

**Pilot's Operating Handbook and
FAA Approved Airplane Flight Manual
Supplement
for the**

Air Conditioning System

When the Air Conditioning System is installed in the Cirrus Design SR22, this POH Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Cirrus Design SR22 Pilot's Operating Handbook. This document must be carried in the airplane at all times. Information in this supplement adds to, supersedes, or deletes information in the basic SR22 Pilot's Operating Handbook.

FAA Approved



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Section 1 - General

The Air Conditioning System is designed to heat and cool the cabin to desired temperature settings and maintain comfortable humidity levels.

The system consists of an engine driven compressor, condenser assembly, evaporator assembly, exhaust heat exchanger, fresh air inlet, air-mixing plenum, blower fan, distribution manifold, ducting, windshield diffuser, vent outlets, associated plumbing, controls, actuators, wiring for system flow-selection and temperature control.

Ventilation and cooling is provided by ducting fresh air from the wing inlet, located in the right wing, to the mixing plenum located under the front passenger seat. Depending on operating mode and temperature selection, the air in the plenum is ducted directly into the distribution system or, if in air-conditioning mode, is further cooled by the evaporator assembly mounted adjacent to the mixing plenum.

Heating is accomplished by mixing ventilation air from the fresh air inlet with heated air provided by the muff-type heat exchanger surrounding the right engine exhaust muffler.

The conditioned air is then forced by ram air pressure or by blower fan into a distribution manifold which regulates system airflow and vent selection. Airflow, temperature, and vent selection is accomplished using the system control panel mounted on the right hand portion of the instrument panel.

The aircraft engine must be running for the air-conditioner to operate.

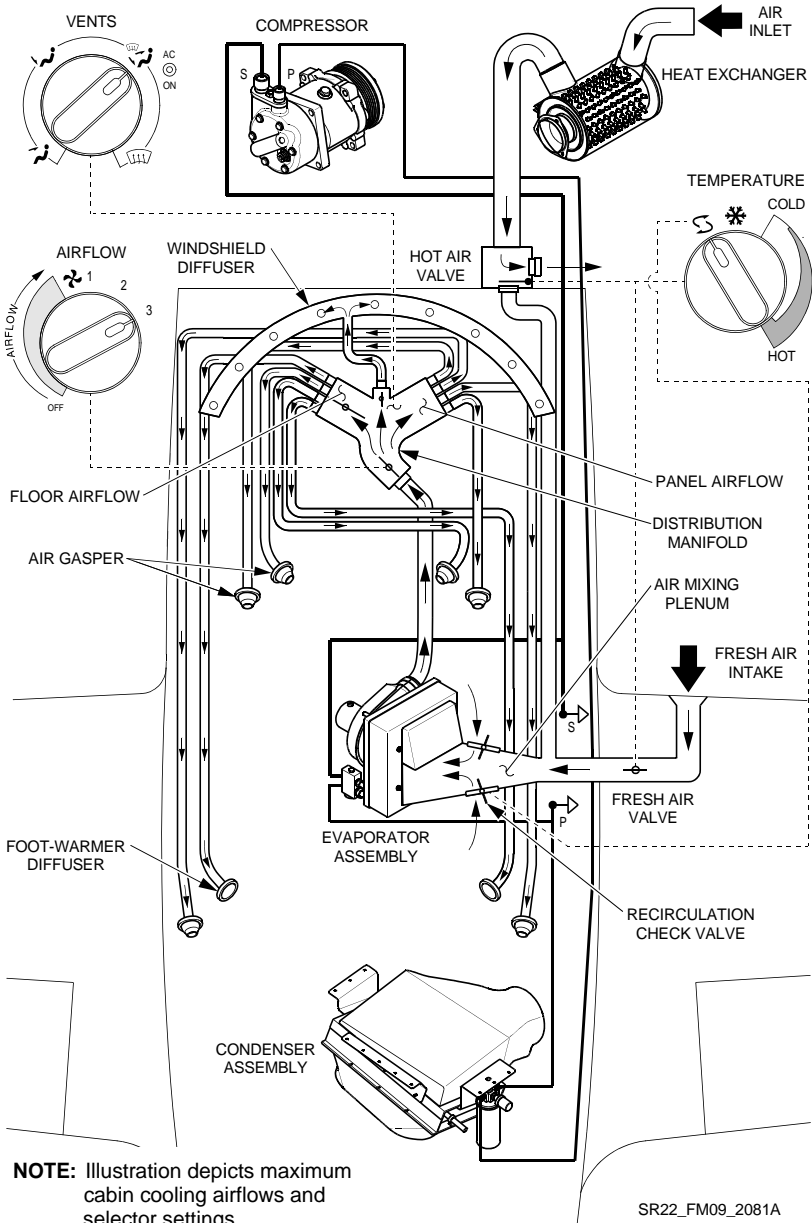


Figure - 1
Air Conditioning System Schematic

Section 2 - Limitations

1. The air-conditioner must be off (A/C light extinguished) during takeoff, landing, and initial climb.

Section 3 - Emergency Procedures

Engine Failure In Flight

1. Air-conditioner.....OFF

Engine Airstart

1. Air-conditioner.....OFF

Engine Partial Power Loss

1. Air-conditionerOFF

Low Oil Pressure

1. Air-conditionerOFF

Smoke and Fume Elimination (See Figure - 2)

