

7.17 ELECTRICAL SYSTEM

All switches are grouped in a switch panel above the power quadrant. The circuit breaker panel is located on the lower right side of the instrument panel. Each breaker is clearly marked to show which circuit it protects. Also, circuit provisions are made to handle the addition of communications and navigational equipment.

Standard electrical accessories include alternator, starter, electric fuel pump, stall warning horn, ammeter, and annunciator panel.

The annunciator panel includes alternator, low oil pressure, and low vacuum indicator lights. The annunciator panel lights are provided only as a warning to the pilot that a system may not be operating properly, and that he should check and monitor the applicable system gauge to determine when or if action is required.

Optional electrical accessories include navigation, ground recognition, anti-collision, landing, instrument panel, and cabin dome lights. The navigation lights are controlled by a rocker switch on the main switch panel. Radio, panel, and switch lights are controlled by rheostat switches located below and to the right of the pilot's control wheel adjacent to the engine instruments.

An optional light, mounted in the overhead panel, provides instrument and cockpit lighting for night flying. The light is controlled by a rheostat switch located adjacent to the light. A map light window in the lens is actuated by an adjacent switch.

The optional wing tip recognition light consists of two lights, one in each wing tip, and is operated by a rocker type switch in the main switch panel.

WARNING

The navigation lights (NAV LIGHT) switch must be off to obtain full intensity gear lights during daytime flying. When the airplane is operated at night and the NAV LIGHT switch is turned on, the gear lights will automatically dim.

The anti-collision and landing lights are controlled by rocker switches on the main switch panel.

7.17 ELECTRICAL SYSTEM (continued)

Secondary power is provided by a 12-volt, 35-ampere-hour battery.

The ammeter as installed does not show battery discharge; rather it shows the electrical load placed on the system. With all the electrical equipment off, and the battery master (BATT MASTR) and alternator (ALTR) switches on, the ammeter will indicate the charging rate of the battery. As each electrical unit is switched on, the ammeter will indicate the total ampere draw of all the units including the battery. For example, the average continuous load for night flying with radios on is about 30 amperes. The 30 ampere value plus 2 amperes for charging the battery will then show on the ammeter, indicating the alternator is functioning properly.

Solenoids, provided in the battery and starter circuits, are used to control high current drain functions remotely from the cabin.

7.19 VACUUM SYSTEM

The vacuum system is designed to operate the air driven gyro instruments. This includes the directional and attitude gyros when installed. The system consists of an engine vacuum pump, a vacuum regulator, a filter and the necessary plumbing.

The vacuum pump is a dry type pump 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 on the right instrument panel, (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 (a low vacuum indicator light is 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.

7.19 VACUUM SYSTEM (continued)

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.

If equipped with the optional auxiliary vacuum system, refer to Section 9, Supplement 3, for operation procedures.

7.21 PITOT-STATIC SYSTEM

The system supplies both pitot and static pressure for the airspeed indicator, altimeter and vertical speed indicator (when installed).

Pitot pressure is picked up by the pitot head on the bottom of the left wing. An optional heated pitot head, which alleviates problems with icing or heavy rain, is available. The switch for pitot heat is located on the switch panel. Static pressure is sensed by button type vents on each side of the aft fuselage. Push-button type pitot and static drains are located on the lower left sidewall of the cockpit.

