Basic Features

- Stainless steel body with 1.125” outside diameter. Will fit into wells down to 1-1/4” (schedule 80).
- Uses static water pressure to fill gas and sample return tubes.
- Maximum depth below ground surface of 3000 ft.

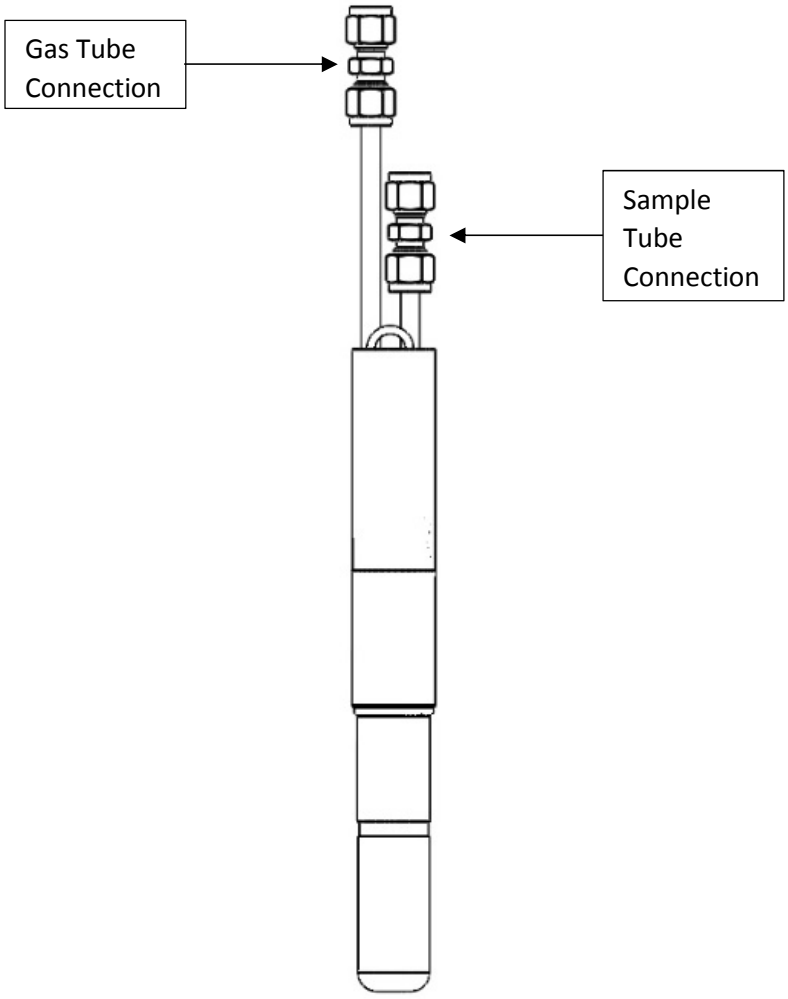
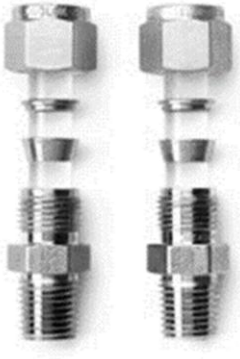
Other Features

