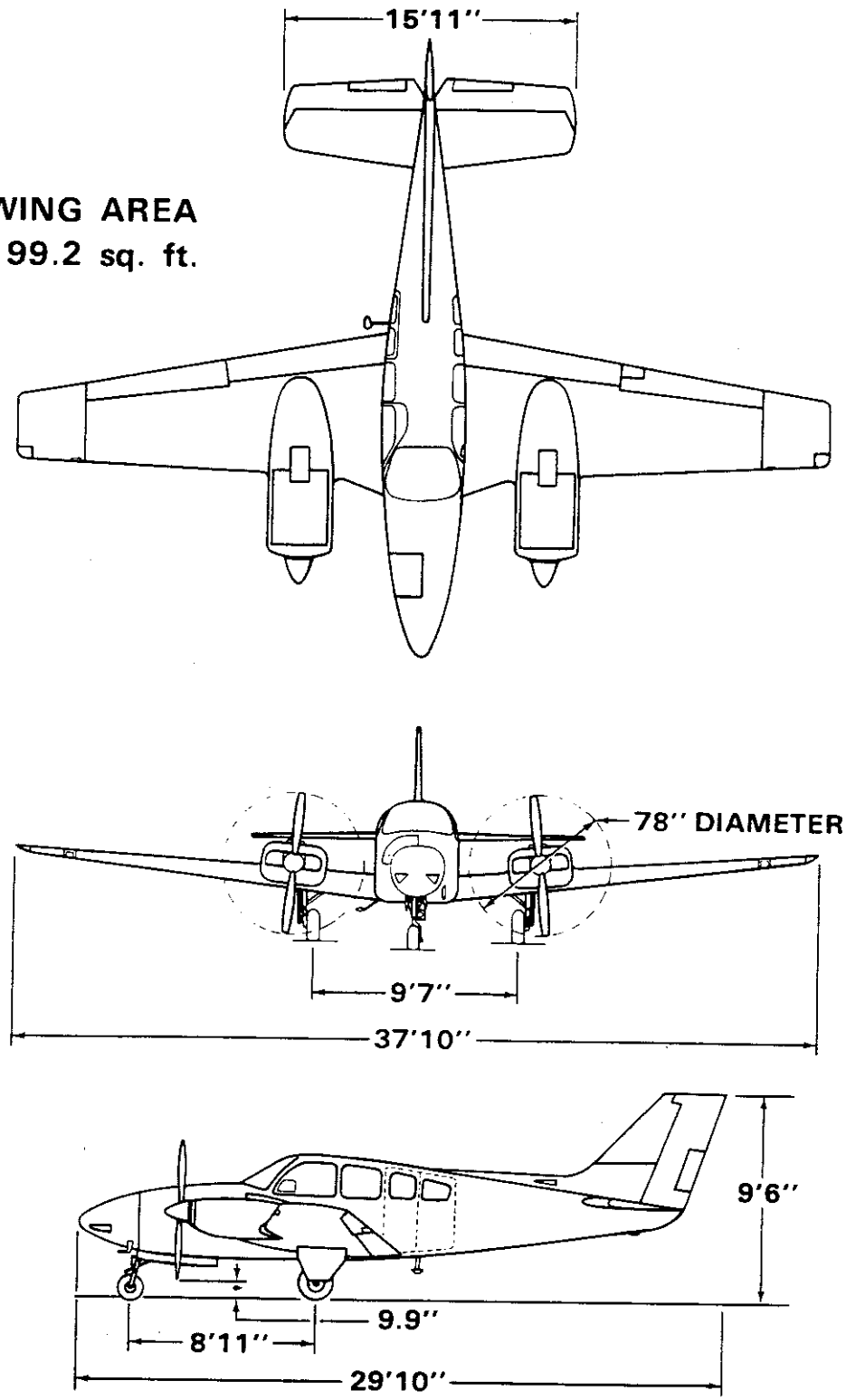
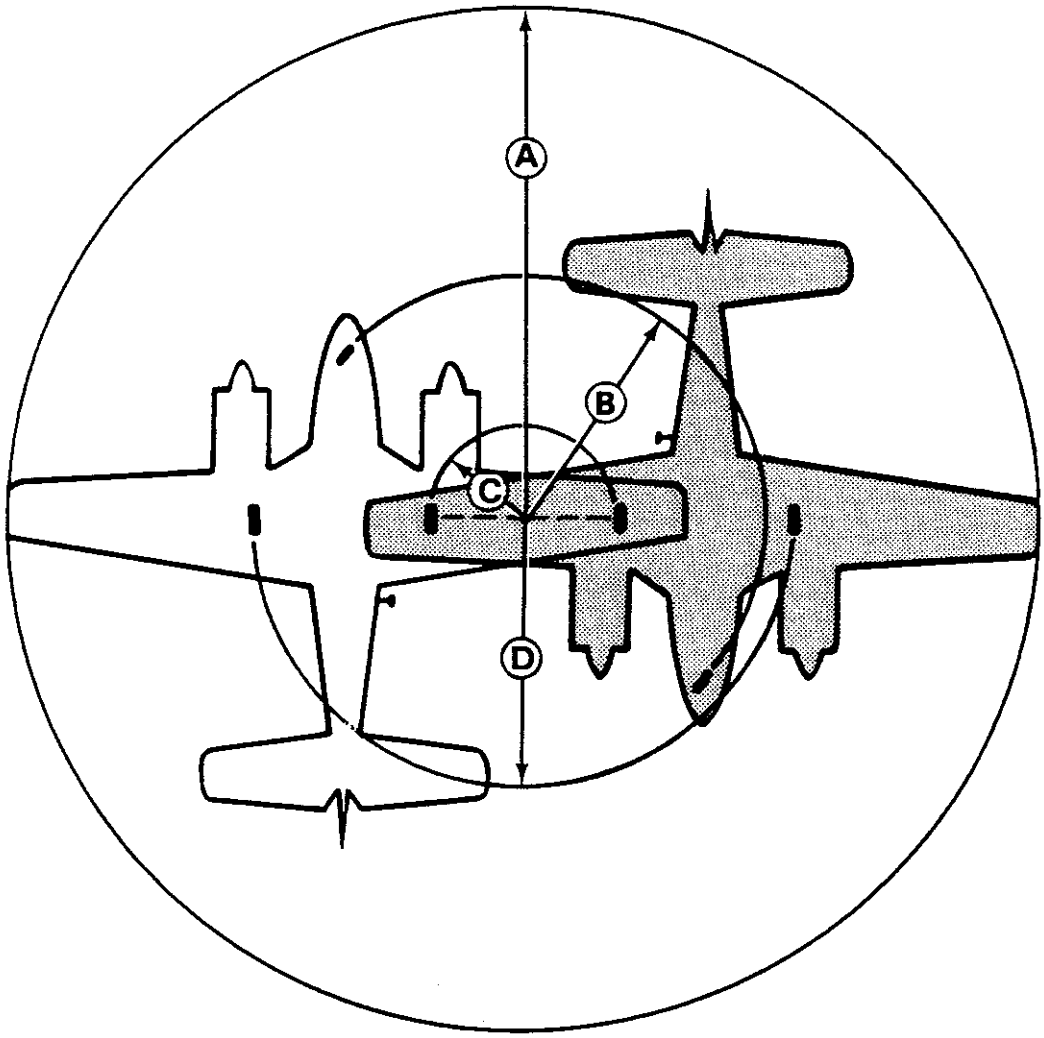


AIRPLANE THREE VIEW

GROUND TURNING CLEARANCE



Ⓐ Radius for Wing Tip ..... 31 feet 6 inches
Ⓑ Radius for Nose Wheel ..... 15 feet 6 inches
Ⓒ Radius for Inside Gear ..... 7 feet 11 inches
Ⓓ Radius for Outside Gear ..... 17 feet 6 inches

TURNING RADII ARE PREDICATED ON THE USE OF PARTIAL BRAKING ACTION AND DIFFERENTIAL POWER.

DESCRIPTIVE DATA

ENGINES

Two Continental IO-520-C fuel injected, air cooled six-cylinder, horizontally opposed engines each rated at 285 horsepower at 2700 rpm.

Take-off and Maximum Continuous Power	Full throttle and 2700 rpm
Maximum One-Engine Inoperative Power	Full throttle and 2700 rpm
Cruise Climb Power	25.0 in. Hg at 2500 rpm
Maximum Cruise Power	24.5 in. Hg at 2500 rpm

PROPELLERS

HARTZELL

2 Blade Hubs: BHC-J2YF-2CF
Blades: FC8475-6
Pitch Setting at 30 inch Station:
Low 14.5°; Feathered 80.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: PHC-J3YF-2F
Blades: FC7663-2R
Pitch Setting at 30 inch Station:
Low 13.0°; Feathered 82.0°
Diameter: 76 inches maximum, 74 inches minimum

McCAULEY

2 Blade Hubs: D2AF34C30
Blades: 78FF-0
Pitch Setting at 30 inch Station:
Low 15.0°; Feathered 79.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: D3AF32C35
Blades: 82NB-6
Pitch Setting at 30 inch Station:
Low 14.0° ± .2°; Feathered 81.2° ± 3°
Diameter: 76 inches, no cut-off permitted

FUEL

Aviation Gasoline 100LL (blue) preferred, 100 (green) minimum grade.

STANDARD SYSTEM:

Total Capacity	142 Gallons
Total Usable	136 Gallons

OPTIONAL SYSTEMS:

Total Capacity	172 Gallons
Total Usable	166 Gallons

or

Total Capacity	200 Gallons
Total Usable	194 Gallons

OIL

The oil capacity is 12 quarts for each engine.

WEIGHTS

58

Maximum Ramp Weight	5424 lbs
Maximum Take-Off Weight	5400 lbs
Maximum Landing Weight	5400 lbs

58A

Maximum Ramp Weight	5014 lbs
Maximum Take-Off Weight	4990 lbs
Maximum Landing Weight	4990 lbs

CABIN AND ENTRY DIMENSIONS

Length	12 ft 7 in.
Height (Max.)	4 ft 2 in.
Width (Max.)	3 ft 6 in.
Entrance Door	37 in. x 36 in.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Main Cabin Compartment	37 cu ft
Extended Aft Compartment	10 cu ft
Utility Door Opening	45 in. x 35 in.
Nose Compartment	18 cu ft

SPECIFIC LOADINGS

Wing Loading	27.1 lbs/sq ft
Power Loading	9.47 lbs/hp

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following Abbreviations and Terminologies have been listed for convenience and ready interpretation where used within this handbook. Whenever possible, they have been categorized for ready reference.

AIRSPEED TERMINOLOGY

CAS Calibrated Airspeed is the indicated speed of an airplane, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.

GS Ground Speed is the speed of an airplane relative to the ground.

IAS Indicated Airspeed is the speed of an airplane as shown on the airspeed indicator. IAS values published in this handbook assume zero instrument error.

TAS True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature, and compressibility.

V_{MCA} Air minimum control speed is the minimum flight speed at which the airplane is directionally controllable as determined in accordance with Federal Aviation Regulations. The airplane certification conditions include one engine becoming inoperative and windmilling; a 5° bank towards the operative engine; takeoff power on operative engine; landing gear up; flaps in take-off position; and most rearward C.G. For some conditions of weight and altitude, stall can be encountered at

speeds above V_{MCA} as established by the certification procedure described above, in which event stall speed must be regarded as the limit of effective directional control.

V_{SSE} The Intentional One-Engine-Inoperative Speed is a speed above both V_{MCA} and stall speed, selected to provide a margin of lateral and directional control when one engine is suddenly rendered inoperative. Intentional failing of one engine below this speed is not recommended.

V_A Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.

V_F Design flap speed is the highest speed permissible at which wing flaps may be actuated.

V_{FE} Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

V_{LE} Maximum Landing Gear Extended Speed is the maximum speed at which an airplane can be safely flown with the landing gear extended.

V_{LO} Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.

V_{NE} Never Exceed Speed is the speed limit that may not be exceeded at any time.

V_{NO} Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

V_S Stalling Speed or the minimum steady flight speed at which the airplane is controllable.

V_{SO} Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.

V_X Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.

V_Y Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

METEOROLOGICAL TERMINOLOGY

ISA — International Standard Atmosphere in which
(1) The air is a dry perfect gas;
(2) The temperature at sea level is 15° Celsius (59° Fahrenheit);
(3) The pressure at sea level is 29.92 in. Hg (1013.2 millibars);
(4) The temperature gradient from sea level to the altitude at which the temperature is -56.5° C (-69.7° F) is -0.00198° C (-0.003566° F) per foot and zero above that altitude.

OAT — Outside Air Temperature is the free air static temperature, obtained either from inflight temperature indications adjusted for instrument error and compressibility effects, or ground meteorological sources.

Indicated Pressure Altitude	The number actually read from an altimeter when the barometric subscale has been set to 29.92 in. Hg (1013.2 millibars).
Pressure Altitude	Altitude measured from standard sea-level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this Handbook, altimeter instrument errors are assumed to be zero. Position errors may be obtained from the Altimeter Correction Chart.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

POWER TERMINOLOGY

Take-off	The highest power rating to be used for takeoff.
Maximum Continuous	The highest power rating not limited by time. To be used only for conditions which warrant the use of this rating.
Cruise Climb	Power recommended for cruise climb.
Maximum Cruise	The highest power settings recommended for cruise.

Recommended Cruise	Intermediate power settings for which cruise power settings are presented.
Economy Cruise	The lowest power setting for which cruise power settings are presented.

ENGINE CONTROLS AND INSTRUMENTS TERMINOLOGY

Throttle Control	The lever used to control the introduction of a fuel-air mixture into the intake passages of an engine.
Propeller Control	This lever requests the governor to maintain rpm at a selected value and, in the maximum decrease rpm position, feathers the propellers.
Mixture Control	This lever, in the idle cut-off position, stops the flow of fuel at the injectors and in the intermediate thru the full rich positions, regulates the fuel air mixture.
Propeller Governors	The governors maintain the selected rpm requested by the propeller control levers.
Manifold Pressure Gage	An instrument that measures the absolute pressure in the intake manifold of an engine, expressed in inches of mercury (in. Hg).
Tachometer	An instrument that indicates the rotational speed of the propeller (and engine) in revolutions per minute (rpm).

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient	The ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.
Demonstrated Crosswind Velocity	The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. The value shown is not limiting.
Accelerate-Stop Distance	The distance required to accelerate to a specified speed and, assuming failure of an engine at the instant that speed is attained, to bring the airplane to a stop.
Accelerate-Go Distance	The distance required to accelerate to a specified speed and, assuming failure of an engine at the instant that speed is attained, feather inoperative propeller and continue takeoff on the remaining engine to a height of 50 feet.
MEA	Minimum enroute IFR altitude.
Route Segment	A part of a route. Each end of that part is identified by: (1) a geographical location; or (2) a point at which a definite radio fix can be established.
GPH	U.S. Gallons per hour.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	A location along the airplane fuselage usually given in terms of distance from the reference datum.
Arm	The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.
Moment	The product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)
Airplane Center of Gravity (C.G.)	The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.

Usable Fuel	Fuel available for flight planning.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.
Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between ramp weight and basic empty weight.
Maximum Ramp Weight	Maximum weight approved for ground maneuvering. (It includes weight of start, taxi, and run up fuel).
Maximum Take-off Weight	Maximum weight approved for the start of the take off run.
Maximum Landing Weight	Maximum weight approved for the landing touchdown.
Zero Fuel Weight	Weight exclusive of usable fuel.

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SECTION II

LIMITATIONS

TABLE OF CONTENTS

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The limitations included in this section have been approved by the Federal Aviation Administration and must be observed in the operation of this airplane.

AIRSPEED LIMITATIONS

SPEED	CAS		IAS		REMARKS
	KNOTS	MPH	KNOTS	MPH	
Never Exceed V_{NE}	223	257	223	257	Do not exceed this speed in any operation
Maximum Structural Cruising V_{NO}	195	225	195	225	Do not exceed this speed except in smooth air and then only with caution
Maneuvering V_A	156	180	156	180	Do not make full or abrupt control movements above this speed
Maximum Flap Extension/ Extended V_{FE}					Do not extend flaps or operate with flaps extended above this speed
(Approach 15°)	152	175	152	175	
(Full down 30°)	122	140	122	140	
Maximum Landing Gear Operating/ Extended V_{LO} and V_{LE}	152	175	152	175	Do not extend, retract or operate with landing gear extended above this speed
Air Minimum Control Speed V_{MCA}	81	93	81	93	Minimum speed for directional controllability after sudden loss of engine
Maximum With Utility Doors Removed	174	200	174	200	Utility door removal kit must be installed

*AIRSPEED INDICATOR MARKINGS

MARKING	CAS		IAS		SIGNIFICANCE
	KNOTS	MPH	KNOTS	MPH	
White Arc	72-122	83-140	74-122	85-140	Full Flap Operating Range
Blue Radial	100	115	100	115	One-Engine-Inoperative Best Rate-of-Climb Speed
Green Arc	83-195	95-225	84-195	96-225	Normal Operating Range
Yellow Arc	195-223	225-257	195-223	225-257	Operate with caution only in smooth air
Red Radial	223	257	223	257	Maximum speed for ALL operations

*The Airspeed Indicator is marked in CAS values

POWER PLANT LIMITATIONS

ENGINES

Two Continental IO-520-C fuel injected, air cooled six-cylinder, horizontally opposed engines each rated at 285 horsepower at 2700 rpm.

Take-off and Maximum continuous power	Full throttle, 2700 rpm
Maximum Cylinder Head Temperature	460°F
Maximum Oil Temperature	240°F
Minimum Take-off Oil Temperature	75°F
Minimum Oil Pressure (Idle)	30 psi
Maximum Oil Pressure	100 psi

FUEL

Aviation Gasoline 100LL (blue) preferred, 100 (green) minimum grade.

OIL

Ashless Dispersant oils must meet latest revision of Teledyne Continental Motors Corporation Specification MHS-24. Refer to Approved Engine Oils, Section VIII, HANDLING, SERVICING, and MAINTENANCE.

PROPELLERS

HARTZELL

2 Blade Hubs: BHC-J2YF-2CF
Blades: FC8475-6
Pitch Setting at 30 inch Station:
Low 14.5°; Feathered 80.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: PHC-J3YF-2F
Blades: FC7663-2R
Pitch Setting at 30 inch Station:
Low 13.0°; Feathered 82.0°
Diameter: 76 inches maximum, 74 inches minimum

McCAULEY

2 Blade Hubs: D2AF34C30
Blades: 78FF-0
Pitch Setting at 30 inch Station:
Low 15.0°; Feathered 79.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: D3AF32C35
Blades: 82NB-6
Pitch Setting at 30 inch Station:
Low 14.0° ± .2°; Feathered 81.2° ± 3°
Diameter: 76 inches, no cut-off permitted

STARTERS - TIME FOR CRANKING

Do not operate starter continuously for more than 30 seconds. Allow starter to cool before cranking again.

POWER PLANT INSTRUMENT MARKINGS

OIL TEMPERATURE
- Caution (Yellow Radial) ..... 75°F
- Operating Range (Green Arc) ..... 75° to 240°F
- Maximum (Red Radial) ..... 240°F

OIL PRESSURE
- Minimum (Red Radial) ..... 30 psi
- Operating Range (Green Arc) ..... 30 to 60 psi
- Maximum (Red Radial) ..... 100 psi

FUEL FLOW AND PRESSURE
- Minimum (Red Radial) ..... 1.5 psi
- Cruise Power (Green Arc) .... 9.7 gph to 17.0 gph
- Take-off and Climb Power (Wide Green Arc) ..... 17.8 gph to 24.3 gph
- Maximum (Red Radial) ..... 17.5 psi

MANIFOLD PRESSURE
- Operating Range (Green Arc) ..... 15 to 29.6 in. Hg
- Maximum (Red Radial) ..... 29.6 in. Hg

TACHOMETER
- Operating Range (Green Arc) ... 2000 to 2700 rpm
- Maximum (Red Radial) ..... 2700 rpm

CYLINDER HEAD TEMPERATURE
- Operating Range (Green Arc) ..... 200° to 460°F
- Maximum (Red Radial) ..... 460°F

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT PRESSURE

Caution (Yellow Arc) ..... 2.5 to 3.5 in. Hg
Normal (Green Arc) ..... 3.5 to 5.5 in. Hg
Caution (Yellow Arc) ..... 5.5 to 6.5 in. Hg
Red Button Source Failure Indicators

or

Normal (Green Arc) ..... 4.3 to 5.9 in. Hg
Red Button Source Failure Indicators

PROPELLER DEICE AMMETER

Normal Operating Range
(Green Arc) ..... 7 to 12 amps (2 blade)
Normal Operating Range
(Green Arc) ..... 14 to 18 amps (3 blade)

FUEL QUANTITY

Yellow Arc ..... E to 1/8 Full

WEIGHTS

58

Maximum Ramp Weight ..... 5424 lbs
Maximum Take-Off Weight ..... 5400 lbs
Maximum Landing Weight ..... 5400 lbs

58A

Maximum Ramp Weight ..... 5014 lbs
Maximum Take-Off Weight ..... 4990 lbs
Maximum Landing Weight ..... 4990 lbs

Maximum Baggage/Cargo Compartment Weights:

Main Cabin Compartment
(less occupants and equipment) ..... 400 lbs
Extended Aft Compartment ..... 120 lbs
Nose Compartment (baggage less
equipment) ..... 300 lbs

Refer to Weight and Balance section for additional information.

CG LIMITS

Baron 58

Forward Limits: 74 inches aft of datum at 4200 lbs and under, then straight line variation to 78.0 inches aft of datum at gross weight of 5400 lbs.

Aft Limits: 86 inches aft of datum at all weights.

Baron 58A

Forward Limits: 74 inches aft of datum at 4200 lbs and under, then straight line variation to 76.6 inches aft of datum at gross weight of 4990 lbs.

Aft Limits: 86 inches aft of datum at all weights.

REFERENCE DATUM

Datum is 83.1 inches forward of center line through forward jack points.

MAC leading edge is 67.2 inches aft of datum.
MAC length is 63.1 inches.

MANEUVER LIMITS

This is a normal category airplane. Acrobatic maneuvers, including spins, are prohibited.

FLIGHT LOAD FACTORS (5400 POUNDS)

Positive maneuvering load factors:

Flaps Up	4.2G
Flaps Down	2.0G

MINIMUM FLIGHT CREW ..... One (1) Pilot

KINDS OF OPERATION LIMITS

This airplane is approved for the following type operations when the required equipment is installed and operational as defined herein:

1. VFR day and night
2. IFR day and night

WARNING

Ice protection equipment which may be installed on this airplane has not been demonstrated to meet requirements for flight into known icing conditions.

FUEL

TOTAL FUEL with left and right wing fuel systems full:

Standard Fuel System
- Capacity ..... 142 Gallons
- Usable ..... 136 Gallons

Optional Fuel System
- Capacity ..... 172 Gallons
- Usable ..... 166 Gallons

or

- Capacity ..... 200 Gallons
- Usable ..... 194 Gallons

Do not take off if Fuel Quantity Gages indicate in Yellow Arc or with less than 13 gallons in each wing fuel system.

The fuel crossfeed system to be used during emergency conditions in level flight only.

Maximum slip duration: 30 seconds

OXYGEN REQUIREMENTS

Refer to FAR 91 for oxygen requirements.

MAXIMUM PASSENGER SEATING CONFIGURATION

Five (5) passengers and one (1) pilot

SEATING

All seats must be in the upright position for takeoff and landing.

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

EMERGENCY AIRSPEEDS

Air Minimum Control Speed (V_{MCA}) ... 81 kts/93 mph
Intentional One-Engine
Inoperative Speed (V_{SSE}) ..... 86 kts/99 mph
Best Rate-of-Climb Speed
One-Engine Inoperative (V_Y) .... 100 kts/115 mph
Best Angle-of-Climb Speed
One-Engine Inoperative (V_X) ..... 96 kts/111 mph
Landing - One Engine Inoperative:
Maneuvering to Final
Approach (minimum) ..... 100 kts/115 mph
Final Approach (minimum) ..... 90 kts/104 mph

The following information is presented to enable the pilot to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur in the operation of the airplane. Where practicable, the emergencies requiring immediate corrective action are treated in check list form for easy reference and familiarization. Other situations, in which more time is usually permitted to decide on and execute a plan of action, are discussed at some length. In order to supply one safe speed for each type of emergency situation, the airspeeds presented were derived at 5400 lbs.

ONE ENGINE OPERATION

Two major factors govern one engine operations; airspeed and directional control. The airplane can be safely maneuvered or trimmed for normal hands-off operation and sustained in this configuration by the operative engine AS LONG AS SUFFICIENT AIRSPEED IS MAINTAINED.

DETERMINING INOPERATIVE ENGINE

The following checks will help determine which engine has failed.

1. DEAD FOOT - DEAD ENGINE. The rudder pressure required to maintain directional control will be on the side of the good engine.

2. THROTTLE. Partially retard the throttle for the engine that is believed to be inoperative; there should be no change in control pressures or in the sound of the engine if the correct throttle has been selected. AT LOW ALTITUDE AND AIRSPEED THIS CHECK MUST BE ACCOMPLISHED WITH EXTREME CAUTION.

Do not attempt to determine the inoperative engine by means of the tachometers or the manifold pressure gages. These instruments often indicate near normal readings.

ONE-ENGINE INOPERATIVE PROCEDURES

ENGINE FAILURE DURING TAKE-OFF

1. Throttles - CLOSED
2. Braking - MAXIMUM

If insufficient runway remains for stopping:

3. Fuel Selector Valves - OFF
4. Battery, Alternator, and Magneto/Start Switches - OFF

ENGINE FAILURE AFTER LIFT-OFF
AND IN FLIGHT

An immediate landing is advisable regardless of take-off weight. Continued flight cannot be assured if take-off weight exceeds the weight determined from the TAKE-OFF WEIGHT graph. Higher take-off weights will result in a loss of altitude while retracting the landing gear and feathering the propeller. Continued flight requires immediate pilot response to the following procedures.

1. Landing Gear and Flaps - UP
2. Throttle (inoperative engine) - CLOSED
3. Propeller (inoperative engine) - FEATHER
4. Power (operative engine) - AS REQUIRED
5. Airspeed - MAINTAIN SPEED AT ENGINE FAILURE (100 KTS/115 MPH MAX.) UNTIL OBSTACLES ARE CLEARED.

After positive control of the airplane is established:

6. Secure inoperative engine:
   a. Mixture Control - IDLE CUT-OFF
   b. Fuel Selector - OFF
   c. Auxiliary Fuel Pump - OFF
   d. Magneto/Start Switch - OFF
   e. Alternator Switch - OFF
   f. Cowl Flap - CLOSED
7. Electrical Load - MONITOR (Maximum load of 1.0 on remaining engine)

NOTE

The most important aspect of engine failure is the necessity to maintain lateral and directional control. If airspeed is below 81 kts (93 mph), reduce power on the operative engine as required to maintain control. Refer to the SAFETY INFORMATION Section for additional information regarding pilot technique.

AIR START

CAUTION

The pilot should determine the reason for engine failure before attempting an air start.

1. Fuel Selector Valve - ON
2. Throttle - SET approximately 1/4 travel
3. Mixture Control - FULL RICH, below 5000 ft (1/2 travel above 5,000 ft)
4. Aux Fuel Pump - LOW
5. Magnetos - CHECK ON
6. Propeller:

WITH UNFEATHERING ACCUMULATORS:

a. Move propeller control full forward to accomplish unfeathering. Use starter momentarily if necessary.
b. Return control to high pitch (low rpm) position, when windmilling starts, to avoid overspeed.

If propeller does not unfeather or engine does not turn, proceed to WITHOUT UNFEATHERING ACCUMULATORS procedure.

WITHOUT UNFEATHERING ACCUMULATORS:

a. Move propeller control forward of the feathering detent to midrange
b. Engage Starter to accomplish unfeathering
c. If engine fails to run, clear engine by allowing it to windmill with mixture in IDLE CUT-OFF. When engine fires, advance mixture to FULL RICH

7. When Engine Starts - ADJUST THROTTLE, PROPELLER and MIXTURE CONTROLS
8. Aux Fuel Pump - OFF (when reliable power has been regained)

9. Alternator Switch - ON
10. Oil Pressure - CHECK
11. Warm Up Engine (approximately 2000 rpm and 15 in. Hg)
12. Set power as required and trim

ENGINE FIRE

ON THE GROUND

1. Mixture Controls - IDLE CUT-OFF
2. Continue to crank affected engine
3. Fuel Selector Valves - OFF
4. Battery and Alternator Switches - OFF
5. Extinguish with Fire Extinguisher

IN FLIGHT

Shut down the affected engine according to the following procedure and land immediately. Follow the applicable single-engine procedures in this section.

1. Fuel Selector Valve - OFF
2. Mixture Control - IDLE CUT-OFF
3. Propeller - FEATHERED
4. Aux Fuel Pump - OFF
5. Magneto/Start Switch - OFF
6. Alternator Switch - OFF

EMERGENCY DESCENT

1. Propellers - 2700 RPM
2. Throttles - CLOSED
3. Airspeed - 152 kts (175 mph)
4. Landing Gear - DOWN
5. Flaps - APPROACH (15°)

GLIDE

1. Propellers - FEATHER
2. Flaps - UP
3. Landing Gear - UP
4. Cowl Flaps - CLOSED

The glide ratio in this configuration is approximately 2 nautical miles of gliding distance for each 1000 feet of altitude above the terrain at an airspeed of 120 kts (138 mph). .

LANDING EMERGENCIES

GEAR-UP LANDING

If possible, choose firm sod or foamed runway. When assured of reaching landing site:

1. Cowl Flaps - CLOSED
2. Wing Flaps - AS DESIRED
3. Throttles - CLOSED
4. Fuel Selectors - OFF
5. Mixture Controls - IDLE CUT-OFF
6. Battery, Alternator and Magneto/Start Switches - OFF
7. Keep wings level during touchdown.
8. Get clear of the airplane as soon as possible after it stops.

NOTE

The gear up landing procedures are based on the best available information and no actual tests have been conducted.

ONE ENGINE INOPERATIVE LANDING

On final approach and when it is certain that the field can be reached:

1. Landing Gear - DOWN
2. Flaps - APPROACH (15°)
3. Airspeed - 90 kts/104 mph
4. Power - AS REQUIRED to maintain 800 ft/min rate of descent

When it is certain there is no possibility of go-around:

5. Flaps - DOWN
6. Execute normal landing

ONE ENGINE INOPERATIVE GO-AROUND

WARNING

Level flight might not be possible for certain combinations of weight, temperature and altitude. In any event, DO NOT attempt a one engine inoperative go-around after flaps have been fully extended.

1. Power - MAXIMUM ALLOWABLE
2. Landing Gear - UP
3. Flaps - UP
4. Airspeed - MAINTAIN 100 kts (115 mph) MINIMUM

SYSTEMS EMERGENCIES

ONE-ENGINE INOPERATIVE OPERATION
ON CROSSFEED

NOTE

The fuel crossfeed system is to be used only during emergency conditions in level flight only.

Left engine inoperative:

1. Right Aux Fuel Pump - LOW
2. Left Fuel Selector Valve - OFF
3. Right Fuel Selector Valve - CROSSFEED
4. Right Aux Fuel Pump - LOW or OFF as required

Right engine inoperative:

1. Left Aux Fuel Pump - LOW
2. Right Fuel Selector Valve - OFF
3. Left Fuel Selector Valve - CROSSFEED
4. Left Aux Fuel Pump - LOW or OFF as required

ELECTRICAL SMOKE OR FIRE

Action to be taken must consider existing conditions and equipment installed:

1. Battery and Alternator Switches - OFF

WARNING

Electrically driven flight instruments will become inoperative.

2. Oxygen - AS REQUIRED
3. All Electrical Switches - OFF
4. Battery and Alternator Switches - ON

5. Essential Electrical Equipment - ON (Isolate defective equipment:

NOTE

Ensure fire is out and will not be aggravated by draft. Turn off CABIN HEAT switch and push in the CABIN AIR control. Open pilot's storm window, if required.

ILLUMINATION OF ALTERNATOR OUT LIGHT

In the event of the illumination of a single ALTERNATOR OUT light:

1. Check the respective loadmeter for load indication
   a. No Load - Turn off affected alternator
   b. Regulate load

In the event of the illumination of both ALTERNATOR OUT lights:

1. Check loadmeters for load indication
   a. No load indicates failure of regulator
      (1) Switch regulators
      (2) System should indicate normal
   b. If condition recurs
      (1) Switch to original regulator
      (2) System returns to normal, indicates overload condition causing malfunction
      (3) Reduce load
   c. If condition indicates malfunction of both alternator circuits
      (1) Both ALT Switches - OFF
      (2) Minimize electrical load since only battery power will be available

UNSCHEDULED ELECTRIC ELEVATOR TRIM

Incorporated in the system is an emergency release button located on the left handle grip of the pilot's control wheel. This button can be depressed to deactivate the system quickly in case of a malfunction in the system. The system will remain deactivated only while the release button is being held in the depressed position.

1. Airplane Attitude - MAINTAIN using elevator control
2. Trim Release (under pilot's thumb adjacent to control wheel trim switch) - HOLD IN DEPRESSED POSITION
3. Trim - MANUALLY RE-TRIM AIRPLANE
4. Electric Trim - OFF
5. Trim Release - RELEASE
6. Circuit Breaker - PULL

NOTE

Do not attempt to operate the electric trim system until the cause of the malfunction has been determined and corrected.

LANDING GEAR MANUAL EXTENSION

Reduce airspeed before attempting manual extension of the landing gear.

1. LDG GR MOTOR Circuit Breaker - PULL
2. Landing Gear Handle - DOWN
3. Remove cover from handcrank at rear of front seats. Engage handcrank and turn counterclockwise as far as possible (approximately 50 turns). Stow handcrank.
4. If electrical system is operative, check landing gear position lights and warning horn (check LDG GR RELAY circuit breaker engaged.)

CAUTION

The manual extension system is designed only to lower the landing gear; do not attempt to retract the gear manually.

WARNING

Do not operate the landing gear electrically with the handcrank engaged, as damage to the mechanism could occur.

After emergency landing gear extension, do not move any landing gear controls or reset any switches or circuit breakers until airplane is on jacks, as failure may have been in the gear-up circuit and gear might retract with the airplane on the ground.

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

After practice manual extension of the landing gear, the gear may be retracted electrically, as follows:

1. Handcrank - CHECK, STOWED
2. Landing Gear Motor Circuit Breaker - IN
3. Landing Gear Handle - UP

ICE PROTECTION

SURFACE DEICE SYSTEM

a. Failure of AUTO Operation
   (1) Surface Deice Switch - MANUAL (Do not hold more than 8 seconds)

CAUTION

The boots will inflate only as long as the switch is held in the MANUAL position. When the switch is released the boots will deflate.

b. Failure of boots to deflate
   (1) Pull circuit breaker on pilot's side panel.

ELECTROTHERMAL PROPELLER DEICE SYSTEM

1. Loss of one alternator; turn off unnecessary electrical equipment. Turn the prop deice system off while operating the cabin heater blower or the landing gear motor. Monitor electrical loads so as not to exceed alternator capacity of 1.0 on the loadmeter.

An abnormal reading on the Propeller Deice Ammeter indicates need for the following action:

a. Zero Amps:

Check prop deice circuit breaker. If the circuit breaker has tripped, a wait of approximately 30 seconds is necessary before resetting. If ammeter reads 0 and the circuit breaker has not tripped or if the ammeter still reads 0 after the circuit breaker has been reset, turn the switch off and consider the prop deice system inoperative.

NOTE

On TH-733 and after, for access past the 3rd and/or 4th seats, rotate the red handle, located on the lower inboard side of the seat back, and fold the seat back over.

UNLATCHED DOOR IN FLIGHT

If the cabin door is not locked it may come unlatched in flight. This may occur during or just after take-off. The door will trail in a position approximately 3 to 4 inches open. Flight characteristics of the airplane will not be affected except for a reduction in performance. Return to the field in a normal manner. If practicable, during the landing flare-out have a passenger hold the door to prevent it from swinging open.

SIMULATED ONE ENGINE INOPERATIVE

ZERO THRUST (Simulated Feather)

Use the following power setting (only on one engine at a time) to establish zero thrust. Use of this power setting avoids the difficulties of restarting an engine and preserves the availability of engine power.

The following procedure should be accomplished by alternating small reductions of propeller and then throttle, until the desired setting has been reached.

1. Propeller Lever - RETARD TO FEATHER DETENT
2. Throttle Lever - SET 12 in. Hg MANIFOLD PRESSURE

NOTE

This setting will approximate Zero Thrust using recommended One-Engine Inoperative Climb speeds.

SPINS

If a spin is entered inadvertently:

Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral during recovery.

