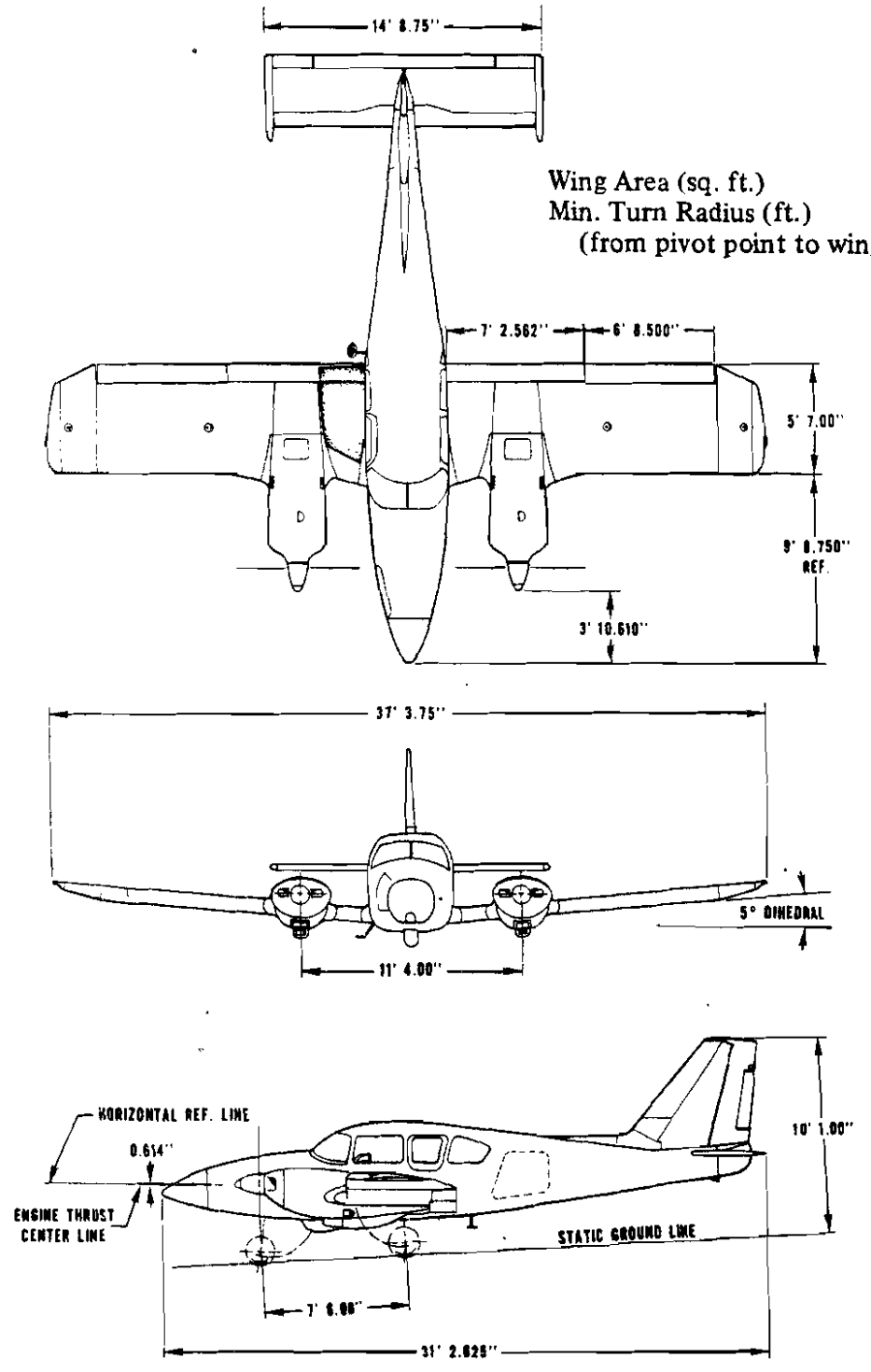


THREE VIEW (SERIAL NUMBERS 27-7654001 THROUGH 27-7954121)

Figure 1-1

3.3 EMERGENCY CHECK LIST

SPEEDS

Air Minimum Control	64 KIAS
Best Single Engine Angle of Climb	83 KIAS
Best Single Engine Rate of Climb	88 KIAS
Maneuvering	131 KIAS
Never Exceed	221 KIAS

ENGINE INOPERATIVE PROCEDURES

ENGINE SECURING PROCEDURE
(FEATHERING PROCEDURE)

Throttle	close
Propeller	FEATHER (1000 RPM min.)
Mixture	IDLE CUT-OFF
Cowl flaps	Close
Magneto switch	OFF
Electric fuel pump	OFF
Fuel selector	OFF (detent)
Alternator switch	OFF
Prop. Sync.	OFF
Electrical load	reduced
Crossfeed	considered

NOTE

(Serial numbers 27-7654001 thru 27-7854050 when Piper Kit No. 763 836 is not installed)

Hydraulic pump on left engine only. Use hand pump to actuate gear and flaps when left engine is out. Gear can be extended with hand pump or by CO_2*.

