



**ZEE Systems, Inc.**  
**AIRCRAFT AIR CONDITIONING and**  
**HEATING SYSTEMS**

***SERVICE BULLETIN 59-000-1A***

1. PLANNING INFORMATION

- A. Effectivity: Dassault Falcon 10 aircraft which have installed R-134a Upgrade Kit SZ59K-R134 before August 8, 2002.
- B. Reason: Upgrade kits before August 8, 2002 did not include the replacement of the three expansion valves.
- C. Description: This Service Bulletin gives instructions for installing the three new expansion valves.
- 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 28 hours  $\pm$  5 hours. Time should be allocated to 1) remove panels in the aft baggage compartment to gain access to the motor-compressor assembly, 2) Remove interior panels in the passenger compartment to gain access to the evaporator assembly. 3) Recover the R-134a refrigerant, 4) flush condenser and evaporator, 5) remove and replace the receiver-dryer, 6) remove evaporator assembly, 7) remove and replace the compressor, 8) replace the three expansion valves, check that each external equalizing tube is clear, 9) re-install evaporator assembly, 10) evacuate for 8 hours, 11) service with R-134a refrigerant, 12) re-attach all panels and secure interior. Evacuation time of 8 hours is not included in the above 28 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.**  
**P.O. Box 791165**  
**San Antonio, TX 78279-1165**  
**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
Poloyl Ester (POE) Oil, Compressor, or LUBRIZOL 2916	Commercially Available



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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 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).



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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:

**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.*

1. Recover the R-134a refrigerant.
  - a. Attach the high side (red) connector for the R-134a manifold gauges to the high side service port.
  - b. Attach the low side (blue) connector for the R-134a manifold gauges to the low side service port.
  - c. Attach the yellow line to the recovery equipment.
  - d. Connect the R-134a recovery bottle to the recovery equipment.
  - e. Recover the R-134a refrigerant in accordance with the recovery equipment instructions.
  
2. Remove or disconnect the following components:



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- a. Disconnect the SZ58-2008 No. 8 (discharge) flex line at the compressor. This line runs from the compressor toward the condenser (runs to the aft). (Refer to Falcon 10 IPC 21-52-01, item -305). See Flushing instructions B., 1., a.
- b. Disconnect the SZ58-20010 No. 10 (suction) flex line at the compressor. This line runs from the compressor toward the evaporator (runs forward). (Refer to Falcon 10 IPC 21-52-01, item -255). See flushing instructions B., 1., b.
- c. Replace the SZ59-050-1 Receiver-Dryer (Reservoir, Tank). (Refer to Falcon 10 IPC 21-52-01, item -285).
- d. Replace the SZ84-913TJ-1 Compressor. Remove the pulley from the old compressor and install it on the new compressor.
- e. Remove the Evaporator Assembly. (Refer to Falcon 10 IPC 21-52-01, item -32, -32A) Refer to Falcon Maintenance Manual Section 21-50-11.
- f. The three Thermostatic Expansion Valves (Pressure Reducing Valves). (Refer to Falcon 10 IPC -40, -40A) Refer to Falcon Maintenance Manual Section 21-50-15. Each expansion valve has a capillary tube with a thermostatic bulb at the end. Each thermostatic bulb is attached to one of the three evaporator pipes in a precise position. Make note of the which valve is connected to which pipe and the position of each thermostatic bulb on the pipe to correctly reassemble.

C. Flushing Instructions:

1. Before re-assembly the Condenser Coil and Evaporator Coil must be flushed to remove trapped mineral oil.
  - a. Connect a source of dry nitrogen to the discharge side flex line (SZ59-2008). With the Receiver-Dryer removed, place a container to collect any 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 oil is removed.
  - b. With the three expansion valves and three sampling tube removed from the evaporator cap the three No.4 sampling tube ports on the outlet tube. Connect a source of dry nitrogen to the first inlet tube. Place a container to collect the oil at the outlet tube. Blow the dry nitrogen through the evaporator coil at 75-100 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. Repeat the process with the other two inlet tubes.

D. Assembly Instructions:

1. Install the following components:
  - a. The new SZ84-913TJ-1 Compressor and pulley. Before installing the compressor check the oil level. The horizontal depth should be 1-3/16" (30mm). Vertical depth should be 1-1/2" (38mm) minimum. Replenish as necessary with Poloyl Ester (P.O.E.)



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- b. On the top of the compressor align the No. 8 Discharge fitting ZEE P/N: 022-21960M as required to fit the hose to the compressor. Snug the bolt down; do not tighten at this time.
  - c. Connect Hose Assembly P/N: SZ59-20010-1 to the compressor. Apply a light film of refrigerant oil to the O-Ring to help seating.
  - d. Connect Hose Assembly P/N: SZ59-2008-1 to the compressor. Route this Hose over the No. 10 Hose at the compressor. Apply a light film of refrigerant oil to the O-Ring to help seating. Tighten the bolt holding the 022-21960M fitting on the compressor. Use a 5/16 12 point socket. Torque the 5/16 torx-head bolt to 17-25 ft.-lb. (23.0-33.9 N-m).
  - e. Connect the SZ59-050-1A 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.
  - f. 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).
  - g. Fit the evaporator with the three SZ84-760-2 Thermostatic Expansion Valves. Refer to Falcon Maintenance Manual Section 21-50-15, using plastic clamps P/N: MS3367-5-9 to replace the existing clips. Make sure that the thermostatic bulb for each valve is correctly positioned. Make sure that a good metal to metal seat between the thermostatic bulb and the pipe is achieved. Once attached, cover with the piece of insulating tape (provided with valve) to isolate the three from each other. Attach cover. Carefully uncoil only enough of the capillary tube necessary. Take care not to kink the capillary tube. There is no repair for a damaged capillary tube. If tube or bulb becomes damaged the valve must be replaced.
  - h. Attach the sampling tube to each valve.
  - i. Install the evaporator according to the instructions in the Falcon 10 Maintenance Manual Section 21-50-11, with new seal(s) P/N: F10A725009 on the evaporator return tube. Refer to Dassault modification M530 or SB F10-207 for seal location and installation information.
- 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.
- 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.



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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 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 until the pressures stabilize or until 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 until the target 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 manifold 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-R134-1A. The kit contains the following items.

<b><i>QTY</i></b>	<b><i>PART NUMBER</i></b>	<b><i>DESCRIPTION</i></b>	<b><i>OLD PART NUMBER</i></b>	<b><i>DISPOSITION</i></b>
1ea	SZ59-050-1A*	Receiver-Dryer	518-65590 or, 536-65590 or, 536-65590-1 or, SZ59-050-1 or, SZ59-050-1A	DISCARD DISCARD DISCARD DISCARD DISCARD
1ea	SZ84-913TJ-1	Compressor	520-65730 or, EF210R16774 or, 11-90355 SZ84-913TJ-1	DISCARD DISCARD DISCARD DISCARD



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<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>OLD PART NUMBER</u>	<u>DISPOSITION</u>
3ea	SZ84-760-2	Expansion Valve	TMSX or, 528-65628-1 or, 528-65628-2	DISCARD DISCARD DISCARD
2ea	F10A725009**	Seal	F10A725009	DISCARD
9ea	MS3367-5-9	Clamp		DISCARD
	Alternate Dassault P/N: 78750-01			

\*Normal maintenance item. Replace anytime the system is interrupted.

\*\*One time use seal. Do not reuse old seal.