

Service Bulletin

FAA-DER APPROVED

Service Bulletin: No. 320

Subject: Removal and Replacement of Air Conditioning System Compressor.

Date: June 26, 1996

Applicability: Bell Model 412 and 412EP which are equipped with the ACC 412AC-100 Cabin Air Conditioning system.

Reference:

1. F.A.A./S.T.C. # SR00066DE, Bell 412 Air Conditioning System.
2. Drawing #: 412AC-302

Compliance: Mandatory – when compressor is to be replaced.

Background: This document summarizes the procedures necessary for the proper removal and replacement of the air conditioner compressor installation.

Compliance with the procedures presented in this bulletin is necessary to assure an acceptable compressor service life, and to maintain the structural integrity of the installation.

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Compressor Removal and Replacement :

Bill of Materials:

Description	Qty.	Part Number
Compressor	1	412AC-3540-1
Drive Belt	1	AX53
Bolt	2	NAS464-P6LA14
Nut	2	MS21042L6
Washer	4	AN960-616
Link Assy	1	412AC-3012-3

Compressor Removal and Replacement Instructions:

1. Reclaim all refrigerant that is currently in the system by using an appropriate refrigerant recovery / recycle machine.
2. Cut safety wire on belt tension link and loosen to allow drive belt to be removed from compressor.
3. Disconnect both suction and discharge lines from the compressor by loosening the B-Nuts holding the O-ring fittings in place on the top of the compressor.
4. Remove the AN6H-47A bolt which mounts the belt tension link to the compressor, and the AN6H-27A bolt which mounts the link to the compressor mount. Remove old belt tension link. Note location of existing washers and sleeves so the new tension link can be installed in the same manner.
5. Remove the bolts which mount the compressor lugs to the compressor mount, Then remove the old compressor.

Note: The system oil charge is 16 oz of oil. This oil is continuously circulated throughout the system. Some of the oil continuously puddles in the compressor. The amount of oil in the original compressor is an indication of the total system oil charge. The system oil charge should be verified and corrected at this time using the procedure on page 7 (also see step 6).

6. The internal parts of the original compressor should be inspected to insure that they are covered by an oil film. If a generous oil film does not exist, the system is oil starved. Twelve (12) ounces of oil should be injected into the system as noted below.

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<u>Qty</u>	<u>Installation Location</u>
4 oz.	Accumulator
8 oz.	Discharge Hose

7. Install the new compressor as shown on page 6.
8. Place NAS464-P6LA bolts through compressor mount ears and compressor lugs as shown on page 5 of this document. When placing the NAS464 bolt through the compressor lugs, make sure the compressor lug sleeves remain in place when the bolts are pushed through the lugs. Confirm there is no space between the compressor lugs and the compressor mount flanges. Use AN960-616 and AN960-616L washers to adjust if space exists. The compressor lugs may fracture if they are not in contact with the compressor mount, when the NAS464-P6LA14 bolts are torqued to 95-110 in.-lb.
9. Hand tighten compressor mounting bolts then install new belt tension link. The hardware configuration (bolts, sleeves, and washers) should be the same as it was for the previous tension link. Torque in accordance with AC43-13.
10. Place the belt over both pulleys and tension by adjusting the belt tension link. The belt should deflect .26 inch with 7 to 10 lb. force applied to midspan of the belt.
11. Torque compressor mount lug bolts to 95-110 in - lb. (2 ea. NAS464-P6LA14)
12. Tighten lock nuts on tension link and safety wire in place.
13. Install new O-rings on the hoses & follow the O-ring fitting installation instructions when connecting the hoses to the compressor. Tighten fittings and torque as shown on installation instructions.
#8 fitting - 40 to 45 in/lb. #10 fitting - 50 to 55 in/lb.
14. System is now ready to be evacuated and recharged.
15. Once the system is evacuated for a minimum of 30 minutes (50 minutes or longer is recommended) a refrigerant charge may be added to do a leak check on the system. If the system was leak free prior to changing the compressor, you may only need to check the compressor fittings for leaks. We would recommend checking all fittings that can be reached for leaks at this time to ensure a trouble free system once it is returned to service. Follow the leak checking procedures as outlined in the enclosed system leak check and charging instructions.
16. To charge the system with the correct amount of refrigerant, use the following procedure:

