MAINTENANCE MANUAL

Splashy

DESIGN&ROBOTICS

12° edition, 2024

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Tutors:
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Group 3

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Davide Grazzani
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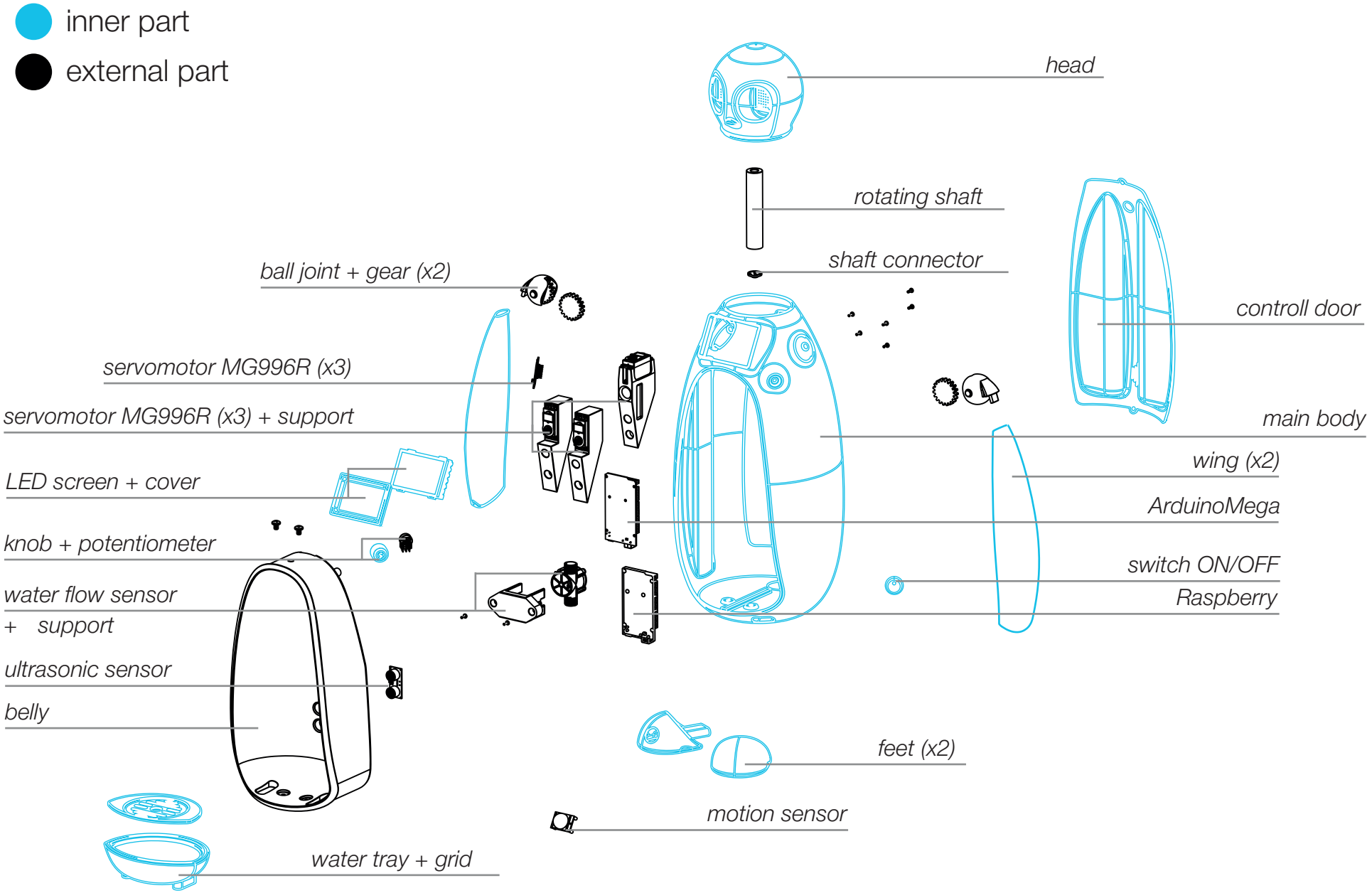
Enrico Virgili

