CIRCUIT AIRPLANE MAINTENANCE MANUAL MODELS SR22 AND SR22T

COOLING

1. DESCRIPTION

On aircraft Serials 22-1863 and subsequent and 22T-0001 and subsequent, an optional air-conditioning system is available. This section covers those systems and components used to supply cooled air. Includes items such the cooling unit, indicating systems related to cooler operation, and wiring.

Cabin ventilation and cooling is provided by ram air admitted through the fresh air intake on the wing (Serials 22-1863 thru 22-2437), or the NACA vent on the RH lower cowl (Serials 22-2438 & subs, 22T-0001 & subs) and/or a vapor cycle air-conditioning system. The aircraft engine must be running for the air-conditioning system to operate.

The air conditioning system consists of an engine driven compressor, condenser assembly with integral blower fan and receiver-drier, evaporator assembly with integral expansion valve assembly, and all associated plumbing and control mechanisms.

The air-conditioning system uses refrigerant R134A. The refrigerant enters the engine mounted compressor as a vapor. The compressor pressurizes the heat-laden vapor until the pressure and heat reach a point much hotter than the outside air. The compressor then pumps the vapor to a condenser mounted under the baggage compartment floor, where the vapor cools and changes to a liquid. The liquid then passes to the receiver-drier. The receiver-drier’s function is to filter, remove any moisture, and ensure a steady flow of liquid refrigerant into an expansion valve and evaporator mounted under the RH crew seat. The expansion valve is 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. Moisture from the air condenses in the evaporator 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 condition operation, ram air from the fresh air intake flows into the evaporator assembly. The air is cooled as it passes through the evaporator coils, and is then ducted forward to the distribution manifold. Conditioned air is circulated through the system by ram air or a by blower fan adjacent to the evaporator.

During maximum air conditioning operation, the fresh air intake valve closes and valves in the evaporator assembly 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 a blower fan adjacent to the evaporator.

Serials 22-1863 & subs: 28 VDC for air conditioning system operation is supplied through the 15-amp CONDENSER breaker on A/C Bus 1, the 15-amp FAN breaker on A/C Bus 2, and the 7.5-amp COMPRESSOR/CONTROL breaker on A/C Bus 2.

Serials 22T-0001 & subs: 28 VDC for air conditioning system operation is supplied through the 15-amp A/C COND breaker on A/C Bus 1, the 15-amp CABIN FAN breaker on A/C Bus 2, and the 5-amp A/C COMPR breaker on A/C Bus 2.
## 2. TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient cooling.</td>
<td>Refrigerant low or leaking.</td>
<td>Perform Inspection/Check - System Plumbing Refrigerant Leak Test. Repair leak as necessary. (Refer to 21-50)</td>
</tr>
<tr>
<td>Air in system.</td>
<td></td>
<td>Perform Air Conditioning System Flushing. (Refer to 21-50)</td>
</tr>
<tr>
<td>Faulty condenser.</td>
<td></td>
<td>Inspect condenser for dirty and/or bent fins. (Refer to 21-50)</td>
</tr>
<tr>
<td>Blocked high pressure line.</td>
<td></td>
<td>Remove restriction.</td>
</tr>
<tr>
<td>Plugged receiver/drier.</td>
<td></td>
<td>Replace condenser. (Refer to 21-50)</td>
</tr>
<tr>
<td>Faulty compressor.</td>
<td></td>
<td>Replace compressor. (Refer to 21-50)</td>
</tr>
<tr>
<td>Excessive oil in system.</td>
<td></td>
<td>Perform Air Conditioning System Flushing. (Refer to 21-50)</td>
</tr>
<tr>
<td>Moisture in system.</td>
<td>Excessive moisture in receiver/drier.</td>
<td>Replace condenser. (Refer to 21-50)</td>
</tr>
<tr>
<td>Ice buildup in expansion valve.</td>
<td></td>
<td>Perform Air Conditioning System Flushing. (Refer to 21-50)</td>
</tr>
<tr>
<td>Refrigerant flow restricted.</td>
<td></td>
<td>Remove restriction.</td>
</tr>
<tr>
<td>Water blown out of evaporator.</td>
<td>Blocked evaporator drain.</td>
<td>Remove restriction in drain line.</td>
</tr>
<tr>
<td>No cooling.</td>
<td>Faulty evaporator expansion valve.</td>
<td>Replace evaporator. (Refer to 21-50)</td>
</tr>
<tr>
<td>Sweating or frosted suction line.</td>
<td>Faulty evaporator expansion valve.</td>
<td>Replace evaporator. (Refer to 21-50)</td>
</tr>
<tr>
<td>Sweating or frosted expansion valve outlet.</td>
<td>Faulty evaporator expansion valve.</td>
<td>Replace evaporator. (Refer to 21-50)</td>
</tr>
<tr>
<td>Conditioned air feels warm.</td>
<td>Hot air valve not sealing tight in HEAT OFF position.</td>
<td>Adjust or connect control linkage. (Refer to 21-60) Replace hot air valve. (Refer to 21-40)</td>
</tr>
</tbody>
</table>

**Note:** During extended use, the air conditioning system may cycle on and off to prevent components from freezing up. This cyclic behavior is considered normal and is not indicative of a problem.
3. MAINTENANCE PRACTICES

A. Compressor (See Figure 21-501)

(1) Servicing - Compressor

If compressor has been disconnected and exposed to air for an extended period of time, or an unapproved oil has been added to compressor, perform the following procedure to flush and lubricate the compressor.

