HAMMERSCHMIDT

Technical Manual

TRUVATIV®

PLEASE READ THE SAFETY AND WARRANTY INFORMATION INSIDE

SRAM LLC WARRANTY

EXTENT OF LIMITED WARRANTY

SRAM warrants its products to be free from defects in materials or workmanship for a period of two years after original purchase. This warranty only applies to the original owner and is not transferable. Claims under this warranty must be made through the retailer where the bicycle or the SRAM component was purchased. Original proof of purchase is required.

LOCAL LAW

This warranty statement gives the customer specific legal rights. The customer may also have other rights which vary from state to state (USA), from province to province (Canada), and from country to country elsewhere in the world.

To the extent that this warranty statement is inconsistent with the local law, this warranty shall be deemed modified to be consistent with such law, under such local law, certain disclaimers and limitations of this warranty statement may apply to the customer. For example, some states in the United States of America, as well as some governments outside of the United States (including provinces in Canada) may:

a. Preclude the disclaimers and limitations of this warranty statement from limiting the statutory rights of the consumer (e.g. United Kingdom).

b. Otherwise restrict the ability of a manufacturer to enforce such disclaimers or limitations.

LIMITATIONS OF LIABILITY

To the extent allowed by local law, except for the obligations specifically set forth in this warranty statement, in no event shall SRAM or its third party supplies be liable for direct, indirect, special, incidental, or consequential damages.

LIMITATIONS OF WARRANTY

This warranty does not apply to products that have been incorrectly installed and/or adjusted according to the respective SRAM technical installation manual. The SRAM installation manuals can be found online at www.sram.com, www.RockShox.com, or www.avidbike.com.

This warranty does not apply to damage to the product caused by a crash, impact, abuse of the product, non-compliance with manufacturers specifications of usage or any other circumstances in which the product has been subjected to forces or loads beyond its design.

This warranty does not apply when the product has been modified.

This warranty does not apply when the serial number or production code has been deliberately altered, defaced or removed.

This warranty does not apply to normal wear and tear. Wear and tear parts are subject to damage as a result of normal use, failure to service according to SRAM recommendations and/or riding or installation in conditions or applications other than recommended.

Wear and tear parts are identified as:

- Dust seals
- Bushings
- Air sealing o-rings
- Glide rings
- Rubber moving parts
- Foam rings
- Rear shock mounting hardware and main seals
- Upper tubes (stanchions)
- Stripped threads/bolts (aluminium, titanium, magnesium or steel)
- Brake sleeves
- Brake pads
- Chains
- Sprockets
- Cassettes
- Shifter and brake cables (inner and outer)
- Handlebar grips
- Shifter grips
- Jockey wheels
- Disc brake rotors
- Wheel braking surfaces
- Bottomout pads
- Bearings
- Bearing races
- Pawls
- Transmission gears
- Tools

This warranty shall not cover damages caused by the use of parts of different manufacturers.

This warranty shall not cover damages caused by the use of parts that are not compatible, suitable and/or authorised by SRAM for use with SRAM components.

This warranty shall not cover damages resulting from commercial (rental) use.

TRUVATIV HAMMERSCHMIDT SERVICE

We recommend that you have your Truvativ HammerSchmidt serviced by a qualified bicycle mechanic. Servicing the HammerSchmidt requires knowledge of planetary gear systems as well as the special tools used for service.

We recommend that you have your Truvativ HammerSchmidt serviced by a qualified bicycle mechanic. Servicing the HammerSchmidt requires advanced mechanical skill, knowledge of planetary gear systems, as well as access to and knowledge of use of the special tools required for service.

NOTE:
The information at the beginning of this document is pulled from the user manual. Some of the user manual information will be referenced in the technical service section.

SAFETY FIRST

At SRAM LLC, we care about you. Please, always wear your safety glasses and gloves when servicing your HammerSchmidt . Protect your eyes! Wear your safety glasses!

INSTALLATION

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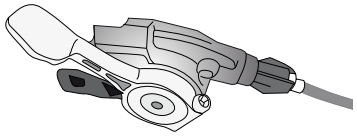
INTRODUCTION

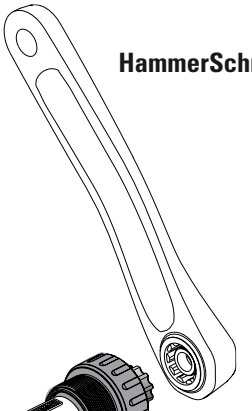
Your days of front shifting as you know it are over. Welcome to instant front transmission. Welcome to HammerSchmidt!

HammerSchmidt is a front transmission so fast and so seamless it's magical. It gives you the security of a single chainring, with the gear range of a double. HammerSchmidt provides better ground clearance and flawless shifting: shifting under load, while coasting, or even standing still. This revolutionary instant shift is accomplished with the proprietary HammerSchmidt X.0 and X.9 trigger shifters. HammerSchmidt's front transmission design is comprised of five main components: HammerSchmidt bottom bracket, crank arm, collar assembly, mechanism assembly and trigger shifters, each working in perfect concert, allowing you to react to terrain in ways you've never imagined before. Take a peek below at the anatomy of HammerSchmidt.

ANATOMY

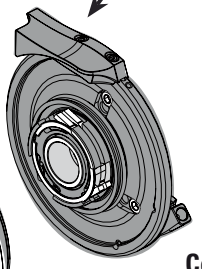


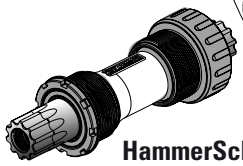
HammerSchmidt Trigger Shifters



HammerSchmidt Non-Drive Side Crank Arm

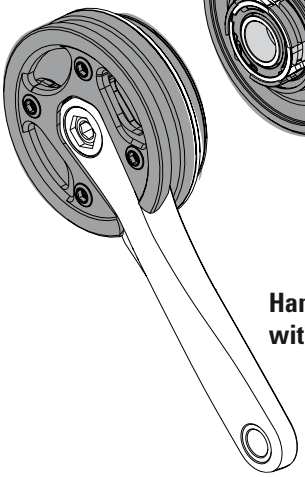
Chain Guide





HammerSchmidt Bottom Bracket

Collar Assembly



HammerSchmidt Mechanism Assembly with Drive Side Crank Arm

INSTALLATION

PARTS AND TOOLS NEEDED

- Safety glasses
- HammerSchmidt frame compatibility checker
- 2, 2.5, 4, 5, and 8 mm hex wrenches
- Flathead screwdriver
- Cable cutters
- Adjustable torque wrench up to 54 N·m (478 in-lb)
- Digital calipers
- Bottom bracket facing tool and cutter (Park Tool BFS-1 or similar
- HammerSchmidt ISCG tab facing cutter
- Cutting Oil
- Truvativ ISIS and GXP bottom bracket installation tools
- Grease

FRAME COMPATIBILITY CHECK

HammerSchmidt is engineered to mount to frames with ISCG 03 or ISCG 05 chain guide mounting tabs and 68, 73, or 83 mm bottom bracket shell widths. However, not all frames are made to the precision standards HammerSchmidt requires. Therefore, before installing you will need to perform a simple frame compatibility check to determine if you can use HammerSchmidt on your frame.

IMPORTANT:
It is critical to perform this check, otherwise you will experience complications with installation and/or function.

To check compatibility, use the enclosed HammerSchmidt frame compatibility checker tool. First, remove your old crank arms and bottom bracket from your frame (if applicable). Next, thread the cup checker into the drive-side bottom bracket shell. Finally, slide the pin checker over the cup checker and insert the pins into the ISCG tabs. The pin checker is double sided; one side has ISCG 03 pins, the other ISCG 05 pins. Be sure to insert the appropriate pins into the ISCG holes. For compatibility, the pins must go into the ISCG holes, the cup checker must be centered in the pin checker and the arrow on the pin checker should point toward the rear wheel axle. If the tool is difficult to insert, won't fit at all, or the arrow doesn't point toward the rear wheel axle, you cannot use HammerSchmidt on your frame.

If you need additional help to determine the compatibility of HammerSchmidt you can visit www.magicmechanics.com or head over to your local Truvativ dealer for assistance.

COMPONENT COMPATIBILITY CHECK

- Bottom Bracket - HammerSchmidt BB only
- Front Shifter - HammerSchmidt X.0 and X.9 trigger shifters only
- Chainrings - HammerSchmidt 22 or 24 tooth
- Chains - 1 x 1, 7, 8, and 9-speed SRAM® or Shimano® chains

NON-COMPATIBILITY

Do not mount HammerSchmidt to an ISCG adapter device. ISCG adapters do not provide enough structural integrity to handle the weight and loads applied by HammerSchmidt. ISCG adapters are only intended as a means to mount chain guide devices to non-ISCG frames; make sure you keep it that way.

FRAME PREPARATION

IMPORTANT:

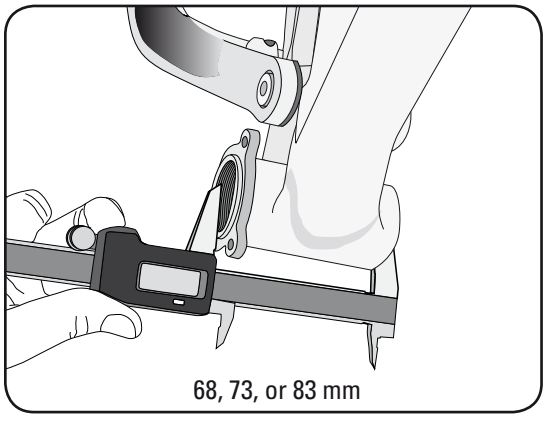
The following sections on Frame Preparation call for making permanent and non-reversible modifications to your frame, requiring advanced mechanical knowledge, skills, and tools. We recommend these procedures only be performed by a qualified bicycle mechanic. If you choose to perform these procedures yourself you should read and understand these instructions and have a working knowledge of tools required prior to starting work on your frame. In addition, you should wear your safety glasses until you have completed all the steps in this manual.

FRAME PREPARATION - PART 1

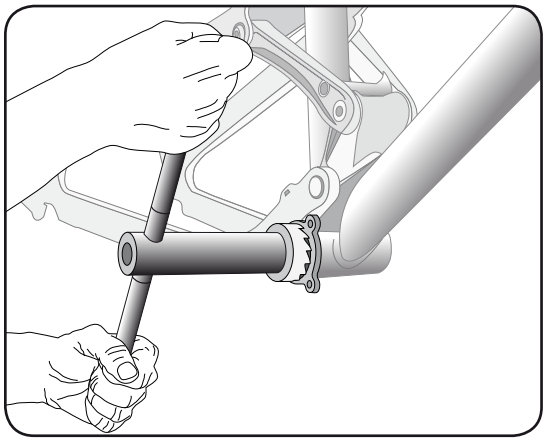
Now that you have determined that the ISCG tabs on your frame are compatible with HammerSchmidt, it is time to make sure the face of the bottom bracket shell and ISCG mounting surfaces are parallel and uniform. This is a critical process because one part of the HammerSchmidt mechanism is located off the bottom bracket shell while the other part is located off the ISCG tabs. When they are mated together, the HammerSchmidt internals need to be aligned so they can engage and function properly. Let's get started:

Make sure your frame's bottom bracket shell threads are clean and undamaged; there should be no paint or dirt in there. For best results, have your bottom bracket shell tapped by a professional bicycle mechanic.

Step 1:
Measure your bottom bracket shell width with a pair of digital calipers. The shell width should be either 68, 73 or 83 mm (+0.3 / -0.2 mm).


68, 73, or 83 mm

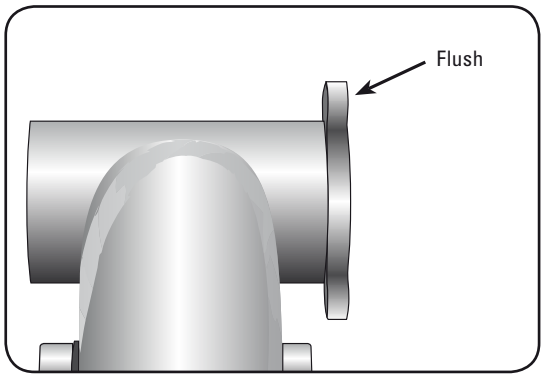
Step 2:
Face the bottom bracket shell. This will create a flat surface for ISCG cutter to bottom out on in the next step. Keep in mind the tolerances as you face the bottom bracket shell. If the shell width exceeds the maximum tolerance value (+0.3 mm), you will need to face it within specification. However, do not face shorter than the minimum tolerance value allows (-0.2 mm). Follow the instructions provided by the manufacturer of your bottom bracket facing tool for proper operation of the tool.