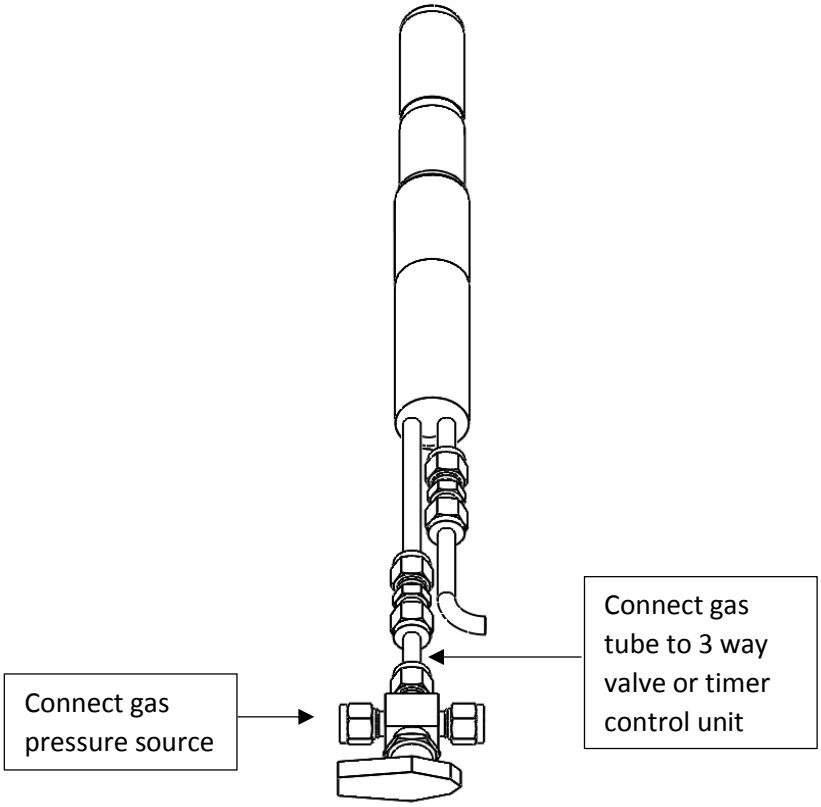
- Compatible with Volume Booster for increased volume per cycle.
- Compatible with Timer Control Unit for pump cycle automation.
- Compatible with Zone Isolation Sampling Technology (ZIST).

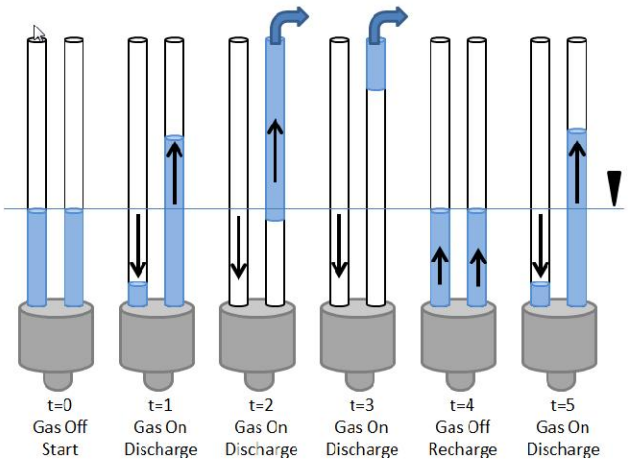
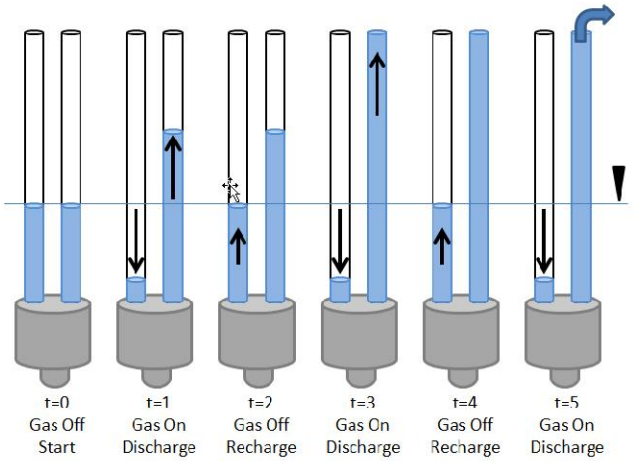
Specifications

	PU-P-125-1000
Body Construction	316 Stainless Steel, Delrin
Length (in)	12.5
Outer Diameter (in)	1.13
Weight (lbs)	1.4
Maximum Pressure (psi)	1500
Maximum Depth (ft bgs)	3000
Minimum Submergence (ft)	6
Internal Volume (mL)	0
Standard Filter Pore Size (µm)	80, others available
Standard Tubing OD (in)	1/4
Seal Material	Buna-N
Gas Compatibility	Nitrogen, Compressed Air
ZIST Compatibility	1.25”

Panacea P125 Precautions For Safe Use
1. Never disassemble the pump while it is connected to a pressurized source. 2. Never operate the pump past its specific maximum pressure. 3. Never use tube ferrules other than those provided by BESST INC or authorized distributor. 4. Never disconnect the pump while it is pressurized with gas.