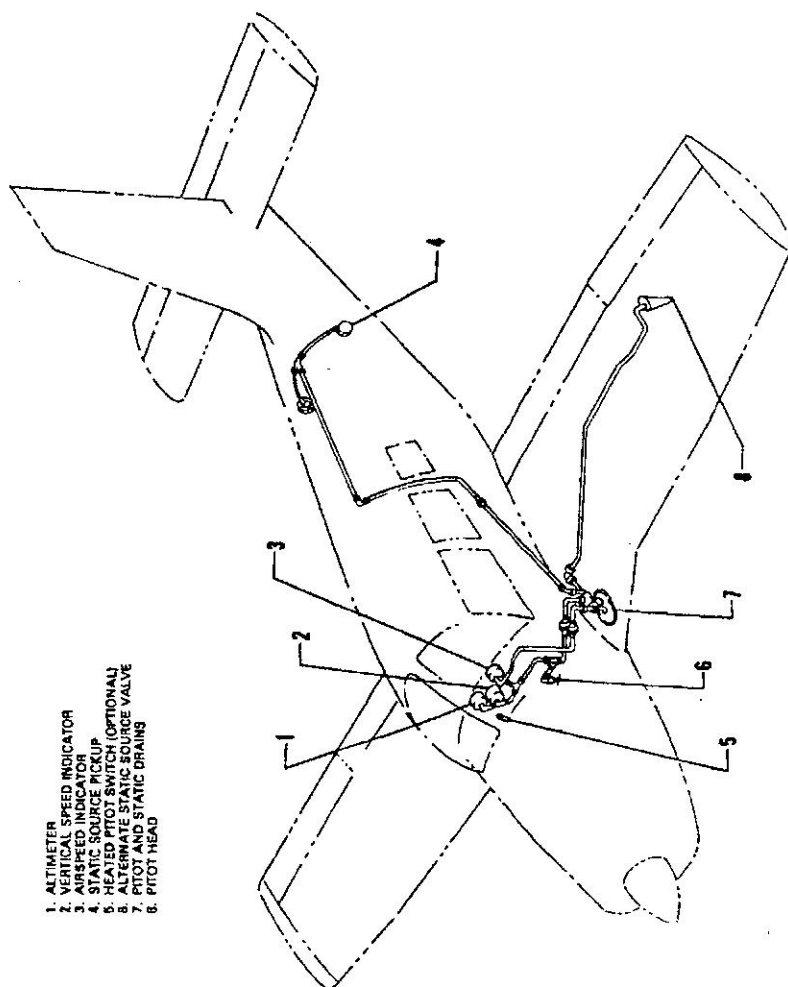
An alternate static source is available as optional equipment. The control valve is located below the left side of the instrument panel. When the valve is set in the alternate position, the altimeter, vertical speed indicator and airspeed indicator will be using cabin air for static pressure. The storm window and cabin vents must be closed and the cabin heater and defroster must be on during alternate static source operation. The altimeter error is less than 50 feet unless otherwise placarded.

To prevent bugs and water from entering the pitot pressure hole when the airplane is parked, a cover should be placed over the pitot head. A partially or completely blocked pitot head will give erratic or zero readings on the instruments.

NOTE

During preflight, check to make sure the pitot cover is removed.

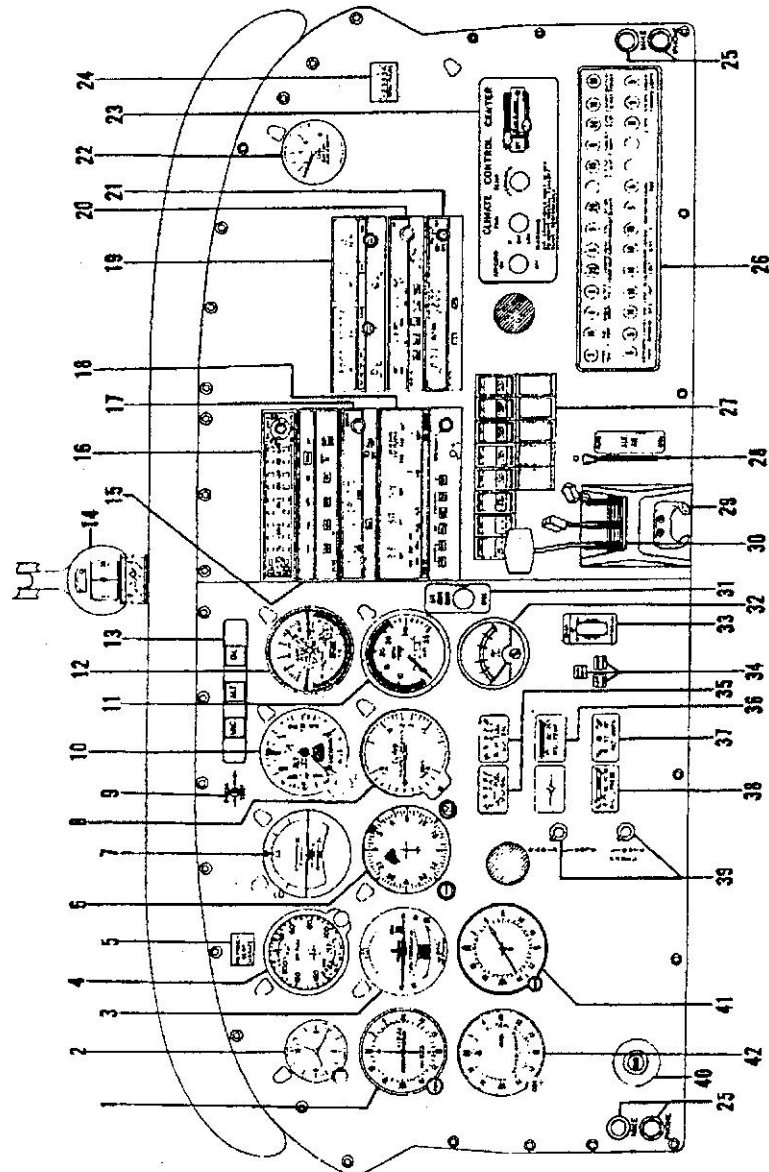
7.21 PITOT-STATIC SYSTEM (continued)



