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DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

7.1 THE AIRPLANE

The Seneca III is a twin-engine, all metal, retractable landing gear, turbocharged airplane. It has seating for up to seven occupants and two separate one hundred pound luggage compartments.

7.3 AIRFRAME

The basic airframe is of aluminum alloy with steel engine mounts and landing gear and thermo-plastic or fiberglass fairings. Aerobatics are prohibited in this airplane since the structure is not designed for aerobatic loads.

The fuselage is a semi-monocoque structure. There is a front door on the right side and a rear door on the left. A cargo door is installed aft of the rear passenger door. Both rear doors may be opened for loading large pieces of cargo. A door on the left side of the nose section gives access to the nose section baggage compartment.

The wing is of a conventional design and employs a laminar flow NACA 65_2-415 airfoil section. The main spar is located at approximately 40% of the chord aft of the leading edge. The wings are attached to the fuselage by the insertion of the butt ends of the spar into a spar box carry-through, which is an integral part of the fuselage structure. The bolting of the spar ends into the spar box carry-through structure, which is located under the center seats, provides in effect a continuous main spar. The wings are also attached fore and aft of the main spar by an auxiliary front spar and a rear spar. The rear spar, in addition to taking torque and drag loads, provides a mount for flaps and ailerons. Each wing contains two fuel tanks as standard equipment. An optional third tank may be installed on each side. The tanks on one side are filled through a single filler neck located well outboard of the engine nacelle.

A vertical stabilizer, an all-movable horizontal stabilator, and a rudder make up the empennage. The stabilator incorporates an anti-servo tab which improves longitudinal stability and provides longitudinal trim. This tab moves in the same direction as the stabilator, but with increased travel. Rudder effectiveness is increased by an anti-servo tab on the rudder.

7.5 ENGINES

The Seneca III is powered by two Teledyne Continental six-cylinder turbocharged engines each rated at 200 horsepower at 2600 RPM maximum continuous at sea level and 220 horsepower at 2800 RPM takeoff power for five minutes. The engines are air cooled and fuel injected and are equipped with oil coolers with low temperature bypass systems and engine mounted oil filters. A winterization plate is provided to restrict air during winter operation. (See Winterization in Handling and Servicing Section.) Asymmetric thrust during takeoff and climb is eliminated by the counter-rotation of the engines, the left engine rotating in a clockwise direction when viewed from the cockpit, and the right engine rotating counterclockwise.

The engines are accessible through removable panels, one on either side of each engine cowling. Engine mounts are constructed of steel tubing, and dynafocal engine mounts are provided to reduce vibration.

A Ray-Jay turbocharger on each engine is operated by exhaust gases. Exhaust gases rotate a turbine wheel, which in turn drives an air compressor. Induction air is compressed (supercharged) and distributed into the engine air manifold, and the exhaust gases which drive the compressor are discharged overboard. Engine induction air is taken from within the cowling, is filtered, and is then directed into the turbocharger compressor inlet. Each engine cylinder is supplied with pressurized air in operation from sea level to maximum operating altitude. The pressure relief valve protects the engine from inadvertently exceeding 42 inches Hg; 40 inches Hg is manually set with the throttles. The turbo bypass orifice is preset for 40 inches Hg at 12,000 feet density altitude at full throttle and 2600 RPM.

The intake filter air box incorporates a manually operated two-way valve designed to allow induction air either to pass into the compressor through the filter or to bypass the filter and supply heated air directly to the turbocharger. There is an automatic alternate air door which opens in the event that the primary air source becomes blocked. Alternate air selection ensures induction air flow should the filter become blocked. Since the air is heated, the alternate air system offers protection against induction system blockage caused by snow or freezing rain, or by the freezing of moisture accumulated in the induction air filter. Alternate air is unfiltered; therefore, it should not be used during ground operation when dust or other contaminants might enter the system. The primary (through the filter) induction source should always be used for takeoffs.

The fuel injection system incorporates a metering system which measures the rate at which turbocharged air is being used by the engine and dispenses fuel to the cylinders proportionally. Fuel is supplied to the injector pump at a greater rate than the engine requires. The excess fuel is returned to the fuel tank by the vapor return line. The fuel injection system is a "continuous flow" type.

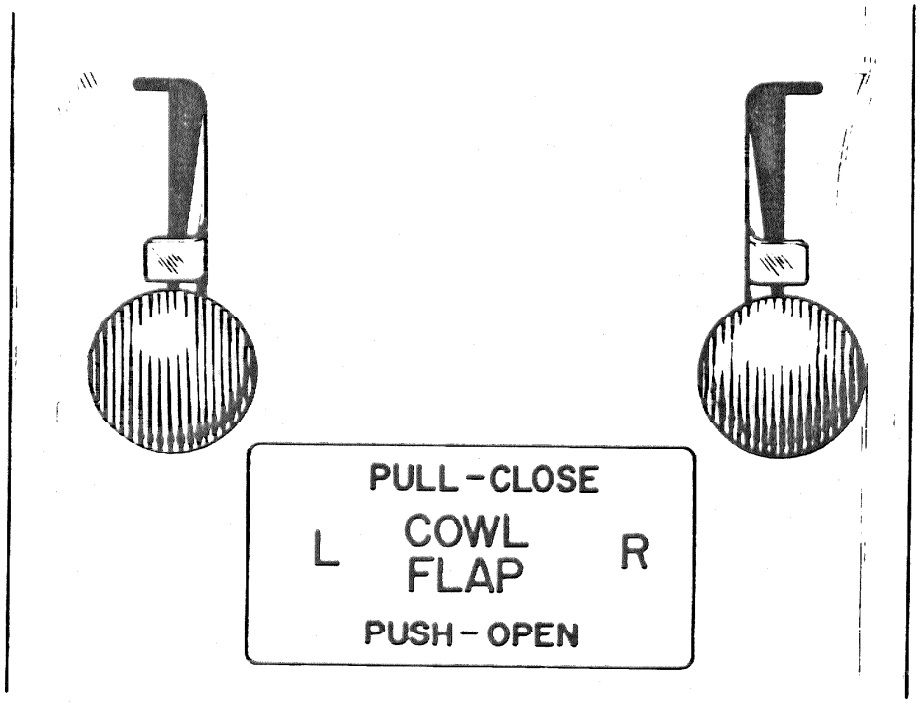
To obtain maximum efficiency and time between overhauls from the engines, follow the procedures recommended in the Teledyne Continental Operator's Manual provided with the airplane.

Engine controls consist of a throttle, a propeller control and a mixture control lever for each engine. These controls are located on the control quadrant on the lower center of the instrument panel where they are accessible to both the pilot and the copilot. The controls utilize teflon-lined control cables to reduce friction and binding.

The throttle levers are used to adjust the manifold pressure. They incorporate a gear up warning horn switch which is activated during the last portion of travel of the throttle levers to the low power position. If the landing gear is not locked down, the horn will sound until the gear is down and locked or until the power setting is increased. This is a safety feature to warn the pilot of an inadvertent gear up landing.

All throttle operations should be made with a smooth, not too rapid movement to prevent unnecessary engine wear or damage to the engines, and to allow time for the turbocharger speed to stabilize.

The propeller control levers are used to adjust the propeller speed from high RPM to feather.



COWL FLAP CONTROL
Figure 7-1

The mixture control levers are used to adjust the air to fuel ratio. An engine is shut down by the placing of the mixture lever in the full lean (idle cut-off) position.

The friction adjustment lever on the right side of the control quadrant may be adjusted to increase or decrease the friction holding the throttle, propeller, and mixture controls or to lock the controls in a selected position.

The alternate air controls are located on the control quadrant just below the engine control levers. When an alternate air lever is in the up, or off, position the engine is operating on filtered air; when the lever is in the down, or on, position the engine is operating on unfiltered, heated air. Should the primary air source become blocked the automatic alternate air door will automatically select unfiltered heated air.

The cowl flap control levers (Figure 7-1), located below the control quadrant, are used to regulate cooling air for the engines. The levers have three positions: full open, full closed, and intermediate. A lock incorporated

in each control lever locks the cowl flap in the selected position. To operate the cowl flaps, depress the lock and move the lever toward the desired setting. Release the lock after initial movement and continue movement of the lever. The control will stop and lock into place at the next setting. The lock must be depressed for each selection of a new cowl flap setting. The intermediate lever position is used for climb and single engine operation. The full open position is available when abnormal temperatures are encountered.

7.7 PROPELLERS

Counter-rotation of the propellers provides balanced thrust during takeoff and climb and eliminates the "critical engine" factor in single engine flight.

Two-blade, constant speed, controllable pitch and feathering Hartzell propellers are installed as standard equipment. The propellers mount directly to the engine crankshafts. Pitch is controlled by oil and nitrogen pressure. Oil pressure sends a propeller toward the high RPM or unfeather position; nitrogen pressure sends a propeller toward the low RPM or feather position and also prevents propeller overspeeding. The recommended nitrogen pressure to be used when charging the unit is listed on placards on the propeller domes and inside the spinners. This pressure varies with ambient temperature at the time of charging. Although dry nitrogen gas is recommended, compressed air may be used provided it contains no moisture. For more detailed instructions, see "Propeller Service" in the Handling and Service Section of this handbook.

Governors, one on each engine, supply engine oil at various pressures through the propeller shafts to maintain constant RPM settings. A governor controls engine speed by varying the pitch of the propeller to match load torque to engine torque in response to changing flight conditions.

Each propeller is controlled by the propeller control levers located in the center of the power control quadrant. Feathering of a propeller is accomplished by moving the control fully aft through the low RPM detent, into the "FEATHER" position. Feathering takes place in approximately six seconds. Unfeathering is accomplished by moving the propeller control forward and engaging the starter until the propeller is windmilling.

An optional propeller unfeathering system may be installed which consists of increased capacity governors, gas charged accumulators and a latching propeller control lever.

The feathering governors are designed to operate in the conventional manner in addition to their accumulator unfeathering capability.

The accumulators store engine oil under pressure from the governors which is released back to the governors for propeller unfeathering when the propeller control lever is unlatched and moved forward from the feathered position.

The feathering latches hold the propeller control lever in the feathered position and prevent inadvertent unfeathering. These latches must be manually released (pushed forward) to unfeather the propeller but do not change the feathering procedure.

With this system installed the feathering time is 10 - 17 seconds and unfeathering times is 8 - 12 seconds depending on the oil temperature.

A feathering lock, operated by centrifugal force, prevents feathering during engine shut down by making it impossible to feather any time the engine speed falls below 800 RPM. For this reason, when airborne, and the pilot wishes to feather a propeller to save an engine, he must be sure to move the propeller control into the "FEATHER" position.

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7.9 LANDING GEAR

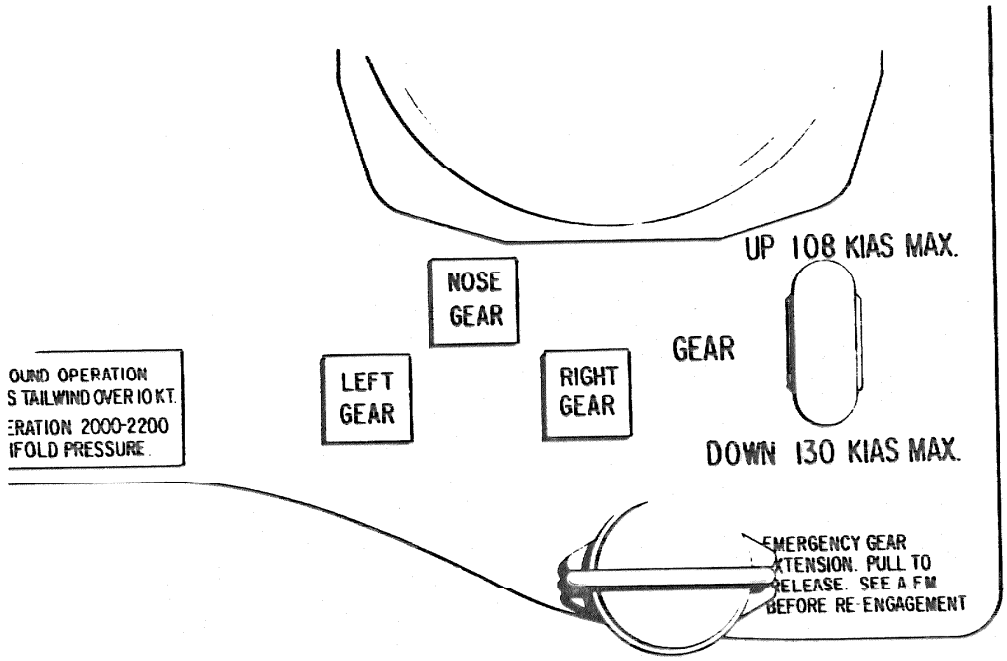
The Seneca III is equipped with hydraulically operated, fully retractable, tricycle landing gear.

Hydraulic pressure for gear operation is furnished by an electrically powered, reversible hydraulic pump (refer to Figures 7-5, 7-7 and 7-8). The pump is activated by a two-position gear selector switch located to the left of the control quadrant on the instrument panel (Figure 7-3). The gear selector switch, which has a wheel-shaped knob, must be pulled out before it is moved to the "UP" or "DOWN" position. When hydraulic pressure is exerted in one direction, the gear is retracted; when it is exerted in the other direction, the gear is extended. Gear extension or retraction normally takes six to seven seconds.

