

# PRESSURIZED OPERATING SYSTEM

## INSTALLATION INSTRUCTIONS

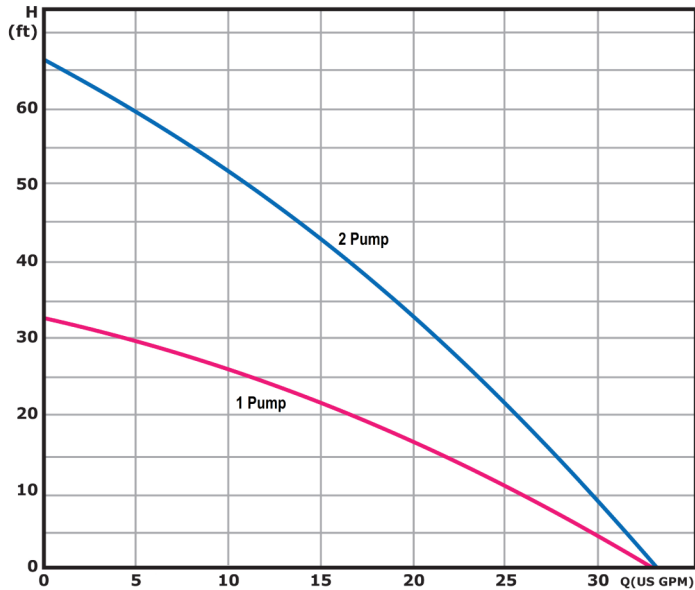


Fig. 1. Low Head Pump Center Flow Chart

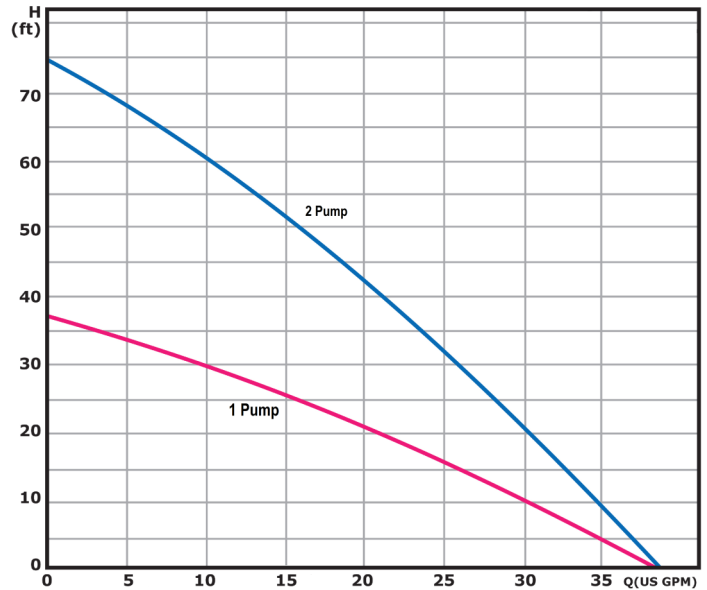


Fig. 2. High Head Pump Center Flow Chart

**NOTE:** Read the entire instruction manual before starting the installation.

### WARRANTY

B & D Mfg., Inc. warrants for a period of 5 years from the date of manufacture, that all Pressurized Operating System (POS) models are free from defects in materials or workmanship. Please contact your Distributor so they can contact the Warranty Department at B&D MFG. INC. for a Return Authorization Form. The alleged defective product must be returned to B&D Mfg., Inc., for inspection via prepaid freight. Defective parts will be repaired or replaced at the manufacturer's discretion. No allowance for labor or property damage is implied. This warranty applies only to the Pressurized Operating System (POS) model and does not include any other products or materials furnished by the installer.

### INTRODUCTION

These instructions cover the installation of the B&D Mfg., Inc. Pressurized Operating System (POS) Part No. 1-230POS and 2-230POS. The Pressurized Operating System (POS) is a prepackaged pump module that is designed for most residential and light commercial closed loop ground source heat pumps. Call B&D Mfg., Inc. for information on equipment designed for multiple heat pumps. Swivel nuts should be hand tight only and a quarter of a turn with a wrench if needed.

