

SPINCAT SC 168 ROTARY NOZZLE USER MANUAL



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This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s).

SPECIFICATIONS

Tool Family:	SpinCat	
Tool Model:	SC-168	
Pressure Range:	1-5k psi (70-340 bar)	
Flow Range:	.7 to 1.33 bpm (30 to 56 gpm)	
Flow Rating:	2.3 Cv	
Rotation Speed:	150-200 rpm	
Inlet Connection:	1" AMMT	
PSI Loss (@ 1 bpm):	330 psi (23 bar)	
Tension (pull):	Safe load to 8500 lbs (3856 kg)	
Compression (set down):	Safe load to 12000 lbs (5443 kg)	
Outside Diameter:	1.68 in.	43 mm
Overall Length:	9.8 in.	250 mm
Weight:	4.6 lbs	2 kg
Maximum Temperature:	390° F	200° C

JETTING

The standard nozzle head has five ports with 1/8 NPT threads — one at 15 degrees forward, two at 45 degrees forward, and two at 90 degrees to the axis of rotation. Some of the ports may be plugged in a balanced pattern to concentrate the flow in a particular direction. Fit-for-purpose head and porting designs are available to accommodate specific flow rates and applications.

DESCRIPTION OF EQUIPMENT AND INTENDED USE

SpinCat tools provide a durable, controlled rotation solution for well intervention. A viscous fluid governor controls rotation speed to maximize jet power delivered to the tubing walls. By using only a few rotating jets, each jet is bigger to convey hard-hitting power. Replaceable jets are efficient and clean recesses and irregular surfaces without damaging the well pipe. Over thirty years of waterjet engineering back the SpinCat design, setting the standard for rotary nozzle performance and durability.

KEY FEATURES:

- Straight flow-through design with a leak-free high pressure seal, so pump power is not wasted.
- Performs at temperatures up to 200°C, with up to 30% HCL and Nitrogen injection.
- Rotating Assembly for Complete Coverage
- Easy Field Serviceability
- Durable Fluoro Elastomer Seals
- Computerized Flow Calculations
- Controlled Rotation, Increases Cleaning Power
- Carbide Nozzles, Deliver the Hardest Hitting, Longest Lasting Jet Possible

DESCRIPTION:

The SpinCat™ is a self-rotating nozzle designed for coil tubing well service. The powerful rotating jets cover a large area for efficient cleaning. Jet reaction force (thrust) powers rotation of the head. An internal centrifugal speed control maintains rotation speeds of 150 to 200 rpm. The SpinCat™ uses a high viscosity synthetic gear oil for lubrication, such as Chevron HiPerSYN® 220, Mobil SHC™ 630 or an equivalent. The oil is available from StoneAge® as part number SC250 048.

The tool has a straight flow-through design with a leak-free high pressure seal so pump power is not wasted. It has a 1" AMMT box inlet thread. The tool can be used at temperatures up to 200°C (392°F), and can be used with up to 30% HCL and Nitrogen injection. (Note: if used with HCL, flush tool with clean water after use.)

If the SpinCat™ will be used with high external borehole pressures, make certain that the body of the tool is completely full of lubricating fluid; air pockets are compressible and this could lead to oil seal failure and loss of lubrication.

The SpinCat™ can be used at operating pressures of 1000 to 5000 psi and flow rates of 0.7 to 1.33 bpm (32 to 80 gpm) with standard head porting. Custom porting can be ordered for use up to 5 bpm (200 gpm).

FLOW RANGE	
PRESSURE	R09
1000-5000 PSI	.7 -1.33 BPM

The standard nozzle head has five ports with 1/8 npt threads; one at 15 degrees forward, two at 45 degrees forward and two at 90 degrees to the axis of rotation. Some of the ports may be plugged in a balanced pattern to concentrate the flow in a particular direction. Alternate head porting patterns may be added to the same head to accommodate different flow rates. Hi-flow Flushing, Perf Stim, and Forward Cutting configurations are available. Verify with SpinCat™ Jetting App that porting changes result in sufficient torque to ensure rotation.

DANGER

Operations with this equipment can be potentially hazardous. Caution must be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

PRE-RIH CHECKLIST:

- After receipt on location, visually inspect the SpinCat™ to ensure no small debris has entered the tool. NOTE: The SpinCat™ package includes a briefcase size Pelican® case. We recommend keeping the SpinCat™ and spare set screws and other parts inside the case.
- Verify there is no oil leaking from the set screw or body. If the set screw is missing and oil has leaked out then perform the Lubrication procedure in this manual.
- Turn the SpinCat™ head by hand. It should rotate very smoothly but not spin freely. There should not be any stoppage or feeling of binding or catching internally.
- Ensure the Weep seal on the inlet nut is in place. The function of this seal is to prevent debris from plugging the vent holes. The vent hole's function is to vent internal pressure build-up should the high pressure (HP) tungsten impregnated seal fail or leak intermittently while reseating itself. If the wiper seal is lost or missing it can be replaced with a suitable size Viton® O-Ring as a temporary measure.
- The SpinCat™ is made of hardened stainless steel for long service life with strong acids, chemicals and solvents. We recommend you do not use pipe wrenches on the SpinCat™. Customers who have SpinCats™ 2-4 years old and are still in excellent condition, NEVER use pipe wrenches on their SpinCats™. Over time teeth cuts accumulate on the inlet nut, the body and head and “chew up” the tool. Eventually these parts have to be replaced unnecessarily. Some customers do not feel this is of significant importance and if replacement parts becomes necessary we can supply them.
- When function testing, watch for leakage along the body and behind the head. This indicates an improperly redressed tool. Also watch for leakage from around the Weep seal, the high pressure seal might leak during initial pressurization but should stop once enough pressure to achieve rotation has been reached. The only place water should be exiting the tool is through the nozzles. The head should rotate slowly and smoothly.
- If the head does not rotate during a function test but it rotates easily by hand, it could be the pump rate and pressure must be increased or the tool is simply “tight” or “cold,” or there is very heavy oil in the tool and it will loosen up in the hole, or the SpinCat™ may be jetted improperly. Check the SpinCat™ Jetting App. A simple but frequent problem in function tests is the test fluid does not contain viscosity reducer but the job requires it due to extremely high friction pressures.

