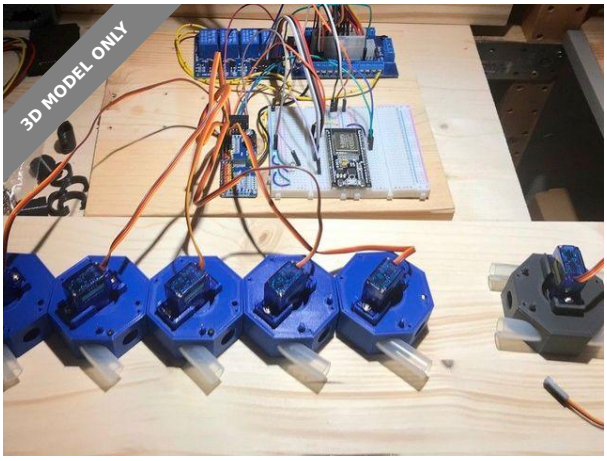

Servo Valve

r red5alex

VIEW IN BROWSER

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Summary

A minimal-cost water valve for low-pressure or gravity-fed small irrigation systems.

Household > Outdoor & Garden

Tags: water watering valve irrigation servo

The objective of this design was to create a minimal-cost valve for lab-scale or small scale irrigation systems where water has to be diverted to many individual outlets.

It uses a cheap (~2EUR) Kuman KY66 mini servo to drive the actuator. This servo can be controlled and powered using only an Arduino or ESP-Devboard (some limitations apply with the 3.3V logic level), even though a dedicated servo driver is recommended.

Because the water is contained completely within the pinched silicon tube, the assembly is safe from leakage without the need for water-proof printing on a budget.

Important: The valve is for **low-pressure applications only**, e.g. with a gravity-fed water supply from a water tank, or using a pump you can turn off, or a tap you can close using a proper shut-off valve.

Note: you will only need one pair of levers provided. I have provided multiple sized levers to adapt to different tubes. Smaller gaps will increase the squeeze on the tube (see below).

Optional Use Cases:

- The valve can optionally be equipped with a second silicon tube. In this configuration it can be used as a **source selector** (e.g. for either fresh water or liquid fertilizer).
- By connecting both tubes to a small reservoir and opening the them in an alternating pattern, it is possible to **deliver relatively precise amounts of water** to the plants.

Dimensions of silicon tube i have tested succefully:

- outer diameter (11mm)
- inner diameter (8mm)
- wall thickness (1.5mm)

This worked well with the Levers with 1.9 mm gap. Choose a smaller gap size if using smaller tubes or if the valve leaks.

The silicon tube can be attached to normal vinyl-tubes of appropriate size without any fittings, further reducing cost for the system.

I recommend adding some grease to reduce friction between the excentre and the casing.

Stay tuned for detailed assembly instructions, schematics for ESP32 and code base (arduino and node-red) for controlling a set of valves.

Model files

servovalve_-_lever2_-_gap16mm.stl

servovalve_-_lever1_-_gap12mm.stl

servovalve_-_lever1_-_gap19mm.stl

servovalve_-_lever2_-_gap12mm.stl

servovalve_-_case.stl

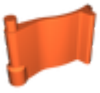
servovalve_-_lever2_-_gap18mm.stl

servovalve_-_lever1_-_gap08mm.stl

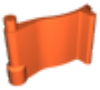
servovalve_-_lever1_-_gap10mm.stl

servovalve_-_excenter_single.stl

servovalve_-_lever2_-_gap19mm.stl



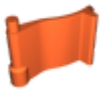
servovalve_-_lever2_-_gap10mm.stl



servovalve_-_lever2_-_gap06mm.stl

servovalve_-_lever1_-_gap14mm.stl

servovalve_-_lever1_-_gap06mm.stl



servovalve_-_lever2_-_gap08mm.stl

servovalve_-_lever1_-_gap16mm.stl

servovalve_-_top.stl

servovalve_-_lever2_-_gap14mm.stl

servovalve_-_lever1_-_gap18mm.stl

Find source .stl files on Thingiverse.com

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