INDEX

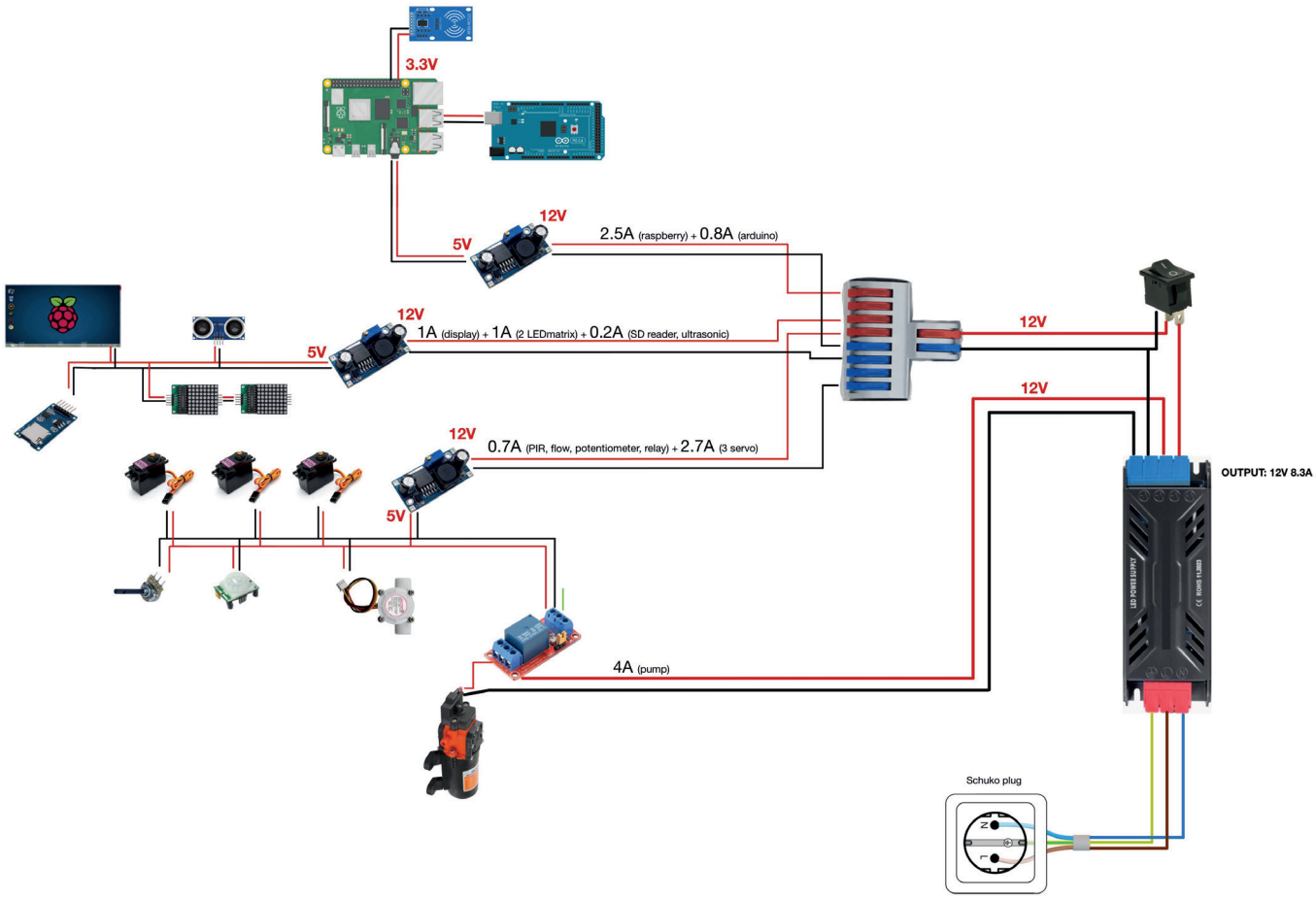
1

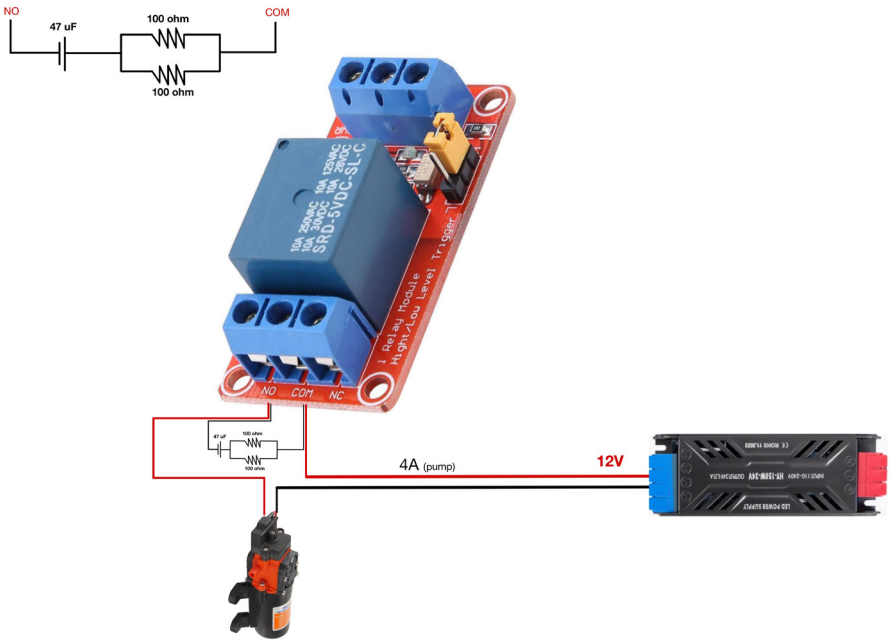
architecture


inner part
external part
head
rotating shaft
shaft connector
ball joint + gear (x2)
controll door
servomotor MG996R (x3)
servomotor MG996R (x3) + support
main body
wing (x2)
LED screen + cover
ArduinoMega
knob + potentiometer
switch ON/OFF
water flow sensor
+ support
Raspberry
ultrasonic sensor
belly
feet (x2)
motion sensor
water tray + grid

