



# ***Patriot***® ***RC50***

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# **OPERATIONS MANUAL**

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## **Care & Maintenance Instructions**

- Do not discard this manual.
- Keep manual readily available for reference during operation or when servicing product.
- Before operation and maintenance, read and comprehend operations manual content.
  
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Patents: 6,883,618 7,442,074 10,612,310 11,085,242 EP 3 803 032 B1 KR-101340351 EP-2029325  
CN-101448608 BR-P10711711 AU2007254317 AU2007254317 WO2007/136658



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**NUMA<sup>®</sup>**  
**HAMMERS AND BITS**  
**WARRANTIES AND REMEDIES**

### **LIMITED WARRANTY**

Numa warrants that the Product will be new and free from defects in material and workmanship under normal use as contemplated by this Contract for a period of six (6) months from the date of shipment.

Except for the foregoing warranty, Numa disclaims all warranties and representations wherever made, including warranties of merchantability, durability, length of service, or fitness for a particular purpose.

Any alteration or modification of the original product without the express written consent of Numa will void this warranty.

### **REMEDY**

If, during such warranty period, Buyer promptly notifies Numa in writing of any defect and establishes that the above warranty is not met, Numa shall either repair or replace the Product or credit the customer, as it deems necessary to meet the warranty.

Such repair, replacement, or credit of Product shall constitute complete fulfillment of Numa's obligation under this warranty, and upon the expiration of the original warranty period, all of Numa's obligations hereunder shall terminate.

### **LIMITATION OF LIABILITY**

Numa shall not be liable to Buyer whether in contract, in tort (including negligence and strict liability), under any warranty or otherwise, for any special, indirect, incidental or consequential loss or damage whatsoever, including (without limitation) loss arising from delay, cost or capital and loss of profits or revenues. The remedies set forth in this Contract are exclusive, and the total cumulative liability of Numa under this Contract or for any act or omission in connection therewith or related thereto, whether in contract, in tort (including negligence and strict liability), under any warranty or otherwise, is limited to the price paid by Buyer for the Product.

The **WARNINGS**, **CAUTIONS** and **NOTES** used throughout the text of this instruction book are defined as follows:

<b>WARNING</b>	A specific procedure or practice that must be strictly followed, or a specific condition that must be met, to prevent possible bodily harm.
<b>CAUTION</b>	A specific procedure or practice that must be strictly followed, or a specific condition that must be met, to prevent damage to the equipment.
<b>NOTE</b>	Important supplemental information.

Numa<sup>®</sup>, Champion<sup>®</sup>, and Patriot<sup>®</sup> are registered trademarks of Numa.

# SECTION I DESCRIPTION

## GENERAL DESCRIPTION

The Patriot RC50 is a valveless, pneumatically operated reverse circulation drill designed to utilize Numa 5-1/4" to 5-3/4" (133 mm to 146 mm) diameter reverse circulation bits in a wide range of rock sampling applications.

The Patriot RC50 hammer design incorporates a hardened reversible case and a large diameter collection tube. Backheads having threads compatible with the major reverse circulation drill rods are available for the Patriot RC50. The large bore design of the Patriot RC50 provides uncontaminated rock sampling without sacrificing the high performance levels associated with Numa down hole hammers.

The Patriot RC50 was specifically designed to provide maximum performance on the drill rigs most commonly used in rock sampling applications. The Patriot RC50 hammer is designed to operate using air pressure from 150 PSI to 500 PSI (10.2 Bar to 34.5 Bar) with compressors ranging in size from 425 CFM to 1050 CFM (201 to 496 Litres/Second). When drilling conditions require supplementary hole cleaning, additional hole cleaning air can be passed through the feed tube by removing the o-rings from the end of the feed tube which seals on the collection tube. Refer to page 13 for the air consumption charts and pages 5 and 9 to facilitate the removal and installation of the o-rings.

<i>Patriot RC50</i>		
Weight w/o Bit:	156 lbs.	(71 kg)
Outside Diameter:	4-7/8"	(124 mm)
Hammer Length:		
Shoulder to Shoulder	41-13/16"	(106 cm)
Shoulder to Bit Face	46-15/16"	(119 cm)
Backhead API Thread	Available for Reverse Circulation 4-1/2 OD Drill Rod	

Table 1-1 General Hammer Specifications

5-1/4"	(133 mm)	33 lbs.	(14.9 kg)	5-5/8"	(143 mm)	34 lbs.	(15.4 kg)
5-3/8"	(137 mm)	33 lbs.	(15.0 kg)	5-3/4"	(146 mm)	35 lbs.	(15.8 kg)
5-1/2"	(140 mm)	34 lbs.	(15.2 kg)				

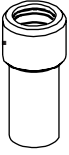
Table 1-2 General Bit Specifications

**NOTE**

NUMA 5-1/4" TO 5-3/4" (133 MM TO 146 MM) BITS ARE AVAILABLE IN A REVOLUTIONARY CONCAVE FACE DESIGN TO TAKE ADVANTAGE OF THE PATRIOT RC50 PERFORMANCE. OTHER SIZES MAY BE AVAILABLE UPON REQUEST.

