Chock ..... remove
Main gear strut ..... proper inflation (2.5 ± .25 in.)
Tire ..... check
Brake block and disc ..... check
Fuel tank ..... check supply visually - secure cap
Fuel tank vent ..... clear
Fuel tank sump ..... drain and check for water, sediment and proper fuel
Tie down ..... remove
Pitot/static head ..... remove cover - holes clear
Wing tip and lights ..... check
Aileron and hinges ..... check
Flap and hinges ..... check

FUSELAGE

Antennas ..... check
Empennage ..... clear of ice, frost, snow
Fresh air inlet ..... clear
Stabilator and trim tab ..... check
Tie down ..... remove
Master switch ..... ON
Cockpit lighting ..... check
Nav and strobe lights ..... check
Stall warning ..... check
Pitot heat ..... check
All switches ..... OFF
Passengers ..... board
Cabin door ..... close and secure
Seat belts and harness ..... fasten/adjust
..... check inertia reel

BEFORE STARTING ENGINE

Avionics switch ..... OFF
Parking brake ..... set
Propeller ..... full INCREASE rpm
Fuel selector ..... desired tank
Alternate air ..... OFF

STARTING ENGINE (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector ..... ON
Mixture ..... RICH
Throttle ..... half travel
Propeller ..... FORWARD
Master switch ..... ON
Propeller ..... clear
Starter ..... engage
Primer button ..... ON as required
Throttle ..... retard when engine starts
Oil pressure ..... check
Alternator ..... check
Gyro vacuum ..... check

STARTING ENGINE (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

Fuel selector ..... ON
Mixture ..... full RICH
Throttle ..... full FORWARD
Prop control ..... full FORWARD
Master switch ..... ON
Auxiliary fuel pump ..... OFF
Primer ..... ON
See Figure 4-3 for Priming Time
Throttle ..... CLOSE
Starter ..... engage immediately

At temperatures below +20° F continue priming while cranking until engine starts.

When engine starts firing - open throttle very slowly to raise engine speed to 1000 RPM. As engine speed accelerates through 500 RPM, release starter.

Primer ..... release
Auxiliary fuel pump ..... low only as necessary to obtain smooth engine operation (1-3 minutes will be required when temp. is below 20°F)

Oil pressure .....check
Alternator .....check
Gyro vacuum .....check

STARTING ENGINE WHEN FLOODED

Mixture.....idle cut-off
Throttle.....full FORWARD
Propeller.....FORWARD
Master switch.....O N
Auxiliary fuel pump.....OFF
Propeller.....clear
Starter .....engage

When engine fires:
Throttle.....retard
Mixture .....advance slowly

STARTING ENGINE IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector.....ON
Mixture .....IDLE CUT-OFF
Throttle.....full FORWARD
Prop control .....full FORWARD
Master switch .....ON
Auxiliary fuel pump.....ON HIGH BOOST
Starter .....engage
Mixture .....full FORWARD for 3 sec.
Throttle .....full FORWARD to full AFT
Mixture .....full FORWARD for 3 sec.
full AFT for 3 sec.
full FORWARD for 3 sec.

When engine fires:
Starter .....leave engaged
Auxiliary fuel pump.....ON LOW BOOST
Primer button .....tap until rhythmic firing
Starter .....release
Throttle .....half travel
Oil pressure .....check

If engine begins to falter:
Primer button ..... tap
Throttle ..... 1000 RPM
Auxiliary fuel pump ..... OFF after start complete

STARTING WITH EXTERNAL POWER SOURCE

Master switch ..... OFF
All electrical equipment ..... OFF
Terminals ..... connect
External power plug ..... insert in fuselage

Proceed with normal start
Throttle ..... lowest possible RPM
External power plug ..... disconnect from fuselage
Master switch ..... ON - check ammeter
Oil pressure ..... check

WARM-UP

Throttle ..... 900 to 1200 RPM

TAXIING

Chocks ..... removed
Taxi area ..... clear
Parking brake ..... release
Throttle ..... apply slowly
Prop ..... high RPM
Brakes ..... check
Steering ..... check

GROUND CHECK

Parking brake ..... set
Propeller ..... full INCREASE
Throttle ..... 1800 to 2000 RPM
Magnetos ..... max. drop 150 RPM - max. diff. 50 RPM
Vacuum ..... 4.8" Hg. to 5.1" Hg.

Oil temperature ..... check
Oil pressure ..... check
Air conditioner ..... check
Annunciator panel ..... press-to-test
Propeller ..... exercise - then full INCREASE
Alternate air ..... check
Engine is warm for takeoff when oil temperature is at least 100 °F.
Auxiliary fuel pump ..... OFF
Fuel pressure ..... check
Throttle ..... retard
Manifold pressure line ..... drain

BEFORE TAKEOFF

Master switch ..... ON
Flight instruments ..... check
Fuel selector ..... proper tank
Auxiliary fuel pump ..... OFF
Engine gauges ..... check
Alternate air ..... CLOSED
Seat backs ..... erect
Mixture ..... set
Prop ..... set
Belts/ harness ..... fastened/adjusted
Empty seats ..... seat belts snugly fastened
Flaps ..... set
Trim tab ..... set
Emergency Gear Extension Lever ..... UP POSITION

NOTE

For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position.

Controls ..... free
Doors ..... latched
Air conditioner ..... OFF
Parking brake ..... release

TAKEOFF

NORMAL

Flaps ..... set
Tab set
Accelerate to 70 to 77 KIAS.
Control wheel ..... back pressure to rotate to climb attitude

SHORT FIELD, OBSTACLE CLEARANCE

Flaps ..... 25° (second notch)
Accelerate to 53 to 64 KIAS depending on aircraft weight.
Control wheel ..... back pressure to rotate to climb attitude
After breaking ground, accelerate to 59 to 68 KIAS depending on aircraft weight.
Gear (OVERRIDE ENGAGED on aircraft equipped with backup gear extender) ..... UP
Accelerate to best flaps up angle of climb speed - 79 KIAS, slowly retract the flaps and climb past the obstacle.
Accelerate to best flaps up rate of climb speed - 97 KIAS.

SOFT FIELD

Flaps ..... 25° (second notch)
Accelerate to 53 to 64 KIAS depending on aircraft weight.
Control wheel ..... back pressure to rotate to climb attitude
After breaking ground, accelerate to 59 to 68 KIAS depending on aircraft weight.
Gear (OVERRIDE ENGAGED on aircraft equipped with backup gear extender) ..... UP
Accelerate to best flaps up rate of climb speed 97 KIAS.
Flaps ..... retract slowly

TAKEOFF CLIMB

Mixture ..... full RICH
Prop speed ..... 2575 RPM
Manifold pressure ..... DO NOT EXCEED 41 in. Hg.
Climb speed
  Best angle ..... 79 KIAS
  Best rate ..... 97 KIAS
Auxiliary fuel pump ..... LO - if required

CRUISE CLIMB

Mixture.....full RICH
Prop speed.....2450 RPM
Manifold pressure.....33 in. Hg.
Climb speed.....104 KIAS
Auxiliary fuel pump.....LO - if required

CRUISING

Reference performance charts, Teledyne Continental Operator's Manual and power setting table.
Normal max power.....75%
Power.....set per power table
Mixture.....adjust
Auxiliary fuel pump.....LO - if required

APPROACH AND LANDING

Fuel selector.....proper tank
Seat backs.....erect
Belts/harness.....fasten/adjust
Mixture.....set
Propeller.....set
Emergency Gear Extension Lever.....UP POSITION

NOTE

For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position.

Gear.....down - 133 KIAS max
Flaps.....set- 108 KIAS max
Air conditioner.....OFF
Trim to 75 KIAS.

STOPPING ENGINE

Flaps ..... retract
Air conditioner ..... OFF
Radios ..... OFF
Propeller ..... full INCREASE
Throttle ..... full aft
Mixture ..... idle cut-off
Magnetos ..... OFF
Master switch ..... OFF

PARKING

Parking brake ..... set
Control wheel ..... secured with belts
Flaps ..... full up
Wheel chocks ..... in place
Tie downs ..... secure

4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for operation of the airplane.

4.9 PREFLIGHT CHECK

The airplane should be given a thorough preflight and walk-around check. The preflight should include a check of the airplanes operational status, computation of weight and C.G. limits, takeoff and landing distances, and in-flight performance. A weather briefing should be obtained for the intended flight path, and any other factors relating to a safe flight should be checked before takeoff.

CAUTION

The flap position should be noted before boarding the airplane. The flaps must be placed in the UP position before they will lock and support weight on the step.

COCKPIT

Upon entering the cockpit, release the seat belts securing the control wheel and set the parking brake. Insure that all electrical switches and the magneto switch are OFF and the mixture is in idle cut-off. Turn ON the master switch, check the fuel quantity gauges for adequate supply and check that the annunciator panel illuminates. Turn OFF the master switch. Check the primary flight controls and flaps for proper operation and set the trim to neutral. Open the pitot and static drains to remove any moisture that has accumulated in the lines. Check the windows for cleanliness and that the required papers are on board. Properly stow and secure the tow bar and baggage. Close and secure the baggage door.

RIGHT WING

Begin the walk-around at the trailing edge of the right wing by checking that the wing surface and control surfaces are clear of ice, frost, snow or other extraneous substances. Check the flap, aileron and hinges for damage and operational interference. Static wicks should be firmly attached and in good condition. Check the wing tip and lights for damage.

Open the fuel cap and visually check the fuel supply. The quantity should match the indication that was on the fuel quantity gauge. Replace cap securely. The fuel tank vent should be clear of obstructions.

Place a container under the quick drain. Drain the fuel tank through the quick drain located at the lower inboard rear corner of the tank, making sure that enough fuel has been drained to verify the proper fuel and insure that all water and sediment is removed. The fuel system should be drained daily prior to the first flight and after each refueling.

CAUTION

When draining any amount of fuel, care should be taken to insure that no fire hazard exists before starting engine.

Remove the tie down and chock.

Next, a complete check of the landing gear. Check the gear strut for proper inflation, there should be 2.5 ± .25 inches of strut exposure under a normal static load. Check the tire for cuts, wear, and proper inflation. Make a visual check of the brake block and disc.

Check that the fresh air inlet is clear of foreign matter.

NOSE SECTION

Check the general condition of the nose section, look for oil or fluid leakage and that the cowling is secure. Check the windshield and clean if necessary. The propeller and spinner should be checked for detrimental nicks, cracks, or other defects. The air inlets should be clear of obstructions and check the alternator belt for proper tension. The landing light should be clean and intact.

Remove the chock and check the nose gear strut for proper inflation, there should be 2.75 ± .25 inches of strut exposure under a normal static load. Check the tire for cuts, wear, and proper inflation. Check the engine baffle seals. Check the oil level, make sure that the dipstick has been properly seated and the oil filler cap properly secured.

Open the fuel strainer located on the left side of the firewall long enough to remove any accumulation of water and sediment.

LEFT WING

The wing surface should be clear of ice, frost, snow, or other extraneous substances. Check that the fresh air inlet is clear of foreign matter and remove the chock. Check the main gear strut for proper inflation, there should be 2.5 ± .25 inches of strut exposure under a normal static load. Check the tire and the brake block and disc.

Open the fuel cap and visually check the fuel supply. The quantity should match the indication that was on the fuel quantity gauge. Replace cap securely. The fuel tank vent should be clear of obstructions. Place a container under the quick drain. Drain enough fuel to verify the proper fuel and to insure that all water and sediment has been removed.

Remove tie down and remove the cover from the pitot/static head on the underside of the wing. Make sure the holes are open and clear of obstructions. Check the wing tip and lights for damage. Check the aileron, flap, and hinges for damage and operational interference and that the static wicks are firmly attached and in good condition.

FUSELAGE

Check the condition and security of the antennas. The empennage should be clear of ice, frost, snow, or other extraneous substances and the fresh air inlet at the top of the fin should be clear of foreign matter. Check the stabilator and trim tab for damage and operational interference, the trim tab should move in the same direction as stabilator. Remove the tie down.

Upon returning to the cockpit, an operational check of the interior lights, exterior lights, stall warning system, and pitot heat should now be made. Turn the master switch and the appropriate switches ON. Check the panel lighting and the overhead flood light. Visually confirm that exterior lights are operational. Lift the stall detector on the leading edge of the left wing and determine that the warning horn is activated. With the pitot heat switch ON the pitot head will be hot to the touch. After these checks are complete the master switch and all electrical switches should be turned OFF.

Board the passengers and close and secure the cabin door. Fasten the seat belts and shoulder harness and check the function of the inertia reel by pulling sharply on the strap. Fasten seat belts on empty seats.

NOTE

If the fixed shoulder harness (non-inertia reel type) is installed, it must be connected to the seat belt and adjusted to allow proper accessibility to all controls, including fuel selector, flaps, trim, etc., while maintaining adequate restraint for the occupant.

If the inertia reel type shoulder harness is installed, a pull test of its locking restraint feature should be performed.

4.11 BEFORE STARTING ENGINE

Before starting the engine the avionics switch should be set OFF, the parking brake should be set and the propeller lever moved to the full INCREASE rpm position. The fuel selector should then be moved to the desired tank.

4.13 STARTING ENGINE (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

The first step in starting is to move the fuel selector to the ON position. Advance the mixture control to full RICH, open the throttle half travel and move the propeller control full FORWARD. Turn ON the master switch. After ensuring that the propellers are clear, engage the starter by rotating the magneto switch clockwise. The primer button should be used (ON) as required. For cold weather starts, refer to Paragraph 4.19 - Starting Engines In Cold Weather. When the engine starts, retard the throttle and monitor the oil pressure gauge. If no oil pressure is indicated within 30 seconds, shut down the engine and have it checked. In cold weather it may take somewhat longer for an oil pressure indication. After the engine has started, check the alternator for sufficient output and the gyro pressure gauge for a reading between 4.8 and 5.1 in. Hg.