1. Air-conditionerOFF
2. Temperature Selector..... MAX FRESH AIR
3. Vent Selector..... FEET/PANEL/DEFROST POSITION
4. Airflow SelectorFAN OFF, MAX RAM AIR
5. Panel Eyeball Outlets.....OPEN

Engine Fire In Flight (See Figure - 2)

1. Air-conditioner..... OFF
2. Temperature Selector..... MAX FRESH AIR
3. Vent Selector..... FEET/PANEL/DEFROST POSITION
4. Airflow Selector..... FAN OFF, MAX RAM AIR
5. Panel Eyeball Outlets..... OPEN

Cabin Fire In Flight

1. Air-conditioner..... OFF

Section 3A - Abnormal Procedures

Alternator Failure

1. Air-conditioner..... OFF

Engine Indicating System Failure

1. Air-conditioner..... OFF

LOW VOLTS Warning Light Illuminated

1. Air-conditioner..... OFF

Section 4 - Normal Procedures

Preflight Walk-Around

1. System Vents Unobstructed
2. System Drains Unobstructed

Ground Operation

• Note •

To facilitate faster cabin cooling, prior to engine start leave the cabin doors open for a short time to allow hot air to escape cabin.

For maximum cabin cooling, set Airflow Selector to fan speed 3, Vent Selector to feet/panel/defrost position, and Temperature Selector to recirculation mode. Additionally, ensure the instrument panel and armrest eyeball outlets are open. (See Figure - 1)

1. Control Panel SELECT Desired Mode and Temperature
2. Voltage MONITOR

• Note •

Decrease electrical load if battery discharge is noted.

3. Annunciator Lights CHECK
 - a. Verify ALT 1 caution light out and positive amps indication.
4. Engine Parameters CHECK

Before Takeoff

1. Air-conditioner OFF

Section 5 - Performance

When the air-conditioner is operating the following performance changes will result:

1. Brake Horsepower is reduced by approximately 6 BHP.
2. Maximum rate of climb performance is reduced by approximately 50 feet per minute. For maximum climb performance the air-conditioner should be off.
3. Cruise performance is reduced by 2 knots. If maximum performance is desired, the air-conditioner should be off.
4. Range is decreased by 1%, for maximum range the air-conditioner should be off.

Section 6 - Weight & Balance

Installation of the Air Conditioning System adds the following optional (Sym = O) equipment at the weight and arm shown in the following table.

ATA / Item	Description	Sym	Qty	Part Number	Unit Wt	Arm
21-01	Compressor	O	1	17557-001	15.0	93.1
21-02	Condenser Assembly	O	1	21209-001	17.0	132.8
21-03	Evaporator Assembly	O	1	21114-002	17.5	199.5

Section 7 - System Description

The Air Conditioning System is powered by 28 VDC supplied through the 15-amp Condenser breaker on the A/C Bus 1, and the 15-amp Evaporator Fan breaker and 7.5-amp Compressor/Control Panel breaker on Main A/C Bus 2.

Distribution

Fresh air enters into the cabin distribution system through the right leading edge air inlet and/or the hot air valve on the firewall. After conditioning, air is ducted to the cabin through eyeball outlets, foot-warmer diffusers, and the windshield diffuser by ram air pressure or blower fan. The vent selector on the system control panel is capable of selecting combinations of floor and defrost outputs. Conditioned air is also ducted directly to all panel and armrest eyeball outlets where airflow is controlled separately by pilot and passenger(s) input.

The airflow selector on the system control panel regulates the volume of airflow allowed into the cabin distribution system through mechanical linkage to a butterfly valve in the distribution manifold. When the selector dial exceeds the full open position, the 3-speed blower fan is turned on.

Heating

Ram air from the upper right cowl inlet flows through the upper cowl and is ducted to the heat exchanger. The heated air is then routed to the hot air valve, mounted to the forward side of the firewall, which controls entry of hot air into the cabin distribution system. When the hot air valve is open, the air flows into the cabin mixing plenum. When the hot air valve is closed, the heated air exits into the engine compartment and is exhausted overboard with the engine cooling airflow.

Cooling

Cabin ventilation and cooling is provided by ram air admitted through the fresh air intake on the wing and/or the air-conditioner.

The R134A refrigerant enters the engine mounted compressor as a vapor and is pressurized until the heat-laden vapor reaches a point much hotter than the outside air. The compressor then pumps the vapor to the condenser where it cools, changes to a liquid, and passes to the receiver-drier. The receiver-drier's function is to filter, remove moisture, and ensure a steady flow of liquid refrigerant into the evaporator through the expansion valve - a temperature controlled metering valve which regulates the flow of liquid refrigerant to the evaporator. Inside the evaporator, the liquid refrigerant changes state to a gas and in doing so, absorbs heat. The evaporator then absorbs the heat from the air passing over the coils and the moisture from the air condenses and is drained overboard through the belly of the aircraft. From the evaporator, the refrigerant vapor returns to the compressor where the cycle is repeated.

