

FAA – DER APPROVED

Service Bulletin

**Service Bulletin:** SB412-304; Bell 412 Air Conditioner System

**Subject:** Installation of a Speed Reducer Sheave Retainer Plate.

**Date:** 3 July, 2001

**Applicability:** Bell Helicopter Models 412 EP, HP, SP equipped with the Air Comm Corporation Air Conditioner System which features the compressor Speed Reducer (See Figure 1).

**Reference:**

1. F.A.A./S.T.C. #SR00066DE, Bell Helicopter 412 Air Conditioning System.
2. 412AC-304 Compressor Installation Drawing
3. 412AC-3028 Assy. Mount, Compressor with Speed Reducer
4. 412AC-3038-1 (EP/HP), and 412AC-3036-1 (SP) Assy. Speed Reducers

**Compliance:** Is **Recommended** within **50 hours** of receiving this Service Bulletin.

**I. Discussion:**

It has come to our attention that failure of the compressor drive Speed Reducer Pulley Bearing allows the Speed Reducer Pulley to dislodge from the Speed Reducer Shaft.

The cause of bearing failure appears to be due to improper bearing assembly (at ACC), or by excessive belt tension.

This Service Bulletin provides for the installation of a "Retainer Disk" to the Speed Reducer to preclude an un-contained Speed Reducer Pulley.

In addition, this document provides a revision to the Service Manual to add inspection and overhaul information related to the Speed Reducer.

**II. Approval:**

The Technical aspects of this Service Bulletin have been FAA / DER approved.

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**III. Purpose:**

The Purpose of this bulletin is to explain the modifications necessary to install the Retainer Plate on the Bell 412 Air Conditioner Speed Reducer Assembly.

**IV. Bill of Materials:**

Item	Part Number	Description	Qty.
1	412AC-3036-13	Bevel Washer	1
2	412AC-3036-14	Retainer Plate	1
3	AN6C10A	Bolt	1
4	MS21043-6	Nut	1

Contact the ACC Service Department to obtain the parts listed above at no charge to complete this Service Bulletin at: Phone 303-440-4075, or Fax 303-440-6355.

**V. Removal of Speed Reducer Assembly.**

**NOTE**

It will be necessary to remove the Speed Reducer Assembly from the Compressor Mount to perform the work to accomplish this Service Bulletin.

1. Cut safety wire on the Compressor Belt Tensioning Link (upper belt), and Belt Tensioning Bolt (lower belt), and loosen respective Jam Nut(s), and lower compressor mounting bolts.

**CAUTION**

Before attempting to adjust the lower drive belt tension, insure that the speed reducer mount attaching bolts have been loosened!

2. Loosen the tension on the Compressor Belt Tension Link, and remove the upper Drive Belt from the Compressor & Speed Reducer Assembly.
3. Turning the Belt Tensioning Bolt Clock-wise (again insure that the Speed Reducer mounting bolts are loose) will loosen the belt tension, and allow the lower drive belt to be removed. Remove cotter key from lower retaining nut on Belt Tensioning Bolt, and remove nut.

**NOTE**

**It is not necessary to remove this belt from the aircraft to conduct the requirements of this Service Bulletin!**

Should the removal of the lower drive belt be necessary, the forward end of the main transmission drive shaft coupling will need to be removed (See BHT Service Manual for instructions).

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4. Remove the four (4) mounting bolts from the Speed Reducer Assembly, and remove Speed Reducer from Compressor Mount.

**CAUTION**

The Speed Reducer Assembly is relatively heavy for a small part, and due to its location above the Transmission Drive Shaft. Care should be taken to protect the aircraft from damage while removing & installing this part.

**NOTE**

See Air Conditioner Service Manual 412AC-208M, Chapter 2, Page 2-1, Revision 2, Periodic Inspections for Special Inspection Information for the Inspection Requirements of the Speed Reducer Bearing prior to continuing Section VI. Installation of Retainer Plate Assembly.

**VI. Installation of Retainer Plate Assembly.**

1. Retainer Plate Installation Procedure. (See figure 2, Pg 6)
  - A. Mark the center of the Speed Reducer Shaft Assembly, and center punch its location.