2

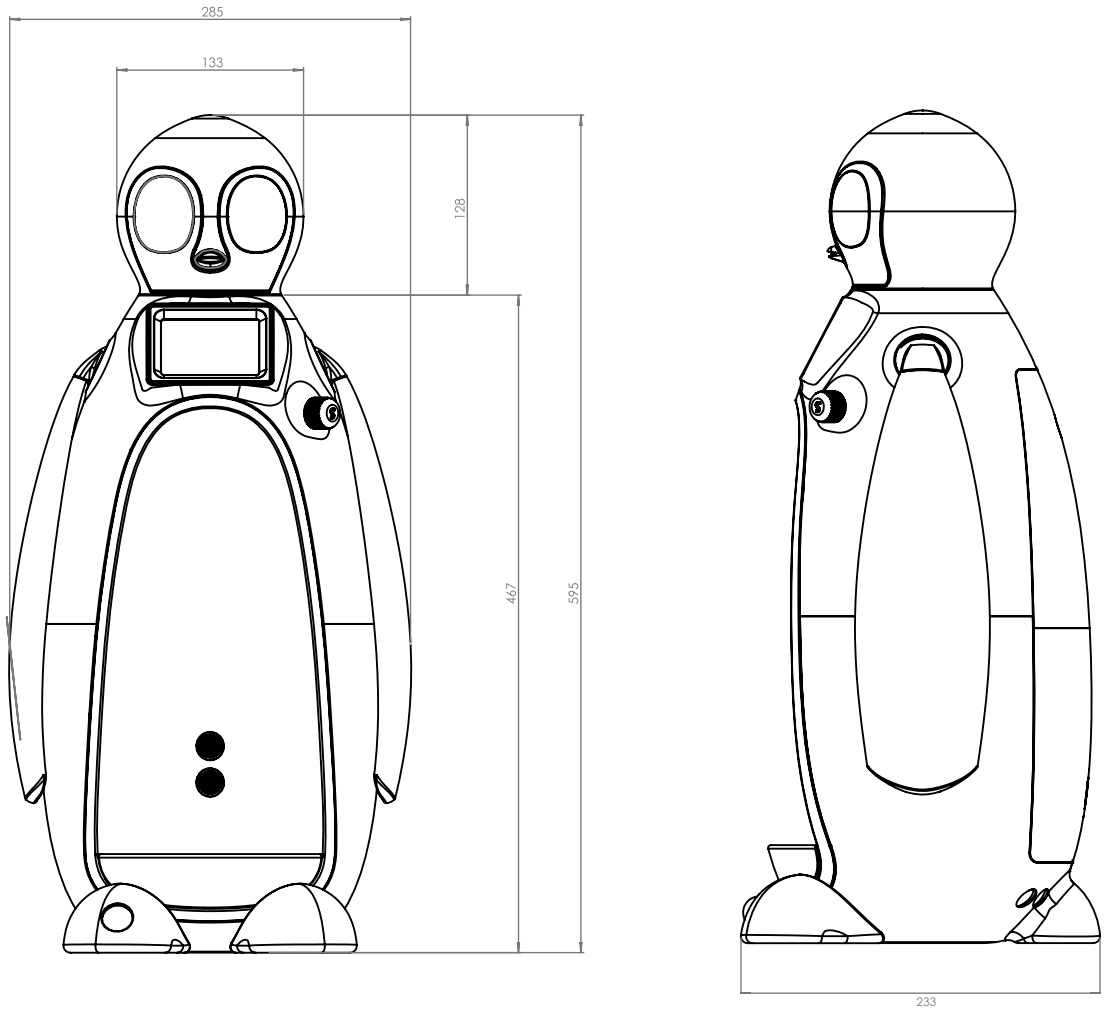
wire configuration scheme


3.3V
12V
5V
2.5A (raspberry) + 0.8A (arduino)
12V
5V
1A (display) + 1A (2 LEDmatrix) + 0.2A (SD reader, ultrasonic)
12V
12V
12V
0.7A (PIR, flow, potentiometer, relay) + 2.7A (3 servo)
5V
OUTPUT: 12V 8.3A
4A (pump)
Schuko plug


NO
47 uF
100 ohm
COM
100 ohm
1 Relay Module
High/Low Level Trigger
NO COM NC
4A (pump)
12V

3

general dimensions



The dimensions of Splashy are 265 x 233 x 595 mm.

