

Maintenance and Troubleshooting Guide V1.5

LEP-150-P, LEP-225-P Pump

QED Environmental Systems

www.QEDENV.com

ATZ PUMP MAINTENANCE & TROUBLESHOOTING GUIDE

Thank you for purchasing a QED pump. We stand by our motto that we make all of our products ***Trusted, Proven and Reliable***, and trust that you will be very pleased with your purchase. It is our hope that this guide will prove useful for any maintenance and troubleshooting issues that may arise in the field. If, however, any questions remain or are not answered in this guide, please do not hesitate to contact us directly at info@qedenv.com.

This guide has three sections:

Section I: Pump Components and Required Tools

Section II: Maintenance Tasks

Section III: Troubleshooting



SECTION I: PUMP COMPONENTS AND REQUIRED TOOLS

PUMP COMPONENTS

Exploded view drawings and part lists for the below components are available in the appendices to this guide.

DRAWING DESCRIPTION	DRAWING NO.	APPENDIX PAGE
Reciprocating Pump Component Options	LP-ASSBLY OPTIONS	1
Complete Pneumatic Leachate Pump Assembly	LP-PNEUMATIC	2-4
Pump Head Assembly	LP-PH-ASSBLY	5-7
Drop Assembly	LP-DA-ASSBLY	8
Lower Pump Assembly	LP-LP150F/150/225-ASSBLY	9-17
Typical Well Cap Assembly	TYP CONFIG_WCA	18

TOOLS REQUIRED

Maintenance and troubleshooting tasks may require the use of the following tools:

- 1) Channel lock pliers
- 2) Vise Grips or 2 pipe wrenches
- 3) Set of imperial combination wrenches
- 4) Set of imperial Allen keys
- 5) 2mm Allen Key
- 6) Short blade screwdriver
- 7) WD-40, Jig-a-loo or equivalent
- 8) Loctite 242 or equivalent thread sealant
- 9) All required Personal Protective Equipment including Gas Monitors

SECTION II: MAINTENANCE

The maintenance requirements for our pumps fall under three main areas: seals and bearings, motor components and lower assembly components.

SEALS

Seals are found both in the pump head and piston assembly. The length of time between seal replacement can vary greatly with amount of use and the nature of the leachate being pumped.

Most clients begin maintenance on the seals within three to four months of continuous 24/7 pumping. These signs will help you know when seals need to be replaced:

- Piston seals: when output drops appreciably
- Pump head seals: when significant amounts of leachate leaks from the indicator hole on the pump head

PISTON SEALS

The piston assembly includes two U-cup straight seals. When pumping particulate filled leachate, the average life expectancy for these two piston seals is 3-4 months, whereas when pumping clean water one can expect at least 12-18 months before any changes need to be made.

Piston seal wear is indicated by an appreciable decrease in pumping output when other causes are ruled out. Even if the piston seals wear, the pump should continue to operate and continue to pump liquid.



In order to replace the U-cup seals on the piston, the lower pump assembly must be pulled from the well. Once disconnected from the drop assembly, the piston can then be pulled out the top end of the pump. Upon removal of the old seals, the new piston U-cup seals **MUST** be installed with the open end of "U" facing **UPWARD**. The piston assembly can be re-inserted into the cylinder body from the **TOP** end and plunged downward into position. Do not forget the 3/4" SS ball before re-screwing the cylinder seat into place.

PUMP HEAD SEALS

The pump head assembly includes our seal body as well as the seal body pin.

When pumping particulate filled leachate, the average life expectancy for these seals is 3-4 months. When pumping cleaner water expect 12-18 months before any seal replacements need to be made.

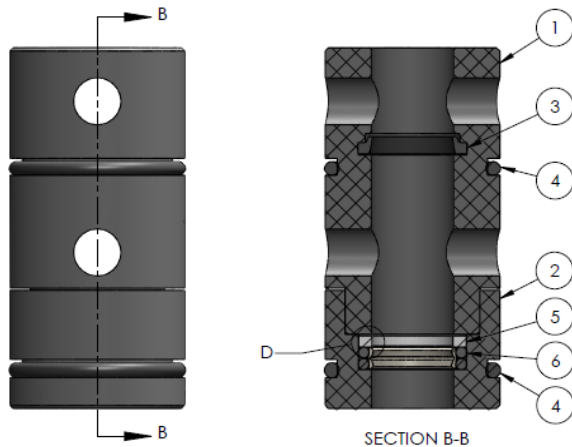
The seal body can be replaced as a complete assembly or replacement seal kits are also available. Many customers keep spare complete seal body assemblies on hand to be easily exchanged in the field, with additional seal kits to replace worn seals once the seal bodies are removed from the field.



If seals are to be installed on site, a blunted hook tool may aid the process. Take care not to puncture seals during installation.

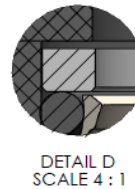


The pump head and seal body incorporate a tell-tale seal wear indicator port which alerts technicians to the failure of the lower set of seals inside the seal body. This same port also accommodates the expansion of pumped liquid under freezing conditions, thereby preventing failure or destruction of the pump head assembly.



