily raised clear of the ground by pulling down on the tail skid and tying it into position.

NOTE

The tie down ring must be capable of withstanding a 300-lb force.

CAUTION

DO NOT PULL DOWN ON THE OUTBOARD SECTION OF THE STABILIZER, OR THE TAIL CONE.

- LEVELING

Leveling the airplane is an extremely useful procedure. When fueling, it is important to maintain an even fuel distribution, and certainly must be used when checking weight and balance. To level the airplane, proceed as follows:

1. Longitudinal Leveling. Place a spirit level fore and aft along the seat track just aft of the pilot's seat. Exact level is obtained by either inflating the nose strut, or deflating the nose tire until the bubble in the spirit level is centered.

2. Lateral Leveling. Place a spirit level across the seat tracks just aft of the pilot's seat. Exact level is obtained by deflating the main tire on the high side of the airplane until the bubble in the spirit level is centered.

3. Recheck to ensure the airplane is exactly level both longitudinally and laterally.

PROLONGED OUT-OF-SERVICE CARE

- FLYABLE STORAGE

The term flyable storage may be applied to all airplanes which will not be flown for an undetermined length of time but need to be kept ready to fly with minimum notice and preparation time.

Engines in airplanes that are flown only occasionally may not achieve normal service life because of corrosion. Corrosion develops when moisture from the air and products of combustion combine to attack cylinder walls and bearing surfaces during periods when the airplane is not used. To combat this condition it is recommended that vulnerable surfaces be coated with rust inhibitive compounds. However, the need for this procedure must be evaluated by the owner or operator of the airplane, based on environmental conditions and frequency of airplane activity.

Airplanes which are not in daily flight should have the propellers rotated, by hand, five revolutions at least once each week. In damp climates and in storage areas where the daily temperature variation can cause condensation, propeller rotation should be accomplished more frequently. Rotating the propeller an odd number of revolutions redistributes residual oil on the cylinder walls, crankshaft and gear surfaces and repositions the pistons in the cylinders, thus minimizing corrosion. Rotate propellers as follows:

1. Throttle Controls - CLOSED.
2. Mixtures Controls - IDLE cut-off.
3. Magneto Switches - OFF.
4. Propellers - Manually rotate propellers five revolutions, standing clear of arc of propeller blades.

NOTE

Ground running the engine for brief periods of time is not a substitute for turning the engine over by hand; in fact, the practice of ground running will tend to aggravate rather than minimize corrosion formation in the engine.

After 30 days, the airplane should be flown for 30 minutes or a ground runup should be made long enough to produce an oil temperature within the lower green arc range. Excessive ground running should be avoided so that maximum cylinder head temperatures are not exceeded.

Also during this period of flyable storage, the airplane should be moored (Reference "TIE DOWN OR MOORING: in this section), fuel tanks should be full to minimize condensation, and the batteries should be at full charge to prevent the electrolyte from freezing in cold weather.

- NON-FLYABLE STORAGE

If it is known that an airplane is to remain inactive for a period of time exceeding thirty days, the following procedure should be applied to the engine, especially if the airplane is located near salt water or similar humid area.

1. Drain the engine lubricating oil from the system and replace it with preservation lubrication oil (Exxon "Rust Ban 631" or equivalent). These products are usually available as a concentrate, or already compounded with lubricating oil. Follow carefully the manufacturer's instructions before use.

2. Operate the engine until normal operating temperatures are attained. If this is accomplished on the ground, be sure cylinder head temperature does not exceed 475°F. Do not stop engine until oil temperature has attained 180°F (82°C). If weather conditions are below freezing oil temperature should be at least 160°F (71°C) before shutdown.

3. As soon as possible after the engine is stopped, move the airplane into the hangar, or other shelter where the preservation process is to be performed.

4. Drain the preservation oil from the lubrication system This oil may be saved and used for future preservation runs.

5. Remove sufficient cowling to gain access to the spark plugs and remove both spark plugs from each cylinder.

6. Spray the interior of each cylinder with approximately two (2) ounces of corrosion preventive oil while cranking the engine about five (5) revolutions with the starter. The spray gun nozzle may be placed in either of the spark plug holes.

The corrosion preventive oil to be used should conform to specification MIL-L-6529C, Type 1 heated to 200°F - 220°F (93°C - 140°C) spray nozzle temperature. It is not necessary to flush preservative oil from the cylinder prior to flying the airplane. The small quantity of oil coating the cylinders will be expelled from the engine during the first few minutes of operation.

Spraying should be accomplished using an airless spray gun (Spraying Systems Co., "Gunjet" Model 124A-8395 or equivalent). In the event an airless spray gun is not available, a moisture trap in the air line of a conventional spray gun may be installed. Be certain oil is hot at the nozzle before spraying cylinders.

7. With the crankshaft stationary, again spray each cylinder through the spark plug holes with approximately two(2) ounces of corrosion preventive oil. Assemble spark plugs and do not turn crankshaft after cylinders have been sprayed.

NOTE

Oils of the type mentioned are to be used in Avco Lycoming airplane engines for corrosion prevention only, and not for lubrication. See the latest edition of Avco Lycoming Service Instruction No. 1014 and Service Bulletin No. 318 for recommended lubricating oil.

8. If the airplane is stored in a region of high humidity, or near a sea coast, it is better to use dehydrator plugs instead of merely replacing the spark plugs as directed in the preceding step. Cylinder dehydrator plugs, Avco Lycoming P/N 40238 or equivalent, may be used.

9. Preferably before the engine has cooled, install small bags of desiccant in exhaust and intake ports and seal with moisture impervious material and pressure sensitive tape. Any other opening from the engine to the atmosphere, such as the breather and any pad from which an accessory is removed, should likewise be sealed.

10. Firmly attach red cloth streamers to any desiccant bags installed in the intake or exhaust passages to ensure material is removed when the engine is made ready for flight. Streamers should be visible from outside the airplane. Porpellers should be tagged, "Engine preserved-Do not turn propeller.

11. A periodic check should be made of the cylinder dehydrator plugs; when the color of the desiccant has turned from blue to pink this preservation procedure must be repeated.

COLD WEATHER OPERATION

Airplane operation in cold weather creates a need for maintenance practices and operating procedures in addition to those required for moderate temperatures. Sheltering the airplane in a heated hangar will prevent frost, ice and snow accumulation and provide the most effective method of preheating the engines. If the aircraft is to be parked or moored outside in extremely cold weather, do not set parking brake. Accumulated moisture may freeze in the brakes. The battery should be fully charged so it will not freeze. Make certain all openings are closed or covered.

