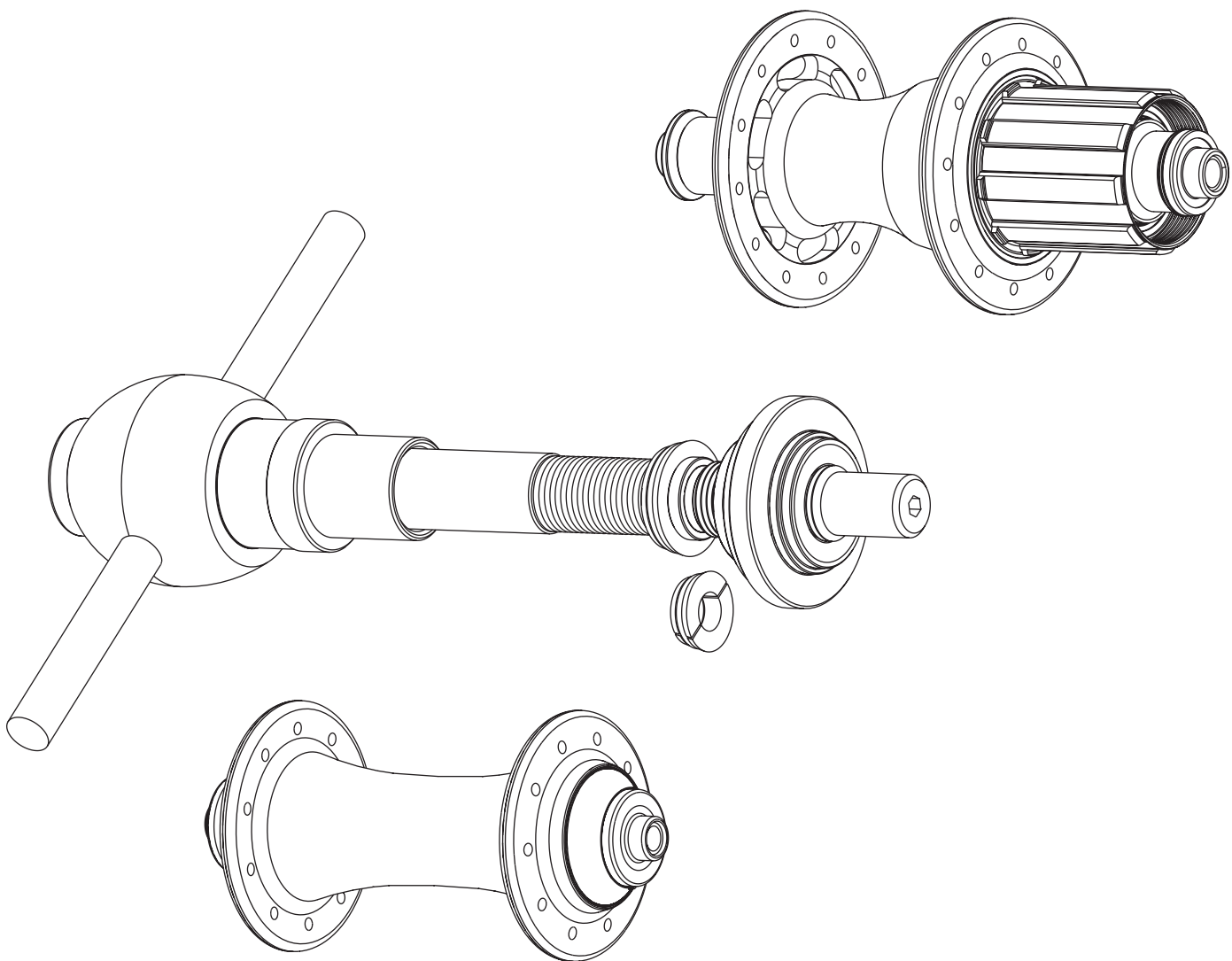


# R45 Hub Service Tool Manual

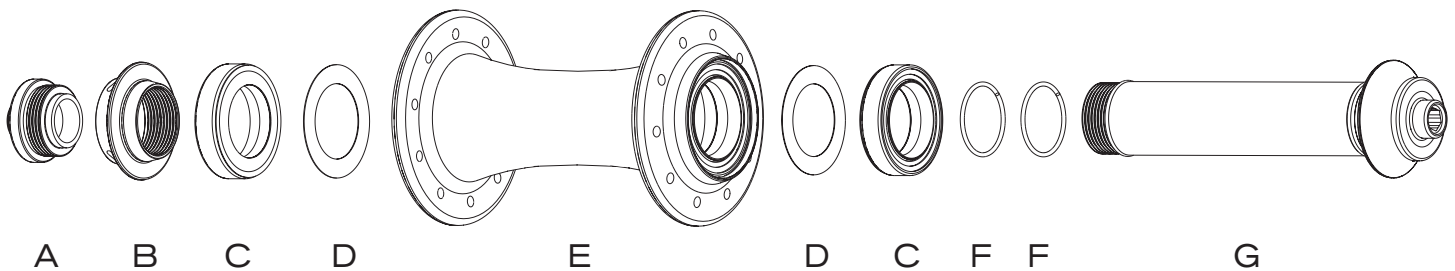


**CHRIS KING<sup>®</sup>**  
PRECISION COMPONENTS

## Hub specifications and wheel building information

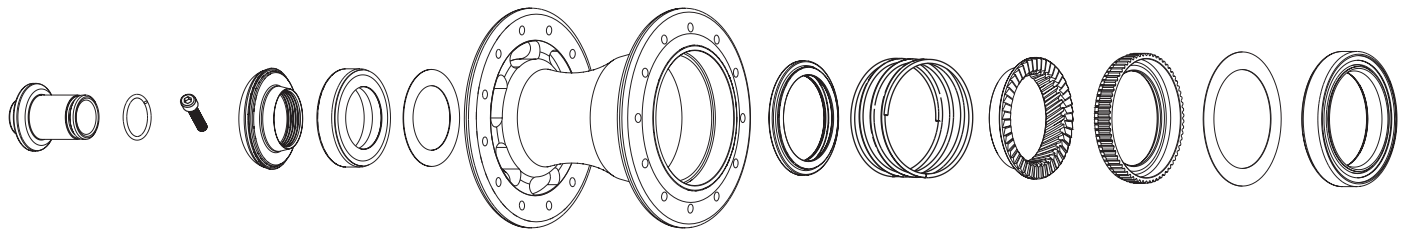
	R45 front	R45 rear
axle type	R45, two piece	R45, one piece
axle width (mm)	100	130
flange diameter - drive side (mm)	39.78	50.95
flange diameter - non drive side (mm)	39.78	50.95
center to flange - drive side (mm)	34.80	18.86
center to flange - non drive side (mm)	34.80	34.58
frame attachment	quick release only	quick release only
available spoke hole configurations	20, 24, 28, 32	24, 28, 32
spoke gauge	13, 14, 15	13, 14, 15
spoke hole diameter (mm)	2.54	2.54
weight (g)	102	215

### R45 front hub exploded diagram

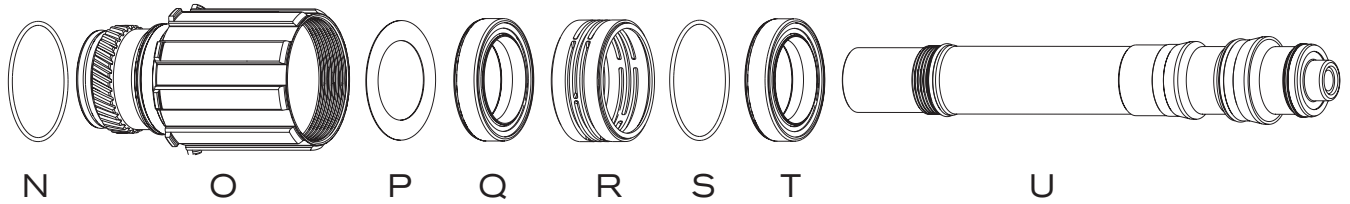


- |                                      |                      |
|--------------------------------------|----------------------|
| A. axle end                          | E. front hubshell    |
| B. adjusting cone                    | F. front axle O-ring |
| C. front hubshell bearing            | G. front main axle   |
| D. front hubshell bearing inner seal |                      |

