

***Rolf***  
***PRIMA***

**WHEEL SYSTEMS**  
Service Manual





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**PLEASE NOTE:** The following service information is provided as a guide for the professional mechanic. These instructions are written with the assumption that the mechanic is familiar with bicycle repair principles and has suitable and appropriate tools. Be certain that this manual pertains to the specific model and model year of Rolf Prima wheel in question.

## SECTION ONE:

### INSPECTION – BEFORE EVERY RIDE

Before every ride be sure to inspect every item on this list to ensure your Rolf Prima wheels are in top condition and are properly installed on your bicycle. If you find that your wheel system requires service or further inspection, see our Factory Service Program or contact your local dealer.

#### CHECK THAT THE WHEELS RUN TRUE

Spin each wheel and watch the rim where it passes the brake pads. If the rim moves up and down [radially] or side to side [laterally] excessively, or does not spin evenly, have the wheel inspected by your Rolf Prima Wheel System dealer.

#### CHECK THAT THE RIMS ARE CLEAN

Dirty or greasy rims greatly reduce braking effectiveness. Particularly dirty rims can present a significant safety risk. Clean the rim braking surface with a clean shop rag or wash them with soap and water and let them air dry.

#### CHECK THAT BRAKE PADS ARE CLEAN AND PROPERLY ADJUSTED

#### CHECK THAT THE TIRES ARE PROPERLY INFLATED

Inflate tires to a pressure appropriate for your weight and riding conditions. Never exceed the maximum pressure indicated on the tire sidewall, or 120psi for clincher type rims. (See Tire Pressure section). Your rims can be damaged by riding with insufficient tire pressure. Inspect the tires for damage or excessive wear. If you have any questions about the condition of your tires or appropriate tire pressure, have them inspected by your local bike shop.

For Rolf Prima Carbon tubular wheels, inflate tires to the maximum inflation pressure indicated on the tire sidewall, but at least to a minimum of 110 psi. Please note: Carbon fiber rims can be easily damaged if ridden with insufficient tire pressure. Impact damage to rims is not covered under your Rolf Prima warranty. Many tubular tires tend to lose significant amounts of pressure over a short period of time. It is very important that tubular tires are checked for proper tire pressure before every ride.

#### CHECK THAT THE QUICK RELEASE MECHANISMS ARE PROPERLY CLOSED

Your wheels are equipped with quick release wheel retention mechanisms. The quick release allows the wheel to be removed and installed without tools. For proper and safe operation, read these instructions carefully.

### **WARNING!**

Failure to have wheel quick release retention mechanisms properly adjusted and closed may cause loss of control resulting in personal injury or death. If you have any questions about the operation of this system, consult your dealer.

## OPERATION OF QUICK RELEASE MECHANISMS

**IMPORTANT: IF YOU DO NOT UNDERSTAND ANY PORTION OF THESE INSTRUCTIONS, HAVE YOUR ROLF PRIMA DEALER SHOW YOU PROPER INSTALLATION OR CONTACT ROLF PRIMA DIRECTLY.**

1. Check both wheels before every ride.
2. Move the quick release lever to the OPEN position [fig. 1] and place the wheel so the axle seats firmly in the frame or fork tips.



FIGURE 1

3. With the lever about halfway between the OPEN and CLOSED position [fig. 2], tighten the quick release adjusting nut on the opposite end of the quick release axle until finger tight.

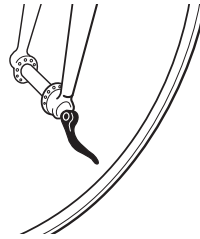


FIGURE 2

4. Move the lever as far as it will go to the closed position [fig. 3 & 4]. At the half way closed position [fig. 2] you should feel resistance to this motion.

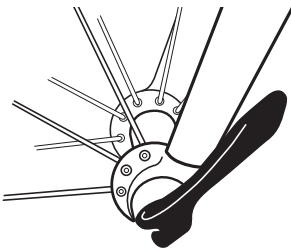


FIGURE 3

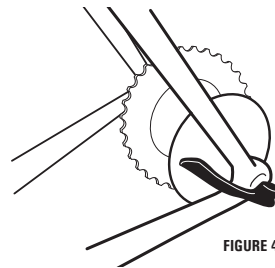


FIGURE 4

5. If the quick release lever is able to be moved to the CLOSED position with little or no resistance, clamping strength is insufficient. Return the lever to the OPEN position and tighten the nut further. Close the lever, testing again for resistance. When the quick release mechanism is properly tightened and clamped in the closed position, the clamping force will be adequate to cause metal into metal engagement [embossing] of the fork or frame tips. It should require effort to close the Quick Release, yet it should not be difficult.



**DO NOT TIGHTEN THE QUICK RELEASE MECHANISM BY USING THE QUICK RELEASE LEVER LIKE A WING NUT [fig 5]. OVERTIGHTENING THE QUICK RELEASE MECHANISM MAY DAMAGE THE QUICK RELEASE ASSEMBLY. FOR FURTHER INFORMATION ON CORRECT ADJUSTMENT OF THE QUICK RELEASE TENSION, SEE ADDITIONAL INFORMATION BELOW:**

**ADDITIONAL INFORMATION:** To properly close the quick release mechanism requires between 15 and 45 pounds of force. [55 to 200 Newton]. If the required closing force is greater than 45 pounds, open the lever and loosen the quick release mechanism adjusting nut. Close the lever again. If it requires less than 15 pounds of force to close the quick release lever, open the lever and tighten the adjusting nut. Repeat adjustment as needed.

6. Orient the quick release levers so they do not interfere with any other part or accessory, such as rack or fenders. Be sure to orient the quick release levers in such a way that they will not become accidentally snagged while riding. [fig. 3 & 4].
7. Perform these two tests to ensure that the quick release mechanisms are properly closed:
  - a. Lift the front of the bicycle and give the top of the tire a sharp downward blow with a closed fist. The wheel should not come out of the fork, be loose, or move from side to side. Repeat this test to the rear wheel. If uncertain, repeat the tightening process, as shown in steps 2–6 above.
  - b. With the quick release lever properly adjusted and closed, it will not be possible to rotate the quick release lever in a circular motion parallel to the wheel as pictured in fig. 5.

FIGURE 5



## INSPECTION – WEEKLY

**CHECK TO BE SURE THERE ARE NO LOOSE, DAMAGED, OR BROKEN SPOKES.**

If a wheel is not in good condition, the strength of the wheel and the effectiveness of the brakes may be greatly diminished. If you suspect spokes are loose or damaged, the wheel must be removed from service immediately and **NOT RIDDEN**. Take the wheel to your Rolf Prima dealer for inspection.

**CHECK TO BE SURE THERE ARE NO CRACKS IN FRONT OR REAR RIMS.**

If cracks are found, do not ride the wheel. Take the wheel to your dealer for inspection.

Carbon fiber rims may become damaged as a result of an accident, impact, or improper handling. Damage to carbon fiber components may be contained internally and the rim may appear outwardly normal and undamaged at a glance. It is very important to thoroughly inspect all the parts on your



bicycle after an accident – but it is especially important that you thoroughly inspect your carbon fiber rims for signs of damage. Look closely for cracks, deep scratches or gouges, delamination, loose fibers and other surface flaws. If you suspect the rim has been damaged, take your wheel to your Rolf Prima dealer for further inspection.

### ⚠ **WARNING!**

Damage to carbon fiber components may be contained internally and appear normal and undamaged at a glance. A damaged carbon fiber part can fail suddenly and possibly cause serious injury or death. Inspect your carbon rims frequently. If you suspect your carbon fiber rims have been damaged, replace them before riding, or take your bicycle to your dealer for inspection and service.

## INSPECTION – MONTHLY

**CHECK TO ENSURE THERE IS NO EXCESSIVE LOOSENESS IN HUB BEARINGS IN BOTH WHEELS.**

Lift the bicycle and attempt to move the rim laterally, left to right. Look, listen, and feel for looseness in the hub bearings. Spin the wheel and listen for any grinding or other unusual noises. If the hub runs noisily or is loose, take the wheel to your Rolf Prima dealer for adjustment or service.

**CHECK BOTH RIMS FOR WEAR.**

Bicycle rims will wear from the friction of braking and may eventually require replacement. Inspect the rim sidewalls and braking surfaces for heavy grooving or cracks. If you see or suspect excessive wear on the rims, take the wheels to your Rolf Prima dealer for inspection.

## SECTION TWO:

### INSTALLATION AND RECOMMENDATIONS

Before attempting any installation of components onto this wheelset, make sure the parts are compatible. Tires, tire valves, gear cluster, brakes and the frame and fork spacing must be correct. If you are unsure of the compatibility of any part, consult your dealer.

### BRAKES AND BRAKE PADS

#### PROPER BRAKE PAD ADJUSTMENT

Brake pads should be adjusted so that they sit at 1mm to 2mm away from the rim when the brakes are released. Brakes should be properly centered over the rim so that each pad is the same distance from the rim when the brakes are released.

Brake pads should be aligned properly with the braking surface of the rim and should contact only the machined brake surface of your rim. Check to be sure there is adequate clearance between the top of the brake pad and the tire. Some brake pads may be too tall to fit your wheels properly. Improper or misaligned pads can cause premature rim wear or a sudden tire blowout. Install brake pads so that the front of the pad contacts the rim first. This is called “toeing” the brake pads.

Some Rolf Prima wheels may have a wider rim than your current wheels. You may need to adjust the location of the conical washer between the brake pad holder and brake arm on the brake calipers.



## ⚠ WARNING!

Proper brake pad selection and brake adjustment is crucial to your safety. If you suspect your brakes are not working properly or your brake pads do not properly fit your wheels **DO NOT RIDE YOUR BICYCLE**. Take your bicycle to a qualified technician at a professional bicycle shop for inspection and service. Riding your bicycle with improperly functioning brakes could result in a loss of control and personal injury or death.