If desired, during periods of cold weather operation "PRIST" may be used as a fuel additive. "PRIST" is the registered trademark of the Houston Chemical Corporation, Prist Division, for the additive designed to prevent ice and bacterial contamination in aviation fuel. Sometimes referred to as PFA-55MB, it is covered by specification MIL-I-27686D. If this additive is used, the following guidelines should be used:

NOTE

"Prist" is only slightly soluable in gasoline and therefore cannot be simply dumped into the fuel tank. To assure that it is completely dispersed in the fuel it must be proportioned while the fuel is flowing. Be sure to follow the manufacturers instructions on the container.

Cold weather post flight maintenance procedures require that engines be allowed to run dry by closing fuel shutoff valves. Fill fuel tanks immediately after flight unless the aircraft will be stored in a hangar facility. If shelter is not available, tie aircraft down and cover wings and engine compartments.

Keeping aircraft in top condition during cold weather operations is extremely important.

SERVICING

FUEL SYSTEM

Service the fuel system with 100/130 (green) minimum octane or 100LL (blue) aviation grade fuel. The standard fuel tank installation includes a fuselage tank with a capacity of 43.5 gallons, and two wet-wing fuel cells, each having a capacity of 65 gallons. Each tank is filled separately through a filler neck by removing flush type filler caps located on the outboard end of each wing, and left side of the fuselage just aft of the left wing trailing edge. For flights not requiring full tanks, if fuel is to be added, it must first be added to the fuselage tank. Should the fuselage tank reach it's capacity and additional fueling be desired, the remainder of the fuel load should be divided equally between the left and right wing fuel cells. This fueling procedure is important to ensure that the fuselage tank fuel level is at or above wing tank fuel level thereby minimizing the possibility of fuselage fuel tank depletion to the 12 gallon low fuel warning level prior to wing tank depletion.

If the fuel tanks are all to be fueled to maximum capacity the sequence in which they are filled is unimportant.

The full amount of usable fuel is based on the airplane sitting on a level ramp, laterally level, and longitudinally (approximately 1.5° nose up) with each wing tank fueled to 0.6 in. below filler neck. The wing tanks are especially sensitive to attitude and, if not leveled, they cannot be fueled to full capacity.

The F.A.A. has determined usable wing fuel quantities based on the wing tanks fueled to 0.6 in. below the filler necks. There is an additional 4 gallons of usable fuel (2 gallons each wing) not accounted for in the event the wing tanks have been fueled to the filler neck. Consequently, in the event the wing tanks are fueled to the filler neck the 4 gallons should be included for weight and balance computations. However, it may not be used for flight planning purposes.

WARNING

DUE TO POSSIBLE ELECTROSTATIC CHARGES, THE FOLLOWING RESTRICTIONS SHALL BE OBSERVED WHILE FUELING AIRCRAFT:

1. DO NOT OPERATE ANY ELECTRICAL OR AVIONICS EQUIPMENT.

2. DO NOT ALLOW ANY SMOKING OR OPEN FLAME IN THE VICINITY OF THE AIRCRAFT.

3. ENSURE THE AIRCRAFT IS PROPERLY GROUNDED DURING ALL FUELING OPERATIONS.

Before the first flight of the day, and after each refueling, open the three sump drain valves and drain any condensed water vapor that may have accumulated. The drain valves are located on the lower left side of the fuselage, just aft of the wing.

ENGINE OIL SYSTEM

Each engine has a 12-quart sump capacity and is serviced through an access cover in the top of the engine cowling. The oil level is indicated by a graduated, combination dipstick-filler cap. Service the engine in accordance with the following table (Figure 10-4).

AVERAGE AIR TEMP	RECOMMENDED GRADES	
	MIL-L-6082B	Ashless Dispersant MIL-L-22851
Above $60^{o}F$	SAE 50	SAE 40 or SAE 50
30^{o} - $90^{o}F$	SAE 40	SAE 40
0^{o} - $70^{o}F$	SAE 30	SAE 40 or SAE 30
Below $10^{o}F$	SAE 20	SAE 30

Engine Oil Recommendations
Figure 10-4

In engines that have been operating on straight mineral oil for several hundred hours, a change to additive oil should be made with a degree of caution, because the cleaning action of some additive oils will tend to loosen sludge deposits and cause plugged oil passages. When an engine has been operating on straight mineral oil, and is known to be in excessively dirty condition, the switch to additive or compounded oil should be deferred until after the engine is overhauled.

When changing from straight mineral oil to compounded oil, the following precautionary steps should be taken:

1. Do not add additive oil to straight mineral oil. Drain the straight mineral oil from the engine and fill with additive oil.

2. Do not operate the engine longer than five hours before the first oil change.

3. Check all oil screens for evidence of sludge or plugging. Change oil every ten hours if sludge conditions are evident. Resume normal oil drain periods after sludge conditions improve.

CAUTION

THE TERMS "DETERGENT", "ADDITIVE", "COMPOUNDED" AND "ASHLESS DISPERSANT" USED HEREIN ARE INTENDED TO REFER TO A CLASS OF AVIATION ENGINE LUBRICATING OILS TO WHICH CERTAIN SUBSTANCES HAVE BEEN ADDED TO IMPROVE THEM FOR AIRPLANE USE. THESE TERMS DO NOT REFER TO SUCH MATERIALS COMMONLY KNOWN AS "TOP CYLINDER LUBRICANT", "DOPES", "CARBON REMOVER" WHICH ARE SOMETIMES ADDED TO FUEL OR OIL. THESE PRODUCTS MAY CAUSE DAMAGE TO THE ENGINE AND THEIR PRESENCE IN AN ENGINE WILL VOID THE MANUFACTURER'S WARRANTY. UNDER NO CIRCUMSTANCES SHOULD AUTOMOTIVE OIL BE USED. THE USE OF AUTOMOTIVE OILS IN AVCO LYCOMING ENGINES IS NOT RECOMMENDED BECAUSE ITS USE COULD CAUSE ENGINE FAILURE.