PITOT-STATIC SYSTEM

Figure 7-19

7.23 INSTRUMENT PANEL



INSTRUMENT PANEL
Figure 7-21

- | | | |
|--|---|--|
| 1. VOR/LOC/GLIDESLOPE INDICATOR | 15. AUTOPILOT | 29. MICROPHONE HOLDER |
| 2. CLOCK | 16. AUDIO CONTROL PANEL | 30. ENGINE CONTROLS QUADRANT |
| 3. TURN COORDINATOR | 17. COMMUNICATIONS TRANSMITTER | 31. AIR CONDITIONER DOOR LIGHT |
| 4. AIRSPEED INDICATOR | 18. AREA NAVIGATION RECEIVER | 32. E.G.T. GAUGE |
| 5. WARNING - GEAR UNSAFE LIGHT | 19. NAVIGATION/COMMUNICATIONS TRANSMITTER | 33. LANDING GEAR SELECTOR |
| 6. DIRECTIONAL GYRO | 20. ADF RECEIVER | 34. LANDING GEAR POSITION |
| 7. ATTITUDE GYRO | 21. RADAR TRANSPONDER | 35. LEFT AND RIGHT FUEL GAUGES |
| 8. VERTICAL SPEED INDICATOR | 22. GYRO SUCTION GAUGE | 36. OIL TEMPERATURE GAUGE |
| 9. ANNUNCIATOR TEST SWITCH | 23. CLIMATE CONTROL CENTER | 37. AMMETER |
| 10. ALTIMETER | 24. HOUR METER | 38. OIL PRESSURE GAUGE |
| 11. TACHOMETER | 25. MIKE/PHONE JACKS | 39. RADIO SWITCH/INSTRUMENT LIGHTS CONTROL |
| 12. MANIFOLD PRESSURE AND FUEL FLOW/PRESSURE GAUGE | 26. CIRCUIT BREAKERS | 40. IGNITION (MAGNETO) SWITCH |
| 13. ANNUNCIATOR LIGHTS | 27. ELECTRICAL SWITCHES | 41. RADIO COMPASS (ADF) |
| 14. MAGNETIC COMPASS | 28. ALTERNATE AIR CONTROL | 42. VOR/LOC INDICATOR |

INSTRUMENT PANEL

Figure 7-21

ISSUED: JULY 12, 1995

REPORT: VB-1612

REVISED: OCTOBER 7, 2004

7-21

7.23 INSTRUMENT PANEL (continued)

The instrument panel is designed to accommodate the customary advanced flight instruments and the normally required power plant instruments. The altitude and directional gyros, located in the center of the left hand instrument panel, are vacuum operated. The vacuum gauge is located on the right hand instrument panel. The turn indicator, on the left side, is electrically operated. The optional Horizontal Situation Indicator (HSI), when installed in place of the directional gyro, is also electrically operated.

The radios are located in the center section of the panel, and the circuit breakers are in the lower right corner of the panel.

An annunciator panel is mounted in the upper instrument panel to warn the pilot of a possible malfunction in the alternator, oil pressure, or vacuum systems.

If installed, the optional radio master (RADIO MASTR) switch is located on the bottom row of the main switch panel. When the battery master (BATT MASTR) switch is turned ON, power is supplied to the avionics master relay switch, opening the contactors, and preventing current flow to the radios. When the radio master (RADIO MASTR) switch is turned ON, power is removed from the avionics master relay, allowing the contactors to spring closed, permitting current flow to the radios.

