

Service Bulletin

Service Bulletin: SB 427-302; Bell 427 Air Conditioner Compressor Drive Belt and Pulley Replacement.

Subject: Up-grade and replacement of the Air Conditioner Compressor Drive Belt and Pulleys.

Date: 3 March, 2005, Rev N/C
28 March, 2005, Rev A

Applicability: Bell Helicopter, 427 Equipped with the Air Comm Corporation Air Conditioner system.

Reference: 1. FAA / STC # SR00418DE Air Comm Corporation Air Conditioner System.
A. 427EC-3502 Rev N/C Drive Pulley Drawing
B. 427EC-302 Rev N/C Compressor Installation Drawing

Compliance: Is at the discretion of the operator

I. Discussion:

Field reports have indicated that the 3VX500K compressor drive belt has experienced wear and cracking problems. This Service Bulletin provides for the replacement of the compressor pulley, drive pulley, and the compressor drive belt with an alternate poly-V design.

II. Approval:

Technical aspects of this Service Bulletin are FAA / DER approved.

III. Purpose:

This is a product improvement change which is intended to improve the service life of the Compressor Drive Belt

IV. Bill of Materials:

Parts to be removed:

Item	Part Number	Description	Quantity
1	427EC-3500-11	Drive Pulley	1
2	427EC-3012-5	Compressor Pulley Assy.	1
3	427EC-3500-18	Idler Pulley Assy.	1
4	3VX500K	V-Belt	1

Record of Revision

Revision	Issue Date	Inserted By	Description of Changes
A	03/28/05	GP	Added additional information to notes on pg's. 3 & 8., added special tools

Bill of Materials continued:

Parts to be installed:

Item	Part Number	Description	Quantity
1	427EC-3502-1	Drive Pulley	1
2	427EC-3016-10	Compressor Pulley Assy.	1
3	427EC-3016-3	Idler Pulley Assy.	1
4	ES35427-1	Poly-V Belt	1
5	23-20551	Compressor Clutch Armature Assy.	1

Special Tools:

Item	Part Number	Description	Quantity
1	4YT15	Pulley Puller tool	1
2	T0-0902C	Clutch Puller tool	1

V. Accomplishment Instructions:

Removal:

1. Remove Engine & Transmission cowlings to gain access to the air conditioner compressor, and belt drive area.

CAUTION

Disconnect the battery and remove ground power prior to starting work on the air conditioner system.

NOTE

It will **not** be necessary to discharge the air conditioner refrigerant charge to accomplish this Service Bulletin.

2. Remove the safety wire from the 412AC-3012-3 Link Assy. and loosen the Jam Nuts at the base of the Link Assembly Rod Ends. (See figure 1.1)

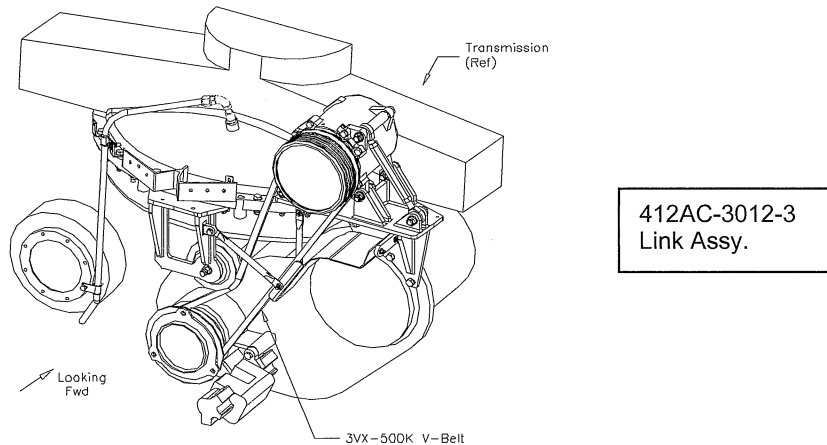


Figure 1.1

Removal Continued:

NOTE

Before attempting to adjust the drive belt tension, insure that the compressor mounting / attaching bolts have been loosened to allow free movement of the compressor body on the compressor mount.

3. Turn the 412AC-3012-3 Link Assy. barrel to loosen the tension on the 3VX500K Drive Belt. Remove and discard 3VX500K Drive Belt.

NOTE

Disconnect the first tail rotor driveshaft segment in accordance with the Bell Helicopter Maintenance Manual **BHT-427MM, Chapter 65-00**. Remove the Rotor Break Disk & Calipers, and Main Transmission Tail Rotor Drive Shaft Output Coupling in accordance with Bell Helicopter Maintenance Manual **BHT-427MM, Chapter 63-00**.

NOTE

The following Bell Helicopter Tools are required for the removal & reinstallation of the Main Transmission Tail Rotor Drive Shaft Output Coupling, **427-240-105-101 Wrench & T101972 Holding Plate Set**.