4

main components

1

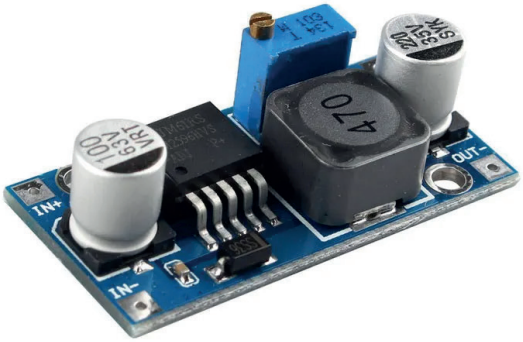
POWER SUPPLY
SUCIKORIO Transformer 12V 100W

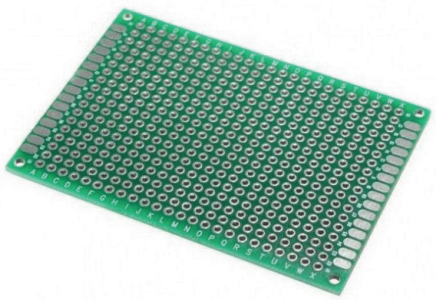
2

ON/OFF SWITCH
DC 12V 20A LED

3

STEP DOWN
LM2596 SIMPLE SWITCHER® Power Converter 150-kHz 3-A Step-Down Voltage Regulator