## BRAKE PAD SELECTION AND MAINTENANCE

### RIMS WITH ALUMINUM BRAKING SURFACE

For best braking performance use Rolf Prima brake pads. Your Rolf Prima alloy wheels do not require special brake pads. Brake pads from many manufacturers are available in different compounds. It is important that medium compound pads designed for aluminum rims are used with your Rolf Prima wheels. Soft pads may cause brake stutter or be too “grabby.” Hard compound pads are abrasive and may decrease the life of your wheels.

Inspect and clean your brake pads frequently. Road grit, small rocks and other items can become embedded in brake pads and cause accelerated wear of the braking surface. If you hear scratching noises when you brake, check and clean your pads.

Brake pads are not generally marked to identify the compound. If you have any question about the compound of your brake pads or about your brake pads at all, replace them with new pads.

### RIMS WITH CARBON BRAKING SURFACE

Rolf Prima Carbon wheels with carbon brake walls feature a specially prepared braking surface to manage heat build-up issues and abrasion. These carbon wheels come with Rolf Prima brake pads. You must use the supplied Rolf Prima pads. The use of other pads will cause damage to the wheels and void the warranty. Replace worn pads with the same type of Rolf Prima pads.

Wheels with carbon fiber rims will exhibit different braking characteristics than wheels with aluminum rims. It is important that you test the suitability of any brake pad before racing or braking hard.

Increased pad consumption. Carbon rims can have a higher rate of brake pad wear, especially in wet conditions. Check your brake pad thickness before each ride.

Different wet braking performance. Carbon rims are different from aluminum rims in wet braking conditions. We recommend you ride the wheels in wet conditions prior to racing or braking hard.

Heat buildup from prolonged braking. Carbon rims do not dissipate the heat generated by braking at the same rate as aluminum rims. Managing rim temperatures through proper brake application is important. If rims are allowed to overheat, damage to the rim and/or tire can result. During long descents, it is very important that brakes are applied with greater force, more frequently, and for the shortest possible time period. Releasing the brake and allowing the brake track surface time to cool is important – even short periods of no braking help drop temperatures. Alternating front and rear brake application is a common technique. This technique of pulses of frequent, hard braking significantly reduces rim temperatures.



WHEEL MODEL	BRAKE PAD COLOR
58RSC & ALL ALLOY MODELS	RED
TdF4SL, TdF6, TdF6SL, TdF8	RED
EoS3, ARES4, ARES6	YELLOW
ARES3, ARES8	BLUE

### CAUTION!

Carbon fiber rims have different braking characteristics and performance as compared to aluminum rims. Brake pad thickness must be checked frequently. Use caution when braking in wet weather. Control your speed on long descents with frequent, hard braking applications. It is VERY IMPORTANT that rims are not allowed to overheat. Overheating rims may cause rim and tire damage which can result in loss of control and personal injury or death.

### Brakes and Tandem wheels

Rolf Prima tandem wheels are compatible with industry standard tandem brakes. The alloy Tandem wheels are compatible with either rim or disc brakes. The Tandem Carbon-disc wheels are disc-brake compatible only. Do not use the Tandem Carbon wheels with rim brakes. Using rim brakes on Carbon Tandem wheels is dangerous and may result in injury or death.

Follow the brake manufacturer's instructions for installation and adjustment. If your tandem is equipped with drag brakes, follow the bicycle maker's instructions on the proper use of the brakes. Consult your tandem bicycle owner's manual or your tandem bicycle dealer for assistance.

### MTB Disc wheels

Rolf Prima mountain bike wheels are compatible with 6 bolt industry standard disc brake rotors. They are not rim brake compatible. Refer to your bike and/or brake owner's manual for proper installation and setup.

### Alloy Road Disc wheels

Rolf Prima road disc wheels are compatible with 6-bolt industry standard disc brake rotors.

### Carbon Road Disc wheels

Rolf Prima carbon road disc wheels are only disc-brake compatible. Using rim brakes on these wheels is dangerous and may result in injury or death.

### Cyclocross wheels

All cyclocross and road disc brake model wheels are compatible with industry standard road or cyclocross Disc brakes. Note the 4CX Disc, Ares4 Disc, Ares3 Disc and TdF4SL Disc are compatible with disc brakes only.





## TIRES: INSTALLATION AND RECOMMENDATIONS

### IMPORTANT INFORMATION ABOUT RIM STRIPS

Each Rolf Prima wheel (with clincher rims) comes with a rim strip installed. Before installing tires, make sure an appropriate rim strip is in place which completely covers the rim tire well so that all spoke holes are completely covered. The tire well is the inner wall of the rim, visible when the tire, tube, and rim strip are removed. If the spoke holes in the tire well are not completely covered with a high strength rim strip, a sudden blowout could occur.

### ▸ **WARNING!**

Failure to use rim strip designed specifically for high pressure tires, properly installed, and covering all spoke holes in the rim tire well can cause a sudden blowout which could lead to loss of control and result in personal injury or death.

### TIRE SELECTION AND INSTALLATION – CLINCHER TIRES

Follow normal clincher tire installation procedures. If you are not familiar with tire installation, consult your bicycle owner's manual or see your dealer. Do not use metal tire levers to install or remove tires. Metal tire levers can damage the rim.

#### > **Road**

Rolf Prima **alloy** clincher road wheels can be used with tire widths ranging from 20mm to 28mm. Rolf Prima **carbon** clincher road wheels can be used with tire widths ranging from 22mm to 28mm. Wider tires may be able to be used safely but they are not recommended. Follow pressure recommendations on the sidewall of the tire. Do not over-inflate tires. Over-inflating can cause sudden blowout or damage to your wheels.

#### > **Cyclocross**

Rolf Prima clincher cyclocross wheels can be used with tires from 20mm to 34mm. Follow pressure recommendations on the sidewall of the tire.

#### > **Mountain Bike**

**Tubeless:** Rolf Prima mountain bike wheels are tubeless compatible with Stan's NoTubes™ BST Technology and can also be used with standard tire/tube systems.

The wheels come with 25mm rim tape and tubeless valve stems. Refer to the detailed instructions and videos at [www.notubes.com](http://www.notubes.com) for tubeless tire application recommendations and mounting instructions. Do not inflate tubeless tires over 40psi.

**Tube:** For use with traditional mountain bike tube and tire combinations follow normal tire mounting procedures. Inspect rim tape before mounting tire to be sure that the nipple access holes in the rim are completely covered. If the rim tape is damaged it can be replaced with 25mm rim tape or similar width standard rim strip. Follow the pressure recommendations on the sidewall of the tire.



## TIRE PRESSURE

Never exceed the maximum pressure marked on the tire or 120 psi, whichever is less. Over inflated tires place greater stress on the rim and may shorten the life of your wheels. Over inflated tires can also cause a sudden blowout, or cause damage to your wheels if a sudden blowout should occur.

**Carbon clincher rims:** Never exceed the maximum pressure marked on the tire or 120 psi, whichever is less. Under inflation of tires may allow rims to make contact with the road surface resulting in damage to the rim. Do not use tires that measure less than 22mm in width. Tires that are less than 22mm in width may not adequately protect the rim from impacts due to road hazards. Do not use latex inner tubes.

**Carbon tubular rims:** Appropriate minimum tire pressure may be dependent upon road conditions, rider weight and tire size. As a general recommendation we recommend a minimum of 110psi to protect your carbon rim from impact damage. Never exceed the maximum tire pressure marked on the tire.

### ⚠ WARNING!

Tires must be installed properly and inflated to the tire manufacturer's recommendation – or 120 psi – whichever is lower. Tires must never be over inflated. Tires which are improperly installed or incorrectly inflated could blow off or cause wheel damage which can lead to loss of control and result in personal injury or death.

## TIRE INSTALLATION – TUBULAR TIRES

Tubular tire installation requires specific experience or training. Correct tire installation is critical to your safety. If you do not know how to install tubular tires, have them installed professionally by your dealer. Have your dealer teach you correct tire installation. It is not difficult, but it is important that it is done correctly. Below are important notes regarding safe installation.

- ⚠ Only use tire cement designed specifically for tubular tires and follow the tire cement maker's instructions carefully. We do not recommend 3M Fast Tack.
- ⚠ Thoroughly clean the tire mounting surface of the rim before adding cement. There should be no dirt, oil or grease on the mounting surface. Dirty surfaces will not adhere properly.
- ⚠ We do not recommend using tape such as TUFO. While tapes can work well, some are overly adhesive and can damage the rim upon removal.
- ⚠ After curing, inflate tires and test the bond by attempting to pull the tire off the rim.

For more detailed instructions, refer to the tire or cement manufacturer's instructions.

- ⚠ Do not use metal, sharp or abrasive tools to install or remove a tubular tire from a carbon rim as they may damage the rim.

### ⚠ WARNING!

Tubular tire installation requires specific experience or training. Improperly installed tires can separate from the rim which can lead to loss of control and result in personal injury or death.



## VALVE EXTENDERS

Rolf Prima carbon wheels come with a valve extender matched to the rim height. Be sure to install the valve extender before mounting the tire.

Installation procedure:

- > Remove valve core from tube or tire valve using supplied valve core tool.
- > Securely install valve core in female threaded end of valve extender.
- > Install valve extender into tube or tire valve using supplied valve extender tool. Overtightening can cause damage to the extender.

## CASSETTE COG INSTALLATION

Follow normal gear cluster installation procedures using only the appropriate tools. If you are not familiar with those procedures or tools, consult your dealer.

Most Rolf Prima wheels are Shimano®/SRAM® 11-speed compatible. To use a 9 or 10 speed cassette with 11-speed compatible wheels, use the 1.8mm Rolf Prima supplied spacer behind the cassette in addition to any spacer included with your cassette. For 11-speed cassettes, do not use the Rolf Prima supplied spacer.

## CASSETTE COMPATIBILITY

Rolf Prima wheels configured with a Shimano® or SRAM® type freehub body will fit 8, 9, 10 or 11-speed Shimano® or SRAM® compatible cassettes. 2013 and newer Rolf Prima wheels are 11-speed compatible. Some 2004-2012 Rolf Prima wheels can be retrofitted with a conversion kit.

