



READ THIS MANUAL CAREFULLY!
It contains important safety information.
Keep it for future reference.

SI CRANKSETS

Owner's Manual Supplement

118609.PDF

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Please note that the specifications and information in this manual are subject to change for product improvement without notice. For the latest product information, go to <http://www.cannondale.com/bikes/tech/>.

GENERAL SAFETY INFORMATION

About This Supplement

Cannondale Owner's Manual Supplements provide important model specific safety, maintenance, and technical information. They are not replacements.

This supplement may be one of several for your bike. Be sure to obtain and read all of them.

If you need a manual or supplement, or have a question about your bike, please contact your Cannondale Dealer immediately, or call us at one of the telephone numbers listed on the back cover of this manual.

You can download Adobe Acrobat PDF versions of any Cannondale Owner's Manuals or Supplements from our website. Go to: <http://www.cannondale.com/bikes/tech>

- This manual is not a comprehensive safety or service manual for your bike.
- This manual does not include assembly instructions for your bike.
- All Cannondale bikes must be completely assembled and inspected for proper operation by a Cannondale Dealer before delivery to the owner.

**** IMPORTANT ****

This manual may include procedures beyond the scope of general mechanical aptitude. Special tools, skills, and knowledge may be required.

If you have any doubt about your ability to properly inspect, adjust, or service your bicycle, do not attempt to perform the work described; please take the fork to a Cannondale Dealer.

Special Manual Messages

In this manual, information which affects your safety is emphasized in the following ways:

WARNING

A WARNING indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

CAUTION

A CAUTION Indicates a potentially hazardous situation which, if not avoided, can result in serious damage to the product. The matters described under CAUTION may, if not avoided, lead to personal injury, or results depending on the situation and degree of damage. Important matters are described in CAUTION (as well as WARNING), so be sure to observe them.

NOTE:

A NOTE provides helpful information or tips intended to make the information presented clearer.

ALLOY CRANKARM REMOVAL & INSTALLATION

Removal

TOOLS & SUPPLIES

- Cannondale tool KT013/
- 8 mm Allen Key
- 15 mm open end wrench
- Clean shop towel
- Bicycle bearing grease

Before starting, consult the exploded view parts drawing so that you can identify parts and features not shown in the following photographs.

1. Insert an 8 mm Allen key into the fixing bolt completely, hold crankarm with your hand and turn the fixing bolt counter-clockwise to remove it.



Figure 1

CAUTION

Not inserting the key fully into the bolt can result in stripping damage to the bolt head.

2. When the bolt is removed, be sure to collect and retain the thin steel washer under the bolt head. It is black in color; check the bolt or use a pencil tip to remove it from the crankarm seat.



Figure 2

3. With the fixing bolt out, apply some bicycle bearing grease to the threads of the tool stud (1) and thread it into the bottom bracket spindle until the top of the stud is flush with the top of the spindle.

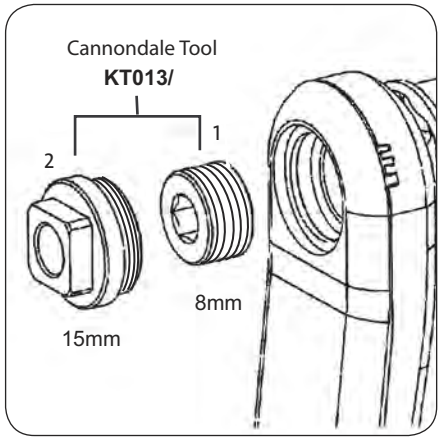


Figure 3

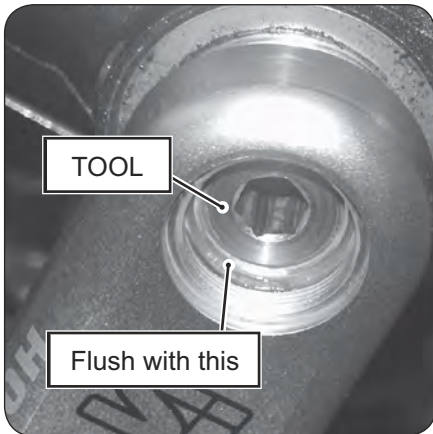


Figure 4

3. Next, apply grease to the threads of the tool body (2) and exposed face of the tool stud.

Install the tool body into the crankarm completely and tighten it snug with a 15mm open end wrench.

4. Insert a 8mm Allen key through the tool body and into the stud. Hold the crankarm and turn the Allen key counter-clockwise until the crankarm can be removed from the spindle end.



Figure 5

5. Repeat the previous steps for the other crankarm.

Installation

TOOLS & SUPPLIES

- 8 mm Allen Key
- Clean shop towel
- Bicycle bearing grease

Crankarms are pressed onto the spindle ends using the fixing bolt. It is important that the fixing bolt, crankarm socket/threads, and spindle splines are clean and greased before tightening to the specified torque. Consult the exploded view.

CARBON CRANKARM REMOVAL & INSTALLATION

Removal

TOOLS & SUPPLIES

- 10 mm Allen Key

1. Insert a 10 mm Allen key through the retaining ring (1) into the fixing bolt.
2. Hold the crankarm, and turn the fixing bolt counter-clockwise until the crankarm can be removed.

It is not necessary to remove the retaining ring when removing or installing the crankarms.

Insufficient grease behind the retaining ring can cause it to be removed while turning the fixing bolt.

If the ring begins to unscrew while turning the fixing bolt, remove it with a red pin spanner (Park SPA-2) and apply grease to the top of the fixing bolt. Apply Loctite 603 to the ring threads and reinstall the ring so it is flush with the top of the crankarm.

Installation

TOOLS & SUPPLIES

- 10 mm Allen Key

1. Consult the exploded view for arrangement order of drive and non-drive side parts.
2. Prior to installation, always be sure to thoroughly clean and grease the spindle splines and fixing bolt threads and the crankarm sockets with a high-quality bicycle bearing grease. Insufficient grease coverage can result in “creaking” of the crankarm assembly when riding. Be generous with the grease and cover all the contact surfaces.

See SI Carbon Crankset Exploded View for areas where it is important to ensure adequate grease coverage of mating surfaces.

3. Tighten the fixing bolt to 34-41 N•m (25-30 Ft•Lbs). using an accurately calibrated torque wrench.

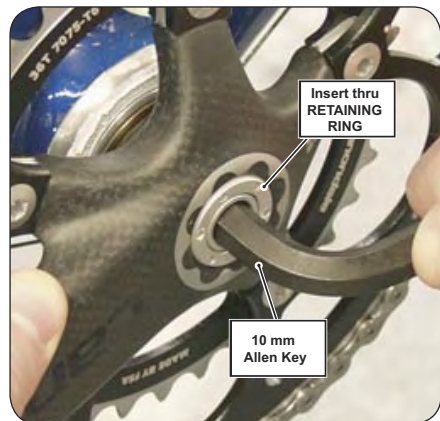


Figure 8

BB SHELL BEARINGS

Information

The two bearings in the SI bottom bracket shell are a maintenance free sealed cartridge type and do not require lubrication. The bearings can be worn out overtime or damaged due to corrosion.

