

# LCD PAK Seal Installation for CBA Series Actuators



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# Section 1: Introduction

## 1.1 Purpose

The purpose of these instructions is to inform the reader/installer on the correct procedure for installing CBA torque-shaft seals, using Installation Rings that are designed specifically for this task and are included in CBA service kits. If instructions are followed, the chance for seal damage upon installation should be eliminated.

## 1.2 Definitions

- 1.2.1 Installation Ring - A rubber ring that comes with the CBA service kit to be installed into the snap ring groove of the torque-shaft prior to new seal installation.
- 1.2.2 LCD PAK Seal - A custom seal designed with a double sealing point surface. LCD stands for "Lip Cut Double." The term "PAK" received its name from the "PolyPak" seal which is a combination of a PolyPak shell energized with an O-Ring expander. The LCD PAK seal used for the CBA does not contain an O-Ring expander.

## 1.3 Service Tool Information

There are many ways to install the LCD PAK seals, because different tools can be used to do so. In these instructions, basic shop tools that are commonly available were used to illustrate that it is not needed or important to use special tools.

## 1.4 Lubrication Requirements

It is very important to not over-grease the seal upon installation. Over lubricating can cause problems during installation by halting the seal from seating all the way in the groove (if too much grease is between the seal and housing). As shown in the pictures below, use a light coat of grease on the seals when installing.

## 1.5 Other Notes

The Installation Rings (or filler rings as commonly referred to), are disposable items as they only need to be used one time and are contained in the CBA service kits. However, it is possible to reuse them by picking instead of cutting them out of the rotor clip groove.

## Section 2: Installation

### **⚠ WARNING: DANGEROUS GAS AND/OR LIQUIDS**

It is possible, that the actuator may contain a dangerous gas and/or liquids. Ensure that all proper measures have been taken to prevent exposure or release of these types of contaminants before commencing any work.

### 2.1 Tools Used

- (1) Plastic mallet
- (2) Socket extension (see 1.3 above)
- (3) Pick
- (4) Rotor Clip Pliers

### 2.2 Kit Items

- (A) Grease
- (B) Two Installation Rings
- (C) Two LCD PAK seals
- (D) Two Rotor Clips

Figure 1 Tools and Kit Items Needed



## 2.3 Procedure

1. Remove the Rotor Clip on side 1 of actuator housing using Rotor Clip Pliers.

**Figure 2 Rotor Clip Removal Side 1**



2. Use the mallet to tap the torque-shaft inward with the use of an extension rod to expose the existing seal.

**Figure 3 Exposing the Seal - Side 1**





3. Use the Pick to remove old seal and clear groove of old grease and debris.

**Figure 4** Cleaning the groove - Side 1



4. Turn actuator to second side (side 2) and use Rotor Clip Pliers to remove rotor clip, tap shaft to expose seal, remove old seal and clean groove by repeating steps 1-3.

**Figure 5** Rotor Clip Removal Side 2





5. Place Installation Ring into Rotor Clip groove of side 1. Use a pick or similar tool to aid installation. When shaft is fitted with ring, lightly grease ring surface.

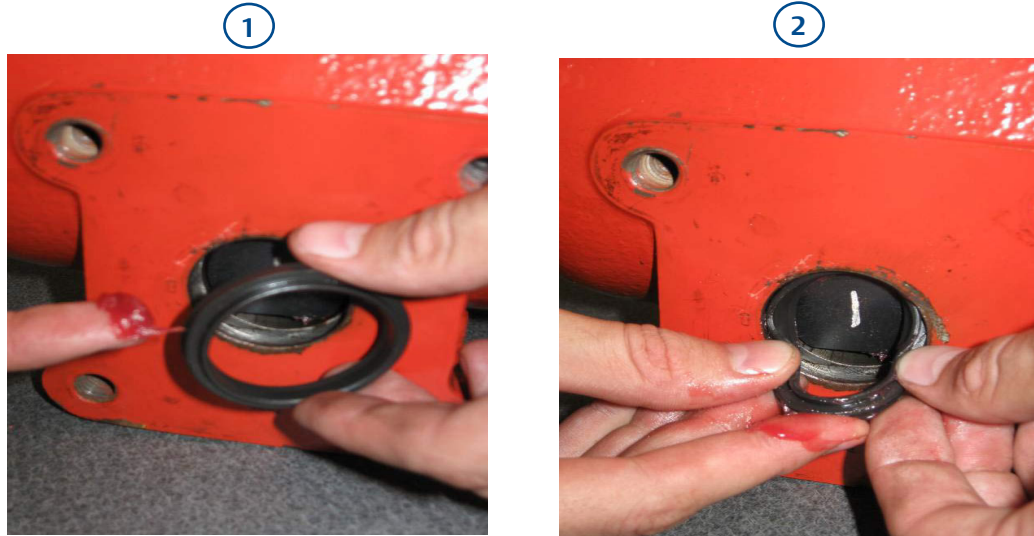
**Figure 6**      **Ring Installation - Side 1**