FRAME PREPARATION - PART 2

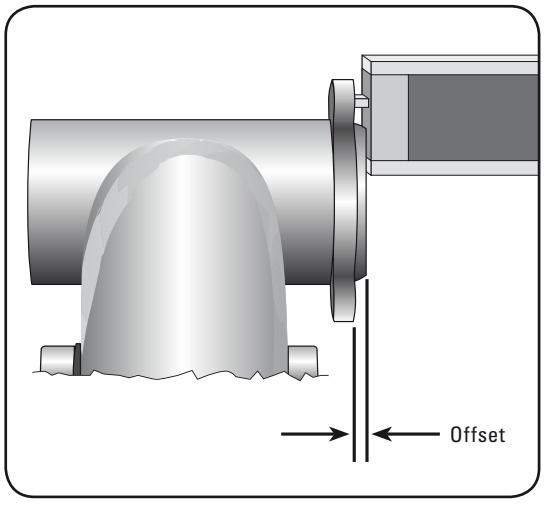
Ok, are you ready for the final and most critical step in frame preparation?

Step 3:
Replace the bottom bracket facing cutter on your tool with the Truvativ ISCG tab facing cutter that is appropriate for your size ISCG tabs and remove all spacers from the cutter.



• If your ISCG tabs are flush with the face of the bottom bracket shell (zero offset), you will only be facing the tabs to ensure they are parallel to the bottom bracket shell face. Face the ISCG tabs using the same method provided by the manufacturer of your bottom bracket facing tool. If the cutter does not completely face the surface of each tab, add a 0.5 mm spacer to the cutter tool and face again. When you are finished facing, be sure the ISCG tab surface is smooth and free from burrs and debris.

NOTE:
If you added a 0.5 mm spacer to the cutter, you now have a 0.5 mm offset to your tabs. Write this number down, you will need it later.

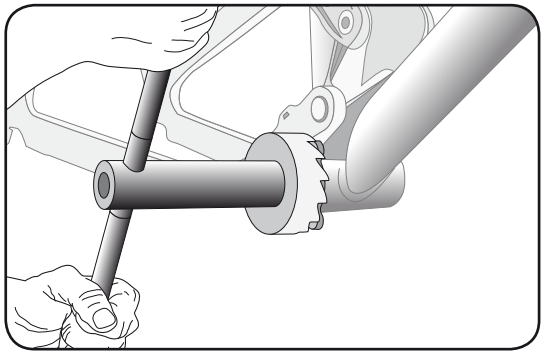


• If your ISCG tabs are offset inboard of the face of the bottom bracket shell, you will need to determine that offset prior to facing so you can space the cutter tool to match. Use the depth stick on the caliper and measure the depth at all three tabs. Select the largest of the three numbers and write it down, this is your offset.

Locate your offset in the chart below and select the spacer or combination of spacers from those supplied with the Truvativ ISCG cutter. The cutter comes with 0.5 mm, 1 mm, and 2 mm width spacers, each marked with its width. For 68 mm width bottom brackets, do **not** exceed 0.5 mm of cutter tool spacing. For 73 mm and 83 mm width bottom brackets, do exceed 3.0 mm of cutter tool spacing.

OFFSET (mm)	ISCG CUTTER SPACER(S) REQUIRED*
0.0	None
0.1 - 0.5	0.5 mm
0.6 - 1.0	1.0 mm
1.1 - 1.5	1.5 mm
1.6 - 2.0	2.0 mm
2.1 - 2.5	2.5 mm
2.6 - 3.0	3.0 mm†

*write this number down you will need it again later on
† maximum spacer value for 73 and 83 mm bottom brackets



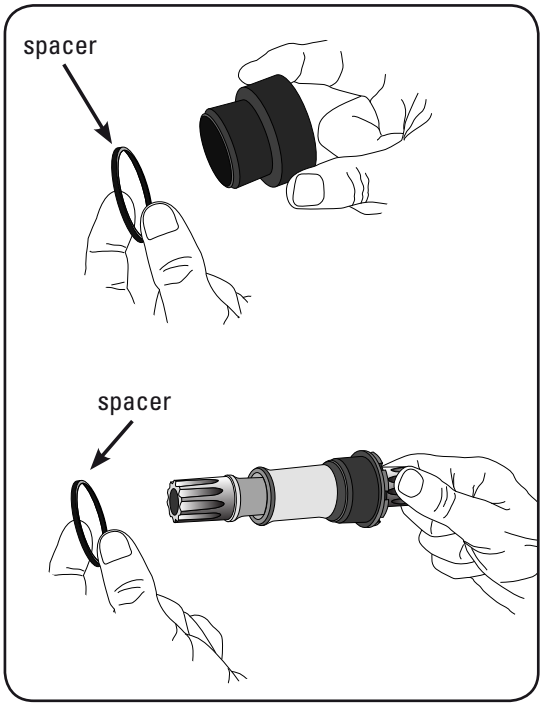
Step 4:
Face the ISCG tabs using the same method provided by the manufacturer of your bottom bracket facing tool. If the cutter does not completely face the surface of each tab, add a 0.5 mm spacer to the cutter tool and face again. Remember, do not exceed 3.0 mm of spacers. When you are finished facing, be sure the ISCG tab surface is smooth and free from burrs and debris.

IMPORTANT:
For 73 and 83 mm bottom brackets do not exceed 3.0 mm of spacers during facing. If you exceed 3.0 mm of spacers the resulting offset will be too large and the custom HammerSchmidt mounting bolts will not have enough thread engagement with ISCG tabs to safely mount HammerSchmidt.

INSTALL HAMMERSCHMIDT BOTTOM BRACKET

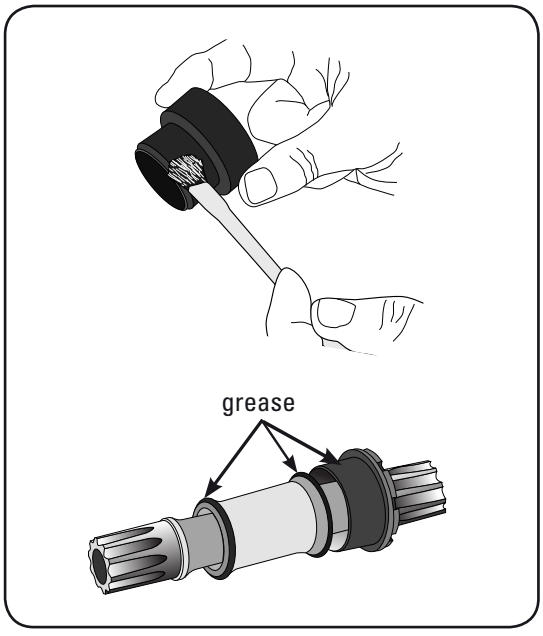
1 If you have a 68 mm bottom bracket shell, separate the two parts of the bottom bracket and install the included bottom bracket spacers, one over the drive side bottom bracket cup, the other over the non-drive side bottom bracket up. This will set the bottom bracket spacing to accommodate HammerSchmidt.

1



2 Apply a liberal amount of grease to the bottom bracket shell threads in the frame. If you haven't already, pull the non-drive side cup off the bottom bracket and apply a small amount of grease to the cup threads. Carefully separate the center shell from the drive side cup and apply a small amount of grease to the o-rings on each side of the cup. Insert the center shell back into the drive side cup. Finally, apply a small amount of grease to the drive side cup threads.

2



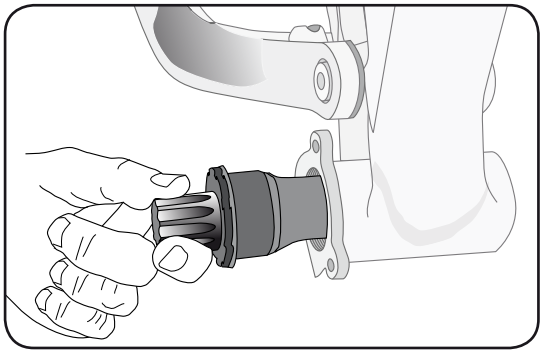
INSTALLATION

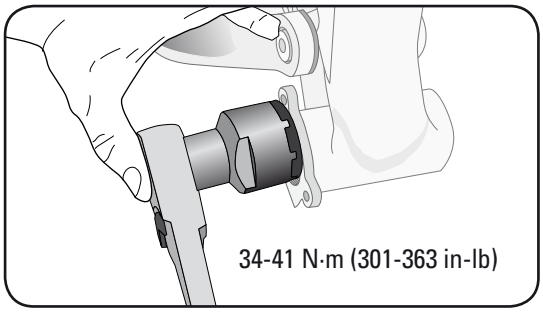
The HammerSchmidt bottom bracket needs to be installed in a specific order:

3 A. Thread the drive side bottom bracket assembly into your frame using the Truvativ ISIS (or equivalent) bottom bracket installation tool. The drive side assembly is left-hand threaded, so turn it counter-clockwise to install and torque to 34-41 N·m (301-363 in-lb).

B. (not pictured)
Install the non-drive side bottom bracket assembly using the Truvativ GXP (or equivalent) bottom bracket installation tool. The non-drive side assembly is right-hand threaded, so turn it clockwise to install and torque to 34-41 N·m (301-363 in-lb).

3

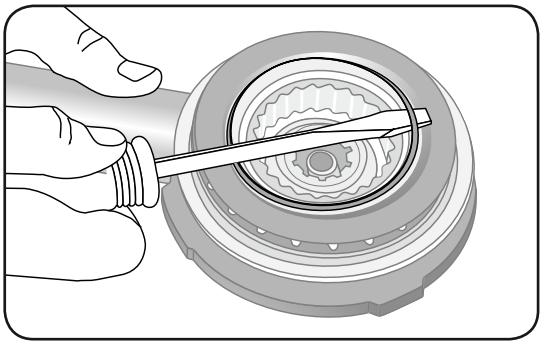




CHAINRING REPLACEMENT – OPTIONAL

5 If you want to change your chainring size, now is a convenient time to do it. Locate the retaining ring on the HammerSchmidt mechanism crank arm and use a flathead screwdriver to gently pry the retaining ring off the ring guide. Remove the ring guide and chainring. Install your other chainring. Re-install the ring guide and carefully press on the retaining ring using the flathead screwdriver. Make sure the retaining ring is fully seated in the groove of the ring guide by rotating it a couple of revolutions.

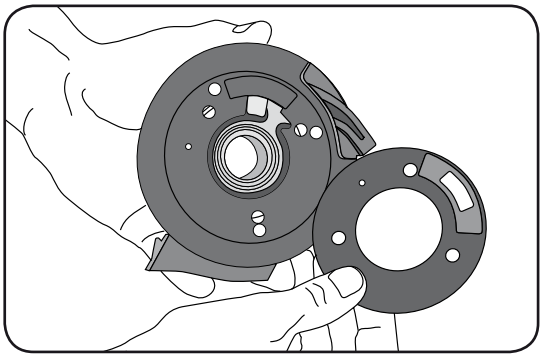
5



COLLAR PLATE ASSEMBLY INSTALLATION

6 Check that the seal disk for your frame's ISCG standard (ISCG 03 or ISCG 05) is installed. If you need to change out the seal disk, use a 4 mm hex to remove the cable anchor bolt and a 2 mm hex to remove the seal disk retaining bolt then switch seal disks. Make sure the recess on the seal disk anchor bolt window faces down. Re-install the cable anchor bolt until it is hand tight. Re-install the seal disk retaining bolt and torque to 0.5 N·m (4 in-lb).

6



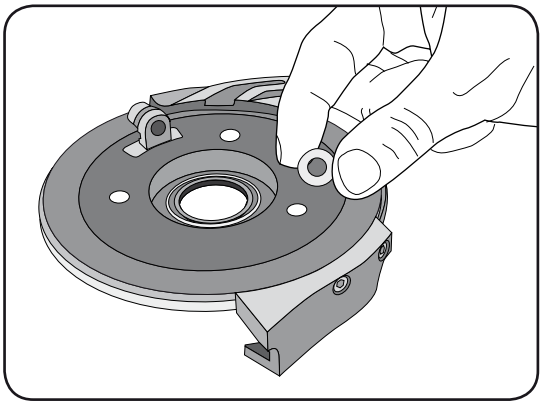
7 The collar assembly **must** sit flush with the bottom bracket shell face (or spacer for 68 mm bottom brackets). So now you need to determine if you need to add ISCG tab spacers.

If your frame's ISCG tabs are flush with the bottom bracket shell face, you do not need to add any spacers. If your frame's ISCG tabs are offset inboard of the bottom bracket shell face, you will need to add the same amount of spacers you used when facing the ISCG tabs in the Frame Preparation section in order to make the surface flush (you wrote this down remember?). Locate the ISCG specific spacer(s) you need.

