

ERA19FA039 Cessna 310R | N5044J

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Airplane Flight Manual Excerpts



ELECTRICAL SYSTEM

Electrical energy is supplied by a 28-volt, negative-ground, direct current system powered by a standard 50 ampere or optional 100 ampere engine-driven alternator on each engine. The electrical system has independent circuits for each side with each alternator having its own regulator and overvoltage protection relay. The voltage regulators are connected to provide proper load sharing. The 24 volt battery is located in the left wing just outboard of the engine

or discharge rate and bus voltage. A selector switch, labeled L ALT, R ALT, BAT and VOLTS is located to the left of the voltmeter. By positioning the switch to L ALT, R ALT, or BAT position, the respective alternator or battery amperage can be monitored. By positioning the switch to the VOLTS position, the electrical system bus voltage can be monitored. Immediate detection of low system voltage is provided by a LOW VOLT failure light, located above the pilot's control wheel. The light will illuminate when the aircraft bus voltage decreases below approximately 25 volts.

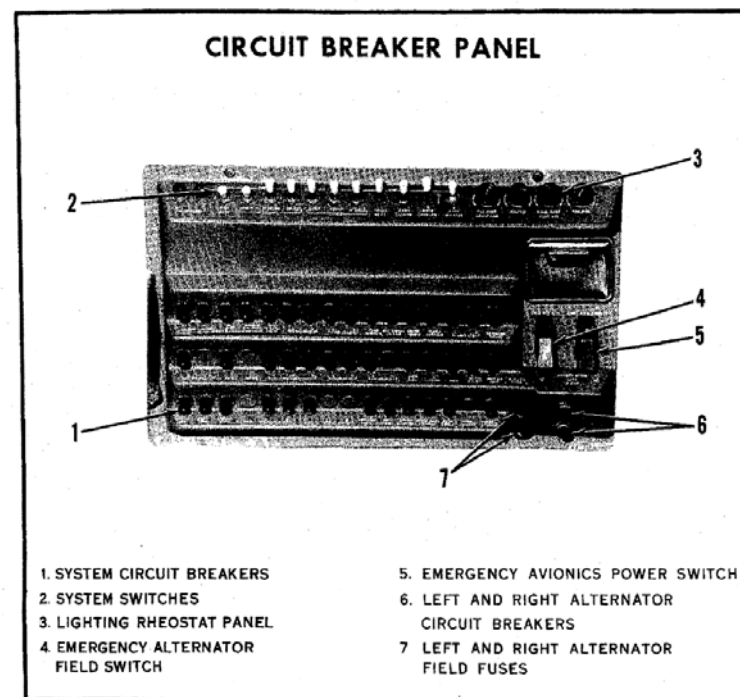


Figure 2-5

CIRCUIT BREAKERS AND SWITCH BREAKERS

All electrical circuits in the aircraft are protected by push-to-reset type circuit breakers or switch breakers (except the alternator field circuit which is protected by a fuse). Should an overload occur in any circuit, the resulting heat rise will cause the controlling circuit breaker to "pop" out, opening the circuit or allowing the switch breaker to return to the OFF position. After allowing the circuit breaker to cool for approximately three minutes, it may be pushed in (until a click is heard or felt) to re-energize the circuit. However, the circuit breaker should not be held in if it opens the circuit a second time, as this indicates a short circuit.

HEATING, VENTILATING AND DEFROSTING SYSTEM

A cabin heating, ventilating and windshield defrosting system, see Figure 2-7, is standard equipment in your aircraft. The system consists of an air inlet on the bottom of the nose, a ventilating fan, a gasoline combustion-type

heater, and controllable heat outlets in the cabin. Two outlets are located at the base of the windshield for defrosting purposes, one is located on the forward cabin bulkhead and one on each side of the forward cabin. Two additional outlets are located in the aft passenger compartment on the aft face of the main spar. Refer to Section VII for operation of the Air Conditioning System.

HEATING AND DEFROSTING

Fresh air is picked up from the air inlet in the nose of the aircraft, heated by the heater, and ducted to the pilot and passenger compartments. The heat and vent air is not recirculated, but exhausts overboard through a passenger compartment air outlet.

The cabin heater depends upon the aircraft fuel system for its fuel supply. Fuel pressure is supplied by a fuel pump mounted on the heater assembly; the main fuel system auxiliary fuel pumps need not be turned on for proper heater operation.

On the ground, the cabin heating system can be used for ventilation by placing the cabin fan switch in the CABIN FAN position. The fan provides unheated, fresh air to the cabin through the cabin heat registers. In flight, the fan becomes inoperative and the heating system can be used for ventilation by placing the cabin heat switch to the OFF position, turning the cabin air knobs to OPEN, and opening the heat registers as desired.

