



Field Maintenance & Repair Guide

All of the specialty tools and replacement parts needed to perform most repairs and maintenance, come with the **Field Maintenance and Repair Kit (FMRK-005)**. In this guide, you will find instruction for three operations:

- 1 Reducing the length of your EarthStraw
- 2 Stroke restrictions from obstructions in the well
- 3 Replacing a damaged piston o-ring

Additional tools/supplies needed to perform the various maintenance and repair operations include:

- 1 Utility knife
- 2 Duct tape
- 3 Tape measure
- 4 Heavy-duty Wire Cutters
- 5 Metal File
- 6 Vice Grips
- 7 Super Glue
- 8 Sharpie Marker
- 9 Smooth-faced Hammer



Note: If you need to replace the entire pump wire and piston assembly, order the appropriately sized EarthStraw Overhaul Kit (EOHK-50, EOHK-100 or EOHK-150) for your system length.

Included in the Field Maintenance and Repair Kit:

- 1 Two replacement Viton piston o-rings
- 2 One replacement EarthStraw Gripper Nut
- 3 Two Replacement Stainless Steel Termination Beads
- 4 One machined aluminum Bead Stop
- 5 One Pump Body release tool for removing the pump body from the brass tee
- 6 Hardened dowel pin for flaring wire





WHEN MIGHT I NEED THIS KIT? Carefully read the three sections below to determine the best course of action, for keeping your pump in top operating condition.

1 Stroke restrictions from obstructions in the well

Indication I Your pump is installed and it doesn't stroke.

What happened? EarthStraw is designed to be inserted into an open well, or a well that is occupied with an electric pump. Often there are restrictions or obstructions in the well. These can include torque arrestors, plumbing fittings, wiring, damaged casings and even rock collapses in the well wall. Because EarthStraw is narrow and flexible, it is unique in its ability to snake around many obstructions. However, if certain portions of the bottom 5 feet of your EarthStraw (where the piston pumps) are bent too sharply or pinched between two obstacles in the well, the piston may become restricted and cannot stroke. When the piston is locked, stroking the pump repeatedly will damage the pump by distorting or breaking the stainless steel spring wire. If the wire is broken, it can be salvaged by following the instructions for raising the piston below.

What should I do? There are two primary options. **1)** Follow the instructions below to field-shorten the entire pump by 10' or so, in an attempt to relocate the critical section of your EarthStraw to an obstacle free location in the well, or **2)** Follow the instructions to raise the piston only, by 10' or so. This requires shortening the stainless stroke wire, so that the piston is free to stroke in an undistorted section of the red pump body.

2 Replace the Viton o-ring on my EarthStraw piston

Indication I You seem to be losing water volume as you pump

What Happened? The brass piston comes from the factory with a close-tolerance Viton o-ring which seals the piston against the inner wall of the pump body. Viton is extremely durable and is factory tested with one-million strokes under normal pressures, with no discernable wear. But, If your well has lots of abrasive silt, it may be possible to wear the seal or the inside of the pump body after extensive use, and thereby experience water "blow-by." Keep in mind as you troubleshoot that your well may not be able to supply enough water, or that your system does not extend far enough below the static water level in your well.

What Should I do? You might want to validate the static water level with a weighted string and a measuring tape. If your water supply is adequate, consider: **1)** Following the instructions below to shorten the system so that you are pumping water from a point well above the silty bottom of the well, or **2)** Follow the instructions below to replace the damaged Viton o-ring to restore the factory seal, or **3)** Follow the instructions to shorten the stroke-wire, thereby raising the piston to an undamaged section of the red pump body...or **4)** Consider performing all three of the above suggestions.

3 Reduce the length of my EarthStraw pump system

Indication I You find that the system is too long, too close to the silty well bottom, or you wish to relocate the system to a shallower well.

What Happened? Perhaps you purchased a longer system to give you options, or before you knew the depth of your well. This is common, and easily remedied.

What Should I do? Follow the detailed instructions below for shortening your EarthStraw Hand Well Pump.