4. Remove the RR-462 Snap Ring, and 427EC-3012-17 Disk from the pulley's aft facing surface on the 427EC-3012-5 Compressor Pulley Assy. (See figure 1.2)

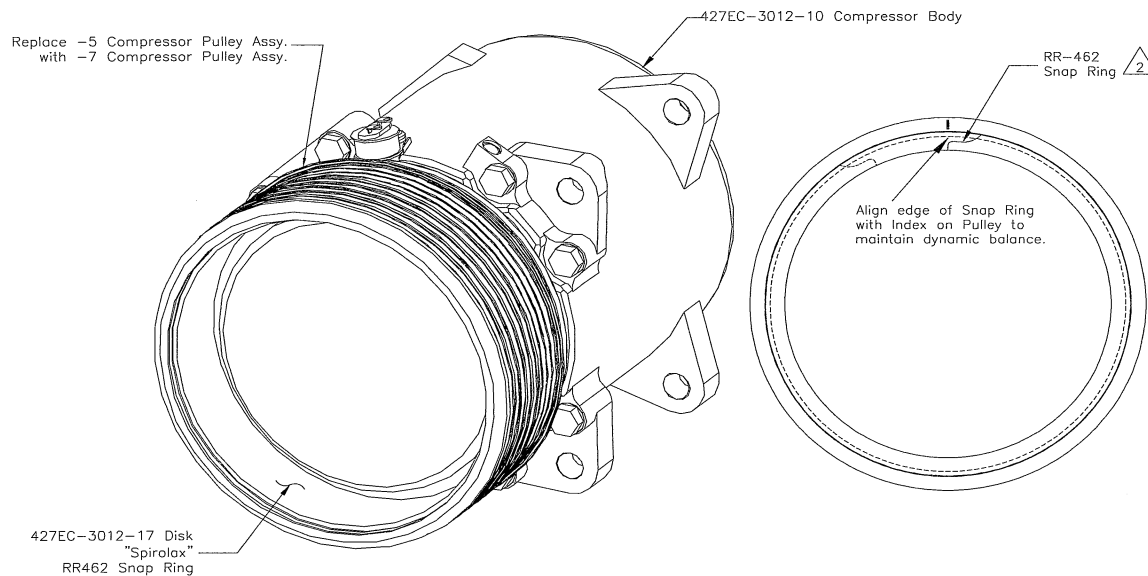


Figure 1.2

5. Hold the compressor clutch armature assembly stationary while removing the retaining nut (9/16" socket required) (See figure 1.3)
6. Remove the compressor clutch armature assembly using a puller. Thread 3 puller bolts into the threaded holes in the armature assembly, and turn center bolt clockwise until the armature assembly comes loose. Remove and discard armature assembly. (See figure 1.3)

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Removal Continued:

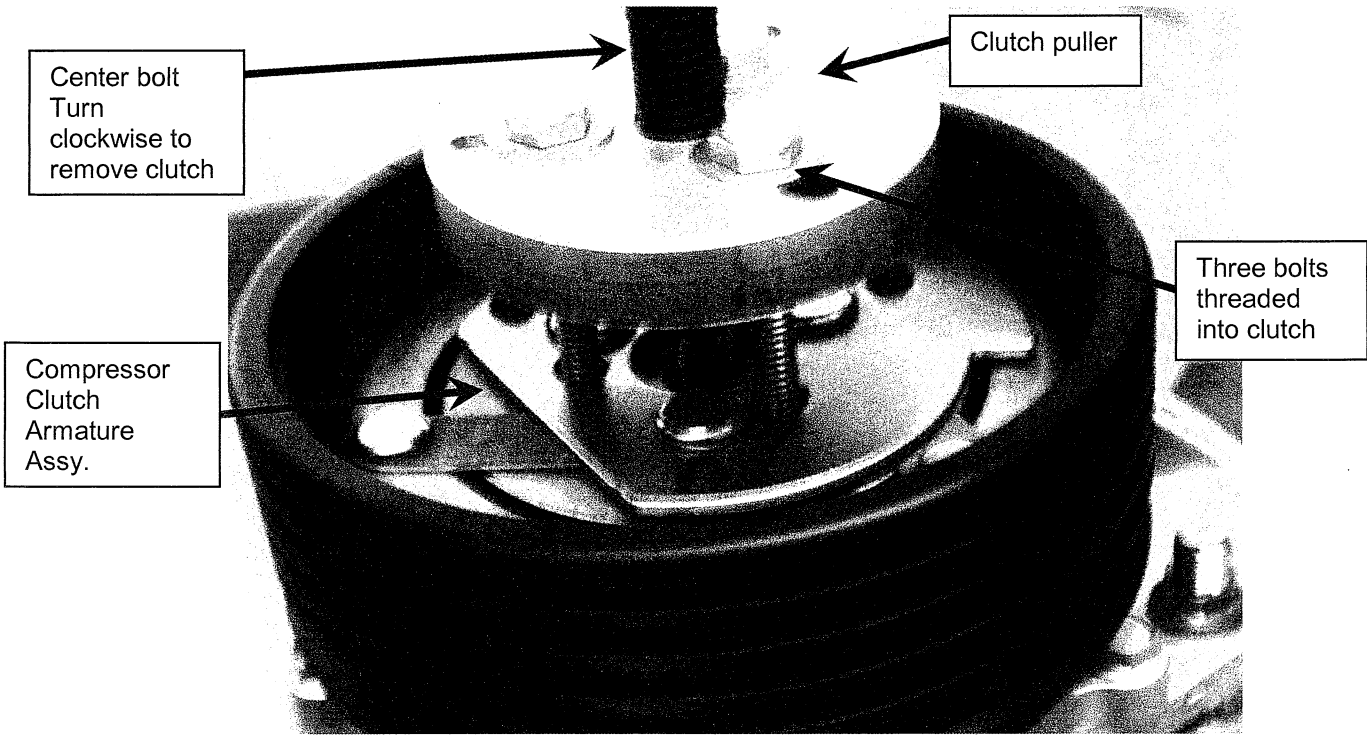


Figure 1.3

7. Remove the pulley retaining snap ring from compressor shaft assembly, and remove the compressor pulley assembly part number 427EC-3012-5. (See figure 1.4)

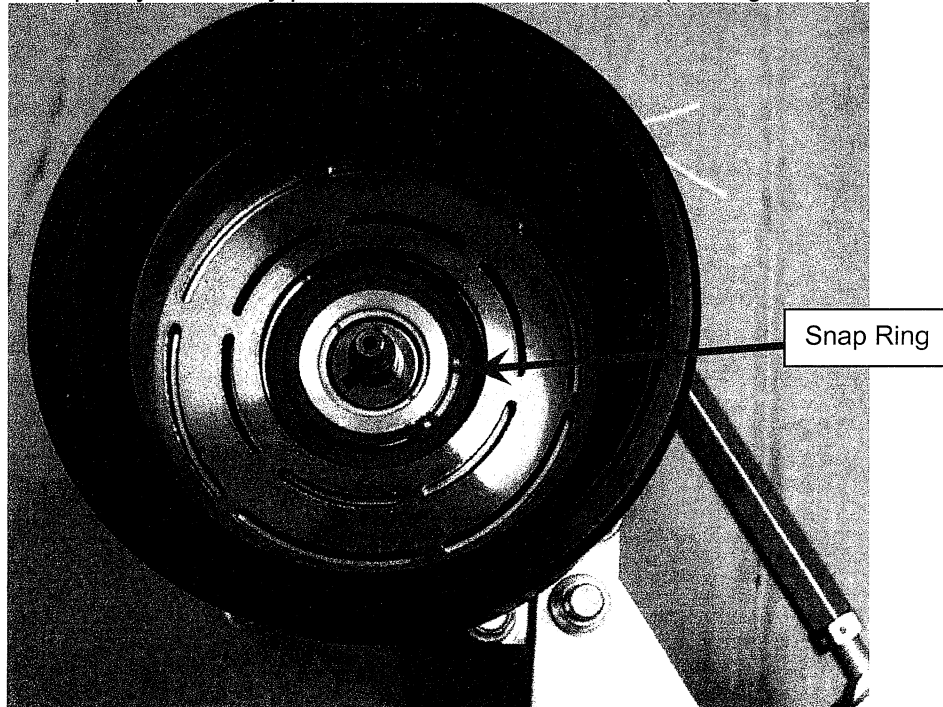


Figure 1.4
Continued

Removal Continued:

NOTE

It maybe necessary to use a pulley puller to remove the compressor pulley assembly.

8. Remove the attaching hardware from the 427EC-3500-11 Drive Pulley Assy., NAS6205-10 Bolt (3X), MS21043-5 Nut (3X), NAS1149F0532P Washer (3X), NAS1149C0563R Washer (3X), and remove and discard 427EC-3500-11 pulley assembly. (See figure 1.5)