NOTE:

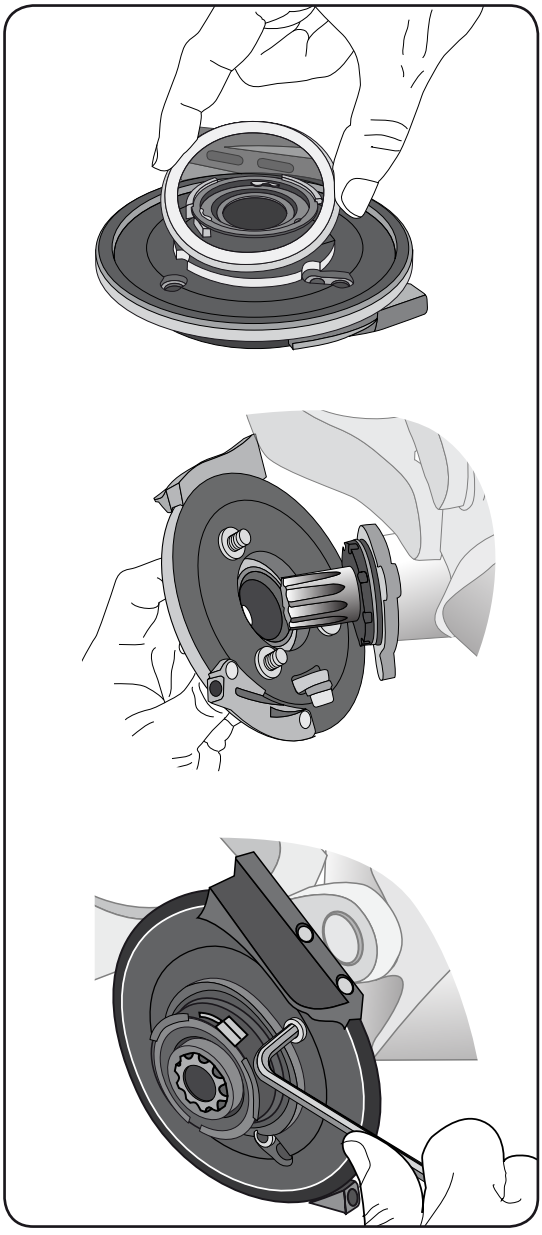
68 mm bottom bracket users! You must add an **additional** 2.5 mm of spacer thickness to the ISCG spacers you needed above. This will complete the spacing requirements necessary for HammerSchmidt.

7



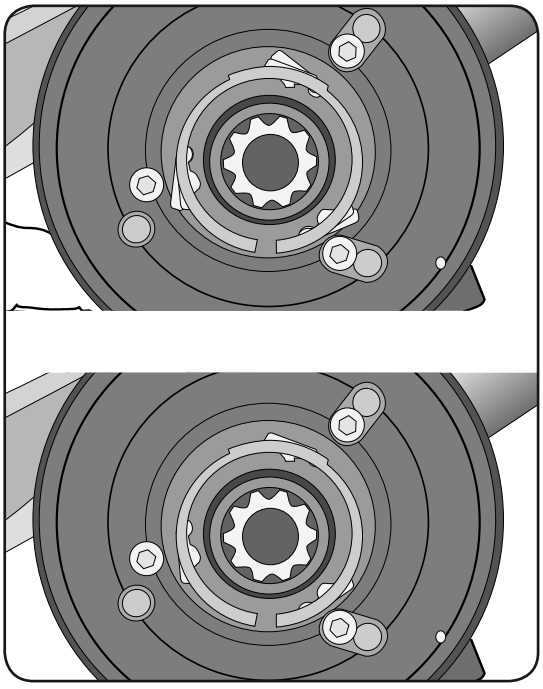
8 Remove the rubber seal from the front of the collar assembly, if necessary, to fully access the mounting holes. Place the ISCG spacer(s) onto the back of the collar assembly and align all of the mounting holes. Insert the three mounting bolts through the collar assembly and ISCG spacer(s) to hold everything together. Carefully slide the complete assembly over the drive side spindle. Align the mounting bolts to the mating ISCG tabs and hand start each bolt. Gently push the assembly on so it sits flat against the ISCG tabs. Use a 4 mm hex to tighten all three mounting bolts in an alternating fashion. Torque each bolt to 4.5 N·m (40 in-lb).

8



9 You can check for proper collar assembly installation by sliding the anchor bolt on the collar assembly back and forth in the seal disk window. You should see the pawls in the collar assembly extend to 'catch' and retract to 'release'; there should be no binding of the actuator. If you removed the rubber seal from the front of the collar assembly, slide the anchor bolt so the pawls are retracted, and re-install the rubber seal, lip side down. Make sure it is fully seated and check again that the pawls can extend and retract without interference.

9



HAMMERSCHMIDT SHIFTER INSTALLATION

10

Install your HammerSchmidt shifter onto your handlebar in a position that is right for you. Use a 5 mm hex to tighten the shifter clamp bolt and torque to 2.5-4 N·m (22-35 in-lb).

Turn the shifter adjuster barrel clockwise until it stops, then turn the adjuster barrel counter-clockwise one full turn.

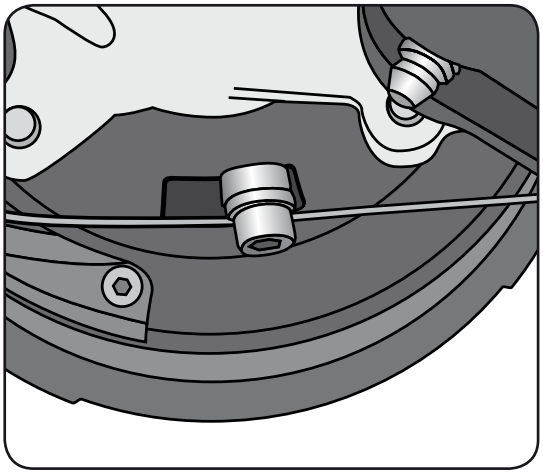
Measure the amount of cable housing you will need to route the housing from the shifter into the cable stop on the collar assembly. Cut the housing with the cable cutters. Remember, measure twice, cut once!

Feed the cable through the cable housing and route the housing from the shifter into the cable stop. Make sure the housing has a slight bend as it reaches the collar assembly and fits easily into the cable stop.

Press the small shifter paddle to ensure the cable is fully released. Loosen the cable anchor bolt, pull the shifter cable taut and attach it to the actuator making sure the cable is sitting in the groove of the anchor bolt. Keeping the shifter cable pulled taught, use a 4 mm hex to tighten the anchor bolt to 2.2 N·m (20 in-lb). Cut the cable a couple centimeters past the anchor bolt and install a cable tip.

Slowly turn the HammerSchmidt shifter barrel adjuster counter-clockwise until you see the anchor bolt move slightly to take up any cable slack. There should be a small gap between the anchor bolt and the edge of the seal disk window.

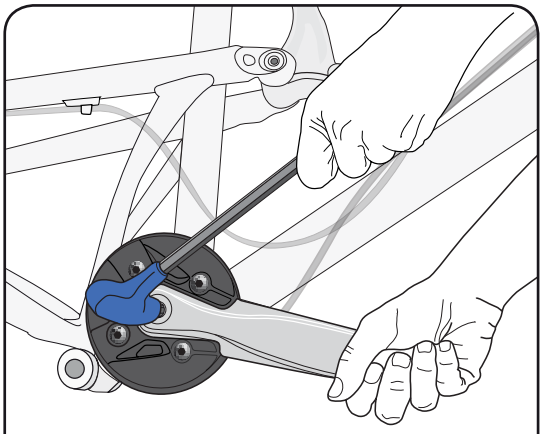
10



DRIVE MECHANISM AND CRANK ARM INSTALLATION

11 Press the large shifter paddle to pull the actuator and retract the pawls on the collar assembly. Apply grease to the drive side bottom bracket splines and crank bolt threads. Use an 8 mm hex to install the drive side crank arm assembly, making sure the spindle splines engage with the bottom bracket. Tighten the crank bolt until it stops, and torque to 48-54 N·m (425-478 in-lb).

11

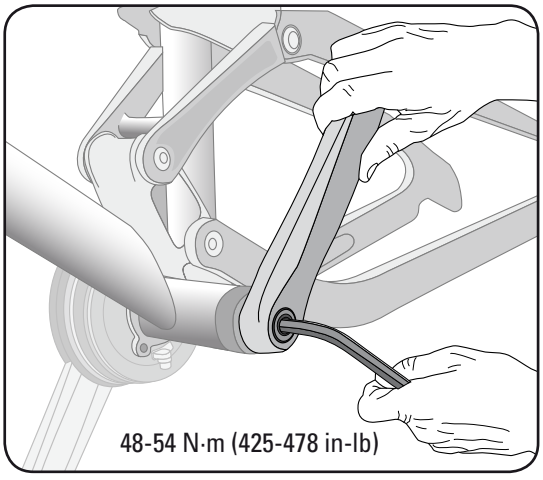


48-54 N·m (425-478 in-lb)

NON-DRIVE SIDE CRANK ARM INSTALLATION

12 Apply grease to the non-drive side bottom bracket splines and crank bolt threads. Align the non-drive side crank arm to be 180° opposite the drive side crank arm. Use an 8 mm hex to install the non-drive side crank arm, making sure the spindle splines engage with the bottom bracket. Tighten the crank bolt until it stops and torque to 48-54 N·m (425-478 in-lb). Check that the crank arm contacts non-drive side crank stop (no gap). If it doesn't, you will need to remove the crank arm, apply additional grease and re-install.

12

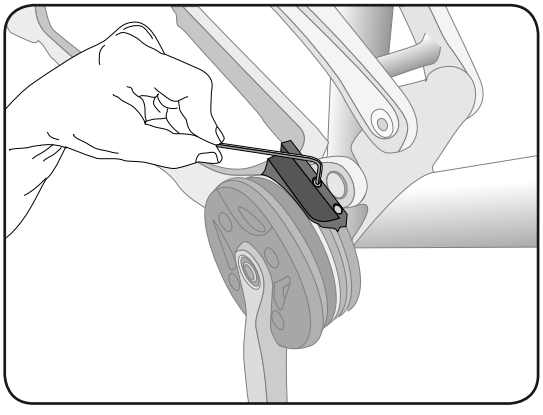


48-54 N·m (425-478 in-lb)

INSTALL CHAIN AND ADJUST CHAIN GUIDE

13 Size and install a new SRAM chain according to the installation instructions. Use a 2,5 mm hex to adjust the location of the chain guide if necessary. Make sure the chain guide does not interfere with the chain when the rear suspension is fully compressed.

13



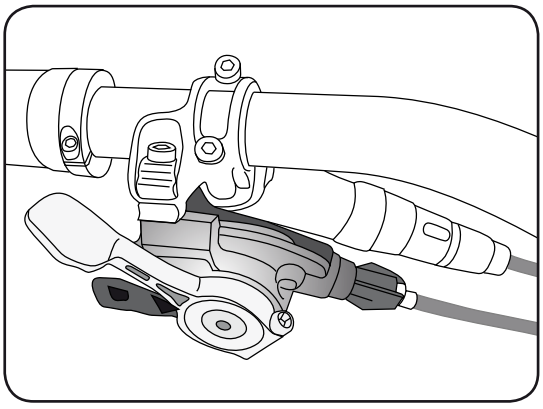
HAMMERSCHMIDT USE

14 HammerSchmidt has two front transmission gears: 1:1 and Overdrive. In 1:1, everything in the mechanism is locked and spinning together; one turn of the pedals equals one revolution of the chainring. This is great for tackling steep climbs! In Overdrive, one turn of the pedals equals approximately 1.6 revolutions of the chainring. This is great for hammering big descents!

The shift from 1:1 to Overdrive can be made smoothly and instantly using the proprietary HammerSchmidt X.0 or X.9 trigger shifters. Press the large shifter paddle to pull cable and you're in 1:1. Instantly! Press the small shifter paddle to release cable and you're in Overdrive. Instantly! With only two shifting directions, you'll never make a bad shift.

Remember, you can shift in any circumstance, no matter what your chain tension is without having to plan ahead. HammerSchmidt does not depend on pedaling; shift while regrouping with your crew before the next climb, shift mid-manual, even shift while coasting or pedaling backward. Shift smoothly and instantly anytime, every time. Your days of front shifting as you know it are over. HammerSchmidt!

14



HAMMERSCHMIDT MAINTENANCE

Use only water and a mild soap to clean the HammerSchmidt unit.

Do NOT use a pressure washer. This will damage the seals and allow dirt/debris to contaminate and potentially damage the internals of the HammerSchmidt unit.

Periodically inspect all of the bolts of the HammerSchmidt unit and crank arms for proper torque. See the service interval schedule at Technical Service.