NOTE

Federal Aviation Administration Regulations do not require spin demonstration of airplanes of this weight; therefore, no spin tests have been conducted. The recovery technique is based on the best available information.

b. Zero to 7 Amps, 2 Blade Propeller; Zero to 14 Amps, 3 Blade Propeller:

If the prop deice system ammeter occasionally or regularly indicates less than 7 amps for 2 blade, (or 14 amps for 3 blade), operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

c. 12 to 15 Amps, 2 Blade Propeller; 18 to 23 Amps, 3 Blade Propeller:

If the prop deicing system ammeter occasionally or regularly indicates 12 to 15 amps for 2 blade (or 18 to 23 amps for 3 blade), operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

d. More than 15 Amps, 2 Blade Propeller, More than 23 amps, 3 Blade Propeller:

If the prop deice system ammeter occasionally or regularly indicates more than 15 amps for 2 blade, or more than 23 amps for 3 blade, the system should not be operated unless the need for prop deicing is urgent.

ALTERNATE (EMERGENCY) STATIC AIR SOURCE SYSTEM

THE EMERGENCY STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED. When the airplane has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed static ports should be considered. Partial obstructions will

result in the rate of climb indication being sluggish during a climb or descent. Verification of suspected obstruction is possible by switching to the emergency system and noting a sudden sustained change in rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the Normal Static Air System or the Emergency Static Air System is desired for use:

1. Emergency Static Air Source - Switch to ON EMERGENCY. (lower sidewall adjacent to pilot)

2. For Airspeed Calibration and Altimeter Corrections, refer to the PERFORMANCE section.

CAUTION

The emergency static air valve should remain in the OFF NORMAL position when system is not needed.

EMERGENCY EXITS

Emergency exits, provided by the openable window on each side of the cabin may be used for egress in addition to the cabin door and the utility door. An emergency exit placard, "EMERGENCY EXIT, LIFT LATCH - PULL PIN, PUSH WINDOW OUT," is installed below the left and right middle windows after compliance with BEECHCRAFT Service Instructions 1241. To open each emergency exit:

1. Lift the latch
2. Pull out the emergency release pin and push the window out.

SECTION IV

NORMAL PROCEDURES

TABLE OF CONTENTS

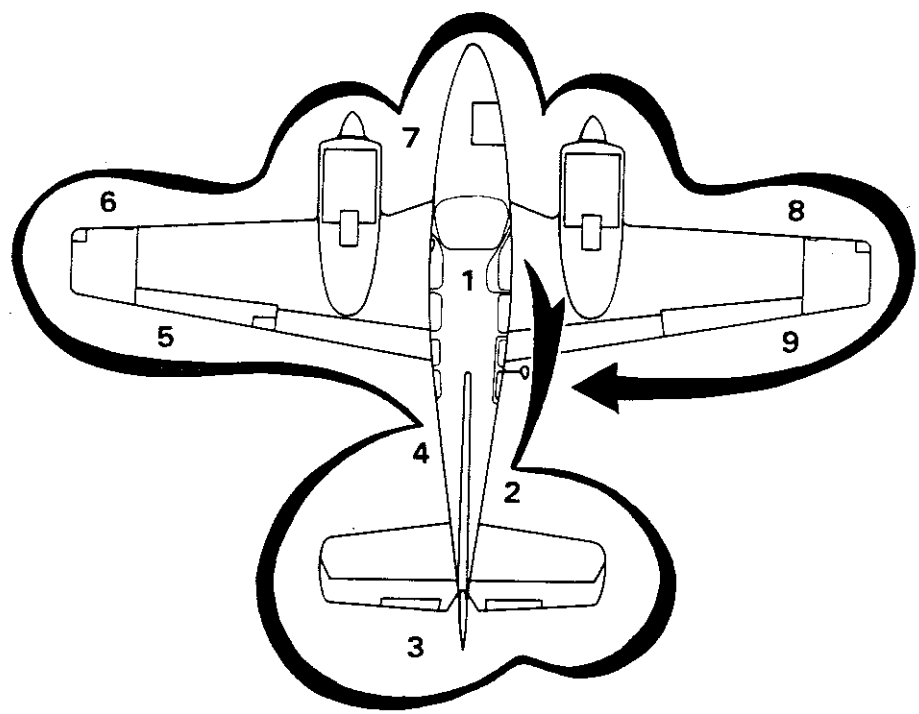
TABLE OF CONTENTS (Continued)

All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

AIRSPEEDS FOR SAFE OPERATION

(Settings established at 5400 lbs.)

Two-Engine Best Angle-of-Climb	86 kts/99 mph
Two-Engine Best Rate-of-Climb	104 kts/120 mph
Single-Engine Best Angle-of-Climb	96 kts/111 mph
Single-Engine Best Rate-of-Climb	100 kts/115 mph
Air Minimum Control (V_{MCA})	81 kts/93 mph
Intentional One Engine Inoperative (V_{SSE})	86 kts/99 mph
Cruise Climb	139 kts/160 mph
Balked Landing Climb	95 kts/109 mph
Landing Approach Flaps 30°	96 kts/110 mph
Turbulent Air Penetration	156 kts/180 mph
Maximum Demonstrated Crosswind	22 kts/25 mph



PREFLIGHT INSPECTION

1. COCKPIT:
   a. Control Lock - REMOVE AND STOW
   b. Parking Brake - SET
   c. All Switches - OFF
   d. Trim Tabs - SET TO ZERO
2. RIGHT FUSELAGE:
   a. Load Distribution - CHECK AND SECURED
   b. Utility Door - SECURE
   c. Static Port - UNOBSTRUCTED
   d. Emergency Locator Transmitter - ARMED
3. EMPENNAGE:
   a. Control Surfaces, Tabs and Deice Boots - CHECK CONDITION, SECURITY, AND ATTACHMENT
   b. Tail Cone, Tail Light, and Beacon - CHECK
   c. Tie Down - REMOVE
   d. Cabin Air Inlet - CHECK
4. LEFT FUSELAGE:
   a. Cabin Air Outlet - CHECK
   b. Static Port - UNOBSTRUCTED
   c. All Antennas and Lower Beacon - CHECK
5. LEFT WING TRAILING EDGE:
   a. Fuel Sump Aft of Wheel Well - DRAIN
   b. Fuel Vents - CHECK
   c. Flaps - CHECK GENERAL CONDITION
   d. Aileron - CHECK CONDITION AND FREEDOM OF MOVEMENT, TAB NEUTRAL WHEN AILERON NEUTRAL
6. LEFT WING LEADING EDGE
   a. Lights and Deice Boot - CHECK FOR CONDITION
   b. Stall Warning Vane - CHECK FREEDOM OF MOVEMENT
   c. Fuel - CHECK QUANTITY AND SECURE CAP(S). ALWAYS CHECK WING TIP TANK FIRST (IF IN-

STALLED); DO NOT REMOVE INBOARD CAP IF FUEL IS VISIBLE IN TIP TANK.

d. Wing Tip Tank (if installed) Sump - DRAIN
e. Fuel Sight Gage - CHECK (if installed)
f. Tie Down, Chocks - REMOVE
g. Engine Oil - CHECK QUANTITY, SECURE CAP AND DOOR
h. Engine Cowling and Doors - CHECK CONDITION AND SECURITY
i. Engine Air Intake - REMOVE COVER AND EXAMINE FOR OBSTRUCTIONS
j. Propeller - EXAMINE FOR NICKS, SECURITY AND OIL LEAKS
k. Cowl Flap - CHECK
l. Wheel Well Doors, Tire, Brake Line and Shock Strut - CHECK
m. Landing Gear Uplock Roller - CHECK
n. Fuel Drains - DRAIN

7. NOSE SECTION
   a. Wheel Well Doors, Tire and Shock Strut - CHECK
   b. Heater Fuel Strainer - DRAIN (if installed)
   c. Pitot(s) - REMOVE COVER, EXAMINE FOR OBSTRUCTIONS
   d. Taxi/Landing Light - CHECK
   e. Heater Air Inlets - CLEAR
   f. Oxygen - CHECK
   g. Baggage Door - SECURE

8. RIGHT WING LEADING EDGE
   a. Wheel Well Doors, Tire, Brake Line, and Shock Strut - CHECK
   b. Landing Gear Uplock Roller - CHECK
   c. Cowl Flap - CHECK
   d. Fuel Drains - DRAIN
   e. Engine Oil - CHECK QUANTITY, SECURE CAP AND DOOR

f. Engine Cowling and Doors - CHECK CONDITION AND SECURITY
g. Propeller - EXAMINE FOR NICKS, SECURITY AND OIL LEAKS
h. Engine Air Intake - REMOVE COVER AND EXAMINE FOR OBSTRUCTIONS
i. Fuel Sight Gage - CHECK (if installed)
j. Fuel - CHECK QUANTITY AND SECURE CAP(S). ALWAYS CHECK WING TIP TANK FIRST (IF INSTALLED); DO NOT REMOVE INBOARD CAP IF FUEL IS VISIBLE IN TIP TANK.
k. Wing Tip Tank (if installed) Sump - DRAIN
l. Tie Down and Chocks - REMOVE
m. Lights and Deice Boot - CHECK FOR CONDITION

9. RIGHT WING TRAILING EDGE
a. Aileron - CHECK CONDITION AND FREEDOM OF MOVEMENT
b. Fuel Vents - CHECK
c. Fuel Sump Aft of Wheel Well - DRAIN
d. Flaps - CHECK GENERAL CONDITION

NOTE

Check operation of lights if night flight is anticipated.

CAUTION

DO NOT TAXI WITH A FLAT SHOCK STRUT.

BEFORE STARTING

1. Seats - POSITION AND LOCK; Seat Backs - UPRIGHT
2. Rudder Pedals - ADJUST
3. Seat Belts and Shoulder Harnesses - FASTEN AND ADJUST
4. Parking Brake - SET
5. All Avionics - OFF
6. Oxygen - CHECK QUANTITY AND OPERATION
7. Landing Gear Handle - DOWN
8. Cowl Flaps - CHECK, OPEN
9. Fuel Selector Valves - CHECK OPERATION THEN ON
10. All Circuit Breakers, Switches and Equipment Controls - CHECK
11. Battery Switch and Alternator Switches - ON (If external power is used, Alternator switches - OFF)
12. Fuel Quantity Indicators - CHECK QUANTITY (See LIMITATIONS for take-off fuel)
13. Landing Gear Position Lights - CHECK

STARTING

1. Throttle Position - APPROXIMATELY 1/2 IN. OPEN
2. Propeller Control - LOW PITCH (High RPM)
3. Mixture Control - FULL RICH

NOTE

If the engine is hot, and the ambient temperature is 90°F or above, place mixture control in IDLE CUT-OFF, switch aux fuel pump to HIGH for 30 to 60 seconds, then OFF. Return mixture control to FULL RICH.

4. Aux Fuel Pump - HIGH (until pressure stabilizes then - OFF)
5. Magneto/Start Switch - START (Observe Starter Limits)

CAUTION

Do not engage starter for more than 30 seconds in any 4-minute period.

NOTE

In the event of a balked start (or overprime condition) place mixture control in IDLE CUT-OFF and open the throttle; operate the starter to remove excess fuel. As engine starts, reduce the throttle to idle rpm and place the mixture control in FULL RICH.

6. Warm-up - 1000 to 1200 RPM
7. Oil Pressure - 25 PSI WITHIN 30 SECONDS
8. External Power (if used) - DISCONNECT

WARNING

When using external power, start the right engine first, since the external power receptacle is on the left nacelle. Disconnect external power before starting left engine.

9. Alternator Switch - ON
10. All Engine Indicators - CHECK

CAUTION

If the total of both loadmeters exceeds .2 after two minutes at 1000-1200 rpm, with no additional electrical equipment on, and the indication shows no signs of decreasing, an electrical malfunction is indicated. The battery master and both alternator switches should be placed in the OFF position. Do not take off.

CAUTION

Low voltage, high ammeter or loadmeter readings, dimming of lights, or excessive noise in radio receivers could be indications that problems are developing in the starter system. A noted change in such normal conditions could indicate prolonged starter motor running and the engine should be shut down. No further flight operations should be attempted until the cause is determined and repaired.

11. Using the same procedure, start other engine.

AFTER STARTING AND TAXI

NOTE

Do not operate engine above 1200 RPM until oil temperature reaches 75°F.

1. Brakes - RELEASE AND CHECK
2. Avionics - ON, AS REQUIRED
3. Exterior Lights - AS REQUIRED

WARNING

When using external power, start the right engine first, since the external power receptacle is on the left nacelle. Disconnect external power before starting left engine.

9. Alternator Switch - ON
10. All Engine Indicators - CHECK

CAUTION

If the total of both loadmeters exceeds .2 after two minutes at 1000-1200 rpm, with no additional electrical equipment on, and the indication shows no signs of decreasing, an electrical malfunction is indicated. The battery master and both alternator switches should be placed in the OFF position. Do not take off.

CAUTION

Low voltage, high ammeter or loadmeter readings, dimming of lights, or excessive noise in radio receivers could be indications that problems are developing in the starter system. A noted change in such normal conditions could indicate prolonged starter motor running and the engine should be shut down. No further flight operations should be attempted until the cause is determined and repaired.

11. Using the same procedure, start other engine.

AFTER STARTING AND TAXI

NOTE

Do not operate engine above 1200 RPM until oil temperature reaches 75°F.

1. Brakes - RELEASE AND CHECK
2. Avionics - ON, AS REQUIRED
3. Exterior Lights - AS REQUIRED

BEFORE TAKEOFF

1. Seat Belts and Shoulder Harnesses - CHECK
2. Parking Brake - SET
3. Aux Fuel Pumps - OFF (If ambient temperature is 90°F or above, use LOW pressure boost)
4. All Instruments - CHECKED
5. Fuel Selector Valves - CHECK ON
6. Mixture - FULL RICH (or as required by field elevation)
7. Propellers - EXERCISE AT 2200 RPM

CAUTION

When exercising propellers in their governing range, do not move the control lever aft past the detent. To do so will allow the propeller to change rapidly to the full feathered position, imposing high stresses on the blade shank and engine.

8. Loadmeters - CHECK for proper indication
9. Throttles - 1700 RPM
10. Magnetos - CHECK (Variance between individual magnetos should not exceed 50 rpm, max. drop 150 rpm)
11. Throttles - 1500 RPM
12. Propellers - FEATHERING CHECK (Do not allow an rpm drop of more than 500 rpm)
13. Throttles - IDLE
14. Electric Trim - CHECK OPERATION
15. Trim - AS REQUIRED FOR TAKEOFF
16. Flaps - CHECK AND SET FOR TAKEOFF
17. Controls - CHECK PROPER DIRECTION, FULL TRAVEL, AND FREEDOM OF MOVEMENT
18. Doors and Windows - LOCKED
19. Parking Brake - OFF

TAKEOFF

Take-Off Power ..... Full Throttle, 2700 rpm

Minimum Take-Off Oil Temperature ..... 75°F

1. Power - SET TAKE-OFF POWER (MIXTURE - SET FUEL FLOW TO ALTITUDE) BEFORE BRAKE RELEASE
2. Airspeed - ACCELERATE TO AND MAINTAIN RECOMMENDED SPEED
3. Landing Gear - RETRACT (when positive rate of climb is established)
4. Airspeed - ESTABLISH DESIRED CLIMB SPEED (when clear of obstacles)

MAXIMUM PERFORMANCE CLIMB

1. Power - SET MAXIMUM CONTINUOUS POWER
2. Mixtures - LEAN TO APPROPRIATE FUEL FLOW
3. Cowl Flaps - OPEN
4. Airspeed - ESTABLISH 104 KTS/120 MPH

CRUISE CLIMB

1. Power - SET (25.0 in. Hg or Full Throttle - 2500 RPM)
2. Mixture - LEAN TO APPROPRIATE FUEL FLOW
3. Airspeed - 139 KTS/160 MPH
4. Cowl Flaps - AS REQUIRED

NOTE

In high ambient temperatures, low pressure boost may be required to prevent excessive fuel flow fluctuations.

CRUISE

Maximum Cruise Power	24.5 in. Hg at 2500 rpm
Recommended Cruise Power .	24.0 in. Hg at 2300 rpm
Recommended Cruise Power .	21.0 in. Hg at 2300 rpm
Economy Cruise Power	20.5 in. Hg at 2100 rpm

1. Power - SET AS DESIRED (Use Tables in PERFORMANCE section)
2. Fuel Flow - LEAN AS REQUIRED
3. Cowl Flaps - AS REQUIRED

LEANING USING THE EXHAUST GAS TEMPERATURE INDICATOR (EGT)

A thermocouple type exhaust gas temperature (EGT) probe is mounted in the system. This probe is connected to an indicator on the instrument panel. The indicator is calibrated in degrees Fahrenheit. Use EGT system to lean the fuel/air mixture when cruising at maximum cruise power or less.

1. Lean the mixture and note the point on the indicator that the temperature peaks and starts to fall.
   a. CRUISE (LEAN) MIXTURE - Increase the mixture until the EGT shows a drop of 25°F below peak on the rich side of peak.

   b. BEST POWER MIXTURE - Increase the mixture until the EGT shows a drop of 100°F below peak on the rich side of peak.

CAUTION

Do not continue to lean mixture beyond that necessary to establish peak temperature.

2. Continuous operation is recommended at 25°F or more below peak EGT only on the rich side of peak.

3. Changes in altitude and power settings require the peak EGT to be rechecked and the mixture reset.

DESCENT

1. Altimeter - SET
2. Cowl Flaps - CLOSED
3. Windshield Defroster - AS REQUIRED
4. Power - AS REQUIRED (avoid prolonged idle settings and low cylinder head temperatures)

Recommended descent speeds:

Smooth air ..... 175 kts/201 mph
Rough air ..... (Max.) 156 kts/180 mph

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - FASTENED, SEAT BACKS UPRIGHT
2. Fuel Selector Valves - CHECK ON
3. Aux. Fuel Pumps - OFF, OR LOW AS PER AMBIENT TEMPERATURE
4. Cowl Flaps - AS REQUIRED
5. Mixture Controls - FULL RICH (or as required by field elevation)
6. Flaps - APPROACH 15° POSITION (Maximum extension speed 152 kts/175 mph)
7. Landing Gear - DOWN (Gear extension speed 152 kts/175 mph)
8. Flaps - FULL DOWN (30°) (Maximum extension speed, 122 kts/140 mph)
9. Airspeed - ESTABLISH NORMAL LANDING APPROACH SPEED.
10. Propellers - LOW PITCH (high rpm)

BALKED LANDING

1. Propellers - LOW PITCH (high rpm)
2. Power - MAXIMUM ALLOWABLE
3. Airspeed - BALKED LANDING CLIMB SPEED (95 KTS/109 MPH)
4. Flaps - UP (0°)
5. Landing Gear - UP
6. Cowl Flaps - AS REQUIRED

AFTER LANDING

1. Landing and Taxi Lights - AS REQUIRED
2. Flaps - UP
3. Trim Tabs - SET TO ZERO
4. Cowl Flaps - OPEN
5. Aux Fuel Pumps - AS REQUIRED

SHUTDOWN

1. Parking Brake - SET
2. Propellers - HIGH RPM
3. Throttles - 1000 RPM
4. Aux Fuel Pumps - OFF
5. Electrical and Avionics Equipment - OFF
6. Mixture Controls - IDLE CUT-OFF
7. Magneto/Start Switches - OFF, AFTER ENGINES STOP
8. Battery and Alternator Switches - OFF
9. Controls - LOCKED
10. If airplane is to be parked for an extended period of time, install wheel chocks and release the parking brake as greatly varying ambient temperatures may build excessive pressures on the hydraulic system.

NOTE

Induction air scoop covers, included in the loose tools and accessories, are to prevent foreign matter from entering the air scoops while the aircraft is parked.

OXYGEN SYSTEM

WARNING

NO SMOKING permitted when using oxygen.

PREFLIGHT

1. Check Oxygen Pressure Gage for pressure reading.
2. Determine percent of full system.
3. Multiply oxygen duration in minutes by percent of full system.

EXAMPLE:

People	5
Gage Pressure	1500 psi
Percent Capacity (from chart)	80%
Cylinder Capacity (full)	49 cu ft
Altitude (planned flight)	15,000 feet
Duration (full cylinder)	149 minutes
Duration (80% full)	119 minutes

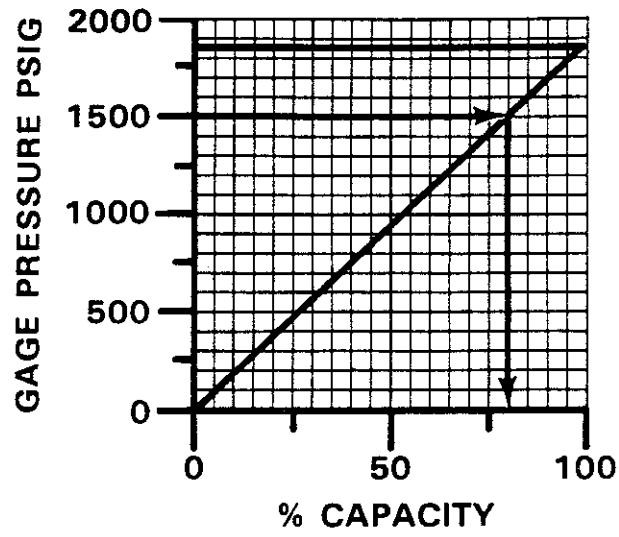
OXYGEN DURATION

The recommended masks are provided with the system. They are designed to be adjustable to fit the average person, with minimum leakage of oxygen.

CAUTION

Since 90% of the system efficiency is determined by the fit of the oxygen mask, make certain the masks fit properly and are in good condition.

OXYGEN AVAILABLE WITH PARTIALLY FULL BOTTLE



OXYGEN DURATION CHART

Duration in minutes at the following altitudes:

	Persons Using	12,500	15,000	20,000
49 cu ft	1	1014	746	507
	2	507	373	253
	3	338	248	169
	4	253	186	126
	5	202	149	101
	6	169	124	84
66 cu ft	1	1344	988	672
	2	672	494	336
	3	448	329	224
	4	336	247	168
	5	268	197	134
	6	224	164	112

IN FLIGHT

The use of oxygen is recommended to be in accordance with current FAR operating rules.

1. Oxygen Control Valve - OPEN SLOWLY
2. Mask - INSERT FITTING, DON MASK (adjust mask for proper fit)
3. Oxygen Flow Indicator - CHECK (red plunger lifts from its seat when the hose is inserted into the oxygen coupling)

AFTER USING

1. Discontinue use by unplugging mask from outlet.

NOTE

Closing the control valve while in flight is not necessary due to automatic sealing of the outlet when the mask is unplugged.

2. Oxygen Control Valve - CLOSE (may be accomplished during shut-down).

ELECTRIC ELEVATOR TRIM

1. ON-OFF switch - ON
2. Control Wheel Trim Switch - Forward for nose down, aft for nose up, (when released the switch returns to the center - OFF position)

Malfunction procedures are given in the EMERGENCY PROCEDURES section.

COLD WEATHER OPERATION

PREFLIGHT INSPECTION

In addition to the normal preflight exterior inspection, remove ice, snow and frost from the wings, tail, control surfaces and hinges, propellers, windshield, fuel cell filler caps and fuel vents, and crankcase breathers. If you have no way of removing these formations of ice, snow, and frost leave the airplane on the ground, as these deposits will not blow off. The wing contour may be changed by these formations sufficiently that its lift qualities are considerably disturbed and sometimes completely destroyed. Complete your normal preflight procedures. Check the flight controls for complete freedom of movement.

Conditions for accumulating moisture in the fuel tanks are most favorable at low temperatures due to the condensation increase and the moisture that enters as the system is serviced. Therefore, close attention to draining the fuel system will assume particular importance during cold weather.

ENGINES

Use engine oil in accordance with Consumable Materials in the SERVICING section. Always pull the propeller through by hand several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if an auxiliary power unit is not used.

Under very cold conditions, it may be necessary to preheat the engine prior to a start. Particular attention should be applied to the oil cooler, and engine sump to insure proper preheat. A start with congealed oil in the system may

produce an indication of normal pressure immediately after the start, but then the oil pressure may decrease when residual oil in the engine is pumped back with the congealed oil in the sump. If an engine heater capable of heating both the engine sump, and cooler is not available, the oil should be drained while the engines are hot and stored in a warm area until the next flight.

If there is no oil pressure within the first 60 seconds of running, or if oil pressure drops after a few minutes of ground operation, shut down and check for broken oil lines, oil cooler leaks or the possibility of congealed oil.

NOTE

It is advisable to use external power for starting in cold weather.

During warm-up, watch engine temperatures closely, since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature. Exercise the propellers several times to remove cold oil from the pitch change mechanisms. The propellers should also be cycled occasionally in flight.

During letdown and landing, give special attention to engine temperatures, since the engines will have a tendency toward overcooling.

EXTERNAL POWER

It is very important that the following precautions be observed while using external power.

1. The airplane has a negative ground system. Be sure to connect the positive lead of the auxiliary power unit to the positive terminal of the airplane's external power receptacle and the negative lead of the auxiliary power unit to the negative terminal of the external power receptacle.

2. To prevent arcing, make certain no power is being supplied when the connection is made.

3. Make certain that the battery switch is ON, all avionics and electrical switches OFF, and a battery is in the system before connecting an external power unit. This protects the voltage regulators and associated electrical equipment from voltage transients (power fluctuations).

STARTING ENGINES USING AUXILIARY POWER UNIT

1. Battery switch - ON

2. Alternators, Electrical, and Avionics Equipment - OFF

3. Auxiliary Power Unit - CONNECT

4. Auxiliary Power Unit - SET OUTPUT (27.0 to 28.5 volts)

5. Auxiliary Power Unit - ON

6. Right Engine - START (use normal start procedures)

7. Auxiliary Power Unit - OFF (after engine has been started)

8. Auxiliary Power Unit - DISCONNECT (before starting left engine)

9. Alternator Switches - ON

TAXIING

Avoid taxiing through water, slush or muddy surfaces if possible. In cold weather, water, slush or mud, when splashed onto landing gear mechanisms or control surface hinges may freeze, preventing free movement and resulting in structural damage.

ICE PROTECTION SYSTEMS

The following equipment, when installed and operable, will provide a degree of protection when icing conditions are inadvertently encountered. Since this equipment has not been demonstrated to meet current requirements for flight into known icing conditions, the pilot must exit such conditions as soon as possible if ice accumulates on the airplane.

1. Equipment required for IFR flight
2. Beech approved emergency static air source
3. Beech approved surface deice system
4. Beech approved propeller deice or anti-ice system
5. Beech approved pitot heat
6. Beech approved heated stall warning
7. Beech approved heated fuel vents
8. Beech approved windshield defogging and openable storm window
9. Beech approved alternate induction air
10. Beech approved external antenna masts (capable of withstanding ice loads)

WARNING

Stalling airspeeds should be expected to increase due to the distortion of the wing airfoil when ice has accumulated on the airplane. For the same reason, stall warning devices are not accurate and should not be relied upon. With ice on the airplane, maintain a comfortable margin of airspeed above the normal stall airspeed.

1. EMERGENCY STATIC AIR SOURCE

If the Emergency Static Air Source is desired for use:

a. Emergency Static Air Source - ON EMERGENCY (lower sidewall adjacent to pilot)

b. For Airspeed Calibration and Altimeter Corrections, refer to PERFORMANCE section

CAUTION

The emergency static air valve should be in the OFF NORMAL position when the system is not needed.

2. SURFACE DEICE SYSTEM

a. BEFORE TAKE-OFF

(1) Throttles - 2000 RPM
(2) Surface Deice Switch - AUTO (UP)
(3) Deice Pressure - 9 to 20 PSI (while boots are inflating)
(4) Wing Boots - CHECK VISUALLY FOR INFLATION AND HOLD DOWN

b. IN FLIGHT

When ice accumulates 1/2 to 1 inch

(1) Surface Deice Switch - AUTO (UP)
(2) Deice Pressure - 9 to 20 PSI (while boots are inflating)
(3) Repeat - AS REQUIRED

CAUTION

Rapid cycles in succession or cycling before at least 1/2 inch of ice has accumulated may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

Stall speeds are increased 4 kts/5 mph in all configurations with surface deice system operating.

NOTE

Either engine will supply sufficient vacuum and pressure for deice operation.

c. For Emergency Operation refer to the EMERGENCY PROCEDURES section.

3. ELECTROTHERMAL PROPELLER DEICE

CAUTION

Do not operate the propeller deice when propellers are static.

a. BEFORE TAKEOFF

(1) Propeller Deice Switch - ON
(2) Propeller Deice Ammeter - CHECK, 7 to 12 amps (2 Blade), 14 to 18 amps (3 Blade)

b. IN FLIGHT

(1) Propeller Deice Switch - ON. The system may be operated continuously in flight and will function automatically until the switch is turned OFF.

(2) Relieve propeller imbalance due to ice by increasing rpm briefly and returning to the desired setting. Repeat as necessary.

CAUTION

If the propeller deice ammeter indicates abnormal reading, refer to the Emergency Procedures section.

4. PROPELLER AND WINDSHIELD ANTI-ICE SYSTEM (FLUID FLOW)

CAUTION

This anti-ice system is designed to PREVENT the formation of ice. Always turn the system ON before entering icing conditions.

a. PREFLIGHT

(1) Check the quantity in reservoir
(2) Check slinger ring and lines for obstructions
(3) Check propeller boots for damage

b. IN FLIGHT

(1) Prop Anti-ice Switch - ON
(2) Windshield Anti-ice Switch - CYCLE AS REQUIRED
(3) Anti-ice Quantity Indicator - MONITOR

NOTE

See SYSTEM description for endurance.

5. PITOT HEAT AND HEATED STALL WARNING

a. Pitot Heat Switch(es) - ON (Note deflection on Loadmeter) Heated Stall Warning is activated by the left pitot heat switch.

NOTE

Switches may be left on throughout flight. Prolonged operation on the ground could damage the Pitot Heat System.

6. FUEL VENT HEAT

   a. Fuel Vent Switch - ON (If ice is encountered)

7. WINDSHIELD DEFOGGING

   a. Defrost Control - PUSH ON

   b. Pilot's Storm Window - OPEN, AS REQUIRED

ENGINE BREAK-IN INFORMATION

Refer to Systems section.

PRACTICE DEMONSTRATION OF V_{MCA}

V_{MCA} demonstration may be required for multi-engine pilot certification. The following procedure shall be used at a safe altitude of at least 5000 feet above the ground in clear air only.

WARNING

INFLIGHT ENGINE CUTS BELOW V_{SSE} SPEED OF 86 kts/99 mph ARE PROHIBITED.

1. Landing Gear - Up
2. Flaps - Up
3. Airspeed - Above 86 kts/99 mph (V_{SSE})
4. Propeller Levers - High RPM
5. Throttle (Simulated inoperative engine) - Idle
6. Throttle (Other engine) - Maximum Manifold Pressure
7. Airspeed - Reduce approximately 1 knot per second until either V_{MCA} or stall warning is obtained.

CAUTION

Use rudder to maintain directional control (heading) and ailerons to maintain 5° bank towards the operative engine (lateral attitude). At the first sign of either V_{MCA} or stall warning (which may be evidenced by: inability to maintain heading or lateral attitude, aerodynamic stall buffet, or stall warning horn sound) immediately initiate recovery: reduce power to idle on the operative engine and immediately lower the nose to regain V_{SSE}.

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SECTION V

PERFORMANCE

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

INTRODUCTION TO PERFORMANCE AND FLIGHT PLANNING

All airspeeds quoted in this section are indicated airspeeds (IAS) except as noted and assume zero instrument error.

The graphs and tables in this section present performance information for takeoff, climb, landing and flight planning at various parameters of weight, power, altitude, and temperature. FAA approved performance information is included in this section. Examples are presented on all performance graphs. In addition, the calculations for flight time, block speed, and fuel required are presented using the conditions listed.

Performance with a gross weight of 4990 lbs (Baron 58A) will be equal to or better than that of the higher gross weight Baron 58.

CONDITIONS

At Denver:

Outside Air Temperature	15°C (59°F)
Field Elevation	5330 ft
Altimeter Setting	29.60 in. Hg
Wind	270° at 10 kts
Runway 26L length	10,010 ft

Route of Trip

*DEN-V81-AMA

For VFR Cruise at 11,500 feet

ROUTE SEGMENT	MAGNETIC COURSE	DIST NM	WIND 11500 FEET DIR/KTS	OAT 11500 FEET °C	ALT SETTING IN.HG
DEN-COS	161°	55	010/30	-5	29.60
COS-PUB	153°	40	010/30	-5	29.60
PUB-TBE	134°	74	100/20	0	29.56
TBE-DHT	132°	87	200/20	9	29.56
DHT-AMA	125°	65	200/20	10	29.56

*REFERENCE: Enroute Low Altitude Chart L-6

At Amarillo:

Outside Air Temperature ..... 25°C (77°F)
Field Elevation ..... 3605 ft
Altimeter Setting ..... 29.56 in. Hg
Wind ..... 180° at 10 kts
Runway 21 Length ..... 10,000 ft

To determine pressure altitude at origin and destination airports, add 100 feet to field elevation for each .1 in. Hg below 29.92, and subtract 100 feet from field elevation for each .1 in. Hg above 29.92.

Pressure Altitude at DEN:

29.92 - 29.60 = .32 in. Hg

The pressure altitude at DEN is 320 feet above the field elevation.

5330 + 320 = 5650 ft

Pressure Altitude at AMA:

29.92 - 29.56 = .36 in. Hg

The pressure altitude at AMA is 360 feet above the field elevation.

3605 + 360 = 3965 ft

NOTE

For flight planning, the difference between cruise altitude and cruise pressure altitude has been ignored.

Maximum Allowable Take-off Weight = 5400 lbs

Ramp Weight = 5400 + 24 = 5424 lbs

NOTE

Fuel for start, taxi and take-off is normally 24 pounds.

Enter the Take-Off Weight graph at 5650 feet pressure altitude and 15°C.

The take-off weight to achieve a positive rate-of-climb at lift-off for one engine inoperative is:

Take-off Weight = 4850 pounds

Enter the Take-Off Distance graph at 15°C, 5650 feet pressure altitude, 5400 pounds, and 9.5 knots headwind component.

Ground Roll	1900 ft
Total Distance over 50 ft Obstacle	3090 ft
Lift-off Speed	86 kts (99 mph)
50 Foot Speed	94 kts (108 mph)

Enter the Accelerate-Stop graph at 15°C, 5650 feet pressure altitude, 5400 pounds, and 9.5 knots headwind component:

Accelerate-Stop Distance ..... 3960 ft
Engine Failure Speed ..... 86 kts (99 mph)

NOTE

Since 3960 feet is less than the available field length (10,010 ft), the accelerate-stop procedure can be performed at any weight.

Take-off at 5400 lbs can be accomplished. However, if an engine failure occurs before becoming airborne, the accelerate-stop procedure must be performed.

The following example assumes the airplane is loaded so that the take-off weight is 4850 pounds.

Although not required by regulations, information has been presented to determine the take-off weight, field requirements and take-off flight path assuming an engine failure occurs during the take-off procedure. The following illustrates the use of these charts.

Enter the Accelerate-Go graph at 15°C, 5650 feet pressure altitude, 4850 pounds, and 9.5 knots headwind component:

Ground Roll ..... 1775 ft
Total Distance Over 50 ft Obstacle ..... 8071 ft
Lift-off Speed ..... 86 kts (99 mph)
50 Foot Speed ..... 94 kts (108 mph)

Enter the graph for Take-off Climb Gradient - One Engine Inoperative at 15°C, 5650 feet pressure altitude, and 4850 pounds.

Climb Gradient 2.1%
Climb Speed ..... 94 kts (108 mph)

A 2.1% climb gradient is 21 feet of vertical height per 1000 feet of horizontal distance.

NOTE

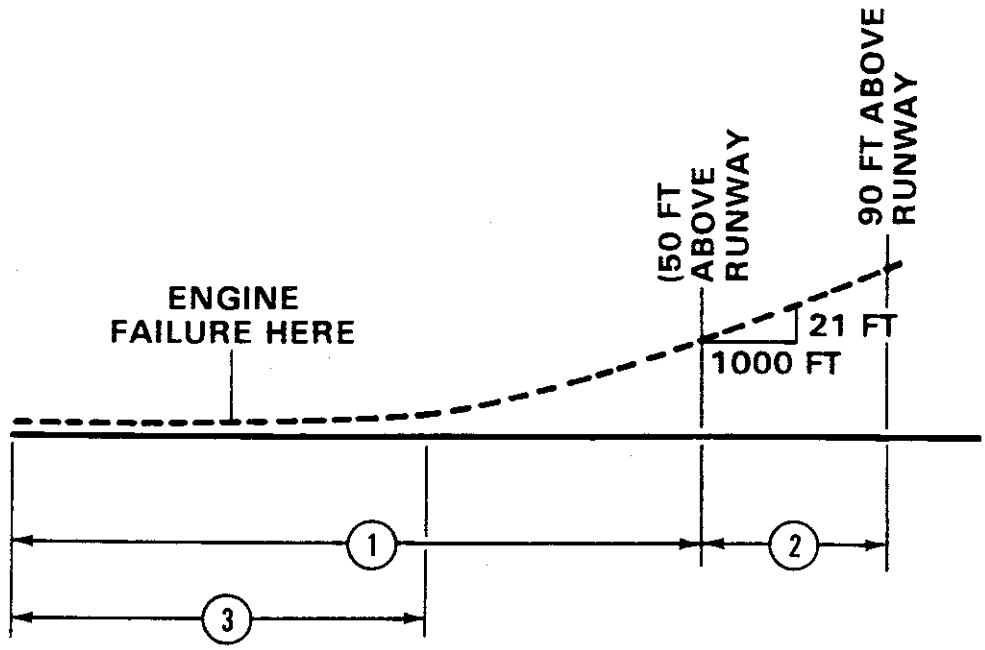
The Climb Gradient - One Engine Inoperative graph assumes zero wind conditions. Climbing into a headwind will result in higher angles of climb, and hence, better obstacle clearance capabilities.

