DFR0523

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Company Address

Arrow Electronics, Inc
9201 East Dry Creek Road
Centennial, CO 80112

Gravity: Digital Peristaltic Pump

SKU:DFR0523 Brand:DFRobot Reward Points: 515

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* Model: Peristaltic Pump | Immersible Pump (350L/H) | Immersible Pump (550L/H)

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Frequently Bought Together

Gravity: Digital Peristaltic Pump + Gravity: IO Exp... V7.1 + Gravity: An... Arduino + Gr... /Meter V2 (K=1) + ... Corrosion Resistant =

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INTRODUCTION

Gravity: digital peristaltic pump is a new product developed by DFRobot. This is a new member of our water quality monitoring devices. It is an actuator for the liquid system.
DFRobot peristaltic pump integrates a PPM motor driver on the pump, this is a Gravity interface (PH2.0-3P) motor driver. The control signal is compatible with standard servo motor, you can use Arduino, Raspberry Pi, micro:bit, and other kinds of microcontrollers to control its direction and flow speed. The tube in the pump head is made up of BPT material, which is anti-acid and long life.
Peristaltic pumps are a kind of positive displacement pump used for delivering small amounts of fluid. The fluid is contained within a flexible tube fitted inside a circular pump casing. When the rotor rotates continuously, the fluid in the tube will be squeezed and deliver to the other side. In this way, the liquid flow rate can be easily accuracy controlled.

(Excerpt from internet)

As a kind of metering pump, peristaltic pump can be conveniently used for quantitative delivery. It has a wide range of application scenarios, such as science experiment, hydroponics, drip irrigation, tropical fish farming, shrimp cylinder environment control, etc. A large number of titration experiments can be automated with this peristaltic pump, such as potentiometric titration, indicator-based colorimetric titration, pH-based titration, and so on. It is great helpful to improve your working efficiency
On the other hand, peristaltic pumps also have a wide range of applications in food, medical and other industries. Making an automatic coffee machine will be a really good idea!

Arduino Peristaltic Pump

Attention: Since the motor power consumption (about 5W) is a little large, it's better to add an external power supply on your microcontroller, USB port can only provide 2.5W power supply.

FEATURES

Peristaltic pump

- Low noise,
- Low cost,
- Simple structure,
- Easy to maintain,
- Three rotors with moderate pulsation,
- Non-toxic and pollution-free

Driver board

- Gravity 3Pin digital connector, plug and play
- Servo PPM control signal, driving easily and compatible with Arduino, Raspberry Pi, micro: bit and other controllers.

SPECIFICATION

Driver Board

- Input Voltage: 5V-6V
- Maximum Continuous Operating Current: 1.8A
- Peak Current: 2.5A
- Quiescent Current: <1mA (No PPM Signal Input)
- PPM Signal Resolution: 1us
- Positive Pulse Width of the PPM Signal: 500us-2500us
- Forward Pulse Width Range: 500us-1400us (500us: max forward speed)
- Stop Pulse Width Range: 1400us-1600us
- Inverted Pulse Width Range: 1600us-2500us (2500us: max inverted speed)
- PPM Frequency: 50Hz (Servo Control Signal)
- Connector: Gravity PH2.0-3P
- Size: 27.4 x 28.7 mm/1.08 x 1.13 inches

Peristaltic Pump

- Motor: DC Motor
- Rated Voltage: 6V
- Rated Power: 5W
- Tube Material: BPT
- Tube Specifications: inner diameter 2.5mm, outer diameter 4.5mm
- Pump Head Material: Engineering Plastics
- Pulsation: Three Rollers, Small Pulsation
- Flow: ≥45ml/min (almost 1ml/s)
- Working Conditions: ambient temperature 0 ~ 40 ℃, relative humidity <80%

DOCUMENTS

- Product wiki
- More Documents
- Code Resources

SHIPPING LIST

- Gravity: digital peristaltic pump with PPM motor driver x1
- Digital sensor cable x1
- Silicone tube (1m) x1
- 10mL plastic measuring cylinder x1

PROJECTS

Project. Hyduino - Automated Hydroponics with an Arduino
hydroponics is growing plants without the use of a traditional dirt medium by using a nutrient-rich water solution. This is especially great for those people that have limited areas in their backyard to grow in.
Hardware list:

- Arduino Mega 2560
- Peristaltic Pumps (2)
- Regular Pump
- pH Electrode Probe and Connection to Arduino

pH Up/Down Solution

- 5V Relay Modules for Arduino
- 12V Solenoid Valve
- DHT11 or DHT21 or DHT22 Humidity/Temperature Sensor
- Photosensitive Sensor for Arduino
- Breadboard
- Various Wires
- Grow Lights (mine are LED)
- Sockets for Grow Lights
- 3.2" TFT LCD Shield + Touch Screen (usually has an SD card reader on the back of it)
- Water Level Sensor Float Switch (2)
- I2C RTC DS1307 AT24C32 Real Time Clock Module
- 9V and 12V Power Supplies
- Hydroponics Pots (I'm using 10 - 3" pots for this)
- 1" PVC Pipe and Fittings + Drain Pipe and Fittings

REVIEW

FAQ

make pump operational

Reply • Share ›

夏青 ➔ Andriy Yeroshchenkov • 3 months ago

4.8v is a little bit low, but seems work to work, but still suggest to use above 5v will be better.

Reply • Share ›

DFRobot Support Mod ➔ Andriy Yeroshchenkov • 2 years ago

What is the voltage of your dc adapter? If the voltage of the dc adapter is 5~6V, you can connect the pump power supply to the dc adapter.The signal is sent by particle photon.

Reply • Share ›

Andriy Yeroshchenkov ➔ DFRobot Support • 2 years ago

Now I figured out how to use it)

When do you expect them back in stock?

Reply • Share ›

DFRobot Support Mod ➔ Andriy Yeroshchenkov • 2 years ago

You can consult store@dfrobot.com and ask him to check whether there is inventory

Reply • Share ›

Hermann Müller • 2 years ago

whats the minimum (sort of precise) pump quantity?

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DFRobot Support Mod ➔ Hermann Müller • 2 years ago

PPM Signal Resolution: 1us
Positive Pulse Width of the PPM Signal: 500us-2500us
Forward Pulse Width Range: 500us-1400us (500us: max forward speed)
Stop Pulse Width Range: 1400us-1600us
Inverted Pulse Width Range: 1600us-2500us (2500us: max inverted speed)
PPM Frequency: 500Hz (Servo Control Signal)
This pump can be controlled by PPM signal, I think the above data can solve your problem.

Reply • Share ›

夏青 • 3 years ago

Do you have some problem on Calibration?

Reply • Share ›

夏青 • 3 years ago

Here is another project.

Reply • Share ›

Daniel Grus • 3 years ago

What is the maximum vertical distance for the pump suction and the pump delivering?

Reply • Share ›

夏青 ➔ Daniel Grus • 3 years ago

I haven't test very precisely, I guess maybe about 1.5m. Maybe you have to limit in 1m.

Reply • Share ›

Eric Pascual • 3 years ago

Interesting product.

In order to have a true and precise control on the amount of liquid, it could be helpful to add an index sensor as feedback. By calibrating first the amount of liquid by pulse count, it could be possible to measure and control precisely the volume of delivered liquid, whatever is the rotation speed of the motor.

Reply • Share ›

夏青 ➔ Eric Pascual • 3 years ago

yes you are right!
but I don't think it need to add a index sensor for it.
sure if you have a index sensor as feedback make it more precisely.
for normal use I think its precise enough.
https://en.wikipedia.org/wi...

Reply • Share ›

Eric Pascual ➔ 夏青 • 3 years ago • edited

I have to disagree. This is not a matter of precision (precision of what by the way ?) but of the absence of the needed input. This has no connection with the peristaltic principle (which I know well enough ;)

You have absolutely no way to know exactly the amount of fluid which is pumped if you have no information about how much the rotor has turned. And this information cannot be known without a sensor on the motor axle, the simplest one being an optical or magnetic index.

Since we are working in open loop without such a feature, the best you can get is a supposed volume, based on a preliminary calibration and time counting. But this is not reliable at all, since it depends on the real motor RPM for a given PWM value, which depends itself on the power supply state at this moment, on the wear state of the tube inside the pump, on the mechanical wear of the moving parts, of the fluid viscosity in the ambiant conditions,... Not what I would call a "precise" value ;)

I would be interested by knowing the solution you think about for getting a worthy input about how much liquid has been pumped in a given amount of time without such a sensor ?