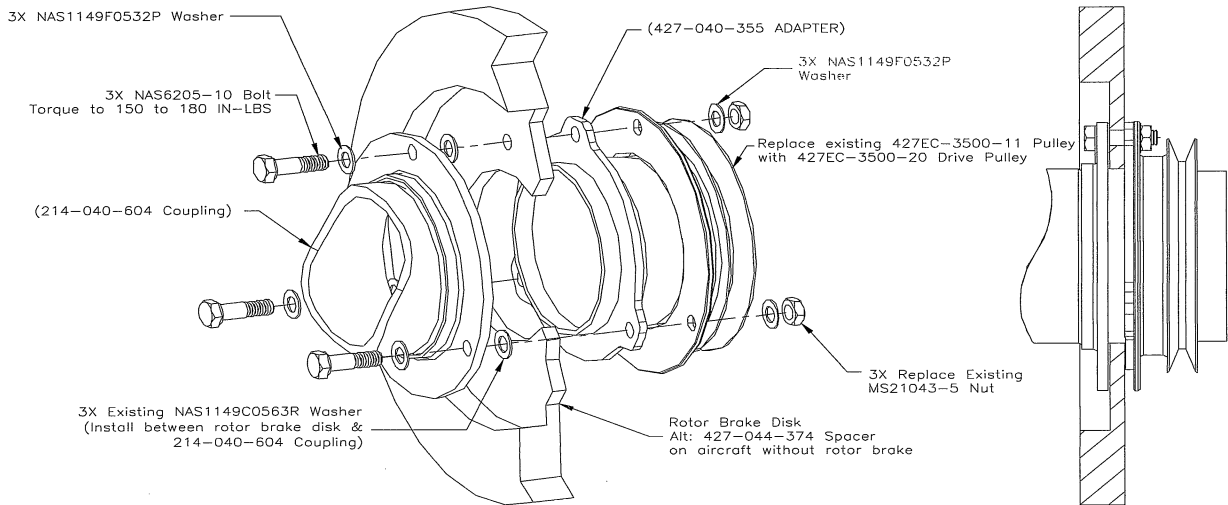


Figure 1.5

NOTE

It will be necessary to remove the Idler Mount Assembly 427EC-3004-2 from the main transmission housing in order to replace the Idler Pulley Assembly.

9. Remove the AN3-5A Bolt (1X), MS21042L3 Nut (1X), and NAS1149F0332P Washer (2X) that attach the 427EC-3006-3 Brace to the Idler mount 427EC-3004-2. (See figure 1.6)
10. Remove the NAS6604-18 Bolt (3X), NAS6604-19 Bolt (1X), NAS1149F0432P Washers (8X), MS21042L4 Nut (4X), to remove the 427EC-3004-2 Mount Assembly from the transmission housing. (See figure 1.7)
11. Remove the AN6C22A Bolt (1X), NAS1149C0632R Washer (2X), MS21042L6 Nut (1X), from the 412AC-3036-14 Retainer Plate to access the 427EC-3500-18 Idler Pulley Assembly. Remove SH-137 Rotor Clip from 427EC-3004-2 Idler Mount. (See figure 1.7)
12. Using a pulley puller carefully remove the 427EC-3500-18 Idler Pulley from the 427EC-3004-2 Idler Mount shaft and discard 427EC-3500-18 Idler Pulley. (See figure 1.8)

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Removal Continued:

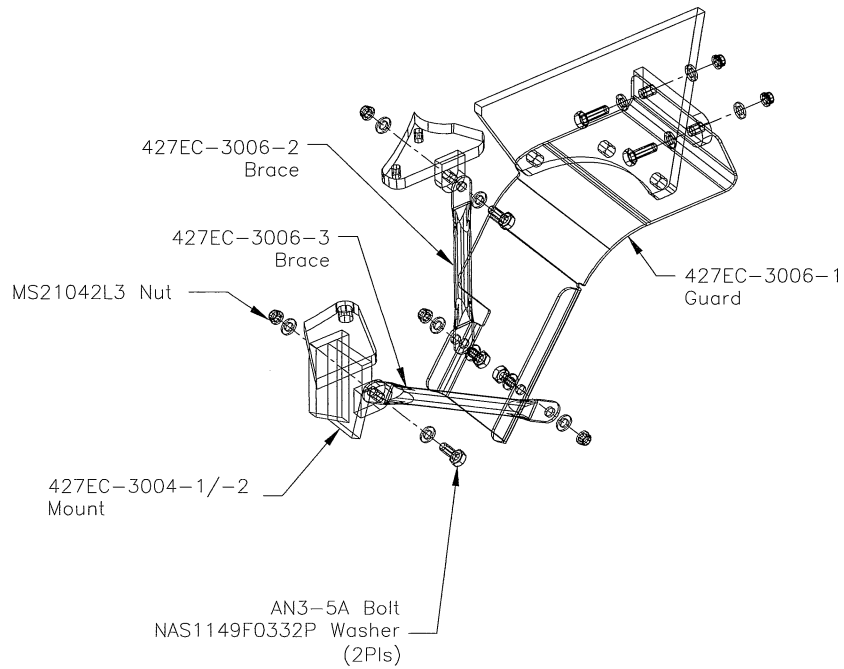


Figure 1.6

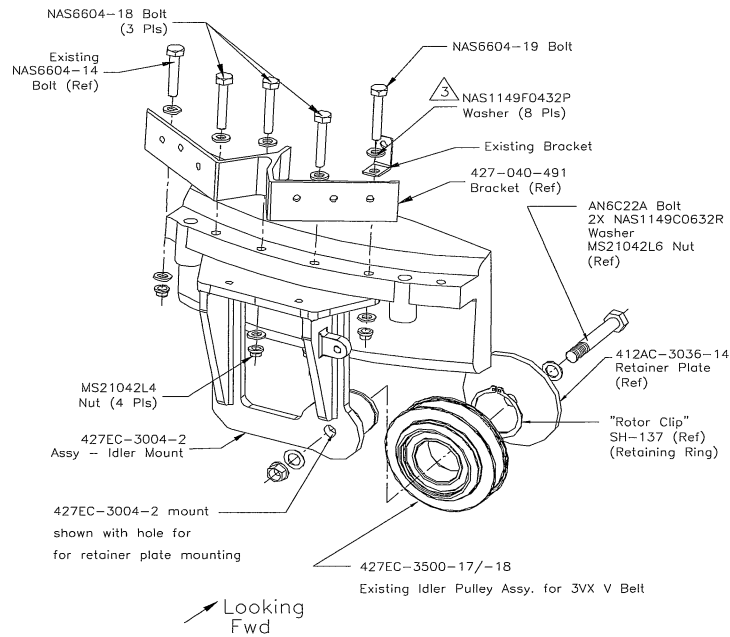


Figure 1.7

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Removal Continued:

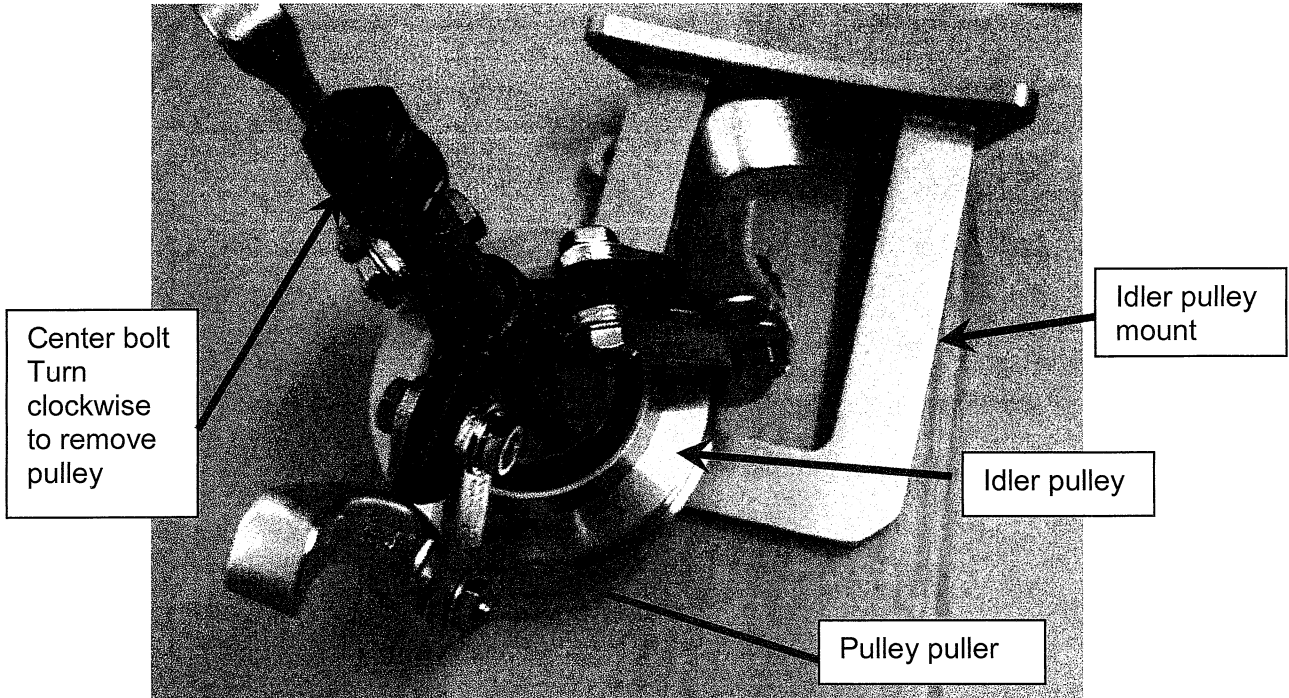


Figure 1.8

Installation:

1. Install new belt, part number ES35427-1, prior to reassembly of the tail rotor driveshaft assembly.

Install the attaching hardware in the 427EC-3502-1 Drive Pulley Assy., NAS6205-10 Bolt (3X), MS21043-5 Nut (3X), NAS1149F0532P Washer (3X), NAS1149C0563R Washer (3X), Torque Nuts to **150 – 180** in lbs. (See figure 2.1)