Panacea P125 Deployment Procedure	
Step 1: Locate the tall tube on the top of the pump; this is the connection for the gas tube. The shorter tube on the pump top is for the sample return tube.	
Step 2: Place the nut, back ferrule, and front ferrule onto the tube. Rotate the nut finger-tight. Tighten nut 1.25 turns. Note: If the tube has already been swaged rotate the nut finger-tight then tighten the nut a quarter turn.	

Step 3: Connect 3 way valve or timer control unit to the end of the gas line. Connect pressure source to the 3 way valve or timer control unit.	
Step 4: Place wire crimp on deployment wire. Thread deployment wire through the loop on the pump top. Crimp free wire end to deployment wire to complete the loop.	
Step 5: Deploy pump and tubing down well pipe.	

Panacea P125 Downhole Operation	
Step 1: Determining the mode of operation. The Panacea pump can be used to purge and ratchet ground water samples to the surface. In both modes of operation the operator pressurizes the pump's gas tube to displace water into the sample return tube, and then depressurizes the pump to allow the refill of the pump and gas tubing. **Purge Mode** • Fully discharge water in the system each pump stroke • High pumping rates and volumes • Minimizes gas usage **Ratchet Mode** • Partially discharge the system with each pump stroke • Samples are gently discharged, ideal for delicate analytes • Sample water does not contact nitrogen gas Note: The mode of use determines the pressure, flow rate, and time of the pump cycle.	**Purge Mode**  **Ratchet Mode** 
Step 2: Determining regulator pressure. The pressure to be used to pump the sample up to the surface is dependent upon the static water pressure, and frictional losses due to fluid movement while pumping. The pressure needed to overcome static water pressure is: $P_{static} = p * g * h$ The pressure needed to overcome frictional losses is subjective to system setup. BESST INC. recommends that an additional pressure of 25psi to 50psi be added to the static water pressure to compensate for these frictional losses and help with the sealing of the foot valve poppet.	$P_{static} = p * g * h$ P_{static} = Pressure (psi) p = Fluid density g = gravitational constant h = Depth below ground surface (ft) For water applications: $P_{static} = 0.4325\ psi/ft * h$ $P_{dynamic} = 25\ psi\ to\ 50\ psi$ $P_{total} = P_{static} + P_{dynamic}$

$$P_{dynamic} = 25\ psi\ to\ 50\ psi$$

The pressure to be set on the regulator is the total pressure.

$$P_{total} = P_{static} + P_{dynamic}$$

In use, the operator of the pump can adjust the dynamic pressure to achieve a specific flow rate.

Step 3:

Determine time of cycle. The cycle time will consist of an on time and an off time.

On Time

- The time that the gas tube is pressurized.
- Sample is displaced from the gas tube and the pump into the sample tubing.
- Water is discharged at the surface.

Off Time

- The time that the gas tube is vented of the pressure.
- Recharge of the pump and gas tube to static water level.

Cycles are sequenced for time efficiency. To achieve the specific mode of operation the timing of the pump cycle must meet the following criteria.