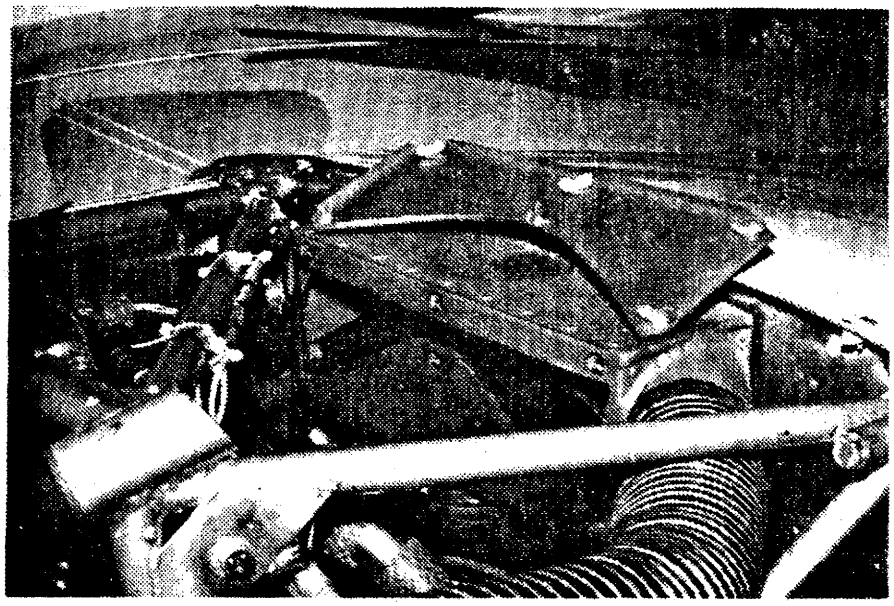
Generally, the engine oil system should be serviced after the first 25 hours of operation and thereafter each 50 hours of operation. (If the airplane is operated in dusty conditions, it may be necessary to service the system every 25 hours or less). Servicing should include an oil change, and replacement of the full-flow oil filter, (Refer to Aerostar Maintenance Manual for proper procedure). The engine should be serviced with the proper grade oil as indicated on the chart (Figure 10-4).

INDUCTION AIR FILTER

The induction air filter (Figure 10-5) is a disposable filter. To change the filter, simply remove the top engine cowling, remove the access plate on the air box mounted on the firewall, and change the filter element. Replace the access cover, and reinstall the top cowling.

NOTE

The filter elements are specially treated for efficient filtration. Do not attempt to clean and reuse the oil filter, or lubricate the new one.



Induction Air Filter
Figure 10-5

TURBOCHARGERS

The turbochargers are lubricated by the engine oil system. Perform inspection and service as indicated under Inspection and Maintenance Schedule found elsewhere in this Section.

NOTE

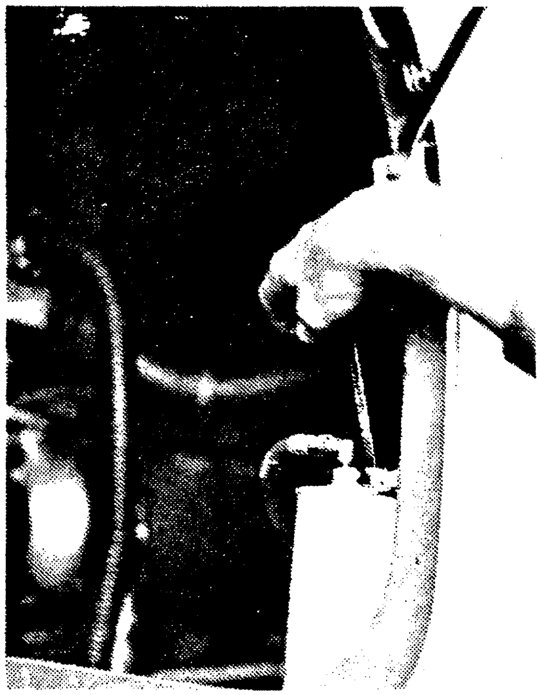
The turbocharger unit (turbine and compressor) is a sealed unit. Manufacturer's warranty is nullified if seal is broken.

HYDRAULICS

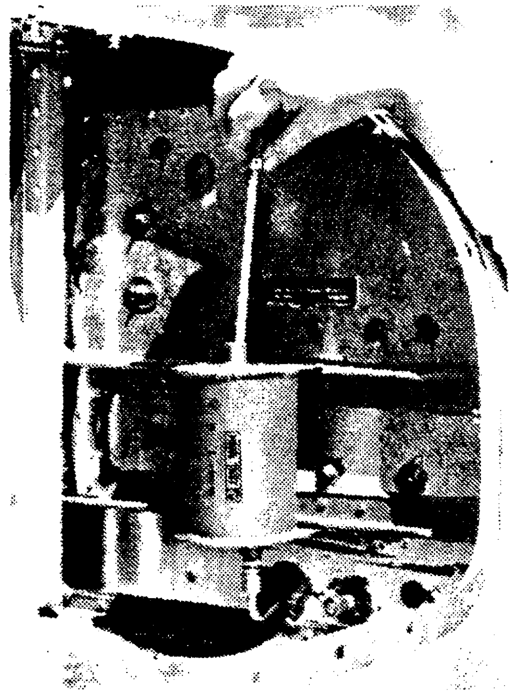
The hydraulic reservoir (Figure 10-6) is located aft of the baggage compartment curtain. A combination dipstick-filler cap indicates fluid level. When necessary, service with (red) hydraulic fluid, MIL-H-5606 only.

NOTE

Static system pressure should be less than 325 psi; otherwise, the reservoir may overflow if serviced to the full mark.



Hydraulic Reservoir
Figure 10-6



Brake Reservoir
Figure 10-7

BRAKES

The brake reservoir (Figure 10-7) is located on the aft bulkhead of the nose compartment. It is accessible through the large access cover on the left side of the nose. The reservoir should be checked regularly to ensure it is full. Service when required with (red) hydraulic fluid, MIL-H-5606 only.

MAIN WHEELS, TIRES AND TUBES

Tires should be replaced whenever the tread is worn down, or when cuts or cracking of the sidewall are evident. Cuts in the tread are permissible if they do not exceed the tread depth. Procedures for complete servicing of the main wheels, tires, tubes, and wheel bearings are as follows:

Goodyear:

Refer to Goodyear Aviation Products Publication AP-384 which may be obtained from Goodyear Field Service Department, Aviation Products Division, Akron, Ohio 44316.

Cleveland:

- REMOVAL

  1. Jack the wheel in accordance with the jacking procedures outlined under Ground Handling found elsewhere in this section.
  2. Completely deflate the tire by removing the valve core.
  3. Remove the cotter pin, wheel retaining nut, washer and spacer.
  4. Carefully remove the main wheel assembly by pulling the wheel straight off the axle.

CAUTION

WHEN REMOVING WHEEL, BE CAREFUL NOT TO DROP OR DAMAGE WHEEL BEARINGS, SEALS, OR CONES.

- DISASSEMBLY

  1. Ensure the valve core has been removed and the tire completely deflated.

WARNING

DO NOT ATTEMPT TO DISASSEMBLE THE WHEEL WITHOUT BEING CERTAIN THE TIRE HAS BEEN DEFLATED, AS SERIOUS PERSONAL INJURY MAY RESULT.

  2. Break the tire beads away from the wheel flanges by pressing with the heels of the hands or carefully stepping on the tire while the wheel lies flat on a clean area; or an approved tire bead break machine may be used.