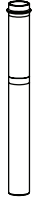
## FUNCTIONAL DESCRIPTION

1. **CONNECTOR TUBE**



The connector tube fits in the backhead and on top of the collection tube to connect the drill to those reverse circulation drills rods that use connector tubes.

2. **COLLECTION TUBE**



The collection tube extends from the check valve seat to the bit and transfers the collected formation sample to the inner drill pipe of the reverse circulation drill rod. The collection tube is designed to be easily replaced.

3. **BACKHEAD**



The backhead connects the hammer to the drill rod. Standard backheads are available with threads that are compatible with most 4-1/2 reverse circulation drill rod. Wrench flats are provided for disassembling.

4. **PIN**



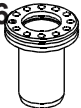
Two pins align the feed tube into the backhead. They are made of hardened steel to ensure long life.

5. **BACKHEAD BEARING**



The backhead bearing aligns and seals the backhead into the case bore.

6. **CHECK VALVE SEAT**



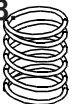
The check valve seat provides the sealing surface for the check valve and is located in the backhead. The check valve seat locates the collection tube in the proper area.

7. **CHECK VALVE**



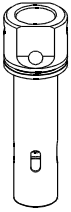
The check valve maintains pressure in the hammer when the air supply has been shut off. The pressure in the hammer balances the hydrostatic pressure in the hole thereby preventing contaminants from entering the hammer.

8. **CHECK VALVE SPRING**



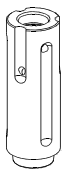
The check valve spring provides tension under the check valve to keep it closed. It is compressed as the air is turned on.

**9. FEED TUBE**



The feed tube supplies the main air into the chambers located in the piston. It is connected to the backhead by two pins. The feed tube is designed with a long bearing surface to maintain alignment in the backhead.

**10. PISTON**



The piston functions as the only moving part in the hammer, controlling the operational air cycle. The percussive action of the piston striking the bit transfers the energy through the bit in order to fracture rock formations.

**11. CASE**



The case is designed to contain the internal parts which make up the hammer assembly. The case is reversible and hardened to resist wear and to extend life in abrasive conditions.

**12. SNAP RING**



A snap ring positions the internal parts in the hammer and prevents the piston from falling out when the chuck, bit retaining rings and bit are removed.

**13. BIT BEARING**



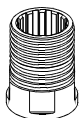
The bit bearing guides the bit to insure proper alignment between the piston and the bit. The bit bearing is a slip fit with a bit bearing retainer o-ring in the chuck end of the case. The bit bearing is located by a snap ring which is inserted into the main bore.

**14. BIT RETAINING RINGS**



The bit retaining rings are designed to allow the bit to move between the drilling and cleaning positions and prevent the bit from coming completely out of the hammer. The bit retaining rings consist of two matched halves and are held together with the bit retaining ring o-ring.

**15. CHUCK**



The chuck threads into the bottom end of the case with a large cross section thread form. It has internal splines that mesh with the splines on the bit body to transmit rotation. Wrench flats are provided for disassembling.

**16. METERING SLEEVE (SOLD SEPARATELY)**



The metering sleeve facilitates sample flow through the collection tube. It should always be 1/8" (3 mm) smaller than bit diameter. The sleeve seats on a shoulder located on the OD of the chuck.

## SECTION II MAINTENANCE

### **DISASSEMBLY**

- If at all possible, the backhead and chuck / metering sleeve should be broken loose on the drill rig; this is much easier than trying to do so after the drill has been removed from the drill rig. The connector tube, if used, should be removed at this time. Cap the backhead to reduce external contamination. Using a small screwdriver pick the o-rings from the inside diameter of the small end of the connector tube.