LUBRICANT FILL INSTRUCTIONS

TOPPING OFF LUBRICANT:

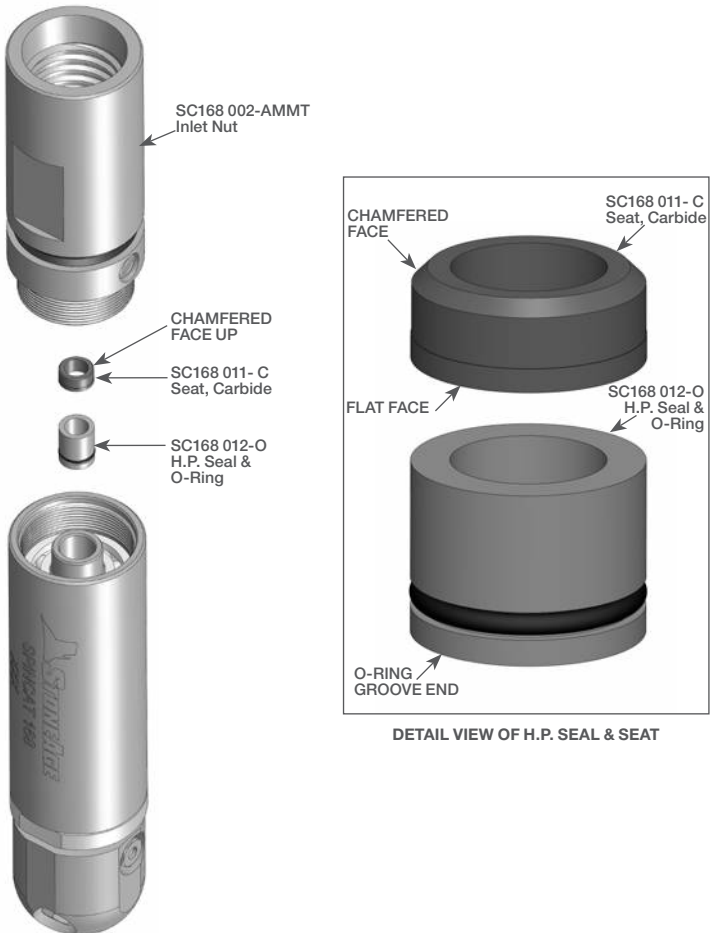
The SpinCat™ uses synthetic gear oil for a lubricant. To top off the tool with lubricant, follow steps below. If the tool is being rebuilt or the seal replaced, the lubricant may be poured directly into the body around the shaft before the inlet nut is installed. Once the inlet nut is installed, it is recommended to use the syringe with the port screw ports to completely remove all air bubbles. High borehole pressures make this a critically important step when assembling the tool. The procedure requires some patience, time and effort i.e. rotating the body back and forth to work out all air bubbles, wait, repeat. If a vice is available in the field we recommend removing the inlet nut and topping off through the open top, working the air bubbles out by rotating the body and allowing to sit.

1. Tilt the tool at a 45 degree angle and secure so that one port screw is at the topmost point
2. Fill the syringe (BC 410) with lubricant.
3. Remove both Port Plugs with O-rings (SC250 026).
4. Thread the syringe into bottom port screw.
5. Hold the tool at an angle so the port with the syringe is lower.
6. Squeeze fluid into the tool until all air bubbles stop coming out.
7. Rotate the body back and forth from the head to work air bubbles out and inject oil.
Repeat
8. Re-install the Port Plugs.
9. Store the Tool with inlet nut facing up.



