Drill King International

DK 24 Hammer Series

N240



TECHNICAL MANUAL

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Introduction

Drill King International was founded back in 2004 by Randy Broseh in Arlington, Texas. A year later, the business turned into a real family affair when brother Larry Broseh acquired the business. The brothers used their extensive industry knowledge to create a unique company with the best customer service in mind.

Continued growth and customer demand saw Drill King in 2008 decide to build a 60,000 sq.ft (5,575 sq.m) facility in Mansfield Texas. From this point the company has gone from strength to strength creating innovative drilling tolls and solutions for a variety of customer projects around the globe



DK Hammer Introduction

The DK Hammer Series is designed to operate efficiently on air pressure. Compressed air is directed to the hammer via the rotation spindle and drill pipe. Exhaust air from the hammer is passsed through blowholes in the drill bit and is used to flush clean the drilled hole. Rotation is provided by a rotation unit on the drill rig and transferred to the hammer via the drill pipe.

The drill pipe is threaded so that the drill string can be extended as drilling advances and the hole becomes deeper. Feed force is also transmitted to the hammer via the hole down unit and the weight of the drill pipe.

The DK Hammer Series was developed after much research by utilizing the newest technologies available. The DK Hammer Series is designed to be used in a wide range of application in rock conditions.

- Innovative & simple design for easy eco kit maintenance
- High frequency design for fastest penetration rates
- Customizable options for open hole or cased hole projects
- Premium alloys & treatment used for longer lasting tools

Safety Recommendation & Precautions

The safety Recommendations listed below are intended to alert the hammer operators and maintenance personnel to the possible physical dangers inherent in the various phases of operating and maintaining equipment of this kind.

We recommend that all operators and maintenance personnel read and thoroughlyunderstand the safety precautions before attempting to operate or perform maintenance on the drilling equipment. We put "SAFETY FIRST" and suggest this must always be the primary consideration of all personnel while operating or maintaining the equipment.

Since the Safety Recommendations can't cover every potential situation, it is suggested that everyone exercises good judgernent and common sense while operating, servicing, or working near the equipment

NOTE:

SAFETY STATEMENTS ARE INCLUDED THROUGHOUT THE MANUAL WHERE IT MAY APPLY SPECIFICALLY TO INDIVIDUAL COMPONENTS OR ASSEMBLIES. FAILURE TO COMPLY WITH SAFETY WARNING CAN RESULT IN SERIOUS OR FATAL INJURY. IMPROPER OPERATION AND MAINTENANCE CAN CASUE SEVERE EQUIPMENT DAMAGE OR EXCESSIVE WEAR ON THE HAMMER AND HAMMER BIT

- ☑ Be equipped with appropriate attire, hard hat, gloves, safety shoes, eye and ear protection. Don't wear loose clothing that could get caught in the equipment.

- ☑ Safety goggles or safety glasses are required. Rocks, dust, and loose particles from drilling may be blown into the as during drilling. Also, use safety glasses when sharpening bits.

- ☑ Handle all equipment with care.

- ☑ Operating the hammer at extreme pressures or speeds may cause failure or excessive wear. Please follow the instructions in the technical manual and use the recommended procedures for operation and maintenance of the hammer.

☑ Compressed air or fluid used for cleaning purposes should be utilized with extreme caution:

- Do not apply directly to your skin
- Do not use for cleaning directly from your clothing
- Do not direct it at another person
- Be careful not to blow directly into the equipment
- Wear safety glasses AT ALL TIMES of the operation

☑ Check the drill rod to power head spindle joint and make sure it is securely tightened before running the rotary head in reverse rotation. If you have a loose connection, it could result in the drill rod becoming disconnected cornpletely. If the drilling rod becomes disconnected, it could strike personnel.

☑ Be cautious about getting under the downhole hammer for inspedion. The downhole hammer could unexpectedly cycle, forcing the piston to drop out of the downhole hammer. This could cause bodily injury to anyone under the downhole hammer.

☑ When using solvents to clean parts, make sure that they are nonflammable, and that it meets current OSHA and International Standards; be sure to use the solvent in a well-ventilated area.