#### **CAUTION**

USE CAUTION WHEN HANDLING DOWN THE HOLE HAMMER PARTS. NUMA HAMMER PARTS ARE MANUFACTURED FROM HARDENED, HEAT TREATED MATERIALS. DROPPING OR STRIKING THESE PARTS MAY CAUSE SEVERE DAMAGE. STRIKING THE HAMMER PARTS WITH HAMMERS, CROWBARS OR LIKE INSTRUMENTS WILL VOID THE WARRANTY.

- Maintenance should be performed in a clean environment.
- Tools needed: overhead crane, hammer stand, chain vise, 2" (51 mm) diameter brass rod, rubber mallet, snap ring pliers, press, a small screwdriver and a scribe.
- Clean the outside of the hammer. This will insure a good surface to clamp on.
- Using an overhead crane place the hammer horizontally on a hammer stand and secure the hammer with a chain vise. Place the chain vise on the area of the case where the bit bearing is housed when working on the chuck end of the hammer. When working on the backhead end of the hammer, place the chain vise on the area of the case where the backhead bearing is housed.

#### **CAUTION**

THE ACCEPTABLE CLAMPING AREAS START 4-1/2" (114 MM) FROM EITHER CASE END, TO AN ADDITIONAL 2-1/2" (64 MM) BEYOND THIS POINT. PLACING THE CHAIN VISE ON THE AREA OF THE CASE WHERE THE PISTON CYCLES OR ON THE THREADED AREAS CAN DISTORT THE CASE AND THE CASE THREADS, RESTRICT PISTON MOVEMENT AND VOID THE WARRANTY.

### **HAMMER DISASSEMBLY**

- Break the bit and chuck loose from the case.
- Remove the bit, chuck and bit retaining rings from the case. Remove the metering sleeve from the chuck.
- Using a small screwdriver, remove the o-ring from the chuck.



- Using a small screwdriver, remove the o-ring from the bit retaining rings.
- Break the backhead loose from the case.
- Remove the connector tube from the backhead. Use a small screwdriver to remove the o-rings from the connector tube inside diameter.
- Using a rubber mallet, tap the bottom of the collection tube until it protrudes out the backhead. Grab with both hands and remove.
- When the collection tube is removed, unscrew the backhead from the case.

### CAUTION

REMOVING THE BACKHEAD ALSO REMOVES THE FEED TUBE, CHECK VALVE SPRING, CHECK VALVE AND CHECK VALVE SEAT. TWO PINS WITH A HOLE IN THE CENTER HOLD THESE PARTS IN THE BACKHEAD.

- To remove the feed tube, check valve spring, check valve and check valve seat from the backhead, stand the backhead on the end so the feed tube is pointing up and vertical. Place a scribe in the pin hole. While pushing the feed tube into the backhead to relieve any force created by the check valve spring, wiggle the scribe as you pull the pin from the backhead. Repeat to remove other pin.
- Remove the check valve seat, check valve, check valve spring, and feed tube from the backhead. Using a screwdriver, remove the backhead bearing from the groove located on the outside diameter of the backhead. Remove the backhead o-ring from the backhead.
- Using a small screwdriver, pick the feed tube o-ring from the outside diameter and two collection tube o-ring rings from the inside diameter of the feed tube.
- Using a small screwdriver, pick the check valve seat o-ring from the outside diameter and the collection tube o-ring from the inside diameter of the check valve seat.
- Using the 2" (51 mm) diameter brass rod from the chuck end of the case, push the piston out of the backhead end of the case.
- Removal of the bit bearing and bottom end snap ring is not necessary for routine maintenance. If necessary, use a small pick to remove the bit bearing retainer o-ring. Using a long 2" (51 mm) diameter brass rod, go through the backhead end of the case and tap the bit bearing out of the chuck end of the case. The bit bearing is a slip fit. To remove the snap ring, insert the piston into the backhead end of the case with the serial numbers toward the snap ring. Using a 2" (51 mm) diameter brass rod, tap on the piston until the snap ring comes out of the chuck end. Remove the piston from the case.

## **INSPECTION**

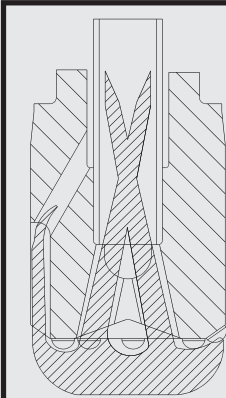
- All parts should be washed in a clean solvent before they are inspected and reassembled.

**WARNING**  
USE CLEANING FLUIDS THAT ARE NONFLAMMABLE AND AVOID  
BREATHING THE FLUID VAPORS.

- Handle all parts carefully, hardened parts may chip if dropped on a hard surface.