A ground clearance energy saver system is available to provide direct power to the number one communications (COMM 1) transceiver without turning on the battery master (BATT MASTR) switch and, if equipped, the radio master (RADIO MASTR) switch. An internally lit ground clearance (GND CLC) rocker switch, located on the instrument panel, provides annunciation for engagement of the system. When the switch is ON, direct airplane battery power is applied to the number one communications (COMM 1) transceiver audio amplifier (speaker) and radio accessories. During periods when the engine is shutdown, and communications is not required, the ground clearance (GND CLC) switch must be turned OFF to prevent depletion of the battery.

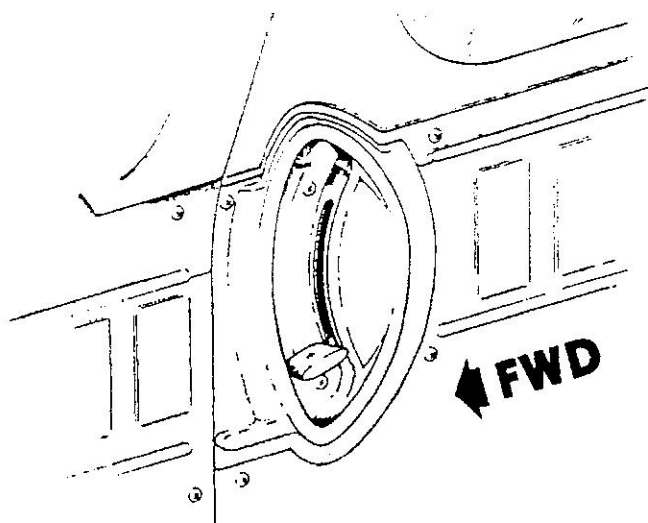
**CABIN DOOR LATCH**

Figure 7-23

7.25 CABIN FEATURES

All seat backs have three positions: normal, intermediate and recline. The adjustment lever is located at the base of the seat back on the outboard side of the seat. The front seats adjust fore and aft for ease of entry and occupant comfort. An armrest is located on the side panels adjacent to the front seat. The rear seats are easily removed to provide room for bulky items. Rear seat installations incorporate leg retainers with latching mechanisms, which must be released before the rear seats can be removed. Releasing the retainers is accomplished by depressing the plunger behind each rear leg. Optional headrests are available.

Seat occupants are protected by individual lap belts and single strap shoulder harnesses. Each shoulder harness is controlled by an inertial reel located above the side window. The shoulder strap is routed over the shoulder adjacent to the window and attached to the lap belt in the general area of the occupant's inboard hip. A check of the inertial reel mechanism can be made by pulling sharply on the strap and checking that the reel will lock in place under sudden stress; this locking feature prevents the strap from extending

7.25 CABIN FEATURES (continued)

and holds the occupant in place. Under normal movement the strap will extend and retract as required. Shoulder harnesses should be routinely worn during takeoff, landing and whenever an in-flight emergency situation occurs.

Additional features include pilot storm window, two sun visors, ash trays for each occupant, map pockets located on the side panels below the instrument panel, miscellaneous pockets on the rear of the front seat backs, armrests for the front occupants, cabin or baggage door locks and ignition lock.

The Arrow cabin door is double locked. To close the cabin door, hold the door closed with the armrest while moving the side door latch to the LATCHED position; then engage the top latch. Both latches must be secured before flight.

7.27 BAGGAGE AREA

A large baggage area, located behind the rear seats, is accessible either from the cabin or through a large outside baggage door on the right side of the aircraft. Maximum capacity is 200 lbs. Tiedown straps are provided and should be used at all times.

NOTE

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

7.29 HEATING, VENTILATING, AND DEFROSTING SYSTEM

The heating system is designed to provide maximum comfort for the occupants during winter and cool weather flights. The system includes a heat shroud, heat ducts, defroster outlets, heat and defroster controls.

CAUTION

When cabin heat is operated, heat duct surface becomes hot. This could result in burns if arms or legs are placed too close to heat duct outlets or surface.