You should have a professional bicycle mechanic periodically disassemble your HammerSchmidt unit to inspect the internals for signs of wear or damage and to re-lubricate the mechanism.

Always inspect components for damage after any crash.

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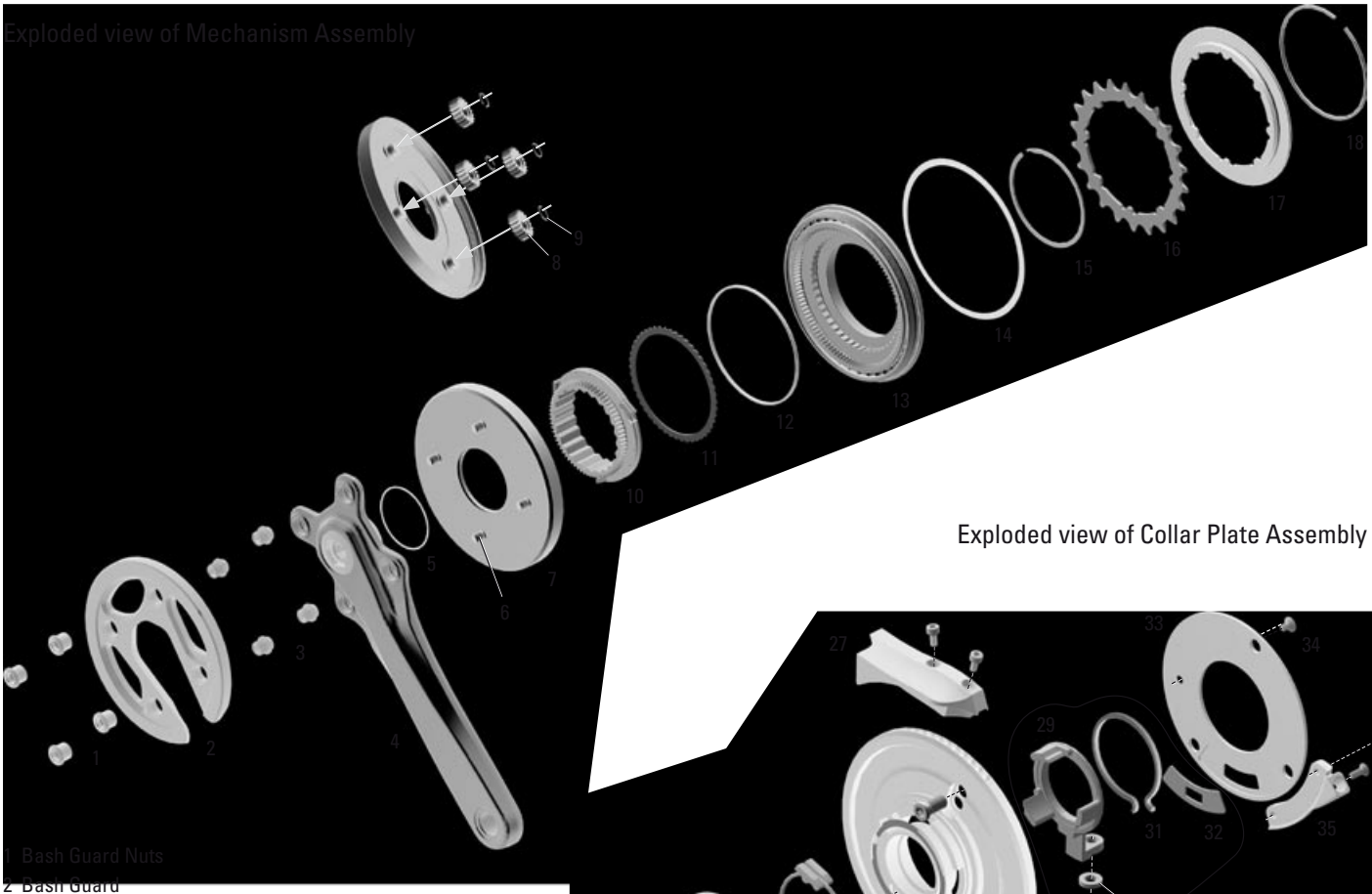
EXPLODED VIEW OF HAMMERSCHMIDT MECHANISM



1 Bash Guard Nuts
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9 Planet Retaining Rings
10 Sun Gear
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30 Cable Anchor Bolt and Washer
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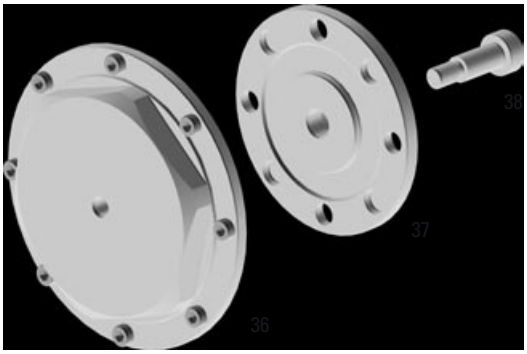
33 Seal Disk
34 Disk Bolt
35 Cable Stop

HAMMERSCHMIDT BEARING REMOVAL TOOL



36 Vice Tool
37 Tool Clamp
38 Shoulder Screw

SERVICE INTERVAL SCHEDULE

To maintain optimal performance and durability of the HammerSchmidt, periodic maintenance is required. If you ride in extreme conditions, maintenance should be performed more frequently.

IMPORTANT:
We recommend that you have your Truvativ HammerSchmidt serviced by a qualified bicycle mechanic. Servicing the HammerSchmidt requires advanced mechanical skill, knowledge of planetary gear systems, as well as access to and knowledge of use of the special tools required for service.

Component	Service	Interval (hours)
Bottom Bracket	Re-lubricate BB splines	25
Collar Plate	Check collar plate bolt torque	25
	Clean dirt and debris from collar plate assembly and re-lubricate	25
Mechanism and Crank Arms	Check planet nut torque. Damage can result from over-tightening	25
	Check crank bolt torque	25
	Inspect chainring for wear	25
	Inspect mechanism assembly function for wear or contamination	25
	Clean dirt and debris from inside of mechanism and re-lubricate	100

HAMMERSCHMIDT SYSTEM TORQUE VALUES

Recommended torque values for the HammerSchmidt are provided below.

IMPORTANT:
Do not exceed the recommended torque values. Over-tightening can result in damage to the unit.

Component	Part	Torque Value		Needed Tool
		N·m	in-lb	
Bottom Bracket	Bottom Bracket Cups	34-41	301-363	Truvativ ISIS and GXP tools (or equivalent)
Collar Plate	Cable Anchor Bolt	2.2	20	4 mm hex
	Cable Housing Stop Bolts	0.6	5	2 mm hex
	Chain Guide Bolts	0.7	6	2.5 mm hex
	Collar Plate Bolts	4.5	40	4 mm hex
	Disk Bolt	0.6	5	2 mm hex
Mechanism and Crank Arms	Chainring Nut	4.5	40	6 mm hex
	Crank Bolts	48-54	425-478	8 mm hex
	Planet Nuts	5.6	50	5 mm hex
Shifter	Shifter Clamp Bolt	2.5-4.0	22-35	5 mm hex

GREASE

IMPORTANT:
Use only the HammerSchmidt grease kit for re-lubrication. Poor performance and accelerated wear can be expected from use of other lubricants.

TROUBLESHOOTING

If performance issues arise, please consult the following table for possible solutions. For more information, please contact your local dealer or SRAM Dealer Service.

Issue	Possible Cause	Cure
Stuck in Overdrive/Loss of 1:1 Gear	Too little tension in shift cable	Adjust the shifter by turning barrel adjuster on the shifter counterclockwise. If barrel adjuster will not provide sufficient adjustment, reattach cable at the cable anchor bolt per "Shifter Installation Instructions".
	Malfunctioning or damaged shifter	Cycle the shift lever several times to confirm proper function. Replace shifter, if necessary.
	Contaminated or improperly routed shift cable housing	Check that housings are properly routed and that cable moves freely within the housing. Properly routed cables will take a smooth path to the cable stop and provide enough slack for handlebar and suspension linkage movement. Clean and lubricate or replace housings if necessary.
	Cable end pinched between collar plate and frame or ISCG spacers	Check to confirm that the excess cable beyond the cable anchor bolt is trimmed to the correct length and allowed to move freely. If not remove cable from pinch point.
	Contamination on overdrive pawls	Clean and lubricate overdrive pawls.
	Contamination inside actuator assembly	Clean and lubricate actuator assembly internals.
	Broken overdrive spring	Replace overdrive spring.
	Incorrect ISCG spacers installed on offset ISCG tabs	Confirm offset and spacer configuration.
Stuck in 1:1/ Loss of Over-Drive Gear	Too much tension in shift cable	Adjust the shifter by turning barrel adjuster on the shifter clockwise. If barrel adjuster will not provide sufficient adjustment, reattach cable at the cable anchor bolt per "Shifter Installation Instructions".
	Malfunctioning or damaged shifter	Cycle the shift lever several times to confirm proper function. Replace shifter, if necessary.
	Contaminated or improperly routed shift cable housing	Check that housings are properly routed and that cables move freely within the housing. Properly routed cables will take a smooth path to the cable stop and provide enough slack for handlebar and any suspension linkage movement. Clean and lubricate or replace housings if necessary.
	Contamination inside actuator assembly	Clean and lubricate actuator assembly internals.
	Contamination in mechanism assembly	Disassemble, inspect, clean, and lubricate mechanism assembly.
	Broken overdrive spring	Replace overdrive spring.
	Incorrect ISCG spacers installed on offset ISCG tabs	Confirm offset and spacer configuration.
Increased Drag	Contamination in mechanism assembly	Disassemble, inspect, clean, and lubricate mechanism assembly.
	Wear or damage in mechanism assembly	Disassemble mechanism assembly and examine gear teeth and pawls for wear or damage.
	Incorrect ISCG spacers installed on offset ISCG tabs	Confirm offset and spacer configuration.
	ISCG tabs out of spec	Use SRAM ISCG cutting tool and face ISCG tabs perpendicular to BB axis.

Issue	Possible Cause	Cure
Erratic Shifting	Too little tension in shift cable	Adjust the shifter by turning barrel adjuster on the shifter counter-clockwise. If barrel adjuster will not provide sufficient adjustment, reattach cable at the cable anchor bolt per "Shifter Installation Instructions".
	Too much tension in shift cable	Adjust the shifter by turning barrel adjuster on the shifter clockwise. If barrel adjuster will not provide sufficient adjustment, reattach cable at the cable anchor bolt per "Shifter Installation Instructions".
	Malfunctioning or damaged shifter	Cycle the shift lever several times to confirm proper function. Replace shifter, if necessary.
	Contaminated or improperly routed shift cable housing	Check that housings are properly routed and that cables move freely within the housing. Properly routed cables will take a smooth path to the cable stop and provide enough slack for handlebar and any suspension linkage movement. Clean and lubricate or replace housings if necessary.
	Cable end pinched between collar plate and frame or ISCG spacers	Check to confirm that the excess cable beyond the cable anchor bolt is trimmed to the correct length and allowed to move freely. If not remove cable from pinch point.
	ISCG tabs are not perpendicular to the BB axis	Use SRAM ISCG cutting tool and face ISCG tabs perpendicular to BB axis.
	ISCG tabs do not meet HammerSchmidt dimensional guidelines	Confirm frame compatibility with the HammerSchmidt ISCG tab gages. Frames with ISCG tabs that do not meet the gage criteria are not recommended for use with HammerSchmidt.
	Loose collar plate	Tighten collar plate bolts to proper torque value.
	Broken overdrive spring	Replace overdrive spring.
	Contamination on OverDrive pawls	Clean and lubricate overdrive pawls.
	Contamination inside actuator assembly	Clean and lubricate actuator assembly internals.
	Contamination in mechanism assembly	Disassemble, inspect, clean, and lubricate mechanism assembly.
	Wear or damage in mechanism assembly	Disassemble mechanism assembly and examine gear teeth and pawls for wear or damage.
Unusual Noises (Creaking, Ticking, Grumbling, Buzzing, Chain rub)	Loose collar plate	Tighten collar plate bolts to proper torque value.
	Loose crank bolts	Tighten crank bolts to proper torque value.
	Loose bash guard nuts	Tighten bash guard nuts to proper torque value.
	Loose planet nuts	Remove bash guard nuts and bash guard. Tighten planet nuts to proper torque value. Replace bash guard and tighten bash guard nuts to proper torque value.
	Worn or loose chainring	Inspect chainring and chainring retainer. Replace if necessary.
	Worn damper or ring spacer	Disassemble mechanism assembly, inspect and replace as appropriate.
	Contamination in mechanism assembly	Disassemble, inspect, clean, and lubricate mechanism assembly.
	Incorrect chain guide position	Adjust chain guide as necessary.
	Wear or damage in mechanism assembly	Disassemble mechanism assembly and examine gear teeth and pawls for wear or damage.