(a) Acquire necessary tools, equipment, and supplies.

(b) Remove compressor. (Refer to 21-50)

(c) Remove caps from high and low pressure fittings on compressor.

(d) Remove drain plug from compressor.

(e) Rotate compressor shaft several times and tilt compressor to drain oil.

(f) Pour isopropyl alcohol into high pressure, low pressure, and drain ports.

(g) Slosh, tilt, and rotate compressor shaft while alcohol drains out.

(h) Repeat previous steps until alcohol runs out clear.

(i) Using dry nitrogen or dry air, blow out ports to evaporate remaining alcohol.

(j) Install compressor drain plug.

(k) Connect vacuum pump to high and low pressure fittings on compressor.

(l) Operate pump for 30 minutes to evacuate compressor.

(m) Remove vacuum pump.

CAUTION: Polyolester oil and polyalkylene glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)

(n) Replenish compressor with approved oil. (See Figure 12-101)

(o) Install caps to high and low pressure fittings on compressor.

(p) Install compressor. (Refer to 21-50)

(2) Removal - Compressor

(a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.

(b) Serials 22-1863 & subs: Pull COMPRESSOR/CONTROL circuit breaker.

(c) Serials 22T-0001 & subs: Pull A/C COMPR CONTROL circuit breaker.

(d) Discharge air conditioning system. (Refer to 12-10)

(e) Remove engine cowl ing. (Refer to 71-10)

CAUTION: Before disconnecting plumbing, ensure vacuum in system is minimal or the O-rings could be pulled into the system.

(f) Disconnect compressor hoses from firewall. Discard O-rings.

(g) Cap fittings and hoses.

(h) Remove clamps securing hoses to engine baffling.
(i) **Serials w/ Keith Products Air Conditioning System:** Remove resistor.
   1. Disconnect resistor wire from wire harness.
   2. Remove bolt, washers, clamp, and nut securing resistor wire to engine baffling.
   3. Remove screws, washers, and nuts securing resistor to engine baffling.

(j) **Serials w/ Enviro Air Conditioning System:** Remove resistor.
   1. Disconnect resistor wire from wire harness.
   2. Remove nut, washers, and clamp securing resistor wire to alternator mounting stud.
   3. Remove bolt, washers, and clamp securing resistor wire to alternator blast tube bracket.
   4. Remove screws and washers securing resistor to compressor.

(k) Remove nuts and washers securing compressor to engine. Remove compressor and old gasket from airplane.

(3) **Disassembly - Compressor (See Figure 21-502)**
   (a) Adjust turnbuckle to reduce belt tension and remove drive belt from compressor drive unit pulley and compressor clutch pulley.
   (b) Remove bolt, washers, and nut securing turnbuckle to drive unit.
   (c) Remove bolt, washers, and nut securing drive unit to compressor.
   (d) Remove bolts, washers, spacers, and vibration dampeners securing drive shaft flange to drive unit.
   (e) Perform Inspection/Check - Compressor Drive Shaft. ([Refer to 21-50])

(4) **Assembly - Compressor (See Figure 21-502)**
   (a) Acquire necessary tools, equipment, and supplies.
   (b) Coat entire spline of drive shaft assembly with lubricant.
   (c) Position vibration dampeners and spacers to drive shaft flange mounting holes of drive unit.
   (d) Slide drive shaft flange into drive unit.
   (e) Hand tighten bolts, washers, spacers, and vibration dampeners in an alternating pattern securing drive shaft flange to drive unit.
   (f) **Serials w/ Keith Products Air Conditioning System:** Torque bolts to 12 - 15 in-lb (1.36 - 1.69 Nm) in an alternating pattern.
   (g) **Serials w/ Enviro Air Conditioning System:** Torque bolts to 55 - 60 in-lb (6.21 - 6.77 Nm) in an alternating pattern.
   (h) Safety wire bolts. ([Refer to 20-50])
   (i) Install bolt, washers, and nut securing drive unit to compressor.
   (j) Install bolt, washers, and nut securing turnbuckle to drive unit.
   (k) Install drive belt between compressor drive unit pulley and compressor clutch pulley.

(5) **Installation - Compressor**

**CAUTION:** If replacement compressor uses a different oil type than the previously installed compressor, the entire air conditioning system must be flushed. ([Refer to 21-50])
(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Oil</td>
<td>(See Figure 12-101)</td>
<td>Any Source</td>
<td>Lubricate O-rings.</td>
</tr>
</tbody>
</table>

(b) Position new gasket and compressor to engine and secure with washers and nuts. Torque nuts to 75 to 85 in-lb (8.5 to 9.6 Nm).

(c) Serials w/ Keith Products Air Conditioning System: Install resistor.
1. Position resistor to engine baffling and secure with screws, washers, and nuts.
2. Connect resistor wire to wire harness.
3. Position resistor wire to engine baffling and secure with bolt, washers, nut, and clamp.

(d) Serials w/ Enviro Air Conditioning System: Install resistor.
1. Position resistor to compressor and secure with screws and washers.
2. Connect resistor wire to wire harness.
3. Position resistor wire to alternator mounting stud and secure with clamp, washers, and nut.
4. Position resistor wire to alternator blast tube bracket and secure with bolt, washers, and clamp.

(e) Remove caps from fittings and hoses.

**CAUTION:** Polyolester oil and polyalkylene glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)

(f) Lubricate new O-rings with compressor oil.

