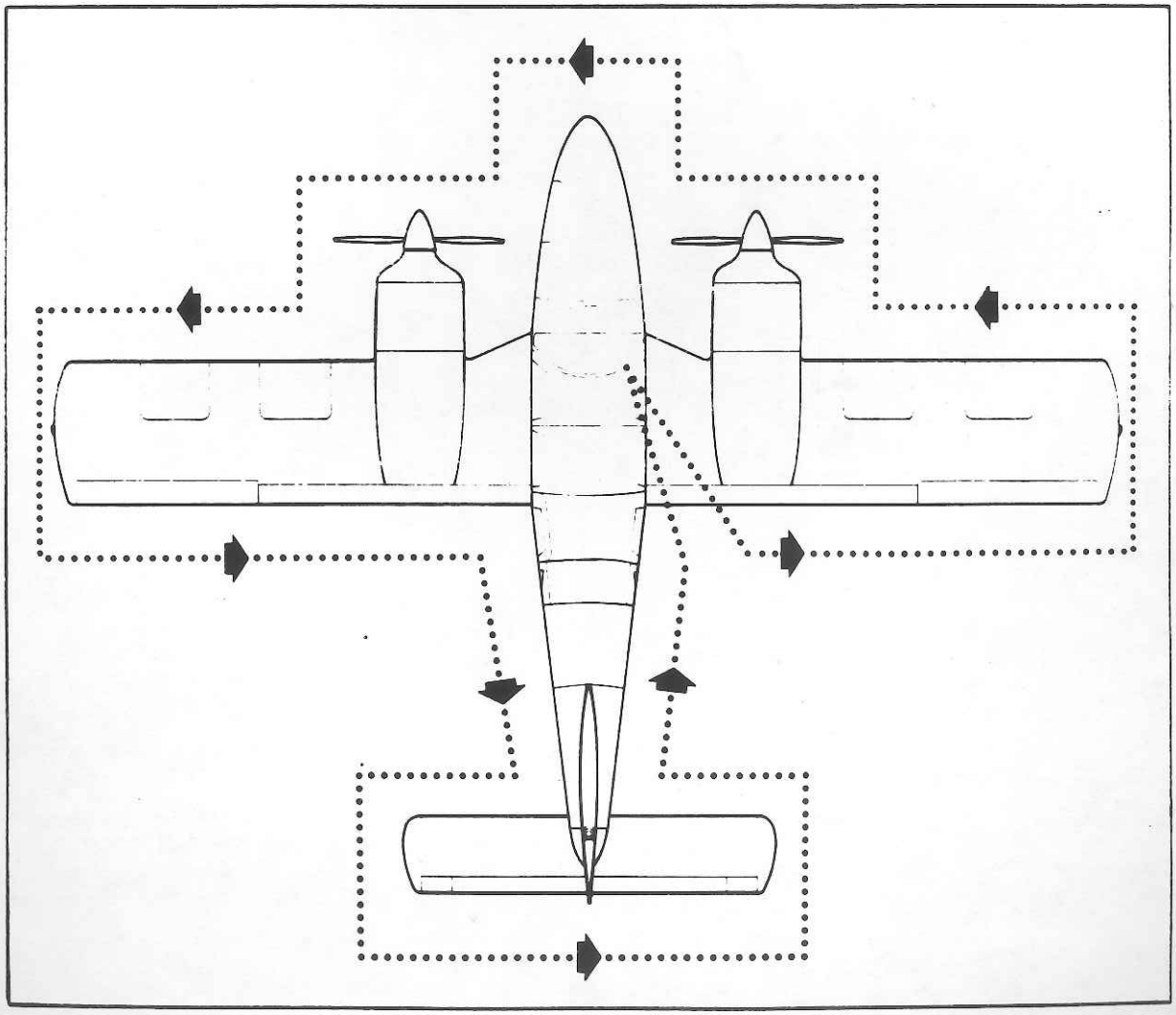
OPERATING INSTRUCTIONS

OPERATING INSTRUCTIONS

PREFLIGHT

When planning a flight in the Seneca II:

1. Make sure the weather is suitable.
2. Plan the navigation (if going cross-country).
3. Check weight and balance for the flight. (See Weight and Balance Section of this Manual.)
4. Investigate performance and range. (See Performance Charts Section of this Manual.)



WALK-AROUND INSPECTION

1. In Cabin
   a. Landing gear control - "DOWN" position
   b. Avionics - off (to save power and prevent wear on the units)
   c. Master switch - on
   d. Landing gear lights - three green lights (no red light)
   e. Fuel quantity - adequate for flight plus reserve
   f. Cowl flaps - open (to facilitate inspectin and ensure cooling after engine start)
   g. Master switch - off (to save battery)
   h. Ignition switches - off - (to prevent inadvertent start during inspection of propeller)
   i. Mixture controls - idle cut-off position (again to prevent inadvertent engine start)
   j. Trim indicators - neutral (so that tabs may be checked for alignment)
   k. Flaps - Extend and retract to check operation. (This should be done before engine start so that you can hear any noise which might indicate binding.)
   l. Controls - free (Check for proper movement)
   m. Pitot and static systems - drain
   n. Fasten seat belts on empty seats.
   o. Paperwork - Check that the proper aircraft papers are aboard and that the necessary inspections have been performed.
   p. Drain two crossfeed drains on forward side of spar box.

2. Outside Airplane
   a. Check crossfeed drains to insure they are closed.
   b. Right wing, aileron and flap - no damage, no ice (Check hinges.)
   c. Right mmain gear - no leaks, tires inflated and not excessively worn, 3-1/2 inches piston exposed under static load
   d. Right wing tip - no damage
   e. Right leading edge - no damage or ice
   f. Fuel cap - Open to check quantity and color of fuel (light green). Check cap vent, and then secure.
   g. Right engine nacelle - Check oil quantity (six to eight quarts). Secure inspection door.
   h. Right propeller - no nicks or leaks, spinner secure and not cracked.
   i. Cowl flaps - open and secure
   j. Fuel drains - Drain three on right side: two fuel tanks drains (under wing), one gascolator drain (near bottom of engine nacelle).
   k. Nose section - undamaged
   l. Nose gear - no leaks, tire inflated and not excesively worn, 2-1/2 inches piston exposed under static load, tow bar removed, condition of landing light checked
   m. Forward baggage door - secure and locked. (Key removeable in locked position only.)
   n. Windshield - clean and secure
   o. Left wing, engine nacelle and landing gear - Inspect as on side.
   p. Pitot tube - hole unobstructed, heat checked by feel if need is anticipated.
   q. Stall warning vanes - damage, free movement
   r. Rear door - latched securely
   s. Left static vent - unobstructed
   t. Dorsal fin air scoop - free from obstruction
   u. Empennage - no damage, free of ice, hinges secure

v. Stabilator - freedom of motion
w. Right static vent - unobstructed
x. Antennas - secure and undamaged
y. Navigation and landing lights - Check (after master switch and light switches have been turned on in cabin).

STARTING ENGINES

BEFORE STARTING ENGINES

1. Seats - adjusted
2. Seat belts, shoulder harness - fastened
3. Parking brake - set
4. Circuit breakers - in
5. Radios - off
6. Cowl flaps - open
7. Alternate air - off
8. Alternators - on

STARTING ENGINES

1. Fuel selector - on
2. Mixture control - rich
3. Throttle control - open half way
4. Propeller control - forward
5. Master switch - on
6. Ignition switches - on
7. Electric fuel pump - (for models without primer system installed only)* on for 10 sec. when cold (5 sec. when hot) - then off
8. Propeller - clear
9. Starter - engage
10. Primer button - (for models with primer system installed only)** on as required (for cold weather operations - see cold weather starting procedure)
11. Throttle - retard when engine starts
12. Oil pressure - up within 30 seconds (except in very cold weather, when it may take somewhat longer) if no pressure indication, shut down engine and have checked
13. Repeat steps 1 through 11 with the other engine
14. Alternators - checked
15. Gyro pressure - checked

NOTE

To prevent starter damage, limit starter cranking to 30-second periods. If the engine does not start within that time, allow a cooling period of several minutes before engaging starter again. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

*Ser. nos. 34-7570001 through 34-7570308 when Piper Kit No. 760 926V is not installed.
**Ser. nos. 34-7570309 and up and 34-7570001 through 34-7570308 when Piper Kit No. 760 926V is installed.

STARTING ENGINES WHEN FLOODED

1. Mixture control - idle cut-off
2. Throttle control - full forward
3. Propeller control - forward
4. Master switch - on
5. Ignition switches - on
6. Auxiliary (or electric) fuel pump - off
7. Propeller - clear
8. Starter - engage
9. When engine fires, retard throttle and advance mixture slowly.

STARTING ENGINES IN COLD WEATHER (32°F and below)

NOTE

As cold weather engine operations are decidedly more demanding, it may become necessary to utilize the starting procedure listed below in low ambient temperatures. (In temperatures below 15°F engine preheat before starting is recommended.)

NOTE

It may be necessary to apply an external power source to facilitate engine cranking if the aircraft's battery is deficient of charge.

1. Check ignition switches (mags) - OFF.
2. Turn props through by hand (3 times).
3. Fuel selector - ON.
4. Mixture control - FULL RICH.
5. Throttle control - FULL FORWARD.
6. Prop control - FULL FORWARD.
7. Master switch - ON.
8. Ignition switch (mag) - ON.
9. Electric fuel boost pump - on LOW BOOST.
10. Primer - ON and engage starter simultaneously.
11. Begin moving throttle control back and forth from full forward to full aft.
12. Release primer button after about 3 seconds of cranking. Leave primer off for about 3 seconds of cranking then re-apply primer for about 3 seconds, etc. until engine begins firing.
13. When engine begins firing, leave starter engaged and tap primer periodically until a rhythmic firing pattern is observed and then release starter switch and position throttle at half travel.
14. Tap primer button if engine falters during this period and adjust throttle to a 1000 RPM idle speed.
15. Electric fuel boost pump may be turned off as soon as it is determined that the engine will continue running without it.

CAUTION

Engine boost pump "ON" with mixture "RICH" or over-priming can cause excessive fuel flow to the engine, which will drain through the overboard vent when the engine is not operating. Turn boost pump "OFF" when engine is not running or not being turned over with the starter. Additional fire precautions should also be observed.

In the event that the procedures shown here are not successful, operators should insure that power plant systems and components are in the highest state of maintenance: i.e., magneto "E" gap, mag timing, mag point condition, fuel injection pressures, proper oil visocity, fully charged battery, etc.

STARTING ENGINES WITH AID OF EXTERNAL ELECTRIC POWER*

An optional feature known as Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the aircraft battery.

The procedure is as follows:

1. Turn aircraft master switch off.
2. Turn radios off.
3. Connect RED lead of PEP kit jumper cable to POSITIVE (+) terminal of external 12 volt battery and BLACK lead to NEGATIVE (-) terminal.
4. Insert plug of jumper cable into socket located on aircraft fuselage.
5. Turn aircraft master switch on and proceed with normal engine starting technique.
6. After engine has been started, turn master switch off, and remove jumper cable plug from aircraft.
7. Turn aircraft master switch on and check alternator ammeter for indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

TAXI

Before taxiing, the brakes should be checked by moving forward a few feet, throttling back and applying pressure on the toe pedals. As much as possible, turns during taxiing should be made using rudder pedal motion and differential power (more power on the engine on the outside of the turn, less on the inside engine) rather than brakes. The following equipment should be checked during taxiing:

1. Instruments - turn indicator, directional gyro, coordination ball, compass
2. Heater and defroster - especially important on a cold day
3. Fuel selector - Place each selector on "CROSSFEED" for a short time, while the other selector is in the "ON" position. Return selectors to the "ON" position. Do not attempt takeoff with selector on "CROSSFEED."

The autopilot, if installed, should be off during taxiing.

*Optional equipment

PRETAKEOFF CHECK

A thorough check should be made before takeoff, using a check list. Before advancing the throttle to check the magnetos and the propeller action, be sure that the engine is warm enough to accept the power if it is a cold day. If there is no hesitation in engine action when the throttle is advanced, the engine is warm enough.

1. Parking brake - on. Head airplane into the wind if possible. (See crosswind limits for propellers.)
2. Engine run-up
   a. Mixture controls - forward
   b. Propeller controls - forward
   c. Throttle control - forward to 1000 RPM
   d. Propeller controls - Check the feather position by bringing the propeller controls fully back and then to the full forward position. Do not allow more than a 300 RPM drop during the feathering check.
   e. Throttle controls - forward to 1900 RPM
   f. Propeller controls - Exercise to check governor. Retard control until a 200 to 300 drop in RPM is indicated. This should be done three times on the first flight of the day. The governor can be checked by retarding the propeller control until a drop of 100 RPM to 200 RPM appears, then advancing the throttle to get a slight increase in manifold pressure. The propeller speed should stay the same when the throttle is advanced, thus showing that the governor is governing.
   g. Propeller controls - full forward
   h. Alternate air controls - on, then off again
   i. Magnetos - check
      Normal drop - 100 RPM
      Maximum drop - 150 RPM
      Maximum differential drop - 50 RPM
   j. Alternator output - check, approximately equal output for both alternators
   k. Gyro pressure gauge - 4.5 to 5.2 in. Hg.
   l. Throttles - 800-1000 RPM
3. Fuel selectors - on
4. Alternators - on
5. Engine gauges - in the green
6. Annunciator panel - press-to-test; all lights on
7. Altimeter - set
8. Attitude indicator - set
9. Directional gyro - set
10. Clock - wound and set
11. Mixtures - set
12. Propellers - set in forward position
13. Quadrant friction - adjusted
14. Alternate air - off
15. Cowl flaps - set
16. Seat backs - erect
17. Wing flaps - set
18. Trim (stabilator and rudder) - set
19. Seat belts and shoulder harness - fastened
20. Empty seats - seat belts fastened
21. Controls - free, full travel

22. Doors - latched
23. Auxiliary (or electric) fuel pumps - off
24. Pitot heat - as required

The normally recommended procedure for sea level takeoff is to advance the throttle until a manifold pressure of 39 in. Hg. is indicated at 2575 RPM. During pretakeoff check at a high elevation, lean the mixture to obtain maximum power. Apply 40 in. Hg. manifold pressure; then lean the mixture until the fuel flow pointer stabilizes at a fuel consumption mark consistent with the altitude as shown on the green takeoff range on the gauge. Leave the mixture in this position for takeoff. Do not overheat the engine when operating with mixture leaned. If overheating occurs, enrich the mixture enough that temperature returns to normal.

NOTE

The "overboost" indicator lights on the annunciator panel will illuminate at approximately 39.8 in. Hg. manifold pressure. Do not exceed 40 in. Hg. manifold pressure.

CAUTION

Insure that the alternators are not indicating full charge prior to takeoff.

TAKEOFF

Takeoff should not be attempted with ice or frost on the wings. Takeoff distances and 50-foot obstacle clearance distances are shown on charts in the Performance Charts Section of this Manual. The performance shown on charts will be reduced by uphill gradient, tailwind component, or soft, wet, rough or grassy surface, or poor pilot technique.