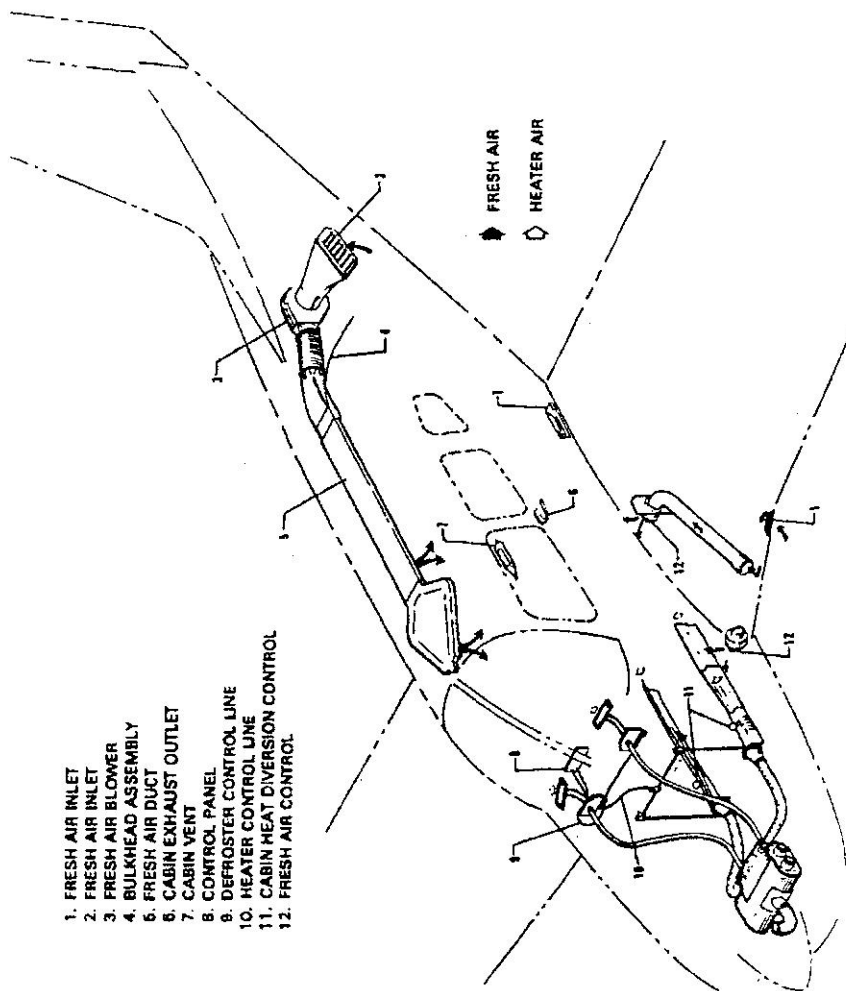
An opening in the front of the lower cowl admits ram air to the heater shroud and then the air is ducted to the heater shut-offs on the right and left side of the firewall. When the shut-off's are opened the heated air then enters the heat ducts located along each side of the center console. Outlets in the heat duct are located at each seat location. Airflow to the rear seats can be regulated by controls in the heat ducts located between the front seats. The temperature of the cabin is regulated by the heater control located on the right side of the instrument panel.

Defrosting is accomplished by heat outlets located on the right and left side of the cowl cover. Heated air is ducted directly to defroster shut-off valves at the firewall, then to the defroster outlets. The airflow is regulated by a defroster control located below the heat control.

To aid air distribution, the cabin air is exhausted overboard by an outlet located on the bottom of the fuselage. Cabin exhaust outlets are located below and outboard of the rear seats. The above features are removed when air conditioning is installed.

Optional individual overhead fresh air outlets supply fresh air from a louvered air inlet located on the side of the left aft fuselage beneath the dorsal fin. The air is directed to a plenum chamber at the base of the fin, then ducted to the individual outlets. For individual comfort, the amount and direction of air can be regulated to control the amount of air and direction of desired airflow. An optional blower is available which forces outside air through the overhead vents for ground use. The blower is operated by a FAN switch with three positions - OFF, LOW, or HIGH.

7.29 HEATING, VENTILATING, AND DEFROSTING SYSTEM
(continued)



HEATING, VENTILATING AND DEFROSTING SYSTEM

Figure 7-25

7.31 STALL WARNING

An approaching stall is indicated by a stall warning horn which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on graphs in the Performance Section. The stall warning horn emits a continuous sound in contrast to the gear warning horn, which emits a 90 Hz beeping sound. The stall warning horn is activated by a lift detector installed on the leading edge of the left wing. During preflight, the stall warning system should be checked by turning the battery master (BAIT MASTR) switch ON, lifting the detector and checking to determine if the horn is actuated.

7.33 FINISH

All exterior surfaces are primed with etching primer and finished with acrylic lacquer. To keep the finish attractive looking, economy size spray cans of touchup paint are available from Piper Dealers.

