How to Install the Minor Rebuild Kit

Disassembly and Inspection

1. Using two pairs of pliers, unscrew the **Gland Nuts (#1)** holding the Crossover Tube onto the Head.
2. Remove the **Crossover Tube. (#2)**
3. Loosen and remove the **End Nuts and End Nut Washers. (#3)**
4. Remove the **Heads (#4)** by twisting and pulling. Occasionally they are stuck on tight enough that you may have to tap them off with a rubber mallet.
5. Remove the **Comm Tubes. (#5)**
6. Gently pull on one of the **Central Tubes (#6)** to pull out the **Piston and Cylinder Assembly (#7).** Often the **Collar (#8)** and one of the **Low Pressure Pistons (#9)** will stay in the **Barrel (#10).** Use a broomstick or similar rod to push those out.
7. Inspect the Collar for wear. If the lips of the Collar are worn thin, replace the Collar, HLPS part 10-1359. If not, gently pry the lips out a little all around with a screwdriver. This gently expands the lips, improving sealing and reducing squealing or wheezing noises. See HLPS document "How to Rejuvenate the Collar and Pistons"
8. Remove the **End Caps (#11)** on the **Valve Body. (#12)**
9. Remove the **Spool (#13),** check for excessive wear, replace as needed, HLPS part 10-1317.
10. Using an angled pick, remove the **Spool Valve O-rings (#14).** Details in "Spool Valve O-Ring-howto".
11. Upend the Barrel and Valve Assembly and set it on a sponge.
12. Fill the Barrel with water and inspect to see if water is flowing from all three Pilot Holes. If a hole is only dribbling, that hole could be clogged. This is a cause of erratic operation or unexpected stalling.
13. If necessary, use a 90 degree pick to dislodge debris from the Pilot Holes. You may need to tape the pick on a stick to get at the insides of these holes in the Barrel. Usually it's the center hole that gets clogged. To prevent Pilot Hole clogs, follow the Filter cleaning procedure on the next page. Also see "What to Do if the High Lifter Gets Stuck".
14. If necessary, use a toothbrush to remove algae from the Valve Body.
15. Check the High Pressure Cylinder and Central Tubes for excessive scratches. The Rebuild Kit will get the pump running, but if there is excessive wear on either the High Pressure Cylinder, HLPS part 10-1365 or 10-1367, or the Central Tubes, part 10-1377, the pump will deliver less water and the rebuild will not last as long. Replace the HPC or the Central Tubes, or install the Major Rebuild Kit, which has both of these parts.
16. Rinse the Barrel, Valve Body, and High Pressure Cylinder.

Assembly and Testing

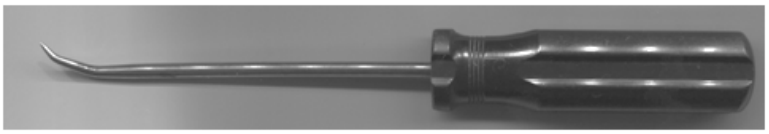
1. Install the new Spool Valve O-Rings using an angled tip tool. See picture of install tool. Do not use a sharp pick to install these o-rings, they will likely be damaged that way.
2. A tube of Silicone Grease is supplied with the Rebuild Kit. Apply small amounts of grease to all o-ring surfaces when re-assembling, except for the Spool Valve O-rings. Also put some grease on the Central Tubes and the inner surfaces of the Barrel and High Pressure Cylinder, for quieter operation.
3. Install the Spool and End Caps.
4. Assemble Pistons, Collar, and Cylinder. The Pistons fit tightly into the Cylinder, tap with a mallet if necessary. Do not over tighten the Central Tubes into the High Pressure Piston.
5. Install the Piston and Cylinder Assembly into the Barrel so that the tips of the Central Tubes show on either end.
6. Install the Heads onto the Barrel.

continued on next page.....