CABIN HEAT SWITCH

The cabin heat switch is a three position, center-off, toggle switch. Placing the switch in the HEAT position maintains cabin heater operation. Placing the switch in the FAN position provides ventilation for the cabin while the aircraft is on the ground.

CABIN AIR TEMPERATURE CONTROL KNOB

The cabin air temperature control knob is labeled TEMP CONTROL, CLOSED (counterclockwise position), and OPEN (clockwise position).

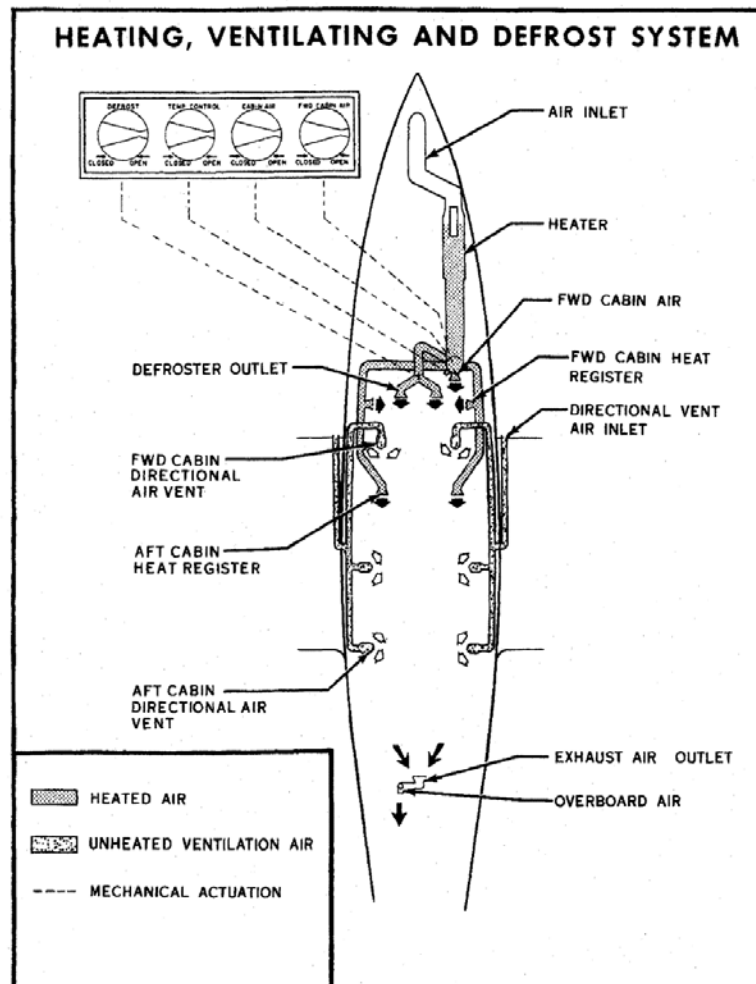


Figure 2-7

is plainly marked for open or closed and may be placed in any intermediate position to regulate the amount of air coming from the registers.

DEFROST KNOB

Windshield defrosting and defogging is controlled by operating the knob labeled DEFROST. When the knob is turned to OPEN, the air flows from the defroster outlets at the base of the windshield. When the knob is turned to CLOSED, airflow to the defroster outlets is shut off. The knob may be set in any intermediate position to regulate the defroster airflow.

HEATER OVERHEAT WARNING LIGHT

An amber overheat warning light is provided and is labeled HEATER OVERHEAT. When illuminated, the light indicates that the heater overheat switch has been actuated and that the temperature of the air in the heater has exceeded 325°F. Once the heater overheat switch has been actuated, the heater turns off and cannot be restarted until the overheat switch, located in the right forward nose compartment, has been reset. Prior to having the overheat switch reset, the heater should be thoroughly checked to determine the reason for the malfunction.

HEATER OPERATION FOR HEATING AND DEFROSTING

- (1) Battery Switch - ON.
- (2) Cabin Air Knob - OPEN.
- (3) Defrost Knob - Adjust as desired (if defrosting is desired).
- (4) Temperature Control Knob - OPEN.
- (5) Cabin Heat Switch - HEAT.
- (6) Heat Registers - As Desired.

Cabin heated air temperature may be increased during operation in extremely cold weather by manually adjusting the defrost, forward cabin and aft cabin air controls to reduce total airflow into the cabin.

- (6) Propeller - RETARD to detent when propeller reaches 1000 RPM.
- (7) Alternator - ON.
- (8) Power - INCREASE slowly until cylinder head temperature reaches 200°F.
- (9) Cowl Flap - AS REQUIRED.

FIRE PROCEDURES

Refer to Section VII if Fire Detection and Extinguishing System is Installed.

