KEITH PRODUCTS, L.P.

CERTIFICATION REPORT NO. CR-220-9

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR CIRRUS DESIGN CORPORATION MODEL SR22

S/N: _____
REG: _____

WITH
KEITH PRODUCTS, L.P.
AIR CONDITIONING SYSTEM

This supplement shall be attached to the applicable FAA approved airplane flight manual when a Keith Products Air Conditioning System with refrigerant R134a is installed in accordance with STC No. SA10195SC.

The information contained herein supplements the basic manual only in those areas listed herein. For limitations, procedures, performance, and weight and balance information not contained in this supplement, consult the basic flight manual.

APPROVED: _____
S. Frances Cox, Manager
Special Aircraft Certification Office
Federal Aviation Administration
Fort Worth, TX 76193-0190

LOG OF REVISIONS

REV.	PAGES	DESCRIPTION	FAA APPROVAL	DATE
NC	1 thru 12	Original Release	None	None
A	3 5 9	Revised System Weight, WAS 69.9 lbs Added (2) and (3) under OTHER LIMITATIONS. Revised CB placard locat. Power generation was 90Amps.	S. F. Cox	10/14/2003
B	1 3,4 5 thru 8 6,7 14	Added STC No. and removed total system weight. Added System Configurations Added kit nos. to placards Added placards (1.b) thru (1.e) Revised ducting description	CP Fred Stellar	04/07/2004
C	4 7	Added 220-0100-18 kit to System Configuration and to section (1.e). Reason: New GTS kit per ER2801.	Fred Stellar	07/18/2005
D	5	Added to section 2 Instruments: (S/N 1663 and prior); Unless the MCU is already equipped with an equivalently modified MCU Reason: Vendor P/N CHG/OBS per ER3183		

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CIRRUS DESIGN SR22

SECTION 1 GENERAL

Air Conditioning System Description

Compressor……..…..Engine Driven off
Auxiliary Drive Pad

Evaporator Fan ……...…….28 VDC Centrifugal

Condenser Fan…….28 VDC Axial

Refrigerant……..……1.9 lbs R134a

Total System Current……..23.4 A @ 28VDC.

System Configurations

The air conditioning system has two basic system kits and six different trim kits for the various configurations of the SR22. The 220-0100-7 system kit is for SR22 aircraft with serial numbers up to and including 819. The 220-0100-8 system kit is for SR22 aircraft with serial numbers 820 and up, or what is known as the "SR22-G2" . The 220-0100–11 trim kit is for SR22-G2 aircraft with the black instrument panel. The 220-0100-12 trim kit is for SR22-G2 aircraft with the "Sand" colored instrument panel. The 220-0100-13 trim kit is for SR22-G2 aircraft with the "Onyx" colored instrument panel. The –14, -15 and –16 trim kits are for original SR22 aircraft which do not already have the required Volt/Amp Indicator (Cirrus P/N 11240-001), and are only used on pre-S/N 820 aircraft. The 220-0100-14 trim

kit is for aircraft with the AVIDYNE MFD and black instrument panel. The 220-0100-15 trim kit is for Centennial Edition aircraft. The 220-0100-16 trim kit is for aircraft with the ARNAV MFD and black instrument panel.
The –17 trim kit is for original SR22 aircraft with the AVIDYNE MFD and black instrument panel which do already have the required Volt/Amp Indicator (Cirrus P/N 11240-001). The 220-0100-18 trim kit is for the GTS version.

SECTION 2 **LIMITATIONS**

OPERATIONAL

The air conditioning system must be off during takeoff, maximum performance climb, and landing.