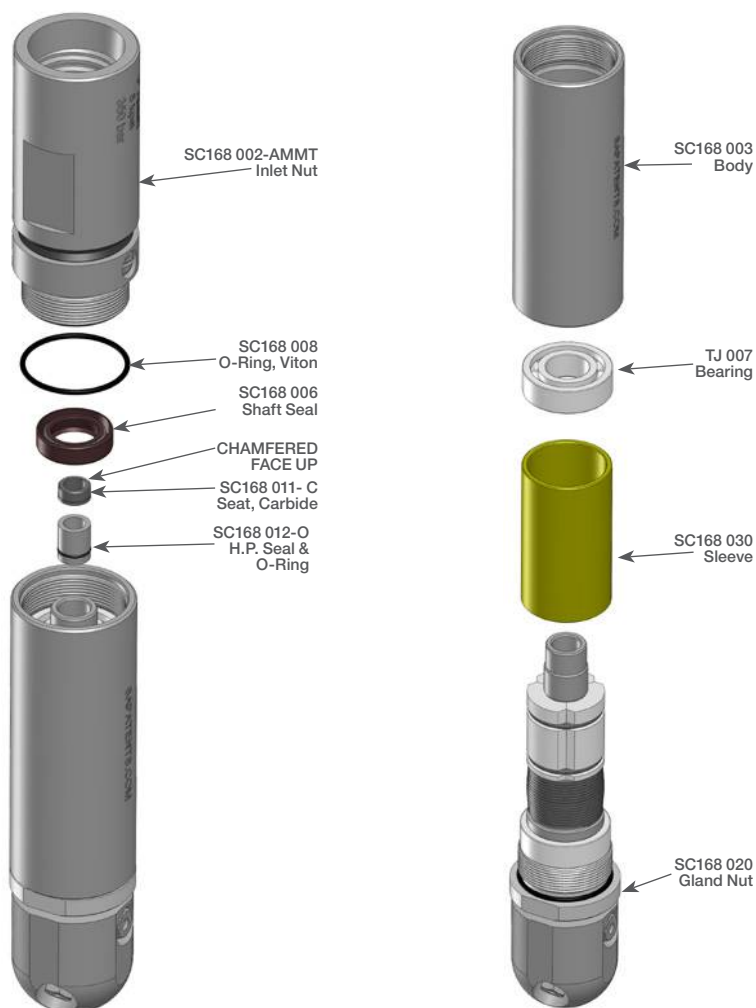
TO REPLACE THE HIGH PRESSURE SEAL:

1. Unscrew the Inlet Nut (SC168 002-AMMT).
2. Remove the old Seat (SC168 011-C) and H.P. Seal & O-Ring (SC168 012-O).
3. Apply grease to and install new H.P. Seal into the shaft with the O-Ring groove end going in first. Do not press all the way into the shaft bore.
4. Install new Seat (SC168 011-C) with the chamfered face toward Inlet Nut. Press in just far enough so that the seat is captured in the shaft bore.
5. Thread Inlet Nut into Body; tighten to 50 ft-lb.

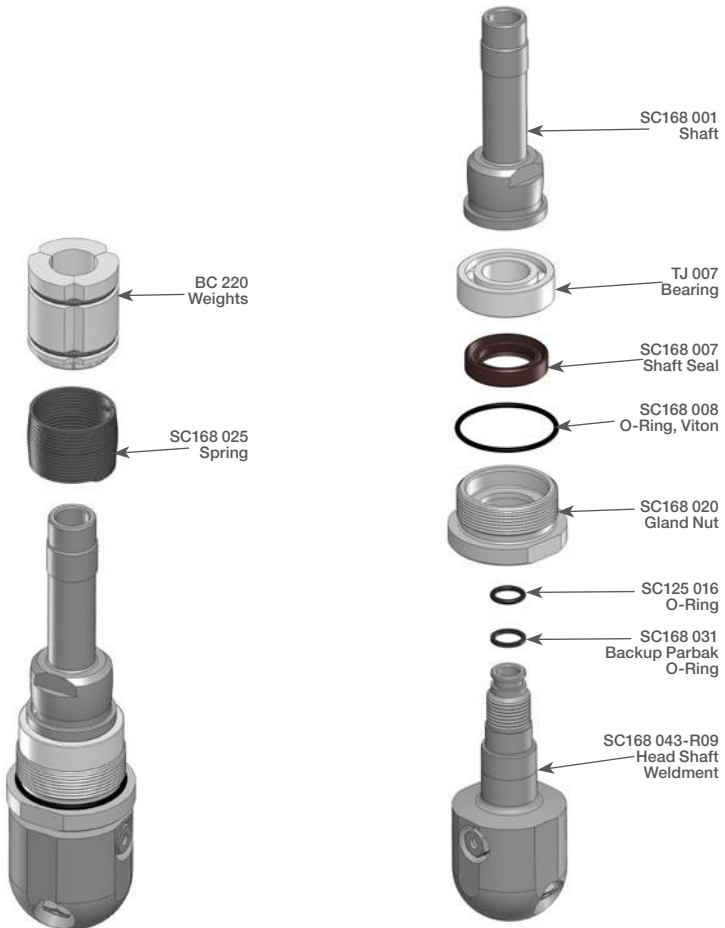


TO DISASSEMBLE THE SPINCAT SC-168:

1. Unscrew the Inlet Nut (SC168 002-AMMT) from the body.
2. Remove the Seat (SC168 011-C) and the H.P. Seal & O-Ring (SC168 012-O) from the bore of the shaft
3. If the Shaft Seal (SC168 006) is damaged, remove it from the Nut using snap ring pliers.
4. Unscrew the Body (SC168 003) from the Gland Nut (SC168 020).
5. Pull off Bearing (TJ 007) from Shaft;



