

Operating Principles

When the Solinst Double Valve Pump (DVP) is placed in a well or borehole, water rises inside the pump and the twin tubes to static level. A Control Unit is used to supply compressed gas to the pump. The gas pushes down on the water column contained in the drive line tubing, closing the check valve at the base of the pump. This forces the water up the sample line tubing.

A vent period, during which the gas is released, allows water to refill the pump and drive line. The top check valve prevents water in the sample line from falling back into the pump body. This pressurization and vent cycle is repeated manually or automatically as set by the timers on the control unit. The cycle may be regulated for purging or sampling.

Sampling Setup

Note: The pump has been decontaminated before leaving Solinst, however, if you wish to decontaminate your pump before use, see the Decontamination section.

Important: If your DVP is on a reel, begin with step 4.

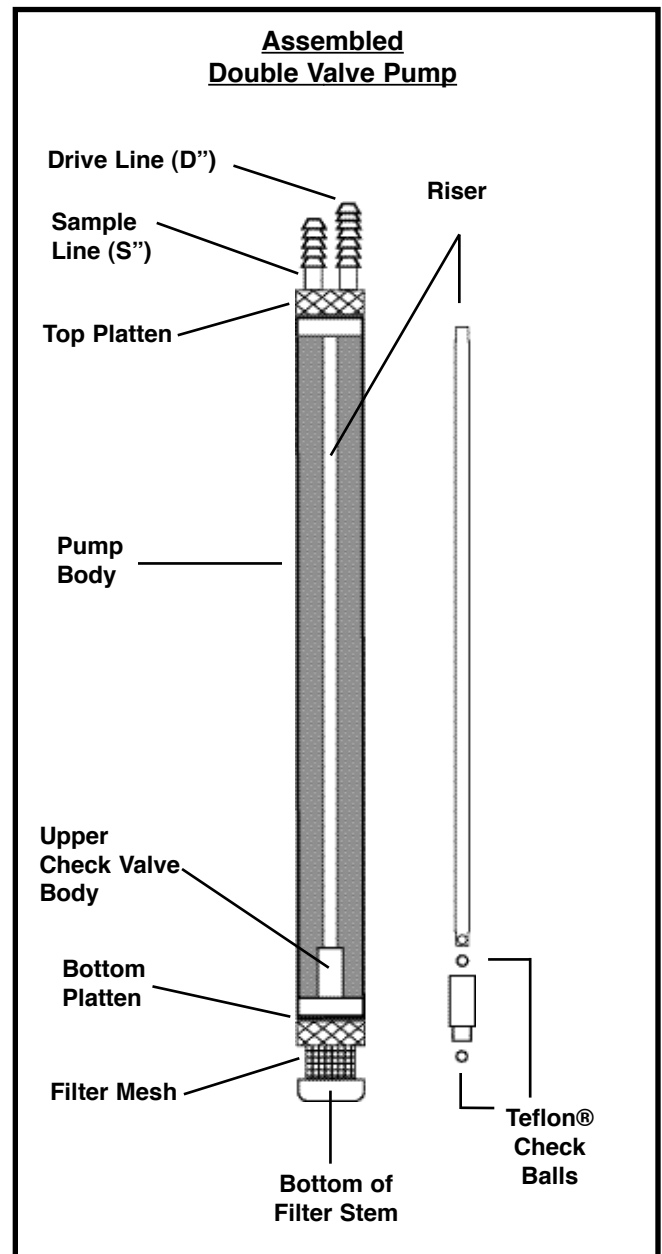
1. Push a length of tubing (1/4" x 1/4" LDPE standard) appropriate for your application onto the compression fittings on the top of the DVP. The compression fitting marked "S" is the sample line and the barb marked "D" is the drive line. Be sure to push the tubing as far as possible onto the compression fittings, tighten securely.
2. Connect the drive line to the fitting marked "D" on the top of the well head manifold. Connect the sample line to the fitting marked "S" on the top of the well head manifold.
3. Connect the white nylon tubing (included with the Control Unit) to the compressed gas supply regulator.

Note: Do not turn the pressure on at this time. If pressure is applied, it will be difficult to insert the line to the regulator.

4. Connect the red polyethylene tubing (included with the Control Unit) to the "Pump Line" outlet on the control unit and to the quick connect on the well head manifold or on the reel.
5. Turn on the compressed gas supply and set the regulator to supply no more than 125 psi to the control unit.
6. Connect the tubing to the control unit at the "Air In".
7. Adjust the control unit "Pressure Regulator" to the appropriate value [(depth below grade in feet x 0.43 psi/ft) + 10 psi].