Charge the system with 6.0 lb. of R134a refrigerant. System pressures should be **approximately** as shown. The **most accurate** method of charging a system is to an initial refrigerant charge of 5.0 lb. then continue to add refrigerant until the evaporator outlet air temperature and system suction pressure reaches a **minimum** and

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subsequently start to increase. When adding the refrigerant after the initial charge, it should be done in increments of .25 lb. and a minimum of 10 minutes allowed to elapse before adding each additional .25 lb. refrigerant charge. This allows the system to stabilize and reach its maximum cooling potential for the given charge. The optimum charge occurs when evaporator outlet air temperatures are at their lowest. Any additional refrigerant will cause the outlet air temperature to increase and system performance to be degraded. Charge the system to the point of noticing first temperature increase, then reduce charge back to the optimum point where outlet air temperatures were lowest.

17. Once system is charged, the High pressure and Suction pressure gauge readings should be approximately as shown below when the system is operating.

Refrigerant Pressure - Temperature Chart with System Operating

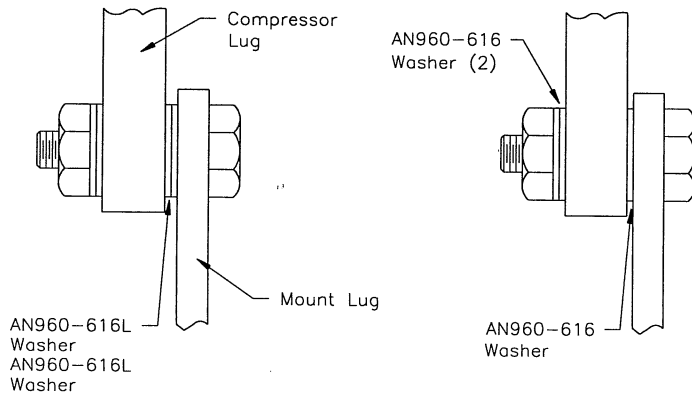
The following data is provided as reference information. System pressures can vary from this table depending on Temperature / Humidity relationships

R-134a Temperature Pressure Chart		
Ambient Temp ° F	High Pressure Gauge Reading	Suction Gauge Reading
55	95 - 115	30 - 40
60	105 - 125	
65	115 - 135	
70	130 - 150	
75	150 - 170	
80	165 - 185	
85	175 - 195	
90	185 - 205	
95	210 - 225	
100	220 - 240	↓
105	240 - 260	30 - 40

