How to Install the Rebuild Kit, HLPS 1118 or 1124

I. Disassembly and Inspection

a. Using two pairs of pliers, unscrew the **Gland Nuts (#1)** holding the Crossover Tube onto the Head.
b. Remove the **Crossover Tube. (#2)**
c. Loosen and remove the **End Nuts and End Nut Washers. (#3)**
d. 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.
e. Remove the **Comm Tubes. (#5)**
f. 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.
g. Inspect the Collar for wear. If the lips of the Collar are worn thin, replace the Collar, HLPS part 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. This procedure can often rejuvenate worn Collars.
h. Remove the **End Caps (#11)** on the **Valve Body. (#12)**
i. Remove the **Spool (#13),** check for excessive wear, replace as needed, HLPS part 1317.
j. Using an angled pick, remove the **Spool Valve O-rings (#14).** Details in Spool Valve O-Ring howto.
k. Upend the Barrel and Valve Assembly and set it on a sponge.
l. 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.
m. 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.
n. If necessary, use a toothbrush to remove algae from the Valve Body.
o. 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 1365 or 1367, or the Central Tubes, part 1377, the pump will deliver less water and the rebuild will not last as long. Replace as needed.
p. Rinse the Barrel, Valve Body, and High Pressure Cylinder.

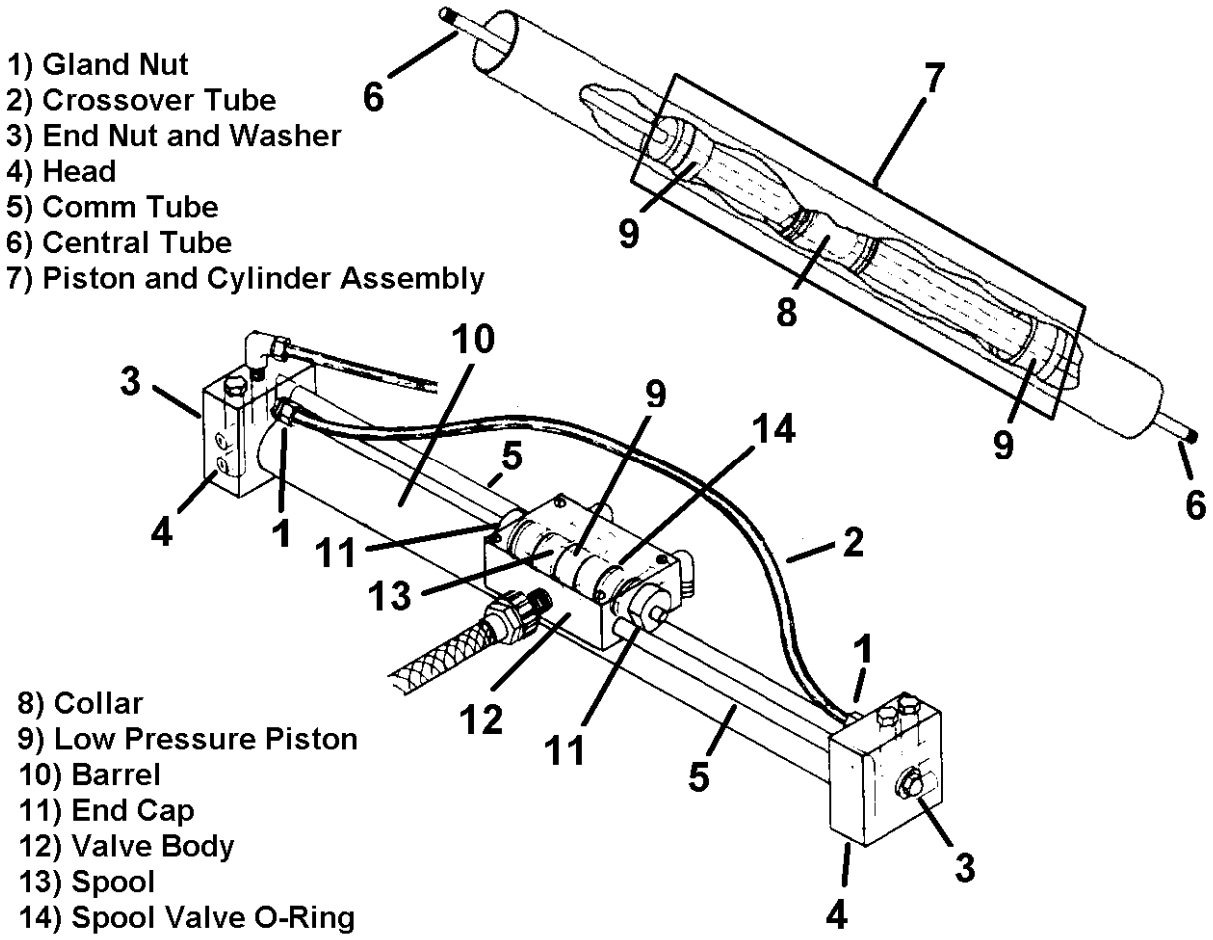
II. Assembly and Testing

a. 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.
b. Install the Spool and End Caps
c. Assemble Pistons, Collar, and Cylinder. Do not over tighten the Central Tubes into the High Pressure Piston.
d. Install the Piston and Cylinder Assembly into the Barrel so that the tips of the Central Tubes show on either end.
e. Install the Heads onto the Barrel.
f. 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.
g. Reinstall the Crossover Tube.
h. Apply water pressure to test the pump.
i. You may have to push on the Buttons on the Valve Body to purge the air out of the pump.
j. Perform the Stall Test.
   1. While running the pump, shut off the outflow using the Outlet Shutoff Valve. This subjects the pump to maximum internal pressure. Any leaks will show up at this time.
      a. Spraying from the bottom holes in the Barrel indicate a worn Collar or Barrel.
      b. A stream of water from either Discharge Fitting thicker than a pencil is an indication of worn internal parts, popped o-rings, or fittings not tightened properly.
      c. Leaks from the Comm Tubes can be bad o-rings or maybe the Comm Tubes just need to be rotated.
      d. Leaks from the Head to Barrel area are often bad Crossover Tube fittings or the fittings didn't get tightened enough.

The Spool Valve O-ring removal tool is shown above. Install tool is shown below, side view, and top view showing rounded edges. (less than actual size) These can be obtained at hardware or auto parts stores.

Parts in the 4.5:1 Rebuild Kit
1327 Spool Valve O-ring qty 6
1361 Low Pressure Piston 4.5:1 qty 2
1369 LPP O-ring 4.5:1 qty 2
1379 High Pressure Piston 4.5:1 qty1

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



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