CAUTION

DO NOT USE BARS OR SCREW DRIVERS. THEY MAY DAMAGE THE WHEEL FLANGES OR BEADS.

3. Remove the self-locking nuts and washers from the wheel bolts.

4. Separate the wheel halves, and remove the tire and tube.

- CLEANING

1. Clean all metal parts in Stoddard solvent or equivalent, and wipe dry with a clean, lint-free cloth.

2. Wash bearings in a clean solution, and dry with compressed air, being careful not to allow the bearings to spin.

3. Clean bearing felt seals in Stoddard solvent or equivalent and dry.

- LUBRICATION

1. Repack the bearings with high temperature bearing grease (Specification MIL-G-3545) and spread a thin coat of grease over the bearing cup. Do not overlubricate.

2. Lubricate the bearing seals with a few drops of engine oil.

- REASSEMBLY

1. Inflate the inner tube just enough to round it out, and install the tube in the tire.

2. Match the yellow stripe of the tube to the red balance dot on the tire.

3. Install the tire and tube on the outboard wheel half and position the valve in the valve hole.

4. Place the inboard wheel half in the tire and align the bolt holes.

5. Lubricate bolt and nut threads, bearing surface on bolt heads, self-locking nuts, and washers with antiseize compound MIL-T-5544.

6. Place countersunk washers on tee bolts with the countersink facing bolt head and install bolts through the inboard and outboard wheel halves.

7. Secure with plain washers and self-locking nuts. Draw up nuts evenly and torque in 20 in. lb increments to 180 in. lbs. plus Friction torque.

NOTE

Nuts must be replaced if they can be turned past the end of the bolt threads with the fingers.

CAUTION

UNEVEN TORQUING CAN CAUSE BOLT FATIGUE. DO NOT USE IMPACT WRENCHES ON WHEEL BOLTS OR NUTS.

- INSTALLATION

1. Install cleaned and lubricated inner bearing and seal in wheel assembly.

2. Carefully install the wheel and tire on the axle and install cleaned and lubricated outer bearing and seal, spacer, axle washer, and nut.

3. Rotate the wheel, and tighten nut to 50 in. lbs, then back off the nut to 25 in. lbs and align the cotter pin hole.

4. Ensure there is no wheel sideplay, and install cotter pin.

5. Inflate tire to 52 psi operating pressure.

6. Remove jack.

NOSE WHEEL, TIRE AND TUBE
Cleveland:

- REMOVAL

1. Raise nose wheel clear of the ground in accordance with the jacking procedures outlined under Ground Handling found elsewhere in this section.

2. Remove cotter key (thru A/F 0607 only), axle bolt nut, axle bolt, and plugs.

3. Slide axle out of fork assembly.

4. Remove nose wheel assembly and spacers.

- DISASSEMBLY, CLEANING AND LUBRICATION

Follow the same procedures as are outlined for the main wheel.

WARNING

DO NOT ATTEMPT DISASSEMBLY OF THE NOSE WHEEL WITHOUT BEING CERTAIN THE VALVE CORE HAS BEEN REMOVED AND THE TIRE COMPLETELY DEFLATED, AS SERIOUS PERSONAL INJURY MAY RESULT.

- REASSEMBLY

1. Inflate the inner tube just enough to round it out, and install the tube in the tire.

2. Match the yellow stripe of the tube to the red balance dot on the tire.

3. Install the tire and tube on the wheel half with the valve stem hole. Position the valve stem in the valve stem hole.

4. Place the other wheel half in the tire and align the bolt holes.

5. Place the countersunk washers on the bolts with the countersink facing the bolt head, and install the bolts through both wheel halves. Secure with plain washers and self-locking nuts.

6. Draw up nuts evenly and torque in 20 in. lb increments to 83 in. lbs.

NOTE

Nuts must be replaced if they can be turned past the end of the bolt threads with the fingers.

CAUTION

UNEVEN TORQUING CAN CAUSE BOLT FATIGUE. DO NOT USE IMPACT WRENCHES ON WHEEL BOLTS OR NUTS.

7. Inflate the tire just enough to seat the beads, completely deflate to permit the tube to equalize, then reinflate to 20 psi.

- INSTALLATION

1. Install bearings and seals in nose wheel assembly.
2. Position nose wheel assembly and spacers in gear fork.
3. Insert axle through fork and nose wheel assembly and install plugs, axle bolt, and nut.
4. Rotate the wheel and tighten nut to 100-130 in. lbs.

NOTE

Wheel must be free to turn without side play. The spacer on each side of the wheel should be snug, but free to turn by hand.

5. Install cotter key. (A/F 0001 thru 0607 only.)
6. Inflate tire to 40 psi operating pressure.
7. Lower the nose wheel to the ground.

NOSE GEAR STRUT SERVICING

The nose gear strut should have 1 to 3 inches (A/F 0001 thru 0607), 2 to 4 inches (A/F 0608 and Subsequent) strut extension. If there is less than 1 inch, the strut should be serviced to prevent possible damage to the strut or supporting structure. Should the strut require emergency service in the field the strut may be inflated to provide the required extension. Moisture free compressed air may be used in lieu of nitrogen gas temporarily; however, the strut should be deflated and reserviced with nitrogen as soon as possible. Nitrogen is more suitable for strut servicing because of its dryness and stability during changes in ambient temperature.

- INFLATION ONLY

  1. Raise nose wheel clear of the ground in accordance with the jacking procedures outlined under "GROUND HANDLING" found elsewhere in this section.

  2. Remove the air valve cap and inflate the strut with nitrogen as placarded.

  3. Lower the nose to the ground and check for proper strut extension.

NOTE

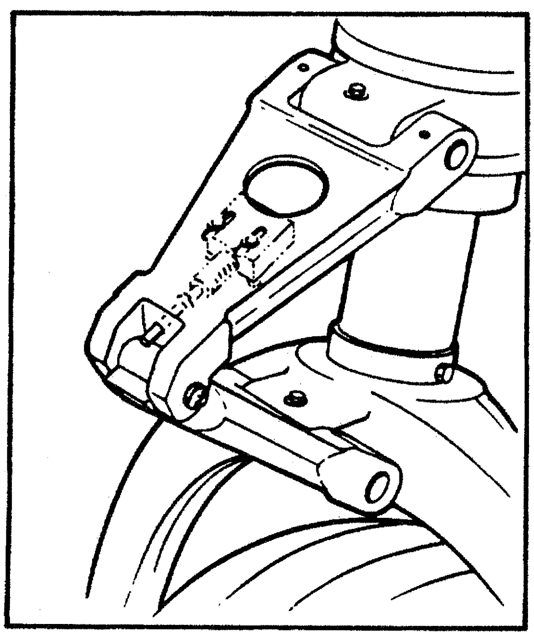
If the strut extension is still incorrect, the strut must be completely serviced.