Avoid fast turns onto the runway, followed by immediate takeoff, especially with a low fuel supply. As power is applied at the start of the takeoff roll, look at the engine instruments to see that the engines are operating properly and putting out normal power, and at the airspeed indicator to see that it is functioning. Apply throttle smoothly until 40 in. Hg. manifold pressure is obtained. **DO NOT APPLY ADDITIONAL THROTTLES.**

NOTE

At altitudes below 12,000 feet, normal takeoffs are made with less than full throttle - use throttle only as required to obtain 40 in. Hg. manifold pressure. **DO NOT EXCEED 40 IN. HG. MANIFOLD PRESSURE.**

Normal Takeoff (Flaps Up):

When obstacle clearance is no problem, a normal takeoff may be used. Accelerate to 80-85 MPH and ease back on the wheel enough to let the airplane lift off. After lift-off, accelerate to the best rate of climb speed (105 MPH) or higher if desired, retracting the landing gear when a gear-down landing is no longer possible on the runway.

Short Field Takeoff (Flaps Up):

When a short field effort is required but the situation presents a wide margin on obstacle clearance, the safest short field technique to use is with the flaps up. In the event of an engine failure, the airplane is in the best flight configuration to sustain altitude immediately after the

gear is raised. Set the stabilator trim indicator in the takeoff range. Set the brakes and bring the engines to full power before release. Accelerate to 80 MPH and rotate the airplane firmly so that the airspeed is approximately 85 MPH when passing through the 50-foot height. The airplane should then be allowed to accelerate to the best angle of climb speed (90 MPH at sea level) if obstacle clearance is necessary, or best rate of climb speed (105 MPH) if obstacles are not a problem. The landing gear should be retracted when a gear-down landing is no longer possible on the runway. The distances for this takeoff procedure are given on a chart in the Performance Charts Section of this Manual.

Short Field Takeoff (25-degree Flaps):

When the shortest possible ground roll and the greatest clearance distance over a 50-foot obstacle is desired, use a 25-degree flap setting (second notch). Set the stabilator trim indicator slightly nose up from the takeoff range. Set the brakes and bring the engines to full power before release. Accelerate to 70 MPH and rotate firmly so that when passing through the 50-foot height the airspeed is approximately 80 MPH. Retract the gear when a gear down landing is no longer possible on the runway.

It should be noted that the airplane is momentarily below Vmc when using the above procedure. IN THE EVENT THAT AN ENGINE FAILURE SHOULD OCCUR WHILE THE AIRPLANE IS BELOW Vmc, IT IS MANDATORY THAT THE THROTTLE ON THE OPERATING ENGINE BE RETARDED AND THE NOSE LOWERED IMMEDIATELY TO MAINTAIN CONTROL OF THE AIRPLANE. It should also be noted that when a 25-degree flap setting is used on the takeoff roll, an effort to hold the airplane on the runway too long may result in a "wheelbarrowing" tendency. This should be avoided.

The distances required using this takeoff procedure are given on a chart in the Performance Charts Section of this Manual.

DOOR OPEN ON TAKEOFF

If either the main or rear cabin door is inadvertently left open or partially open on takeoff, fly the airplane in a normal manner and return for a landing to close the door on the ground. If a landing cannot be made, it may be possible to close a door in flight in the following manner:

1. Maintain airspeed between 100 and 110 MPH.
2. Open the storm window.
3. Pull the door closed, making certain the upper latch is properly positioned.
4. Close the upper latch. It may be necessary to pull in on the upper portion of the door while the latch is being closed.

It is necessary to have someone in the airplane in addition to the pilot to carry out this procedure. If the door, either main or rear, cannot be closed in flight, it is possible to continue safely for an extended period. In this case, the airspeed should be kept below 125 MPH and above 100 MPH to prevent buffeting as a result of the open door.

MANIFOLD PRESSURE OVERBOOST LIGHTS

Illumination of the overboost light on the annunciator panel does not indicate a malfunction. The overboost lights illuminate when manifold pressure approaches the maximum limit. The overboost lights should be monitored during takeoff to insure that an overboost condition does not persist.

CLIMB

On climb-out after takeoff, it is recommended that the best angle of climb speed (90 MPH) be maintained only if obstacle clearance is a consideration. The best rate of climb speed (105 MPH) should be maintained with full power on the engines until adequate terrain clearance is obtained. At this point, engine power should be reduced to 31.5 inches manifold pressure and 2450 RPM (approximately 75% power) for cruise climb. A cruise climb speed of 120 MPH or higher is also recommended. This combination of reduced power and increased climb speed provides better engine cooling, less engine wear, reduced fuel consumption, lower cabin noise level, and better forward visibility.

When reducing engine power the throttles should be retarded first, followed by the propeller controls. The mixture controls should remain at full rich during the climb. Cowl flaps should be adjusted to maintain cylinder head and oil temperatures within the normal ranges specified for the engine. During climbs under hot weather conditions, it may be necessary to use the electric fuel pump for vapor suppression.

Consistent operational use of cruise climb power settings is strongly recommended since this practice will make a substantial contribution to fuel economy and increased engine life, and will reduce the incidence of premature engine overhauls.

NORMAL CRUISE

When leveling off at cruise altitude, the pilot may reduce to a cruise power setting in accordance with the Power Setting Table in this Manual. The mixture should be leaned in accordance with the recommendations for the engine in the Teledyne Continental Operator's Manual which is provided with the aircraft.

For maximum service life, cylinder head temperature should be maintained below 435° F during high performance cruise operation and below 400° F during economy cruise operation. If cylinder head temperatures become too high during flight, reduce them by enriching the mixture, by opening cowl flaps, by reducing power, or by use of any combination of these methods.

Following level-off for cruise, the cowl flaps should be closed or adjusted as necessary to maintain proper cylinder head temperatures, and the airplane should be trimmed to fly hands off.

The pilot should monitor weather conditions while flying and should be alert to conditions which might lead to icing. If induction system icing is expected, place the alternate air control in the "ON" position.

WARNING

Flight in icing conditions is prohibited unless aircraft is equipped with the approved and complete Piper ice protection system. If icing is encountered, immediate action should be taken to fly out of icing conditions. Icing is hazardous due to greatly reduced performance, loss of forward visibility, possible longitudinal control difficulties due to increased control sensitivity, and impaired power plant and fuel system operation.

The ammeters for the electrical system should be monitored during flight, especially during night or instrument flight, so that corrective measures can be taken in case of malfunction. The procedures for dealing with electrical failures are contained in the Airplane Flight Manual portion of this Manual. The sooner a problem is recognized and corrective action taken, the greater is the chance of avoiding total electrical failure.

It is not recommended to takeoff into IFR operation with a single alternator. During flight, electrical loads should be limited to 50 amperes for each alternator. Although the alternators are capable of 65 amperes output, limiting loads to 50 amperes will assure battery charging current.

Since the Seneca has one combined fuel tank per engine, it is advisable to feed the engines symmetrically during cruise so that approximately the same amount of fuel will be left in each side for the landing. A crossfeed is provided and can be used to even up the fuel, if necessary.

During flight, keep account of time and fuel used in connection with power settings to determine how the fuel flow and fuel quantity gauging systems are operating. If the fuel flow indication is considerably higher than the fuel actually being consumed or if an asymmetric flow gauge indication is observed, a fuel nozzle may be clogged and require cleaning.

There are no mechanical uplocks in the landing gear system. In the event of a hydraulic system malfunction, the landing gear will free-fall to the gear down position. The true airspeed with gear down is approximately 75% of the gear retracted airspeed for any given power setting. Allowances for the reduction in airspeed and range should be made when planning extended flight between remote airfields or flight over water.

DESCENT

When power is reduced for descent, the mixtures should be enriched as altitude decreases. The propellers may be left at cruise setting; however if the propeller speed is reduced, it should be done after the throttles have been retarded. Cowl flaps should normally be closed to keep the engines at the proper operating temperature.

APPROACH AND LANDING

Sometime during the approach for a landing, the throttle controls should be retarded to check the gear warning horn. Flying the airplane with the horn inoperative is not advisable. Doing so can lead to a gear up landing as it is easy to forget the landing gear, especially when approaching for a single-engine landing, or when other equipment is inoperative, or when attention is drawn to events outside the cabin.

Prior to entering the traffic pattern, the aircraft should be slowed to approximately 115 MPH, and this speed should be maintained on the downwind leg. The landing check should be performed on the downwind leg:

1. Seat backs - erect
2. Seat belts and shoulder harness - fastened
3. Fuel selectors - on
4. Cowl flaps - set as required
5. Auxiliary (or electric) fuel pumps - off
6. Mixture controls - set
7. Propellers - set to 2250 RPM
8. Landing gear - down (three green lights and nose wheel in mirror)
9. Flaps - set as required; 125 MPH maximum airspeed

The landing gear should be lowered at speeds below 150 MPH and the flaps at speeds as follows:

10° (first notch)	160 MPH maximum
25° (second notch)	140 MPH maximum
40° (third notch)	125 MPH maximum

Maintain a speed of 115 MPH on the downwind leg, 110 MPH on base leg, 110 MPH during the turn onto final approach, and 95 MPH on final approach. If the aircraft is lightly loaded, the final approach speed may be reduced to 90 MPH.

When the power is reduced on close final approach, the propeller controls should be advanced to the full forward position to provide maximum power in the event of a go-around.

The landing gear position should be checked on the downwind leg and again on final approach by checking the three green indicator lights on the instrument panel and looking at the external mirror to check that the nose gear is extended. Remember that when the navigation lights are on, the gear position lights are dimmed and are difficult to see in the daytime.

Flap position for landing will depend on runway length and surface wind. Full flaps will reduce stall speed during final approach and will permit contact with the runway at a slower speed. Good pattern management includes a smooth, gradual reduction of power on final approach, with the power fully off before the wheels touch the runway. This gives the gear warning horn a chance to blow if the gear is not locked down. If electric trim is available, it can be used to assist a smooth back pressure during flare-out.

Maximum braking after touch-down is achieved by retracting the flaps, applying back pressure to the wheel and applying pressure on the brakes. However, unless extra braking is needed or unless a strong crosswind or gusty air condition exists, it is best to wait until turning off the runway to retract the flaps. This will permit full attention to be given to the landing and landing roll, and will also prevent the pilot's accidentally reaching for the gear handle instead of the flap handle.

Normal Landing:

Approach with full flaps (40 degrees) and partial power until shortly before touch-down. Hold the nose up as long as possible before and after contacting the ground with the main wheels.

Short Field Landing:

Approach with full flaps at 87 MPH CAS. Immediately after touch-down, raise the flaps, apply back pressure to the wheel and apply brakes.

Crosswind or High-wind Landing:

Approach with higher than normal speed and with zero to 25 degrees of flaps. Immediately after touch-down, raise the flaps. During a crosswind approach hold a crab angle into the wind until ready to flare out for the landing. Then lower the wing that is into the wind, to eliminate the crab angle without drifting, and use the rudder to keep the wheels aligned with the runway. Avoid prolonged side slips with a low fuel indication.

The maximum demonstrated crosswind component for landing is 20 MPH.

POST LANDING

After leaving the runway:

1. Wing flaps - retract
2. Cowl flaps - fully open
3. Alternate air - off

SHUT DOWN

1. Heater (if on) - switch to **FAN** for 2 minutes, then **OFF**
2. Radio and electrical equipment - off
3. Mixture controls - idle cut-off
4. Magneto switches - off
5. Master switch - off
6. Parking brake - on if required

MOORING

The airplane can be moved on the ground with the aid of the optional nose wheel tow bar stowed aft of the fifth and sixth seats. Tie-down ropes may be attached to mooring rings under each wing and to the tail skid. The ailerons and stabilator should be secured by looping the seat belt through the control wheel and pulling it snug. The rudder need not be secured under normal conditions, as its connection to the nose wheel holds it in position. The flaps are locked when in the fully retracted position.

AIRSPEED DATA

All airspeeds quoted in this manual are calibrated unless otherwise noted. Calibrated airspeed is indicated airspeed corrected for instrument and position errors. The following table gives the correlation between indicated airspeed and calibrated airspeed for the Seneca II if zero instrument error is assumed. See Airspeed Calibration Chart in Performance Chart section.

TURBULENT AIR OPERATION

In keeping with good operating practice used with all aircraft, it is recommended that in conditions of extreme turbulence, power be reduced to slow the airplane to slightly below the design maneuvering speed of 140 MPH. When flying in extreme turbulence or strong vertical currents and using the autopilot, the altitude-hold mode should not be used.

Vmc - MINIMUM SINGLE-ENGINE CONTROL SPEED

Vmc is the calibrated airspeed below which a twin-engine aircraft cannot be controlled in flight with one engine operating at takeoff power and the other engine windmilling. Vmc for the Seneca II has been determined to be 80 MPH. Under no circumstances should an attempt be made to fly at a speed below this Vmc with only one engine operating. As a safety precaution, when operating under single-engine flight conditions either in training or in emergency situations, maintain an indicated airspeed above 90 MPH.

The Vmc demonstration required for the FAA flight test for the multi-engine rating approaches an uncontrolled flight condition with power reduced on one engine. The demonstration should not be performed at an altitude of less than 3500 feet above the ground. Initiate recovery during the demonstration by immediately reducing power on the operating engine and promptly lowering the nose of the airplane.

In the Seneca II, more power is available on the operating engine at higher altitudes with the same manifold pressure; hence, there can be more asymmetric thrust. The Vmc in the Seneca II is lowest at low altitudes, and the airplane will approach a stall before reaching Vmc. The most critical situation occurs at the altitude where the stall speed and Vmc speed coincide. Care should be taken to avoid this flight condition, because at this point loss of directional control occurs at the same time the airplane stalls, and spin could result.

NOTE

SINGLE-ENGINE STALLS ARE NOT RECOMMENDED.

OPERATION IN KNOWN ICING CONDITIONS

The Piper Seneca II is approved for flight into known icing conditions when equipped with the complete Piper Ice Protection System.* Operating in icing conditions in excess of the Continuous Maximum and Intermittent Maximum as defined in FAR 25, Appendix C has been substantiated; however, there is no correlation between these conditions and forecast or reported "Light, Moderate and Severe" conditions. Therefore, on the basis of flight tests, the following guidelines should be observed:

1. Flight into severe icing is prohibited.
2. Moderate icing conditions above 10,000 ft. should be avoided whenever possible; if moderate icing conditions are encountered above 10,000 ft., a descent to a lower altitude should be initiated if practical.
3. Operation in light icing is approved at all altitudes.

Icing conditions of any kind should be avoided wherever possible, since any minor malfunction which may occur is potentially more serious in icing conditions. Continuous attention of the pilot is required to monitor the rate of ice buildup in order to effect the boot cycle at the optimum time. Boots should be cycled when ice has built to between 1/4 and 1/2 inch thickness on the leading edge to assure proper ice removal. Repeated boot cycles at less than 1/4 inch can cause a cavity to form under the ice and prevent ice removal; boot cycles at thicknesses greater than 1/2 inch may also fail to remove ice.

Icing conditions can exist in any clouds when the temperature is below freezing; therefore it is necessary to closely monitor outside air temperature when flying in clouds or precipitation. Clouds which are dark and have sharply defined edges have high water content and should be avoided whenever possible. Freezing rain must always be avoided.

The following listing contains a few of the more highly recommended operating procedures for flight in icing conditions.