Calculation of horizontal distance to clear an obstacle 90 feet above the runway surface:

Horizontal distance used to climb from 50 feet to 90 feet = (90-50) (1000 ÷ 21) = 1905 feet

Total Distance = 8071 + 1905 = 9976 feet

The above results are illustrated below:



(1) ACCELERATE - GO TAKE-OFF DISTANCE = 8071 FT

(2) DISTANCE TO CLIMB FROM 50 FT TO 90 FT ABOVE RUNWAY = 1905 FT

(3) ACCELERATE - STOP DISTANCE FOR 5400 LBS TAKE-OFF WEIGHT = 3960 FT

The following calculations provide information for the flight planning procedure. All examples are presented on the performance graphs. A take-off weight of 5400 pounds has been assumed.

Enter the Time, Fuel, and Distance to Climb graph at 15°C to 5650 feet and to 5400 pounds. Also enter at -5°C to 11,500 feet and to 5400 pounds. Read:

Time to Climb = (22 -7) = 15 min
Fuel Used to Climb = (12.7 -4.7) = 8 gal
Distance Traveled = (55 -17) = 38 NM

The temperatures for cruise are presented for a standard day (ISA); 20°C (36°F) above a standard day (ISA + 20°C); and 20°C (36°F) below a standard day (ISA - 20°C). These should be used for flight planning. The IOAT values are true temperature values which have been adjusted for the compressibility effects. IOAT should be used for setting cruise power while enroute.

Enter the graph for ISA conversion at 11,500 feet and the temperature for the route segment:

DEN-PUB	OAT	=	-5°C
	ISA Condition	=	ISA + 3°C
PUB-TBE	OAT	=	0°C
	ISA Condition	=	ISA + 8°C
TBE-DHT	OAT	=	9°C
	ISA Condition	=	ISA + 17°C
DHT-AMA	OAT	=	10°C
	ISA Condition	=	ISA + 18°C

Enter the table for recommended cruise power - 24 in. Hg, 2300 rpm at 10,000 ft, 12,000 ft, ISA and ISA + 20°C.

	TEMPERATURE					
	ISA			ISA + 20°C		
ALTITUDE FEET	MAN. PRESS. IN. HG	FUEL FLOW GPH/ ENG	TAS KTS/ MPH	MAN. PRESS. IN. HG	FUEL FLOW GPH/ ENG	TAS KTS/ MPH
10000	20.1	12.3	187/ 215	20.1	11.8	187/ 215
12000	18.5	11.6	184/ 212	18.5	11.2	185/ 213

Interpolate for 11,500 feet and the temperature for the appropriate route segment. Results of the interpolations are:

ROUTE SEGMENT	MAN. PRESS. IN. HG	FUEL FLOW GPH/ENG	TAS KTS/ MPH
DEN-PUB	18.9	11.7	186/ 214
PUB-TBE	18.9	11.6	186/ 214
TBE-DHT	18.9	11.5	185/ 213
DHT-AMA	18.9	11.4	185/ 213

NOTE

The preceding are exact values for the assumed conditions.

Enter the graph for Descent at 11,500 feet to the descent line, and enter again at 3965 feet to the descent line, and read:

Time to Descend = (23-8) = 15 min
Fuel Used to Descend = (9.7 -3.3) = 6.4 gal
Descent Distance = (72-25) = 47 NM

Time and fuel used were calculated at Recommended Cruise Power - 24 in. Hg. 2300 RPM as follows:

$$\text{Time} = \frac{\text{Distance}}{\text{Ground Speed}}$$

Fuel Used = (Time) (Total Fuel Flow)

Results are:

ROUTE SEGMENT	DISTANCE NM	EST GROUND SPEED KTS/ MPH	TIME AT CRUISE ALTITUDE HRS: MIN	FUEL USED FOR CRUISE GAL
DEN-COS	*17	215/ 247	: 05	1.9
COS-PUB	40	213/ 245	: 11	4.4
PUB-TBE	74	171/ 197	: 26	10.0
TBE-DHT	87	173/ 199	: 30	11.6
DHT-AMA	*18	176/ 203	: 06	2.3

*Distance required to climb or descend has been subtracted from segment distance.

TIME - FUEL - DISTANCE

ITEM	TIME HRS: MINS	FUEL GAL	DISTANCE NM
Start, Runup, Taxi and Take-off	0:00	4.0	0
Climb	0:15	8.0	38
Cruise	1:18	30.2	236
Descent	0:15	6.4	47
Total	1:48	48.6	321

Total Flight Time: 1 hour, 48 minutes

Block Speed: 321 NM ÷ 1 hour, 48 minutes = 178 kts/205 mph

Reserve Fuel: (45 minutes at Economy Cruise Power):

Enter the cruise power settings table for Economy Cruise Power at 11,500 feet for ISA (assume ISA Fuel Flow Rate).

Fuel Flow Per Engine = 10.3 gal/hr

Total Fuel Flow = 20.6 gal/hr (124 lbs/hr)

Reserve Fuel = (45 min) (124 lbs/hr) = 93 lbs (15.5 gal)

Total Fuel = 48.6 + 15.5 = 64.1 gallons

The estimated landing weight is determined by subtracting the fuel required for the flight from the ramp weight:

Assumed ramp weight = 5424 lbs

Estimated fuel from DEN to AMA = 64.1 gal (385 lbs)

Estimated landing weight = 5424 -385 = 5039 lbs

Examples have been provided on the performance graphs. The above conditions have been used throughout. Rate of climb was determined for the initial cruise altitude conditions.

Enter the graph for Landing Distance - Flaps 30 degrees at 25°C, 3965 feet pressure altitude, 5039 pounds and 9.5 kts headwind component:

Ground Roll	1450 ft
Total Distance over 50 ft Obstacle	2500 ft
Approach Speed	91 kts (105 mph)

Enter the graph for Climb-Balked Landing at 25°C, 3965 feet pressure altitude and 5039 pounds:

Rate-of-Climb	640 ft/min
Climb Gradient	6.5%

COMMENTS PERTINENT TO THE USE OF PERFORMANCE GRAPHS

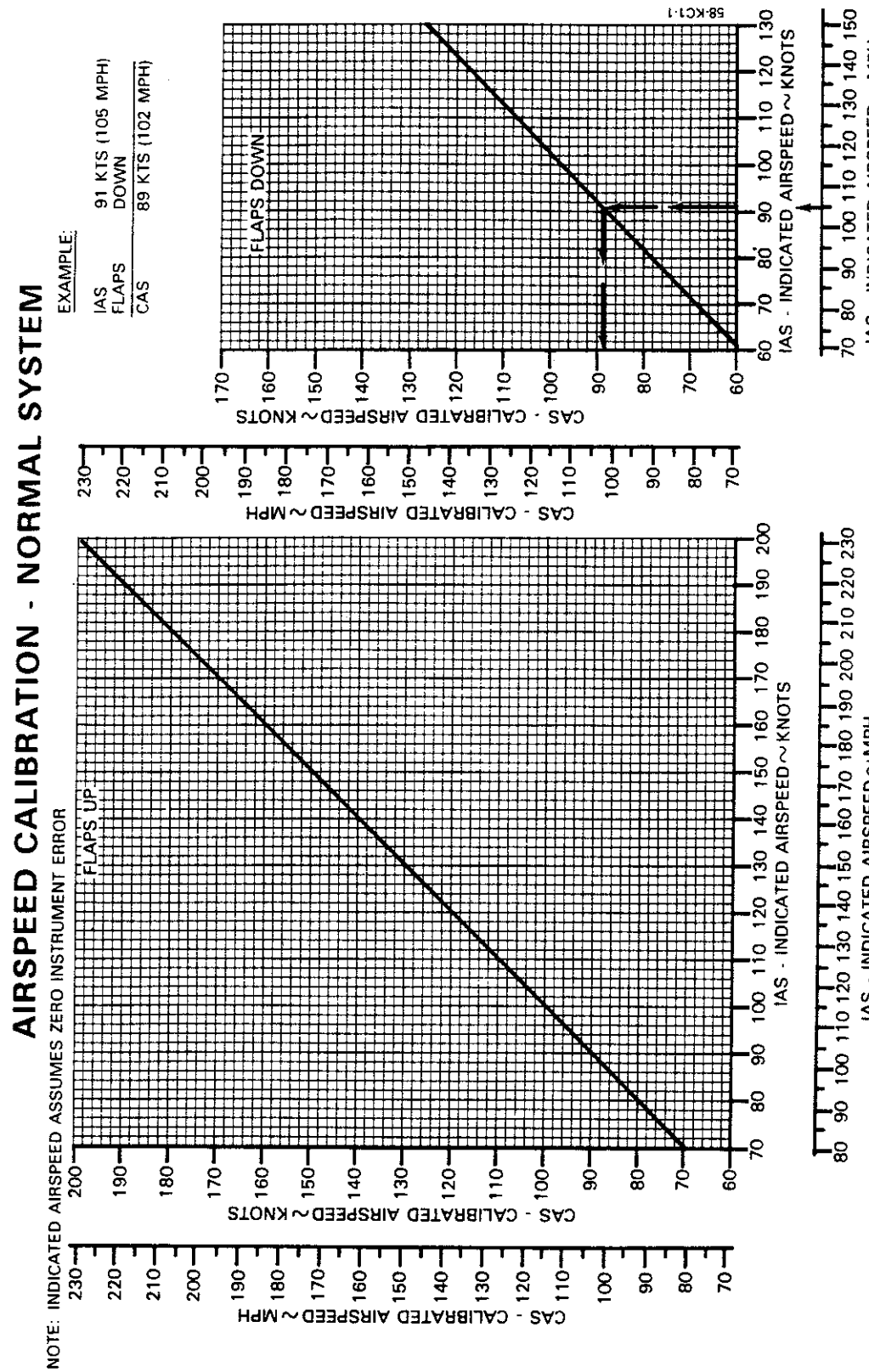
1. The example, in addition to presenting an answer for a particular set of conditions, also presents the order in which the graphs should normally be used, i.e., if the first item in the example is OAT, then enter the graph at the known OAT.

2. The reference lines indicate where to begin following guide lines. Always project to the reference line first, then follow the guide lines to the next known item.

3. Indicated airspeeds (IAS) were obtained by using the Airspeed Calibration-Normal System.

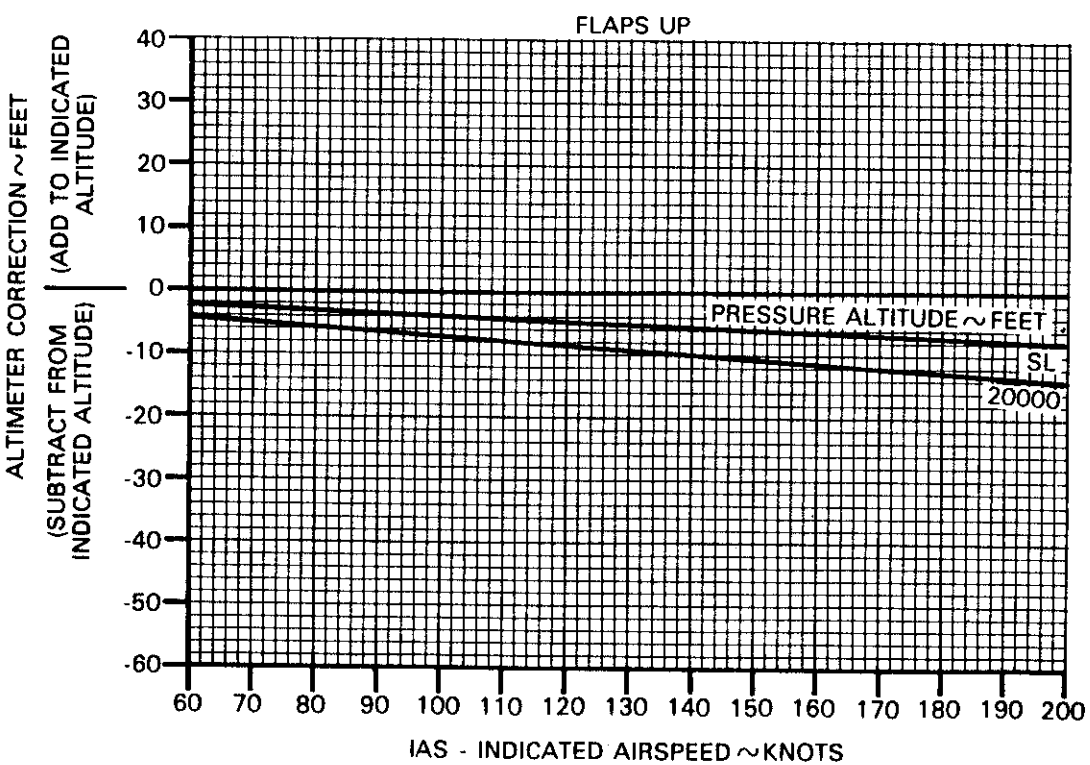
4. The associated conditions define the specific conditions from which performance parameters have been determined. They are not intended to be used as instructions, however, performance values determined from charts can only be achieved if specified conditions exist.

5. The full amount of usable fuel is available for all approved flight conditions.


AIRSPEED CALIBRATION - NORMAL SYSTEM
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR
FLAPS UP
CAS - CALIBRATED AIRSPEED ~ MPH
CAS - CALIBRATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ MPH
EXAMPLE:
IAS 91 KTS (105 MPH)
FLAPS DOWN
CAS 89 KTS (102 MPH)
FLAPS DOWN
CAS - CALIBRATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ MPH
58-KC1-1

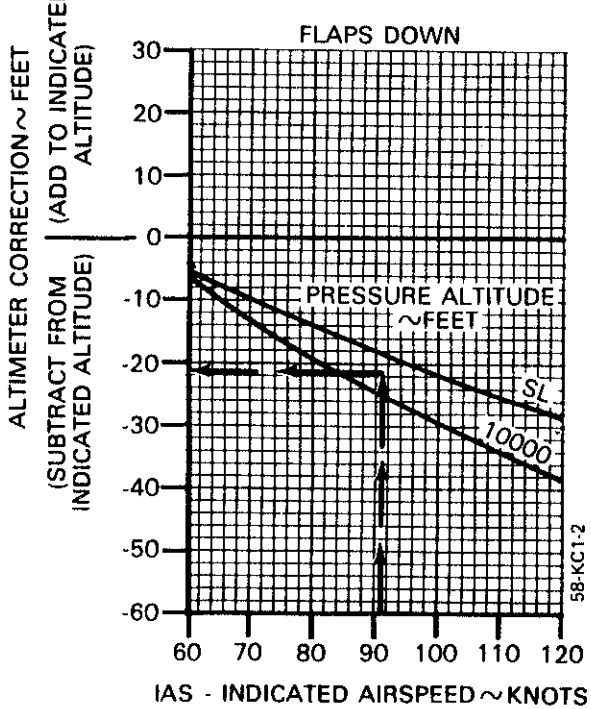
ALTIMETER CORRECTION - NORMAL SYSTEM

NOTE:
INDICATED ALTITUDE AND INDICATED AIRSPEED ASSUME ZERO INSTRUMENT ERROR

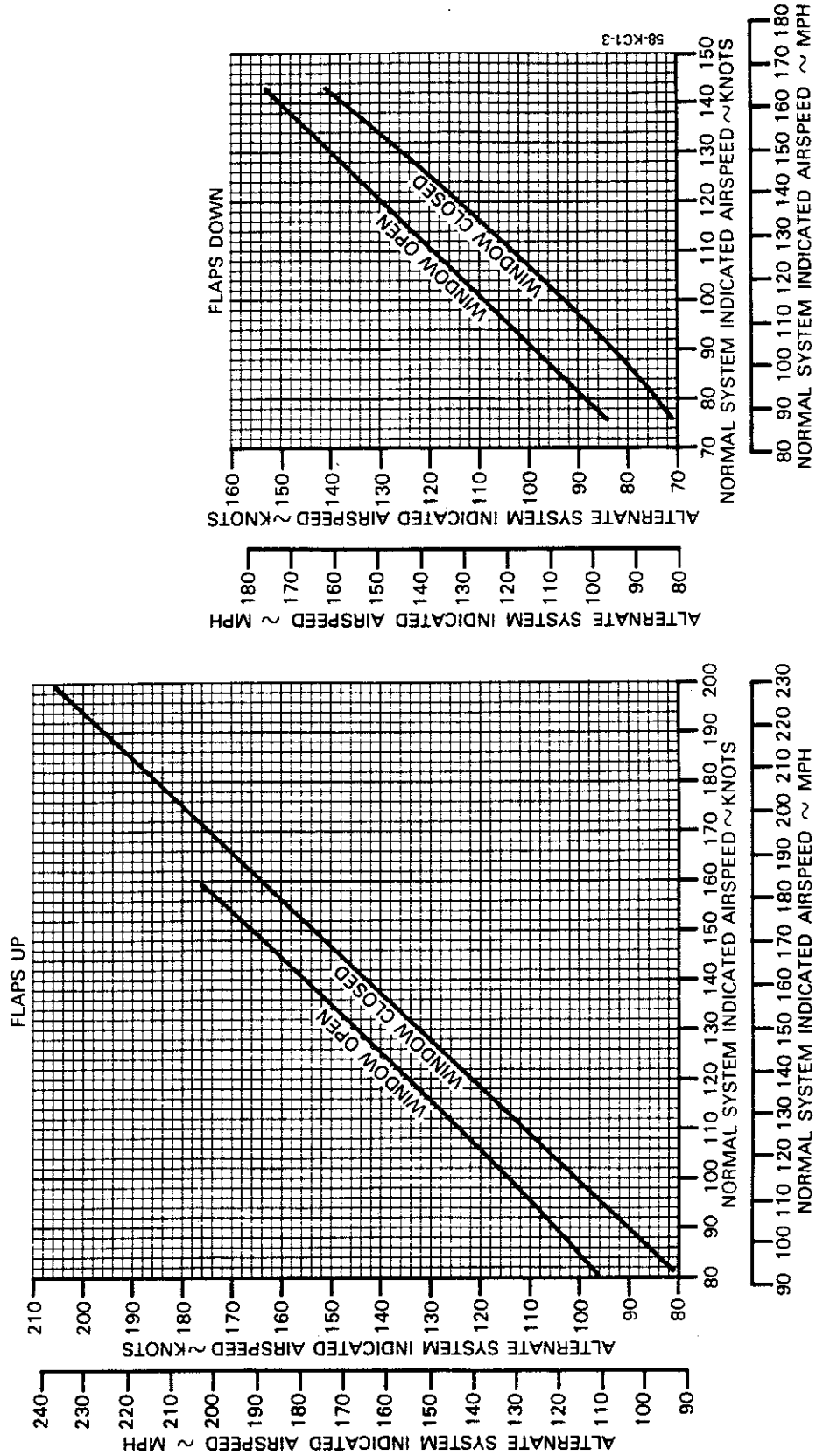


EXAMPLE:

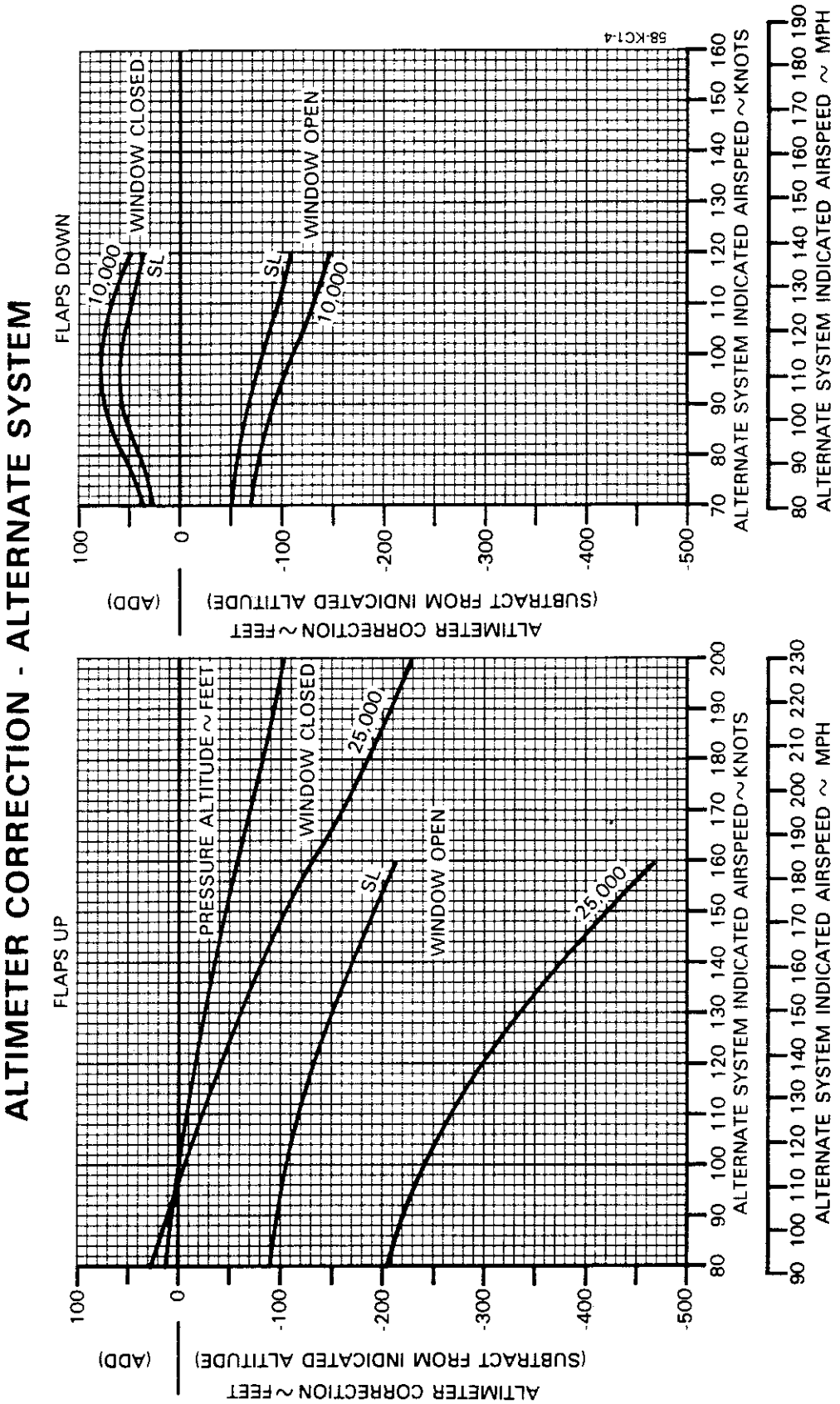
IAS	91 KTS (105 MPH)
FLAPS	DOWN
INDICATED PRESSURE ALTITUDE	3965 FT
ALTIMETER CORRECTION	-21 FT
ACTUAL PRESSURE ALTITUDE	(3965-21) + 3944 FT

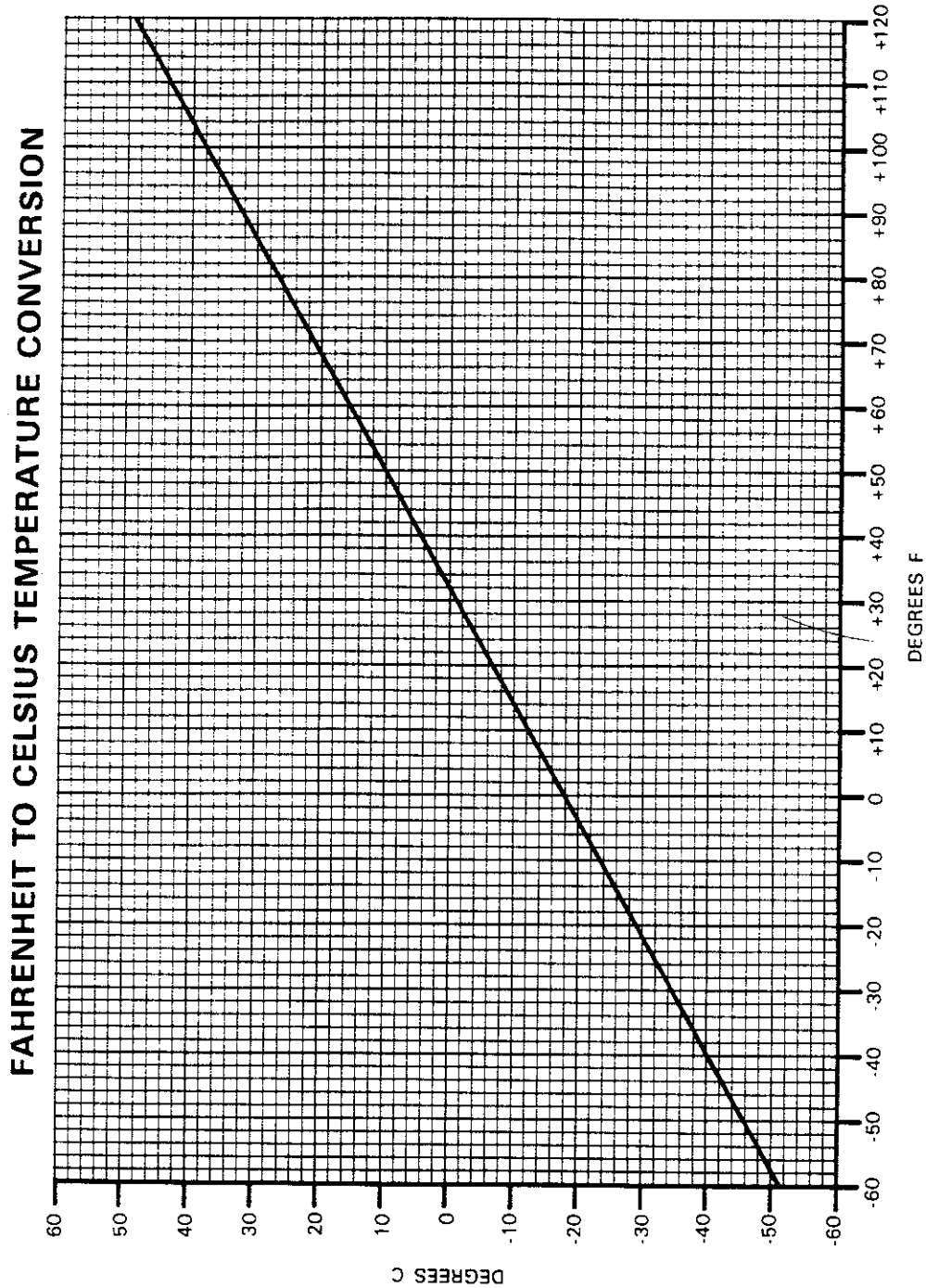


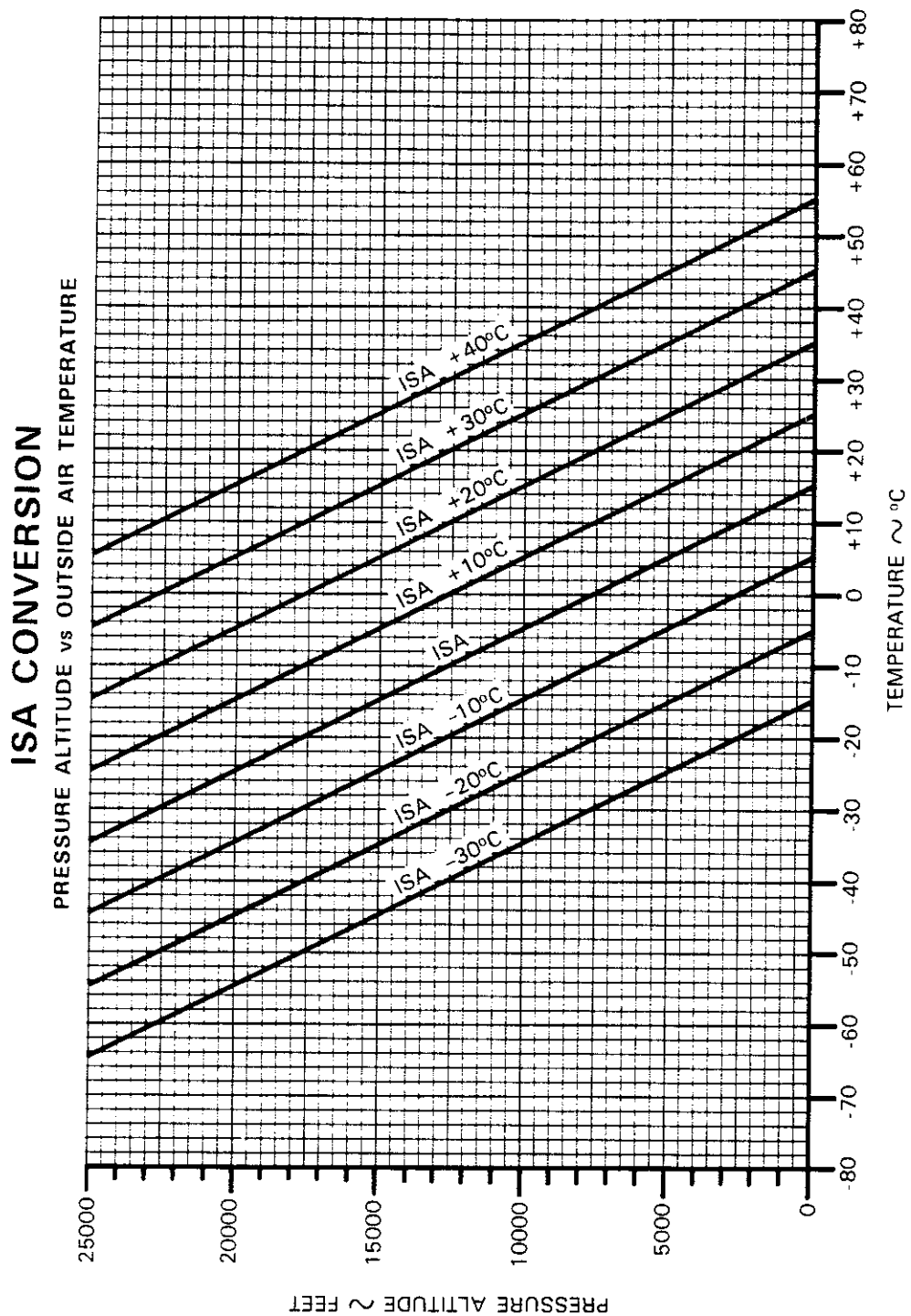
AIRSPEED CALIBRATION - ALTERNATE SYSTEM

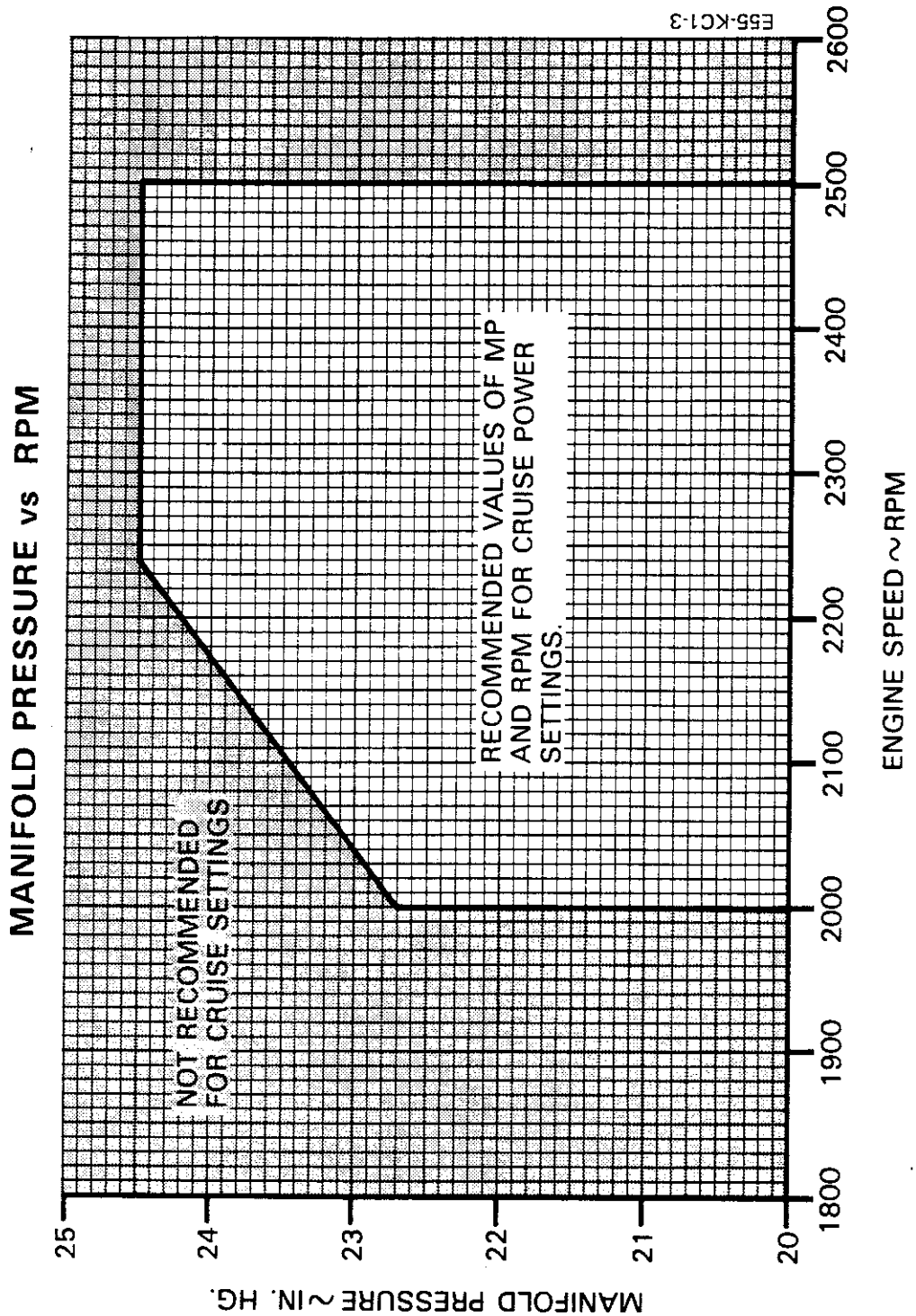


ALTIMETER CORRECTION - ALTERNATE SYSTEM




FAHRENHEIT TO CELSIUS TEMPERATURE CONVERSION
DEGREES F
+120
+110
+100
+90
+80
+70
+60
+50
+40
+30
+20
+10
0
-10
-20
-30
-40
-50
-60
DEGREES C
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60


ISA CONVERSION
PRESSURE ALTITUDE vs OUTSIDE AIR TEMPERATURE
ISA +40°C
ISA +30°C
ISA +20°C
ISA +10°C
ISA
ISA -10°C
ISA -20°C
ISA -30°C
25000
20000
15000
10000
5000
0
PRESSURE ALTITUDE ~ FEET
+80
+70
+60
+50
+40
+30
+20
+10
0
-10
-20
-30
-40
-50
-60
-70
-80
TEMPERATURE ~ °C


MANIFOLD PRESSURE vs RPM
E55-KC1-3
NOT RECOMMENDED FOR CRUISE SETTINGS
RECOMMENDED VALUES OF MP AND RPM FOR CRUISE POWER SETTINGS.
MANIFOLD PRESSURE ~ IN. HG.
25
24
23
22
21
20
1800
1900
2000
2100
2200
2300
2400
2500
2600
ENGINE SPEED ~ RPM