## **COLLECTION TUBE**

- Inspect the outside diameters for nicks, burrs and scoring.
- Remove all minor irregularities with emery cloth.
- Check the length and I.D. size (at the chuck end) of the collection tube. The tube I.D. should be no bigger than 1-5/8" (41 mm) and the length should be at least 37-1/2" (95 cm).



### **NOTE**

- Due to the angle of the exhaust into the collection tube two sides will show increased wear.
- To increase the life of the collection tube, it is important to index the bit 90° away from the worn area of the collection tube. This should be done after each hole.
- The wear on the collection tube is determined by a visual inspection on the last two inches of the bit end of the collection tube.

## **BACKHEAD**

- Inspect the threads and pin hole for cracks and burrs.
- Remove all burrs on the thread with a fine file.
- Replace if necessary.

## **BACKHEAD BEARING**

- Check for gouges or irregularities.
- Replace if necessary.

### ***CHECK VALVE SEAT***

- Inspect the outside diameters for nicks, burrs and scoring.
- Remove all minor irregularities with emery cloth.
- Replace if necessary.

### ***CHECK VALVE***

- The check valve should be smooth and free from abrasions.
- Replace if necessary.
- Replace the check valve spring if it is worn or broken.

### ***FEED TUBE***

- Inspect the outside diameter for nicks, burrs and scoring.
- Inspect all makeup surfaces for indentations or nicks caused by wear.
- Remove all minor irregularities with emery cloth.
- Replace if necessary.

### ***SNAP RING***

- Inspect the snap ring for severe wear indications.
- Remove or round over any sharp edges.
- Replace if necessary.

### ***PISTON***

- Inspect the striking face, inside and outside diameters for nicks, scoring and cracks.
- Polish the piston with emery cloth to remove all minor irregularities. Cracked pistons should be replaced.
- Wash the piston thoroughly, inside and out, to remove all emery dust.
- Replace if necessary.

### **CASE**

- Inspect the outside diameter for excessive wear or cracks. Inspect the internal case bore for scoring.
- Remove all minor irregularities with fine honing stones.
- Clearance between the piston and the case should not exceed .012" (.30 mm).
- Select the larger diameter end of case to be the chuck end. Replace if the outside diameter is worn to 4-1/2" (114 mm) or less near the chuck end.

### **BIT BEARING**

- Inspect the inside and outside for nicks and burrs.
- Remove all internal irregularities with a fine honing stone.
- Remove all external irregularities with an emery cloth.
- Clearance between the bit shank and bit bearing should not exceed .020" (.51 mm).
- Replace if necessary.

### **BIT RETAINING RINGS**

- Inspect for cracks or deformations.
- Remove all irregularities with a file or emery cloth.
- Replace if necessary.

### **CHUCK**

- Inspect for cracks and burrs.
- Collar length should not be less than 1-7/8" (48 mm).

#### **CAUTION**

IF THE COLLAR LENGTH IS LESS THAN 1-7/8" (48 MM) AND THE BIT IS UNDER LOAD CONDITIONS, CONTACT BETWEEN THE SHOULDER OF THE BIT RETAINING RINGS AND THE BOTTOM OF THE BIT RETAINING RING AREA ON THE BIT COULD CAUSE THE BIT TO SHANK IN THIS AREA.

- Replace if necessary.

### ***O-RINGS / BACKHEAD BEARING***

- Inspect for damage such as cracks and deformations.
- Replace if necessary.

### ***METERING SLEEVE***

- Inspect for cracks.
- Measure OD and always make sure it is a minimum of 1/8" (3 mm) under the bit size.
- Replace if necessary.

## **GENERAL ASSEMBLY INSTRUCTIONS**

- Assembly should be performed in a clean environment.
- All parts should be cleaned thoroughly and wiped dry before assembly.
- Oil all parts by hand using Rock Drill Oil to insure easy assembly.
- Coat all thread connections with a thread compound to allow joints to thread easily.

### ***HAMMER ASSEMBLY***

- Select the larger outside diameter end of the case to be the chuck end.
- Insert the snap ring into the groove located in the chuck end of case, making sure it seats properly in the groove. Slip the bit bearing into the chuck end of the case. Make sure the bit bearing is in contact with the snap ring in the case.
- Insert the bit bearing retainer o-ring into the groove located just above the bit bearing.
- Slide the piston in the backhead end of the case. Push the piston all the way to the chuck end. The piston should ride in the case very smoothly.
- Install the backhead o-ring in the groove located at the shoulder end of the case thread of the backhead. Install the backhead bearing on the outside diameter groove at the end of the case thread of the backhead.
- Install the check valve seat o-ring in the groove on the outside diameter of the check valve seat. Install the collection tube o-ring in the inside diameter groove of the check valve seat.

