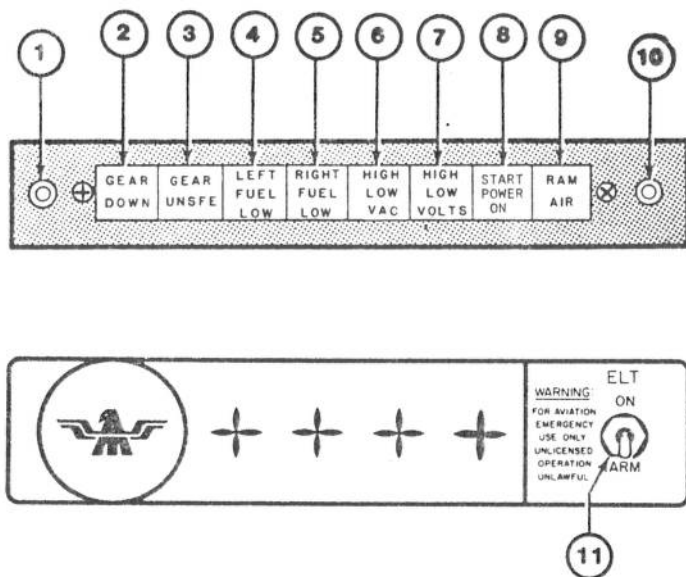


SECTION VII  
AIRPLANE & SYSTEMS DESCRIPTION

- ⑥ CIGAR LIGHTER
- ⑦. PARKING BRAKE CONTROL  
Depressing the brake pedals and pulling the parking brake control sets the parking brake. Pushing in the parking brake control releases the parking brake.
- ⑧. CABIN VENT CONTROL  
Pulling the cabin vent control aft opens the cabin vent, located on the right side of the airplane. Optimum use of the cabin vent control is described in the Cabin Environment Section.
- ⑨. CABIN HEAT CONTROL  
Pulling the cabin heat control turns on cabin heat. To lower cabin temperature the cabin heat control is pushed forward toward the OFF position. Optimum use of the cabin heat control is described in the Cabin Environment Section.
- ⑩. DEFROST CONTROL  
Pulling the defrost control decreases air flow to cabin and increases air flow over the windshield in the front of the glareshield area. Optimum use of the defrost control is described in the Cabin Environment Section.
- ⑪ ALTERNATE STATIC SOURCE VALVE  
Pulling the alternate static source valve to the full aft position (alternate) changes the source of static air for the altimeter, airspeed indicator and rate-of-climb indicator from the outside of the aircraft to the cabin interior.
- ⑫. HEADSET JACK
- ⑬. MICROPHONE JACK

SECTION VII  
AIRPLANE & SYSTEMS DESCRIPTION  
ANNUNCIATOR AND SWITCH PANELS



① PRESS-TO-TEST SWITCH

Pressing the red press-to-test switch with the master switch ON will illuminate all annunciator light bulbs, excluding "Start Power On" indicator. Defective bulbs should be replaced prior to the next flight.

② and ③ GEAR SAFETY INDICATOR

The green GEAR DN light and a red GEAR UNSFE light provide visual gear position signals. The green light (GEAR DN) shows continuously when the gear is fully extended. With the navigation lights on, the GEAR DN light is dim for night operation. All gear lights are out when the gear is fully retracted. Gear unsafe light is on between gear fully extended and gear fully retracted position.

④ and ⑤ FUEL LOW INDICATORS

Left and/or right, red, fuel low annunciator light comes on when there is 2-1/2 to 3 gallons of useable fuel remaining in the respective tanks.