Rolf Prima wheels configured with a Campagnolo® freehub body will fit 9, 10 or 11-speed Campagnolo® ED compatible cassettes. 2010 and newer Rolf Prima wheels are 11-speed Campagnolo® compatible. Some 2004–2009 wheels can be retrofitted to work with 11-speed Campagnolo®.

Lock rings for Campagnolo® cassettes are not included with Rolf Prima wheels. The required lock ring thread diameter is 27mm. Cassettes with 12T – 16T top gear cog require a lock ring with 38.5 mm flange diameter. Cassettes with 11T top gear cog require a lock ring with 35.2mm flange diameter.

Spacer requirements for different cassettes on Rolf Prima freehub bodies

Cassette	Rolf Prima Freehub Body	
	10 Speed (spacer needed)	11 Speed (spacer needed)
Shimano 9 speed	None	1.85mm
Shimano 10 speed	1mm	1.85mm + 1mm
Shimano 11 speed	Not compatible	None
SRAM 9 speed	None	1.85mm
SRAM 10 speed	None	1.85mm
SRAM 11 speed	Not compatible	None
Campagnolo 9/10/11 speed	None	None



# SECTION THREE:

## MAINTENANCE

### ▼ CARE AND CLEANING

While acetone or denatured alcohol will not damage either carbon or aluminum rims, they will damage the decals. Use isopropyl alcohol to clean wheels and use care around the decals. Replacement decals can be purchased if necessary, but decal removal can be time consuming. To remove tubular tire glue, use Goof Off or another similar product. For general cleaning, soapy water with a light rinse works well. Do not use high pressure water to clean wheels. The high pressure blast can force water past the bearing seals.

### ▼ WHEEL TRUING

Wheel truing involves special tools and knowledge and should be performed by a qualified professional wheel builder. Should you suspect your wheels need truing, we recommend that you take them to your Rolf Prima dealer for evaluation.

Before truing a wheel it is important to apply oil between the rim and the nipple, and between the spoke and the nipple. This can be accomplished by dripping oil into the hole where the spoke enters the rim and also through the hole in the tire well. Spin the wheel to help oil penetrate.

Care is taken during assembly of Rolf Prima wheels to ensure the spokes do not twist, or “wind up” during tensioning and truing. It is very important that this care is exercised every time the wheel is trued. The spokes must be held with a special tool or small adjustable wrench closed over the bladed section of the spoke while turning the spoke nipple to prevent wind up.

### ▼ ROLF PRIMA HUB CHART

Use the below chart to determine which hub you have:

Model Year	Wheel Model	Hub Platform
2017	Eos3	TdF6.0
2006-2017	TT, TdF, Ares (Standard & SL versions)	TdF4.4, TdF5.5
2015-2017	Ares ES models	TdF3.0
2014-2017	TdF4SL Disc, Ares4 Disc, Ares3 Disc	XST +
2014-2017	58RSC	TdF3.0
2010-2013	58RSC, 38RSC	TdF2.4
2017	Vigor Alpha Stealth	TdF6.0
2004-2017	Vigor, Vigor RS, Vigor Alpha, Vigor SL, Vigor CLS	TdF3.4, TdF4.4, TdF5.5
2002-2003	Vigor, Elan	TdF1.0
2014-2015	Vigor Alpha Disc, Elan Alpha Disc	XST +
2016-2017	Vigor Disc, Elan Disc	XST
2017	Elan Alpha Stealth	TdF6.0
2004-2017	Elan, Elan Alpha, Elan RS, Elan CLS, Elan Aero, Dauphine	TdF3.4, TdF4.4, TdF5.5

<b>Model Year</b>	<b>Wheel Model</b>	<b>Hub Platform</b>
2017	Vigor ES, Elan ES	TdF3.0
2017	Vigor ES Disc, Elan ES Disc	XR Road
2015-2016	Aspin SL Disc	XR Road
2014-2016	Echelon SL, Aspin SL	TdF3.0
2010-2013	Echelon SL, Aspin SL	TdF2.4
2014-2017	Aspin, Echelon	TdF2.4
2008-2013	Aspin, Echelon	TdF1.2
2005-2007	Aspin, Echelon	TdF3.4
2011-2016	Apex SL	TdF2.4, TdF4.4
2006-2007	Apex, Tempo	TdF1.2
2014-2017	Tandem Disc, Tandem Disc Carbon, Tandem Disc Stealth	Tandem XST
2006-2013	Tandem Disc	Tandem Disc
2005-2013	Tandem	Tandem
2010-2017	Vigor FX, FX58	FX
2010-2015	P-Town	Town
2016-2017	Alsea, Alsea Plus	XST
2016-2017	Alsea XR, Alsea XR Plus	XR
2017	Ralos MK V	XST
2017	Ralos	XR
2013-2016	Ralos CXC, Ralos, Rage	XST
2014-2016	Ralos XR, Rage XR	XR
2017	Hyalite	XST
2017	Hyalite ES	XR
2014-2017	4CX Disc	XST
2012-2014	4CX, 58CX, 38CX	TdF4.4
2011-2015	VCX	TdF4.4
2013-2017	VCX Disc	XST
2012-2015	ECX	TdF2.4
2015-2017	ECX Disc	XR Road
2012-2015	SSCX	Town



## ▾ HUB BEARING ADJUSTMENT, REPLACEMENT & OVERHAUL

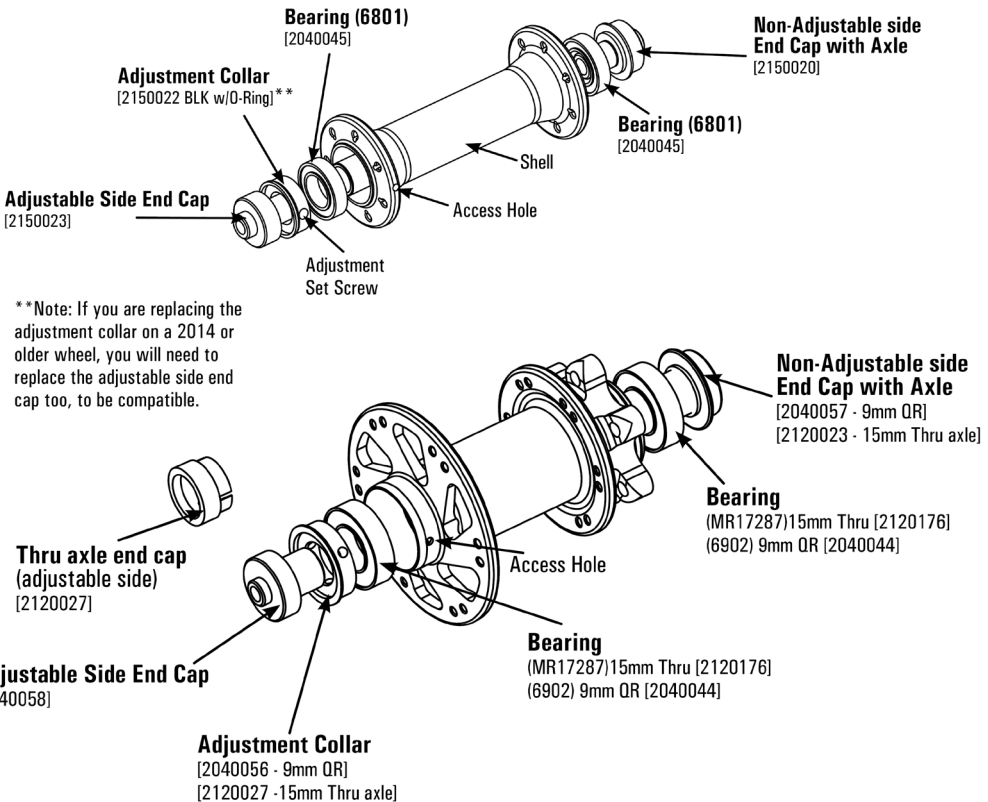
Refer to the Rolf Prima Hub Chart to determine which hub you have.

At some point, hub bearings may require replacement. This may be once every other year or more often if the bike is ridden more than average, in wet weather, or off-road. It may also be required less frequently. This requires special tools and knowledge and should be performed by a qualified technician at a bicycle shop.

Refer to the bearing table on the Rolf Prima website at: [www.rolfprima.com/bearing-kit-guide](http://www.rolfprima.com/bearing-kit-guide) to determine which bearing you will need. \*\*The bearing model is printed on the bearing seal. Double check the bearing to confirm type.

**FRONT HUB:** TdF3.4, TdF4.4, TdF5.5, TdF6.0, XST, XST+, Tandem, Tandem Disc

[Refer to exploded assembly view below]



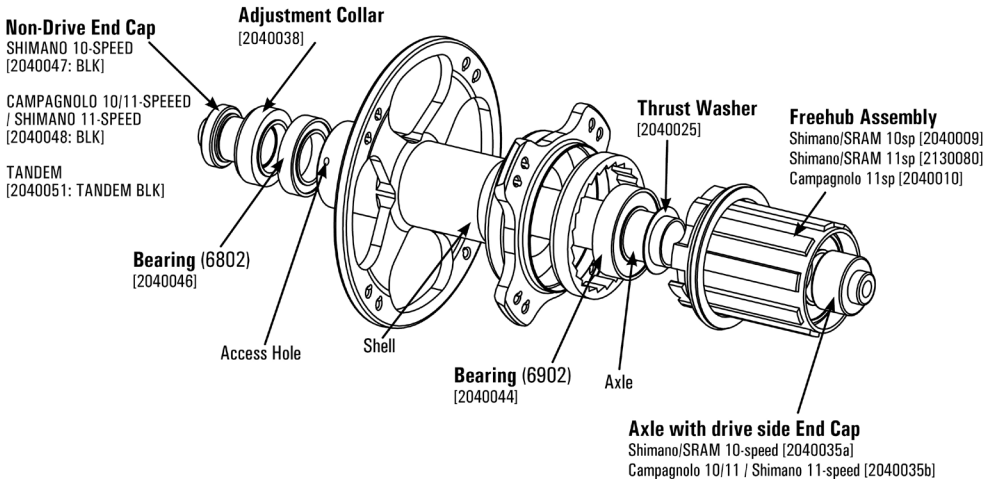
1. Loosen the three (3) set screws by inserting a 2mm Hex wrench in the access hole in the hub shell. For 2007 and earlier models, the hub will have one (1) set screw and the access hole may be on the hub shell outboard of the flange (not shown). For 2007 and later models, the access hole will be through the outer diameter of the flange (shown).