(g) Connect 5/8 inch (19 mm) compressor hose to firewall. Torque hose and fittings to 250 to 350 in-lb (28.2 - 39.5 Nm).

(h) Connect 1/2 inch (16 mm) compressor hose to firewall. Torque hose and fittings to 180 to 240 in-lb (20.3 - 27.1 Nm).

(i) Install clamps securing hoses to engine baffling.

(j) Perform Adjustment/Test - Compressor Drive Belt Tensioning. (Refer to 21-50)

(k) Charge air conditioning system. (Refer to 21-50)

(l) Perform Inspection/Check - System Plumbing Refrigerant Leak Test. (Refer to 21-50)

(m) Install engine cowling. (Refer to 71-10)

(n) Serials 22-1863 & subs: Reset COMPRESSOR/CONTROL circuit breaker.

(o) Serials 22T-0001 & subs: Reset A/C COMPR CONTROL circuit breaker.

(p) Perform Operational Test - Air Conditioning System. (Refer to 21-50)

(6) Inspection/Check - Compressor

(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion Inhibitor (aerosol)</td>
<td>MIL-C-81309</td>
<td>Any Source</td>
<td>Prevent corrosion.</td>
</tr>
<tr>
<td></td>
<td>Type II or III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
(c) **Serials 22-1863 & subs:** Pull COMPRESSOR/CONTROL circuit breaker.

(d) **Serials 22T-0001 & subs:** Pull A/C COMPR CONTROL circuit breaker.

(e) Remove engine cowling. *(Refer to 71-10)*

**Note:** If it is difficult to distinguish casting features from cracks, refer to Advisory Circular 43.13-1B Acceptable Methods, Techniques, and Practices - Aircraft Inspection And Repair for additional non-destructive testing.

(f) Using inspection mirror and flashlight, visually inspect all surfaces of compressor for cracks, deformation, or signs of distress.

(g) Visually inspect compressor drive assembly for corrosion. Clean minor corrosion as necessary.
   1. Using wire brush, remove minor corrosion from compressor drive assembly.
   2. Apply corrosion inhibitor to compressor drive assembly.

(h) Visually inspect compressor belt for cracks and improper wear.

(i) Install engine cowling. *(Refer to 71-10)*

(j) **Serials 22-1863 & subs:** Reset COMPRESSOR/CONTROL circuit breaker.

(k) **Serials 22T-0001 & subs:** Reset A/C COMPR CONTROL circuit breaker.

(7) **Inspection/Check - Compressor Drive Shaft**

(a) Visually inspect drive assembly housing for cracks, deformation, or signs of distress.

(b) Visually inspect engine accessory drive for cracks, deformation, or signs of distress.

(c) Visually inspect drive shaft assembly for cracks, deformation, or signs of distress.

(d) Verify freedom of movement exists at end of compressor pulley.

(8) **Adjustment/Test - Compressor Drive Belt Tensioning**

(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibrated Spring Scale</td>
<td>5A354</td>
<td>Chatillon Kew Gardens, NY 11415718-847-5000</td>
<td>Tension drive belt.</td>
</tr>
<tr>
<td>Straight Edge</td>
<td>-</td>
<td>Any Source</td>
<td>Tension drive belt.</td>
</tr>
</tbody>
</table>

(b) Position straight edge across compressor drive unit pulley and compressor clutch pulley.

(c) Attach spring scale to compressor drive belt midway between compressor drive unit pulley and compressor clutch pulley.

(d) Pull compressor drive belt downward in a straight line until spring scale indicates approximately 8.0 lb (3.6 kg).

(e) Verify deflection of belt to straight edge measures 0.25 inch (6.4 mm) at mid span of belt.

(f) Adjust compressor turnbuckle as necessary to obtain proper drive belt tension. *(Refer to 20-70)*
B. Evaporator (See Figure 21-501)

(1) Removal - Evaporator
   (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
   (b) Serials 22-1863 & subs: Pull COMPRESSOR/CONTROL and FAN circuit breakers.
   (c) Serials 22T-0001 & subs: Pull A/C COMPR CONTROL and CABIN FAN circuit breakers.
   (d) Discharge air conditioning system. (Refer to 12-10)
   (e) Remove RH crew seat. (Refer to 25-10)
   (f) Remove RH sidewall air duct trim. (Refer to 25-10)
   (g) Remove RH rear cabin side trim. (Refer to 25-10)
   (h) Remove bolts and washers securing evaporator cover and evaporator to fuselage.
   (i) Disconnect wire harness connector from evaporator.

   **CAUTION:** Before disconnecting plumbing, ensure vacuum in system is minimal or the O-rings could be pulled into the system.

   (j) Disconnect evaporator hose from firewall. Discard O-ring.
   (k) Disconnect evaporator hose from plumbing bulkhead. Discard O-ring.
   (l) Cap fittings and hoses.
   (m) Remove cable ties securing evaporator hoses to fuselage.
   (n) Remove cable ties securing ducts to evaporator.
   (o) Remove clamp securing drain hose to fuselage rivnut.
   (p) Remove evaporator from airplane.

(2) Disassembly - Evaporator
   (a) Remove bolts and washers securing blower motor assembly to evaporator.
   (b) Remove blower wheel from blower motor shaft.

(3) Assembly - Evaporator
   (a) Install blower wheel onto blower motor shaft.
   (b) Install bolts and washers securing blower motor assembly to evaporator.