SECTION VII  
AIRPLANE & SYSTEMS DESCRIPTION

- ⑥ **VACUUM MALFUNCTION INDICATOR**  
The red VAC annunciator light indicates a malfunction or improper adjustment of air suction system. Air suction is available for operation of the attitude gyro, and also the directional gyro, and will be shown in inches of mercury. The designated suction range is 4.25 to 5.5 inches of mercury. The vac light will blink when suction is below 4.25 inches of mercury and gives a steady light when suction is above 5.5 inches of mercury. In either case the gyros should not be considered reliable during this warning time.
- ⑦ **VOLTAGE IRREGULARITY INDICATOR**  
The red VOLTS annunciator light comes on designating improper voltage supply. A red blinking light designates low, or no voltage from the alternator; a steady red light indicates over voltage or a trippage of the voltage relay.
- ⑧ **START POWER ON INDICATOR**  
The start power on light illuminates when the starter switch or relay has malfunctioned and the starter is engaged while the engine is running. Shut the engine off as soon as practicable. This light does not illuminate when press-to-test switch is pushed.
- ⑨ **RAM AIR POSITION INDICATOR**  
The amber RAM AIR annunciator light is a reminder that ram air system is in operation when the gear comes down and should be turned off to reroute air through air filter.
- ⑩ **DIM SWITCH**  
The DIM switch may be activated when the low fuel lights come on bright. The switch will dim both low fuel lights but will not turn them off. To restore the display to bright, press the test switch.
- ⑪ **EMERGENCY LOCATOR TRANSMITTER SWITCH**  
The E L T switch manually activates the emergency locator transmitter located in the tailcone. To activate the system pull the switch out and raise. Failure to pull out can result in a breakage of the switch. Reference should be made to the Emergency Locator Transmitter section for proper and lawful usage of the ELT.

## FLIGHT CONTROLS

### PRIMARY FLIGHT CONTROLS

Push-pull tubes with self-aligning rod end bearings actuate the primary flight control surfaces. A spring-loaded interconnect device indirectly joins the aileron and rudder control systems to assist in lateral stability during flight maneuvers. Control surface gap seals minimize airflow through the hinge slots and reduce drag.

### TRIM CONTROLS

For pitch trim control, the entire empennage pivots on the tail cone attachment points to increase or decrease the horizontal stabilizer angle. This design allows flight trim establishment with minimum control surface deflection. A trim indicator on the console indicates stabilizer trim position. In flight, forward rotation of the trim wheel lowers the nose; rearward rotation raises the nose.

### WING FLAP CONTROLS

The flap control is located in a recess on the right side of the engine control console and operates the electrically-actuated wide-span wing flaps. Moving the control to the UP position, retracts the flaps. The position of the flaps can be noted from the flap position indicator located adjacent to the trim indicator. Holding the control in the down position moves the flaps down until the desired position is reached, releasing the control stops flap movement. Limit switches prevent flap travel above or below travel limits.

### PITOT STATIC SYSTEM

A pitot tube, mounted on the lower surface of the left wing, picks up airspeed indicator ram air. A heated pitot prevents pitot tube icing when flying in moisture-laden air. A pitot system drain valve is located on the forward bottom skin of the left wing just outboard of the wing fillet. Static ports on each side of the tail cone

supply static air pressure for the altimeter, the air-speed indicator, and the vertical speed indicator. A static system drain valve is located on the fuselage bottom skin below the tail cone access door. An alternate static pressure source valve is installed under the left flight panel above the pilot's left knee.

### **STALL WARNING SYSTEM**

The electrical stall warning system uses a vane-actuated switch, installed in the left wing leading edge, to energize a stall warning horn located in the cabin. The stall warning switch is adjusted to provide aural warning at 4 to 8 KIAS before the actual stall is reached and will remain on until the aircraft flight attitude is changed.

### **EMERGENCY LOCATOR TRANSMITTER**

The Emergency Locator Transmitter (ELT) is located in the tailcone and is accessible by removing the radio access panel on the left side of the fuselage. The emergency locator transmitter meets the requirements of FAR 91.52 and is automatically activated by a longitudinal force of 5 to 7 g's. The ELT transmits a distress signal on both 121.5 MHz and 243.0 MHz for a period of from 48 hours in low temperature areas and up to 100 hours in high temperature areas. The unit operates on a self-contained battery.

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

On the unit itself is a three position selector switch placarded "OFF", "ARM", "ON". The "ARM" position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until the battery is drained to depletion or until the switch is manually moved to the "OFF" position. The "ARM" position is selected when the transmitter is installed at the factory and the switch should remain in that

position whenever the unit is installed in the airplane. The "ON" position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter.

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

**NOTE**

If the switch on the unit has been placed in the "ON" position for any reason, the "OFF" position has to be selected before selecting "ARM". If "ARM" is selected directly from the "ON" position the unit will continue to transmit in the "ARM" position.