TAKE-OFF WEIGHT

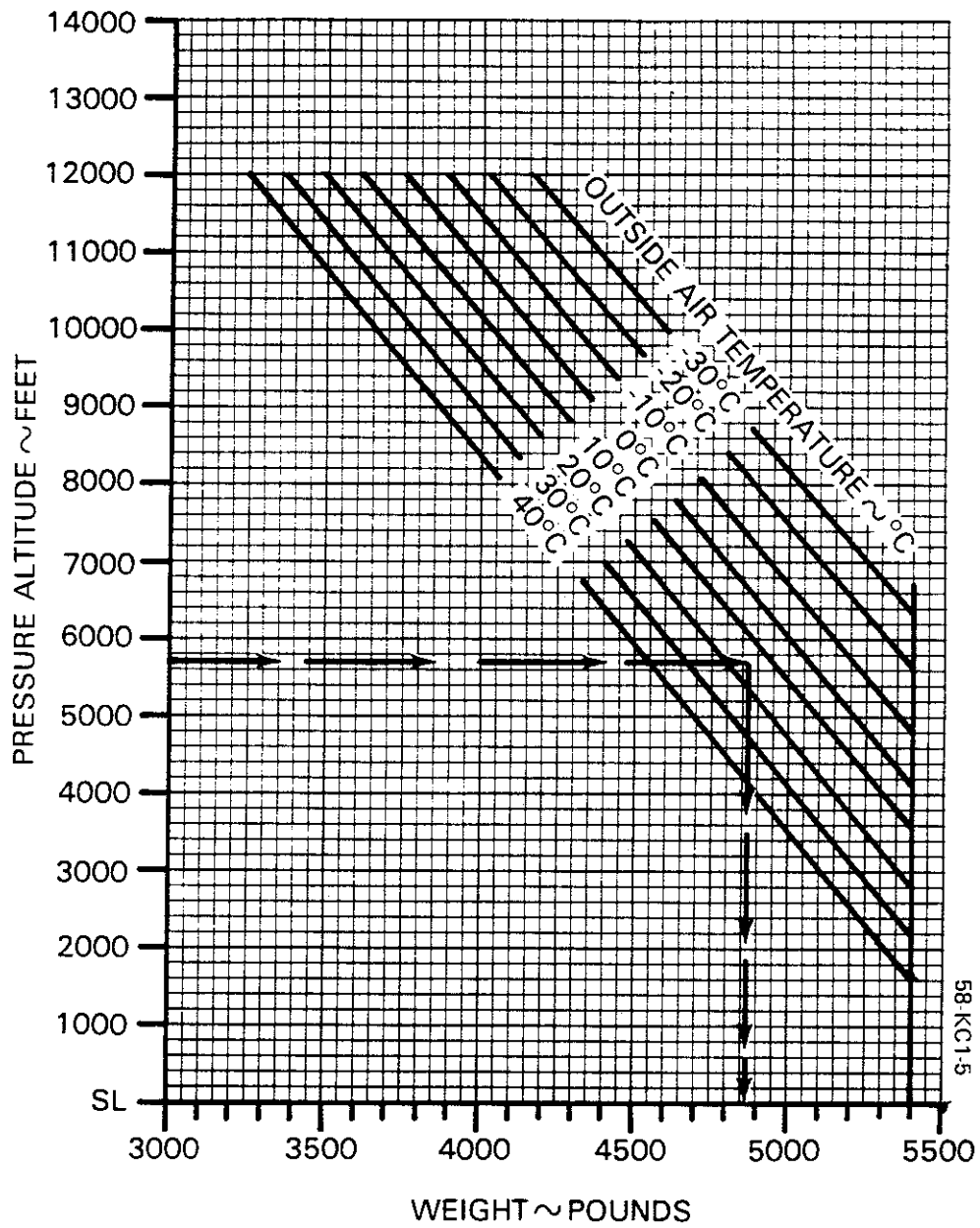
TO ACHIEVE POSITIVE SINGLE ENGINE
RATE-OF-CLIMB AT LIFT-OFF

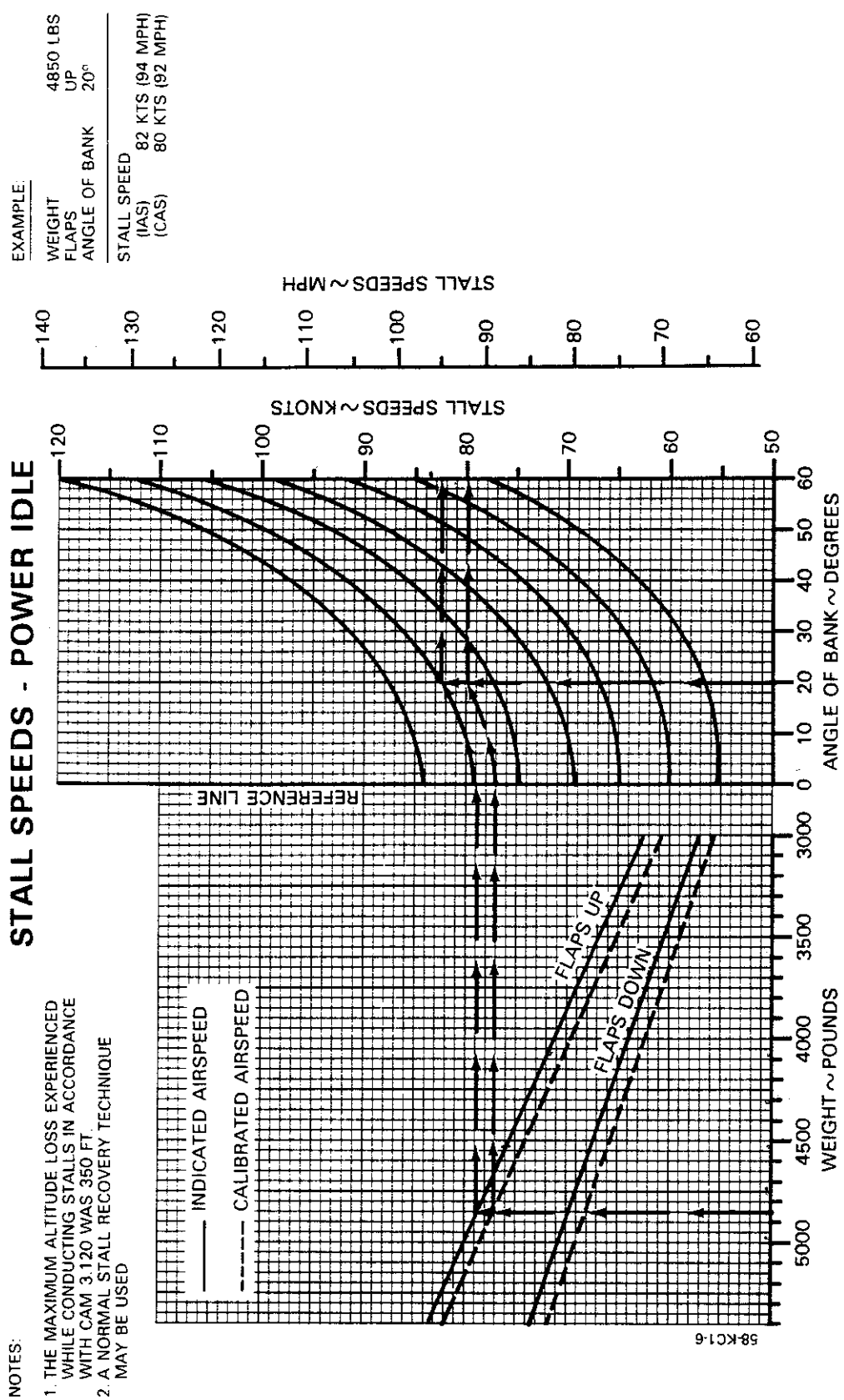
ASSOCIATED CONDITIONS:

AIRPLANE	AIRBORNE
POWER	TAKE-OFF
FLAPS	UP
LANDING GEAR	DOWN
INOPERATIVE PROPELLER	FEATHERED

EXAMPLE:

PRESSURE ALTITUDE	5650 FEET
OAT	15°C (59°F)
TAKE-OFF WEIGHT	4850



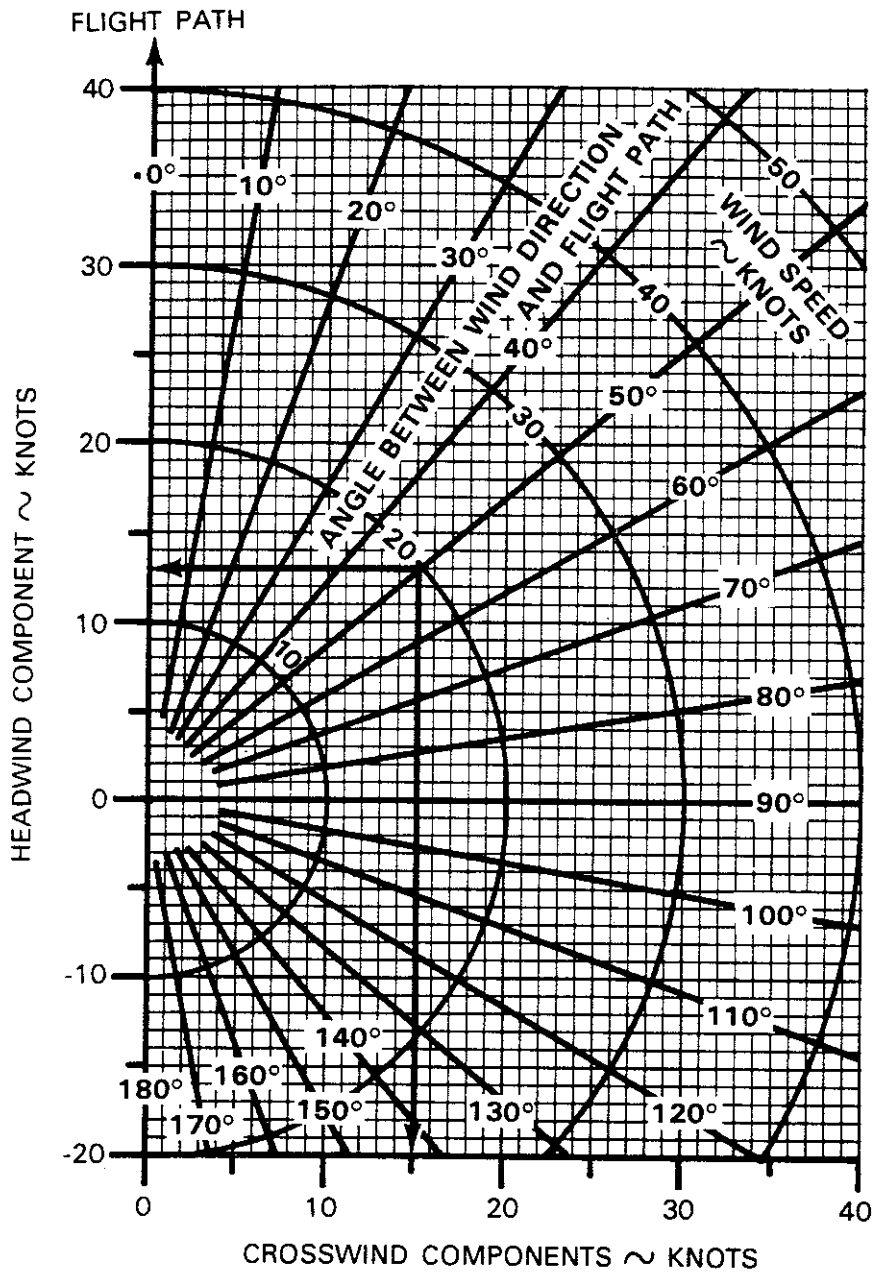

STALL SPEEDS - POWER IDLE
EXAMPLE:
WEIGHT 4850 LBS
FLAPS UP
ANGLE OF BANK 20°
STALL SPEED
(IAS) 82 KTS (94 MPH)
(CAS) 80 KTS (92 MPH)
STALL SPEEDS ~ MPH
140
130
120
110
100
90
80
70
60
STALL SPEEDS ~ KNOTS
120
110
100
90
80
70
60
50
REFERENCE LINE
FLAPS UP
FLAPS DOWN
ANGLE OF BANK ~ DEGREES
0
10
20
30
40
50
60
WEIGHT ~ POUNDS
3000
3500
4000
4500
5000
INDICATED AIRSPEED
CALIBRATED AIRSPEED
58-KC1-6
NOTES:
1. THE MAXIMUM ALTITUDE LOSS EXPERIENCED WHILE CONDUCTING STALLS IN ACCORDANCE WITH CAM 3.120 WAS 350 FT.
2. A NORMAL STALL RECOVERY TECHNIQUE MAY BE USED

WIND COMPONENTS

Demonstrated Crosswind Component is 22 kts

EXAMPLE:

WIND SPEED	20 KTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	50°
HEADWIND COMPONENT	13 KTS
CROSSWIND COMPONENT	15 KTS



TAKE-OFF DISTANCE

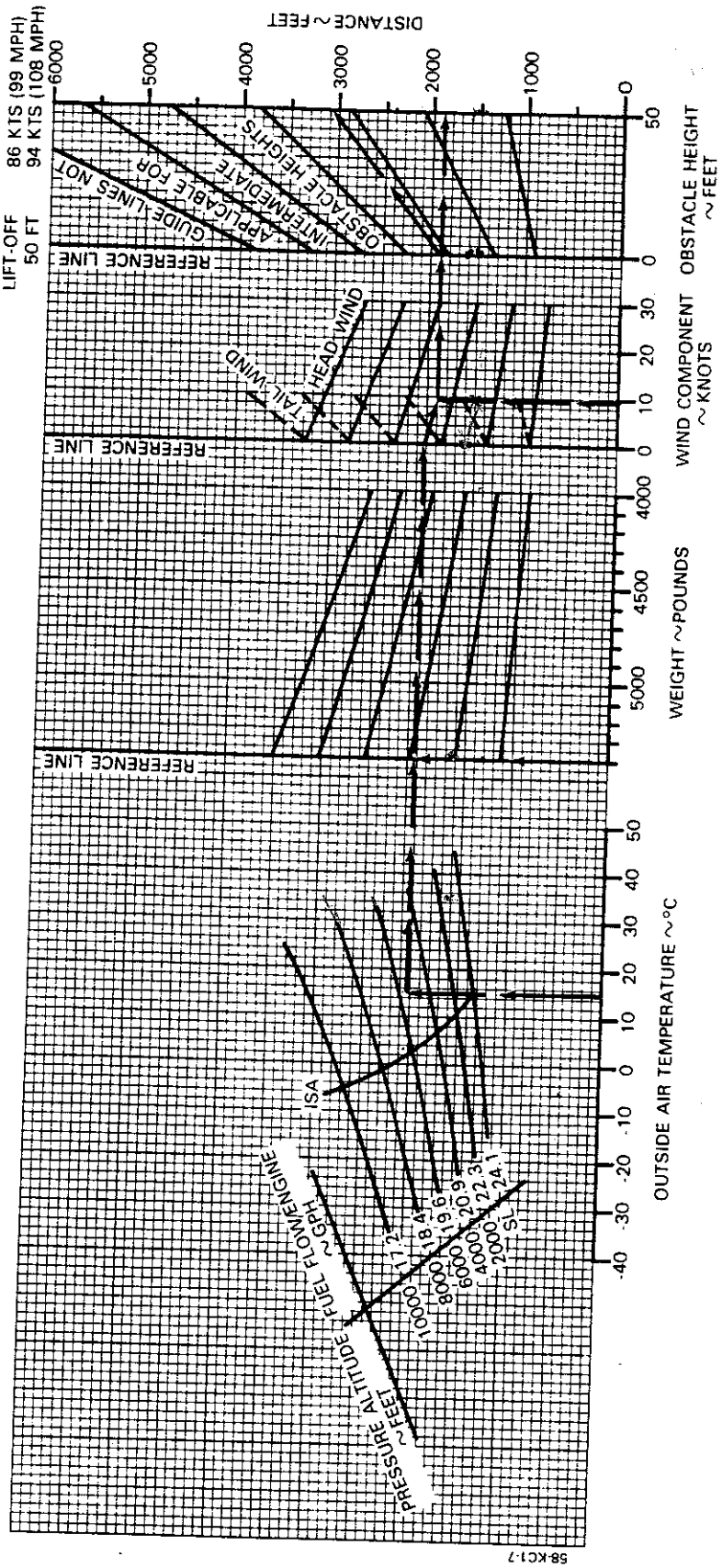
TAKE-OFF SPEEDS (ALL WEIGHTS)
LIFT-OFF 86 KTS (99 MPH)
50 FEET 94 KTS (108 MPH)

ASSOCIATED CONDITION:

POWER	TAKE-OFF POWER
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED
COWL FLAPS	OPEN
RUNWAY	PAVED, LEVEL, DRY SURFACE

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FEET
TAKE-OFF WEIGHT	5400 LBS
HEAD WIND COMPONENT	9.5 KTS
GROUND ROLL	1900 FEET
TOTAL DISTANCE OVER 50 FT OBSTACLE	3090 FEET
TAKE-OFF SPEED AT LIFT-OFF	86 KTS (99 MPH)
50 FT	94 KTS (108 MPH)



ACCELERATE - STOP DISTANCE

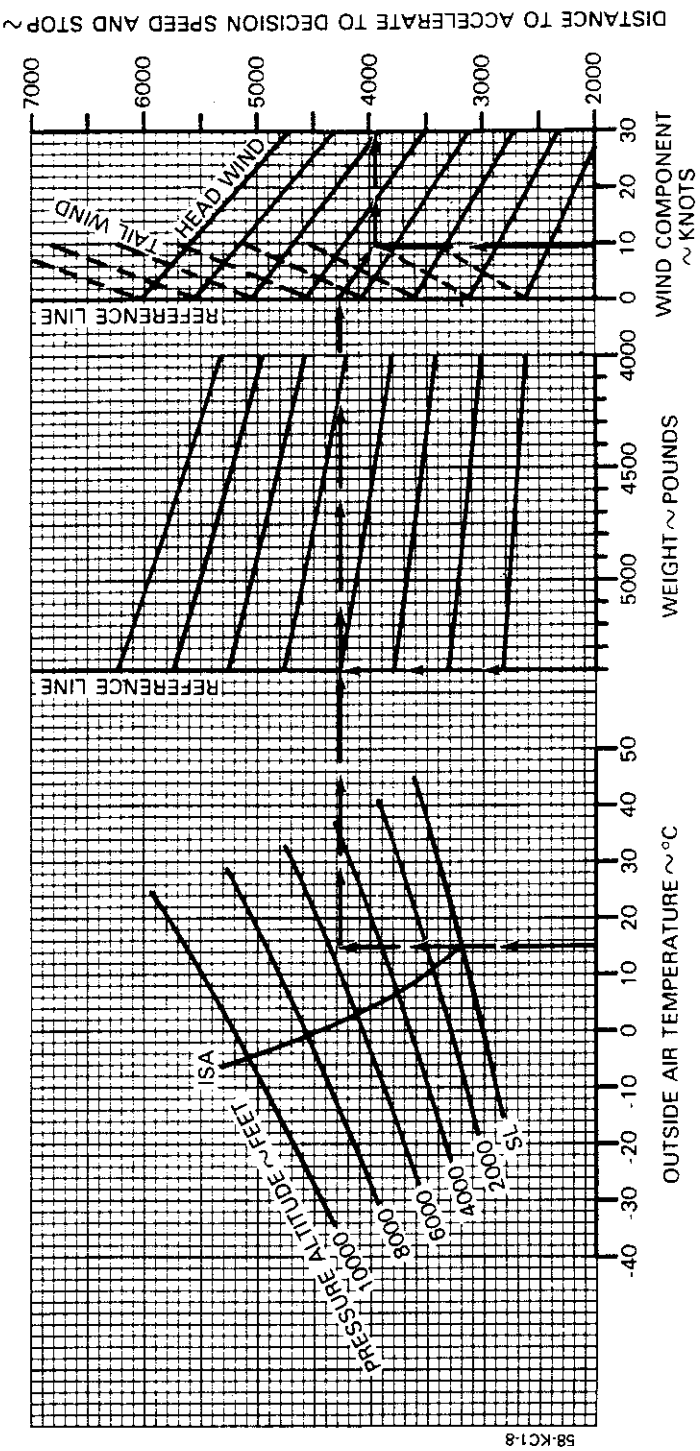
ASSOCIATED CONDITIONS:

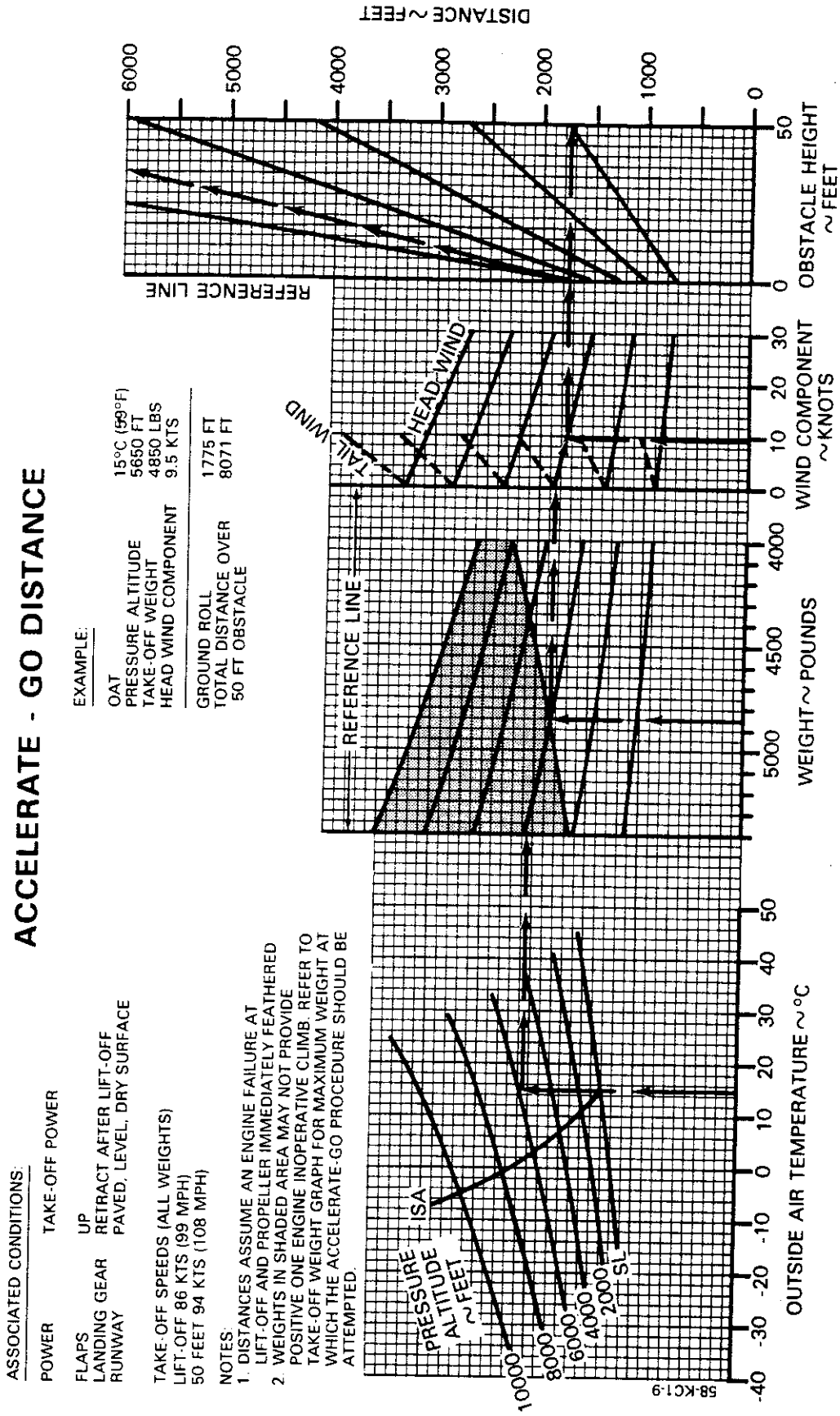
POWER	1. TAKE-OFF POWER 2. ENGINE IDLE AT DECISION SPEED
FLAPS	UP
COWL FLAPS	OPEN
RUNWAY	PAVED, LEVEL, DRY SURFACE

DECISION SPEED (ALL WEIGHTS)
86 KTS
(99 MPH)

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	5400 LBS
HEAD WIND	9.5 KTS
ACCELERATE - STOP DISTANCE	3960 FT
DECISION SPEED (IAS)	86 KNOTS (99 MPH)




ACCELERATE - GO DISTANCE
ASSOCIATED CONDITIONS:
POWER TAKE-OFF POWER
FLAPS UP
LANDING GEAR RETRACT AFTER LIFT-OFF
RUNWAY PAVED, LEVEL, DRY SURFACE
TAKE-OFF SPEEDS (ALL WEIGHTS)
LIFT-OFF 86 KTS (99 MPH)
50 FEET 94 KTS (108 MPH)
NOTES:
1. DISTANCES ASSUME AN ENGINE FAILURE AT LIFT-OFF AND PROPELLER IMMEDIATELY FEATHERED
2. WEIGHTS IN SHADED AREA MAY NOT PROVIDE POSITIVE ONE ENGINE INOPERATIVE CLIMB. REFER TO TAKE-OFF WEIGHT GRAPH FOR MAXIMUM WEIGHT AT WHICH THE ACCELERATE-GO PROCEDURE SHOULD BE ATTEMPTED.
EXAMPLE:
OAT 15°C (59°F)
PRESSURE ALTITUDE 5650 FT
TAKE-OFF WEIGHT 4850 LBS
HEAD WIND COMPONENT 9.5 KTS
GROUND ROLL 1775 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE 8071 FT
REFERENCE LINE
TAIL WIND
HEAD WIND
DISTANCE ~ FEET
REFERENCE LINE
OBSTACLE HEIGHT ~ FEET
WIND COMPONENT ~ KNOTS
WEIGHT ~ POUNDS
OUTSIDE AIR TEMPERATURE ~ °C
PRESSURE ALTITUDE ~ FEET
ISA
SL
58-KC1-9

CLIMB - TWO ENGINE

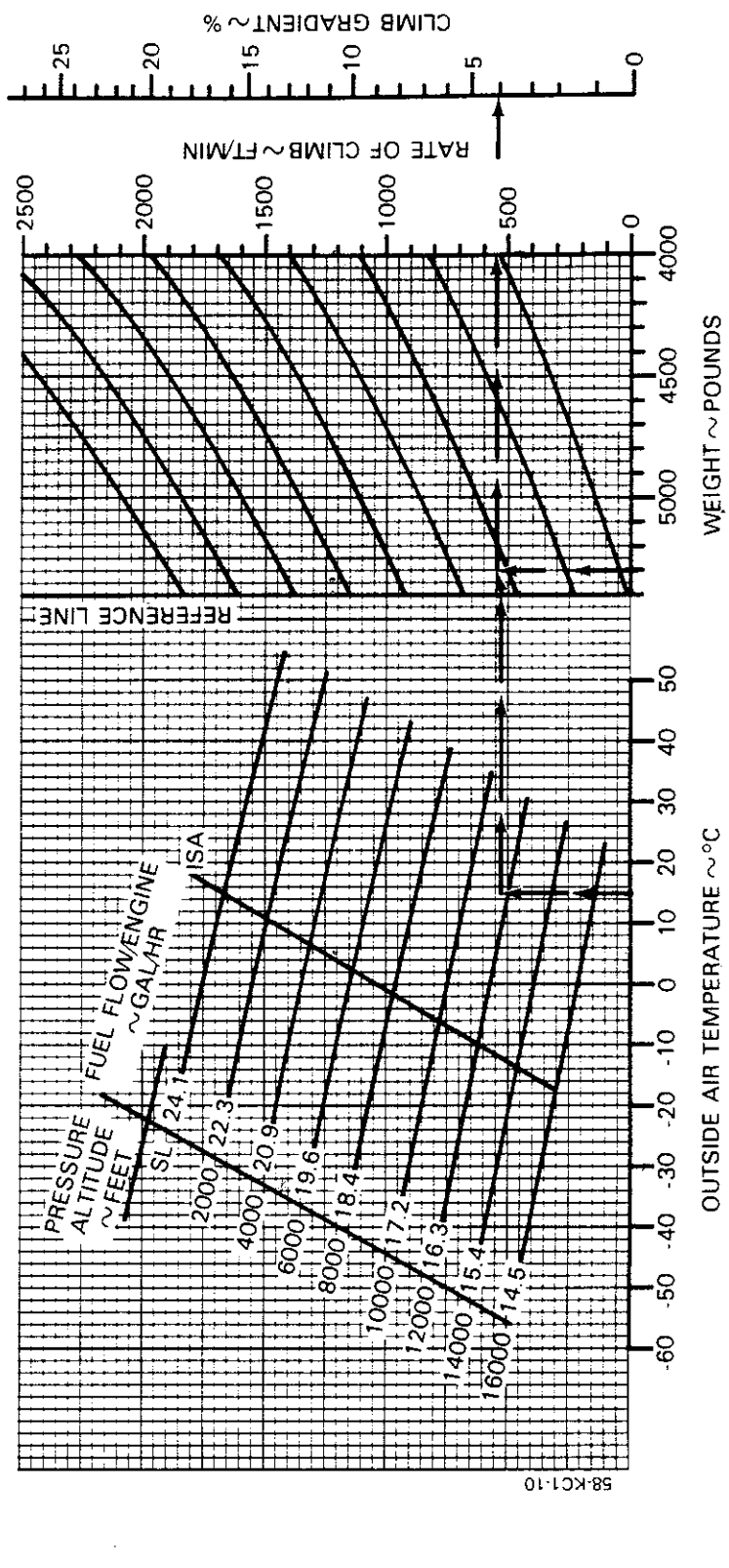
CLIMB SPEED 104 KTS (ALL WEIGHTS)
(120 MPH)

ASSOCIATED CONDITIONS:

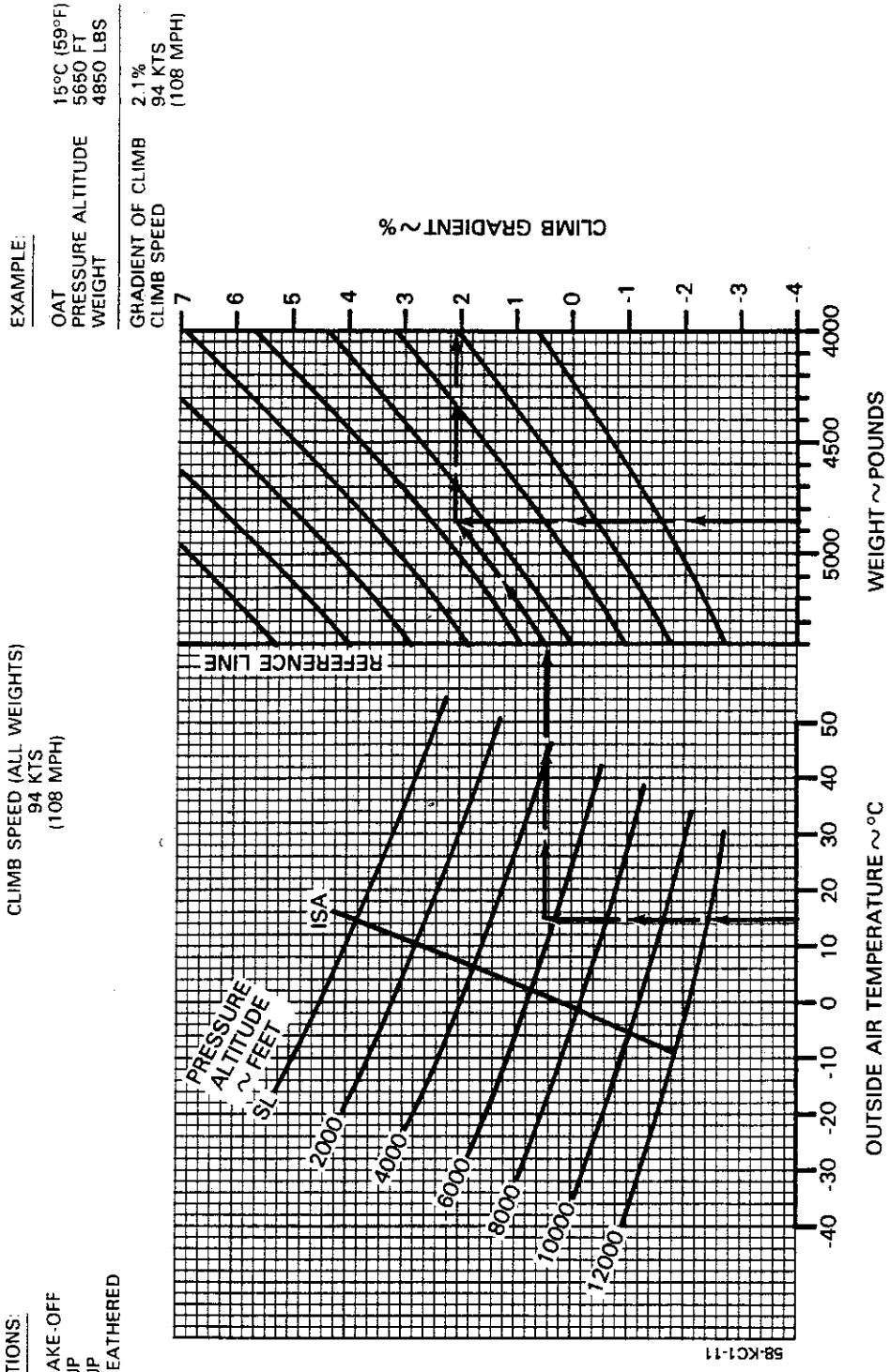
POWER	MAXIMUM CONTINUOUS
FLAPS	UP
LANDING GEAR	UP
COWL FLAPS	OPEN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	11500 FEET
WEIGHT	5352 LBS
RATE OF CLIMB	550 FPM
CLIMB GRADIENT	4%



TAKE-OFF CLIMB GRADIENT - ONE ENGINE INOPERATIVE



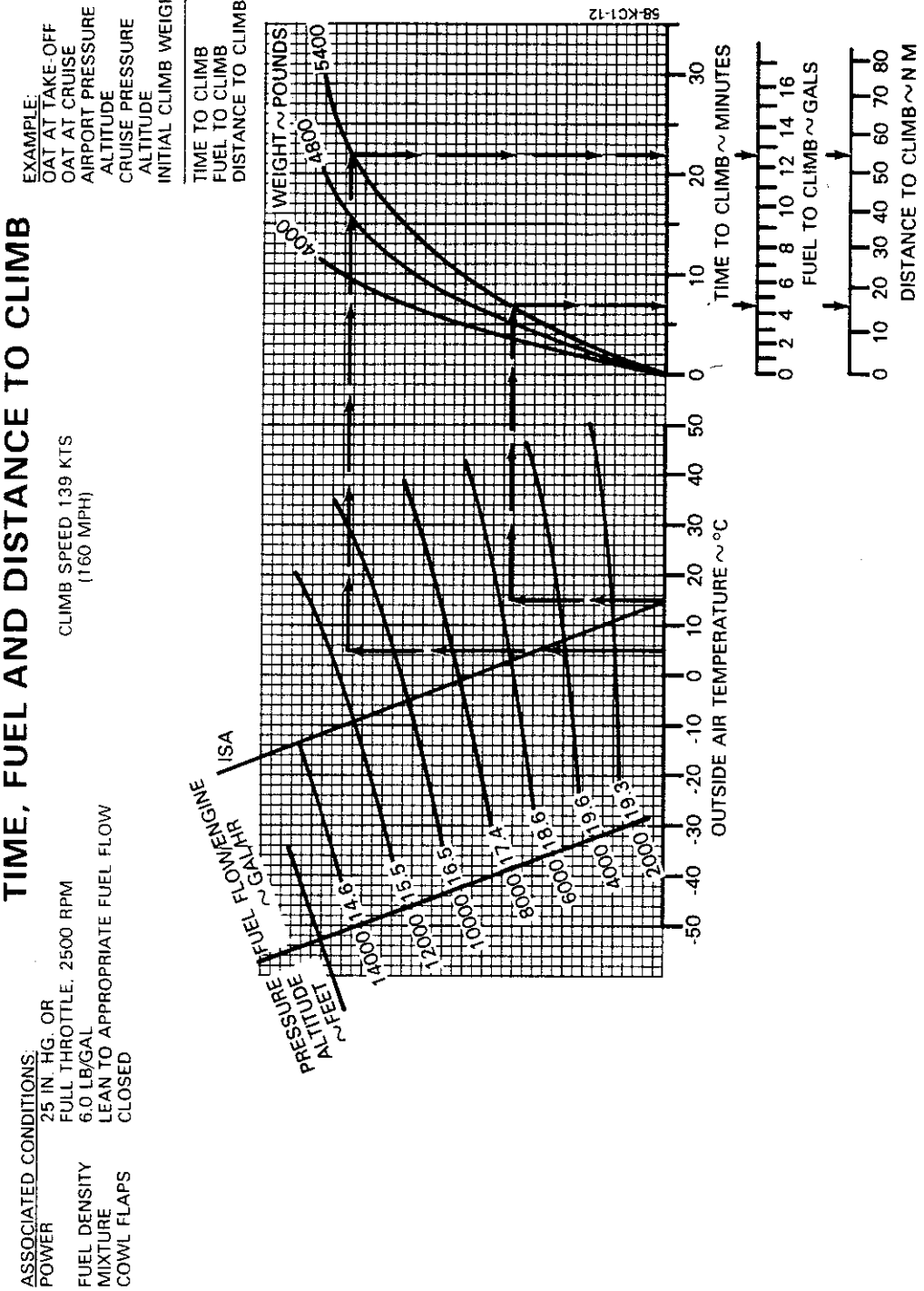
TIME, FUEL AND DISTANCE TO CLIMB

ASSOCIATED CONDITIONS:
POWER — 25 IN. HG. OR FULL THROTTLE, 2500 RPM
FUEL DENSITY — 6.0 LB/GAL
MIXTURE — LEAN TO APPROPRIATE FUEL FLOW
COWL FLAPS — CLOSED