7.35 AIR CONDITIONING*

The air conditioning system is a recirculating air system. The major components include an evaporator, a condenser, a compressor, a blower, switches and temperature controls.

The evaporator is located on the left side of the fuselage behind the rear baggage compartment. This cools the air used for the air conditioning system.

The condenser is mounted on a retractable scoop located on the bottom of the fuselage and to the rear of the baggage compartment area. The scoop extends when the air conditioner is ON and retracts to a flush position when the system is OFF.

The compressor is mounted on the forward right underside of the engine. It has an electric clutch which automatically engages or disengages the compressor to the belt drive system of the compressor.

Air from the baggage area is drawn through the evaporator by the blower and distributed through an overhead duct to individual outlets located adjacent to each occupant.

*Optional equipment

7.35 AIR CONDITIONING* (continued)

The switches and temperature control are located on the lower right side of the instrument panel in the climate control center panel. The temperature control regulates the temperature of the cabin. Turning the control clockwise increases cooling; counterclockwise decreases cooling.

The fan speed switch and the air conditioning ON-OFF switch are inboard of the temperature control. The fan can be operated independently of the air conditioning; however, the fan must be on for air conditioner operation. Turning either switch off will disengage the compressor clutch and retract the condenser door. Cooling air should be felt within one minute after the air conditioner is turned on.

NOTE

If the system is not operating in 5 minutes, turn the system OFF until the fault is corrected.

The fan switch allows operation of the fan with the air conditioner turned OFF to aid in cabin air circulation. LOW or HIGH can be selected to direct a flow of air through the air conditioner outlets in the overhead duct. These outlets can be adjusted or turned off individually.

A condenser door light, located to the right of the tachometer, illuminates when the door is open and is extinguished when the door is closed.

A circuit breaker on the circuit breaker panel protects the air conditioning electrical system.

Whenever the throttle is in the full forward position, it actuates a micro switch which disengages the compressor and retracts the scoop. This allows maximum power and maximum rate of climb. The fan continues to operate and the air will remain cool for about one minute. When the throttle is retarded approximately 1 inch, the clutch will engage, the scoop will extend, and the system will again supply cool, dry air.

*Optional equipment

7.37 PIPER EXTERNAL POWER*

An optional starting installation known as Piper External Power (PEP) is accessible through a receptacle located on the right side of the fuselage aft of the baggage compartment door. 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.

7.39 EMERGENCY LOCATOR TRANSMITTER*

The Emergency Locator Transmitter (ELT) operates on self-contained batteries and is located in the aft fuselage section. It is accessible through a rectangular cover on the right hand side. A number 2 Phillips screwdriver is required to remove the cover.

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 tests must be made at any other time, the tests should be coordinated with the nearest FAA tower or flight service station.

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.

*Optional equipment

7.39 EMERGENCY LOCATOR TRANSMITTER* (continued)

NARCO ELT 10 OPERATION (continued)

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.

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.

*Optional Equipment

7.39 EMERGENCY LOCATOR TRANSMITTER* (continued)**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.

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 tone it is probably you. Setting the remote switch back to ARM will automatically reset the ELT.

*Optional Equipment

7.39 EMERGENCY LOCATOR TRANSMITTER* (continued)

ARTEX ELT OPERATION

On the ELT unit itself is a two position switch placarded ON and OFF. The OFF position is selected when the transmitter is installed at the factory and the switch should remain in that position whenever the unit is installed in the airplane.

A pilots remote switch, placarded ON and ARM is located on the copilots instrument panel to allow the transmitter to be armed or turned on from inside the cabin. The switch is normally in ARM position. Moving the switch to ON will activate the transmitter. A warning light located above the remote switch will alert you when ever the ELT is activated.

This ME-406 ELT (406 MHz), if installed, is equipped with a warning buzzer. This warning buzzer, which receives power from the ELT itself, is mounted in the tailcone. Whenever the ELT is activated the buzzer "beeps" periodically. The time between pulses lengthens after a predetermined transmitter "ON" time. The objective is to hear the buzzer from outside the aircraft while the engine is not running.

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

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 and then immediately to the ARM position.

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

NOTE:

Three sweeps of the emergency tone and an illuminated warning light indicates a normally functioning unit. The warning light must illuminate during the first 3 second test period. If it does not illuminate, a problem is indicated such as a "G" switch failure.

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's ELT is probably transmitting. Setting the remote switch back to OFF will automatically reset the ELT and should stop the signal being received on 121.50 MHz.