CAUTION

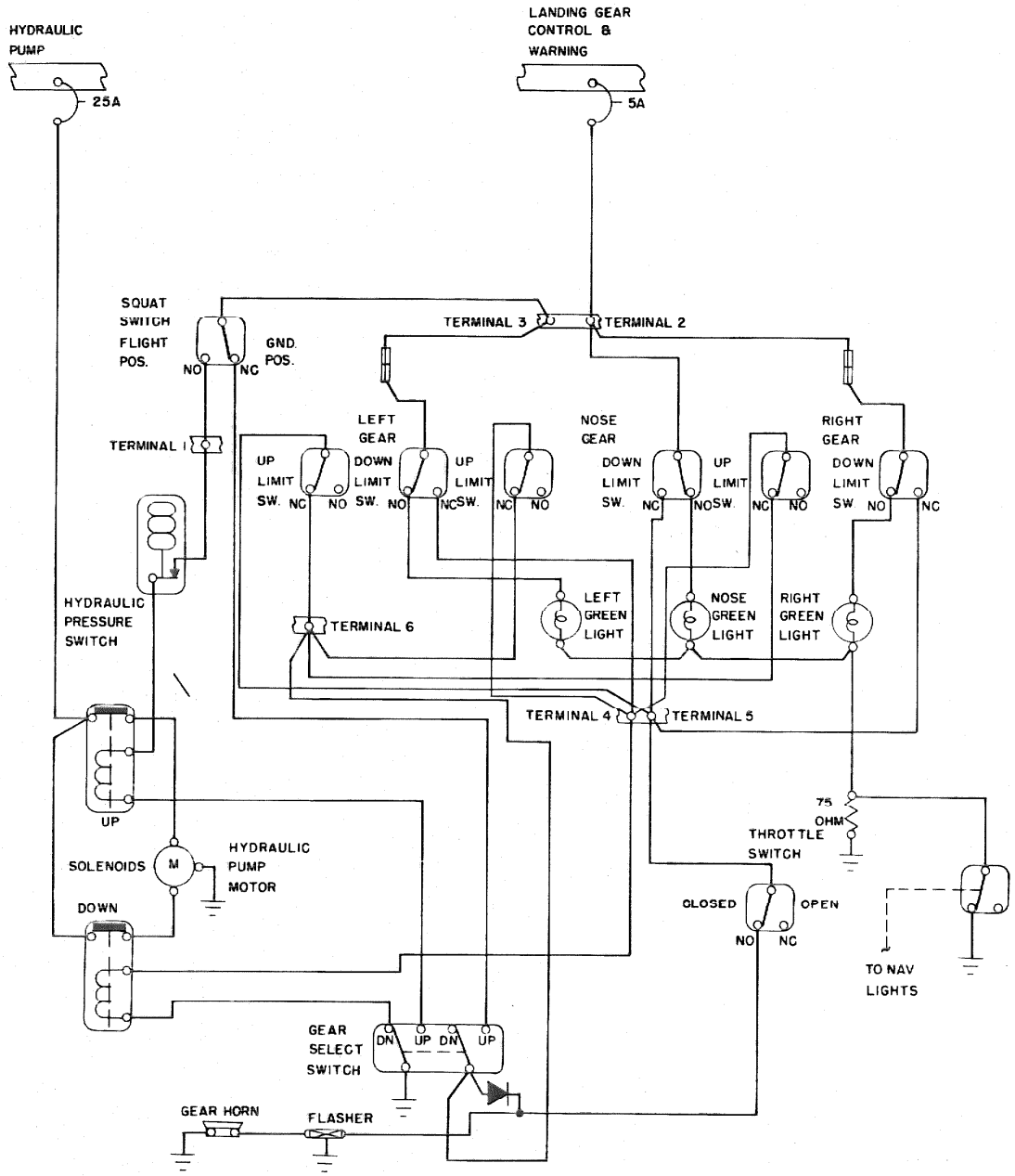
If the landing gear is in transit, and the hydraulic pump is running, it is NOT advisable to move the gear selector switch to the opposite position before the gear has reached its full travel limit, because a sudden reversal may damage the electric pump.

The landing gear is designed to extend even in the event of hydraulic failure. Since the gear is held in the retracted position by hydraulic pressure, should the hydraulic system fail for any reason, gravity will allow the gear to extend. When the landing gear is retracted, the main wheels retract inboard into the wings and the nose wheel retracts forward into the nose section. Aerodynamic loads and springs assist in gear extension and in locking the gear in the down position. During gear extension, once the nose has started toward the down position, the airstream pushes against it and assists in moving it to the downlocked position. After the gears are. down and the downlock hooks engage, springs maintain force on each hook to keep it locked until it is released by hydraulic pressure.

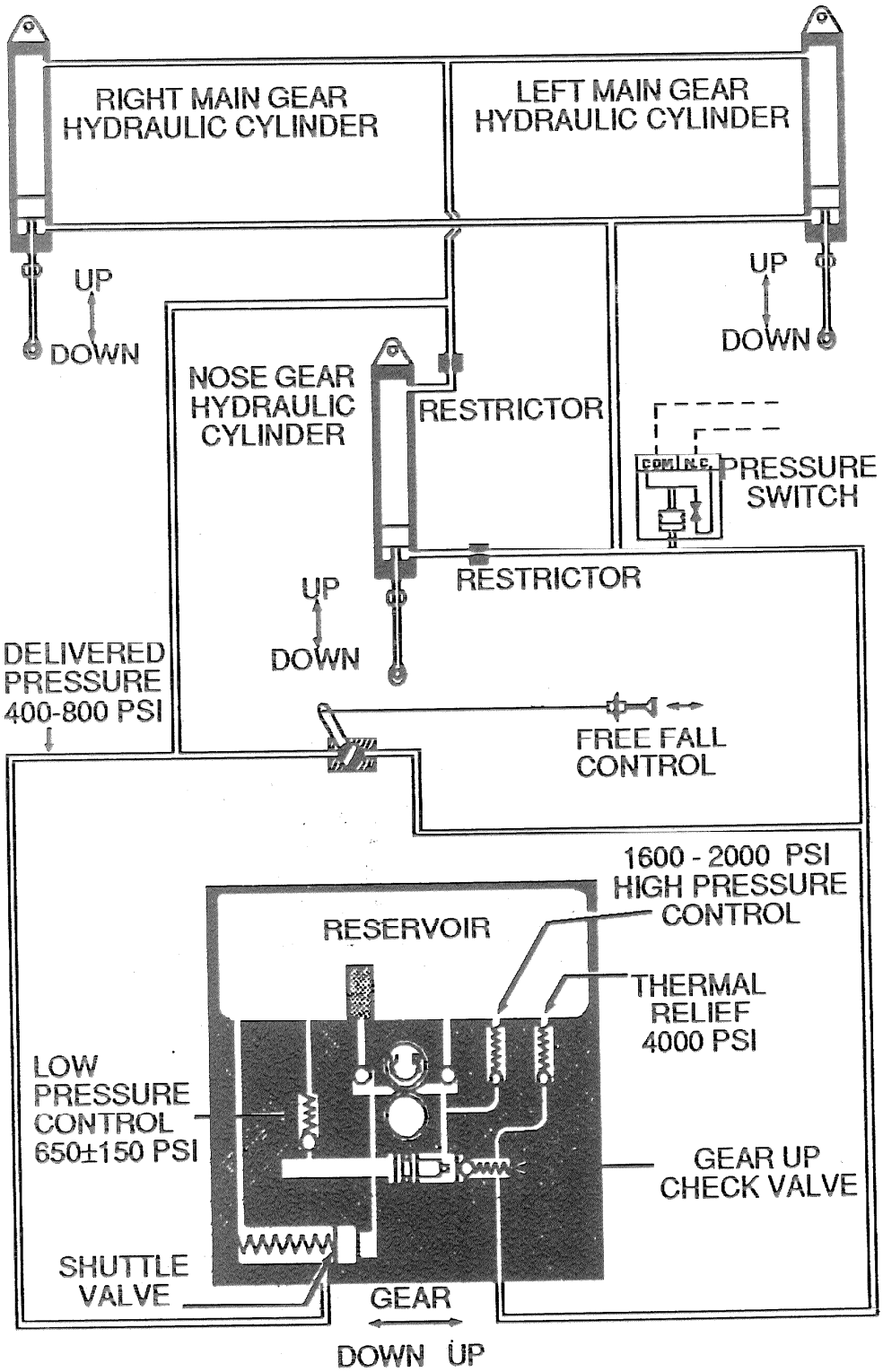


LANDING GEAR SELECTOR
Figure 7-3

To extend and lock the gears in the event of hydraulic failure, it is necessary only to relieve the hydraulic pressure. Emergency gear extension must not be attempted at airspeeds in excess of 85 KIAS. An emergency gear extension knob, located directly beneath the gear selector switch is provided for this purpose. Pulling this knob releases the hydraulic pressure holding the gear in the up position and allows the gear to fall free. During normal operation, this knob is covered by a guard to prevent inadvertent extension of the gear. Before pulling the emergency gear extension knob, place the landing gear selector switch in the "DOWN" position to prevent the pump from trying to raise the gear. If the emergency gear knob has been pulled out to lower the gear by gravity, due to a gear system malfunction, leave the control in its extended position until the airplane has been put on jacks to check the proper function of the landing gears hydraulic and electrical systems. See Aircraft Service Manual for proper landing gear system check out procedures. If the airplane is being used for training purposes or a pilot check out mission, and the emergency gear extension has been pulled out, it may be pushed in again when desired if there has not been any apparent malfunction of the landing gear system.



LANDING GEAR ELECTRICAL SYSTEM SCHEMATIC
Figure 7-5



LANDING GEAR HYRAULIC SYSTEM SCHEMATIC
PRIOR TO S/N 33170
Figure 7-7

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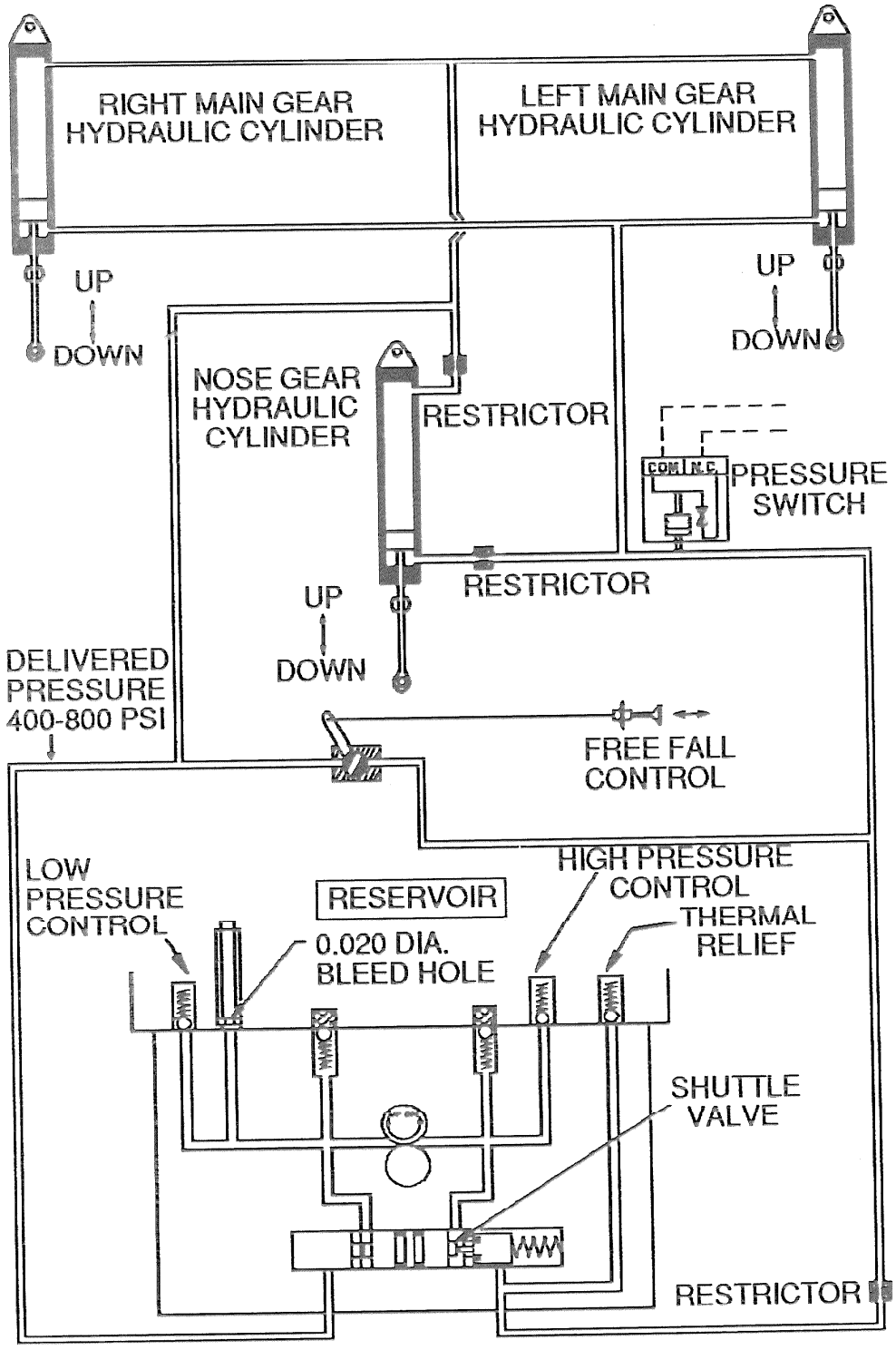


LANDING GEAR HYRAULIC SYSTEM SCHEMATIC
S/N 33170 AND UP
Figure 7-8

When the gear is fully extended or fully retracted and the gear selector is in the corresponding position, electrical limit switches stop the flow of current to the motor of the hydraulic pump. The three green lights to the left of the landing gear selector switch illuminate to indicate that each of the three landing gears is down and locked. A convex mirror on the left engine nacelle both serves as a taxiing aid and allows the pilot to visually confirm the condition of the nose gear. If the gear is in neither the full up nor the full down position, a red warning light on the instrument panel illuminates. Should the throttle be placed in a low setting - as for a landing approach while the gear is retracted, a warning horn sounds to alert the pilot that the gear is retracted. The gear warning horn emits a 90 cycle per minute beeping sound.

The green gear lights are dimmed automatically when the navigation lights are turned on. For this reason, if the navigation lights are turned on in the daytime, it is difficult to see the landing gear lights. If the green lights are not observed after the landing gear selector switch is placed in the "DOWN" position, the first thing to check is the position of the navigation lights switch.

If one or two of the three green lights do not illuminate when the gear down position has been selected, any of the following conditions could exist for each light that is out:

(a) The gear is not locked down.
(b) A bulb is burned out.
(c) There is a malfunction in the indicating system.

In order to check the bulbs, the square indicator lights can be pulled out and interchanged.

A micro switch incorporated in the throttle quadrant activates the gear warning horn under the following conditions:

(a) The gear is not locked down and the manifold pressure has fallen below 14 inches on either one or both engines.
(b) The gear selector switch is in the " U P" position when the airplane is on the ground.

To prevent inadvertent gear retraction should the gear selector switch be placed in the "UP" position when the airplane is on the ground, a squat switch located on the left main gear will prevent the hydraulic pump from actuating if the master switch is turned on. On takeoff, when the landing gear oleo strut drops to its full extension, the safety switch closes to complete the

circuit which allows the hydraulic pump to be activated to raise the landing gear when the gear selector is moved to the "UP" position. During the preflight check, be sure the landing gear selector is in the "DOWN" position and that the three green gear indicator lights are illuminated. On takeoff, the gear should be retracted before an airspeed of 108 KIAS is exceeded. The landing gear may be lowered at any speed up to 130 KIAS.

The hydraulic reservoir for landing gear operation is an integral part of the gear hydraulic pump. Access to the combination pump and reservoir is through a panel in the nose baggage compartment. For filling instructions, see the PA-34-220T Service Manual.

The nose gear is steerable through a 27 degree arc either side of center by use of a combination of full rudder pedal travel and brakes. A gear centering spring, incorporated in the nose gear steering system, prevents shimmy tendencies. A bungee assembly reduces ground steering effort and dampens shocks and bumps during taxiing. When the gear is retracted, the nose wheel centers as it enters the wheel well, and the steering linkage disengages to reduce pedal loads in flight. The landing light turns off automatically when the gear is retracted.