- COMPLETE STRUT SERVICE

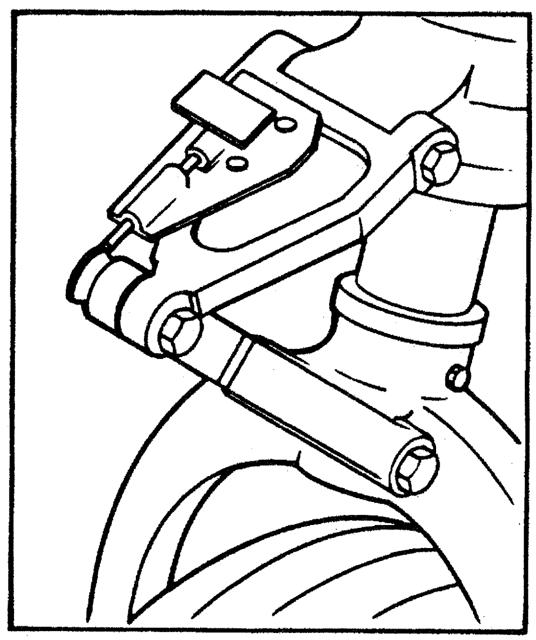
  To completely service the struts, follow the instructions specified in the Maintenance Manual and strut placard.

- NOSE LANDING GEAR SQUAT SWITCH (If Installed)

  Inspect nose landing gear squat switch for security, loose wires and freedom of actuating pin (Figure 10-8).



NOSE LANDING GEAR SQUAT SWITCH
A/F 0608 and Subsequent
(Figure 10-8)



NOSE LANDING GEAR SQUAT SWITCH
A/F 0356 thru 0607
(Figure 10-8)

MAIN LANDING GEAR STRUT SERVICING

The general comments pertaining to the nose gear strut also apply to the main gear struts.

- INFLATION ONLY

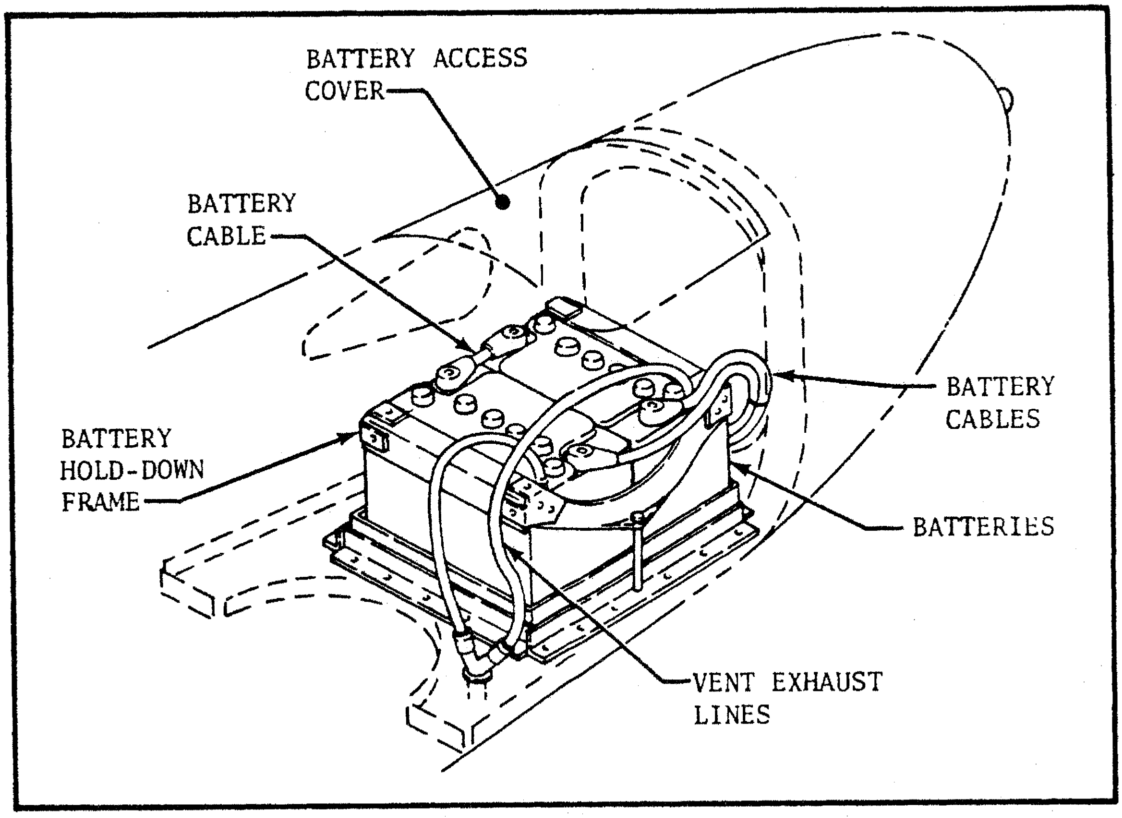
  1. Connect a regulated high pressure air source of at least 600 psi capacity to the air valve at the base of the strut and open the air valve.
  2. While gently rocking the airplane to prevent the strut piston from binding in the strut barrel, inflate the strut to 1 to 3 inch extension.
  3. Close air valve, and remove high pressure air source.

- COMPLETE STRUT SERVICING

  To completely service the struts follow the instructions in the Maintenance Manual and strut placard.

BATTERIES

Two 12 volt batteries are connected in series to provide 24 volt electrical power. The batteries are accessible through a cover in the top of the tail cone (Figure 10-9). Inspect batteries regularly for general condition, cleanness, and security of mounting. The electrolyte level should be checked every 25 hours of operation. Following are recommended procedures.



Airplane Batteries
Figure 10-9

1. Add distilled water to maintain electrolyte level at the bottom ring of the electrolyte filler port.

2. Maintain the electrolyte specific gravity above 1.240. If the specific gravity is lower, have the battery charged.

NOTE

An electrolyte with a specific gravity of 1.265-1.275 for all cells represents a completely charged battery. A specific gravity of 1.150 or less indicates a completely discharged battery.

- BATTERY AND COMPARTMENT CLEANNESS

1. The battery and compartment can be cleaned with a solution of baking soda and water mixed at one pound per gallon.

CAUTION

BAKING SODA AND WATER WILL NEUTRALIZE THE ELECTROLYTE IF ALLOWED TO ENTER THE BATTERY.

2. After cleaning with baking soda and water, thoroughly rinse with clear water.
3. Keep compartment protected with a coat of battery compartment paint.
4. Keep battery and compartment vent and drain lines clean and open.
5. Clean battery terminals and cables with emery cloth.