1. Perform careful functional check of ice protection systems before flight. Turn on pitot heat, windshield heat and propeller heat for 30 seconds and feel for heat.
2. Avoid forecast icing conditions when possible.
3. When flying in clouds or precipitation, monitor temperature closely.
4. Turn on windshield defroster and pitot heat before entering icing conditions.
5. Turn on propeller heat and windshield heat immediately upon entering icing conditions. Cycle boots as required.
6. Review Airplane Flight Manual procedures before any flight in which icing conditions might be encountered.
7. Plan an alternate airport whenever flying in ice.

*Optional equipment

EMERGENCY PROCEDURES

Procedures for handling in-flight emergencies and equipment malfunction are detailed in the Airplane Flight Manual Section. These should be read and followed by the pilot.

WEIGHT AND BALANCE

It is the responsibility of the owner and/or pilot to determine that the airplane remains within the acceptable weight vs. center of gravity envelope while in flight. For weight and balance data see the Weight and Balance Section of this Manual.

EMERGENCY LOCATOR TRANSMITTER*

The Emergency Locator Transmitter (ELT) when installed, is located in the aft portion of the fuselage just below the stabilator leading edge and is accessible through a plate on the right side of the fuselage. (On aircraft manufactured prior to mid-1975, this plate is retained by three steel Phillips head screws. On aircraft manufactured from mid-1975 and on, this plate is attached with three slotted-head nylon screws for ease of removal; these screws may be readily removed with a variety of common items such as a dime, a key, a knife blade, etc. If there are no tools available in an emergency the screw heads may be broken off by any means.) It is an emergency locator transmitter which meets the requirements of FAR 91.52. The unit operates on a self-contained battery. The replacement date as required by FAA regulations is marked on the transmitter label. The battery should also be replaced if the transmitter has been used in an emergency situation or if accumulated test time exceeds one hour. The unit is equipped with a portable antenna to allow the locator to be removed from the airplane in case of an emergency and used as a portable signal transmitter.

The battery has a useful life of four years. However, to comply with FAA regulations it must be replaced after two years of shelf life or service life. The battery should also be replaced if the transmitter has been used in an emergency situation or if accumulated test time exceeds one hour. The replacement date is marked on the transmitter label.

On the unit itself is a three-position selector switch placarded "OFF," "ARM" and "ON." The "ARM" position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until the battery is drained to depletion or until the switch is manually moved to the "OFF" position. The "ARM" position is selected when the transmitter is installed at the factory and the switch should remain in that position whenever the unit is installed in the airplane. The "ON" position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter.

Select the "OFF" position when changing the battery, when rearming the unit if it has been activated for any reason, or to discontinue transmission.

*Optional equipment

A pilot's remote switch, located on the left side panel, is provided to allow the transmitter to be controlled from inside the cabin. On early models the pilot's remote switch is placarded "ON," "ARM," "OFF RESET." If the pilot's remote switch has been placed in the "ON" position for any reason, the "OFF RESET" position must be selected for one second before the switch is placed in the "ARM" position. On later models the pilot's remote switch is placarded "ON/RESET" and "ARM (NORMAL POSITION)." The switch is normally left in the down or "ARM" position. To turn the transmitter off, move the switch to the "ON/RESET" position for one second then return it to the "ARM" position. To actuate the transmitter for tests or other reasons, move the switch upward to the "ON/RESET" position and leave it in that position as long as transmission is desired.

The unit is equipped with a portable antenna to allow the locator to be removed from the airplane in case of an emergency and used as a portable signal transmitter.

The locator should be checked during the ground check to make certain the unit has not been accidentally activated. Check by tuning a radio receiver to 121.5 MHz. If there is an oscillating sound, the locator may have been activated and should be turned off immediately. Reset to the "ARM" position and check again to insure against outside interference.

NOTE

If for any reason a test transmission is necessary, the operator must first obtain permission from a local FAA/FCC representative (or other applicable Authority). Test transmission should be kept to a minimal duration.

OPERATING TIPS

The following Operating Tips are of particular value in the operation of the Seneca II.

1. Learn to trim for takeoff so that only a very light back pressure on the wheel is required to lift the airplane off the ground.
2. On takeoff, do not retract the gear prematurely. The airplane may settle and make contact with the ground because of lack of flying speed, atmospheric conditions, or rolling terrain.
3. In high density areas where high traffic pattern speeds are necessary or when it is advantageous to extend the gear, it is permissible to extend the landing gear at speeds up to 150 MPH.
4. Flaps may be lowered at airspeeds up to 125 MPH. To reduce flap operating loads, it is desirable to have the airplane at a slower speed before extending the flaps.
5. Before attempting to reset any circuit breaker, allow a two to five minute cooling off period.
6. Always determine position of landing gear by checking the gear position lights.
7. Before starting the engine, check that all radio switches, light switches, and the pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged.
8. A high fuel pressure indication on the fuel flow indicator is a possible sign of restricted fuel nozzles.
9. The gyro pressure gauge is provided to monitor the pressure available to assure the correct operating speed of the pressure driven gyroscopic flight instruments. It also monitors the condition of the common air filter by measuring the flow of air through the filter.

   If the pressure gauge does not register 5" ± .10" Hg at 2000 RPM, the following items should be checked before flight:

   a. Common air filters could be dirty or restricted.
   b. Pressure lines could be loose or broken.
   c. Pressure pumps could be worn.
   d. Pressure regulators may not be adjusted correctly. The pressure, even though set correctly, can read lower under two conditions:
      (1) Very high altitude, above 25,000 feet.
      (2) Low engine RPM, usually on approach or during training maneuvers. This is normal and should not be considered a malfunction.

10. The shape of the wing fuel tanks is such that in certain maneuvers the fuel may move away from the tank outlet. If the outlet is uncovered, the fuel flow will be interrupted and a temporary loss of power may result. Pilots can prevent inadvertent uncovering of the outlet by avoiding maneuvers which could result in uncovering the outlet.

    Extreme running turning takeoffs should be avoided as fuel flow interruption may occur.

    Prolonged slips or skids which result in excess of 2000 feet of altitude loss, or other radical or extreme maneuvers which could cause uncovering of the fuel outlet must be avoided as fuel flow interruption may occur when the tank being used is not full.

11. The rudder pedals are suspended from a torque tube which extends across the fuselage. The pilot should become familiar with the proper positioning of his feet on the rudder pedals so as to avoid interference with the torque tube when moving the rudder pedals or operating the toe brakes.
12. Anti-collision lights should not be operating when flying through overcast and clouds, since reflected light can produce spacial disorientation. Do not operate strobe lights when taxiing in the vicinity of other aircraft.
13. On takeoff, advance throttles smoothly, pausing momentarily at approximately 30 inches Hg of manifold pressure to allow time for the turbocharger speed to increase. Maintain manifold pressure at or below 40 inches Hg.
14. In an effort to avoid accidents, pilots should obtain and study the safety related information made avialable in FAA publications such as regulations, advisory circulars, Aviation News, AIM and safety aids.
15. Pilots who fly above 10,000 feet should be aware of the need for special physiological training. Appropriate training is available at approximately twenty-three Air Force Bases throughout the United States for a small fee. The training is free at the NASA Center in Houston and at the FAA Aeronautical Center in Oklahoma.

    Forms to be completed (Physiological Training Application and Agreement) for application for the training course may be obtained by writing to the following address:

    Chief of Physiological Training, AAC-143
    FAA Aeronautical Center
    P. O. Box 25082
    Oklahoma City, Oklahoma 73125

    It is recommended that all pilots who plan to fly above 10,000 feet take this training before flying this high and then take refresher training every two or three years.
16. Sluggish RPM control and propeller overspeed with poor RPM recovery after rapid throttle application are indications that nitrogen pressure in the propeller dome is low.

PERFORMANCE CHARTS

INTRODUCTION

PERFORMANCE SECTION

The example on the following introductory pages outlines a detailed flight plan using the performance charts in this section. Each chart includes its own example to show how it is used.

Due to the altitude capability of turbocharged airplanes, the pilot should always consider the possibility of encountering icing conditions.

Pilots and owners of the Seneca II are encouraged to use this information to ensure safe and efficient utilization of the aircraft.

WARNING

Performance information derived by extrapolation beyond the limits shown on the charts should not be used for flight planning purposes.

FLIGHT PLAN

I. AIRCRAFT LOADING:

(A)	Basic Weight	2790 Lbs.
(B)	Occupants (3)	510 Lbs.
(C)	Baggage & Cargo	420 Lb.
(D)	Zero Fuel Wt.	4000 Lbs. (Max. Allowable 4,000 Lbs.) I(A) + (I)B + I(C)
(E)	Fuel	570 Lbs.
(F)	T. O. Weight	4570 Lbs. (Max. Allowable 4,570 Lbs.) I(D) + I(E)
(G)	T. O. Center of Gravity	93.3 Inches Aft of Datum
(H)	Landing Weight	4274 Lbs. (Max. Allowable 4,342 Lbs.) (Item X)

II. TAKEOFF:

		DEPARTURE AIRPORT
(A)	Elevation	7586 Ft.
(B)	Temperature	40 °F
(C)	Surface Wind	Calm Kts. @ ____°
(D)	Runway Length Available	7400 Ft.
(E)	Runway Length Required: (Ref. Pages 9-4 to 9-8)	
	(1) T. O.	2100 Ft.
	(2) Accelerate & Stop	4400 Ft.

III. EN ROUTE:

(A) Highest Obstruction — 11200 Ft.
(B) Cruise Altitude — 16500 Ft.
(C) Temp. at Altitude (Forecast) — 8 °F
(D) Total Distance — 453 Statute Miles
(E) Power — 55%
(F) Weather Consideration
(1) VFR ✓
(2) IFR
(3) Icing Conditions None Forecast
(4) Winds Aloft 12000' - 030 @ 8 Kts; 15000' - 020 @ 11 Kts; 18000' - 020 @ 24 Kts

IV. CLIMB: (Ref. Page 9-10)

(A) Time 15 - 6 = 9 Min. = 0.15 Hrs.
(B) Fuel 12.5 - 5 = 7.5 Gal.
(C) Distance 34 - 13 = 21 Statute Miles

V. DESCENT: (Ref. Page 9-13)

(A) Time 17 - 5 = 12 Min. = 0.20 Hrs.
(B) Fuel 4.7 - 1.3 = 3.4 Gal.
(C) Distance 50 - 15 = 35 Statute Miles

VI. CRUISE:

(A) Distance = Total Dist. - Climb Dist. - Descent Dist. = III (D) - IV (C) - V (C)
= 453 - 21 - 35 = 397 Statute Miles
(B) Speed = 186 MPH TAS (Ref. Page 9-12) Wind Correction X - Wind.
Corrected Cruise Speed = 186 MPH TAS
(C) Time = Cruise Dist./Cruise Speed = VI (A)/VI (B)
= 397 / 186 = 2.13 Hrs.
(D) Fuel = Cruise Time x Cruise Fuel Consumption VI (C) x
= 2.13 x 18 = 38.4 Gallons
(E) Oxygen (Oxygen required for flight above 12,500 feet).
(1) Number of people 3
(2) Duration of flight above 12,500 Ft. 2.48 Hrs. (or Item VIII)
(3) Oxygen Required 2 Full Bottles (Ref. Supplement B of A. F. M.)
(4) Oxygen on Board 2 Full Bottles

VII. LANDING:

	DESTINATION AIRPORT
(A) Elevation	4411 Ft.
(B) Temperature	50 °F
(C) Surface Wind	5 Kts. @ 340°
(D) Runway Length Available	9000 Ft.
(E) Runway Length Required (Item X for Landing Weight - Page 9-14 to 9-16 for Landing Distance)	1500 Ft.

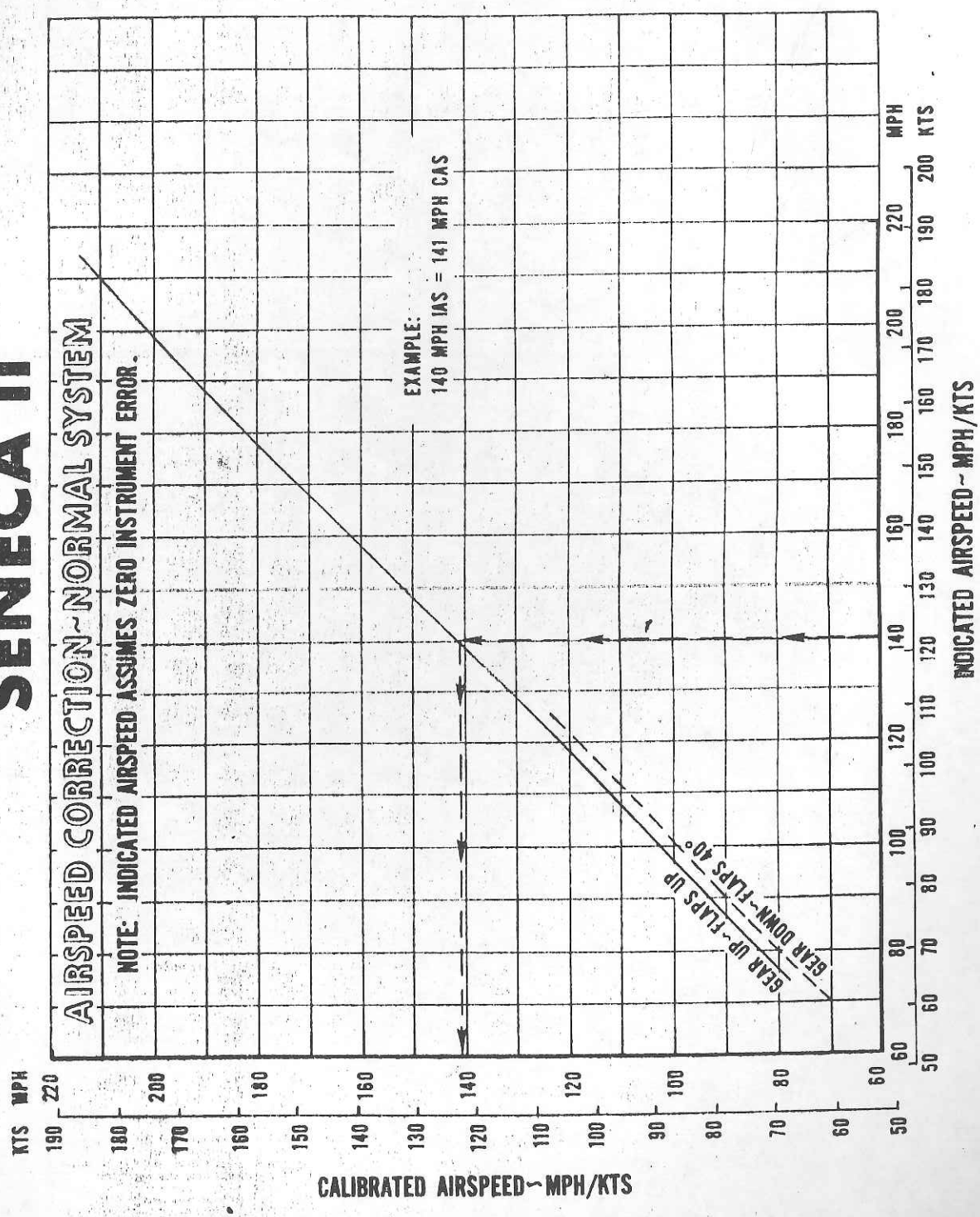
VIII. Total Flight Time = Climb Time + Cruise Time + Descent Time
= IV (A) + VI (C) + V (A)
= .15 + 2.13 + .20 = 2.48 Hrs.