## R45 rear hub exploded diagram

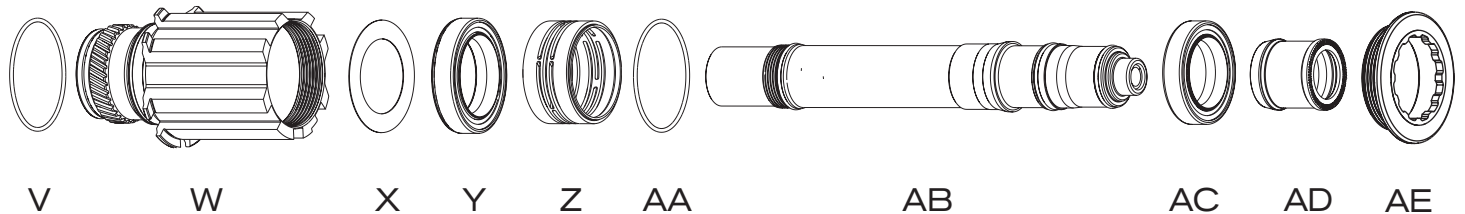


A B C D E F G H I J K L M



N O P Q R S T U

Shimano®/SRAM® Hub Type



V W X Y Z AA AB AC AD AE

Campagnolo® Hub Type

- |  |  |
|--|--|
| A. QR insert                             | Q. inboard driveshell bearing                    |
| B. O-ring                                | R. Shimano®/SRAM® bearing spacer spring (silver) |
| C. adjusting clamp screw                 | S. bearing spacer spring O-ring                  |
| D. adjusting clamp                       | T. outboard driveshell bearing                   |
| E. small rear hubshell bearing           | U. Shimano®/SRAM® rear axle                      |
| F. small hubshell bearing inner seal     | V. bearing spacer spring O-ring                  |
| G. rear hubshell                         | W. Campagnolo® driveshell                        |
| H. spring retainer w/ O-ring             | X. inboard driveshell bearing inner seal         |
| I. drive spring                          | Y. inboard driveshell bearing                    |
| J. drive ring                            | Z. Campagnolo® bearing spacer spring (black)     |
| K. driven ring                           | AA. bearing spacer spring O-ring                 |
| L. large hubshell bearing inner seal     | AB. Campagnolo® rear axle                        |
| M. large hubshell bearing                | AC. outboard driveshell bearing                  |
| N. O-Ring                                | AD. retainer sleeve                              |
| O. Shimano®/SRAM® driveshell             | AE. Campagnolo® 11t locking                      |
| P. inboard driveshell bearing inner seal |  |

## **A note on this manual**

Chris King R45 hubs require care and overhaul procedures that are different from other Chris King hubs. Be sure to thoroughly read and understand the R45 overhaul procedure before servicing R45 hubs. We recommend that these hub overhaul procedures be performed by a professional bicycle mechanic.

## **General setup**

### **Cassettes**

The aluminum driveshells of the rear hubs should only be used in conjunction with “spidered”-style cassettes. Avoid using individual cogs with aluminum driveshells. We recommend using our aluminum or Ti cassette lock rings which feature longer threads to provide a more secure engagement with driveshell threads.

The Campagnolo-compatible driveshell requires the use of a Chris King Campagnolo-compatible cassette lock ring. Each Campagnolo-compatible R45 rear hub is shipped with an 11T lock ring. A 12T Campagnolo-compatible cassette lock ring is available for 12-tooth cogs and larger. Contact Customer Service or your local Chris King dealer for details.

### **Frame preparation**

Check frame and fork dropouts to ensure that they are parallel to each other. Use an appropriate tool made by a reputable bicycle tool manufacturer. Unparallel dropouts may damage or compromise the performance of your new hub.

When using any Chris King products in conjunction with other manufacturers' parts, be sure to follow other manufacturers' instructions and recommendations.

### **Never use thread locking compounds**

Thread locking compounds are not an acceptably reliable substitution for loose threads or press fits. All Chris King components are engineered and manufactured to exacting tolerances to eliminate the need for thread locking compounds. Please refer to the bearing preload adjustment procedure (see page 4) to properly adjust hubs.

### **Dropout spacing and retention devices**

R45 front hubs are designed to work with 100mm fork drop out spacing only. Do not attempt to use your hub with any other dropout spacing. The axle is designed for exclusive use with a skewer-type retention device. Do not modify or alter the axle to accept thru-bolt retention devices.

R45 rear hubs are designed to work with 130mm frame drop out spacing only. Do not attempt to use your hub with any other dropout spacing. The axle is designed for exclusive use with a skewer-type retention device. Do not modify or alter the axle to accept thru-bolt retention devices.

## **Wheel building**

Proper wheel building technique is essential in creating a strong wheel. Wheel building is a skill that requires proper training and specialized tools and should be done by a trained professional.

For wheel building dimensions, see “Hub specifications and wheel building” table. (see page 2)

## **Radial lacing**

The R45 hubshell has been designed with the most common lacing patterns in mind. We recommend special care be taken when building and using radial laced wheels. The undersides of spoke heads may sometimes have considerable seam lines that can make an impression or “cut line” in the hubshell hole chamfer. Please inspect and selectively sort out these spokes to minimize this possibility. Spoke nipples on radial spokes may have a tendency to unthread themselves if a spoke preparation compound is not used on spoke threads. Radial laced wheels are also more sensitive to over- or under-tensioning, thus proper wheel building practices must be followed. Please follow the rim manufacturer’s recommended tension specifications when building wheels. Inspect hubs and check spoke tension at regular intervals.

## **Post wheel build bearing preload adjustment**

Your hub bearing preload is set at the factory anticipating spoke tension and skewer compression. However, because of variations in wheel building practices, a minor bearing adjustment may be required upon completion of the wheel build.

## **Break-in**

Once your new hub is placed in service, some settling may occur. Check adjustment by clamping wheel into frame with a quick-release skewer. Ride for 5-10 minutes, check for bearing play or binding, and readjust if necessary. Recheck after the first 1-5 hours of riding. Check cog lock ring on rear hubs after the first 20 hours of use, and tighten if necessary. Continue monitoring for the first 60 hours of use. See “Bearing preload adjustment.” (see page 4)

During the first 60 hours of use, above average amounts of drag may be noticed. This is normal as the seals break in, and will soon diminish. If this causes chain sag in the rear while back-pedaling, try increasing the B-tension (cage tension) on the rear derailleur.

## **Maintenance**

### **Service schedule**

Chris King R45 hubs are designed to provide long life and high performance. Beyond an occasional bearing preload adjustment, the only maintenance necessary is cleaning and lubricating the RingDrive, driveshell and bearings. Riding conditions will determine how often to maintain your hubs. As a beginning guideline, your hubs should be maintained after every 6-12 months of consistent use in normal and dry conditions and every 3 months in wet or muddy conditions.

Normal preventative maintenance of the RingDrive is simple and can be performed using basic tools. In many cases, a cleaning and reapplication of lubricant is all that may be necessary. If the hubs are running smoothly and are free of contamination, go to “Basic hub service.” (see page 7)

Periodically (every one to two years), or if foreign debris is detectable in the grease and/or the grease looks hard or dry, a complete servicing (removal and cleaning) of the RingDrive, driveshell and bearings should be performed. Complete service requires the use of our R45 Hub Service Tool. Go to “Complete service.”(see page 13)

An R45 Hub Service Tool Kit, RingDrive lube and replacement hub parts can be purchased through any authorized Chris King dealer or directly from Chris King Precision Components.

Chris King Precision Components provides overhaul services at reasonable rates. Contact the Customer Service hotline at 800-523-6008 or online at [info@chrisking.com](mailto:info@chrisking.com) for details.

## Wet conditions

Riding in wet conditions necessitates more frequent service. Often this is as simple as removing the axle and driveshell from the hub, removing any moisture from inside the hub shell, and applying more lube to the RingDrive assembly. This should not replace periodic complete disassembly and maintenance, especially in extreme or prolonged wet conditions. Since it is nearly impossible to seal a hub from water and still have it spin freely, we have designed our hubs to be able to operate normally with some water intrusion. Although the bearings are stainless steel and will resist water induced corrosion, the lubricant will eventually deteriorate, leading to premature wear and possible failure. High-pressure spray washing, transporting or riding the bicycle in the rain, or submersion in water while riding can all lead to lubricant contamination by water. Be aware of these situations and service more frequently when they occur.