NOTE

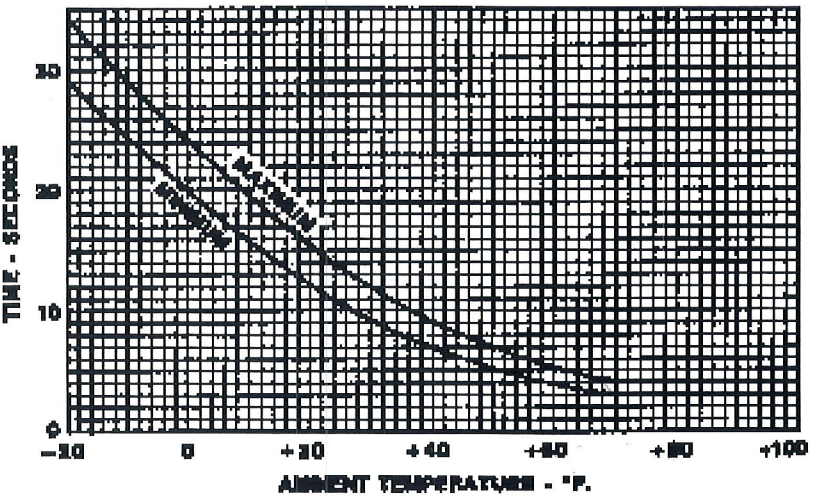
To prevent starter damage, limit starter cranking to 30 second periods. If the engine does not start within that time, allow a cooling period of several minutes before engaging starter again. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

4.15 STARTING ENGINE (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

NOTE

Engine starts can be accomplished down to ambient temperatures of +20°F with engine equipped with standard (massive electrode) spark plugs. Below that temperature fine wire spark plugs are highly recommended to ensure engine starts, and are a necessity at +10°F and below. In addition, the use of external electrical power source is also recommended when ambient temperatures are below +20°F.

Upon entering the cockpit, begin starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn the master switch ON. The electric fuel boost pump should be OFF. Push primer switch and hold for the required priming time (see Figure 4-3). Close throttle and immediately engage starter by rotating the magneto switch clockwise. With ambient temperatures above +20°F, starts may be made by discontinuing priming before engaging starter. With ambient temperatures below +20°F, starts should be made by continuing to prime during cranking period. Do not release starter until engine accelerates through 500 RPM, then SLOWLY advance throttle to obtain 1000 RPM. Release primer and immediately place auxiliary fuel pump switch to LO. Auxiliary fuel pump operation will be required for one to three minutes initial engine warm-up.



OPTIONAL ENGINE PRIMER SYSTEM - PRIMING TIME VS. AMBIENT TEMPERATURE
Figure 4-3

NOTE

When cold weather engine starts are made without the use of engine preheating or other precautions (refer to TCM Operator's Manual), longer than normal elapsed time may be required before an oil pressure indication is observed.

4.17 STARTING ENGINE WHEN FLOODED

If an engine is flooded, move the mixture control to idle cut-off and advance the throttle and propeller controls full forward. Turn ON the master switch. The auxiliary fuel pump should be OFF. After ensuring that the propeller is clear, engage the starter by rotating the magneto switch clockwise. When the engine fires, retard the throttle and advance the mixture slowly.

4.19 STARTING ENGINE IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

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. (See Continental Engine Operator's Manual for Cold Weather Operating Recommendations.)

NOTE

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

Prior to attempting the start turn the propellers through by hand three times. Upon entering the cockpit, begin the starting procedure by moving the fuel selector to ON. Advance the throttle and prop controls to full forward. Move the mixture control to idle cut-off. Turn ON the master switch. The auxiliary fuel pump should be ON in the HIGH position. Engage the starter (rotate magneto switch clockwise) and advance the mixture control to full RICH simultaneously. Begin moving the throttle control back and forth from full forward to full aft. Place the mixture control in idle cut-off after about 3 seconds of cranking. Leave the mixture control in idle cut-off for 3 seconds of cranking and then advance to full RICH for about 3 seconds. Repeat this procedure until the engine begins to fire.

When the engine begins firing, place the auxiliary fuel pump switch to the LOW position, leave the starter engaged and tap the primer periodically until a rhythmic firing pattern is observed. When a rhythmic pattern is attained, release the starter switch and position the throttle at half travel. Tap the primer button if the engine begins to falter during this period and adjust the throttle to a 1,000 RPM idle speed.

The auxiliary fuel pump may be turned OFF as soon as it is determined that the engine will continue to run without it.

4.21 STARTING WITH EXTERNAL POWER SOURCE

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the airplane's battery.

Turn the master switch OFF and turn all electrical equipment OFF. Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable into the socket located on the fuselage. Note that when the plug is inserted, the electrical system is ON. Proceed with the normal starting technique.

After the engine has started, reduce power to the lowest possible RPM, to reduce sparking, and disconnect the jumper cable from the aircraft. Turn the master switch ON and check the alternator ammeter for an indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

NOTE

For all normal operations using the PEP jumper cables, the master switch should be OFF, but it is possible to use the ship's battery in parallel by turning the master switch ON. This will give longer cranking capabilities, but will not increase the amperage.

CAUTION

Care should be exercised because if the ship's battery has been depleted, the external power supply can be reduced to the level of the ship's battery. This can be tested by turning the master switch ON momentarily while the starter is engaged. If cranking speed increases, the ship's battery is at a higher level than the external power supply.

4.23 WARM-UP

Warm-up the engine at 900 to 1200 RPM. Avoid prolonged idling at low RPM, as this practice may result in fouled spark plugs.

Takeoff may be made as soon as the ground check is completed, provided that the oil temperature is at least 100°F and throttle may be opened to 41 inches manifold pressure without backfiring or skipping, and without a reduction in engine oil pressure.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.25 TAXIING

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Ascertain that the propeller back blast and taxi areas are clear. Release the parking brake.

Power should be applied slowly to start the taxi roll. Taxi a few feet forward and apply the brakes to determine their effectiveness. Taxi with the propeller set in low pitch, high RPM setting. While taxiing, make slight turns to ascertain the effectiveness of the steering.

Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.

Avoid holes and ruts when taxiing over uneven ground.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.27 GROUND CHECK

Set the parking brake. The magnetos should be checked at 1800 to 2000 RPM with the propeller set at high RPM. Drop off on either magneto should not exceed 150 RPM and the difference between the magnetos should not exceed 50 RPM. Operation on one magneto should not exceed 10 seconds.

Check the vacuum gauge; the indicator should read between 4.8 and 5.1 inches Hg at 2000 RPM.

Check the annunciator panel lights with the press-to-test button. Also check the air conditioner and the alternate air.

The propeller control should be moved through its complete range to check for proper operation, and then placed in full "INCREASE" rpm for takeoff. To obtain maximum rpm, push the pedestal mounted control fully forward on the instrument panel. Do not allow a drop of more than 200 RPM to 300 RPM during this check. In cold weather the propeller control should be cycled from high to low RPM at least three times before takeoff to make sure that warm engine oil has circulated.

Drain the manifold pressure line by running the engine at 1000 RPM and depressing the drain valve located behind and below the manifold pressure gauge for 5 seconds. Do not depress the valve when the manifold pressure exceeds 25 inches Hg.

4.29 BEFORE TAKEOFF

All aspects of each particular takeoff should be considered prior to executing the takeoff procedure.

After takeoff, on aircraft equipped with the backup gear extender, if the gear selector switch is placed in the gear up position before reaching the airspeed at which the system no longer commands gear down*, the gear will not retract. For obstacle clearance on takeoff and for takeoffs from high altitude airports, the landing gear can be retracted after lift-off at the pilot's discretion by placing the gear selector switch in the "UP" position and then locking the emergency gear lever in the "OVERRIDE ENGAGED" position. If desired, the "OVERRIDE ENGAGED" position can be selected and locked before takeoff, and the gear will then retract as soon as the gear selector switch is placed in the "UP" position. Care should always be taken not to retract the gear prematurely, or the aircraft could settle back onto the runway. If the override lock is used for takeoff, it should be disengaged as soon as sufficient airspeed and terrain clearance are obtained, to return the gear system to normal operation. For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the back-up gear extender system were not installed.

After all aspects of the takeoff are considered, a pretakeoff check procedure must be performed.

*Approximately 78 KIAS at sea level to approximately 97 KIAS at 20,000 ft. with a straight line variation between.

Turn "ON" the master switch and check and set all of the flight instruments as required. Check the fuel selector to make sure it is on the proper tank (fullest). Check the engine gauges. The alternate air should be in the "CLOSED" position.

All seat backs should be erect.

NOTE

If the fixed shoulder harness (non-inertia reel type) is installed, it must be connected to the seat belt and adjusted to allow proper accessibility to all controls, including fuel selector, flaps, trim, etc., while maintaining adequate restraint for the occupant.

If the inertia reel type shoulder harness is installed, a pull test of its locking restraint feature should be performed.

The mixture and propeller control levers should be set and the seat belts and shoulder harness fastened. Fasten the seat belts snugly around the empty seats.

Exercise and set the flaps and trim tab. The Emergency Gear Extension Lever should be in the up position to permit normal gear operation.. If the Emergency Gear Extension lever is not in the fully up position prior to gear retraction, the landing gear may not retract when the landing gear switch is selected up. For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position to permit normal gear retraction. Insure proper flight control movement and response.

All doors should be properly secured and latched and the parking brake released.

On air conditioned models, the air conditioner must be "OFF" to insure normal takeoff performance.

4.31 TAKEOFF

To achieve the takeoff performance specified in Section 5 it is necessary to set rated power (2575 RPM, 41 In. Hg.) prior to brake release.

NOTE

At altitudes below 12,000 feet, normal takeoffs are made with less than full throttle setting. Use the throttle as required to obtain 41 In. Hg. manifold pressure. DO NOT EXCEED 41 IN. HG. MANIFOLD PRESSURE. The overboost warning light will illuminate when manifold pressure approaches the maximum limit.

Illumination of the yellow overboost warning light on the annunciator panel does not indicate a malfunction. The light should be monitored during takeoff to insure that an overboost condition does not persist.

The normal takeoff technique is conventional for the Turbo Arrow IV. The tab should be set slightly aft of neutral with the exact setting determined by the loading of the airplane. Allow the airplane to accelerate to 70 to 77 KIAS depending on the weight of the aircraft and ease back on the control wheel to rotate to climb attitude.

The procedure used for a short field takeoff with an obstacle clearance or a soft field takeoff differs slightly from the normal technique. The flaps should be lowered to 25° (second notch). Allow the aircraft to accelerate to 53 to 64 KIAS depending on the aircraft weight and rotate the aircraft to climb attitude. After breaking ground, accelerate to 59 to 68 KIAS, depending on aircraft weight and select gear up*. Continue to climb while accelerating to the flaps-up rate of climb speed, 97 KIAS if no obstacle is present or 79 KIAS if obstacle clearance is a consideration. Slowly retract the flaps while climbing out.

*If desired, on aircraft equipped with the backup gear extender, the OVERRIDE ENGAGED position can be selected and locked before takeoff, and the gear will then retract as soon as the gear selector switch is placed in the up position. In this case care should be taken not to retract the gear prematurely, or the aircraft could settle back onto the runway. If the override lock is used for takeoff, it should be disengaged as soon as sufficient terrain clearance is obtained, to return the gear system to normal operation.

4.33 CLIMB

On climb-out after takeoff, it is recommended that the best angle of climb speed (79 KIAS) be maintained only if obstacle clearance is a consideration. The best rate of climb speed (97 KIAS) should be maintained with full power until adequate terrain clearance is obtained. At this point, engine power should be reduced to 33 inches manifold pressure and 2450 RPM (approximately 75% power) for cruise climb. A cruise climb speed of 104 KIAS 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 power the throttle should be retarded first, followed by the propeller control. The mixture control should remain at full rich during the climb. Cylinder head temperatures should be monitored during climb and should be kept below 460° at all times. During climbs under hot weather conditions, it may be necessary to use LO auxiliary fuel pump for vapor suppression. Presence of fuel vapor may be indicated by a fluctuating fuel flow indicator.

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.

NOTE

On aircraft equipped with the backup gear extender, during climbs at best angle of climb speed at any altitude and best rate of climb speed above approximately 15,000 feet density altitude it may be necessary to select OVERRIDE ENGAGED to prevent the landing gear from extending automatically during the climb. This altitude decreases with reduced climb power and increases with increased climb airspeed.

4.35 CRUISING

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. If cylinder head temperatures become too high during flight, reduce them by enriching the mixture, by reducing power, or by use of any combination of these methods. During cruise under hot weather and/or high altitude conditions, it may be necessary to use LO auxiliary fuel pump for vapor suppression. Presence of fuel vapor may be indicated by a fluctuating fuel flow indicator.

Following level-off for cruise, the airplane should be trimmed.

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.

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, 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.

In order to keep the airplane in best lateral trim during cruise flight, the fuel should be used alternately from each tank at one hour intervals.

4.37 APPROACH AND LANDING

Check to insure the fuel selector is on the proper (fullest) tank and that the seat backs are erect. The seat belts and shoulder harness should be fastened and the inertia reel checked.

NOTE

If the fixed shoulder harness (non-inertia reel type) is installed, it must be connected to the seat belt and adjusted to allow proper accessibility to all controls, including fuel selector, flaps, trim, etc., while maintaining adequate restraint for the occupant.

If the inertia reel type shoulder harness is installed, a pull test of its locking restraint feature should be performed.

Turn "OFF" the air conditioner. The mixture should be set in the full "RICH" position. Set the propeller at full "INCREASE" rpm to facilitate ample power for an emergency go-around.

Prior to landing gear operation, the Emergency Gear Extension Lever should be in the up position to permit normal gear extension or retraction in the event of a go-around. For aircraft equipped with the backup gear extender, the Emergency Gear Extension lever should be in the normal/disengaged position. The landing gear may be extended at speeds below 133 KIAS. The airplane should be trimmed to a final approach speed of about 75 KIAS with flaps extended. The flaps can be lowered at speeds up to 108 KIAS, if desired.

The mixture control should be kept in full "RICH" position to insure maximum acceleration if it should be necessary to open the throttle again.

The amount of flap used during landings and the speed of the aircraft at contact with the runway should be varied according to the landing surface and conditions of wind and airplane loading. It is generally good practice to contact the ground at the minimum possible safe speed consistent with existing conditions.

Normally, the best technique for short and slow landings is to use full flap and enough power to maintain the desired airspeed and approach flight path. Mixture should be full "RICH," fuel on the fullest tank. Reduce the speed during the flareout and contact the ground close to the stalling speed. After ground contact hold the nose wheel off as long as possible. As the airplane slows down, gently lower the nose and apply the brakes. Braking is most effective when flaps are raised and back pressure is applied to the control wheel, putting most of the aircraft weight on the main wheels. In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the ground at higher than normal speeds with partial or no flaps.

4.39 STOPPING ENGINE

At the pilot's discretion, the flaps should be raised.

NOTE

The flaps must be placed in the "UP" position for the flap step to support weight. Passengers should be cautioned accordingly.

The air conditioner and radios should be turned "OFF," the propeller set in the full "INCREASE" position, and the engine stopped by disengaging the mixture control lock and pulling the mixture control back to idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the magneto and master switches must be turned "OFF."

4.41 PARKING

Set the parking brake. If necessary, the airplane should be moved on the ground with the aid of the nose wheel tow bar provided with each airplane and secured behind the rear seats. The aileron and stabilator controls should be secured by looping the safety belt through the control wheel and pulling it snug. The flaps are locked when in the "UP" position and should be left retracted.