ITEM	DWG/PART NUMBER	DESCRIPTION	QTY
1	LP-SB-04	Upper Seal Body	1
2	LP-SB-05	Lower Seal Body	1
3	S5	Rod Wiper	1
4	S3	1-220 O-Ring	2
5	LP-SB-03	Wear Ring - Seal Body	1
6	S8	SKF Custom Seal	1

NOTE ORIENTATION OF WEAR RING SHOWN IN DETAIL D.



In order to replace the seals in the seal body, it must be removed from the pump head and unscrewed (in half). For proper function of the seal body, upon removal of the old seals the new seals **MUST** be installed following the diagram above.

BEARINGS

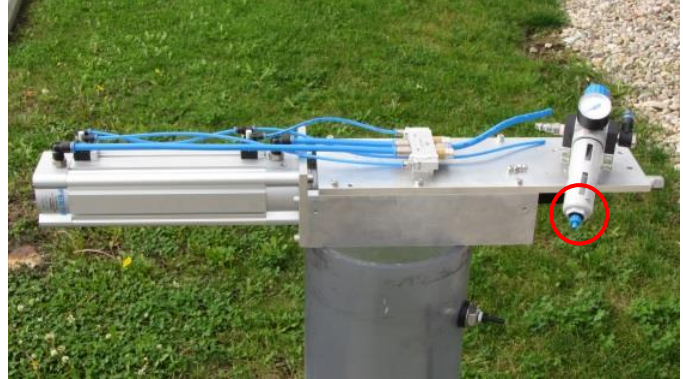
Bearings are found both in the backplate and linkage assembly. The length of time between bearing replacement can vary greatly with amount of use and the nature of the leachate being pumped. Most clients only perform maintenance on the bearings upon indication of a problem, and usually only the bottom linear bearing and exterior dog bone bearing will ever require replacement. These signs will help you know if bearings need to be replaced:

- Backplate linear bearings: if there is significant wear within the housing, as evidenced by significant lateral movement of the insert within the mounting pillow block.
- Linkage assembly bearings: if they show significant wear, as evidenced by significant lateral or sloppiness within the bearing assembly.

PNEUMATIC BACKPLATE ASSEMBLY

The operational lifespan of the pneumatic backplate assembly depends greatly on the dryness and cleanliness of the air supply. Drain water from the filter/regulator housing regularly by loosening then retightening the blue vent screw circled at right.

In the event of difficulty with the pneumatic assembly function, refer to the troubleshooting steps in Section III.



LOWER PUMP ASSEMBLY

The lower pump assembly includes the PVC Piston and 2 x 316 series stainless steel balls, which may experience wear over time, especially with highly abrasive content in the leachate. The PVC piston and one ball are shown at left.

One of the best methods to reduce wear on the lower pump assembly and seals is through the use of our optional Intake Screen Filter, shown below. This simple slotted PVC pipe extends from the lower seat of the pump and provides an initial filtration of larger particles so as to reduce the abrasive elements entering the pump.

Should there be high temperatures (>130 degrees F), or a high percentage of abrasive content in the leachate, such as sand or silica, we recommend the use of our upgraded high temperature version of our piston, Part # LP-150-11.



Portion of Intake Screen Filter, typically 24 inches in length

SECTION III – TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES	SOLUTION
PUMP NOT OPERATING	<ul style="list-style-type: none"> • No pneumatic power 	<ul style="list-style-type: none"> • Check that pneumatic power exists and that all connections are sound.
	<ul style="list-style-type: none"> • Insufficient regulator pressure for pump load 	<ul style="list-style-type: none"> • Check regulator setting and adjust if needed.
	<ul style="list-style-type: none"> • Limit switches or may be out of position 	<ul style="list-style-type: none"> • Verify correct limit switch position (refer to installation manual). Ensure that lower limit switch is raised at least $\frac{1}{8}$ inch above its lowest position.
	<ul style="list-style-type: none"> • Exhaust regulator settings may be too restricted 	<ul style="list-style-type: none"> • Unscrew the adjustment screw in both the lifting and return exhaust regulator to check for improved operation.
PUMP WILL NOT OPERATE AT FULL SPEED, OR STALLS AFTER A FEW MINUTES OF OPERATION	<ul style="list-style-type: none"> • Blockage in discharge line 	<ul style="list-style-type: none"> • Remove discharge line and confirm pump operation with no line attached. To remedy locate blockage in discharge line and remove.
	<ul style="list-style-type: none"> • Discharge line is frozen 	<ul style="list-style-type: none"> • Heat tracing and insulation is recommended in colder climates, as well as keeping the pump operational 24/7 to keep lines from freezing.
	<ul style="list-style-type: none"> • Exhaust regulator settings may be too restricted 	<ul style="list-style-type: none"> • Unscrew the adjustment screw in both the lifting and return exhaust regulator to check for improved operation.
	<ul style="list-style-type: none"> • Insufficient regulator pressure for pump load 	<ul style="list-style-type: none"> • Check regulator setting and adjust if needed.
PUMP IS OPERATING, BUT OUTPUT IS MINIMAL	<ul style="list-style-type: none"> • PVC piston seals have worn 	<ul style="list-style-type: none"> • Pull pump, replace piston seals.
	<ul style="list-style-type: none"> • Crack or leak in drop assembly, either fiberglass drop shafts or PVC 	<ul style="list-style-type: none"> • Pull pump. Inspect drop assembly for disconnections, cracks, over-tightening.
	<ul style="list-style-type: none"> • Intake filter or lower pump assembly clogged 	<ul style="list-style-type: none"> • Pull pump. Remove build up/clog. Replace intake filter if necessary.

