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**The Guts And Glory Of A Bypass Shock
Up Close And Personal With Fox Racing Shox**

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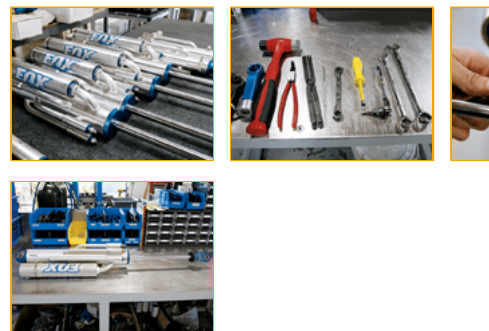
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When the time comes, and you have realized that your vehicle has exhausted the capabilities of a standard, non-bypass shock, where do you turn? usually when that time comes, you are in need of something that will not only soak up more abuse but give you infinite adjustability, controlling the way your suspension moves through even the toughest terrain. What you need is a bypass shock. they come in various lengths and diameters to suit your needs from mild to extreme. You can even custom-order how many bypass tubes come with your shocks, allowing you to valve the control of your shock externally. the only real problem with bypass shocks is that most of us look at them as a complex equation of mechanical goodness that we couldn't possibly try to take apart ourselves. One of the benefits of a shock of this caliber is that if shy of totally destroying it, you can rebuild it and replace every part, making it last a lifetime.



Fox Racing Shox is one of the leaders among the high-performance shock manufacturers in today's automotive and racing scenes. You will find its shocks in OEM-replacement kits, on mountain bikes, aftermarket long-travel suspension, and running on some race-winning cars and 28 trucks in Baja. the folks at Fox Racing Shox opened their doors and tool chest for us to come in and pick their brain and learn just what goes into building and rebuilding their high-performance bypass shocks. Hopefully this article will help you realize, as we did, that although it seems complex, once you start turning wrenches, it's actually a fairly easy process.

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Our 3.0 Fox bypass shock ready to be rebuilt.



Valve tool, hammer, snapping pliers, cap tool, pick, ratchet wrench, nut driver, allen wrench, 3/4-inch open-end wrench, and 7/8-inch open-end wrench is all you need.



Use an allen wrench and ratchet to loosen each bypass adjuster all the way out. Be sure to keep count of how many turns it takes to adjust them out. When reinstalling them, adjust them back to the same valving settings.



So What Is The Basic Operation Of A Bypass Shock?

The external bypass shock functions by allowing a metered amount of oil to flow around the valving piston by way of the tube(s). By allowing some oil to flow around the piston, the damping of the shock will be only a fraction of the total amount of valving on the piston. By controlling the bypass amount with the adjuster, the shock can be broken into small zones, each zone with a different amount of control than the previous. this is only true while the piston is passing through the bypass circuit or tube. Once the piston has reached the end of the circuit or tube, the effects of that adjuster are no longer effective. if the piston has entered another bypass circuit, then that adjuster is now controlling the bypass. if the piston is passing through any bypass tube, then there is no bypass and therefore 100 percent of the control is coming from the valving on the piston. typically, this area of zero bypass is common in the last 25-30 percent of travel. as the shock is compressing, bypass only occurs from the blue compression tubes, and as the shock is extending, bypass only occurs from the red rebound tubes.



Be sure to secure the shock upside down in a good, strong table vise.



Use a 5/32-inch allen wrench to remove the set screw in the blue bearing cap.



Be sure to completely discharge the nitrogen from the shock before going further. using the snapping pliers, remove the snap ring.

What Do Those Bypass Adjusters Do And How Do They Work?