## Cold conditions

If cold weather riding is anticipated, we recommend servicing your rear hub to ensure that no water is present in the drive components. At temperatures below freezing, water contamination inside the hub can freeze and thus impede hub engagement mechanisms.

## Lubrication

### R45 RingDrive™

We recommend using a quality 10w synthetic oil (such as Mobil 1® 10w-30 or equivalent) on the RingDrive assembly and helical splines on the driveshell. Oil provides optimal low drag, low viscosity lubrication for road riding applications. RingDrive lube is also acceptable. Do not substitute other brands of grease as they may be too thick or sticky for the helix of the RingDrive and cause hub engagement problems.

### R45 stainless steel bearings

For R45 bearings with stainless steel balls, apply a bead (approximately .3ml or half of the circumference) of RingDrive Lube around the top of the hub bearings. Rotate the inner race to work the lube throughout the ball area.

### R45 ceramic bearings

For R45 bearings with ceramic balls, apply enough RingDrive Lube to lightly coat the balls inside the bearing, using approximately .1ml (a pea-sized amount) of lube. This can be accomplished by applying a light bead of lube 1/8 to 1/4 of the way around the bearing. Rotate the inner race to work the lube throughout the ball area. In wet and/or muddy conditions, apply more lube to the bearings to help seal the bearings from contaminants.

## Solvents

Use of light duty mineral spirits-based solvents or cleaners is acceptable (i.e. WD-40™). Use of caustic or acidic cleaners may result in damage to the anodized coating.

## Bearing preload adjustment

R45 will require occasional bearing preload adjustment as the hubs break in. The best way to determine if a hub requires adjustment is to clamp the hub into a frame or truing stand. If side-to-side play is detected when the wheel is moved laterally, then the bearing preload requires adjustment. Correct adjustment of the rear hub is necessary for proper engagement of the RingDrive. **If the hub is run**





loose, the RingDrive may not engage properly and could lead to permanent damage of the internal parts.

## Front hub bearing preload adjustment

### If in a bike shop or workshop environment:

1. Remove axle skewer from hub.
2. Secure “L”-shaped 5 mm hex key in vice with shorter end of “L” facing up.
3. With adjusting cone facing up, insert hub axle onto 5 mm hex key so that hub can sit freely on vice.
4. Insert 5 mm hex key into adjusting cone-side of hub.
5. Turn hex key counter clockwise to loosen axle end and adjusting cone from main axle assembly. Unscrew until both items are free from main axle.
6. Unscrew axle end from adjusting cone.
7. Thread adjusting cone onto protruding axle threads until finger tight against bearing.
8. Then unthread adjusting cone a fraction of a turn so that axle spins freely, and no play is detected between axle and bearings.
9. Insert hub assembly onto 5 mm hex key in vice so that adjusting cone is facing up.
10. Thread axle end into adjusting cone two full turns, making sure that the adjusting cone does not turn in the process.
11. Place hub cone adjusting tool onto adjusting cone.
12. Use hub cone adjusting tool to hold adjusting cone in place while tightening axle end with 5 mm hex key to 110 in lbs. (12.4 Nm).
13. Check for excessive bearing drag by turning axle with fingers. If excessive drag is detected, go back to step 4 to reset bearing preload.
14. Check for bearing-axle play by clamping hub or wheel into frame or truing stand. If play is detected, go back to step 4 to reset bearing preload.



### If in the field:

Assuming that the axle end and adjusting cone is facing to the right:

1. Remove axle skewer from hub
2. Insert 5 mm hex keys into both ends of axle assembly.
3. Hold the left hex key steady while turning the right hex key in a counter clockwise direction. This will loosen the axle end and adjusting cone from the main axle assembly. Unscrew until both items are free from main axle.
4. Unscrew axle end from adjusting cone.
5. Thread adjusting cone onto protruding main axle threads until finger tight against bearing.
6. Then unthread adjusting cone a fraction of a turn so that axle spins freely, and no play is detected between axle and bearings.
7. Use one hand to make sure that adjusting cone does not continue to tighten or

loosen. Thread axle end into adjusting cone until it is snug.

8. Insert 5 mm hex keys into both ends of axle assembly.
9. Have a friend securely hold the hex key that is inserted into the main axle assembly. With one hand still securing the adjusting cone, tighten the axle end to 110 in lbs. (12.4 Nm) (very tight). **Please recheck torque when a torque wrench is available.**
10. Check for excessive bearing drag by turning axle with fingers. If excessive drag is detected, go back to step 3 to reset bearing preload.
11. Check for bearing-axle play by clamping hub or wheel into frame or truing stand. If play is detected, go back to step 3 to reset bearing preload.

## **Rear hub bearing preload adjustment**

### **If in a bike shop or workshop environment:**

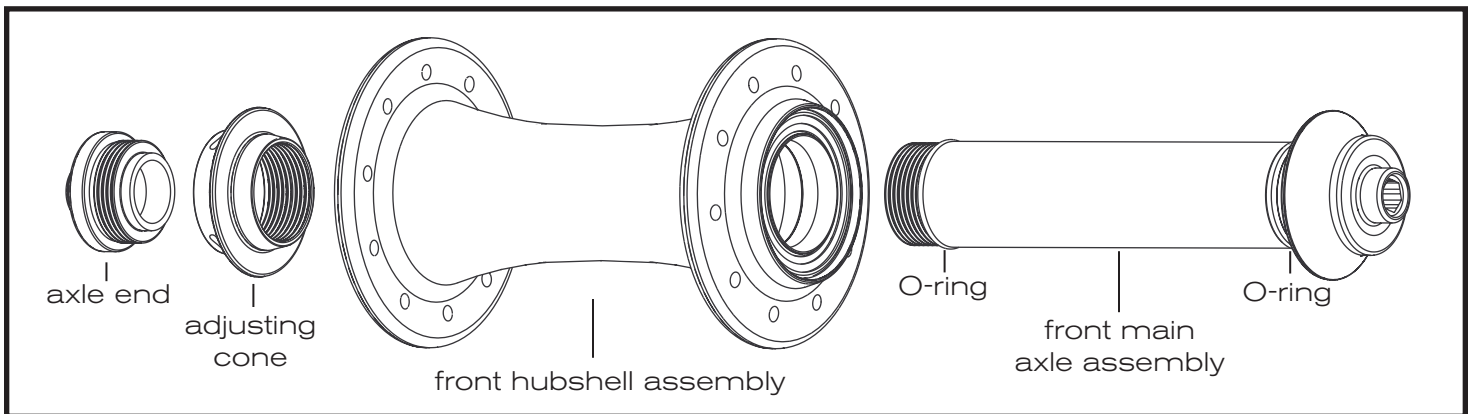
1. Remove axle skewer from hub.
2. Loosen 2.5mm hex bolt on adjusting clamp.
3. Turn adjusting clamp one full turn counter clockwise.  
  
Tech Tip: if adjusting clamp is difficult to remove, first insert a 5mm hex key into drive side axle end to keep axle stationary. Then insert a 2.5mm hex key into hole on adjusting clamp adjacent to 2.5mm hex bolt. Use 2.5mm hex key as a lever to unscrew adjusting clamp.
4. Secure "L"-shaped 5 mm hex key in vice with shorter end of "L" facing up
5. With non-driveside facing up, insert hub onto 5 mm hex key so that hub can sit freely on vice. If vice is not available, place the hub or wheel onto a flat, firm surface with the non-driveside facing up.
6. Push downward on the hubshell. This compresses the bearing spacer spring in the driveshell and ensures proper bearing seating.
7. While maintaining firm downward pressure on the hubshell, tighten the adjusting clamp onto axle until it stops against bearing. Do not overtighten.
8. Once adjusting clamp is in position, tighten adjusting clamp hex bolt to **10 inch-pounds (1.1 Nm)** using a **2.5mm** hex key.
9. Check adjustment by attaching wheel to bicycle frame. Check for bearing play or binding, and readjust adjusting clamp if needed.

### **If in the field:**

If play is detected in the rear wheel during a ride, it can be quickly remedied with the following steps. It is recommended to readjust the preload using the shop procedure as soon as possible.

1. With the wheel installed in a frame, loosen 2.5mm hex bolt on adjusting clamp
2. Place the 2.5mm hex key into the hole adjacent to the bolt
3. Gently tighten the adjusting clamp using the hex key as a lever. Do not overtighten
4. Tighten adjusting clamp hex bolt to **10 inch-pounds (1.1Nm)** using the **2.5mm** hex key. Do not overtighten.
5. Check for bearing play or binding. Readjust the Adjusting Clamp if necessary.