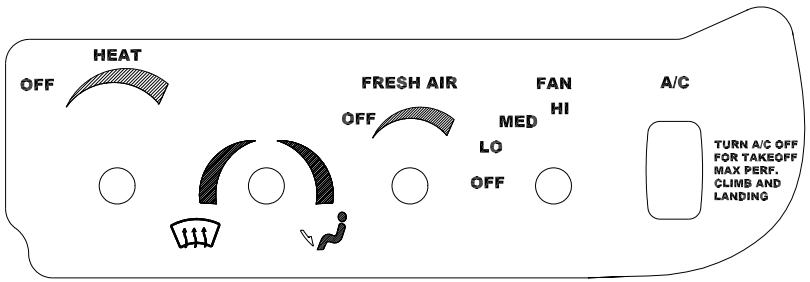
Instruments

Volts/Amp Indicator (Cirrus part number 11240-001) is a required indicator when this Keith Products Air Conditioning System is installed. (S/N 1663 and prior)

Master Control Unit (MCU) modification per Cirrus drawing 15737 is required when this Keith Products Air Conditioning System is installed, unless the MCU is already equipped with an equivalently modified MCU.

Placards

(1.a) On the right side of the instrument panel (220-0100-16 only)



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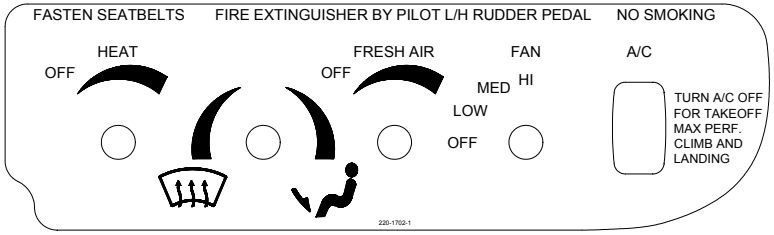
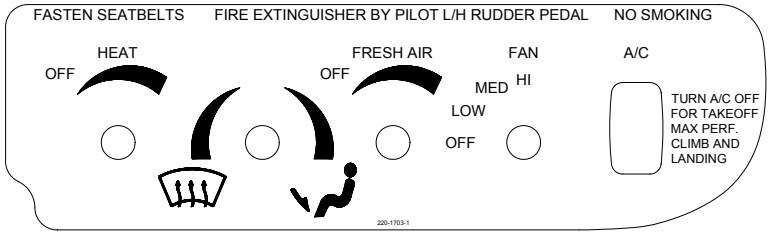
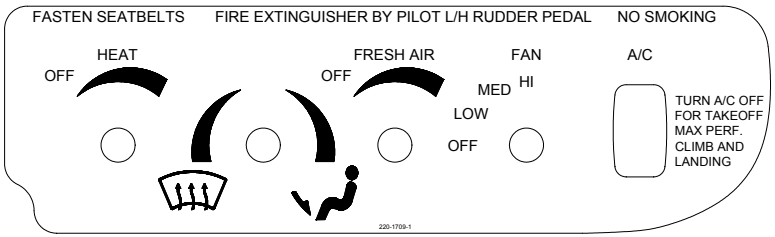
(1.b) On the right side of the instrument panel (220-0100-11, 220-0100-14 and 220-0100-17 only)



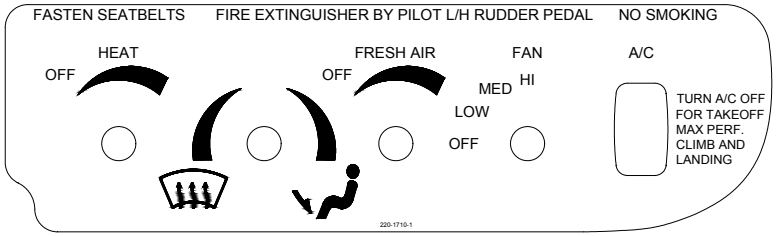
(1.c) On the right side of the instrument panel (220-0100-15 only)



(1.d) On the right side of the instrument panel (220-0100-12 only)



(1.e) On the right side of the instrument panel (220-0100-13 and 220-0100-18 only)



(2) On circuit breaker panel next to the air conditioning system circuit breaker (220-0100-7 & 220-0100-8)

AIR COND.