The bypass-unit adjuster consists of a locknut, adjusting screw, plunger, and check valve. When oil is passed through the bypass tube, the check valve is pushed back against the plunger, whose depth is determined by the adjusting screw. With the valve in the open position, oil can bypass the piston. the greater the distance between the plunger tip and the valve, the greater the amount of bypass. the adjuster itself can be adjusted by using a 9/16-inch wrench to loosen the jam nut and a 3/16- inch allen wrench to turn the adjusting screw in or out. Rotating the screw clockwise will decrease the amount of bypass by decreasing the travel of the check valve. likewise, rotating the screw counterclockwise will increase the amount of bypass. to determine how far open the adjuster is, loosen the jam nut and count the number of revolutions until the screw is in the fully closed position. the adjusting screw may be set in any position to function, however, it is easier to keep track of the adjustment if the screw is adjusted in full or half turns. When opening the adjusting screw, the screw will stop when the adjuster reaches the fully open position. the bypass valves are designed to allow flow in only one direction and therefore can only control flow in one direction. For this reason, there are two types of tubes on a bypass shock: a compression tube with a blue cap and a rebound tube with a red cap. any adjustments to the compression tubes will not affect the rebound control and vice versa.

It's Time To Service My Shock, How Do I Do That?

The photos shown are a basic guide on how the Fox Racing service department walked us through rebuilding a 3.0-diameter bypass race shock. please consult your included instructions if you plan on doing this yourself. if you feel at any time you are not confident tearing apart the shocks yourself, Fox is just a phone call away.



Remove the shock shaft from the shock body.



Have a bucket handy to dispose of all the used shock oil.



Use the snap-ring pliers to remove the snap ring on the other end of the reservoir can.

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Go ahead and remove each one of the bypass adjusters. Be cautious of all parts.



The blue bypass adjusters control compression, and the red ones control rebound. the gold adjuster is a custom piece that allows the oil to flow both directions, controlling both rebound and compression. this adjuster is typically run in the middle bypass tube keeping the centermost portion of the shock valving smooth.



Using a 3/4-inch open-end wrench, remove the valve nut on top of the shaft assembly, so the valving stack can be removed. Be careful when removing the valving stack, as the shims are very small and need to be reinstalled in the same direction and order they were removed. at this point the shim-stack valving can be adjusted.



Remove all parts from the shaft assembly including the valve stack, spacers, bearing, bearing cap, and bottom-out bumpstop. using a pick, remove all the seals from all parts and replace each one.



Take the valve assembly apart and line up all of the shims according to diameter. keeping these in line is very important, so the valving stays the same.



Measure each one of the shims to see if any that may have suffered damage need to be replaced. This way the correct part can be ordered without question. the top half is the rebound stack, and the lower is the compression stack. typically, the compression stack contains more shims.



Fox shock pistons have bleed holes predrilled on them that help remove air bubbles during the rebuilding process.



Fox sends all of the internal shock components into an ultrasonic cleaning bath for 10 minutes to clean all components thoroughly. all of the plated body pieces get cleaned with normal soap and water in a cleaning tank.



If the shaft is damaged, a press of some sort will be needed in order to hold the shaft in place to remove the eyelet. Fox uses a special tool made to go around the large eyelet, twisting it off with ease. use the same process to install the new shaft and place a small amount of red loctite on the threads.



Check the shock shaft for cracks, pits, or any damage to see if it needs to be replaced. If not, Fox suggests cleaning the



With all of the new seals installed and the valve stack reassembled, place them all back onto the shaft in the reverse order



Slide the internal floating piston (iFp) into the reservoir body. The iFp is what separates the oil from the nitrogen in the



Using a 7/8-inch open-end wrench, tighten down each bypass valve adjuster to the base. They will later be opened back to the exact number of turns written down when removed to keep valving the same on both compression and rebound.



Slide the reservoir can back in place and reconnect both snap rings.



Refill the shock using specific Fox Racing red shock oil.



With oil in the shock, push and pull the shaft assembly in and out of the shock body until all air bubbles have been released. As the blue cap is pressed down, a small amount of shock oil may leak, so it's a good idea to wrap a rag around the shock to keep things from getting messy.



Reinstall the snap ring.



Fox adds a small amount of antiseize to the threads of the cap. Replace the end cap, charge the nitrogen back in the shock, and you are good to go.

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