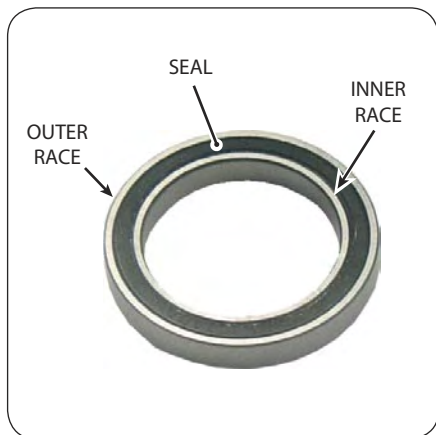


Figure 7

In general, the condition of the bearings should be inspected annually or anytime the crankset assembly is disassembled or serviced using the a simple inspection procedure.

Frequent renewal is not recommended. because repeated removal and reinstallation can damage the inside BB shell surfaces resulting in poor bearing fit.

NOTE: Loose bearings can be a cause of “creaking.”

Replacement bearings are available through a Cannondale dealer. See “Replacement Parts (Kits)” at the end of this manual.

Inspection



Figure 8

1. Remove the crankarms and spindle.
2. Clean the bearings with a dry shop towel to remove grease and grime.

CAUTION

Do not use spray chemical cleaners to clean.

3. Rotate the inner bearing race of both bearings with your fingers; they should rotate smoothly and quietly with only the force of your finger. It should not move side-to-side, stick or feel gritty.

There should not be any play detected in the inner race and the bearing should not be free to slide in the bottom bracket shell.

The bearings are a press fit and if they move in the shell, this is an indication of damage to either the bearings or bottom bracket shell.

Removal

TOOLS & SUPPLIES

- Cannondale tool KT011/
- A punch or drift
- Small hammer

Before starting, consult the exploded view parts drawing so that you can identify parts and features not shown in the following photographs.

1. Remove the crankarms
1. Remove the crankarm spindle.
3. Position Cannondale special tool KT011/ behind the BEARING as shown. Tilt inward and position on the inside face of the bearing.

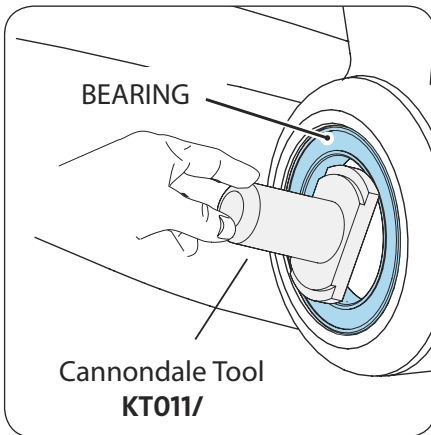


Figure 9

4. Insert a driver (punch or drift) from the opposite side. Locate it on the back of the tool and use light tapping to drive the bearing from the shell.

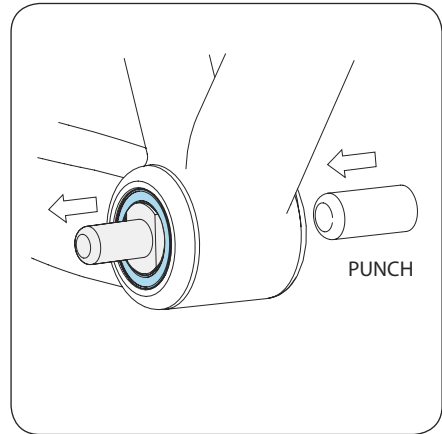


Figure 10

5. Repeat for other side. Discard the removed bearings; do not reinstall them. Always replace with a new set.

Installation

TOOLS & SUPPLIES

- Cannondale tool KT010/ (three-piece bearing driver set)
- Headset bearing press (such as Park Tool HHP-2 (with 1" adapters needed))
- Clean shop towel
- Bicycle bearing grease

CAUTION

DO NOT FACE, MILL OR MACHINE THE BOTTOM BRACKET SHELL FOR ANY REASON. Doing so can result in serious damage and possibly a ruined bike frame.

1. Always thoroughly clean the inside surface of the BB shell with a dry shop towel.

CAUTION
Do not use spray chemical cleaners to clean.

4. Apply a coating of grease to both sides of each bearing seal to help repel moisture.

2. Lightly grease entire inside surface of the bottom bracket shell.
3. Install the drive side bearing first. Use the tool arrangements for each bearing side. See next Figure.

Press the bearing until it bottoms

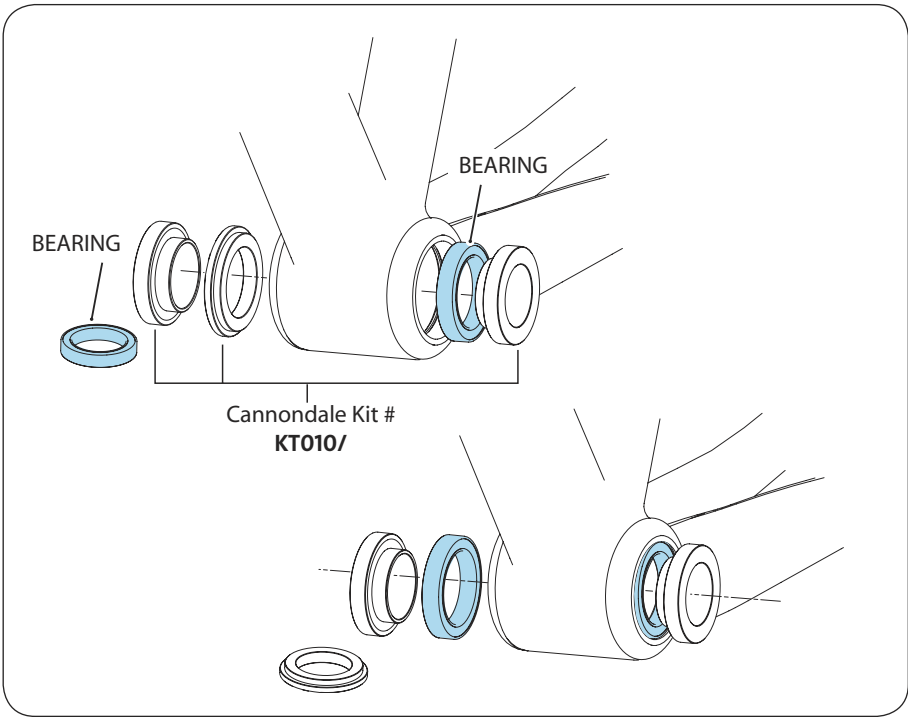


Figure 11

BB SHELL CIRCLIPS

Removal

TOOLS & SUPPLIES

- Small thin blade screw driver

The two circlips in the bottom bracket shell can be left in place unless they are damaged.

Should they need to be removed, use a flat blade screwdriver on the hooked end to lift the end out of the shell groove.

Installation

TOOLS & SUPPLIES

- Clean shop towel
- Bicycle bearing grease

1. Thoroughly clean the inside and outside surfaces of the BB shell with a dry shop towel.
2. Inspect the the circlip grooves (a) and

the machined bearing seats (b) on both sides of the bottom bracket. And, carefully inspect the BB (outer and inner surfaces) and frame welds for evidence of fatigue cracking or damage.