☑ Be sure all downhole hammer components are properly lubricated and maintained, while in storage. Failure to follow lubrication recommendations could cause damage and wear to the downhole hammer, its components, and /or personnel injury.

☑ Never heat up any parts of the hammer or weld on it. Use extreme care when breaking loose the top and bottom connections, using either a spanner wrench or a flat wrench that properly fits the driver and top sub

Hammer View and Parts List

Bit Shank N240

Part List (N240)

NO	Name	QTY	Part Number
1	Top Sub	1	HPDK24002
2	Top Sub O-Ring	1	See Sealkit
3	Washer Top Sub	2	HPDK-24004-N
4	Check Valve	1	HPDK-24007-N
5	C.V. Spring	1	HPDK-24009-N
6	Spacer Ring	1	HPDK-24005-N
7	Make Up Ring	1	HPDK-24006-N
8	Air Distributer	1	HPDK-24010
9	Air Distributer O Ring	1	See Sealkit
10	Cylinder	1	HPDK-24012
11	Piston	1	HPDK-24014
12	Wear Sleeve	1	HPDK-24001
13	Bearing	1	HPDK-24020-N
14	Stop Ring	1	HPDK-24017-N
15	Bit Ret. Ring	1	HPDK-24018-N
16	Bit Ret. Ring O-Ring	1	See Sealkit
17	Washer Drive Sub	1	HPDK-24021-N
18	Driver Chuck	1	HPDK-24022-N
	Sealkit (Items 2, 9, 16)	1	HPDK-240SEALKIT
	Complete Hammer		HADK-240

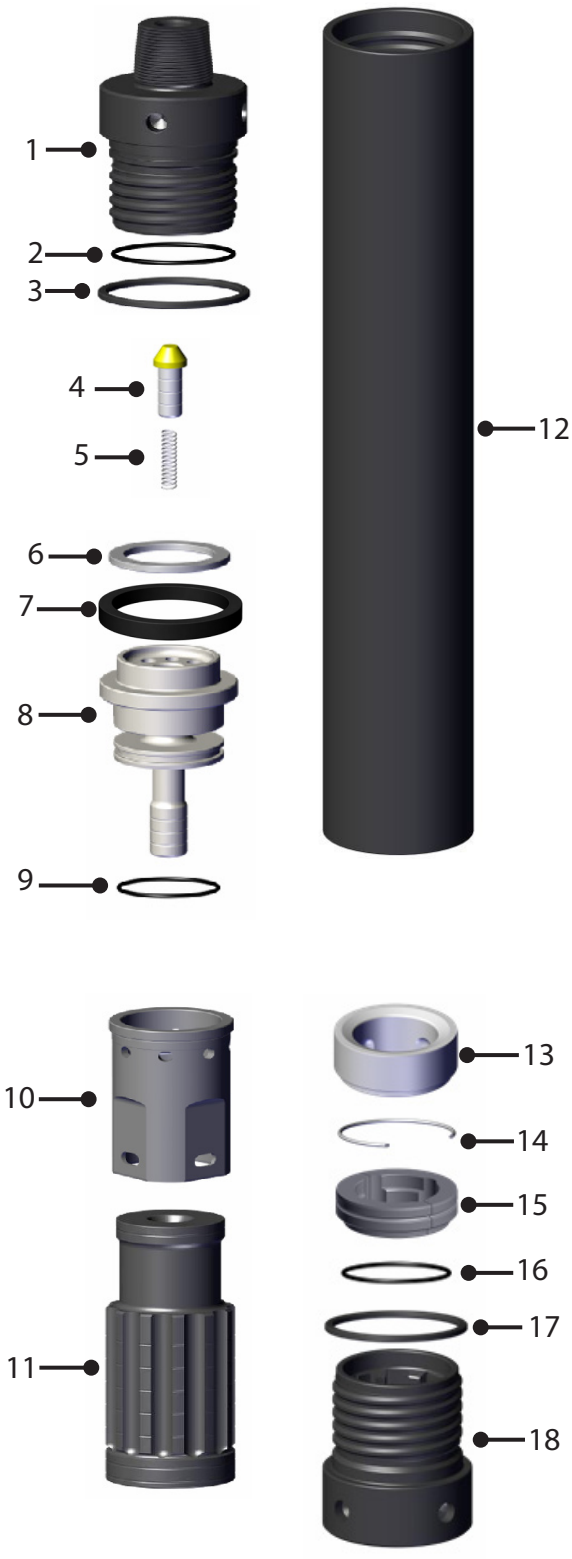
Dimensions & Weights	
Top Sub	8 5/8" API REG PIN
Eff. Length (in / mm)	78.6 / 1998
OD Range (in / mm)	20.9 / 530
Weight (lbs / Kg)	5705 / 2588