SYMPTOM	POSSIBLE CAUSES	SOLUTION
PUMP IS OPERATING, BUT NOT PUMPING FLUID	<ul style="list-style-type: none"> • Air bubble in intake cylinder (especially if right after install/re-install) 	<ul style="list-style-type: none"> • Turn the pump off, manually move the push rod through a full stroke, and restart the pump.
	<ul style="list-style-type: none"> • Piston has disconnected from piston rod 	<ul style="list-style-type: none"> • Pull pump, dry piston and piston rod threads, apply crazy glue, and reassemble.
	<ul style="list-style-type: none"> • Stainless steel ball is stuck on piston seat 	<ul style="list-style-type: none"> • Pull pump, clean and inspect the piston.
PUMP OPERATING BUT NOT PUMPING FLUID, DISCHARGE LINE HAS VACUUM AND IS SUCKING AIR IN	<ul style="list-style-type: none"> • Well is dry or pump depth is above liquid level 	<ul style="list-style-type: none"> • Lower pump depth setting. Turn the pump off, remove the well cap and drive components, install a 5 or 10 foot length of drop assembly to lower pump depth setting.
	<ul style="list-style-type: none"> • Crack or disconnection in drop assembly, either fiberglass drop shafts or PVC 	<ul style="list-style-type: none"> • Pull pump. Inspect drop assembly for disconnections, cracks
	<ul style="list-style-type: none"> • Piston has disconnected from piston rod 	<ul style="list-style-type: none"> • Pull pump, dry piston and piston rod threads, apply crazy glue, and reassemble.
	<ul style="list-style-type: none"> • Intake filter or lower pump assembly clogged 	<ul style="list-style-type: none"> • Pull pump. Remove build up/clog. Replace intake filter if necessary.
ABNORMALLY RAPID SEAL FAILURE OR WEAR ON BEARINGS	<ul style="list-style-type: none"> • Alignment is not linear. Drop assembly may be crooked/cross-threaded at couplings. 	<ul style="list-style-type: none"> • Pull pump, inspect drop assembly for cross-threading.
	<ul style="list-style-type: none"> • Backplate or push rod may be bent 	<ul style="list-style-type: none"> • Inspect backplate and push rod for warping/bending.
	<ul style="list-style-type: none"> • Push rod may be worn through at contact point with linear bearing 	<ul style="list-style-type: none"> • Replace push rod, linear bearing, and seals in pump head.
LEACHATE IS LEAKING FROM SEAL WEAR INDICATOR HOLE ON PUMP HEAD ASSEMBLY	<ul style="list-style-type: none"> • Shafting may be too tall, causing push rod to exit seals 	<ul style="list-style-type: none"> • Verify push rod protrusion per install manual p. 9 and adjust stack height if necessary.
	<ul style="list-style-type: none"> • Seals inside the seal body need to be replaced 	<ul style="list-style-type: none"> • Remove seal body assembly from pump head and inspect. If worn, install new seals. Replacement seal kits and seal body assemblies are available through QED.

SYMPTOM	POSSIBLE CAUSES	SOLUTION
PVC DROP PIPE CRACKS OR BREAKS AT FIRST COUPLING OR AT PUMP HEAD ASSEMBLY	<ul style="list-style-type: none"> Blockage in discharge line 	<ul style="list-style-type: none"> Locate blockage in discharge line and remove. Lower the overload status adjustment for the motor.
	<ul style="list-style-type: none"> Pump has bottomed out 	<ul style="list-style-type: none"> Pull pump and inspect. Upon re-installation ensure to raise the push rod up approximately 1 inch from the lowest point ensuring the PVC piston does not bottom out during operation.
	<ul style="list-style-type: none"> Intake filter or lower pump assembly clogged 	<ul style="list-style-type: none"> Pull pump. Remove build up/clog. Replace intake filter if necessary. Lower the overload status adjustment for the motor.
DROP ASSEMBLY DIFFICULT/IMPOSSIBLE TO REMOVE FROM WELL	<ul style="list-style-type: none"> Well may be pinched or crooked, drop assembly may be caught on in well debris 	<ul style="list-style-type: none"> Move drop assembly back and forth to dislodge. If not successful, remove as much of the drop assembly as possible, and pull upwards with force on fiberglass drop shaft to eventually disconnect piston from lower pump assembly. Fish lower assembly out if possible, if not, it may be left in the well and another pump installed at a higher depth setting.