(3) On the center of the instrument panel above the instruments (220-0100-16 only)

FIRE EXTINGUISHER LOCATED BY PILOT L/H RUDDER PEDAL
220–1667–1

(4) On the inside of the baggage door (220-0100-7 & 220-0100-8)

DISTRIBUTED FLOOR LIMIT 110 LBS

BAGGAGE STRAP CAPACITY IS 35 LBS EACH MAXIMUM

SEE AIRPLANE FLIGHT MANUAL FOR BAGGAGE TIE-DOWN AND WEIGHT AND BALANCE INFORMATION

220-1303-1

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(5) Under the left side of the instrument panel adjacent to condenser fan breaker (220-0100-7 & 220-0100-8)

CABIN
BLOWER

(6) Under the left side of the instrument panel adjacent to the cabin blower breaker (220-0100-7 & 220-0100-8)

COND. FAN

Other Limitations

(1)The MCU modified per Cirrus drawing 15737, is limited to 75 Amps continuous load.

(2) The air conditioning system requires a MIN 95A Alternator.

(3) The air conditioning system requires a R.H. drive pad installed BC410-01 or 13565-001 secondary alternator.

SECTION 3 EMERGENCY PROCEDURES

GROUND EMERGENCIES:

Engine Fire During Start	
Air Conditioning	OFF
Brake Failure During Taxi	
Air Conditioning	OFF
Aborted Takeoff	
Air Conditioning	OFF
Emergency Engine Shutdown on Ground	
Air Conditioning	OFF
Emergency Ground Egress	
Air Conditioning	OFF

IN-FLIGHT EMERGENCIES

Engine Failure on Takeoff (Low Altitude)	
Air Conditioning	OFF
Engine Failure In Flight	
Air Conditioning	OFF
Engine Air Start	
Air Conditioning	OFF
Engine Partial Power Loss	
Air Conditioning	OFF
Low Oil Pressure	
Air Conditioning	OFF
Propeller Governor Failure	
Air Conditioning	OFF
Smoke and Fume Elimination	
Air Conditioning	OFF
Engine Fire In Flight	
Air Conditioning	OFF
Wing Fire In Flight	
Air Conditioning	OFF
Cabin Fire In Flight	
Air Conditioning	OFF
Inadvertent Icing Encounter	
Air Conditioning	OFF

Emergency Descent	
Air Conditioning	OFF
Door Open In Flight	
Air Conditioning	ON or OFF
Inadvertent Spin Entry	
Air Conditioning	ON or OFF
CAPS Deployment	
Air Conditioning	OFF

LANDING EMERGENCIES:

Forced Landing (Engine Out)	
Air Conditioning	OFF
Landing Without Elevator Control	
Air Conditioning	OFF
Landing With Failed Brakes	
Air Conditioning	OFF
Landing With Flat Tire	
Air Conditioning	OFF

SYSTEM MALFUNCTIONS:

Alternator Failure	
Air Conditioning	OFF
LOW VOLTS Warning Light Illuminated	
Air Conditioning	OFF
Communications Failure	
Air Conditioning	ON or OFF
Power Lever Linkage Failure	
Air Conditioning	ON or OFF
Pitot Static Malfunction	
Air Conditioning	ON or OFF
Electric Trim/Auto-pilot Failure	
Air Conditioning	ON or OFF

SECTION 4 NORMAL PROCEDURES

AIR CONDITIONING

Air conditioning may be operated on the ground with the engine operating and the aircraft electrical system providing 28 volts DC to the main buss. Air conditioning may be operated in flight during normal climb, cruise and descent.

CABIN FAN

1. Pushbutton Switch……..NOT ENGAGED
2. Fan Control Knob……ROTATED TO HI, MED, OR LO

The cabin fan is operable with and without the air conditioning system operational. Air can be distributed through all foot, defog, and eyeball outlets.

Note: With only the cabin fan on, the green light in the A/C switch will stay off and fresh air inlets will remain open.

AIR CONDITIONING

1. Pushbutton Switch……..……..ENGAGED
2. Fan Control Knob……..…..ROTATED TO HI, MED, OR LOW
3. White Snowflake Light…….…....DIM AS REQUIRED

Note: With the air conditioning system engaged, the green light in the A/C switch will illuminate, and the fresh air inlets from the wing will automatically seal to allow the conditioned air to re-circulate within the cabin.