Drilling Parameters	
Working Pressure (PSI / Bar)	100-200 / 6.8-13.7
Application Bit (in / mm)	24-34 / 610-864
Feed Force (FT-lbs / M-Kg)	8000-20000 / 1106-2765
Rotation Speed (RPM)	4-5
Rotation Torque (FT-lbs / M-kg)	2000 / 277

Air Consumption

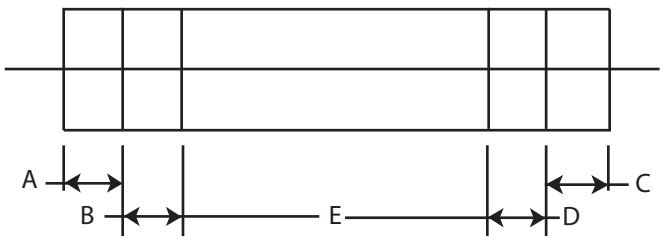
PSI	BAR	CFM	M3/Min
100	6.8	1950	55
150	10.3	2820	80
200	13.9	3520	100

Exploded view



Clamping Locations

HAMMER	LOCATION FROM TOP SUB END OF WEAR SLEEVE "A	LENGTH OF GRIP AREA "B"	LOCATION FROM DRIVER SUB END OF WEAR SLEEVE "C"	LENGTH OF GRIP AREA "D"
IR3.5	3	4	3	4
IR340	4	4	4	4
QL40	4	4	4	4
SD4	4	4	4	4
IR350	6	4	5	4
QL50	6	4	5	4
SD5	6	4	5	4
IR360	4.5	4	5	4
QL60	4.5	4	4.5	4
SD6	4.5	4	5.5	4
IR380	6.5	4	6	4
QL80	6.5	4	6	4
SD8	6.5	4	6	4
SD10	8	6	6.5	6
IR112	9.5	6	7	6
N120	4.4	13.78	6	12.11
QL120	9.5	6	7.5	6
SD12	9.5	6	8	6
SD15	9.5	6	8.5	6
N240	4.13	12.8	6.26	14.96

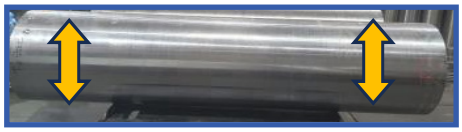


All Measurements Are In Inches

DO NOT USE TONGS IN AREAS A, C AND E

CAUTION 1

Do not apply the clamp on the thread during breakout (Refer clamping page 7)





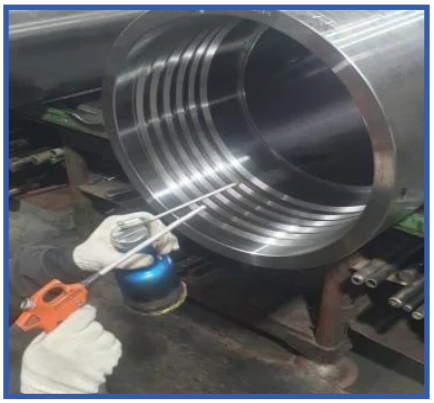
CAUTION 2

All parts should be cleaned thoroughly and wiped dry before assembly (no burs, dirt or water etc)



CAUTION 3

The hammer serial number can be found on top or bottom edges of the wear sleeve.