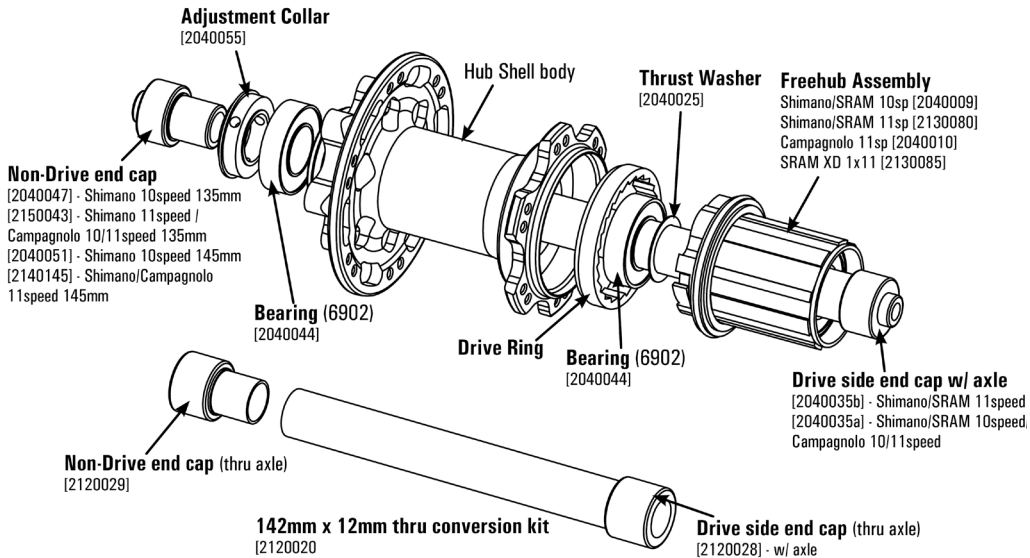


2. Remove the axle end cap from the adjustable side of the hub. If needed, thread a M6 bolt into the axle end and pull on the bolt for a better grip. The end cap may need to be driven out with a drift. Insert a drift into the axle from the non-adjustable side (old QR skewers work well) and tap on the end of the bolt to remove the axle end cap.
3. Remove the axle by pushing it through the non-adjustable side of the hub. If needed, drive the axle out with a suitable punch.
4. Check the bearings for smooth running or end play at the inner race and replace as needed. Remove bearings from the hub with a suitable bearing removal tool or punch. Once removed, bearings should not be reused, as removal will damage the bearing.
5. To install new bearings, apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press or drift. Be sure the press or punch contacts only the outer race of the bearing and not the seal or the inner race. Press or drive the bearing in its bore slowly and carefully. It is very important that the bearing is driven into its bore evenly. **CAUTION:** Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.
6. To reassemble, be sure the non-adjustable axle end cap is securely installed on the axle. This part is pressed on the axle end and should not be loose.
7. Insert the axle into the hub shell from the non-adjustable side. Place the hub in an axle vise with the non-adjustable side facing downward.
8. Replace the adjustment collar on the axle, ensuring it is oriented correctly and contacts only the inner race of the bearing.
9. Install the adjustable side axle end cap onto the axle.
10. Tighten the three set screws.

**REAR HUB: TdF3.4, TdF4.4, TdF5.5, TdF6.0, XST, XST +, Tandem, Tandem Disc**

[Refer to exploded assembly view below]





1. Loosen the three set screws on the adjustable (non-drive) side of the hub by inserting a 2mm Hex wrench in the access hole in the hub shell.
2. Remove the non-drive side axle end cap and adjustment collar. If needed, thread a M6 bolt into the axle end cap and pull on the bolt for a better grip. The end cap may need to be driven out with a punch. Insert a punch into the axle from the drive side [old QR skewers work well] and tap on the end of the bolt to remove the axle end cap.
3. Working over a workbench or table, remove the axle and freehub body by pulling the freehub body away from the hub. Use a rag to grab the freehub body as edges may be sharp. Orient the wheel freehub side up and watch carefully for pawls and pawl springs, which may fall out. If needed, drive the axle out a short distance with a drift. After moving the axle only a short distance it should be possible to remove the axle and freehub body by hand, as outlined above.
4. Locate the thrust washer, which sits between the bearings of the freehub body and the hub shell. This washer will often adhere to one of the bearings, held in place by a film of grease. Clean the washer and set it aside for reassembly.
5. Check the bearings for smooth running or end play at the inner race and replace as needed. Remove bearings from the hub with a suitable bearing removal tool or drift. Once removed, bearings should not be reused, as removal will damage the bearing.
6. To install new bearings, apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press or drift. Be sure the press or drift contacts only the outer race of the bearing and not the seal or the inner race. Press or drive the bearing in its bore slowly and carefully. It is very important that the bearing is driven into its bore evenly. CAUTION: Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.

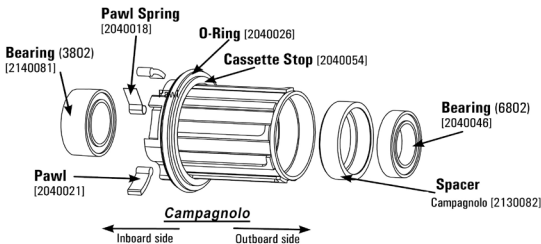
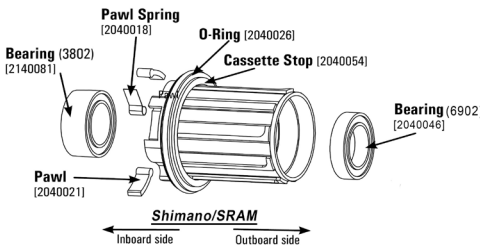


Freehub body exploded assembly view: (TdF6.0, TdF5.5, TdF4.4, TdF3.4, XST+ & XST)

Depending on the model year of your wheel, you may have a different bearing configuration.

- Shimano/SRAM. The inboard bearings of the freehub may have: (6802 x 1 bearing and 1 x bearing spacer) or (3802 x 1 bearing) or (6802 x 2 bearings). These three configurations are interchangeable. 2014 and newer bearing kits will contain 3802 x 1 bearing along with a 6802 x 1 bearing and spacer for the outboard side of the freehub. Replace the 6902 outboard bearing with 6802 bearing, placed inside the spacer #2130083. The bearing faces outboard.

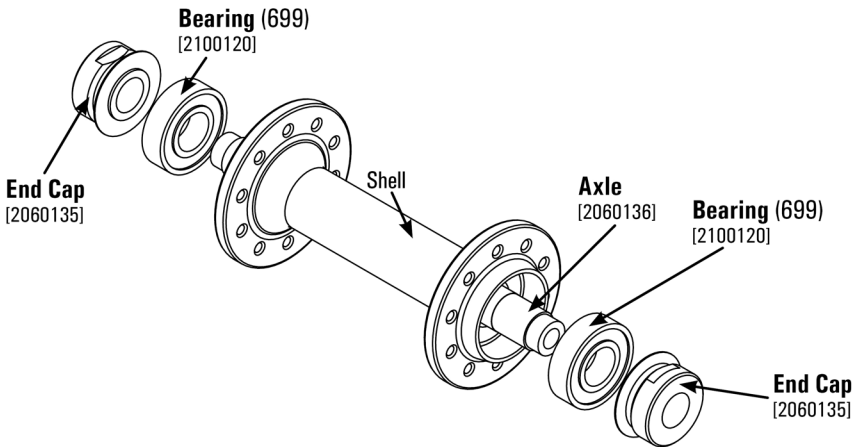
- Campagnolo. The inboard bearings of the freehub may have: (6802 x 1 bearing and 1 x bearing spacer) or (3802 x 1 bearing) or (6802 x 2 bearings). These three configurations are interchangeable. 2014 and newer bearing kits will contain 3802 x 1 bearing along with a 6802 x 1 bearing and spacer for the outboard side of the freehub. On the outboard side, replace the innermost 6802 bearing with spacer #2130082.



7. Remove the pawls and pawl springs by first lifting pawls from their bores, then removing springs. Note the specific location of the pawls and springs in the freehub body. Also note the orientation of the pawl springs in their bores – the open portion of the spring faces outward, away from the axle.
8. Clean the freehub body and reinstall the pawls and pawl springs. Lubricate pawls and pawl springs with oil. Check to be sure each pawl and spring rotates freely.
9. To reassemble, be sure the drive side axle end cap is securely installed on the axle. This part is pressed on the axle end and should not be loose.
10. Apply a thin film of grease on the axle and install the freehub body on the axle, with the outboard freehub body bearing contacting the axle end cap.
11. Place the thrust washer on the axle, against the inboard freehub bearing.