All three landing gears carry 6.00 x 6 tires. The nose wheel has a 6-ply tire and the main wheels have 8-ply tires. For information on servicing the tires, see "Tire Inflation" in the Handling and Servicing Section of this handbook.

Struts for the landing gear are air-oil assemblies. Strut exposure should be checked during each preflight inspection. If a need for service or adjustment is indicated, refer to the instructions printed on the units. Should more detailed landing gear service information be required, refer to the PA-34-220T Service Manual.

7.11 BRAKE SYSTEM

Two single-disc, double puck brake assemblies, one on each main gear, are actuated by toe brake pedals mounted on both the pilot's and the copilot's rudder pedals. A brake system hydraulic reservoir, independent of the landing gear hydraulic reservoir, is located behind a panel in the rear top of the nose baggage compartment. Brake fluid should be maintained at the level marked on the reservoir. For further information see "Brake Service" in the Handling and Servicing Section of this handbook.

The parking brake knob is located on the lower left instrument panel. To set the parking brake, first depress and hold the toe brake pedals and then pull out the parking brake knob. To release the parking brake, first depress and hold the toe brake pedals and then push in on the parking brake knob.

WARNING

No braking will occur if knob is pulled prior to brake application.

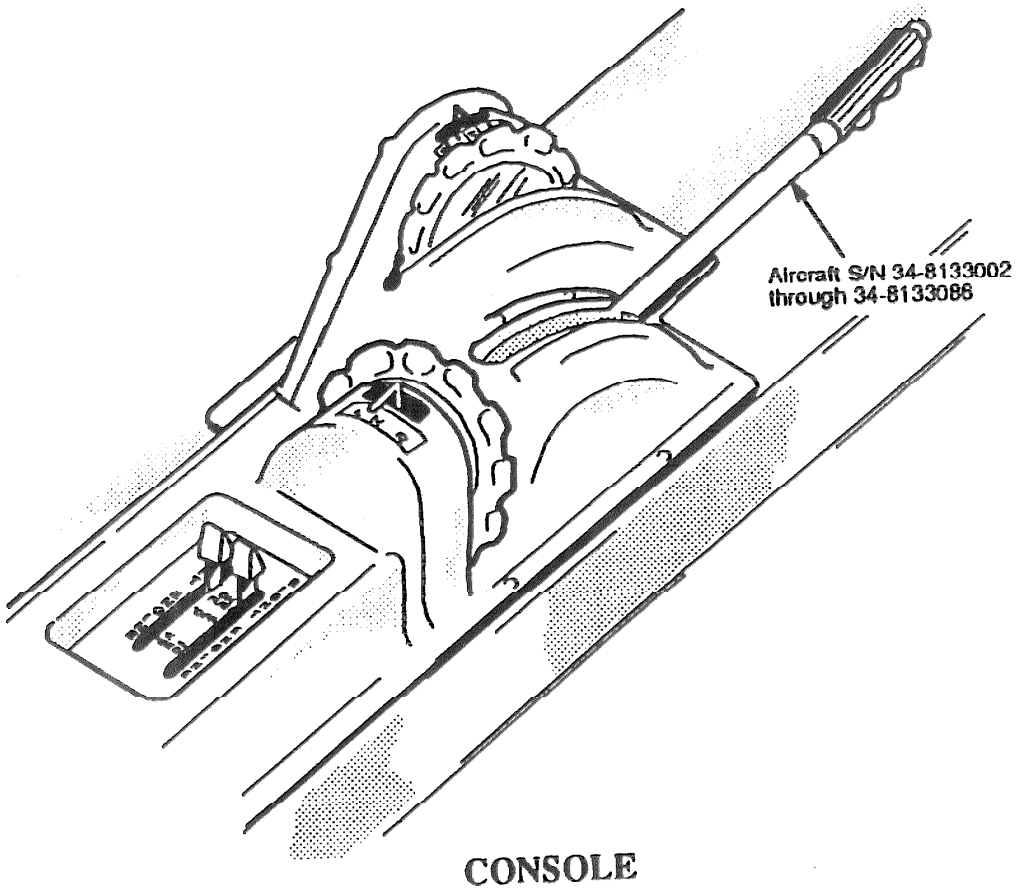
7.13 FLIGHT CONTROL SYSTEM

Dual flight controls are installed in the Seneca 111 as standard equipment. The controls actuate the control surfaces through a cable system. The horizontal tail surface (stabilator) is of the all movable slab type with an anti-servo tab mounted on the trailing edge. This tab, actuated by a control mounted on the console between the front seats, also acts as a longitudinal trim tab (refer to Figure 7-9).

The ailerons are of the Frise type. This design allows the leading edge of the aileron to extend into the airstream to provide increased drag and improved roll control. The differential deflection of the ailerons tends to eliminate adverse yaw in turning maneuvers and to reduce the amount of coordination required in normal turns.

The vertical tail is fitted with a rudder which incorporates a combination rudder trim and anti-servo tab. The rudder trim control is located on the control console between the front seats.

On aircraft serial numbers 34-8133002 through 34-8433086, the flaps are manually operated and spring loaded to return to the retracted position. A four-position flap control lever (Figure 7-9) between the front seats adjusts the flaps for reduced landing speeds and glide path control. The flaps have three extended positions - 10, 25 and 40 degrees - as well as the fully retracted position. A button on the end of the lever must be depressed before the control can be moved. A past center lock incorporated in the actuating linkage holds the flap when it is in the retracted position so that it may be used as a step on the right side. Since the flap will not support a step load except in the fully retracted position, the flaps should be retracted when people are entering or leaving the airplane.



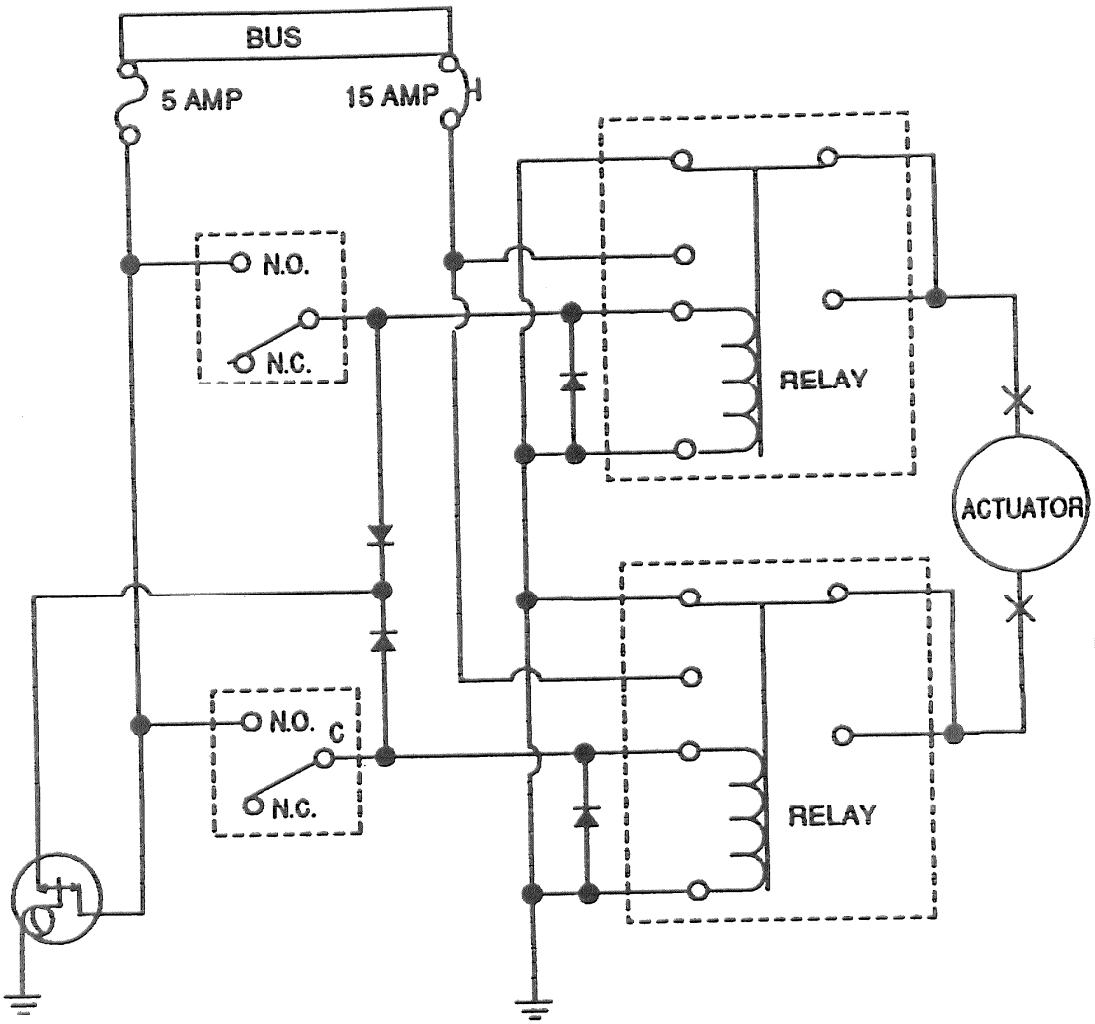
CONSOLE
Figure 7-9

On aircraft serial numbers 34-8533001, and 34-8633001 and up, the flaps are electrically operated. A control lever and indicator light are located on the lower right instrument panel. Selection of a new flap position will activate the flap motor and the light. When the flaps reach the desired position the flap motor is automatically switched off and the indicator light goes out.

In the event of a flap drive malfunction; move the flap lever until the light goes out. The position of the flap lever relative to the instrument panel markings indicates the approximate flap position.

On aircraft serial number 34-8533002 thru 34-8533069 there are three stops for the flap control lever, full up (0° flap), 1st notch (25° flap), and full down (40° flap).

On aircraft serial numbers 34-8533001, and 34-8633001 and up there are four stops for the flap control lever, full up (0° flap), 1st notch (10° flap), 2nd notch (25° flap), and full down (40° flap).



ELECTRIC FLAP SCHEMATIC
Figure 7-10

A past center lock incorporated in the actuating linkage hold the flap when it is in the retracted position so that it may be used as a step on the right side. Since the flap will not support a step load except in the fully retracted position, the flaps should be retracted when people are entering or leaving the airplane.

7.15 FUEL SYSTEM

Fuel is stored in fuel tanks located in each wing. The tanks in each wing are interconnected to function as a single tank (refer to Figure 7-11). All tanks on each side are filled through a single filler in the outboard tank, and as fuel is consumed from the inboard tank, it is replenished by fuel from outboard. Only two and one half gallons of fuel in each wing is unusable, giving the Seneca III a total of 93 usable gallons with standard fuel tanks or 123 usable gallons with the optional fuel tanks installed. The minimum fuel grade is 100 or 100LL Aviation Grade. The fuel tank vents, one installed under each wing, feature an anti-icing design to prevent ice formation from blocking the fuel tank vent lines.

The fuel injection system is a "continuous flow" type that utilizes a vapor return line leading back to the fuel tanks. This line provides a route back to the tanks for vapor laden fuel that has been separated in the injector pump swirl chamber. Each engine has an engine-driven fuel pump that is a part of the fuel injection system. An auxiliary fuel system is provided. The purpose of the electrically powered auxiliary fuel system is to supply fuel to the engine in case of engine-driven fuel pump shaft failure or malfunction, for ground and inflight engine starting, and for vapor suppression. The two auxiliary fuel pump switches are located on the lower left side of the instrument panel and are three-position rocker switches: LO, HI and OFF. The

LO auxiliary fuel pressure is selected by pushing the top of the switch. The HI auxiliary fuel pressure is selected by pushing the bottom of the switch, but this can be done only after unlatching the adjacent guard. When the HI auxiliary fuel pump is activated, an amber light near the annunciation panel is illuminated for each pump. These lights dim whenever the pump pressure reduces automatically and manifold pressure is below approximately 21 inches.

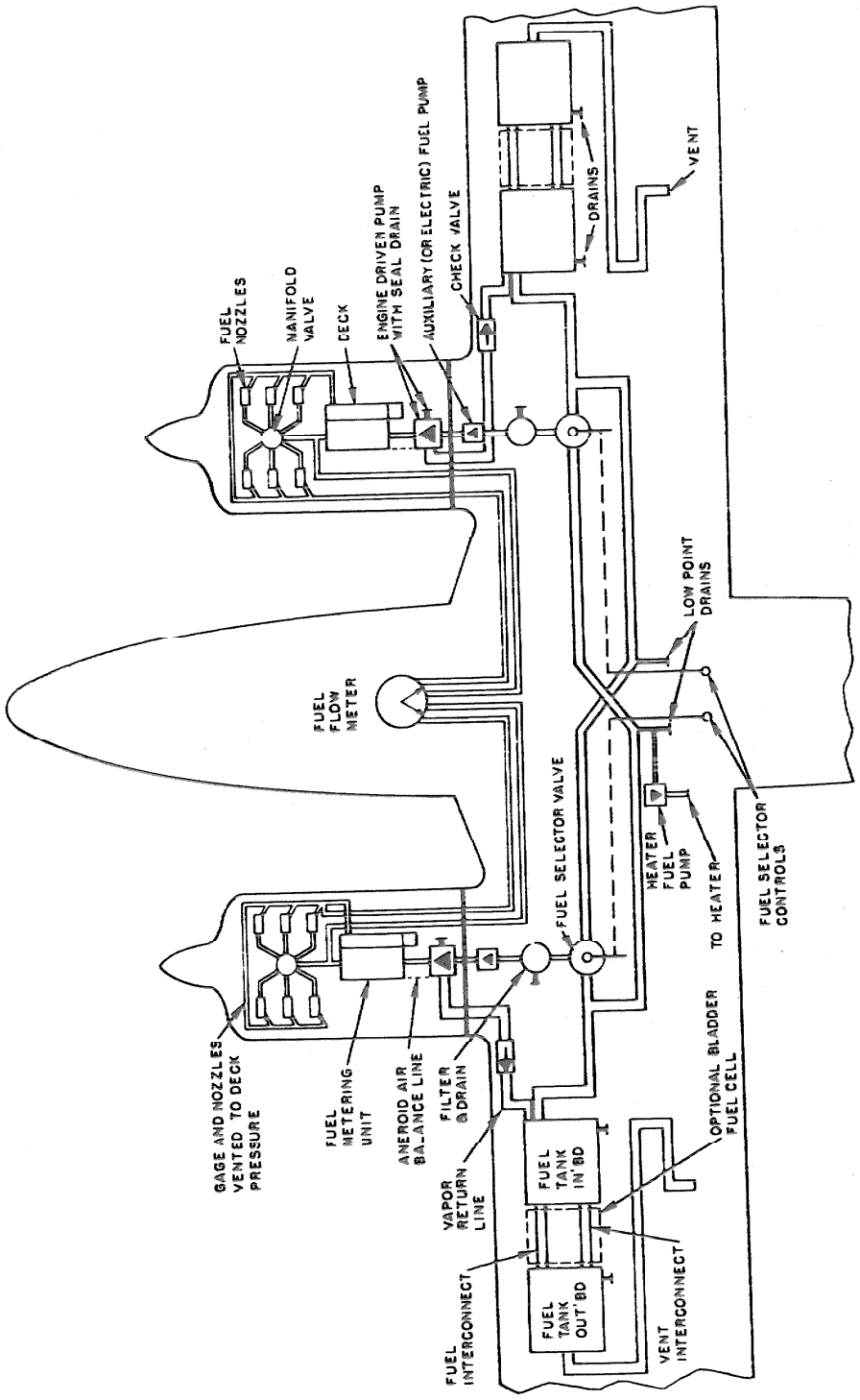
In case of a failed engine-driven fuel pump, HI auxiliary fuel pressure should be selected. Adequate pressure and fuel flow will be supplied for up to approximately 75% power. Manual leaning to the correct fuel flow will be required at altitudes above 15,000 feet and for engine speeds less than 2300 RPM. An absolute pressure switch automatically selects a lower fuel pressure when the throttle is reduced below 21" Hg manifold pressure and the HI auxiliary fuel pump is on.