### SAFETY CONSIDERATIONS

Installing and servicing of air conditioning and heating equipment can be hazardous due to system pressures and electrical components. Only trained, qualified personnel should install, start-up and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning coils or cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on the equipment, observe precautions in the literature, tags, stickers and labels attached to the equipment and to any other safety precautions that apply.

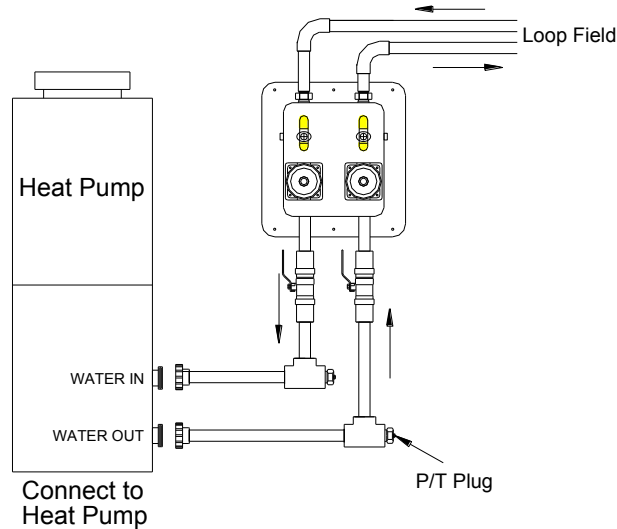
Follow all safety codes. Wear safety glasses and work gloves.

## INSTALLATION PRECAUTIONS

Before installing the Pressurized Operating System (POS), check the flow charts and loop table against system flow and pressure drop characteristics to be sure the correct Pressurized Operating System (POS) model is selected for the system. (See Fig. 1, 2 ) To ensure adequate flow, the selection must be made based on your specific system design.

The Pressurized Operating System (POS) flow center location should be selected on the basis of ease of installation and future service but as close to the heat pump as possible. The Pressurized Operating System (POS) pump module can be mounted using the mounting holes provided with the flow paths either vertical or horizontal.

**NOTE:** Always pipe the module so that the circulator(s) is (are) located between the module valves and the heat pump, never on the earth loop side of the valves. Flushing the earth loop through the circulator(s) would be very difficult or impossible.



**Fig. 3. Recommended Schematic (For Use with Underground Headers; Flush cart Required)**

## PIPING INSTALLATION

The recommended piping schematic for the Pressurized Operating System (POS) is usable with all types of closed-loop, ground source heat pump systems, vertical bore holes, horizontal loops, slinky, outside headers or inside headers. This recommended method allows for isolating the heat pump or the loop field for separate flushing and purging. Standard piping practices should be used. Provide ball valves where indicated to allow future service of Pressurized Operating System (POS). P/T ports are recommended where indicated to allow for pressure drop and temperature measurements. Ball valves shall be the same as pipe size or greater.

All piping shall be properly sized for the flow rate (GPM) required by the system. Follow the recommendations of the earth loop pipe manufacturer or IGSPHA (International Ground Source Heat Pump Association) when making these transition connections.

**NOTE:** Incorrect piping may not eliminate the air pockets.

**CAUTION:** Loops should not contain any dirt or debris prior to connecting to the flow center.

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### FILL AND FLUSH A NEW SYSTEM

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All earth loop systems must be flushed to remove air and debris. A B&D Mfg., Inc., purge cart that has a high volume, high head circulator pump or an equivalent purge cart should be used to flush and fill the earth loop. Follow the recommendations of the heat pump manufacturer or IGSPHA when selecting a pump for flushing.

**NOTE:** it is recommended to use a strainer or screen to catch any debris in the system. if a B&D Mfg., Inc., purge cart is used, check screen position in tank to be sure it is below the return elbow, so all water goes through the screen to catch debris.

