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## Small Body Overhaul Service Sheet

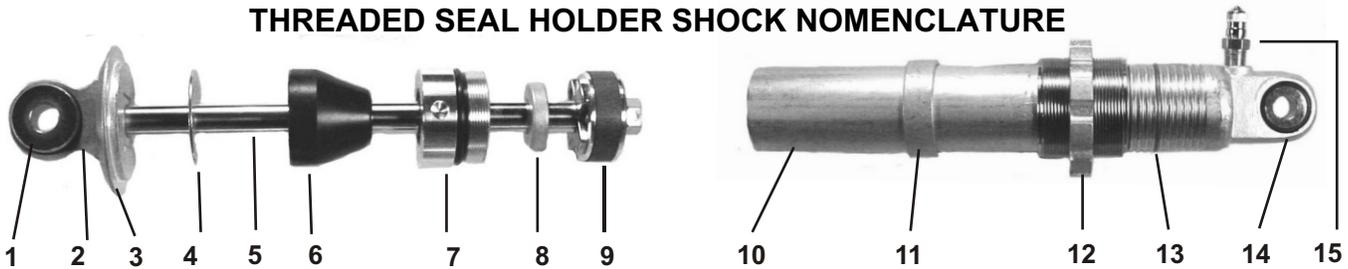
#SBOHAUL - 10/01/2002



**Important Note:** If your shocks have nitrogen fill valves pictured above, they are **NOT** user serviceable and need to be sent to Works Performance for service.

Note: This service sheet covers gas shocks without external reservoirs. The shock series involved are the Oilers, Gassers, Trackers, & A-T Steelers. Two types of seal head assemblies were used. The most common is the threaded seal head, which has a 1/4-inch hole drilled in the side. The other type is a two-piece, push-in style seal holder and dust cap which is clipped into place. It has a thin groove around the dust cap at the shaft end of the shock. Separate procedures for the Push-in Seal Holder are in a supplemental service sheet.

### THREADED SEAL HOLDER SHOCK NOMENCLATURE



- |                          |                    |                             |
|--------------------------|--------------------|-----------------------------|
| 1. Bushing *             | 6. Bumper          | 11. Crossover Spacer        |
| 2. Eye(see note)         | 7. Seal Head       | 12. Threaded Pre-load Assy. |
| 3. Lower Spring Retainer | 8. Inside Spacer** | 13. Body Snap Ring          |
| 4. Bumper Washer         | 9. Piston Assy..   | 14. Eye (see note)          |
| 5. Shaft                 | 10. Body           | 15. Nitrogen Fill Valve     |

**Note:** May have a clevis in place of the eye, check the back of this service sheet for descriptions.

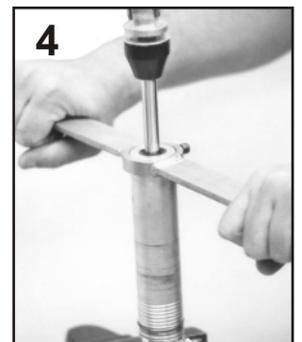
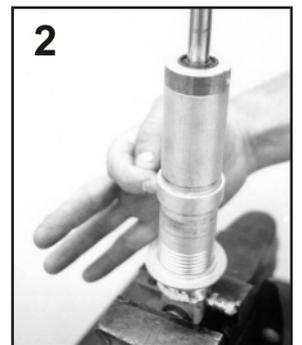
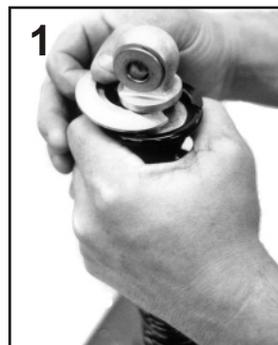
\*Other types of bushings are explained at the back of the service sheet.

\*\* If so equipped

**CAUTION:** These shocks are pressurized to 250 psi. with nitrogen. This pressure is not an adjustable feature of the shock. Unless there is a leak, the shock would not normally lose pressure. It is imperative that the gas be safely released from the shock before dismantling the shock assembly.

#### DISASSEMBLY

1. Clamp the shock in a vise at the shock eye only--not on the tube. In some cases, the spring retainer can be removed by hand. Otherwise, an aftermarket spring compressor will have to be used.
2. On multi-spring shocks, the loose ring (or rings) called crossover spacers on the body inside the short spring, determine the point at which the spring set transitions from soft to stiff. Put them back in the same order, as they vary by thickness. On triple-rate springs, make sure that the same crossovers go inside the same springs.
3. Release the pressure from the shock. On emulsion shocks, oil will also come out. Caution: These shocks are pressurized to 250 psi. with nitrogen. Point the shock away from your face. (Shock oil can be recycled along with used motor oil.)
4. Seal head spanner wrench (available from Works, see tools page) is used to unscrew the seal head. Threads are right hand. It may take a good deal of force to break it loose.