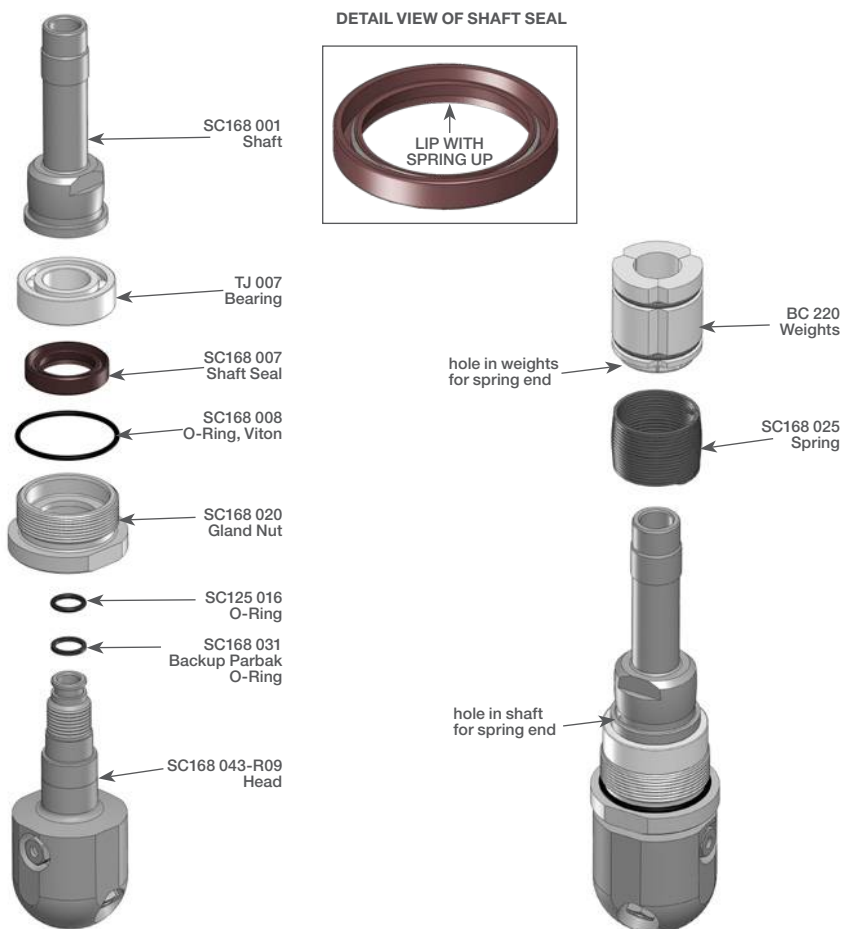
6. Pull the Sleeve (SC168 030) off the assembly.
7. Unhook the Spring (SC168 025) from the holes in the Shaft and the Weights; slightly expand and remove the Weights (BC 220) and Spring (SC168 025) from the Shaft. Leave the Weights together.
8. Unscrew the Shaft (SC168 001) from the Head (SC168 043) and pull up on the Gland Nut (SC168 020) to remove it and the Bearing (TJ 007) from the Head.
9. If the Shaft Seal (SC168 007) is damaged, remove it from the Gland Nut.
10. Inspect the O-Ring (SC125 016) and Backup Ring (SC168 031) on the end of the Head. Remove them if they are damaged.



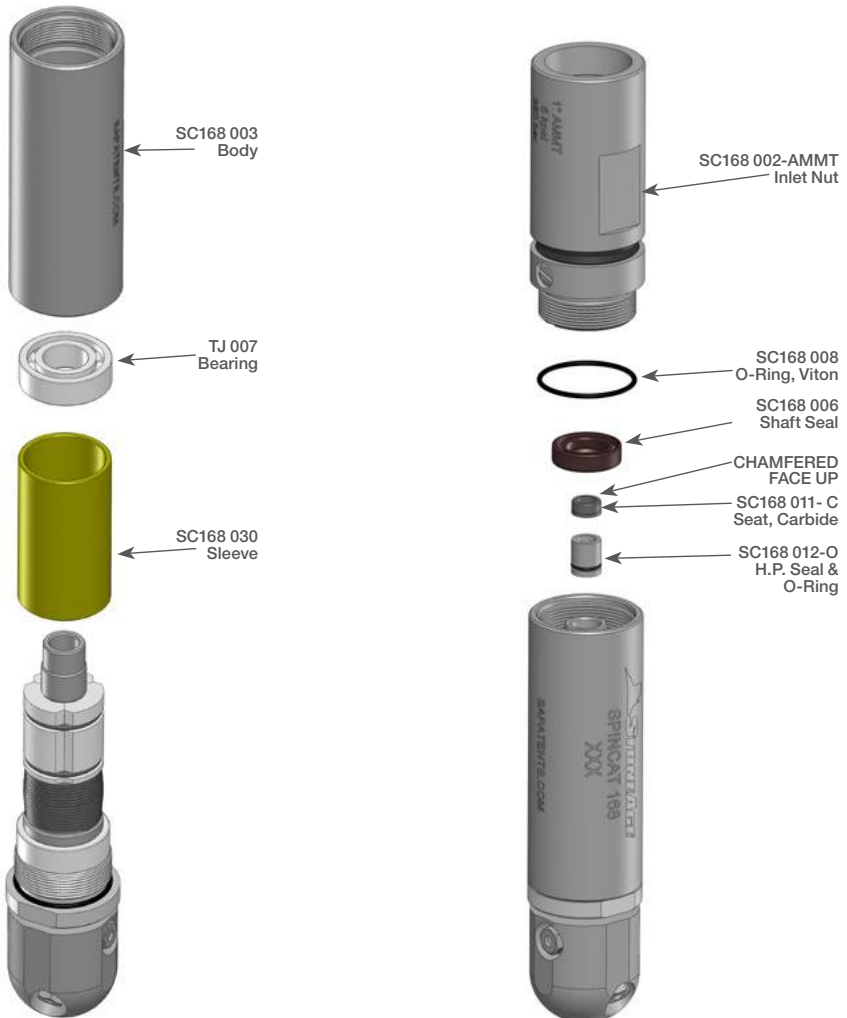
ASSEMBLY

TO ASSEMBLE THE SPINCAT SC-168:

1. Install Backup Ring (SC168 031) and then the O-Ring (SC125 016) on Head (SC168 043). Note order they sit. Apply anti-seize to threads and grease to O-Rings.
2. Install Shaft Seal (SC168 007) into Gland Nut (SC168 020). Note direction of lip with spring. Install O-Ring (DT 008) onto Gland Nut. Apply anti-seize to Gland Nut threads. Apply Armour-All to lips of seal; slide Gland Nut onto Head.
3. Install Bearing (TJ 007) on Head.
4. Thread Shaft (SC168 001) onto Head; tighten to 30 ft-lb.
5. Slide Spring (SC168 025) onto Shaft (SC168 001). Insert Spring end into hole in shaft; then slightly expand and slide Weights onto Shaft; insert other spring end into hole in Weights.



6. Slide Sleeve (SC168 030) over the assembly.
7. Slide Bearing (TJ 007) onto Shaft.
8. Slide Body (SC168 002) over assembly and thread onto Gland Nut (SC168 020) and tighten hand-tight.
9. Install O-Ring (DT 008) onto Inlet Nut (SC168 002-AMMT). Install Shaft Seal (SC168 006) into Inlet Nut. Note direction of lip with spring. Apply anti-sieze to threads and Armour-All to lips of seal.
10. Fill the tool with lubricant to top of Bearing.
11. Install the H.P. Seal and Seat as shown in the Maintenance Section and thread Inlet Nut into Body.
12. Install Port Plugs with O-Rings. (SC250 026).



TROUBLESHOOTING

HIGH-PRESSURE SEAL LEAK:

- The high pressure seal may leak initially at lower pressures, but should pop closed as pressure is increased. A continuous leak at operating pressure from the weep holes indicates the need to replace the HP Seal and Seat. HP Seals wearing out too quickly can be an indication that the HP Seat is installed upside-down, or the tool is rotating too fast. If the tool is leaking, but not over rotating, the SC212 602 Seal Kit is required.

TOOL WILL NOT ROTATE:

- Check the nozzles for plugging or wear (nozzles have to be removed to check for obstructions).
- Check that the nozzle sizes are correct for the desired flow and that the desired flow matches the head flow range.
- Check that the nozzle sizes are installed in a balanced configuration.
- If the tool feels rough when manually rotating the head, this indicates internal damage and SC168 610 Overhaul Kit will be required.
- Check head by hand to make sure it rotates freely. If it does not rotate freely by hand, the tool needs to be disassembled and repaired. Research from field reports show that exceeding set-down weight may bend the headshaft ever so slightly and prevent rotation.

LOCK-UP TROUBLESHOOTING TIP:

- Rotate in reverse 1 1/4 to 1 1/2 turns to unlock braking mechanism. If tool rotates smoothly then redress may not be required.
- If the head rotates freely by hand, check the jet sizes and calculate pressure loss thru the coil tubing and check with your distributor or StoneAge® to make certain there is enough jet torque to provide rotation.
- Verify using the SpinCat™ Jetting app, contact your factory authorized SpinCat™ dealer or contact StoneAge®, Inc.

TOOL ROTATES TOO FAST:

- If the head rotates too fast, clean out old lubricating fluid and replace with fresh lubricant.
- If tool is showing heavy scuffing damage to body, we suggest that the customer install an available fluted body on the SpinCat™.

STORAGE

TOOL STORAGE:

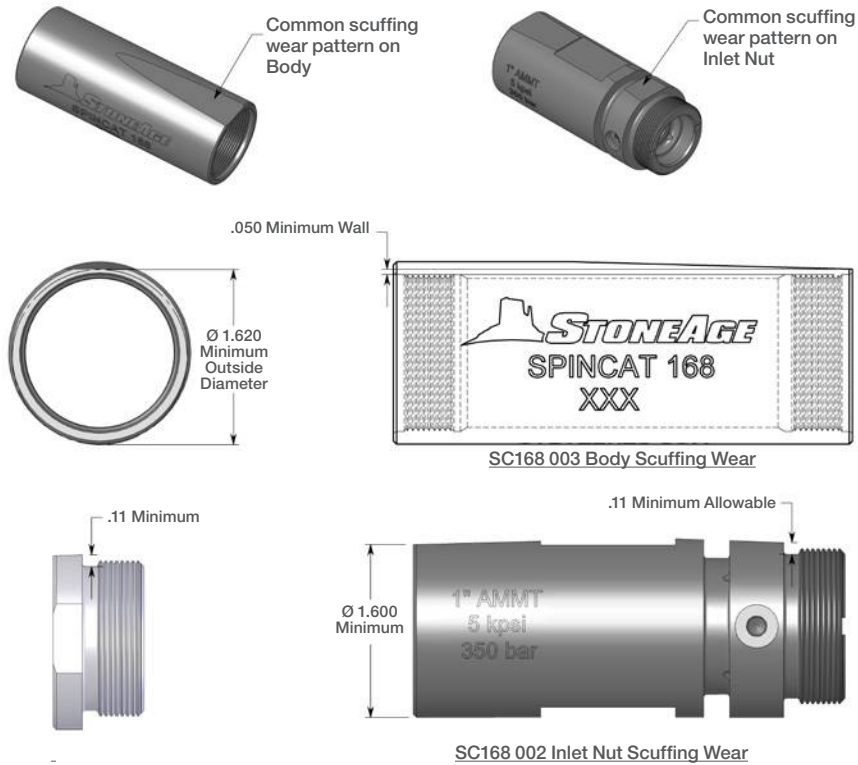
The SpinCat™ should NOT be stored in a used condition with wellbore and pumped fluids possibly migrating into the lubricant chamber. Flush with fresh water and perform a seal redress after HCL, Xylene or Toluene chemical treatment jobs. Downhole tools, especially thru tubing tools tend to be stored upside down in tool racks with threaded stubs welded to rack base. Storing the SpinCat™ in this manner allows air to collect at the top of the lubricant chamber. We recommend the SpinCat™ be stored with inlet nut facing up to avoid this air pocket. The SpinCat™ may also be stored horizontally.

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REPLACEMENT PART WEAR INFORMATION

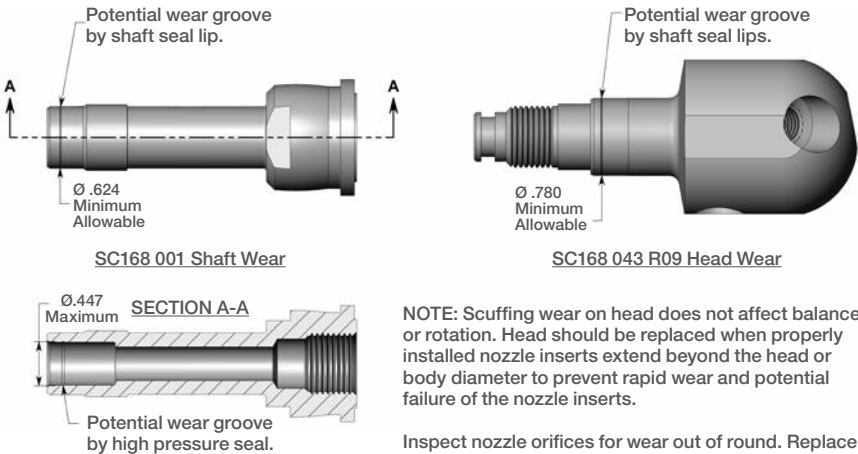
• BODY AND INLET NUT WEAR:

Follow these wear dimension guidelines to determine when to replace parts.



• SHAFT/HEAD WEAR:

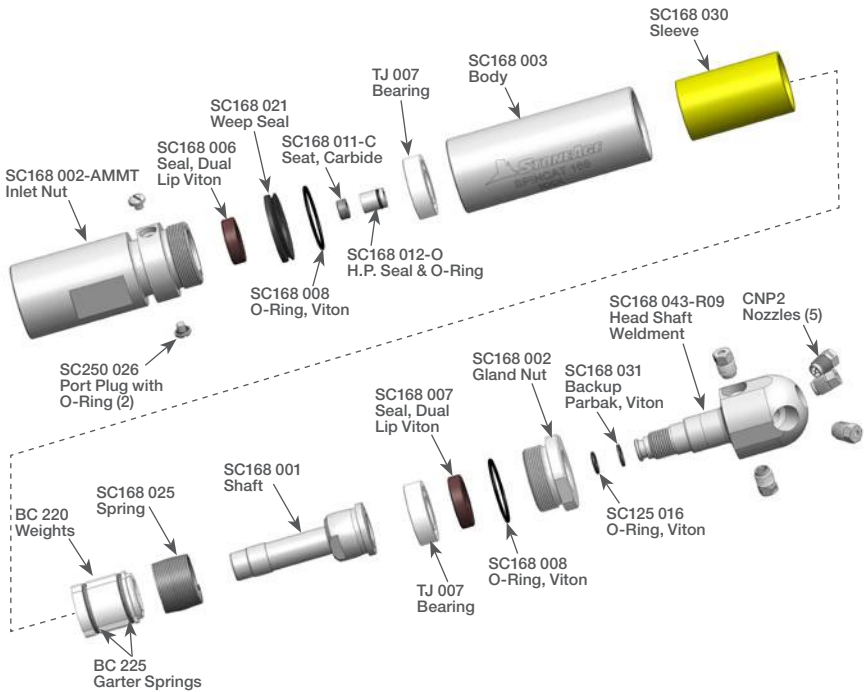
Follow these wear dimension guidelines to determine when to replace parts.



NOTE: Scuffing wear on head does not affect balance or rotation. Head should be replaced when properly installed nozzle inserts extend beyond the head or body diameter to prevent rapid wear and potential failure of the nozzle inserts.