- REMOVAL AND INSTALLATION

1. Ensure all electrical and avionics switches are OFF including the BATT Master switch.
2. Remove the access cover.

WARNING

REMOVE WATCHES, RINGS, AND OTHER JEWELRY BEFORE REACHING INTO THE BATTERY COMPARTMENT TO AVOID ARCING AND POSSIBLE PERSONAL INJURY.

3. Disconnect the negative cables.
4. Disconnect the positive cables.
5. Remove all vent lines.
6. Remove bolts on battery hold down frame, and remove frame.
7. Remove the batteries.

NOTE

It is generally easier to remove the forward battery first and then the aft battery.

8. Disconnect the battery tray drain line, and remove tray.

9. Clean the batteries and battery compartment as outlined above.

Installation steps are accomplished in reverse order of removal procedure.

1. Ensure battery terminals and cables are clean.

2. Position batteries in the tray and connect the cables to the terminals. Ensure the positive terminal is connected first.

3. Cover terminal and cable connections with petroleum jelly to retard corrosion.

OXYGEN SYSTEM

The oxygen cylinder is located on the aft side of Station 204 bulkhead between the cabin and baggage compartment (Figure 9-22). When fully charged, the cylinder weighs 44.10 pounds and contains 115 cubic feet of aviator's breathing oxygen at 1850 psig pressure.

WARNING

NO SMOKING OR OPEN FLAME OF ANY KIND IS PERMITTED IN OR NEAR THE AIRPLANE WHILE THE OXYGEN SYSTEM IS ON. KEEP ALL OIL, GREASE, HYDRAULIC FLUID, FLAMMABLE ITEMS AND OTHER FOREIGN MATERIAL AWAY FROM OXYGEN EQUIPMENT.

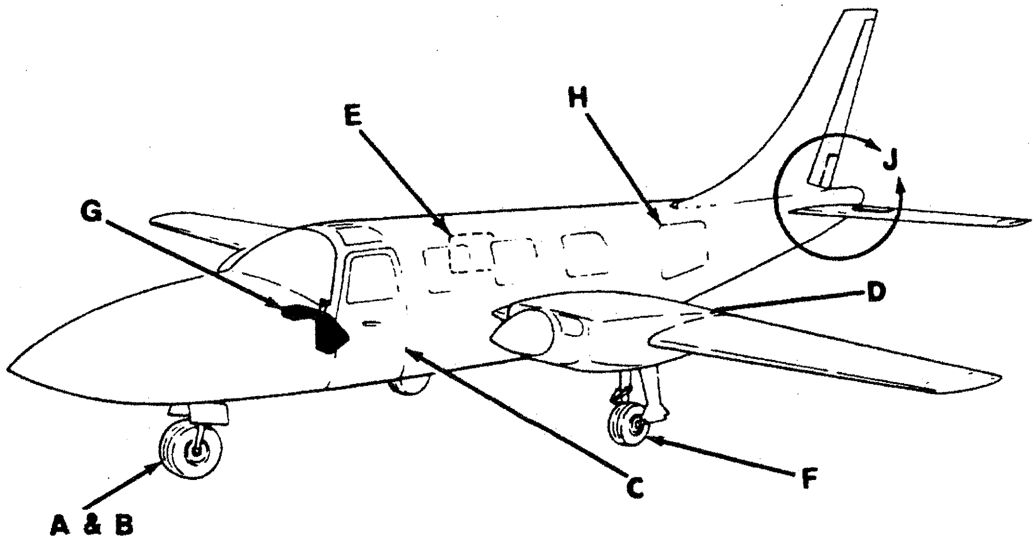
The oxygen filler port is located on the forward baggage compartment door frame (Figure 9-22). Refilling of oxygen cylinders must be accomplished by a qualified oxygen service station using Type 1 aviator's breathing oxygen MIL-O-27210. This oxygen is specially dried to remove moisture which could cause corrosion and system damage, or which could freeze at low temperatures and render the system useless.

Before removing the oxygen cylinder for replacement, the valve on the cylinder must be closed and the oxygen system lines bled to zero. While the airplane is on the ground, the oxygen cylinder supply shutoff valve should be closed and the altitude adjusting valve OFF (full extent of travel counterclockwise).

Perform inspection and service as indicated under Inspection and Maintenance Schedule found elsewhere in this Section.