**NOTE**

A Drill Press should be used to accomplish steps B, C, & D.

- B. Place the 412AC-3016-1 Speed Reducer Assembly on a flat surface, using a .386" Dia. Drill bit, drill a hole through the center of the Speed Reducer Shaft and continue through the Speed Reducer Backplate.
- C. Turning the Speed Reducer Assembly over, and using the .386" Dia. Hole previously drilled. Drill a 1.00" Dia. Hole through the Speed Reducer Backplate only.
- D. Drill Drain Hole (.125) in bottom (six o'clock position) of Speed Reducer Assembly.
- E. Clean all sharp edges where practical, and remove metal chips that maybe trapped inside the Speed Reducer Housing Assembly using shop air.
- F. Install 412AC-3036-13 Bevel Washer through 1.00" Dia. Hole in Speed Reducer Back Plate, seating it as shown on page 6 of 6.
- G. Install AN6C10A Bolt through the 412AC-3036-14 Retainer Plate, 412AC-3016-3 Pulley Assy Shaft, and 412AC-3036-13 Bevel Washer. (See page 6 of 6)
- H. Install MS21043-6 Nut on the AN6C10A Bolt (See page 6 of 6) and Torque to 95 –110 inch lbs.

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## VII. Re-installation of Speed Reducer Assembly, and Belt Tensioning Procedures.

- A. Re-install the 412AC-3016-1 Speed Reducer Assembly to the face of the Compressor Mount utilizing the existing Mounting bolts and Nutplates. Re-install nut and cotter key on lower belt tensioning bolt.

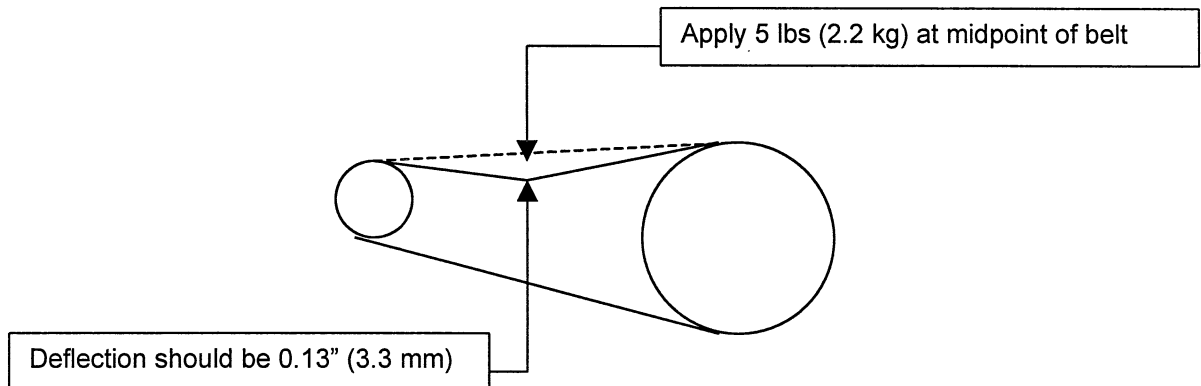
### **NOTE**

Do not torque mounting hardware until belt tensioning has been completed.

- B. Re-install the Lower Drive Belt between the Speed Reducer and the Driveshaft Drive Pulley Assembly.
- C. Tension Lower Drive Belt by turning the Belt Tensioning Bolt Counter-clockwise. Utilizing a Belt Tensioning Gauge, tension belt to 55 lbs, or use the alternate method by applying 5 lbs (2.2 kg.) of pressure to the midpoint of the belt and tension until a 0.13" (3.3 mm) deflection is observed.