Tie downs can be secured to rings provided under each wing and to the tail skid. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured.

4.43 STALLS

The stall characteristics of the Turbo Arrow IV are conventional. An approaching stall is indicated by a stall warning horn which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall.

The gross weight stalling speed of the Turbo Arrow IV with power off and full flaps is 61 KIAS. With the flaps up this speed is increased 5 KTS. Loss of altitude during stalls can be as great as 300 feet, depending on configuration and power.

NOTE

The stall warning system is inoperative with the master switch "OFF".

During preflight the stall warning system should be checked by turning the master switch "ON," lifting the detector and checking to determine if the horn is actuated. The master switch should be returned to the "OFF" position after the check is complete.

4.45 TURBULENT AIR OPERATION

In keeping with good operating practice used in all aircraft, it is recommended that when turbulent air is encountered or expected, the airspeed be reduced to maneuvering speed to reduce the structural loads caused by gusts and to allow for inadvertent speed build-ups which may occur as a result of the turbulence or of distractions caused by the conditions.

4.47 LANDING GEAR

Some aircraft are equipped with an airspeed - power sensing system (backup gear extender) which extends the landing gear under low airspeed - power conditions* even though the pilot may not have selected gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed - power values are below a predetermined minimum. To override this system or to hold the emergency gear lever in the "OVERRIDE ENGAGED" position without maintaining manual pressure on the emergency gear lever, pull the lever full up and push the lock pin in. To release the override, pull lever up and then release. For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the back-up gear extender system were not installed.

The pilot should become familiar with the function and significance of the landing gear position indicators and warning lights.

*Approximately 103 KIAS at any altitude, power off.

The red gear warning light on the instrument panel and the horn operate simultaneously in flight when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or below, and the gear selector switch is not in the "DOWN" position. On aircraft equipped with the backup gear extender, this warning will also occur during flight when the system has lowered the landing gear and the gear selector switch is not in the "DOWN" position and the manifold pressure is reduced below approximately 14 inches of mercury. The red gear warning light on the instrument panel and the horn will also operate simultaneously on the ground when the master switch is "ON" and the gear selector switch is in the "UP" position and the throttle is in the retarded position.

The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.

WARNING

Panel lights' dimmer switch must be off to obtain gear and overboost lights full intensity during daytime flying. When aircraft is operated at night and panel lights' dimmer switch is turned on, gear lights and overboost light will automatically dim.

On aircraft equipped with the backup gear extender the yellow "Auto Ext. OFF" light immediately below the gear selector switch flashes whenever the emergency gear lever is in the "OVERRIDE ENGAGED" position.

When the Emergency Landing Gear Extension Procedure (Par. 3.29) is performed for training purposes, the following changes must be made to the procedure in order to prevent the hydraulic pump from activating during the procedure. On aircraft equipped with the backup gear extender the landing gear selector must be left in the UP position until all gear position indicators are green. On aircraft which do NOT have the backup gear extender a pull type LANDING GEAR PUMP circuit breaker is installed and must be pulled prior to executing the emergency extension procedure. The circuit breaker must be reset after completion of the procedure to allow normal gear system operation.

Most aircraft incorporate a spring return knob on the emergency gear lever. On these aircraft, the lever must be held in the DOWN position for emergency gear extention. Later aircraft do not incorporate the return spring. On these aircraft, the emergency gear lever must be returned to the raised position prior to gear retraction.

4.49 WEIGHT AND BALANCE

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

For weight and balance data refer to Section 6 (Weight and Balance).

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PERFORMANCE

5.1 GENERAL

All of the required (FAA regulations) and complementary performance information applicable to the Turbo Arrow IV is provided in this section.

Performance information associated with those optional systems and equipment that require handbook supplements is provided in Section 9 (Supplements).

5.3 INTRODUCTION - PERFORMANCE AND FLIGHT PLANNING

The performance information presented in this section is based on measured Flight Test Data corrected to I.C.A.O. standard day conditions and analytically expanded for the various parameters of weight, altitude, temperature, etc.

The performance charts are unfactored and do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft. This performance, however, can be duplicated by following the stated procedures in a properly maintained airplane.

Effects of conditions not considered on the charts must be evaluated by the pilot, such as the effect of sod or grass runway surface on takeoff and landing performance, or the effect of winds aloft on cruise and range performance. Endurance can be grossly affected by improper leaning procedures, and inflight fuel flow and quantity checks are recommended.

REMEMBER! To get chart performance, follow the chart procedures.

The information provided by paragraph 5.5 (Flight Planning Example) outlines a detailed flight plan using the performance charts in this section. Each chart includes its own example to show how it is used.

WARNING

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

5.5 FLIGHT PLANNING EXAMPLE

(a) Aircraft Loading

The first step in planning the flight is to calculate the airplane weight and center of gravity by utilizing the information provided by Section 6 (Weight and Balance) of this handbook.

The basic empty weight for the airplane as licensed at the factory has been entered in Figure 6-5. If any alterations to the airplane have been made effecting weight and balance, reference to the aircraft logbook and Weight and Balance Record (Figure 6-7) should be made to determine the current basic empty weight of the airplane.

Make use of the Weight and Balance Loading Form (Figure 6-11) and the C.G. Range and Weight graph (Figure 6-15) to determine the total weight of the airplane and the center of gravity position.

After proper utilization of the information provided, the following weights have been determined for consideration in the flight planning example.

The landing weight cannot be determined until the weight of the fuel to be used has been established [refer to item (g)(1)].

(1) Basic Empty Weight	1810 lbs.
(2) Occupants (2 x 170 lbs.)	340 lbs.
(3) Baggage and Cargo	158 lbs.
(4) Fuel (6 lb./gal. x 72)	432 lbs.
(5) Takeoff Weight	2740 lbs.
(6) Landing Weight (a)(5) minus (g)(1), (2740 lbs. minus 366 lbs.)	2374 lbs.

The takeoff weight is below the maximum of 2900 lbs., and the weight and balance calculations have determined the C.G. position within the approved limits.

(b) Takeoff and Landing

After determining the aircraft loading, all aspects of takeoff and landing must be considered.

All of the existing conditions at the departure and destination airport must be acquired, evaluated and maintained throughout the flight.

Apply the departure airport conditions and takeoff weight to the appropriate Takeoff Performance and Takeoff Ground Roll graph (Figures 5-5, 5-7, 5-9 and 5-11) to determine the length of runway necessary for the takeoff and/or the barrier distance.

The landing distance calculations are performed in the same manner using the existing conditions at the destination airport and, when established, the landing weight.

The conditions and calculations for the example flight are listed below. The takeoff and landing distances required for the example flight have fallen well below the available runway lengths.

	Departure Airport	Destination Airport
(1) Pressure Altitude	4990 ft.	2000 ft.
(2) Temperature	20°C	30°C
(3) Wind Component	6 KTS	3 KTS
(4) Runway Length Available	5000 ft.	4600 ft.
(5) Runway Required	2480 ft.*	1470 ft.**

NOTE

The remainder of the performance charts used in this flight planning example assume a no wind condition. The effect of winds aloft must be considered by the pilot when computing climb, cruise and descent performance.

* reference Figure 5-9
** reference Figure 5-35

(c) Climb

The next step in the flight plan is to determine the necessary climb segment components.

The desired cruise pressure altitude and corresponding cruise outside air temperature values are the first variables to be considered in determining the climb components from the Fuel, Time and Distance to Climb graph (Figure 5-17). After the fuel, time and distance for the cruise pressure altitude and outside air temperature values have been established, apply the existing conditions at the departure field to the graph (Figure 5-17). Now, subtract the values obtained from the graph for the field or departure conditions from those for the cruise pressure altitude.

The remaining values are the true fuel, time and distance components for the climb segment of the night plan corrected for field pressure altitude and temperature.

The following values were determined from the above instructions in the flight planning example.

(1) Cruise Pressure Altitude	8500 ft.
(2) Cruise OAT	10°C
(3) Time to Climb (10 min. minus 4 min.)	6 min.*
(4) Distance to Climb (17 naut. miles minus 9 naut. miles)	8 naut. miles*
(5) Fuel to Climb (4 gal. minus 2.0 gal.)	2 gal.*

(d) Descent

The descent data will be determined prior to the cruise data to provide the descent distance for establishing the total cruise distance.

Utilizing the cruise pressure altitude and OAT, determine the basic fuel, time and distance for descent (Figure 5-31). These figures must be adjusted for the field pressure altitude and temperature at the destination airport. To find the necessary adjustment values, use the existing pressure altitude and temperature conditions at the destination airport as variables to find the fuel, time and distance

* reference Figure 5-17

values from the graph (Figure 5-31). Now, subtract the values obtained from the field conditions from the values obtained from the cruise conditions to find the true fuel, time and distance values needed for the flight plan.

The values obtained by proper utilization of the graphs for the descent segment of the example are shown below.

(1) Time to Descend (8.5 min. minus 2 min.)	6.5 min.*
(2) Distance to Descend (19.5 naut. miles minus 4.5 naut. miles)	15 naut. miles*
(3) Fuel to Descend (2 gal. minus .5 gal.)	1.5 gal.*

(e) Cruise

Using the total distance to be traveled during the flight, subtract the previously calculated distance to climb and distance to descend to establish the total cruise distance. Refer to the Power Setting Table (Figure 5-19) when selecting the cruise power setting. The established pressure altitude and temperature values and the selected cruise power should now be utilized to determine the true airspeed from the appropriate Speed Power graph (Figure 5-23).

Calculate the cruise fuel flow for the cruise power setting (75% High Speed Power for this example) from the information provided by the Range - Cruise Power chart (Figure 5-27).

The cruise time is found by dividing the cruise distance by the cruise speed and the cruise fuel is found by multiplying the cruise fuel flow by the cruise time.

The cruise calculations established for the cruise segment of the flight planning example are as follows:

(1) Total Distance	745 naut. miles
(2) Cruise Distance (e)(1) minus (c)(4) minus (d)(2), (745 naut. miles minus 8 naut. miles minus 15 naut. miles)	722 naut. miles

* reference Figure 5-31

(3) Cruise Power	75% High Speed
(4) Cruise Speed	151 KTS TAS*
(5) Cruise Fuel Consumption	12 GPH**
(6) Cruise Time	
(e)(2) divided by (e)(4), (722 naut. miles divided by 151 KTS)	4.78 hrs. (4 hrs. 47 min.)
(7) Cruise Fuel	
(e)(5) multiplied by (e)(6), (12 GPH multiplied by 4.78 hrs.)	57.5 gal.

(f) Total Flight Time

The total flight time is determined by adding the time to climb, the time to descend and the cruise time. Remember! The time values taken from the climb and descent graphs are in minutes and must be converted to hours before adding them to the cruise time.

The following flight time is required for the flight planning example.

(1) Total Flight Time	
(c)(3) plus (d)(1) plus (e)(6), (.10 hrs. plus .11 hrs. plus 4.78 hrs.) (6 min. plus 6.5 min. plus 4 hrs. & 47 min.)	4.99 hrs.

(g) Total Fuel Required

Determine the total fuel required by adding the fuel to climb, the fuel to descend and the cruise fuel. When the total fuel (in gallons) is determined, multiply this value by 6 lb./gal. to determine the total fuel weight used for the flight.

The total fuel calculations for the example flight plan are shown below.

(1) Total Fuel Required	
(c)(5) plus (d)(3) plus (e)(7), (2 gal. plus 1.5 gal. plus 57.5 gal.)	61 gal.
(61 gal. multiplied by 6 lb./gal.)	366 lbs.