NOTE

Excessive fuel pressure and very rich fuel/air mixtures will occur if the HI position is energized when the engine fuel injection system is functioning normally.

Low auxiliary fuel pressure is available and may be used during normal engine operation both on the ground and inflight for vapor suppression should it be necessary as evidenced by unstable engine operation or fluctuating fuel flow indications during idle or at high altitudes.

Separate spring loaded OFF primer button switches, located adjacent to the starter switches, are used to select HI auxiliary fuel pump operation for priming, regardless of other switch positions. These primer buttons may be used for both hot or cold engine starts.



FUEL SYSTEM SCHEMATIC
Figure 7-11

On airplanes equipped with an optional primer system (identified by Placard below starter switch shown in Figure 7-15), the primer switch location and actuation is the same as the basic airplane. However, this system does provide a separate primer system as an integral part of the engine fuel system. An electrically operated diverter valve is located in the metered fuel supply line between the air throttle valve and the manifold valve. Other components are two primer nozzles, located in the intake manifold on each side of the engine, and the interconnecting fuel lines. Actuation of the engine primer switch operates the auxiliary electric fuel pump on HI and energizes the diverter valve which supplies fuel to each primer nozzle. The diverter valve does not shut off fuel flow to the manifold valve, therefore some quantity of fuel is also supplied to each cylinder nozzle during priming. Normal operation of the auxiliary fuel pump is unchanged.

Fuel management controls are located on the console between the front seats. There is a control lever for each of the engines, and each is placarded ON - OFF - X FEED. During normal operation, the levers are in the ON position, and each engine draws fuel from the tanks on the same side as the engine. The two fuel systems are interconnected by crossfeed lines. When the X FEED position is selected, the engine will draw fuel from the tanks on the opposite side in order to extend range and keep fuel weight balanced during single-engine operation. The OFF position shuts off the fuel flow from a side.

NOTE

When one engine is inoperative and the fuel selector for the operating engine is on X FEED the selector for the inoperative engine must be in the OFF position. Do not operate with both selectors on X FEED. Do not take off with a selector on X FEED. Fuel and vapor are always returned to the tank on the same side as the operating engine.

Before each flight, fuel must be drained from low points in the fuel system to ensure that any accumulation of moisture or sediment is removed from the system and to check for proper fuel. Fuel drains are provided for each fuel filter (2), each fuel tank (4), and each crossfeed line (2). The fuel filter drains are located on the outboard underside of each engine nacelle; two fuel tank drains are located on the underside of each wing; fuel crossfeed drains are located at the lowest point in the fuel system, on the underside of the fuselage, just inboard of the trailing edge of the right wing flap.

7.17 ELECTRICAL SYSTEM

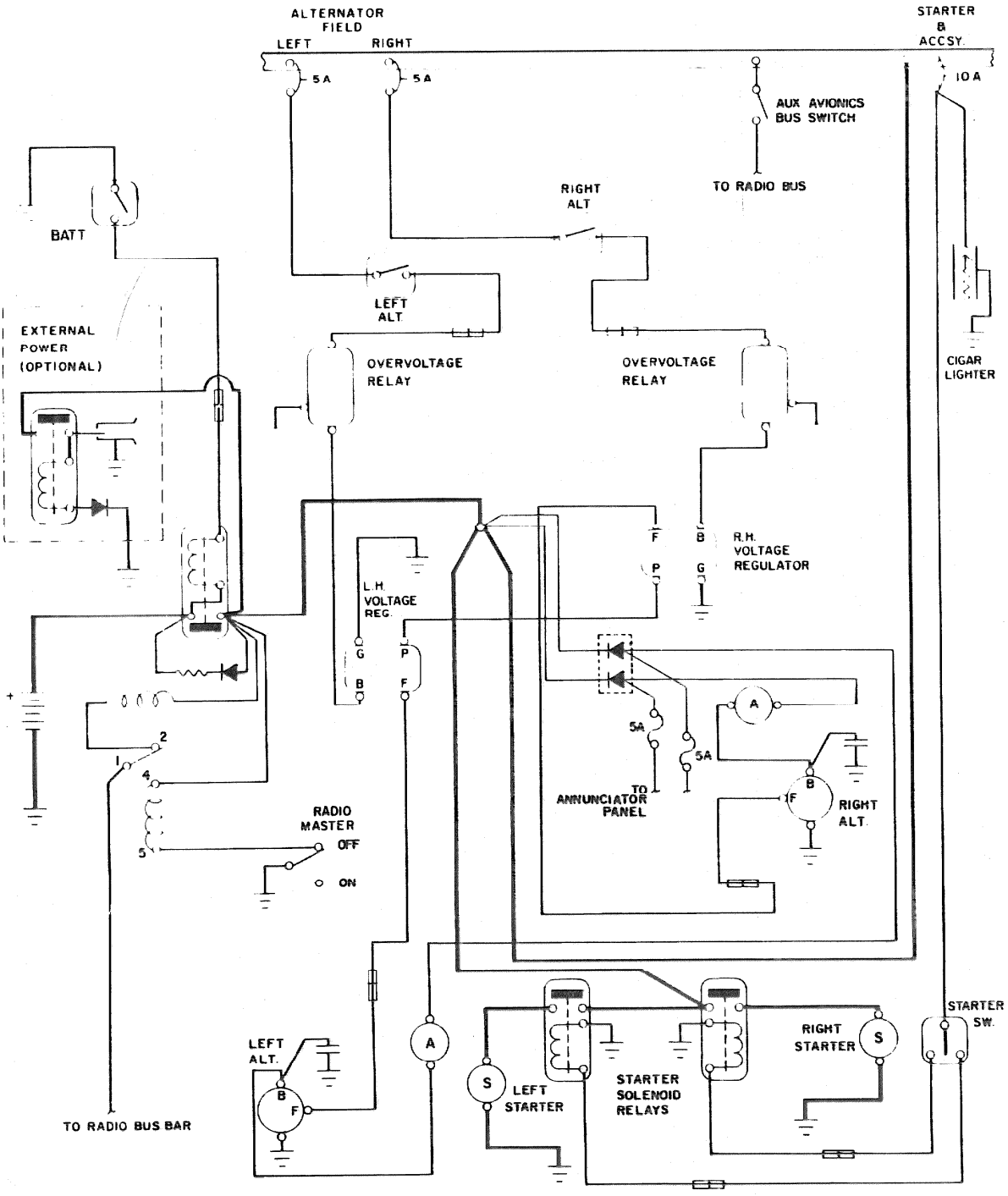
The electrical system of the Seneca III is capable of supplying sufficient current for complete night IFR equipment. Electrical power is supplied by two 65 ampere alternators (Figure 7-13), one mounted on each engine. A 35 ampere-hour, 12 volt battery provides current for starting, for use of electrical equipment when the engines are not running, and for a source of stored electrical power to back up the alternator output. The battery, which is located in the nose section and is accessible through the baggage compartment, is normally kept charged by the alternators. If it becomes necessary to charge the battery, it should be removed from the airplane.

Two solid state voltage regulators maintain effective load sharing while regulating electrical system bus voltage to 14 volts. An overvoltage relay in each alternator circuit prevents damage to electrical and avionics equipment by taking an alternator off the line if its output exceeds 17 volts. If this should occur, the alternator light on the annunciator panel will illuminate. Voltage regulators and overvoltage relays are located forward of the bottom of the bulkhead separating the cabin section from the nose section.

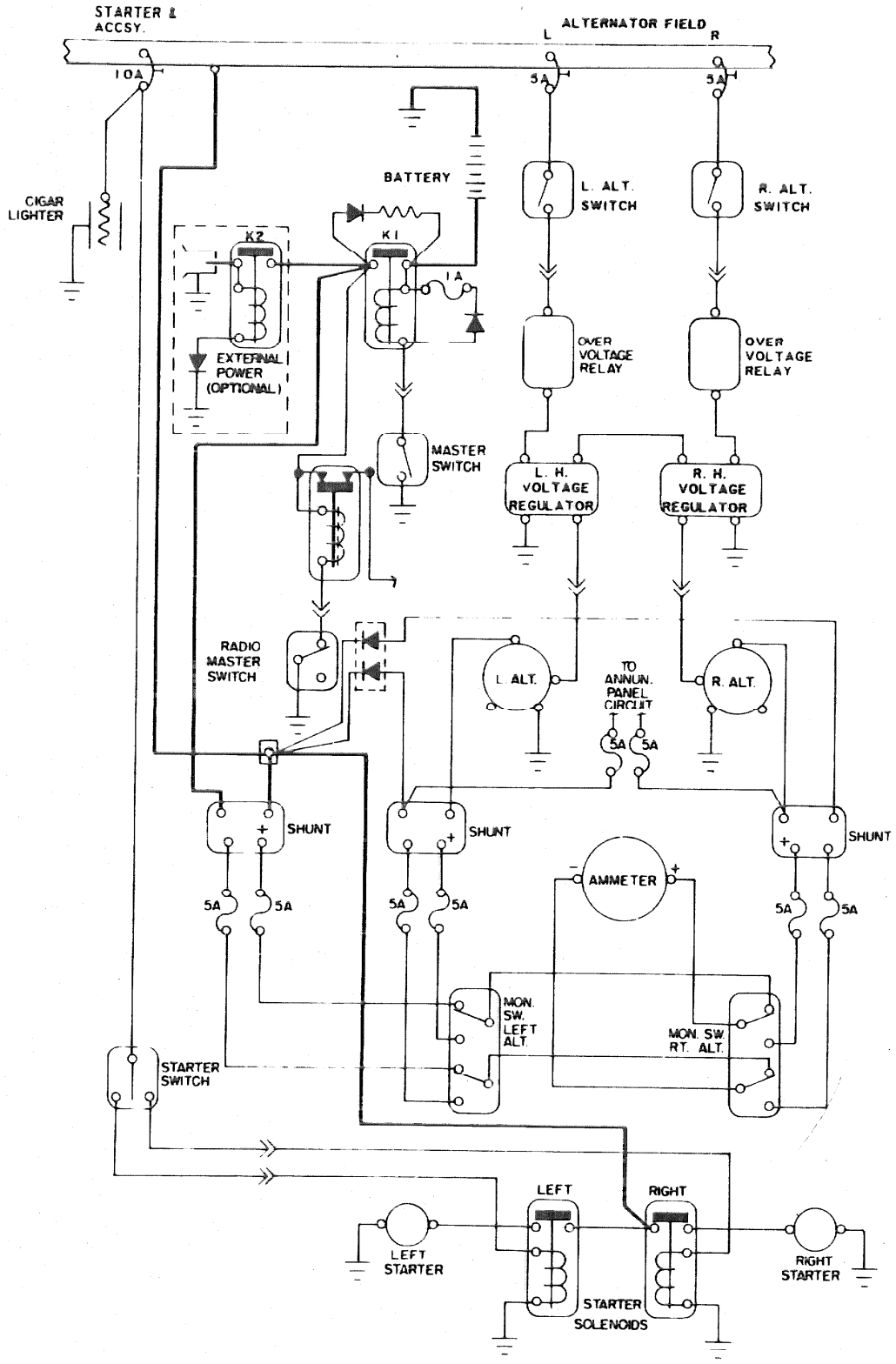
The electrical system and equipment are protected by circuit breakers located on a circuit breaker panel on the lower right side of the instrument panel. The circuit breaker panel is provided with enough blank spaces to accommodate additional circuit breakers if extra electrical equipment is installed. In the event of equipment malfunctions or a sudden surge of current, a circuit breaker can trip automatically. The pilot can reset the breaker by pressing it in (preferably after a few minutes cooling period). The circuit breakers can be pulled out manually.

Most of the electrical switches, including the battery switch and switches for magnetos, fuel pumps, starters, alternators, lights and pitot heat, are conveniently located on the switch panel (Figure 7-15) to the left of the pilot's control wheel.

An optional starting installation known as Piper External Power (PEP) is accessible through a receptacle located on the lower left side of the nose section. An external battery can be connected to the socket, thus allowing the operator to crank the engine without having to gain access to the airplane's battery.



ALTERNATOR AND STARTER SCHEMATIC
S/N 34-8133001 THRU 34-8233205
Figure 7-13



ALTERNATOR AND STARTER SCHEMATIC
S/N 34-8333001 AND UP
Figure 7-14

An optional cabin courtesy light system consists of a front entrance light over the forward cabin door and rear entrance light, which replaces the reading light over the aft cabin door. These lights are operated individually with switches that are incorporated as part of each light assembly. The courtesy light circuit is independent of the aircraft battery switch; therefore, the lights can be operated regardless of the position of the battery switch. Unless the engines are running, the courtesy lights should not be left on for extended time periods, as battery depletion could result.

An optional wing tip/recognition light system consists of 2 lights (one in each wing tip) and is operated by a switch mounted adjacent to existing switches on the pilot's side of the instrument panel.

S/N 34-8133001 THRU 34-8233205

Approximately 2000 RPM or more is required to obtain full alternator output of 65 amperes. It is normal to have zero output at idle RPM. This is due to the reduced drive ratio from the engine. Dual ammeters and the ALT annunciator light provide a means of monitoring the electrical system operation. The two ammeters (load meters) indicate the output of the alternators. Should an ammeter indicate a load much higher than the known consumption of the electrical equipment in use, an alternator malfunction should be suspected and the respective alternator switch turned off. In this event, the remaining alternator's ammeter should show a normal indication after approximately one minute. If both ammeters indicate a load much higher than the known consumption for more than approximately five minutes, an electrical defect other than the alternator system should be suspected because a discharged battery will reduce the alternator load as it approaches the charged conditions. A zero ammeter reading indicates an alternator is not producing current and should be accompanied by illumination of the ALT annunciator light. A single alternator is capable of supporting a continued flight in case of alternator or engine failure in most conditions: however, with deicing equipment and other high loads, care must be exercised to prevent the loads from exceeding the 65 ampere rating and subsequent depletion of the battery. For abnormal and/or emergency operations and procedures refer to Section 3 - Emergency Procedures.