FIRE ON THE GROUND (Engine Start, Taxi, and Takeoff with Sufficient Distance Remaining to Stop)

- (1) Throttles - CLOSE.
- (2) Brakes - AS REQUIRED.
- (3) Mixtures - IDLE CUT-OFF.
- (4) Battery - OFF (use gang bar).
- (5) Magnetos - OFF (use gang bar).
- (6) Evacuate aircraft as soon as practical.

IN FLIGHT WING OR ENGINE FIRE

- (1) Both Auxiliary Fuel Pumps - OFF.
- (2) Appropriate Engine - SECURE.
 - (a) Mixture - IDLE CUT-OFF.
 - (b) Propeller - FEATHER.
 - (c) Fuel Selector - OFF.
 - (d) Alternator - OFF.
 - (e) Magnetos - OFF.
- (3) Cabin Heater - OFF.
- (4) Land and evacuate aircraft as soon as practical.

IN FLIGHT CABIN FIRE OR SMOKE

- (1) Electrical Load - REDUCE to minimum required.
- (2) Attempt to isolate the source of fire or smoke.
- (3) Wemacs - OPEN.
- (4) Cabin Air Controls - OPEN (all vents including windshield defrost).
If intensity of smoke increases - CLOSE.

CAUTION

Opening the foul weather window or cabin door will create a draft in the cabin and may intensify a fire.

- (5) Land and evacuate aircraft as soon as practical.

SUPPLEMENTARY INFORMATION CONCERNING AIRCRAFT FIRES

With the use of modern installation techniques and material the probability of an aircraft fire occurring in your aircraft is extremely remote. However, in the event a fire is encountered, the following information will be helpful in dealing with the emergency as quickly and safely as possible.

The preflight checklist is provided to aid the pilot in detecting conditions which could contribute to an aircraft fire. As a fire requires both fuel and an ignition source, close preflight inspection should be given to the engine compartment and wing leading edge and lower surfaces. Leaks in the fuel system, oil system, or exhaust system can lead to a ground or airborne fire.

NOTE

Flight should not be attempted with known fuel, oil, or exhaust leaks. The presence of fuel, unusual oil or exhaust stains may be an indication of system leaks and should be carefully investigated prior to flight.

If an aircraft fire is discovered on the ground or during takeoff, but prior to committed flight, the aircraft is to be landed and/or stopped and the passengers and crew evacuated as soon as practical.

Fires originating inflight must be controlled as quickly as possible in an attempt to prevent major structural damage. Both auxiliary fuel pumps should be turned off to reduce pressure on the total fuel system (each auxiliary pump pressurizes a crossfeed line to the opposite fuel selector). The engine on the wing in which the fire exists should be shut

NOTE

The deice system is manually controlled. Every time a deicing cycle is desired, the switch must be positioned to ACTUATE. The switch will instantly spring back to OFF, but a 6 second delay action in the timing relay will complete the deicing inflation cycle.

- (2) Check boots visually for complete deflation to the vacuum hold-down position.

NOTE

Complete inflation and deflation cycle will last approximately 30 seconds.

In Flight

- (1) When ice has accumulated to approximately 1/2 inch thick on the leading edges, position deice switch to ACTUATE.

After Landing

- (1) Check boots for damage and cleanliness. Remove any accumulations of engine oil or grease.

OPERATING DETAILS

Cycling the deice boots produces no adverse aerodynamic effects in any attitude within the allowable flight limitations.

Deice boots are intended to remove ice after it has accumulated rather than preventing its formation. If the

rate of ice accumulation is slow, best results can be obtained by leaving the deice system OFF until 1/4 to 1/2 inch of ice has accumulated. After clearing this accumulation with one or two cycles of operation, the system should remain OFF until a significant quantity of ice has again accumulated. Rapid cycling of the system is not recommended, as this may cause the ice to grow outside the contour of the inflated boots, preventing its removal.

NOTE

Since wing and horizontal stabilizer deice boots alone do not provide adequate protection for the entire aircraft, known icing conditions should be avoided whenever possible. If icing is encountered close attention should be given to the pitot-static system, propellers, induction systems, and other components subject to icing.

The deice system will operate satisfactorily on either or both engines. During single-engine operation, suction to the gyros will drop momentarily during the boot inflation cycle.

DEICE BOOT CARE

Deice boots have a special, electrically-conductive coating to bleed off static charges which cause radio interference and may perforate the boots. Fueling and other servicing operations should be done carefully, to avoid damaging this conductive coat or tearing the boots.

Keep the boots clean and free from oil and grease, which swell the rubber. Wash the boots with mild soap and water, using benzol or unleaded gasoline, if necessary, to remove stubborn grease. Do not scrub the boots and be sure to wipe off all solvent before it dries.

Small tears and abrasions can be repaired temporarily without removing the boots and the conductive coating can be renewed. Your Cessna Dealer has the proper materials and know-how to do this correctly.