* reference Figure 5-23
** reference Figure 5-27

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5.7 PERFORMANCE GRAPHS

LIST OF FIGURES

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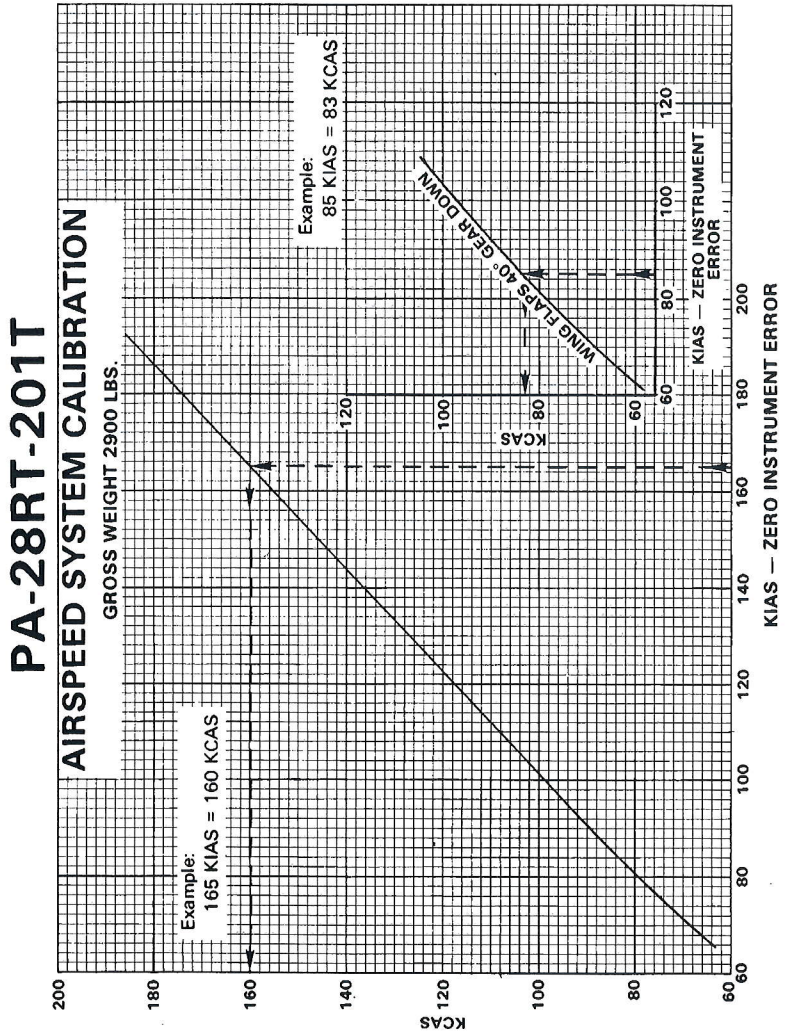
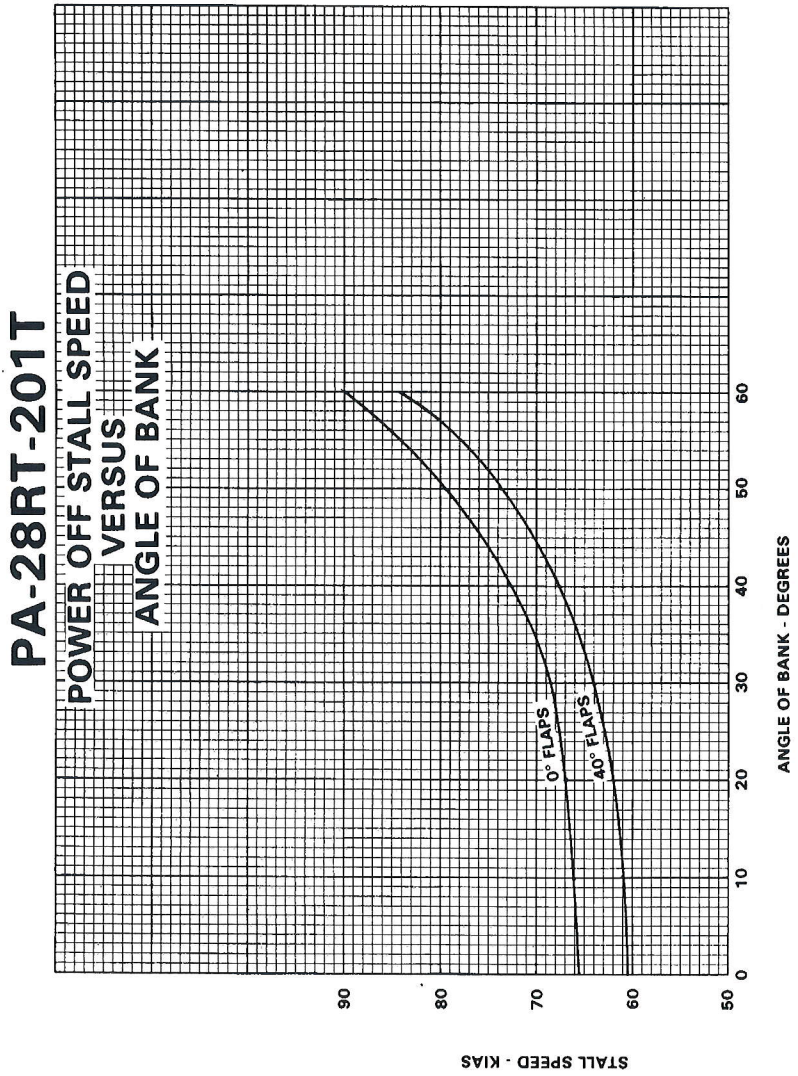
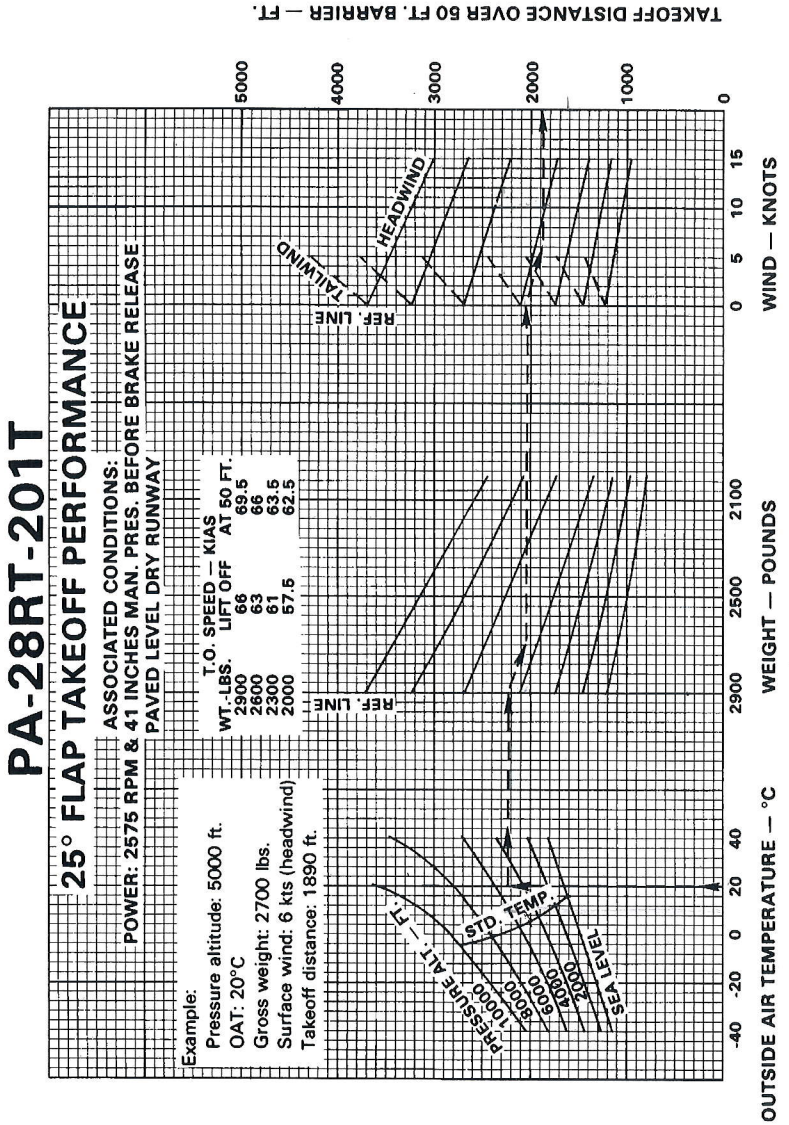


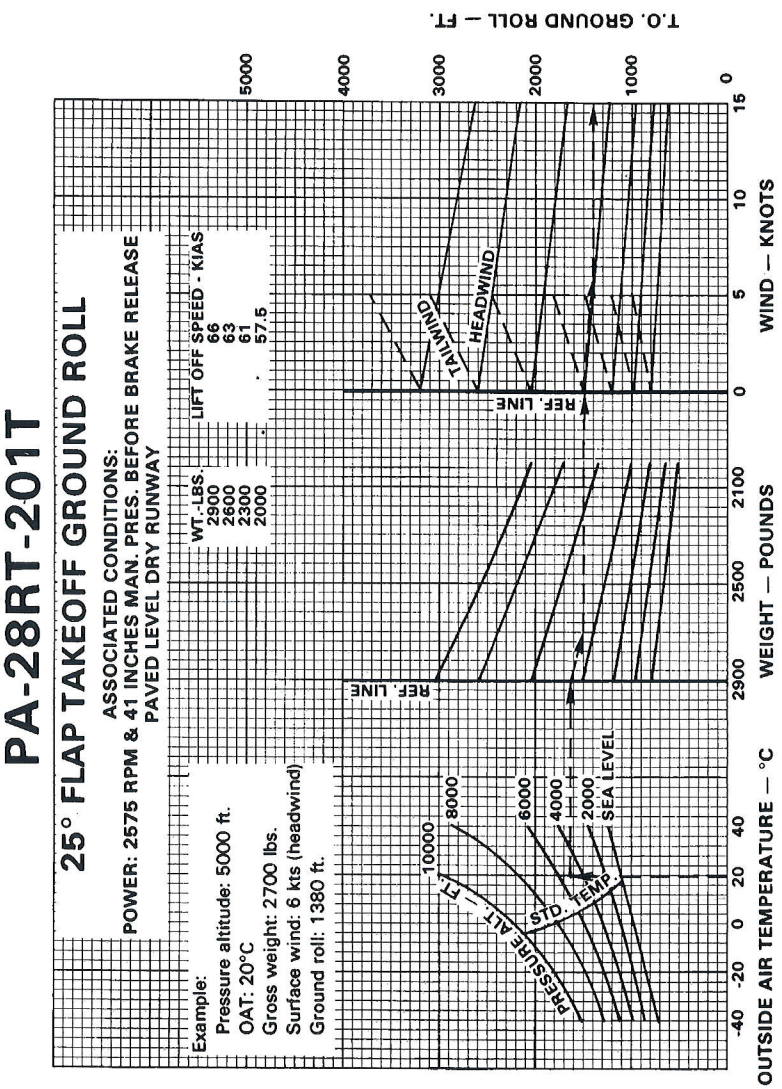
AIRSPEED SYSTEM CALIBRATION
Figure 5-1



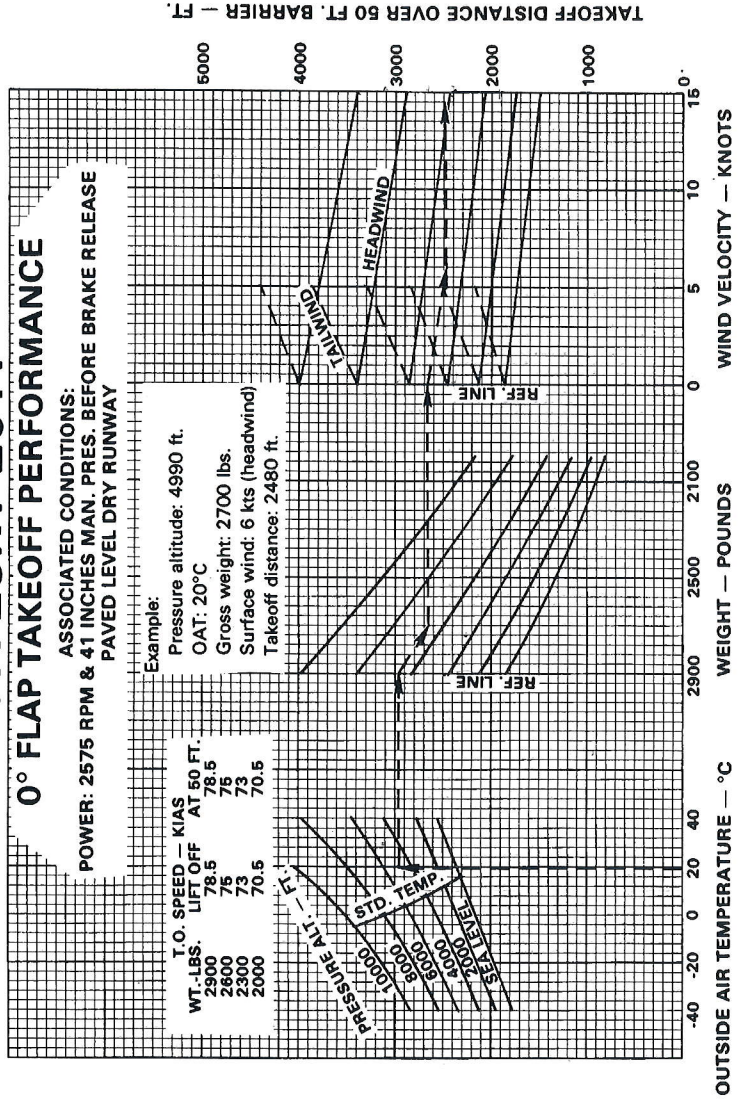
POWER OFF STALL SPEED VS. ANGLE OF BANK
Figure 5-3