(4) Installation - Evaporator
   (a) Acquire necessary tools, equipment, and supplies.

   **CAUTION:** Polyolester oil and polyalkylene glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)

   (b) Position evaporator to fuselage.
   (c) Position drain hose to fuselage rivnut and secure with clamp.
   (d) Position ducts to evaporator and secure with cable ties.
   (e) Remove caps from fittings and hoses.

   **CAUTION:** Lubricate new O-rings with compressor oil.

   (f) Lubricate new O-rings with compressor oil.
   (g) Connect evaporator hose to firewall. Torque hose and fittings to 250 to 350 in-lb (28.2 - 39.5 Nm).
EFFECTIVITY:

CIRRUS AIRPLANE MAINTENANCE MANUAL MODELS SR22 AND SR22T

At plumbing bulkhead, connect evaporator hose to hose from condenser. Torque hose and fittings to 120 to 160 in-lb (13.6 - 18.0 Nm).

Install cable ties securing evaporator hoses to fuselage.

Connect wire harness connector to evaporator.

Position cover to evaporator and secure evaporator and cover to fuselage with bolts and washers.

Install RH rear cabin side trim. (Refer to 25-10)

Install RH sidewall air duct trim. (Refer to 25-10)

Install RH crew seat. (Refer to 25-10)

Perform Inspection/Check - System Plumbing Refrigerant Leak Test. (Refer to 21-50)

Charge air conditioning system. (Refer to 12-10)

Serials 22-1863 & subs: Reset COMPRESSOR/CONTROL and FAN circuit breakers.

Serials 22T-0001 & subs: Reset A/C COMPR CONTROL and CABIN FAN circuit breakers.

Perform Operational Test - Air Conditioning System. (Refer to 21-50)

(5) Inspection/Check - Evaporator

Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Cleaner</td>
<td>-</td>
<td>Any Source</td>
<td>Clean evaporator coil.</td>
</tr>
</tbody>
</table>

Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.

Serials 22-1863 & subs: Pull COMPRESSOR/CONTROL and FAN circuit breakers.

Serials 22T-0001 & subs: Pull A/C COMPR CONTROL and CABIN FAN circuit breakers.

Remove RH crew seat. (Refer to 25-10)

Remove bolts and washers securing evaporator cover and evaporator to fuselage.

Open recirculation valves to access evaporator coil.

Visually inspect evaporator inlet for airflow restrictions.

Visually inspect evaporator for bent or dirty fins. Straighten and clean fins as necessary.

Visually inspect evaporator coil for dirt and debris.

Using vacuum cleaner, remove large debris from evaporator coil.

Close recirculation valves.

Position evaporator and cover to fuselage floor and secure with bolts and washers.

Install RH crew seat. (Refer to 25-10)

Serials 22-1863 & subs: Reset COMPRESSOR/CONTROL and FAN circuit breakers.

Serials 22T-0001 & subs: Reset A/C COMPR CONTROL and CABIN FAN circuit breakers.

Perform Operational Test - Air Conditioning System. (Refer to 21-50)
C. Condenser (See Figure 21-501)

(1) Removal - Condenser
   (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
   (b) **Serials 22-1863 & subs:** Pull CONDENSER and COMPRESSOR/CONTROL circuit breakers.
   (c) **Serials 22T-0001 & subs:** Pull A/C COND and A/C COMPR CONTROL circuit breakers.
   (d) If removing condenser to perform Inspection/Check or to access pitch trim servo, flap actuator, condenser intake screen, or condenser exhaust screen, perform the following:

   **Note:** Refrigerant discharging is not required. Hose length allows condenser to be removed from fuselage floor with refrigerant plumbing still connected.

   1. Remove access panel CF5. (Refer to 06-00)
   2. Remove bolt, washer, and nut securing intake screen grounding strap to condenser.
   3. **Serials 22-1602, 22-1821, 22-1840, 22-1863 thru 22-2043:** Remove bolt, washers, and nut securing exhaust screen grounding strap to condenser.
   4. Remove screws securing condenser to fuselage floor.
   5. Remove condenser from fuselage floor as necessary to perform Inspection/Check or to access pitch trim servo, flap actuator, condenser intake screen, or condenser exhaust screen.

   (e) If removing condenser for replacement, perform the following:

   1. Discharge air conditioning system. (Refer to 12-10)
   2. Remove access panel CF5. (Refer to 06-00)
   3. Remove RH rear cabin side trim. (Refer to 25-10)

   **CAUTION:** Before disconnecting plumbing, ensure vacuum in system is minimal or the O-rings could be pulled into the system.

   5. Cap fittings and hoses.
   6. Remove cable ties securing condenser hoses to fuselage.
   7. Remove bolt, washer, and nut securing grounding strap to condenser intake screen.
   8. **Serials 22-1863 thru 22-2043:** Remove bolt, washers, and nut securing grounding strap to condenser exhaust screen.
   9. Remove screws securing condenser to fuselage floor. Remove condenser from airplane.

(2) Disassembly - Condenser

(a) Outlet Duct
   1. Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putty Knife</td>
<td></td>
<td>Any Source</td>
<td>Break sealant.</td>
</tr>
</tbody>
</table>

   2. Remove bolts, washers, and nuts securing outlet duct to condenser blower.
   3. Using putty knife to break sealant, carefully remove outlet duct from condenser blower.

