

Air Conditioner Flushing Procedures All

ATA 21

The process of flushing an air-condition system is used for conversion between refrigerants [from R12 to R134a] or when the system has become contaminated by “sludge” or metal particles. The following is meant to give a generally acceptable process for flushing the system. The first part of this article is the setup for the flushing, the second is the actual flushing. A flush cart or a pump, valve and reservoir may be used along with any acceptable flushing fluid. Five gallons of fluid generally is used. Various King Airs are covered so there may be differences noted in the following process. The 90/100 series aircraft have a nose mounted system with all components located forward of the forward pressure bulkhead. The 200/300/B300 have an Engine driven compressor on the right engine, option of aft evaporator in the rear fuselage and incorporate a hot gas bypass valve in the nose wheel well. These are components that deal with the actual flow of refrigerant. Electrical control sensing devices are not included in this article.

After concluding these procedures the service organization should ensure the system is 1) vacuumed to the 125 micron level to ensure total removal of water from interior and verify sealing, 2) oil has been serviced to proper levels with appropriate oil for the refrigerant used and 3) refrigerant added using recommended procedures.

Please note that large quantities of metal particles cannot be removed adequately from the condenser and evaporator coils (radiators) by flushing. The cavities in these components do not allow for total removal without disassembly of the unit, which may require replacement of the components.

Part 1: Component Removal and Replacement Prior to Flushing

1. Reclaim all R12/R134a refrigerant from the a/c system per environmentally safe procedure in the refrigerant reclaim unit.
 - Remove the a/c compressor from the right engine nacelle (or nose compartment) per the Raytheon Maintenance Manual.
 - Remove the oil from the compressor by allowing it to drain, in an inverted position, for a minimum of (1) hour. A (4) hour is drain best for maximum oil removal.
2. Remove the front (and aft, if applicable) expansion valve, thermal sensor coil, and the pressure line and insulation from the thermo bulb mounted on the plumbing.

Note: We recommend that the seal on the plumbing fittings be replaced when the joint has been "broken". Note the mfg. code stamp on the side of the fitting to determine the correct replacement seal to order.

3. Modify the existing expansion valve to be used as a flushing fixture or, if possible, use a 10-419 reducing union elbow and a 10-075 nut to cap the plumbing for flushing.

Procedure for modifying expansion valves:

- A. Using a hex key, remove threaded cap from outlet.
- B. Remove all internal valve components.
- C. Remove inlet strainer (if equipped).
- D. Drill inlet and outlet to center of valve. Note: valve must be free of all foreign material.

4. Install the modified valves or the 10-419 elbows and 10-075 nuts on the fwd evaporator and (if installed) the aft evaporator.

5. Remove the existing receiver-dryer and replace with 129-550140-1 tube assembly (or equivalent—a tube to fit in place of receiver-dryer) to be used as a flushing fixture.

6. Remove the hot gas by-pass valve (if applicable—200/300 and B300 aircraft) and replace with 70-103-01 or v50op-8 valve (or equivalent) and (2) AN816-8d adapter to be used as a flushing fitting.

7. Open the valves to allow flushing for (5) minutes during the cycle. Allow the by-pass valve to drain.

8. Replace components being changed (switches, hoses, etc) as appropriate for the service before flushing the system. Components may be lubricated with mineral oil.

Note: rubber components not designed for use with R134a may flake or swell; thus resulting in leaks. If not making a conversion of the system to R134a then utilize R12 components if available or appropriate.

Part 2: Flushing & Purging Procedure

1. In order to isolate each evaporator section during the flushing process, disconnect the high pressure (discharge) and low pressure (suction) plumbing lines from the aft evaporator (if installed—200/300/B300).

2. Connect the flushing cart discharge hose to the discharge (high pressure) a/c hose and the flushing cart pressure hose to the suction (low pressure) a/c hose. Connect the filtered shop air to the flushing cart to power the flushing cart pump.

3. Fill flush cart reservoir with approximately 5.0 gallons of flush fluid. If reservoir capacity is less than 5 gallons, fill to capacity, turn cart on to force fluid into the system, and add fluid to reservoir. Repeat until all fluid has been pumped into the system.

a. Run flushing cart for at least (10) minutes.

b. Reverse flow direction by switching flush cart hose connections and run for at least (10) minutes.

c. Again, switch the flush cart hose connections and run for at least (10) minutes.

4. Reconnect lines at the aft evaporator. (if installed—200/300/B300)

5. Disconnect suction tube assembly 101-555139-1 from the 131533-919-20 reducer and plug the tube with a AN305D6 plug and cap the reducer with a AN929-10 cap (located in the nose wheel well.)
6. Disconnect discharge tube assembly 101-555137-1 from 131533-1564-8-6D reducer, plug the tube with a AN806-d6 plug and cap the reducer with a AN929-6 cap. (to flush the aft evaporator.)
7. Repeat step 3 in order to flush the aft evaporator. (if installed—200/300/B300)
8. After the flushing process has been completed, purge the system of flush fluid using the flushing cart powered with filtered shop air.
 - a. Pressurized air from the flushing cart pump is used to blow all flush fluid from the plumbing.
 - b. Then purge the system for at least (20) minutes with dry nitrogen. Do not forget to cycle the hot gas by-pass purging valve plumbing for (5) minutes to purge it.
9. Remove plug from 101-555137-1 and 101-555139-1 tube assembly and remove the cap from the reducers.
10. Reconnect lines to the forward evaporator.
11. Repeat step 8 in order to purge the complete system.
12. Isolate and purge the forward evaporator and condenser coil as follows:
 - a. Isolate the forward evaporator. Purge the unit through the discharge line using 2-10 psig dry nitrogen until dry. Collect the flushing fluid coming from the suction line.
 - b. Isolate the condenser purge the unit through the top fitting using 2-10 psig of dry nitrogen until dry. Collect the flushing fluid coming from the lower fitting.
 - c. Replace soft seals in evaporator and condenser coil line fittings and reconnect to unit. (not included in kit due to various fittings used. Survey the plumbing and obtain correct type).
13. Purge aft evaporator (if installed—200/300/B300) as follows:
 - a. Isolate the aft evaporator and purge the unit through the discharge Line using 2-10 psig dry nitrogen until unit is dry. Collect the fluid coming from the suction side.

Or

 - a. Remove the evaporator from the aircraft, drain the flushing fluid, Purge with dry nitrogen at 2-10 psig until dry.
 - b. Reinstall unit in aircraft per maintenance manual.
 - c. Replace soft seals and reconnect the plumbing lines.