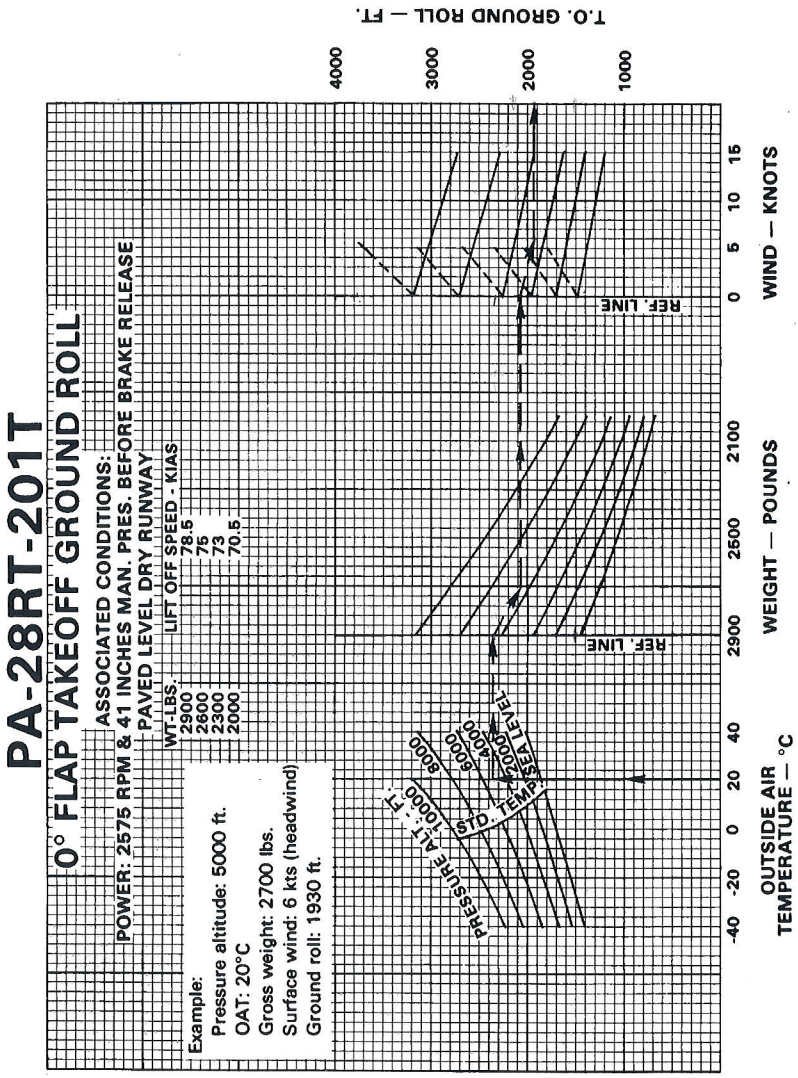
25° FLAP TAKEOFF PERFORMANCE
Figure 5-5



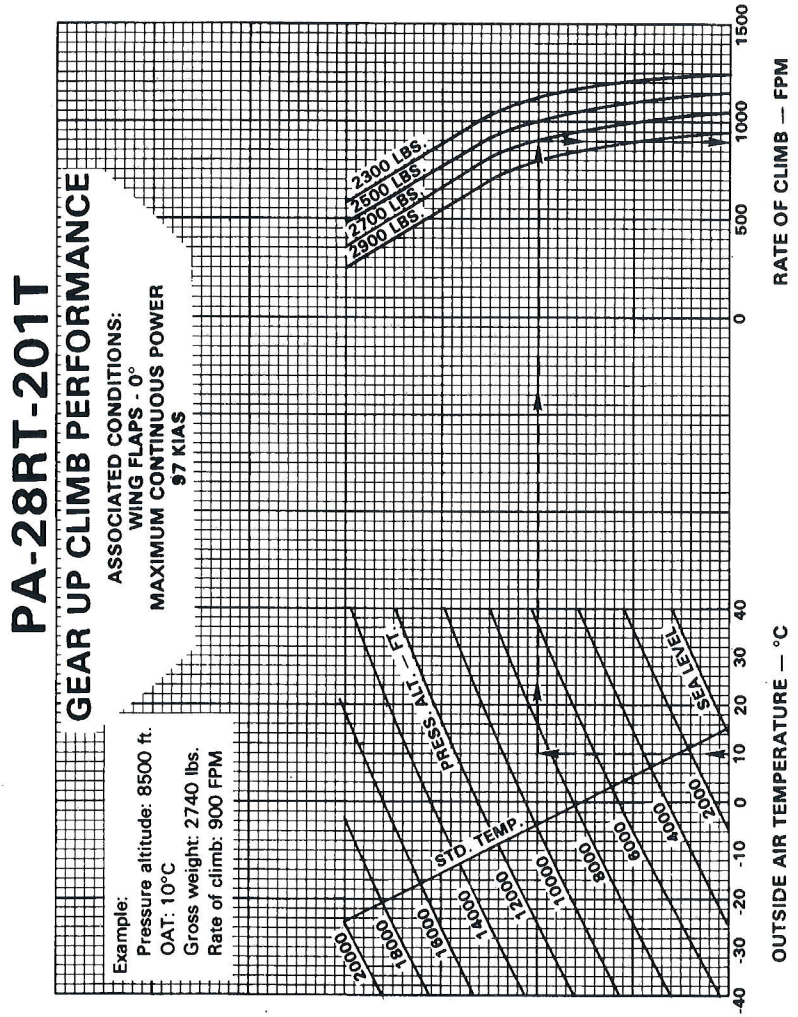
25° FLAP TAKEOFF GROUND ROLL
Figure 5-7



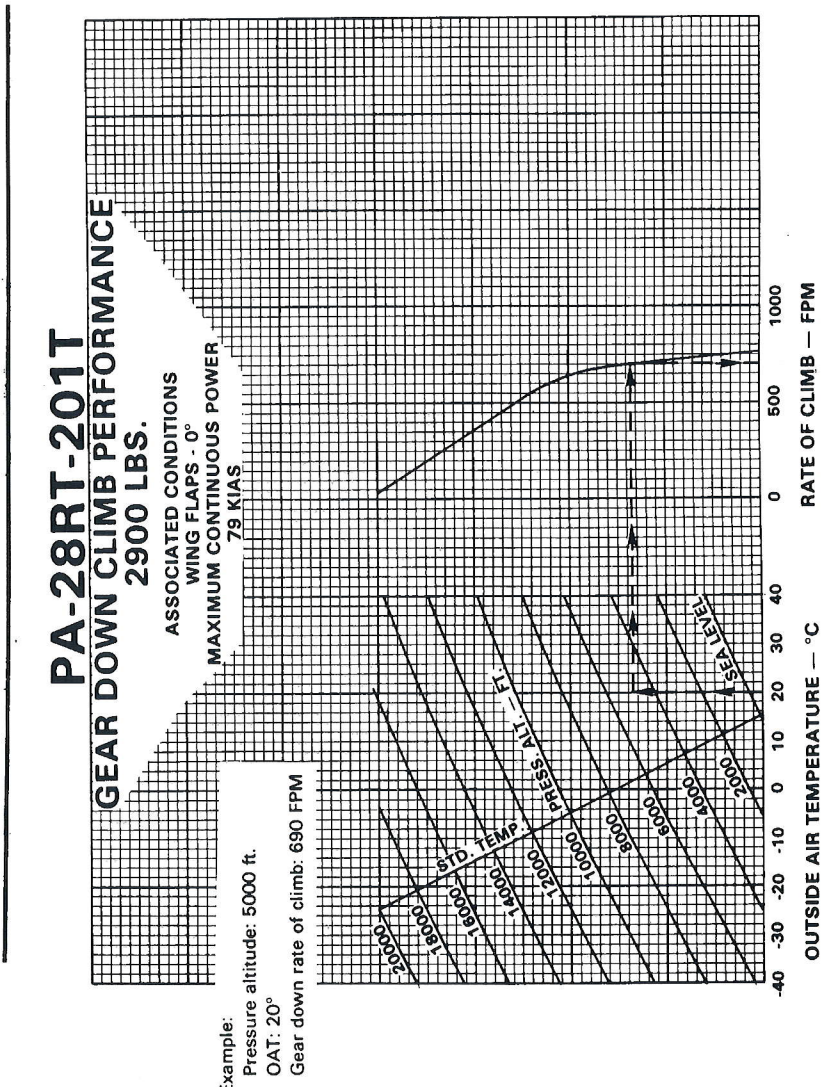
0° FLAP TAKEOFF PERFORMANCE
Figure 5-9



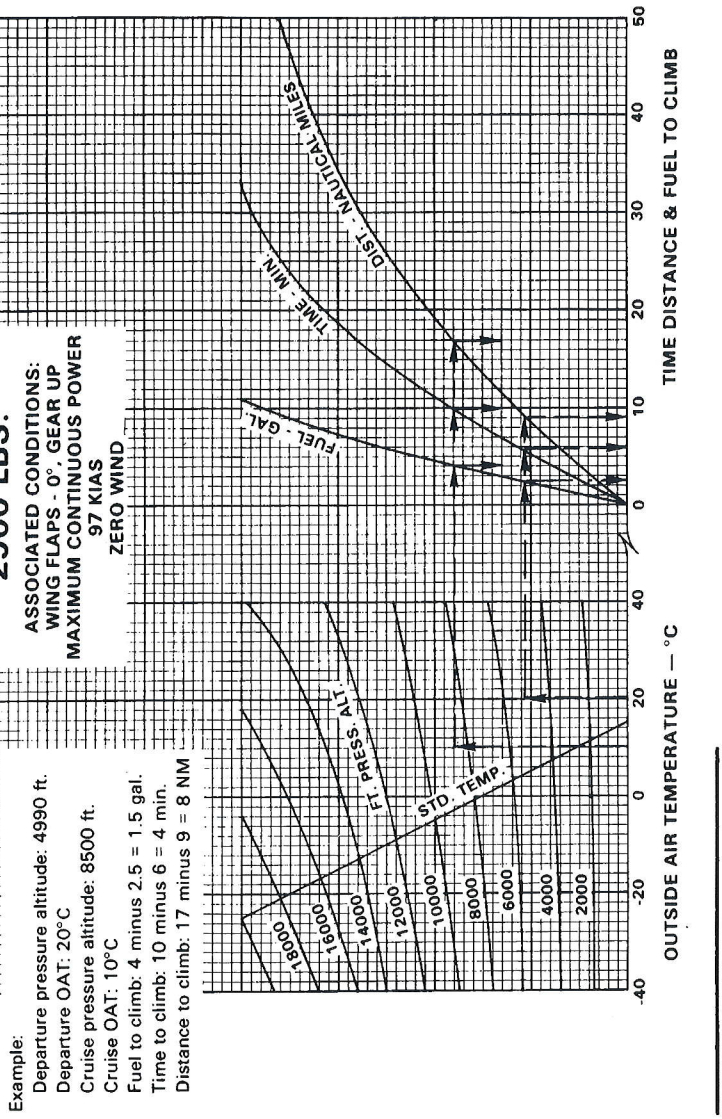
0° FLAP TAKEOFF GROUND ROLL
Figure 5-11



GEAR UP CLIMB PERFORMANCE
Figure 5-13



GEAR DOWN CLIMB PERFORMANCE
Figure 5-15



FUEL, TIME AND DISTANCE TO CLIMB
Figure 5-17

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POWER SETTING TABLE — T.C.M. TSIO 360FB SERIES

PRESS. ALT. FEET	STD ALT. TEMP. °C	55% POWER					65% POWER					75% POWER				
		RPM	2200	2300	2400	2500	2575	2200	2300	2400	2500	2575	2200	2300	2400	2500	2575
		MANIFOLD PRESSURE—INCHES MERCURY															
S.L.	15		29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
2000	11		29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
4000	7		29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
6000	3		29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
8000	-1		260	27.7	26.8	26.0	25.0	—	31.1	30.0	29.2	28.2		—	33.8	32.8	31.5
10000	-5		29.0	27.7	26.8	26.0	25.0	—	31.1	30.0	29.2	28.2		—	33.8	32.8	31.5
12000	-9		—	27.7	26.8	26.0	25.0	—	—	30.0	29.2	28.2		—	—	32.8	31.5
14000	-13		—	27.7	26.8	26.0	25.0	—	—	30.0	29.2	28.2		—	—	32.8	31.5
16000	-17		—	—	26.8	26.0	25.0	—	—	—	29.2	28.2		—	—	—	31.5
18000	-21		—	—	—	26.0	25.0	—	—	—	29.2	28.2		—	—	—	31.5
20000	-25		—	—	—	26.0	25.0	—	—	—	—	28.2		—	—	—	31.5

To maintain constant power, add approximately 1% for each 6°C above standard, subtract approximately 1% for each 6°C below standard.

APPROXIMATE FUEL FLOW

CRUISE POWER

55% Power	9.2 GPH
65% Power	10.8 GPH
75% Power	12.0 GPH

NOTE: Fuel flow will vary with altitude; therefore, cruise fuel control must be accomplished by adjusting EGT (peak EGT for best economy and peak EGT plus 100°F rich for best power) rather than leaning to an indicated fuel flow.

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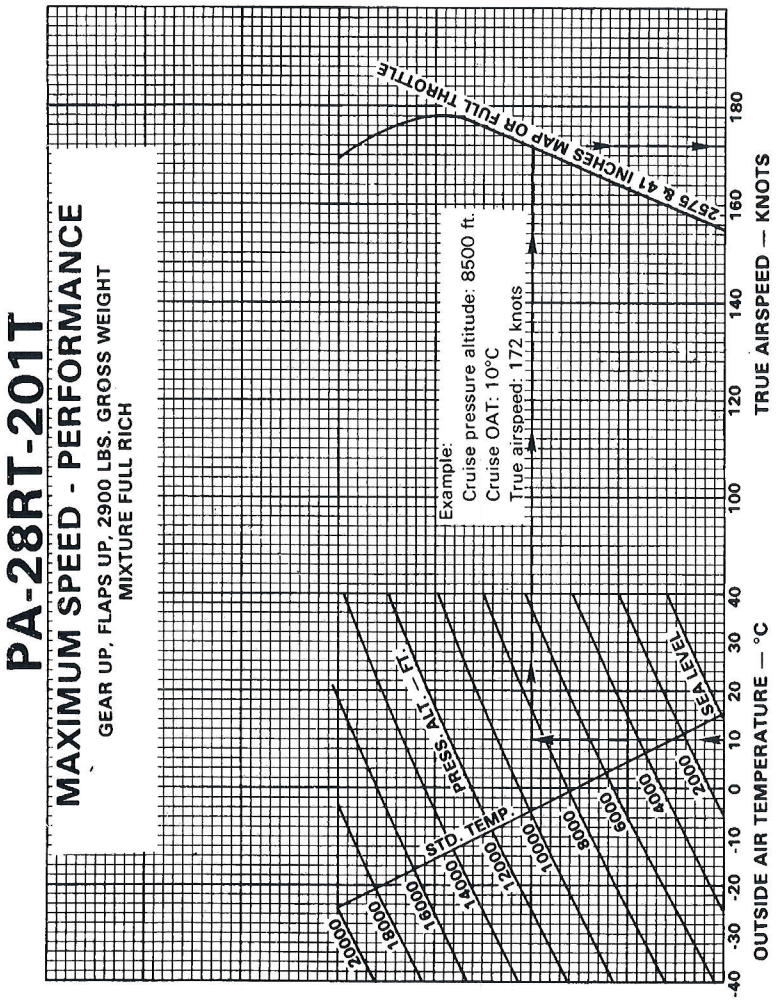
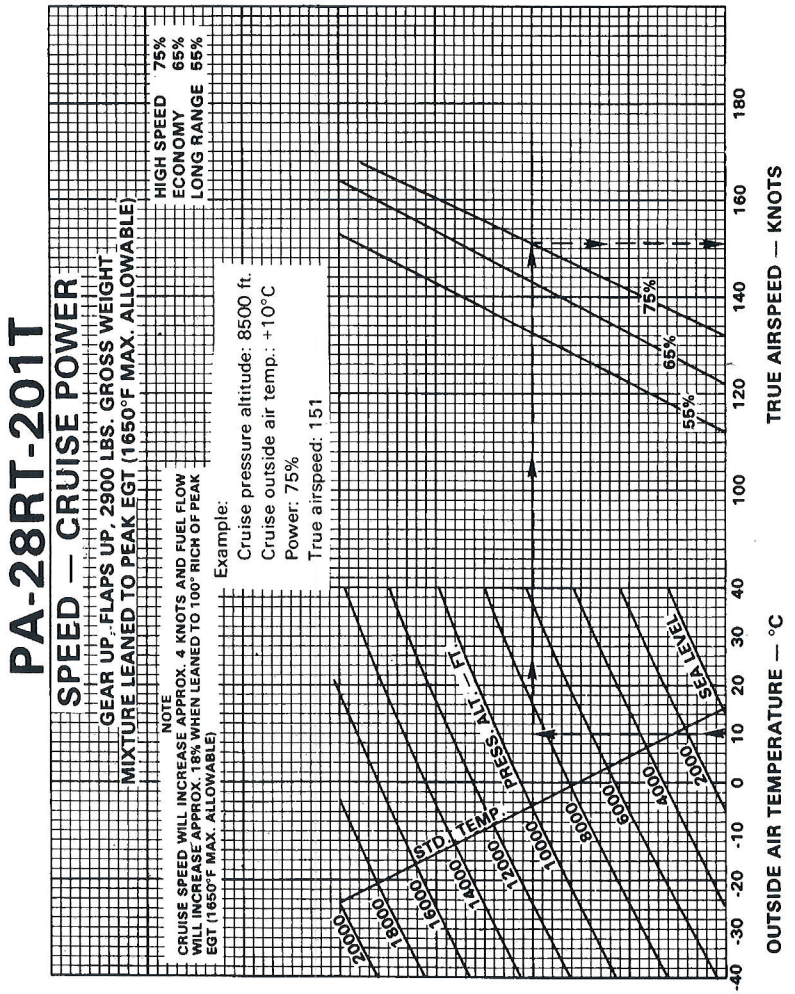