CLIMB SPEED 139 KTS (160 MPH)

EXAMPLE:

OAT AT TAKE-OFF	15°C (59°F)
OAT AT CRUISE	5°C (41°F)
AIRPORT PRESSURE ALTITUDE	5650 FT
CRUISE PRESSURE ALTITUDE	11500 FT
INITIAL CLIMB WEIGHT	5400 LBS
TIME TO CLIMB	(22-7) = 15 MIN
FUEL TO CLIMB	(12.7-4.7) = 8 GAL
DISTANCE TO CLIMB	(55-17) = 38 NM



CLIMB - ONE ENGINE INOPERATIVE

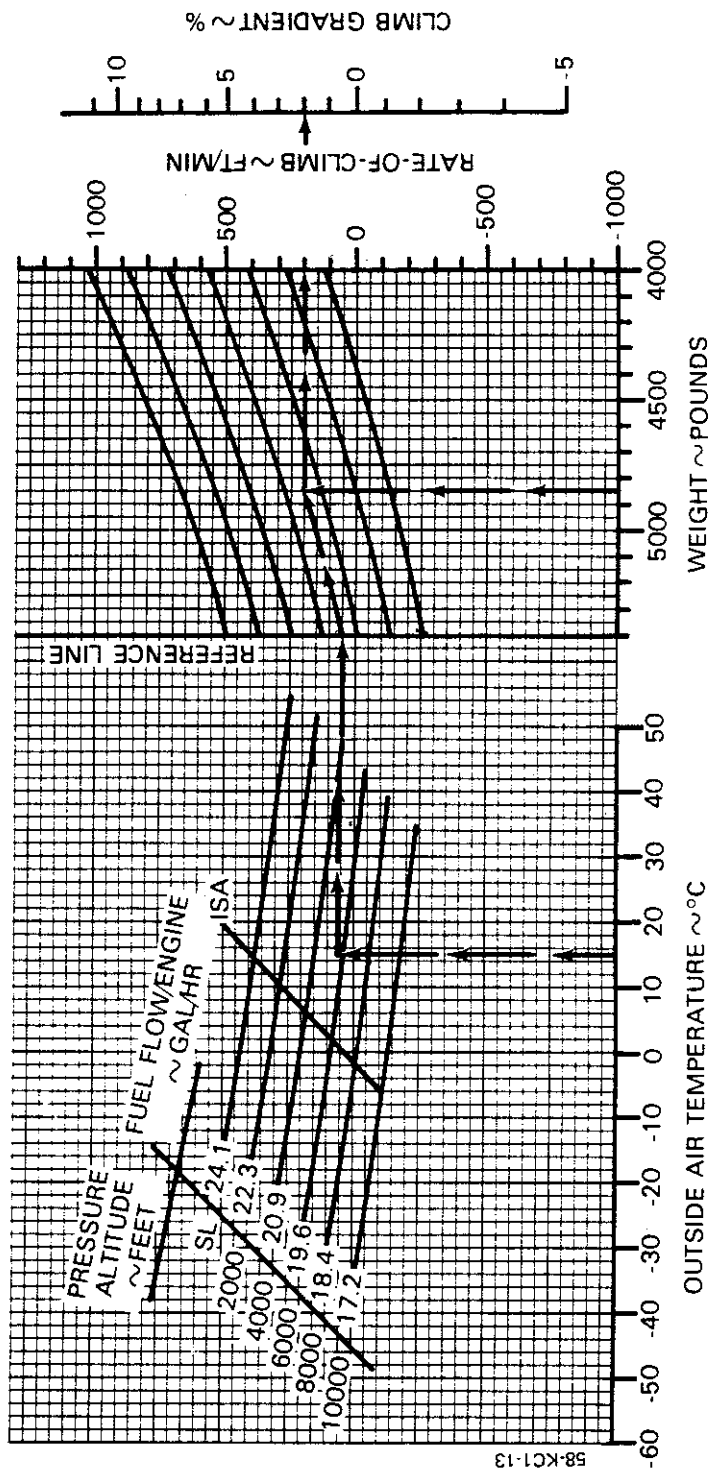
CLIMB SPEED 100 KTS (ALL WEIGHTS)
(115 MPH)

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	UP
LANDING GEAR	UP
INOPERATIVE PROPELLER	FEATHERED
COWL FLAPS	OPEN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
WEIGHT	4850 LBS
RATE-OF-CLIMB	200 FPM
CLIMB GRADIENT	2%



SERVICE CEILING - ONE ENGINE INOPERATIVE

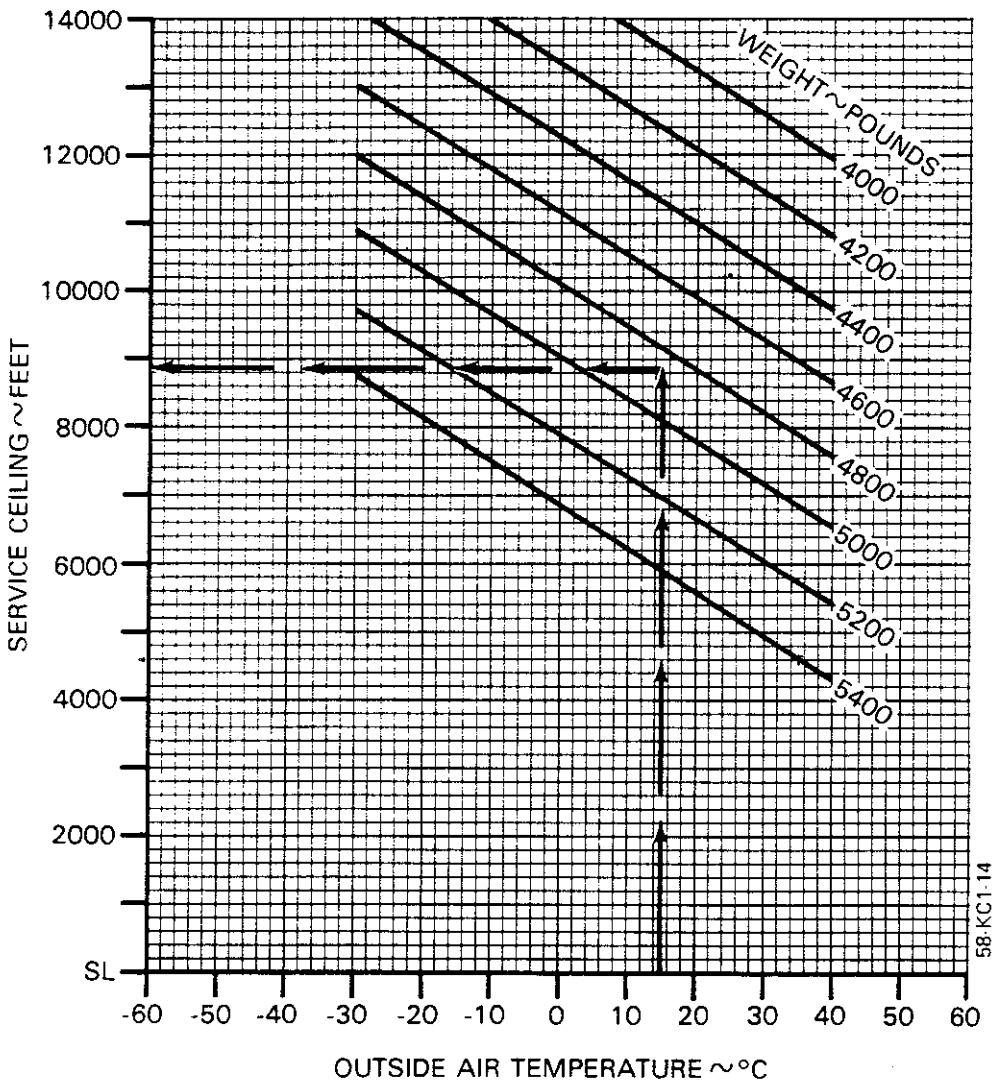
ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
LANDING GEAR	UP
INOPERATIVE PROPELLER	FEATHERED
FLAPS	UP

EXAMPLE:

OAT	15°C (59°F)
WEIGHT	4850
SERVICE CEILING	8425 FT

NOTE:
SERVICE CEILING IS THE PRESSURE ALTITUDE WHERE AIRPLANE HAS CAPABILITY OF CLIMBING 50 FT MINUTE WITH ONE PROPELLER FEATHERED



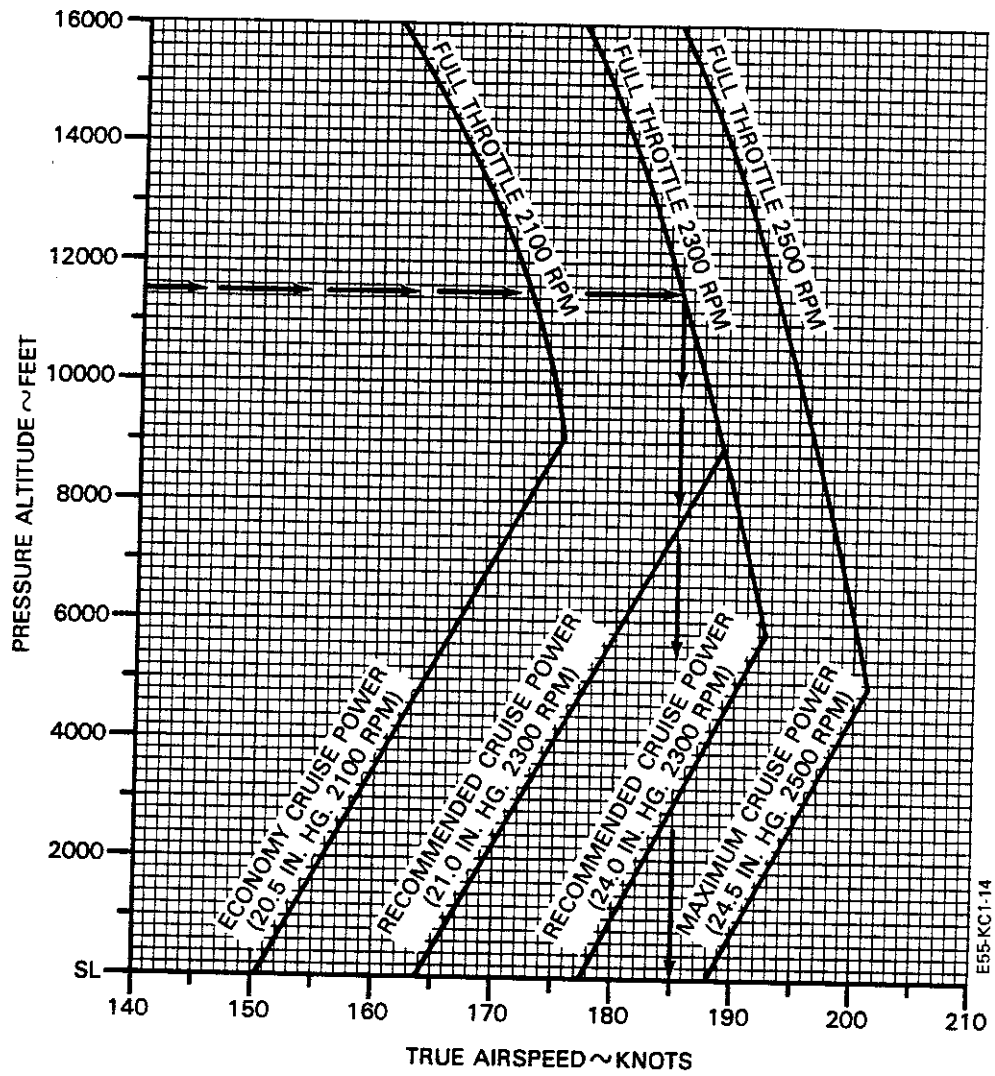
CRUISE SPEEDS

ASSOCIATED CONDITIONS:

AVERAGE CRUISE WEIGHT	5000 LBS
TEMPERATURE	STANDARD DAY (ISA)

EXAMPLE:

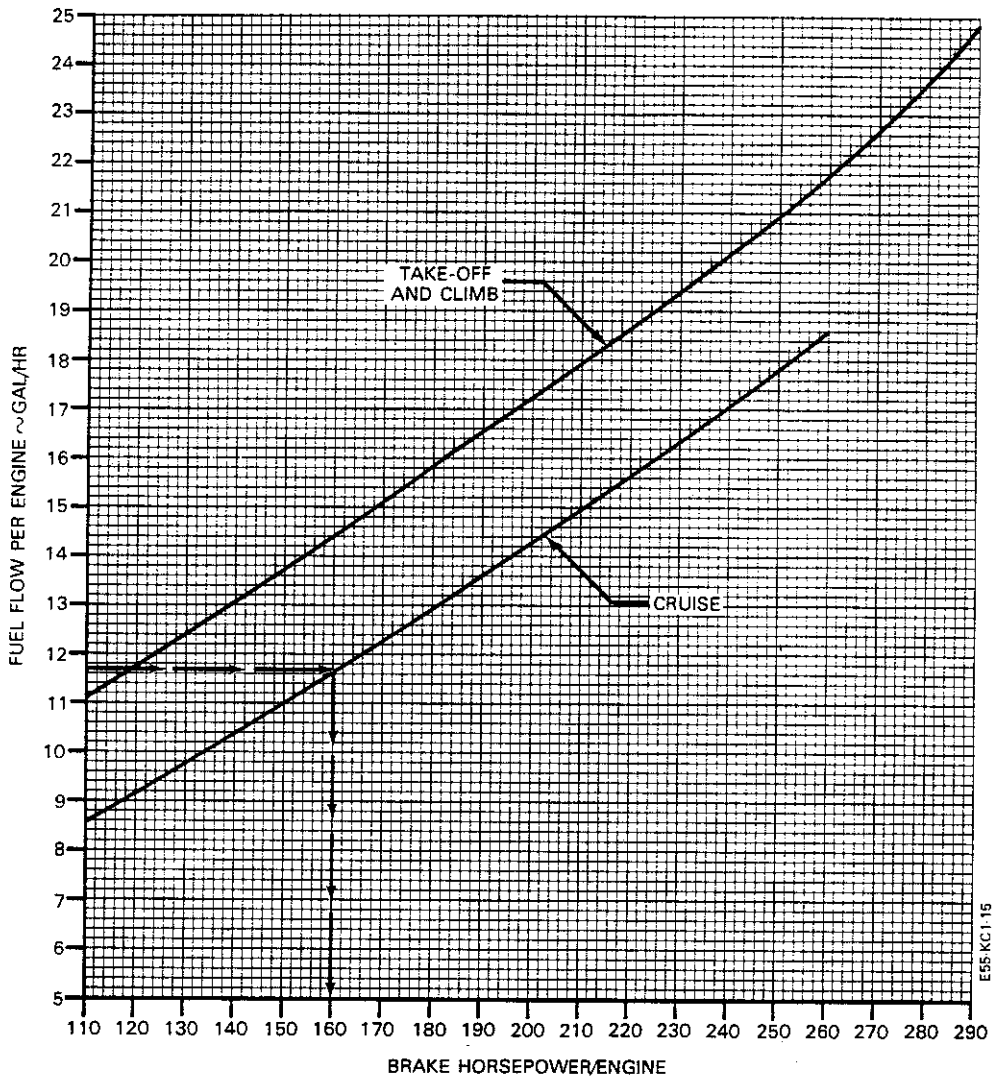
PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
TRUE AIRSPEED	185 KTS (213 MPH)



FUEL FLOW vs BRAKE HORSEPOWER

EXAMPLE

FUEL FLOW/ENGINE CONDITION	11 7 GAL HR LEVEL FLIGHT CRUISE LEAN
BRAKE HORSEPOWER PER ENGINE	160 HP



CRUISE POWER SETTINGS
MAXIMUM CRUISE POWER
24.5 IN. HG. @ 2500 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	100	38	2500	24.5	90	14.8	189	183
	2000	95	35	2500	24.5	91	15.2	195	183
	4000	88	31	2500	24.5	93	15.5	200	182
	6000	81	27	2500	23.4	90	15.0	201	178
	8000	73	23	2500	22.0	84	14.0	199	170
	10000	66	19	2500	20.0	79	13.1	196	163
	12000	59	15	2500	18.3	73	12.2	193	155
	14000	52	11	2500	16.8	69	11.4	189	148
	16000	43	6	2500	15.5	64	10.6	185	139
STANDARD DAY (ISA)	SL	64	18	2500	24.5	93	15.4	188	188
	2000	57	14	2500	24.5	95	15.8	193	188
	4000	52	11	2500	24.5	96	16.1	199	187
	6000	45	7	2500	23.4	93	15.6	200	183
	8000	37	3	2500	22.0	87	14.5	197	176
	10000	30	−1	2500	20.0	82	13.6	195	168
	12000	23	−5	2500	18.3	76	12.7	192	161
	14000	16	−9	2500	16.8	71	11.8	189	153
	16000	7	−14	2500	15.5	66	11.0	195	145
ISA −36°F (−20°C)	SL	28	−2	2500	24.5	96	16.0	186	193
	2000	21	−6	2500	24.5	98	15.9	192	193
	4000	16	−9	2500	24.5	100	16.7	197	192
	6000	9	−13	2500	23.4	97	16.2	198	188
	8000	1	−17	2500	22.0	90	15.0	196	181
	10000	−6	−21	2500	20.0	84	14.0	194	174
	12000	−13	−25	2500	18.3	78	13.1	191	166
	14000	−20	−29	2500	16.8	73	12.2	188	158
	16000	−29	−34	2500	15.5	68	11.3	184	150

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE

CRUISE POWER SETTINGS
RECOMMENDED CRUISE POWER
24.0 IN. HG. @ 2300 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	100	38	2300	24.0	78	13.0	179	173
	2000	93	34	2300	24.0	80	13.3	184	172
	4000	86	30	2300	24.0	81	13.6	189	172
	6000	81	27	2300	23.5	82	13.6	193	171
	8000	73	23	2300	21.8	76	12.7	191	164
	10000	64	18	2300	20.1	71	11.9	187	156
	12000	57	14	2300	18.5	67	11.2	185	149
	14000	50	10	2300	17.1	57	9.5	170	133
	16000	43	6	2300	15.6	54	9.1	167	126
STANDARD DAY (ISA)	SL	64	18	2300	24.0	81	13.5	178	178
	2000	57	14	2300	24.0	82	13.7	183	177
	4000	50	10	2300	24.0	84	14.1	188	177
	6000	45	7	2300	23.5	85	14.1	192	176
	8000	36	2	2300	21.8	79	13.2	190	169
	10000	28	−2	2300	20.1	74	12.3	187	161
	12000	21	−6	2300	18.5	69	11.6	184	154
	14000	14	−10	2300	17.1	59	9.9	171	139
	16000	7	−14	2300	15.6	56	9.4	169	132
ISA −36°F (−20°C)	SL	27	−3	2300	24.0	83	13.9	176	183
	2000	21	−6	2300	24.0	85	14.2	181	182
	4000	14	−10	2300	24.0	87	14.5	187	183
	6000	7	−14	2300	23.5	88	14.6	190	181
	8000	0	−18	2300	21.8	82	13.6	188	174
	10000	−8	−22	2300	20.1	76	12.7	185	166
	12000	−15	−26	2300	18.5	72	11.9	183	159
	14000	−22	−30	2300	17.1	62	10.3	171	144
	16000	−29	−34	2300	15.6	59	9.8	169	138

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE

CRUISE POWER SETTINGS
RECOMMENDED CRUISE POWER
21.0 IN. HG. @ 2300 RPM (OR FULL THROTTLE) 5200 LBS.

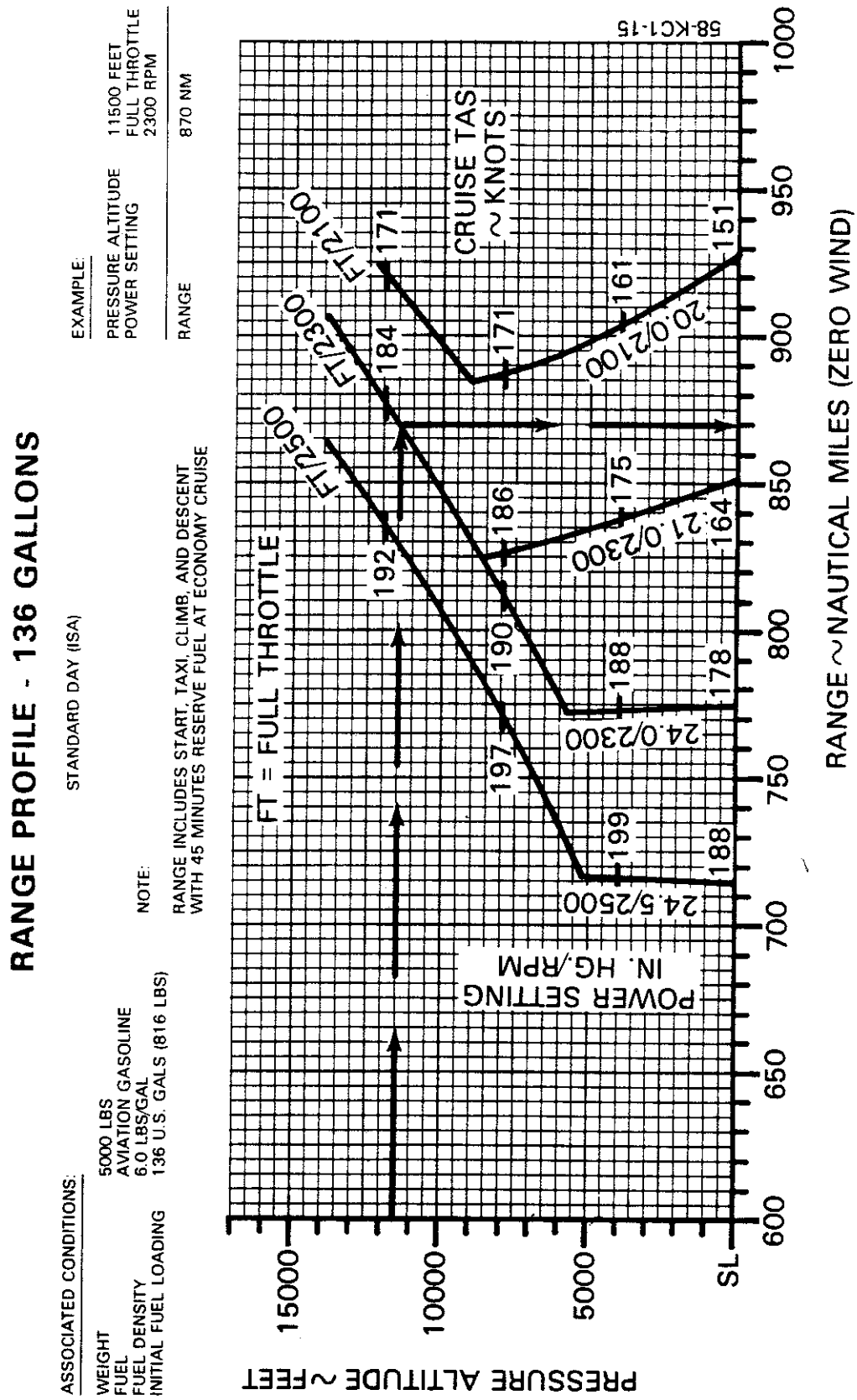
	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	99	37	2300	21.0	66	10.9	164	159
	2000	93	34	2300	21.0	67	11.2	169	159
	4000	86	30	2300	21.0	70	11.6	175	160
	6000	79	26	2300	21.0	72	11.9	181	160
	8000	72	22	2300	21.0	73	12.2	187	160
	10000	64	18	2300	20.2	71	11.9	187	156
	12000	57	14	2300	18.6	67	11.2	185	149
	14000	50	10	2300	17.0	57	9.5	170	133
	16000	43	6	2300	15.7	54	9.1	167	126
STANDARD DAY (ISA)	SL	63	17	2300	21.0	68	11.3	164	164
	2000	57	14	2300	21.0	70	11.6	169	164
	4000	50	10	2300	21.0	72	12.0	175	165
	6000	93	6	2300	21.0	74	12.3	180	165
	8000	36	2	2300	21.0	76	12.7	186	165
	10000	28	−2	2300	20.2	74	12.3	187	161
	12000	21	−6	2300	18.6	69	11.6	184	154
	14000	14	−10	2300	17.0	59	9.9	171	139
	16000	7	−14	2300	15.7	56	9.4	169	132
ISA −36°F (−20°C)	SL	27	−3	2300	21.0	70	11.6	163	168
	2000	21	−6	2300	21.0	72	12.0	168	169
	4000	14	−10	2300	21.0	74	12.4	173	170
	6000	7	−14	2300	21.0	76	12.7	179	170
	8000	0	−18	2300	21.0	78	13.1	185	170
	10000	−3	−22	2300	20.2	76	12.7	185	166
	12000	−15	−26	2300	18.6	72	12.0	183	159
	14000	−22	−30	2300	17.0	62	10.3	171	144
	16000	−29	−34	2300	15.7	59	9.8	169	138

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE
2. SHADED AREA REPRESENTS OPERATION FULL THROTTLE

CRUISE POWER SETTINGS
ECONOMY CRUISE POWER
20.5 IN. HG. @ 2100 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	99	37	2100	20.5	56	9.2	151	146
	2000	91	33	2100	20.5	57	9.5	156	146
	4000	84	29	2100	20.5	59	9.8	161	147
	6000	79	26	2100	20.5	62	10.3	167	148
	8000	72	22	2100	20.5	62	10.4	171	147
	10000	64	18	2100	20.2	62	10.4	174	144
	12000	57	14	2100	18.6	59	9.3	170	137
	14000	50	10	2100	17.0	54	9.0	165	128
	16000	43	6	2100	15.7	50	8.4	157	118
STANDARD DAY (ISA)	SL	63	17	2100	20.5	58	9.6	151	151
	2000	55	13	2100	20.5	59	9.9	156	152
	4000	48	9	2100	20.5	61	10.2	161	152
	6000	43	6	2100	20.5	64	10.6	167	153
	8000	36	2	2100	20.5	64	10.7	171	152
	10000	28	−2	2100	20.2	64	10.7	174	150
	12000	21	−6	2100	18.6	61	10.1	171	143
	14000	14	−10	2100	17.0	56	9.4	167	135
	16000	7	−14	2100	15.7	52	8.7	160	125
ISA −36°F (−20°C)	SL	27	−3	2100	20.5	60	10.0	151	156
	2000	19	−7	2100	20.5	62	10.3	156	157
	4000	12	−11	2100	20.5	63	10.6	160	157
	6000	7	−14	2100	20.5	66	10.9	166	158
	8000	0	−18	2100	20.5	66	11.1	170	157
	10000	−8	−22	2100	20.2	66	11.1	174	155
	12000	−15	−26	2100	18.6	63	10.5	171	149
	14000	−22	−30	2100	17.0	58	9.7	167	140
	16000	−29	−34	2100	15.7	54	9.0	162	132

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE


RANGE PROFILE - 136 GALLONS
ASSOCIATED CONDITIONS:
WEIGHT 5000 LBS
FUEL AVIATION GASOLINE
FUEL DENSITY 6.0 LBS/GAL
INITIAL FUEL LOADING 136 U.S. GALS (816 LBS)
STANDARD DAY (ISA)
NOTE:
RANGE INCLUDES START, TAXI, CLIMB, AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE
EXAMPLE:
PRESSURE ALTITUDE 11500 FEET
POWER SETTING FULL THROTTLE 2300 RPM
RANGE 870 NM
58-KC1-15
PRESSURE ALTITUDE ~ FEET
RANGE ~ NAUTICAL MILES (ZERO WIND)
FT = FULL THROTTLE
POWER SETTING IN. HG./RPM
CRUISE TAS ~ KNOTS
FT/2500
FT/2300
FT/2100
24.5/2500
24.0/2300
21.0/2300
20.0/2100
15000
10000
5000
SL
600
650
700
750
800
850
900
950
1000
192
190
197
199
188
186
188
184
178
175
171
164
161
151

ENDURANCE PROFILE - 136 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

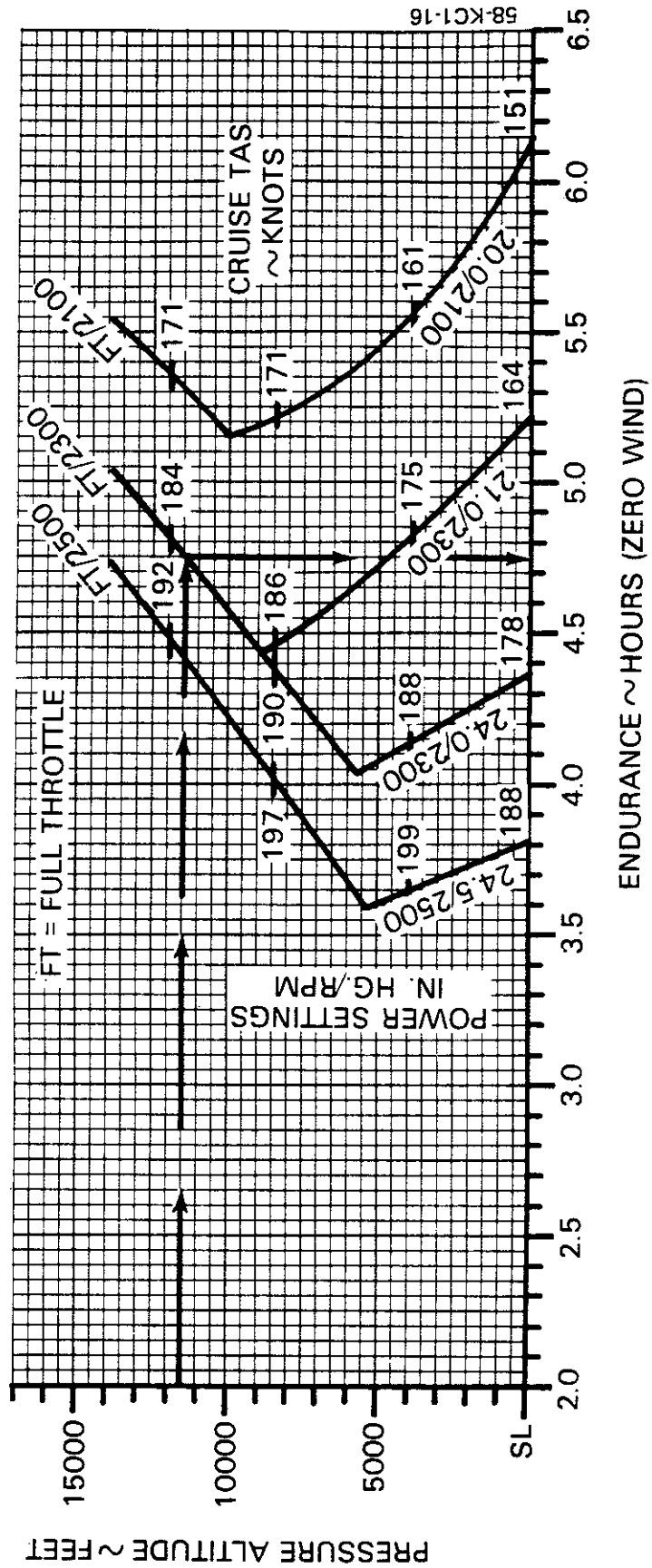
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	136 U.S. GALS (816 LBS)

NOTE:

ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
ENDURANCE	4.75 HRS (4 HRS. 45 MIN)



RANGE PROFILE - 166 GALLONS

STANDARD DAY (ISA)

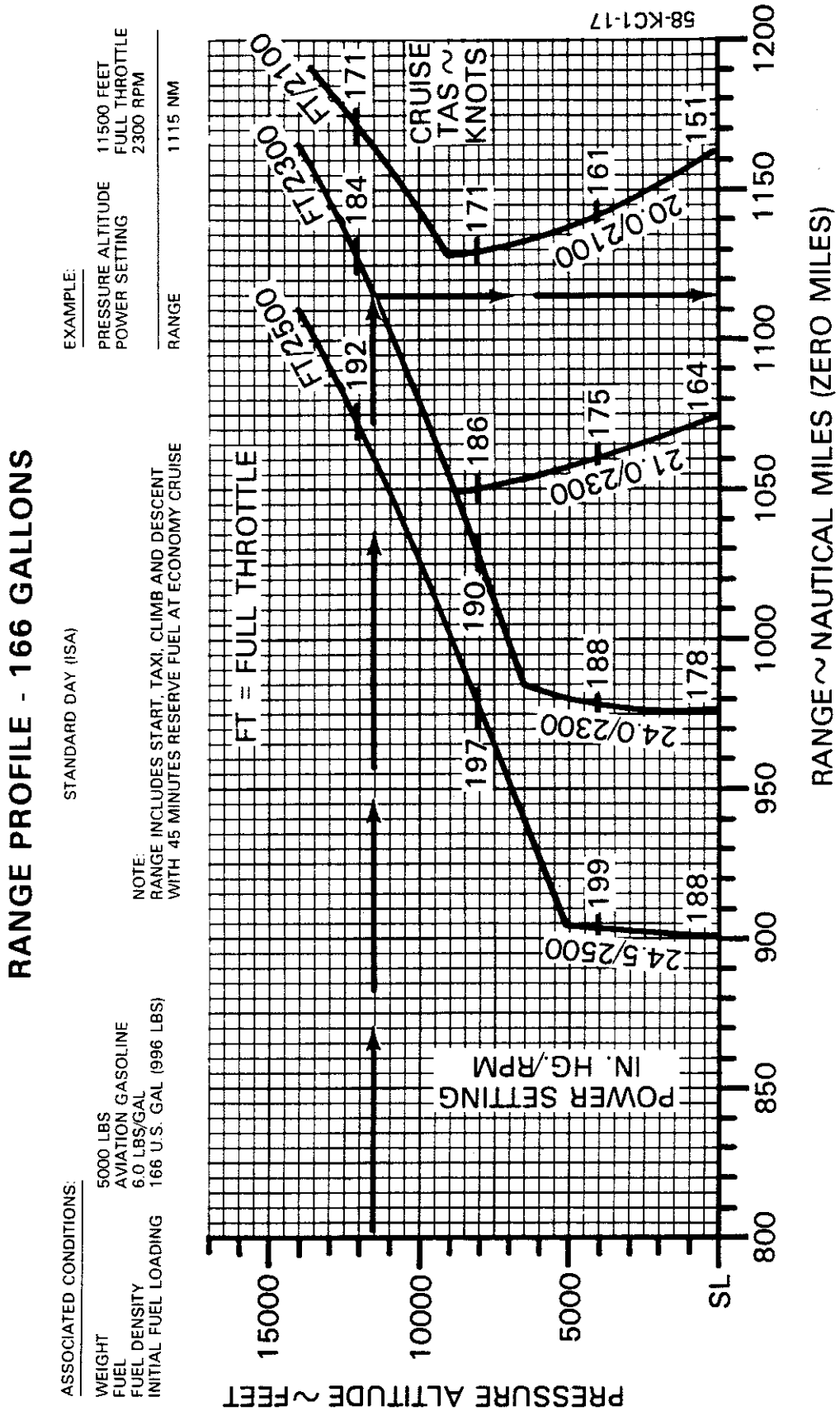
ASSOCIATED CONDITIONS:

WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	166 U.S. GAL (996 LBS)

NOTE:
RANGE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
RANGE	1115 NM



ENDURANCE PROFILE - 166 GALLONS

STANDARD DAY (ISA)