493

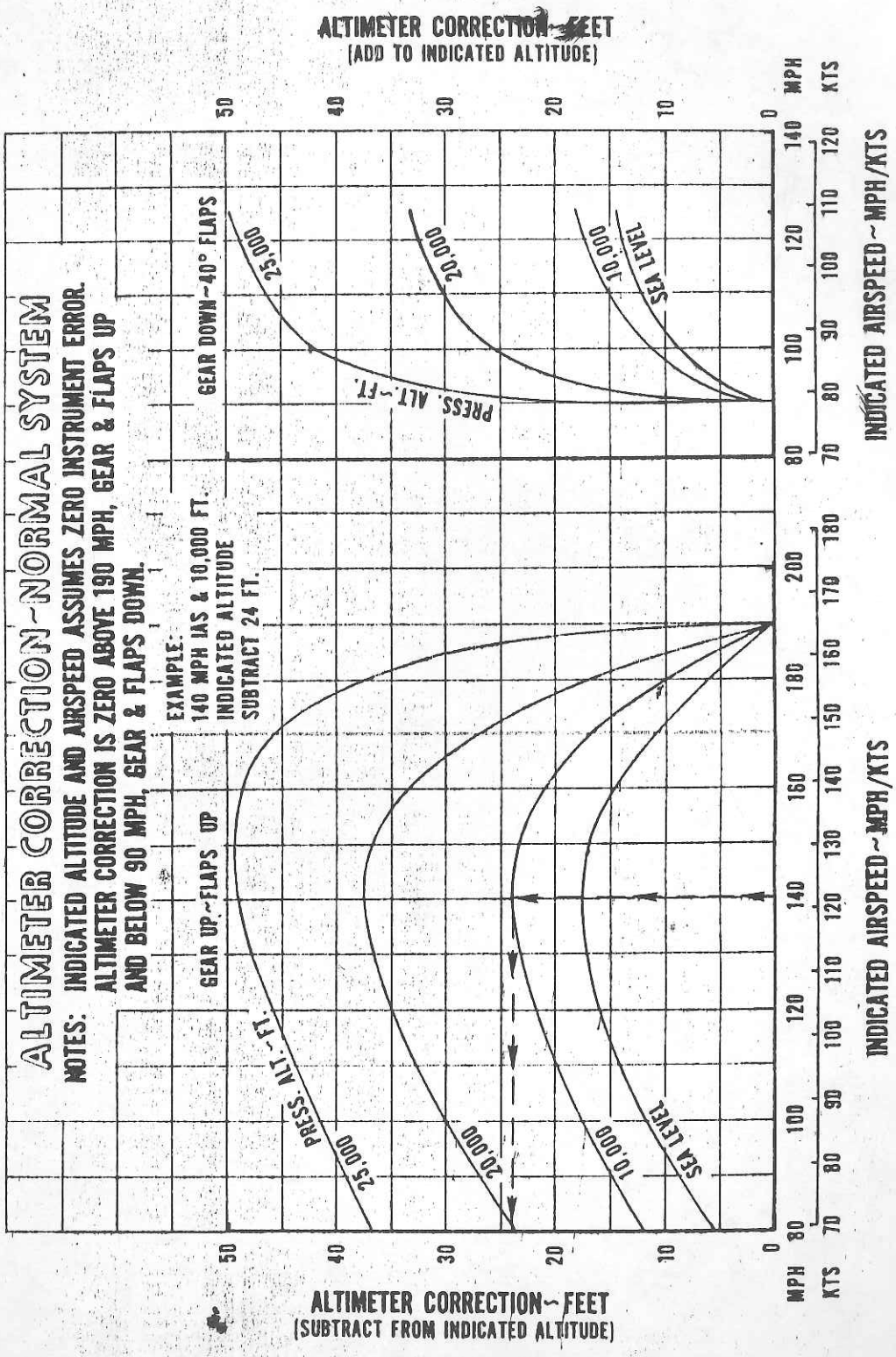
IX. Total Fuel Required = Climb Fuel + Cruise Fuel + Descent Fuel
= IV (B) + VI (D) + V (B)
= 7.5 + 38.4 + 3.4 = 49.3 Gal. x 6 = 296 Lbs.

X. Landing Weight = T. O. Weight - Total Fuel Consumption = I (F) - IX
= 4570 - 296 = 4274 Lbs.

NOTES:


SENECA II
AIRSPEED CORRECTION~NORMAL SYSTEM
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.
EXAMPLE:
140 MPH IAS = 141 MPH CAS
GEAR UP~FLAPS UP
GEAR DOWN~FLAPS 40°
KTS MPH
190 220
180 200
170 180
160 160
150 140
140 130
130 120
120 110
110 100
100 90
90 80
80 70
70 60
60 50
60 60
50 50
CALIBRATED AIRSPEED~MPH/KTS
60 60
70 70
80 80
90 90
100 100
110 120
120 130
130 140
140 150
150 160
160 170
170 180
180 190
190 200
200 220
MPH KTS
INDICATED AIRSPEED~MPH/KTS

SENECA II


ALTIMETER CORRECTION-NORMAL SYSTEM
NOTES: INDICATED ALTITUDE AND AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.
ALTIMETER CORRECTION IS ZERO ABOVE 190 MPH, GEAR & FLAPS UP
AND BELOW 90 MPH, GEAR & FLAPS DOWN.
EXAMPLE:
140 MPH IAS & 10,000 FT. INDICATED ALTITUDE
SUBTRACT 24 FT.
GEAR UP-FLAPS UP
GEAR DOWN-40° FLAPS
PRESS. ALT.-FT.
25,000
20,000
10,000
SEA LEVEL
ALTIMETER CORRECTION-FEET
(SUBTRACT FROM INDICATED ALTITUDE)
ALTIMETER CORRECTION-FEET
(ADD TO INDICATED ALTITUDE)
INDICATED AIRSPEED-MPH/KTS
MPH
KTS

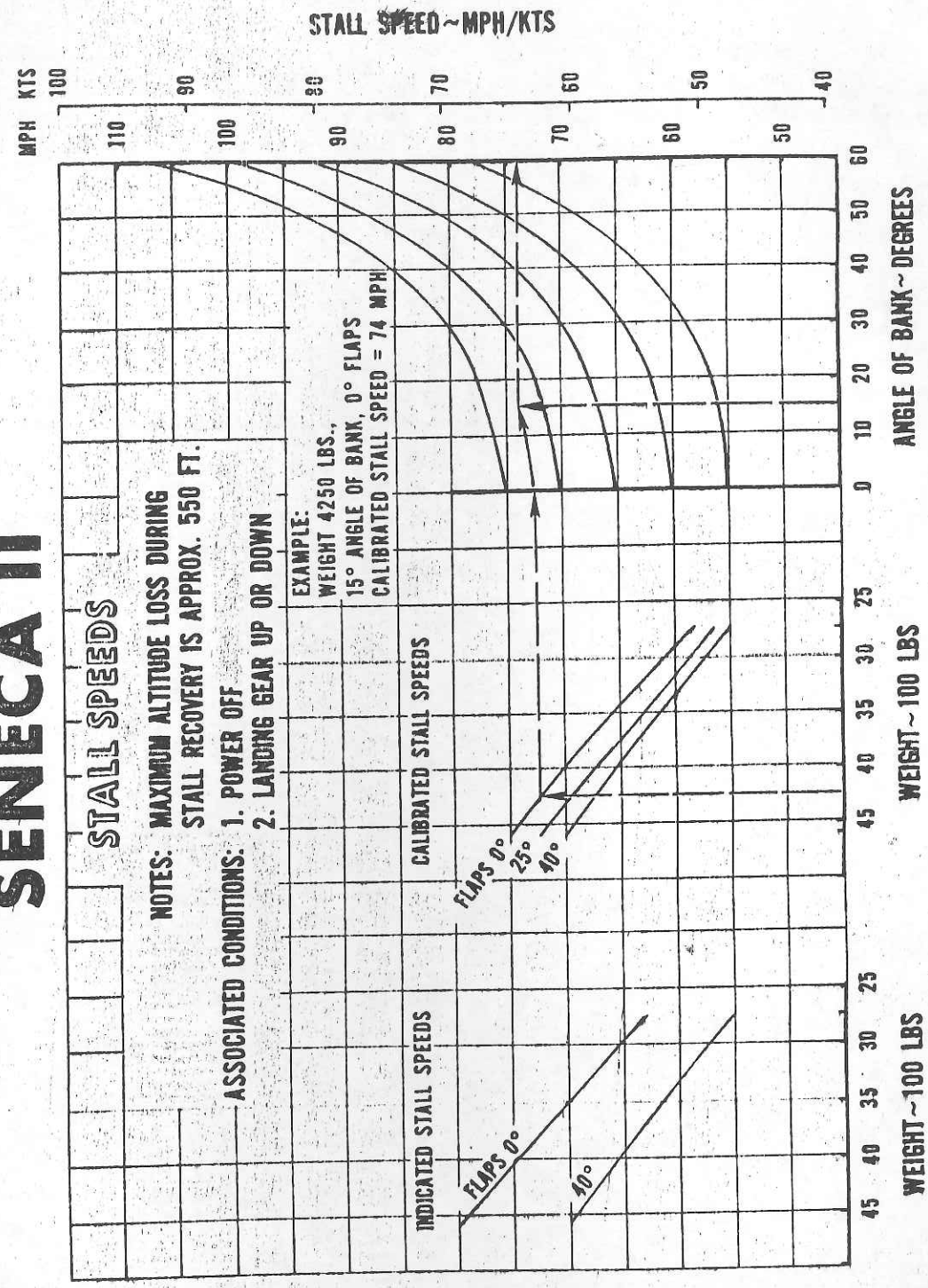
SENECA II

STALL SPEEDS

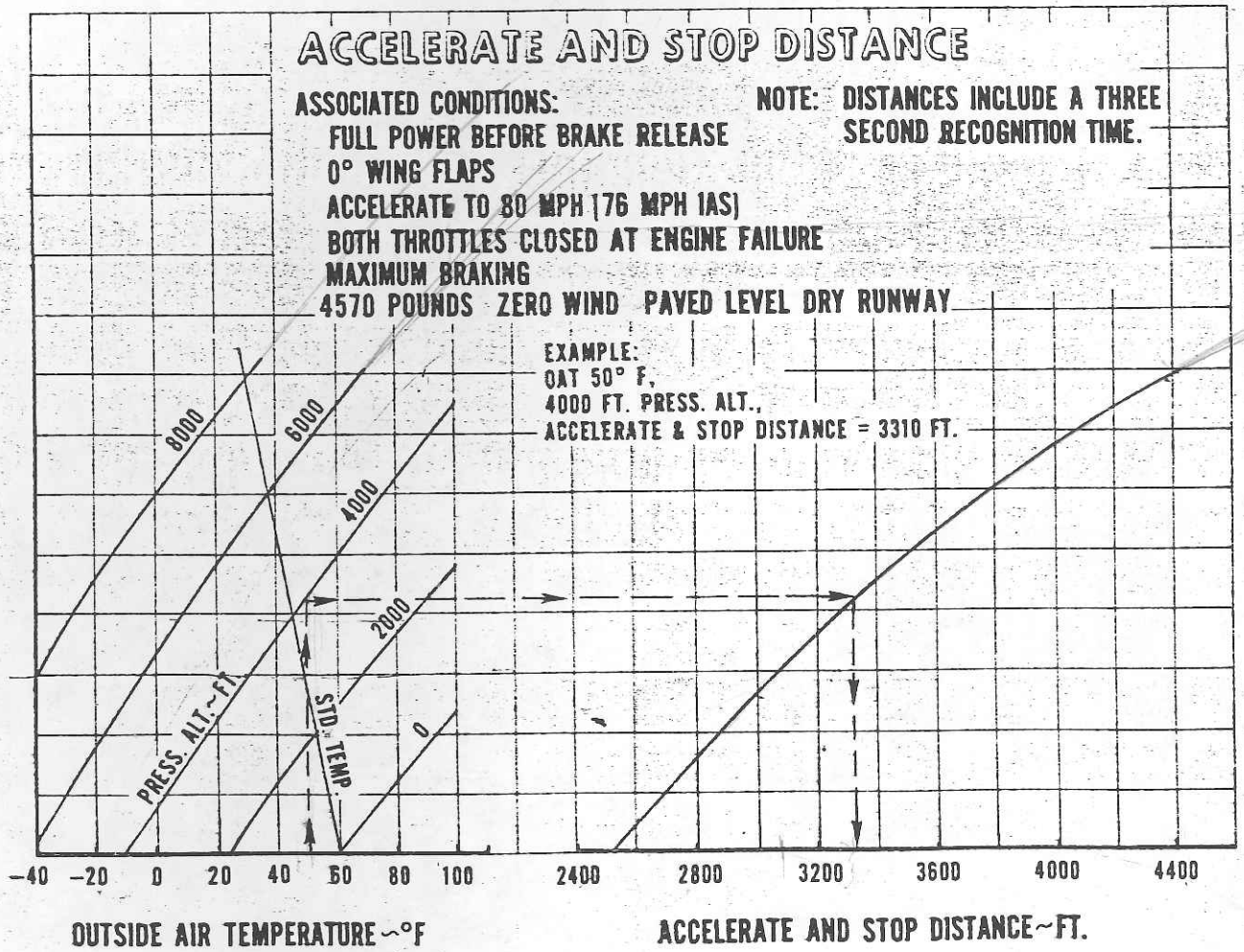
NOTES: MAXIMUM ALTITUDE LOSS DURING STALL RECOVERY IS APPROX. 550 FT.

ASSOCIATED CONDITIONS: 1. POWER OFF
2. LANDING GEAR UP OR DOWN

EXAMPLE:
WEIGHT 4250 LBS.,
15° ANGLE OF BANK, 0° FLAPS
CALIBRATED STALL SPEED = 74 MPH



SENECA II


ACCELERATE AND STOP DISTANCE
ASSOCIATED CONDITIONS:
FULL POWER BEFORE BRAKE RELEASE
0° WING FLAPS
ACCELERATE TO 80 MPH (76 MPH IAS)
BOTH THROTTLES CLOSED AT ENGINE FAILURE
MAXIMUM BRAKING
4570 POUNDS ZERO WIND PAVED LEVEL DRY RUNWAY
NOTE: DISTANCES INCLUDE A THREE SECOND RECOGNITION TIME.
EXAMPLE:
OAT 50° F,
4000 FT. PRESS. ALT.,
ACCELERATE & STOP DISTANCE = 3310 FT.
8000
6000
4000
2000
0
PRESS. ALT.~FT.
STD. TEMP.
-40 -20 0 20 40 60 80 100
OUTSIDE AIR TEMPERATURE ~°F
2400 2800 3200 3600 4000 4400
ACCELERATE AND STOP DISTANCE~FT.