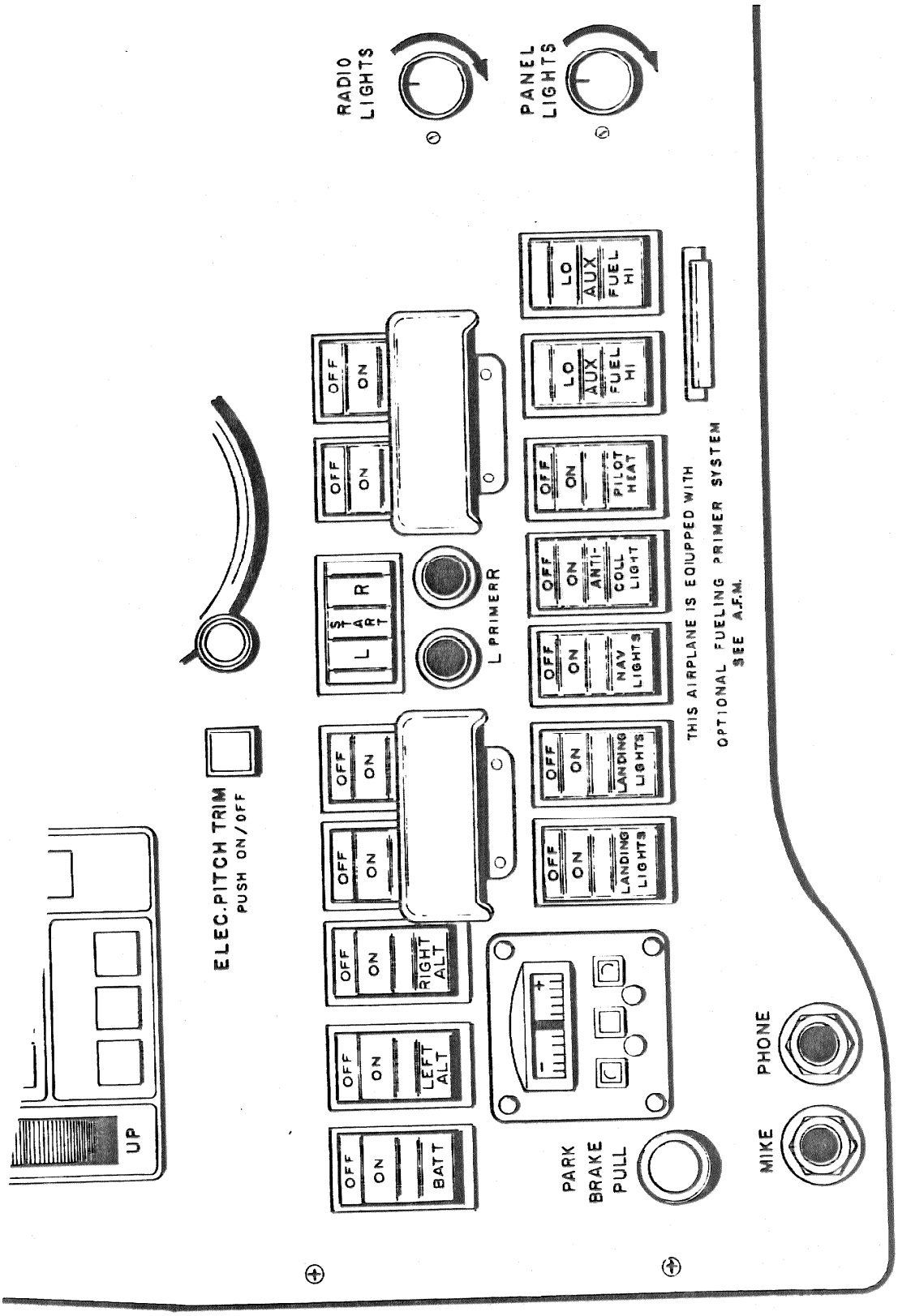
S/N 34-8333001 AND UP

A single ammeter on the instrument panel indicates both battery charging current and alternator output. When the ammeter needle indicates to the left of center, the battery is being discharged; when the needle indicates to the right of center, the battery is being charged. During single-engine operation, this feature can be used to determine how much the electrical load should be reduced. To check the output of each alternator individually, use the press-to-test buttons located on either side of the ammeter. The left button, when depressed, will cause the ammeter to indicate left alternator output, and the right button, when depressed, will indicate right alternator output. These buttons are the momentary type, and indicate alternator output only while depressed.

Approximately 2000 RPM or more is required to obtain full alternator output of 65 amperes. It is normal to have zero output at idle RPM. This is due to the reduced drive ratio from the engine. Ammeter and the ALT annunciator lights provide a means of monitoring the electrical system operation.Should the ammeter indicate a load much higher than the known consumption of the electrical equipment in use, an alternator malfunction should be suspected and the respective alternator switch turned off. In this event, the remaining alternator should show a normal indication on the ammeter after approximately one minute. If both alternators indicate a load much higher than the known consumption for more than approximately five minutes, an electrical defect other than the alternator system should be suspected because a discharged battery will reduce the alternator load as it approaches the charged conditions. A zero ammeter reading indicates an alternator is not producing current and should be accompanied by illumination of the ALT annunciator light. A single alternator is capable of supporting a continued flight in case of alternator or engine failure in most conditions: however, with deicing equipment and other high loads, care must be exercised to prevent the loads from exceeding the 65 ampere rating and subsequent depletion of the battery. For abnormal and/or emergency operations and procedures refer to Section 3 - Emergency Procedures.

CAUTION

Do not use cigar lighter receptacles as power sources for any devices other than the cigar lighters supplied with the airplane. Any other device plugged into these receptacles may be damaged.



SWITCH PANEL - WITH PRIMER SYSTEM
Figure 7-15

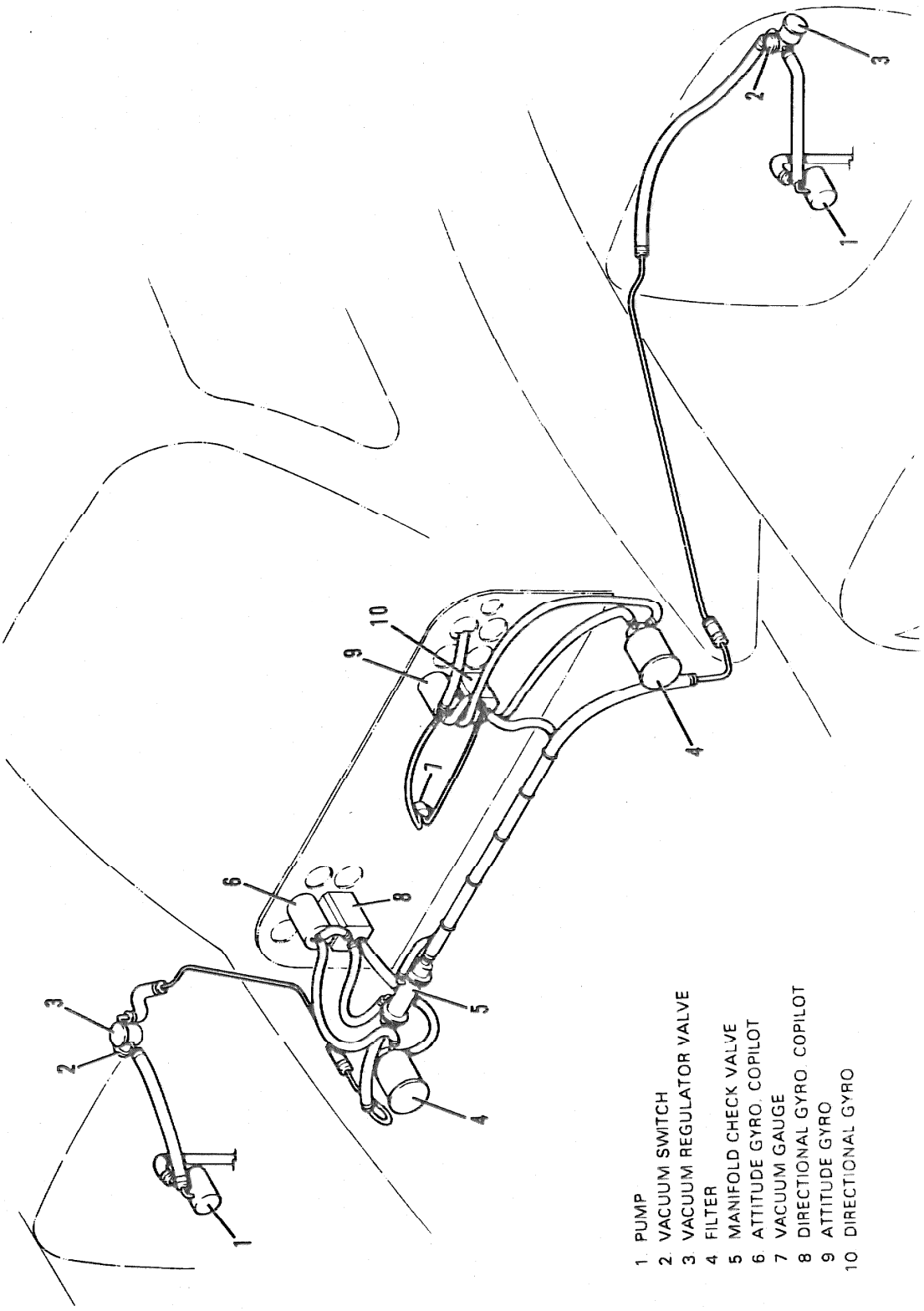
7.19 VACUUM SYSTEM

The vacuum system operates the air driven gyro instruments. The vacuum system (Figure 7-17) consists of a vacuum pump on each engine, plus plumbing and regulating equipment.

The vacuum pumps are dry type pumps, which eliminates the need for an air/oil separator and its plumbing. A shear drive protects the engine from damage. If the drive shears the gyros will become inoperative.

The vacuum gauge, mounted in the center of the instrument panel below the radios (refer to Figure 7-21), provides valuable information to the pilot about the operation of the vacuum system. A decrease in pressure in a system that has remained constant over an extended period, may indicate a dirty filter, dirty screens, possibly a sticking vacuum regulator or leak in system (low vacuum indicator lights are provided in the annunciator panel). Zero pressure would indicate a sheared pump drive, defective pump, possibly a defective gauge or collapsed line. In the event of any gauge variation from the norm, the pilot should have a mechanic check the system to prevent possible damage to the system components or eventual failure of the system.

A vacuum regulator is provided in the system to protect the gyros. The valve is set so the normal vacuum reads 4.8 to 5.1 inches of mercury, a setting which provides sufficient vacuum to operate all the gyros at their rated RPM. Higher settings will damage the gyros and with a low setting the gyros will be unreliable. The regulator is located behind the instrument panel.



VACUUM SYSTEM
Figure 7-17

7.21 PITOT STATIC SYSTEM

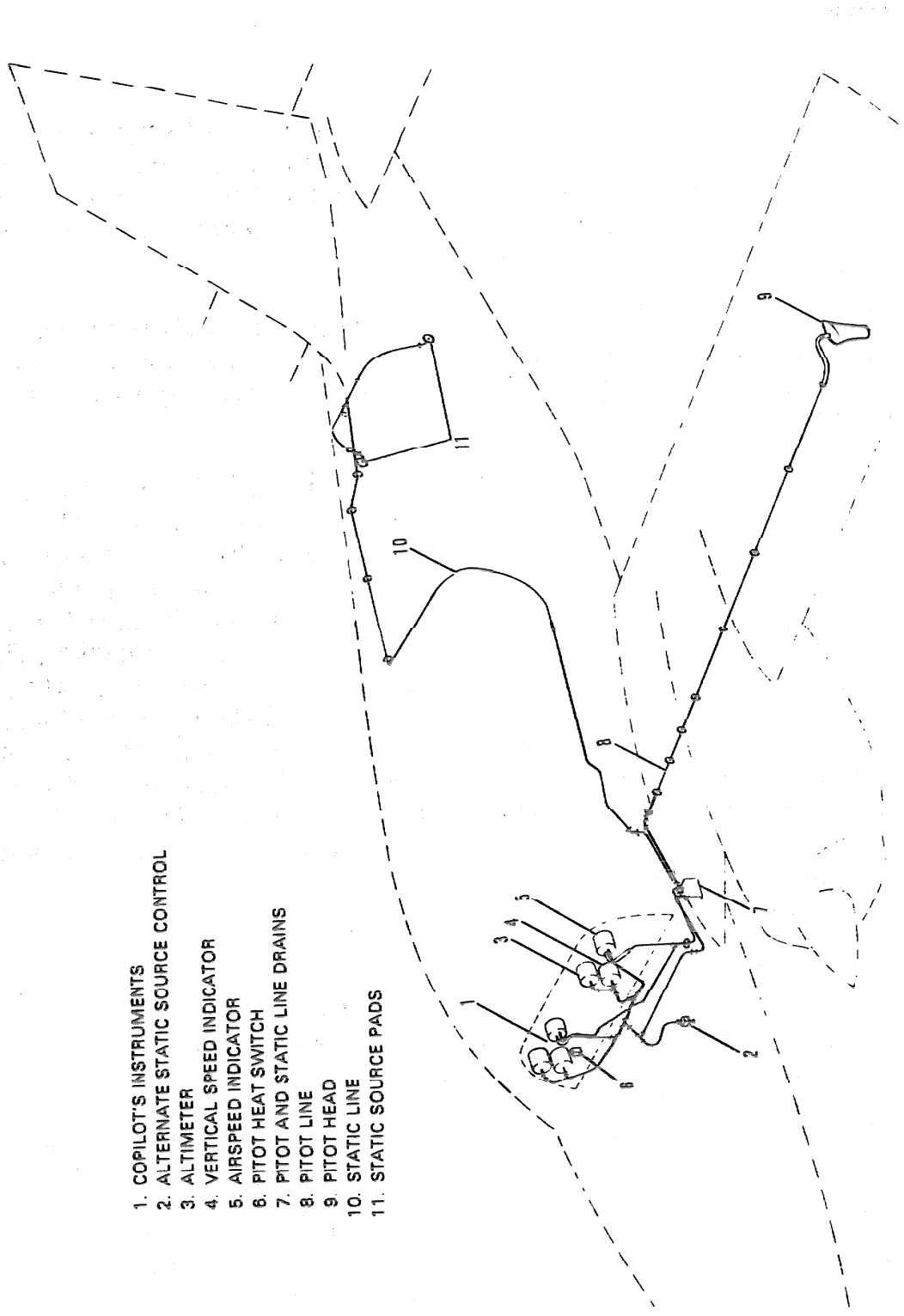
Pitot pressure for the airspeed indicator is sensed by an aluminum pitot head installed on the bottom of the left wing and carried through lines within the wing and fuselage to the gauge on the instrument panel (refer to Figure 7-19). Static pressure for the altimeter, vertical speed and airspeed indicators is sensed by two static source pads, one on each side of the rear fuselage forward of the stabilator. They connect to a single line leading to the instruments. The dual pickups balance out differences in static pressure caused by side slips or skids.