MAXIMUM SPEED - PERFORMANCE
Figure 5-21



SPEED - CRUISE POWER
Figure 5-23

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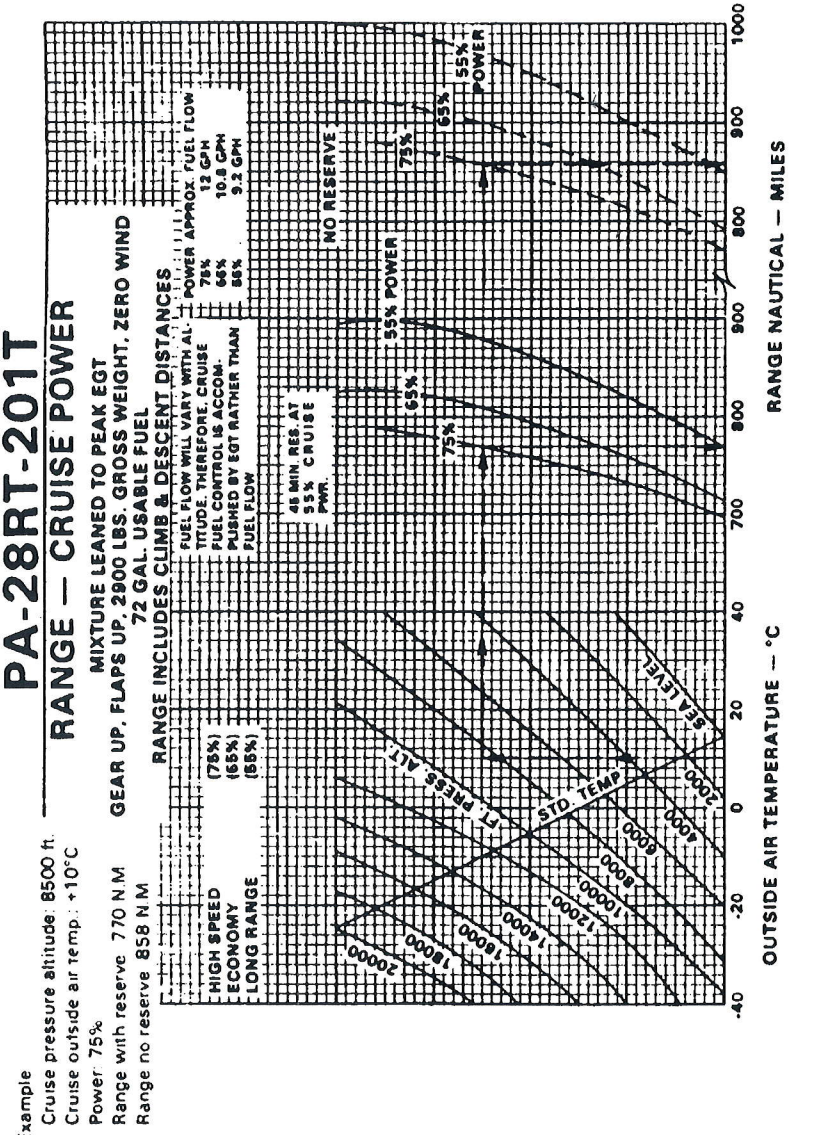
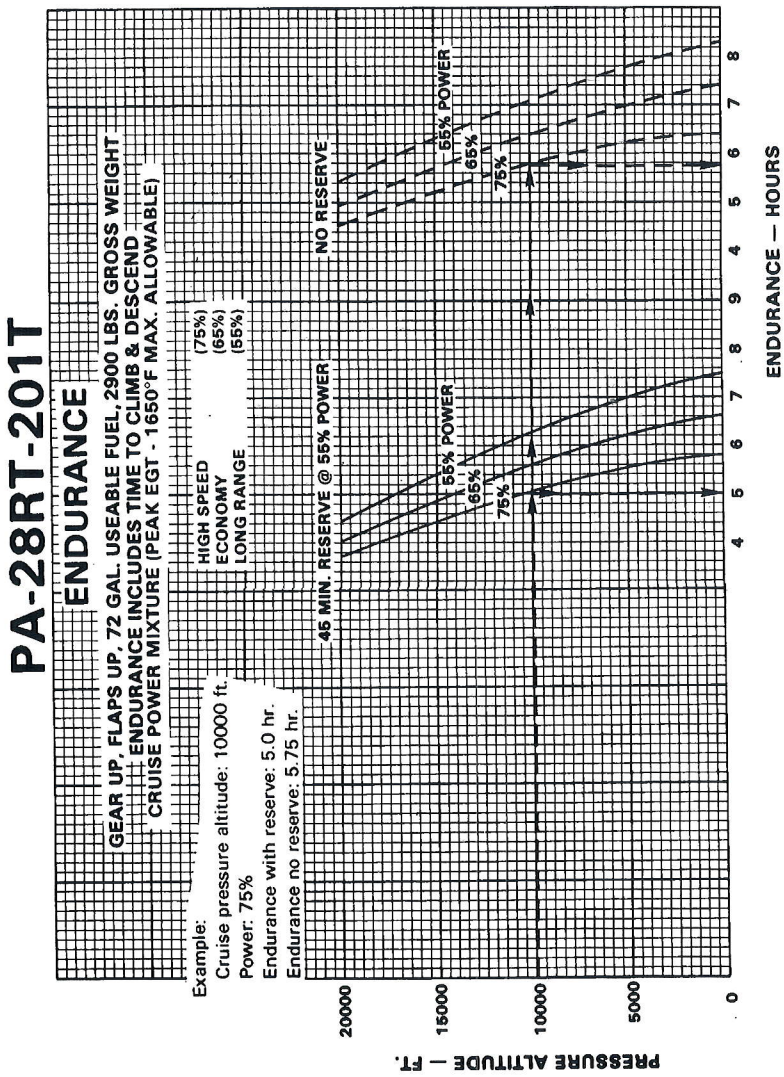
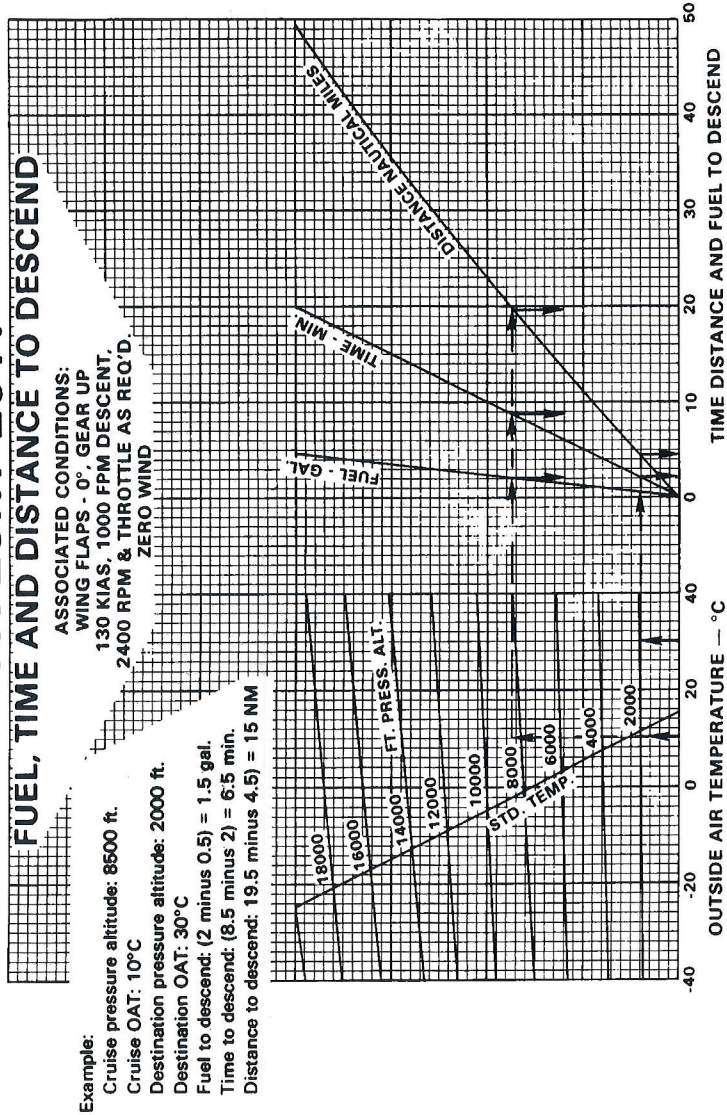
Figure 5-25



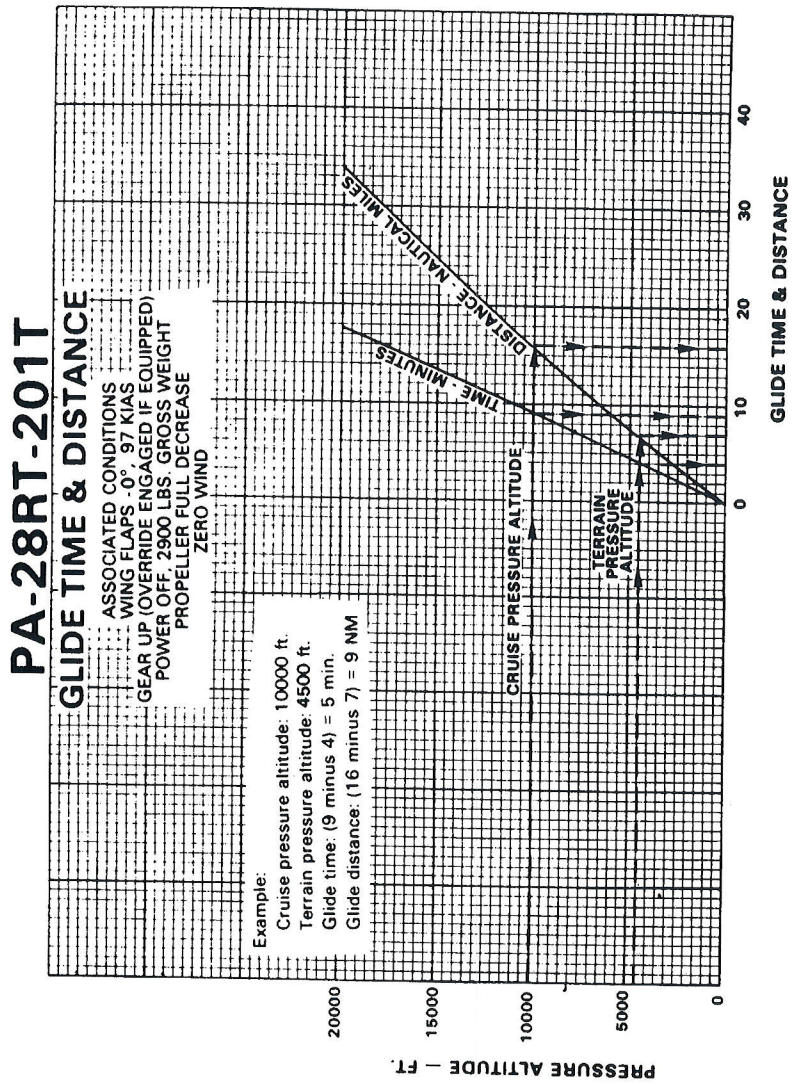
RANGE - CRUISE POWER
Figure 5-27



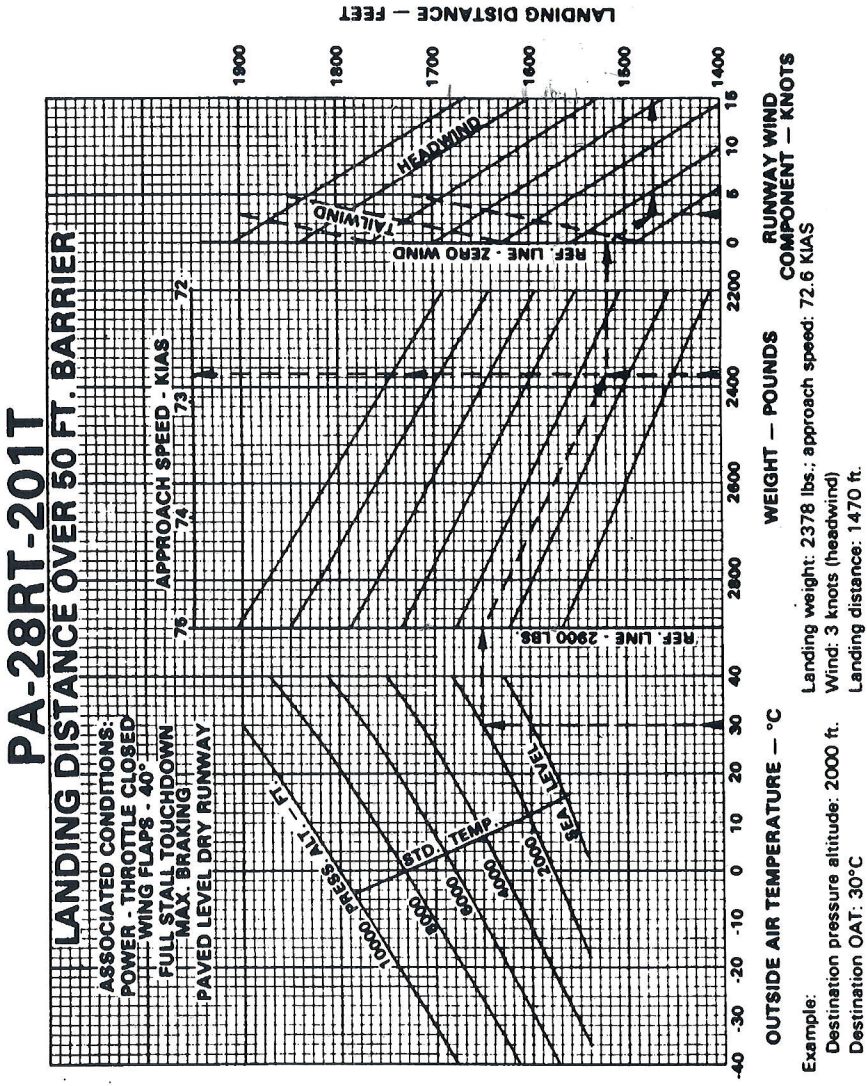
ENDURANCE
Figure 5-29



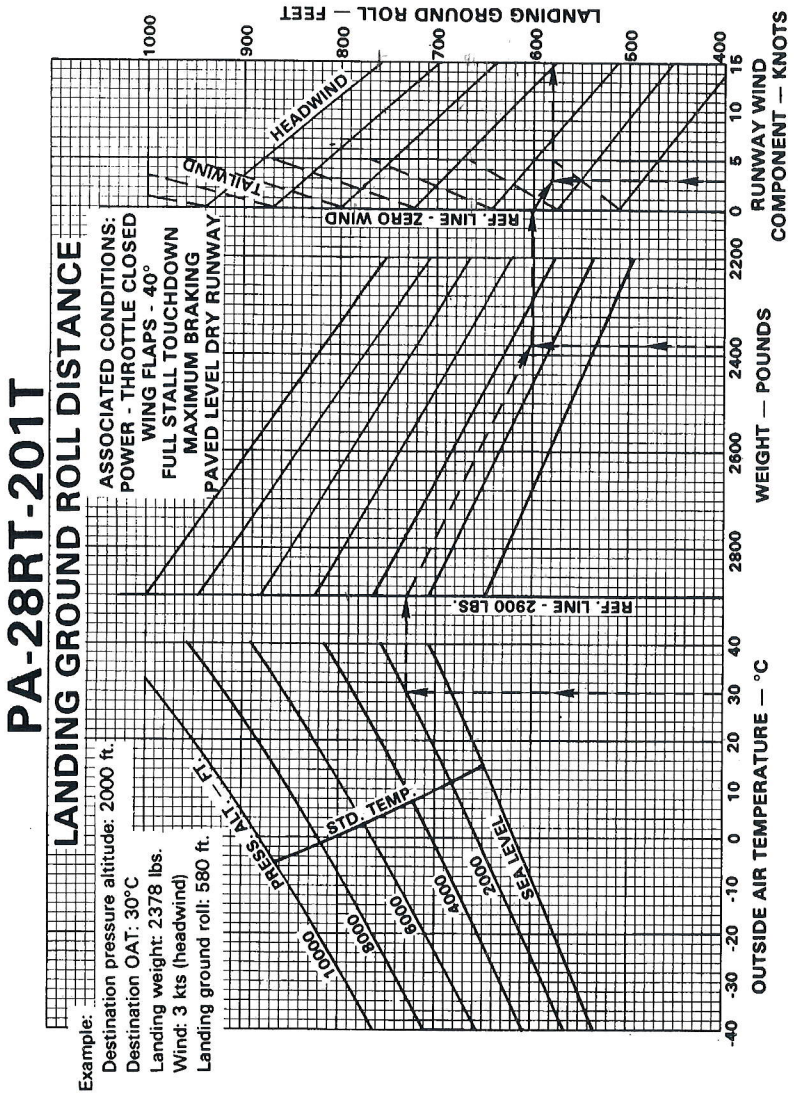
FUEL, TIME AND DISTANCE TO DESCEND
Figure 5-31