Fill the Purge Cart with clean potable water. Start by pumping water into the system by connecting the pump discharge hose to one of the NPT connections located on the pump module. Connect a return hose to the opposite side of the pump module to discharge any air, debris and water as the loop field is flushed.

**NOTE:** If the ball valve handles have been removed, you can refer to the center of the valve to see the current position of the 3 way valve. The center of the valve has an engraved indentation to help as a reference. (See Fig. 4 below)

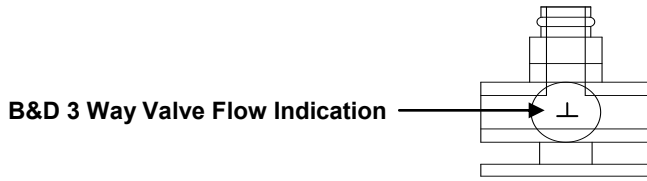
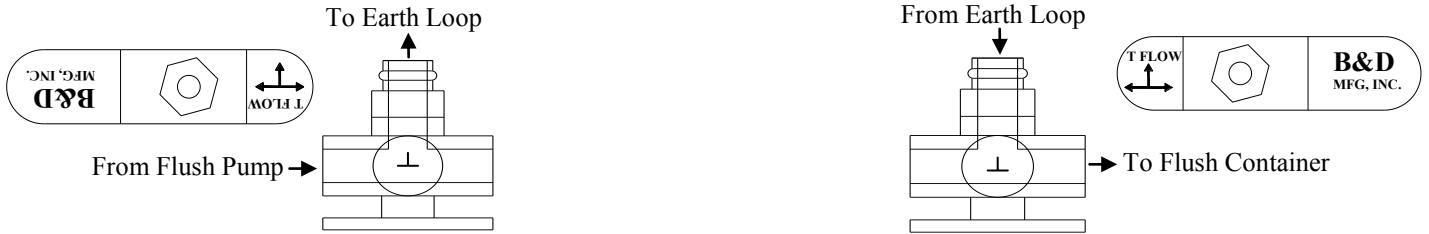


Fig. 4.

Rotate the B&D 3 way valve handles to allow flow as shown below. Position the valves to the correct configuration.



Once the Purge cart hoses are connected and the valves are in the B&D 3 way valve is in the correct position, start the purge cart pump. Add anti-freeze and water to the container as need so that no air enters the system. Follow recommendations of the heat pump manufacturer or IGSPHA for the appropriate type and amount of anti-freeze.

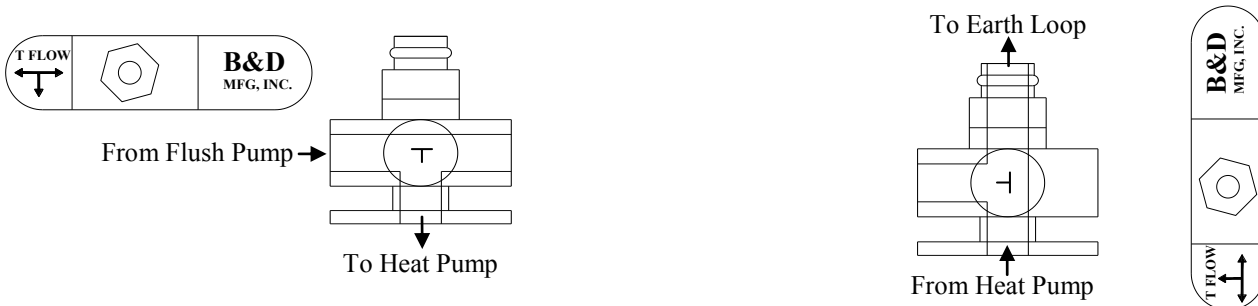
**NOTE:** At first only air will come out of the return hose, then air mixed with water, and finally nothing but water as the system becomes filled with water. When air bubbles stop returning to the purge container, the earth loop has been completely flushed.