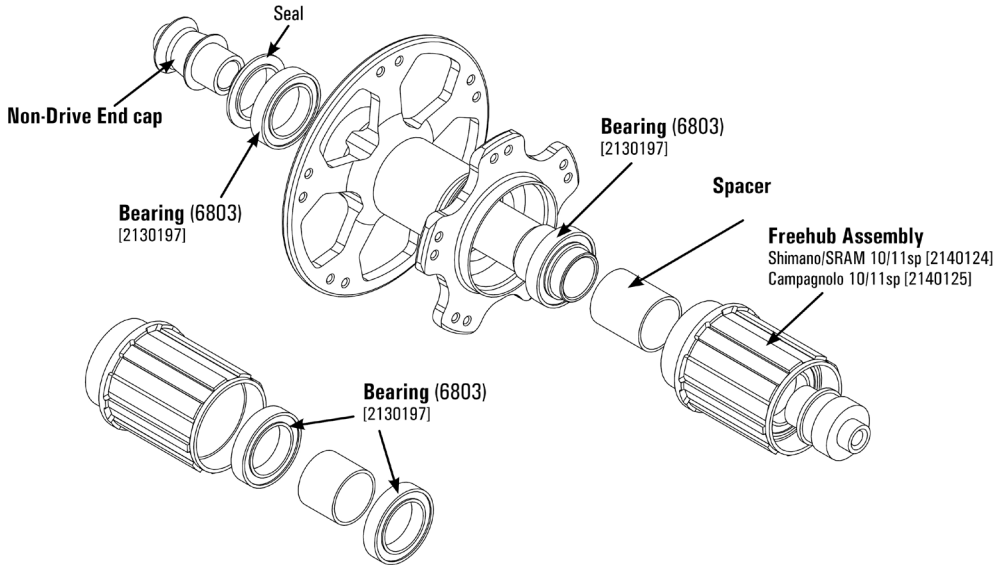
12. Apply a thin film of grease on the axle and apply grease into hubshell around ratchet ring. Lithium grease cut with chain oil works well. Insert the axle and freehub body assembly into the hub shell from the drive side. Rotate the free hub body counterclockwise to engage the pawls and ratchet ring.
13. Place the hub in an axle vise with the non-adjustable side facing downward.
14. Replace the adjustment collar on the axle, ensuring it is oriented correctly and contacts only the inner race of the bearing.
15. Install the non-drive side axle end cap onto the axle.
16. Tighten the three set screws in the adjustment collar.

FRONT HUB: TdF3.0 [Refer to exploded assembly view below]



**NOTE:** Spin axle in fingers, feeling for roughness. Removing bearings will damage them so perform these steps only if new bearings will be installed.

1. Using two 5mm hex wrenches, loosen the threaded axle end caps. Remove the end cap which breaks loose first.
2. Slide a suitable drift through the axle contacting the opposing side endcap. Gently strike the drift and drive the axle assembly with bearing out of the hub shell toward the side with the end cap still on the axle.
3. Tap out the bearing remaining in the hub shell with the drift.
4. Coat the outer races of the new bearings and bearing surfaces and shoulders on the axle with a thin film of grease to prevent corrosion.
5. Install one bearing on the axle end cap. Thread the endcap into the axle end and tighten to finger-tight.
6. Insert the axle into the hub shell and carefully drive the bearing/axle assembly into the bearing bore by striking the axle gently with a soft faced hammer. Maintain alignment so bearing goes in straight.
7. Place the remaining bearing in the remaining empty bearing bore. Install with a press or a suitable drift. Thread the remaining axle end cap on the axle end. With the bearing fully seated in the hub shell, tighten the axle end cap firmly using two 5mm hex wrenches.

**REAR HUB: TdF3.0** [Refer to exploded assembly view below]


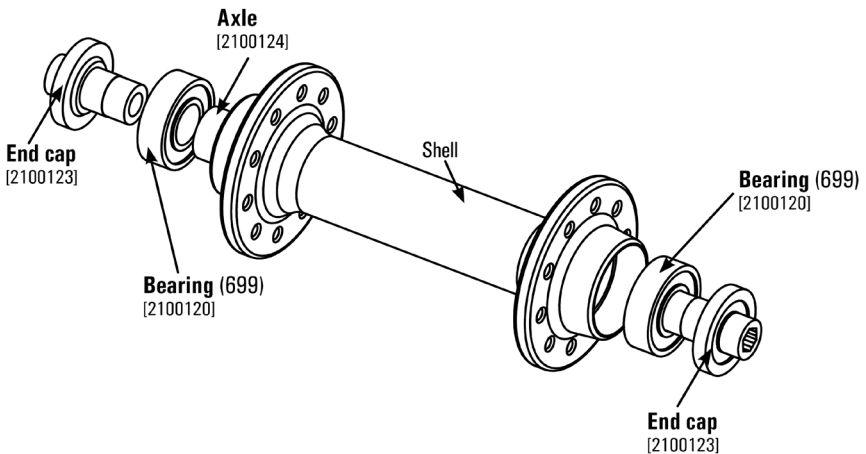
1. Pull firmly on freehub body to remove both the freehub body and drive side axle endcap. The endcaps can be tight the first time they are removed. If necessary the endcaps may be tapped out using a rod inserted through the opposite side of the axle.
2. Remove steel spacer from axle.
3. Using a soft faced hammer, drive the axle and one bearing out of the hub shell.
4. Remove bearing from other side of hub shell with 17mm blind bearing puller.
5. Coat contact surfaces of bearings with a thin film of grease.
6. Press new bearing into drive side of hub shell first, being sure to press on the outer bearing race only.
7. Install axle from non-drive side.
8. Slide new bearing over axle non-drive axle end and press into hub shell using appropriate size bearing press tool, being sure to press on the outer bearing race only. There will be a slight amount of axle end play at this point.
9. Slide the aluminum dust shield over the non-drive side of the axle then press the non-drive side endcap in.
10. Slide steel spacer over drive side of axle.
11. Slide freehub body onto drive side of axle, aligning the spacer inside freehub body so that it will slide fully onto the axle. Rotate freehub body counterclockwise until the pawls engage with the drive ring and the freehub body seats inside the hub shell.
12. Insert drive side endcap into axle end.

**Freehub body exploded assembly view: TdF3.0**

1. Inspect pawls and spring for proper spring action and check for wear or damage. If any of the pawls or springs are questionable, replace the freehub body assembly.
2. To service bearings in the freehub body use a 17mm blind bearing puller installed just inboard of the outboard bearing inner race. Press bearing out and save spacer. Alternately, the spacer can be shifted to one side and the bearing can be tapped out using a punch; alternating from one side to the other.

3. Remove internal retaining ring using retaining ring pliers.
4. Remove inboard bearing using same method as step 2.
5. Install new inboard bearing using appropriate size bearing press, making sure to apply pressure to outer race only.
6. Install internal retaining ring so that it fully seats in groove and up against inboard bearing outer race only.
7. Install spacer.
8. Install new outboard bearing using appropriate bearing press, pushing on the outboard race until it is just seated. Do not over-press outboard bearing. When installed to proper depth the spacer should be free to slide between the bearings with minimal play. Push outboard bearing further out if binding of spacer occurs.

TdF2.4 [Refer to exploded assembly view below]



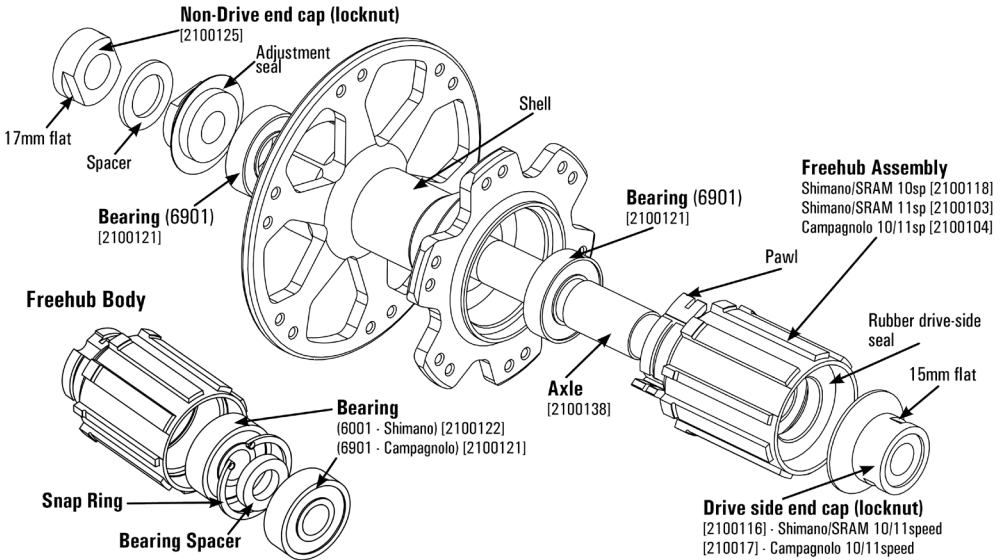
**NOTE:** Spin axle in fingers, feeling for roughness. Removing bearings will damage them so perform these steps only if new bearings will be installed.

1. Using two 5mm hex wrenches, loosen the threaded axle end caps. Remove the end cap which breaks loose first.
2. Slide a suitable drift through the axle contacting the opposing side end cap. Gently strike the drift and drive the axle assembly with bearing out of the hub shell toward the side with the end cap still on the axle.
3. Tap out the bearing remaining in the hub shell with the drift.
4. Coat the outer races of the new bearings and bearing surfaces and shoulders on the axle with a thin film of grease to prevent corrosion.
5. Install one bearing on the axle end cap. Thread the end cap into the axle end and tighten to finger-tight.



6. Insert the axle into the hub shell and carefully drive the bearing/axle assembly into the bearing bore by striking the axle gently with a soft faced hammer. Maintain alignment so bearing goes in straight.
7. Place the remaining bearing in the remaining empty bearing bore. Install with a press or a suitable drift. Thread the remaining axle end cap on the axle end. With the bearing fully seated in the hub shell, tighten the axle end cap firmly using two 5mm hex wrenches.

TdF2.4 [Refer to exploded assembly view below]



**NOTE:** the orientation of parts for reassembly. It is a good idea to lay the parts out in the order they were removed, resembling the exploded view, above.

