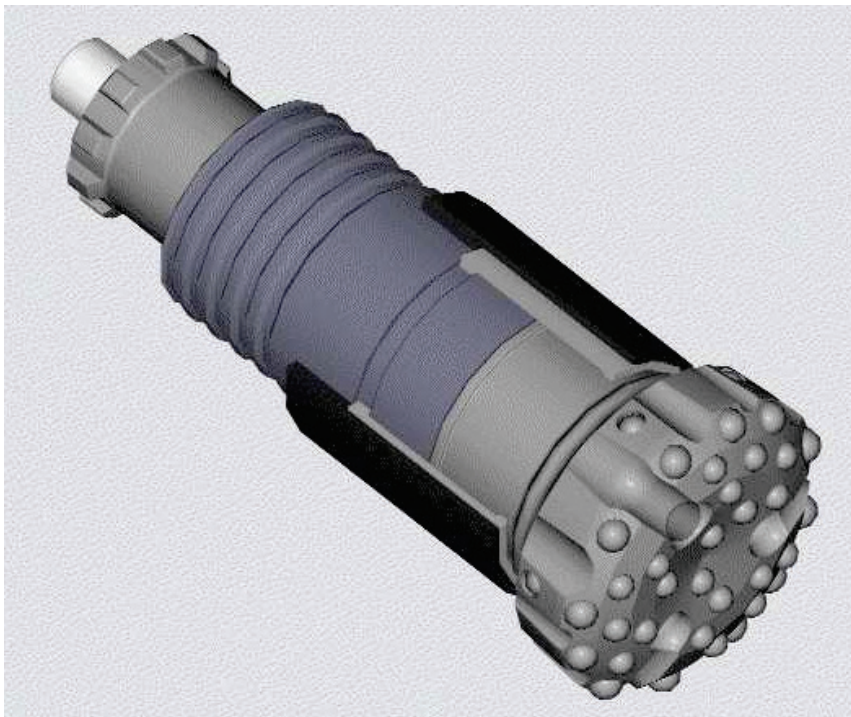


NUMA[®] **HAMMERS AND BITS**

BIT RETENTION SYSTEM OPERATING MANUAL



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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 one (1) month 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 the 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:

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

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SECTION I DESCRIPTION

GENERAL DESCRIPTION

NUMA Bit Retention Systems utilize a dual half ring retainer inside of a retainer wear sleeve, assembled over a specially configured bit head and chuck, to provide the safety and confidence of being able to retain and retrieve a bit head, in the unlikely event of a bit shank failure.

The Retainer itself is comprised of two basic components. An Inner Ring with internal lugs is split into two half rings so that they may be fitted over the top portion of a Bit head that has a corresponding external lug. These half rings are held in place and prevented from separating by a simple Wear Sleeve that is fitted over them. This assembly is mounted on a specially machined hammer chuck, and the entire unit (Bit, Retainer, and Chuck) is assembled to the Down Hole Hammer.

A Pin key is provide to lock the retainer with the Chuck to prevent the separate rotation of these assemblies.

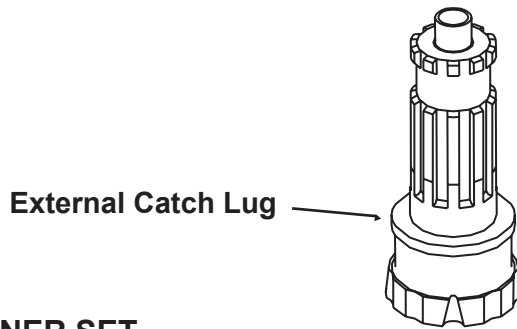
FEATURES

- Simple easily assembled design.
- Robust and durable
- No threads, cams, or teeth to fit or damage.
- Unlike most other retention systems, the NUMA system provides full contact around the entire circumference of the Retainer / Bit interface.

SECTION II FUNCTIONAL DESCRIPTION

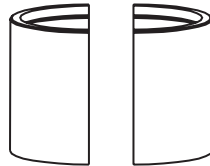
BIT CUT FOR SPLIT RETAINER (CFSR)

Bits manufactured for Retention Systems are made with an extended bit head, machined with an external catch lug for connecting with the Retainer.



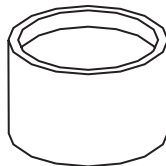
SPLIT RETAINER SET

The Split Retainer Set is an internally lugged sleeve cut into two halves.



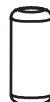
RETAINER WEAR SLEEVE

The Wear Sleeve is fitted over the Split Retainer Set at assembly.