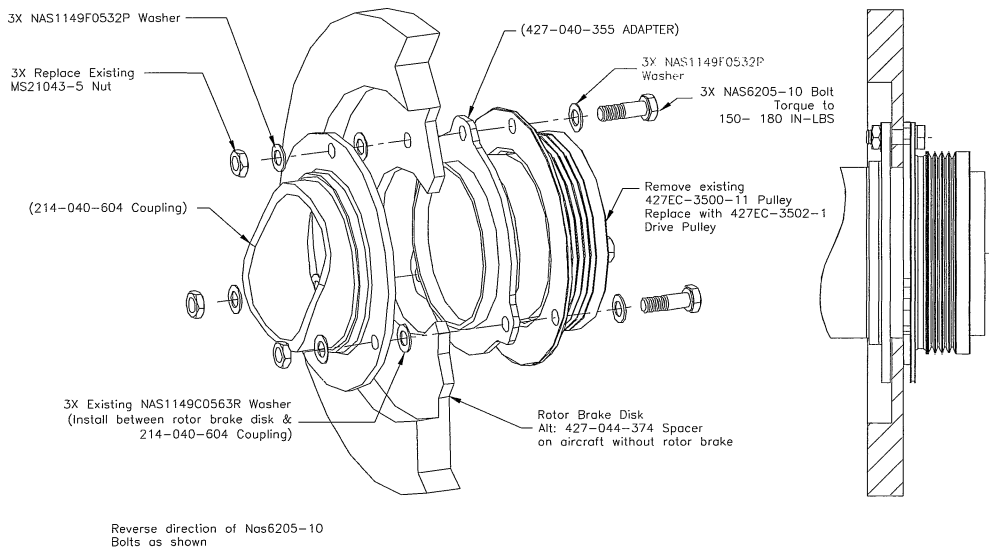


Figure 2.1
 Continued

Installation continued:

NOTE

Please note that the new direction of installation for the NAS6205-10 Bolts as shown in figure 2.1

NOTE

Reinstall the first tail rotor driveshaft segment in accordance with the Bell Helicopter Maintenance Manual **BHT-427MM, Chapter 65-00**. Reinstall the Rotor Break Disk & Calipers, and Main Transmission Tail Rotor Drive Shaft Output Coupling in accordance with Bell Helicopter Maintenance Manual **BHT-427MM, Chapter 63-00**.

2. Install new 427EC-3016-10 Compressor pulley on the compressor driveshaft assembly and reinstall the pulley retaining snap ring on the compressor shaft.
3. Install new compressor clutch armature assembly on the compressor drive shaft, hold the armature assembly stationary, reinstall the retaining nut on the compressor driveshaft, and torque nut to **180 – 200** in lbs. (See figure 2.2)
4. Reinstall the 427EC-3012-17 Disk on the new compressor pulley, and reinstall the RR-462 Snap Ring assembly.

NOTE

Install RR-426 Snap Ring so that the beveled edge of the ring aligns with the index mark on the outer surface of the new compressor pulley. (See figure 2.2)

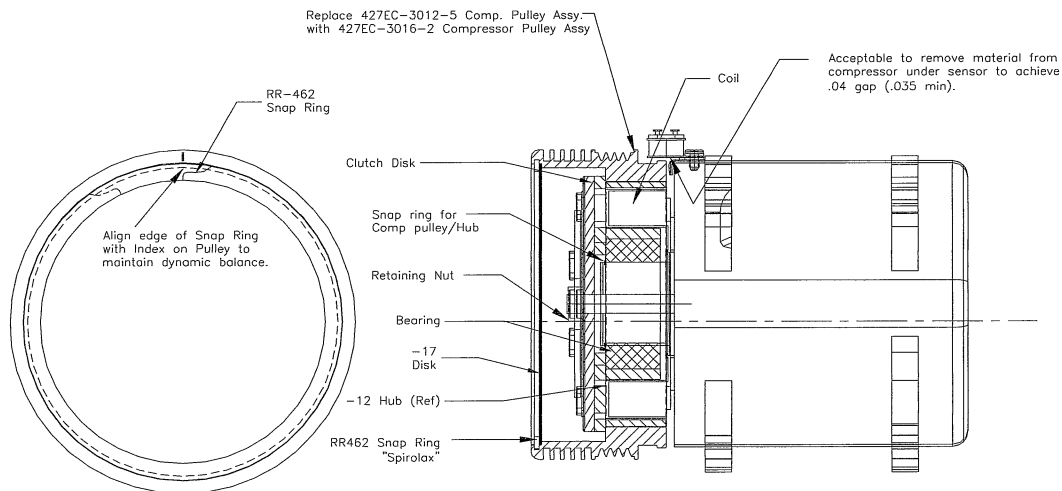


Figure 2.2

5. Install new 427EC-3016-3 Idler Pulley on the 427EC-3004-2 Mount Assembly.

NOTE

It will be necessary to freeze the 427EC-3004-2 Mount Assembly in a freezer, or with the use of dry ice prior to attempting to press the new Idler pulley on the mount.