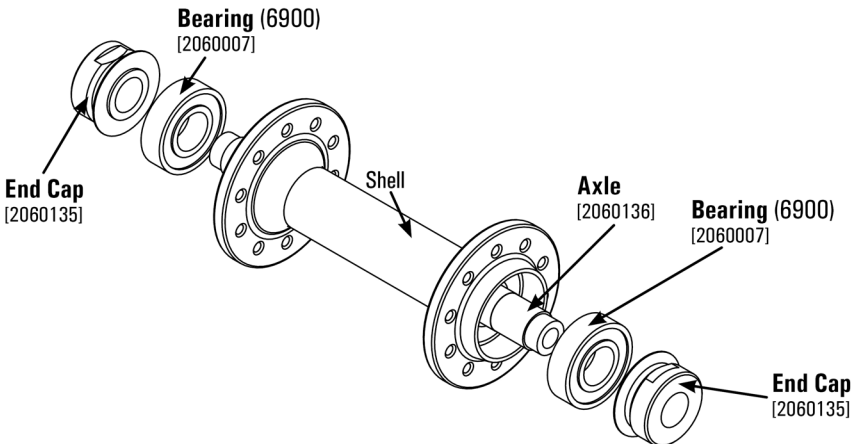
1. Insert a 5mm Hex wrench into the non-drive side axle end and loosen the drive side axle lock nut using a 17mm cone wrench. **NOTE:** this lock nut has left-hand threads – turn clock-wise to loosen. Remove the axle lock nut.
2. Remove the free hub body by sliding it off the axle. Set the freehub body aside. For service instructions, refer to the freehub body exploded assembly view below.
3. Using two 17mm cone wrenches, remove the non-drive side endcap and locknut. Pull axle out the drive side. Set aside.
4. Before proceeding, inspect bearings for smooth running. Determine which bearings need replacement, if any, and remove only these bearings, as removal will damage bearings. Once removed, bearings should not be reinstalled.
5. Using a suitable drift, drive the bearings to be replaced from the hub shell.



6. To install new bearings, apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press or drift. Be sure the press or drift contacts only the outer race of the bearing and not the seal or the inner race. Press or drive the bearing in its bore slowly and carefully. It is very important that the bearing is driven into its bore evenly. **CAUTION:** Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.
7. Install axle. Grease axle lightly and slide into hub shell from the drive side. It should pass all the way through the shell and through the non-drive side bearing.
8. Install the non-drive side locknut with large flange. Tighten the lock nut firmly against bearing while holding the axle stationary with a 5mm Hex wrench inserted in the hex broach of axle. Install washer.
9. Using two 17mm cone wrenches, install and tighten non-drive endcap against locknut.
10. If bearings in freehub body need to be replaced. Refer to the exploded assembly diagram and instructions below:
11. Slide freehub body onto axle.
12. Install and tighten drive-side endcap using 17mm wrench and 5mm hex wrench.

**NOTE:** Drive side endcap is reverse threaded and tightens by turning counter-clockwise.

TdF1.2 [Refer to exploded assembly view below]



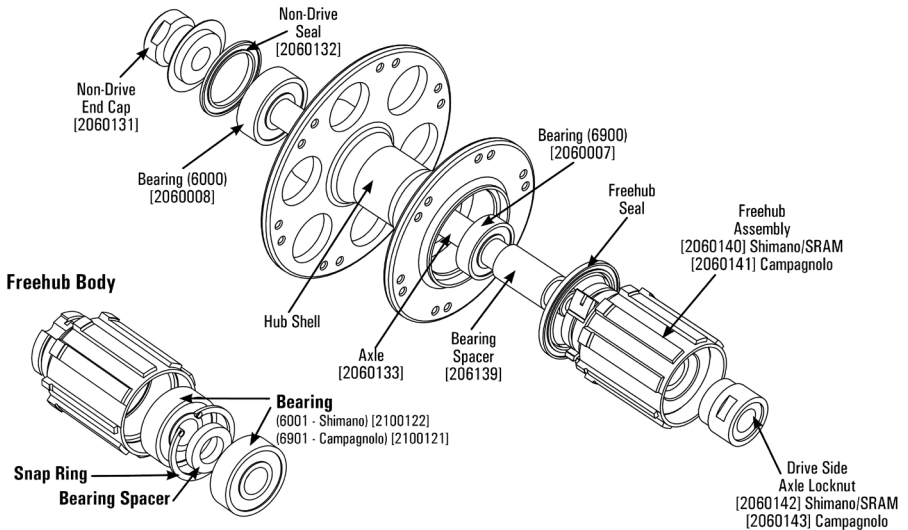
**NOTE:** Spin axle in fingers, feeling for roughness. Removing bearings will damage them so perform these steps only if new bearings will be installed.

1. Using two 17mm cone wrenches, loosen the threaded axle end caps. Remove the end cap which breaks loose first.
2. Using a soft faced hammer, gently strike the axle end and drive the axle assembly out of the hub shell toward the side with the end cap still on the axle.



3. Locate the wrench flats on the axle. Remove the remaining axle end cap by holding the axle with a 10mm wrench, using a 17mm cone wrench to remove end cap.
4. Using a suitable drift, drive the remaining bearing from the hub shell. The axle works well for this, but strike it gently – only with a soft faced hammer.
5. To reinstall new bearings, apply a thin film of grease to the bearing bores in the hub shell.
6. Install one bearing on the axle end with the wrench flat and tighten the lock nut firmly.
7. Insert the axle into the hub shell and carefully drive the bearing into its bore by striking the axle gently with a soft faced hammer.
8. Place the remaining bearing on the empty axle end. Thread the remaining axle end cap on the axle end. Using two 17mm cone wrenches, drive the bearing into its bore by tightening the axle end cap. With the bearing fully seated in the hub shell, tighten the axle end cap firmly.

TdF1.2 [Refer to exploded assembly view below]



**NOTE:** the orientation of parts for reassembly. It is a good idea to lay the parts out in the order they were removed, resembling the exploded view, above.

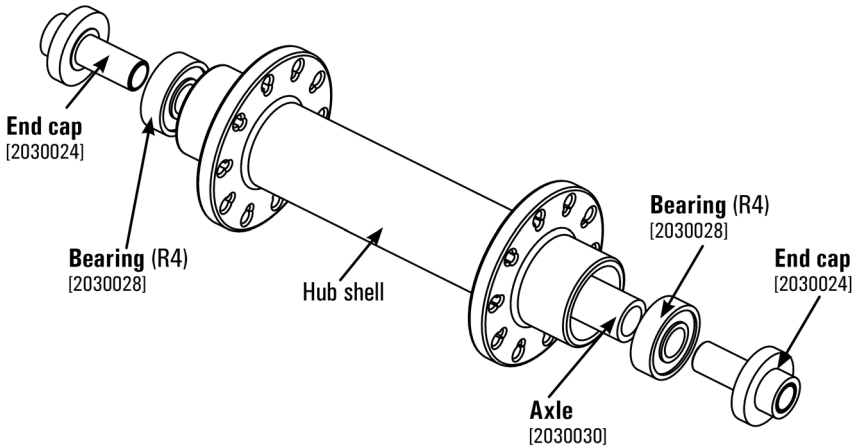
1. Insert a 5mm Hex wrench into the hex broach in the non-drive side axle end and loosen the drive side axle lock nut using a 17mm cone wrench. **NOTE:** this lock nut has left-hand threads – turn clock-wise to loosen. Remove the axle lock nut.
2. Remove the freehub body by sliding it off the axle. Set the freehub body aside. For service instructions, refer to the freehub body exploded assembly view below.



3. Before proceeding, inspect bearings for smooth running. Determine which bearings need replacement, if any, and remove only these bearings, as removal will damage bearings. Once removed, bearings should not be reinstalled.
4. If only one hub shell bearing is to be replaced, remove the axle in the direction of the bearing slated for replacement. Remove the axle by striking the axle end with a soft faced hammer. Do not use a metal faced hammer – damage to axle threads may result. Removal of the axle will drive one hub shell bearing from its bore. If both bearings are to be replaced, remove the remaining hub shell bearing with a suitable drift. The axle can be used, but be sure to only strike the axle end with a soft faced hammer.
5. If necessary, remove the rubber freehub body seal and/or non drive freehub body seal from the hub shell by carefully prying with a small flat bladed screwdriver or pick.
6. Special care must be taken when installing bearings, as they can be damaged easily. Select drifts or bearing installation tools which will drive bearings by contacting only the outer race. Bearings installed by the inner race – or by the bearing seals will not run smoothly.
7. If only one hub shell bearing is to be replaced, install the axle into the hub shell and existing bearing after first coating the bearing seat and shoulder portions of the axle lightly with grease.
8. If both hub shell bearings are being replaced, install the drive side hub shell bearing first. Insert the axle into the hub shell and then install the non-drive side hub shell bearing.
9. Install the non-drive side rubber seal with the sealing lip facing outward and install the left side axle-end lock nut. Tighten the lock nut firmly while holding the axle stationary with a 5mm Hex wrench inserted in the hex broach.
10. Install the rubber freehub seal in the hub shell, with the sealing lip facing outward.
11. Inspect pawls for heavy wear or damage and replace as needed. Carefully remove pawl spring by prying upward with a small pick at the end of the spring with a 90 degree bend. Place new pawls in their pockets and install a new pawl spring.
12. Remove the drive side rubber freehub body seal by carefully prying outward with a pick.
13. Inspect freehub bearings before removal, as removal will likely damage bearings. Place the freehub body on a hard work surface with outboard side facing down. Locate the bearing spacer between freehub bearings and push it aside with a drift. Remove the outboard bearing by carefully striking the inner bearing race with a drift.
14. Locate the bearing spacer and set it aside for reassembly.
15. Remove the snap ring using snap ring pliers.
16. Remove the inboard freehub bearing by striking the inner bearing race with a drift.



17. Lightly coat the outer bearing race of two new freehub bearings. Carefully drive the inboard freehub bearing into its bore by selecting a drift or bearing installation tool which only contacts the bearing outer race. Seat the bearing firmly in its bore.
18. Install the snap ring, making certain that it is properly seated in its groove. Install the bearing spacer.
19. Install a new outboard freehub body bearing.
20. Install the outboard freehub body seal, with the sealing lip facing outward.
21. Oil freehub pawls with two to three drops per pawl.
22. Coat the exposed portion of the axle with a thin film of grease and install the bearing spacer on the axle.
23. Coat the outside diameter of the bearing spacer with a thin film of grease and install the freehub body, rotating it counter-clockwise to engage pawls with the hub shell drive ring.
24. Apply removable thread locking compound (such as Loctite Blue) to axle and install and tighten drive-side end cap using a 17mm cone wrench.



1. Remove the skewer and pull the end caps out of the hub.
2. Check the bearings for smooth running or end play at the inner race and replace as needed. Once removed, bearings should not be reused. Removal will damage the bearing.
3. Using a small screwdriver or drift, push the floating axle askew until the axle end is visible through the bearing. Drive out one bearing by striking the exposed axle end with a drift. Remove the other bearing in the same manner.
4. Bearings should be firmly pressed into their bores. If bearings can be removed or installed with no tools, replacements should be reinstalled with a gap-filling retaining compound such as Loctite® RC/609.