ENGINE FAILURE DURING TAKEOFF
(Below 64 KIAS)

If sufficient runway remains for a safe stop:

Throttles	CLOSE immediately
Brakes	as required

Stop straight ahead.

If insufficient runway remains for a safe stop:

Throttles	close immediately
Mixture	retard fully aft
Master switch	OFF
Fuel selectors	OFF
Magneto switches	OFF

Maintain directional control and maneuver to avoid obstacles.

*CO_2 system installed on aircraft serial numbers 27-7654001 through 27-7954121 only.

ENGINE FAILURE DURING TAKEOFF
(Between 64 KIAS and 83 KIAS)

Decide whether to abort or continue

If abort	follow above procedures
If continue	accelerate inground effect (near ground) to 83 KIAS and follow below procedures

WARNING

Certain combinations of aircraft weight, configuration, ambient conditions and speeds will not permit positive climb.

ENGINE FAILURE DURING TAKEOFF
(83 KIAS or above)

Airspeed	83 KIAS minimum
Directional control	maintain
Power	maximum
Gear	RETRACT (Serial numbers 27-7654001 thru 27-7854050, when Piper Kit No. 763 836 is not installed, if left engine failed, gear must be raised with hand pump)
Flaps	insure UP
Prop. (inop. eng.)	FEATHER
Cowl flap (inop. eng.)	CLOSE
Airspeed	when clear of obstacles accelerate to 88 KIAS
Trim	bank 5° toward oper. eng.
Cowl flap (operative eng.)	CLOSE (as much as possible)
Climb	straight ahead (avoiding obstacles and attain sufficient altitude to execute single engine landing procedure
Inop. engine	complete Engine Securing Procedure

Land as soon as practical at nearest suitable airport.

ENGINE FAILURE DURING CLIMB

Airspeed	maintain 88 KIAS
Directional control	maintain
Inop. engine	identify and verify
Inop. engine	complete Engine Securing Procedure

Land as soon as practical at nearest suitable airport.

ENGINE FAILURE DURING FLIGHT (Below 64 KIAS)

Rudder . . . . . apply towards operative engine
Throttles (both engines) . . . . retard to stop turn
Pitch attitude . . . . . lower nose to accelerate above 64 KIAS
Operative eng. . . . . increase power as airspeed increases above 64 KIAS

If altitude permits, a restart may be attempted.

If restart fails or altitude does not permit:
Inop. eng. prop . . . . . FEATHER
Trim . . . . . adjust 5° toward operative eng.
Inop. eng. . . . . complete Engine Securing Procedure
Cowl flap (operative eng.) . . . . . as required

ENGINE FAILURE DURING FLIGHT (Above 64 KIAS)

Inop. eng. . . . . identify
Operative eng. . . . . adjust as required

Before securing inop. engine:
Fuel flow . . . . . check (if deficient - electric fuel pump ON)
Fuel quantity . . . . . check
Fuel selector (inop. eng.) . . . . . switch to other tank containing fuel
Oil pressure and temp. . . . . check
Magneto switches . . . . . check

If engine does not start, complete Engine Securing Procedure.

Power (operative eng.) . . . . . as required
Mixture (operative eng.) . . . . . adjust for power
Fuel quantity (operative eng. tank) . . . . . sufficient
Electric fuel pump (operative eng.) . . . . . as required
Cowl flap (operative eng.) . . . . . as required
Trim . . . . . adjust 5° toward operative eng.
Electrical load . . . . . decrease to min. required

Land as soon as practical at nearest suitable airport.

SINGLE ENGINE LANDING

Inop. engine . . . . . Engine Securing Procedure complete
Hydraulic pump . . . . . check
Seat belts/harnesses . . . . . secure
Heater . . . . . FAN position
Electric fuel pump (operative eng.) . . . . . ON
Mixture (operative eng.) . . . . . RICH
Propeller (operative eng.) . . . . . full FORWARD
Fuel quantity . . . . . check
Cowl flap (operative eng.) . . . . . as required
Fuel selector (operative eng.) . . . . . ON
Crossfeed . . . . . OFF
Airspeed . . . . . maintain 98 KIAS min. until landing is assured
Altitude . . . . . higher than normal until landing is assured

When landing is assured:

NOTE
(Serial numbers 27-7654001 thru 27-7854050 when Piper Kit No. 763 836 is not installed)
If the engine is inoperative the flaps must be lowered with the emergency hand pump and the gear must be extended with the emergency hand pump or CO_2 system.*

Gear . . . . . DOWN
Flaps . . . . . DOWN
Power . . . . . retard slowly and flare airplane
Trim . . . . . as power is reduced (airplane will yaw in direction of operative engine)

*Serial numbers 27-7654001 thru 27-7854050 when Piper Kit No. 763 836 is not installed are equipped with a single hydraulic pump on the left engine only.

SINGLE ENGINE GO-AROUND

Avoid if possible.