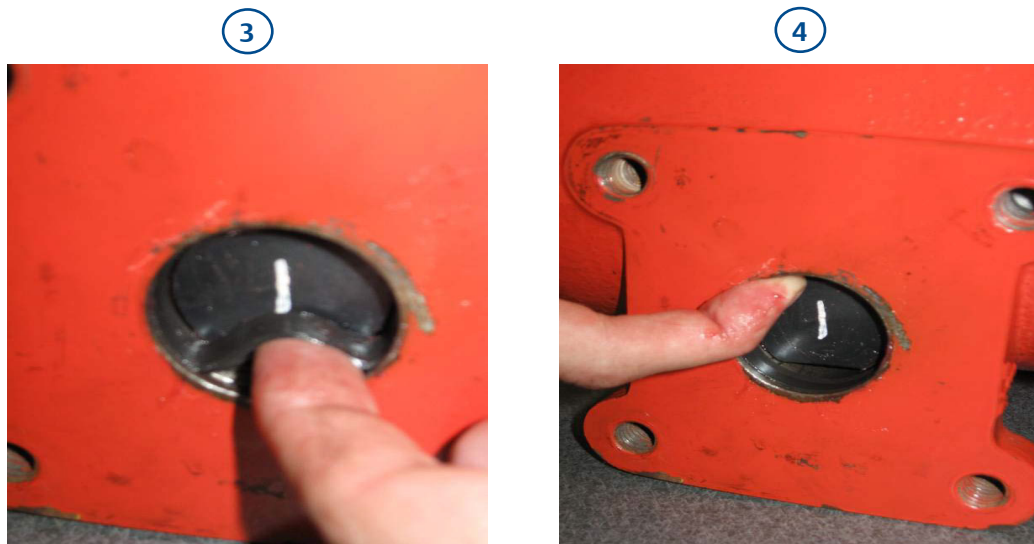
Make sure that the Installation Ring is seated completely flush with the surface of the torque-shaft

6. Tap side one inward to expose seal groove. Install new seal after lightly greasing.

Figure 7 New Seal Installation - Side 1

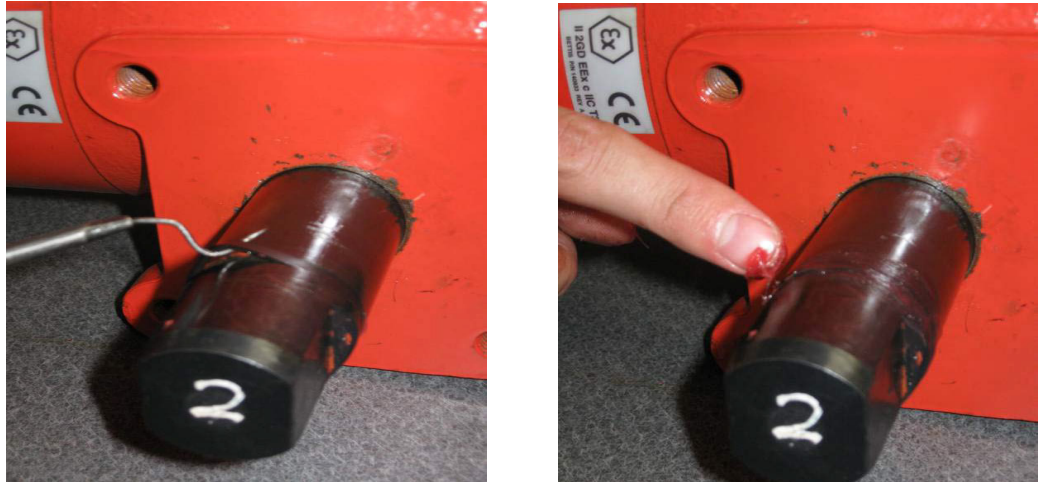


When installing, insert the top of the seal first, with the lip side inward towards shaft, then work the sides in. When the seal is mostly in, invert the bottom of the seal (see photo #3) into a wave like shape. When you release, the seal should seat itself smoothly into the groove. Press the seal in from all angles with your finger to make sure it is flush with the housing bore (see photo #4).