## Front hub - basic service

Follow these instructions to clean and relubricate front hub bearings, and to set bearing preload.

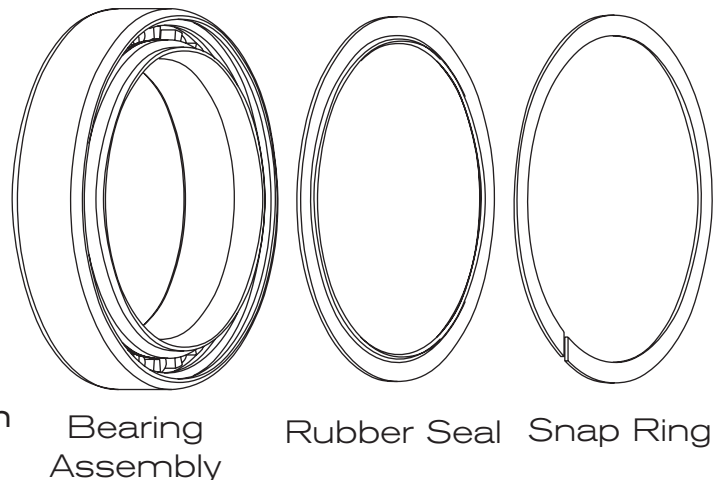
### Front hub disassembly

1. Remove axle skewer from hub
2. Secure "L"-shaped 5 mm hex key in vice with shorter end of "L" facing up
3. With adjusting cone facing up, insert hub axle onto 5 mm hex key so that hub can sit freely on vice.
4. Insert 5 mm hex key into adjusting cone-side of hub
5. Turn hex key counter clockwise to loosen axle end and adjusting cone from main axle assembly. Unscrew until both items are free from main axle.
6. Unscrew axle end from adjusting cone.
7. Slide main axle from hubshell assembly
8. Both front hub bearing assemblies can be now be accessed for cleaning and relubrication.
9. Proceed to "Service of the bearings" section.

Complete removal of front hub bearings requires the R45 Hub Service Tool. Refer to "Complete Service" for procedure. Front hub bearings do not need to be fully removed unless they are damaged and require replacement.

### Service of the bearings

Chris King sealed bearings have removable snap rings that hold the rubber seals in place.



1. Carefully, using a very small screwdriver, pick, or penknife, remove the snap ring by inserting tool into split of snap ring. Gently work one end of the snap ring toward bearing center until it is out of its groove. Follow the ring around with the tool until the snap ring is completely dislodged.
2. Lift and remove exposed rubber seal to access the interior of the bearing.
3. Thoroughly flush the bearing with a light solvent-based spray lubricant (e.g., WD-40™).

4. Scrub bearing surface with toothbrush to remove hardened grease and contaminants.
5. Flush bearing again with a light solvent-based spray lubricant.
6. Use compressed air to blow all spray lubricant, grease and contaminants out of the bearings and hubshell. If compressed air is not available, use a clean, lint-free towel to thoroughly wipe out interior of hubshell and bearing surfaces. Bearings and hubshell must be completely dry before adding new lubrication.

Some solvents, synthetic lubricants, and greases with high-pressure additives may attack and damage seals and other nonmetallic materials. Minimize exposure to these substances and thoroughly dry hub after cleaning.

7. Wipe dirt and other contaminants from the seals and snap rings. Avoid cleaning the seals with heavy-duty solvent, which could cause deterioration.
8. Lay a bead of our RingDrive lube (see “Lubrication”), filling the gap between the inner and outer races halfway around bearing. Do not overfill bearing with lube, as this may cause excess drag. Rotate the inner race to work grease throughout the ball area.
9. Replace rubber seal between inner and outer race in its original orientation to minimize drag.
10. Insert one edge of snap ring into groove of outer bearing race. Press along entire groove until snap ring is fully seated; a very small gap should be visible between both ends of the snap ring.
11. Turn inner race of bearing by hand to test for binding. If bearings have excessive drag, try reinstalling seals and snap rings. Bearing drag is often a result of improperly seated seals and/or snap rings.

## Front hub reassembly and adjustment

1. Vice assembly: setup 5 mm hex key in vice
2. Clean threads and O-rings on main axle, axle end and adjusting cone.
3. Apply thin layer of waterproof grease to threads on axle, axle end, and adjusting cone. Apply a drop of light chain lube (Tri-Flow™, etc) to O-rings on axle.
4. Slide main axle into hubshell assembly.
5. Thread adjusting cone onto protruding axle threads until finger tight against bearing
6. Then unthread adjusting cone a fraction of a turn so that axle spins freely, and no play is detected between axle and bearings.
7. Insert hub assembly onto 5 mm hex key in vice so that adjusting cone is facing up
8. Thread axle end into adjusting cone two full turns,



making sure that the adjusting cone does not turn in the process.

9. Place hub cone adjusting tool onto adjusting cone.
10. Use hub cone adjusting tool to hold adjusting cone in place while tightening axle end with 5 mm hex key to 110 in lbs. (12.4 Nm).
11. Check for excessive bearing drag by turning axle with fingers. If excessive drag is detected, go back to step 6 to reset bearing preload.
12. Check for bearing-axle play by clamping hub or wheel into frame or truing stand. If play is detected, go back to step 6 to reset bearing preload. **Running the hub loose could lead to permanent damage of the internal parts.**

## Rear hub - basic service

Follow these instructions for a basic cleaning, relubrication, and bearing preload procedure.

Refer to the schematics (see page 3) of this manual for specific part listing.

For a more comprehensive service, including a thorough cleaning, inspection and replacement of parts, and removal of hub bearings, an R45 Hub Service Tool is required. Refer to "Complete Service" for procedure.

## Rear hub disassembly

1. Remove skewer, cog lock ring and cassette from hub.
2. Loosen 2.5mm hex bolt on adjusting clamp and then remove R45 QR insert from main axle assembly by pulling it directly out of the non-driveside of axle.
3. Unscrew adjusting clamp and remove it from axle. [Tech Tip: if adjusting clamp is difficult to remove, first insert a 5mm hex key into drive side axle end to keep axle stationary. Then insert a 2.5mm hex key into hole on adjusting clamp adjacent to 2.5mm hex bolt. Use 2.5mm hex key as a lever to unscrew adjusting clamp.]
4. Remove axle from the main hub assembly by pushing it through from the non-driveside. [Tech note: The outboard driveshell bearing of the Shimano-compatible R45 may or may not remain on the axle as it is pushed out of the hubshell assembly. It will remain on the axle in the Campagnolo-compatible version.]
5. Remove driveshell by holding hubshell or wheel in one hand and with other hand pull driveshell straight out of hubshell assembly.
6. All rear hub bearing and RingDrive assemblies can now be accessed for basic cleaning and relubrication.

## 7. Rear hub basic cleaning

Chris King sealed bearings have removable snap rings that hold the rubber seals in place.

1. Carefully, using a very small screwdriver, pick, or penknife, remove the snap ring by inserting tool into split of snap ring. Gently work one end of the snap ring toward bearing center until it is out of its groove. Follow the ring around with the tool until the snap ring is completely dislodged.
2. Lift and remove exposed rubber seal to access the interior of the bearing.
3. Thoroughly flush the bearing and RingDrive assembly with a light solvent-based spray lubricant (e.g., WD-40™). **Do not use citrus based cleansers as they are corrosive and will damage hub parts.**

Some solvents, synthetic lubricants, and greases with high-pressure additives may

attack and damage seals and other nonmetallic materials. Minimize exposure to these substances and thoroughly dry hub after cleaning.

4. Using a toothbrush, scrub bearing surfaces, RingDrive splines and teeth, and helical splines on driveshell with toothbrush to remove hardened grease and contaminants.
5. Flush bearing and RingDrive assembly again with a light solvent-based spray lubricant.
6. Use compressed air to blow all spray lubricant, old grease and contaminants out of the bearings and hubshell. If compressed air is not available, use a clean, lint-free towel to thoroughly wipe out interior of hub assembly and bearing surfaces. Bearings, RingDrive and hub interior must be completely dry and free of solvents before adding new lubrication.
7. Wipe dirt and other contaminants from the seals and snap rings. Avoid cleaning the seals with heavy-duty solvent, which could cause deterioration.