CAUTION

It is important to note that the Idler pulley assembly has one snap ring already installed to retain the Bearing in the Idler pulley body. This snap ring must face away from the Idler mount when the pulley is installed.

Continued

Installation continued:

6. Reinstall the AN6C22A Bolt (1X), NAS1149C0632R Washer (2X), MS21042L6 Nut (1X), from the 412AC-3036-14 Retainer Plate to access the 427EC-3500-18 Idler Pulley Assembly. Reinstall SH-137 Rotor Clip to 427EC-3004-2 Idler Mount. Torque Nut **50 -70** in-lbs. (See figure 2.3)

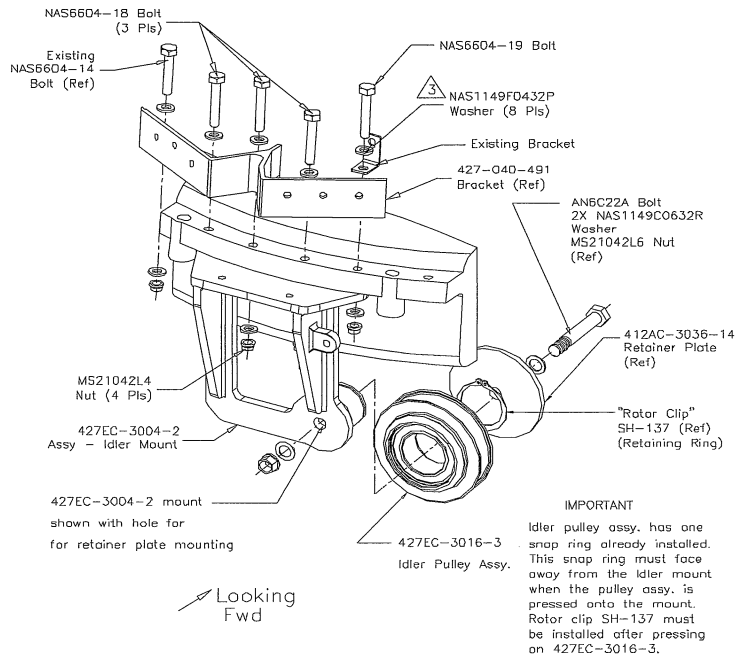


Figure 2.3

7. Reinstall the NAS6604-18 Bolt (3X), NAS6604-19 Bolt (1X), NAS1149F0432P Washers (8X), MS21042L4 Nut (4X), to reinstall the 427EC-3004-2 Mount Assembly to the transmission housing. Torque Nuts **50 - 70** in-lbs. (See figure 2.3)

NOTE

Some early versions of the 427 air conditioner systems were not provisioned with 412AC-3036-14 Retainer Plate. At the discretion of the operator it is permissible to drill a .406 (13/32) hole through the center of the pulley boss on the 427EC-3004-2 mount. (Parts available through ACC Service Department on request).

NOTE

Apply a film of MIL-S-8784 between mating surfaces of the 427EC-3016-2 Idler mount and the transmission housing.

NOTE

Apply a bead of MIL-S-8802, Class B-2 around interface joints between all attached component, transmission, and around all fasteners in these locations.

8. Reinstall the AN3-5A Bolt (1X), MS21042L3 Nut (1X), and NAS1149F0332P Washer (2X) that attach the 427EC-3006-3 Brace to the Idler mount 427EC-3016-2. Torque Nut **50 - 70** in-lbs. (See figure 1.6)

NOTE

Seal faying surfaces with Mil-S-8802 between 427EC-3006-3 Brace and the 427EC-3016-2 Idler mount.

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Installation continued:

9. Install new ES35427-1 Poly-V Belt on the air conditioner drive pulleys and tension the belt using the 412AC-3012-3 Link Assy. The correct belt tension is achieved when 5.75 lbs. of force at the mid span of the belt produces .27" deflection. (It is recommended that a belt tensioning gauge be used during the installation of this belt. Kent-Moore BT-33-73F or equivalent). (Figure 2.4) (See Page 11 of 11 for use of Belt Tension Tester).

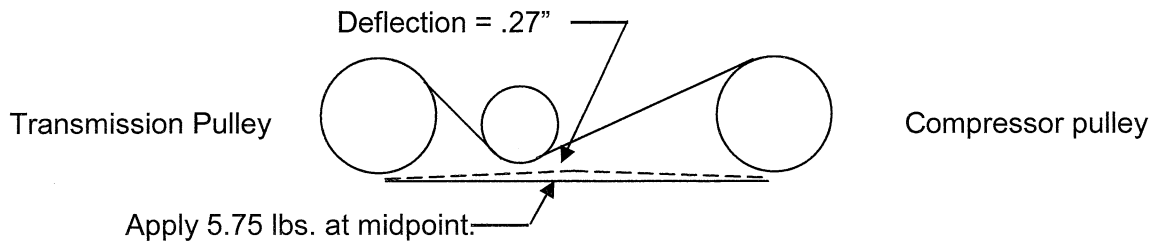


Figure 2.4

Once the correct belt tension has been achieved tighten the Jam Nuts at both ends of the belt tensioning link and safety wire using **.032** Safety Wire.