Continued on next page

5a,b. Remove the shaft assembly from the body. Inspect the shaft for pitting, scratches or other deep grooving. Replace if necessary.

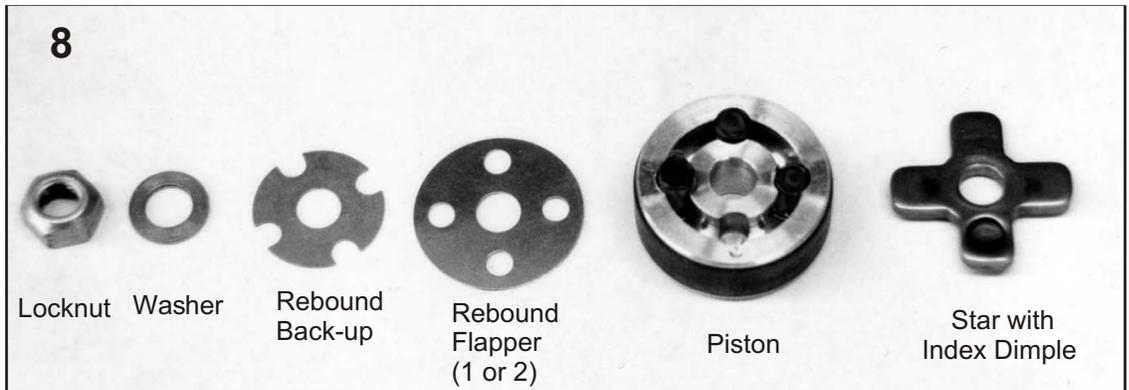
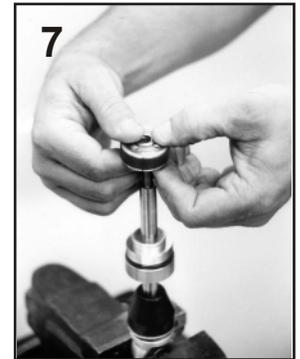
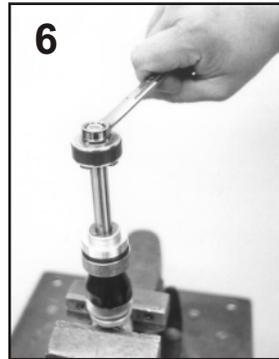
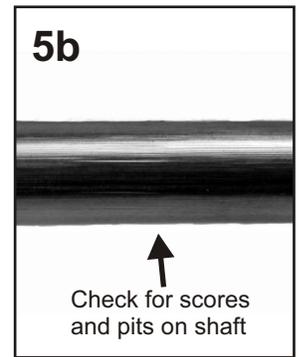
Note: If the shaft is marred, then it should be replaced. New seals will not seal a damaged shaft. When ordering a shaft, measure the full length of the shaft from end to end. Two types of shafts were used in these shocks. The first is the "standard shaft, which has 3/8-16 threads at both ends. The other shaft is the "Magna" shaft, which has 3/8-16 threads on one end and 5/16-24 threads on the other.

6. Clamp the eye only--do not clamp the shaft. Remove the nut that secures the damping piston on the shaft.

Note: On many older shocks, the piston is threaded and is screwed on to the shaft. The piston can be removed by putting a wrench on the flats of the star and unscrewing. It is a right hand thread.

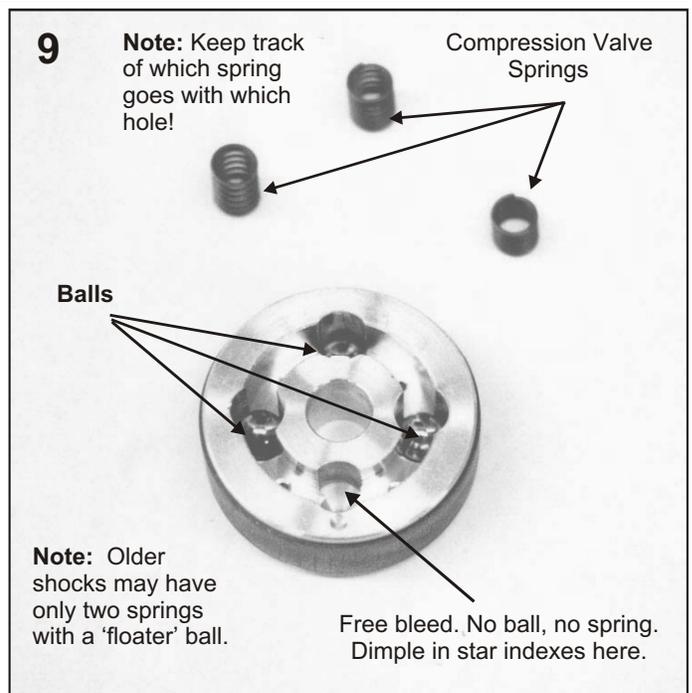
7. Carefully remove the piston assembly. The damping components inside, which are specific to each hole in the piston, can fall out and be easily mixed up.

