HAMMERS AND BITS

CHALLENGER® RC100

OPERATIONS MANUAL

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.**

- **Customer Service:** 800.356.NUMA or 860.923.9551
- **Email:** numa@numahammers.com
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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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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:

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

SECTION I
DESCRIPTION

GENERAL DESCRIPTION

The Challenger RC100 is a valveless, pneumatically operated reverse circulation drill designed to utilize Numa 10" to 15" (254mm to 381mm) diameter reverse circulation bits in a wide range of soil sampling applications.

The Challenger RC100 hammer design incorporates a hardened reversible case and a large diameter collection tube. Service life, replacement cost and ease of replacement were all carefully considered in the design of the collection tube. The large bore design of the Challenger RC100 provides uncontaminated soil sampling without sacrificing the high performance levels associated with Numa down hole hammers.

The Challenger RC100 was specifically designed to provide maximum performance on the drill rigs most commonly used in soil sampling applications. The Challenger RC100 hammer is designed to operate using air pressure from 150 PSI to 250 PSI (10.3 Bar to 17.2 Bar) with compressors having 850 CFM (401 Litres/Second) or more. When drilling conditions require supplementary hole cleaning, additional hole cleaning air can be passed through the hammer through the unique orifice system. All standard hammers shipped from Numa have the orifice installed. Refer to page 15 for correct orifice selection and pages 6 and 12 to facilitate the removal and installation of the choke.

Challenger RC100		
Weight w/o Bit	777 lbs.	(352 kg)
Outside Diameter	9-1/2"	(241 mm)
Hammer Length:		
Shoulder to Shoulder	60"	(152 cm)
Shoulder to Bit Face	69"	(175 cm)
Backhead API Thread	7-5/8 REG BOX MODIFIED	

Table 1-1 General Hammer Specifications

10"	(254 mm)	255 lbs.	(116 kg)	13"	(330 mm)	415 lbs.	(188 kg)
11"	(279 mm)	295 lbs.	(134 kg)	14"	(356 mm)	466 lbs.	(211 kg)
12"	(305 mm)	345 lbs.	(157 kg)	15"	(381 mm)	525 lbs.	(238 kg)

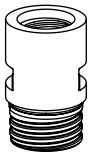
Table 1-2 General Bit Specifications

NOTE

NUMA 10" TO 15" (254 MM TO 381 MM) BITS ARE AVAILABLE IN A REVOLUTIONARY CONCAVE FACE DESIGN WITH A LARGE CENTER COLLECTION TUBE TO TAKE ADVANTAGE OF THE CHALLENGER RC100 PERFORMANCE. OTHER SIZES MAY BE AVAILABLE UPON REQUEST.

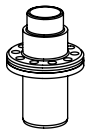
FUNCTIONAL DESCRIPTION

1. BACKHEAD



The backhead connects the hammer to the drill rod. Standard backheads are available with threads that are compatible with 7-5/8 Reg Box Modified reverse circulation drill rod. Wrench flats are provided for disassembling.

2. CHECK VALVE SEAT



The check valve seat provides the sealing surface for the check valve and connects with the drill rod center pipe to separate the drill supply air from the exhaust air which contains the rock sample.

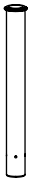
3. CHECK VALVE

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.

4. 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.

5. COLLECTION TUBE



The collection tube extends from the check valve seat to the bit and transfers the collected soil sample to the inner drill pipe of the reverse circulation drill rod. The collection tube is designed to be an easily replaced and a reasonably priced replacement item.

6. COLLECTION TUBE HOUSING

The collection tube housing locates and aligns the collection tube. Holes in the collection tube housing provide the necessary porting for supply air.

7. COMPRESSION RING

A compression ring between the collection tube housing and the feed tube housing, keeps the internal hammer parts tight.

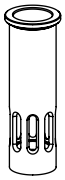
8. FEED TUBE HOUSING

The feed tube housing is aligned in the main bore of the hammer. It is located by a snap ring that is inserted in the main bore and is held in position by the backhead, collection tube housing and compression ring combination. The feed tube housing locates and aligns the feed tube.