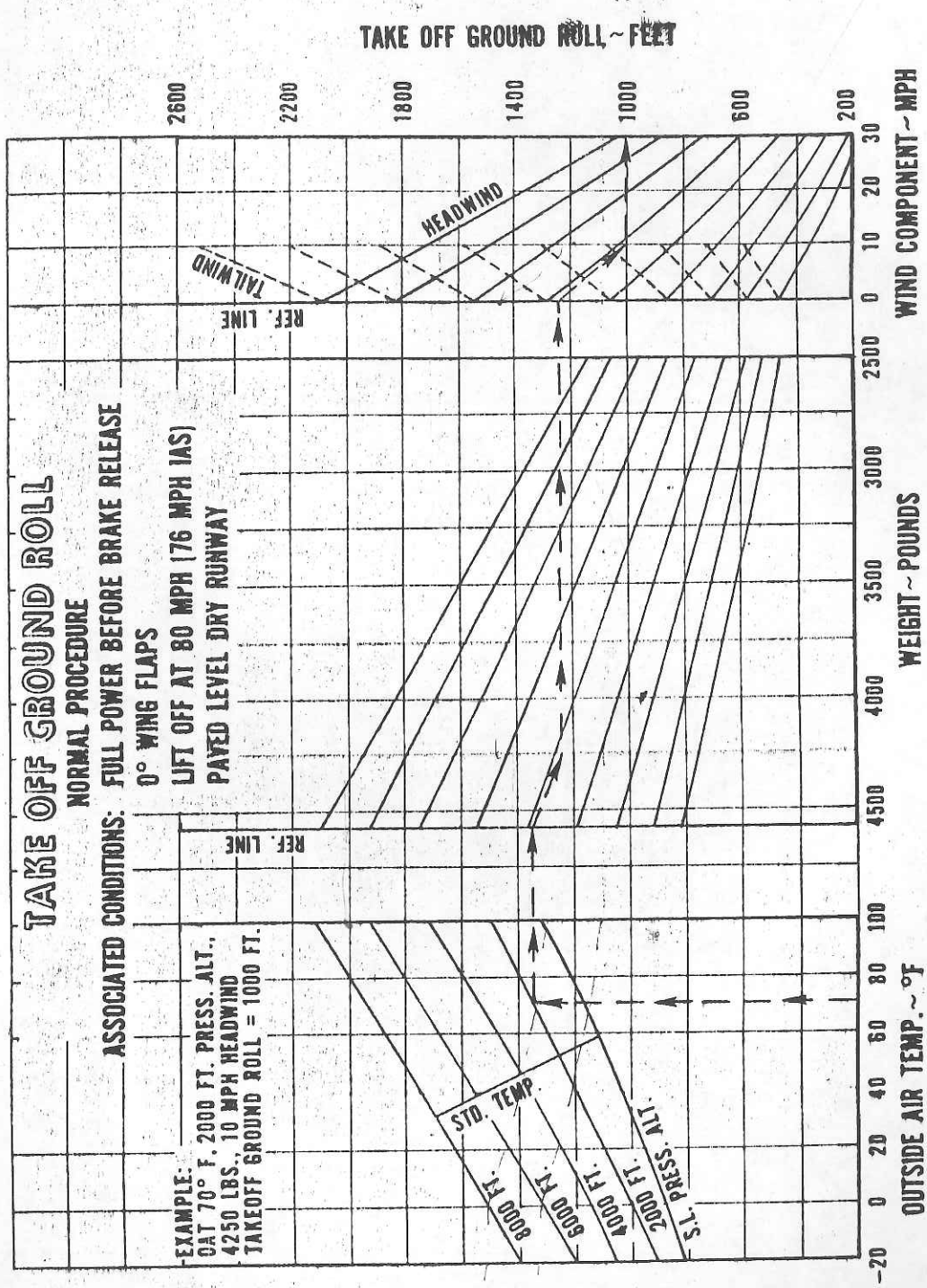
SENECA II

TAKE OFF GROUND ROLL

NORMAL PROCEDURE

ASSOCIATED CONDITIONS: FULL POWER BEFORE BRAKE RELEASE
0° WING FLAPS
LIFT OFF AT 80 MPH (76 MPH IAS)
PAVED LEVEL DRY RUNWAY

EXAMPLE:
OAT 70° F. 2000 FT. PRESS. ALT.,
4250 LBS., 10 MPH HEADWIND
TAKEOFF GROUND ROLL = 1000 FT.



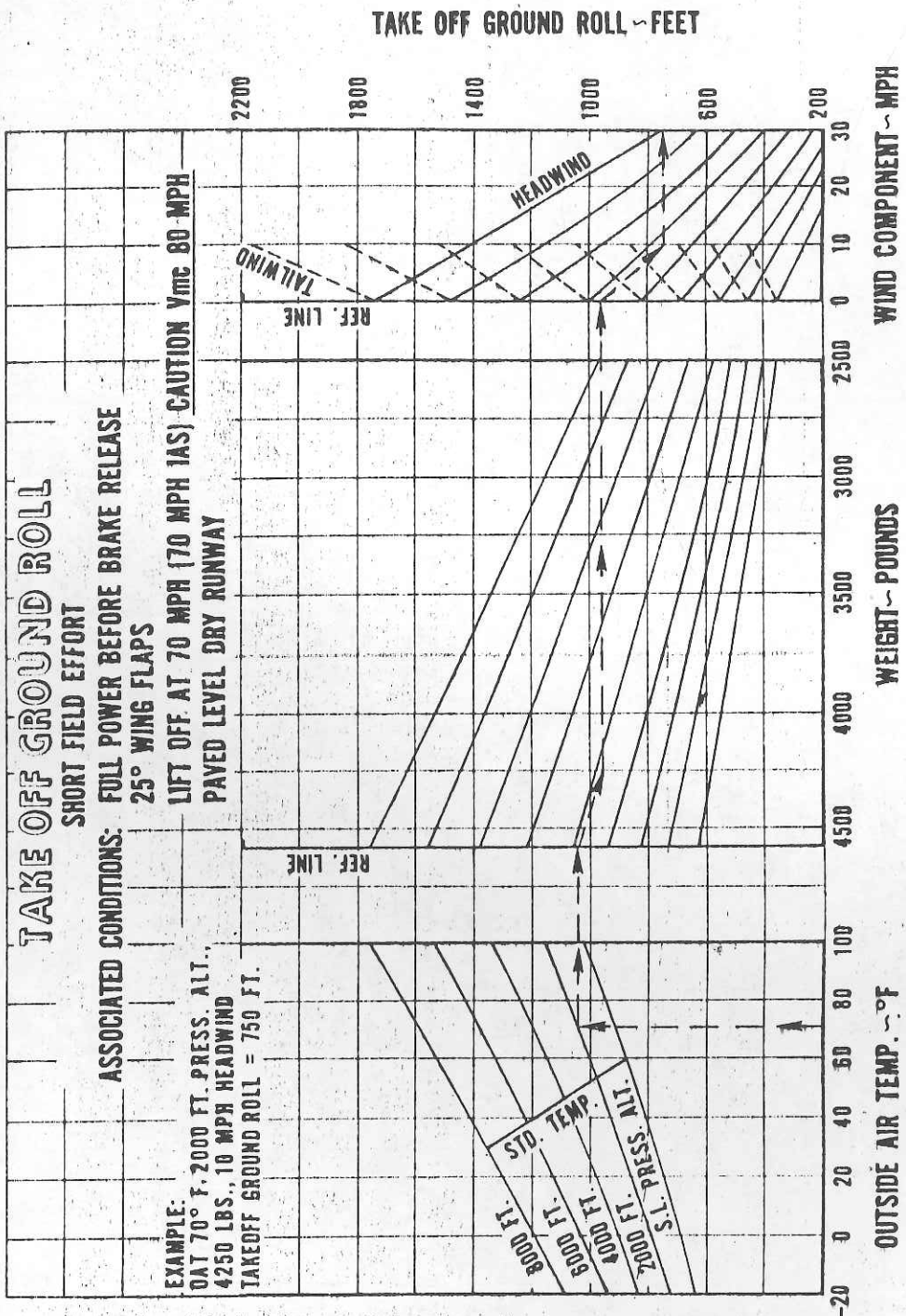
SENECA II

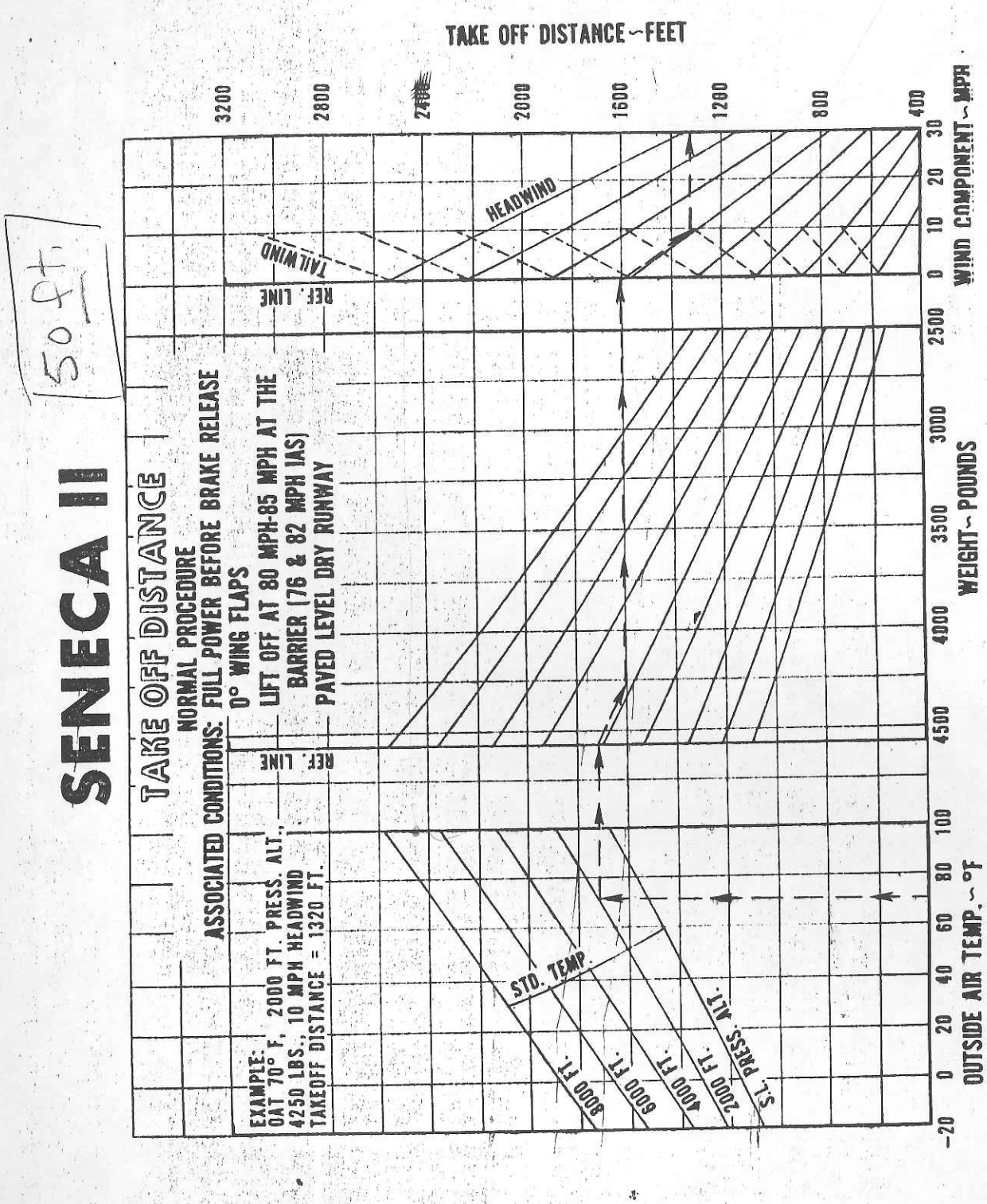
TAKE OFF GROUND ROLL

SHORT FIELD EFFORT

ASSOCIATED CONDITIONS: FULL POWER BEFORE BRAKE RELEASE
25° WING FLAPS
LIFT OFF AT 70 MPH (70 MPH IAS) CAUTION Vmc 80 MPH
PAVED LEVEL DRY RUNWAY

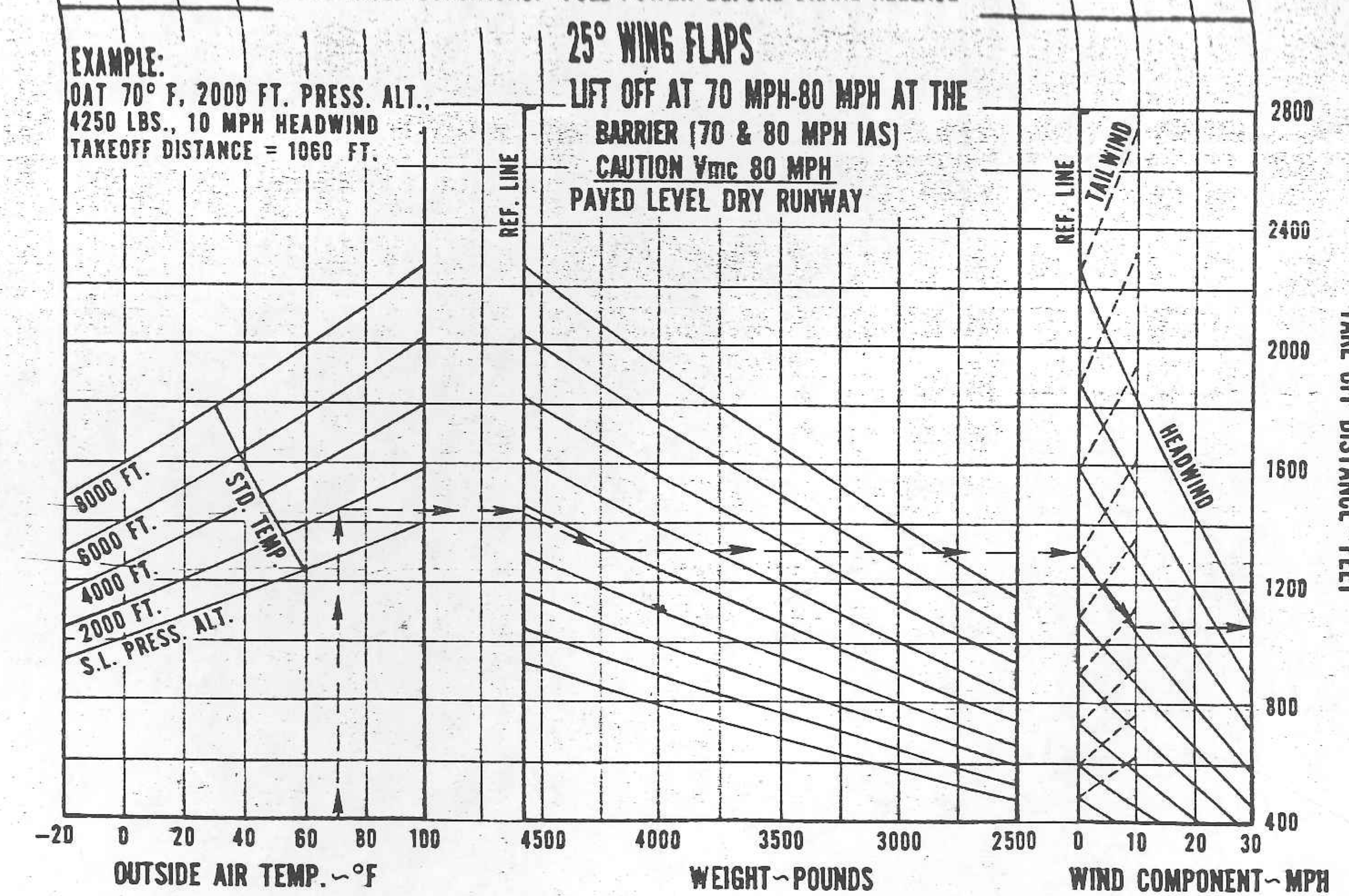
EXAMPLE:
OAT 70° F, 2000 FT. PRESS. ALT.,
4250 LBS., 10 MPH HEADWIND
TAKEOFF GROUND ROLL = 750 FT.



