ZEE Systems, Inc.
AIRCRAFT AIR CONDITIONING and HEATING SYSTEMS

SERVICE BULLETIN 59-000-1

1. PLANNING INFORMATION

A. Effectivity: Dassault Falcon 10 aircraft with STC SA4843SW installed. This Service Bulletin may be accomplished concurrently with original STC equipment installation.

B. Reason: To modify and upgrade the vapor cycle air conditioning system to use CFC free R-134a refrigerant.

C. Description: This Service Bulletin gives instructions for converting the Vapor Cycle air conditioning system from R-12 (Freon) to the EPA accepted R-134a (HFC-134a) refrigerant. This conversion consists of discharge of the system, parts replacement and recharging the system.

D. Compliance: Compliance is optional.

E. Approval: This Service Bulletin has been approved by the FAA. Components are FAA-PMA.

F. Manpower: Estimated labor hours is 30 hours ± 5 hours. Time should be allocated to 1) remove panels in the aft baggage compartment to gain access to the compressor and discharge flex line from compressor to the pressure switch and the suction return line to the compressor, 2) receiver-dryer 3). Remove interior panels in the passenger compartment to gain access to the evaporator assembly. 4) Recover the R-12 refrigerant, 5) prior to system disassembly, evacuate (5 hours) R-12 residue from the system, 6) flush condenser and evaporator, 7) remove and replace the compressor and flex lines, 8) remove and replace the receiver-dryer, 9) evacuate for 8 hours, 10) service with R-134a refrigerant, 11)re-attach all panels and secure interior. Evacuation time of 5and 8 hours is not included in the above 30 hour estimate.

G. Material cost and availability: Refer to Section IV for a detailed listing of parts and materials required to accomplish the modification procedures outlined in this Service Bulletin. The required parts and pricing is available from:

Zee Systems, Inc.
406 W. Rhapsody
San Antonio, TX 78216
USA

TEL: 210-342-9761
FAX: 210-341-2609
Email: info@zeeco-zeesys.com

H. Equipment and Tooling:

Ground Power Unit (28VDC capable of 120A continuous)	Commercially Available
R-134a Refrigerant	Commercially Available

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Poloyl Ester (POE) Oil, Compressor, or LUBRIZOL 2916	Commercially Available
Nitrogen Bottle	Commercially Available
Recovery/Recycle Equipment which meets SAE J1990 or J2209.	Commercially Available
Manifold Gauge Set, R-134a compatible, w/ quick Disconnects.	Commercially Available
Manifold Gauge Set, R-12 compatible	Commercially Available
Scale .1 lb. Increments (or smaller)	Commercially Available
Leak Detector for R-134a	Commercially Available
Vacuum Pump, refrigerant	Commercially Available

I. Weight and Balance: No effect.

J. Electrical Load Data: No effect.

K. References: Refer to Zee Systems, Inc. DWG SZ59-001 for basic STC installation information.

Refer to Dassault Falcon 10 Service Instructions from Maintenance Manual,
Section 6-30-00
Section 12-16-00
Section 21-50-02
Section 21-50-06
Section 21-50-07
Section 21-50-11
Section 21-50-12
Section 21-50-14
Section 21-50-15

Differences to Falcon 10 Service Instructions from Maintenance Manual, Section 21-50-02 are as follows.

1. General
   Throughout the entire document change the word “freon” to “refrigerant”.

2. Special tools, materials and equipment
   Refer to this Service Bulletin when alternate service (replenishing) method is used.

3. Operation
   A.(7) Open the HP and LP valves on the manifold gauge set. Evacuate the system for 6 hrs (minimum) to 8 hrs. after attaining maximum vacuum.

B.(7) Load to 3.2 lbs. (1.45 kg).

B.(8) Close the valves on the manifold gauge set and the filling cylinder when the system has reached 3.2 lbs. (1.45kg)

C.(3) Do not use the bubbles to check the refrigerant charge when using R-134a refrigerant. Disregard steps (4) through (11).

Refer to Section III of this Service Bulletin for alternate service (replenishing) instructions.

II ACCOMPLISHMENT INSTRUCTIONS

A. Preparation: The replacement of components should be accomplished in a clean, dry area free of oil, dirt, moisture and other contamination.

CAUTION

The air conditioning system is under pressure. Appropriate safety measures should be taken when servicing this equipment. Only trained personnel with safety equipment should perform these duties.

NOTE

It is unlawful to release R-12 to the atmosphere. Use approved Recovery/Recycle equipment to capture the R-12 refrigerant. Use only lawful means to dispose of the recovered R-12. Check with local agencies for approved disposal procedures.