CAUTION 4

Oil all parts using rock drill oil to ensure easy assembly



CAUTION 5

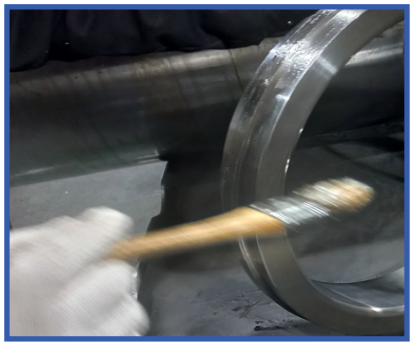
Coat all thread connections with good quality grease to allow joints to thread easily.



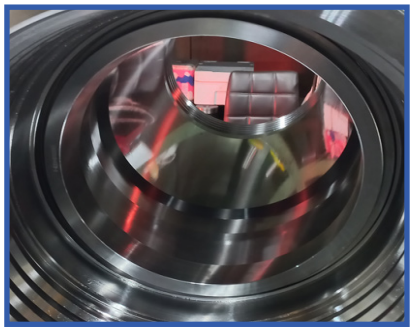
CAUTION 6

Wear personal protective equipment. Handle components with care!

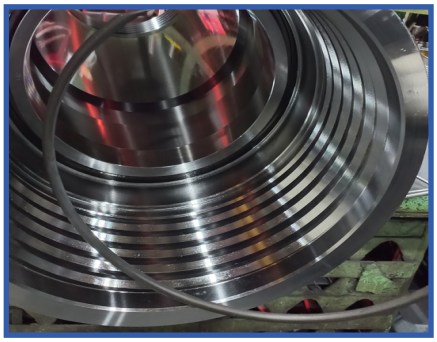
1. Apply oil to the bearing (13) and insert into the chuck end of hammer wear sleeve (12)

