

**Service Bulletin**

**FAA-DER APPROVED**

Service Bulletin: No. 412-201

**Subject:** 412 Air Conditioner Drive belt replacement procedure, Compressor installation requirements, Refrigerant charging procedures, and Refrigerant Oil verification procedures.

**Date:** 27 March 1997

**Applicability:** Bell Model 412EP, S/N 36116 Helicopter which is equipped with Air Comm Corporation Cabin Air Conditioning System; 412AC-100.

**Reference:**

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

**Purpose:** This bulletin provides a belt, and belt tension change. By replacing the existing AX53 (Gates) belt with the 15542 (Goodyear) belt, the belt tension is reduced to improve the compressor bearing life.

In addition, a compressor safety stop link is added by this document. The multiple lugs of this compressor installation provide redundant structural mounting of the compressor. The safety stop provides a restraint of the compressor, in case of a belt tension link disconnect.

Section I : Air Conditioner Belt Replacement, and Oil Charge Verification Requirements.

Section II : Compressor Installation Requirements.

Section III : Refrigerant Charging Procedure.

Section IV : Refrigerant Oil Charge Verification Procedures.

**Bill of Materials:**

Qty.	Part Number	Description
1	15542	Drive Belt
1	412AC-3014-1	Safety Stop
1	NAS464-P6LA14	Bolt
1	NAS1306-44	Bolt
2	MS21042L6	Nut
6	AN960-616	Washer
1	90916	Oil Dipstick

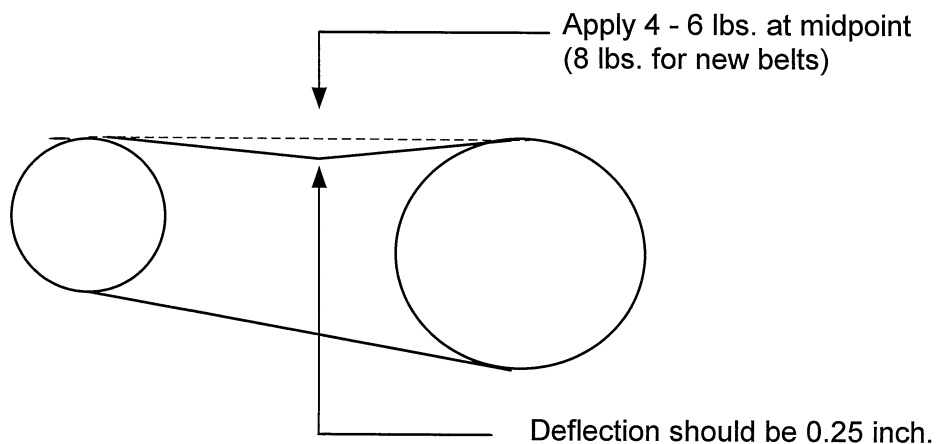
Following items required only if compressor is replaced.

1	No. 8 (AIR 440-841)	O-ring
1	No. 10 (AIR 440-842)	O-ring
12 oz.	RL100S	Polyester Oil Emkarate
1	412AC-3540-1	Compressor

Section I : Air Conditioner Belt Replacement and Belt Tensioning Procedure.

1. Remove Transmission cowling to gain access to the air conditioner compressor assembly & Main transmission drive shaft input coupling.
2. Cut safety wire securing the jam nuts to the air conditioner compressor belt tensioning link, and loosen belt tension.
3. Disconnect main drive shaft from the drive pulley mounted at the main drive shaft in-put coupling, per BHT approved procedures.
4. Check refrigerant oil charge and add, if required, as prescribed in section IV.
5. Remove old drive belt.
6. Install new drive belt, part number 15542.
7. The required belt tension is 60 lbs. NOTE: Over tensioning will shorten belt life and may damage the clutch bearing. Insufficient belt tension will result in belt slippage, excess heat and reduced belt life. In the absence of a belt tensioning gauge, an approximate adjustment can be made using the following procedure. By applying 4 to 6 lbs. (8 lbs for new belts) force, produces a .25 inch deflection. (see illustration below).