Note: It is advisable to replace the distorted thread locknut on the piston end of the shaft. If it is to be re-used, a thread locking compound should be applied.



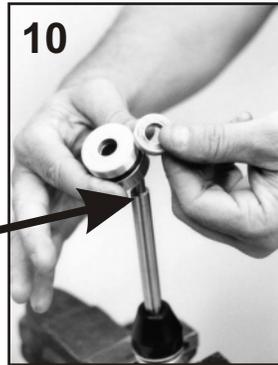
8. The piston stack as it fits on the shaft from right to left: star; piston; flapper (1 or 2 each of 1 or 2 thickness); back up; piston washer; and piston lock nut. The dimple in the star indexes into hole with no ball or spring. On pistons with a floater ball (no spring) the dimple indexes over the floater. Rebound flappers (use, quantity and thickness varies by shock model) have a slight cone shape. The concave side should go down against the piston face. While the back up is always on the outside of the stack next to the piston washer, the flappers start with the thickest next to the piston out to the thinnest. (They may all be the same thickness.)

9. Each valve spring (two on older shocks, three on later shocks) should be removed individually and identified so that they will go back on top of the ball in the same hole. The balls are all the same, but the springs have different rates and have specific relationships to each hole size under the ball. Most pistons will have a dimple on the piston face that indicates the compression and rebound "through hole," or free bleed. This pocket is shallower than the other pockets, and is not equipped with a ball and spring.



10. On many shocks, a spacer is used inside to adjust the eye-to-eye length. It fits between the seal head and the piston.

Sometimes the shoulder of the shaft where the piston is installed (see arrow) will flare out slightly to a burr. Carefully use a light file to smooth that spot, so that the seals are not damaged during assembly. Do not nick or scratch the sliding surface of the shaft, or the shock will leak right away.

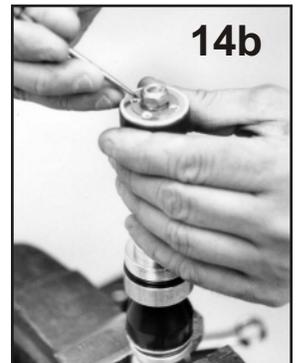
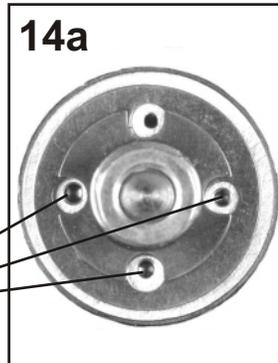


Note: If neither the shaft nor eye (or clevis) needs to be replaced, leave these components assembled. If the shaft needs to be replaced, clamp the eye or clevis in the vise and unscrew the shaft from the eye. Since the shaft is not serviceable, it can be removed with vise grips. It is helpful to have a heat gun to heat the eye to break the bond of the thread adhesive. On the other hand, if the shaft is to be saved and a new eye or clevis installed, then you will need the shaft clamp set as shown in the tools section of the overhaul guidelines. In most cases, you will need a hydraulic press to clamp the shaft sufficiently to remove the eye. Sometimes the clamp will work in a large vise.



11. Put the seal head back into the body. Pry out the outer seal with an open-end wrench (5/8-inch or 17mm works great.) Avoid scratching the inner surface of the seal bore or shaft bore.

12. With a plastic or aluminum pick, remove the inner O-ring seal. This is the main pressure seal, so take care to avoid scratching the groove. The outer O-ring should be removed with the same care.