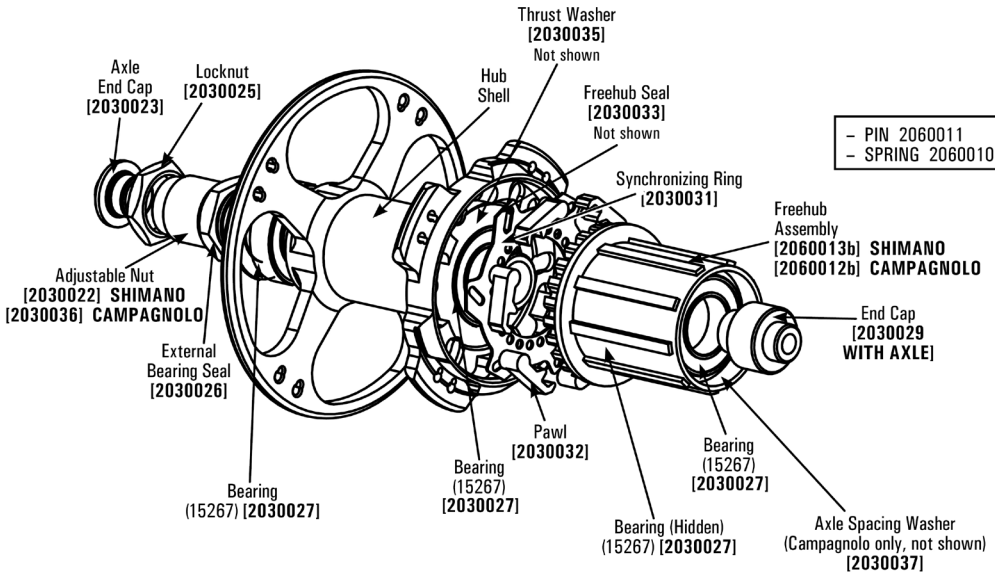
- To install new bearings, apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press or drift. Be sure the press or drift contacts only the outer race of the bearing and not the seal or the inner race. Press or drive the bearing into its bore slowly and carefully. It is very important that the bearing is driven into its bore evenly.

**CAUTION:**

Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.

- Reinstall the end caps.

TdF1.0 [Refer to exploded assembly view below]

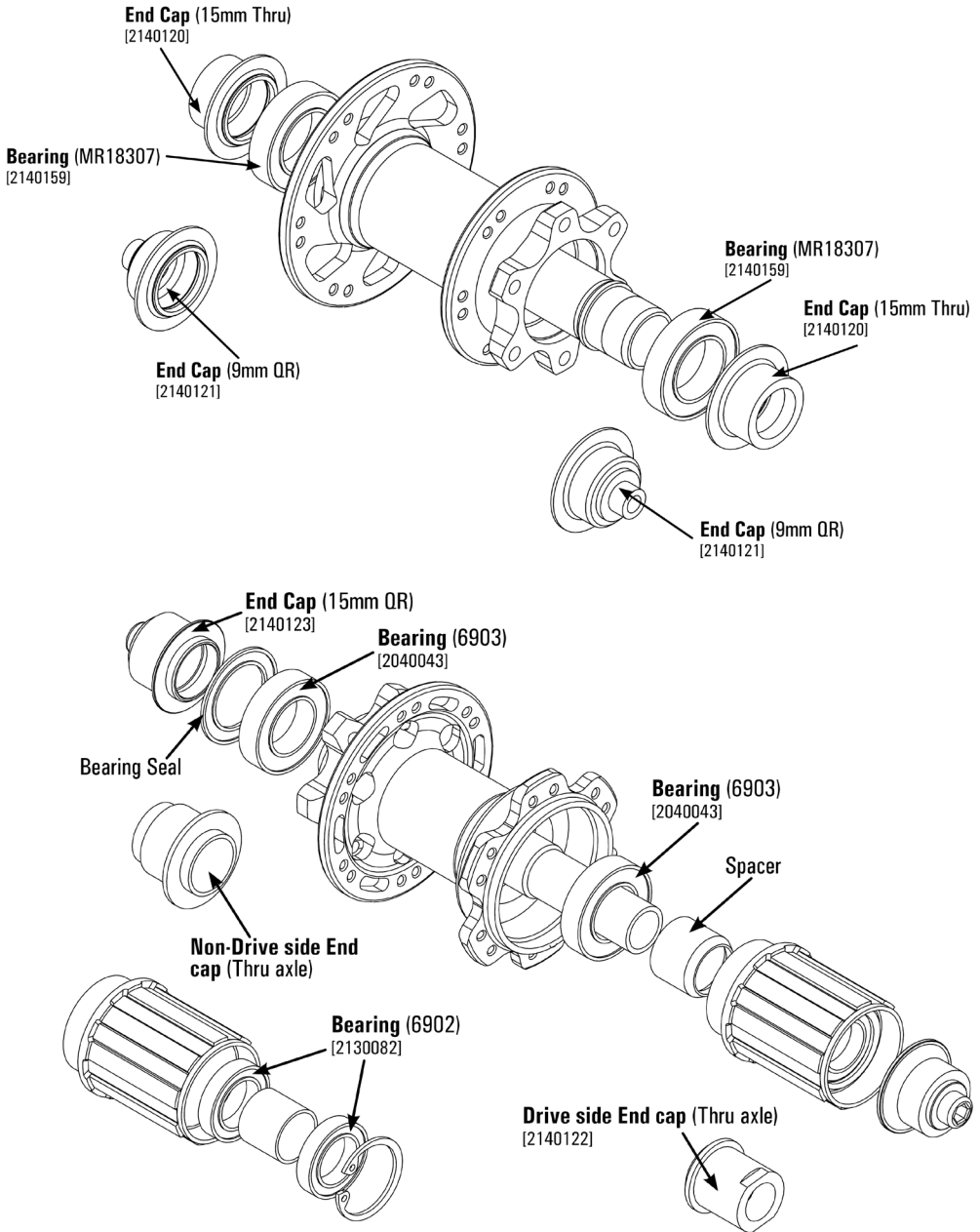


- Place the hub into an axle vise with freehub body side facing downward.
- Using two 19mm wrenches loosen the axle lock nut and adjustable nut. Unthread the locknut until it contacts the axle end cap. Continue turning the locknut against the axle end cap, forcing it out of the axle end. Thread the locknut back onto the axle just until the locknut threads are fully engaged. Pry the axle end cap out of the axle using a screwdriver or other suitable prying tool. Remove the lock nut and adjustable nut.
- Pull hub off of axle. Remove the freehub body by pulling it away from the hub shell. Note the location of the washer between the freehub body and hub bearing for proper reassembly.
- Remove the axle from the freehub body. Note the location of the axle spacing washer (used only on Campagnolo® compatible hubs). Set the washer aside for reassembly.

5. Carefully remove the rubber ring seal from the drive side of the hub shell (not shown) and remove the pawls and synchronizing ring.
6. Check the bearings for smooth running or end play at the inner race and replace as needed. Once removed, bearings should not be reused, as removal will damage the bearing.
7. Remove bearings with a bearing removal tool or drift. If bearings can be removed or installed with no tools, replacements should be installed with a gap-filling retaining compound such as Loctite® RC/609.
8. Apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press or drift. Be sure the press or drift contacts only the outer race of the bearing and not the seal or the inner race. Press or drive the bearing in its bore slowly and carefully. It is very important that the bearing is driven into its bore evenly. **CAUTION:** Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.
9. Apply a thin film of grease to the axle, synchronizing ring and pawls. Reinstall the synchronizing ring and pawls.
10. Install the freehub body on the axle. For Campagnolo® compatible hubs, be sure to first reinstall the axle spacing washer.
11. Reinstall the thrust washer onto the axle/freehub assembly and slide the axle into the hub.
12. Turn the freehub body counter clockwise to engage the pawls. Replace the rubber freehub seal, ensuring the inner and outer diameter of the seal seats properly in the seal channels in the hub shell and cassette body.
13. Ensure that the rubber seal is installed properly on the adjustable nut and thread the adjustable nut on the axle finger tight.



XR [Refer to exploded assembly view below]





## ▼ FREEHUB BODY CONVERSION

**Hub: TdF3.4, TdF4.4, TdF5.5, TdF6.0, XST+, XST, Tandem, Tandem Disc**

Conversion kit contents:

Model year	Shimano® to Campagnolo®	Campagnolo® to Shimano®	Redish wheel
2004-2009		Freehub, axle, end caps	Yes
2010-2017		Freehub only	No
2004-2012	Freehub, axle, end caps		Yes
2013-2017	Freehub only		No

1. Follow steps 1–5 of bearing replacement on pg. 15-16.
2. To reassemble, be sure the drive side axle end cap is securely installed on the axle. This part is pressed on the axle and should not be loose.
3. Apply a thin film of oil on the new replacement axle [2004-2012] and install the new replacement free hub body on the axle, with the outboard freehub body bearing contacting the drive side axle end cap.
4. Follow reassembly steps for bearing replacement and adjustment on pg. 18. Use the new non-drive end cap [2004-2012] on the non-drive side.
5. Due to a small difference in axle spacing on 2012 models and prior, the wheel will need to be re-dished. For 2013 and later models, redishing is not needed.

**IMPORTANT:** lubricate every spoke nipple by placing one or two drops of penetrating oil on each spoke at the rim hole. Place the wheel in a wheel truing fixture and spin the wheel so as to force the oil into the spoke and nipple threads.

6. Remove the tire [and tube and rim tape for clincher wheels]. Use a wheel dishing gauge to determine the extent to which the rim will need to move to be properly centered. It is important that the average overall tension is not changed. Be sure to make the dish correction with equal amounts of tension increase and tension reduction. Start by loosening each left side [non-drive] spoke nipple 1/4 turn and tightening the right side spoke 1/4 turn. Repeat in smaller rotational increments as needed. **IMPORTANT:** Each spoke must be held carefully to prevent wind-up while turning the spoke nipple. Hold the spoke with a Spoke Vise or with a small adjustable wrench closed on the flat section of the spoke near the point where the spoke enters the rim. Check the dish with a wheel dishing gauge and make corrections if needed.