- With the large diameter of the check valve seat toward the backhead bore, insert the check valve seat into the backhead.
- With the rubber end of the check valve facing the backhead bore, insert the check valve into the backhead and over the small diameter of the check valve seat so it meets with the check valve seat shoulder.
- Insert the check valve spring.
- Install the collection tube o-rings into the inside diameter grooves of the feed tube. Install the feed tube o-ring in the groove of the outside diameter of the feed tube.
- Insert the large diameter of the feed tube in the backhead so the pin holes on the feed tube align with the pin holes of the backhead. As the feed tube contacts the check valve spring in the backhead, apply just enough force to keep the pin holes aligned while inserting the pins.
- Install the backhead with the check valve seat, check valve, check valve spring, feed tube, and pins already installed into the backhead end of the case.
- Oil the outside surface of the collection tube. Insert the collection tube through the backhead, until refusal. Using a rubber mallet, tap on the collection tube until it protrudes out of the chuck end. Using both hands, pull the collection tube down until it stops.

### **CAUTION**

THE O-RINGS WHICH SEAL AROUND THE COLLECTION TUBE WILL BECOME WORN OVER TIME. DISASSEMBLY OF THE HAMMER WILL BE NECESSARY ON A PERIODIC BASIS TO ENSURE THERE IS A SEAL AND AIR IS NOT LEAKING BY, CAUSING A LOWER OPERATING PRESSURE.

### **CAUTION**

WHEN CONNECTING THE RC HAMMER TO THE RC DRILL PIPE, MAKE SURE THE CORRECT CONNECTOR TUBE IS SEATED PROPERLY BETWEEN THE COLLECTION TUBE AND THE DRILL ROD.

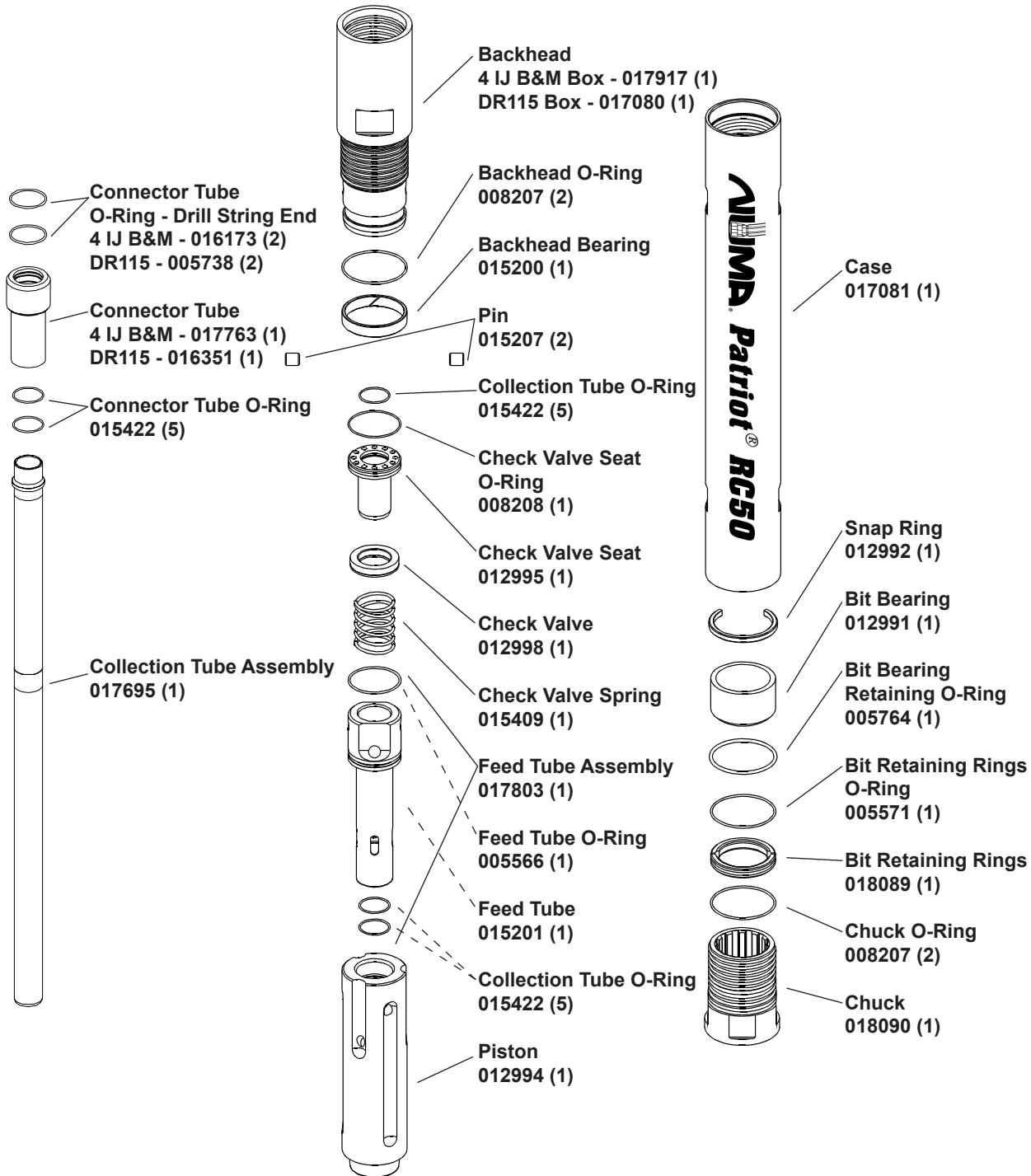
- Insert the bit retaining rings, with the o-ring installed, in the chuck end of the case.
- Install the o-ring into the outside diameter groove of the chuck located above the shoulder.
- Place the metering sleeve over the chuck and seat against shoulder of chuck.
- Thread the chuck into the case and hand tighten. The chuck shoulder should sit flat against the bottom of the case.