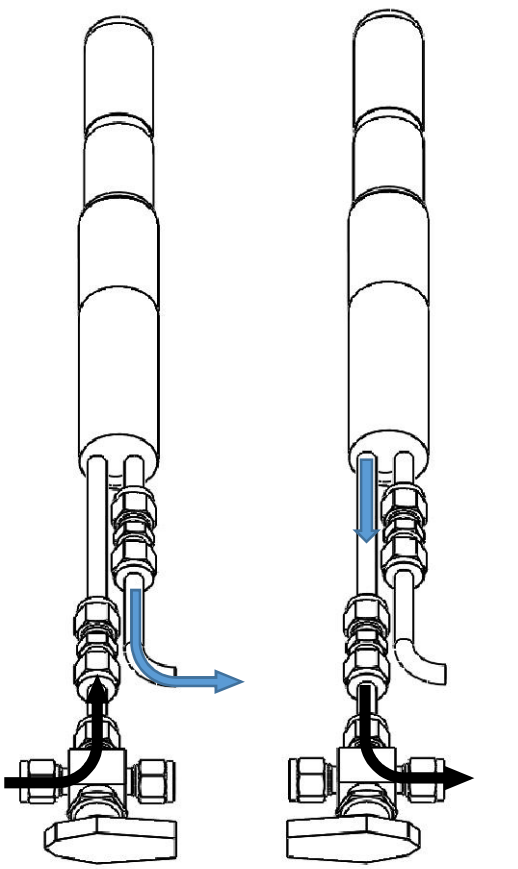
Purge Mode

- **On Time** will cause pressurized gas to escape the sample tube.
- **Off Time** Will allow for gas tube and sample return tube to completely vent of pressurized gas.

Ratchet Mode

- **On Time** will result in no pressurized gas exiting the sample tube.
- **Off Time** will allow for gas tube to completely vent of pressurized gas.

Note: The first few pump cycles in **Ratchet Mode** will typically build the water column in the sample tubing. It is the best practice to determine timing cycles once the water column has been built to ground level.