Weight and Balance:

The weight change is negligible. Therefore no change to the existing weight and balance is required.

Required Documents:

Bell Helicopter Maintenance Manual BHT-427MM

Maintenance Operational Check (MOC):

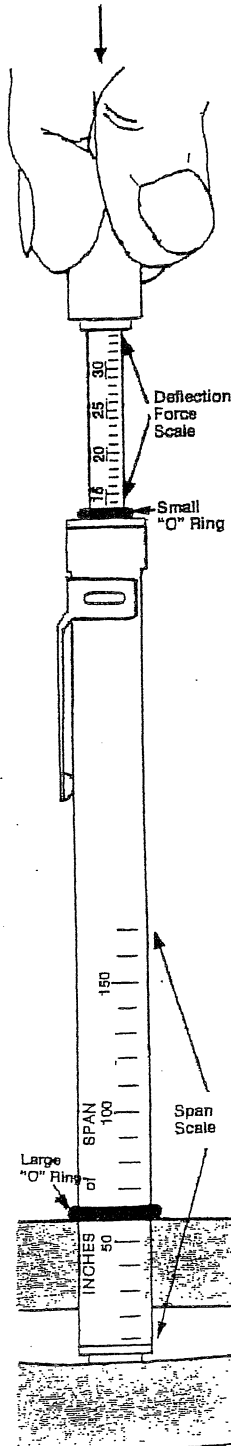
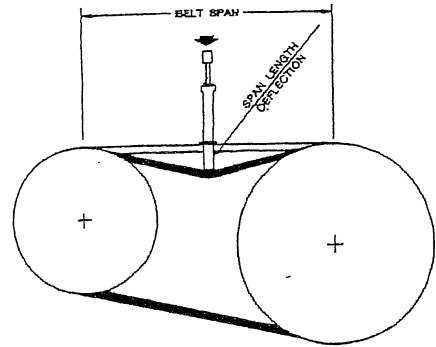
Prior to reinstalling transmission and engine cowlings the following steps will need to be performed prior to returning the aircraft to service:

1. Turn the main rotor system by hand and observe the air conditioner belt to insure that there are no interferences, rubbing, or chafing with existing aircraft components.
2. With the aircraft running at **"flight idle"** (air conditioner in **OFF** position) for 3 minutes and observe the air conditioner belt again to insure that there are no interferences, rubbing, or chafing with existing aircraft components.
3. With the aircraft running at **"flight idle"** (air conditioner in **ON** position) for 3 minutes and observe the air conditioner belt again to insure that there are no interferences, rubbing, or chafing with existing aircraft components.
4. With the aircraft running at **"100%"** (air conditioner in **OFF** position) for 3 minutes and observe the air conditioner belt again to insure that there are no interferences, rubbing, or chafing with existing aircraft components.
5. With the aircraft running at **"100%"** (air conditioner in **ON** position) for 3 minutes and observe the air conditioner belt again to insure that there are no interferences, rubbing, or chafing with existing aircraft components.
6. On completion of MOC, reinstall cowlings per BHT manual and return aircraft to service.

Belt Tension Tester & Measurement Procedure

General rules of tensioning.

1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24-48 hours of operation.
3. Over tensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slip.
5. Make V-drive inspection on a periodic basis. Tension when slipping. Never apply belt dressing as this will damage the belt and cause early failure.



TENSION MEASUREMENT PROCEDURE

1. Measure the belt span (see sketch).
2. Position bottom of the large "O" ring on the span scale at the measured belt span.
3. Set the small "O" ring on the deflection force scale to zero.
4. Place the tension tester squarely on one belt at the center of the belt span. Apply a force on the plunger and perpendicular to the belt span until the bottom of the large "O" ring is even with the top of the next belt or with the bottom of a straight edge laid across the sheaves.
5. Remove the tension tester and read the force applied from the bottom of the small "O" ring on the deflection force scale.
6. Compare the force you have applied with the values given in the tables on this sheet. The forces should be between the minimum and maximum shown. The maximum value is shown for "New Belt" and new belts should be tensioned at this value to allow for expected tension loss. Used belts should be maintained at the minimum value as indicated in the chart. IF THE BELT SPAN WAS MEASURED IN INCHES, THEN USE THE POUNDS OF FORCE VALUES FOR COMPARISON. IF THE BELT SPAN WAS MEASURED IN CENTIMETERS, THEN USE THE KILOGRAMS OF FORCE VALUES FOR COMPARISON.