A pilot's remote switch, located above the radio panel, is provided to allow the transmitter to be controlled from inside the cabin. The pilot's remote switch is placarded "ON", "ARM". The unit will start transmitting when placed in the "ON" position and will stop when remote switch is placed in "ARM" position during cockpit checkout.

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

**NOTE**

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

## LANDING GEAR

### ELECTRIC GEAR RETRACTION SYSTEM

The two-position electric gear control switch, identified by its wheel-shaped knob, is located near the top of the instrument panel above the throttle.

There are two ways to check that the electrically-actuated gear is down:

- (1) The green gear-down annunciator light is on.
- (2) The indicator marks align as seen on the floor-board visual gear-position indicator.

A green GEAR DN light, a red UNSAFE light, and a warning horn provide visual and audible gear position signals. The green light (GEAR DN) shows continuously when the gear is fully extended. With the navigation lights on, the GEAR DN light is dim for night operation. All gear lights are off when the gear is fully retracted.

#### NOTE

Retarding the throttle below 12 inches manifold pressure causes the gear warning horn to emit an intermittent tone if the gear is not down.

To prevent inadvertent retraction of the landing gear system an airspeed actuated safety switch is installed in the pitot system. The switch is not intended to substitute for the gear switch in keeping the gear extended while taxiing, taking-off, or landing.

#### CAUTION

Never rely on the safety switch to keep the gear down during taxi, take-off or landing. Always make certain that the landing gear switch is in the down position during these operations.

The aircraft is also equipped with a landing gear safety bypass switch override should the gear fail to retract after take-off. Section III discusses the procedure to be used should the landing gear safety switch fail to de-activate after take-off.

## SECTION VII AIRPLANE & SYSTEMS DESCRIPTION

### EMERGENCY GEAR - MANUAL EXTENSION SYSTEM

The emergency gear extension pull cable located between and aft of the seats is for manually driving the electric gear actuator to extend the gear if the electric system malfunctions. Section III discusses the emergency gear extension procedure. The electrical extension or retraction system will not operate if the manual extension lever is not properly positioned.

### BRAKE & STEERING SYSTEMS

The main gear wheels incorporate self-adjusting disc-type hydraulic brakes. The pilot's rudder pedals have individual toe-actuated brake cylinders linked to the rudder pedals. Depressing the toe pedals and pulling out the parking brake control on the console sets the brakes. Pushing the parking brake control forward releases the brakes.

It is not advisable to set the parking brake when the brakes are overheated, after heavy braking or when outside temperatures are unusually high. Trapped hydraulic fluid may expand with heat and damage the system. Wheel chocks and tiedowns should be used for long-term parking.

Rudder pedal action steers the nose wheel. Gear retraction relieves the rudder control system of its nose wheel steering and centers the wheel to permit retraction into the nose wheel well. The minimum turning radius on the ground is 41 feet.

#### CAUTION

The nose wheel must not be swiveled beyond 14° either side of center. To exceed these limits may cause structural damage.

### ELECTRICAL POWER

#### ALTERNATOR & BATTERY

A 12-volt 35-ampere-hour storage battery in the tailcone and a 60-ampere self-rectifying alternator supply electrical power for equipment operation. The ammeter in the engine instrument display indicates battery charge/discharge rate. A power loss in the alternator or voltage regulator will be shown as a discharge reading on the ammeter; a discharged battery will be indicated as a high-charge reading.



