ZEE Systems, Inc.

SERVICE LETTER Z26-1

I. PLANNING INFORMATION

A. Effectivity: Aircraft equipped with ZEE Systems, Inc. P/N: Z26-89600-Series Motor Compressor Condenser Assembly or P/N: Z26-8900-Series Motor Compressor Assembly and remote location Power Condenser Assy.

B. Reason: Provide refrigerant charging instructions for air conditioning systems using the Z26-89600-Series Motor Compressor Condenser Assembly or P/N: Z26-8900-Series Motor Compressor Assembly and remote location Power Condenser Assy.

C. Description: Servicing of the air conditioning system is done in 3 phases, 1) Evacuation, 2) Static Charge, and 3) Running Charge.

D. Compliance: Compliance is mandatory.

E. Manpower: The following is an estimated time only. Facility, knowledge, experience, equipment and ambient conditions will effect these estimates: 1) Remove Panels: 0.5hrs, 2) Recover refrigerant: 2.0hrs, 3) Evacuation 7.5hrs, 4) Static Charge: 0.5hrs, 5) Running Charge: 1-4hrs, 2) Panel installation 0.5hrs. This estimate does not include equipment set up and any other service, maintenance or repairs that may be required.

F. Material cost and availability: Operator to provide all cost.

G. Tools and Materials:

1. The following special tools are required to perform the maintenance described in this Service Letter.

ITEM	SOURCE
Leak Detector, for HFC-134a	Commercially Available.
Power Supply capable of 28VDC, 150 Amps For up to 5 hrs continuous duty.	Commercially Available.
Refrigerant Recovery/Recycle equipment Meeting SAE J1990 or J2209 specifications.	Commercially Available.
Manifold Gauge Set, R-134a, with automotive service connections.	Commercially Available.
Refrigeration Vacuum Pump.	Commercially Available.
Scale with 0.1 lb. increments (minimum). Scale with 10 gram increments is acceptable Scale with .01 kilogram increments is acceptable	Commercially Available.

Thermometer, 2 each	Commercially Available.

2. The following material may be required to perform maintenance described in this manual.

ITEM	SOURCE
Refrigerant, HFC-134a NOTE: Always use virgin refrigerant. DO NOT use recycled refrigerant.	Commercially Available.
Lubricant, Refrigeration (HFC-134a) Sanden SP-20 (PAG) or PAG-100 Mopar P/N 82300349	Commercially Available.

NOTE: PAG oil absorbs atmospheric moisture very quickly. Never leave the compressor or oil container exposed to air for prolonged time. Tightly reseal the oil container and compressor immediately after exposing the oil to air.

H. Weight and Balance: Compliance with this Service Letter does not effect previous calculations.

I. Electrical Load Data: Compliance with this Service Letter does not effect previous calculations.

J. References: Not applicable.

II. CHARGING INSTRUCTIONS

NOTE 1: NEVER INVERT THE REFRIGERANT BOTTLE WHEN SERVICING OR CHARGING THE SYSTEM. LIQUID REFRIGERANT WILL DAMAGE THE COMPRESSOR.

NOTE 2: ANYTIME THE SYSTEM HAS BEEN OPEN TO AMBIENT CONDITIONS OR YOU SUSPECT THE SYSTEM HAS BEEN CONTAMINATED WITH AIR OR MOISTURE REPLACE THE RECEIVER-DRYER BEFORE YOU EVACUATE THE SYSTEM.

NOTE 3: USE ONLY VIRGIN REFRIGERANT IN THIS SYSTEM. DO NOT RETURN REMOVED REFRIGERANT TO THIS SYSTEM.

NOTE 4: DO NOT ADD OIL WITH THE REFRIGERANT. ONLY ADD OIL TO THE CRANKCASE OF THE COMPRESSOR. THE SYSTEM MUST BE DISCHARGED TO ADD OIL.

NOTE 5: SEE SECTION III. FOR “TOPPING OFF” PROCEDURES.

NOTE 6: SYSTEMS THAT ARE NOT COOLING AFTER A TOPPING OFF CHARGE MAY HAVE DEFECTIVE PARTS. REFER TO CMM Z26-89600 FOR TROUBLE SHOOTING PROCEDURES.

NOTE 7: WITH R-134a REFRIGERANT THE BUBBLES DO NOT CLEAR IN THE SIGHT GLASS LIKE R-12. DO NOT ATTEMP TO USE THIS METHOD TO DETERMINE IF THE SYSTEM IS ADEQUATELY CHARGED.

A. EVACUATION

1. Attach the manifold gauges to the 1) Vacuum pump (yellow hose), 2) discharge (high side) service port (red hose), 3) the suction (low side) service port (blue hose). Make sure all valves are closed.

2. Pull a deep vacuum for at least 4 hours. Follow the vacuum pump manufacturer recommendations and procedures for pump operation.

a. When the vacuum pump is running open the 1) valve on the yellow hose (if it has one) to the vacuum pump, 2) high side (red) valve on the manifold gauges and 3) low side (blue) valve on the manifold gauges.

b. After 30 minutes of evacuation close the high side (red) valve on the manifold gauges and the low side (blue) valve on the manifold gauges. Note the vacuum reading. The needle should not move on either gauge. Wait 5 minutes and check the readings, the vacuum reading should not move toward zero. DO NOT turn off the pump.

    1. If the needle has moved toward zero there is a leak in the system. Stop the procedure and repair all leaks. After all leaks have been repaired start the evacuation procedure over with Step 1.