(b) Condenser Blower

   1. Disassemble outlet duct from condenser blower. (Refer to 21-50)
   2. Remove hose clamp securing condenser blower to coupler.
(c) Coupler
1. Remove hose clamps securing coupler to condenser blower.

(d) Receiver/dryer
1. Disconnect pressure hoses from receiver/dryer.
2. Remove clamp securing receiver/dryer to condenser.

(3) Assembly - Condenser
(a) Outlet Duct
1. Acquire necessary tools, equipment, and supplies.
2. Clean outlet duct and condenser blower with isopropyl alcohol to remove any dirt, dust, and existing sealant.
3. Apply thin bead of sealant to mating surface of outlet duct, and position outlet duct to condenser blower.
4. Install bolts, washers, and nuts securing outlet duct to condenser blower.

(b) Condenser Blower
1. Assemble outlet duct to condenser blower. (Refer to 21-50)
2. Position condenser blower assembly to coupler.
3. Install hose clamp securing condenser blower assembly to coupler.

(c) Coupler
1. Position coupler between condenser blower and condenser.
2. Install hose clamps securing coupler to condenser and condenser blower.

(d) Receiver/dryer
1. Position receiver/dryer to condenser.
2. Connect pressure hoses to receiver/dryer.
3. Install clamp securing receiver/dryer to condenser.

(4) Installation - Condenser
(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>General-Purpose Acetoxy Sealant</td>
<td>(Refer to 51-30)</td>
<td>Any Source</td>
<td>Seal mating surfaces.</td>
</tr>
</tbody>
</table>

2. Clean outlet duct and condenser blower with isopropyl alcohol to remove any dirt, dust, and existing sealant.
3.Apply thin bead of sealant to mating surface of outlet duct, and position outlet duct to condenser blower.
4. Install bolts, washers, and nuts securing outlet duct to condenser blower.

(b) Condenser Blower
1. Assemble outlet duct to condenser blower. (Refer to 21-50)
2. Position condenser blower assembly to coupler.
3. Install hose clamp securing condenser blower assembly to coupler.

(c) Coupler
1. Position coupler between condenser blower and condenser.
2. Install hose clamps securing coupler to condenser and condenser blower.

(d) Receiver/dryer
1. Position receiver/dryer to condenser.
2. Connect pressure hoses to receiver/dryer.
3. Install clamp securing receiver/dryer to condenser.

(4) Installation - Condenser
(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Oil</td>
<td>(See Figure 12-101)</td>
<td>Any Source</td>
<td>Lubricate O-rings.</td>
</tr>
</tbody>
</table>

(b) Position condenser to fuselage floor and secure with screws.
(c) Position intake screen grounding strap to condenser and secure with bolt, washer, and nut.
(d) Serials 22-1863 thru 22-2043: Position exhaust screen grounding strap to condenser and secure with bolt, washers, and nut.
(e) If condenser was disconnected from refrigerant plumbing, perform the following:
1. Remove caps from fittings and hoses.

CAUTION: Polyolester oil and polyalkylene glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)
2 Lubricate new O-rings with compressor oil.
3 At plumbing bulkhead, connect condenser hose to compressor hose. Torque hose and fittings to 180 to 240 in-lb (20.3 - 27.1 Nm).
4 At plumbing bulkhead, connect condenser hose to evaporator hose. Torque hose and fittings to 120 to 160 in-lb (13.6 - 18.0 Nm).
5 Install cable ties securing condenser hoses to fuselage.

(f) Perform Inspection/Check - System Plumbing Refrigerant Leak Test. (Refer to 21-50)
1 Install RH rear cabin side trim. (Refer to 25-10)
2 Charge air conditioning system. (Refer to 12-10)

(g) Install access panel CF5. (Refer to 06-00)
(h) Serials 22-1863 & subs: Reset CONDENSER and COMPRESSOR/CONTROL circuit breakers.
(i) Serials 22T-0001 & subs: Reset A/C COND and A/C COMPR CONTROL circuit breakers.
(j) Perform Operational Test - Air Conditioning System. (Refer to 21-50)

(5) Inspection/Check - Condenser

(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Cleaner</td>
<td>-</td>
<td>Any Source</td>
<td>Clean condenser coil.</td>
</tr>
</tbody>
</table>

(b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
(c) Serials 22-1863 & subs: Pull CONDENSER and COMPRESSOR/CONTROL circuit breakers.
(d) Serials 22T-0001 & subs: Pull A/C COND and A/C COMPR CONTROL circuit breakers.
(e) Remove access panel CF5. (Refer to 06-00)
(f) Remove clamps and sleeve securing exhaust duct to condenser.
(g) Remove bolt, washer, and nut securing grounding strap to condenser intake screen.
(h) Serials 22-1602, 22-1821, 22-1840, 22-1863 thru 22-2043: Remove bolt, washers, and nut securing grounding strap to condenser exhaust screen.
(i) Remove screws securing condenser to fuselage floor.
(j) Raise condenser out of fuselage floor as necessary to inspect and clean.
(k) Visually inspect condenser inlet for airflow restrictions.
(l) Visually inspect condenser for bent or dirty fins. Straighten and clean fins as necessary.
(m) Visually inspect condenser coil for dirt and debris.
(n) Using vacuum cleaner, remove large debris from condenser coil.
(o) Position exhaust duct to condenser and secure with cable tie.
(p) Position grounding strap to intake screen and secure with bolt, washer, and nut.
(q) Serials 22-1863 thru 22-2043: Position grounding strap to exhaust screen and secure with bolt, washers, and nut.
(r) Position condenser to fuselage floor and secure with screws.
(s) Install access panel CF5. (Refer to 06-00)
(t) Serials 22-1863 & subs: Reset CONDENSER and COMPRESSOR/CONTROL circuit breakers.
(u) Serials 22T-0001 & subs: Reset A/C COND and A/C COMPR CONTROL circuit breakers.
(v) Perform Operational Test - Air Conditioning System. (Refer to 21-50)
D. Exhaust Screen (See Figure 21-501)