3. Apply a thin film of bearing grease to the BB circlip groove. Install the square end (a) of the circlip into the groove first, then moving clockwise, push the clip into the groove until it is fully seated in the groove. Install the other circlip the same way.

WARNING

WEAR HAND AND EYE PROTECTION
Circlips may have sharp edges that can cut your fingers. A circlip can cause serious eye injury if it springs out of your hands or the work unexpectedly.

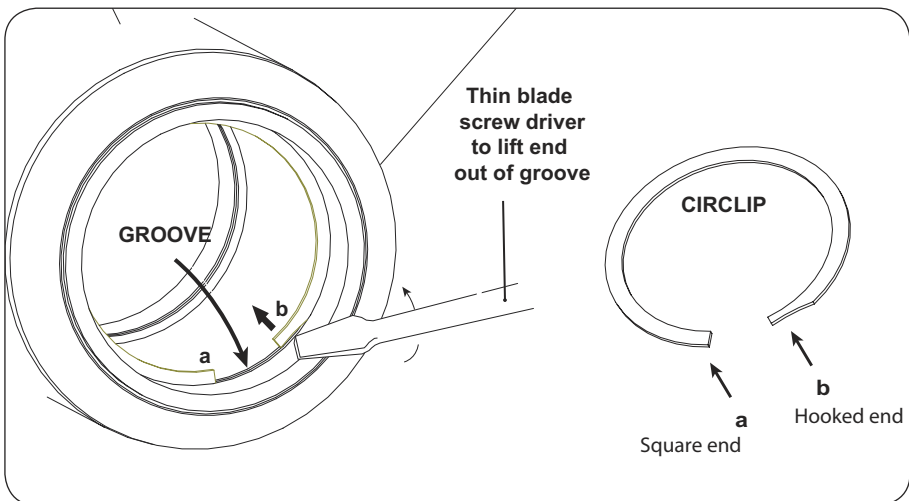


Figure 12

SPINDLE

Removal

TOOLS & SUPPLIES

- A small non-marring rubber mallet

Before starting, consult the exploded view parts drawing so that you can identify parts and features not shown in the following photographs.

1. Remove the crankarms.
2. Remove the small parts from the drive side spindle end (wave washer, shims, spacer (mountain only) bearing shield and seal (mountain only)).
3. Use a plastic mallet to lightly tap the spindle on the drive side and pull it out on the non-drive side with your hand.

CAUTION

Do not use metallic hammer or other hard object on the spindle end.



Figure 13

Installation

TOOLS & SUPPLIES

- A small non-marring rubber mallet
- Clean shop towel
- Bicycle bearing grease

Before starting, consult the exploded view parts drawing so that you can identify parts and features not shown in the following photographs.

1. Install the circlips.
2. Install the bearings.
3. Consult the appropriate exploded view for your crankset and assemble the non-drive (left) side parts onto the spindle.

Make sure the flat side of the bearing shield faces outward and the bearing seal face is coated with bicycle bearing grease.

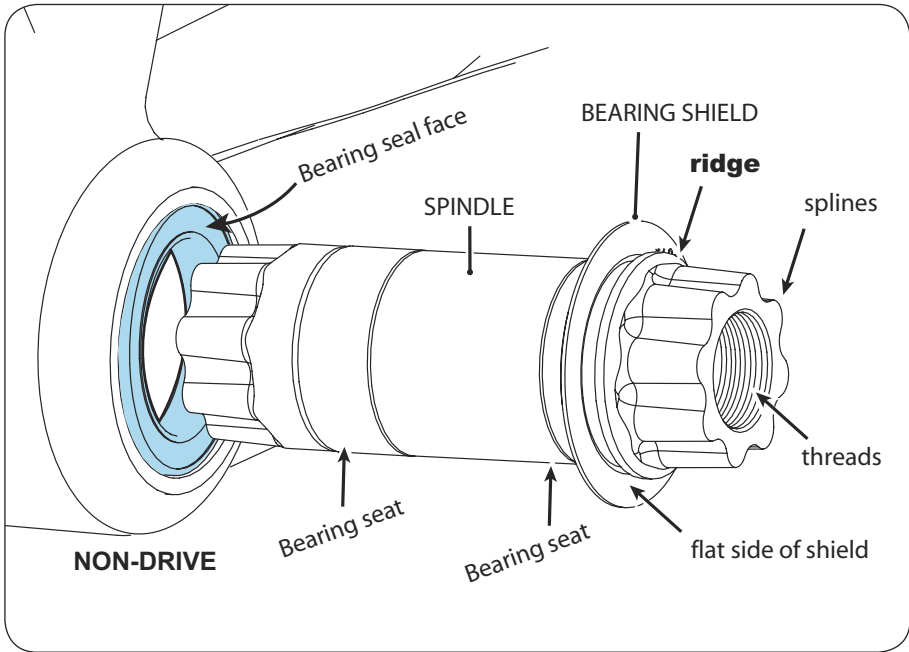


Figure 14

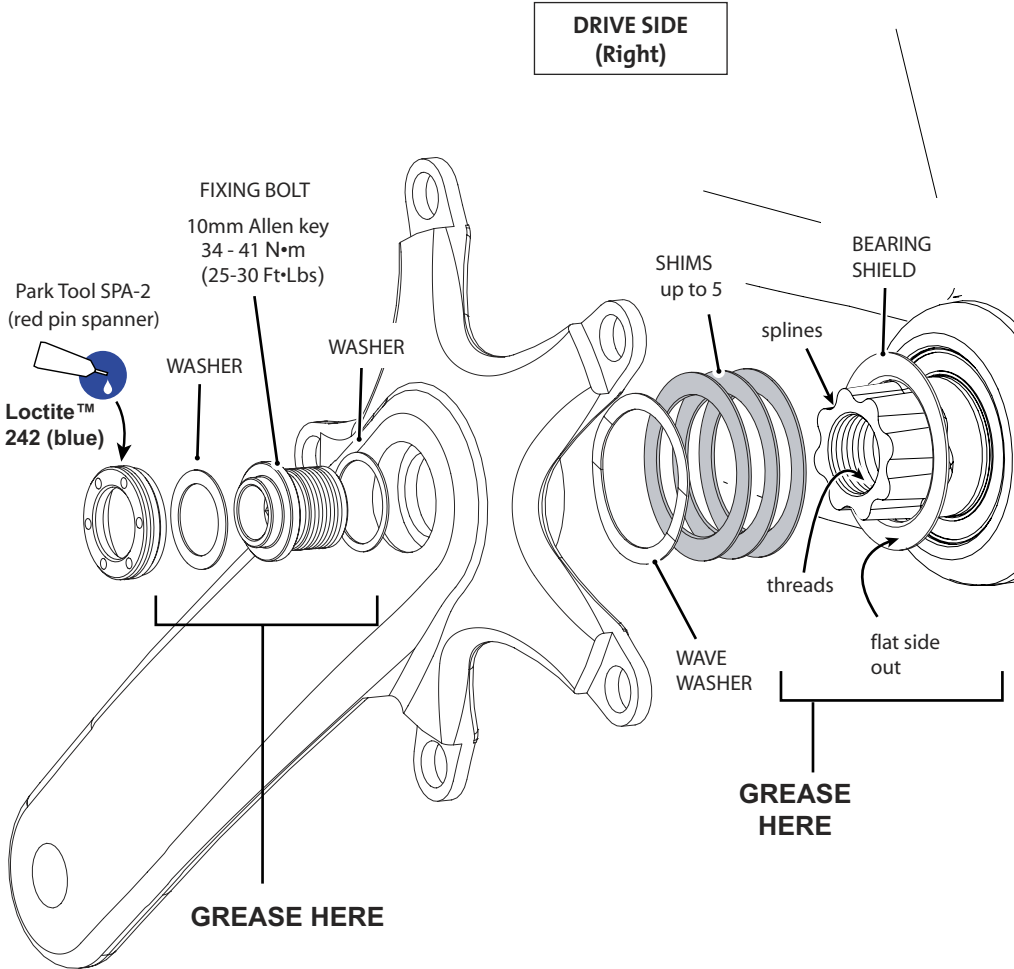
4. Lightly grease the entire spindle.
5. Insert the spindle into the non-drive side of the BB shell with the ridge on the non-drive side.