MECHANISM ASSEMBLY AND DRIVE SIDE CRANK ARM SERVICE

WARNING:

Always wear your safety glasses and gloves when servicing the HammerSchmidt. Some parts of the HammerSchmidt are spring loaded and can pop out suddenly which could lead to injury if your eyes are not properly protected.

Make sure you have a clean work area, clean rags, and the necessary parts and tools to service your HammerSchmidt.

IMPORTANT:

When performing service on your HammerSchmidt, the following parts are not re-usable and must be replaced during service: Planet Retaining Rings and Carrier Seal.

Parts and tools needed for service:

- Safety glasses
- Gloves
- HammerSchmidt Bearing Removal Tool
- 5, 6, 8 mm hex wrenches
- 24 mm wrench
- Small flathead screwdriver
- Pick
- Clean rags
- Adjustable torque wrench up to 25 N·m (217 in-lb)
- HammerSchmidt grease kit*
- Small grease brush (optional)

* You must use the grease supplied in the HammerSchmidt grease kit unless otherwise specified. Using any other grease will void your warranty.

MECHANISM ASSEMBLY AND DRIVE SIDE CRANK ARM REMOVAL

Shift the HammerSchmidt into 1:1 by pressing the large shifter paddle. Remove the chain according to the chain manufacturer's instructions.

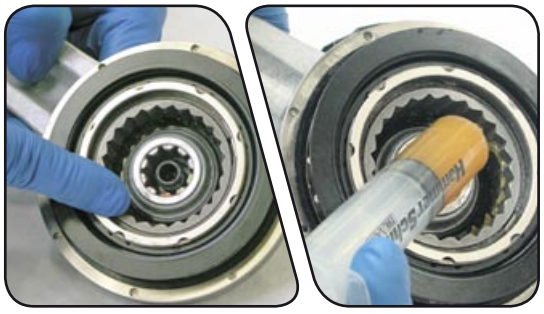
1 Using an 8 mm hex wrench, turn the self-extracting crank bolt counter-clockwise to remove the HammerSchmidt mechanism assembly and drive side crank arm.

1

FUNCTIONAL INSPECTION OF THE HAMMERSCHMIDT MECHANISM ASSEMBLY

2 With the mechanism assembly separated from the collar plate inspect the HammerSchmidt visually and by feel for wear and contamination. Look inside the sun gear for dirt and debris. It may be appropriate to wipe this area with a clean, dry rag and re-grease periodically.
Spin the ring gear counter-clockwise and feel for increased or unusual drag or play in the assembly as this may indicate the need for service.

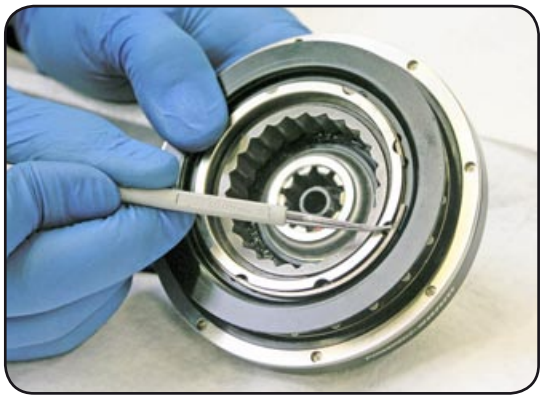
2

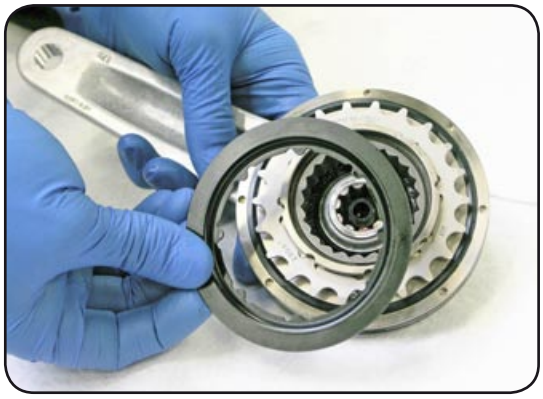


CHAINRING REMOVAL

3 Using a flathead screwdriver gently pry the retaining ring off the ring guide. Remove the guide ring and chainring.

3





BASH GUARD REMOVAL

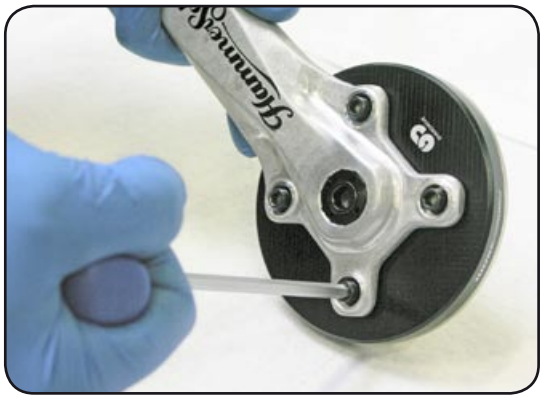
4 Using a 6 mm hex wrench, loosen and remove the four bash guard nuts. Remove the bash guard.

4

CRANK ARM REMOVAL

5 Using a 5 mm hex wrench, loosen and remove the four planet nuts. Lift and remove the crank arm.

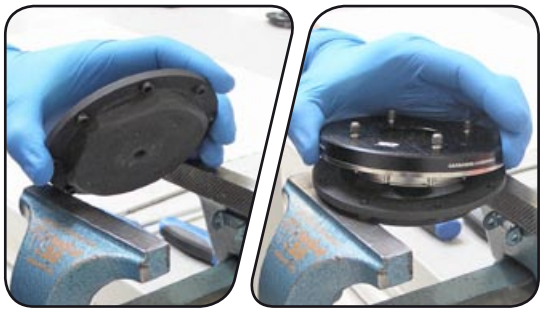
5



HAMMERSCHMIDT MECHANISM DISASSEMBLY

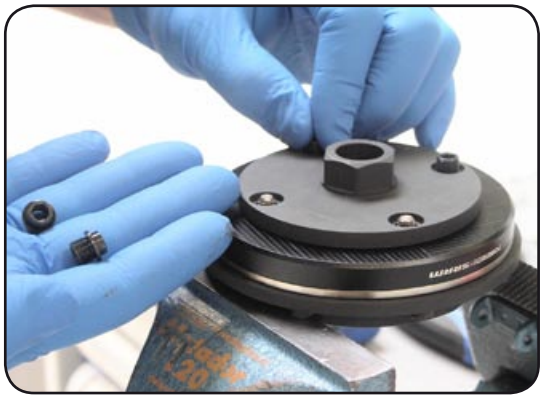
6 Clamp the bearing removal tool base into a vice. Place the HammerSchmidt mechanism assembly on the tool base so the tool pins engage the recesses on the HammerSchmidt mechanism.

6



7 Place the tool clamp over the planet posts. Using 5 mm hex wrench secure the clamp to the HammerSchmidt with the planet nuts. Torque to 5.6 N·m (50 in-lb).

7



8 Using a 5 mm hex wrench, install the shoulder screw. Torque hand-tight.

8

9 The HammerSchmidt mechanism assembly is left hand threaded. Use a 24 mm wrench and turn the clamp **clockwise** until the mechanism breaks free. It could take significant force to open the system.

9

10 Using a 5 mm hex wrench, remove the shoulder screw and the planet nuts. Remove the clamp tool.

10

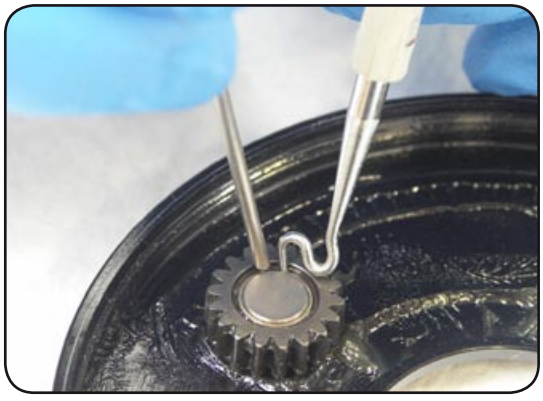
Planet Removal

NOTE:
HammerSchmidt planet retaining rings are not reusable.
Do not continue disassembly without new rings to reassemble the HammerSchmidt.

11 On the carrier assembly find the planet retaining rings. You may need to wipe away some grease to reveal the rings.

Use a small flathead screwdriver and a pick or tweezers, remove the ring by prying the two exposed ends of the ring outward. Repeat until all four rings have been removed. Discard the used rings. Lift and remove the planets.

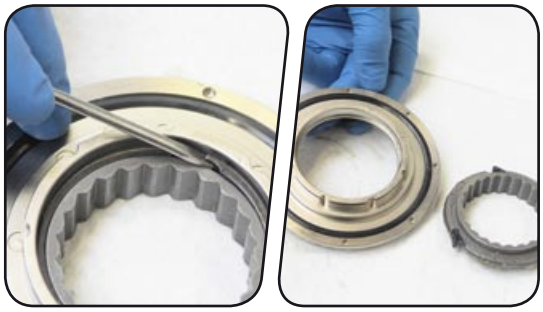
11



Sun Gear Removal

12 Using a small flathead screwdriver, gently pry the retainer ring off the sun. Separate the sun and bearing assembly.

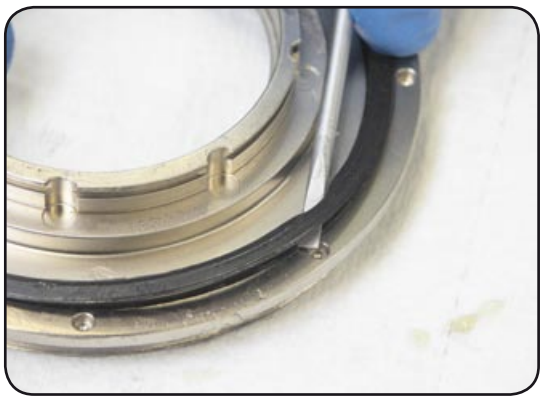
12



Bearing Seal Removal

13 Use a small flathead screwdriver to remove the bearing seal by gently prying upward from the inner edge of the seal. Perform this step carefully to avoid bending or damaging the seal. If the seal is damaged during removal, it should be replaced to avoid creating increased drag and poor sealing performance.

13

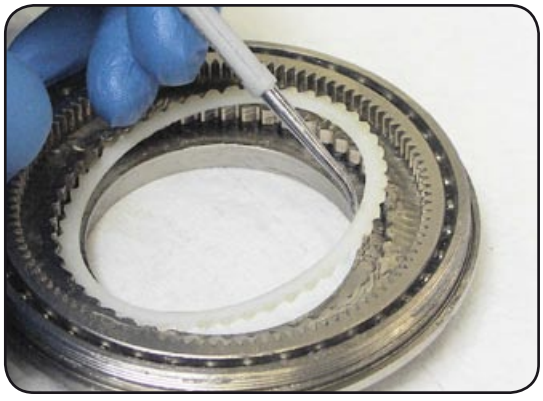


Ring Spacer and Damper Removal

NOTE:
It is not necessary to remove the ring spacer and damper to service the HammerSchmidt mechanism assembly. These parts should only be removed for damper replacement to avoid damage from removal.

14 Use a pick and pry upward to lift out the ring spacer.

14



15 Use a pick to carefully pry the damper from the ring gear. The damper is tightly fitted into a groove on the ring gear and may require firm pressure to position the pick for prying.

15

CLEAN MECHANISM ASSEMBLY

Thoroughly clean any contamination and grease from the components of the mechanism assembly. Ensure that any grease residue is removed from the pawls, pawl seats, gear teeth, and the outer bearing and ensure these components are dry prior to applying fresh grease.

GREASE AND REASSEMBLE MECHANISM ASSEMBLY

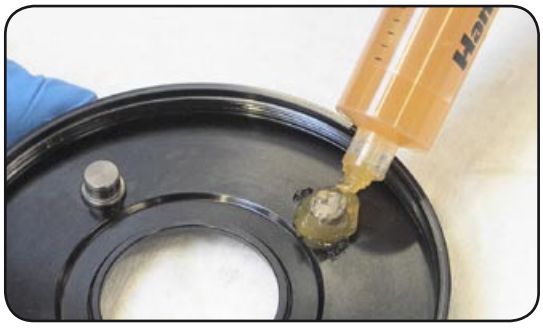
IMPORTANT:

Use only the grease provided in the HammerSchmidt grease kit inside the mechanism assembly. Poor performance and accelerated wear may be expected from use of other lubricants.

