Pump it up

Team Name:
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Dimensions

To get the desired flow rate and for the estimation of the unknown flow rate, participants need to set the following parameters:

1. Impeller Diameter: 110mm
2. Outlet diameter of pipe: 120 mm
3. Centrifugal Pump Size: 130*130*80 mm
4. Diameter of container: 10cm
5. Cost: 1500 Rs

Components and its Materials

1. Impeller: Acrylic
2. Pipe
3. M seal
4. Johnson Motor
5. 12V LIPO Battery
6. Aluminium Plate
7. 2 Containers: Transparent Plastic
8. Sensor: Water flow rate sensor using Arduino

Construction

The Pump is built by construction of the Valve and Impeller and its casing.

IMPELLER

Impeller has Two main parts

1. Base Plate
2. Vanes

Base plate is made up of Aluminum Plate of diameter 11 cm. The backend of the base plate is attached with coupler using nut and bolt. The coupler's smaller diameter is joined with the shaft of

Johnson base motor. The frontend of the base plate contains six vanes and each of this plate is curled and of four cm in height. These vanes are pasted with help of **Araldite** glue. This completes the formation of impeller.

Now, the impeller is covered with casing made up PVC pipe. This casing if attached with the impeller base plate by M seal. The diameter and the height of casing are 12cm and 5 cm respectively. The casing has hole diameter of 6cm and is 3.5 cm above the base plate. This hole is attached with the delivery pipe through which water is send to container 1 placed at a certain height.

The battery used is 5V LIPO battery.

VALVE

The valve is made up of hollow cube which has dimension of 5*5*5 cm. there is a strip of 5*5 cm placed inside the valve to regulate the flow of water. The strip is attached with revolver in such manner that both are synchronized with each other. If the revolver is at 0 degree than the flow rate is 0 and if revolver is at 90 degree, then flow rate will be maximum.

Calculations

Water Flow Sensor

Description of sensor used

Sensor used in our project is **'Water Flow Sensor'.** This sensor consists of a plastic valve body, a water rotor, and hall effect sensor. Hall effect sensor are used to measure proximation of speed detection.

Water flow sensor needs Arduino uno, 1 rheostat (10k pot), 1 LCD display 1602 and Jumper Wires.

Circuit Diagram is
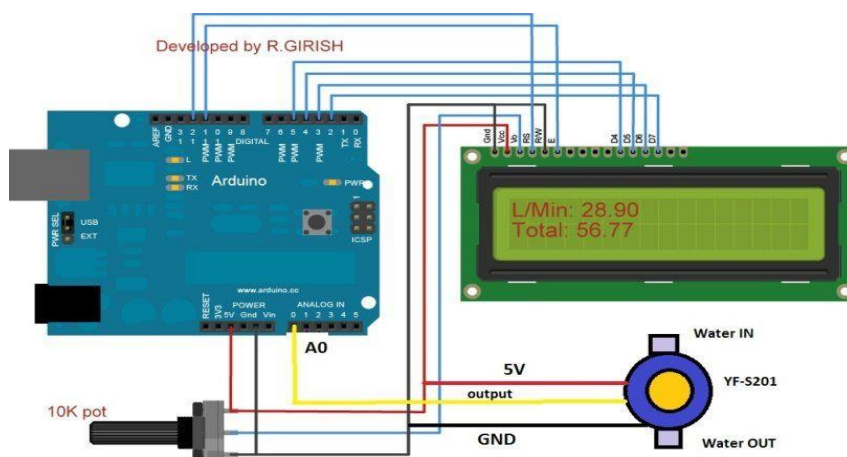
VCC of LCD 1602 need 5v to display the flow rate which is provided by Arduino (connected to 5 V pin) and D4, D5, D6, D7 are connected to digital pins in Arduino Uno. The Analog pin (0) of Arduino uno is connected to middle portion of water flow sensor (value detected by hall effect sensor present inside the water flow sensor) to transfer the data of flow rate to Arduino Uno. Water flow sensor also requires 5V supply, therefore the left pin of sensor is either connected to 5v Arduino Uno pin r or to the VCC pin of LCD 1602. All the Grounds are connected to its respective positions. Thus, after the successful connection of all the pins, the data should be transmitted to Uno and this data is then displayed LCD 1602.