### **NOTE**

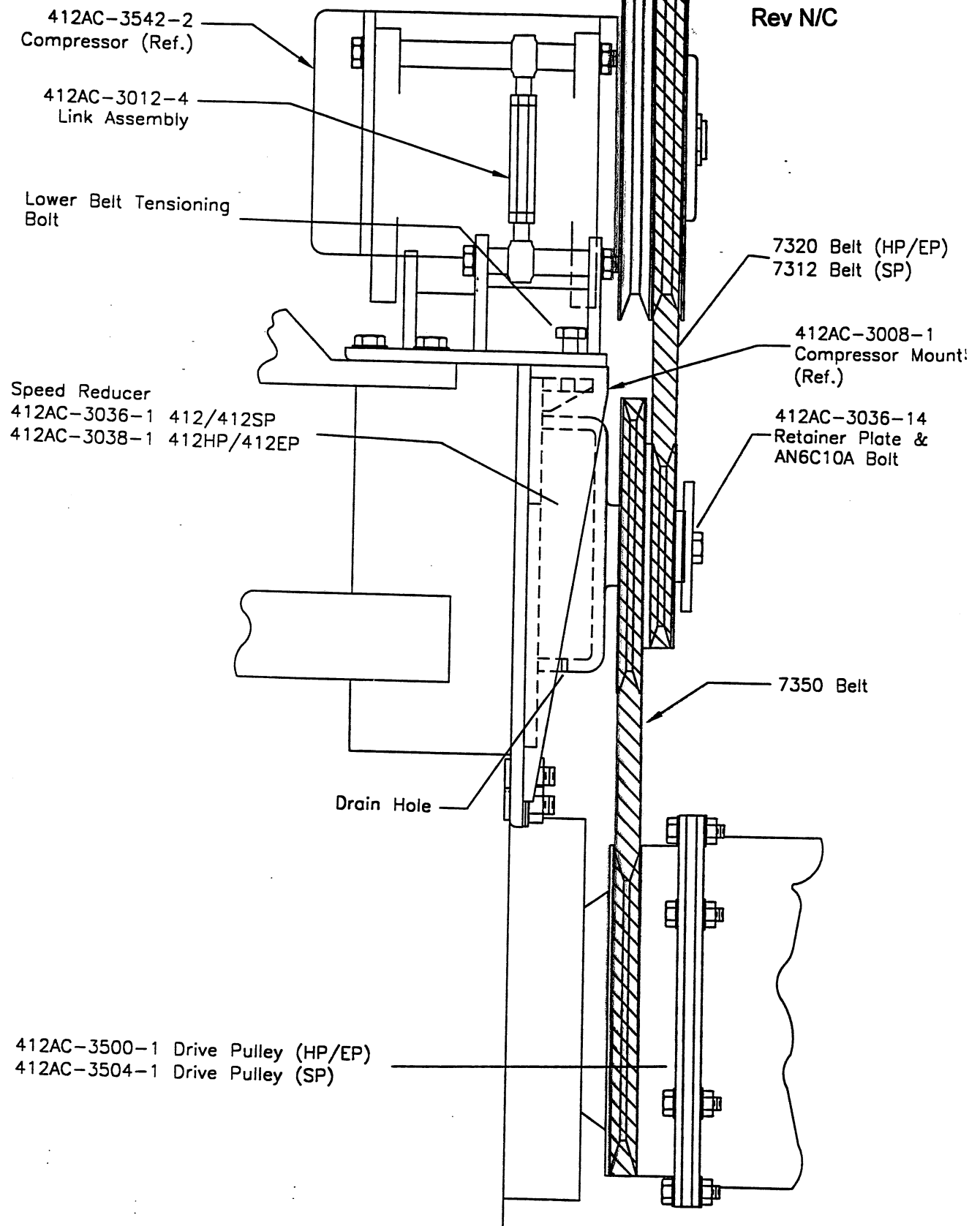
This same tensioning procedure applies for both the upper and lower drive belts.



- D. Re-install upper Drive Belt on Speed Reducer & Compressor Drive Pulley, and repeat belt tensioning procedures as shown above.
- E. Re-torque Speed Reducer Mounting Bolts, and lower Compressor Mounting Bolts to 95 – 110 inch lbs.
- F. Re-safety the Compressor Belt Tensioning Link and Lower Belt Tensioning Bolt using .032 safety wire.
- G. Conduct Maintenance Operational Check (MOC) of air conditioner, and return air conditioner to service.