A belt tension gauge should be used to adjust the belt tension (Kent-Moore BT3373F or Equivalent, source: Snap-On tools)



8. Run system for 15 minutes, or until normal operating temperatures are achieved. Check belt tension, and make adjustments as necessary.
9. Safety wire belt tension link per AC43.13 (pg. 6 & 7).
10. Reinstall main transmission cowling.

Section II : Compressor Installation Requirements.

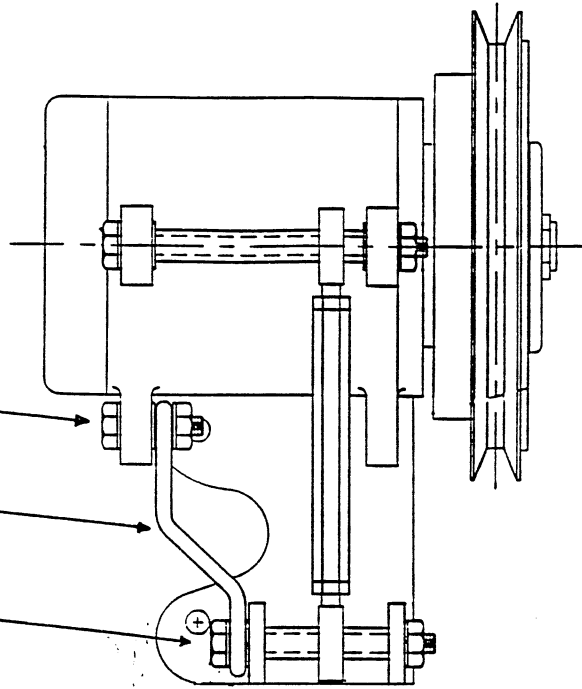
1. Install Compressor & related hardware as illustrated below.

View Looking Down

NAS464-P6LA14 Bolt (1)  
MS21042L6 Nut (1)  
(Torque Nut to 95-110 in-lbs)  
AN960-616 Washer (3)

412AC-3014-1 Safety Stop (1)  
(Install Safety Stop as shown)

NAS1306-44 Bolt (1)  
MS21024L6 Nut (1)  
(torque Nut to 95-110 in-lbs)  
AN960-616 Washer (3)

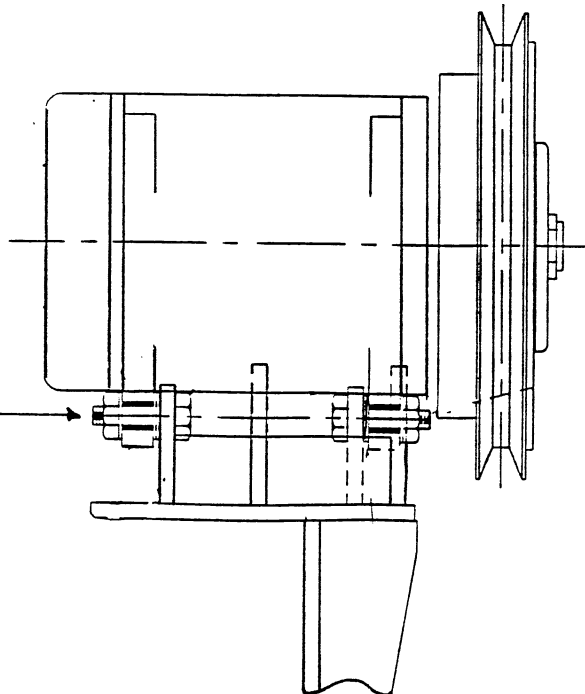


Side View

Note: Install washers as required to fill spaces between compressor lugs, and compressor mount lugs. Normally one AN960-616 Washer on each side will be adequate, but due to variations in the thickness of the washers you may need one AN960-616 and one AN960-616L to fill the space between the lugs and mounting ears.