How to Install the Minor Rebuild Kit, cont

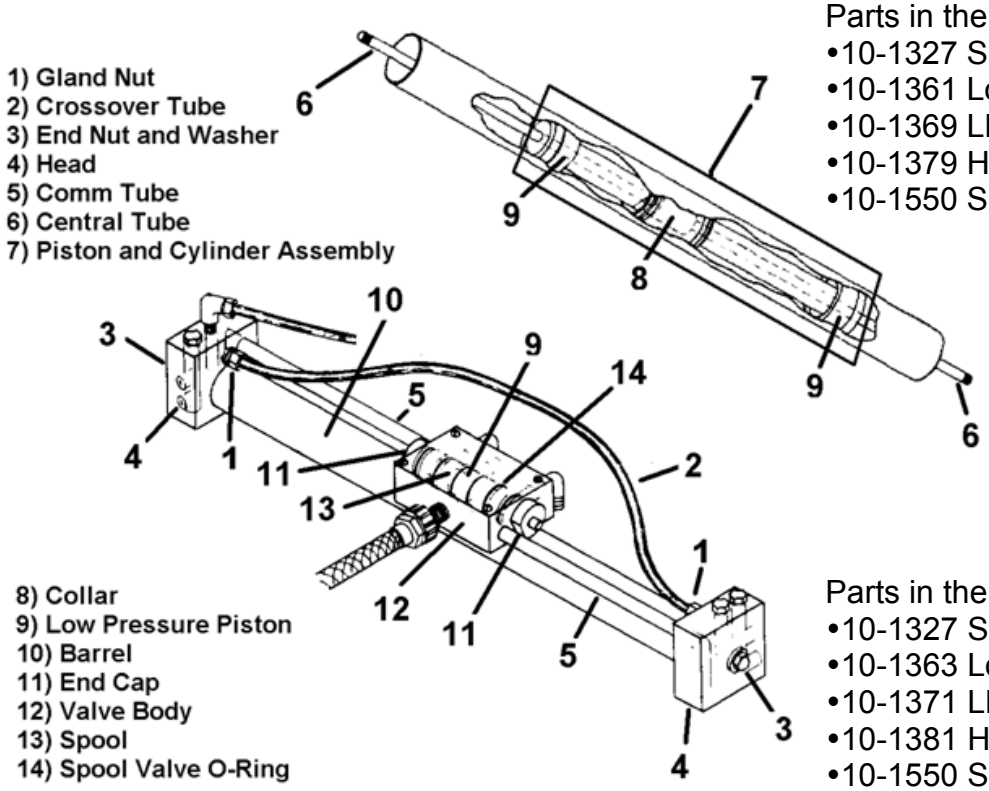
Assembly and Testing, continued

7. Install the End Nut Washers and End Nuts onto the Central Tubes. Make sure the End Nut Washers and Head are clean. Any cracks in the End Nut Washers, or dirt or hairs in this area will cause leaks. Then the tendency to deal with leaks is to over tighten the End Nuts instead of cleaning or replacing. This will strip the threads in the High Pressure Piston and ruin the rebuild. Also, leaks where the Head joins the Barrel are due to worn Head O-rings. FIX LEAKS BY CLEANING THE END NUT WASHER AREA, REPLACING THE END NUT WASHERS, OR REPLACING THE HEAD O-RINGS. DO NOT OVERTIGHTEN THE END NUTS OR DAMAGE WILL OCCUR.
8. Reinstall the Crossover Tube.
9. Apply water pressure to test the pump.
10. You may have to push on the Buttons on the Valve Body to purge the air out of the pump.
11. Perform the Stall Test. See “”How to perform the Stall Test.pdf” .Note that a stream of water thicker than a pencil coming from either Discharge Fitting is an indication of worn internal parts, popped o-rings, or fittings not tightened properly. Leaks from the Comm Tubes can be bad o-rings, or maybe the Comm Tubes just need to be rotated to seat the o-ring properly. A little leakage from the two weep holes on the bottom of the Barrel below the Valve Body is normal, but if it sprays out there, you probably need to replace the Collar, or the Barrel itself is worn out.



Spool Valve O-Ring removal tool. Various brands of picks are available at hardware stores.

Spool Valve O-Ring installation tool. This is a dental tool, but any tool with a small, flat, spoon-shaped tongue will work.



Parts in the 4.5:1 Rebuild Kit
- 10-1327 Spool Valve O-ring qty 6
- 10-1361 Low Pressure Piston 4.5:1 qty 2
- 10-1369 LPP O-ring 4.5:1 qty 2
- 10-1379 High Pressure Piston 4.5:1 qty 1
- 10-1550 Silicone Grease Minitube qty 1

Parts in the 9:1 Rebuild Kit
- 10-1327 Spool Valve O-ring qty 6
- 10-1363 Low Pressure Piston 9:1 qty 2
- 10-1371 LPP O-ring 9:1 qty 2
- 10-1381 High Pressure Piston 9:1 qty 1
- 10-1550 Silicone Grease Minitube qty 1