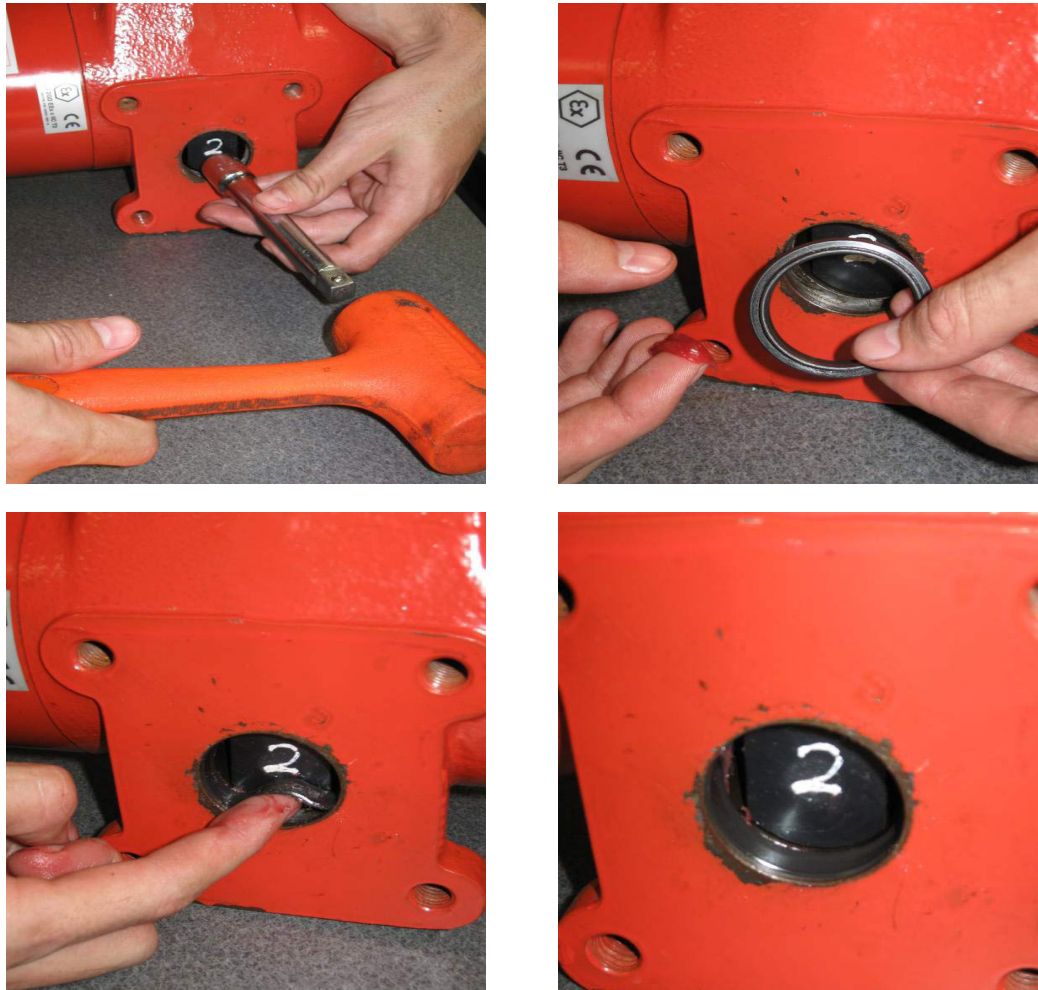
7. On side 2, place Installation Rings on torque-shaft. Lightly grease as per step 5.