9. FEED TUBE COMPRESSION RING

A compression ring between the feed tube and the feed tube housing, keeps the feed tube assembly tight.

10. FEED TUBE



The feed tube supplies the main air into the chambers located in the piston. It seats on a shoulder in the feed tube housing and is designed with a long bearing surface to maintain alignment in the feed tube housing.

11. ORIFICE O-RING

The orifice o-ring is located on the inside surface of the top of the feed tube. The orifice and collection tube o-rings act as a seal when lower volumes of air are utilized. The orifice o-ring can be removed, which is the equivalent of an 1/8" choke, when supplemental hole cleaning is needed.

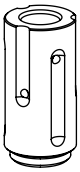
NOTE

The loss of the orifice o-ring will cause a pressure loss and performance loss of the RC100 hammer. Check the o-ring on a regular basis.

12. SNAP RING

Two snap rings position the internal parts in the hammer. The upper snap ring locates the feed tube housing and the lower snap ring locates the bit bearing.

13. 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.

14. CASE

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

15. BIT BEARING

The bit bearing guides the bit to insure proper alignment between the piston and the bit. The bit bearing is pressed into the chuck end of the case to provide a seal for the main air supply. The bit bearing is located by a snap ring that is inserted in the main bore.

16. 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 an o-ring.

17. 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.

18. CHUCK BUSHING

The chuck bushing is a nylon insert located in the bottom end of the chuck to provide a bearing surface between the lower bit shank and chuck.

19. THRUST WASHERS

Two brass thrust washers, one located between the backhead and the case, and one between the chuck and the case, provide for easy disassembly.

20. DRIVE PLATES

The plastic drive plates provide wear protection for the splines. They are inserted between the chuck and the bit. A complete drive plate set is provided with each bit.

SECTION II
MAINTENANCE

DISASSEMBLY

- **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 after the drill has been removed from the drill rig. Cap the backhead to reduce internal contamination.**

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: appropriate hammer lifting device, hammer stand, chain vise, 2" (51mm) diameter brass rod, rubber mallet, snap ring pliers, press, and a small screwdriver.**
- **Clean the outside of the hammer. This will insure a good surface to clamp on.**
- **Using an appropriate lifting device, 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 feed tube assembly is housed.**

CAUTION

THE ACCEPTABLE CLAMPING AREAS START 6" (152MM) FROM EITHER CASE END, TO AN ADDITIONAL 5" (127MM) BEYOND THIS POINT. PLACING THE CHAIN VISE ON THE AREA OF THE CASE WHERE THE PISTON CYCLES CAN DISTORT THE CASE, RESTRICT PISTON MOVEMENT AND VOID THE WARRANTY.

- **Unscrew and remove the backhead from the case. Remove the backhead o-ring and the thrust washer from the backhead. Remove the check valve seat from the backhead. Remove the check valve seat o-ring from the outside of the check valve seat.**
- **Remove the check valve and check valve spring from the backhead end of the case.**
- **Unscrew and remove the chuck, drive plates, bit and the bit retaining rings from the case.**
- **Remove the thrust washer from the chuck.**

- **Removal of the chuck bushing is not necessary for routine maintenance. If necessary, lay the chuck on its side so that the bit end is facing you. Locate the seam in the chuck bushing. Insert a screwdriver into the slot in the middle of the seam and pry the chuck bushing from the under cut. Remove the chuck bushing from the bit end of the chuck.**

- **Remove the bit retaining rings o-ring from the bit retaining rings.**

- **Using a rubber mallet, tap the collection tube which is extending from the chuck end of the case, to force the collection tube and collection tube housing out the backhead end of the case.**

- **Remove the compression ring from the backhead end of the case.**

- **Using a 2" diameter brass rod, go through the chuck end of the case into the inside of the piston, push the feed tube assembly out the the backhead end of the case.**