On aircraft with serial numbers 27-7654001 thru 27-7854050 when Piper Kit No. 763 836 is not installed, do not attempt if gear or flaps are extended and left propeller is feathered. With left engine inoperative gear and flaps must be retracted with hand pump.*

Airspeed . . . . . hold 88 KIAS
Power . . . . . max. on operating engine
Flaps . . . . . retract
Landing gear . . . . . retract
Cowl flaps and trim . . . . . as required

AIR START (UNFEATHERING PROCEDURE)

Fuel selector . . . . . ON
Throttle . . . . . open 1/2 inch
Mixture . . . . . RICH
Elect. fuel pump . . . . . prime then OFF
Propeller . . . . . forward
Magnetos . . . . . ON
Starter . . . . . engage until prop unfeathers
Propeller . . . . . pull back to low RPM position as propeller speed accelerates through 1000 RPM
Throttle . . . . . reduced power till warm; 2000 RPM max.
Engine instruments . . . . . check
Alternator . . . . . ON

OVERSPEEDING PROPELLERS

Throttle . . . . . retard
Airspeed . . . . . reduce
Throttle . . . . . add slowly after RPM is under control
Airspeed . . . . . maintain below airspeed at which overspeed occurred (select lower RPM if higher airspeed required)
Descend at 2200 RPM
Land with prop set at 2400 RPM

NOTE

Prop will not feather while overspeeding; therefore while in the overspeed condition do not select feather position and do not shut down engine. Propeller will feather normally if not overspeeding.

ENGINE ROUGHNESS

Electric fuel pumps . . . . . ON
Engine instruments . . . . . scan for cause
Mixture . . . . . adjust as required
Alternate air . . . . . OPEN
Cowl flaps . . . . . adjust for proper CHT
Fuel . . . . . switch tanks if fuel in second tank
Magnetos . . . . . check

ENGINE OVERHEAT

Cowl flaps . . . . . OPEN
Mixture . . . . . richen
Power . . . . . reduce
Airspeed . . . . . increase (if altitude permits)

LOSS OF OIL PRESSURE

Engine . . . . . secure per Engine Securing Procedure

ROUGH AIR OPERATION

Slow to maneuvering speed or slightly less (5200 lbs. 131 KTS)
Fly attitude and avoid abrupt maneuvers
Seat belt and shoulder harness - tighten.

*Serial numbers 27-7654001 thru 27-7854050 when Piper Kit No. 763 836 is not installed are equipped with a single hydraulic pump on the left engine only.

EMERGENCY GEAR EXTENSION

EXTENDING GEAR WITH HAND PUMP

132 KIAS max. gear down speed.

Gear handle . . . . . DOWN
Emergency hand pump . . . . .pull out and pump until 3 green lights and handle returns to neutral

EXTENDING GEAR WITH CO_2 (SERIAL NUMBERS 27-7654001 THROUGH 27-7954121 ONLY)

132 KIAS max. gear down speed

Gear handle . . . . . DOWN
Ring cover . . . . . raise
Ring . . . . . pull
Do not attempt to raise gear hydraulically.

MANUAL EXTENSION OF WING FLAPS

Flap control . . . . . down
Emergency hand pump . . . . .pull out and pump

ENGINE FIRE ON GROUND (Engine start, taxi and takeoff with sufficient distance remaining to stop)

Fuel selector . . . . . OFF
Electrical fuel pump . . . . . OFF
Brakes . . . . . as required
Throttle . . . . . open
Radio . . . . . call for assistance
Mixture (if fire continues) . . . . . IDLE CUT-OFF
External fire extinguisher . . . . . use

NOTES

If fire continues, shut down both engines and evacuate.

If fire is on the ground, it may be possible to taxi away.

ENGINE FIRE IN FLIGHT

Mixture . . . . . idle cut-off
Electric fuel pump . . . . . OFF
Fuel selector . . . . . OFF
Propeller . . . . . feather
Good engine . . . . . increase power
Drag . . . . . reduce (gear, flaps, cowl flaps)
Alternator . . . . . OFF
Magnetos . . . . . OFF
Electrical load . . . . . reduce
If fire persists, increase airspeed as much as possible in an attempt to blow out fire.

Loss of power procedures . . . . . complete
Land at nearest suitable airport.

CABIN FIRE

Vents . . . . . closed
Heater . . . . . OFF
Fire extinguisher . . . . . use
(When fire is out ventilate the cabin)

ELECTRICAL FIRE

Flashlight (night) . . . . . in hand
Master switch . . . . . OFF
Circuit breakers . . . . . check, then pull all
Electrical switches . . . . . all OFF
Avionics . . . . . all OFF
Heater . . . . . OFF
Ventilators . . . . . close
Fire extinguisher . . . . . use
(when fire is out)
- Master switch . . . . . ON
- Ventilators . . . . . open
- Switches and circuit breakers . . . . . ON, one at a time

EMERGENCY DESCENT

Throttles . . . . . retard slowly to idle
Propellers . . . . . controls forward
Dive at 172 knots . . . . . (131 KTS in rough air)
Cowl flaps . . . . . closed

GOING INTO CROSSFEED

(To use fuel from opposite side during single engine operation)