An alternate static source control valve is located below the instrument panel to the right of the control quadrant. When the valve is set to the alternate position, the altimeter, vertical speed indicator and airspeed indicator will be using cabin air for static pressure. During alternate static source operation, these instruments may give slightly different readings, depending on conditions within the cabin. Airspeed, setting of heating and ventilating controls, or the position of the storm window can influence cabin air pressure. The pilot can determine the effects of the alternate static source on instrument readings by switching from standard to alternate sources at different airspeeds and heating and ventilating configurations (including open storm window below 129 KIAS).

If one or more of the pitot static instruments malfunction, the system should be checked for dirt, leaks, or moisture. The pitot and static lines may be drained through separate drains located on the side panel next to the pilot's seat.

The holes in the sensors for pitot and static pressure must be fully open and free from blockage. Blocked sensor holes will give erratic or zero readings on the instruments.

A heated pitot head, which alleviates problems with icing and heavy rain, is available as optional equipment. Static source pads have been demonstrated to be non-icing; however, in the event icing does occur, selecting the alternate static source will alleviate the problem.



PITOT STATIC SYSTEM
Figure 7-19

7.23 INSTRUMENT PANEL

Flight instruments are grouped in the upper instrument panel (Figures 7-20, 7-21, 7-22), engine instruments are to the left of the radios. The auto-pilot is to the left of pilots control wheel. The circuit breaker panel is on the lower right instrument panel. The left and right engine instruments are stacked by the pilots control wheel shaft.

Radios are mounted in the center of the upper instrument panel. The control quadrant-throttles, propeller and mixture controls are in the center of the lower instrument panel. To the left of the control quadrant is the landing gear selector.

An annunciator panel is located to the upper left of the radios, and incorporates a press-to-test feature. The annunciator panel includes the manifold pressure overboost, oil pressure, gyro vacuum, alternator, auxiliary fuel, gear unsafe, heater overheat and provisions for an optional baggage door ajar and air conditioner door open lights. The illumination of these lights in flight is an indication of a possible system malfunction. The pilot should closely monitor instrument panel gauges to check the condition of a system whose corresponding light on the annunciator panel illuminates. Illumination of the manifold pressure overboost lights indicates manifold pressure at or above the maximum allowable 40 inches Hg. During preflight the operational status of the annunciator panel should be tested by use of the press-to-test button. When the button is depressed all annunciator panel lights should illuminate.

NOTE

When an engine is feathered, the alternator, gyro air and engine oil pressure annunciator lights will remain illuminated.

Optimum cockpit lighting for night flying is achieved by using a combination of the panel lights and the red overhead flood lights. The panel lights are adjusted by rheostat switches below the pilot's control shaft. The overhead lights are adjusted by rheostat switches adjacent to the lights. A white map light can be selected from either overhead flood light.

Most of the electrical switches are located in the switch panel on the left side of the instrument panel. A radio power switch is located near the top of the instrument panel between the radio stacks. It controls the power to all radios through the aircraft battery switch. The radio power switch has an ON and OFF position.

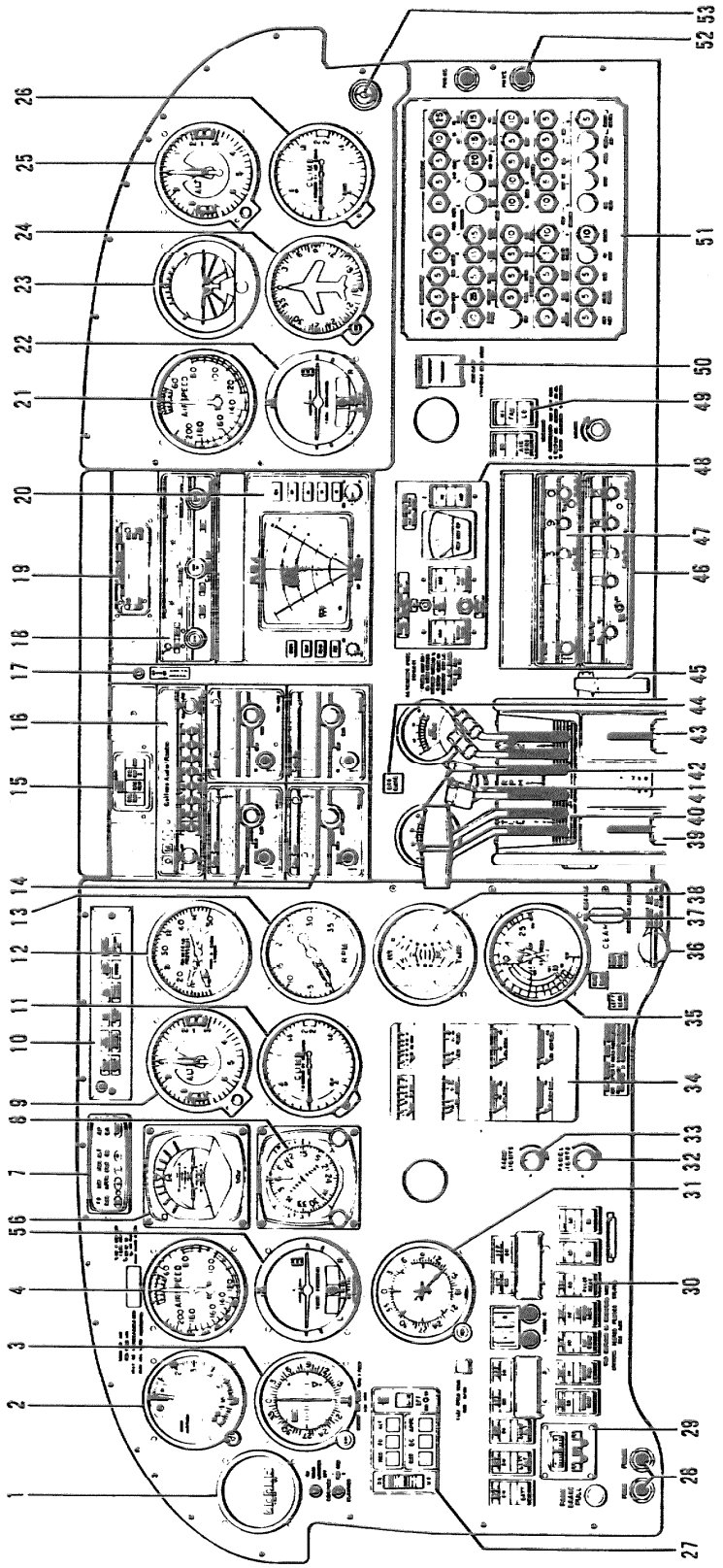
An optional ground clearance energy saver system is available to provide direct power to Comm #1 without turning on the master switch. An internally lit pushbutton switch, located on the instrument panel, provides annunciation for engagement of the system. When the button is engaged direct aircraft battery power is applied to Comm #1, audio amplifier (speaker) and radio accessories. The switch must be turned off or depletion of battery could result.

An "Auxiliary Avionics Bus Switch" is located on the instrument panel to the right of the copilot control wheel shaft. The switch is provided to give auxiliary power to the avionics bus in the event of a radio master switch circuit failure.

The manifold pressure lines have drain valves located behind and below the dual manifold pressure gauge at the bottom of the instrument panel. This allows any moisture which may have collected from condensation to be pulled into the engines. This is accomplished by depressing the two valves for 5 seconds while operating the engines at 1000 RPM.

NOTE

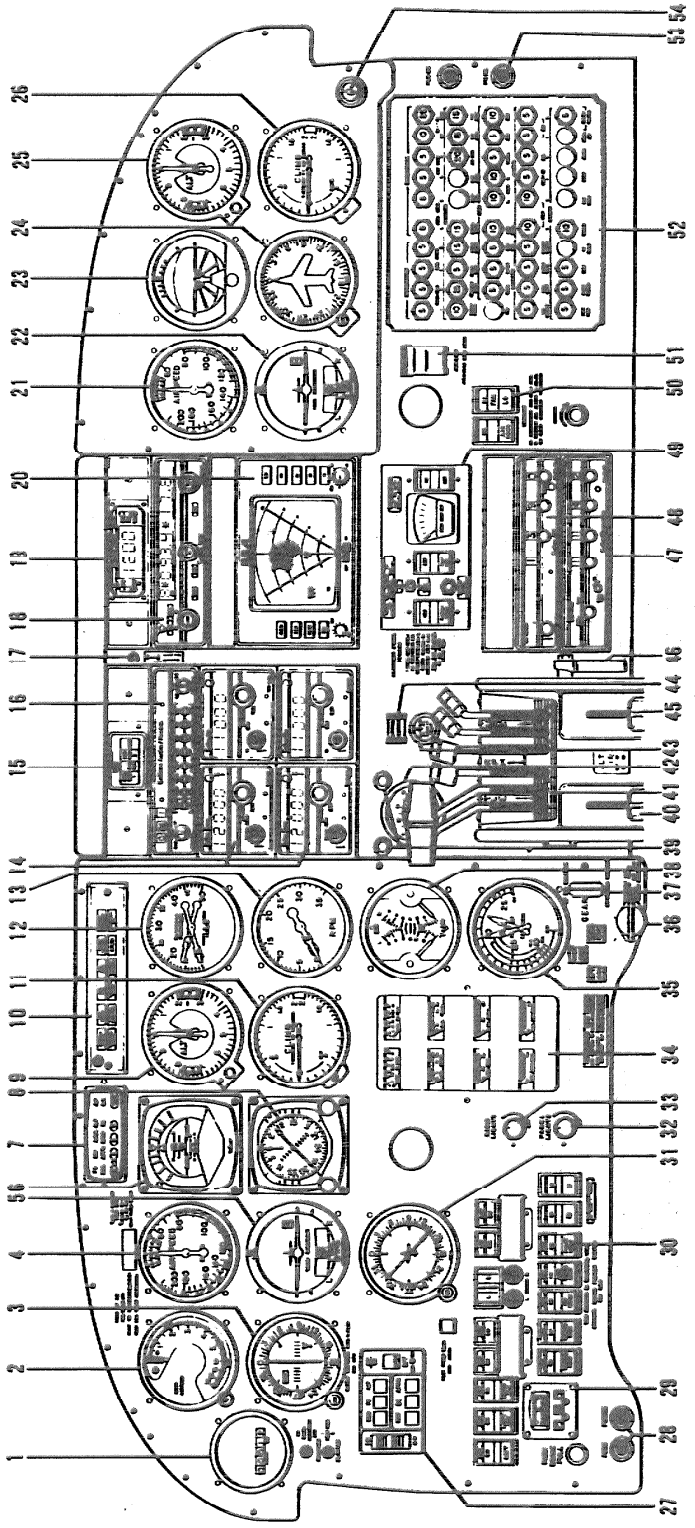
Do not depress the valves when manifold pressure exceeds 25 inches Hg.



TYPICAL INSTRUMENT PANEL
S/N 34-8133001 THRU 34-8233205
Figure 7-20

1. HOURMETER
2. RADAR ALTIMETER
3. NAV INDICATOR
4. AIRSPEED INDICATOR
5. TURN AND BANK INDICATOR
6. ATTITUDE GYRO
7. AUTOPILOT ANNUNCIATOR PANEL
8. DIRECTIONAL GYRO
9. ALTIMETER
10. ANNUNCIATOR PANEL
11. VERTICAL SPEED INDICATOR
12. DUAL MANIFOLD PRESSURE GAUGE
13. DUAL TACHOMETER
14. AVIONICS
15. MODE SELECTOR
16. AUDIO/MARKER PANEL
17. RADIO MASTER SWITCH
18. R-NAV
19. DME
20. RADAR
21. AIRSPEED INDICATOR, COPILOT
22. TURN AND BANK INDICATOR
23. ATTITUDE GYRO, COPILOT
24. DIRECTIONAL GYRO, COPILOT
25. ALTIMETER, COPILOT
26. VERTICAL SPEED INDICATOR
27. AUTOPILOT CONTROL PANEL
28. PILOT'S MIKE AND PHONE JACKS
29. SLAVING METER
30. SWITCH PANEL
31. ADF INDICATOR
32. PANEL LIGHTS
33. RADIO LIGHTS
34. ENGINE GAUGES
35. DUAL FUEL FLOW GAUGE
36. EMERGENCY GEAR EXTENDER
37. LANDING GEAR SELECTOR
38. DUAL EGT GAUGE
39. LEFT ENGINE ALTERNATE AIR CONTROL LEVER
40. CONTROL LEVERS
41. VACUUM GAUGE
42. AMMETERS
43. RIGHT ENGINE ALTERNATE AIR CONTROL LEVER
44. GROUND CLEARANCE SWITCH
45. CONTROL FRICTION LOCK
46. TRANSPONDER
47. ADF
48. PNEUMATIC DE-ICE CONTROLS
49. ECS CONTROL SWITCHES
50. AVIONICS EMERGENCY BUS SWITCH
51. CIRCUIT BREAKER PANEL
52. COPILOT'S MIKE AND PHONE JACKS
53. CIGAR LIGHTER