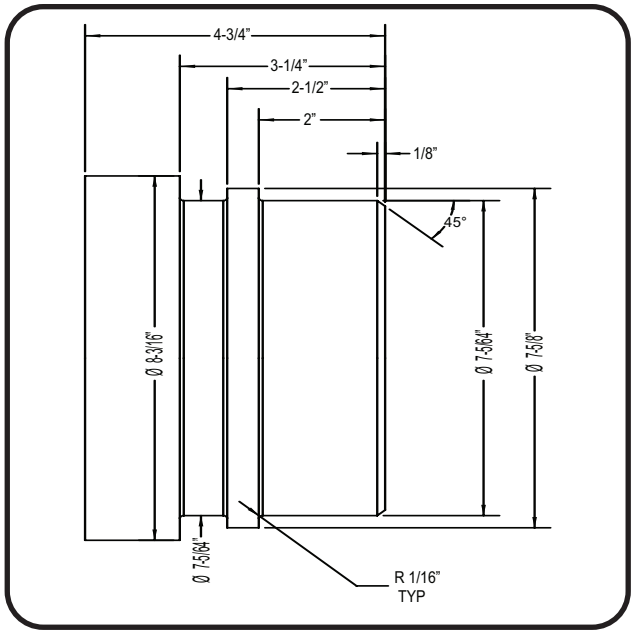
- **Using a 2" diameter brass rod, slide the piston against the snap ring and press the snap ring and piston out the backhead end of the case.**

- **Using a rubber mallet, tap the collection tube out of the collection tube housing.**

- **Using a screwdriver, pick the two o-rings from the inside diameters of the collection tube housing.**

- **Removal of the bit bearing and snap ring in the chuck end of the case is not necessary for routine maintenance. If necessary, insert the bit bearing press plate into the b ackhead end of the case, with the smaller diameter toward the case bore. Using a 2" (51mm) diameter brass rod, slide the bit bearing press plate to the chuck end of the case until it rests against the bit bearing. Remove the brass rod. Using a press, apply pressure to the bit bearing press plate and force the bit bearing and snap ring out of the chuck end of the case. Refer to figure 2-1 for bearing spacer dimensions.**

- **Disassembly of the feed tube assembly is not necessary for routine maintenance. If necessary, using snap ring pliers, remove the feed tube snap ring. With the orifice end of the feed tube against the work bench, apply downward pressure toward the work bench. This will cause the feed tube to protrude from the feed tube housing. Grasp the feed tube and slide it out of the feed tube housing. Slide the feed tube compression ring off the orifice end of the feed tube. Place the feed tube collar toward the work bench. Using a small screwdriver pick the orifice o-ring from the inside diameter of the orifice. Using a small screwdriver, pick the two feed tube o-rings from the smallest bore of the feed tube housing.**



RC100 Bearing Spacer/Press Plate
Figure 2-1

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.**

BACKHEAD

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

CHECK VALVE SEAT

- **Inspect the outside diameters for nicks, burrs and scoring.**
- **Remove all minor irregularities with emery cloth.**
- **Inspect the I.D. for wear caused by erosion from sample.**
- **Replace if necessary.**

CHECK VALVE

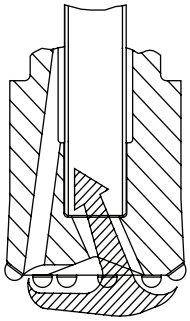
- **The check valve should be smooth and free from abrasions.**
- **Replace if necessary.**
- **Replace the check valve spring if it is worn or broken.**

COLLECTION TUBE & COLLECTION TUBE HOUSING

- **Inspect the outside diameters for nicks, burrs and scoring.**
- **Remove all minor irregularities with emery cloth.**
- **Check the I.D. size (at the chuck end) of the collection tube. The tube I.D. should be no bigger than 3" (76 mm).**

NOTE

- **Due to the angle of the exhaust into the collection tube, one side 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.**