Inspect nozzle orifices for wear out of round. Replace if visibly worn.

PARTS OVERVIEW



MAINTENANCE & OVERHAUL KIT PARTS

SC168 600 – LUBRICATION KIT

- 1 BC 410 20CC Syringe Tube Assembly
- 1 BJ 062-S Anti-seize, 2g
- 1 PL 546 SC-168 Manual Insert
- 2 SC250 026 Port Plug
- 1 SC250 048 High Temp Visc, Not for SC-H, 6oz

SC168 602 -SEAL REDRESS KIT

- 1 BJ 062-S Anti-seize, 2g
- 1 PL 546 SC-168 Manual Insert
- 1 SC125 016 O-Ring, Viton
- 1 SC168 006 Seal, Shaft - Viton
- 1 SC168 007 Seal, Shaft - Viton
- 2 SC168 008 O-Ring, Viton
- 1 SC168 011-C Carbide Seat
- 1 SC168 012-O HP/ High Temp Seal w/ O-Ring
- 1 SC168 031 Backup Parbak, Viton
- 2 SC250 026 Port Plug with O-Ring
- 1 SC250 048 High Temp Visc, Not for SC-H, 6oz

SC168 610 - OVERHAUL KIT

- 1 BJ 062-S Anti-seize, 2g
- 1 PL 546 SC-168 Manual Insert
- 1 SC125 016 O-Ring, Viton
- 1 SC168 006 Seal, Dual Lip Viton
- 1 SC168 007 Seal, Shaft - Viton
- 2 SC168 008 O-Ring, Viton
- 1 SC168 011-C Carbide Seat
- 1 SC168 012-O HP/ High Temp Seal w/ O-Ring
- 1 SC168 021 Weep Seal, Viton
- 1 SC168 025 Spring
- 1 SC168 030 Sleeve
- 1 SC168 031 Backup Parbak, Viton
- 2 SC250 026 Port Plug with O-Ring
- 1 SC250 048 High Temp Visc, Not for SC-H, 6oz
- 2 TJ 007 Bearing, Ball

SC168 107 SEAL TOOL

TERMS AND CONDITIONS AND WARRANTY INFORMATION

1. Acceptance of Terms and Conditions. Receipt of these Terms and Conditions of Sale ("Terms and Conditions") shall operate as the acceptance by StoneAge, Inc. ("Seller") of the order submitted by the purchaser ("Buyer"). Such acceptance is made expressly conditional on assent by Buyer to these Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of these Terms and Conditions (including inconsistencies between Buyer's purchase order and this acceptance) is given by Buyer to Seller promptly on receipt hereof.

Seller desires to provide Buyer with prompt and efficient service. However, to individually negotiate the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, the product(s) furnished by Seller are sold only according to the terms and conditions stated herein and with the terms and conditions stated in any effective StoneAge Dealer Agreement or StoneAge Reseller Agreement, if applicable. Notwithstanding any terms and conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to these Terms and Conditions unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's terms and conditions.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for the product(s) shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of the product(s), and the collection of which Seller is or may be responsible to provide to any governmental authority, unless acceptable exemption certificates are provided by Buyer in accordance with applicable law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the product(s) being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. SELLER MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE PERFORMANCE OF ANY PRODUCT EXCEPT AS SET FORTH IN THE STONEAGE LIMITED WARRANTY PROVIDED WITH THE PRODUCT.

4. Delivery. Seller is not obligated to make delivery by a specified date, but will always use its best efforts to make delivery within the time requested. The proposed shipment date is an estimate. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. UNDER NO CIRCUMSTANCES SHALL SELLER HAVE ANY LIABILITY WHATSOEVER FOR LOSS OF USE OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM DELAY REGARDLESS OF THE REASON(S).

All product(s) will be shipped F.O.B. point of origin, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance costs from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the product(s). Buyer shall bear all risk of loss commencing with the shipment or distribution of the product(s) from Seller's warehouse. Order shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No product(s) may be returned without securing written approval from Seller.

5. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement relating to the subject matter hereof and cannot be supplemented or amended without Seller's prior written approval.

6. Omission. Seller's waiver of any breach or Seller's failure to enforce any of these Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every term and condition hereof.

7. Severability. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

TERMS AND CONDITIONS AND WARRANTY INFORMATION

8. Disputes. Seller and Buyer shall attempt in good faith to promptly resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Seller and Buyer shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the Seller and Buyer.

9. Governing Law. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state.

WARRANTY:

Warranties set forth herein extend only to End-Users, meaning customers acquiring, or that have previously acquired, a product manufactured by StoneAge ("Product") for their own use and not for resale, either directly from StoneAge Inc. ("StoneAge") or from a StoneAge Authorized Dealer or Reseller ("Dealer"). No warranty of any kind or nature is made by StoneAge beyond those expressly stated herein.

1. LIMITED WARRANTY PERIOD. Subject to the limitations and conditions hereinafter set forth, StoneAge warrants its Product to be free from defects in workmanship and material for a period of one (1) year from the date of purchase by the End-User, provided that the end of the limited warranty period shall not be later than eighteen (18) months from the date of shipment of the Product to the Dealer or the End-User by StoneAge ("Limited Warranty Period"). All replacement parts which are furnished under this Limited Warranty and properly installed shall be warranted to the same extent as the original Product under this Limited Warranty if, and only if, the original parts were found to be defective within the original Limited Warranty Period covering the original Product. Replacement parts are warranted for the remainder of the original Limited Warranty Period. This Limited Warranty does not cover any component part of any Product not manufactured by StoneAge. Any such component part is subject exclusively to the component manufacturer's warranty terms and conditions.