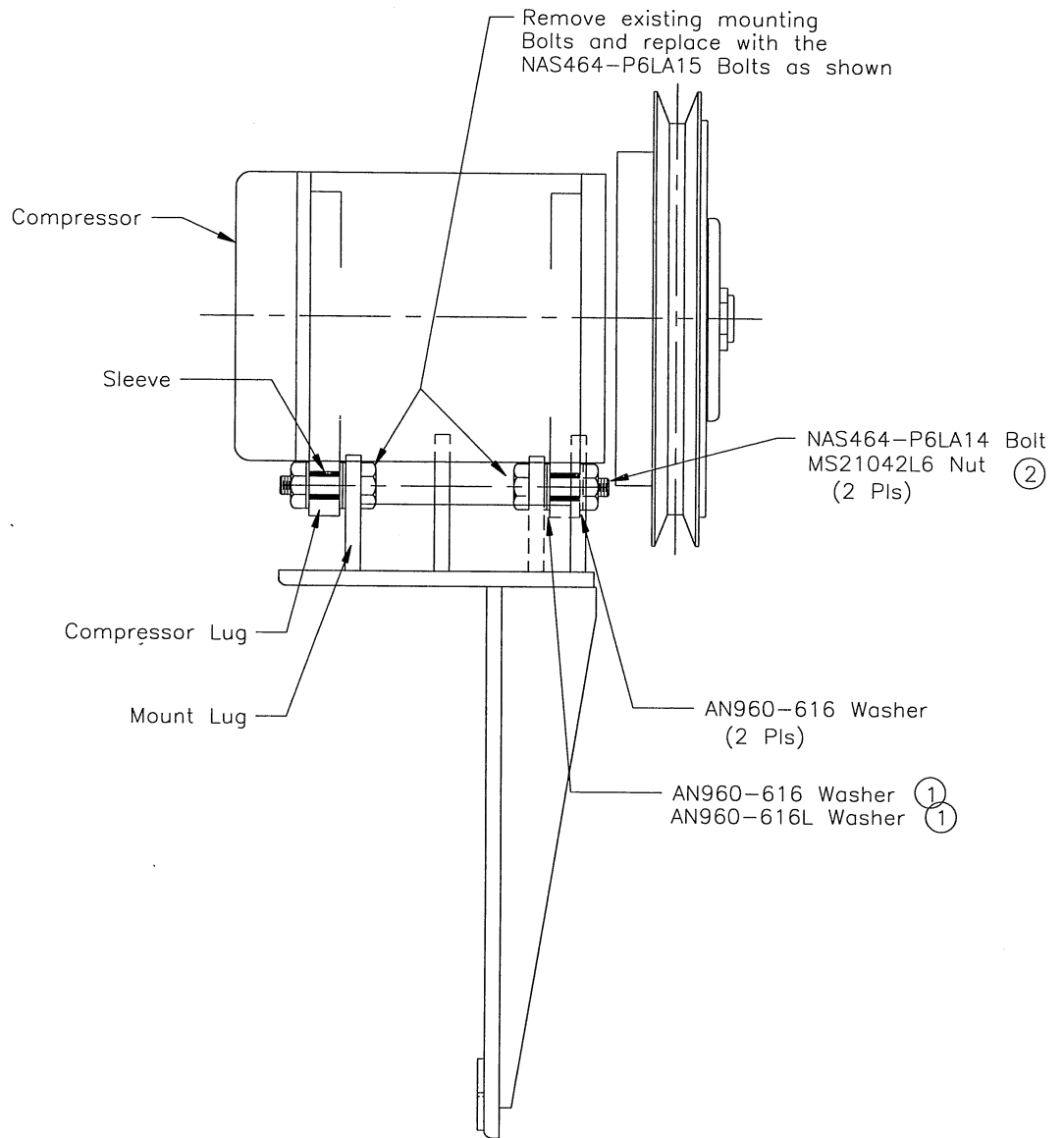
Important Note

When reclaiming refrigerant, be sure to note any oil that is removed from the system, and replace the lost oil before reserVICING. Compressor failure is possible, if total system oil charge is not maintained.

Weight & Balance: No change.