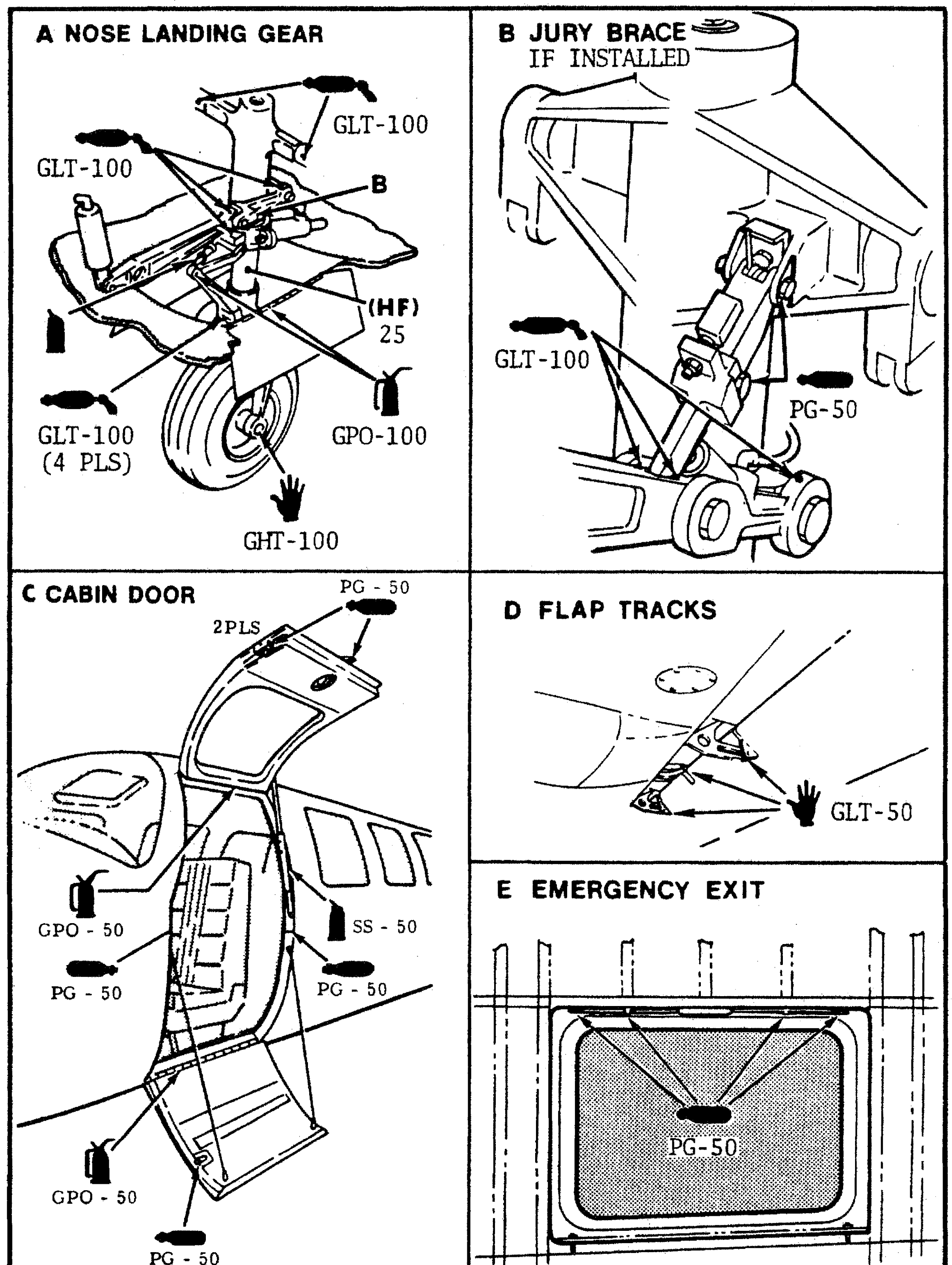
LUBRICATION

Lubrication requirements are shown in (Figure 10-10). These requirements are intended to fill the gap between the normal 100-hour inspection cycle, and what would be accomplished after washing the airplane, or as otherwise required. It is strongly recommended that the owner take advantage of thorough lubrication inspection procedures performed by Aerostar Service Center maintenance personnel. They are familiar with specific lubrication requirements not normally accessible or apparent, as well as routine lubrication requirements.

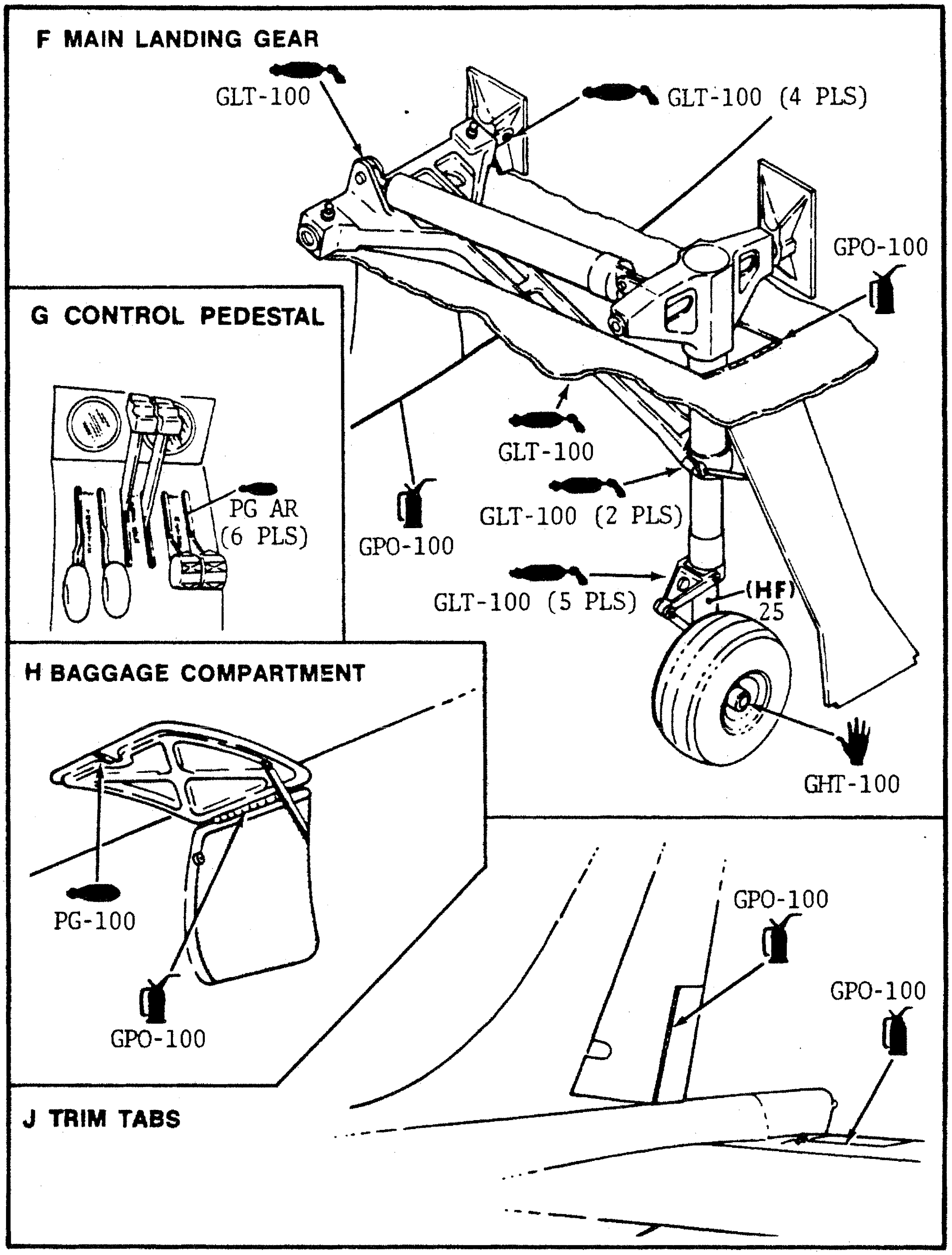


APPLICATION SYMBOLS		TYPE OF LUBRICANT
HAND	AR AS REQUIRED	GLT MIL-G-7711 GREASE, LOW TEMPERATURE
		GHT MIL-G-3545 GREASE, HIGH TEMPERATURE
GREASE GUN	25 25 HOURS & AS REQUIRED	GPO SAE 20 GENERAL PURPOSE OIL
		HF MIL-H-5606 HYDRAULIC FLUID (RED)
SQUIRT CAN	50 50 HOURS & AS REQUIRED	PG MIL-G-6711 POWDERED GRAPHITE
(H F) CLOTH WIPE	100 100 HOURS & AS REQUIRED	SS SILICONE SPRAY
DISPENSER		
SPRAY CAN		

Lubrication
Figure 10-10 (Sheet 1 of 3)



Lubrication
Figure 10-10 Sheet 2 of 3)



Lubrication
Figure 10-10 (Sheet 3 of 3)

CLEANING

PAINTED EXTERIOR

The painted exterior of your Aerostar requires an initial curing period, which may last as long as 90 days after the finish has been applied. During this curing period, use only water and mild soap for cleaning, and wipe dry with a soft cloth or chamois. Do not use polish or wax during this period since the paint would be sealed from the air, and curing could not take place. Do not rub or buff the finish, as this may cause very fine scratches or cracking.