(1) Removal - Exhaust Screen
   (a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic Scraper</td>
<td></td>
<td>Any Source</td>
<td>Remove residue.</td>
</tr>
<tr>
<td>General Purpose</td>
<td>(Refer to 51-30)</td>
<td>(Refer to 51-30)</td>
<td>Remove residue.</td>
</tr>
<tr>
<td>Adhesive Cleaner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>99% or higher purity</td>
<td>Any Source</td>
<td>Clean installation area.</td>
</tr>
<tr>
<td>Cotton Cloth (clean and lint free)</td>
<td></td>
<td>Any Source</td>
<td>Clean installation area.</td>
</tr>
</tbody>
</table>

   (b) Remove condenser. (Refer to 21-50)
   (c) Remove screws securing exhaust screen to interior skin of baggage compartment.
   (d) Remove exhaust screen and air deflector from airplane.
   (e) Remove residue from exhaust screen installation areas using scraper and cleaner.
   (f) Solvent clean installation areas on fuselage. (Refer to 20-30)

(2) Disassembly - Exhaust Screen - Serials 22-1602, 22-1821, 22-1840, 22-1863 thru 22-2043
   (a) Remove pem stud, washer, and nut securing grounding strap to exhaust screen.

(3) Reassembly - Exhaust Screen - Serials 22-1602, 22-1821, 22-1840, 22-1863 thru 22-2043
   (a) For new exhaust screens: Burnish grounding strap installation area on screen.

   1. Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandpaper</td>
<td>600-grit</td>
<td>Any Source</td>
<td>Abrade.</td>
</tr>
</tbody>
</table>

   2. Prior to grounding strap installation, use 600-grit sandpaper to abrade a 1.0 inch (2.54 cm) minimum diameter area around hole on stud side of exhaust screen until gloss of anodization is removed.

   (b) Position grounding strap to exhaust screen and secure with pem stud, washer, and nut.

(4) Installation - Exhaust Screen

   CAUTION: Ensure perimeter of exterior screw installation holes have been burnished to expose EMM. If not, using 80 grade sand paper or finer to burnish EMM until shiny. Frequently clean surface of contaminants using vacuum and paint brush to ensure EMM is not damaged.

   (a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caulk Sealant</td>
<td>(Refer to 51-30)</td>
<td>(Refer to 51-30)</td>
<td>Seal exhaust screen to fuselage.</td>
</tr>
</tbody>
</table>

   (b) Apply 0.12 inch (3.05 mm) minimum continuous bead of sealant to mating surfaces of exhaust screen and air deflector.
(c) At interior of fuselage floor, position air deflector to forward installation location of exhaust screen.
(d) Position exhaust screen over air deflector at installation hole. From exterior, install screws securing exhaust screen and air deflector to interior skin of baggage compartment.
(e) Install condenser. (Refer to 21-50)
E. Intake Screen (See Figure 21-501)

1. Removal - Intake Screen
   (a) Acquire necessary tools, equipment, and supplies.

   (b) Remove condenser. (Refer to 21-50)
   (c) Remove screws securing intake screen to interior skin of baggage compartment.
   (d) Remove intake screen from airplane.
   (e) Remove residue from intake screen installation areas using scraper and cleaner.
   (f) Solvent clean installation areas on fuselage. (Refer to 20-30)

2. Disassembly - Intake Screen
   (a) Remove pem stud, washer, and nut securing grounding strap to intake screen.

3. Reassembly - Intake Screen
   (a) For new exhaust screens: Burnish grounding strap installation area on screen.
      1. Acquire necessary tools, equipment, and supplies.

   2. For new intake screens: Prior to grounding strap installation, use 600-grit sandpaper to burnish a 1.0 inch (2.54 cm) minimum diameter area around hole on stud side of intake screen until gloss of anodization is removed.

   (b) Position grounding strap to intake screen and secure with pem stud, washer, and nut.

4. Installation - Intake Screen

   CAUTION: Ensure perimeter of exterior screw installation holes have been burnished to expose EMM. If not, using 80 grade sand paper or finer to burnish EMM until shiny. Frequently clean surface of contaminants using vacuum and paint brush to ensure EMM is not damaged.

   (a) Acquire necessary tools, equipment, and supplies.

   (b) Apply 0.12 inch (3.05 mm) minimum continuous bead of sealant to mating surface of intake screen.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic Scraper</td>
<td></td>
<td>Any Source</td>
<td>Remove residue.</td>
</tr>
<tr>
<td>General Purpose Adhesive Cleaner</td>
<td>(Refer to 51-30)</td>
<td>(Refer to 51-30)</td>
<td>Remove residue.</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>99% or higher purity</td>
<td>Any Source</td>
<td>Clean installation area.</td>
</tr>
<tr>
<td>Cotton Cloth (clean and lint free)</td>
<td>-</td>
<td>Any Source</td>
<td>Clean installation area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandpaper</td>
<td>600-grit</td>
<td>Any Source</td>
<td>Abrade.</td>
</tr>
</tbody>
</table>

For new intake screens: (Refer to 51-30) (Refer to 51-30) Seal intake screen to fuselage.
(c) At interior of fuselage floor, position intake screen at installation hole. From exterior, install screws securing intake screen to interior skin of baggage compartment.