## **Rear hub basic lubrication**

**Please refer to the Service of Bearing section beginning on page 9 to properly service rear hub bearings.**

1. Apply 1 to 2 mL of 10w synthetic oil on the helical splines of the driven ring inside of the hubshell assembly
2. Apply a drop of light chain lube (Tri-Flow™, etc) onto O-ring on driveshell. Apply a thin layer of grease onto clean threads in driveshell.
3. Apply a drop of light chain lube (Tri-Flow™, etc) onto both O-rings on axle and O-ring on QR adaptor. Apply a thin layer of grease onto clean threads on adjusting clamp and adjusting clamp 2.5 mm hex screw.

## **Rear hub basic reassembly**

1. Insert driveshell into the hub shell; turn in a clockwise motion while letting it pull itself in. A distinctive click sound will indicate that the driveshell is firmly seated.
2. If outboard driveshell bearing is separated from axle, slide it onto axle with the black seal and silver snapping facing the driveside and the white bearing retainer facing the non-driveside.
3. Insert main axle, threaded (non-driveside) end first into driveshell. Continue until axle is through the hub and driveside end is firmly seated in driveshell.
4. Thread adjusting clamp onto the protruding threads on the non-driveside of axle.
5. Insert R45 QR insert into non-driveside axle end.
6. Snug adjusting clamp up to bearing.

## **Rear hub adjustment**

The R45 rear hub features an adjusting clamp and bearing spacer spring that maintain proper bearing preload and seating.

1. Secure "L"-shaped 5 mm hex key in vice with shorter end of "L" facing up
2. With non-driveside facing up, insert hub onto 5 mm hex key so that hub can sit freely on vice. If vice is not available, place the hub or wheel onto a flat, firm surface with the non-driveside facing up.
3. Push downward on the hubshell. This compresses the bearing spacer spring in the drive shell and ensures proper bearing seating.



4. While maintaining firm downward pressure on the hubshell, tighten the adjusting clamp onto axle until it stops against bearing. Do not overtighten.
5. Once adjusting clamp is in position, tighten adjusting clamp hex bolt to **10 inch-pounds (1.1 Nm)** using a **2.5mm** hex key.
6. Double check adjustment by attaching wheel to bicycle frame. Check for bearing play or binding, and readjust adjusting clamp if needed.

**Note: Correct adjustment of the rear hub is necessary for proper engagement of the RingDrive. If the hub is run loose, the RingDrive may not engage properly and could lead to permanent damage of the internal parts.**

## Complete Service - Usage of the R45 Hub Service Tool

Periodically (every one to two years), or if foreign debris is detectable in the grease and/or the grease looks hard or dry, a complete servicing (removal and cleaning) of the RingDrive, driveshell and bearings should be performed. The R45 Hub Service Tool allows for all small parts to be pressed out of the hub to be cleaned, inspected, replaced if necessary, and pressed back into the hubshell/driveshell.

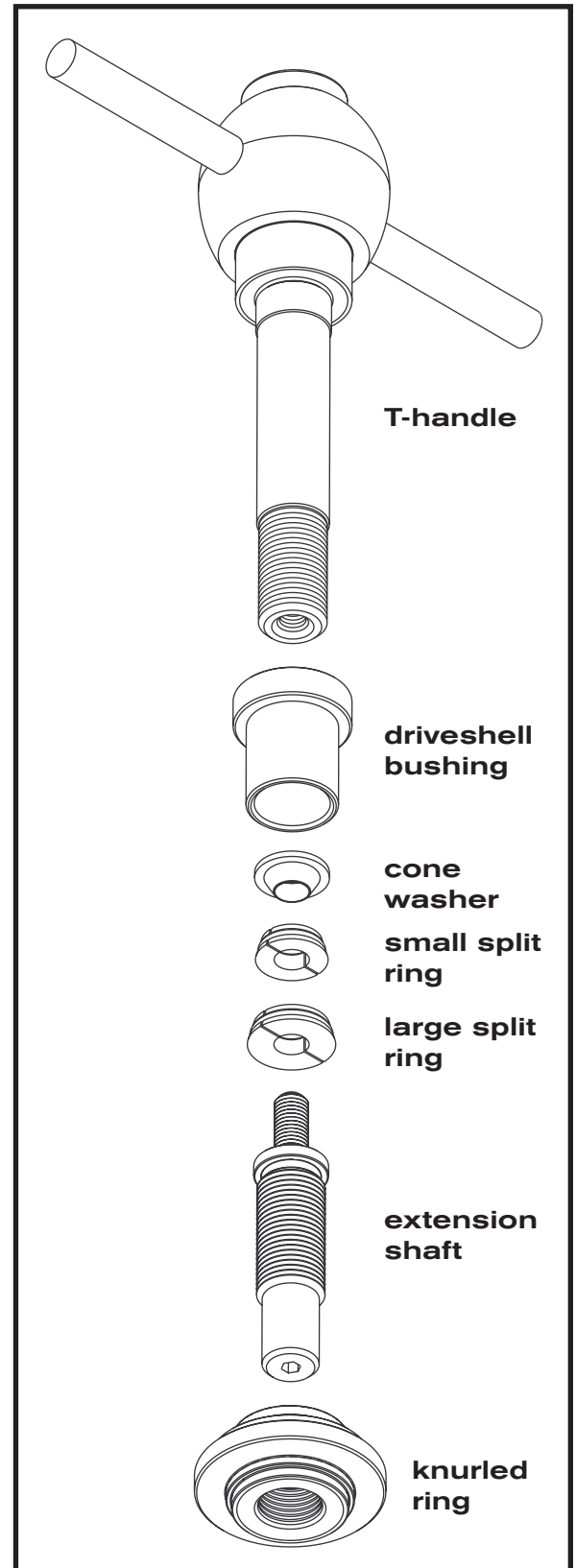
**It is important to note that the R45 Hub Service Tool can only be used on R45 hubs, and cannot service other Chris King hubs without significantly risking damage to both the tool and hubs. Similarly, the standard Chris King Hub Service Tool (non-R45 compatible version) cannot service R45 hubs without significantly risking damage to both the tool and hubs.**

This tool set is designed only for working on Chris King R45 hubs. It is not intended to be used with any other parts or on any other hubs. Use other than that for which it is intended may cause damage to the tool, other products, and/or bodily harm.

## Introduction to the R45 Hub Service Tool

The tool is made up of the following parts

1. **T-handle.** This is the main part of the pressing device. It is a long shaft with threads on one end, and a bulbous end with a handlebar through it. It has a steel strike piece in the top of the bulbous end that may be struck with a hammer or mallet. Permanently mounted to the T-handle is the thrust collar, which should be able to spin freely.
2. **Driveshell bushing.** This is a tube shaped part with one end bigger than the other. It is used when removing and installing the inboard driveshell bearing into the drive shell.





3. **Cone washer.** This part is a steel washer with one side shaped like a cone. It goes on the small end of the extension shaft before it is screwed into the T-handle. Its function is to make split rings expand (explained in next section).
4. **Split rings.** These are doughnut shaped with an O-ring around the outside. They have been precisely cut in half to allow them to be expanded to a bigger diameter. These are the pieces that get behind the bearings to force them out by their outer races. The large split ring is for the RingDrive and large hubshell bearing in the rear hub. The small split ring is for all the small bearings in the front and rear hub shells and the driveshell.
5. **Extension shaft.** A threaded shaft with a knurled section on one end and small threads on the other, it screws into the end of the T-handle. A 4 mm hex key can be inserted into the knurled end to gain leverage when needed.
6. **Knurled ring.** This is the large round piece with a threaded hole. It can be threaded on to either the extension shaft or the T-handle. It is used to pull bearings into their respective bores upon assembly or to capture parts as they are being tapped out.

### **Function of the expanding split rings**

1. Slide the appropriate split ring onto the small end of the extension shaft with laser marked side facing towards knurled end of extension shaft.
2. Follow it by the cone washer, pointed end first, onto the shaft next to the split ring.
3. Take this complete assembly and thread it into the hole in the threaded end of the T-handle.
4. As you screw it together, you will force the cone washer into the split ring. The split ring will begin to expand; continue screwing until the cone has disappeared completely into the split ring. With the cone washer clamping the split ring, fully expanded, against the flange of the extension shaft the tool is ready to drive a bearing. When driving bearings, the split ring should only be used in this fully expanded and clamped position.
5. Release by unscrewing the extension shaft from the T-handle. A hole is provided in the end of the extension shaft for a 4 mm hex key in the event it has become too tight to turn with fingers.