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SECTION 5 PERFORMANCE DATA

No Change.

SECTION 6 WEIGHT AND BALANCE

No change to the original weight and balance limits. See the Aircraft Weight and Balance Data, located in the Airplane Flight Manual, for the air conditioning system weight, new empty weight, C.G. and moment.

SECTION 7 AIRPLANE SYSTEMS AND DESCRIPTIONS

Fire Extinguisher

The cabin fire extinguisher is relocated to the left side of the fuselage near the pilot's left ankle, forward of the cup holder in the trim panel indentation.

Electrical System

Power Generation:
At minimum, a 95-amp alternator is required equipment for the air conditioning installation.

Volt/Amp Meter:
The amp pointer sweeps a scale from –100 to +100 amps with zero at the 9'oclock position.

Environmental System
Air Conditioning System

Components:
The major components for the R134a vapor cycle air-conditioning system consist of a compressor, condenser, receiver/drier, expansion valve, and evaporator.

Refrigerant hoses are routed from the engine compartment, along the cabin floor and side panels, and continue aft to the baggage compartment.

A pushbutton switch labeled “A/C” and a rotary switch labeled “FAN” are mounted on the right side of the instrument panel with associated wiring running with existing wiring bundles and new refrigerant plumbing.

Three circuit breakers are associated with the air conditioning system: one 2-amp control circuit breaker located on the non-essential circuit breaker panel by the pilot’s right knee, and two 15-amp circuit breakers underneath the left side of the instrument panel.

Operation:
The compressor takes the low-temperature, low-pressure gas and compresses it to a high-temperature, high-pressure gas. The auxiliary drive pad located at the rear left side of the engine turns the compressor via a drive assembly and belt.

After the high-temperature, high-pressure gas leaves the compressor, it enters the condenser/fan assembly in the baggage compartment. A 28 VDC blower forces outside air through the condenser, which cools the high-temperature, high-pressure gas until it condenses to a medium-temperature, high-pressure liquid.

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The refrigerant then enters the receiver/drier, which stores liquid refrigerant and filters out any moisture and contaminants.

After the medium-temperature, high-pressure liquid leaves the receiver/drier it enters the expansion valve. This allows the medium-temperature, high-pressure liquid to expand to a low-temperature, low-pressure spray of liquid.

After the liquid leaves the expansion valve it enters the evaporator/fan assembly mounted under the pilot’s seat. A 28 VDC blower forces cabin air through the evaporator. The air from the cockpit causes the low-temperature, low-pressure liquid spray to boil and then evaporate. This low-temperature, low-pressure gas passes through the suction hose into the compressor. The refrigerant cycle continues, cooling the aircraft cabin.

Air is cooled as it passes through the evaporator, and moisture from the air condenses in the evaporator and liquid water is formed. The water then drains overboard through a drain in the floor of the aircraft.

The cold air is distributed through the cabin by flexible ducting. Cold air from the evaporator is routed under the floor to a splitter which directs the air to the left and right sides of the aircraft. Each duct then branches again to one outlet in the passenger compartment and two outlets in the instrument panel.

When the A/C switch is pushed in, power engages the compressor clutch, the condenser fan, and a pneumatic assembly on the underside of the forward access panel underneath the pilot’s feet. The pneumatic assembly inflates a bladder valve inside an inlet tee to restrict airflow from the fresh air inlet, located in each leading edge wing

root. This allows the cold air from the air conditioning system to be undiluted by warm outside air.

The outlets automatically open to outside air when the air conditioning system is turned off or in the event of a power failure.

A white light in the A/C switch remains illuminated when the electrical system is on. Rotating the INST lights control on the instrument panel bolster counterclockwise will dim this light. A green light in the A/C switch illuminates when there is power to the condenser, compressor, and pneumatic assembly.

SECTION 8 HANDLING, SERVICE, AND MAINTENANCE

Service Publications

A Maintenance Manual (CR-220-10) containing FAA-approved Instructions for Continued Airworthiness and Airworthiness Limitations is available from Keith Products. Call 972-407-1234 or download from www.keithproducts.com.

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DETACH AND DISCARD

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