**Figure 8** Ring Installation - Side 2



8. Tap shaft inward to expose second seal groove. Install seal as per step 6.

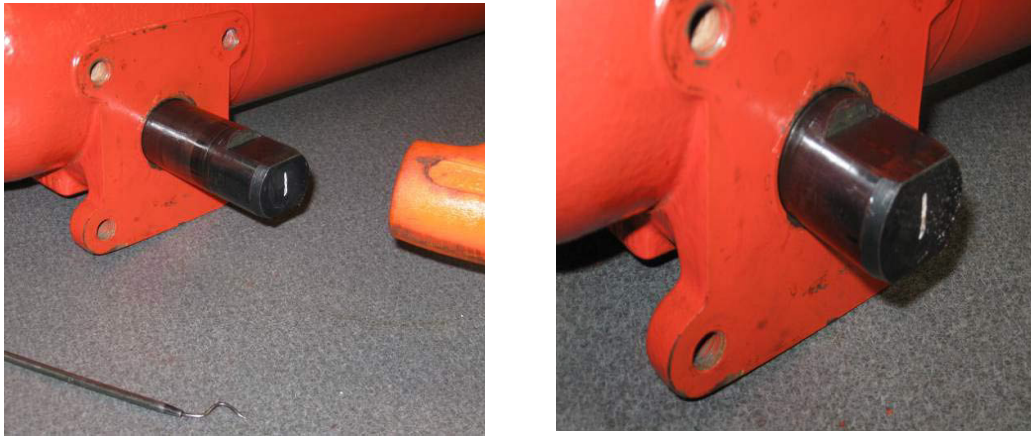
**Figure 9** New Seal Installation - Side 2





- Carefully tap torque-shaft back through housing and newly installed seals. If resistance is felt (a bouncy feeling especially), gently tap forward and backward until it becomes easier.

**Figure 10** Re-installing torque shaft with newly installed seals



- Remove side 1 Installation Ring and discard.

**Figure 11** Discard Installation Ring - Side 1



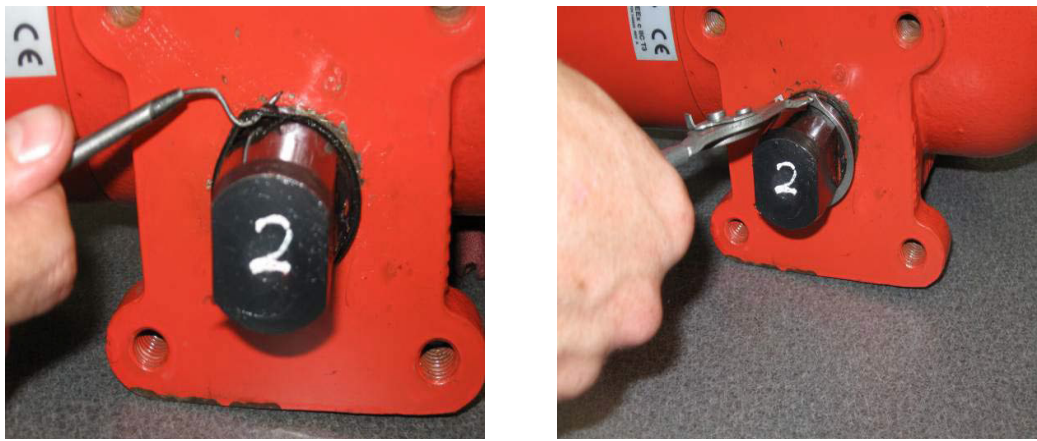
11. On side 1, place Rotor Clip on torque-shaft. Tap this side towards the housing, pressing the Rotor Clip against the housing. This makes it easier to remove the side 2 Installation Ring.

**Figure 12 Rotor Clip Installation - Side 1**



12. Remove and discard side 2 Installation Seal and then install a new Rotor Clip.

**Figure 13 Discard Installation Ring and Rotor Clip Installation - Side 2**



## Section 3: Document Revision

**Table 1. Revision Overview**

ECN	DATE	REV		BY *	DATE
Released	17 December 2001	A	COMPILED	B. Cornelius	17 December 2001
			CHECKED	B. Cornelius	17 December 2001
			APPROVED	R. Smith	17 December 2001
0526 001	May 2012	B	COMPILED	A. Cruz	5/16/12
			CHECKED	B. Jumawan	8/21/12
			APPROVED	B. Jumawan	9/26/12

\* Signatures on file Bettis Actuator & Controls, Waller, Texas

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