Reply • Share ›

夏青 ➔ Eric Pascual • 3 years ago • edited

I think you are right.
But I have to say that this pump is more precise then the nornal pump in DFRobot. For the feed back of the pump, I will say that maybe we can use some flow sencer like SEN0216(https://www.dfrobot.com/pro... or ir sencer to make it.
I think maybe 6ml ±0.1ml.
I mean if when we cal the pump, then give a quatity to the pump, like 6ml then pump about 6.1ml in some case or 5.9ml.

Reply • Share ›

Eric Pascual ➔ 夏青 • 3 years ago • edited

Hi,

You're right about the flow sensor solution, since it is the ultimate solution for getting the true value (as long as the sensor is able to detect low flows). But it adds complexity and takes more space.
My suggestion aimed at finding a good compromise for having a quite reliable feedback without needing an extra device.

If ever the motor axle extended a bit more out of the motor casing it could have been possible to design some kind of extension using a Hall effect sensor and a magnet attached to the axle. But this does not seem to be that easy based on the pictures.

Important note : since the sensor you proposed (BTW the link in your comment is broken) can measure flow in one direction only (just got the answer to this question in the sensor's page), the solution does not work when we need to control the quantity of liquid which is transferred in both directions (since the pump can operate in both ones). My proposed extension would, since you know in which direction you're running the motor and the index returns the number of rotor rotations.

1 Reply • Share ›

1

夏青 → Eric Pascual • 3 months ago

you suggestion is great! using a hall effect sensor is great!
but for now maybe a little bit diffical to made it.
Do you think that a stepper motor can work?

Reply • Share ›

Eric PASCUAL → 夏青 • 3 months ago

Hi.
The stepper motor could work in theory, since as long as you are sure not to miss steps because not enough current for having the required torque and the frequency kept in a range the motor can sustain, you know precisely how much the rotor has turned and hence how much liquid has been pumped.
The only problem with steppers is that they cannot run at RPMs as high as standard ones, so the time to transfer the same amount of liquid has chances to be quite higher.
It would worth a try anyway.

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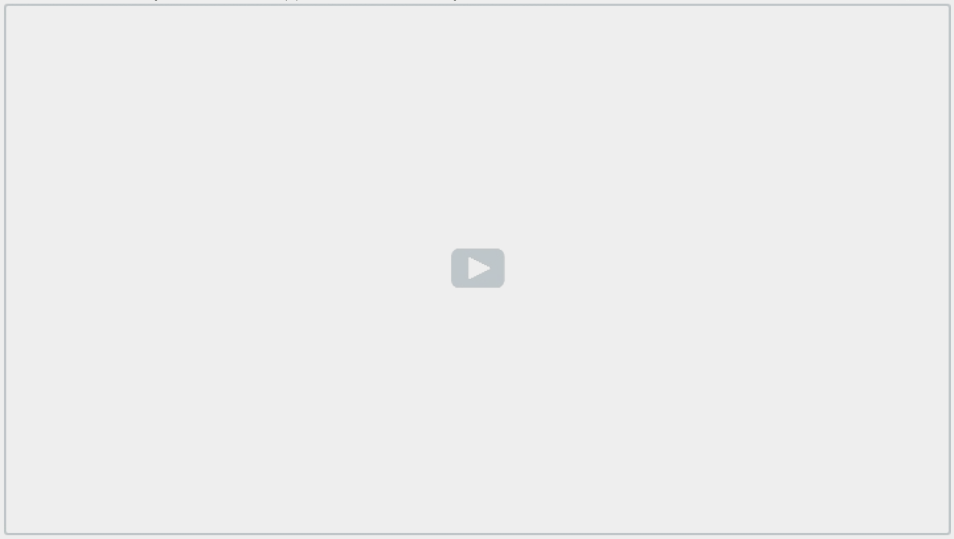
夏青 → Eric PASCUAL • 2 months ago

let's find a solution for it.

Reply • Share ›

夏青 → Eric Pascual • 3 years ago

I have found a way to make the application more easy to feed back.



here is the youtube link, they use weight sensor to do that!

Reply • Share ›

Eric Pascual → 夏青 • 3 years ago

Nice project ;)

Reply • Share ›

FAQ