PIN

A Pin (key) is provided to lock the Retainer Assembly to the Chuck to prevent separate rotation



SECTION III ASSEMBLY AND OPERATION

ASSEMBLY

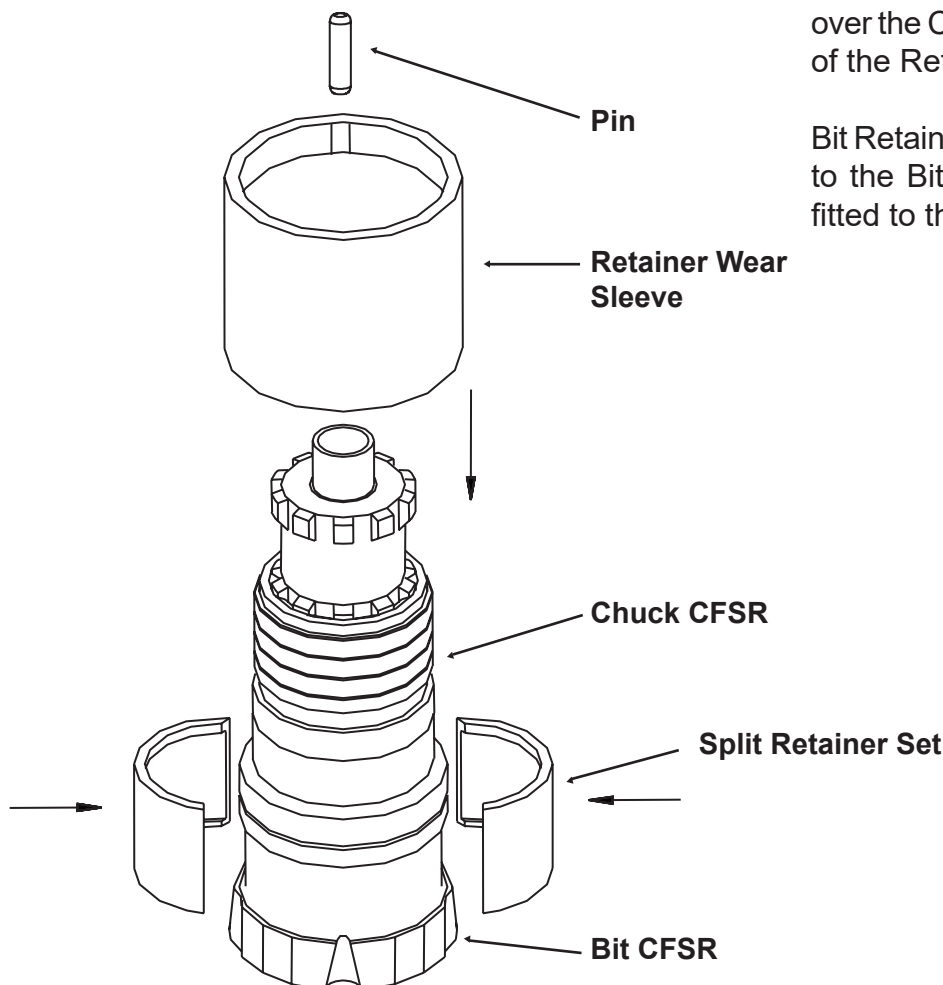
Assemble the (Cut for Split Retainer) Chuck over the (Cut for Split Retainer) Bit by fitting it down over the Bit shank in the usual fashion.

Slide the two halves of the Split Retainer Set over the interface of the Bit and Chuck so that the bottom internal lug in the halves is below the external lug on the Bit, and the upper internal lugs of the halves are resting in the groove or on the shoulder provided for them on the Chuck.

While holding the Split Retainer halves together, slide the Retainer Wear Sleeve downward over top of the Split Retainer halves. The internal lip in the Wear Sleeve will be at the top. The Wear Sleeve will slide over the Split Retainer halves, holding them together over the Bit and Chuck, and come to rest against the top shoulder of the Split Retainer halves. The Pin may then be installed in the key slot provided in the Wear Sleeve and Chuck.

If used, install the Thrust Washer over the Chuck threads to seat on top of the Retainer Wear Sleeve.