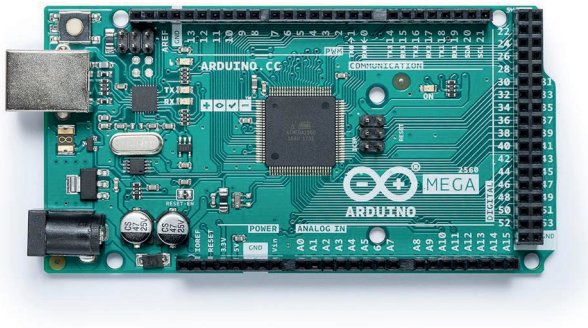


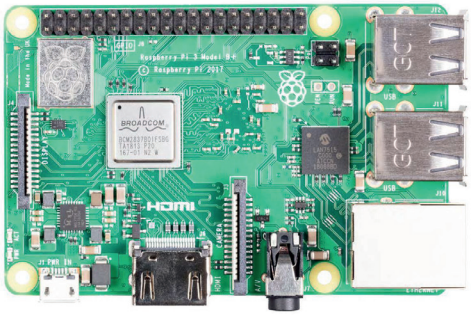
4

MATRIX BOARD

5

ARDUINO
Arduino® MEGA 2560 Rev3



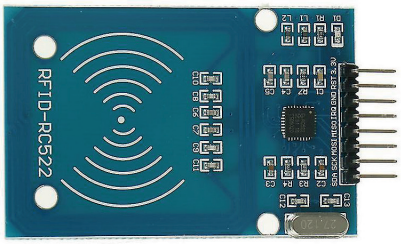


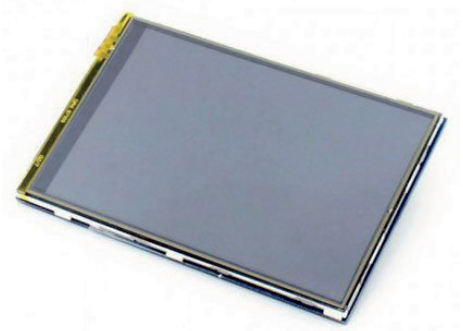
6

RASPBERRY
Raspberry Pi 3 Model B+

7

RFID SENSOR
RC522 RFID



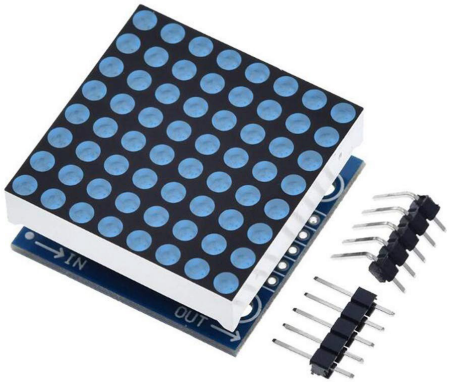


8

SCREEN
MPI3508

9

LED MATRIX
MAX7219 LED matrix

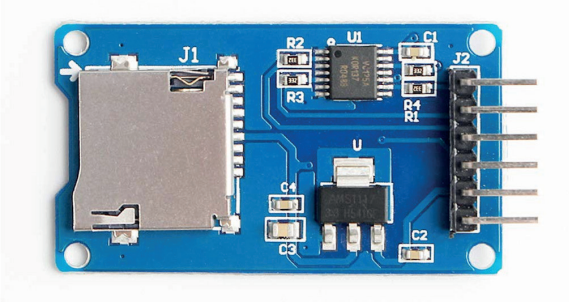


10

SERVOMOTOR MG996R
MG996R High Torque
Metal Gear Dual Ball Bearing
Servo

11

MICRO SD MODULE
MicroSD Card Adapter



12

ULTRASONIC SENSOR
HC-SR04

13

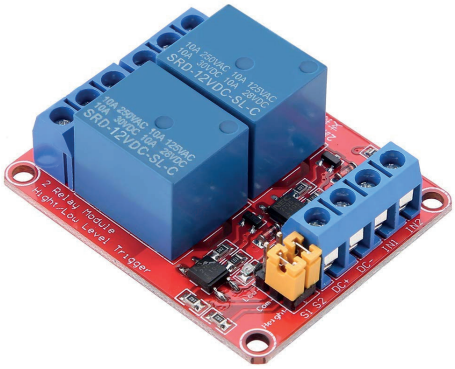
PIR SENSOR
PIR Motion sensor (Passive Infrared) HC-SR501

14

POTENTIOMETER
B1M

15

TOUCH SENSOR



16

RELAY
2 Channels Relay Module
High/Low Level Trigger

17

FLOW SENSOR
YF-S402

18

WATER PUMP
SEAFLO pompa 12V 4.3LMP

19

WATER PIPES
10mm

5

maintenance

1

WHERE DOES IT OPEN?

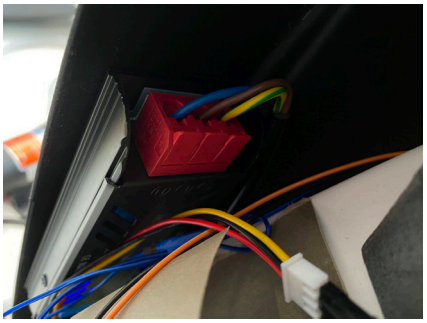
For maintenance, open the control door at the back or lift the penguin's head.




CHANGE THE POWER SUPPLY

Open the back door
Detach from the velcro
Unplug from all the cables

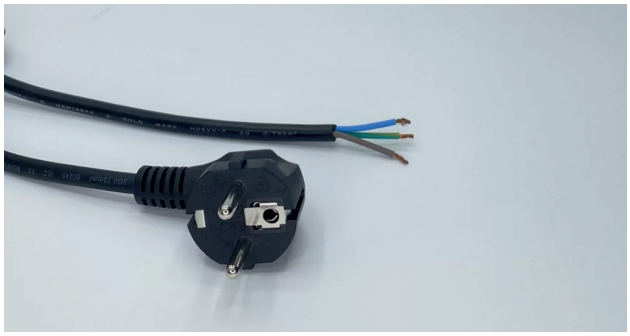
2



3

CHANGE THE SCHUKO CABLE

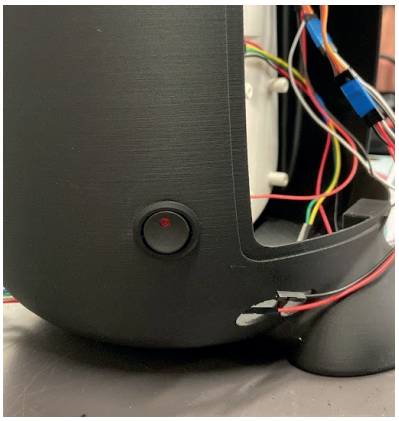
Open the back door
Unplug from the power supply



4

CHANGE THE ON/OFF SWITCH

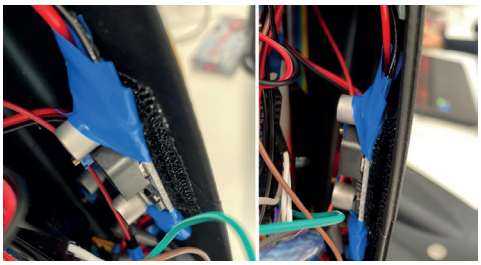
Open the back door
Unplug from all the cables
Push out the switch

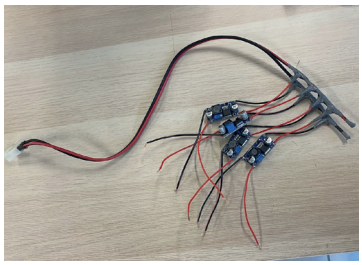


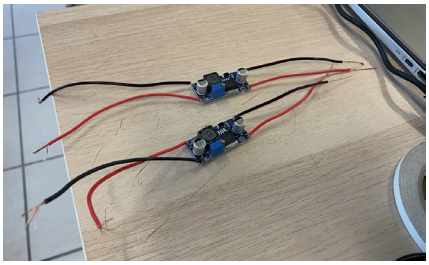
CHANGE THE STEP DOWN (x3)