### **CAUTION**

DUE TO CLOSE TOLERANCES BETWEEN THE PATRIOT RC50 INTERNAL PARTS AND THE CASE, NUMA CAN NOT ACCEPT RESPONSIBILITY FOR DAMAGE CAUSED BY WELDING ON THE CASE OD. WELDING ON THE CASE CAN CREATE DISTORTION, CAUSE PREMATURE FAILURE AND VOID THE WARRANTY. CONTACT NUMA FOR SPECIAL INSTRUCTIONS IF WELDING THE CASE BECOMES UNAVOIDABLE.

- Insert the o-rings into the inside diameter groove of the connector tube.
- With the small outside diameter of the connector tube toward the backhead, install the connector tube on the end of the collection tube.

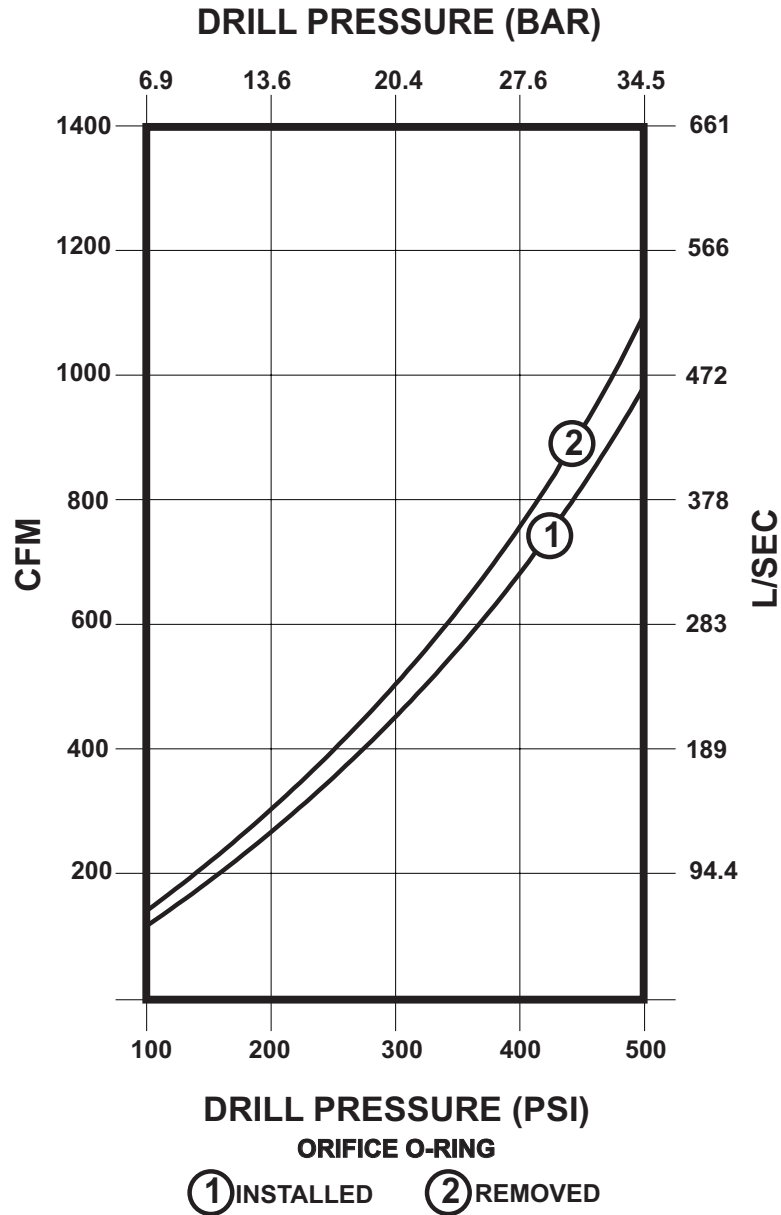
## SECTION III PARTS IDENTIFICATION EXPLODED VIEW