NOTE

Cap all lines to prevent contaminants and moisture from entering the system.

B. Disassembly: If this Service Bulletin is accomplished concurrent with the original STC SA4843SW installation, duplicate steps in this Service Bulletin may be omitted.

NOTE

Standard air conditioning service equipment for mobile R-134a refrigerant system is used for this service. If you are using automatic service equipment some of the steps may be omitted, performed in a different order or combined with other steps. Refer to the operating instructions for the equipment you are using. Also, the following steps are recommended. If you have contracted an air conditioning service professional they may have different procedures to perform the same functions.

NOTE

NEVER introduce LIQUID refrigerant into this system when performing service.

1. Recover the R-12 refrigerant.

   a. Attach the high side (red) connector for the R-12 manifold gauges to the high side service port.

b. Attach the low side (blue) connector for the R-12 manifold gauges to the low side service port.
c. Attach the yellow line to the recovery equipment.
d. Connect the R-12 recovery bottle to the recovery equipment.
e. Recover the R-12 refrigerant in accordance with the recovery equipment instructions.

2. Before removing any components evacuate the system to remove as much R-12 residue and mineral oil from components as possible. Evacuate the system.

a. Connect the R-12 manifold gauge set to the Discharge and Suction service ports. The high (red) and low (blue) side valves should be shut off at the manifold gauge.
b. Connect the yellow line from the manifold gauge set to the vacuum pump.
c. Start the pump. Open the high and low side valve at the manifold gauge set. Maintain a vacuum of 29.0-30.0 in-Hg for 5 hours. During the evacuation period occasionally close the high and low side valves at the manifold gauge set. The vacuum reading should not change. Any change in the vacuum reading with the valves closed indicates a leak in the system.
d. When evacuation has been completed turn off pump and disconnect gauges from the aircraft system. Begin removal of components.

3. Remove or disconnect the following components:

a. Disconnect the No. 8 (discharge) flex line from the compressor (runs to the aft) (Refer to Falcon 10 IPC 21-52-01, item –305). Do not remove the flex line from the pressure switch until the condenser has been flushed. See Flushing instructions C., 1., a. before removing this line completely.
b. Remove the No. 10 (suction) flex line from the compressor. (runs forward) (Refer to Falcon 10 IPC 21-52-01, item –255).
c. Remove the Receiver-Dryer (Freon Reservoir). (Refer to Falcon 10 IPC 21-52-01, item –285).
d. Remove the Compressor and Pulley. Remove the large pulley from the compressor.

C. Flushing Instructions:

1. Before re-assembly the Condenser Coil must be flushed to remove trapped mineral oil.

a. Connect a source of dry nitrogen to the discharge side flex line that is to be replaced. With the Receiver-Dryer (R12) removed, place a container to collect the mineral oil at the end of that line. Blow the dry nitrogen through the condenser coil at 100-150 PSI. There is no way to determine the amount of oil trapped in the coil. Continue to force the dry nitrogen through the coil until all mineral oil is removed. When flushing is complete discard the original Dassault discharge flex line.

D. Assembly Instructions:

1. Install the following components:

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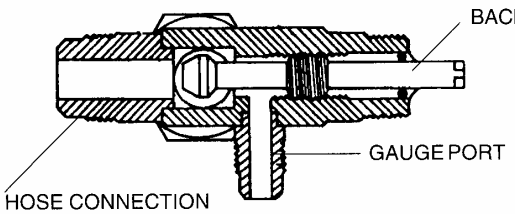
a. Zee P/N: DS200U137-10 Union in the tube from the evaporator. Apply a light film of the refrigerant oil to the flare of the union to help seat the seal area. Use a backup wrench and tighten.
b. Check the oil level in the compressor. Remove the oil fill plug on the side of the compressor. With the compressor horizontal the depth should be 1" (25mm). With the compressor vertical the depth should be 1-1/4" (32mm). Replenish as necessary with Poloyl Ester (POE). Replace the oil fill plug.
c. The large pulley on the new SZ84-913 Compressor.
d. The new Compressor with Pulley.
e. Connect Discharge Hose Assembly P/N: SZ59-2008-1 with end that has the service port to the No. 8 fitting on the compressor and the other to the pressure switch. **Route this hose under the No. 10 Hose at the compressor**. Apply a light film of refrigerant oil to the O-Ring and the flare on the pressure switch to help seating. Align the hose so that the end closest to the compressor turns slightly down (to make a small loop) and under the suction hose to prevent the return of oil to the discharge fitting on the top of the compressor. If necessary loosen the 5/16 torx bolt on the compressor suction fitting. Swivel the fitting for best alignment with the hose.
f. Connect Suction Hose Assembly P/N: SZ59-20010-1 with end that has the service port to the DS200U137-10 Union and the other to the No. 10 fitting on the compressor. Apply a light film of refrigerant oil to the O-Ring to help seating. Align the hose so it is runs above the discharge hose. If necessary loosen the 5/16 torx bolt on the compressor suction fitting. Swivel the fitting for best alignment with the hose.
g. Connect the SZ59-050-1B Receiver-Dryer to the hard lines. Be sure that the direction of flow is forward. Apply a light film of the refrigerant oil to the flare to help seat the seal area. Use a backup wrench and tighten.
h. Tighten all connections. Torque the two 5/16 torx-head bolts on the compressor fittings to 17-25 ft.-lb. (23.0-33.9 N-m).