During normal air-conditioning operation, ram air from the fresh air intake flows into the mixing plenum, is cooled as it passes through the evaporator coils, and is then ducted forward to the distribution manifold. During maximum air-conditioning operation - or recirculation mode - the fresh air intake valve closes and valves in the mixing plenum open allowing cabin air to be recirculated and further cooled as the air passes through the evaporator coils and ducted forward to the distribution manifold.

Conditioned air is circulated through the system by ram air or by the blower fan mounted adjacent to the evaporator.

Airflow Selection

The airflow selector regulates the volume of airflow allowed into the cabin distribution system through mechanical linkage to a butterfly valve in the distribution manifold. When the selector dial exceeds the full open position, the 3-speed blower fan is turned on.

Vent Selection

Conditioned air from the distribution manifold can be proportioned and directed to passengers and/or the windshield by manipulating the cabin vent selector. The selector is mechanically linked to butterfly valves at the entrances to the windshield diffuser and the cabin floor ducting. There is continuous airflow to the panel and armrest eyeball outlets. Each occupant can control the flow rate from 'off' to maximum by rotating the nozzle.

When the selector is in the far left position, both butterfly valves are closed providing maximum airflow to the panel and armrest eyeball outlets.

Rotating the selector a quarter-turn clockwise opens the cabin floor butterfly valve allowing airflow to the rear seat foot warmer diffusers and the front seat outlets mounted to the underside of each kickplate.

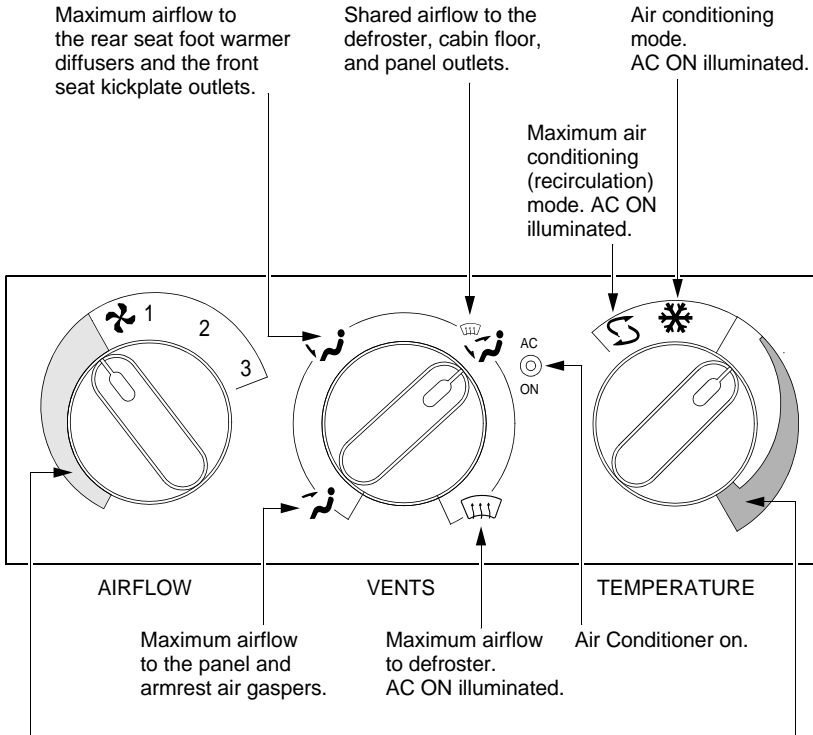
Rotating the selector another quarter-turn clockwise opens the windshield diffuser butterfly valve which permits shared airflow to the defrosting mechanism and cabin floor outlets.

When the selector is in the far right position, the cabin floor butterfly valve is closed providing maximum airflow to the windshield diffuser.

When the full/max defrost position is selected, the air-conditioner is activated to provide conditioned, dry air to the diffuser to facilitate windshield defogging. The A/C ON light will illuminate in the full/max defrost position.

Temperature Selection

The temperature selector is mechanically linked to the hot air valve and fresh air intake valve. Rotating the selector simultaneously opens and closes the two valves, permitting hot and cold air to enter the air-mixing plenum. When the temperature selector is moved to the ❄️ position, the hot air valve completely closes and the air-conditioner is activated. When ↻ is selected, the fresh air valve completely closes and cabin air is recirculated to provide for maximum air-conditioning operation. The A/C ON light will illuminate when ❄️ or ↻ is selected.



Rotating the selector controls the volume of airflow allowed into the cabin distribution system by opening and closing a butterfly valve in the distribution manifold. When the selector dial exceeds the full open position, the 3-speed blower fan is turned on.

Rotating the selector simultaneously opens and closes the hot and fresh air butterfly valves, permitting conditioned (mixed) air to enter distribution system.

NOTE: Illustration depicts settings for Emergency Procedures Smoke and Fume Elimination and Engine Fire in Flight.

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Figure - 2
Air Conditioning System Operation

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