

# Rack and Pinion with Servo Motor – Vertical Sliding Mechanism with Limit Switches

## Step 1: Components Required

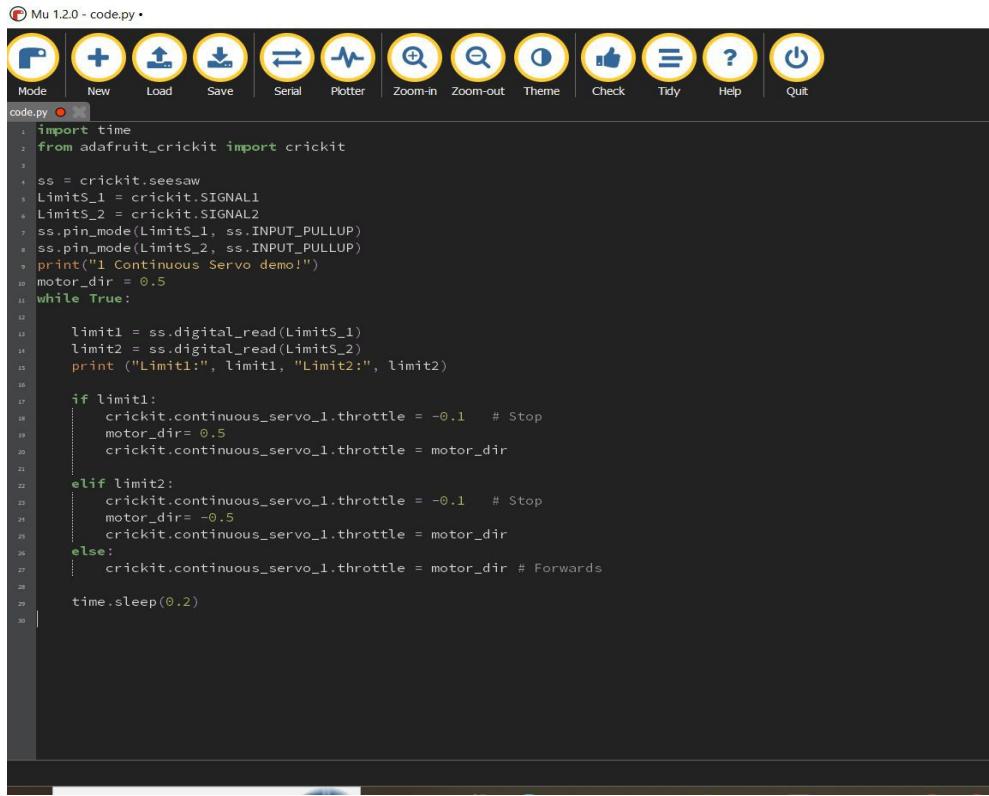
- MG995 Servo motor
- Rack & Pinion gear set
- Telescopic slide (for vertical guide)
- 2 × Limit switches (Top and Bottom)
- Arduino / CPX + Crickit controller
- Power supply (5–6V, 2A for servo)
- Jumper wires and breadboard
- Mounting base (wood/acrylic)

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## Step 2: Connect Components

- Fix telescopic slide vertically to guide the rack.
- Mount rack gear on the sliding plate of the slide.
- Attach pinion gear to the MG995 servo horn.
- Place **Top limit switch** at the upper end and **Bottom limit switch** at the lower end.
- Connect servo motor and limit switches to Arduino/CPX.

## Step 3: Code



The screenshot shows the Mu 1.2.0 code editor interface. The title bar reads "Mu 1.2.0 - code.py •". The menu bar has "File", "Edit", "Run", "Terminal", "Help", and "About". The toolbar contains icons for Mode, New, Load, Save, Serial, Plotter, Zoom-in, Zoom-out, Theme, Check, Tidy, Help, and Quit. The code editor window displays the following Python code:

```
1 import time
2 from adafruit_crickit import crickit
3
4 ss = crickit.seesaw
5 Limits_1 = crickit.SIGNAL1
6 Limits_2 = crickit.SIGNAL2
7 ss.pin_mode(Limits_1, ss.INPUT_PULLUP)
8 ss.pin_mode(Limits_2, ss.INPUT_PULLUP)
9 print("1 Continuous Servo demo!")
10 motor_dir = 0.5
11 while True:
12
13     limit1 = ss.digital_read(Limits_1)
14     limit2 = ss.digital_read(Limits_2)
15     print("Limit1:", limit1, "Limit2:", limit2)
16
17     if limit1:
18         crickit.continuous_servo_1.throttle = -0.1 # Stop
19         motor_dir= 0.5
20         crickit.continuous_servo_1.throttle = motor_dir
21
22     elif limit2:
23         crickit.continuous_servo_1.throttle = -0.1 # Stop
24         motor_dir= -0.5
25         crickit.continuous_servo_1.throttle = motor_dir
26     else:
27         crickit.continuous_servo_1.throttle = motor_dir # Forwards
28
29     time.sleep(0.2)
30
```

## Step 4: Save & Run

- Save the code as an Arduino sketch and upload it to the controller.
- Rack will move **upward** until the top switch stops it.
- After delay, rack will move **downward** until the bottom switch stops it.