Arduino - Hardware - Submersible Pump

This low voltage centrifugal pump will work between 3 and 6 **V**olts **D**irect **C**urrent and doesn't require priming (*pre filling the pump chamber with liquid prior to starting*). It is ideal for use in model railroads and diorama's, where it can be used to create dynamic water effects such as waterfalls, flowing rivers, etc. It can also be used to pump inert liquids such as some liquid soaps, as long as the viscosity of the liquid is close to that of water. Other possible uses include automatic pot plant watering systems, automatic soap / hand sanitiser dispenser, etc.

The pressure at the outlet will vary based on the voltage supply, and the viscosity, of the liquid being pumped. The length of pipe, and the number, and radius, of bends in the outlet pipework will also have an effect on the final volume and pressure.

Important!

The power cable is very flexible, and, if it is bent close to where it enters the pump housing, the silicon used to seal this joint may become fractured. If this joint will be underwater when the pump is mounted in its final location, apply additional silicon to the joint to ensure the seal is 100% waterproof.

Do not expose the pump to any liquids which contain abrasive particles, or, with liquids which could have an adverse effect on plastic such as solvents, acids, alkali's, etc.

This pump is not designed for long term continuous use, or, for use in critical systems.

The inlet (the base) must always be immersed in liquid, otherwise the internal seals may overheat and allow water to enter the electric motor causing permanent damage.

Table 1: Submersible Pump Electrical Connections

Wire	Description
■	Negative (ground) connection to pump motor.
■	Positive 3 to 6 **V**olts **D**irect **C**urrent connection to pump motor.

Specifications

External Dimensions - (H × W × D): 46.0 × 33.5 × 22.4 millimetres [mm]
Lead Length: 225 mm
Weight (pump and lead): 26.09 grams [g]
Pump Outlet **O**utside **D**iameter: 7.3 mm
Pump Outlet **I**nside **D**iameter: 4.4 mm
Pump Motor Voltage Range: 3 (**min**) to 6 (**max**) **VDC**
Pump No-load Current (pumping air): ~200 milliamps [mA]

In the table below the pressure was calculated by connecting an open ended clear vertical tube to the outlet, and measuring the level that the water reached for the various voltages (millimetres head). The flow was measured with a 2 metre [m] open ended tube (2 × ~300 mm coils) with its outlet 100 mm higher than the pump outlet level.

Performance (Water)

| Voltage |Direct Current	Current (milliamps [mA])		Flow litres/minute [l/min]	Pressure		
	Running	Starting		kilopascals [kPa]	Pounds per square inch [psi]	millimetres head
3.0	399	438	0.86	8.72	1.26	890
4.5	655	724	1.55	10.98	1.59	1120
5.0	668	847	1.63	17.36	2.52	1770
6.0	910	1030	1.85	22.35	3.24	2280

Note! All motors require more current when starting. While this current is only experienced for a short time, it has to be allowed for, especially if fuses are being used.

Mounting

The pump is designed to be installed with the wire entry at the top, and has a raised flat section which fits into a slide mount, where gravity holds the pump in place. *See Mount Dimensions.*

A 3D model of the mount is available at the same Internet location as this document.
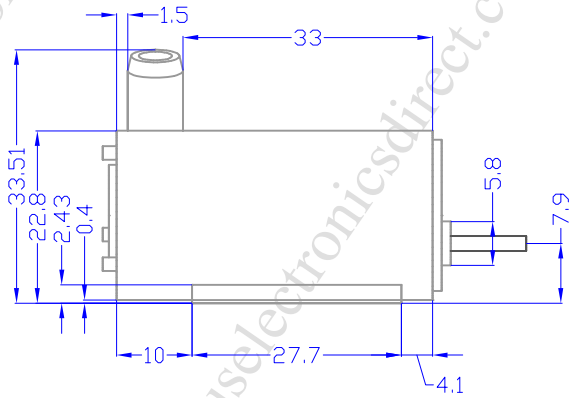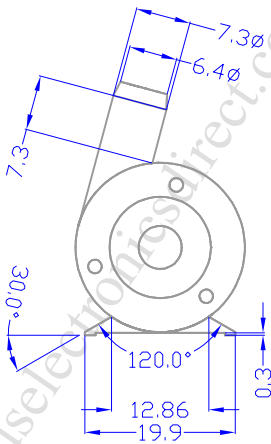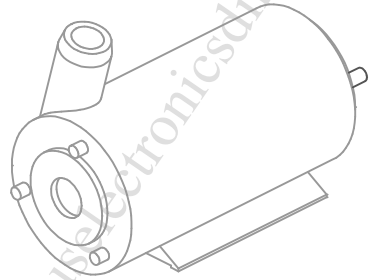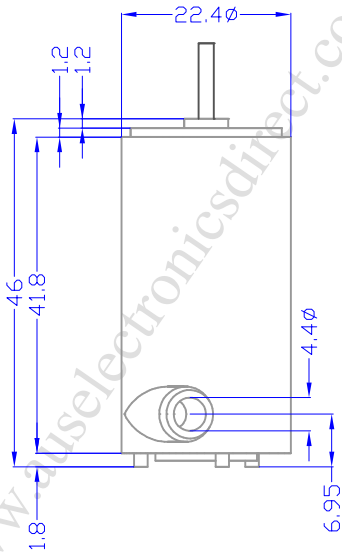
Arduino - Hardware - Submersible Pump – Mount - Dimensions #1

ø3.5 Typical Countersunk

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