Reassemble Carrier Assembly

16 Apply a generous amount of grease to the planet carrier surface and planet posts.

16



17 Install the planet gears onto the planet posts. Grease should ooze from underneath the planets as they are pressed against the carrier.

17

18 Install **new** planet retaining rings. **Be sure that these rings are completely seated in their grooves** by pressing the ends in with a small screwdriver.

18

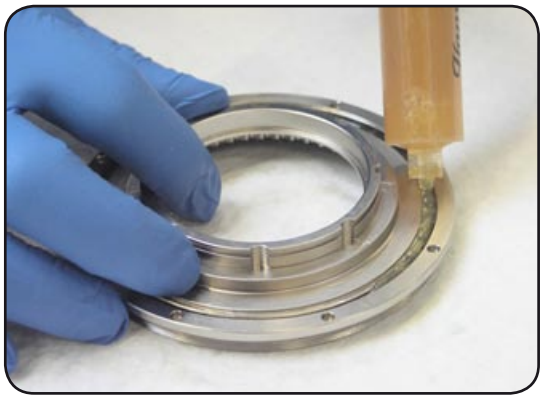
19 Apply grease to the teeth and exposed face of the planets.

19

REASSEMBLE BEARING ASSEMBLY

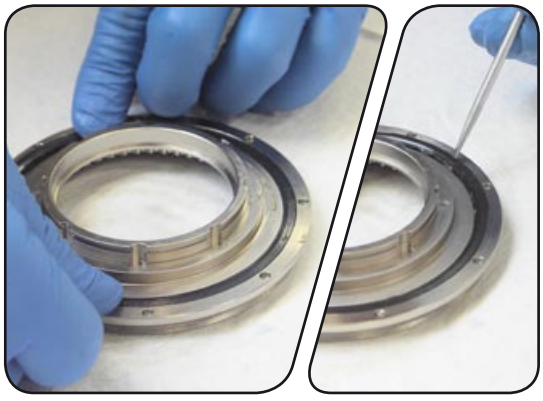
20 Apply a thin bead of grease in the space between the bearing and the outer race.

20



21 Replace the bearing seal by placing it over the bearing and pressing it firmly into the groove on the outer race.
A screwdriver may be required to push the last portion of the bearing seal into the groove.

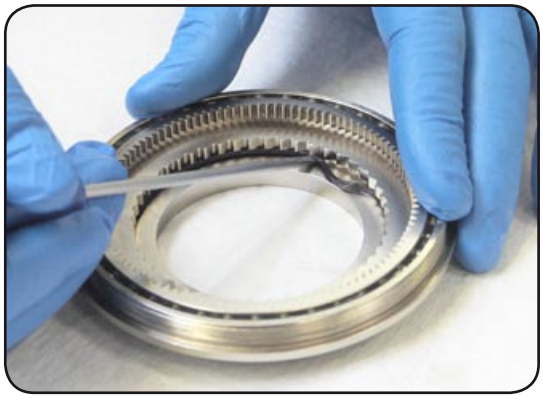
21



Ring Spacer and Damper Assembly

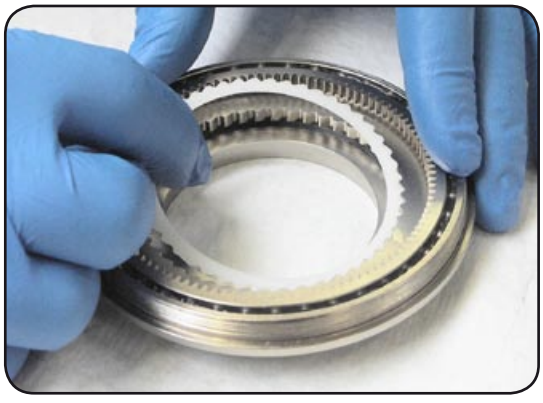
22 If the ring spacer and damper were removed in disassembly, they should be reassembled now.
Using a new damper, press the wide portion of the damper into the back of the groove. To seat the damper properly, work around the circle pushing both into the groove and slightly back towards the section already in the groove.
Once the damper is in, apply light pressure to the damper to smooth the damper and seat it evenly. Verify that there are no twists in the damper.

22



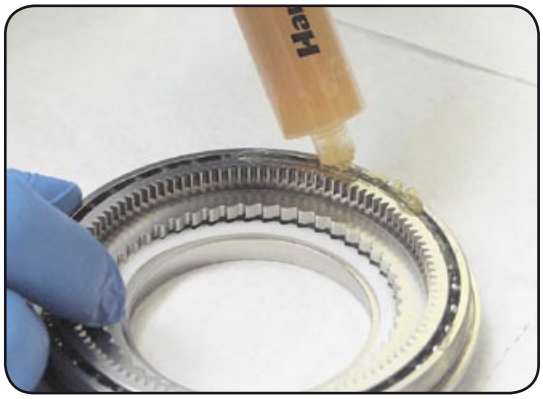
23 Press a new ring spacer inside the damper. The ring spacer will fit in tightly inside the damper and its outline should match the profile of the 1:1 pawl teeth.

23



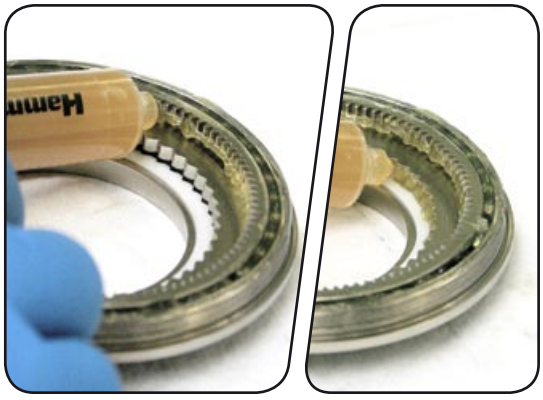
24 Apply grease to the inside of the bearing. Make sure you fill all of the gaps with grease. Spin the bearing to evenly distribute the grease.

24



25 Thoroughly grease ring gear teeth and 1:1 pawl teeth.

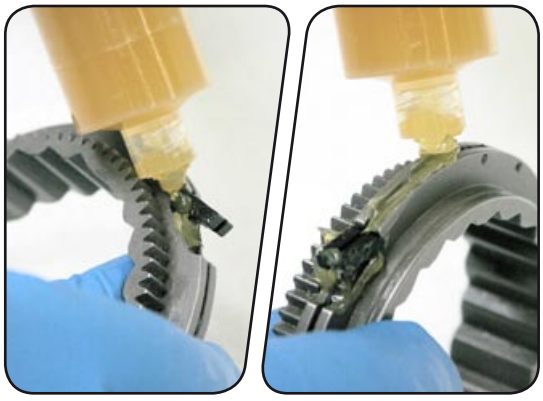
25



LUBRICATE SUN GEAR ASSEMBLY

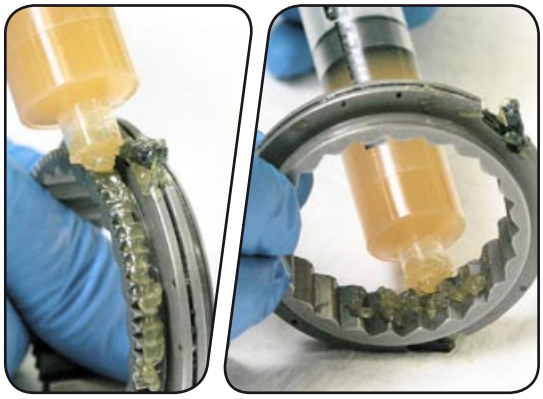
26 Apply grease to pawls, pawl seats, and spring groove of the sun gear.

26



27 Apply grease to the gear teeth and pawl teeth on the inside of the sun gear.

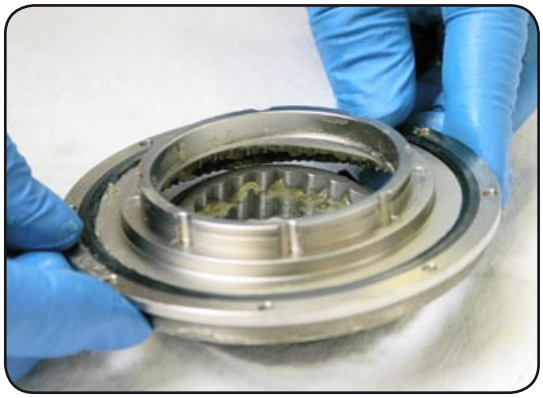
27



REASSEMBLE MECHANISM ASSEMBLY

28 Place the sun gear assembly inside the ring gear. Rotate the sun assembly counter-clockwise inside the ring to allow the 1:1 pawls to mesh with the corresponding pawl teeth.

28

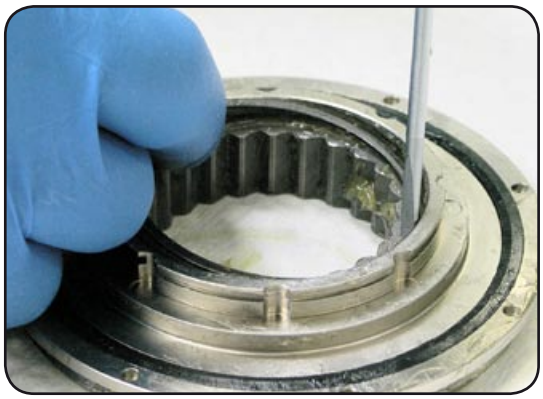


29 Apply grease to the sun retainer groove.

29

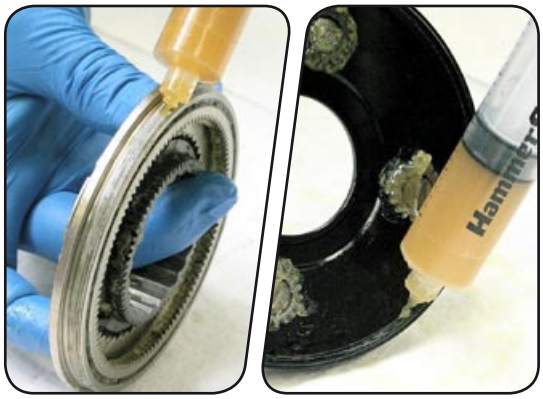
30 Hold the sun firmly against the ring and flip the assembly over. Using a flathead screwdriver, reinstall the sun retaining ring by pushing it into the groove on the sun assembly. Ensure the retaining ring is fully seated into the groove.

30



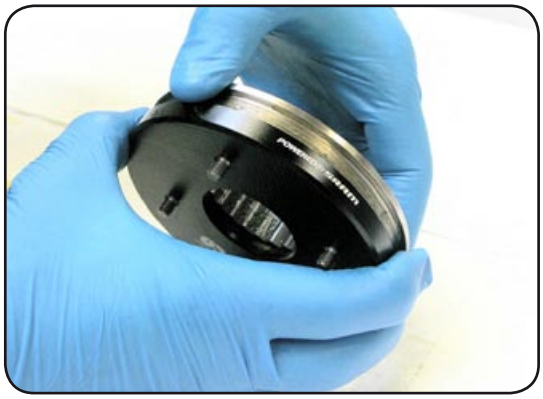
31 Apply a small dab of grease to the outside of the bearing and the inside of the carrier assembly. Using a grease brush or your finger, spread the grease all the way around the edge of each.

31



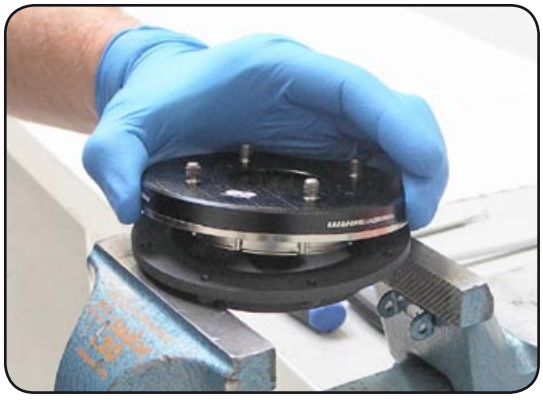
32 Place the bearing assembly on top of the carrier assembly. Wiggle them together until the bearing assembly slides slightly into the carrier assembly. Turn the ring gear counter-clockwise to ensure the gears mesh properly. Continue to turn the bearing assembly counter-clockwise until it is fully hand threaded into the carrier assembly.