There should be no space between the washer and the mounting lugs. This should be a snug fit, but do not force lugs together.  
(Torque Nut to 95-110 in lbs)

NAS464-P6LA14 Bolt (2)  
AN960-616 Washer (3)  
AN960-616L Washer (1)  
MS21042L6 Nut (2)



Section III : Refrigerant Charging Procedure.

This procedure is considered a summary of the system service procedure provided in the service manual.

Note: System to be serviced by qualified personnel only!

1. Leak check system in accordance with procedures outlined in the Air Comm 412 Air Conditioner Installation Service Manual, using an electronic refrigerant leak detector.
2. Evacuate system for a minimum of 30 minutes, to remove all moisture from the system.
3. Charge system with 6 lbs. (2.721 kg.) of R134a refrigerant. System pressure should be approximately as shown below. The most accurate method of charging a system is to add refrigerant until evaporator outlet air temperature and suction pressure reaches a minimum and subsequently start to increase. 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 system to the point of noticing first temperature increase, the reduce charge back to the optimum point where outlet air temperatures were lowest.

R134a Refrigerant Pressure - Temperature Chart (With System Operating)

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

Ambient Temperature		High Pressure Gauge		Low Pressure Gauge	
F	C	Psig.	Kg/cm	Psig.	Kg/cm
55	12.7	95-115	6.5-8.0	30-40	2.0-3.0
60	15.5	105-125	7.1-8.6	30-40	2.0-3.0
65	18.3	115-135	8.0-9.5	30-40	2.0-3.0
70	21.1	130-150	9.0-10.5	30-40	2.0-3.0
75	23.8	150-170	10.5-12.0	30-40	2.0-3.0
80	26.6	165-185	11.1-12.6	30-40	2.0-3.0
85	29.4	175-195	12.2-13.7	30-40	2.0-3.0
90	32.2	185-205	13.0-14.5	30-40	2.0-3.0
95	35.0	210-225	14.9-16.4	30-40	2.0-3.0
100	37.7	220-240	15.5-17.0	30-40	2.0-3.0
105	40.5	240-260	17.0-18.5	30-40	2.0-3.0

System Refrigerant & Oil Charge

System Description	Refrigerant Charge		Oil Charge	
Bell 412	6.0 lbs.	2.721 kg.	12.0 oz.	354 ml.

WARNING

Inadequate refrigerant or refrigerant oil in the system will result in compressor "lock-up" and require the replacement of the compressor!

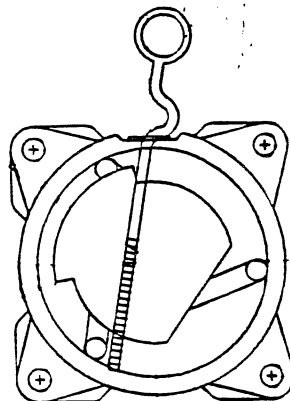
Section IV : Refrigerant Oil Charge Verification.

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 dia. hose) Total system oil charge is 16 fl. oz., New compressors contain 3.4 fl. oz., compressor failure is possible, if the total system oil charge is not maintained.

Refrigerant Oil Charge Procedure.

1. Remove refrigerant from the system.  
Note: steps 2, 3, & 4 are required, even if the compressor is to be replaced.
2. Remove the oil filter plug from the top of the compressor body, and check the oil quantity using a dipstick (90916 provided), as shown below.



3. Add oil to the compressor discharge line according to the following schedule.

Dipstick Indications	Quantity of Oil to be added	
None	8 oz.	224.0 gr.
1 - 3 increments	4 oz.	112.0 gr.
3 - 5 increments	None	None

4. Replace compressor, if required, or replace plug in compressor body. Torque plug to 11 - 15 ft. lbs. (15 -20 Nom, 150 -200 Kgf. cm).
5. Note: if the compressor is to be replaced, the additional oil requirement from step 4 is still required. The oil in the compressor to be discarded is not required.