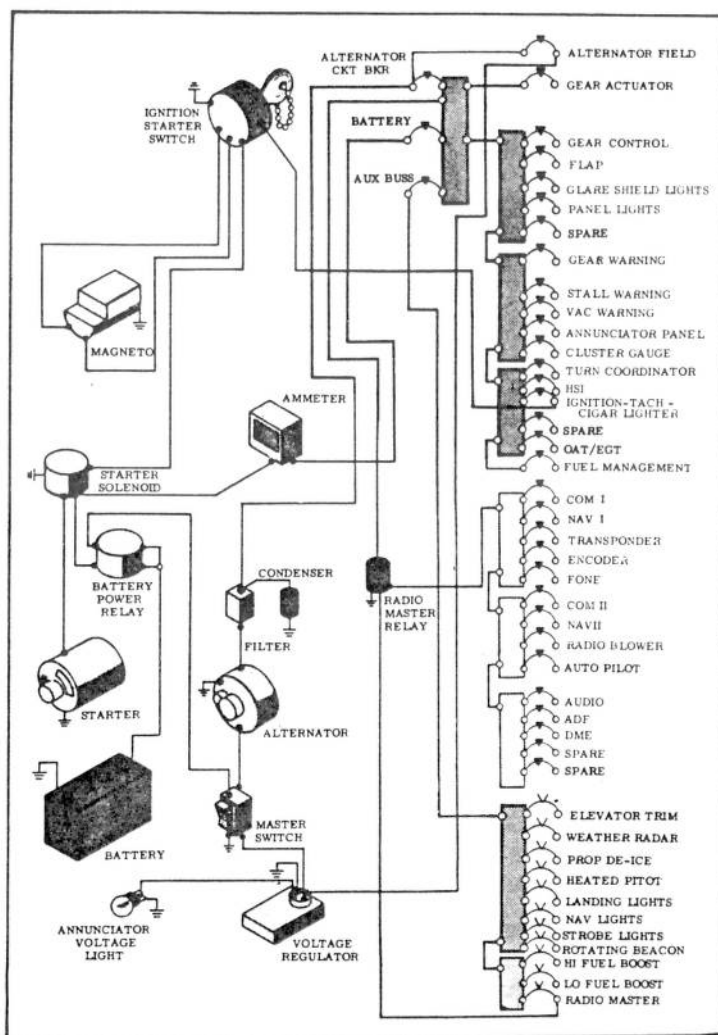


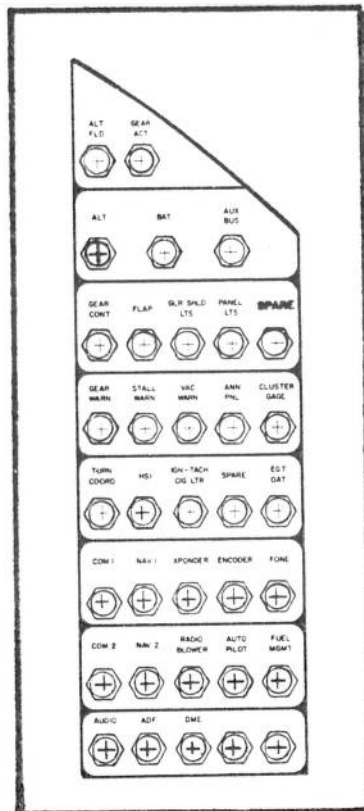
FIGURE 7-3 ELECTRICAL SYSTEM SCHEMATIC

## CIRCUIT BREAKERS

Push-pull, or rocker-switch circuit breakers automatically break the electrical current flow if the systems receive an overload, thus preventing damage to electrical wiring.

The main circuit breaker panel is in the extreme right panel. Figure 7-4 illustrates the main circuit breaker panel with its push-pull circuit breakers. All rocker-switch circuit breakers are at the bottom of the flight panel.

FIGURE 7-4  
Main  
Circuit Breaker Panel



The alternator push-pull circuit breaker on the main breaker panel furnishes an emergency overload break between the alternator and the main buss. Since the alternator is incapable of output in excess of the circuit breakers capacity, a tripped breaker normally indicates a fault within the alternator. Since the alternator is then cut out of the power circuit, the storage battery supplies electrical power in steadily diminishing output with the master switch on.

The alternator-field is a push-pull circuit breaker and furnishes an emergency break in the alternator field excitation circuit in the event of alternator or voltage regulator malfunction. If the regulator output voltage

exceeds limits, the red voltage warning light illuminates steadily. Turning off the radio master switch and then turning master switch off and on, will reset the voltage regulator. The overvoltage annunciator light should remain out. If the overvoltage light comes on again, pulling out the alternator-field circuit breaker cuts the alternator out of the power circuit. Once again the battery is the only source of electrical power; therefore, all electrical equipment not essential for flight should be turned off and the flight terminated as soon as practical to correct the malfunction.

#### NOTE

The circuit breakers installed in the panel will vary depending on installed equipment per customer order.

#### ANNUNCIATOR PANEL

The landing gear lights, low fuel light, voltage lights, starter engage light and ram air lights are grouped in the annunciator panel. A test switch, dim switch are also found on the panel.