## **Front hub - complete service**

Front hub bearing removal is only necessary when a bearing is damaged and must be replaced. If the bearings are contaminated but not damaged, follow the directions in the “Basic service - front hub” section to clean and relubricate the bearings.

## **Front hub complete disassembly**

### **R45 tool setup for front hub bearing disassembly**

Slide small split ring onto extension shaft with laser marked side facing towards knurled end of extension shaft. Slide cone onto extension shaft with narrow end facing split ring. Thread extension shaft onto T-handle until assembly is snug, but split ring is not expanded.

1. Remove axle skewer from hub
2. Secure “L”-shaped 5 mm hex key in vice with shorter end of “L” facing up
3. With adjusting cone facing up, insert hub onto 5 mm hex key so that hub can sit freely on vice.
4. Insert 5 mm hex key into adjusting cone-side of hub

5. Turn hex key counter clockwise to loosen axle end and adjusting cone from main axle assembly. Unscrew until both items are free from main axle.
6. Unscrew axle end from adjusting cone.
7. Slide main axle from hubshell assembly
8. Both front hub bearing assemblies can be now be accessed for cleaning and relubrication.

### **Removal of front hubshell bearings**

1. Insert T-handle assembly into hubshell.
2. Thread knurled ring, laser side out, onto extension shaft until it is half way up the extension shaft threads.
3. Move hubshell toward knurled ring until knurled ring sits flush with bearing.
4. Turn extension shaft clockwise until tight to fully expand split ring behind bearing.
5. Invert T-handle so that hubshell falls onto expanded small split ring.
6. Turn knurled ring clockwise until it sits tightly against bearing.
7. Firmly grasp wheel or hub body. Using a hammer, tap strike plate on T-handle to remove bearing and the inner seal behind it.
8. After removing bearing from hubshell, check to see if bearing can turn freely. If bearing does not spin, lay bearing onto hard flat surface with the solid white plastic portion facing down. Tap inner race lightly with a wide-headed hammer to properly align the bearing races.
9. Repeat steps above to remove second bearing from front hubshell.

After removing bearing from hubshell, check to see if bearing can turn freely. If bearing does not spin, lay bearing onto hard flat surface and tap inner race lightly with a wide headed hammer. This will properly align inner bearing race with outer race.



### **Front hub bearing service**

Clean and relubricate the hubshell bearings. Follow bearing service instructions in the "Service of the bearings" section on page 9 of this manual.

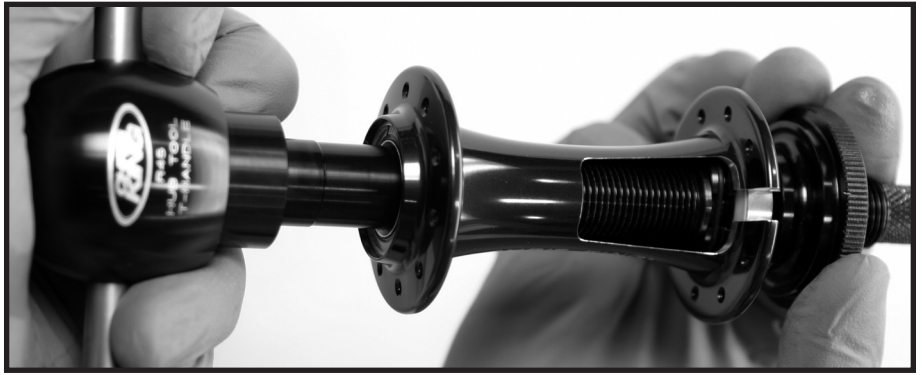
Replacement bearings and other small parts can be purchased from any authorized Chris King dealer. Small parts can be purchased directly from Chris King Precision Components. Contact the Customer Service hotline at 800-523-6008 or online at [info@chrisking.com](mailto:info@chrisking.com) for details.

### **Front hub bearing complete reassembly**

#### **R45 tool setup for front hub bearing reassembly**

1. Slide onto T-handle: bearing with snap ring facing thrust collar, then white inner seal, then hubshell.
2. Thread knurled ring onto T-handle with laser marked side facing T-handle.

3. Hold knurled ring stationary in one hand while turning T-handle clockwise with the other hand until it stops. This will press the front hub bearing into the hubshell.
4. Repeat steps above to install second front hubshell bearing.



## Front hub final reassembly and adjustment

1. Vice assembly: setup 5 mm hex key in vice
2. Clean threads and O-rings on main axle, axle end and adjusting cone.
3. Apply thin layer of waterproof grease to threads on axle, axle end, and adjusting cone. Apply a drop of light chain lube (Tri-Flow™, etc) to O-rings on axle.
4. Slide main axle into hubshell assembly.
5. Thread adjusting cone onto protruding axle threads until finger tight against bearing
6. Then unthread adjusting cone a fraction of a turn so that axle spins freely, and no play is detected between axle and bearings.
7. Insert hub assembly onto 5 mm hex key in vice so that adjusting cone is facing up
8. Thread axle end into adjusting cone two full turns, making sure that the adjusting cone does not turn in the process.
9. Place hub cone adjusting tool onto adjusting cone.
10. Use hub cone adjusting tool to hold adjusting cone in place while tightening axle end with 5 mm hex key to 110 in lbs. (12.4 Nm).
11. Check for excessive bearing drag by turning axle with fingers. If excessive drag is detected, go back to step 6 to reset bearing preload.
12. Check for bearing-axle play by clamping hub or wheel into frame or truing stand. If play is detected, go back to step 6 to reset bearing preload.



## Rear hub - complete service

A complete service on the R45 rear hub should be performed periodically (every one to two years), or if foreign debris is detectable in the oil and/or the grease looks hard or dry. Also use this process to replace any worn or broken parts within the hub assembly. A complete service involves a thorough cleaning, inspection and relubrication of small parts and hub bearings. An R45 Hub Service Tool is required for this procedure.

### Rear hub basic disassembly

1. Remove skewer, cog lock ring and cassette from hub.
2. Loosen 2.5mm hex bolt on adjusting clamp and then unscrew it until it is loose on axle.
3. Wrap shop rag around adjusting clamp and use adjusting clamp to pull R45 QR insert directly out of non-driveside aRemove it from axle. [Tech Tip: if adjusting clamp is difficult to remove, first insert a 5mm hex key into drive side axle end to keep axle stationary. Then insert a 2.5mm hex key into hole on adjusting clamp adjacent to 2.5mm hex bolt. Use 2.5mm hex key as a lever to unscrew adjusting clamp.]
4. Remove axle from the main hub assembly by pushing it through from the non-driveside. [Tech note: The outboard driveshell bearing of the Shimano-compatible R45 may or may not remain on the axle as it is pushed out of the hubshell assembly. It will remain on the axle in the Campagnolo-compatible version.]
5. Remove driveshell by holding hubshell or wheel in one hand and with other hand pull driveshell straight out of hubshell assembly.

### R45 tool setup for rear small hubshell bearing removal

Slide small split ring onto extension shaft with laser marked side facing towards knurled end of extension shaft. Slide cone onto extension shaft with narrow end facing split ring. Thread extension shaft onto T-handle until assembly is snug, but split ring is not expanded.

1. Insert T-handle assembly into driveside of rear hubshell.
2. Thread knurled ring onto extension shaft, with the laser marked side facing away from the T-handle, until it is half way onto the extension shaft
3. Move hubshell toward knurled ring until knurled ring sits flush with small hubshell bearing.
4. Turn extension shaft clockwise until tight to fully expand split ring behind small hubshell bearing
5. Invert T-handle so that hubshell falls onto expanded small split ring.
6. Turn knurled ring clockwise until it sits tightly against small hubshell bearing.
7. Using a hammer, tap strike plate on T-handle to remove small hubshell bearing and the inner seal behind it.





## Rear hub large hubshell bearing and RingDrive disassembly

### R45 tool setup for rear large hubshell bearing and RingDrive disassembly

Slide drive shell bushing onto T-handle with wide side facing T-handle. Slide large split ring onto threaded portion of extension shaft with laser side facing knurled end of extension shaft. Then slide cone onto extension shaft with narrow end facing split ring.

