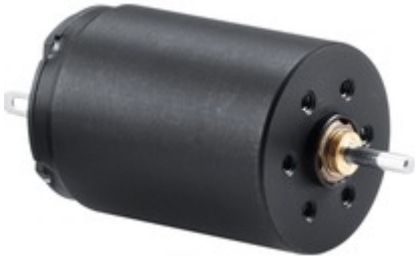
Hardware components

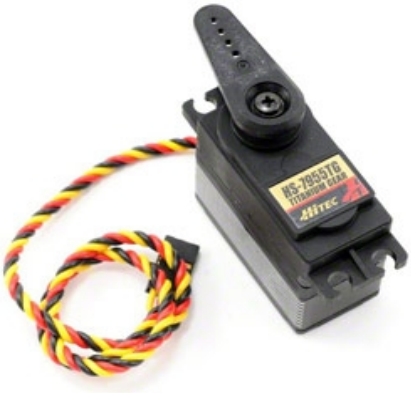
1. Actuators

- Amphibot I: 0.75 W DC motor

- Amphibot II: The 2.83 W DC motor (Faulhaber 1724 T 003 SR) , maximum torque of 4.2 mN·m, gearbox with a reduction factor of 125. (Expensive > 50 eur)



- Modular snake robot, San Diego: heavily modified Hitec HS-5955TG servos (Expensive > 50 eur).



-Mamba: Hitec servo motor (HSR-5990TG) expensive, servo motor (Dynamixel AX-18A), expensive.

2. Battery

- Amphibot I: 3.6 V Li-Ion battery

- Amphibot II: battery has a capacity of 600 mAh.

3. Microcontroller

- Amphibot I: PIC microcontroller, does not specify.

- Amphibot II: PIC18F2580 microcontroller, master. PIC16F876A microcontroller, motors. PIC16LF876A microcontroller, controls a nRF905 radio transceiver. Both cost between 5-6 eur, they are 8-bit microcontrollers.

- Modular snake robot, San Diego: Atmel micro- processor, which permits the module to perform necessary computation internally. Each module functions independently of the others within the snake while the gaits are generated bya personal computer. Thus the PC coordinates the distributed system made up of the modules in the snake.

-Mamba: microcontroller card (TITechSH2 Tiny Controller from HiBot) ti controll de joints, price 100 eur.

3. Sensors

- Amphibot I: integrated magnetic incremental en-coder generating 16 pulses per turn.

0.2 Ω resistor inserted between the H-bridge and the motor so as to indirectly measure the motor’s torque.

- Amphibot II: water detector circuit. 512- pulse integrated incremental encoder for the DC motor.

- Modular snake robot, San Diego: magnetic encoder.

-Mamba: The main contribution of the robot compared to previous snake robot designs is its novel approach for measuring contact forces and torques acting along its body. This sensor capability is achieved by strain gauge based force/torque sensors installed in each joint module of the robot.

Sensors inside the joint also include two temperature sensors, a 3-axis accelerometer, and a water leakage detector. Wireless camera.