#### ELT PANEL

The ELT Panel houses the remote ELT Switch and provides room for other switches as required for optional avionics systems installed in this aircraft. (See Section IX for these items).

#### INSTRUMENT & PLACARD LIGHTS

All instrument faces and placards are floodlighted by light bulbs in the glareshield. There are two rheostat knobs on the right hand radio panel, the left control regulates the intensity of the instruments and placard lighting. The right control provides avionics lighting. Rotating the knobs clockwise turns on and increases light intensity.

#### CABIN LIGHTING

Four headliner lights illuminate the cabin. The forward lights are controlled by the BRIGHT-OFF-DIM switch located in the headliner above the co-pilot. The rear cabin lights are controlled by another BRIGHT-OFF-DIM switch located above the rear seat, easily accessible from the baggage door for assistance with night loading.

## EXTERIOR LIGHTING

Conventional navigation and high intensity strobe lights are installed on the wing tips. A landing and taxi light is installed on the right side of the lower engine cowling. All exterior lights are controlled by rocker type switches on the lower left portion of the instrument panel.

The high intensity wing tip and tail strobe lights are required for night operation, but should be turned off when taxiing near other aircraft, or flying in fog or clouds. The conventional position lights must be used for all night operations.

## CABIN ENVIRONMENT

### HEATING & VENTILATION SYSTEMS

Three ventilating systems provide cabin environmental control suited to individual pilot and passenger preferences. Fresh air heated by the engine exhaust muffler, and cool air from an airscoop on the co-pilot side, can be individually controlled and mixed to the desired

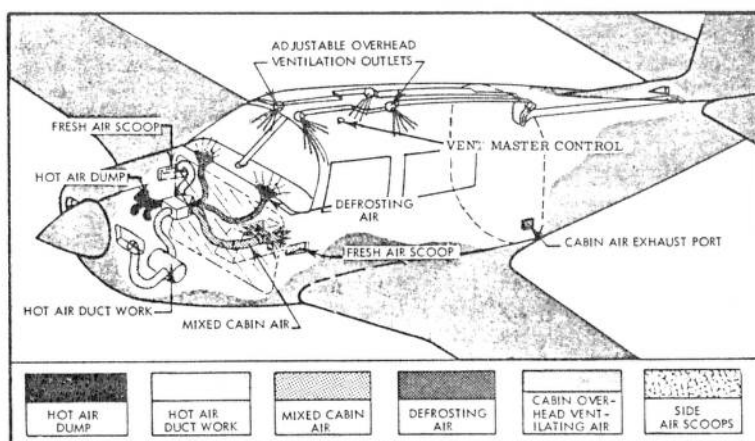


FIGURE 7-5. CABIN HEATING & VENTILATING.

temperature. The left side fresh-air scoop has an adjustable eyeball outlet near the pilot's knee.

The cabin overhead ventilating system works independently of the cabin heating and ventilating system. Fresh air enters an intake on the dorsal fin and is controlled by individual eyeball outlets above each seat. A master air vent control regulates flow of air through the individual overhead outlets. This control is located above the pilots seat back on the overhead panel.

The cabin heat control is marked CABIN HEAT. Pulling the cabin heat control aft supplies heat to the cabin and defroster system. The cabin vent control is marked VENT. Pulling the vent control aft supplies fresh air to the lower cabin and the defrost system. Hot and cold air may be mixed by adjusting both heat and vent controls. These controls may be adjusted between full open and full closed. The right side airscoop has outlets under the side panel for installation of radio cooling ducts.

#### WINDSHIELD DEFROSTING SYSTEM.

The windshield defrost system takes air from the cabin air distribution system and distributes this air over the windshield interior surface any time the heat and/or fresh air valves are opened. Pulling the defrost control full aft decreases flow to the cabin and forces maximum air to flow through the defrost ducts.

### CABIN

#### SEATS & SAFETY BELTS

The front seats are individually mounted and may be adjusted fore and aft to fit individual comfort preferences. The front seat back may be adjusted by turning hand crank until seat back is in desired position. The rear seat backs have four (4) adjustment positions. Each seat can be adjusted independent of the other by pulling up on respective release handles located to left or right of aircraft center line on forward spar. This allows adjustment from approximately 10° to 40° recline position.