Fuel Selector
(inop. engine side) . . . . . (inbd or outbd) ON
Electric fuel pump
(inop. side) . . . . . .ON
Crossfeed valve . . . . . .ON
Electric fuel pump
(operative side) . . . . . .OFF
Fuel selector
(operative side) . . . . . .OFF

COMING OUT OF CROSSFEED

When one engine is inoperative

Fuel selector
(operative engine side) . . . . . .ON
Electric fuel pump
(operative side) . . . . . .ON
Electric fuel pump
(inop. side) . . . . . .OFF
Crossfeed valve . . . . . .OFF
Fuel selector
(inop. side) . . . . . .OFF
Fuel pump (operative
side) . . . . . as required

ONE ALTERNATOR INOPERATIVE LIGHT ON

Reduce electrical load to minimum required
Turn OFF same side of master switch
Reset tripped circuit breakers
Master switch (both sides) ON
If light goes out, reinstate electrical load.
If light stays on, turn same side of master switch OFF and continue with reduced electrical load.

BOTH ALTERNATOR INOPERATIVE LIGHTS ON

Repeat above procedure for each alternator.

If both lights fail to go off:
a. Master switch . . . . . both sides ON
b. Alternator circuit
breaker switches . . . . . .OFF
c. Terminate flight as
soon as possible

NOTE
Since battery is furnishing all the current, keep the load low.

DOOR OPEN IN FLIGHT

Airspeed . . . . . slow to reduce buffeting
Land at nearest airport

SPIN RECOVERY

Throttles . . . . . .retard both to idle
Rudder . . . . . .full opposite to spin until rotation stops
Control wheel . . . . . .neutral; then full forward if necessary
Ailerons . . . . . neutral
Smoothly recover from dive when spin stops.

NOTE
Inasmuch as FAA Regulations do not require spin demonstrations of airplanes of this weight, no spin tests have been conducted. The recovery technique is based on the best available information.

AIRFRAME VIBRATION

Reduce airspeed till vibration stops
Handle controls smoothly and gently
Land and investigate cause

GEAR UP LANDING

Normal check list . . . . . complete (except for gear selector)
Gear selector . . . . . .UP
Make normal approach with power
Close throttles before touchdown
Turn OFF master and magneto switches
Turn OFF fuel valves
Touch down at minimum speed
(If time permits, use starter to position props parallel with wings.)

ENGINE FAILURE DURING TAKEOFF (Between 64 KIAS and 83 KIAS)

If an engine fails during takeoff at an airspeed between 64 KIAS and 83 KIAS, and there is not sufficient runway remaining for deceleration, the pilot must decide whether to abort the takeoff following the above procedures or to continue takeoff and climb on a single engine. The pilot's decision must be based upon a personal judgement, taking into consideration such factors as remaining runway, obstacles, the type of terrain beyond the runway, density altitude, weight and loading, weather, other associated conditions, airplane condition, and the pilot's own proficiency and capability. If the decision is to continue the takeoff on a single engine, the airplane should be accelerated in ground effect (near the ground) to 83 KIAS, at which point the below procedures should be followed.

WARNING

Certain combinations of aircraft weight, configuration, ambient conditions and speeds will not permit positive climb.

ENGINE FAILURE DURING TAKEOFF (83 KIAS or above)

If engine failure occurs when the airspeed is above 83 KIAS, or if the airspeed is between 64 KIAS and 83 KIAS and the pilot has decided to continue takeoff, the first step before attempting climb is to reach and maintain a minimum airspeed of 83 KIAS. Since one engine will be inoperative and the other will be at maximum power, the airplane will want to turn in the direction of the inoperative engine. Rudder pedal force on the side of the operating engine will be necessary to maintain directional control. Once committed to takeoff, maintain maximum power and retract the landing gear. Once the faulty engine is identified and its power loss verified, its propeller should be feathered. Directional tendency will identify the faulty engine, and observing response to a retarded throttle will verify the loss of power. Be sure to maintain maximum power on the good engine. After feathering the propeller on the inoperative engine, close its cowl flap. When clear of obstacles accelerate to the best single-engine rate of climb speed (88 KIAS), trim as necessary, and close the cowl flap on the operating engine as much as possible without exceeding engine temperature limits. After a climb has been established, complete the "Engine Securing Procedures." Continue a straight ahead climb until sufficient altitude (minimum of 1000 feet above ground elevation) is reached to execute the normal single-engine landing procedure at the nearest suitable airport.

ENGINE FAILURE DURING CLIMB

If engine failure occurs during climb, a minimum airspeed of 88 KIAS should be maintained. Since one engine will be inoperative and the other will be at maximum power, the airplane will want to turn in the direction of the inoperative engine. Rudder pedal force on the side of the operating engine will be necessary to maintain directional control. After the faulty engine has been identified and power loss verified, complete the "Engine Securing Procedures." Continue a straight ahead climb until sufficient altitude (minimum of 1000 feet above ground elevation) is reached to execute the normal "Single Engine Landing" procedure at the nearest suitable airport.