- **Replace if necessary.**

COMPRESSION RING

- **Inspect the compression ring for severe wear indications.**
- **Replace if necessary.**

FEED TUBE ASSEMBLY

- **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 RINGS

- **Inspect the snap rings for severe wear indications.**
- **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.**

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 0.020" (0.51 mm).**
- **Select the larger end of the case to be the chuck end. Replace if the outside diameter is worn to 9.125" (231 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 0.020" (0.51 mm).**
- **Replace if necessary.**

BIT RETAINING RINGS

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

THRUST WASHERS

- **Inspect for damage such as cracks.**
- **Replace if necessary.**

CHUCK

- **Inspect for cracks and burrs.**
- **For continued use, the outside diameter should be larger than the outside of the case or the same. Collar length should not be less than 4.125" (105 mm).**

> **CAUTION**
> **IF THE COLLAR LENGTH IS LESS THAN 4.125" (105 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 FAIL IN THIS AREA.**

- **Torsional play in the splines should not exceed 0.125" (3.18 mm).**
- **Replace if necessary.**
- **Inspect the drive plates. Replace if cracked or worn.**
- **Inspect the chuck bushing for cracks or irregularities. Replace if necessary.**

O-RINGS

- **Inspect for damage such as cracks and deformations.**
- **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.**

FEED TUBE ASSEMBLY

- **Install the two feed tube o-rings in the two grooves located in the smallest inside diameter of the feed tube housing.**
- **Insert the orifice o-ring into the inside diameter groove of the feed tube.**
- **Place the feed tube compression ring over the orifice end of the feed tube, then slide it along the feed tube until it seats against the feed tube collar.**
- **Position the piston vertically on the work bench. Place the smallest outside diameter of the feed tube housing on the piston so that the bores will align. Insert the orifice end of the feed tube into the feed tube housing. Slide the feed tube into the feed tube housing until the feed tube compression ring seats against the feed tube housing shoulder. While applying pressure to the feed tube collar to expose the snap ring groove, use snap ring pliers to insert the feed tube snap ring. Remove the feed tube assembly from the piston.**

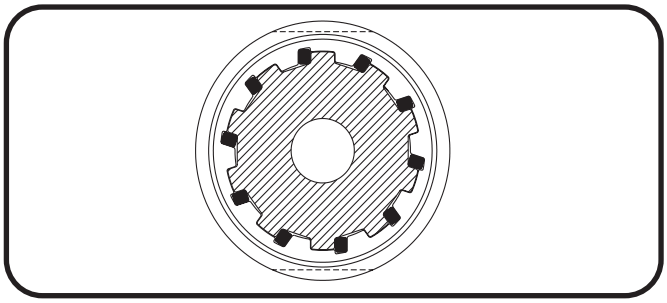
HAMMER ASSEMBLY

- **Select the larger outside diameter end of the case to be the chuck end.**
- **Insert the snap ring into the groove located at the chuck end of the case, making sure it seats properly in the groove. Press 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.**
- **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 snap ring in the groove at the backhead end, making sure it seats properly in the groove.**
- **Install the collection tube housing o-ring and the collection tube o-ring in the collection tube housing, then install the collection tube in the collection tube housing, making sure it seats properly.**
- **Install the compression ring around the shoulder of the collection tube housing. Install the feed tube assembly over the collection tube, seating it against the compression ring and collection tube housing.**
- **Install the collection tube assembly and the feed tube assembly in the case making sure it is firmly against the snap ring.**
- **Install the check valve seat, with the check valve seat o-ring installed, into the backhead, making sure it seats firmly on the shoulder.**
- **Place the check valve and the check valve spring onto the check valve seat.**

- **Assemble the backhead o-ring into the groove on the backhead. With the thrust washer installed against the shoulder of the backhead threads, thread the backhead into the case and tighten until the shoulder is tight against the case.**

