

Solar Powered DC Circulation Pump Model HS-21 Installation & Operating Instructions

General Information

This pump has been designed to provide versatility and performance not available in any other high temperature DC-operated pump. It can be powered from any fixed (12V - 24V) source or directly from a PV Solar Panel. The pump can automatically optimize power draw from a PV panel for maximum flow rate using advanced MPPT (maximum power point tracking) technology. It is completely waterproof and submersible.

When powered from fixed sources, it is suitable for applications in cars, boats, and RVs that require high temperature capability. In Solar Water Heating systems, this pump can be connected directly to a PV panel, eliminating the need for any controllers and sensors.

Areas of Use:

- Solar Water Heating Systems
- Hot Water Circulation
- Radiant Floor Heating
- Heat Transfer Applications
- Cooling Systems
- Food Grade Liquid Transfer
- General High Temperature Pumping

Main Features

- Waterproof and Submersible to IP68
- Brushless and Sealless: Nothing to Wear Out
- Advanced Magnetic Drive Technology
- Durable Permanent Magnet Rotor
- Ceramic Shaft
- Designed for Continuous Operation, Rated for 10,000 hours
- All Food Grade Materials
- Quiet

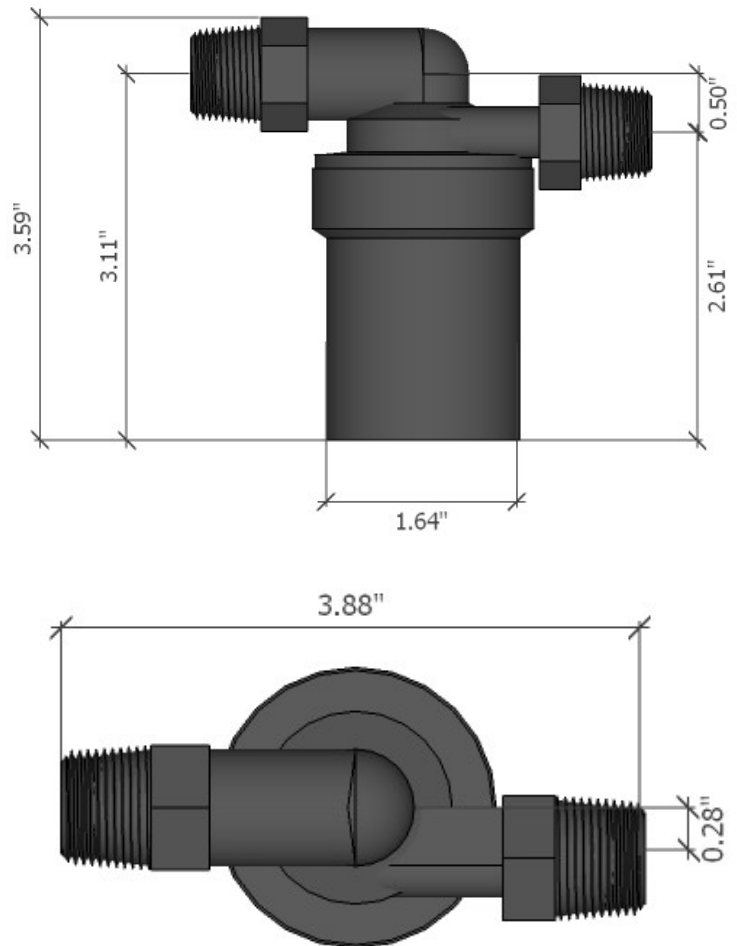
Built-In Protective Functions

- Drive Circuitry will sense dry operation and shut down to prevent damage.
- Protected against overload conditions like an impeller stuck due to debris.

General Specifications

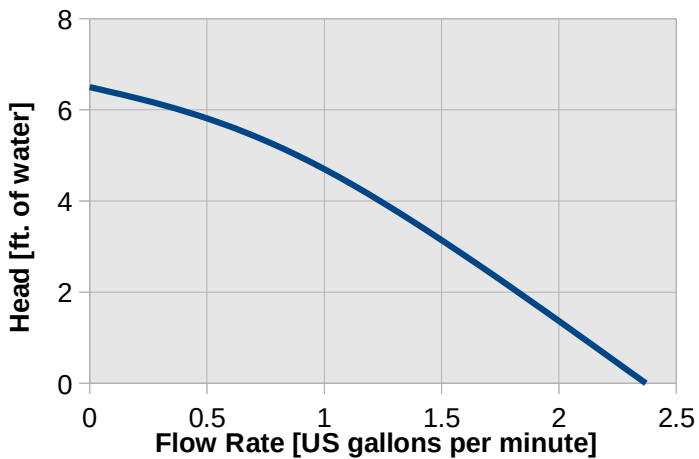
Voltage Range	12V-24V
Nominal Operating Voltage	18V
Maximum Fluid Temperature	221°F
Maximum Fluid Pressure	100 psi
Operating Noise	≤ 43dB
Maximum Head	6.5 ft.
Maximum Flow Rate	2.37 gpm
Weight	9.2 oz.

Dimensions



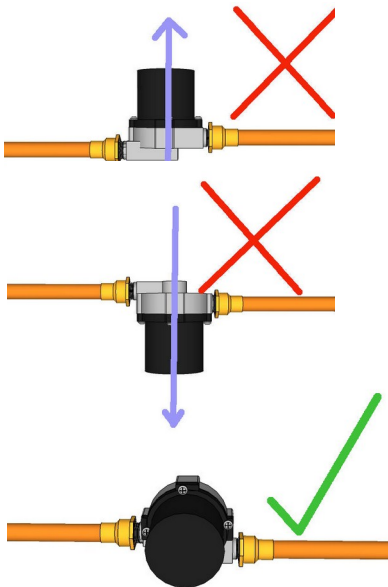
The pump will not work if it has air in it and cannot prime itself. For initial operation, thoroughly purge the system of all air.

Performance Characteristics



Installation

- The pump shaft should be horizontal. A shaft that is vertical will cause premature pump failure.



- Do not allow water inside the pump to freeze. The expansion of the ice will crack the pump housing.
- There is a powerful magnet inside the pump. If your water contains small particles of iron or other magnetic materials, they will eventually collect on the magnet and prevent the pump from operating at full efficiency.

Observe POLARITY!

The **RED** wire must be connected to the positive side of the power supply.

The **BLACK** wire to the negative.

Reversing polarity will **IMMEDIATELY DESTROY** the electronics in the pump!

Startup Hints

- Make sure the system is purged of all air. Sometimes small bubbles will remain in the pump and cause noisy operation. Turning the pump off and on several times will usually purge the bubbles from the pump.
- If you are running the pump from a PV panel, it will take some time before the pump starts in the morning. PV panels will not produce enough power to run the pump until they receive full sun.

Troubleshooting

Symptom	Cause	Solution
Noisy operation	Air bubbles in the pump, Running dry	Purge the air from the pump
Pump runs intermittently	Dry running protection active	Purge the air from the pump
	Overtemperature protection active	Wait until pump cools down
Pump won't run	Incorrect polarity	Complete replacement necessary
	Input power insufficient	Provide specified power supply
	Dirt in the pump	Clean inside of pump housing