PROPELLER DEICE SYSTEM

The propeller deice system consists of electrically heated boots on the propeller blades. Each boot consists of two heating elements "Outboard" and "Inboard," which receive their electrical power through a deice timer. To reduce power drain and maintain propeller balance, the timer directs current to the propeller boots in cycles between boot elements and between propellers.

NORMAL PROCEDURES

To operate the propeller deice system proceed as follows:

- (1) Battery Switch - ON
- (2) Propeller Deice Switch Breaker - ON (up position).
- (3) Ammeter - CHECK.

NOTE

- Periodic fluctuation within the green arc of the propeller deice ammeter pointer indicates normal operation of the deicing elements of first one propeller and then the other.
- To check all the heating elements of both propellers and the deice timer for normal operation, the system must be left ON for approximately two and one-half minutes.

The timer directs current to the propeller boots in cycles between boot elements and between propellers in the following cycling sequence:

Heating Period No. 1 - Outboard halves - right engine blades.
Heating Period No. 2 - Inboard halves - right engine blades.
Heating Period No. 3 - Outboard halves - left engine blades.
Heating Period No. 4 - Inboard halves - left engine blades.

Each heating period lasts for approximately one-half minute.

EMERGENCY PROCEDURES

Abnormal operation of the propeller deice system is indicated by the propeller deice switch breaker tripping to the OFF position. Failure of the switch breaker to stay reset indicates that deicing is impossible for the propellers.

A reading below the green arc on the propeller deice ammeter indicates that the blades of the propeller are not being deiced uniformly.

WARNING

When uneven deicing of the propeller blades is indicated, it is imperative that the deicing system be turned OFF. Uneven deicing of the blades can result in propeller unbalance and engine failure.

DUAL HEATED PITOT STATIC SYSTEM

The dual heated pitot static system consists of a pitot head located on each side of the fuselage nose cap, the pilot's and copilot's pitot static instruments, dual static sources for the pilot's and copilot's instruments and an alternate static source for the pilot's instruments only. See Figure 6-2 for pilot's and copilot's airspeed calibrations when using normal static source. Refer to the Pilot's Checklist for the pilot's instruments airspeed and altimeter calibrations when using the alternate static source.

The pilot's instruments are connected to the left pitot tube and the upper left and right static sources located on the aft fuselage. When the alternate static source is selected, the pilot's instruments reference the static pressure in the cabin.

The copilot's instruments are connected to the right pitot tube and the lower left and right static sources located on the aft fuselage. No alternate static source is provided for the copilot's instruments.

ALCOHOL WINDSHIELD DEICE SYSTEM

The alcohol windshield deice system consists of an alcohol tank, a pump, left and right-hand dispersal tubes, and a switch breaker.

The alcohol tank, located in the aft end of the right wing locker, has a 3.0 gallon capacity. The tank should be filled with isopropyl alcohol only. Water dilution of the alcohol is not recommended, as any water contained in the alcohol will reduce the efficiency of ice removal and may freeze on the windshield at very low temperatures. The pump located adjacent to the tank provides positive pressure to the windshield dispersal tubes. The left and right-hand dispersal tubes located at the forward base of the windshield provide flow pattern control throughout the aircraft's speed envelope. Each tube contains five holes which should be inspected and cleaned with a small diameter wire as necessary.

NORMAL PROCEDURES

Before Entering Aircraft

- (1) During the exterior inspection, check the windshield dispersal tubes for cleanliness. Check the tank alcohol level. Flow requirements are 3.0 gallons per hour of continuous operation.

During Engine Runup

- (1) Position the windshield deice switch breaker to ON. Allow approximately 10 seconds for flow to begin. Assure that each of the five holes in left and right-hand dispersal tubes are flowing alcohol. Return the windshield deice switch breaker to the OFF position.

Normal Operation

To operate the windshield deice system, proceed as follows:

- (1) Windshield Deice Switch Breaker - ON.

NOTE

For operation in continuous enroute icing conditions, allow approximately 1/8 to 1/4 inch of ice to accumulate. The windshield deice system can be used as an anti-ice system by continuous use and should be so used during the approach to landing. However, the maximum endurance with a 3-gallon tank is approximately 1.0 hour of continuous operation. Airspeed should be 140 KIAS or below for best results.

- (2) Windshield - CHECK (allow approximately 10 seconds for alcohol flow to begin).
- (3) When windshield ice is removed, windshield deice switch breaker OFF.

WARNING

The windshield deice switch breaker must be positioned OFF 20 seconds prior to reaching minimum descent altitude. The alcohol film must be allowed to evaporate before a clear field of vision through the windshield is available.

EMERGENCY PROCEDURES

Abnormal operation of the alcohol windshield deice system is indicated by the switch breaker tripping to the OFF position or failure of alcohol to flow onto the windshield. Do not leave system on more than 3 minutes without alcohol flow.