ENGINE FAILURE DURING FLIGHT (Below 64 KIAS)

Should an engine fail during flight at an airspeed below 64 KIAS, apply rudder towards the operative engine to maintain directional control. The throttles should be retarded to stop the yaw force produced by the inoperative engine. Lower the nose of the aircraft to accelerate above 64 KIAS and increase the power on the operative engine as the airspeed exceeds 64 KIAS.

After an airspeed above 64 KIAS has been established, an engine restart attempt may be made if altitude permits. If the restart has failed, or altitude does not permit, the engine should be secured. Move the propeller control of the inoperative engine to FEATHER and complete the "Engine Securing Procedure." Adjust the trim to 5°of bank toward the operating engine. The cowl flap on the operative engine should be adjusted as required to maintain engine temperature within allowable limits.

ENGINE FAILURE DURING FLIGHT (Above 64 KIAS)

If an engine fails at an airspeed above 64 KIAS during flight, begin corrective response by identifying the inoperative engine. The operative engine should be adjusted as required after the loss of power has been verified. Once the inoperative engine has been identified and the operating engine adjusted properly, an engine restart may be attempted if altitude permits.

Prior to securing the inoperative engine, check to make sure the fuel flow to the engine is sufficient. If the fuel flow is deficient, turn ON the electric fuel pump. Check the fuel quantity on the inoperative engine side and switch the fuel selector to the other tank if a sufficient supply is indicated. Check the oil pressure and oil temperature and insure that the magneto switches are ON.

If the engine fails to start it should be secured using the "Engine Securing Procedure."

After the inoperative engine has been secured, the operative engine can be adjusted. Power should be maintained as required and the mixture control should be adjusted for power. Check the fuel supply and turn ON the electric fuel pump if necessary. The cowl flaps on the operative engine should be adjusted as required to maintain engine temperatures within allowable limits. Trim 5° toward the operating engine. The electrical load should be decreased to a required minimum. Land as soon as practical at the nearest suitable airport.

SINGLE ENGINE LANDING

If a single-engine landing is necessary, a check should be performed to determine whether or not the hydraulic pump(s) is functioning for normal gear extension. This check is accomplished by placing the landing gear control in the "UP" position with the gear retracted. If the hydraulic pump is functioning, pressure will return the control to the neutral position. This check should be performed before entering the traffic pattern so that there will be time to pump the gear down with the hand pump or to employ the emergency CO_2* gear extension system if necessary.

The "Engine Securing Procedure" should be complete on the inoperative engine. Fasten the seat belts and shoulder harnesses and select the FAN position of the heater switch. The operative engine electric fuel pump should be ON and the mixture RICH. Advance the propeller control (operative engine) full forward. Check to ensure that the fuel supply is sufficient. The cowl flaps on the operative engine should be adjusted as required. Insure that the fuel selector is ON and that the fuel crossfeed valve is OFF.

Maintain an airspeed of 98 KIAS or above and an altitude higher than normal until a landing is assured. When a landing is assured, extend the gear and flaps. On aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed and the left engine is inoperative the flaps must be lowered with the emergency hand pump and the gear must be extended with the emergency hand pump or CO_2* system. Slowly retard the power on the operative engine and flare out the airplane for a normal landing. Trim as necessary as power is reduced. The airplane will tend to yaw toward the operative engine.

*CO_2 system installed on aircraft serial numbers 27-7654001 through 27-7954121 only.

SINGLE ENGINE GO-AROUND

A single engine go-around should be avoided if at all possible. On aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed, do not attempt a go-around if gear or flaps are extended and the left propeller is feathered.* A final approach speed of 88 KIAS will place the airplane in the best configuration should a go-around be necessary.

To execute a single engine go-around, advance mixture, throttle, and propeller controls fully forward for maximum power on the operating engine. Retract flaps and landing gear. Maintain the airspeed at or above 88 knots IAS. Set the trim and cowl flaps as required.

WARNINGS

A go-around should not be attempted after the airspeed is decreased below the best single engine angle of climb speed (83 KIAS).

On aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed and the left engine is inoperative, operation of the landing gear and/or flaps is limited to the use of the hydraulic hand pump.*

AIR START (UNFEATHERING PROCEDURE)

When unfeathering a propeller, first turn "ON" the fuel selector of the inoperative engine side. Open the throttle 1/2 inch. If the engine has been inoperative long enough to cool down, prime the engine by moving its mixture control to full "RICH" and turning its electric fuel pump "ON" until the first indication of fuel flow on the gauge; then turn the electric fuel pump "OFF." Move the propeller control full forward and turn "ON" the magnetos. Engage the starter until the propeller is unfeathered. As the RPM passes 1000 coming out of feather, pull the propeller control back to the low RPM position to prevent excessive engine speed. Maintain the engine speed between 1800 and 2000 RPM, not exceeding 2000 RPM. This low power setting must be held until the engine is warmed up and oil pressure and temperature are stabilized within limits. Turn the alternator "ON."

