Seal Replacement

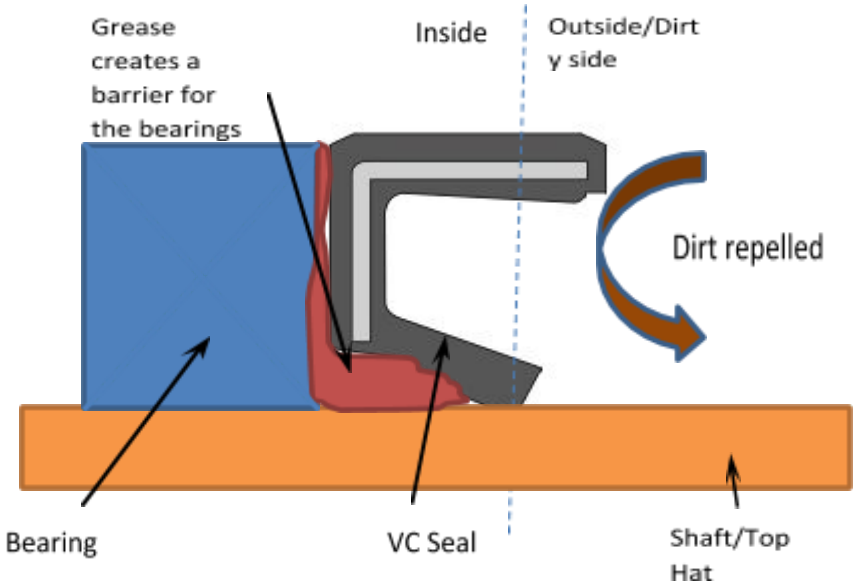
As a result of recent reports of high friction in production frames, Deviate Cycles have changed the specification of the seals used throughout the Highlander. The original seals were twin lipped, which are designed to contain the oil/grease within the system. After rigorous testing it was found that the seals can become displaced axially, adding to the friction, while pressuring the seals.

The solution is to use a single lip seal, orientated in the opposite direction to convention. This allows the grease filling process to purge any air from the system and provides lubrication to the lips of the seals. As a result suspension friction is reduced and therefore improved sensitivity/shock performance. In addition, this allows the customer to pump out any contaminants that may pass through the seal.

Seal orientation is critical to the function of this design. Seal orientation is the opposite of what will be currently installed – with the seal lips facing outwards – see photo below:



Shown in the cross-sectional view below:



This document provides the instructions to replace all the lip seals on the Highlander frame. These instructions should be used in conjunction with the manual for naming convention, part numbers and tightening torque.

Tools required:

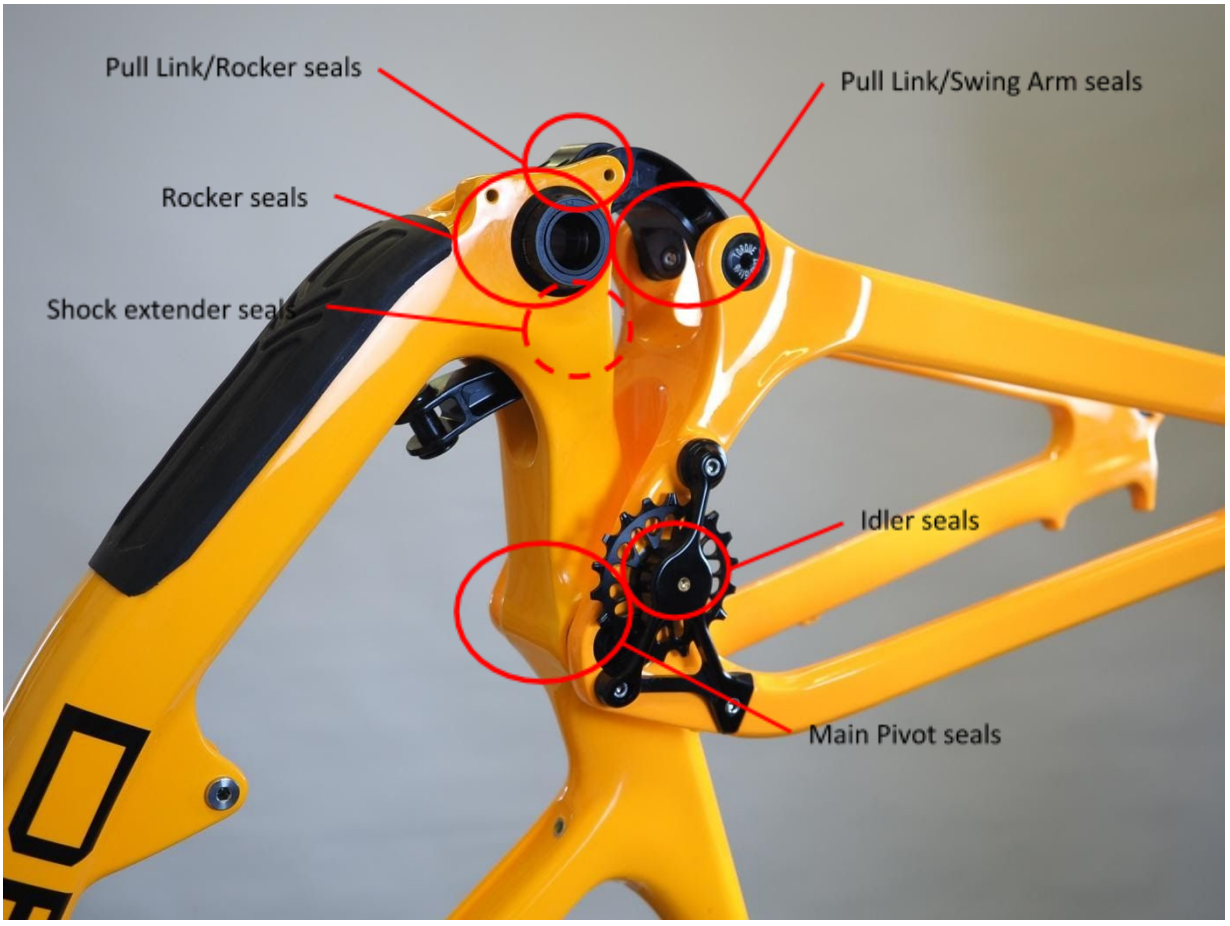
- Flat blade screwdriver
- Plastic tyre lever
- Large socket
- Mallet
- Allen keys
- Torque Wrench (2-10Nm and 20-30Nm)
- Grease