Open the back door
Detach from the velcro
Unplug the two step downs from the matrix board
and the one from the Raspberry
On the other end unplug from the power supply

5



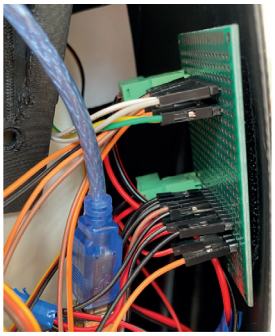


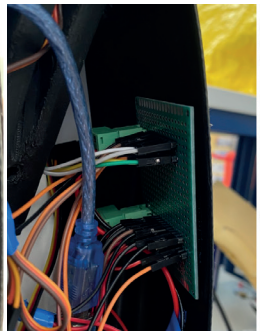


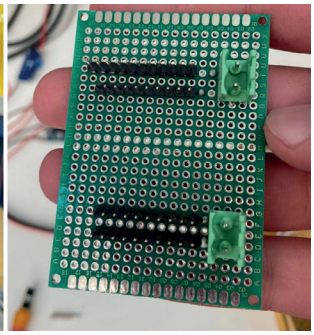
6

CHANGE THE MATRIX BOARD

Open the back door
Detach from the velcro
Unplug the two step downs
Unplug from all the jump wires



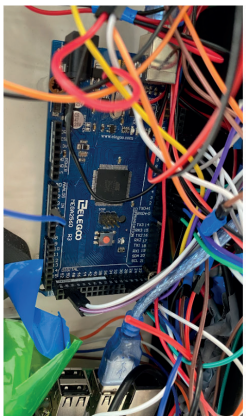
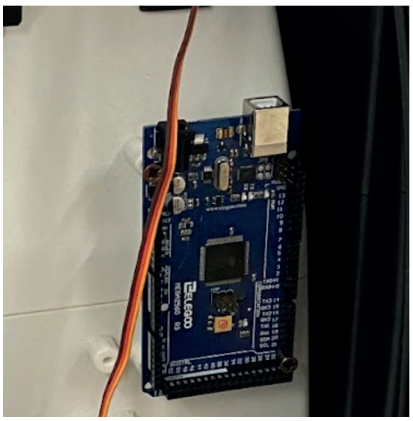




7

CHANGE THE ARDUINO

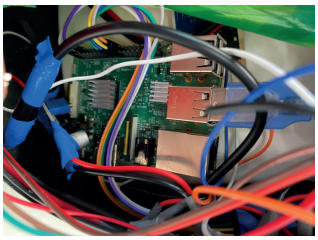
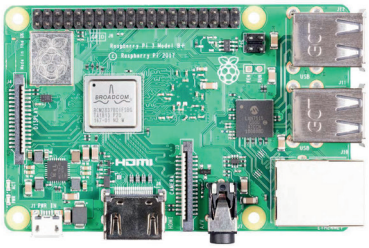
Open the back door
Unplug the cable connected to the Raspberry
Unplug from all the jump wires
Unscrew the Arduino from the body

CHANGE THE RASPBERRY

Open the back door
Unscrew the Raspberry from the body
Unplug from the power cable
Unplug from the cable connected to the Arduino
Unplug from the HDMI cable
Unplug from all the jump wires

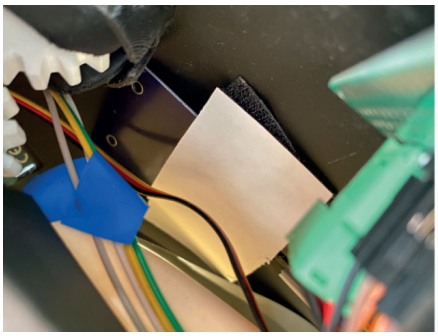
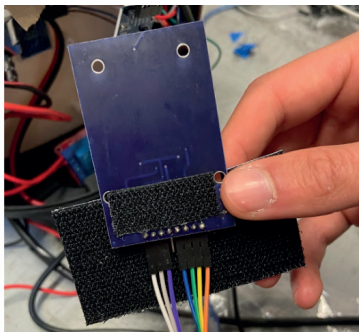
8

9

CHANGE THE RFID SENSOR

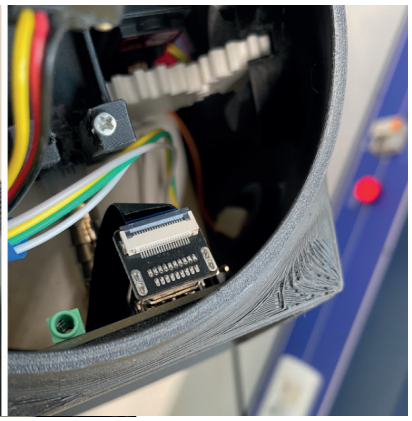
Open the back door
Detach from the velcro
Unplug from all the jump wires