3.9 OVERSPEEDING PROPELLER

If a propeller overspeed condition occurs, retard the throttle and reduce airspeed until the RPM is under control. When the RPM is under control, slowly advance the throttle. Maintain airspeed below that at which the overspeed condition occurred. If a higher airspeed is required for safe flight, select a suitable power setting with a lower RPM setting and higher manifold pressure.

If propeller overspeeding has occurred, descend at 2200 RPM and land with the propeller set at 2400 RPM.

NOTE

A propeller will not feather while overspeeding. Therefore, while in an overspeed condition, do not select the feather position and do not shut down the engine. The propeller will feather normally if not overspeeding.

*Serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed are equipped with a single hydraulic pump on the left engine only.

3.11 ENGINE ROUGHNESS

If an engine falters or runs erratically, the cause may be fuel flow interruption, fuel contamination, icing or air starvation, or ignition problems. If roughness occurs, turn the electric fuel pumps "ON." Scan the engine instruments to see if the cause can be determined. Adjust the mixture controls for maximum smoothness; if the mixture is too rich or too lean, engine roughness may result. Open the alternate air control; a blocked induction system can cause roughness. If cylinder head temperatures are too high or too low, adjust the cowl flaps as required.

If the problem is in the fuel system, selecting another tank containing fuel may remedy the situation. A check of the magnetos will determine if they are operating properly.

3.13 ENGINE OVERHEAT

If engine temperatures become excessive, open the cowl flaps. Enriching the mixture and reducing power will also reduce engine temperature. If a more rapid reduction of engine temperature is desired, increase the airspeed by establishing a shallow dive.

3.15 LOSS OF OIL PRESSURE

Loss of oil pressure could be caused by a faulty pump, oil exhaustion, or a leak. A loss of oil pressure indication could be the result of a faulty gauge. In any event, continued operation of the engine could result in a serious emergency situation or severe engine damage.

Complete the "Engine Securing Procedure" (paragraph 3.7) on the faulty engine.

3.17 ROUGH AIR OPERATION

In conditions of extreme turbulence, slow the airplane to maneuvering speed or slightly less. Maneuvering speed will decrease with the weight of the airplane - e.g., 131 KIAS at 5200 lbs., 112 KIAS at 3600 lbs. A reduction in speed will ease the stress to which the airplane is subjected by turbulence. Fly attitude and avoid abrupt maneuvers. Fasten seat belts and shoulder harnesses as a precaution against buffeting and lurching. When flying in extreme turbulence or strong vertical currents and using the autopilot, the altitude-hold mode should not be used.

3.19 EMERGENCY GEAR EXTENSION

EXTENDING GEAR WITH HAND PUMP

To extend the landing gear manually with the hand pump, move the gear selector to the "DOWN" position. Pull the hand hydraulic pump handle fully aft and pump until three green gear indicator lights illuminate and the gear selector handle returns to neutral.

EXTENDING GEAR WITH CO_2 (SERIAL NUMBERS 27-7654001 THROUGH 27-7954121 ONLY)

Use the emergency CO_2 gear extension system only if the engine-driven and hand hydraulic pumps fail. The system may also be used on aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed, if rapid gear extension is required for an emergency landing when the left engine is inoperative. The maximum gear down speed is 132 KIAS.

To extend the gear with the emergency CO_2 system, first place the gear selector in the "DOWN" position. Raise the firing ring cover under the left front seat and pull the ring as far as possible. Do not then attempt to raise the gear hydraulically.

NOTE

Any time the gear has been extended by the CO_2 system, do not operate the gear or flap selector handles until the system has been repaired.

3.21 MANUAL EXTENSION OF WING FLAPS

To extend the wing flaps manually, place the flap selector control in the "DOWN" position. Pull the hand hydraulic pump handle fully aft and pump until the desired flap setting is obtained or until the flap selector control automatically returns to the neutral position.

3.23 ENGINE FIRE ON GROUND (Engine start, taxi and takeoff with sufficient distance remaining to stop)

The first step to extinguish the fire is to turn "OFF" the fuel selector and electric fuel pump. Brakes should be used as required. OPEN the throttle and use the radio to call for assistance.

If the fire continues, move the mixture control to IDLE CUT-OFF, shut down the engines and evacuate the airplane; the fire should be extinguished by external means.

If the fire is on the ground near the airplane, it may be possible to taxi to safety.

3.25 ENGINE FIRE IN FLIGHT

If an engine fire occurs in flight, place the mixture control of the involved engine in idle cut-off and turn "OFF" its electric fuel pump and fuel selector. Feather the propeller on the faulty engine. Increase power on the good engine, and reduce drag by ensuring that gear and wing flaps are retracted and cowl flaps on the feathered engine are closed. Turn "OFF" the alternator and magnetos of the feathered engine and reduce the electrical load on the remaining alternator. Complete the Engine Securing procedure and prepare for a landing at the nearest airport.

7.19 BRAKE SYSTEM

Main gear brakes are actuated by toe brake pedals on the left set of rudder pedals. Toe brakes for the right side are available as optional equipment. The brakes are hydraulically actuated by individual master cylinders mounted on the rudder pedals. The brakes hydraulic system is completely independent of the hydraulic system for the landing gear and flaps. The master cylinders are accessible through the cockpit for servicing. Fluid for the master cylinders is supplied through flexible lines from a brake fluid reservoir which is mounted inside the left nose access panel. The brakes are self-adjusting, single-disc, double housing and double piston assemblies. Toe pressure against the upper part of the rudder pedals operates the brakes.