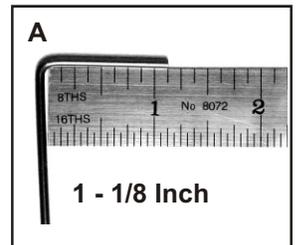
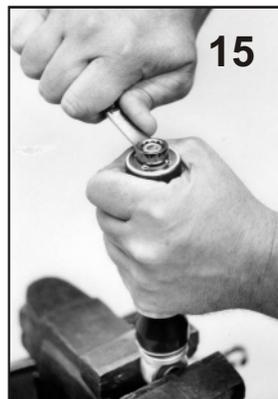


13. The outer seal can be pressed in place with either an arbor press or between the jaws of the vise. Lightly grease the O-rings and reinstall them.

**Important Note: Make sure that the balls are visible thru the valve holes.**

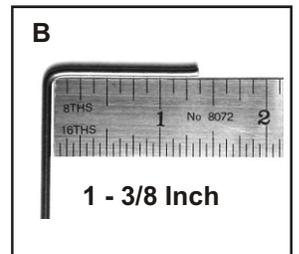
**ASSEMBLY**

14a,b. When installing the piston assembly and the shaft washer and nut, position the rebound flappers so that the balls are visible through the valve holes. This is critical to proper performance. Look for the balls. Remember, if the distorted thread locknut is not replaced, apply a thread locking compound.



15. Hold the flappers in position and tighten the shaft nut to 16 ft. Lbs of torque. Check to see that the balls are visible through the flapper holes.

Note: Because various length and diameter shafts are used in various length shock bodies, the most accurate method of filling the shock with the correct amount of oil is to measure to a certain level, rather than a specified amount (cc's or ounces). The oil level is critical to proper performance. Too little oil can cause cavitations. Too much oil can cause the shocks to hydraulically lock and damage the shafts or bodies.



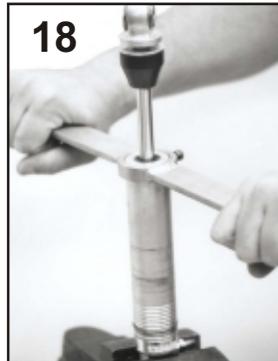
Bend a piece of wire (coat hanger or welding rod) into a dipstick. The oil level measurement for shocks with 1/2-inch diameter shafts and threaded seal heads is 1-1/8-inch (fig A). On shocks with 5/8" diameter shafts and threaded seal heads, the oil level dipstick should be 1-3/8-inch (fig B).

16. Pour in enough Works shock oil to fill a third of the body depth. Coat the piston ring with clean Works shock oil and insert the shaft with a gentle circular motion, so that the threads on the body don't scrape up the piston ring.

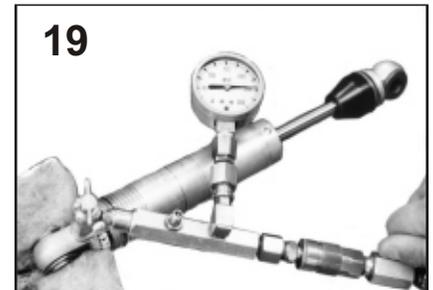


17. With the bumper and seal head firmly up against the shaft eye and the inside spacer (if so equipped) down inside the shock, push the shaft assembly down to the edge of the shock body and cock it over. Pour Works shock oil to the bottom of the dipstick. Screw in the seal head by hand.

18. Tighten the seal head securely into the body.



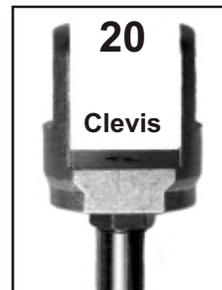
19. Screw the filling manifold on the valve and bring the pressure up to 250 psi dry nitrogen. Screw the T-handle down to depress the valve core to fill the shock with nitrogen. With the manifold still at 250 psi, unscrew the T-handle to close the valve core and capture the nitrogen in the shock. If the pressure is released in the manifold before the valve in the shock is closed, oil will transfer to the manifold assembly and the shock will have to be refilled with shock oil and nitrogen.



Install the springs, crossovers and go-betweens in the proper sequence and order.

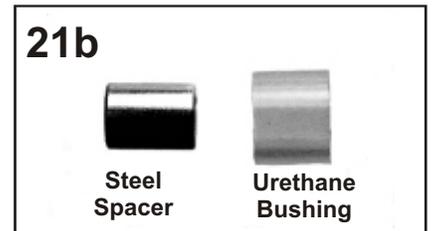
### Eye, Clevis and Bushing Descriptions

20. Clevis, this is used on some installations, note the size of the holes on each side.

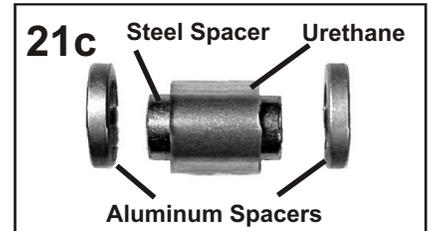
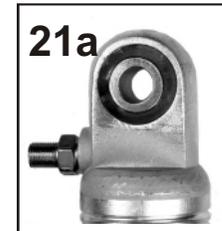


Note: Various bushing sets are used in the shock eyes (eyelets). When replacing these bushing sets measure the width and inside diameter of the steel inserts.