- **Insert the chuck bushing into the groove on the inside of the chuck.**

- **Place the thrust washer against the chuck thread shoulder. Lower the chuck over the bit splines. Rotate the chuck counter-clockwise, and install the drive plates into the slots. See Figure 2-2. Place the o-ring onto the bit retaining rings and place the bit retaining rings over the bit and onto the top of the chuck. Thread the chuck into the case and hand tighten. The chuck shoulder should sit flat against the end of the case.**

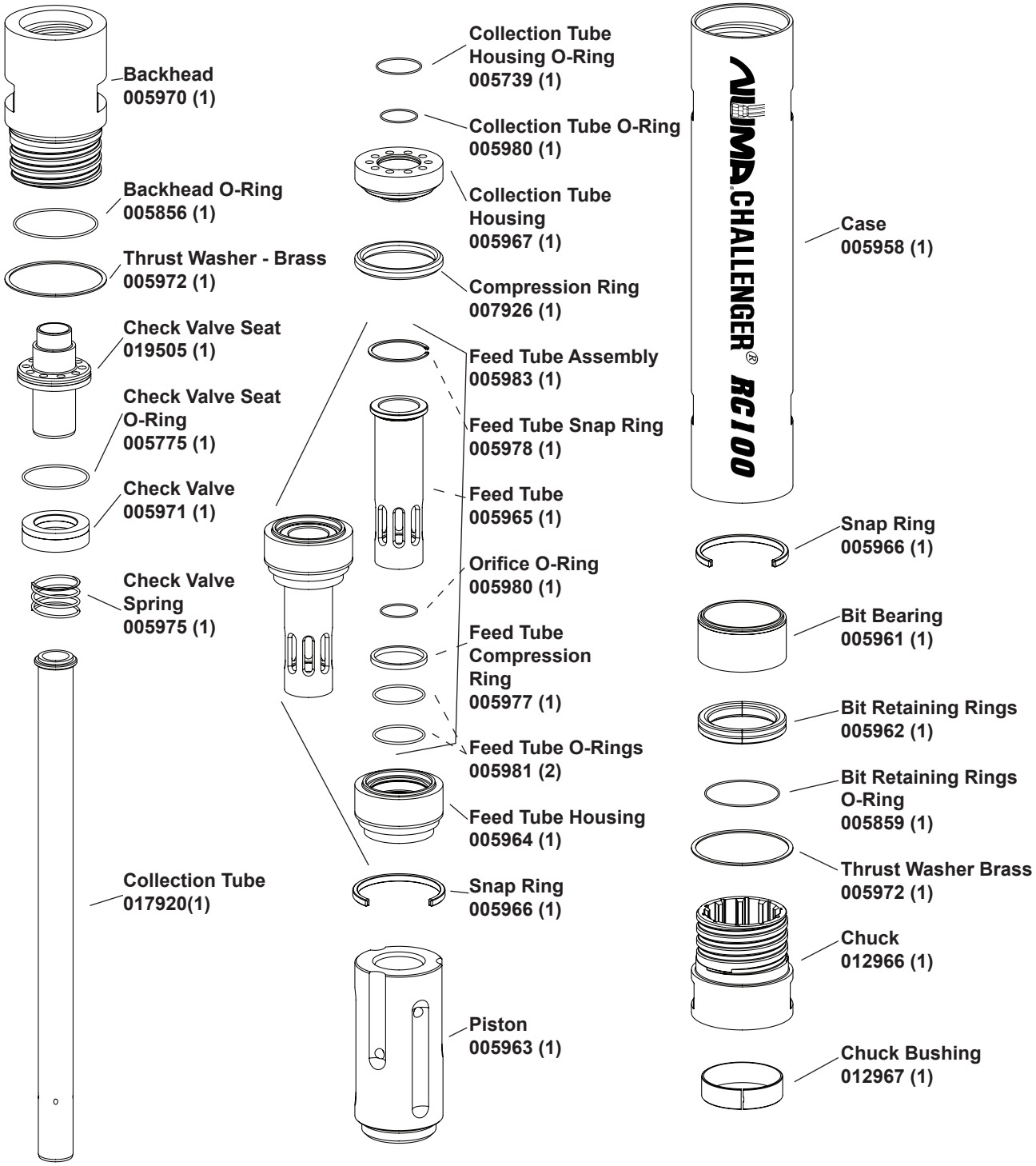


RC100 Drive Plate Positioning as Viewed from Top
Figure 2-2

CAUTION

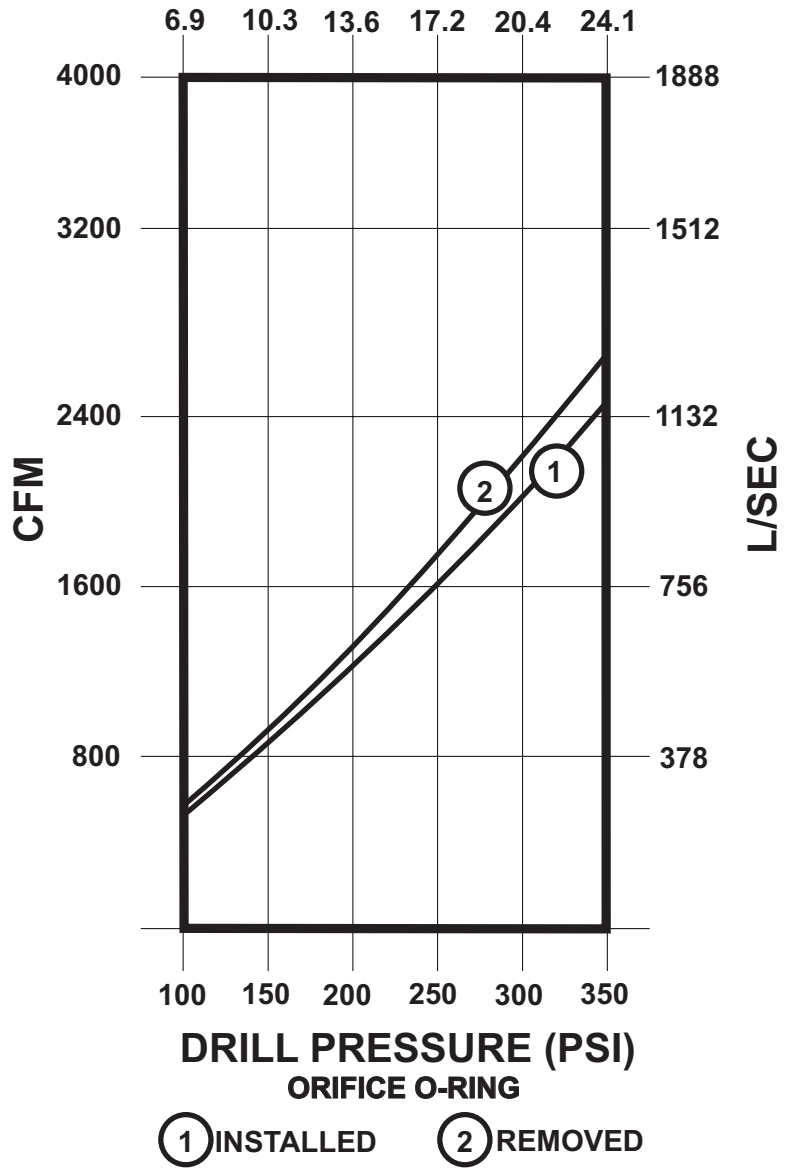
DUE TO THE CLOSE TOLERANCES BETWEEN THE CHALLENGER RC100 INTERNAL PARTS AND THE CASE, NUMA CAN NOT ACCEPT RESPONSIBILITY FOR DAMAGE CAUSED BY WELDING ON THE CASE OD. WELDING ON THE CASE CAN CREATE DISTORTION, CAUSE PREMATURE FAILURE AND VOID THE WARRANTY. CONTACT NUMA FOR SPECIAL INSTRUCTIONS IF WELDING THE CASE BECOMES UNAVOIDABLE.