The spindle should fit snugly into the bearings; you will need to tap it in until the non-drive side bearing shield bottoms lightly against the bearing. Use a plastic mallet.

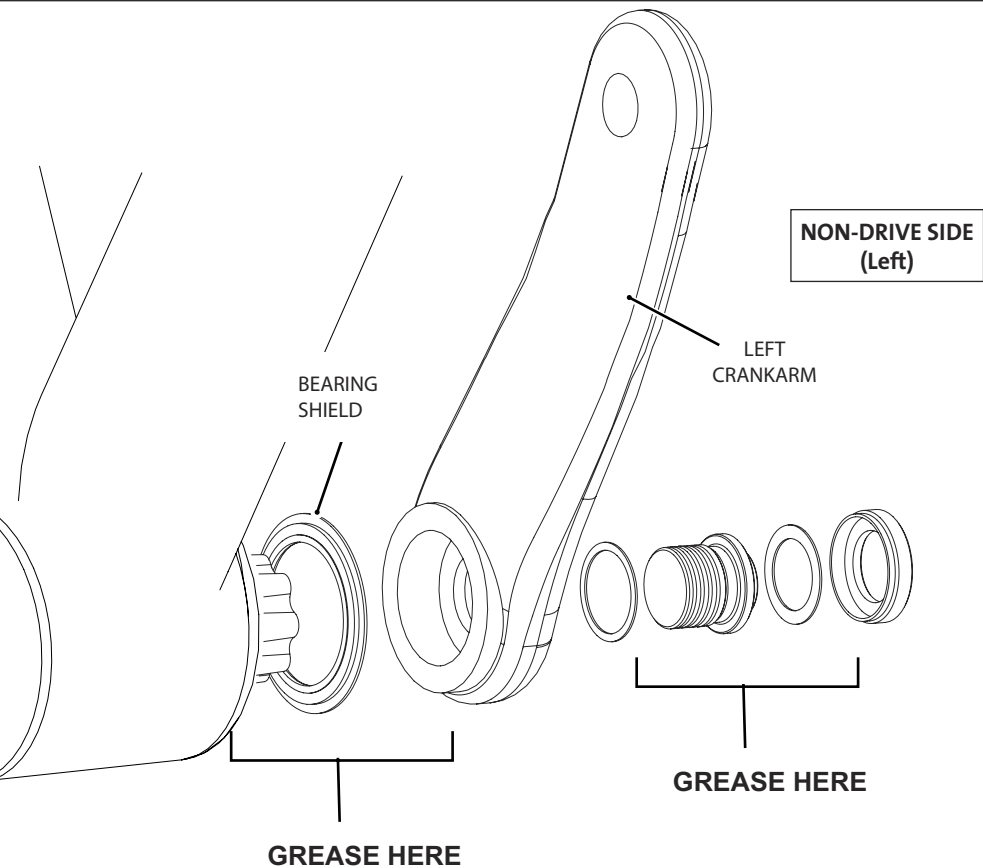
4. On the drive side (right), apply a coating of grease to the bearing seal face and install the bearing seal and bearing shield with the flat side facing out.
5. Consult the appropriate exploded view for your crankset and install the drive side parts.

SI COMPACT CARBON CRANKSET EXPLODED VIEW

Figure 15



NOTE: Please note that the total number of SHIMS required depends on the compression state of the WAVE WASHER with the crankarm installed and tightened to the recommended torque. The wave washer "compressed but not flattened."



Reminders

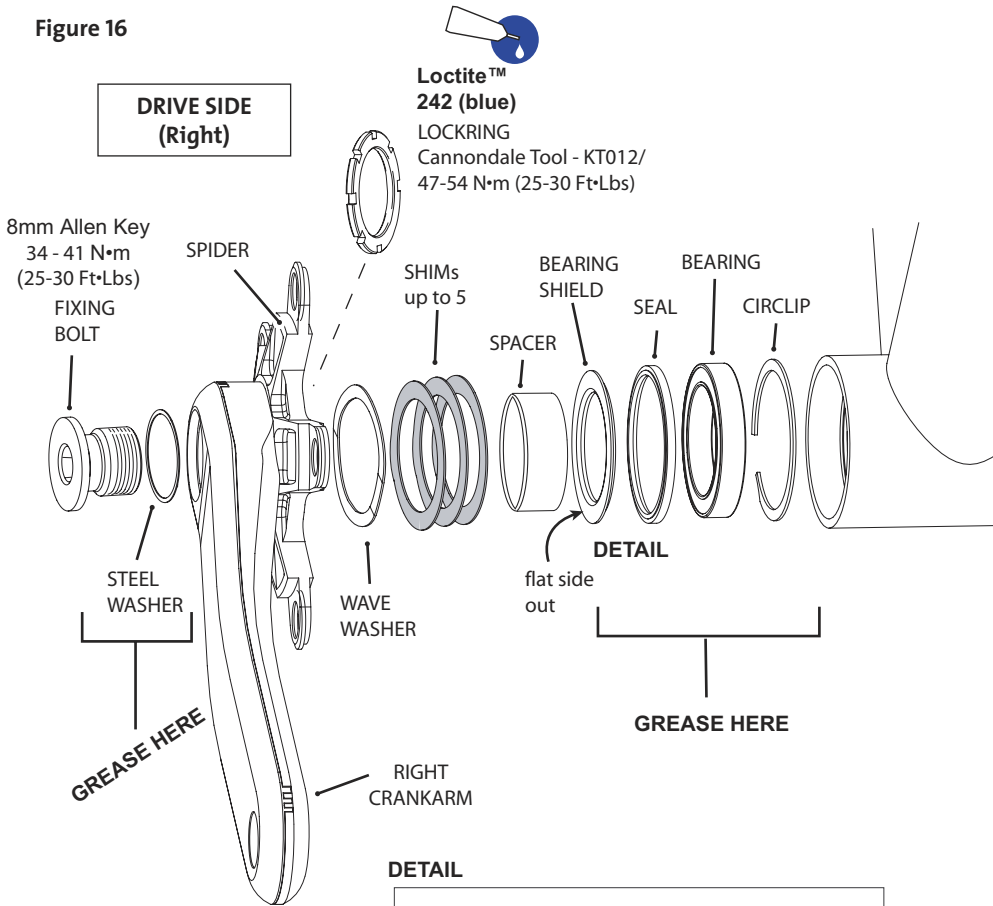
1. When reinstalling the crankarms, always clean the spindle splines, spindle threads, and the crankarm sockets.