Before you start

To protect the frame from damage it is recommended to wrap the shaft of the screwdriver blade with an insulation tape (or similar), leaving the tip exposed.



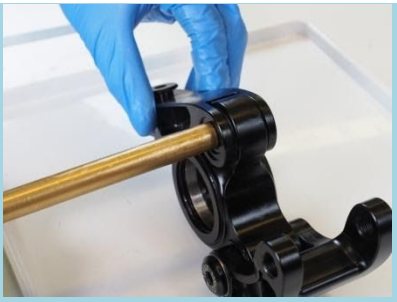
Diagram showing complete frame assembly with terminology



Rocker Assembly

	Description	Supporting Photos
1.	Loosen the Pull Link to Rocker bolt.	
2.	Loosen the two Pull Link to Rear Triangle bolts.	
3.	Loosen the RH (Drive side) Bottom Bracket (BB) shell to leave 5-10mm of thread exposed.	
4.	While supporting the Front Triangle gently tap the BB shell with a soft mallet. As the BB shell moves towards the Front Triangle loosen the BB shell further. Remove the BB spacer if necessary and reattach the BB shell to tap the Bottom Bracket Axle out further. If the BB Axle is still stiff to remove, use a suitable sized socket or bush to tap the final few millimetres. Once the BB Axle is disengaged it becomes noticeably easier to move.	 

5.	Before removing the BB Axle, remove the two Pull Link to Rear Triangle bolts. Ensure the Rear Triangle is supported as the bolts are removed.	
6.	While supporting the Rocker Assembly, remove the BB Axle and remove the Rocker Assembly.	 
7.	On a level surface, with good engagement and pressure of the flat blade screwdriver, remove the Zerks grease nipple from the Shock Extender Sleeve.	
8.	Using the 5 and 6mm hex allen key to loosen the Shock Extender Sleeve and Bolt.	

9.	Remove the Shock Extender Sleeve. Using fingers, or a soft metal bar/mallet.	
10.	Remove the Pull Link to Rocker bolt.	
11.	Remove all 6 Top Hats from the Rocker. The Main Rocker Top Hats can be stiff to remove, so may need assistance by carefully twisting the flat blade screw driver and working around the diameter of the Top Hat.	
12.	Pry out all 6 seals from the Rocker.	
13.	Fit the 6 new, single lip seals. Ensure seals are fitted with the lips facing outwards – in the opposite direction from those currently installed. Some pressure may be required to seat the seals.	