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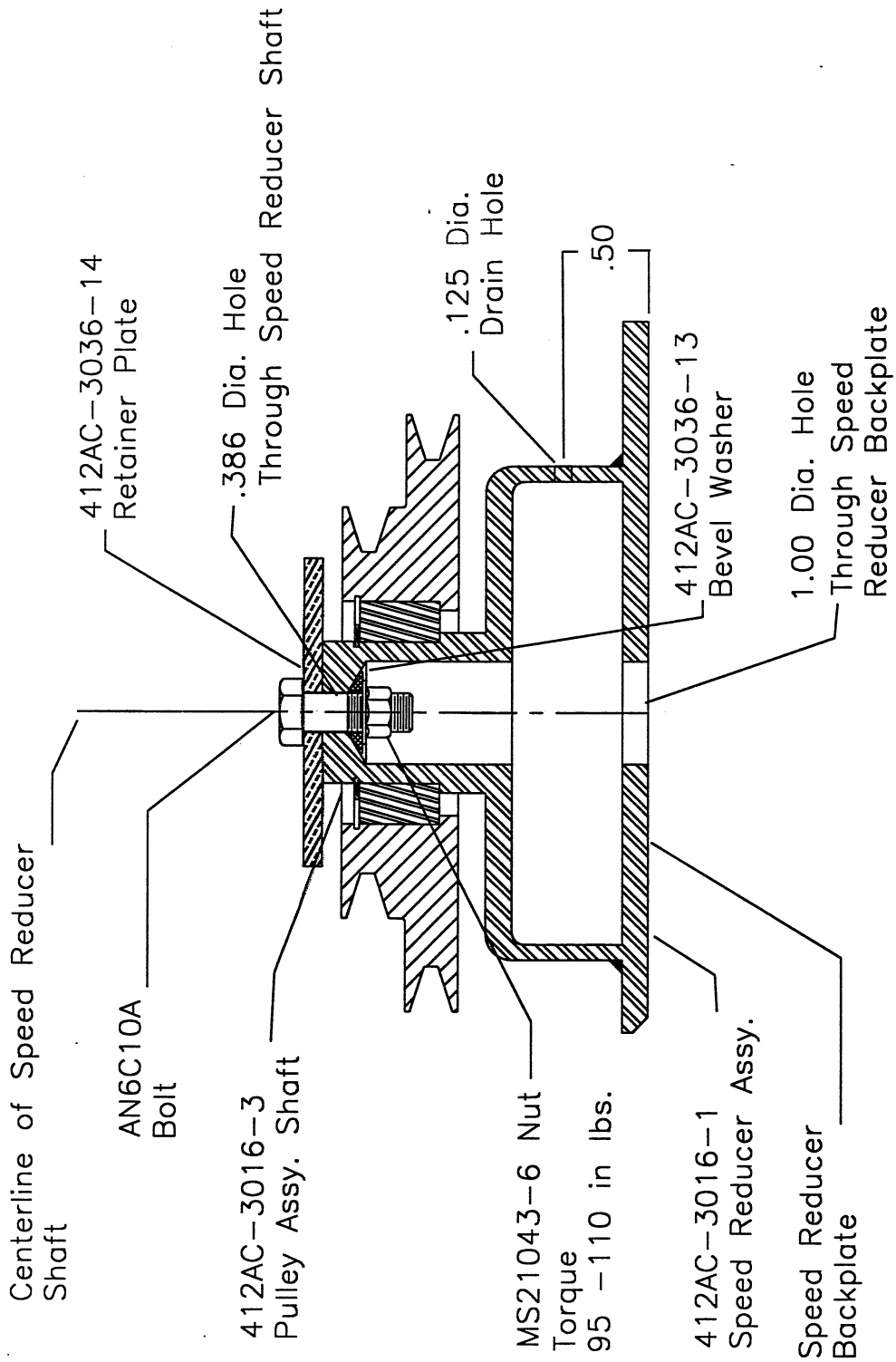
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**Figure 1, Compressor Installation**

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**Figure 2, 412AC-3016-1 Speed Reducer Assy. Retainer Plate Modifications**