Flush the heat pump. To do so, simply rotate valves as shown below while pump is running. Flush the heat pump using the same procedure as used to flush the earth loop.



## PRESSURIZING THE SYSTEM

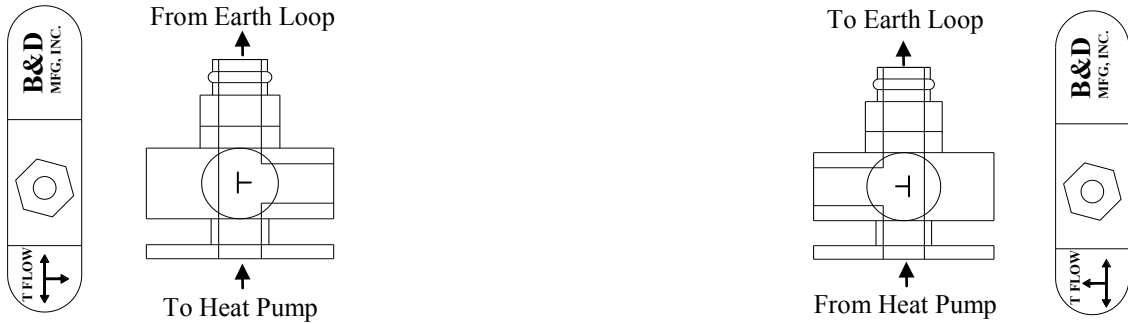
After flushing and filling the system, rotate only the valve discharging into the flush container as shown below on the right.



System pressure should increase rapidly as the purge pump works to force more water into the system. Flow into the container should cease.

**NOTE:** Additional purging is necessary if the water level in the container falls. This is evidence of air in the system that is being compressed.

If purging has been successful, rotate the other valve as shown on the left below.



Turn off the flush pump. System should maintain pressure. Release excess pressure by rotating either module valve to allow a small amount of water to pass through and out of the system and into the container. Some initial loss of pressure can be expected and is due to the expansion of the earth loop pipe under pressure. This pressure will stabilize if the system has no leaks.

**NOTE:** Normal system operating pressures are 10 to 40 PSI. Protect circulators by maintaining positive pressure at all times.

## SYSTEM STARTUP

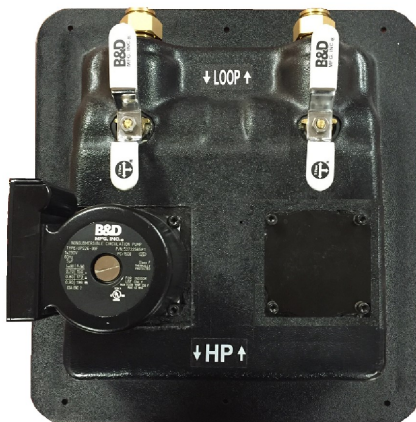
Flushing, filling and pressurizing should be complete. Start the loop pump module circulators. If for some reason the circulators are not operating, power off and diagnose the problem.

Using a single water pressure gauge, measure the pressure drop at the pressure/temperature plugs across the heat pump heat exchanger. Compare this measurement with the flow versus pressure drop data supplied by the heat pump manufacturer to determine the actual flow rate. If the flow rate is low, recheck the selection of the loop pump module model for sufficient capacity.

**NOTE:** If the module selection is correct, there is likely trapped air or a restriction in the flow circuit.

### MODEL 1-230POS

Weight: 29 lb.



### MODEL 2-230POS

Weight: 37 lb.



**Electrical:** 1/60/230V    **Insulation:** Foam Cabinet    **HP & Loop Connection:** 1" Swivel

**Height = 12 1/2"    Width = 12 1/2"    Depth = 8"**

**LETTER AFTER MODEL NUMBER FOR PUMP NEEDED:**

**L=** Low Head 3 Speed Pump (230V)    **H=** High Head Single Speed Pump (230V)