32



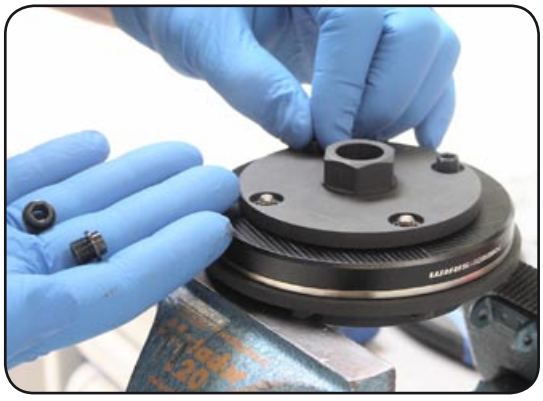
33 Place mechanism assembly on the base of the bearing removal tool so the tool pins fit into the recesses on the outer race.

33



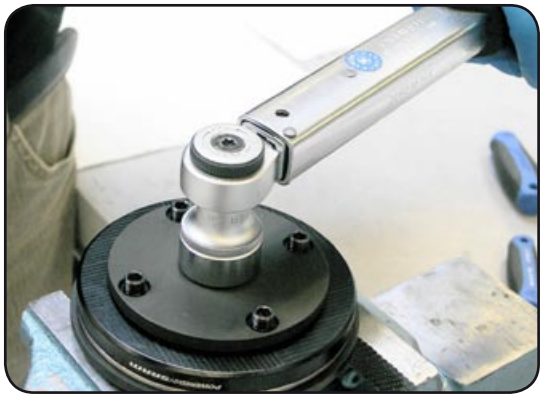
34 Place the tool clamp over the planet posts. Using a 5 mm hex wrench secure the clamp to the HammerSchmidt with the planet nuts. Torque to 5.6 N·m (50 in-lb).

34



35 Using a 24 mm wrench, tighten the mechanism assembly. Torque to 25 N·m (217 in-lb). Remember the HammerSchmidt mechanism assembly is left hand threaded.

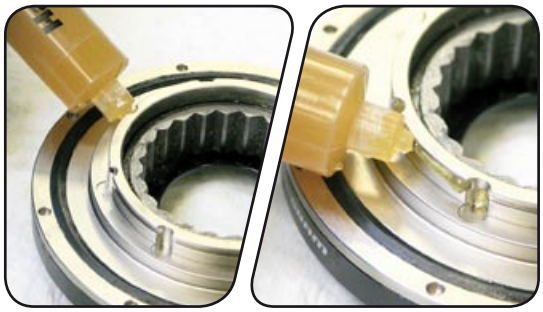
35



CHAINRING INSTALLATION

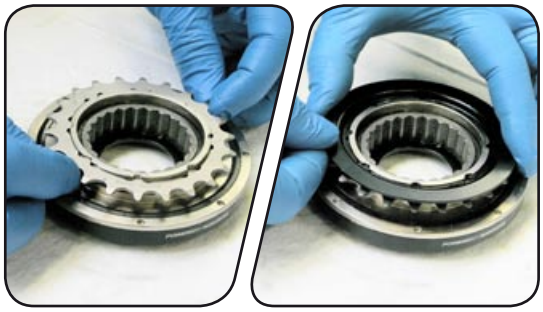
36 Apply a small dab of grease to the splines and retaining ring groove of the ring gear. Using a grease brush or your finger, spread the grease all the way around the edge.

36



37 Slide the chainring and guide ring into position.

37



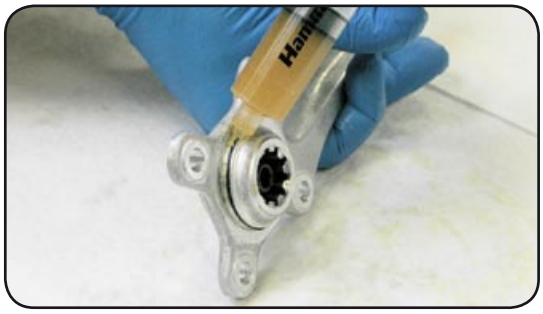
38 Using a flathead screwdriver, install the chainring retaining ring. Make sure that it is fully seated in the groove of the ring gear by rotating it a couple of revolutions.

38

CRANK ARM INSTALLATION

39 Clean and lightly grease the carrier seal on the crank arm.

39



40 To reinstall the crank arm place arm over the planet posts. Insert the planet nuts and use 5 mm hex torque wrench to torque to 5.6 N·m (50 in-lb).

40

BASH GUARD INSTALLATION

41 To replace the bash guard place it over the planet nuts. Using a 5 mm hex wrench, tighten the bash guard bolts. Torque to 4.5 N·m (40 in-lb).

41

REASSEMBLE THE MECHANISM ASSEMBLY AND DRIVE SIDE CRANK ARM

For reassembly of the mechanism assembly and drive side crank arm follow the instructions as shown under headings “Drive Mechanism and Crank Arm Installation” in the Installation section of this manual.

This concludes the Mechanism Assembly and Drive Side Crank Arm Service for your HammerSchmidt. You did a great job!

COLLAR PLATE ASSEMBLY SERVICE

Parts and tools needed for service:

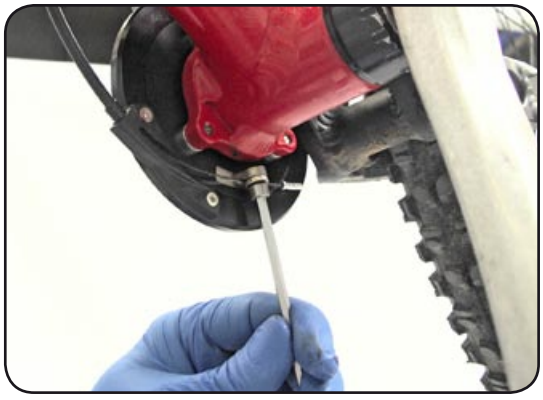
- Safety glasses
- Gloves
- 2, 2.5, and 4 mm hex wrenches
- Clean rags
- Pick
- HammerSchmidt grease kit*
- Small grease brush (optional)

* You must use the grease supplied in the HammerSchmidt grease kit unless otherwise specified. Using any other grease will void your warranty.

REMOVE THE COLLAR PLATE ASSEMBLY

1 Shift the HammerSchmidt into overdrive by pressing the small shifter paddle. Using a 4 mm hex wrench, loosen the cable anchor bolt and remove the cable. Remove the housing from the cable housing stop.

1



2 If you have ISCG 03 tabs, remove the collar seal to access the HammerSchmidt mounting bolts.

2

3 Using a 4 mm hex wrench to remove the 3 mounting bolts. Slide the collar plate off the bike.

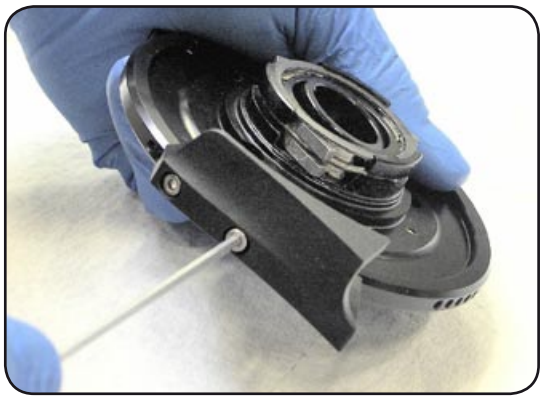
3

COLLAR PLATE DISASSEMBLY

Chain Guide Removal

4 If your chain guide is damaged and needs to be replaced, locate the two screws that attach the chain guide to the collar plate and note their position. You will want to reinstall the chain guide in the same position later. Using a 2.5 mm hex wrench, remove the screws and chain guide.

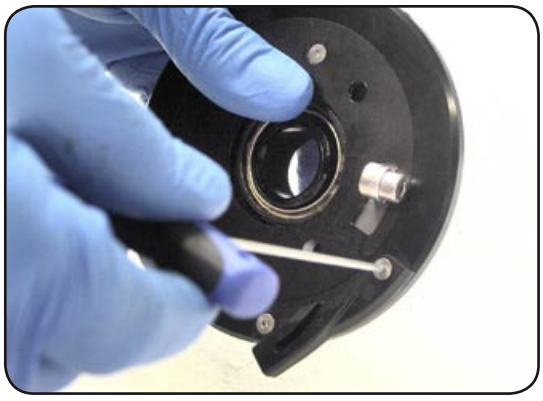
4



Cable Stop Removal

5 If your cable stop is damaged and needs to be replaced, use a 2 mm hex wrench to remove the screws and cable stop.

5



Overdrive Pawl Removal

6 Using a pick, carefully lift and pull back on the overdrive spring to remove it.

NOTE:
Be careful not to damage the spring upon removal by over stretching or kinking it. If the spring is damaged upon removal, replace it with a new one.

6

7 Remove the three pawls from their seats.

7

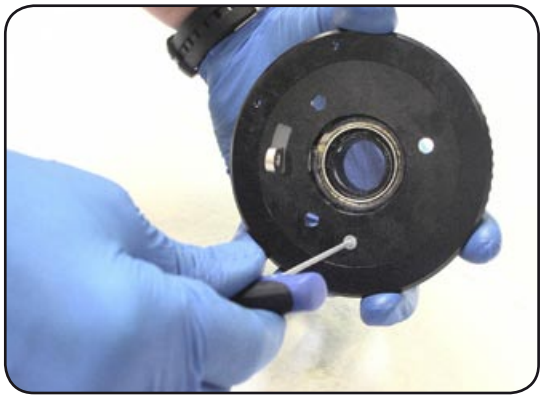
Seal Disk Removal

8 Using a 4 mm hex wrench, remove the cable stop bolt and cable stop washer.

8

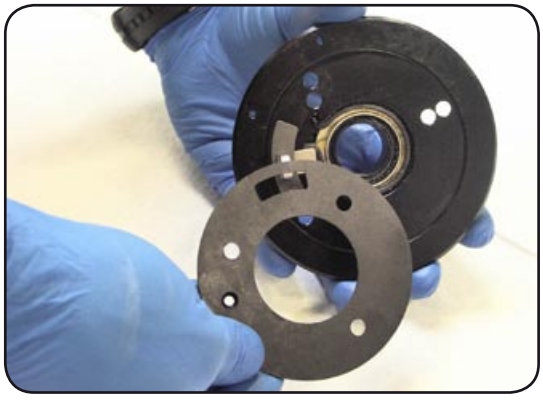
9 Using a 2 mm hex wrench, remove the disk bolt.

9



10 Lift and remove the seal disk.

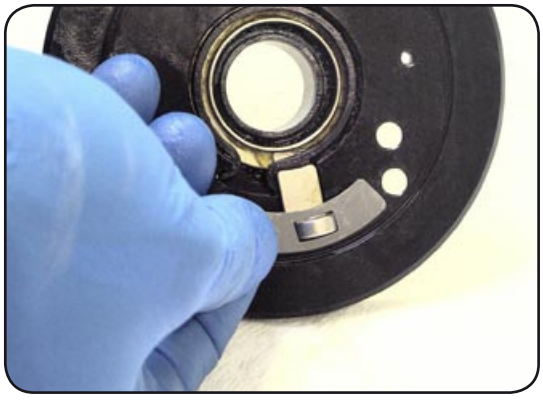
10



Wiper Seal Removal

11 With the seal disk removed the wiper seal can removed.

11

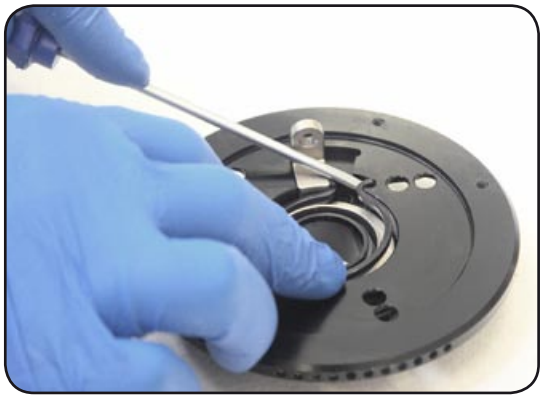


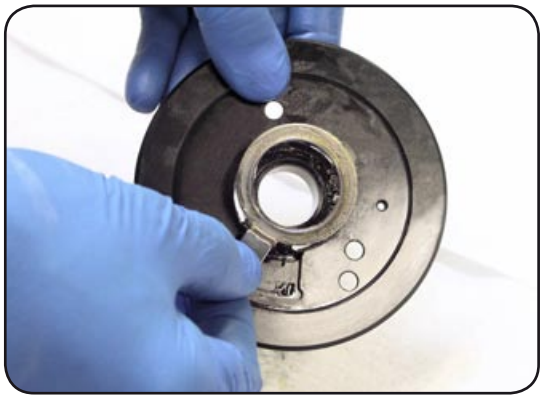
Actuator Removal

NOTE:
Be sure to wear your safety glasses for this step. The actuator spring is pre-loaded and may pop out suddenly.