**Hammer Assembly**  
4 IJ B&M Box #018111 / DR115 Box #018113  
Figure 3-1



## SECTION IV AIR CONSUMPTION CHARTS PATRIOT RC50



**NOTE**

Numa RC hammers utilize feed tube o-rings as a choke. Removal of the feed tube o-rings allow additional air to pass through the hammer for hole cleaning/flushing purposes.

## SECTION V LUBRICATION

The Patriot RC50 hammer requires a continuous supply of the correct type Rock Drill Oil or an adequate application of Numa Enviro Lube. The Patriot RC50 hammer consumes at least two quarts (2 litres) of Rock Drill Oil per hour in order to maintain adequate lubrication. See table 5-1 for recommended Rock Drill Oil.

As an alternative to Rock Drill Oil, Numa Enviro Lube provides continuous protection for the Patriot RC50 when 3 oz. (.09 litres) are used every 300' (92 m) or four hours of drilling, whichever occurs first. Numa Enviro Lube is utilized in 3-1/2" to 6" hammers only.

	Medium SAE 30	Heavy SAE 50
Shell	Air Tool Oil S2 A 150	Air Tool Oil S2 A 320
Chevron	Aries 150	Aries 320
Conoco	Conoco 150	Conoco 320
Numa Bio Blend	RDP 150	RDP 320

Table 5-1  
Recommended Rock Drill Oil

### CAUTION

ROCK DRILL OILS AND NUMA ENVIRO LUBE ARE THE ONLY ACCEPTABLE LUBRICANTS. SAE 50 ROCK DRILL OIL SHOULD BE USED IN AMBIENT TEMPERATURES OF 80° FAHRENHEIT (27° CELSIUS) OR HIGHER. CONTACT NUMA FOR ACCEPTANCE OF ALTERNATIVE ROCK DRILL LUBRICANTS.

### CAUTION

THE PATRIOT RC50 HAMMER, AS WITH ANY MACHINE, REQUIRES CONTINUOUS LUBRICATION. THE FAILURE TO SUPPLY ADEQUATE LUBRICATION TO THE HAMMER CAN CAUSE PREMATURE FAILURE AND MAY VOID THE WARRANTY.

## SECTION VI STORAGE

When storing a Patriot hammer, it is important to take the necessary steps in order to insure a smooth operation after restarting.

When the hole is completed and the hammer is to be inactive for several weeks or longer the following steps should be followed:

Each drill rod should be blown clear of all water. During this process, turn on the in line lubricator and blow until the rock drill oil can be seen from the bottom end of each drill rod. In addition, each rod (pin and box end) should be wiped clean and capped to prevent foreign contaminants from sticking to the connector ends.

### ***SHORT TERM STORAGE***

When the Patriot hammer will be stored for only a short period of time the following steps should be taken:

- Blow the hammer clear of all water.
- Pour one cup of Rock Drill Oil into the backhead.
- Turn the air on and cycle for 10 seconds. This will lubricate the internal parts.
- Cap the backhead and chuck end.
- Store the hammer horizontally in a dry environment.

### ***LONG TERM STORAGE***

When the Patriot hammer will be stored for a long period of time the following steps should be taken:

- Blow the hammer clear of all water.
- If at all possible, the backhead and chuck should be broken loose on the drill rig, this is much easier than trying to do so in the shop.
- Disassemble the hammer.
- Inspect and wipe all the parts clean.