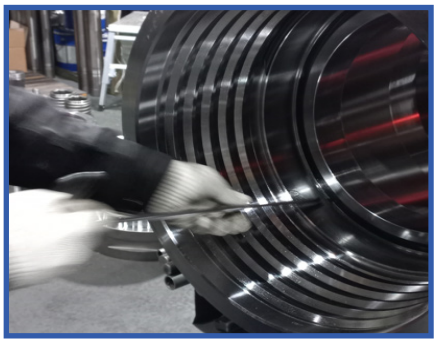


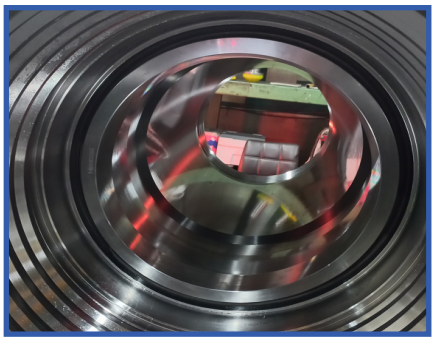




2. Install the stop ring (14) to secure the bearing as shown below.

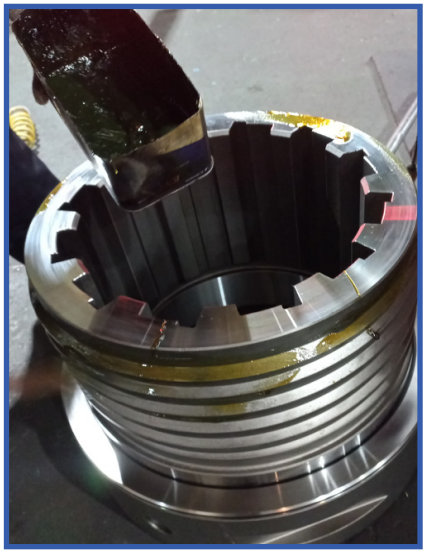




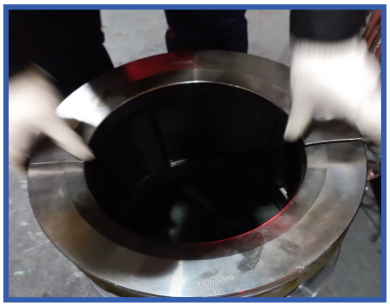


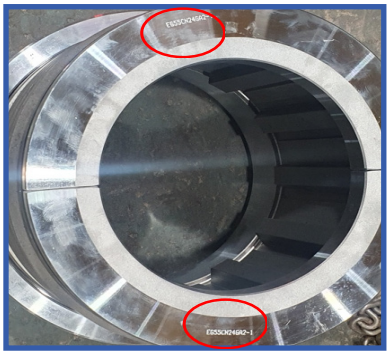
3. Prepare the Driver chuck (18) on the even ground and install the Washer (17) as below. Apply grease to the threads.





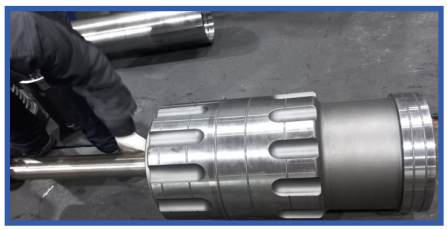
4. Locate the Bit retainer ring (15). The serial number should be visable. Install O-ring (16) to the bit retainer.

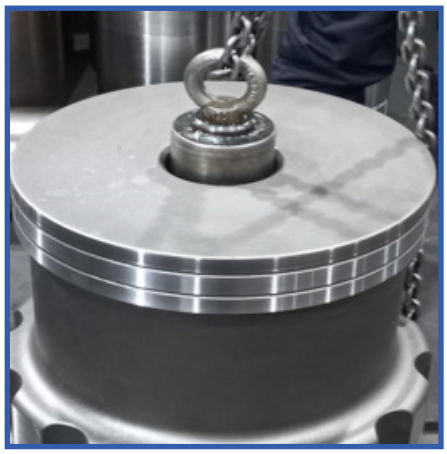






5. Install a lifting tool into the piston (11) and place it on level ground. Apply oil to piston outer body.







6. Lift the Cylinder (10) and oil the inside. Install it over the Piston as shown in the photo below.





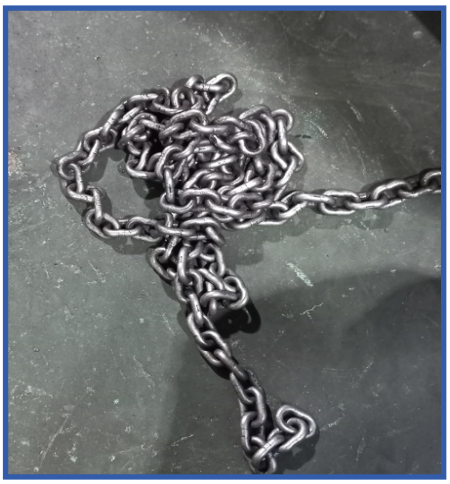
7. Lift the piston/cylinder assembly and install it into the Wear sleeve (12) from Top sub end as shown in the photo below.





8. Ensure that the piston/cylinder assembly is seated in the correct position smoothly. Then remove the steel chain or lifting tools.