**Hub: TdF3.0, TdF2.4, TdF1.2**

Conversion kit contents:

- 1 free hub body (Shimano® to Campagnolo®)
- 1 drive-side axle lock nut

[If needed, refer to exploded assembly view on pg. 16 or pg. 22 (depending on your model) of this manual.]

1. Follow steps to remove freehub body from bearing replacement instructions on pg. 16 or pg. 22 (depending on your model).
2. Remove the free hub body by sliding it off the axle. Keep the lock nut and free hub body together, as there are specific lock nuts for Shimano® and Campagnolo® compatible free hub bodies.
3. Oil freehub pawls of new freehub body with two to three drops per pawl.
4. Coat the exposed portion of the axle with a thin film of grease and install the bearing spacer (does not apply for the SL version) on the axle.
5. Coat the outside diameter of the bearing spacer (does not apply to SL) with a thin film of grease and install the freehub body, rotating it counter-clockwise to engage pawls with the hub shell drive ring.
6. Apply removable thread locking compound (such as Locktite 242) to axle threads and install the new drive-side axle lock nut and tighten.

### 2003 VIGOR & ÉLAN MODELS: SHIMANO® TO CAMPAGNOLO® (TdF1.0)

Shimano® to Campagnolo® conversion kit contents:

- 1 Campagnolo® compatible cassette body
- 1 Axle spacing washer
- 1 Axle nut

Campagnolo® to Shimano® conversion kit contents:

- 1 Shimano® compatible cassette body
- 1 Rubber Seal
- 1 Axle nut (1mm longer than Campagnolo® axle nut)

1. Follow steps 1 and 2 from bearing replacement instructions on pg. 24.
2. Remove the freehub with cassette body from the hub axle. Observe the location of axle spacers and seals for proper reassembly. Leave the axle in the axle vise.
3. Remove the existing freehub body by gently pulling it away from the hub shell while holding the hub shell with the cassette body facing up. Place the hub shell on a clean surface, with the cassette body end up. Note the location of the washer between the cassette body and hub bearing. You will need this washer.
4. A. Shimano® to Campagnolo® Remove the rubber contact seal from the drive side of the axle. Note that this rubber contact seal is not used on a Campagnolo® compatible hub. Install axle spacing washer on axle.  
B. Campagnolo® to Shimano® Remove the axle spacing washer. This is not used on Shimano® compatible hubs. Install rubber seal on drive side end cap.
5. If the hub is silver in color, proceed to step 7. If the hub is black in color, remove the pawls and pawl synchronizing drive plate. Remove the washer, if applicable, which sits beneath the pawl synchronizer plate. This washer may be discarded, as it is not used with 3 Pin drive free hub bodies. Reinstall the synchronizer plate and pawls.
6. Install the new freehub body on the hub shell. Be sure the thin thrust washer is in place between the bearings of the freehub body and hub shell. Turn the cassette body to engage the pawls and cassette body engagement teeth.



7. Install on axle.
8. Ensure that the rubber seal is installed properly on the adjustable nut and thread the adjustable nut on the axle until it just touches the bearing.
9. Replace the lock nut, also finger tight.
10. Carefully replace the axle end cap by tapping it back into place with a soft faced hammer.
11. Due to the small difference in axle spacing, the wheel will need to be re-dished.

**IMPORTANT:** lubricate every spoke nipple by placing one or two drops of penetrating oil on each spoke at the rim hole. Place the wheel in a wheel truing fixture and spin the wheel to force the oil into the spoke and nipple threads.

12. Remove the tire, tube and rim tape. Use a wheel dishing tool to determine the extent to which the rim will need to move to be properly centered. It is important that the average overall tension is not changed. Be sure to make the dish correction with equal amounts of tension increase and tension reduction. Start with  $\frac{1}{4}$  turns

**IMPORTANT:** Each spoke must be held carefully to prevent wind-up while turning the spoke nipple. Hold the spoke with a Spoke Vise or with a small adjustable wrench closed on the flat section of the spoke near the point where the spoke enters the rim.

## Converting to XD Driver

Follow steps 1–5 of bearing replacement to remove the current freehub

1. To reassemble, be sure the drive side axle end cap is securely installed on the axle. This part is pressed on the axle and should not be loose.
2. Apply a thin film of oil on the axle and install the XD Driver freehub body on the axle, with the outboard freehub body bearing contacting the drive side axle end cap.
3. Follow reassembly steps for bearing replacement and adjustment.

## Conversion for thru axle and quick release - hubs: XST, XST+, XR

### Front Hub – 9mm quick release to 15mm thru axle

Parts Needed: Conversion kit (part #2120018) consisting of non-adjustable side thru axle end cap with axle (part # 2120025), adjustable side thru axle end cap (part #2150025), Adjustment Collar (part # 2120027), and two MR17287 bearings (part #2120176)

Tools Needed: 2mm allen wrench, 15mm bearing puller, drift punch (old QR skewer works well)

1. Loosen the three (3) set screws by inserting a 2mm Hex wrench in the access hole in the hub shell. For 2007 and earlier models, the hub will have one (1) set screw and the access hole may be on the hub shell outboard of the flange (not shown). For 2007 and later models, the access hole will be through the outer diameter of the flange (shown in diagram).



2. Remove the axle end cap from the adjustable side of the hub. If needed, thread a M6 bolt into the axle end and pull on the bolt for a better grip. The end cap may need to be driven out by inserting a drift punch into the axle from the non-adjustable side (old QR skewers work well) and tapping on the end of the bolt.
3. Remove the axle by pushing it through the non-adjustable side of the hub. If needed, drive the axle out with a suitable punch.
4. Remove bearings from the hub with a suitable bearing removal tool or punch.
5. Install new bearings (MR17287), apply a thin film of grease to the bearing bores in the hub shell and press the bearings into their bores using a suitable bearing press. Be sure the press contacts only the outer race of the bearing and not the seal or the inner race. Press the bearing in its bore slowly and carefully. It is very important that the bearing is pressed into its bore evenly. **CAUTION:** Forcing a misaligned bearing into the bearing bore can result in damage to the hub shell, bearing, or both.
6. Insert the new thru axle into the hub shell from the non-adjustable side. Place the hub in an axle vise with the non-adjustable side facing downward.
7. Install the new adjustment collar on the axle, ensuring it is oriented correctly, seated tightly and contacts only the inner race of the bearing.
8. Install the new adjustable side axle end cap onto the axle.
9. Tighten the three set screws while ensuring that the adjustment collar remains seated tightly.

### **Rear Hub – 135mm quick release to 142mm x 12mm thru axle**

Parts Needed: Conversion kit (part # 2120020) consisting of Drive side end cap (part # 2120029 – drive) with axle (part # 2080116) and non-drive end cap (part # 2120029-adj)

Tools Needed: 2mm Allen wrench, punch (old QR skewer works well)

1. Loosen the three set screws on the adjustable (non-drive) side of the hub by inserting a 2mm Hex wrench in the access hole in the hub shell.
2. Remove the non-drive side axle end cap and adjustment collar. If needed, thread a M6 bolt into the axle end cap and pull on the bolt for a better grip. The end cap may need to be driven out by inserting a drift punch into the axle from the non-adjustable side (old QR skewers work well) and tapping on the end of the bolt.
3. Working over a workbench or table, remove the axle and freehub body by pulling the freehub body away from the hub. Use a rag to grab the freehub body as edges may be sharp. Orient the wheel freehub/drive side up and watch carefully for pawls and pawl springs, which may fall out. If needed, drive the axle out a short distance with a drift. After moving the axle only a short distance it should be possible to remove the axle and freehub body by hand, as outlined above. Once you have removed the freehub and axle from the hub shell you can slide the freehub off of the axle.



4. Locate the thrust washer, which sits between the bearings of the freehub body and the hub shell. This washer will often adhere to one of the bearings, held in place by a film of grease. Clean the washer and set it aside for reassembly.
5. Check the bearings for smooth running or end play at the inner race and replace as needed.
6. Apply a thin film of grease on the axle and install the freehub body on the axle, with the outboard freehub body bearing contacting the axle end cap.
7. Place the thrust washer on the axle, against the inboard freehub bearing.
8. Apply a thin film of grease on the axle and apply grease into hub shell around ratchet ring. Lithium grease cut with chain oil works well. Insert the axle and freehub body assembly into the hub shell from the drive side. Rotate the freehub body counterclockwise to engage the pawls and ratchet ring.
9. Place the hub in an axle vise with the non-adjustable side facing downward.
10. Replace the adjustment collar on the axle, ensuring it is oriented correctly, seated tightly and contacts only the inner race of the bearing.
11. Install the new non-drive side thru axle end cap onto the axle.

Tighten the three set screws while ensuring that the adjustment collar remains seated tightly.

**XR Front Hub – 9mm quick release to 15mm thru axle**

Parts Needed: Thru axle end cap (part # 2140120 x 2)

Tools Needed: None

1. Remove both end caps using fingers. A punch can be used if necessary (an old quick release skewer works well for this). Removal is easier during subsequent attempts.
2. Install new end caps by pressing on until fully seated.

**Rear Hub – 135mm quick release to 142mm x 12mm thru axle**

Parts Needed: Thru axle end cap (part # 2140122 x 2)

Tools Needed: 12mm Allen wrench, 5mm Allen wrench, 17mm open or cone wrench, blue Loctite (#242)

1. Remove non-drive side end cap using a punch (an old quick release skewer works well for this).
2. Hold axle with the 12mm Allen wrench on the non-drive side while using 5mm Allen wrench to remove drive side end cap.



3. Apply blue Loctite to drive side axle threads.
4. While still holding the non-drive side axle with the 12mm Allen wrench, install new thru axle drive side ends cap (part # 2140122) using 17mm open wrench.
5. Install new non drive side end cap by pressing on until fully seated.