- Lubricate all the internal parts with Rock Drill Oil. See table 5-1 on page 12 for suitable Rock Drill Oils.
- Cap the backhead and chuck ends.
- Store the hammer horizontally in a dry environment.

## ***RESTARTING***

Before restarting the hammer after prolonged periods of inactivity, disassemble and inspect all internal hammer parts.

If any internal hammer parts have oxidized, use an emery cloth to polish each part. Wash each hammer part, wipe dry, relubricate with rock drill oil and reassemble the hammer.

### **CAUTION**

**FAILURE TO CHECK INTERNAL PARTS BEFORE RESTARTING THE HAMMER  
MAY CAUSE SERIOUS DAMAGE TO THE HAMMER.**

## SECTION VII BUTTON BIT MAINTENANCE

### GENERAL

Numa button bits are designed for fast penetration and long life. Keeping the carbide buttons sharp has a direct effect on both the penetration and the tool life.

As the bit wears flat, spots develop on the carbide buttons. These flat spots increase stress on the buttons causing the bit to work harder, which may cause button failure. Bit sharpening can minimize these problems.

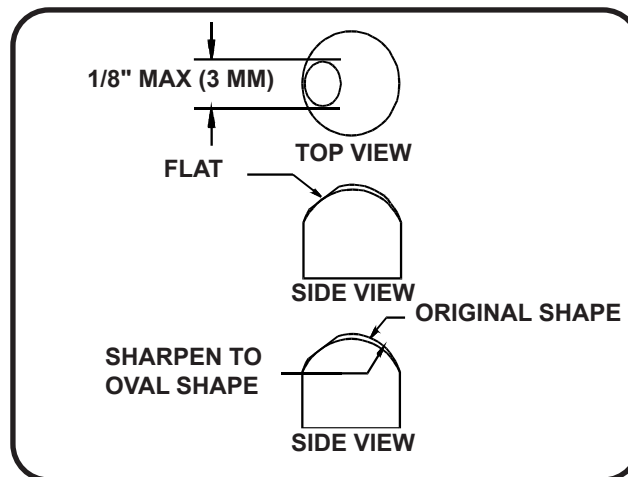
Gauge buttons will usually show the most wear and should be used to determine the frequency of bit sharpening. When the flats on the gauge buttons become a maximum of 1/8" (3 mm) wide it is time to resharpen. Refer to figure 7-1.

### SHARPENING

The following tools are required to resharpen the bit:

- Hand grinder (20,000 r.p.m.)
- Silicon carbide wheel 1" (25 mm) diameter, 60 - 80 grit
- Bit stand
- Pencil

Place a mark on the center of the button flat. Grind the button to its original shape leaving the mark untouched. Refer to figure 7-1. It is important to leave the center of the flat untouched to insure concentricity.



**Button Resharpening**  
*Figure 7-1*



## SECTION VIII RECOMMENDED SPARES PATRIOT RC50

Product Description	Part Number	Class 1	Class 2
Connector Tube 4 IJ B&M	017763	0	1
O-Ring - Drill String End	016173	2	4
O-Ring - Collection Tube End	015422	2	4
Collection Tube Assembly	017695	4	8
Backhead 4 IJ B&M Box	017917	0	1
Backhead O-Ring	008207	1	2
Backhead Bearing	015200	1	2
Pin	015207	2	4
Check Valve Seat	012995	0	1
Check Valve Seat O-Ring	008208	2	4
Collection Tube O-Ring	015422	1	2
Check Valve	012998	1	2
Check Valve Spring	015409	1	2
Feed Tube Assembly	017803	1	2
Feed Tube	015201	1	2
Feed Tube O-Ring	005566	1	2
Collection Tube O-Ring	015422	2	4
Piston	012994	1	2
Case	017081	0	1
Snap Ring	012992	1	2
Bit Bearing	012991	1	1
Bit Bearing Retainer O-Ring	005764	1	2
Bit Retaining Rings	018089	1	1
Bit Retaining Rings O-Ring	005571	2	4
Chuck	018090	1	2
Chuck O-Ring	008207	1	2

*For Complete Hammer Assembly #018111 4 IJ B&M Box*

Connector Tube DR115	016351	0	1
O-Ring - Drill String End	005738	2	4
Backhead DR115 Box	017080	0	1

*Different Parts For Complete Hammer Assembly #018113 DR115 Box  
Table 8-1*

### NOTE

- Class 1      Represents a user of a Patriot RC50 hammer that has readily available spare parts.
- Class 2      Represents a user of a Patriot RC50 hammer that does not have readily available spare parts.

**NOTES**

**NOTES**