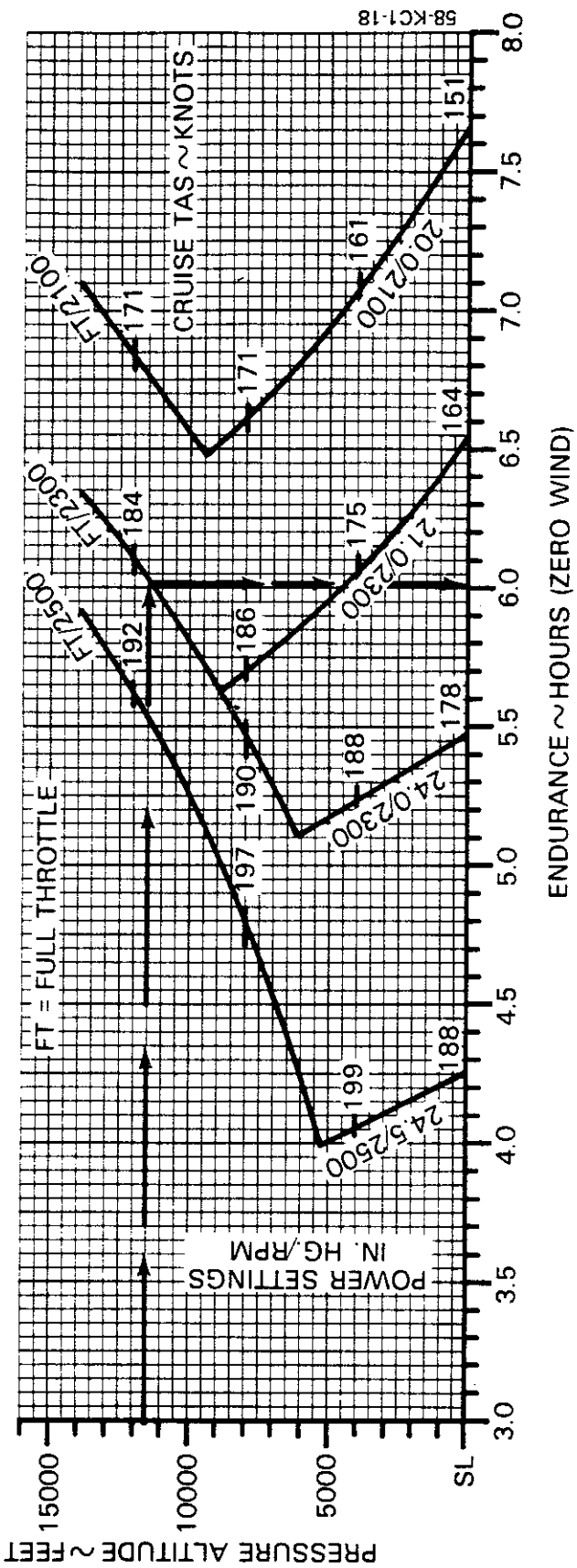
ASSOCIATED CONDITIONS:

WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	166 U.S. GALS (996 LBS)

NOTE:
ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
ENDURANCE	6.0 HRS



RANGE PROFILE - 194 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

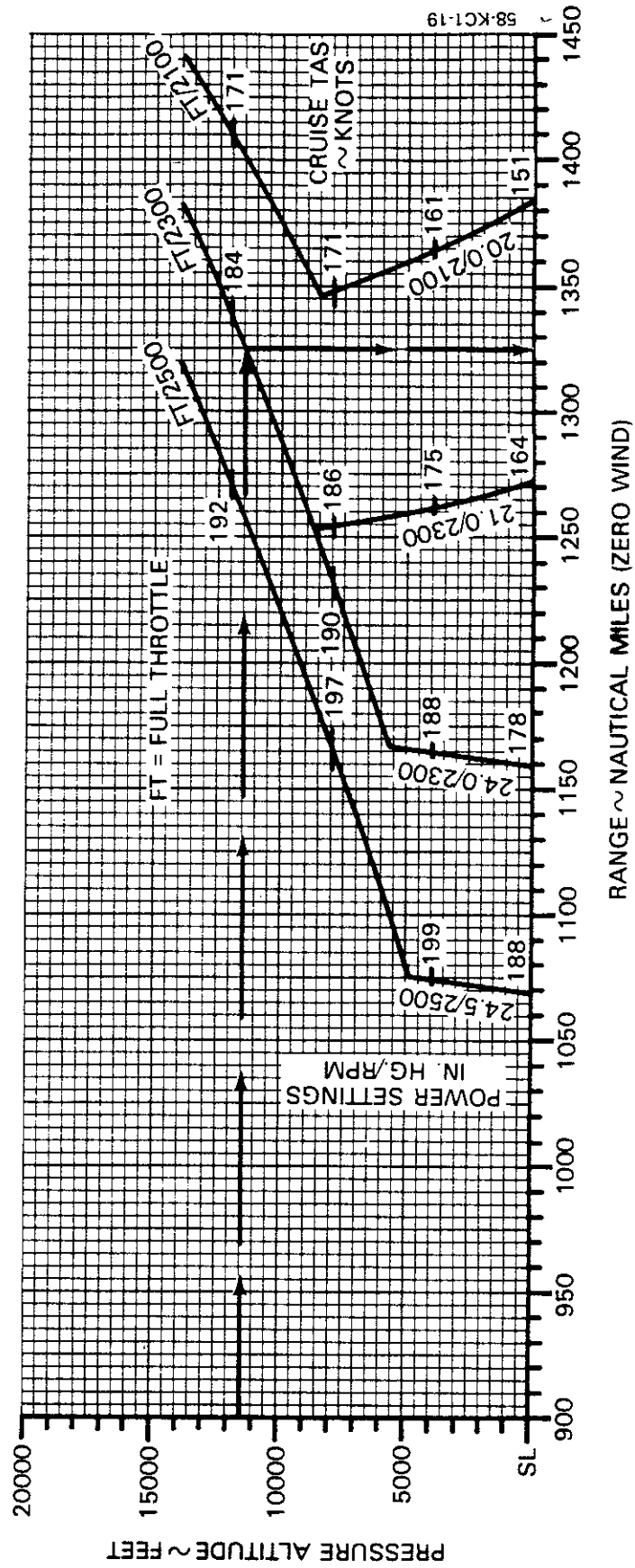
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	194 U.S. GAL (1164 LBS)

NOTE:

RANGE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
RANGE	1325 NM



ENDURANCE PROFILE - 194 GALLONS

STANDARD DAY (ISA)

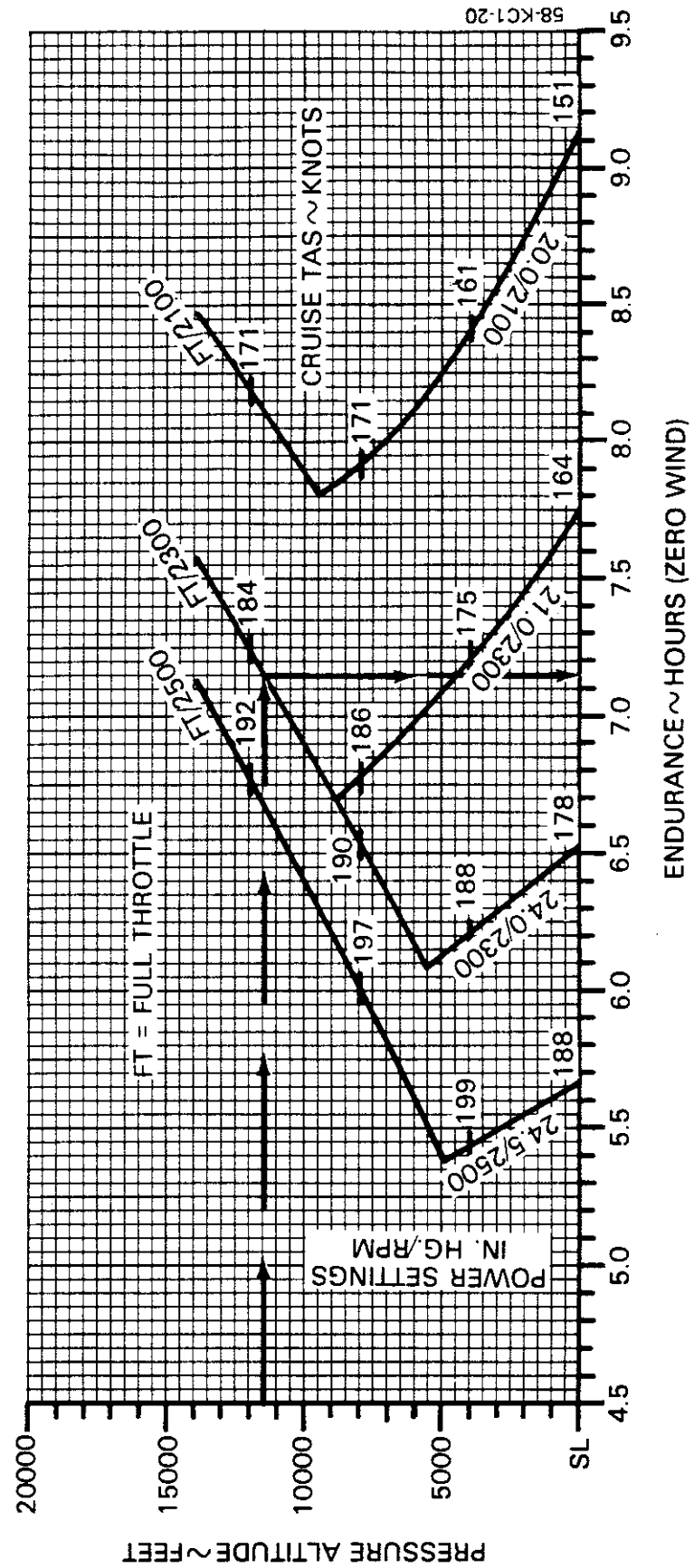
ASSOCIATED CONDITIONS:

WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	194 U.S. GALS (1164 LBS)

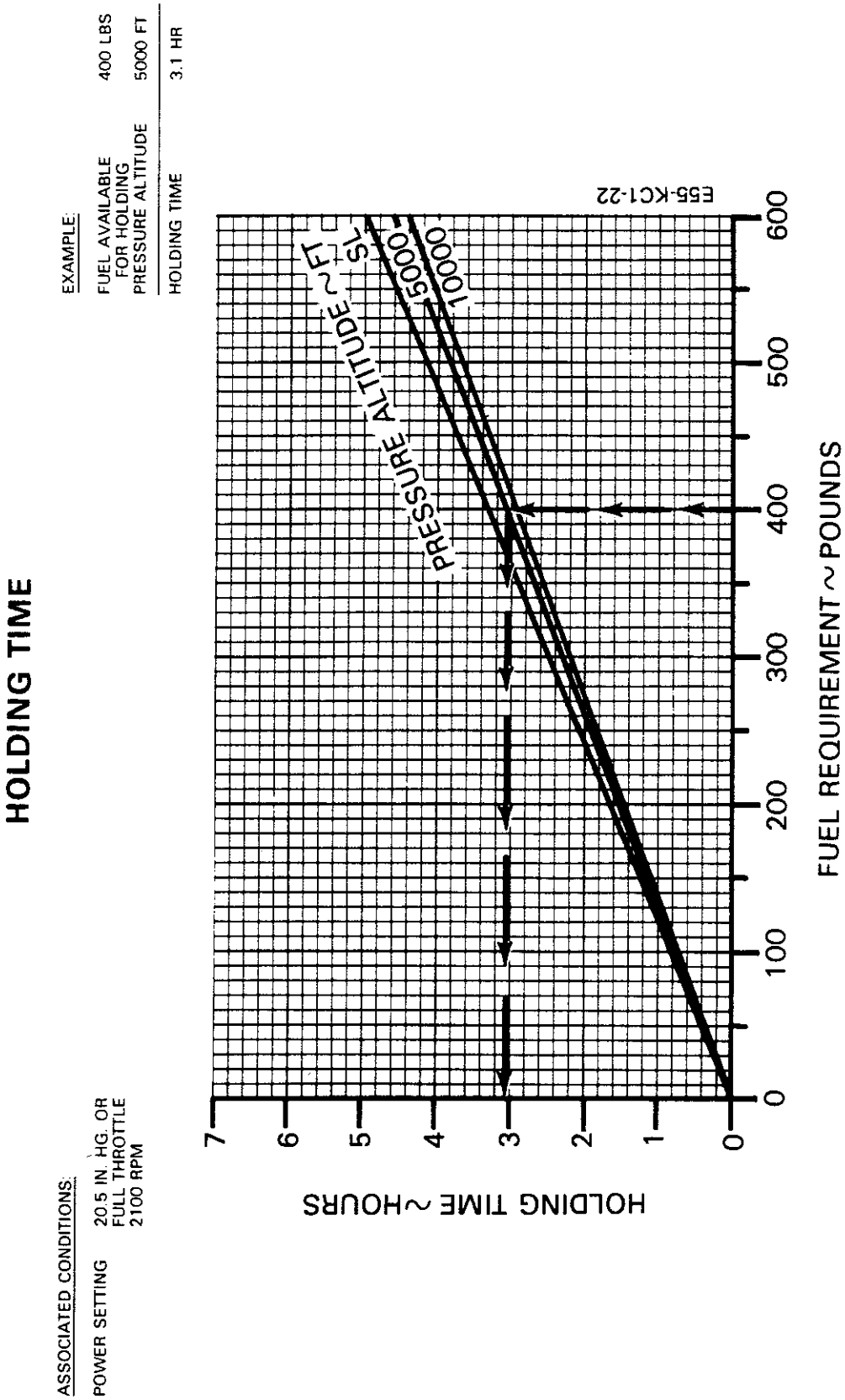
NOTE:
ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
ENDURANCE	7.15 HRS (7 HRS. 9 MIN)



HOLDING TIME



EXAMPLE:

FUEL AVAILABLE FOR HOLDING	400 LBS
PRESSURE ALTITUDE	5000 FT
HOLDING TIME	3.1 HR

ASSOCIATED CONDITIONS:

POWER SETTING 20.5 IN. HG. OR FULL THROTTLE 2100 RPM

TIME, FUEL AND DISTANCE TO DESCEND

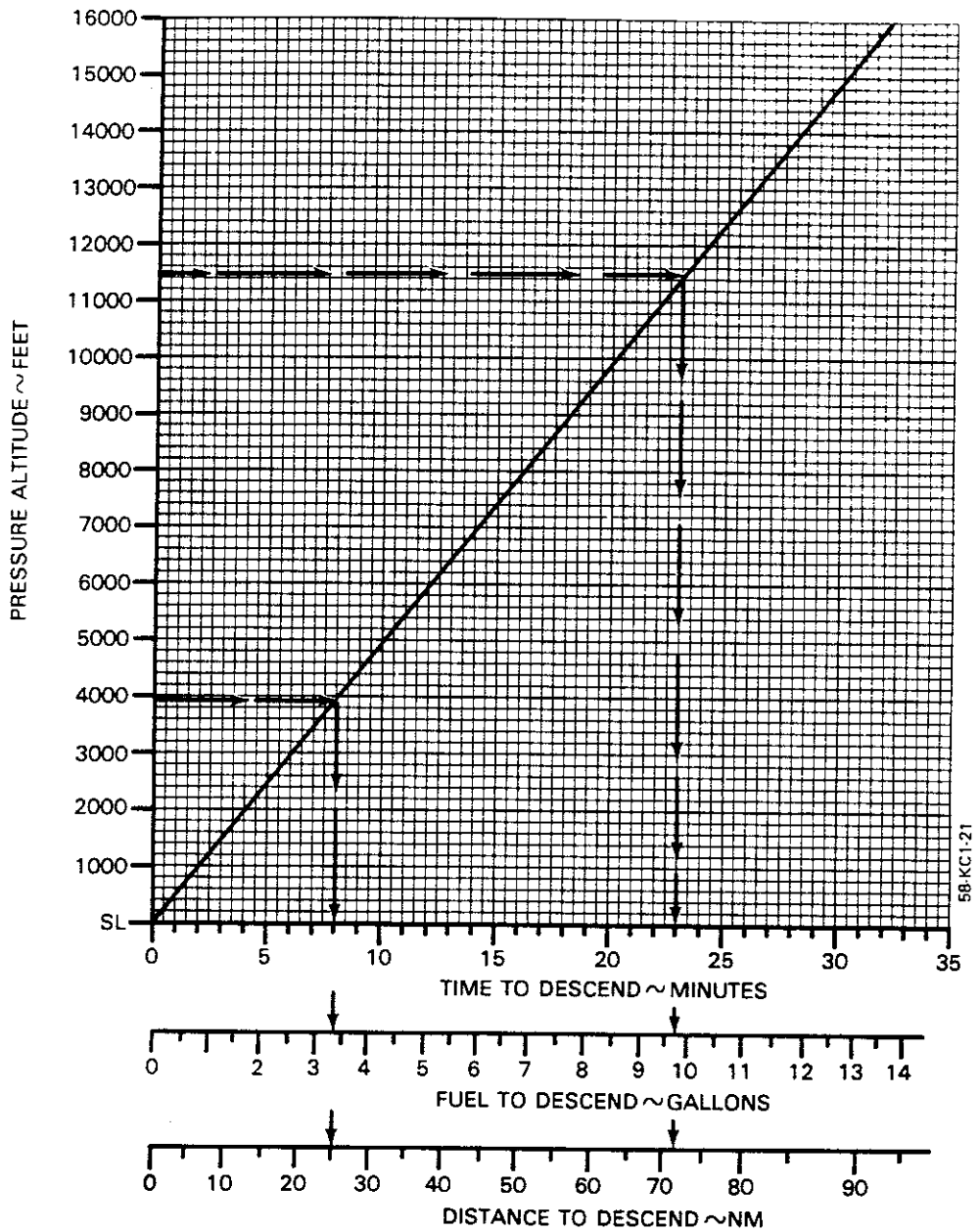
ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 500 FT/MIN RATE-OF-DESCENT
LANDING GEAR	UP
FLAPS	UP

EXAMPLE:

INITIAL ALTITUDE	11500 FT
FINAL ALTITUDE	3965 FT
TIME TO DESCEND	(23-8) = 15 MIN
FUEL TO DESCEND	(9.7-3.3) = 6.4 GAL
DISTANCE TO DESCEND	(72-25) = 47 NM

DESCENT SPEED
175 KTS
(201 MPH)



CLIMB-BALKED LANDING

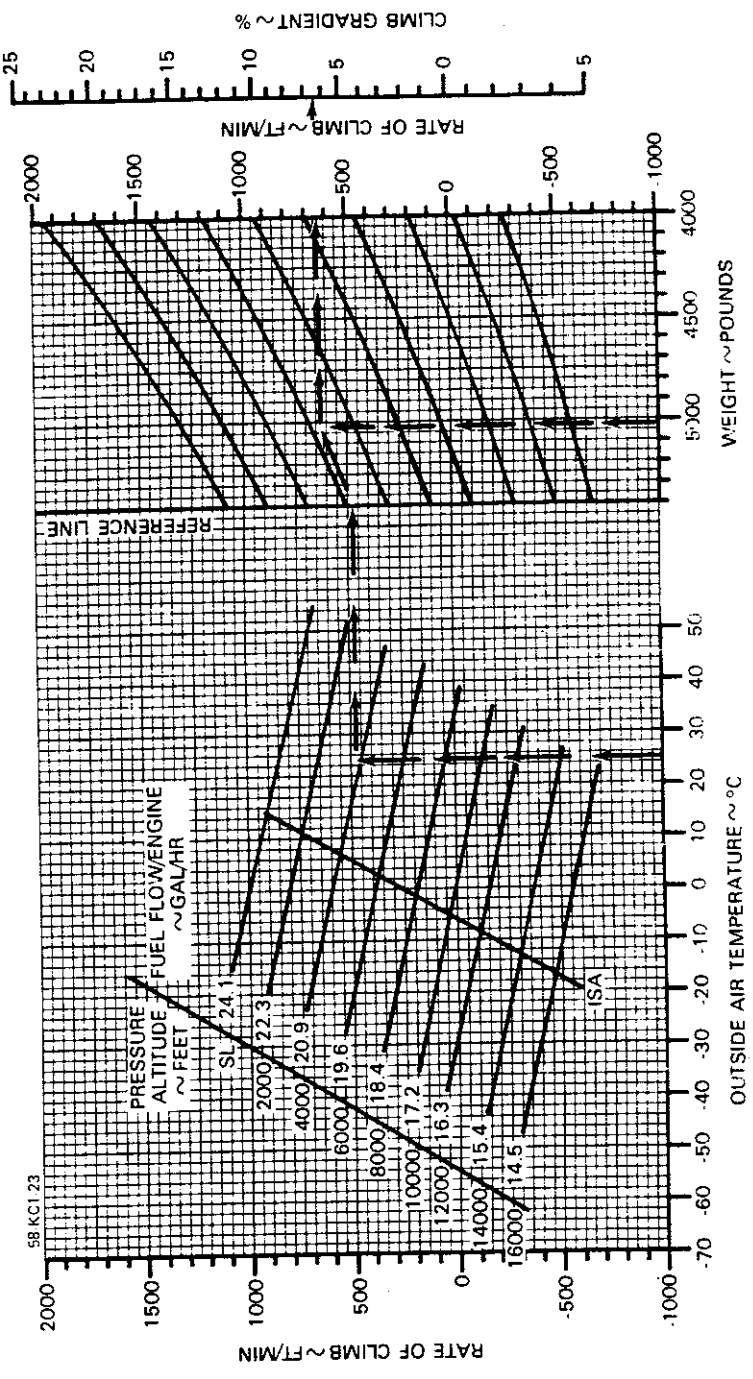
CLIMB SPEED 96 KTS (ALL WEIGHTS)
(110 MPH)

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	DOWN
LANDING GEAR	DOWN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	5039
RATE OF CLIMB	640 FT/MIN
CLIMB GRADIENT	6.5%



LANDING DISTANCE

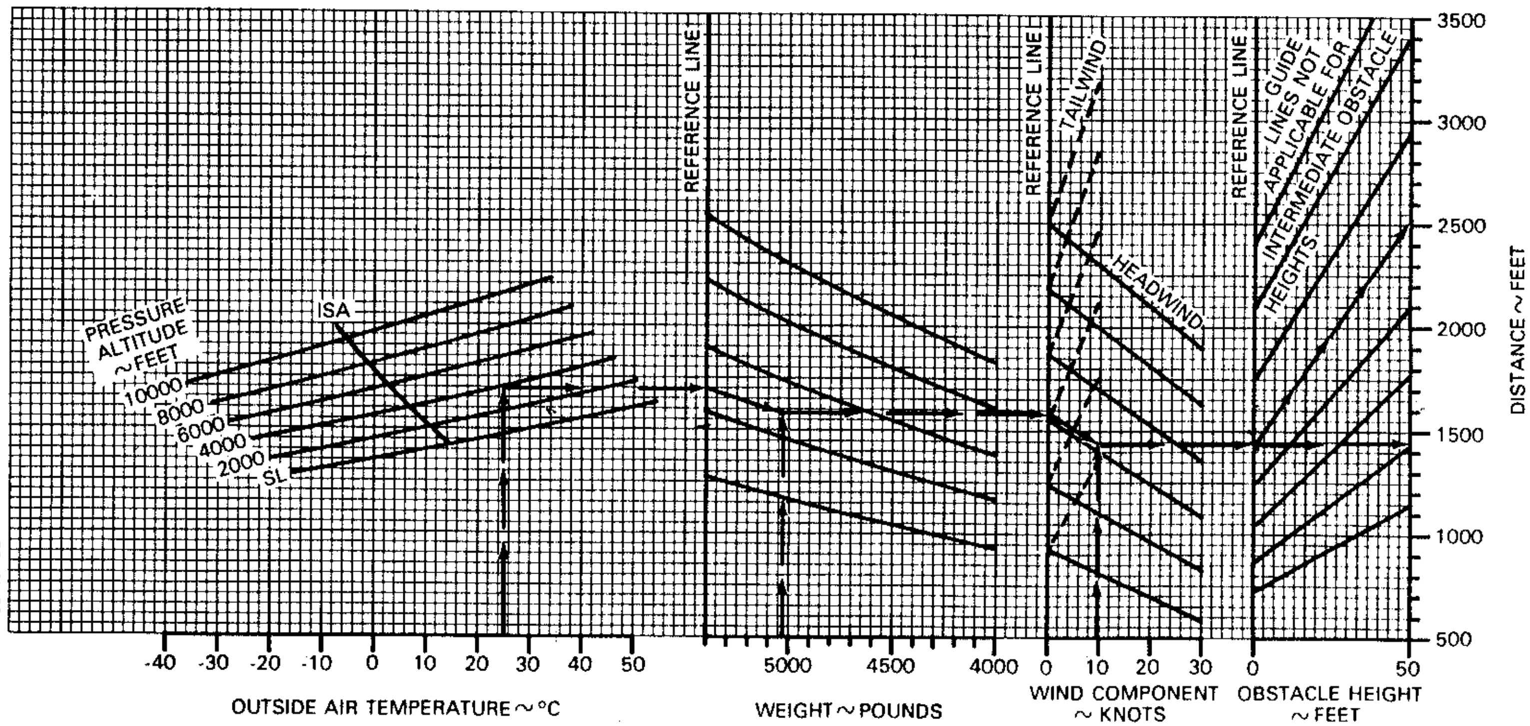
ASSOCIATED CONDITIONS:

POWER	RETARDED TO MAINTAIN 800 FT/MIN ON FINAL APPROACH
FLAPS	DOWN
LANDING GEAR	DOWN
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT ~ POUNDS	SPEED AT 50 FT	
	KTS	MPH
5400	96	110
5000	91	105
4600	87	100
4000	81	93

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	5039 LBS
WIND COMPONENT	9.5 KTS
GROUND ROLL	1450 FT
TOTAL OVER 50 FT OBSTACLE	2500 FT
APPROACH SPEED	91 KTS (105 MPH)



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SECTION VII

SYSTEMS DESCRIPTION

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AIRFRAME

The BEECHCRAFT BARON 58 is a four to six place all-metal, low-wing, twin-engine airplane with retractable tricycle landing gear, and a conventional horizontal and vertical stabilizer.

FLIGHT CONTROLS

CONTROL SURFACES

Control surfaces are bearing supported and operated through push-pull rods and conventional cable systems terminating in bellcranks.

CONTROL COLUMN

The throw-over type control column for elevator and aileron control can be placed in front of either front seat. Pull the T-handle latch at the back of the control arm and position the control wheel as desired. Check for full freedom of movement after repositioning the control.

NOTE
(TH-312 thru TH-772)

If a reduced power throttle position exists when throwing over the control column, it will be necessary to momentarily move the throttle levers forward for passage of the control column.

The optional dual control column is required for flight instruction.

RUDDER PEDALS

To adjust the rudder pedals, press the spring-loaded lever on the side of each pedal arm and move the pedal to its forward or aft position. The adjustment lever can also be used to place the right set of rudder pedals against the floor, (when the copilot brakes are not installed) when not in use.

TRIM CONTROLS

Trim tabs on the rudder, left aileron, and elevator are adjustable with the controls mounted on the center console through closed cable systems. Mechanical position indicators for each of the trim tabs are integrated with their respective controls. The left aileron tab incorporates servo action in addition to its trimming purpose. Elevator trim is accomplished through either the electric or the manual pitch trim system.

ELECTRIC ELEVATOR TRIM

The electric elevator trim system is controlled by the ON-OFF switch located on the instrument panel, a thumb switch on the control wheel and a circuit breaker on the left sidewall. The ON-OFF switch must be in the ON position to operate the system. The thumb switch is moved forward for nose down, aft for nose up and when released returns to the center OFF position. When the system is not being electrically actuated, the manual trim control wheel may be used.

Incorporated in the system is an emergency release button located on the left handle grip of the pilot's control wheel. This button can be depressed to deactivate the system quickly in case of a malfunction in the system. The system will remain deactivated only while the release button is being held in the depressed position.

INSTRUMENT PANEL

FLIGHT INSTRUMENTS

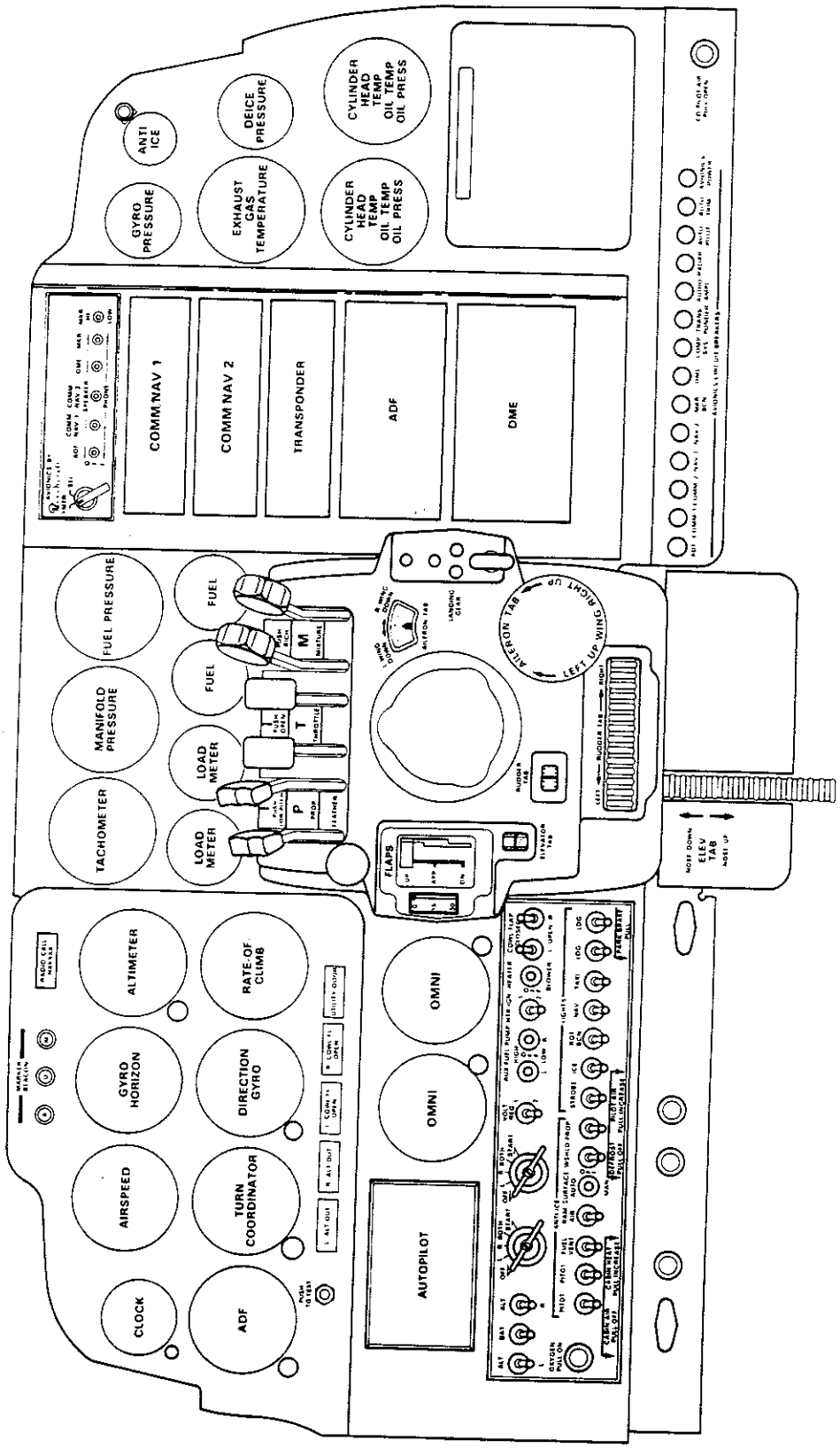
The flight instruments are located on a floating panel directly in front of the pilot's seat. Standard flight instrumentation includes attitude and directional gyros, airspeed, altimeter, vertical speed, turn coordinator, and a clock. A magnetic compass is mounted above the instrument panel and an outside air temperature indicator is located on the left side panel. Located on the right side of the instrument panel is the standard pressure gage for the instrument air system.

POWER PLANT INSTRUMENTS

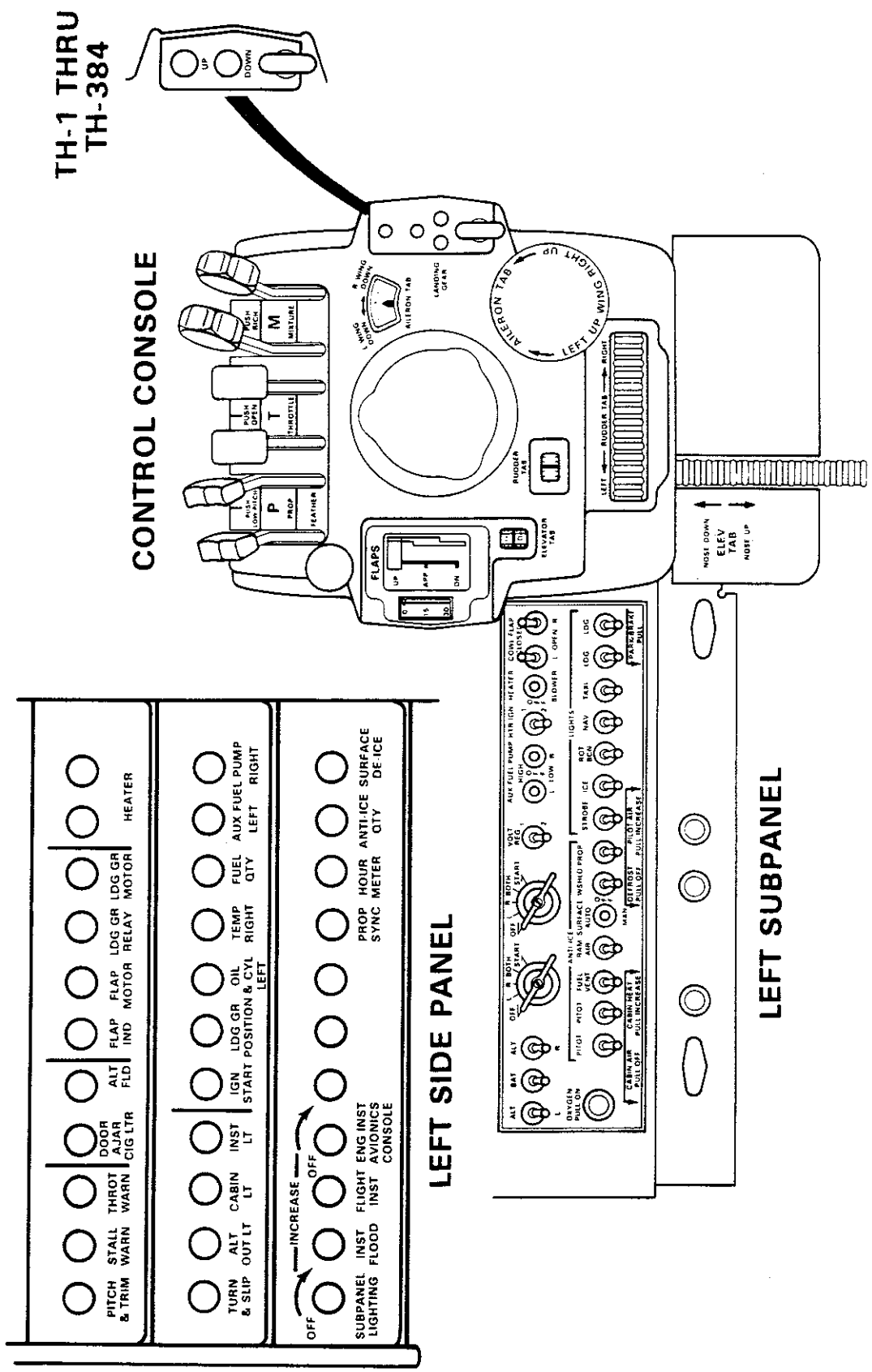
Most of the engine instruments are located in the upper center of the instrument panel. The standard indicators for each engine are as follows: tachometers, manifold pressure, fuel flow, fuel quantity, and loadmeters. Other indicators such as the exhaust gas temperature system, the propeller deice ammeter (or propeller alcohol quantity and deice pressure) are usually installed on the right side of the instrument panel. Two multi-purpose instruments, one for each engine, indicate cylinder head temperature, oil pressure, and oil temperature.

GROUND CONTROL

Spring-loaded linkage from the nose gear to the adjustable rudder pedals allows for nose wheel steering. Smooth turning is accomplished by allowing the airplane to roll while depressing the appropriate rudder pedal. The minimum wing tip turning radius, using partial braking action and differential power, is 31 feet 6 inches.



TYPICAL INSTRUMENT PANEL


TH-1 THRU
TH-384
UP
DOWN
CONTROL CONSOLE
M
MIXTURE
PUSH RICH
T
THROTTLE
PUSH OPEN
P
PROP
FEATHER
PUSH LOW PITCH
FLAPS
UP
APP
DN
0
15
30
RUDDER TAB
ELEVATOR TAB
AILERON TAB
LEFT UP WING
RIGHT UP WING
L WING DOWN
R WING DOWN
AILERON TAB
LANDING GEAR
LEFT ← RUDDER TAB → RIGHT
NOSE DOWN
ELEV TAB
NOSE UP
LEFT SUBPANEL
LEFT SIDE PANEL
PITCH & TRIM
STALL WARN
THROT WARN
DOOR AJAR
CIG LTR
ALT FLD
FLAP IND
FLAP MOTOR
LDG GR RELAY
LDG GR MOTOR
HEATER
TURN & SLIP
ALT OUT LT
CABIN LT
INST LT
IGN START
LDG GR POSITION
OIL TEMP & CYL
TEMP RIGHT
FUEL QTY
AUX FUEL PUMP LEFT
AUX FUEL PUMP RIGHT
SUBPANEL LIGHTING
INST FLOOD
FLIGHT INST
ENG INST AVIONICS CONSOLE
PROP SYNC
HOUR METER
ANTI-ICE QTY
SURFACE DE-ICE
INCREASE
OFF
PULL OFF
PULL INCREASE
PARK/BRKT PULL

WING FLAPS

The wing flaps have three positions; UP, APP (15°), and DOWN (30°), with no intermediate positions. A flap position indicator and a control switch are located on the left side of the control console. The switch must be pulled out of a detent to change the flap position. The flaps will move to either position selected from any previously selected position.