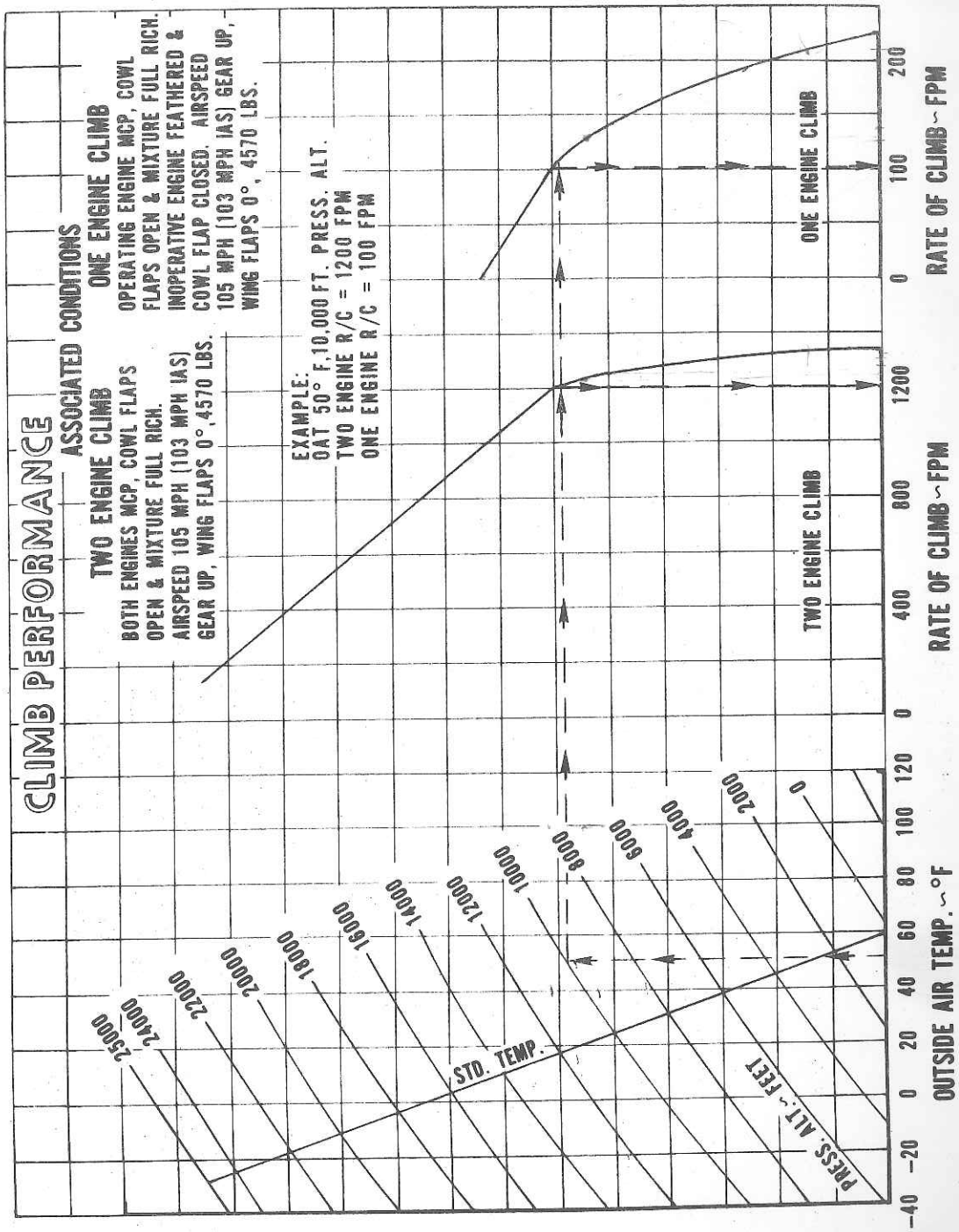

SENECA II
TAKE OFF DISTANCE
NORMAL PROCEDURE
ASSOCIATED CONDITIONS: FULL POWER BEFORE BRAKE RELEASE
0° WING FLAPS
LIFT OFF AT 80 MPH-85 MPH AT THE BARRIER (76 & 82 MPH IAS)
PAVED LEVEL DRY RUNWAY
EXAMPLE:
OAT 70° F, 2000 FT. PRESS. ALT.,
4250 LBS., 10 MPH HEADWIND
TAKEOFF DISTANCE = 1320 FT.
REF. LINE
REF. LINE
TAKE OFF DISTANCE ~ FEET
3200
2800
2400
2000
1600
1200
800
400
TAILWIND
HEADWIND
WIND COMPONENT ~ MPH
30 20 10 0
2500
3000
3500
4000
4500
WEIGHT ~ POUNDS
100 80 60 40 20 0 -20
OUTSIDE AIR TEMP. ~ °F
STD. TEMP.
S.L. PRESS. ALT.
2000 FT.
4000 FT.
6000 FT.
8000 FT.

50 ft
1

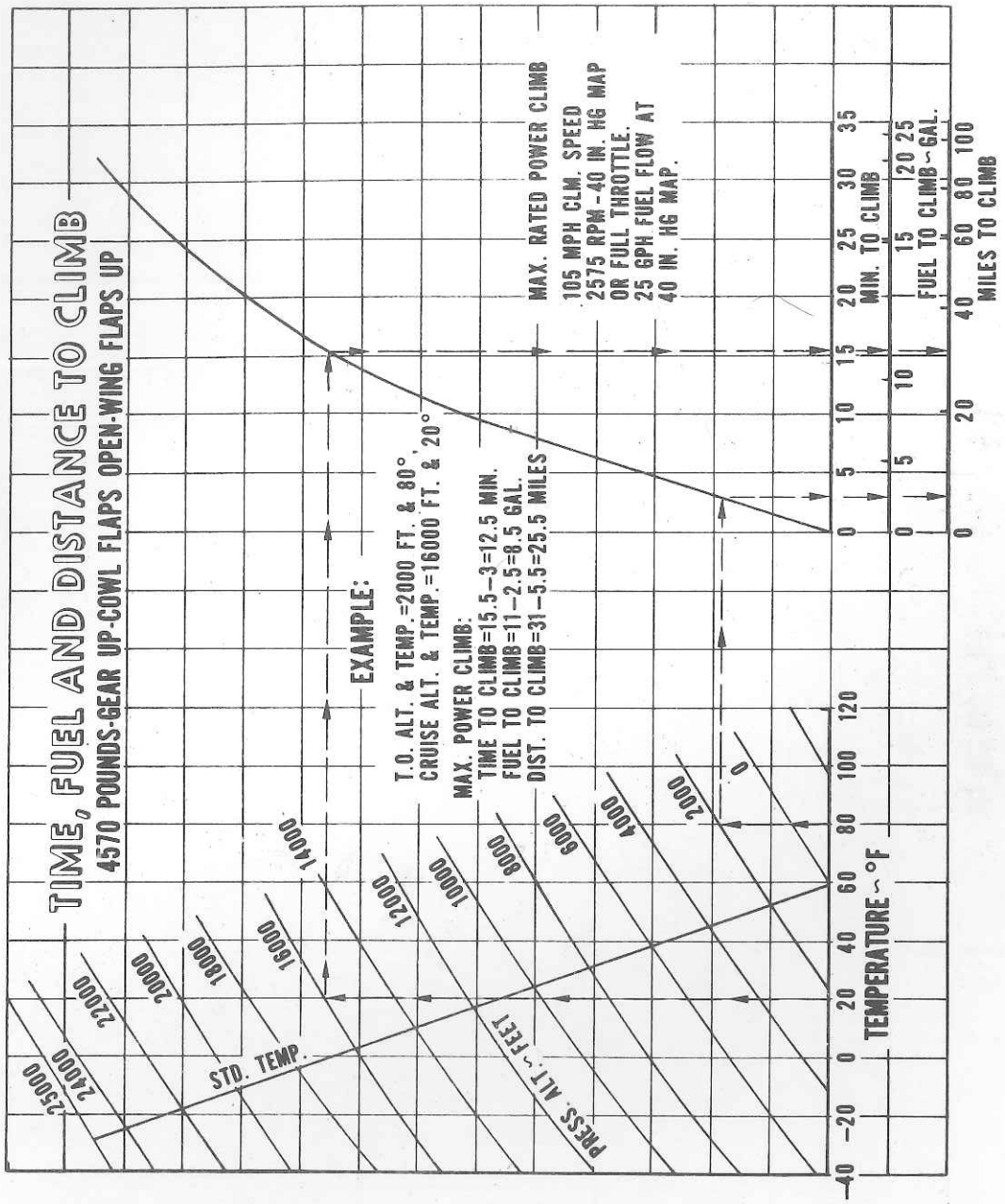
ASSOCIATED CONDITIONS: FULL POWER BEFORE BRAKE RELEASE



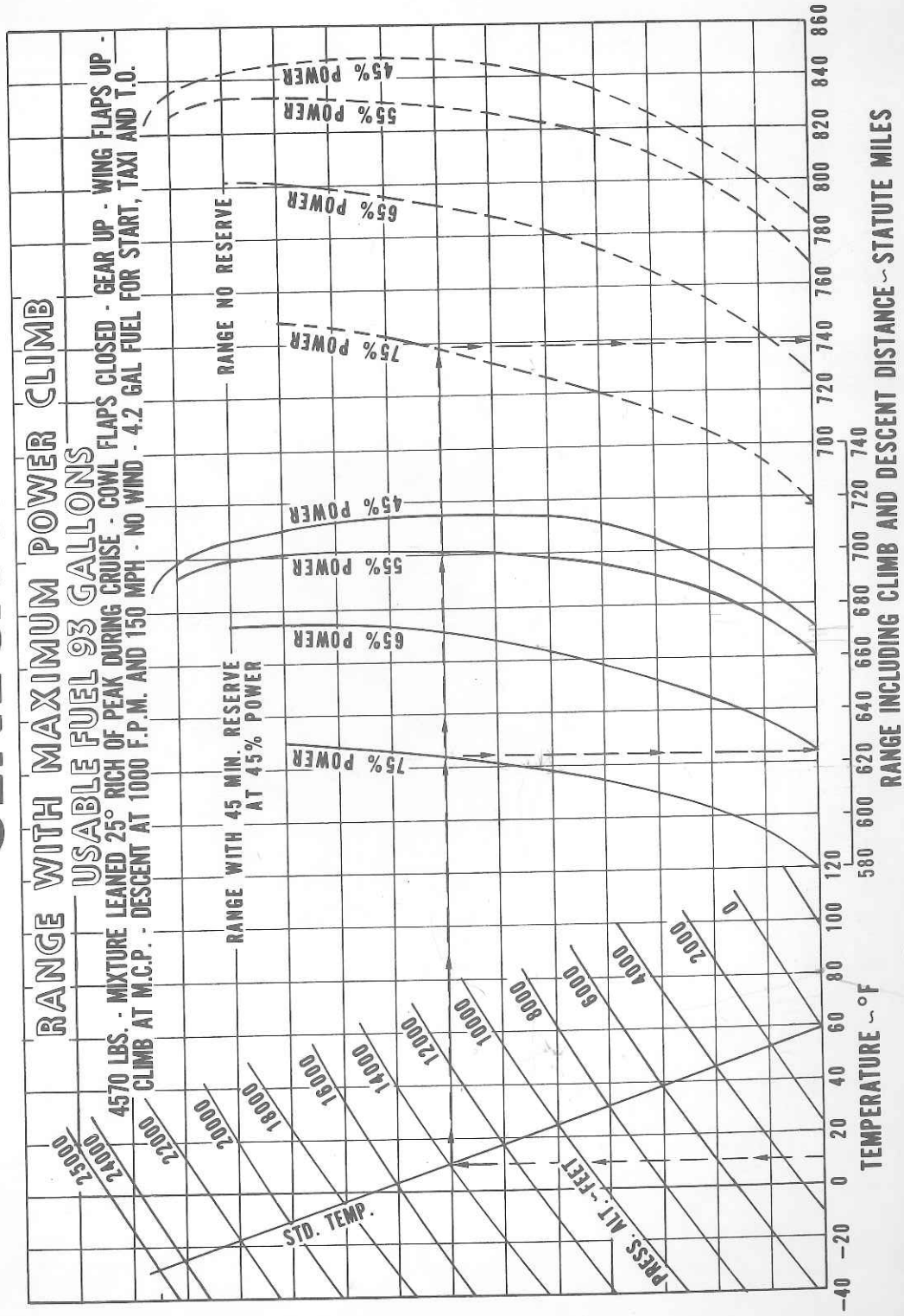
SENECA II


CLIMB PERFORMANCE
ASSOCIATED CONDITIONS
TWO ENGINE CLIMB
BOTH ENGINES MCP, COWL FLAPS
OPEN & MIXTURE FULL RICH.
AIRSPEED 105 MPH (103 MPH IAS)
GEAR UP, WING FLAPS 0°, 4570 LBS.
ONE ENGINE CLIMB
OPERATING ENGINE MCP, COWL
FLAPS OPEN & MIXTURE FULL RICH.
INOPERATIVE ENGINE FEATHERED &
COWL FLAP CLOSED. AIRSPEED
105 MPH (103 MPH IAS) GEAR UP,
WING FLAPS 0°, 4570 LBS.
EXAMPLE:
OAT 50° F, 10,000 FT. PRESS. ALT.
TWO ENGINE R/C = 1200 FPM
ONE ENGINE R/C = 100 FPM
PRESS. ALT. - FEET
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
22000
24000
25000
STD. TEMP.
TWO ENGINE CLIMB
ONE ENGINE CLIMB
-40 -20 0 20 40 60 80 100 120
OUTSIDE AIR TEMP. - °F
0 400 800 1200
RATE OF CLIMB - FPM
0 100 200
RATE OF CLIMB - FPM