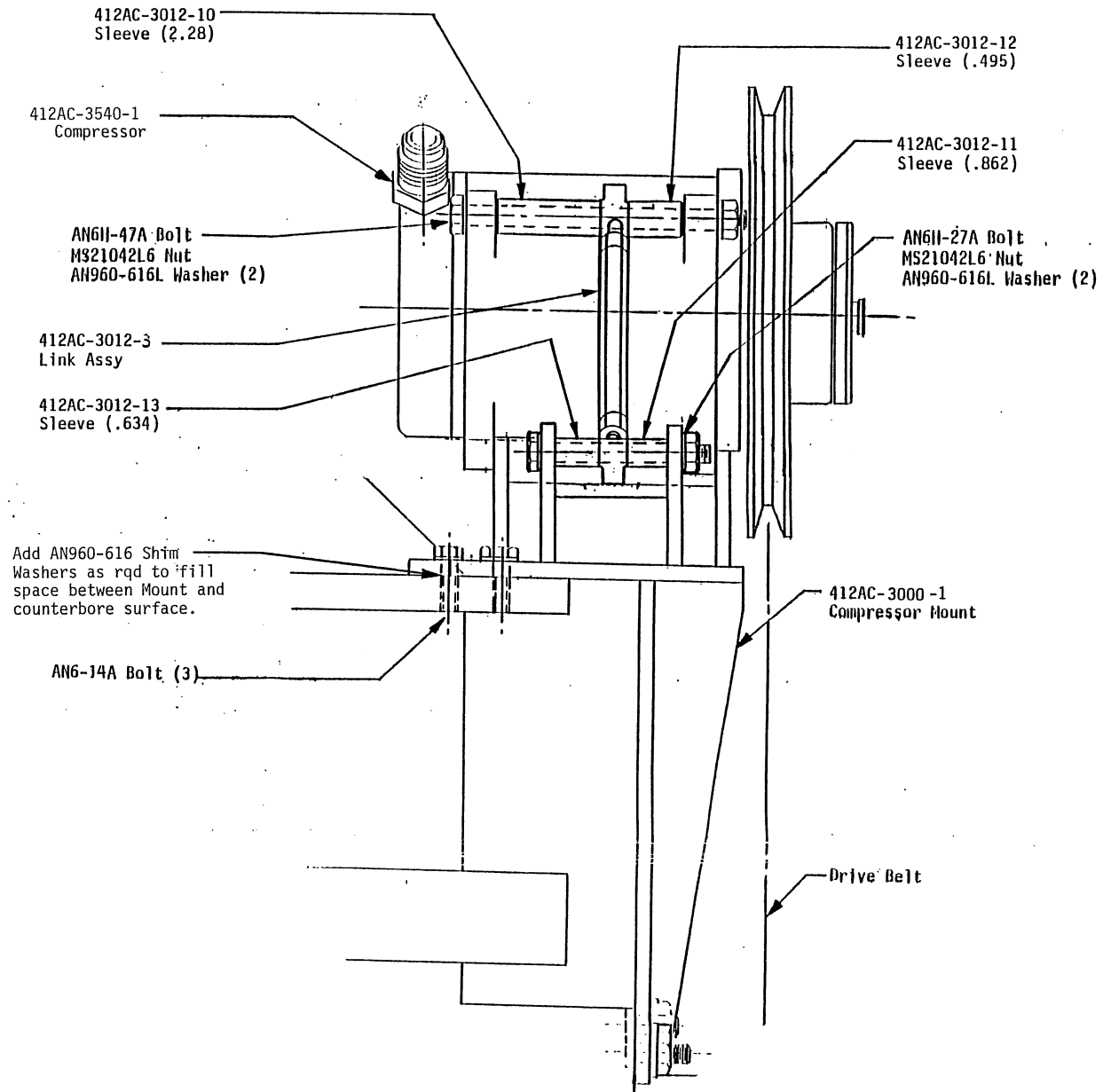
Alternate washer configurations



- ① Install washers as required to fill space between lugs. Normally one AN960-616 Washer on each side will be adequate, but due to the variation in thickness of the washers you may need one AN960-616 and one AN960-616L to fill the space between the lugs and mounting ears, see details.
Note: Due to the variation on thickness of the washers, you may need to try a few AN960-616 Washers to get the best fit. Attempt to make the fit snug so there will be no space between the washer and lugs.
- ② Torque requirement 95 to 110 in-lbs. DO NOT FORCE LUG TOGETHER.

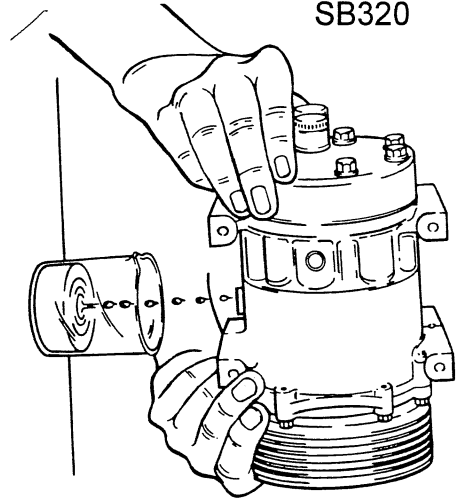
Figure 1. Compressor Pivot Bolt Installation.

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Verification of Proper Oil Charge For A System That Has Been in Service.

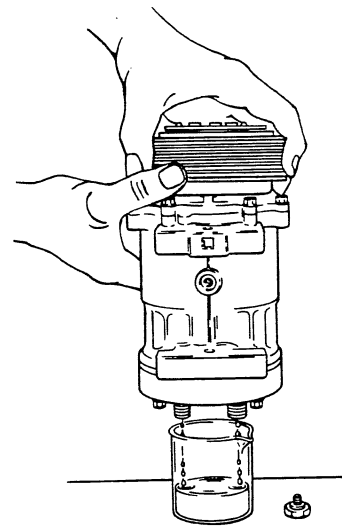
1. Remove the oil plug and drain as much oil as possible into a suitable container.



2. Drain oil from the suction and discharge ports while turning the shaft clockwise only with a socket wrench on the armature retaining nut.

3. Measure and record the volume of oil drained from the compressor.

4. Approximately 0.5 fl. oz. (15cc) will remain in the compressor as a film coating the internal surfaces. Add 0.15 fl. oz. (15cc) to the recorded volume of oil. This is the calculated amount of oil in the original compressor.