Apply a generous coating of a high-quality bicycle bearing and cover all the contact surfaces. Also, lightly grease the exposed face of the bearing to repel moisture. Also include the fixing bolt assembly, if removed. You should ensure grease coating between the fixing bolt, each washer, and behind the retaining ring. If these parts are dry, the increased friction may cause the retaining ring to back out while attempting to extract the crankarm.

2. Use an accurately calibrated torque wrench to tighten .

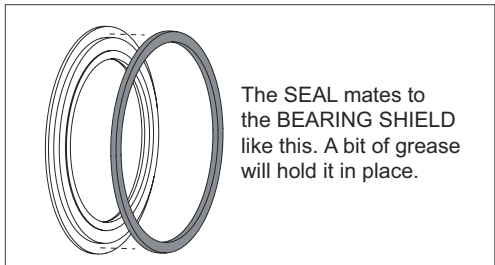
SI ALLOY MOUNTAIN CRANKSET EXPLODED VIEW

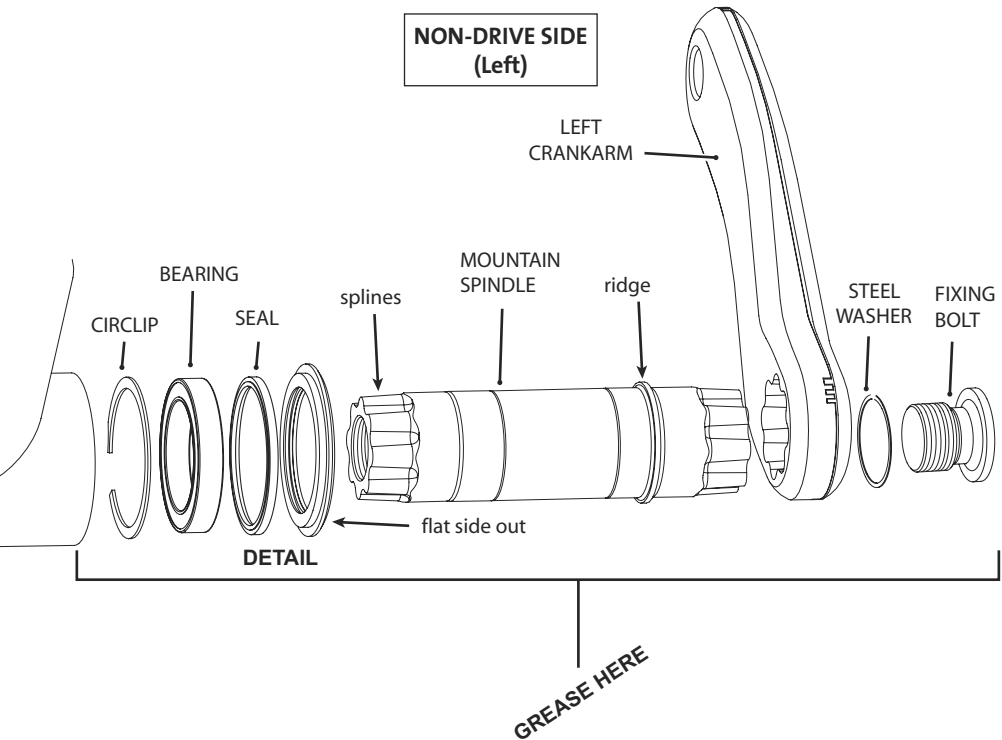
Figure 16



NOTE: Please note that the total number of SHIMS required depends on the compression state of the WAVE WASHER with the crankarm installed and tightened to the recommended torque. The wave washer “compressed but not flattened.”

DETAIL





Reminders

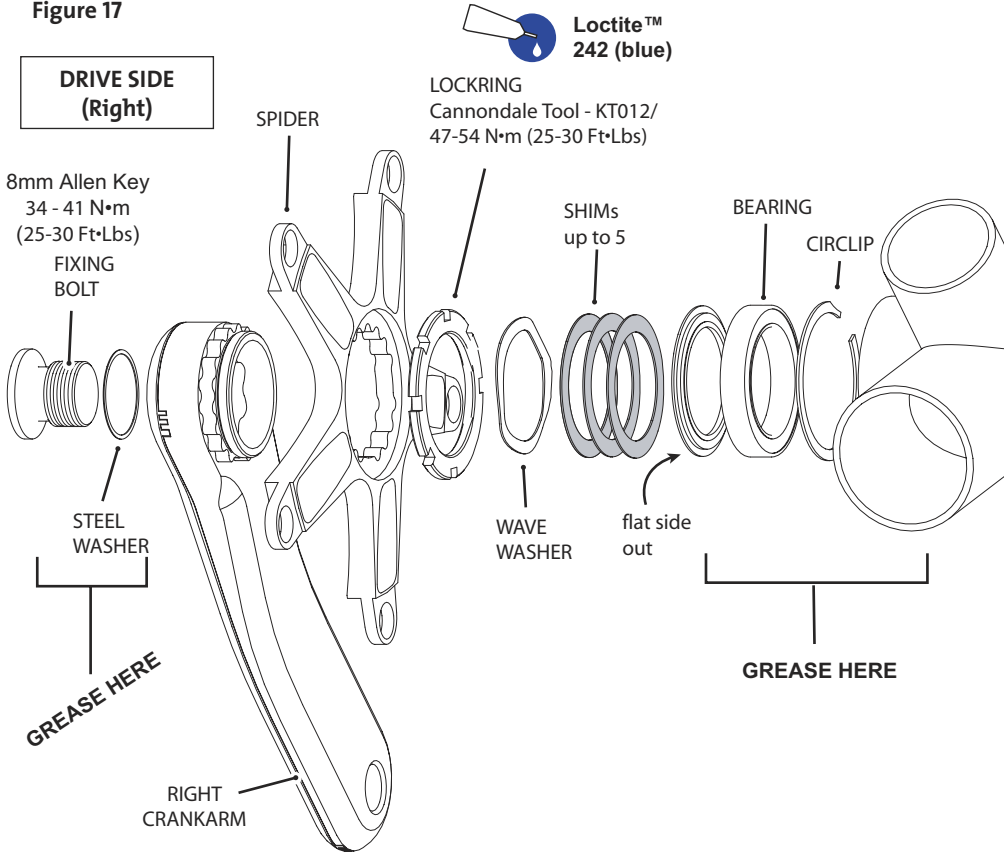
1. When reinstalling the crankarms, always clean the spindle splines, spindle threads, and the crankarm sockets.

Apply a generous coating of a high-quality bicycle bearing and cover all the contact surfaces. Also, lightly grease the exposed face of the bearing to repel moisture. Also include the fixing bolt assembly, if removed. You should ensure grease coating between the fixing bolt, each washer, and behind the retaining ring. If these parts are dry, the increased friction may cause the retaining ring to back out while attempting to extract the crankarm.