To set the parking brake, first depress and hold the toe brake pedals and then pull out the parking brake handle. To release the parking brake, first depress and hold the toe brake pedals and then push in on the parking brake handle.

WARNING

No braking will occur if aircraft brakes are applied while parking brake handle is pulled and held.

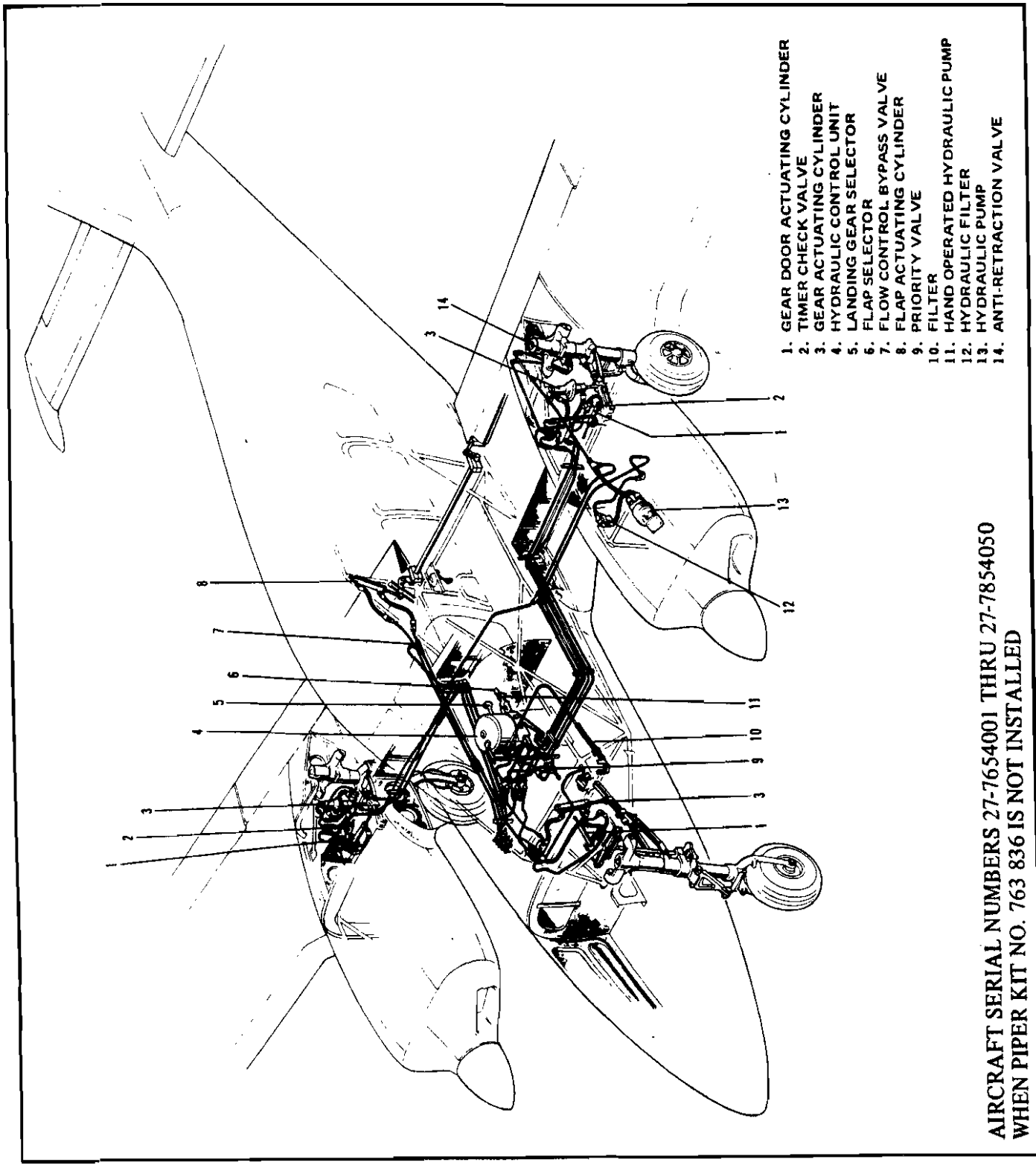
7.21 HYDRAULIC SYSTEM

The hydraulic system is used for the extension of both the landing gear and the flaps. The position of the flaps or the landing gear is controlled by the levers protruding through the face of the control pedestal. The hydraulic control unit which is also a hydraulic fluid reservoir is housed within the control pedestal. On aircraft with serial numbers 27-7654001 through 27-7854050 with Piper Kit No. 763 836 installed and serial numbers 27-7854051 and up, pressure for the hydraulic system is supplied to the control unit from two engine-driven pumps one mounted on each engine. Pressure for the system is supplied by one engine-driven hydrualic pump mounted on the left engine on aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed. Movement of the gear or flaps occur when hydraulic pressure is routed into actuating cylinders directly connected to the gear or flaps. Landing gear doors are also operated by the hydraulic system.