(d) Install condenser. (Refer to 21-50)
F. System Plumbing (See Figure 21-501)

(1) Removal - System Plumbing
(a) Discharge air conditioning system. (Refer to 12-10)
(b) Remove RH sidewall air duct trim. (Refer to 25-10)
(c) Remove RH rear cabin side trim. (Refer to 25-10)
(d) Remove cable ties securing plumbing to fuselage.

CAUTION: Before disconnecting plumbing, ensure vacuum in system is minimal or the O-rings could be pulled into the system.

(e) Disconnect plumbing.
(f) Discard O-rings.
(g) Cap fittings and hoses.

(2) Installation - System Plumbing
(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Oil</td>
<td>(See Figure 12-101)</td>
<td>Any Source</td>
<td>Lubricate O-rings.</td>
</tr>
</tbody>
</table>

(b) Remove caps from fittings and hoses.

CAUTION: Polyolester oil and polyalkyline glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)

(c) Lubricate new O-rings with compressor oil.
(d) Connect plumbing.
   1. Torque 3/8 inch (13 mm) hose and fittings to 120 - 160 in-lb (13.6 - 18.0 Nm).
   2. Torque 1/2 inch (16 mm) hose and fittings to 180 - 240 in-lb (20.3 - 27.1 Nm).
   3. Torque 5/8 inch (19 mm) hose and fittings to 250 - 350 in-lb (28.2 - 39.5 Nm).
(e) Position plumbing to fuselage and secure with cable ties.
(f) Install RH sidewall air duct trim. (Refer to 25-10)
(g) Install RH rear cabin side trim. (Refer to 25-10)
(h) Charge air conditioning system. (Refer to 12-10)
(i) Perform Operational Test - Air Conditioning System. (Refer to 21-50)

(3) Inspection/Check - System Plumbing Refrigerant Leak Test

Note: Perform Inspection/Check - Refrigerant Leak Test when ambient temperature is above 65°F.

(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant Detector</td>
<td>-</td>
<td>Any Source</td>
<td>Detect leaks.</td>
</tr>
</tbody>
</table>

(b) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
(c) **Serials 22-1863 & subs:** Pull COMPRESSOR/CONTROL, FAN, and CONDENSER circuit breakers.

(d) **Serials 22T-0001 & subs:** Pull A/C COMPR CONTROL, CABIN FAN, and A/C COND circuit breakers.

(e) Remove engine cowling. *(Refer to 71-10)*

(f) Remove RH crew seat. *(Refer to 25-10)*

(g) Remove RH sidewall air duct trim. *(Refer to 25-10)*

(h) Remove RH rear cabin side trim. *(Refer to 25-10)*

(i) Remove floor access panel CF5. *(Refer to 06-00)*

(j) Using electronic refrigerant detector, check all plumbing connections and components for leaks.

(k) If leak is detected, perform the following:
   1. Discharge air conditioning system. *(Refer to 12-10)*
   2. Repair or replace components and plumbing as needed.

   **Note:** Ensure oil from leak is cleaned up and any residual refrigerant has dissipated prior to recharging air conditioning system.

   3. Charge air conditioning system. *(Refer to 12-10)*
   4. Repeat leak check.

(l) Install floor access panel CF5. *(Refer to 06-00)*

(m) Install RH rear cabin side trim. *(Refer to 25-10)*

(n) Install RH sidewall air duct trim. *(Refer to 25-10)*

(o) Install RH crew seat. *(Refer to 25-10)*

(p) Install engine cowling. *(Refer to 71-10)*

(q) **Serials 22-1863 & subs:** Reset COMPRESSOR/CONTROL, FAN, and CONDENSER circuit breakers.

(r) **Serials 22T-0001 & subs:** Reset A/C COMPR CONTROL, CABIN FAN, and A/C COND circuit breakers.
G. Servicing - Air Conditioning System

(1) Air Conditioning System Flushing

If any air conditioning component has been disconnected and exposed to air for an extended period of time, an unapproved compressor oil has been added to the system, or if replacement compressor uses a different oil type than the previously installed compressor, perform the following procedure to flush the air conditioning system.

(a) Acquire necessary tools, equipment, and supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver/Dryer Test Fitting</td>
<td>Contact manufacturer¹</td>
<td>Keith Products Addison, Texas 75001 972-407-1234</td>
<td>Flush air conditioning system.</td>
</tr>
<tr>
<td>Open Expansion Valve Test Fitting</td>
<td>Contact manufacturer¹</td>
<td>Enviro Systems Inc. Seminole, OK 74868 405-382-0731</td>
<td>Flush air conditioning system.</td>
</tr>
<tr>
<td>Flushing Pump</td>
<td>-</td>
<td>Any Source</td>
<td>Flush air conditioning system.</td>
</tr>
<tr>
<td>Flushing Container</td>
<td>-</td>
<td>Any Source</td>
<td>Flush air conditioning system.</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>99% or higher purity</td>
<td>Any Source</td>
<td>Flush air conditioning system.</td>
</tr>
<tr>
<td>Compressor Oil</td>
<td>(See Figure 12-101)</td>
<td>Any Source</td>
<td>Lubricate O-rings.</td>
</tr>
</tbody>
</table>

1. Acquire necessary fitting and hose per manufacturer’s specifications to assemble required coupling.

(b) Discharge air conditioning system. (Refer to 12-10)

**CAUTION:** Before disconnecting plumbing, ensure vacuum in system is minimal or the O-rings could be pulled into the system.