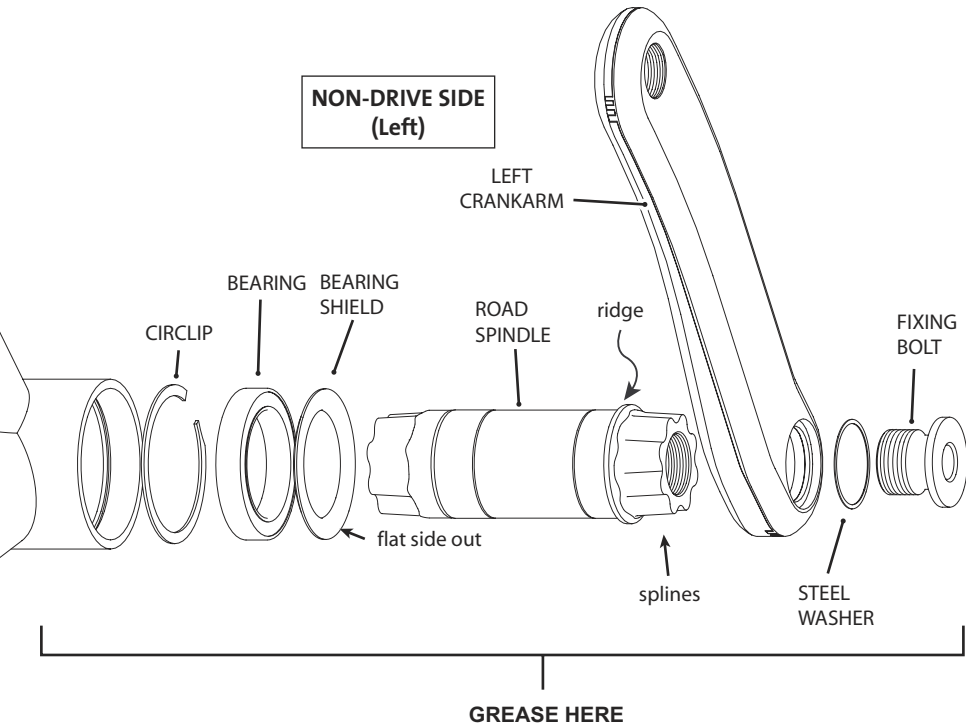
2. Use an accurately calibrated torque wrench to tighten .

SI ALLOY ROAD CRANKSET EXPLODED VIEW

Figure 17



NOTE: Please note that the total number of SHIMS required depends on the compression state of the WAVE WASHER with the crankarm installed and tightened to the recommended torque. The wave washer "compressed but not flattened."



Reminders

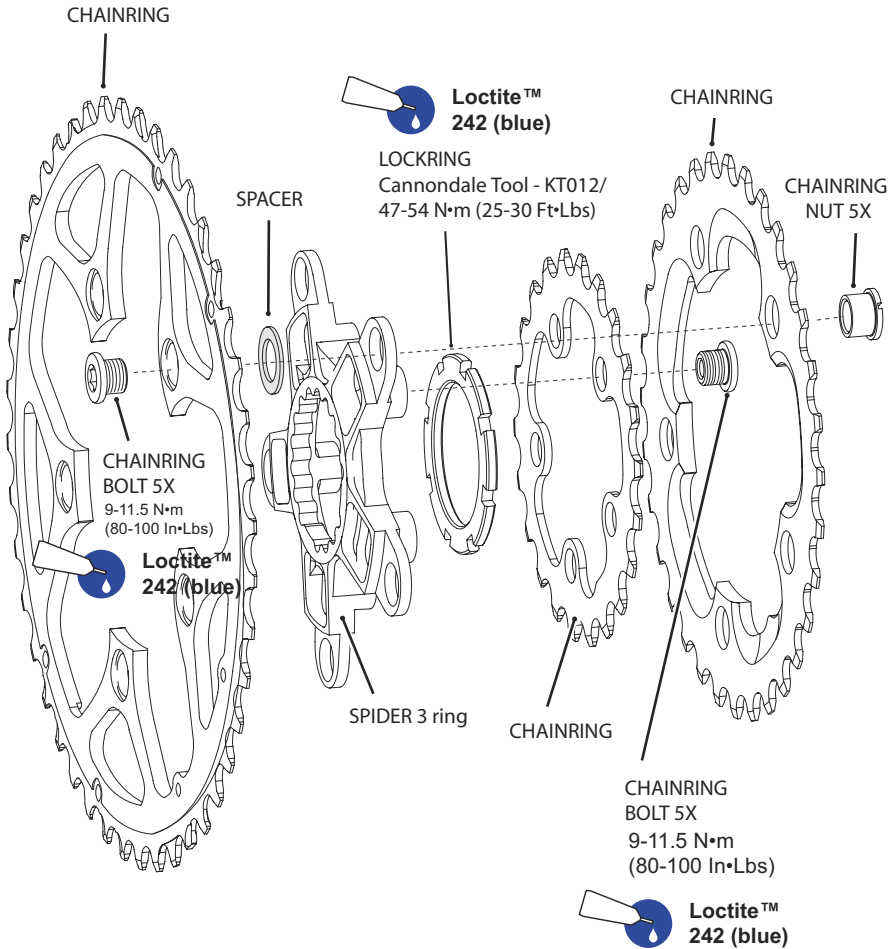
1. When reinstalling the crankarms, always clean the spindle splines, spindle threads, and the crankarm sockets.

Apply a generous coating of a high-quality bicycle bearing and cover all the contact surfaces. Also, lightly grease the exposed face of the bearing to repel moisture. Also include the fixing bolt assembly, if removed. You should ensure grease coating between the fixing bolt, each washer, and behind the retaining ring. If these parts are dry, the increased friction may cause the retaining ring to back out while attempting to extract the crankarm.