LANDING GEAR SYSTEM

CAUTION

Never taxi with a flat strut.

The landing gear is operated through adjustable linkage connected to an actuator assembly mounted beneath the front seats. The actuator assembly is driven by an electric motor. The landing gear may be electrically retracted and extended, and may be extended manually.

CONTROL SWITCH

The landing gear is controlled by a two-position switch on the right side of the control console. The switch handle must be pulled out of the safety detent before it can be moved to the opposite position. Never operate the landing gear electrically with the handcrank engaged.

CAUTION

Do not change the position of the control switch to reverse the direction of the landing gear while the gear is in transit, as this could cause damage to the retract mechanism.

POSITION INDICATORS *(TH-1 thru TH-384)*

Landing gear position lights are located above the control switch. The lights, red for gear up and green for gear down, illuminate only when the gear has reached the fully retracted or extended position. In addition, a mechanical pointer at the base of the console shows the position of the nose gear during transit and in the full up or full down position.

POSITION INDICATORS *(TH-385 thru TH-772)*

The landing gear position indicator lights are located above the landing gear switch handle. Three green lights, one for each gear, are illuminated whenever the landing gear are down and locked. The red light illuminates anytime one or all of the landing gear are in transit or in any intermediate position. All of the lights will be extinguished when the landing gear are up and locked. Pressing the warning light test button on the instrument panel will verify the landing gear lamp bulbs are illuminating. The intensity of the lamps are automatically lowered for night flights when the navigation lights are turned on.

SAFETY SWITCH

To prevent inadvertent retraction of the landing gear on the ground, a main strut safety switch opens the control circuit when the strut is compressed.

CAUTION

Never rely on the safety switch to keep the gear down during taxi or on take-off, landing roll, or in a static position. Always make certain that the landing gear switch is in the down position during these operations.

WARNING HORN

If either or both throttles are retarded below an engine setting sufficient to sustain two engine flight with the landing gear retracted, a warning horn will sound intermittently. During one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit.

MANUAL EXTENSION

The landing gear can be manually extended, but not retracted, by operating the handcrank at the rear of the pilot's seat. Make certain that the landing gear handle is in the down position and pull the landing gear MOTOR circuit breaker before manually extending the gear. When the electrical system is operative, the landing gear may be checked for full down with the gear position lights, provided the landing gear RELAY circuit breaker is engaged. After the landing gear is down, disengage the handcrank. For electrical retraction of the landing gear after a practice manual extension use procedures outlined in the EMERGENCY PROCEDURES Section.

If the landing gear was extended for emergency reasons, do not move any landing gear controls or reset any switches or circuit breakers until the airplane is on the ground and the malfunction has been determined and corrected, to prevent a gear retraction on the ground. These procedures are outlined in the EMERGENCY PROCEDURES section.

BRAKES

The brakes on the main landing gear wheels are operated by applying toe pressure to the top of the rudder pedals.

CAUTION

Continuous brake application of either the pilot's or copilot's brake pedals in conjunction with an overriding pumping action from the opposite brake pedals could result in the loss of braking action on the side which continuous pressure is being applied.

The parking brake T-handle control is located just left of the elevator tab wheel on the pilot's subpanel. To set the parking brakes, pull the control out and depress the pilot's toe pedals until firm. Push the control in to release the brakes.

CAUTION

The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in ambient temperature can cause the brakes to release or to exert excessive pressures.

NOTE

Only the pilot's brake pedals can be used in conjunction with the parking brake system to set the parking brake.

The brakes hydraulic fluid reservoir is accessible through the nose baggage door. Fluid level is checked with the dipstick attached to the reservoir cap. The brakes require no adjustments, since the pistons move outward to compensate for lining wear.

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BAGGAGE/CARGO COMPARTMENTS

AFT BAGGAGE/CARGO COMPARTMENT

The aft baggage/cargo compartment is accessible through the utility door on the right side of the fuselage. This area extends aft of the pilot's seats to the rear bulkhead. Because of structural limitations, this area is divided into three sub-compartments, each having a different weight limitation. Loading within the baggage/cargo compartment must be in accordance with the data in the WEIGHT AND BALANCE Section. All baggage/cargo must be secured with the approved cargo retention systems.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry passengers in the baggage or cargo area unless secured in a seat.

NOSE BAGGAGE/CARGO COMPARTMENT

The forward baggage/cargo compartment is easily accessible through a large door on the right side of the nose. The door, hinged at the top, swings upward, clear of the loading area. Loading within this area must be within the limitations according to the WEIGHT AND BALANCE section. The nose baggage/cargo compartment incorporates the full width of the fuselage as usable space. This compartment also affords accessibility to the oxygen cylinder and to some of the airplane's avionics. Straps are provided and should be used to secure any baggage or cargo loaded into the nose baggage/cargo compartment.

SEATING

To adjust any of the four standard seats forward or aft, pull up on the release bar below the seat and slide the seat to the desired position. The seat backs of all standard seats can be placed in any of four positions by operating a release lever on the inboard side of each seat. An option is available that provides for the seat backs on all seats (except the pilot's) to be placed in any position from vertical to fully reclined. Outboard armrests for all standard seats are built into the cabin sidewalls. Center armrests can be elevated or positioned flush with the seat cushions. On airplanes TH-733 and after, the 3rd and 4th place chairs are equipped with a locking back to accomodate the shoulder harness, and the seat back can be folded over for access by rotating the red handle located on the lower inboard side of the seat back. The optional fifth and sixth seats can be folded up to provide additional floor space, or folded down to provide access to the optional extended baggage/cargo compartment.

Club seating is available. When occupied, aft facing chairs in the club seating arrangement must have the headrests in the fully raised position during takeoff and landing. When aft facing seats are reversed to the forward facing configuration, maintenance personnel must refer to the shop manual before making the conversion in order to assure proper installation.

SEAT BELTS AND SHOULDER HARNESSES

PRIOR TO TH-733

The optional shoulder harness installation is available for the pilot seats only. The belt is in the "Y" configuration with the single strap being contained in an inertia reel attached to the overhead canopy structure of the cockpit. The two straps are worn with one strap over each shoulder and fastened by metal loops into the seat belt buckle. The harness should be used with the seats in the upright position. The spring loading at the inertia reel keeps the harness snug but will allow normal movement required during flight operations. The inertia reel is designed with a locking device that will secure the harness in the event of sudden forward movement or an impact action.

TH-733 AND AFTER

The shoulder harness is a standard installation for all seats and must be used with the seats in the upright position. The spring loading at the inertia reel keeps the harness snug but will allow normal movement during flight operations. The inertia reel is designed with a locking device that will secure the harness in the event of sudden forward movement or an impact action.

The strap is worn over the shoulder and down across the body, where it is fastened by a metal loop into the seat belt buckle. For the pilot seats, the harness strap is contained in an inertia reel attached to the side canopy structure of the cockpit. The inertia reel is covered with an escutcheon and the strap runs up from the reel location to a looped fitting attached to the window frame just aft of the pilot seats. For the third and fourth passenger seats, the inertia reel is attached into the seat back structure and is covered with the seat back upholstery. The strap runs up the seat back and over the outboard corner of the seat back. For the fifth and sixth passenger seats, the strap is contained in an inertia reel attached to the upper fuselage side structure, just aft of the seat back and is covered with an escutcheon.

NOTE

The seat belt is independent of the shoulder harness, but the outboard seat belt and the shoulder harness must be connected for stowage when the seat is not occupied.

DOORS, WINDOWS AND EXITS

FORWARD CABIN DOOR

The airplane has a conventional cabin door on the forward right side of the fuselage and when closed,the outside cabin door handle is spring loaded to fit into a recess in the door to create a flat aerodynamically clean surface. The door may be locked with a key. To open the door from the outside, lift the handle from its recess and pull until the door opens.

To close the cabin door from the inside, observe that the door handle is in the unlocked position. In this position, the latch handle is free to move approximately one inch in

either direction before engagement of the locking mechanism. Then grasp the door and firmly pull the door closed. Rotate the door handle fully counterclockwise into the locked position. When the door is properly locked, the door latch handle is free to move approximately one inch in either direction.

NOTE

When checking the door latch handle, do not move it far enough to engage the door latch release mechanism.

Press firmly outward at the top rear corner of the door. If any movement of the door is detected, completely open the door and close again following the above instructions.

To open the door from the inside, depress the lock button and rotate the handle clockwise.

UTILITY DOOR

A utility door aft of the cabin door is provided for loading bulky cargo or to accommodate passengers. The utility door is a double door with each half hinged at the forward and aft edge of the door opening. The rear half of the door must be closed first. A latch on the forward edge of the door moves downward to a locked position to secure the hooks at the top and bottom of the door to the door frame. The front half of the door cannot be fully closed until the latch of the aft door is latched and flush with the edge of the door. After the forward half of the door is closed, it can be latched from the outside by rotating the half-moon shaped handle to the CLOSED position. A conventional handle on the inside of this door provides for opening or closing from the inside.

A BEECH approved kit is available to provide for operation with the cargo doors removed. A baffle is to be installed on the forward edge of the door and placards installed in the airplane. With the doors removed, assure that all registration numbers are visible on the side of the airplane. With doors removed, all occupants not wearing parachutes must wear restraining belts.

The utility door ajar warning light is tested by a PRESS-TO-TEST switch. When the switch is held in, the light is energized in order to verify that it illuminates.

OPENABLE CABIN WINDOWS

To open window; release latch front of bar, pull bar at the bottom of the window out and upward. Window will open approximately two inches.

Close window by pulling inward and down on the bar at the bottom of the window. Resistance will be felt as the bar moves downward. Continue moving bar downward to its lowest position. Check that bar is locked by the latch.

NOTE

Windows are to be closed before takeoff and during flight. While closing window, ascertain that the emergency release pin (which allows the window to open fully for emergency exit) is securely in place.

EMERGENCY EXITS

To open the emergency exit provided by the openable middle window on each side of the cabin:

1. Lift the latch.
2. Pull out the emergency release pin and push the window out.

The above procedure is described on a placard installed below the left and right middle windows after compliance with BEECHCRAFT Service Instructions 1241.

CONTROL LOCKS

CONTROL COLUMN TYPE

1. Insert the spring end of the rudder control locking pin into the hole at the top of the pilot's left rudder pedal.
2. Neutralize the pedals and insert the opposite end of the locking pin into the right pedal by compressing the spring.
3. Place the elevator and aileron controls in an approximately neutral position.
4. Insert the elevator-aileron control locking pin into the hole in the control column hanger and the hole in the underside of the control column tube.
5. Close the throttles and place the throttle lock over the throttle control knobs.

To lessen the possibility of taxi or takeoff with the control lock installed, remove the locking components in the following order: rudder, throttle and elevator-aileron.

OR

THROTTLE TYPE

The control column pin assembly is placarded with the installation instructions. Install the assembly with the instructions facing the instrument panel. Placard reading CONTROLS LOCKED, REMOVE BEFORE FLIGHT will be facing pilot if properly installed.

1. Close throttles, install pin between levers, through collar lock and control column. (Rotate control wheel approximately 12° to the right.)
2. Route cable and rudder lock around right side of control column, position pedals in aft position and install lock in rudder pedals.

POWER PLANTS

The BEECHCRAFT BARON 58 is powered by two Continental IO-520-C six-cylinder, horizontally opposed, fuel injected engines rated at 285 hp at 2700 rpm.

POWER PLANT CONTROLS

PROPELLER, THROTTLE, AND MIXTURE

The control levers are grouped along the upper face of the control console. Their knobs are shaped so they can be identified by touch. A single controllable friction knob below and to the left of the control levers prevents creeping.

INDUCTION AIR

(TH-1 thru TH-384)

The induction air controls are located near the bottom of the control console. Individual control levers for each engine provide three sources of induction air: unfiltered ram, alternate, and filtered ram. The UNFILTERED RAM position is at the lower limit of lever travel and provides unfiltered ram air. Detents placarded ALTERNATE and FILTERED are located above the UNFILTERED RAM position. Moving the control to the ALTERNATE position blocks the induction system from operating on filtered or unfiltered air. This causes a spring-loaded door on the alternate air box to be sucked open and the engine draws air from the engine compartment. If the filtered ram air is blocked due to ice or foreign material against the filter, or the entire induction system is blocked at the air scoop, the spring-loaded door will suck open regardless of the position selected, providing the engine with alternate air.

Unfiltered ram air provides slightly better engine performance. However, where dusty conditions prevail, filtered air should be selected.

(TH-385 thru TH-772)

Induction air is available from filtered ram air or unfiltered alternate air. Filtered ram air enters from the intake air scoop on top of the cowling. Should the filter become obstructed, a spring-loaded door on the alternate air intake will open automatically and the induction system will operate on alternate air taken from the engine accessory section.

ENGINE ICE PROTECTION

Engine ice protection consists of electrothermal fuel vent heaters controlled by a switch on the left panel, and an automatic alternate air induction system.

The only significant ice accumulation is impact ice on the inlet scoop and filter. Should the induction air scoop or filter become clogged with ice, a spring-loaded door on the firewall will open automatically, and the induction system will operate on alternate air.

LUBRICATION SYSTEM

The engine oil system for each engine is the full pressure, wet sump type, with a full flow, integrally mounted oil filter and has a 12-quart capacity. Oil operating temperatures are controlled by an automatic thermostat bypass control. The bypass control will limit oil flow through the oil cooler when operating temperatures are below normal and will permit the oil to bypass the cooler if it should become blocked.

The oil system may be checked through access doors in the engine cowling. A calibrated dip stick attached to the filler cap indicates the oil level. Due to the canted position of the engines, the dip sticks are calibrated for either right or left engines and are not interchangeable.

The oil grades listed in the Approved Engine Oils in the SERVICING section are general recommendations only, and will vary with individual circumstances. The determining factor for choosing the correct grade of oil is the average ambient temperature.

COWL FLAPS

(TH-1 thru TH-384)

The cowl flap for each engine is controlled by a separate switch located on the pilot's subpanel to the left of the control console. The cowl flap is closed when the switch is in the up position and open when the switch is down. An amber annunciator light on the floating instrument panel illuminates when its respective cowl flap is between one third and full open.

(TH-385 thru TH-772)

The cowl flap for each engine is controlled by a manual control lever located on the lower center console. The cowl flap is closed when the lever is in the up position and open when the lever is down.

PROPELLERS

The engines are equipped with either two or three blade, full feathering, constant speed, propellers. Springs aided by counterweights move the blades to high pitch. Engine oil under governor-boosted pressure moves the blades to low pitch.

The propellers should be cycled occasionally during cold weather operation. This will help maintain warm oil in the propeller hubs so that the oil will not congeal.

HARTZELL AIR-CHARGED PROPELLER DOMES

If propeller air dome pressure is lost during flight, the following symptoms may be noticed: sluggish propeller rpm reduction; overspeed and poor synchronization during higher rpm operation; and propeller overspeed upon the instant opening of the throttle, followed by poor rpm recovery.

NOTE

In the event of pressure loss, feathering capability is lost, but flight can be continued by reducing air speed to regain rpm control. The malfunction should be corrected by an authorized service center before further flight.

PROPELLER SYNCHRONIZER

(TH-467 thru TH-772 except TH-473 and TH-474)

The propeller synchronizer automatically matches the rpm of both propellers. The system's range of authority is limited to approximately 25 rpm. Normal governor operation is unchanged but the synchronizer will continuously monitor propeller rpm and adjust one governor as required.

A magnetic pickup mounted in each propeller governor transmits electric pulses to a transistorized control box installed behind the pedestal. The control box converts any pulse rate differences into correction commands, which are transmitted to the appropriate governor.

A toggle switch installed on the pedestal turns the system on. To operate the system, synchronize the propellers in the normal manner and turn the synchronizer on. To change rpm, adjust both propeller controls at the same time. This will keep the setting within the limiting range of the system. If the synchronzer is on but unable to adjust the propeller rpm, the system has reached its range limit. Turn the synchronizer switch off, synchronize the propellers manually, and turn the synchronizer switch on.

PROPELLER SYNCHROSCOPE

A propeller synchroscope, located in the tachometer case, operates to give an indication of synchronization of propellers. If the right propeller is operating at a higher rpm than the left, the face of the synchroscope, a black and white cross pattern, spins in a clockwise rotation. Counterclockwise rotation indicates a higher rpm of the left propeller. This instrument aids the pilot in accomplishing manual synchronization of the propellers.

FUEL SYSTEM

The fuel system is an OFF-ON-CROSSFEED arrangement. The fuel selector panel, located on the floor forward of the front seats, contains the fuel selector for each engine and a schematic diagram of fuel flow.

The standard wing fuel system has a total capacity of 142 gallons. Two optional systems are available. The first has a total capacity of 172 gallons; the second, comprising the 172 gallon system plus wet wing tip tanks, provides a total capacity of 200 gallons. The fuel value placarded adjacent to each filler cap indicates fuel capacity and usable fuel when that wing fuel system is full. Refer to the LIMITATIONS section for usable fuel in each system.

A vapor return line returns excess fuel from the engine to its respective wing system. All of the fuel cells, standard or optional, in each wing are interconnected in order to make all the usable fuel in each wing available to its engine when the fuel selector valve is turned to ON. The standard 142 gallon and optional 172 gallon fuel systems are filled through a single filler located in each wing. When the wet wing tip option is installed (200 gallons total), there are two additional filler caps, one per wing. Refer to the SERVICING section for additional information.

CAUTION

When the wet wing tip tanks are filled with fuel, DO NOT open the outboard wing leading edge filler caps, as fuel will exit from those opening.

The standard 142 gallon fuel system and the optional 172 gallon fuel system have six drain locations. There are two additional drain locations when the wet wing tip tanks are installed.

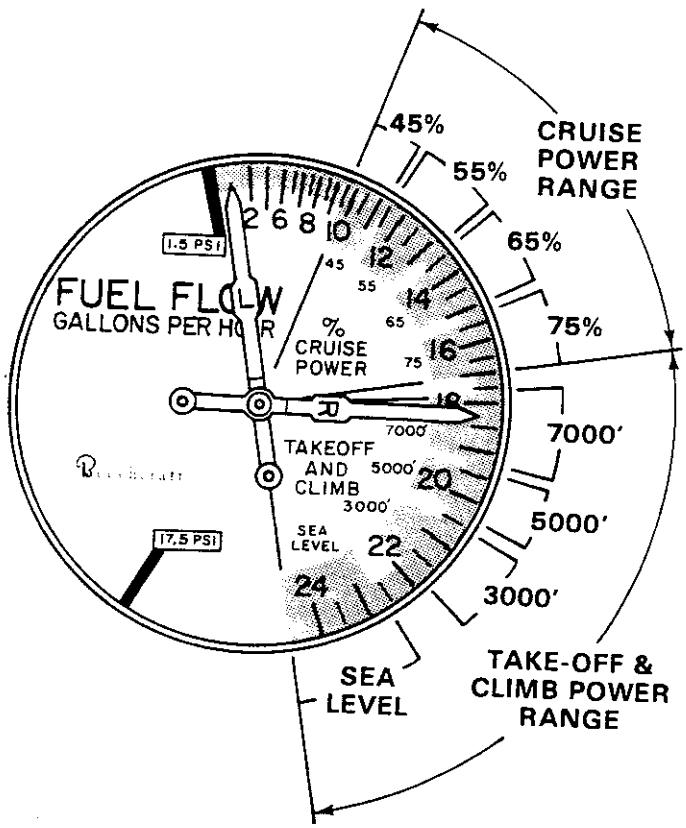
Fuel quantity is measured by float type transmitter units which transmit the common level indication to a single indicator for each respective wing system.

When the wet wing tip fuel system is installed, the fuel quantity indicators will read FULL until the fuel quantity remaining is less than 75 gallons. When this occurs, the quantity indicated is coordinated to the total usable fuel supply.

FUEL FLOW INDICATOR

The dual fuel flow indicator on the instrument panel is calibrated in gallons per hour, the green arc indicating fuel flow for normal operating limits. Red radials are placed at the minimum and maximum allowable fuel pressures.

In the cruise power range the green sectors cover the fuel flow from 45% to 75% power. The lower edge of each sector is the cruise-lean setting and the upper edge is the best power setting for that particular power range. When cruise RPM is set in accordance with cruise power setting tables in the PERFORMANCE section, these sectors provide approximate percent power information.



The takeoff and climb range is covered by green radials for climb at various altitudes. These markings represent the mixtures which should be set for the altitudes shown and correspond to fuel flow settings in the performance section.

FUEL CROSSFEED (One Engine Inoperative Only)

The fuel lines for the engines are interconnected by crossfeed lines. During normal operation each engine uses its own fuel pumps to draw fuel from its respective wing fuel system. However, on emergency crossfeed operations either engine can consume the available fuel from the opposite side.

The fuel crossfeed system is provided for use during emergency conditions. The system cannot be used to transfer fuel from one wing system to the other. The procedure for using the crossfeed system is described in the EMERGENCY PROCEDURES section.

AUXILIARY FUEL PUMPS

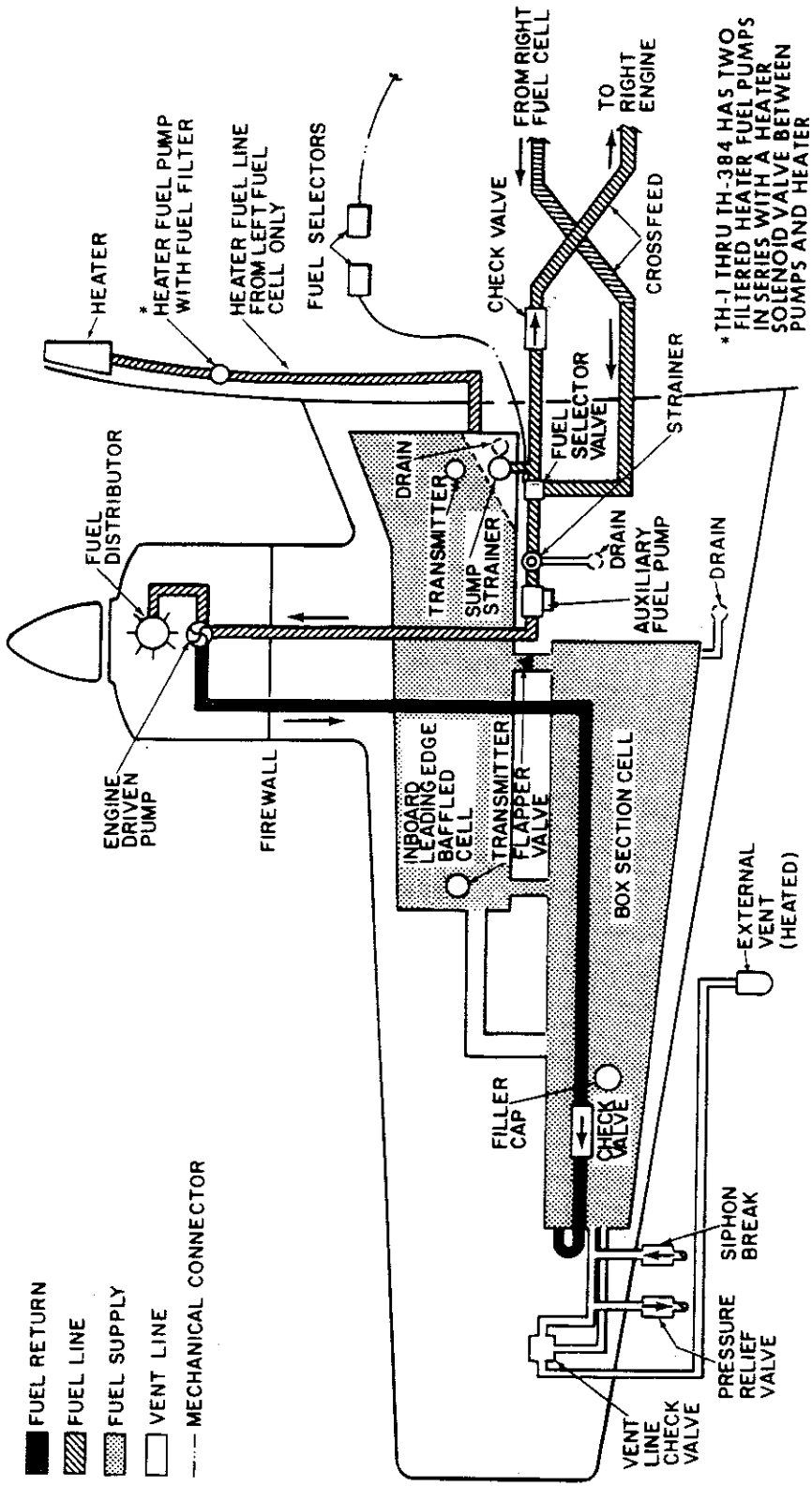
An individual two-speed electric auxiliary fuel pump is provided for each engine. HIGH pressure, OFF or LOW pressure is selected with each auxiliary fuel pump switch on the pilot's subpanel. High pressure is used for providing fuel pressure before starting, and provides near maximum engine performance, should the engine-driven pump fail. Low pressure may be used in any operating mode to eliminate pressure fluctuations resulting from high ambient temperatures and/or high altitudes. The high pressure position should not be selected while the engine is operating except in the event of engine-driven pump failure since the high pressure mode supplies a greater pressure than can be accepted by the injection system during normal operation.

PARTIAL FUEL LOADING *(TH-385 thru TH-772)*

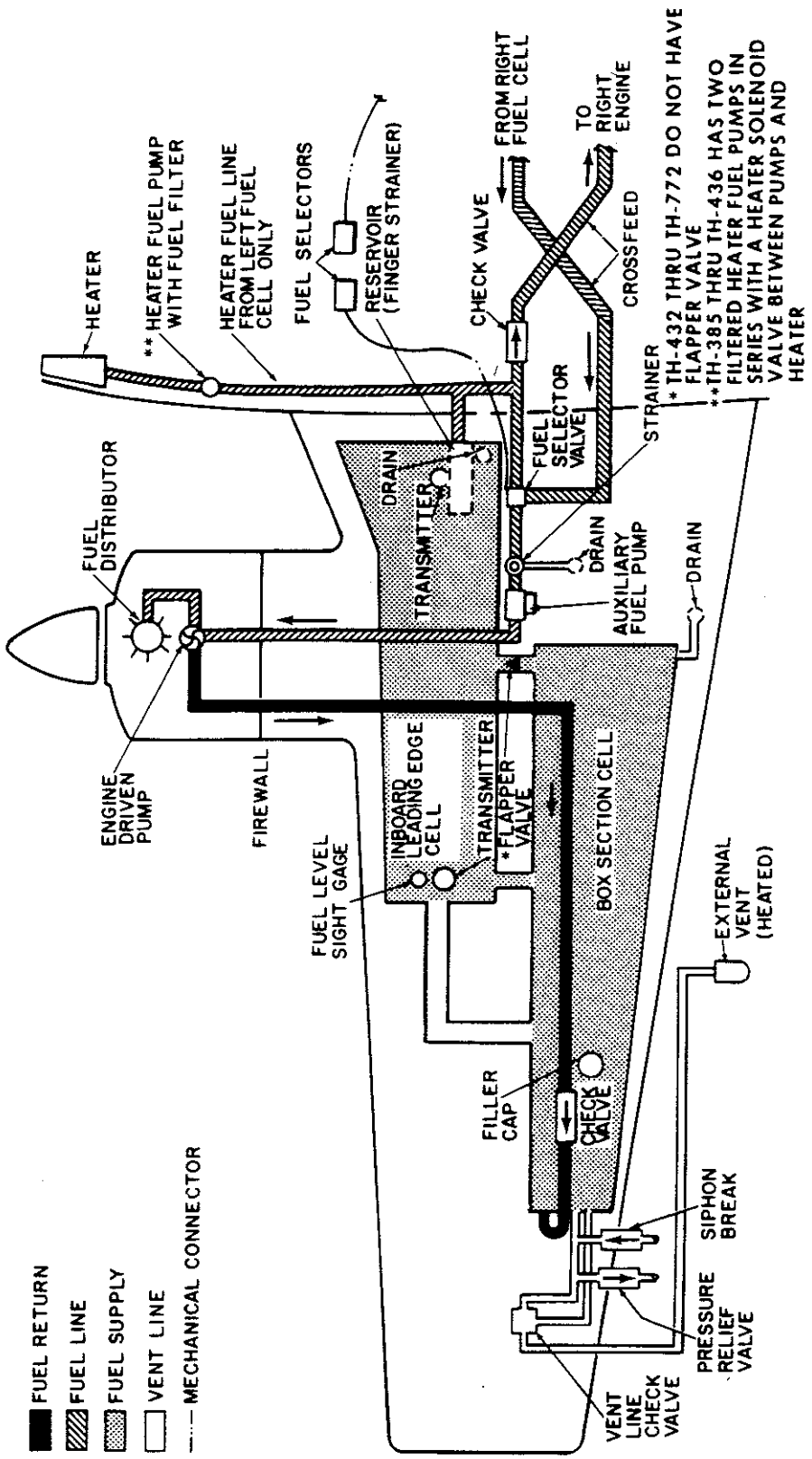
A visual fuel level sight gage in each wing leading edge, outboard of the engine nacelle, can be used for partial filling or off-loading of fuel. This gage is to be used only when it reads within the calibrated areas.

FUEL REQUIRED FOR FLIGHT

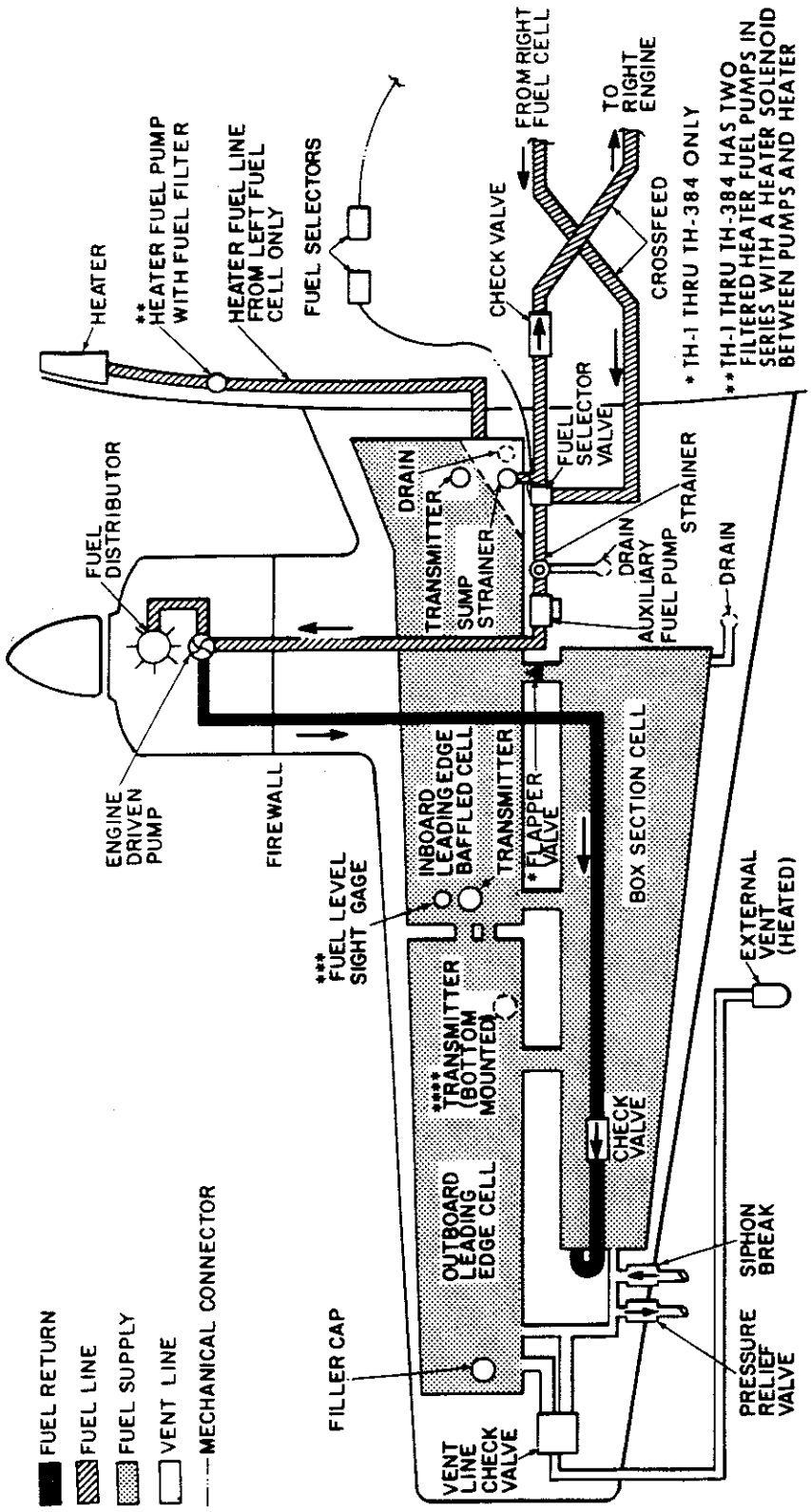
Flight planning and fuel loading is facilitated by the use of fuel quantity indicators that have been coordinated with the usable fuel supply. It is the pilot's responsibility to ascertain that the fuel quantity indicators are functioning and maintaining a reasonable degree of accuracy, and be certain of ample fuel for a flight. A minimum of 13 gallons of fuel is required in each wing system before takeoff. An inaccurate indicator could give an erroneous indication of fuel quantity. If the pilot is not sure that at least 13 gallons are in each wing system, add necessary fuel so that the amount of fuel will not be less than 13 gallons per wing system at takeoff. Plan for an ample margin of fuel for any flight.