10. Jurisdiction and Venue. Seller and Buyer agree that the state or federal courts located within the City and County of Denver, Colorado shall have sole and exclusive jurisdiction over any litigation concerning any dispute arising under these Terms and Conditions not otherwise resolved pursuant to Section 9 as well as any alleged defects of any Products or damages sustained as a result of such alleged defects. Seller and Buyer further agree that should any litigation be commenced in connection with such a dispute, it shall only be commenced in such courts. Seller and Buyer agree to the exclusive jurisdiction of such courts and neither will raise any objection to the jurisdiction and venue of such courts, including as a result of inconvenience.

11. Attorney's Fees. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or mediation.

2. LIMITED WARRANTY COVERAGE. StoneAge's sole obligation under this Limited Warranty shall be, at StoneAge's option and upon StoneAge's inspection, to repair, replace or issue a credit for any Product which is determined by StoneAge to be defective in material or workmanship. StoneAge reserves the right to examine the alleged defective Product to determine whether this Limited Warranty is applicable, and final determination of limited warranty coverage lies solely with StoneAge. No statement or recommendation made by a StoneAge representative, Dealer or agent to End-User shall constitute a warranty by StoneAge or a waiver or modification to any of the provisions hereof or create any liability for StoneAge.

3. WARRANTY SERVICE PROVIDERS. Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at www.stoneagetools.com/service. Unauthorized service, repair or modification of the Product or use of parts not approved by StoneAge will void this Limited Warranty. StoneAge reserves the right to change or improve the material and design of the Product at any time without notice to End-User, and StoneAge is not obligated to make the same improvements during warranty service to any Product previously manufactured.

TERMS AND CONDITIONS AND WARRANTY INFORMATION

4. WARRANTY EXCLUSIONS. This Limited Warranty does not cover, and StoneAge shall not be responsible for the following, or damage caused by the following: (1) any Product that has been altered or modified in any way not approved by StoneAge in advance in writing; (2) any Product that has been operated under more severe conditions or beyond the rated capacity specified for that Product; (3) depreciation or damage caused by normal wear and tear, failure to follow operation or installation instructions, misuse, negligence or lack of proper protection during storage; (4) exposure to fire, moisture, water intrusion, electrical stress, insects, explosions, extraordinary weather and/or environmental conditions including, but not limited to lightning, natural disasters, storms, windstorms, hail, earthquakes, acts of God or any other force majeure event; (5) damage to any Product caused by any attempt to repair, replace, or service the Product by persons other than StoneAge authorized service representatives; (6) costs of normal maintenance parts and services; (7) damage sustained during unloading, shipment or transit of the Product; or (8) failure to perform the recommended periodic maintenance procedures listed in the Operator's Manual accompanying the Product.

5. REQUIRED WARRANTY PROCEDURES. To be eligible for warranty service, the End-User must: (1) report the Product defect to the entity where the Product was purchased (i.e. StoneAge or the Dealer) within the Limited Warranty Period specified in this Limited Warranty; (2) submit the original invoice to establish ownership and date of purchase; and (3) make the Product available to a StoneAge authorized service representative for inspection to determine eligibility for coverage under this Limited Warranty. This Limited Warranty shall not extend to any person or entity who fails to provide proof of original purchase from StoneAge or a Dealer. No Product may be returned for credit or adjustment without prior written permission from StoneAge.

6. DISCLAIMER OF IMPLIED WARRANTIES AND OTHER REMEDIES. EXCEPT AS EXPRESSLY STATED HEREIN (AND TO THE FULLEST EXTENT ALLOWED UNDER APPLICABLE LAW), STONEAGE HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL WARRANTIES, REPRESENTATIONS OR PROMISES AS TO THE QUALITY, PERFORMANCE OR FREEDOM FROM DEFECT OF THE PRODUCT COVERED BY THIS LIMITED WARRANTY. STONEAGE FURTHER DISCLAIMS ALL IMPLIED INDEMNITIES.

7. LIMITATION OF LIABILITY. End-User specifically acknowledges that the Product may be operated at high speeds and/or pressures, and that as such it may be inherently dangerous if not used correctly. End-User shall familiarize itself with all operation materials provided by StoneAge and shall at all times use and require its agents, employees and contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. In no event shall StoneAge be responsible for any injuries to persons or property caused directly or indirectly by the operation of the Product if End-User or any agent, employee, or contractor of End-User: (1) fails to use all necessary and appropriate safety devices, guards and proper safe operating procedures; (2) fails to maintain in good working order such safety devices and guards; (3) alters or modifies the Product in any way not approved by StoneAge in advance in writing; (4) allows the Product to be operated under more severe conditions or beyond the rated capacity specified for the Product; or (5) otherwise negligently operates the Product. End-User shall indemnify and hold StoneAge harmless from any and all liability or obligation incurred by or against StoneAge, including costs and attorneys' fees, to or by any person so injured.

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