12 Remove the actuator spring by pinching the curved tips together and lifting the spring out of the assembly. Remove the actuator.

12





Crank Stop Removal

13 Locate the beveled edge of the crank stop retainer. Using a pick, start at the beveled edge to lift the crank stop retainer from its groove.

13

CLEAN COLLAR PLATE ASSEMBLY

Thoroughly clean any contamination and grease from the components of the collar plate assembly. Ensure that any grease residue is removed from the pawls, pawl seats, actuator, and the actuator recess in the collar plate and ensure these components are dry prior to applying fresh grease.

GREASE AND REASSEMBLE COLLAR PLATE

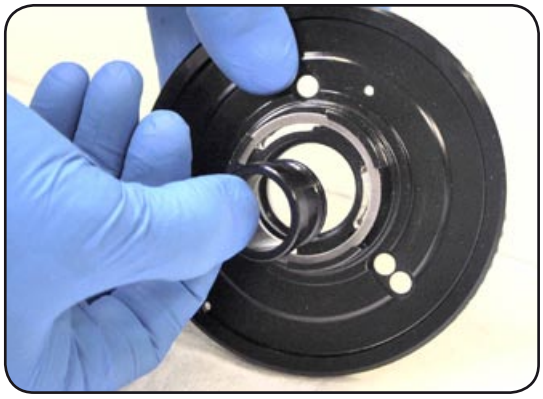
IMPORTANT:

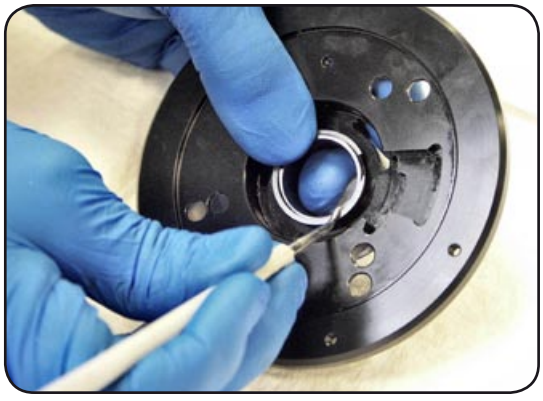
Use only the grease provided in the HammerSchmidt grease kit inside the collar plate assembly. Poor performance and accelerated wear can be expected from use of other lubricants.

Crank Stop Reassembly

14 Insert the crank stop and secure it in place with the crank stop retainer. Make sure that the retaining ring is fully seated in the groove of the crank stop.

14

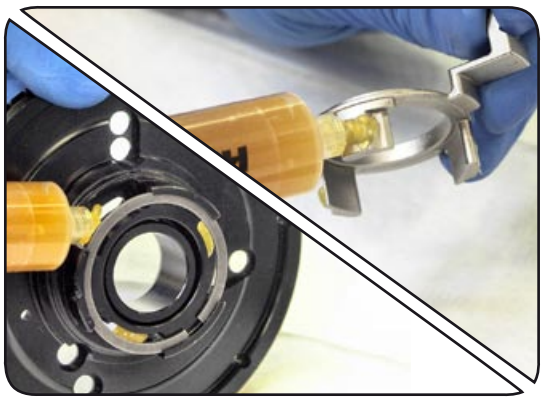




Actuator Reassembly

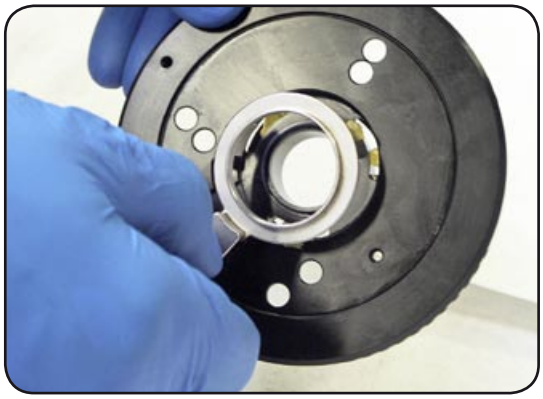
15 Apply a light coat of grease over the entire actuator, evenly distributing it with a small grease brush or your finger. Apply a light coat of grease to the corresponding recess in the collar plate.

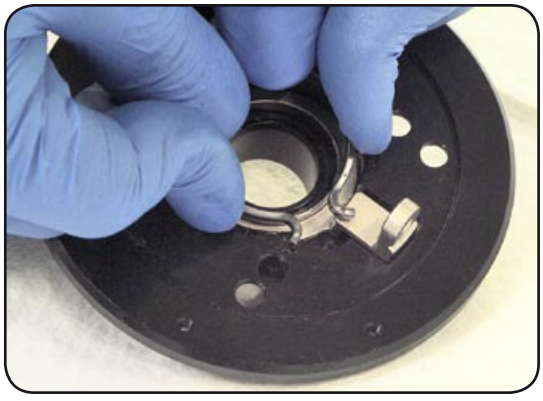
15



16 Insert the actuator into the collar plate and install the actuator spring by squeezing the tips together and pressing it into the collar plate recess.

16

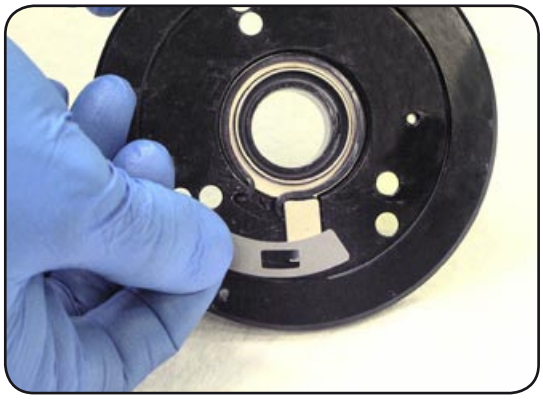




Wiper Seal Reassembly

17 Fit the wiper seal over the cable bolt tab on the actuator.

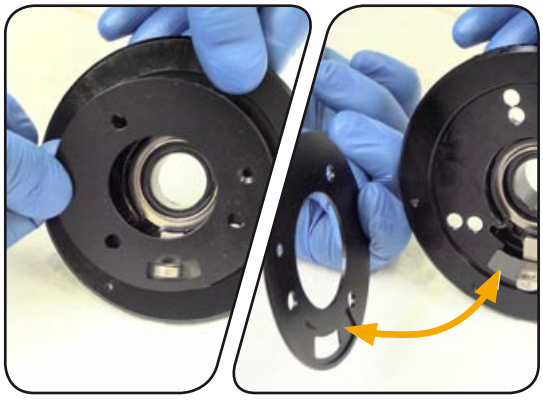
17



Seal Disk Reassembly

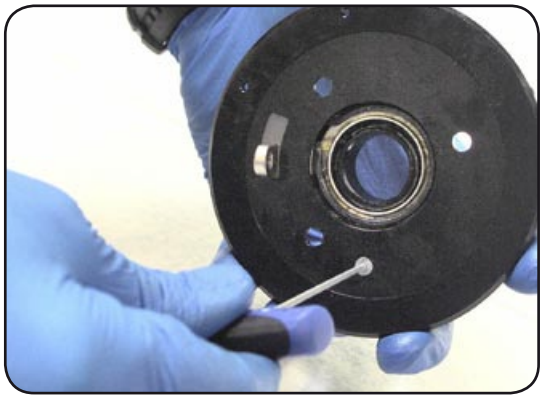
18 Replace the seal disk with the recessed side down.

18



19 Using a 2 mm hex wrench, install the seal disk bolt. Torque to 0.6 N·m (5.0 in-lb).

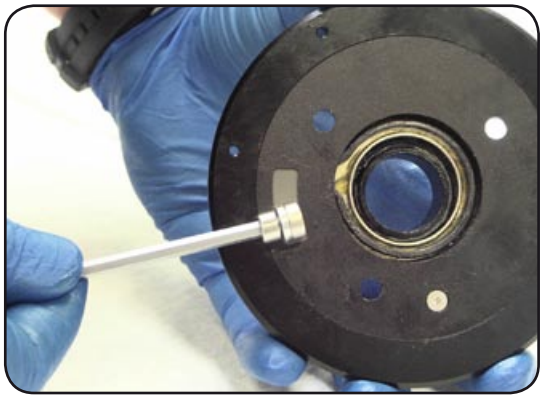
19



Cable Anchor Bolt Reassembly

20 Using a 4 mm hex wrench, install the cable anchor bolt and washer. Tighten to hand-tight.

20



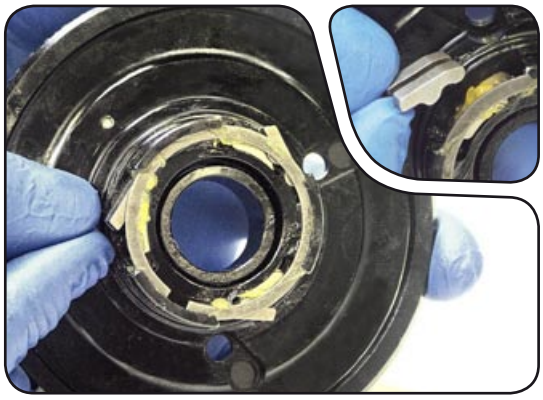
Overdrive Pawls Reassembly

21 Apply a light coat of grease to pawl seats on the collar plate assembly.

21

22 Install the pawls in the collar plate assembly. Make sure the pawls are oriented correctly. The round end should be seated in the pocket and the square end should be exposed.

22



23 Carefully stretch the overdrive spring around into the grooves of the collar plate and each of the pawls.

NOTE:
Be careful not to damage the spring upon removal by over stretching or kinking it. If the spring is damaged upon installation, replace it with a new one.

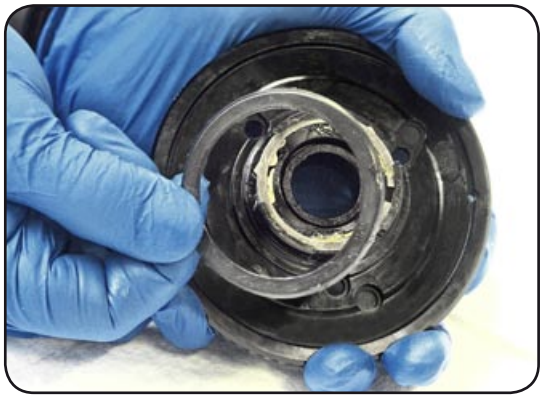
Make sure that the spring is fully seated in the groove of the collar plate and the pawls.

23

Collar Seal Reassembly

24 Pull the actuator arm so the pawls are retracted, and re-install the collar seal, lip side down. Make sure it is fully seated and check again that the pawls can extend and retract without interference.

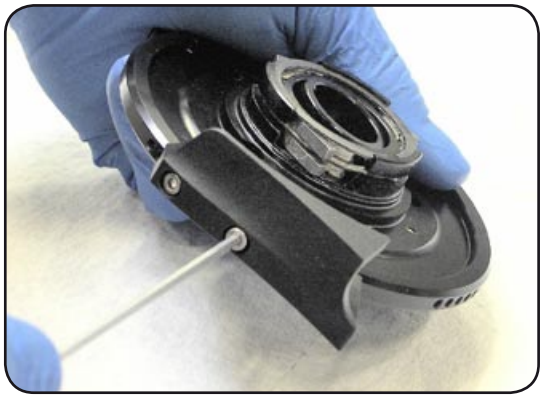
24



Chain Guide Reassembly

25 If the chain guide was removed due to damage, install a new chain guide onto the collar plate in the same location as before the service. Using a 2.5 mm hex wrench, install the two chain guide screws. Torque to 0.7 N·m (6 in-lb).

25



REASSEMBLE THE COLLAR PLATE ASSEMBLY

For reassembly of the collar plate assembly follow the instructions as shown under headings “Collar Plate Assembly Installation” in the Installation section of this manual.

For installation of the shifter cable and shifter adjustment follow the instructions as shown under headings “HammerSchmidt Shifter Installation” in the Installation section of this manual.

SAFETY CHECK

WARNING:
Before setting out on a ride, perform a parking lot test to ensure the HammerSchmidt shifts and functions properly.

This concludes the Collar Plate Assembly Service for your HammerSchmidt. You did a great job!

www.sram.com

world headquarters
SRAM LLC
1333 n. kingsbury st., 4th fl
chicago, il 60622
phone +1-312-664-8800
fax +1-312-664-8826

european headquarters
SRAM europe
basicweg 12-d
3821 br amersfoort
the netherlands
phone +31-33-450-6060
fax +31-33-457-0200

asian headquarters
SRAM taiwan
no. 1598-8 chung shan rd
shen kang hsiang, taichung
county 429 taiwan r.o.c.
phone +886-4-2561-3678
fax +886-4-2561-3686