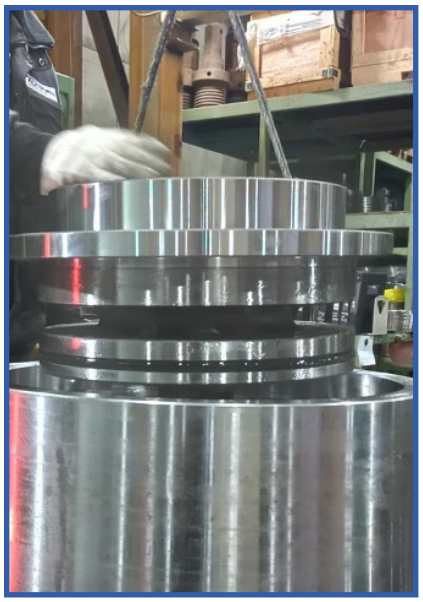


9. Lift the Air distributor (8). Install the O-ring (9) and apply oil as shown below.



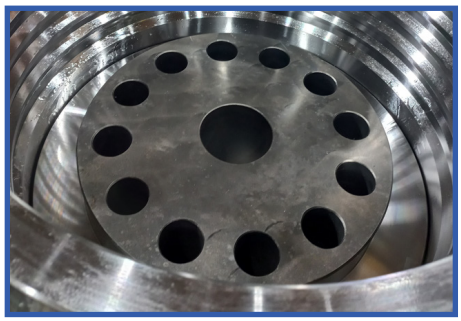


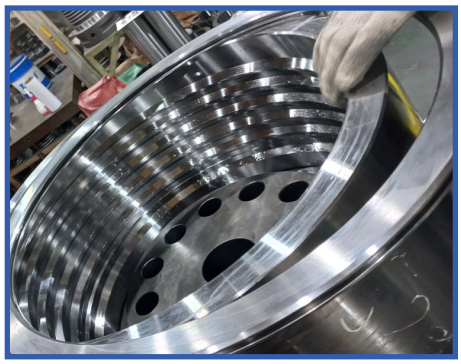
10. Install the air distributor into the Top sub end of wear sleeve. Tap the surface with a steel pipe to ensure that it is seated in the correct position as shown above.

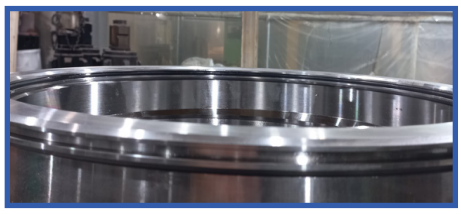




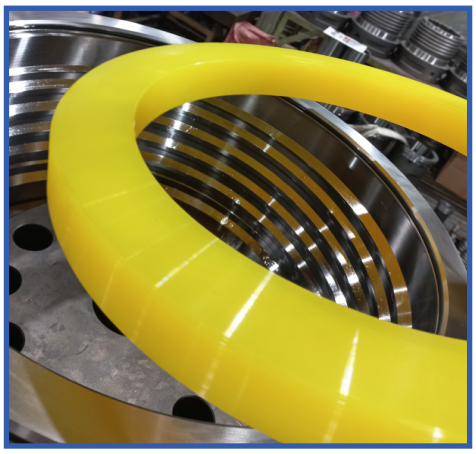
11. Place the washer (3) on the top of the wear sleeve as shown below.

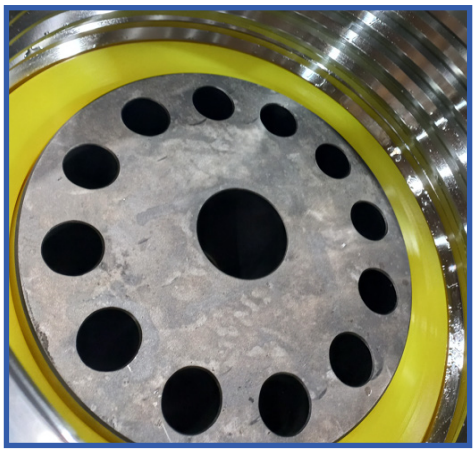




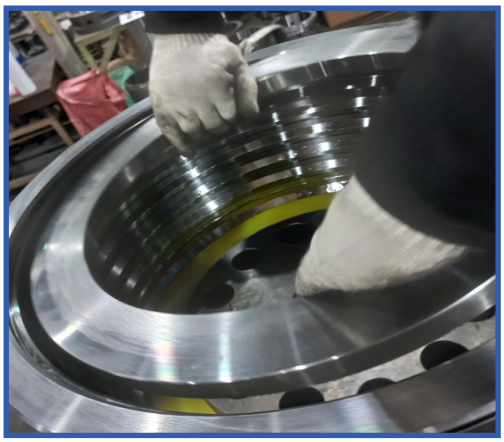


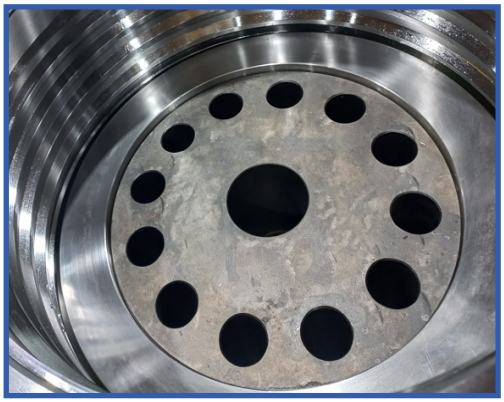
12. Install the Make up ring (7) as shown below.