Safety belts, if worn properly, keep occupants firmly in their seats in rough air and during maneuvers. The belts are mechanically simple and comfortable to wear. They are attached to the seat, which can be moved without re-adjusting the belt. Shoulder harnesses are provided for front and rear seat occupants and must be fastened for take-off and landing operations. Refer to Figure on page 7-32 for proper harness adjustment.

## SAFETY HARNESS

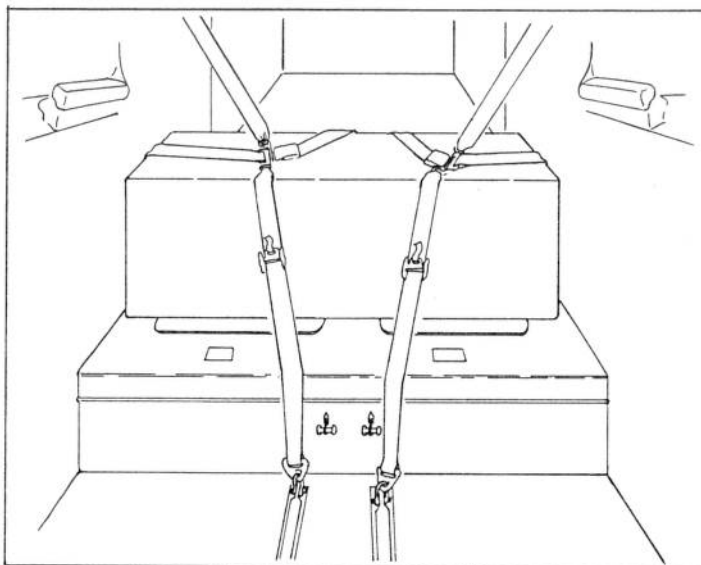
The single diagonal type harness is designed so the chest strap crosses diagonally from the outboard shoulder to an attachment point as low on the inboard hip as possible. Care should be taken to conform with this location in adjusting the chest strap and inboard belt length. This diagonal configuration places the body center-of-gravity inside the triangle formed by the chest strap and lap belt. The lap belt should be adjusted comfortably tight. As a result the body is restricted from rolling out toward the unrestricted shoulder, or "open" side of the harness, upon forward impact.



### BAGGAGE & CARGO AREAS

The standard baggage compartment has 17 cubic feet of baggage or cargo space and two pairs of floor tiedown straps. The loose equipment consists of wing jackpoints, tiedown rings, a fuel sampling cup, cargo tiedown rings and cargo belts. These are stowed in the baggage compartment. The rear seat backs may be folded down independently or together for use as additional cargo area; remove rear seat bottom cushion and the upholstered rear seat back cushions by folding seat back forward, separate velcro fastener on bottom of cover and slide cover up and off frame and store as desired, then fold rear seat backs down.

The cargo tiedown rings are to be inserted in holes provided in web of front seat rails. The cargo belts attach to these rings and to standard seat belt harness to retain cargo.



### CAUTION

Proper loading and retention of cargo is mandatory. See Loading Computation Graph, page 6-7.

## DOORS, WINDOWS & EXITS

### CABIN DOOR

Access to the cabin is provided by a door located on the right side of the fuselage. This door has inside and outside operating handles. The outside door handle can be locked with a key specifically provided for it. The door has two latching mechanisms, one located at the top of the door and one at the aft, center of the door.

Should the door come open inflight the flying qualities of the aircraft will not be affected. Procedures for closing the door in flight are contained in Section III.

### PILOT'S WINDOW

A fresh air pilot's window is located in the left main cabin window. This window is generally used for fresh air for prolonged ground operations. The window should not be opened in flight above 132 KIAS.

### EMERGENCY EXITS

The cabin door is the primary emergency exit for the cabin. If an emergency exists where a probable crash landing will occur the door should be unlatched to prevent jamming of the door during the crash.

The baggage compartment access door can be used as a means of auxiliary exit. The door can be opened from the inside even though locked. To open, pull off the cover, pull the white knob and lift up the red handle. To re-engage outside latch: open outside latch fully, close inside latch to engage pin into cam slide on outside latch and push in on white button until latched. Operate outside latch in normal method.