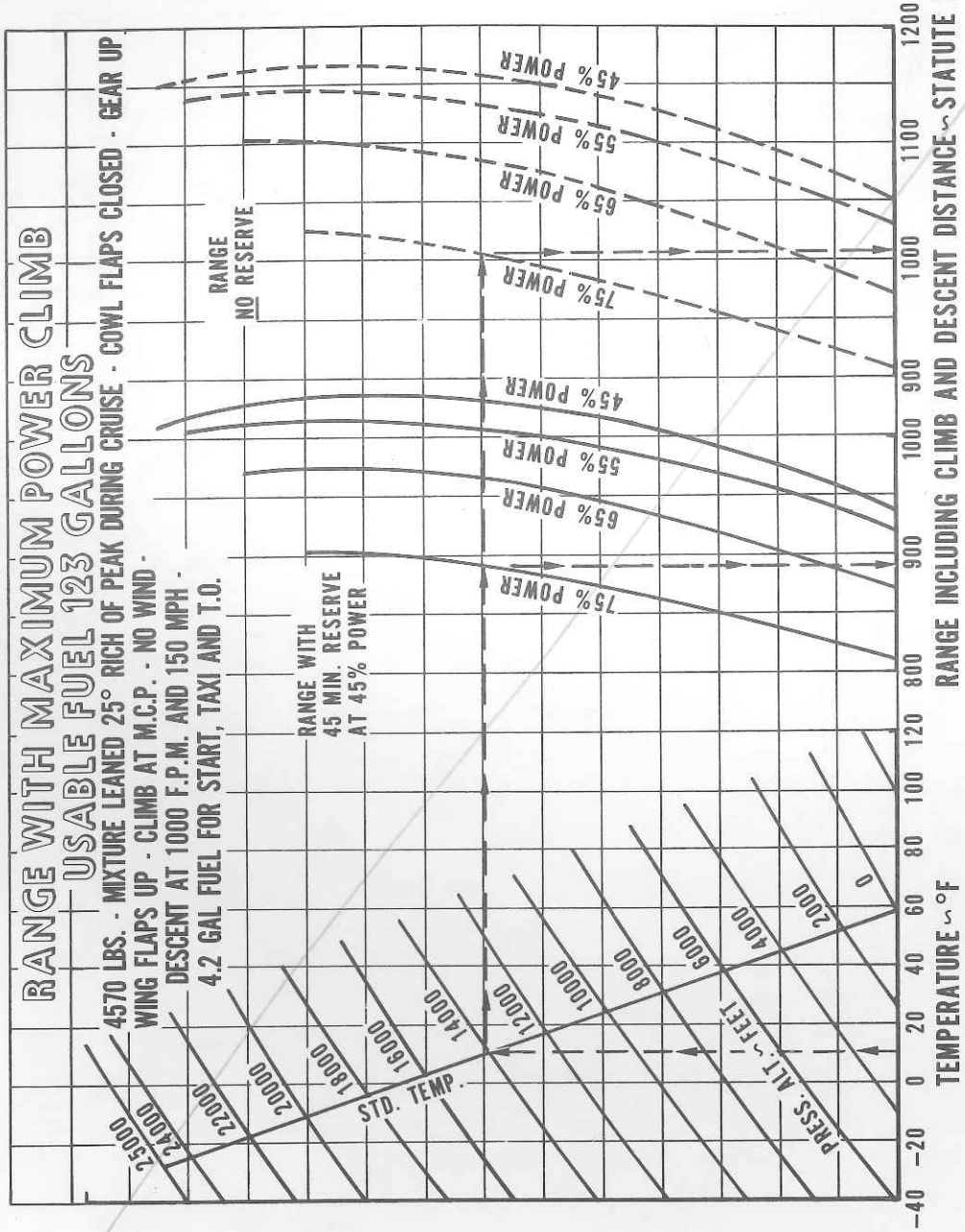
SENECA II


TIME, FUEL AND DISTANCE TO CLIMB
4570 POUNDS-GEAR UP-COWL FLAPS OPEN-WING FLAPS UP
EXAMPLE:
T.O. ALT. & TEMP.=2000 FT. & 80°
CRUISE ALT. & TEMP.=16000 FT. & 20°
MAX. POWER CLIMB:
TIME TO CLIMB=15.5−3=12.5 MIN.
FUEL TO CLIMB=11−2.5=8.5 GAL.
DIST. TO CLIMB=31−5.5=25.5 MILES
MAX. RATED POWER CLIMB
105 MPH CLM. SPEED
2575 RPM-40 IN. HG MAP
OR FULL THROTTLE.
25 GPH FUEL FLOW AT
40 IN. HG MAP.
STD. TEMP.
PRESS. ALT.-FEET
TEMPERATURE ~ °F
MIN. TO CLIMB
FUEL TO CLIMB~GAL.
MILES TO CLIMB

SENECA II


RANGE WITH MAXIMUM POWER CLIMB
USABLE FUEL 93 GALLONS
4570 LBS. - MIXTURE LEANED 25° RICH OF PEAK DURING CRUISE - COWL FLAPS CLOSED - GEAR UP - WING FLAPS UP - CLIMB AT M.C.P. - DESCENT AT 1000 F.P.M. AND 150 MPH - NO WIND - 4.2 GAL FUEL FOR START, TAXI AND T.O.
RANGE NO RESERVE
RANGE WITH 45 MIN. RESERVE AT 45% POWER
75% POWER
65% POWER
55% POWER
45% POWER
STD. TEMP.
PRESS. ALT. - FEET
25000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-40 -20 0 20 40 60 80 100 120
TEMPERATURE - °F
580 600 620 640 660 680 700 720 740
700 720 740 760 780 800 820 840 860
RANGE INCLUDING CLIMB AND DESCENT DISTANCE - STATUTE MILES
EXAMPLE: 10°F, 14000 FT., 75% POWER
RANGE=624 MILES WITH RES., 737 MILES NO RES.

SENECA II

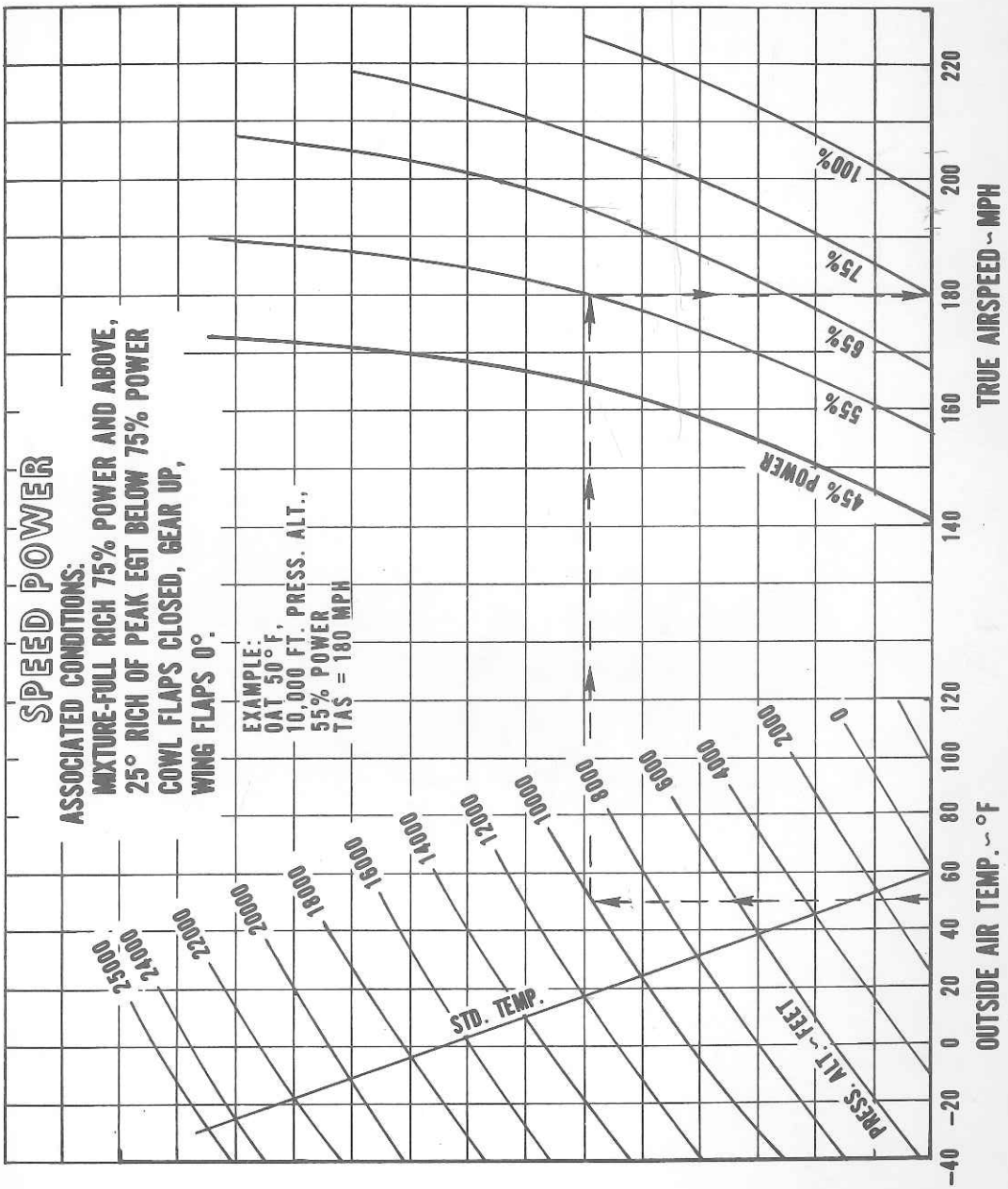

RANGE WITH MAXIMUM POWER CLIMB
USABLE FUEL 123 GALLONS
4570 LBS. - MIXTURE LEANED 25° RICH OF PEAK DURING CRUISE - COWL FLAPS CLOSED - GEAR UP
WING FLAPS UP - CLIMB AT M.C.P. - NO WIND -
DESCENT AT 1000 F.P.M. AND 150 MPH -
4.2 GAL FUEL FOR START, TAXI AND T.O.
RANGE NO RESERVE
RANGE WITH 45 MIN. RESERVE AT 45% POWER
45% POWER
55% POWER
65% POWER
75% POWER
STD. TEMP.
PRESS. ALT. - FEET
25000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-40 -20 0 20 40 60 80 100 120
TEMPERATURE - °F
800 900 1000 1100 1200
RANGE INCLUDING CLIMB AND DESCENT DISTANCE - STATUTE MILES
EXAMPLE: 10°F, 14000 FT., 75% POWER
RANGE=880 MILES WITH RES., 1015 MILES NO RES.