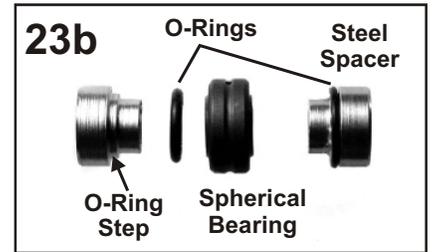
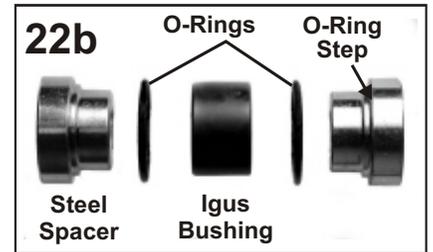
Urethane Type (Figs. 21a, b & c). This is the most common type consisting of a urethane outer sleeve and a straight or flanged steel insert. The spacer outside diameter is 5/8-inch. These are normally removable by hand. In some cases, wide steel spacers have aluminum side spacers on one or both sides of the eye (Fig. 21c).



"Iigus" Type (Figs 22a & b) This set consists of an inner thermoplastic sleeve bearing that is pressed into the eye with an arbor press. One long (Fig. 22a) or two flanged steel inserts (Fig. 22b) slide inside the bearing. The flange outside diameter is 1-inch. O-rings are used depending on the width of the flange insert. These bearings are designed to be used without lubrication. Specifically do not use a spray lube (chain lube for instance) because the carrier can cause the bearing to swell up and seize on the inserts.



Spherical Type (Figs. 23a & b) This consists of a spherical bearing (also referred to as a "Heim" bearing) that is pressed into the eye with a hydraulic press. For all mounting bolt sizes 12mm and smaller, steel inserts are pressed into the bearing from each side. For 1/2-inch bolts, the sleeves are loose on the sides. These steel inserts are 3/4" outside diameter. O-rings are used to exclude dirt and moisture from the bearing. These bearings need to be greased occasionally. Peel the O-rings off and lube the bearing. Then install the O-rings to capture the grease.





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Small Body Service Sheet Supplement  
 for Push In Seal Holders

#SBOSUP - 10/01/2002

**PUSH-IN SEAL HOLDER SHOCK NOMENCLATURE**

1. Eye	10. Piston Assembly
2. Lower Spring Holder	11. Aluminum Body
3. Bumper Washer	12. Crossover Spacer (not used on single rate springs)
4. Bumper	13. Upper Spring Retainer
5. Shaft	14. Body Clip
6. Dust Cap	15. Nitrogen Valve
7. Spring Clip	16. Steel Bushing
8. Seal Head	
9. Inside Spacer (May not be on all shocks)	

**DISASSEMBLY**

Steps 1-3 refer to the threaded seal holder service sheet.

4. Using a chisel or drift lightly tap the dust cap from below. Work around each side to remove it.

5a & b. Wrap duct tape around the shaft at the edge of the seal head, to avoid damage to the shaft. With a blunt-ended drift, push the seal head down inside the body. If it doesn't move easily, use a mallet to tap the seal head down far enough to get access to the retaining clip and remove the clip.

Steps 6 - 12 refer to the threaded seal holder service sheet.

12a. With a plastic or aluminum pick, remove the dust cap seal. Pay close attention when installing the new seal so that the lip is installed toward the outside of the cap.

Steps 13 - 15 refer to the threaded seal holder service sheet.

15c. Bend a piece of wire (coat hanger or welding rod) into a dipstick. The oil level measurement for shocks with 1/2-inch diameter shafts and push-in seal heads is 1 - 3/4 Inch.

Steps 16 - 17 refer to the threaded seal holder service sheet.

18 b, c. Note the snap clip step on the seal head. After inserting the snap clip, pull the shaft out fully to make sure that the snap clip is fully engaged with the step BEFORE pressurizing the shock or serious injury could result!

Steps 19 - 23 refer to the threaded seal holder service sheet.