    2. If the needle did not move open the valves and continue with the evacuation.

c. Continue to evacuate for at least 3.5 hours after Step 2., b. NOTE: *BEFORE* you turn off the vacuum pump close all valves (red and blue on the gauge set and any on the yellow hose)

B. STATIC CHARGE Refer to the aircraft to aircraft maintenance manual for the amount of refrigerant to be added for that aircraft. If there is not an established amount of refrigerant refer to section C., 6.

1. Attach the manifold gauges to the 1) refrigerant bottle (yellow hose), 2) discharge (high side) service port (red hose), 3) the suction (low side) service port (blue hose). Make sure all valves are closed.

2. Bleed the hose (yellow) from the refrigerant bottle to the manifold gauge set to remove all air. Place the refrigerant bottle on the scale.

3. Weigh the refrigerant bottle.

4. The system OFF. Introduce a static charge into the system. NEVER LIQUID CHARGE THE SYSTEM.

a. Open the valve on the refrigerant bottle.

b. Open high side valve (red) on the manifold gauge set.

c. Open the low side valve (blue) on the manifold gauge set.

d. Continue to introduce refrigerant until both the high side and low side gauges stabilize and are reading the same OR the if the system has an established target weight DO NOT exceed the target weight. When the target weight is achieved charging is complete.

e. Close both the high side and low side valves on the manifold gauge set.

C. RUNNING CHARGE

1. Place the thermometer so you are reading the temperature of the air as it enters the condensing coil (just before the fan blades).

2. Turn the system ON. Record the temperature of the air entering the condensing coil.

3. Add 25°F (14°C) to the temperature reading for the target condensing temperature.

EXAMPLE 1: (air temp entering coil 93°F) 93 + 25 = 118F
(air temp entering coil 34°C) 34 + 14 = 48C

4. Using the Temperature-Pressure Chart (See TABLE 1) read the corresponding (R-134a) pressure for temperature calculated in Example 1.

EXAMPLE 2: 118°F =>166 psig.

5. METHOD TO PERFORM RUNNING CHARGE OF A SYSTEM WITH KNOWN TARGET WEIGHT. If a maximum charge weight (target weight) has been established charge using steps C., 5., a and C., 5., b.

a. To charge, slowly open the low side (blue) valve on the manifold gauge set until the low side maximum reading is 40 psig. NOTE: NEVER OPEN THE HIGH SIDE VALVE WHILE THE SYSTEM IS RUNNING.

b. Continue to charge until you reach the target weight. NOTE: THE TARGET WEIGHT INCLUDES THE AMOUNT OF REFRIGERANT INTRODUCED DURING STATIC CHARGE PLUS THE AMOUNT INTRODUCED DURING THE RUNNING CHARGE. When the target weight is achieved close all valves. The Suction (low side) should be 30 psig ± 7 psig. Charging is complete.

6. METHOD TO DETERMINE A TARGET WEIGHT: Calculate a target high side target pressure using Steps C.,1, C.,2, C.,3, C.,4 (see Example 1 and Example 2).

a. To charge, slowly open the low side (blue) valve on the manifold gauge set until the low side maximum reading is 40 psig. NOTE: NEVER OPEN THE HIGH SIDE VALVE WHILE THE SYSTEM IS RUNNING.

b. Continue to charge until you reach the calculated discharge (high side) pressure. When the target pressure is achieved close all valves. The Suction (low side) should be 30 psig ± 7 psig. Charging is complete.

c. When charging is complete weigh the bottle and determine weight of the refrigerant charge introduced into the system. (Starting weight)-(end weight) = (total charge weight) This would be your target weight for a dry system. NOTE: THE TARGET WEIGHT INCLUDES THE AMOUNT OR REFRIGERANT INTRODUCED DURING STATIC CHARGE PLUS THE AMOUNT INTRODUCED DURING THE RUNNING CHARGE.

III. TOPPING OFF

1. Place the thermometer so you are reading the temperature of the air as it enters the condensing coil (just before the fan blades).

2. Turn the system ON. Record the temperature of the air entering the condensing coil.

3. Add 25°F (14°C) to the temperature reading for the target condensing temperature.

EXAMPLE 1: (air temp entering coil 93°F) 93 + 25 = 118F
(air temp entering coil 34°C) 34 + 14 = 48C

4. Using the Temperature-Pressure Chart (See TABLE 1) read the corresponding (R-134a) pressure for temperature calculated in Example 1.

EXAMPLE 2: 118°F (48°C) =>166 psig.

5. Continue to charge until you reach the calculated discharge (high side) pressure. When the target pressure is achieved close all valves. The Suction (low side) should be 30 psig ± 7 psig. Charging is complete.

SERVICE LETTER Z26-1

TEMPERATURE - PRESSURE CHART

TEMP F°	C°	PRESSURE (PSIG) R-134a	TEMP F°	C°	PRESSURE (PSIG) R-134a
50	10	45.5	100	37.8	124.3
52		47.7	102		128.5
54		50.1	104		132.9
56		52.3	106		137.3
58		55.0	108		142.8
60	15.6	57.5	110	43.3	146.5
62		60.1	112		151.3
64		62.7	114		156.1
66		65.5	116		161.1
68		68.6	118		166.1
70	21.1	71.2	120	48.9	171.3
72		74.2	122		176.6
74		77.2	124		182.0
76		80.3	126		187.5
78		83.5	128		193.1
80	26.7	86.8	130	54.4	198.9
82		90.2	132		204.7
84		93.6	134		210.7
86		97.1	136		216.8
88		100.7	138		223.0
90	32.2	104.4	140	60	229.4
92		108.2	142		235.8
94		112.1	144		242.4
96		116.1	146		249.2
98		120.1	148		256.0
			150	65.6	263.0

TABLE 1.