GLIDE TIME AND DISTANCE
Figure 5-33



LANDING DISTANCE OVER 50 FT.
Figure 5-35



LANDING GROUND ROLL DISTANCE
Figure 5-37

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SECTION 6

WEIGHT AND BALANCE

*For 1982 and preceding models only.
**For 1983 and subsequent models only.

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SECTION 6

WEIGHT AND BALANCE

6.1 GENERAL

In order to achieve the performance and flying characteristics which are designed into the airplane, it must be flown with the weight and center of gravity (C.G.) position within the approved operating range (envelope). Although the airplane offers a flexibility of loading, it cannot be flown with the maximum number of adult passengers, full fuel tanks and maximum baggage. With the flexibility comes responsibility. The pilot must insure that the airplane is loaded within the loading envelope before he makes a takeoff.

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

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

A properly loaded airplane, however, will perform as intended. Before the airplane is licensed, it is weighed, and a basic empty weight and C.G. location is computed (basic empty weight consists of the standard empty weight of the airplane plus the optional equipment). Using the basic empty weight and C.G. location, the pilot can determine the weight and C.G. position for the loaded airplane by computing the total weight and moment and then determining whether they are within the approved envelope.

The basic empty weight and C.G. location are recorded in the Weight and Balance Data Form (Figure 6-5) and the Weight and Balance Record (Figure 6-7). The current values should always be used. Whenever new equipment is added or any modification work is done, the mechanic responsible for the work is required to compute a new basic empty weight and C.G. position and to write these in the Aircraft Log Book and the Weight and Balance Record. The owner should make sure that it is done.

A weight and balance calculation is necessary in determining how much fuel or baggage can be boarded so as to keep within allowable limits. Check calculations prior to adding fuel to insure against improper loading.

The following pages are forms used in weighing an airplane in production and in computing basic empty weight, C.G. position, and useful load. Note that the useful load includes usable fuel, baggage, cargo and passengers. Following this is the method for computing takeoff weight and C.G.

6.3 AIRPLANE WEIGHING PROCEDURE

At the time of licensing, Piper Aircraft Corporation provides each airplane with the basic empty weight and center of gravity location. This data is supplied by Figure 6-5.

The removal or addition of equipment or airplane modifications can affect the basic empty weight and center of gravity. The following is a weighing procedure to determine this basic empty weight and center of gravity location:

(a) Preparation

(1) Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.

(2) Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.

(3) Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops. Then add the unusable fuel (5.0 gallons total, 2.5 gallons each wing).

CAUTION

Whenever the fuel system is completely drained and fuel is replenished it will be necessary to run the engine for a minimum of 3 minutes at 1000 RPM on each tank to insure no air exists in the fuel supply lines.

(4) Fill with oil to full capacity.

(5) Place pilot and copilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.

(6) Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

(b) Leveling

(1) With airplane on scales, block main gear oleo pistons in the fully extended position.

(2) Level airplane (refer to Figure 6-3) deflating nose wheel tire, to center bubble on level.

(c) Weighing - Airplane Basic Empty Weight

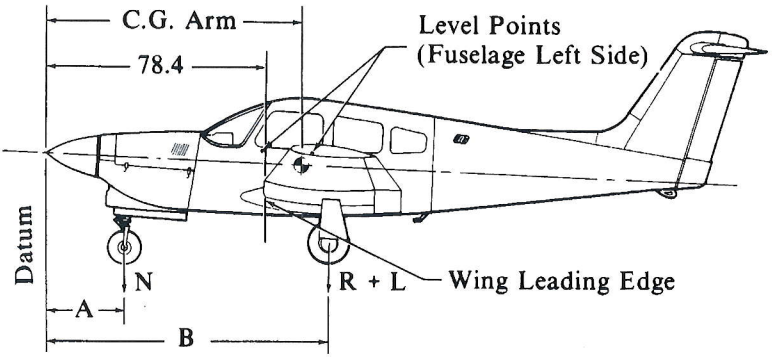
(1) With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

Scale Position and Symbol		Scale Reading	Tare	Net Weight
Nose Wheel	(N)			
Right Main Wheel	(R)			
Left Main Wheel	(L)			
Basic Empty Weight, as Weighed (T)				

WEIGHING FORM
Figure 6-1

(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the PA-28RT-201T airplane when it is level. Refer to Leveling paragraph 6.3 (b).



A = 15.6
B = 109.7

The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

LEVELING DIAGRAM
Figure 6-3

(2) The basic empty weight center of gravity (as weighed including optional equipment, full oil and unusable fuel) can be determined by the following formula:

$$\text{C.G. Arm} = \frac{N(A) + (R + L)(B)}{T} \quad \text{inches}$$

Where: $T = N + R + L$

6.5 WEIGHT AND BALANCE DATA AND RECORD

The Basic Empty Weight, Center of Gravity Location and Useful Load listed in Figure 6-5 are for the airplane as licensed at the factory. These figures apply only to the specific airplane serial number and registration number shown.

The basic empty weight of the airplane as licensed at the factory has been entered in the Weight and Balance Record (Figure 6-7). This form is provided to present the current status of the airplane basic empty weight and a complete history of previous modifications. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in the Weight and Balance Record.

MODEL PA-28RT-201T TURBO ARROW IV

Airplane Serial Number 28R-8031065

Registration Number N6664P

Date 8-14-2013

AIRPLANE BASIC EMPTY WEIGHT

Item		Weight (Lbs)	x	C.G. Arm (Inches Aft of Datum)	=	Moment (In-Lbs)
Standard Empty Weight*	Actual Computed					
Optional Equipment						
Basic Empty Weight		1874		89.4		171325

*The standard empty weight includes full oil capacity and 5.0 gallons of unusable fuel.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Ramp Weight) - (Basic Empty Weight) = Useful Load

(2912 lbs.) - (1874 lbs.) = 1038 lbs.

THIS BASIC EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS LICENSED AT THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

WEIGHT AND BALANCE DATA FORM
Figure 6-5

PA-28RT-201T	Serial Number 28R-8031065			Registration Number N666HP			Page Number 1	
Date	Item No.	Description of Article or Modification	Added (+) Removed (-)	Weight Change			Running Basic Empty Weight	
				Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100
8.14.2013		As licensed					1874.0	1713.25
3.9.2015		Removed G-35	-	27.0	168.0	-4536		
3.9.2015		Installed RG-35AXC	+	32.0	168.00	5376	1879.0	1721.65

WEIGHT AND BALANCE RECORD
Figure 6-7

PA-28RT-201T	Serial Number	Registration Number	Page Number

Date	Item No.	Description of Article or Modification	Added (+) Removed (-)	Weight Change			Running Basic Empty Weight	
				Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100

WEIGHT AND BALANCE RECORD (cont)
Figure 6-7 (cont)

6.7 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

(a) Add the weight of all items to be loaded to the basic empty weight.
(b) Use the Loading Graph (Figure 6-13) to determine the moment of all items to be carried in the airplane.
(c) Add the moment of all items to be loaded to the basic empty weight moment.
(d) Divide the total moment by the total weight to determine the C.G. location.
(e) By using the figures of item (a) and item (d) (above), locate a point on the C.G. range and weight graph (Figure 6-15). If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight	1896.0	88.2	167227
Pilot and Front Passenger	340.0	80.5	27370
Passengers (Rear Seats)	340.0	118.1	40154
Fuel (72 Gallons Maximum)	312.0	95.0	29640
Baggage (200 Lbs. Maximum)	24.0	142.8	3427
Ramp Weight (2912 Lbs. Maximum)	2912.0	92.0	267818
Fuel allowance for engine start, taxi, and run-up	-12	95.0	-1140
Takeoff Weight (2900 Lbs. Maximum)	2900.0	92.0	266678

The center of gravity (C.G.) of this sample loading problem is at 92.0 inches aft of the datum line. Locate this point (92.0) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

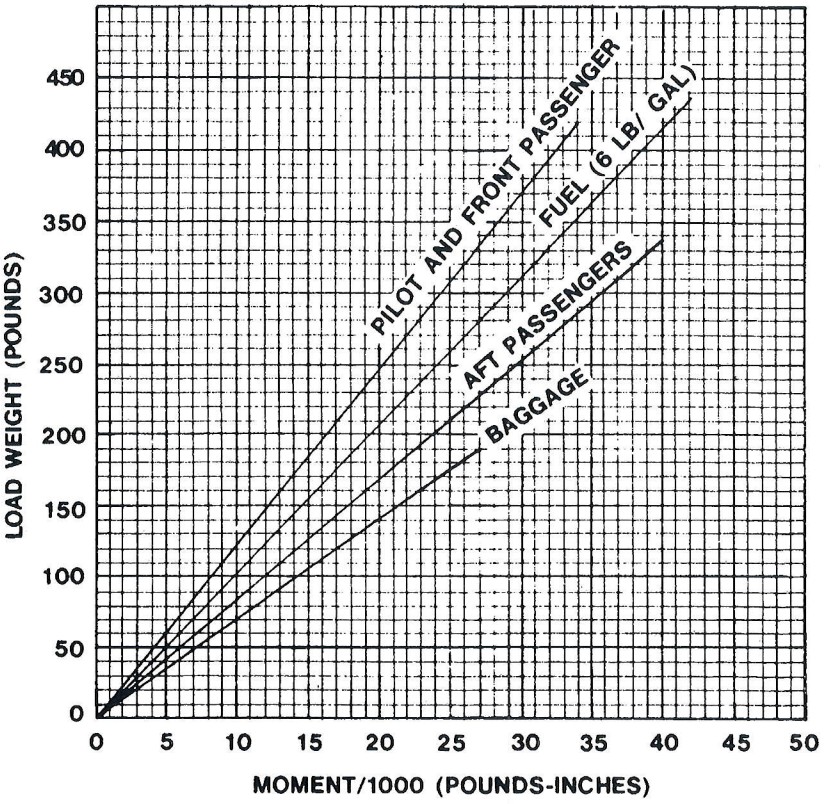
IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)
Figure 6-9

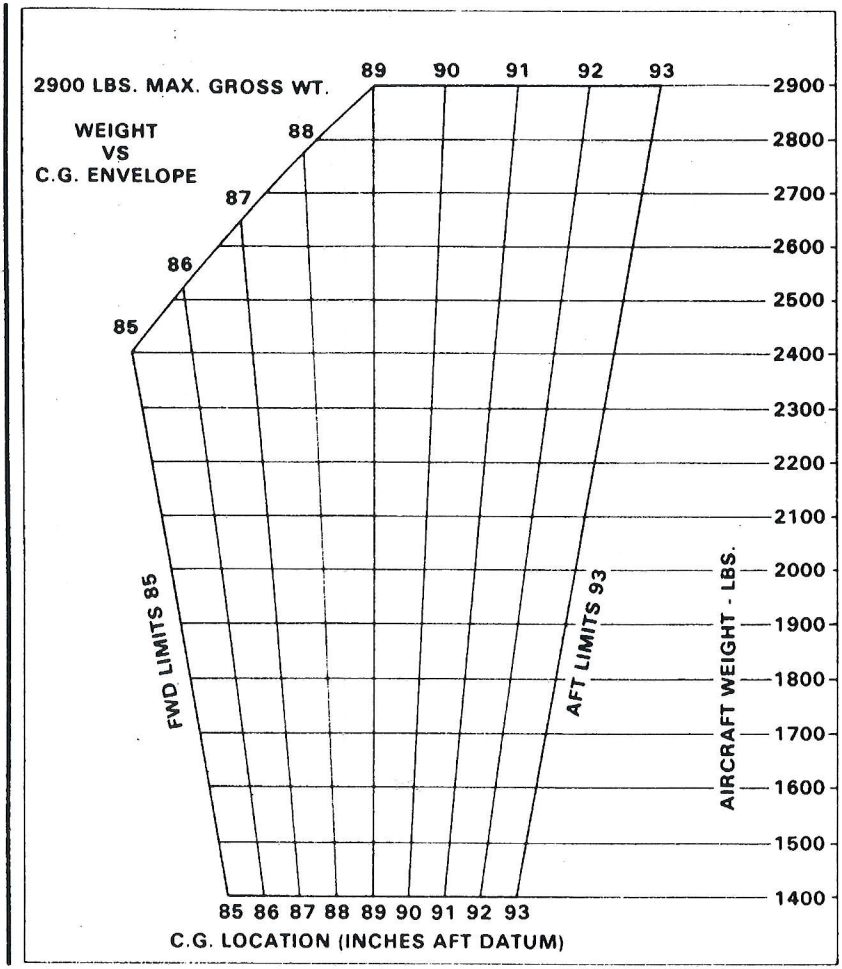
	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger		80.5	
Passengers (Rear Seats)		118.1	
Fuel (72 Gallons Maximum)		95.0	
Baggage (200 Lbs. Maximum)		142.8	
Ramp Weight (2912 Lbs. Maximum) Fuel allowance for engine start, taxi, and run-up	-12	95.0	-1140
Total Loaded Airplane (2900 Lbs. Maximum)			

Totals must be within approved weight and C.G. limits. It is the responsibility of the airplane owner and the pilot to insure that the airplane is loaded properly. The Basic Empty Weight C.G. is noted on the Weight and Balance Data Form (Figure 6-5). If the airplane has been altered, refer to the Weight and Balance Record for this information.