2. Use an accurately calibrated torque wrench to tighten .

SI MOUNTAIN 3X9 CHAINRINGS EXPLODED VIEW

Figure 19

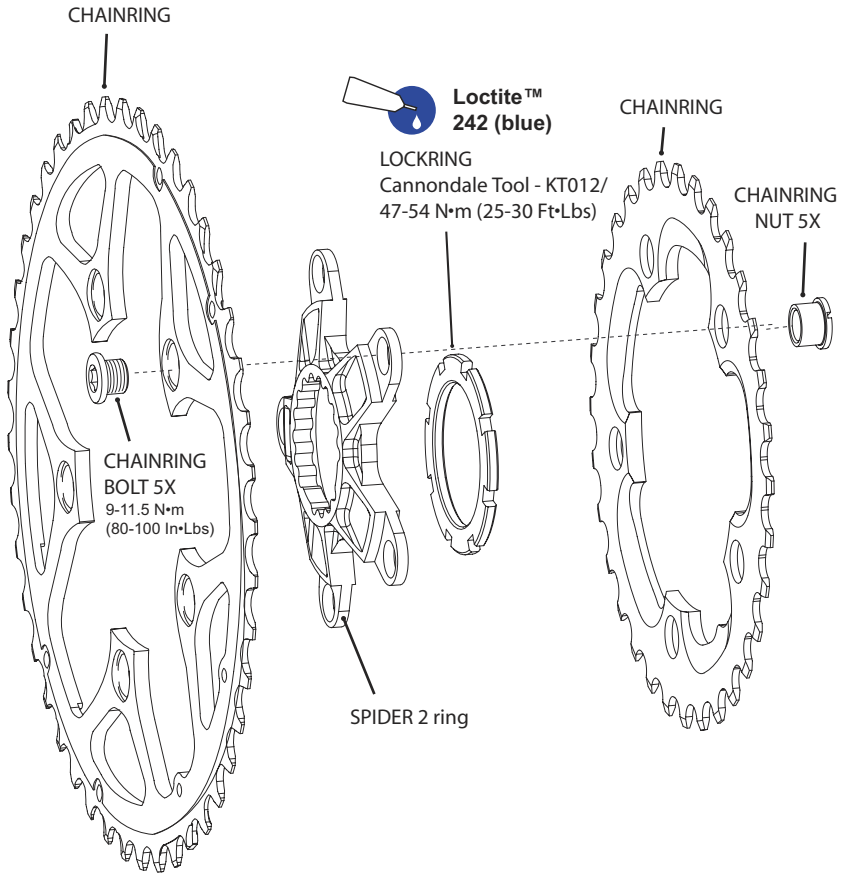


Reminders

1. Grease the mating surface between the chainring and the spider.
2. Use an accurately calibrated torque wrench to tighten .

SI MOUNTAIN 2X9 CHAINRINGS EXPLODED VIEW

Figure 20



Reminders

1. Grease the mating surface between the chainring and the spider.
2. Use an accurately calibrated torque wrench to tighten .

SI CARBON CRANKARM/CHAINRINGS

Figure 21

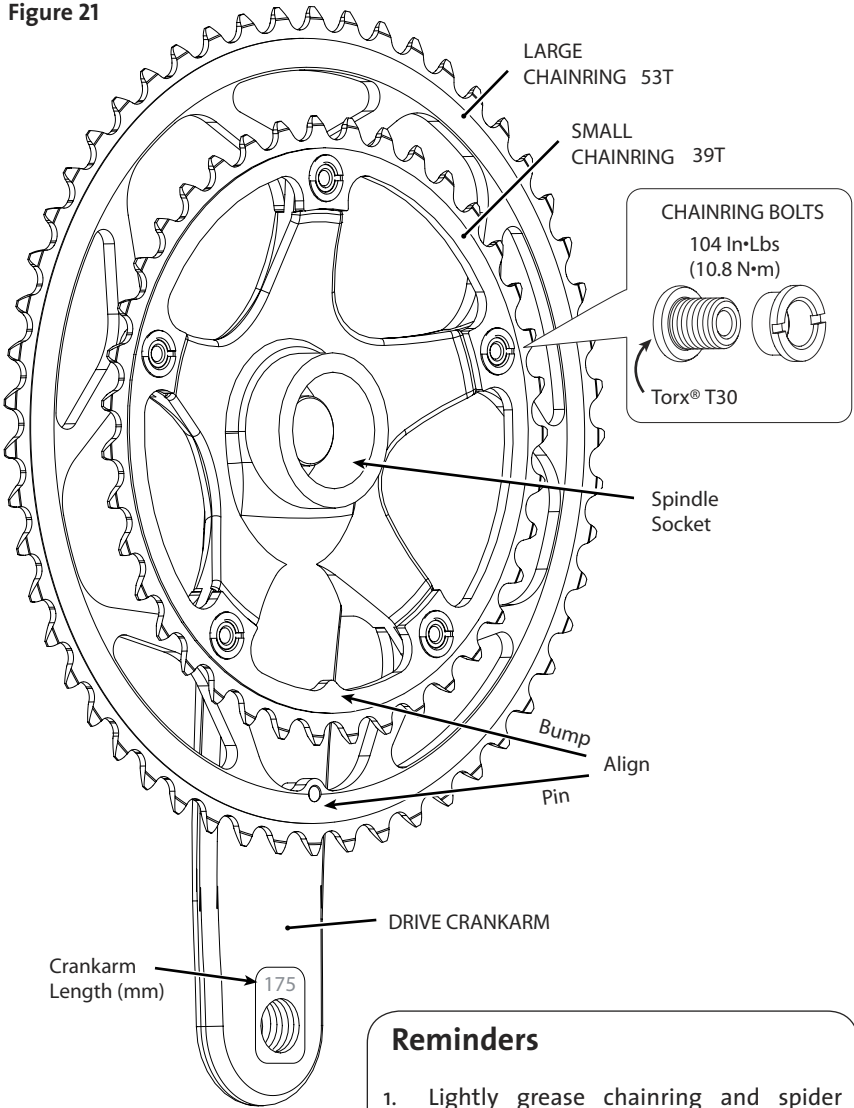


Figure 21

SI BOTTOM BRACKET ADAPTER

The SI bottom bracket adapter enables the use of standard English/68mm bottom bracket cranksets in Cannondale System Integration (SI) road or mountain bicycle frames. Its is sold as an Cannondale Kit. The adapter is removable on alloy BB frames, however, repeated removal and reinstallation could result in damage to the SI BB shell and is not recommended. The adapter IS NOT a repair part and will only work in undamaged frames in good condition. Improper installation or removal can result in damage and void applicable frame warranty. If the adapter is installed in a Synapse carbon frame, the installation is permanent and can not be removed.

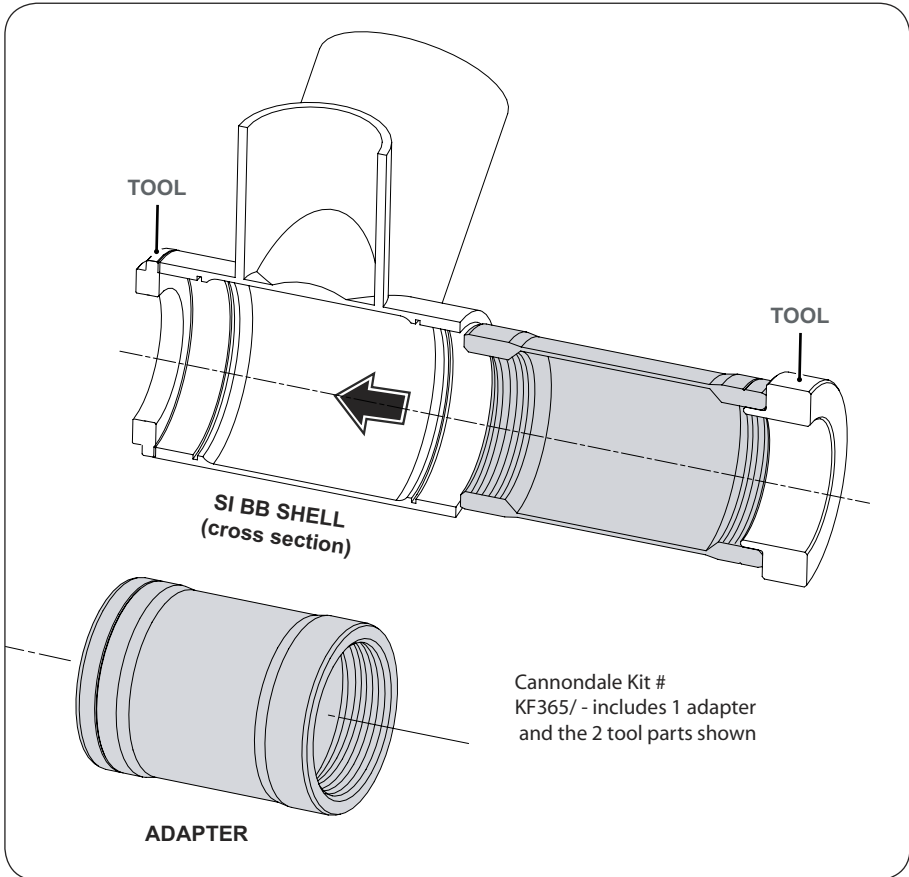


Figure 22

REPLACEMENT PARTS (KITS)