Once the finish has cured, it is advisable to wash and dry the airplane, and then apply a coat of good automotive wax. An extra coat of wax on wing and tail leading edges will help protect against abrasion. Keeping the airplane waxed will not only protect the finish against foreign elements, but help it retain a like-new appearance.

NOTE

Washing solutions tend to remove lubricants from hinge joints, and flap tracks. After washing, relubricate the affected hinge points, and flap tracks in accordance with the lubrication guide.

WINDOWS AND WINDSHIELD

The Plexiglas windows and windshield should be kept clean and waxed at all times. Wash them with a soft cloth and plenty of mild soap and water. Rinse thoroughly and dry with a damp chamois. Apply a Plexiglas wax and lightly hand polish with a clean, soft, dry cloth. Stubborn grease and oil deposits may be cleaned by moistening a soft cloth with kerosene or a aliphatic naptha.

CAUTION

DO NOT USE GASOLINE, BENZENE, ALCOHOL, ACETONE, CARBON TETRACHLORIDE, FIRE EXTINGUISHER, ANTI-ICE FLUID, LACQUER THINNER, OR GLASS CLEANER TO CLEAN PLEXIGLAS. THESE FLUIDS WILL SOFTEN THE PLASTIC, AND MAY CAUSE CRAZING.

NEVER WIPE A PLEXIGLAS WINDOW OR WINDSHIELD WITH A DRY CLOTH, AS THE PLEXIGLAS MAY BE SCRATCHED. A DRY CLOTH WILL ALSO BUILD UP AN ELECTROSTATIC CHARGE, ATTRACTING SMALL PARTICLES OF DUST TO THE SURFACE.

INTERIOR

- CARPETING

Frequent vacuum cleaning of the carpeting will help keep it free from loose dust and dirt. Non-water soluable stains and spots (gum, grease, etc) may be removed by using a dry cleaning fluid such as Stoddard solvent or an equivalent. The carpeting may be shampooed using a pregenerated foam type shampoo. Be sure to follow the directions printed on the container.

CAUTION

DO NOT SOAK THE CARPET SURFACE WITH WATER OR SHAMPOO TOO FREQUENTLY AS THIS MAY REMOVE THE FIRE-RETARDANT PROPERTIES OF THE CARPET OR CAUSE SHRINKING.

- LEATHER, ROYALITE AND VINYL MATERIALS

Interior trim panels made of leather, Royalite or vinyl may be cleaned with a soft, clean cloth, moistened in a solution of mild household liquid detergent and water.

CAUTION

DO NOT USE CLEANERS CONTAINING SOLVENTS ON SURFACES MADE OF LEATHER, ROYALITE OR VINYL.

- FABRIC, CURTAINS AND UPHOLSTERY

  Curtains should be removed periodically and dry cleaned. Upholstery should be sponged down with a clean, damp cloth, and periodically may be cleaned with a commercial type dry foam cleaner. Be sure and follow the directions including cautions printed on the container.

WARNING

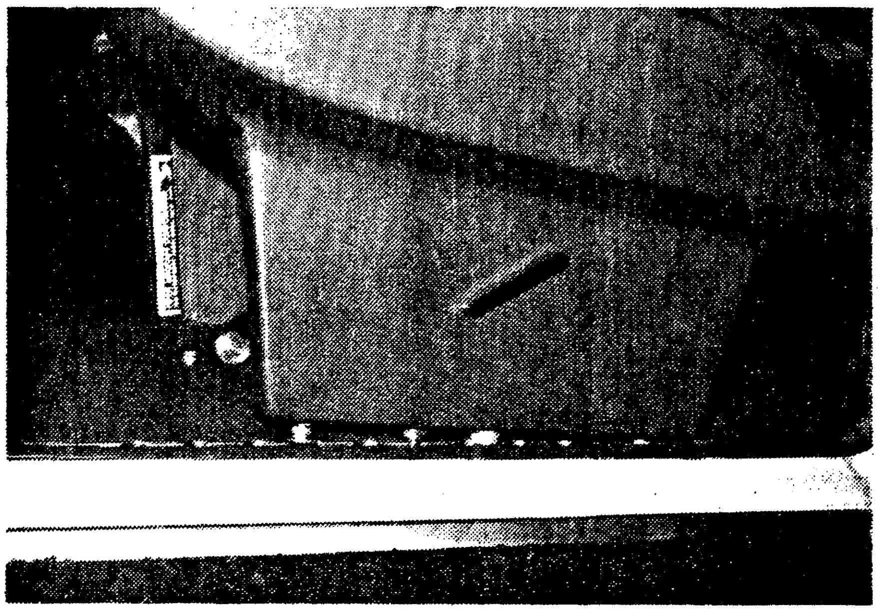
DO NOT WET FABRICS AS COLORS MAY MIGRATE AND FIRE RETARDANT PROPERTIES MAY BE DESTROYED.

SEAT REMOVAL

If the seats are to be removed for an extended period of time, the entire seat should be covered with a protective covering to keep dust and dirt from accumulating. When removing the seats, note the position they were in prior to removal, and reinstall in the same place. Do not lubricate the seat tracks or seat parts since the working parts are specially treated to provide adequate self-lubrication.

Remove the seats as follows (Figure 10-11).

1. Loosen nuts on seat retaining studs (one on each side of seat between forward stud and locking pin).
2. Line up the two seat lugs on the rear of the seat with the holes in the seat track and lift the seat clear of the tracks.



Seat Removal
Figure 10-14

3. While holding the back of the seat up, repeat Step 2 for the two front studs and remove the seat from the track.

Installation is the reverse of the removal procedure.

SECTION 11
SUPPLEMENTS

This section is to include all FAA Approved Flight Manual Supplements required for proper operation of additional equipment or other modifications. List all supplements in the space provided in this section.

ITEM	TITLE	DATE
1.	. . . .	______
2.	. . . .	______
3.	. . . .	______
4.	. . . .	______
5.	. . . .	______
6.	. . . .	______
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10.	. . . .	______
11.	. . . .	______
12.	. . . .	______
13.	. . . .	______
14.	. . . .	______

APPENDIX A

MAJOR REPAIRS & SERVICE CHANGE RECORDS

All forms and records describing major repairs, alterations, or service changes, are to be included in this Appendix, except for weight and balance changes which must be included in Section 7 of this manual.