1. Thread extension shaft onto T-handle until assembly is snug, but split ring is not expanded.
2. Insert T-handle assembly into non-driveside of rear hubshell.
3. Turn extension shaft clockwise until tight to fully expand large split ring inside of hub. Ensure that split ring expands between the spring retainer and the narrow part of the hub body.
4. The driveshell bushing tool slides into the hub body in place of the non-driveside bearing that has already been removed.
5. After ensuring that large split ring is expanded against the spring retainer, thread on knurled ring with the laser marked side facing away from the hub. Tighten knurled ring until it sits tightly against large hub bearing.



6. Using a mallet or hammer, tap strike plate on T-handle to remove large hubshell bearing, inner seal, driven ring, drive ring, spring and spring retainer.

**TECH NOTE: Large hubshell bearing can only be removed along with the entire RingDrive assembly. An attempt to only remove the large hubshell bearing will likely result in the damage to large hubshell bearing and hub service tool.**

## Rear hub driveshell disassembly

### R45 tool setup for driveshell disassembly

Slide drive shell bushing onto T-handle with wide side facing thrust collar. Slide small split ring onto threaded portion of extension shaft with laser side facing knurled end of extension shaft. Then slide cone onto extension shaft with conical side facing split ring. Thread extension shaft onto T-handle until assembly is snug, but split ring is not expanded.

1. If outboard driveshell bearing remained inside driveshell when axle was removed from driveshell, proceed to step 2. If outboard driveshell bearing was removed along with axle when axle was removed from driveshell, simply remove O-ring and driveshell spring from driveshell manually.
2. Insert the T-handle into the narrower, non-driveside end of driveshell.
3. Thread knurled ring, laser side facing T-handle, onto





extension shaft exactly 4 turns.

4. Move driveshell so it sits against knurled ring.
5. Turn extension shaft clockwise until tight to fully expand split ring behind inboard driveshell bearing.
6. Hold knurled ring stationary in one hand, while turning T-handle clockwise with the other hand. This will remove all remaining contents of driveshell, including inboard driveshell bearing and white bearing seal.



## Rear hub complete cleaning

Chris King sealed bearings have removable snap rings that hold the rubber seals in place.

1. Carefully, using a very small screwdriver, pick, or penknife, remove the snap ring by inserting tool into split of snap ring. Gently work one end of the snap ring toward bearing center until it is out of its groove. Follow the ring around with the tool until the snap ring is completely dislodged.
2. Lift and remove exposed rubber seal to access the interior of the bearing.
3. Thoroughly flush all small parts and bearings with a light solvent-based spray lubricant (e.g., WD-40™).

Some solvents, synthetic lubricants, and greases with high-pressure additives may attack and damage seals and other nonmetallic materials. Minimize exposure to these substances and thoroughly dry hub after cleaning.

4. Using a toothbrush, scrub bearing surfaces, splines and teeth on drive ring and driven ring, and helical splines on driveshell with toothbrush to remove hardened grease and contaminants.
5. Scrub out interior of hubshell and driveshell.
6. Wipe dirt and other contaminants from the seals and snap rings. Avoid cleaning the seals with heavy-duty solvent, which could cause deterioration.
7. Flush bearings and RingDrive assembly again with a light solvent-based spray lubricant to flush out any remaining contaminants.
8. Use compressed air to blow all spray lubricant, old grease and contaminants from all parts. If compressed air is not available, use a clean, lint-free towel to thoroughly dry all parts. All parts must be completely dry and free of solvents before adding new lubrication and reassembly.

## Rear hub bearing lubrication

Clean and relubricate the hubshell bearings. Follow bearing service instructions in the "Service of the bearings" section on page 9 of this manual.

## Rear hub large hubshell bearing and RingDrive reassembly

### R45 tool setup for rear large hubshell bearing and RingDrive reassembly

1. Slide driveshell bushing onto T-handle with larger side facing thrust collar.
2. Be sure that spring retainer O-ring is installed in inner diameter of spring retainer. Apply a drop of light chain lube (Tri-Flow™, etc) to spring retainer O-ring. Insert spring retainer into driveside of hubshell.
3. Insert spring into hubshell.
4. Insert drive ring into hubshell with engagement teeth facing up.
5. Insert driven ring into hubshell with engagement teeth facing down.
6. Line up splines on outside of driven ring with splines on interior of hubshell. Gently press down on driven ring until it is firmly seated inside of hubshell spline interface.
7. Insert white inner seal into hubshell.
8. Invert T-handle and slide T-handle through non-driveside of hubshell assembly so that driveside is facing up. Invert T-handle and slide T-handle through non-driveside of hubshell assembly so that driveside is facing up.



1. Slide driveshell bushing.

2. Be sure that the spring retainer O-ring is installed



2. spring retainer



3. spring



4. drive ring



5/6. driven ring



7. inner seal



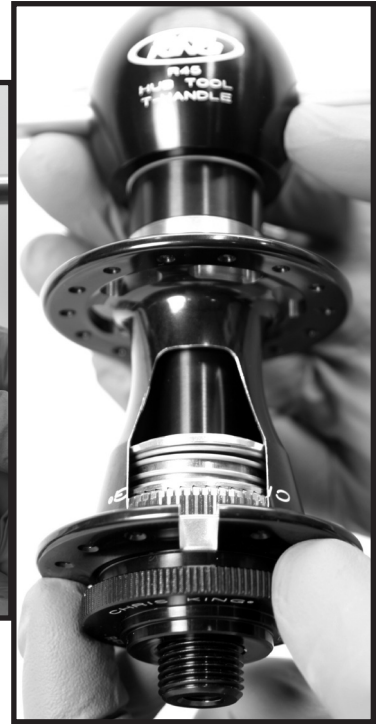
8. Invert T-handle

9. Place bearing onto hubshell assembly with snapping side facing out.
10. Thread knurled ring, laser marked side facing away from T-handle, onto T-handle until flush with bearing.
11. Hold knurled ring in place while turning T-handle clockwise until large hubshell bearing is fully pressed into hubshell.

## Rear hub small hubshell bearing reassembly

### R45 tool setup for rear small hubshell bearing reassembly

1. Slide small hubshell bearing onto T-handle so that snap ring is facing T-handle
2. Slide white inner seal into T-handle
3. Slide hubshell assembly, non-driveside first, onto T-handle
4. Thread knurled ring, laser marked side facing away from T-handle, onto T-handle until it is flush with large hubshell bearing.
5. Hold knurled ring in place while turning T-handle clockwise until small hubshell bearing is fully pressed into hubshell.



## Rear hub driveshell reassembly

### R45 tool setup for driveshell reassembly

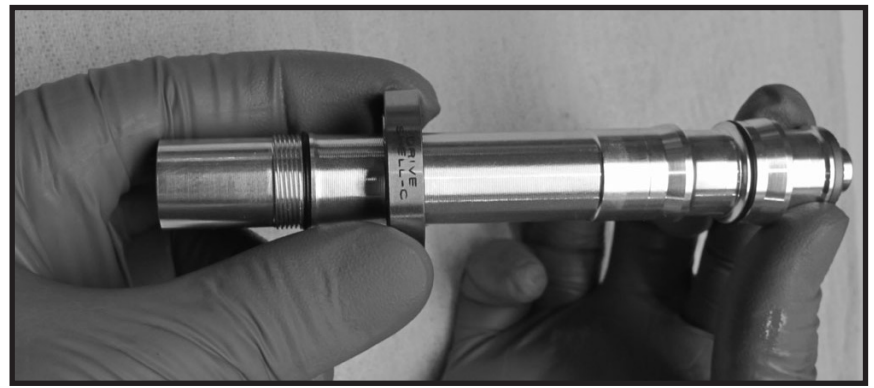
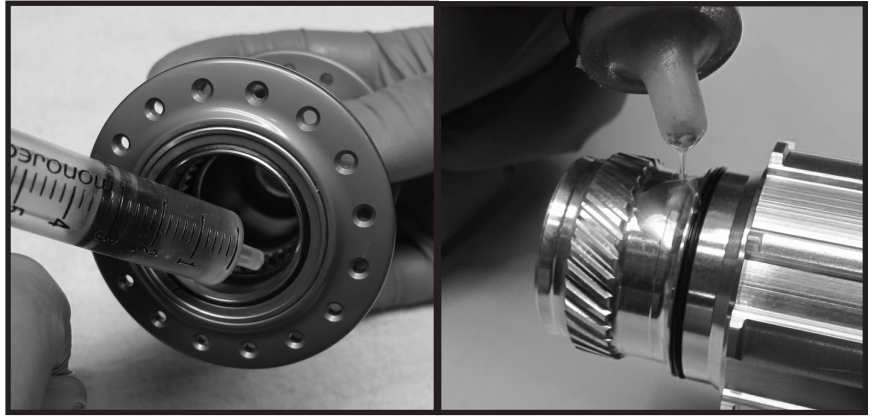
1. Slide driveshell bushing onto T-handle so that larger end of bushing faces away from T-handle.
2. Slide clean, relubricated small inboard driveshell bearing (laser marked "drive shell-B" on bearing) onto T-handle so that ball bearings face T-handle.
3. Slide on white inner seal onto T-handle.
4. Slide driveshell onto T-handle.
5. Thread on knurled ring, laser side facing in, until snug against driveshell.
6. Hold knurled ring in place while turning T-handle clockwise until inboard driveshell bearing is fully pressed into driveshell.
7. Insert driveshell spacer spring into driveshell.
8. Insert driveshell inner O-Ring into driveshell so that it seats cleanly against driveshell spacer spring