5. The required amount of oil in the compressor after previous operation, is 1.2 fl. oz. (35cc)

6. If the required amount is less than the calculated amount, a quantity of oil equal to the difference should be injected into the discharge hose of the system.

Example:

Total oil drained	0.4 oz.
Add film oil qty	0.5 oz
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Total calculated oil	0.9 oz
Require oil	1.2 oz
Amount to be added to system	0.3 oz

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PROCEDURE FOR SYSTEM OIL CHARGE WITHOUT REMOVAL OF THE COMPRESSOR

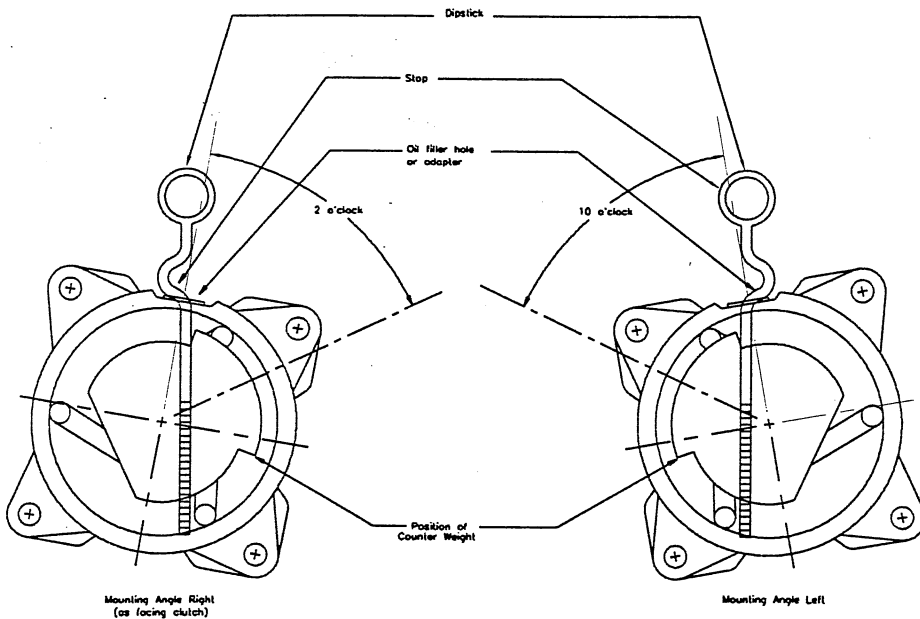
Maintaining the correct amount of refrigerant oil in the system is **critical** for ensuring long life of the compressor. Oil can be lost due to leaks or rapid loss of refrigerant as well as during normal servicing. If oil loss is suspected use the following oil level measurement procedure described below.

Any oil that was removed during refrigerant reclaiming must be replaced by adding that amount to the discharge line from the compressor, (smaller hose). Total system oil charge is 16 fl. oz. New compressors contain 3.4 fl. oz. Compressor failure is possible, if total system oil charge is not maintained.

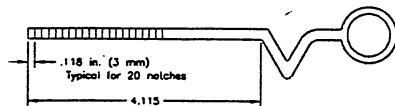
Oil Level Measurement

Oil level in the compressor should be checked as follows:

1. Run the compressor for 10 minutes with the engine at idle.
2. Recover all refrigerant from the system, SLOWLY so as not to lose any oil.
3. Determine the mounting angle of the compressor from horizontal (i.e., oil plug or adapter on top). This is most readily done by using a machinist's universal level, if access to the compressor permits.



4. Remove the oil filler plug. Using a socket wrench on the armature retaining nut, turn the shaft clockwise until the counterweight is positioned as shown.
5. Insert oil dipstick up to the stop, as shown in figure, with the angle pointing in the correct direction.
6. Remove dipstick and count number of notches covered by oil.
7. Add or subtract oil to meet the specifications shown in the table.
8. Re-install oil plug. Seat and O-ring must be clean and not damaged. Torque to 11-15 ft-lbs (15-20 N-m)



Mounting Angle (degrees)	Acceptable oil level in increments
0	3-5
10	4-6
20	5-7
30	6-8
40	7-9
50	8-10
60	8-10
90	8-10

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