CANNONDALE KIT NO.		DESCRIPTION
SI ROAD		
QC692/	Kit,SI CHAINRNGS,39/53 MK4,GLD	
QC600/	Kit, Chainrings, 53t+39t SI - MK3; includes chain catch pin. Replaces MK1 and MK2. MK3 is not compatible w/MK1 or2; Replace with both MK3	
QC601/	Kit, Chainring, 53t -SI; Date code D1 is MK1 design=10 grms heavier+stiffer than MK2	
QC602/	Kit, Chainring, 39t -SI	
QC603/	Kit, Pin,Chain Catch-SI	
KF360/	KIT,BOLT,SI C-RING, MK4 ONLY	
QC604/	Kit,Bolts/Nuts Ch.Rings-SI (5); Kit contains 5 bolts, and 5 nuts to attach chainrings to the spider	
QC605/	Kit, Crank Spider-SI	
QC693/	Kit,Spider,H-GRAM SI,110mm BCD	
QC694/	Kit,Spider,H-GRAM SI,130MM BCD	
QC606/	Kit, Crankarm-L, 170mm-SI	
QC607/	Kit, Crankarm-R, 170mm-SI	
QC608/	Kit, Crankarm-L, 172.5mm-SI	
QC609/	Kit, Crankarm-R, 172.5mm-SI	
QC610/	Kit, Crankarm-L, 175mm-SI	
QC611/	Kit, Crankarm-R, 175mm-SI	
QC613/	Kit, Lockring-SI--requires KT012/	
KF346/	KIT,CRANKSET,SI CRB,39/53,170	
KF347/	KIT,CRANKSET,SI CRB,39/53,172	
KF348/	KIT,CRANKSET,SI CRB,39/53,175	
KF349/	KIT,CRANKSET,SI CRB,36/50,170	
KF350/	KIT,CRANKSET,SI CRB,36/50,172	
KF351/	KIT,CRANKSET,SI CRB,36/50,175	
QC061/	KIT,CRANKSET,Hollowgram Si, 39/53, 170 mm	
QC062/	KIT,CRANKSET,Hollowgram Si, 39/53, 172.5 mm	
QC063/	KIT,CRANKSET,Hollowgram Si, 39/53, 175 mm	

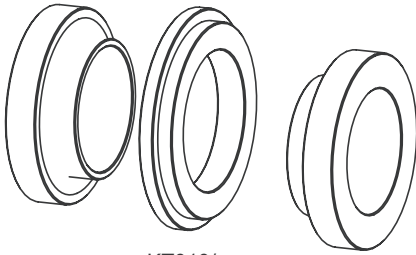
SI MOUNTAIN	
QC075/	Kit, Spider - SI Mtn. Triple: requires 1mm spacer between spider and outer ring
QC076/	Kit, Spider - SI Mtn. Double: requires 1mm spacer between inner ring and spider
KF355/	KIT,SPIDER-SI MTN,104BCD/4BOLT
QC077/	Kit, Spacer - SI Mtn. Chainrings (5); contains 5 - 1.02mm thick chainring spacers
KF352/	KIT,CRANKSET,Hollowgram Mtn Si, 22/32/34, 170
KF353/	KIT,CRANKSET,Hollowgram Mtn Si, 22/32/34, 175

SI BOTTOM BRACKET SHELL	
QC614/	Kit, Bolts, Crankarm-S (2); includes washers
KF361/	KIT,BOLTS,SI CARBON CRANK,(2)
QC615/	Kit, Bearing Shield,BB-SI
QC616/	Kit, Circlip,BB-SI
QC617/	Kit, Shims-Plastic, BB-SI; contains 5 shims
QC618/	Kit, Washer-wave, BB-SI
KB6180/	Kit, Bearings-BB-SI; contains 2 bearings for the bottom bracket SKF#6806-2RS /SR12 /90% fill
QC074/	Kit, Seal, Bearing - SI Mtn. Only; seals sits behind bearing shield on SI Mtn
QC072/	Kit, Spacer - SI Mtn., 9mm; SI Mtn Only used with 122 spindle
QC073/	Kit, Spacer - SI Mtn., 12mm; SI Mtn Only used with 128 spindle
QC690/	KIT,BB,CDALE Si,106mm Rd
QC691/	KIT,BB,CDALE Si,128mm MTN
QC612/	Kit, Spindle-SI Road
QC070/	Kit, Spindle-SI Mtn. 128mm
QC071/	Kit, Spindle-SI Mtn. 122mm; VERY rare and not currently used in production

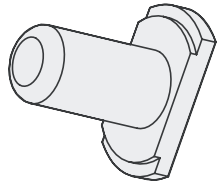
For an up to date list of kits available for your bike, please visit our Tech Center at : <http://www.cannondale.com/bikes/tech/>

SI SPECIAL TOOLS

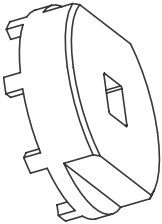
CANNONDALE KIT NO.	DESCRIPTION
KT011/	Driver to remove BB shell bearings
KT010/	Driver to install BB shell bearings. This is a three piece tool set
KT012/	3/8" drive Socket to tighten spider locking
KT013/	Extraction tools to remove alloy crankarms. This is a two piece tool set.
KF366/	A two-piece extraction tool for use with a standard bicycle headset bearing press.



KT010/

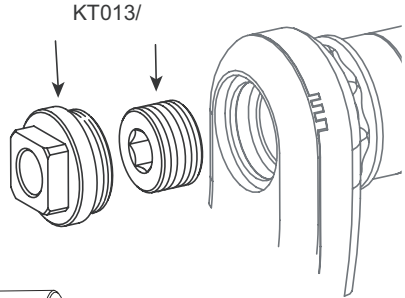


KT011/

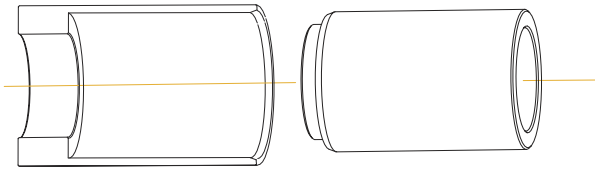


3/8" drive

KT012/



KT013/



KF366/