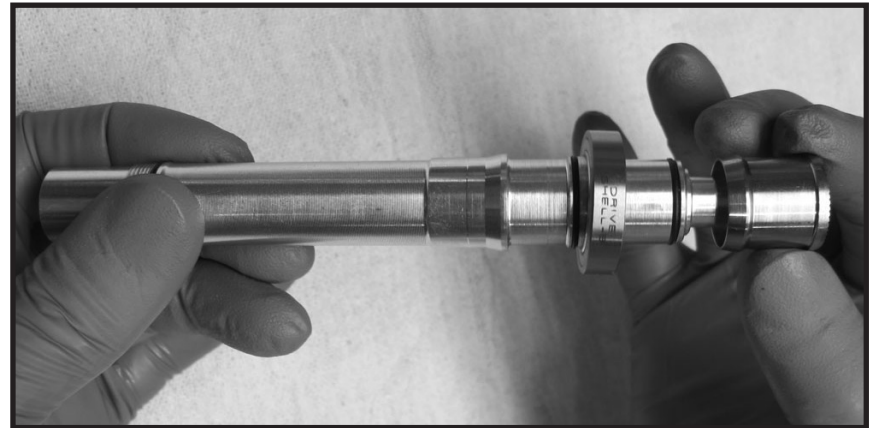


## Rear hub final reassembly

1. Apply 1 to 2 mL of oil onto helical splines on drive ring.
2. Apply a drop of light chain lube (Tri-Flow™, etc) onto both O-rings on axle and O-ring on QR adaptor. Apply a thin layer of grease onto clean threads on adjusting clamp and adjusting clamp 2.5 mm hex screw.
3. Insert driveshell into the hub shell; turn in a clockwise motion while letting it pull itself in. A distinctive click sound will indicate that the driveshell is firmly seated.
4. Shimano®/SRAM® Axles. Slide cleaned, relubricated outer driveshell bearing (laser marked "C" on bearing) onto main axle with snap ring facing out toward driveside.
5. Campagnolo® Axle. Slide cleaned, relubricated outer driveshell bearing (laser marked "B" on bearing from drive side on to main axle with snap ring facing out toward driveside. Press on retainer sleeve from drive side.
6. Insert main axle, threaded (non-driveside) end first into driveshell. Continue until axle is through the hub and driveside end is firmly seated in driveshell.
7. Thread adjusting clamp onto the protruding threads on the non-driveside of axle.
8. Insert R45 QR insert into non-driveside axle end.
9. Snug adjusting clamp up to bearing.



4. Shimano®/SRAM® Axle and Bearing assembly

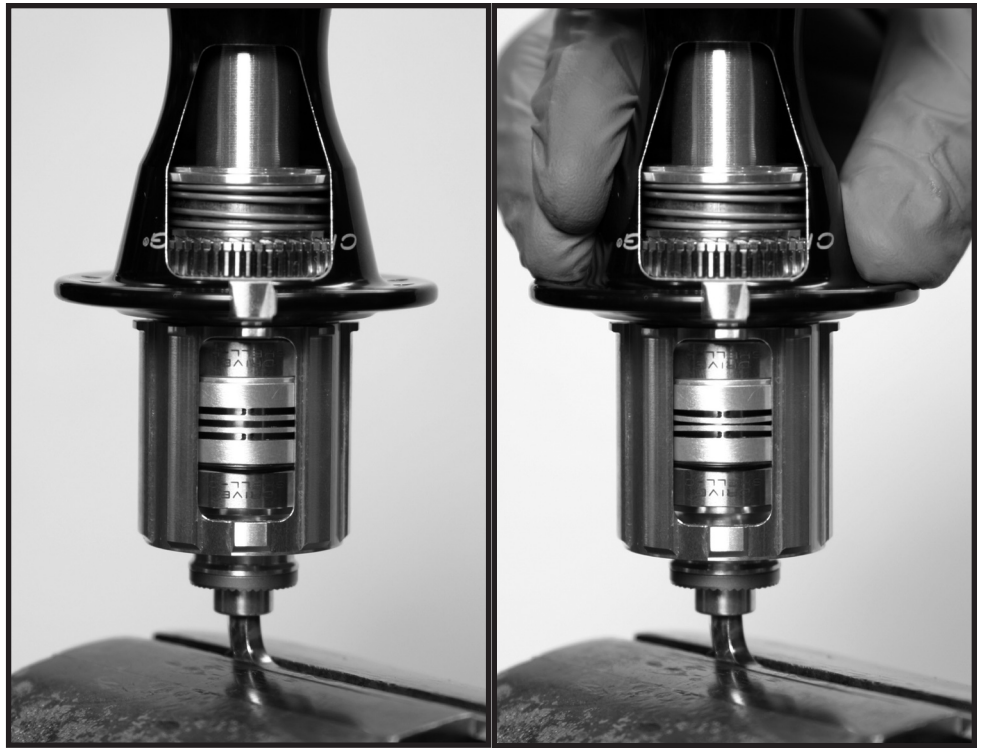


5. Campagnolo® Axle and Bearing assembly

## Rear hub adjustment

The R45 rear hub features an adjusting clamp and bearing spacer spring that maintain proper bearing preload and seating.

1. Secure “L”-shaped 5 mm hex key in vice with shorter end of “L” facing up
2. With non-driveside facing up, insert hub onto 5 mm hex key so that hub can sit freely on vice. If vice is not available, place the hub or wheel onto a flat, firm surface with the non-driveside facing up.
3. Push downward on the hubshell. This compresses the bearing spacer spring in the drive shell and ensures proper bearing seating. See photos below.
4. While maintaining firm downward pressure on the hubshell, tighten the adjusting clamp onto axle until it stops against bearing. Do not overtighten.
5. Once adjusting clamp is in position, tighten adjusting clamp hex bolt to **10 inch-pounds (1.1 Nm)** using a **2.5mm** hex key.
6. Double check adjustment by attaching wheel to bicycle frame. Check for bearing play or binding, and readjust adjusting clamp if needed.



Note bearing spacer spring before being compressed (left), and while under compression (right). Proper bearing preload can be set only while spacer spring is under compression.

**Note: Correct adjustment of the rear hub is necessary for proper engagement of the RingDrive. If the hub is run loose, the RingDrive may not engage properly and could lead to permanent damage of the internal parts.**



## **Additional support**

Check our website often for updated technical information and new revisions of this service manual to help you, our customers, stay on your bike. Visit: [chrisking.com/tech](http://chrisking.com/tech).

Additional questions? Please email us at [info@chrisking.com](mailto:info@chrisking.com) or call the customer service hotline at 800-523-6008.

Printed with soy ink. Contains 100% post consumer recycled paper fiber.

Thank you for your purchase!

All Chris King Precision Components products are manufactured in the USA using industry leading environmental and quality control standards.

All trademarks, registered trademarks, and logos are of their respective holders.

©King Cycle Group, 2010. All rights reserved.

**CHRIS KING**<sup>®</sup>  
**PRECISION COMPONENTS**

2801 NW Nela Street, Portland, Oregon 97210  
800.523.6008 | [chrisking.com](http://chrisking.com) | [info@chrisking.com](mailto:info@chrisking.com)