13. Install the spacer ring (6) on top of the Make up ring (7).



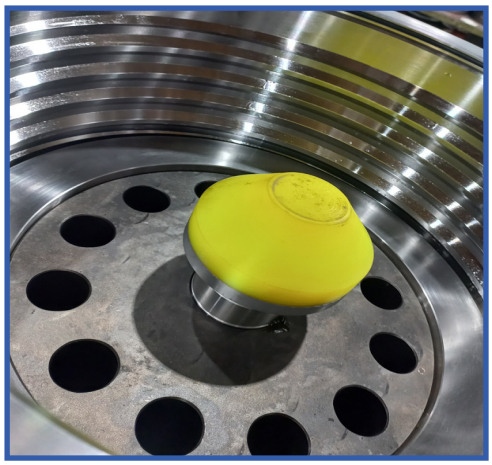


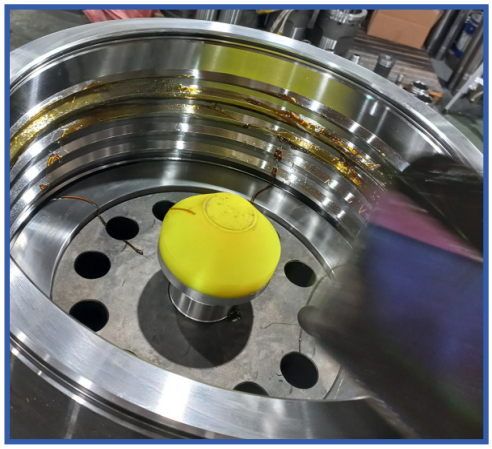
14. Apply grease to the C.V. spring (5) and install it into the check valve (4).





15. Install the check valve into the center of the cylinder. Apply grease to the threads as shown below.





16. Lift the top sub (1). Apply grease to the threads and hand-tighten it into the wear sleeve.







17. Lift the hammer assembly and thread on to drive chuck (18) as shown below.



18. Use a Lifting adapter to hold the driver chuck and prevent it from rotating. Hand-tighten the hammer assembly clockwise, as shown above.



19. This completes the 24"/N240 hammer assembly.



Storage of the Hammer for Long Periods

- All parts should be blown clear of water and wiped clean, ensuring they are free of rust and burrs.
- Ensure all parts are fully lubricated with rock drill oil, and apply grease to all threaded areas.
- Store the hammer horizontally in a dry environment.
- If the hammer is stored vertically, oil will remain on one side and may cause corrosion on the opposite side.
- This is especially critical in winter, as vertical storage can lead to severe corrosion.
- After long-term storage, it is strongly recommended to disassemble the hammer and inspect all components for corrosion.Clean or replace any rusted parts with new ones as necessary before putting the hammer back into service.

Lubrication

In order to maintain satisfactory operation of the Drill King Hammers, you must lubricate the hammer properly. The recommended lubricant to use with Drill King Hammers is the Biodegradable and Environmentally Friendly Rock Drill Oil (Part Number DKRDO-5G).

- Check the oil level in the lubricating tank
- Check for oil in the compressed air.
- Mineral oils have the best lubricating properties
- Lubricating out used in water well drilling should be non-toxic.

You can make sure the lubricant is being carried to the hammer via the compressed at by placing a plank over the drill steel support and letting the operating air blow over the plank. If you see that it is oily then the oil should be getting to the hammer. It is also essential to the life of the hammer components.

Proper thread lubricants are also critical to the life of the hammer components. Thread lubrication applied to the stress relief grooves at the base pin will help fight the effects of corrosive drilling fluids.