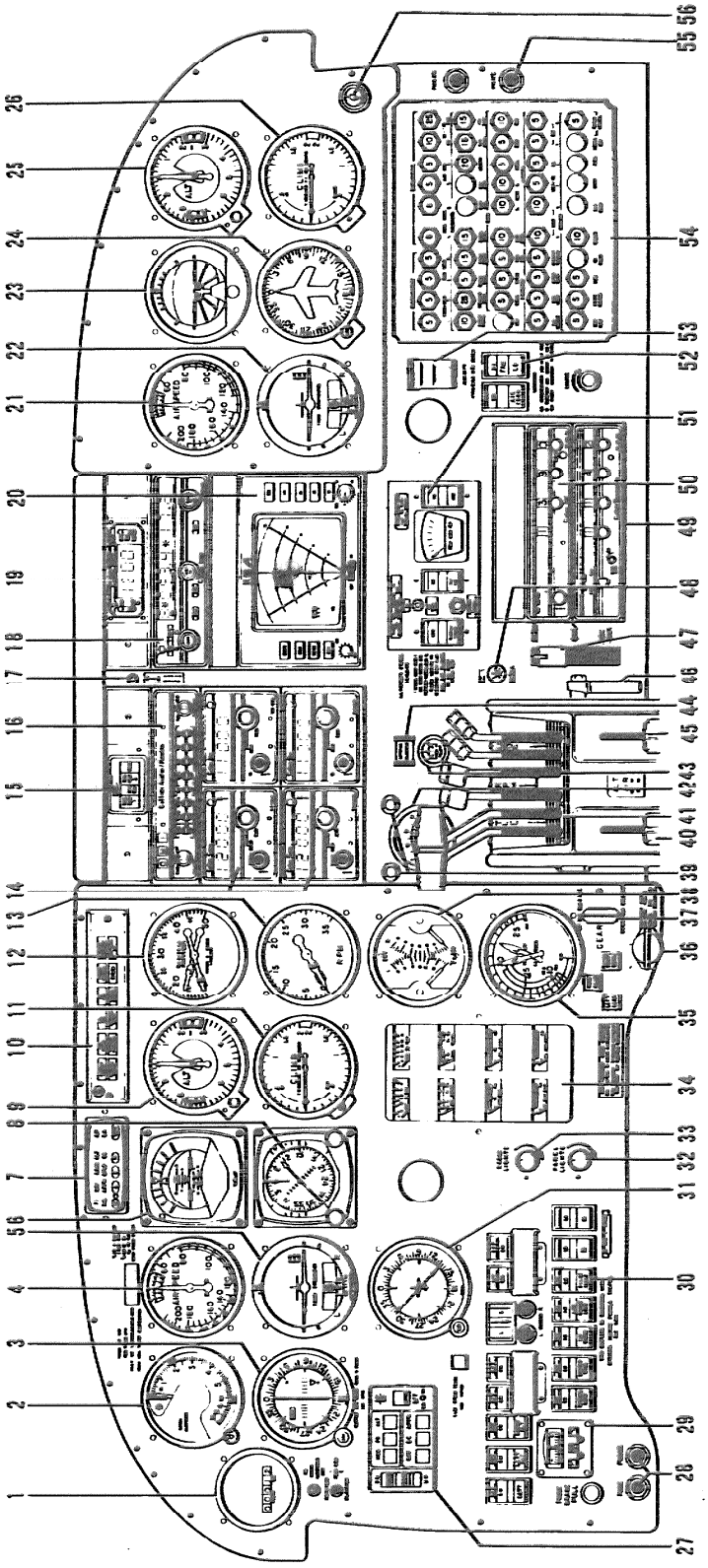
TYPICAL INSTRUMENT PANEL (cont)
S/N 34-8133001 THRU 34-8233205 (cont)
Figure 7-20 (cont)



TYPICAL INSTRUMENT PANEL
S/N 34-8333001 THRU 34-8433086
Figure 7-21

1. HOURMETER
2. RADAR ALTIMETER
3. NAV INDICATOR
4. AIRSPEED INDICATOR
5. TURN AND BANK INDICATOR
6. ATTITUDE GYRO
7. AUTOPILOT ANNUNCIATOR PANEL
8. DIRECTIONAL GYRO
9. ALTIMETER
10. ANNUNCIATOR PANEL
11. VERTICAL SPEED INDICATOR
12. DUAL MANIFOLD PRESSURE GAUGE
13. DUAL TACHOMETER
14. AVIONICS
15. MODE SELECTOR
16. AUDIO/MARKER PANEL
17. RADIO MASTER SWITCH
18. R-NAV
19. DME
20. RADAR
21. AIRSPEED INDICATOR, COPILOT
22. TURN AND BANK INDICATOR
23. ATTITUDE GYRO, COPILOT
24. DIRECTIONAL GYRO, COPILOT
25. ALTIMETER, COPILOT
26. VERTICAL SPEED INDICATOR
27. AUTOPILOT CONTROL PANEL
28. PILOT'S MIKE AND PHONE JACKS
29. SLAVING METER
30. SWITCH PANEL
31. ADF INDICATOR
32. PANEL LIGHTS
33. RADIO LIGHTS
34. ENGINE GAUGES
35. DUAL FUEL FLOW GAUGE
36. EMERGENCY GEAR EXTENDER
37. LANDING GEAR SELECTOR
38. DUAL EGT GAUGE
39. *AMMETER PRESS-TO-TEST BUTTONS
40. LEFT ENGINE ALTERNATE AIR CONTROL LEVER
41. CONTROL LEVERS
42. AMMETER
43. VACUUM GAUGE
44. GROUND CLEARANCE SWITCH
45. RIGHT ENGINE ALTERNATE AIR CONTROL LEVER
46. CONTROL FRICTION LOCK
47. TRANSPONDER
48. ADF
49. PNEUMATIC DE-ICE CONTROLS
50. ECS CONTROL SWITCHES
51. AVIONICS EMERGENCY BUS SWITCH
52. CIRCUIT BREAKER PANEL
53. COPILOT'S MIKE AND PHONE JACKS
54. CIGAR LIGHTER

TYPICAL INSTRUMENT PANEL (cont)
S/N 34-8333001 THRU 34-8433086 (cont)
Figure 7-21 (cont)



TYPICAL INSTRUMENT PANEL
S/N 34-8533001 AND UP
Figure 7-22

1. HOURMETER
2. RADAR ALTIMETER
3. NAV INDICATOR
4. AIRSPEED INDICATOR
5. TURN AND BANK INDICATOR
6. ATTITUDE GYRO
7. AUTOPILOT ANNUNCIATOR PANEL
8. DIRECTIONAL GYRO
9. ALTIMETER
10. ANNUNCIATOR PANEL
11. VERTICAL SPEED INDICATOR
12. DUAL MANIFOLD PRESSURE GAUGE
13. DUAL TACHOMETER
14. AVIONICS
15. MODE SELECTOR
16. AUDIO/MARKER PANEL
17. RADIO MASTER SWITCH
18. R-NAV
19. DME
20. RADAR
21. AIRSPEED INDICATOR, COPILOT
22. TURN AND BANK INDICATOR
23. ATTITUDE GYRO, COPILOT
24. DIRECTIONAL GYRO, COPILOT
25. ALTIMETER, COPILOT
26. VERTICAL SPEED INDICATOR
27. AUTOPILOT CONTROL PANEL
28. PILOT'S MIKE AND PHONE JACKS
29. SLAVING METER
30. SWITCH PANEL
31. ADF INDICATOR
32. PANEL LIGHTS
33. RADIO LIGHTS
34. ENGINE GAUGES
35. DUAL FUEL FLOW GAUGE
36. EMERGENCY GEAR EXTENDER
37. LANDING GEAR SELECTOR
38. DUAL EGT GAUGE
39. AMMETER PRESS-TO-TEST BUTTONS
40. LEFT ENGINE ALTERNATE AIR CONTROL LEVER
41. CONTROL LEVERS
42. AMMETER
43. VACUUM GAUGE
44. GROUND CLEARANCE SWITCH
45. RIGHT ENGINE ALTERNATE AIR CONTROL LEVER
46. CONTROL FRICTION LOCK
47. WING FLAP SELECTOR (S/N 34-8533001 AND UP)
48. FLAP INTRANSIT LIGHT (S/N 34-8533001 AND UP)
49. TRANSPONDER
50. ADF
51. PNEUMATIC DE-ICE CONTROLS
52. ECS CONTROL SWITCHES
53. AVIONICS EMERGENCY BUS SWITCH
54. CIRCUIT BREAKER PANEL
55. COPILOT'S MIKE AND PHONE JACKS
56. CIGAR LIGHTER

TYPICAL INSTRUMENT PANEL (cont)
S/N 34-8533001 AND UP (cont)
Figure 7-22 (cont)

7.25 HEATING, VENTILATING AND DEFROSTING SYSTEM

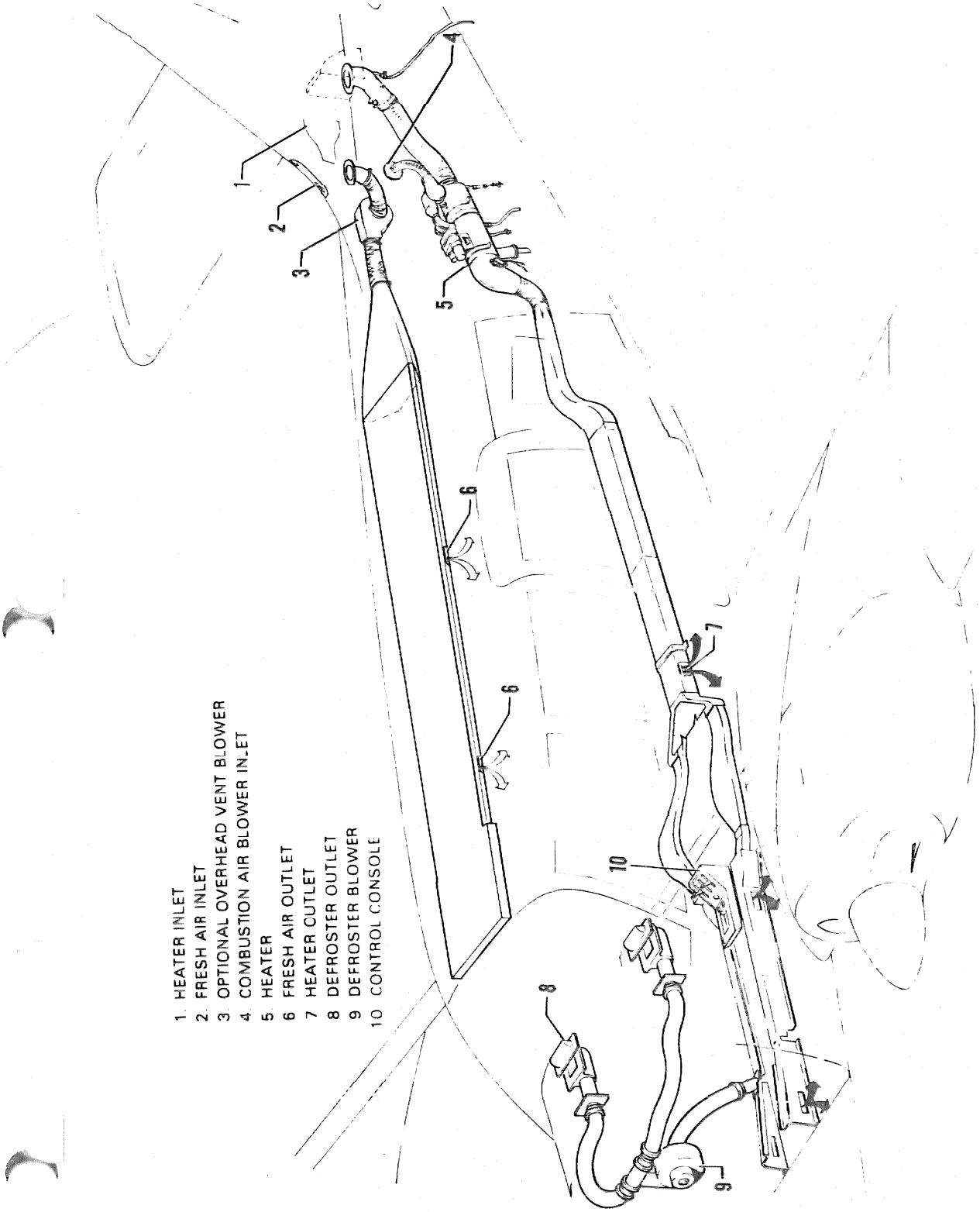
Heated air for cabin heat and windshield defrosting is provided by a Janitrol combustion heater located in the aft fuselage behind the cabin baggage compartment close-out panel (refer to Figure 7-23). Air from the heater is ducted forward along the cabin floor to outlets at each seat and to the windshield area.

Operation of the combustion heater is controlled by a three-position switch located on the control console (Figure 7-25) between the front seats and labeled FAN, OFF and HEATER. Airflow and temperature are regulated by the two levers on the console. The right-hand lever regulates air intake and the left-hand lever regulates cabin temperature. Cabin comfort can be maintained as desired through various combinations of lever positions. Passengers have secondary control over heat output by individually adjustable outlets at each seat location.

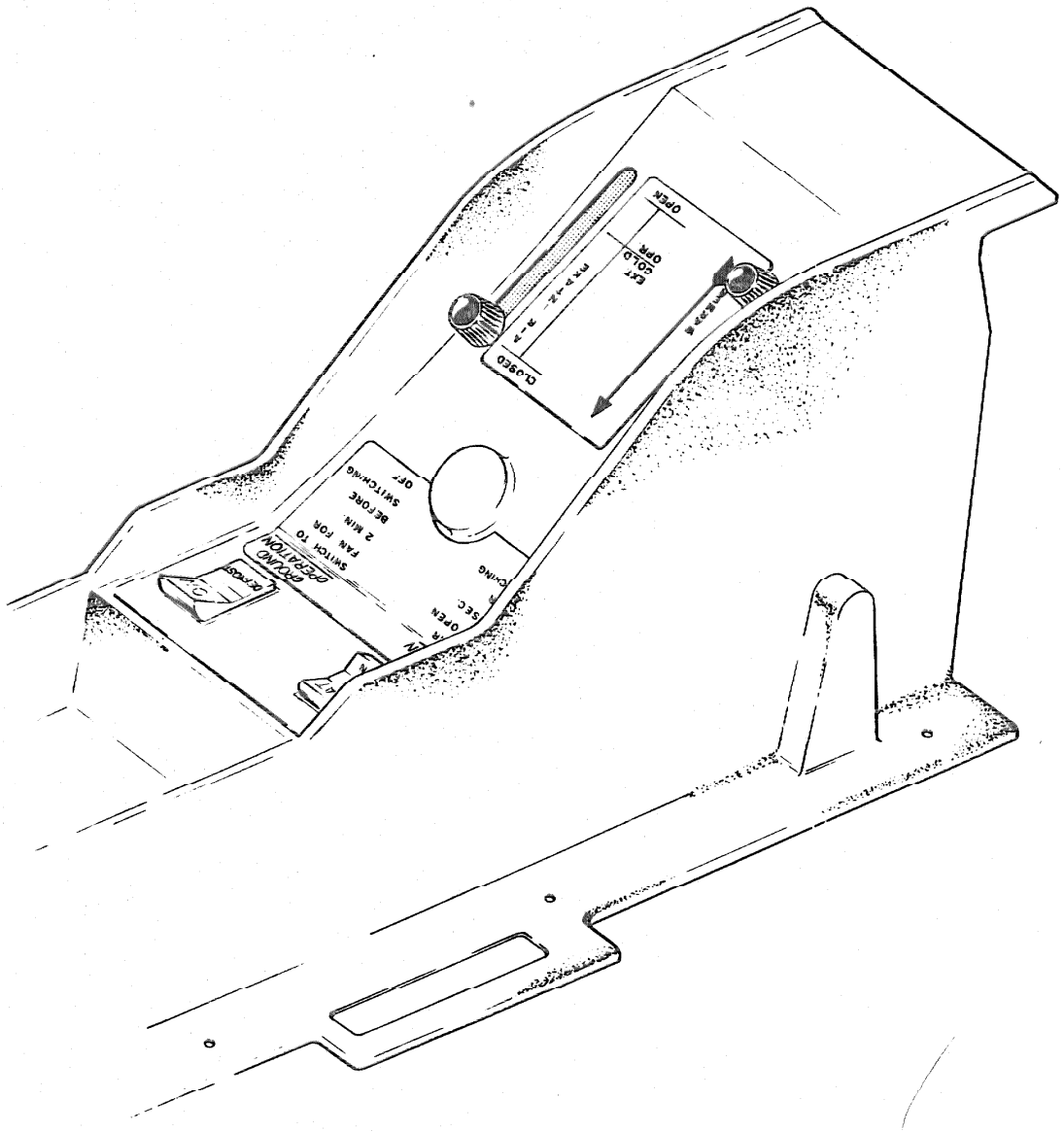
For cabin heat, the air intake lever on the heater control console must be partially or fully open and the three-position switch set to the HEATER position. This simultaneously starts fuel flow and ignites the heater; and, during ground operation, it also activates the ventilation blower which is an integral part of the combustion heater. With instant starting and no need for priming, heat should be felt within a few seconds. When cabin air reaches the temperature selected on the cabin temperature lever, ignition of the heater cycles automatically to maintain the selected temperature. Two safety switches activated by the intake valve and located aft of the heater unit prevent both fan and heater operation when the air intake lever is in the closed position. A micro switch, which actuates when the landing gear is retracted, turns off the ventilation blower so that in flight the cabin air is circulated by ram air pressure only.

