Gradient mixer requirements

# Solenoid

## 3/2 valve

e.g. RLM3B4H30V from Asco

<https://www.asco.com/de-de/Seiten/solenoid-valve-series-rb.aspx#/#flt=e30%3D>

5 V

e.g. Reichelt

<https://www.rct-online.de/de/haehne-und-ventile/magnetventile/3/2-wege-mini-magnetventil-aus-ptfe>

## or four-channel mixer

<https://www.pumpen-ventile.de/niederdruck-gradienten-mischventil-lc/>

# Opening and closing through a programmable microprocessor with free software

## either through computer

Arduino Uno or larger; other microprocessor if freeware is available

Breadboard

## or through a touchpad

# Software

Arduino or appropriate for other microprocessor model

# Requirements on gradient

Time should be chosen by user, minimum time 20 minutes, maximum time 6 hours

Start with 100% solvent A for a freely chosen time

Start of gradient (linear increase of solvent B from a chosen starting percentage to a chosen final percentage of solvent B). Switching rather frequently (2-6 times per second).

Regeneration of column with solvent B 100% for a freely chosen time (including 0 minutes)

The status of the valve should be visible by two LEDs (one for solvent A, one for solvent B). The regeneration phase should be indicated by a third LED. The end of the program should be indicated by a fourth LED. Alternatively output via display.

(If a touchscreen is used, indication can also be via the touchscreen.)

The program code should include all the instructions as comments (no handbook should be needed).

The program should allow to switch off a 230V equipment (pump) after a predetermined time, preferentially through a radio-controlled socket or similar, so that no manipulation on the 230 V equipment is needed.

(If a four-channel mixer is used, have indicators accordingly. The four-channel mixer should allow a third solvent for regeneration during a user-defined time period.)

# Example in the literature

<https://www.bc-robotics.com/tutorials/controlling-a-solenoid-valve-with-arduino/>

# List of hardware needed