NOTE
The BACH SEAT VALVES on the compressor must be in the proper position for service and operation. Operating the compressor with the valves in the wrong position can damage the compressor.
Refer to the instruction sheet that was provided attached to the compressor.



Turn valve stem all the way forward (clockwise) to shut off connecting line. This is "front seating". Turn valve stem all the way backward (counter-clockwise) to shut off gauge port and allow connection of service line (hose) to gauge port. This is "back seating". In normal operation valve stem is "back seated" to allow full flow through the valve.

A. Check: Check the system for leaks.

1. Pressurized the system to 100 PSIG with Nitrogen. DO NOT USE AIR

2. Use soap solution to check the connections.

B. Evacuate the system.

1. Connect the R-134a manifold gauge set to the Discharge and Suction service ports. The high (red) and low (blue) side valves should be shut off at the manifold gauge.

2. Connect the yellow line from the manifold gauge set to the vacuum pump.

3. Start the pump. Open the high and low side valve at the manifold gauge set. Maintain a vacuum of 29.0-30.0 in-Hg for 8 hours. During the evacuation period occasionally close the high and low side valves at the manifold gauge set. The vacuum reading should not change. Any change in the vacuum reading with the valves closed indicates a leak in the system.

NOTE
NEVER introduce LIQUID refrigerant into this system at any time during service.

C. Service: Charge the System with refrigerant in accordance with Falcon Maintenance Manual Section 21-50-02. Note the changes the instructions as described in Section I, K of this Service Bulletin.

D. Alternate Service (Replenishing) instructions.

1. Weigh the refrigerant bottle. Make note of the weight.

2. Connect the yellow line on the manifold gauge set to the refrigerant bottle.
   a. With the valves on the manifold gauge closed bleed the air from the yellow line so only refrigerant gas will enter the system.

3. Introduce a static charge with the system NOT RUNNING.
   a. Open the valve on the refrigerant bottle.
   b. Slowly open the high and low side valves on the manifold gauge. Continue to add refrigerant gas until the pressures stabilize or until the TOTAL target charge weight of 3.2 lb.(1.45kg) of refrigerant is reached then close the valves on the manifold gauge.

4. Introduce a running charge.
   a. Connect external electrical supply unit.
   b. Set the “FREON” switch on the console to “ON”. Make sure the evaporator blowers are operating.
   c. Slowly open the LOW side valve on the manifold gauge set until the gauge reads 25-30 PSI.
   d. Continue to add refrigerant gas until the TOTAL target charge weight of 3.2 lb.(1.45kg) is reached. When the target weight is reached immediately close the valve.
   e. Close the valve on the refrigerant bottle.

5. Disconnect the high and low side quick disconnect fittings from the aircraft plumbing.

6. Check for leaks.

7. Make appropriate log book entries.

IV. MATERIAL INFORMATION

A. To accomplish the Service Bulletin, order Kit Part Number SZ59K-R134-1B. The kit contains the following items.

QTY	*PART NUMBER*	*DESCRIPTION*	*OLD PART NUMBER*	*DISPOSITION*
1ea	SZ59-2008-1	Hose Assy	513-65528 or,	DISCARD
			310-90219 or,	DISCARD
			320-90219 or,	DISCARD
			310-90219-1	DISCARD
1ea	SZ59-20010-1	Hose Assy	537-65527 or,	DISCARD
			320-90219 or,	DISCARD
			320-90219-1	DISCARD
1ea	SZ59-050-1B*	Receiver-Dryer	518-65590 or,	DISCARD
			536-65590 or,	DISCARD
			536-65590-1	DISCARD
1ea	SZ84-913OP-1	Compressor	520-65730 or,	DISCARD
	ALT: SZ84-913TJ-1		EF210R16774 or,	DISCARD
			11-90355	DISCARD
1ea	DS200U137-10	Union	NEW PART	

* Normal replacement item. Replace any time system is opened to air.