When the three-position switch is in the FAN position during ground operation, the ventilation fan blows fresh air through the heater ductwork for cabin ventilation and windshield defogging when heat is not desired. When the heater controls are used either for cabin heat or for ventilation, air is automatically ducted to the windshield area for defrosting.

The flow of defroster air to the windshield area can be increased by the activation of a defroster fan. The fan is controlled by a defroster switch located on the control console between the two front seats.



CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM
Figure 7-23



HEATING, VENTILATING AND DEFROSTING CONTROL CONSOLE
Figure 7-25

To introduce fresh, unheated air into the cabin during flight, the air intake should be open and the heater off. Ram air enters the system and can be individually regulated at each floor outlet. Overhead outlets also supply fresh air for cabin ventilation. The occupant of each seat can manually adjust an outlet in the ceiling to regulate the flow of fresh air to that seat area. An optional fresh air blower may be installed in the overhead ventilation system to provide additional fresh air flow during ground operation.

An overheat switch located in the heater unit acts as a safety device to render the heater inoperative if a malfunction should occur. Should the switch deactivate the heater, the OVERHEAT light on the annunciator panel will illuminate. The overheat switch is located on the forward outboard end of the heater vent jacket. The red reset button on the heater shroud can be reached through the bulkhead access panel in the aft cabin close-out panel.

To prevent activation of the overheat switch upon normal heater shut-down during ground operation, turn the three-position switch to FAN for two minutes with the air intake lever in the open position before turning the switch to OFF. During flight, leave the air intake lever open for a minimum of fifteen seconds after turning the switch to OFF.

The combustion heater uses fuel from the airplane fuel system. An electric fuel pump draws fuel from the left tank at a rate of approximately one-half gallon per hour. Fuel used for heater operation should be considered when planning for a flight.

7.27 CABIN FEATURES

The front seats are adjustable fore and aft. Each seat reclines and is provided with an armrest. The center and rear seats are easily removed to provide additional cargo space.

NOTE

To remove the center seats, retainers securing the back legs of the seats must be unlocked. Releasing the retainers is accomplished by depressing the plunger behind each rear leg. Any time the seats are installed in the airplane, the retainers should be in the locked position. To remove the rear seats, depress the plunger behind each front leg and slide seat to rear.

An optional jump seat, which can be mounted between the two center seats, gives the Seneca III seven-place capabilities.

Shoulder harnesses with inertia reels are standard equipment for the front seats.

On aircraft serial numbers 34-8133001 through 34-8433086 shoulder harnesses with inertia reels are offered as optional equipment for the third, fourth, fifth and sixth seats, but not for the seventh seat.

On aircraft serial numbers 34-8533001 and up, shoulder harnesses with inertia reels are standard equipment on the third, fourth, fifth and sixth seat. A shoulder harness with inertia reel is also provided when the optional seventh seat is installed.

The inertia reel should be checked by tugging sharply on the strap. The reel will lock in place under this test and prevent the strap from extending. Under normal movement, the strap will extend and retract as required.

On earlier aircraft provided with a single strap adjustable shoulder harness for each front seat the shoulder strap is routed over the shoulder adjacent to the windows and attached to the lap belt in the general area of the person's inboard hip. Adjust this fixed strap so that all controls are accessible while maintaining adequate restraint for the occupant.

Shoulder harnesses shall be worn during takeoff and landing. Shoulder harnesses should be worn during an emergency situation.

Standard cabin features include a pilot's storm window, ashtrays, map pockets, coat hooks and assist straps, a cigar lighter, sun visors, and pockets on the front and center seat backs. Among the options which may be added to suit individual needs are headrests, a fire extinguisher, and a special cabin sound-proofing package.

An optional club seating interior is also available. In the club seating interior the center seats face aft. These seats are equipped with lap belts and adjustable shoulder harnesses.* Removal of the seats is accomplished by removing the two bolts holding the aft attach points and sliding the seat aft.

An optional refreshment console is located between the center seats. It is removed in a manner identical to the removal of the center seats.

*Earlier aircraft are equipped with lab belts only.

An optional oxygen system is located between the center seats. It is strapped to the jump seat in the standard seating arrangement. In the club seating arrangement it utilizes the same attach points as the refreshment console.

An optional cabin work table, serving the two seats on the right side of the passenger cabin, is offered to the club seating arrangement. The table must be stowed during takeoff and landing. If the table is to be used, it should be set up after a level cruise is established.

To remove the cabin work table from the aft baggage compartment, unlock the stud located on the bottom of the close-out bulkhead. Loosen the white tie-down strap and remove the table from the mounting brackets by lifting the table two inches straight up until it clears the mounting brackets. Do not twist the table while it is in the brackets.

To install the cabin work table during flight, hold the table in place and tilt the free end of the table upward 30° until the lobed upper knobs on the table supports align with the top holes of the escutcheons located below the right cabin window trim. Hold the upper lobes in place and lower the free end of the table to the level work position. The retaining springs will click when secure.

To stow the cabin work table, remove the table by lifting the free end of the table upward to disengage the bottom lobes of the table supports. Lift until the top support lobes disengage at approximately 30° of tilt and remove the table. Position the table in the stowage area and, with the table work surface facing forward, place the slots in the table support into the receptacle clips mounted on the hat shelf. Make sure the tie-down strap is not behind the table. With the table fully placed in the clips, bring the tie-down strap across the face of the table and lock over the stud located on the bottom of the close-out bulkhead.

7.29 STALL WARNING

An approaching stall is indicated by a stall warning indicator which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on a graph in the Performance Charts Section. The stall warning indicator consists of a continuous sounding horn located behind the instrument panel. The stall warning horn has a different sound from that of the

gear warning horn which has a 90 cycles per minute beeping sound. The stall warning indicator is activated by two lift detectors on the leading edge of the left wing, outboard of the engine nacelle. The inboard detector activates the indicator when the flaps are in the 25 and 40 degree positions, the outboard when the flaps are in other positions.

A squat switch in the stall warning system does not allow the units to be activated on the ground.

7.31 BAGGAGE AREA

There are two separate baggage compartments. One, the nose section baggage compartment, is accessible through a baggage door on the left side of the nose section. It has a maximum weight capacity of 100 pounds. The cabin baggage compartment, located aft of seats five and six has a weight capacity of 100 pounds. This compartment is loaded and unloaded through the rear cabin door, and it is accessible during flight. Tie-down straps are provided and should be used at all times. A cargo loading door, installed aft of the rear door, facilitates the loading of bulky items. All cargo, baggage compartment and passenger doors use the same key. The key can be removed from the forward baggage compartment door only when in the locked position.

A nose section baggage compartment light* illuminates automatically whenever the baggage door is opened. The baggage compartment light is independent of the aircraft battery switch; therefore, when the baggage door is opened, the light will illuminate regardless of the position of the battery switch. When the baggage compartment light option is installed, the baggage door should not be left open or ajar for extended time periods as battery depletion could result.

An optional forward baggage door ajar annunciator system is available, which senses the baggage door latch pin position. Failure to latch the forward baggage door will illuminate an amber light on the pilot's annunciator panel. The annunciator, when illuminated, is "Baggage Door" advising the pilot of this condition.

NOTE

It is the pilot's responsibility to be sure when baggage is loaded that the airplane C.G. falls within the allowable C.G. range. (See Weight and Balance Section.)

*Optional equipment

7.33 FINISH

All exterior surfaces are finished with acrylic lacquer.

An optional polyurethane finish is available.

7.35 PIPER EXTERNAL POWER*

An optional starting installation known as Piper External Power (PEP) allows the airplane engine to be started from an external battery without the necessity of gaining access to the airplane battery. The cable from the external battery can be attached to a receptacle under the right side of the nose section of the fuselage. Instructions on a placard located on the cover of the receptacle should be followed when starting with external power. For instructions on the use of the PEP, refer to Starting Engines - Section 4.

7.37 EMERGENCY LOCATOR TRANSMITTER*

The Emergency Locator Transmitter (ELT) is located in the aft portion of the fuselage just below the stabilator leading edge and is accessible through a plate on the right side of the fuselage. This plate is attached with slotted-head nylon screws for ease of removal; these screws may be readily removed with a variety of common items such as a dime, key, knife blade, etc. If there are no tools available in an emergency, the screw heads may be broken off by any means. The ELT is an emergency locator transmitter which meets the requirements of FAR 91.52.

A battery replacement date is marked on the transmitter to comply with FAA regulations, the battery must be replaced on or before this date. The battery must also be replaced if the transmitter has been used in an emergency situation or if the accumulated test time exceeds one hour, or if the unit has been inadvertently activated for an undetermined time period.

NOTE

If for any reason a test transmission is necessary, the test transmission should be conducted only in the first five minutes of any hour and limited to three audio sweeps. If the tests must be made at any other time, the tests should be coordinated with the nearest FAA tower or flight service station.

*Optional equipment

NARCO ELT 10 OPERATION*

On the ELT unit itself is a three position switch placarded ON, OFF and ARM. The ARM position sets the ELT so that it will transmit after impact and will continue to transmit until its battery is drained. The ARM position is selected when the ELT is installed in the airplane and it should remain in that position.

After a forced landing, and assistance is desired, verify the operation of the ELT by tuning a radio receiver to 121.50 MHz. If the ELT transmission can be heard it is functioning properly. If there is no ELT transmission, remove the ELT access plate in the tail cone and place the ELT selector switch in the ON position.

After verification that the ELT is transmitting, turn off monitoring receiver to conserve the battery. If radio communication is attempted, place the ELT selector switch in the OFF position until the communication is completed.

If required, the ELT may be removed from the airplane and used as a portable unit. To use the ELT as a portable unit in an emergency, remove the cover and unlatch the unit from its mounting base. The antenna cable is disconnected by a left quarter-turn of the knurled nut and a pull. A sharp tug on the two small wires will break them loose. Deploy the self-contained antenna by pulling the plastic tab marked "PULL FULLY TO EXTEND ANTENNA." Move the switch to ON to activate the transmitter.

In the event the transmitter is activated by an impact, it can only be turned off by moving the switch on the ELT unit to OFF. Normal operation can then be restored by pressing the small clear plastic reset button located on the top of the front face of the ELT and then moving the switch to ARM.

A pilot's remote switch located on the left side panel is provided to allow the transmitter to be turned on from inside the cabin. The pilot's remote switch is placarded ON and ARMED. The switch is normally in the ARMED position. Moving the switch to ON will activate the transmitter. Moving the switch back to the ARMED position will turn off the transmitter only if the impact switch has not been activated.

*Optional equipment

The ELT should be checked to make certain the unit has not been activated during the ground check. Check by selecting 121.50 MHz on an operating receiver. If there is an oscillating chirping sound, the ELT may have been activated and should be turned off immediately. This requires removal of the access cover and moving the switch to OFF, then press the reset button and return the switch to ARM. Recheck with the receiver to ascertain the transmitter is silent.

NARCO ELT 910 OPERATION*

On the ELT unit itself is a three position switch placarded ON, OFF and ARM. The ARM position sets the ELT so that it will transmit after impact and will continue to transmit until its battery is drained. The ARM position is selected when the ELT is installed in the airplane and it should remain in that position.

A pilot's remote switch, placarded ON and ARM, is located on the left side panel to allow the transmitter to be armed or turned on from inside the cabin. The switch is normally in the ARM position. Moving the switch to ON will activate the transmitter. A warning light, located above the remote switch, will blink continuously whenever the ELT is activated.

NOTE

The warning light will not blink if the ELT is activated by an incident that also results in severance of the airplane's power supply lines.

Should the ELT be activated inadvertently it can be reset by either positioning the remote switch to the ON position for two seconds, and then relocating it to the ARM position, or by setting the switch on the ELT to OFF and then back to ARM.

In the event the transmitter is activated by an impact, it can be turned off by moving the ELT switch OFF. Normal operation can then be restored by resetting the switch to ARM. It may also be turned off and reset by positioning the remote switch to the ON position for two seconds, and then to the ARM position.

*Optional equipment

The transmitter can be activated manually at any time by placing either the remote switch or the ELT switch to the ON position.

The ELT should be checked during postflight to make certain the unit has not been activated. Check by selecting 121.50 MHz on an operating receiver. If a downward sweeping audio tone is heard, the ELT may have been activated. Set the remote switch to ON. If there is no change in the volume of the signal, your airplane is probably transmitting. Setting the remote switch to ARM will automatically reset the ELT and should silence the signal being received on 121.50 MHz.

7.39 PIPER CONTROL WHEEL CLOCK

The time and date can be set by the operation of the reset (RST) button while in the clock mode.

The month is set by pressing the reset (RST) button once, this will cause the date to appear with the month flashing. Pressing the start/ stop (ST-SP) button advances the months at one per second or one per push, until the right month appears. To set the date, press the reset (RST) button once again causing the date to flash, then press the start/stop (ST-SP) button to advance to the correct date.

To set the correct hour, press the RST button two times causing the hours digits to flash. Press the ST-SP button to advance to the correct hour.

The minutes can now be set by pressing the RST button once again and causing the minutes digits to flash. Set the minutes to the next minute to come up at the zero seconds time mark and depress the RST button to hold the time displayed. At the time mark, press the ST-SP button momentarily to begin time counting at the exact second. If the minutes are not advanced when they are flashing in the set mode, pressing the RST button will return the clock to the normal timekeeping mode without altering the minutes timing. This feature is useful when changing time zones, when only the hours are to be changed.

The calender function will automatically advance the date correctly according to the four year perpetual calendar. One day must be added manually on February 29 on leap year. The date advances correctly at midnite.

To display a test function, press both the RST and ST-SP buttons at the same time.