10

CHANGE THE SCREEN

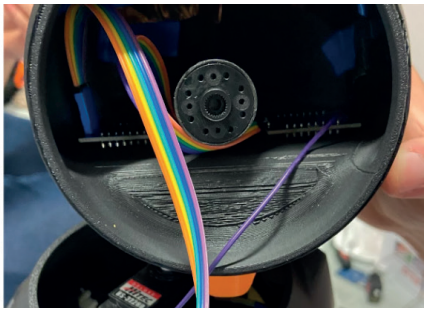
Open from the head
Unplug from the power cable
Unplug from the HDMI cable
Remove the front frame


CHANGE THE LED MATRIX (x2)

Open from the head
Unplug from all the jump wire
Remove the front frame

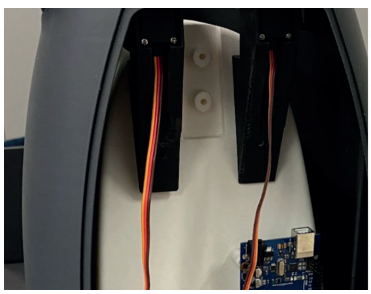
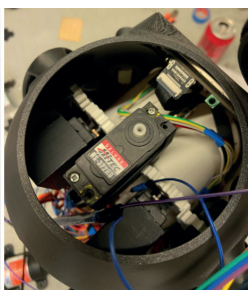
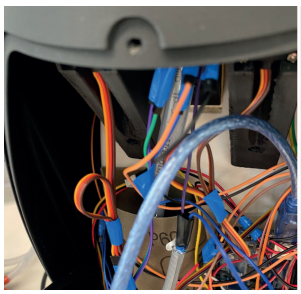
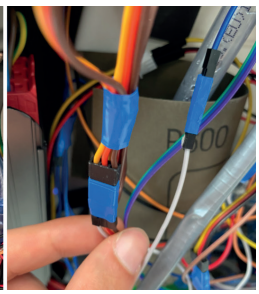
11


12

CHANGE THE SERVO MG996R (x3)

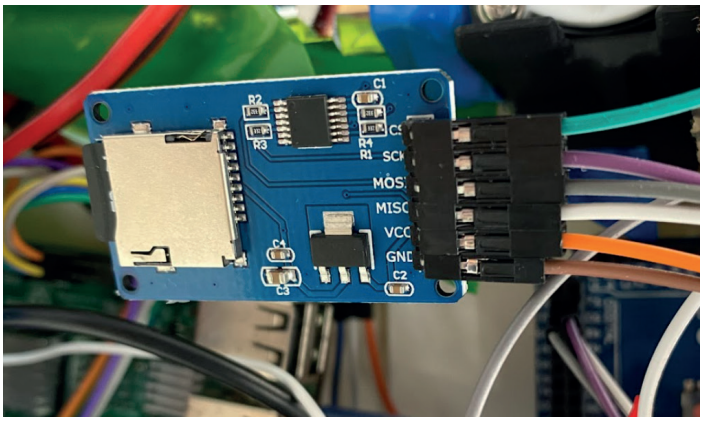
Open the back door
Unplug from all the jump wires
Remove wings servos
Open from the head
Remove head servo

13

CHANGE THE MICRO SD MODULE

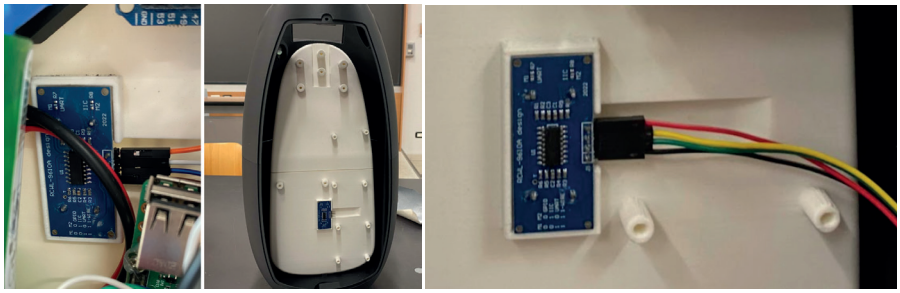
Open the back door
Unplug from all the jump wires



CHANGE THE ULTRASONIC SENSOR)