14.	The seals should fit flush with the metal edge of the Rocker.	
15.	Check the condition of the o-rings within the Top Hats and refit. Replace o-ring if damaged. Apply grease to the inside faces of the bearings and Top Hats. This helps reassembly and reduces risk of o-ring damage.	 
16.	Apply Loctite 243 to the 3 female threads of the Pull Link.	
17.	Refit the Pull Link to Rocker bolt. When fitting this bolt ease in gently to ensure o-rings are not damaged. Too much resistance shoud be investigated – this could be an extruded o-ring.	

18.	Refit the Shock Extender Sleeve. When fitting this bolt ease in gently to ensure o-rings are not damaged. Too much resistance should be investigated – this could be an extruded o-ring.	
19.	Apply Loctite 243 to the thread of the Shock Extender Bolt.	
20.	Tighten and torque the Shock Extender Sleeve and Bolt to 20Nm.	
21.	Refit the Zerks Grease Port. Tip – Fill the Shock Extender Pivot with grease at this point for improved access.	
22.	Grease both the BB axle and the Front Triangle bores.	

		
23.	Offer the Rocker Assembly back into the Front Triangle.	
24.	Refit the BB Axle from non-drive side. **Important!** Ensure the flat portions of the BB Axle align with the corresponding flats in the Front Triangle. Failure to do this may result in damage to the frame or BB Axle or hinder assembly.	 
25.	It should be possible to fit the BB Axle by hand, but as the seals engage it can get stiff. If required a gentle tap with a soft mallet will fully fit the BB Axle. Alternatively a headset press or fitting the RH BB shell and spacer will pull the BB Axle into position.	
26.	Refit the drive-side BB Shell with the supplied spacer and torqued as per manufacturer's guidelines.	

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Main Pivot and Pull Link to Rear Triangle Seal Replacement

	Description	Supporting Photos
	Main Pivot Seals	
1.	Loosen and remove the Main Pivot Axle. And slide the Rear Triangle away from the Main Pivot.	
2.	Remove the Top Hats and pry out the seals from the Main Pivot.	
3.	Replace the seals.	
4.	Inspect o-rings inside Top Hats and replace if damaged.	

5.	Grease o-rings inside Top Hats.	

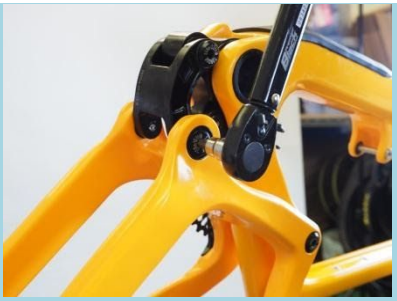
Pull Link to Rear Triangle Seals

6.	Remove the Top Hats and pry out the seals.	
7.	Replace the 4 seals.	
8.	Inspect o-rings inside Top Hats and replace if damaged.	
9.	Grease o-rings inside Top Hats.	

Reassembly

10.	Apply Loctite 243 to the female thread of Main Pivot Insert.	
11.	Reposition Rear Triangle back into positon and replace Main Pivot Axle. Tighten by hand.	
12.	Refit the Pull Link to Rear Triangle bolts. Tighten by hand.	

Torque Tightening

	Description	Supporting Photos
1.	Tighten the 2 Pull Link to Rear Triangle bolts to 20Nm.	
2.	Tighten the Rocker to Pull Link Axle to 30Nm.	
3.	Tighten the Main Pivot Axle to 30Nm.	

Idler Assembly

	Description	Supporting Photos
1.	Remove the three M5 screws mounting the Idler Cover Plate.	
2.	Slide the Idler Cover Plate off (this may be tight on the bearing, so the use of a plastic tyre lever may be required to pry it off).	 
3.	Using the flat blade screwdriver, pry out the seals.	 

4.	Push the new seals into place – note orientation of seal.	 
5.	Refit the Idler and Idler Cover Plate.	
6.	Apply Loctite 243 to the screw threads.	
7.	Refit screws and tighten to 2Nm.	

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Lubrication Locations

Grease should be applied to the following locations (total of 8 ports):

1. Idler Bearings;
2. Shock Extender Sleeve (will require compression of suspension or while Rocker is removed);
3. Pull Link to Rocker Axle;
4. Pull Link to Rear Triangle Axle (x2) (with wheel removed and slightly bent tip on the grease gun)
5. Main Pivot Axle (non-drive side);
6. Rocker Bearings (x2 ports on the underside).

Depending on where you ride and the conditions you ride in will help you choose the right grease for you. We have been using Bio grease throughout the frame recently to reduce the impact to the environment we ride in. Most lithium or silicone based grease should be suitable though and mixing grease is not detrimental to the sealing performance.