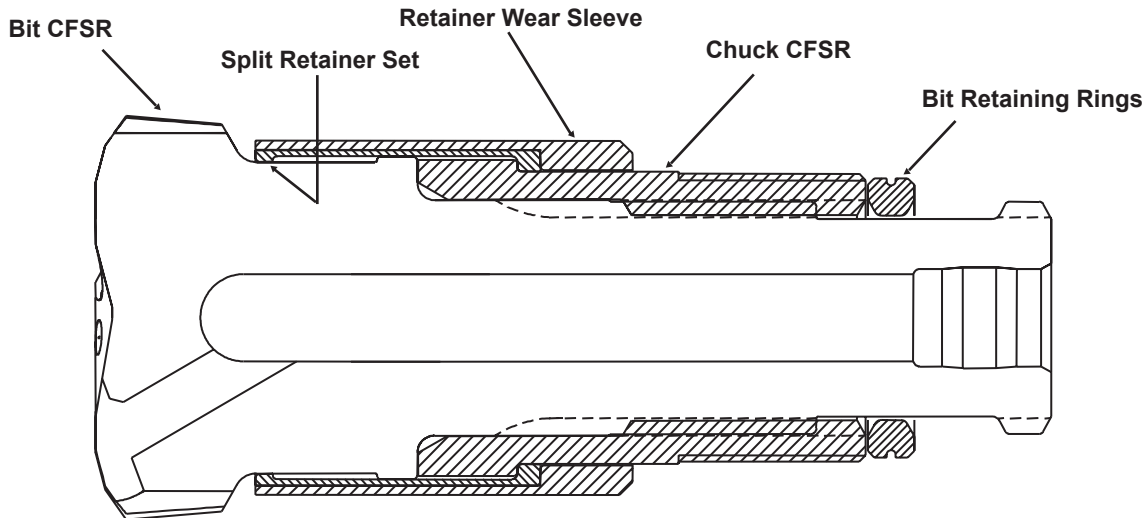
Bit Retaining Rings can then be fitted to the Bit, and the entire assembly fitted to the Down Hole Hammer.



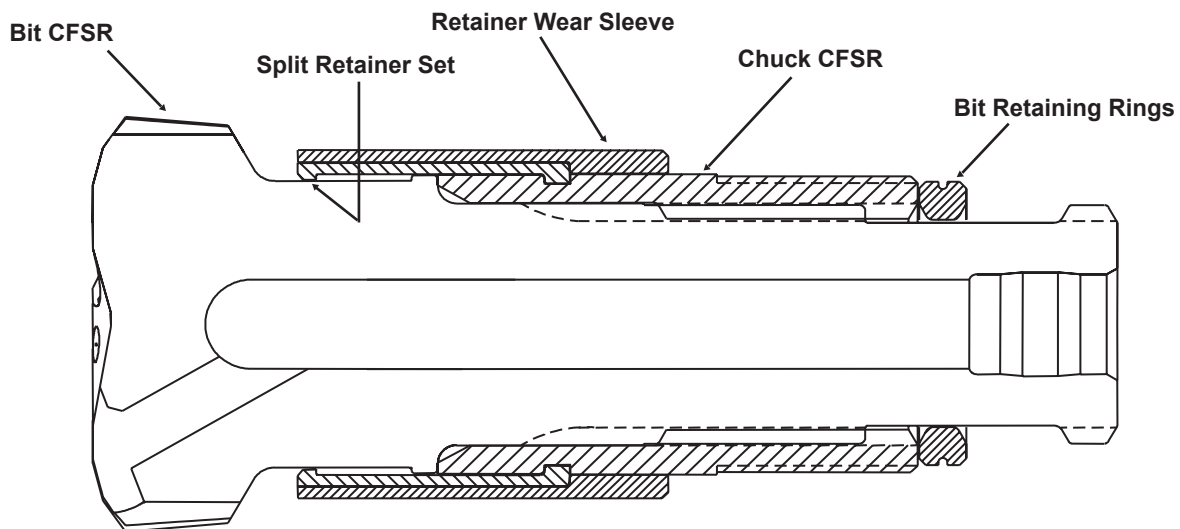
SECTION III ASSEMBLY AND OPERATION

CHUCK CUT FOR SPLIT RETAINER (CFSR)

Down Hole Hammer Chucks specially machined to accept Retention Systems, will have either a shoulder or a shouldered groove cut on the OD to accept the internal lugs of the Split Retainer Set and the Retainer Wear Sleeve. A cross section view of how two different types of Retainers fit on the Chuck is illustrated below.



Chuck with Straight Shoulder



Chuck with Shouldered Groove

SECTION IV SHANK & BIT SIZES for Numa Retention System

| Bit Shank | Bit Range (in) | Bit Range (mm) |
|-----------|-----------------|----------------|
| 360 | 6-1/4" - 6-3/4" | (159 - 171 mm) |
| 380 | 7-7/8" - 8-7/8" | (200 - 225 mm) |
| N100 | 9-7/8" - 11" | (251 - 279 mm) |
| P125 | 12-1/4" - 20" | (311 - 508 mm) |
| P180/P185 | 18" - 26" | (457 - 660 mm) |
| P240 | 24" - 34" | (609 - 863 mm) |

Special sizes and configurations may be available upon request and review.

NOTES