Instructions

FIELD-SHORTENING YOUR EARTHSTRAW HAND WELL PUMP SYSTEM

The **EarthStraw Length Adjustment Kit (ESLA-001)** comes with a hardened pin to use as an anvil for flaring the stainless steel spring-wire, a small stainless steel bead to terminate the wire, and a machined aluminum stop to hold the bead-termination. Additionally you will need a utility knife, tape, heavyduty wire cutters, vice grips, and a smooth-faced hammer (**figure 1 PG 1**). If already assembled, use the **EarthStraw Tee-Release (ESTR-075)** to detach the red pump pipe from the discharge tee (**figure 2 PG 1**), so that the entire pump rod assembly may be removed, including the discharge tee and pump-handle.

- step 1** With the system laid straight on the ground, measure from the open end of the red pipe (where the wire extends), and mark the length of pipe to be removed.
- step 2** Remove the plastic insert from the end of the pipe and keep for reuse. Cut the red pipe squarely “around the wire” at your mark, being careful not to nick or otherwise damage the wire inside, and then slide the discarded pipe off the wire.
- step 3** Replace the plastic insert. Push the wire back into the pump until it comes to a stop, and carefully cut the wire off, just above the open end of the shortened red pipe. Dress the cut end of the wire if necessary to fit the stainless bead.
- step 4** Wrap a strip of tape on the wire 3-5 inches from the newly cut end to keep the bead from sliding down the wire during assembly. Slide the small stainless steel bead over the end of the wire until it rests freely above the tape.
- step 5** Lay the hardened pin from your kit down on a solid surface such as concrete, sledge hammer, a large vise, an anvil, or the ball hitch on your vehicle. Hold the stainless wire over the pin and strike it hard with your hammer, directly over the pin to create a wide flare in the wire (**figure 3**). The middle of the flare should be thin. This flare must be sufficient to hold the bead on the wire while pumping.
- step 6** Cut the wire off at the center of the flare (which is the widest part) . Slide the bead up against the flare and test it for holding power, and then tape the bead in place temporarily.
- step 7** Insert the beaded/taped wire up through the long black pump rod as shown (**in figure 4**) above. At the same time, insert the rod all the way into the red pump body until the beaded-wire comes through the top (threaded end) of the rod.



step
8

Firmly push the red pipe into the bottom of the discharge tee about 1" or until fully engaged as shown **(figure 5)**. As a safety precaution against your pump slipping into the well, apply 5 turns of duct tape to the red pump body, immediately below the brass tee.

step
9

Place the stainless steel wire into the side-slot of the machined aluminum stop, just below the bead, as shown in **(figure 6)**. Using vice grips, crimp the small end of the stop around the wire until the gap closes at least half way and the wire is securely captured as shown in **(figure 7)**. Remove the holding-tape from the bead.

step
10

Push/cinch everything toward the bead until the beaded end is fully recessed into the head of the aluminum stop. Check to ensure that the wire flare DOES NOT extend out of the head of the machined aluminum stop. Trim the wire slightly if needed.

step
11

Drop a small amount of superglue into the slot and over the beaded end to further hold everything in place. After allowing a few minutes for the adhesive to cure, insert the wire and stop, into the pump rod until seated as shown in **(figure 8)**. By hand, screw the double grip handle in place to secure the aluminum stop. Do not over-tighten.

step
12

Reinstall the shortened pump into your well. Set the height to a comfortable pumping position, or lower the pump until the 5 wraps of duct tape (your safety stop) are just above the Gripper Nut.

step
13

Now short-stroke the handle, gently at first, to recharge the dry system. Water provides lubrication and will reduce friction. As you pump, remember that one foot of stroke, produces one foot of lift. So, 30 two-foot strokes will raise the water 60 feet.

figure
5

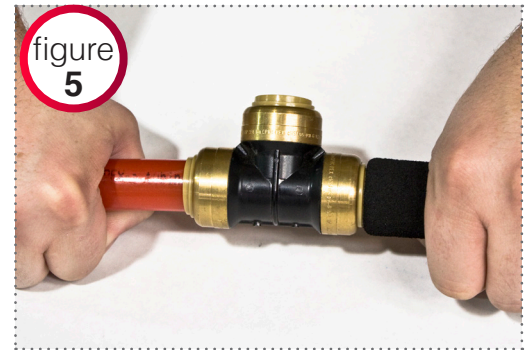


figure
6



figure
7



figure
8



Raising the piston to an undamaged/unrestricted part of the pump

Relocating the piston to a higher stroking location in the pump body is done by shortening the stainless steel pump wire from the top. If your piston is too restricted, you may have to pull the pump up and away from the obstruction in your well, to release the piston for raising. As long as the piston is below your static water level, it will pump water. You should remove a minimum of 10 feet. However, if you are concerned about multiple obstructions in your well, consider shortening the wire several feet. Just make sure that the piston is at least 20 feet or so below your static water level. If you are repairing a broken wire, you may have to cut a few feet of pipe off the top to retrieve the end of the broken wire.