Open the back door
Unplug from all the jump wires

14



15

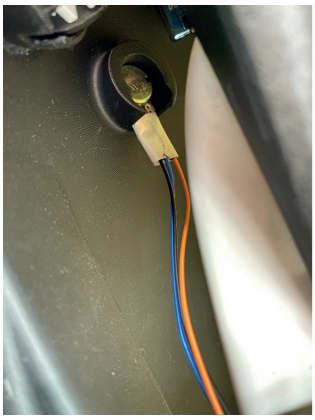
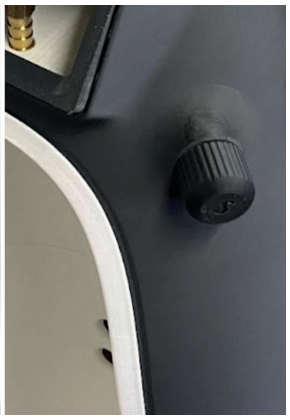
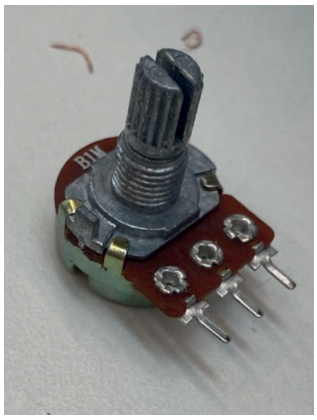
CHANGE THE PIR SENSOR

Open the back door
Unplug from all the jump wires that come out from the bottom channel connecting the foot to the body
Remove the foot
Remove the sensor from the foot

16

CHANGE THE POTENTIOMETER

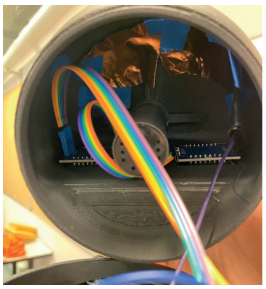
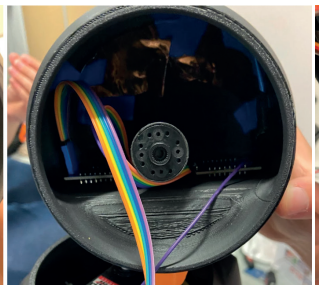
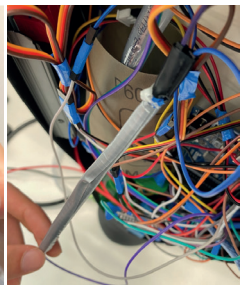
Open the back door
Remove the knob
Unplug from all the jump wires

CHANGE THE TOUCH SENSOR

Open the back door
Unplug from all the jump wires
Open from the head
Detach from the head

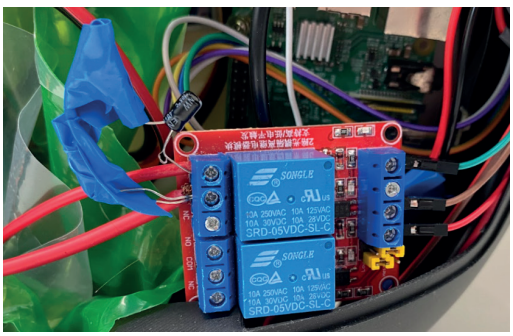
17

18

CHANGE THE RELAY

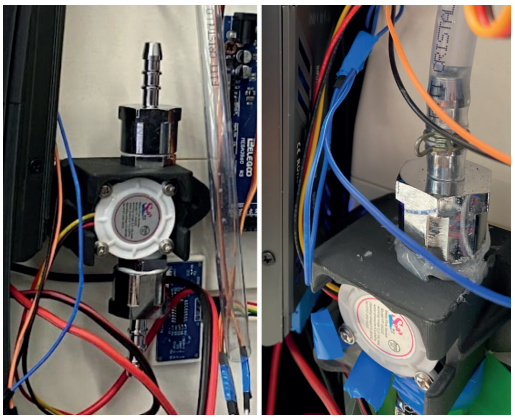
Open the back door
Unplug from all the jump wires
Unplug from power cables and capacitor/resistors



19

CHANGE THE FLOW SENSOR

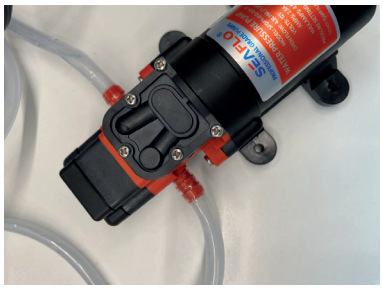
Open the back door
Unplug from all the jump wires
Unscrew the water pipes connectors



CHANGE THE WATER PUMP

Open the back door
Unplug the power cables from the power supply and from the relay

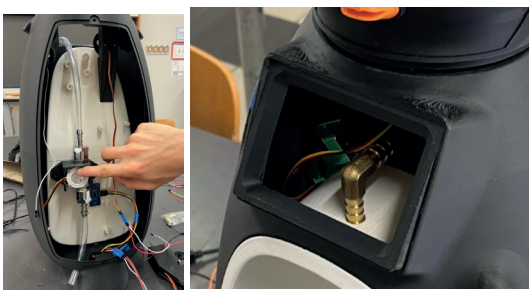
20



21

CHANGE THE WATER PIPES

Open the back door
Unplug from the flow sensor
Unplug from the pump
Open from the head
Remove all the three pipes



AIRLAB
ARTIFICIAL INTELLIGENCE AND ROBOTICS LAB

POLITECNICO
MILANO 1863