(c) Disconnect expansion valve from evaporator. Discard O-rings.
(d) Connect open expansion valve test fitting to evaporator.
(e) Disconnect receiver/drier from condenser. Discard O-rings.
(f) Connect receiver/drier test fitting to condenser.
(g) Disconnect hoses from compressor. Discard O-rings.
(h) Cap expansion valve, receiver/drier, and compressor fittings.
(i) Connect high pressure hose to flushing pump.
(j) Insert low hose into flushing container.
(k) Pump 3 to 4 quarts of isopropyl alcohol through system.
(l) Disconnect flushing pump.
(m) Using dry nitrogen or dry air with regulator set to 25 to 30 PSI, blow through system for 5 minutes to evaporate remaining alcohol.
(n) Remove caps from expansion valve, receiver/drier, and compressor fittings.
CAUTION: Polyester oil and polyalkylene glycol oil are not interchangeable. Verify compressor part number to determine which oil type to use. (See Figure 12-101)

(o) Lubricate new O-rings with compressor oil.
(p) Connect 5/8 inch (19 mm) hose to compressor. Torque hose and fittings to 250 to 350 in-lb (28.2 - 39.5 Nm).
(q) Connect 1/2 inch (16 mm) hose to compressor. Torque hose and fittings to 180 to 240 in-lb (20.3 - 27.1 Nm).
(r) Disconnect receiver/drier test fitting from condenser.
(s) Connect receiver/drier to condenser. Torque fittings to 120 to 160 in-lb (13.6 - 18.0 Nm).
(t) Disconnect open expansion valve test fitting from evaporator.
(u) Connect expansion valve to evaporator.
(v) Charge air conditioning system. (Refer to 12-10)
H. Operational Test - Air Conditioning System

(1) Operational Test - Air Conditioning System
   (a) Start engine in accordance with Pilot’s Operating Handbook procedures.
   (b) Open cabin air panel vents.
   (c) Set temperature control knob to the snowflake symbol position.
   (d) Verify AC ON light illuminates.
   (e) At 5 minutes, verify cool air exits cabin air panel vents.
   (f) Rotate airflow control knob through all fan positions. Verify fan operates at all speeds and airflow increases at each position.
   (g) Rotate temperature control knob to turn off air conditioning system.
   (h) Shutdown engine in accordance with Pilot’s Operating Handbook procedures.
Figure 21-501
Air Conditioning System (Sheet 1 of 4)

LEGEND
1. Service Ports
2. Pressure Line
Figure 21-501
Air Conditioning System (Sheet 2 of 4)

NOTE

Verify compressor drive belt tension equals approximately 8.0 lbs (3.6 kg) with 0.25 inch (6.40 mm) of deflection at mid span of belt.

DETAIL A

Serials w/ Keith Products Compressor.

Legend:
3. Compressor
4. Screw
5. Bolt
6. Washer
7. Resistor
8. Nut
9. Spacer
10. Clamp
11. Bracket
12. Seal
13. Connector
14. O-Ring

FIREWALL (REF)
FROM EVAPORATOR
TO CONDENSER
Figure 21-501
Air Conditioning System (Sheet 3 of 4)


LEGEND
5. Bolt
6. Washer
16. Evaporator
17. Evaporator Cover
18. Evaporator Duct
19. Cable Tie
20. Rivnut
21. Hose Clamp
22. Drain Hose
23. Coupler Duct
24. Fresh Air Inlet Duct
25. Blower Wheel
26. Blower Motor

FUSELAGE SKIN (REF)
FUSELAGE FLOOR (REF)

DETAIL B

SR22_MM21_2316C
NOTE

For new exhaust/intake screens: Prior to grounding strap installation, use 600-grit sandpaper to abrade a 1.0 inch (2.54 cm) minimum diameter area around hole on stud side of condenser screen until gloss of annodization is removed.

Apply thin bead of sealant to mating surface of outlet duct prior to installation.

Apply 0.12 inch (3.05 mm) minimum continuous bead of sealant to mating surfaces of exhaust screen and air deflector.

Apply 0.12 inch (3.05 mm) minimum continuous bead of sealant to mating surface of intake screen.

Figure 21-501
Air Conditioning System (Sheet 4 of 4)
NOTE
⚠ Coat entire spline of drive shaft assembly with lubricant.
⚠ Torque bolts to 12 - 15 in-lb (1.36 - 1.69 Nm) in an alternating pattern.

Serials w/ Keith Products Compressor.

Figure 21-502
Compressor Assembly - Serials w/ Keith Products Compressor (Sheet 1 of 2)
NOTE

⚠ Coat entire spline of drive shaft assembly with lubricant.
⚠ Torque bolts to 55 - 60 in-lb (6.21 - 6.77 Nm) in an alternating pattern.

Serials w/ Enviro Compressor.

LEGEND

1. Compressor
2. Drive Unit
3. Drive Shaft Assembly
4. Spacer
5. Bolt
6. Washer
7. Nut
8. Vibration Dampener
9. Turnbuckle
10. Belt
11. Bracket