SENECA II

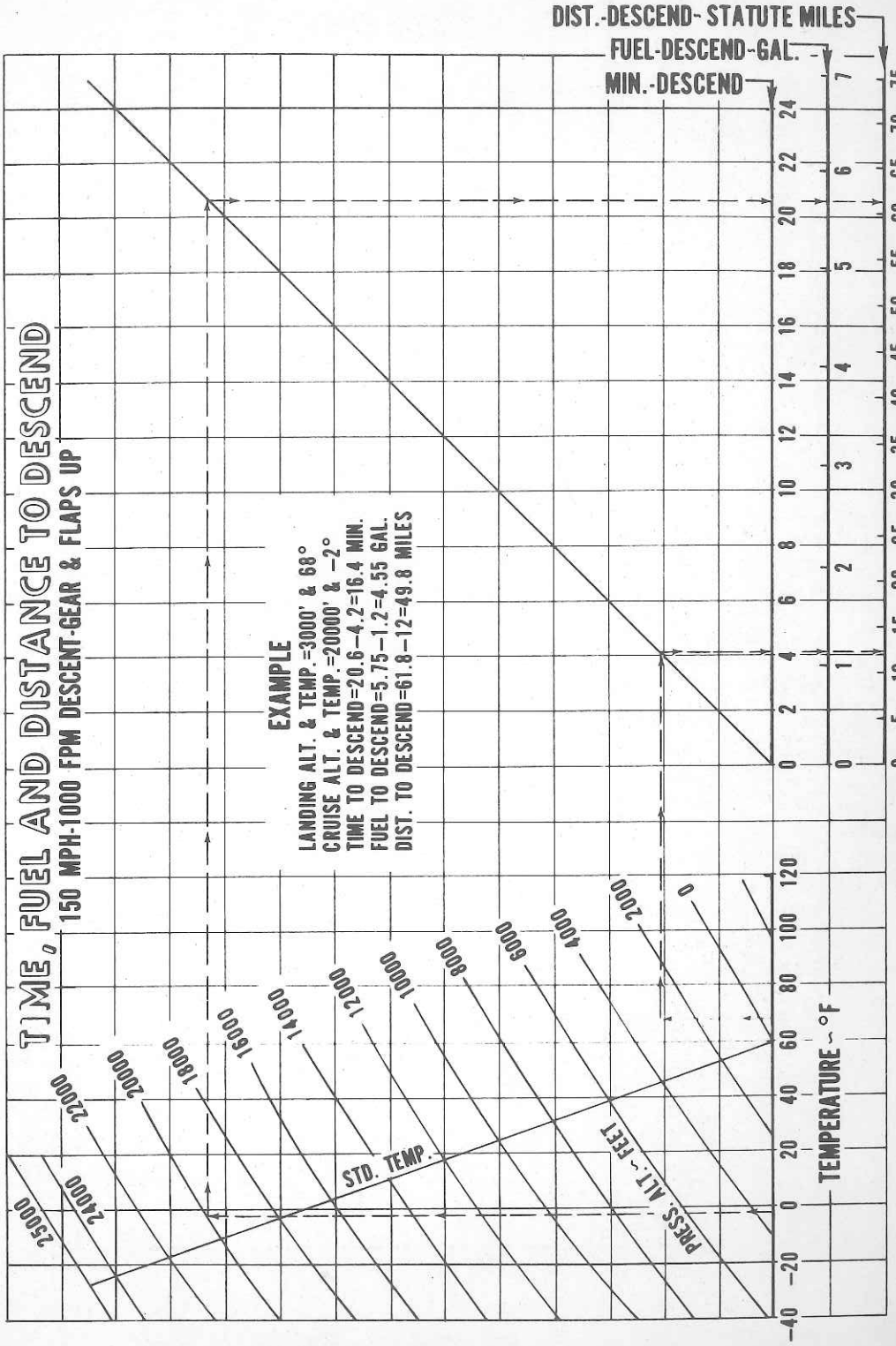
SPEED POWER

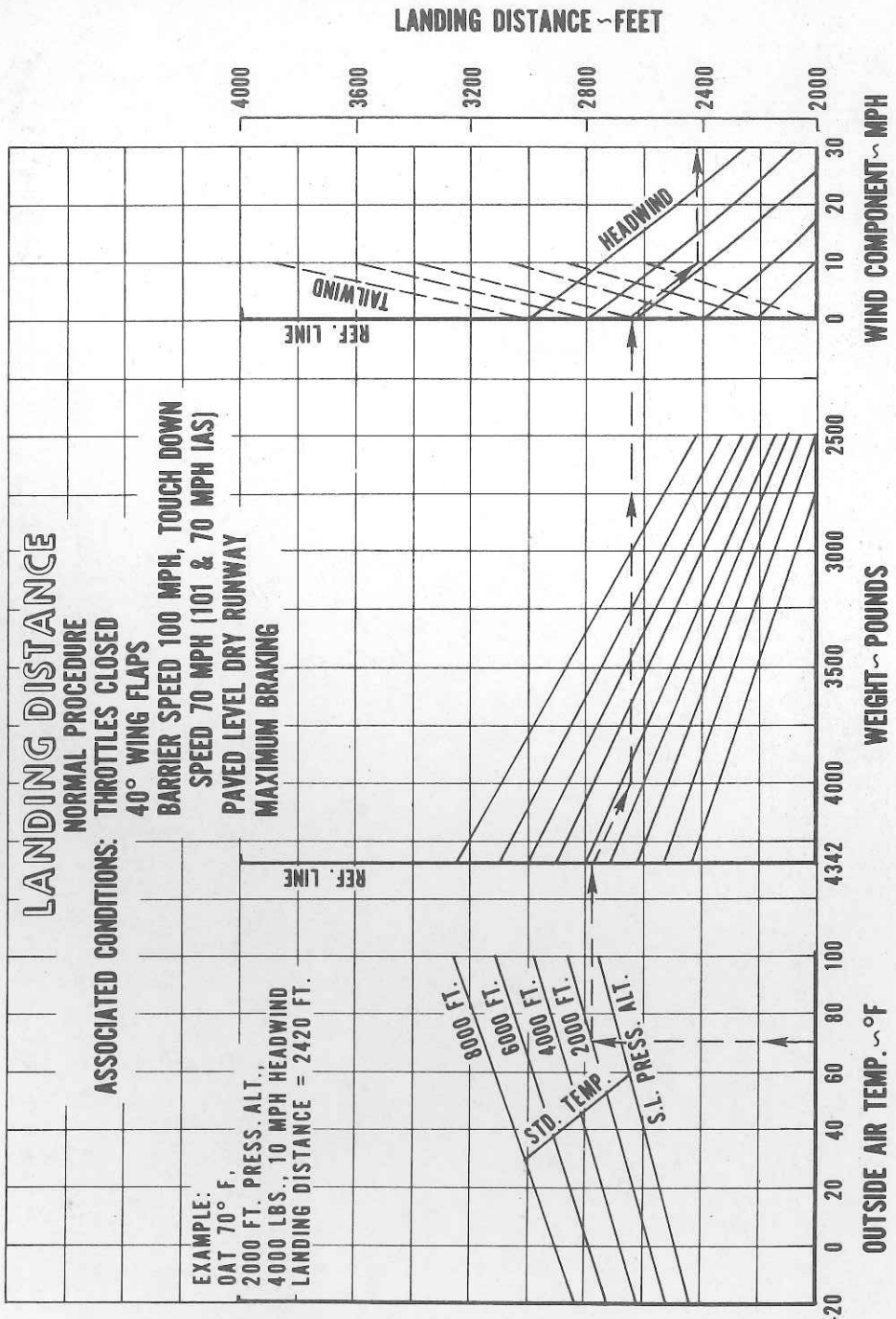
ASSOCIATED CONDITIONS:
MIXTURE-FULL RICH 75% POWER AND ABOVE,
25° RICH OF PEAK EGT BELOW 75% POWER
COWL FLAPS CLOSED, GEAR UP,
WING FLAPS 0°.

EXAMPLE:
OAT 50°F,
10,000 FT. PRESS. ALT.,
55% POWER
TAS = 180 MPH



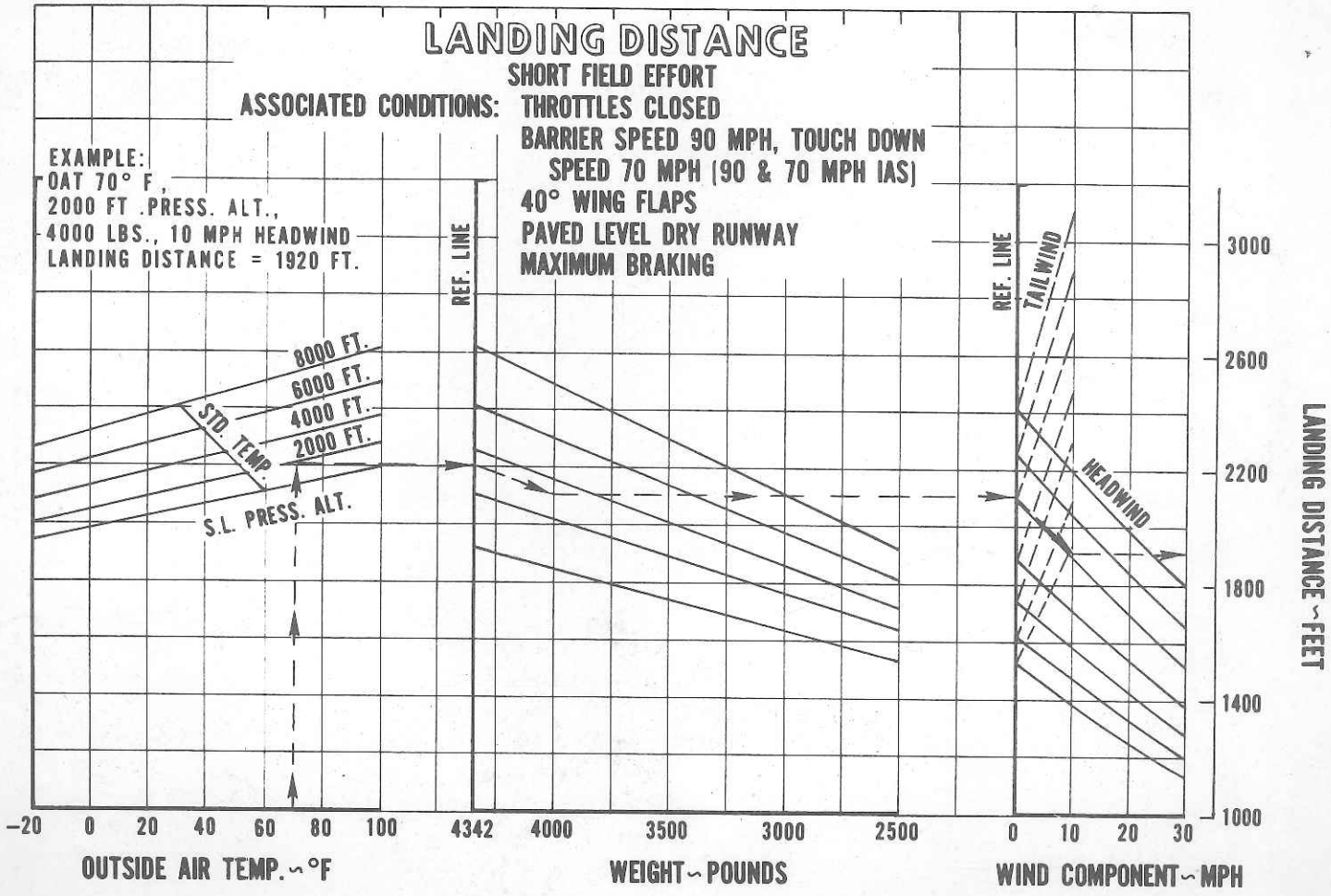
SENECA II


TIME, FUEL AND DISTANCE TO DESCEND
150 MPH-1000 FPM DESCENT-GEAR & FLAPS UP
EXAMPLE
LANDING ALT. & TEMP.=3000' & 68°
CRUISE ALT. & TEMP.=20000' & -2°
TIME TO DESCEND=20.6-4.2=16.4 MIN.
FUEL TO DESCEND=5.75-1.2=4.55 GAL.
DIST. TO DESCEND=61.8-12=49.8 MILES
DIST.-DESCEND-STATUTE MILES
FUEL-DESCEND-GAL.
MIN.-DESCEND
TEMPERATURE - °F
STD. TEMP.
PRESS. ALT.-FEET
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
22000
24000
26000

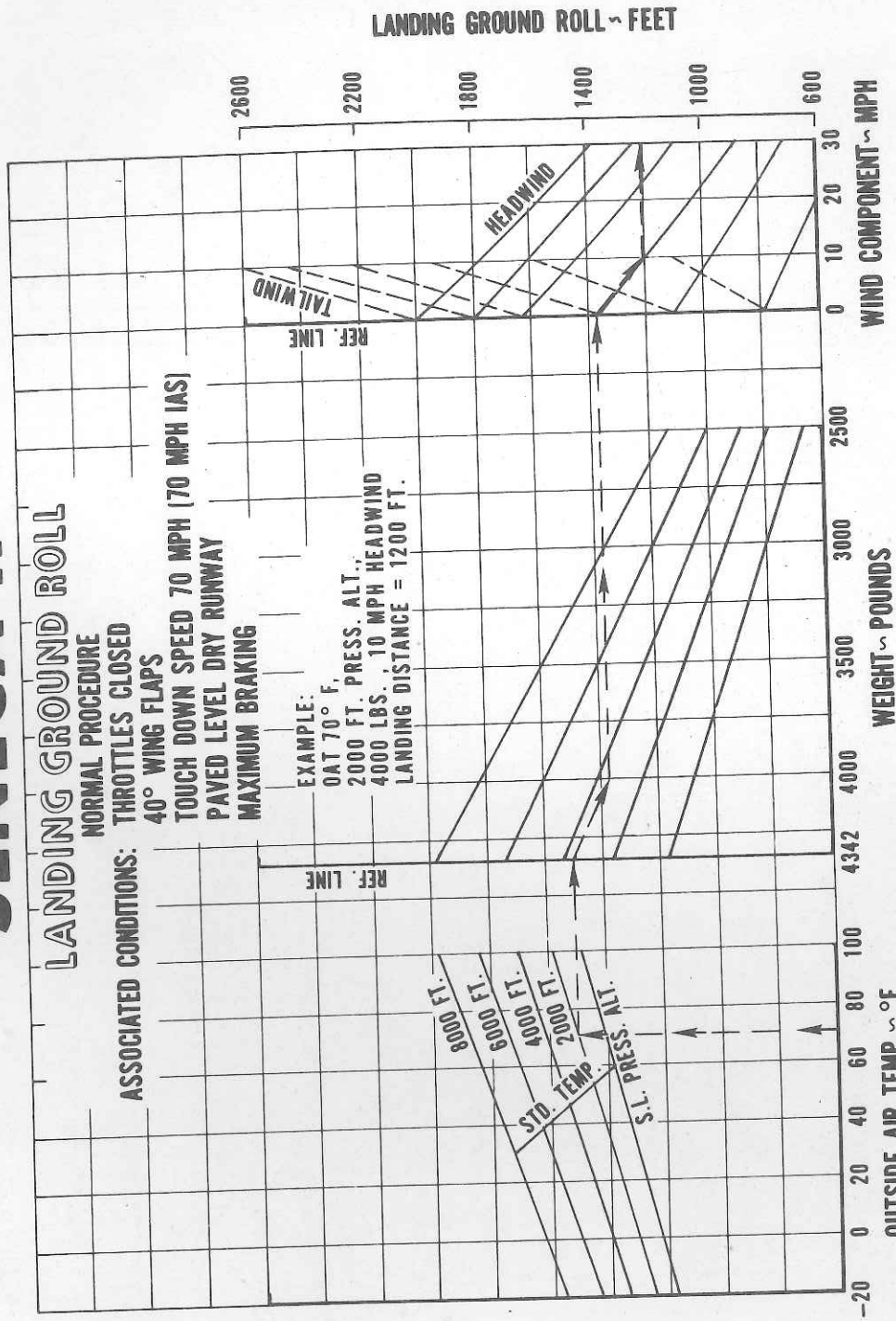


"The above distances may be reduced by approximately 12% when the aircraft is equipped with optional Heavy Duty Wheels, Tires and Brakes. (Reference Aircraft Equipment List in Weight and Balance Section of this manual.)"

SENECA II



"The above distances may be reduced by approximately 12% when the aircraft is equipped with optional Heavy Duty Wheels. Tires and Brakes. (Reference Aircraft Equipment List in Weight and Balance Section of this manual.)"



"The above distances may be reduced by approximately 25% when the aircraft is equipped with optional Heavy Duty Wheels, Tires and Brakes. (Reference Aircraft Equipment List in Weight and Balance Section of this manual.)"

POWER SETTING TABLE – T.C.M. TSIO 360E SERIES

PRESS. ALT. FEET	STD. ALT. TEMP. °F	RPM	45% POWER (APPROX. 16.1 GPH FUEL CONS.)				55% POWER (APPROX. 18 GPH FUEL CONS.)					
			2000	2100	2200	2300	2000	2200	2300	2400	2500	2575
			MANIFOLD PRESSURE – INCHES MERCURY									
S.L.	60		27.6	26.4	25.6	24.6	31.8	29.6	28.4	27.0	26.0	25.6
2000	52		26.8	25.6	25.0	24.0	30.8	28.5	27.6	26.4	25.4	25.0
4000	45		26.0	25.0	24.0	23.4	29.8	28.0	27.0	25.8	25.0	24.6
6000	38		25.0	24.4	23.6	22.8	29.0	27.4	26.4	25.2	24.4	24.0
8000	30		24.6	23.6	22.8	22.3		26.6	25.6	24.8	24.0	23.8
10000	23		23.8	23.0	22.4	21.8		26.0	25.0	24.2	23.6	23.2
12000	16		23.0	22.4	21.7	21.0		25.0	24.4	23.8	23.0	22.8
14000	9		22.6	21.8	21.0	20.6		24.5	23.8	23.0	22.6	22.4
16000	2			21.0	20.4	20.0		24.0	23.4	22.6	22.0	22.0
18000	-5				19.8	19.4			22.8	22.0	21.0	21.7
20000	-12					18.8				21.6	20.8	21.0
22000	-19										20.6	20.8
24000	-27										20.4	20.4
25000	-30										20.0	20.0

For each 6 °F above std. temp. add 0.4" MAP.
For each 6 °F below std. temp. subtract 0.4" MAP.

POWER SETTING TABLE – T.C.M. TSIO 360E SERIES

PRESS. ALT. FEET	STD. ALT. TEMP. °F	RPM	65% POWER (APPROX. 20.5 GPH FUEL CONS.)					75% POWER (APPROX. 23.6 GPH FUEL CONS.)			
			2200	2300	2400	2500	2575	2300	2400	2500	2575
			MANIFOLD PRESSURE – INCHES MERCURY								
S.L.	60		33.5	32.0	30.6	29.8	29.2	35.5	34.0	33.0	32.8
2000	52		32.8	31.5	30.0	29.0	28.8	35.0	33.4	32.6	32.0
4000	45		32.0	30.8	29.6	28.6	28.2	34.4	32.8	32.0	31.6
6000	38		31.4	30.0	29.0	28.0	27.8	33.6	32.0	31.4	30.9
8000	30		30.6	29.6	28.4	27.6	27.4	33.0	31.6	30.8	30.3
10000	23			28.8	27.8	27.0	27.0	32.4	31.0	30.2	29.8
12000	16			28.0	27.2	26.6	26.4	31.6	30.4	29.8	29.3
14000	9			27.4	26.6	26.0	26.0		29.8	29.2	29.0
16000	2			26.7	26.0	25.8	25.6		29.4	28.8	28.6
18000	-5				25.6	25.2	25.0			28.4	28.3
20000	-12					24.8	24.8				28.0
22000	-19					24.4	24.4				
24000	-27						24.0				
25000	-30										

For each 6 °F above std. temp. add 0.4" MAP.
For each 6 °F below std. temp. subtract 0.4" MAP.