- step 1** Leave the pump in your well. Unscrew the foam-gripped tee-handle as shown, exposing the machined aluminum stop.
- step 2** Remove the stop, and pull out the length of wire that you intend to cut off. If you must use vice grips to hold the wire while lifting, use a rag or cardboard to keep from nicking the wire as you clamp it.
- step 3** Mark the cut point with tape and then extend an extra 6 feet or so to provide plenty of wire to work on. Tape the extended wire securely to the top of the pump handle threads to hold it in place as you work.
- step 4** Cut the wire and discard the removed section. If the end is distorted from cutting, dress it with a file or grinder. Place a piece of tape 3-4 inches from the cut end as a stop for the stainless steel bead. Slide a new stainless steel bead over the fresh cut end.
- step 5** Follow steps 5-11 of the **“Instructions for field-shortening your EarthStraw Hand Well Pump System”** on pages 3-4.
- step 6** Reinstall the shortened pump into your well and short-stroke gently at first, to recharge the dry system. Water provides lubrication and will reduce friction. As you pump, remember that one foot of stroke, produces one foot of lift. So, 30 two-foot strokes will raise the water 60 feet.

Replacing the o-ring on you brass EarthStraw piston

You will be removing the upper handle assembly to provide access for pulling the stainless steel spring wire and piston assembly from your pump. This is a two person job, and care must be taken to avoid dropping the pump into your well, and to avoid tangling the stainless steel spring wire as it is removed and reinstalled.

- step 1** Leave the pump in your well. The piston and wire are unloaded and reloaded much easier when vertical. Unlock the Gripper Nut and raise the EarthStraw about 2 feet, and then re secure the gripper nut. Test to make sure that the Gripper Nut is holding!
- step 2** Just above the Gripper Nut, wrap 5 turns of duct tape to function as a back-up stop to keep the pump from falling into the well as you are working on the system.

**step
3**

Using the the EarthStraw Tee-Release (ESTR-075) , press up on the small release ring at the bottom of the brass tee and hold it, while pulling the red pump body from the discharge tee, so that the entire pump rod assembly may be removed, including the discharge tee and pump-handle.

**step
4**

Remove the plastic insert from the end of the red pump body and just let it slide on the wire. Cut and remove a 1" section of red pipe to provide a fresh reconnection for later. You will have to slice it lengthwise to remove it from the wire.

**step
5**

One person will grip the wire and pull it straight up and out, without bending or kinking, while the other person walks the handle assembly away, being careful to manage the slack wire. Tangles or kinks are to be avoided at all cost.

**step
6**

As you pull, at some point, water should spill from the top of the pump body. The piston is attached to the lower end of the wire. Be careful to watch for it. When it comes out, remove and replace the o-ring being careful not to over-stretch the new one. Also, ensure that the piston is not cocked on the wire. Be sure to straighten by hand if necessary.

**step
7**

Inspect the old o-ring for evidence of wear or abrasion. Consider relocating the piston to an unworn section of the pump body by shortening the wire as shown in the instructions for that process.

**step
8**

Re-insert the plastic or metal insert which was removed in step 4. Carefully feed the wire back into the pump body, pushing the piston down, the same way it came out, until the brass tee contacts the end of the red pump body.

**step
9**

Re-insert the freshly cut red pipe into the brass tee firmly until it stops...about 1". It is very important to check for a secure grip. Remove the duct tape. As a safety precaution against your pump slipping into the well, apply 5 turns of duct tape to the red pump body, immediately below the brass tee.

**step
10**

Loosen the Gripper Nut and lower the pump down until it is at a comfortable pumping height, or until the duct tape is just above the Gripper Nut. Re-tighten the Gripper Nut and gently short-stroke your EarthStraw to encourage the water to recharge the system. Water provides lubrication and will reduce friction. As you pump, remember that one foot of stroke, produces one foot of lift. So, 30 two-foot strokes will raise the water 60 feet.