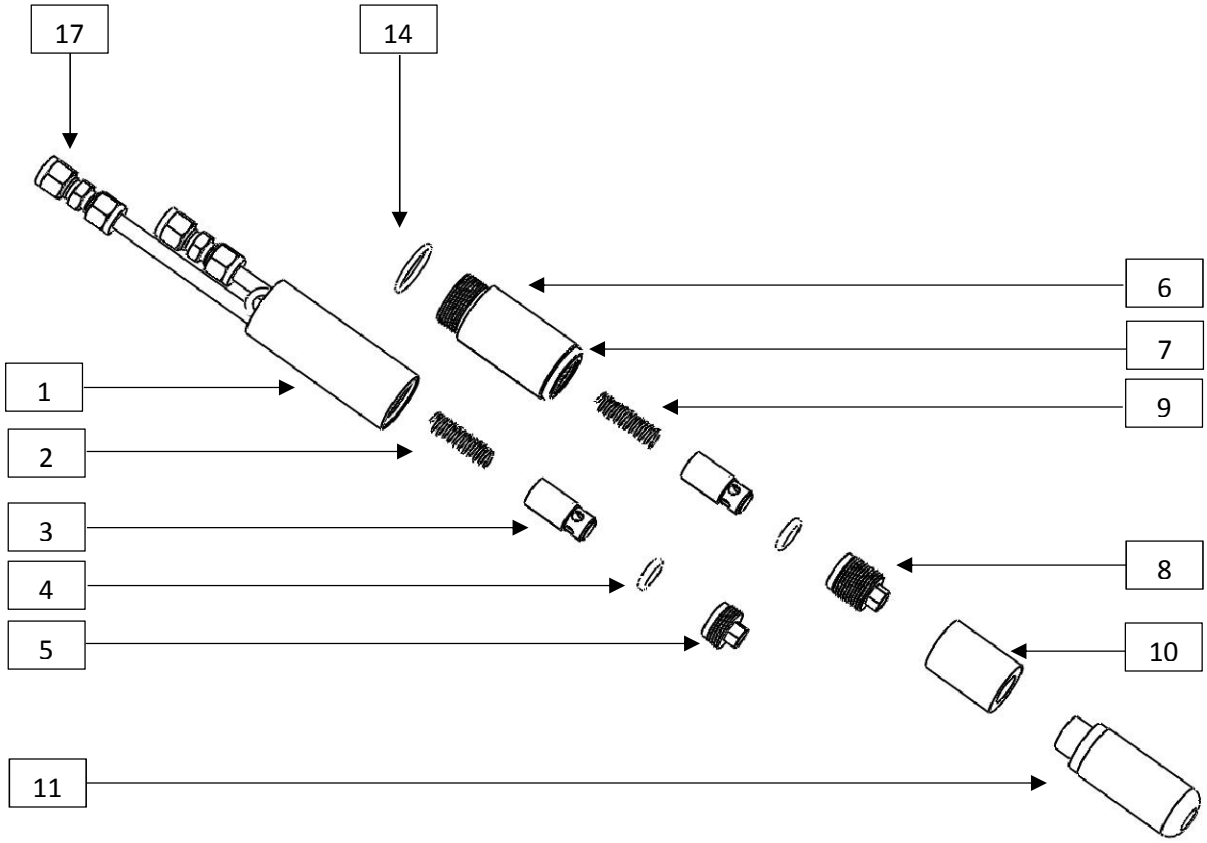


Pressurizing pump and getting sample.

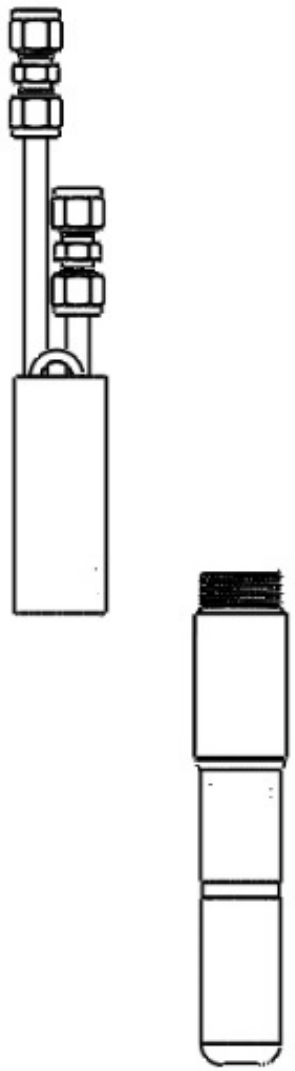
Venting pump and refilling to static water level.

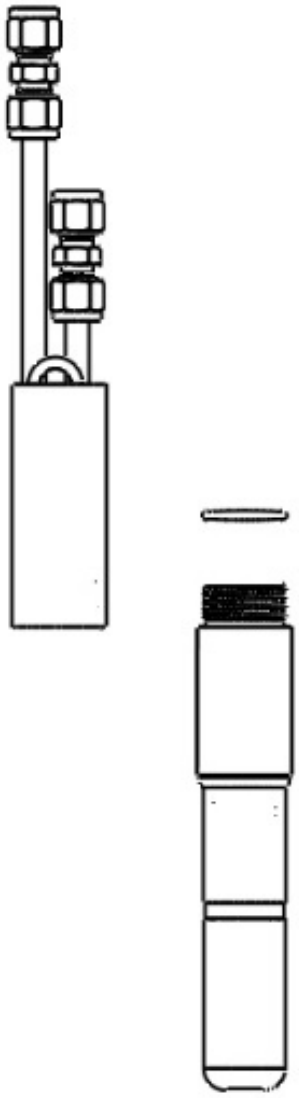
Step 4:

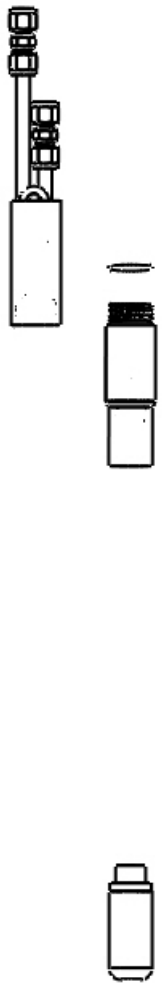
Refine pressure and timing intervals for optimum performance.



Number	Panacea P125 Part Number	Part Name	Quantity
1	PU-P125-1001	Top	1
2	PU-P125-1002	Sample Return Spring 1 psi	1
3	PU-P125-1003	Poppet	2
4	PU-P125-1004	Valve O Ring	2
5	PU-P125-1005	Short Hex Cap	1
6	PU-P125-1006	Chamber	1
7	PU-P125-1007	ZIST Docking O Ring	1
8	PU-P125-1008	Long Hex Cap	1
9	PU-P125-1009	Foot Valve Spring 1/3 psi	1
10	PU-P125-1010	Foot Valve Adapter	1
11	PU-P125-1011	Poly Filter	1
14	PU-P125-1014	Seam O Ring	1
17	PU-P125-1017	Tube to Tube Connector	2

Panacea P125 Disassembly Procedure	
Step 1: Unscrew the chamber assembly from the top.	