It is a necessary procedure to reapply thread lubricant (Drill King Copper Cote Part No. 630010 1-gal) to the driver sub threads when changing bits. It is also important that the drive sub and the top sub threads be recoated with thread lubricant often in order to assure the maximum protection from corrosion pitting.

Corrosion failures in percussion hammers and hammers bits can be controlled by maintaining a protective barrier between the bit and hammer parts and the environment through proper application of readily available rock drill oils and thread lubricants.

The best method for preventing failures due to corrosion fatigue is to be sure the surface of the bits and components of the hammer is coated with rock drill oil. Threaded connections and thread run out grooves should be protected by coating with thread lubricant. When using water injection, solvable rock drill oil with a higher viscosity rating should be utilized.

Storage

When storing Drill Hammers, it is important to blow the hammer clear of all water. After disassembling the hammer, all internal parts are liberally coated with rock drill oil. Store the hammer horizontally in a clean dry place.

Warranty

NOTICE TO CUSTOMER: READ CAREFULLY, THESE TERMS AND CONDITIONS CONTAIN DISCLAIMERS OF WARRANTIES AND STRICT LIMITATIONS OF LIABILITIES AND REMEDIES. NO WARRANTY IS TRANSFERRABLE WITHOUT THE EXPRESS PERMISSION OF DRILL KING INTERNATIONAL.

Drill King International LP warrants to the original purchaser that its products are free from defects in material and workmanship for a period of:

☑ Percussion Bits — One year from the date of purchase.
☑ DTH Hammers — Six months from the date of purchase.

Claims of defects in material and workmanship are subject to review and physical inspection of the returned product. Failure of the purchaser to provide relevant operational details to assist in the investigation will result in the denial of the claim. Until resolution, the purchaser must retain and appropriately store the claim. part. Upon request, the claimed part must be sent to Drill King for assessment. Any part or product sent to Drill King must be accompanied with a "Return Authorization Form" issued, in advance, by the Sales Department at Drill King. All return packaging must clearly be marked with the return authorization number. Freight for the return must be pre-paid by the purchaser. Failure to abide by these instructions will result in refusal to accept the returned product at the Drill King facility.

To begin a warranty claim a 'Product Evaluation Report' must be fully completed and submitted within the above mentioned time frame or warranty life

The report must be completed and submitted within (14) days of either the time of discovery of defect or when reasonable discovery of defect should have been made. Warranty Claims will only be accepted on products still within their warranty life.

Drill King International expressly excludes the following from the terms of this warranty:

- ☑ Incidental or consequential damages connected with the use of their products
- ☑ Claims of parts issued under concession.
- ☑ Claims of lost time
- ☑ Performance outside of the standard scope provided by Drill King International
- ☑ Effects of corrosion and/or normal wear
- ☑ Hammer seals and/or items intended to wear
- ☑ Any part that shows evidence of improper application
- ☑ Fitness for use other than the intended purposes of the product
- ☑ Proprietary design where the design control is retained by the customer, particularly when design parameters are outside Drill King Internationals recommended specifications (E.X. Oversized bits or hole openers.)
- ☑ Evidence of abuse, localized heating, welding, galling, corrosion, inadequate lubrication, physical alteration, wrench marks, lack of proper maintenance, operating outside recommended specifications, bending or otherwise distorting, excessive wear, improper storage or transportation, and chipped or crushed carbides must result in denial of claims
- ☑ Damage caused as a result of using incorrect servicing tools or procedures
- ☑ Evidence from wear shows the product has achieved at least 7596 of its expected life.
- ☑ Any part that is described as "No Warranty" in the quote, order acknowledgement, order, packing list, or invoice
- ☑ Special warranties described in the quote, order acknowledgement, order, packing list, or invoice.

Conclusion

In the event of finding a defective product, a full or pro-rated credit will be issued provided that the end user has demonstrated that the product has been stored, installed, maintained and operated in an acceptable manner.

Drill King International will not accept any remedies to the user other than those set out under the provisions of the warranty above. **Drill King international will only ever be liable for damages that are liquidated and set at the original purchase price for any said item or part in dispute**



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