WEIGHT AND BALANCE LOADING FORM
Figure 6-11



LOADING GRAPH
Figure 6-13



C.G. RANGE AND WEIGHT
Figure 6-15

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6.11 EQUIPMENT LIST

The following is a list of equipment which may be installed in the PA-28RT-201T. It consists of those items used for defining the configuration of an airplane when the basic empty weight is established at the time of licensing. Only those standard items which are alternate standard items and those required to be listed by the certificating authority (FAA) are presented. Items marked with an "X" are those items which were installed on the airplane described below when licensed by the manufacturer.

Where the letter "A," "B," or "C" precedes an item, "A" denotes an item which is required equipment that must be installed in the aircraft; "B" denotes an item which is required equipment that must be installed in the aircraft unless replaced by an optional equivalent item; "C" denotes an optional item which replaces a required item of standard equipment. Where no letter precedes an item, that item is not required equipment.

Unless otherwise indicated, the installation certification basis for the equipment included in this list is the aircraft's approved type design.

PIPER AIRCRAFT CORPORATION PA-28RT-201T TURBO ARROW IV

SERIAL NO. 28R-8031065 REGISTRATION NO. N666HP DATE: 8/14/2013

(a) Propeller and Propeller Accessories

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
1	B	Propeller, Hartzell BHC-C2YF-1BF/F8459A-8R Cert. Basis - TC P920	_____	48.0	-3.2	-154
3	A	Propeller Governor				
		a. Piper Dwg. 37845-2	_____	3.7	3.8	14
		b. Piper Dwg. 37476-3	_____	2.5	3.8	10
		Cert. Basis - TC P920				
5	B	Spinner Piper Dwg. 35703-7 (Hartzell C-3568)				
		a. Bulkhead	_____	2.6	-0.4	-1
		b. Spinner Dome	_____	2.9	-4.1	-12

(b) Engine and Engine Accessories

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
9	A	Engine - Teledyne Continental Model TSIO-360-FB Cert. Basis - TC E9CE	X	405.7	19.0	7708
11	A	Fuel Injector System Teledyne Continental 639289 Cert. Basis - TC E9CE	X	*		
13	A	Electric Fuel Pump (Airborne P/N 2B6-44)	X	3.4	42.3	144
15	A	Fuel Valve (Airborne P/N 1-H80-2)	X	1.3	65.5	85
17	A	Oil Coolers (Harrison P/N 8534388)	X	*		
19	A	Air Filter (~~Fram P/N CA-161PL~~) Bracket BA-3	X	1.7	33.7	57
21	A	Alternator (Prestolite P/N ~~ALX9425A~~) KAES ALX9525BR	X	*		

*Included in basic engine dry weight.

(b) Engine and Engine Accessories (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
23	A	Starter (Prestolite P/N MCL-6501) Cert. Basis - TC E9CE	X	*		
25	A	Oil Filter Teledyne Continental 641583 Cert. Basis - TC E9CE	X	*		
27	A	Exhaust Gas Temp. Gauge Piper Dwg. 35809-2 (Alcor Indicator)	X	0.5	61.4	31

*Included in basic engine dry weight.

(c) Landing Gear and Brakes

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
35	A	Two Main Wheel Assemblies				
		a. Cleveland Aircraft Products				
		Wheel Assy. No. 40-86	X	5.4	109.7	592
		Brake Assy. No. 30-55		3.6	109.7	395
		Cert. Basis - TSO C26a				
		b. 6.00-6 Type III 6 Ply Rating Tires with Reg. Tubes	X	17.2	109.7	1887
		Cert. Basis - TSO C62				
37	A	Nose Wheel Assembly				
		a. Cleveland Aircraft Products				
		Wheel Assy. No. 40-77				
		Cert. Basis - TSO C26a	X	2.6	15.6	41
		b. McCauley Industrial Corp.				
		Wheel Assy. No. D-30500				
		Cert. Basis - TSO C26b		3.6	15.6	56
		c. 5.00-5 Type III 4 Ply Rating Tire with Reg. Tube	X	5.8	15.6	90
		Cert. Basis - TSO C62				
39	A	Handbrake Master Cylinder Cleveland Aircraft Products No. 10-22	X	0.6	60.9	37

(c) Landing Gear and Brakes (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
41	A	Toe Brake Cylinders				
		a. Cleveland Aircraft Products No. 10-27	X	0.7	53.0	37
		b. Gar-Kenyon Instruments 17000		0.4	53.0	21
43	A	Landing Gear Hydraulic Pump Piper Dwg. 67509-0 (Prestolite 105255B)	X	9.0	159.0	1431
45	A	Main Gear Hydraulic Cylinders (2) Piper Dwg. 96860-0 (Synco Devices SFA 232-3)	X	2.2	108.0	238
47	A	Nose Gear Hydraulic Cylinder Piper Dwg. 35797-2 (Gar-Kenyon 94951)	X	2.0	41.8	84

(d) Electrical Equipment

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
55	A	Voltage Regulator Piper Dwg. 68804-3	X	0.5	53.4	27
57	B	Battery (Rebat S-25) GU.35	X	~~21.9~~ 27.0	168.0	~~3679~~ 4536
59	A	Starter Relay Piper Dwg. 99130-2 (RBM Control P/N 111-111)	X	1.0	45.7	46
61	A	Overvoltage Relay Piper PS50034-1 (Prestolite "Wico Div." P/N FOC-4002B)	X	0.5	51.2	26
63	A	Stall Warning Device Piper Dwg. 78978-6, -7 (Safe Flight P/N C52207-4)	X	0.2	80.2	16
65	A	Stall Warning Horn Piper Dwg. 78978-6, -7 (Safe Flight P/N 35214	X	0.2	58.8	12

(e) Instruments

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
71	B	Altimeter Piper PS50008-4-2 (United Instruments UI5934-PA or UI5934PA-1) Cert. Basis - TSO C10b	X	1.1	60.9	67
73	B	Airspeed Indicator Piper PS50049-51S-2 (United Instruments 8025-B365) Cert. Basis - TSO C2b	X	0.6	61.8	37
75	A	Manifold Pressure and Fuel Flow Indicator Piper 35711-2 (United Instruments 35B90H Kit) Cert. Basis - TSO C45 & C47	X	1.1	60.8	67
77	A	Compass Piper Dwg. 67462-6 (Airpath P/N C-2200-L4-B) Cert. Basis - TSO C7c	X	0.9	59.9	54
79	A	Tachometer Piper Dwg. 37629-2	X	0.7	61.2	43

(e) Instruments (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
81	A	Left Engine Cluster Piper Dwg. 95241-21	X	0.8	62.4	50
83	A	Right Engine Cluster Piper Dwg. 95241-22, Plus 38224-3 (2)	X	0.8	62.4	50

(f) Miscellaneous

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
89	B	Left Front Seat Piper Dwg. 79337-21	X	15.5	84.0	1302
91		Right Front Seat Piper Dwg. 79337-22	X	15.5	84.0	1302
93		Left Rear Seat Piper Dwg. 96827-22	X	14.5	123.0	1784
95		Right Rear Seat Piper Dwg. 96827-23	X	14.5	123.0	1784

(f) Miscellaneous (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
97	A	Front Seat Belts (2) Piper PS50039-4-2A (American Safety Eqpt. Corp. 500576) (Davis Acft. Prod. Inc. FDC-5900-120-5) (Black) Cert. Basis - TSO C22f	X	1.8	84.0	151
99	A	Aft Seat Belts (2) Piper PS50039-4-3 (American Safety Eqpt. Corp. 449968) (Davis Acft. Prod. Inc. FDC-5900-120-2) (Black) Cert. Basis - TSO C22f	X	1.6	123.0	197
101	A	Shoulder Harness (2) (Front Seats Only) Piper PS50039-4-20 (Pacific Scientific 1107447-13 Black)	—	1.4	119.5	167

(f) Miscellaneous (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
102	B	Shoulder Harness - Fixed (Front) (2) Piper PS50039-4-23 (American Safety Eqpt. Corp. 501385-407) (Davis Acft. Prod. Inc. FDC-7275-16-14) (Black)	X	1.1	119.5	131
103	A	Baggage Straps Piper Dwg. 66804-0 and 66805-0	X	1.3	142.8	186
105		Tow Bar Piper Dwg. 67336-0	X	2.2	156.0	343
		SUN VISORS ROSEN STC SA00072SE	X			

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(g) Propeller and Propeller Accessories (Optional Equipment)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
115	C	Propeller, Hartzell PHC-C3YF-1( )F/F7663-2R Cert. Basis - TC P25EA	———	*22.0	-3.2	-70
117	C	Spinner Piper Dwg. 35707-11 (Hartzell C-3570)				
		a. Bulkhead	———	(Same as standard equipment)		
		b. Spinner Dome	———	*-0.7	-4.1	3
		Propeller MT-12-D/188-30d STC SA0258AT	X		-3.2	
		Spinner P-285-7	X		-4.1	
		Propeller w/Spinner	X	45.6	-4.6	-209

*Weight and moment difference between standard and optional equipment.

(h) Engine and Engine Accessories (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
121	Optional Engine Primer System Piper Dwg. 37865-3	X	1.6	13.9	22
123	Vacuum Pump				
	a. Piper Dwg. 79399-0 (Airborne P/N 211CC) 215 CC	X	1.8	40.0	72
	b. Piper Dwg. 36535-2 (Edo-Aire P/N 1U128A)		2.2	40.0	88

(i) Landing Gear and Brakes (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)

(j) Electrical Equipment (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
127	Instrument Panel Lights Instl.	X	0.3	62.8	19
129	Instrument Light, Grimes 15-0083-7 or Whelen A300-W-14	X	0.1	99.0	10

(j) Electrical Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
131	Cabin Light Piper Dwg. 79247	X	0.3	99.0	30
133	Landing Light Piper PS10008-4509 (G.E. Model 4509)	X	0.5	10.0	5
135	Navigation Lights (Wing) (2) Whelen P/N A429PR-D-14 (Red) and P/N A429PG-D-14 (Green)	X	0.4	106.6	43
137	Navigation Light (Rear) (2) Grimes Model A2064 (White)	X	0.4	292.0	117
139	Navigation Lights (Wing) (2) Red/White & Green/White Whelen Model A675		0.5	106.6	53
141	Navigation Lights (Wing) (2) Red/White & Green/White With White Strobe Whelen Model A600		5.8	157.9	916

(j) Electrical Equipment (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
143	Navigation Lights (Wing) (2) Red/White & Green/White With Red Strobe Whelen Model A600	___	5.8	157.9	916
145	Anti-Collision Lights (Wing Tip) (Whelen) Piper Dwg. 79850-14 & -15 Cert. Basis - STC SA615EA	X	5.7	157.9	900
147	Heated Pitot Installation Piper Dwg. 35896-4 & -5	X	0.4	100.0	40
149	Piper Pitch Trim Piper Dwg. 67496-5	X	4.3	155.3	668
151 C	Battery 12v 35 A.H. (Rebat R35)	___	*6.5	168.0	1092
153	Auxiliary Power Receptacle Piper Dwg. 79454	X	2.7	178.5	482

*Weight and moment difference between standard and optional equipment.

(j) Electrical Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
155	External Power Cable Piper Dwg. 62355-2	X	4.6	142.8	657
157	Lighter (Casco P/N 200462)	____	0.2	62.9	13

(k) Instruments
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
163	Attitude Gyro				
	a. Piper Dwg. 99002-3 (Edo-Aire P/N 5000B-9)	X	1.9	59.4	113
	b. Piper Dwg. 99002-8 (Aeritalia S.P.A. P/N 36101P)	____	2.2	59.4	131
	Cert. Basis - TSO C4c				

(k) Instruments
(Optional Equipment) (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
165		Directional Gyro a. Piper Dwg. 99003-3 (Edo-Aire P/N 4000B-9) b. Piper Dwg. 99003-7 (Aeritalia S.P.A. P/N 31101P) Cert. Basis - TSO C5c	 X _____	 2.4 1.9	 59.7 59.7	 143 113
167		Horizontal Situation Indicator (Mitchell P/N NSD-360A) Cert. Basis - TSO C6c, C9c, C52a	_____	4.9	58.9	289
168		Horizontal Situation Indicator (Mitchell P/N NSD-360A Slaved) Cert. Basis - TSO C6c, C9c, C52a	_____	8.2	136.0	1116
169	C	Tru-Speed Indicator Piper PS50049-51T (United Instruments P/N 8125-B.366) Cert. Basis - TSO C2b	_____	(Same as standard equipment)		

(k) Instruments
(Optional Equipment) (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
171	C	Altimeter Piper PS50008-5 (United Instruments P/N 5934-PAM-1) Cert. Basis - TSO C10b	X	(Same as standard equipment)		
173	C	Encoding Altimeter Piper PS50008-6 (United Instruments P/N UI5035P-P23) or Piper PS50008-7 (United Instruments P/N UI5035PM-P24) Cert. Basis - TSO C10b & C88	X	*0.9	60.3	54
175		Altitude Digitizer (United Instruments P/N 5125-P3) Cert. Basis - TSO C88		1.0	51.5	52
177		Rate of Climb Piper Dwg. 99010-5 (United Instruments P/N UI-7000) Cert. Basis - TSO C8b	X	1.0	60.9	61

*Weight and moment difference between standard and optional equipment.

(k) Instruments
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
179	Alternate Static Source Installation Piper Dwg. 35896-3 & -5	X	0.4	61.0	24
181	Turn and Slip Indicator Piper PS50030-2 (R. C. Allen P/N A2475-2) Cert. Basis - TSO C3b		2.6	59.7	155
183	Turn Coordinator, Piper PS50030-3 (Electric Gyro Corp. P/N 1394T100) Cert. Basis - TSO C3b	X	2.6	59.7	155
185	MK 10 Radar Altimeter Piper Dwg. 37693-7		5.4	156.3	844
187	King KRA Radio Altimeter		4.3	162.6	699
189	Engine Hour Meter, Piper Dwg. 79548-0		0.3	61.2	18
191	Clock, Piper Dwg. 79621-2		0.4	62.4	25