SECTION III
PARTS IDENTIFICATION
EXPLODED VIEW



HAMMER ASSEMBLY #017921
Figure 3-1

SECTION IV
AIR CONSUMPTION CHARTS
CHALLENGER RC100



** Operation Above 250 PSI (17 BAR) Is Not Recommended.*

NOTE

Numa RC hammers utilize an orifice o-ring as a choke. Removal of the orifice o-ring allows additional air to pass through the hammer for hole cleaning/flushing purposes.

SECTION V
LUBRICATION

The Challenger RC100 hammer requires a continuous supply of the correct type Rock Drill Oil. The Challenger RC100 hammer consumes at least 4 quarts (4 litres) of Rock Drill Oil per hour in order to maintain adequate lubrication. See table 5-1 for recommended Rock Drill Oil.

	Medium SAE 30	Heavy SAE 50
Shell	Air Tool Oil S2 A 150	Air Tool Oil S2 A 320
Texaco / Caltex	Rock Drill Lube 100	Rock Drill Lube 320
Chevron	Vistac 150	Vistac 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 CHALLENGER, 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 Challenger 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 Challenger 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 Challenger hammer will be stored for only 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 16 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.

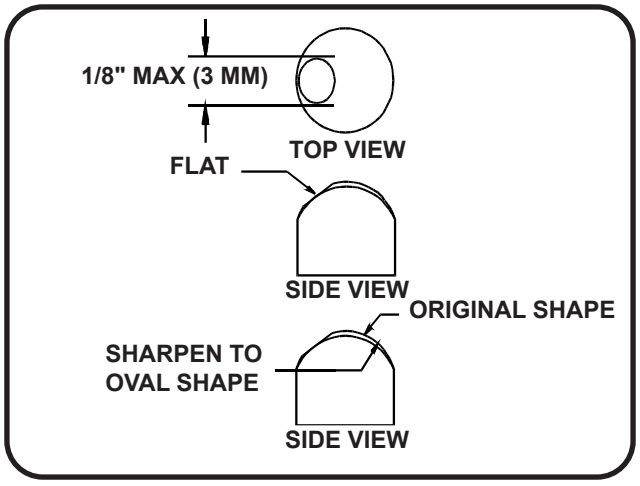
Gauge buttons will usually show the most wear and should be used to determine the frequency of bit sharpening. When the flats on the gauge buttons become a maximum of 1/8" (3 mm) wide it is time to resharpen. Refer to figure 7-1.

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
CHALLENGER RC100

Product Description	Part Number	Class 1	Class 2
Backhead 7-5/8 Reg Box Modified	005970	0	1
Backhead O-Ring	005856	2	4
Thrust Washer - Brass	005972	2	4
Check Valve Seat	019505	0	1
Check Valve Seat O-Ring	005775	2	4
Check Valve	005971	1	2
Check Valve Spring	005975	1	2
Collection Tube	017920	4	8
Collection Tube Housing	005967	0	1
Collection Tube Housing O-Ring	005739	2	4
Collection Tube O-Ring	005980	2	4
Compression Ring	007926	1	2
Feed Tube Assembly	005983	1	2
Feed Tube Snap Ring	005978	1	2
Feed Tube	005965	1	2
Orifice O-Ring	005980	2	4
Feed Tube Compression Ring	005977	1	2
Feed Tube O-Ring	005981	2	4
Feed Tube Housing	005964	0	1
Snap Ring	005966	1	2
Piston	005963	1	2
Case	005958	0	1
Bit Bearing	005961	1	1
Bit Retaining Rings	005962	1	1
Bit Retaining Ring O-Ring	005859	2	4
Chuck	012966	1	2
Chuck Bushing	012967	1	2

For Complete Hammer Assembly #017921
Table 8-1

NOTE

Class 1 Represents a user of a Challenger RC100 hammer that has readily available spare parts.

Class 2 Represents a user of a Challenger RC100 hammer that does not have readily available spare parts.

NOTES

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