Control Unit Operation Tips

1. The control unit may be operated automatically for timer periods of between 5 and 40 seconds. Periods outside of this range will require manual operation.
2. Optimal Control Unit settings may be found through manual operation of the Control Unit. Once achieved, make note of the pressure, timer, and flow rate settings for subsequent sampling events and or to operate the Control Unit automatically.
3. Once optimum flow rates have been achieved, make note of the pressure, flow rate and timer settings for subsequent sampling dates.
4. Each revolution of the timer knobs provides for a five second change in the period.



Sampling or Purging

Operation with the 466 Electronic Control Unit

As a starting point, select the desired flow rate from the pre-set screens. Use the Flow Regulator to adjust flow to your desired rate. If a higher flow is required, slowly increase the Drive time to increase the flow rate. If air is expelled, decrease the Drive time. To further optimize the flow rate, increase or decrease the Vent time until the highest flow rate is achieved.

Timer Adjustment

The Drive and Vent times can be altered using the Timer Adjustment rotary dial.

To change the Drive time: hold down the 'Select' button and turn the Timer Adjustment dial clockwise to increase drive times and counter-clockwise to decrease drive times. Drive times can be set from 0.1 seconds to 164 seconds.

To change the Vent time: turn the Timer Adjustment dial clockwise to increase vent times and counter-clockwise to decrease vent times. Vent times from 0.1 seconds to 164 seconds are available.

Flow Regulator

After selecting the pumping cycles, use the Flow Regulator to change flow rates. To decrease rates, turn the Flow Regulator counter-clockwise. To increase flow rates, turn the Flow Regulator clockwise.

Pump Cycle Selection

Press the Menu button to cycle through all of the sub-menus on the LCD screen. Choose a sub-menu by pressing the 'Select' button. The sub-menus are as follows;

- Sel. Last Settings
- Manual Drive (pressure)
- Sel. Fast 2 l/mn
- Sel. High 1.5 L/mn
- Sel. Med 1.0 L/mn
- Sel. Low 0.5 L/mn
- Sel. Slow 0.1 L/mn

Operation with a Manual Control Unit

1. Begin pumping by turning the "Auto, Off/Vent, Pressure" switch clockwise to "Pressure". The control unit will supply a flow of gas to the pump until the switch is returned to the "Off" position. Gas from the pump is vented with the switch in the "Off" position allowing formation water to re-enter the pump and drive line.
2. Repeat step 1 until purging and/or sampling is complete.
3. The "Flow Rate" dial may be used to fine-tune pump operation. The full counter-clockwise position provides unrestricted gas flow for maximum flow rates. Flow rates may be minimized by turning the dial clockwise (the full clockwise position will shut off gas flow completely).

Assembly of the Double Valve Pump

Note: Prior to assembling the pump, ensure that all o-rings are properly lubricated.

1. Slide the Filter Mesh over the Filter Stem until seated.
2. Thread the Bottom Platten onto the Filter Stem until the o-ring is seated and the parts are finger tight.
3. Insert a Teflon® Check Ball into the top of the Bottom Platten.
4. Take the Upper Check Valve Body and insert into the Bottom Platten until the o-ring firmly seats.
5. Insert a Teflon® Check Ball into the top of the Upper Check Valve Body.
6. Insert the bottom end of the riser into the Lower Check Valve.
7. Slide the Pump Body over the Riser and thread onto the Bottom Platten.
8. Take the Top Platten and while lining up the top of the Riser into the centre of the Top Platten, thread the Pump Body to the Top Platten.

Decontamination

1. Completely disassemble the pump.
2. Wash all pump components in a phosphate-free soap or a detergent.

Note: Do not use acetone on the o-rings.

3. Rinse all components thoroughly with deionized water and dry.
4. Check o-rings for wear. Replace as necessary.
5. Reassemble the pump (see Assembly of the Double Valve Pump).

Maintenance

1. After every sampling event, decontaminate the pump (see the Decontamination section). While the pump is disassembled, check the o-ring for damage. Replace as necessary.
2. Always keep the filter clean. Check it regularly for clogs or damage and replace as necessary.
3. The control unit should be cleaned with a damp cloth.