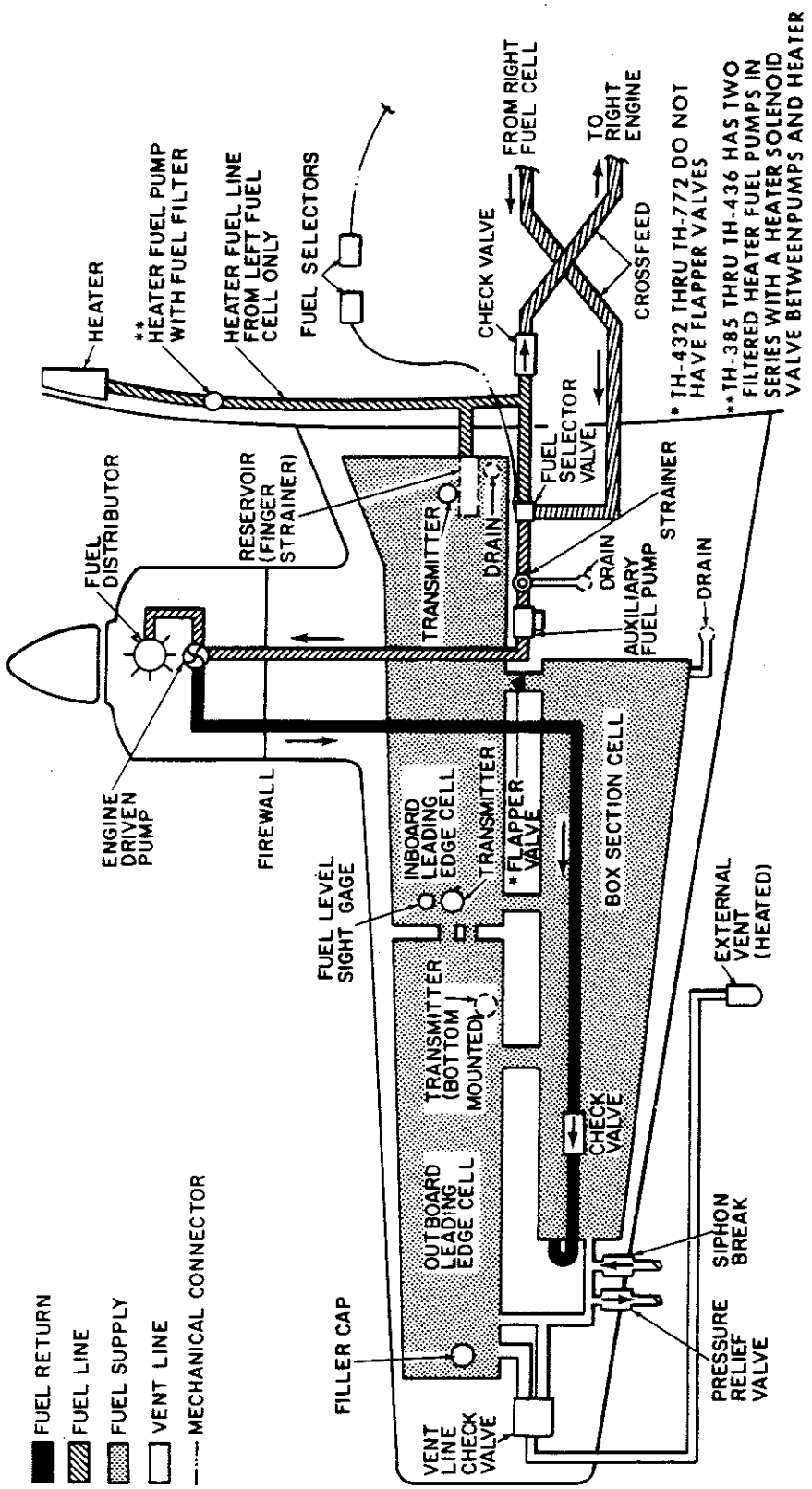
FUEL SYSTEM, 142 Gallon Capacity
(136 Gallons Usable, TH-1 thru TH-384)



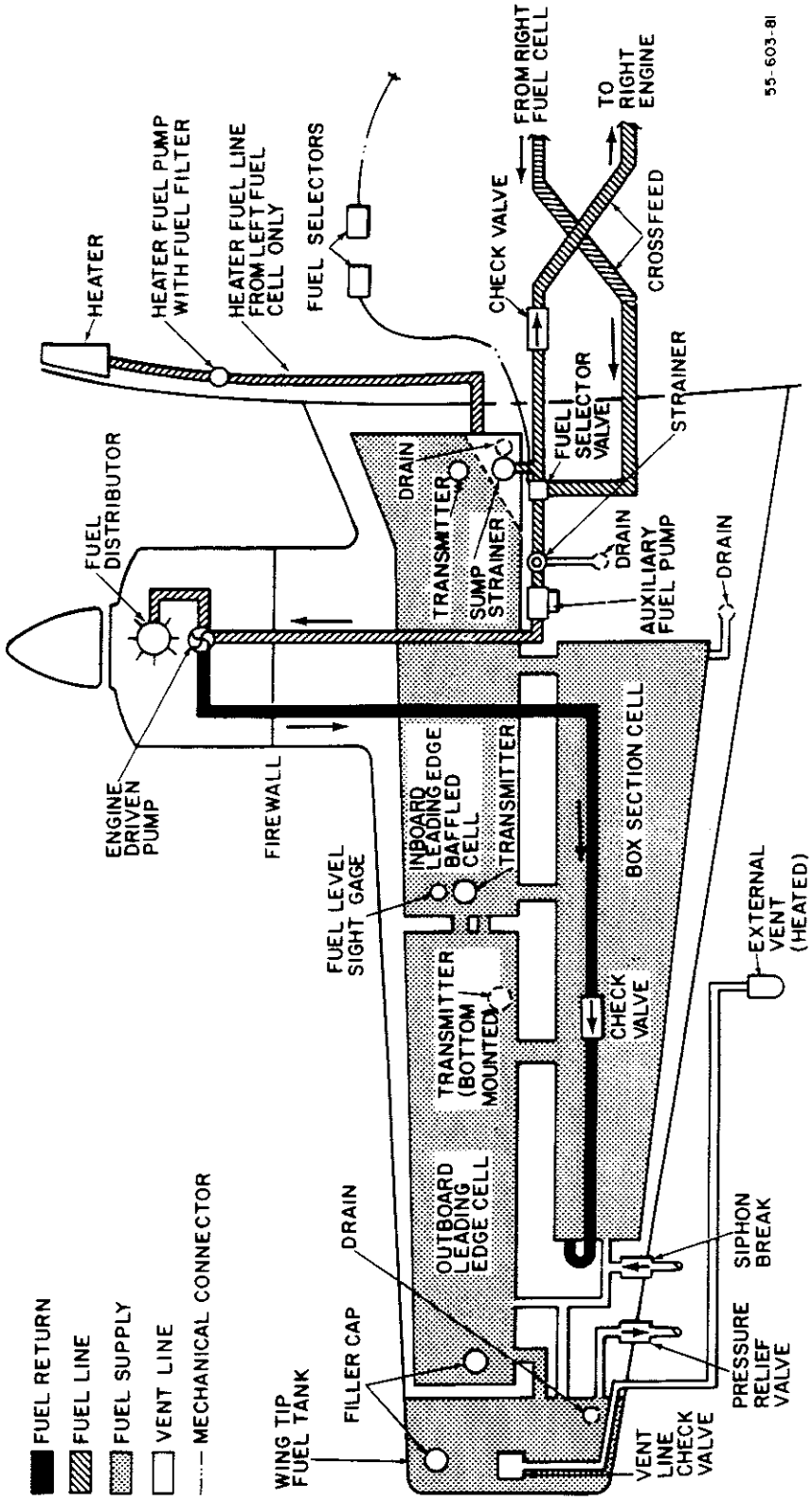
FUEL SYSTEM, 142 Gallon Capacity
(136 Gallons Usable, TH-385 thru TH-772)



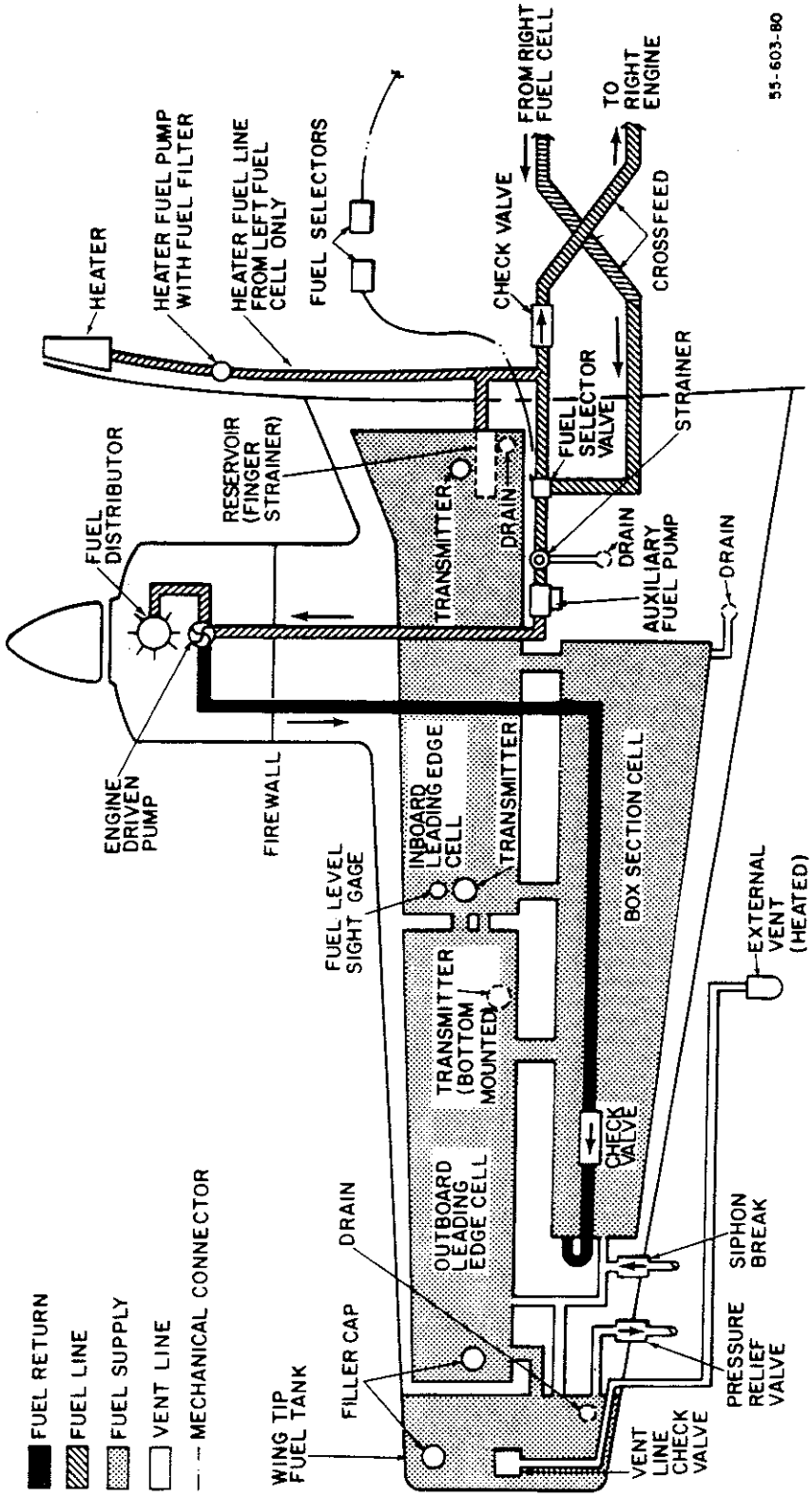
FUEL SYSTEM, 172 Gallon Capacity
(166 Gallons Usable, TH-1 thru TH-384, TH-766)



FUEL SYSTEM, 172 Gallon Capacity
(166 Gallons Usable, TH-385 thru TH-772 except TH-766)



FUEL SYSTEM, 200 Gallon Capacity
(194 Gallons Usable, TH-1 thru TH-384 and TH-766)



FUEL SYSTEM, 200 Gallon Capacity
(194 Gallons Usable, TH-385 thru TH-772 except TH-766)

ELECTRICAL SYSTEM

In general, the airplane's circuitry is the single-wire, ground return type. The battery, magneto/start, and alternator switches are located on the left subpanel. This panel contains most of the electrical system switches and switch type circuit breakers. Each is placarded as to its function. The remainder of the electrical equipment circuit breakers are located on the pilot's side panel. Avionics circuit breakers are located on the right subpanel.

BATTERY

One 17 ampere-hour, 24-volt lead acid battery is standard. Two 25 ampere-hour, 12-volt lead acid batteries, connected in series, are offered as options. The battery installation is located beneath the floor of the nose baggage compartment. Battery servicing procedures are described in the SERVICING section. The battery switch can be turned off in flight and the alternator will remain on the line.

ALTERNATORS

Two 50-ampere, 24-volt, gear-driven alternators are controlled by two transistorized voltage regulators. Only one regulator is operable in the system at any one time. The remaining regulator is used as an alternate or standby unit. When switched into the circuit, either regulator will adjust alternator output to the required electrical load, including battery recharging. Selection of the regulators is provided by a two-position selector switch on the pilot's subpanel. The alternators are protected by current limiters.

Individual alternator output is indicated by two loadmeters on the instrument panel. The loadmeters give a percentage reading of the load on the system.

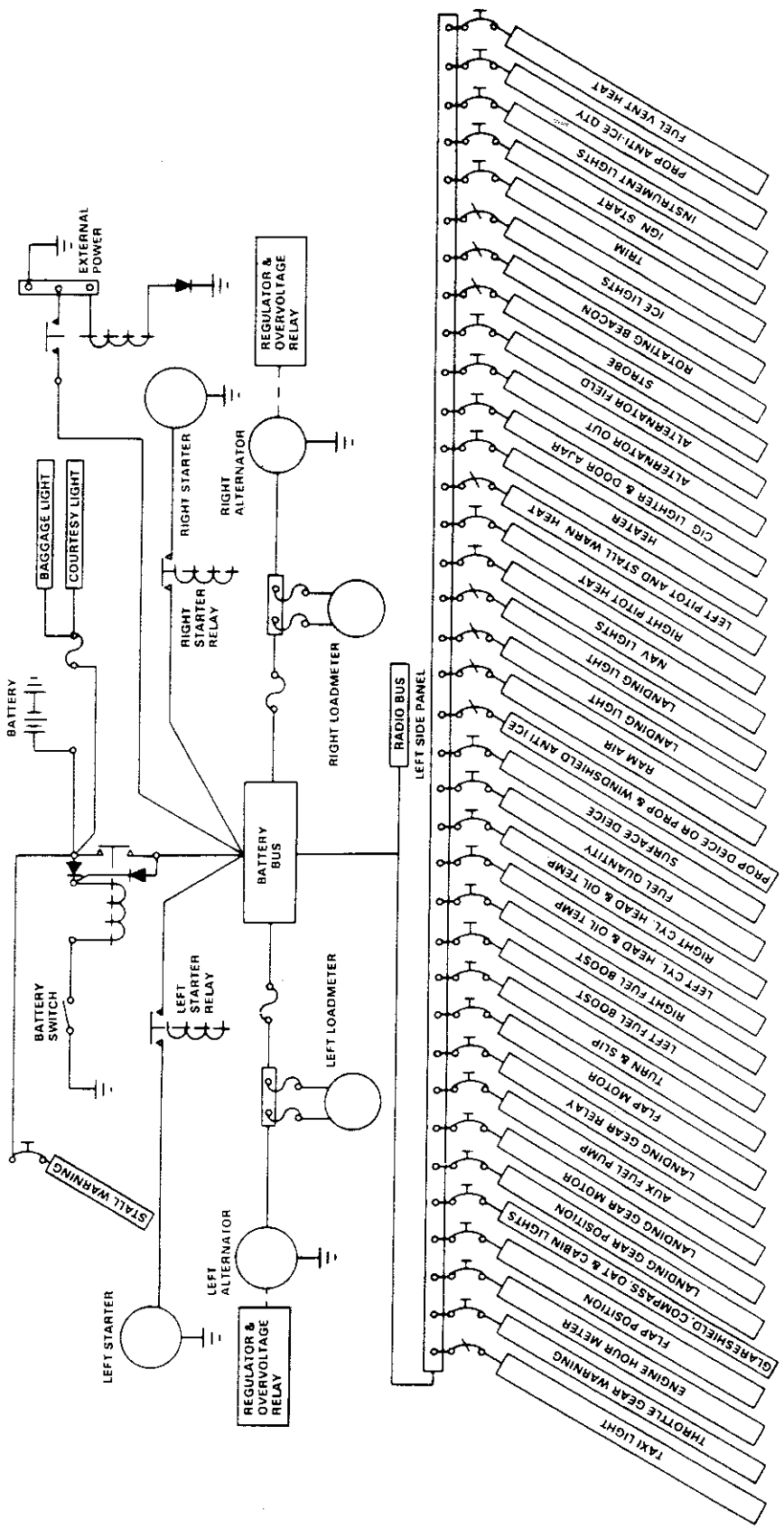
Two warning lights, placarded ALTERNATOR-L-R, located in the floating instrument panel, will illuminate whenever the respective alternator is disconnected from the bus by low voltage or an over-voltage condition or with the switch in the OFF position. Any time a failure is detected. the appropriate alternator should be turned off. These lights can be tested by the PRESS-TO-TEST - WARN LIGHT switch, located on the floating instrument panel.

STARTERS

The starters are relay-controlled and are actuated by rotary type, momentary-on switches incorporated in the magneto/start switches located on the pilot's subpanel. To energize the starter circuit, hold the magneto/start switch in the START position. After starting, release the switch to the BOTH position.

EXTERNAL POWER

The external power receptacle is located in the outboard side of the left nacelle and accepts a standard AN type plug. The power unit should be capable of delivering at least 300 amperes for starting. Before connecting an external power unit, turn the electrical systems and avionics off to avoid damage due to electrical surges. If the unit does not have a standard AN type plug, check the polarity (negative ground) and connect the positive lead from the external power unit to the center and aft post of the airplane's receptacle. The negative lead connects to the front post. When external power is connected, the battery switch should be turned on. If polarity is reversed, a diode in the coil circuit will prevent contactor operation.



POWER DISTRIBUTION SCHEMATIC

LIGHTING SYSTEM

INTERIOR LIGHTING

A courtesy light located in the door will be illuminated any time the door is in the open position. The cabin dome light is operated by an OFF-ON switch forward of the light. Individual reading lights above the standard third and fourth or the optional fifth and sixth seats are operated by switches between the air and light outlets. Four rheostat switches are located on the lower level of the circuit breaker panel. One switch adjusts the intensity of the individual instrument lights for the instruments directly above the pilot's subpanel. The second switch regulates the lighting for the avionics panel, the fuel selector panel, and the trim tab indicators. The third switch controls the intensity of the instrument lights in th glareshield. The fourth switch controls the electroluminescent lighting in the pilot's subpanel.

On aircraft with serials TH-1 thru TH-174, the magnetic compass light and the outside air temperature indicator light are controlled by a momentary PUSH-ON switch located above the outside air temperature indicator. On aircraft TH-175 thru TH-772, the switch for these lights is located on the pilot's control wheel.

EXTERIOR LIGHTING

The switches for the navigation lights, landing light(s), rotating beacons, nose gear taxi light (if installed), and wing ice light(s) are at the top of the pilot's subpanel. The two wing leading edge landing lights are operated by separate switches. With optional wing tip fuel tanks a single nose gear landing light replaces the two leading edge landing lights and the optional nose gear taxi light. For longer

battery and lamp service life, use the landing light(s) only when necessary. Avoid prolonged operation, during ground maneuvering, which could cause overheating. The optional taxi light is offered for use during ground operation. At night, reflections from rotating anti-collision lights on clouds, dense haze, or dust can produce optical illusions and vertigo. The use of these lights is not advisable under instrument or limited VFR conditions.

HEATING AND VENTILATION SYSTEM

CABIN HEATING

A combustion heater in the nose supplies heated air to the cabin. Outlets are located forward of the pilot and copilot seats, at the rear of the copilot's seat, and at the rear of the right passenger seat. The fifth outlet provides heated air for windshield defrosting.

In flight, fresh ram air enters an intake on each side of the nose cone, passes through the heater, and is distributed to the cabin outlets. For ground operation, a blower maintains airflow through the system.

If a malfunction resulting in dangerously high temperatures should occur, a thermostat will trip a circuit breaker in the heater power circuit. This circuit breaker cannot be reset in flight. MAKE CERTAIN ANY MALFUNCTION CAUSING THE OVERHEAT CIRCUIT BREAKER TO TRIP IS CORRECTED BEFORE ATTEMPTING TO OPERATE THE HEATER AGAIN.

HEATER OPERATION

1. A three-position switch, placarded BLOWER, OFF, and HEATER, is located on the pilot's subpanel. To place the heating system in operation, move the switch to the HEATER position.

2. The CABIN AIR control, which regulates the amount of intake air, is below the left side of the pilot's subpanel. Push the CABIN AIR control full forward.

3. Pull out the CABIN HEAT control to the right of the CABIN AIR control to increase the temperature of the heated air. Push the CABIN HEAT control in to decrease temperature.

4. For windshield defrosting, push in the DEFROST control located to the right of the CABIN HEAT control.

5. To direct heated air onto the pilot's feet, pull out the PILOT AIR control to the right of the DEFROST control.

6. The COPILOT AIR control, identical to the PILOT AIR control, is located below the right side of the instrument panel.

HEAT REGULATION

For maximum heat, the CABIN AIR control can be pulled partially out to reduce the volume of incoming cold air and permit the heater to raise the temperature of the admitted air. However, if the CABIN AIR control is pulled out more than halfway, the heater will not operate.

The volume of air available for the pilot outlet and the copilot outlet can be divided between the two outlets as desired by adjusting each control individually.

More heated air will be available for defrosting by reducing the flow of air from the pilot outlet, copilot outlet, or both.

The PILOT AIR and COPILOT AIR controls can be used to regulate the amount of air distributed to the two rear outlets.

HEATER BLOWER

When the three-position switch on the pilot's subpanel is placed in either the HEATER position or the BLOWER position, the blower will operate if the landing gear is in the extended position and the CABIN AIR control is more than halfway in. The blower will automatically shut off if the landing gear is retracted or the CABIN AIR control is pulled out more than halfway.

CABIN VENTILATION

In flight, to provide unheated air for the same cabin outlets used for heating, push the CABIN AIR and CABIN HEAT controls forward.

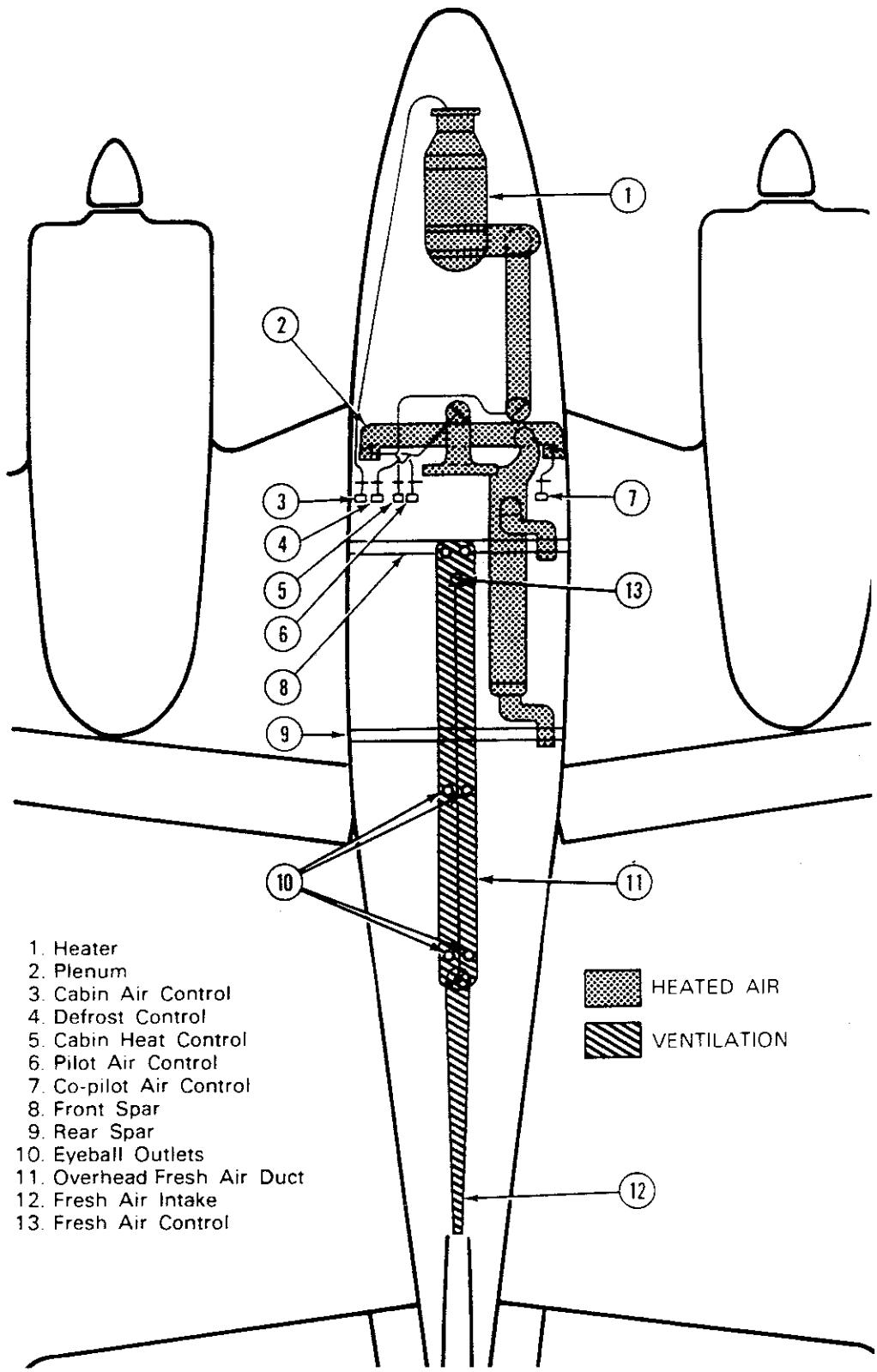
For ventilation during ground operation, push the CABIN AIR control forward and place the three position switch on the pilot's subpanel in the BLOWER position.

EXHAUST VENTS

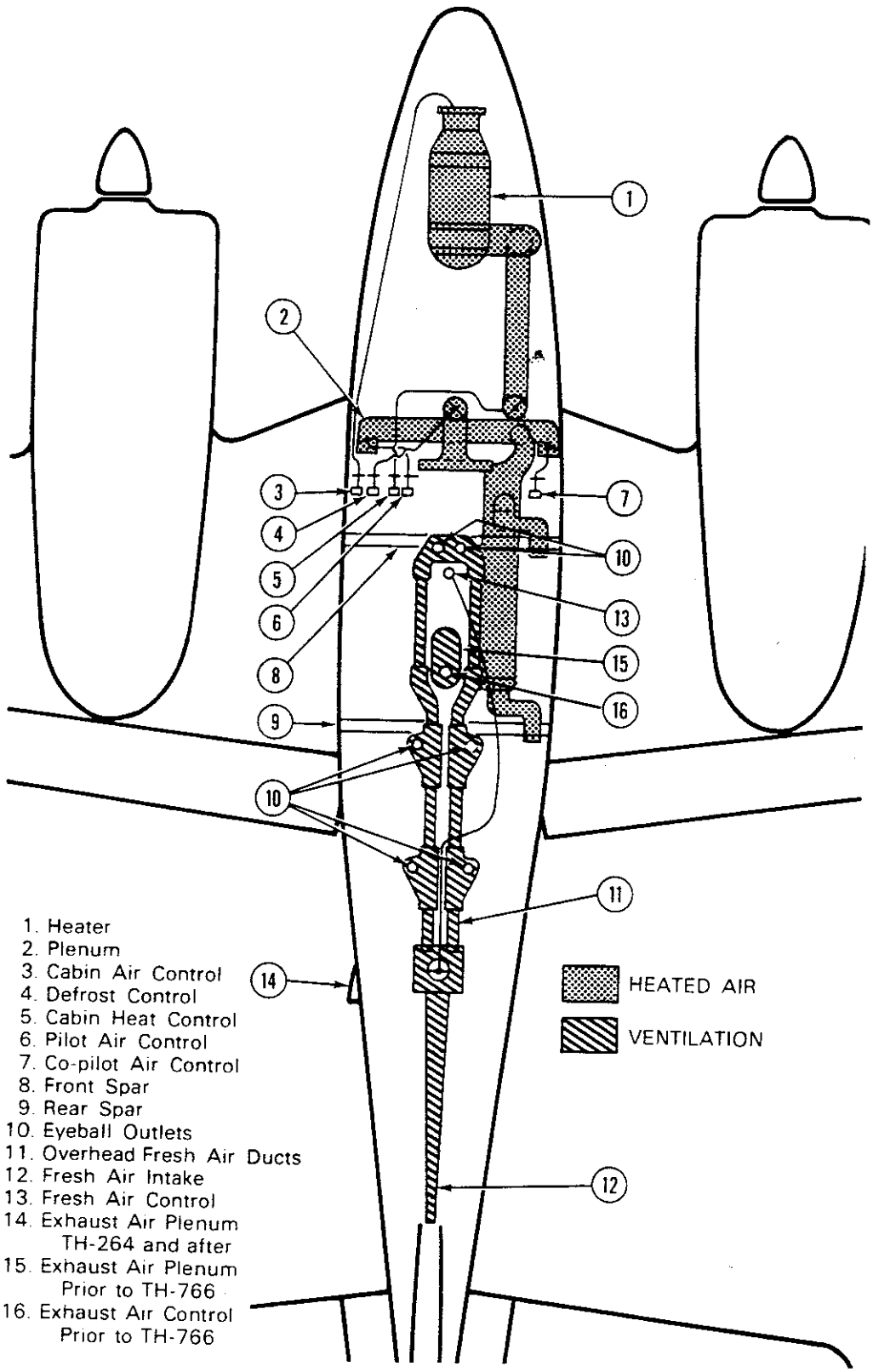
ON Serials TH-1 thru TH-765, an adjustable cabin air exhaust vent is located aft of the radio speaker in the overhead panel. The overhead vent can be closed by a control located in the overhead panel. In addition, a fixed exhaust vent is located in the aft cabin (effective TH-264 and after).

INDIVIDUAL FRESH AIR OUTLETS

Fresh ram air from the intake on the left side of the dorsal fairing is ducted to individual outlets above each seat, including the optional fifth and sixth seats. A master control in the overhead panel just aft of the front air outlets enables the pilot to adjust the amount of ram air available to all outlets. The volume of air at each outlet can be regulated by rotating the outlet. Each outlet can be positioned to direct the flow of air as desired.



ENVIRONMENTAL SCHEMATIC
(TH-1 thru TH-174)



ENVIRONMENTAL SCHEMATIC
(TH-175 thru TH-772)

OXYGEN SYSTEM

WARNING

Proper safety measures must be employed when using oxygen, or a serious fire hazard will be created. NO SMOKING PERMITTED.

DESCRIPTION

The recommended masks are provided with the system. The masks are designed to be adjustable to fit the average person.

The oxygen cylinder is located at the aft end of the forward baggage compartment. The system is available with either four, five, or six outlets and with a 49.8 or 66 cu ft oxygen bottle.Supply of oxygen to the system is controlled by a push-pull control on the pilot's subpanel. The pressure indicator shows the supply of oxygen available (1850 psi is nominal pressure for a full supply in the cylinder).

The system regulator is altitude compensated to provide a varying flow of oxygen with altitude. Flow is varied automatically from 0.5 liters per minute at 5,000 feet to 3.5 liters per minute at 30,000 feet. The use of oxygen is recommended to be in accordance with current FAR operating rules.

PITOT AND STATIC SYSTEM

The pitot and static system provides a source of impact and static air for the operation of flight instruments.

PITOT SYSTEM

A standard pitot tube for the pilot's flight instruments is located immediately to the left of the nose gear doors. The optional pitot tube for the copilot's instrument is located to the right of the nose gear doors.

Left and right pitot heat switches, located on the pilot's left subpanel, supply heat to the left and right pitot masts respectively.

The pitot system needs no drain because of the location of the components.

STATIC SYSTEM

Static air is taken from a flush static port located on each side of the aft fuselage. The static air is routed to the rate-of-climb indicator, altimeter and airspeed indicator.

The static air line is drained at the emergency static air source by raising the lever to the emergency static air source position. Return the lever to normal position after the line is completely drained.

The alternate static air source is designed to provide a source of static pressure to the instruments from inside the fuselage should the outside static air ports become blocked. An abnormal reading of the instruments supplied with static air could indicate a restriction in the outside static air ports. A lever on the lower sidewall adjacent to the pilot, is placarded OFF NORMAL, ON EMERGENCY. When it is desired or required to use this alternate source of static air, select the ON EMERGENCY position. To recognize the need and procedures for the use of alternate static air, refer to EMERGENCY PROCEDURES. Airspeed Calibrations and Altimeter Corrections charts are in the PERFORMANCE section.

PRESSURE SYSTEM

Pressure for the flight instruments, deice boots, and autopilot (if installed) is supplied by two, engine-driven, dry, pressure pumps interconnected to form a single system. If either pump fails, check valves automatically close and the remaining pump continues to operate all gyro instruments. A pressure gage on the instrument panel indicates pressure in inches of mercury. Two red buttons on the pressure gage serve as source failure indicators, each for its respective side of the system. The pressure system incorporates two filters per engine. One is located on the rear baffle of the engine to filter intake air to the pressure pump. The other is down stream of the pump and is located aft of the firewall in the upper nacelle. This filter protects the instruments.

STALL WARNING

A stall warning horn on the cabin forward bulkhead sounds a warning signal while there is time for the pilot to correct the attitude. The horn is triggered by a sensing vane on the leading edge of the left wing and is effective in all flight attitudes and at all weights and airspeeds. Irregular and intermittent at first, the warning signal will become steady as the airplane approaches a complete stall.

In icing conditions, stalling airspeeds should be expected to increase due to the distortion of the wing airfoil when ice has accumulated on the airplane. For the same reason, stall warning devices tend to lose their accuracy. The sensing vane is installed on a plate that can be electrically heated, preventing ice from forming on the vane of the transducer. A switch on the pilot's subpanel, placarded PITOT HEAT, supplies power to the heated pitot mast and to the heating plate at the stall warning transducer. However, any accumulation of ice in the proximity of the stall

warning vane reduces the probability of accuracy in the stall warning system whether or not the vane itself is clear of ice. For this reason, it is advisable to maintain an extra margin of airspeed above the stall speed.

ICE PROTECTION SYSTEMS

SURFACE DEICE SYSTEM

Deice boots bonded to the leading edges of the wings and the tail surfaces are operated by engine-driven pump pressure. Compressed air, after passing through the pressure regulator, goes to the distributor valve. When the deice system is not in operation, the distributor valve applies vacuum to the boots to deflate and hold the boots flat against the surface. Then, when the deice system is operated, the distributor valve changes from vacuum to pressure and the boots inflate. After the cycle is completed, the valve returns to vacuum hold down.

A three-position, spring loaded switch, with a center OFF position, a MAN (manual) down position, and an up AUTO (automatic) position, controls the system. When the switch is in the AUTO position, the deice boots inflate for a period of five to six seconds, then deflate automatically and return to the vacuum hold down position. The switch must be tripped for each complete cycle. In the MAN position the deice boots inflate as long as the switch is held in this position. When the switch is released, the boots deflate and go to the vacuum hold down condition.

Deice boots are designed to remove ice after it has accumulated, rather than prevent its formation. If the rate of ice accumulation is slow, best results are obtained by leaving the deice system off until 1/2 to 1 inch of ice accumulates. Bridging can occur if boots are actuated too early or too frequently.

The wing ice light(s), used to check for ice accumulation during night operation, illuminates the wing leading edge. The light switch is on the pilot's subpanel.

PROPELLER AND WINDSHIELD ANTI-ICE SYSTEM (FLUID FLOW)

The system is designed to prevent the formation of ice. Always place the system in operation before encountering icing conditions.

Ice is prevented from forming on the propeller blades by wetting the blade anti-ice boots with anti-icing fluid. The anti-ice pump delivers a constant flow of fluid from the supply tank to the blade boots. The pump is controlled by an ON-OFF switch located on the pilot's subpanel.

Windshield anti-ice (when installed) receives anti-ice fluid from the same source as the propeller anti-ice system. Ice is prevented from forming on the windshield by wetting the windshield surface with anti-ice fluid. This combined system is controlled by a three position switch, MOM ON-OFF-ON, located on the pilot's subpanel. The system will not function unless the propeller anti-ice pump switch is turned ON. For windshield system only, the flow is controlled by an ON-OFF switch. An indicator on the right side of the instrument panel indicates the amount of fluid in the supply tank.

With a full reservoir, system endurance is:

Windshield ..... approx. 36 min.
Prop Anti-ice Only ..... approx. 120 min.
Prop & Windshield ..... approx. 28 min.

ELECTROTHERMAL PROPELLER DEICE (2 and 3 BLADES)

Propeller ice removal is accomplished by the electrically heated deice boots bonded to each propeller blade. The system uses the aircraft electrical power to heat portions of the deice boots in a sequence controlled by a timer. The system is controlled by an ON-OFF switch on the pilot's subpanel. When the system is turned on the ammeter will register 7 to 12 amperes on the 2 blade propeller, or 14 to 18 amperes on the 3 blade propeller. The system can be operated continuously in flight; it will function automatically until the switch is turned off. Propeller imbalance can be relieved by varying rpm. Increase rpm briefly, then return to the desired setting. Repeat if necessary.

CAUTION

Do not operate the system with the engines inoperatve.

PITOT HEAT

Heating elements are installed in the pitot mast(s). Each heating element is controlled by an individual switch located on the pilot's subpanel. The switches are placarded PITOT HEAT - LT - RT, and should remain off during ground operations, except for testing or for short intervals of time to remove ice or snow from the mast(s).

STALL WARNING ANTI-ICE (Optional)

The mounting pad and the stall warning vane are equipped with a heating element that is activated any time the switch placarded PITOT HEAT - LT, is on.

HEATED FUEL VENTS

The fuel system vents, one located on the underside of each wing outboard of the nacelle, are provided with heating elements controlled by the FUEL VENT switch on the pilot's subpanel.

ENGINE BREAK-IN INFORMATION

Use a straight mineral oil as recommended by the engine manufacturer throughout the break-in period. Drain the initial oil at 20 to 30 hours, replace with new mineral oil which is to be used until oil consumption stabilizes, usually a total of about 50 hours.

Drain and replace the engine oil as recommended in HANDLING, SERVICING AND MAINTENANCE. If operating conditions are unusually dusty or dirty, more frequent oil changes may be necessary. Oil changes are more critical during the break-in period than at any other time.

Use full throttle at recommended rpm for every take-off and maintain until at least 400 feet AGL, then reduce as necessary for cruise climb or cruise. Maintain the highest power recommended for cruise operations during the break-in period, avoiding altitudes above 8000 feet. Interrupt cruise power every 30 minutes or so by smoothly advancing to take-off power settings for about 30 seconds, then returning to cruise power settings.

Avoid long power-off descents especially during the break-in period. Maintain sufficient power during descent to permit cylinder head temperatures to remain in the green arc.

Minimize ground operation time, especially during warm weather. During the break-in period, avoid engine idling in excess of 15 minutes, especially in high ambient temperatures.

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