The gear control knob is wheel-shaped, and the flap control knob is airfoil-shaped. When a selector lever is in the off or neutral position, hydraulic fluid flows through selector ports and circulates freely between the engine-driven pump(s) and the control unit. For extension or retraction of gear or flaps, the respective control lever is moved from the center position into the desired direction. When a control lever is placed in an up or down position, the selector ports hydraulic fluid into the proper actuating cylinder. Once a selected component reaches full extension or retraction, hydraulic pressure within the control unit forces the control lever back into a neutral or off position, allowing hydraulic fluid to resume free circulation between the pump(s) and the control unit. Flap travel can be stopped at any intermediate position if the control knob is manually returned to the neutral position. Although both gear and flap levers may be moved at the same time, the flaps will not extend until the gear system completes its operation; however, the flaps will "blow" up during the retraction cycle with the priority valve supplying the gear system.

When the gear or flaps have reached their selected position, the actuating cylinders and their associated lines are isolated from the hydraulic fluid supply. This feature, along with a system of check valves, ensures the retention of sufficient fluid under pressure in the actuating cylinder to operate the landing gear in the event of a leak in the hydraulic system.

The emergency hydraulic hand pump, which is an integral part of the control unit, is used to obtain hydraulic pressure should the engine-driven pump(s) malfunction. Aircraft with serial numbers 27-7654001 through 27-7854050 when Piper Kit No. 763 836 is not installed must also use the hand pump to provide hydraulic pressure when the left engine is inoperative. To operate the hand pump, the handle should be pulled aft to its full extension and the gear or flap selector positioned as desired. Approximately fifty strokes are required to raise or lower the landing gear. At altitudes above 10,000 feet, the hand pump becomes increasingly inefficient.



HYDRAULIC SYSTEM (SINGLE HYDRAULIC PUMP)

Figure 7-7

An additional back-up system * exists independent of the need for hydraulic fluid. The system is powered by a CO_2 cylinder, and emergency extension of the landing gear may be accomplished by this CO_2 system. The control for the CO_2 system is located beneath a small cover plate under the pilot's seat. When the control is pulled, the gear selector must be in the down position. Pulling the emergency gear extender ring releases CO_2 from a cylinder under the floor panel. The gas flows into the gear actuating cylinders, extending the landing gear. Note that this system may be used for gear extension only; it must never be used for gear retraction or operation of the flaps.

The landing gear position lights and the flap indicator, along with visual observation, should be used as primary indications of the positions of gear and flaps. Secondary indication that gear and flaps have reached their selected position is the return of the control lever to the off or neutral position.

The left main gear includes a by-pass valve which prevents the retraction of the landing gear while the airplane is on the ground. The weight of the airplane causes the valve to remain open while the strut is compressed, and all fluid by-passes directly from the pressure side of the system to the return side, preventing any build-up of hydraulic pressure in the retraction system. Note that this system is designed to prevent inadvertent retraction during aircraft start-up. The by-pass valve cannot be relied upon as the sole means of preventing retraction during high engine power on the ground or during taxi and takeoff operations. Be sure the gear handle is down before moving the aircraft.

7.23 FLIGHT CONTROL SYSTEM

Dual flight controls are installed in the Aztec F as standard equipment. The control wheels operate the ailerons and the stabilator. The rudder pedals control the rudder movement, and during ground operations also steer the nose wheel. The wheel brakes are applied by toe pressure on the top portion of the rudder pedals. These toe brakes are standard on the pilot's side. Ailerons, stabilator and rudder are cable controlled; wing flaps are hydraulically controlled. Stabilator and rudder trim are set with the control knobs located overhead.

The horizontal tail is an all-movable, slab type stabilator which incorporates an anti-servo tab along the trailing edge. The anti-servo tab, which moves in the same direction as the stabilator, but with increased travel, provides a more efficient control surface. The anti-servo tab also functions as a longitudinal trim tab for nose up or nose down correction.

The vertical tail is fitted with a rudder which incorporates a servo tab. The servo tab, which moves in a direction opposite to the travel of the rudder, lessons pedal forces necessary to move the rudder. The servo tab also functions as a rudder trim tab for nose right or nose left correction.

The knob portion of the trim control moves the rudder tab, and the crank portion moves the stabilator tab. Trim position is shown on the indicators in the overhead panel.

Wing flaps are adjustable from no flaps to 50 degrees of flap. Flap position is shown on the indicator located to the right of the flap control lever. Flaps may be set at any position between full extension and full retraction by manually returning the flap control to the neutral position when the flaps have reached the desired degree of travel. If the flap control is left in the up or the down position, the flaps will automatically extend or retract to their full travel and the lever will automatically return to the neutral position. For ease of entry or exit, the right flap may be used as a step, but only when it is fully retracted.

*Airplanes serial numbers 27-7654001 through 27-7954121 only.