Step 2: Remove the seam o-ring from the base of the chamber threads.	

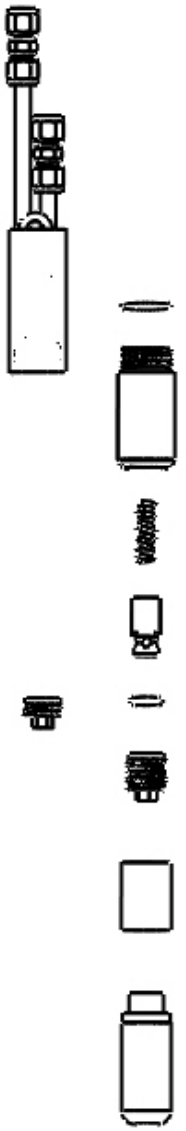
Step 3 Unscrew the poly filter from the bottom of the foot valve adapter.	

Step 4 Unscrew the foot valve adapter from the bottom of the chamber assembly.	

Step 5 Unscrew the large hex cap from the bottom of the chamber assembly. A 3/8 socket can be used unscrew the large hex cap. Note: If following these instructions for reassembly, the large hex cap must be firmly tightened to the chamber in order to seat the valve o-ring properly.	

Step 6 Use a pick to pull out the valve o-ring which is seated inside the bottom of the chamber.	

Step 7 The poppet and the foot valve spring will slide out the bottom of the chamber. Note: If following these instructions for reassembly, the flat face of the poppet must face the large hex cap and valve o-ring in the orientation shown.	

Step 8 Unscrew the small hex cap from inside the top assembly. A 3/8 socket can be used to unscrew the small hex cap. Note: If following these instructions for reassembly, the hex cap must be firmly tightened to the top in order to seat the valve o-ring properly.	

Step 9 Use a pick to pull out the valve o-ring which is seated inside the top assembly.	

Step 10 The poppet and the sample return spring will slide out the top assembly. Note: If following these instructions for reassembly, the flat face of the poppet must face the small hex cap and valve o-ring in the orientation shown.	

Panacea P125 Troubleshoot	
Symptom 1: Pump is hooked up and deployed downhole. Gas is on and nothing happens. That is, neither air nor water comes out of the sample return line.	Causes 1. The sample return tube and gas tube are switched. The sample return poppet is being locked by pressurization. Turn the gas off and connect the gas tube to the gas regulator. Turn gas on and retest. 2. Using too low of a pressure. The pressure is not high enough to overcome static pressure. Recalculate the necessary static pressure. 3. There is a leak. Pull pump from well. Check position of poppets. The flat of the poppet should face the bottom of the pump. Make sure a valve O-Ring is between the poppet and hex cap. When re-assembling make sure the hex caps are tightened firmly against top and the chamber. Check condition of the seam O-Ring on the chamber.
Symptom 2: Pump is hooked up and deployed downhole. Gas is on and just gas comes out of the sample return tube.	Causes 1. Initial gas discharge is caused by the displacement of water in the sample return tube. Allow several pump cycles to build water column. 2. The pump is not submerged in water. Lower the pump to at least 6 ft below water level. 3. High pressure compressed gas is coming out of the pump. Purging for too much time. Lower the cycle on time. Repeat cycling of the pump. 4. Using too low of a pressure. The pressure is not high enough to overcome static pressure. Recalculate the necessary static pressure.
Symptom 3: Sample is flowing back into the pump after the pump cycle.	Causes 1. Top poppet is not sealing. Pull pump from well. Check position of poppets. The flat of the poppet should face the bottom of the pump when deployed. Make sure an unblemished valve O-Ring is between the poppet and hex cap. When re-assembling make sure the hex caps are tightened firmly against top and the chamber. Check condition of the seam O-Ring on the chamber.