

Integrated Report

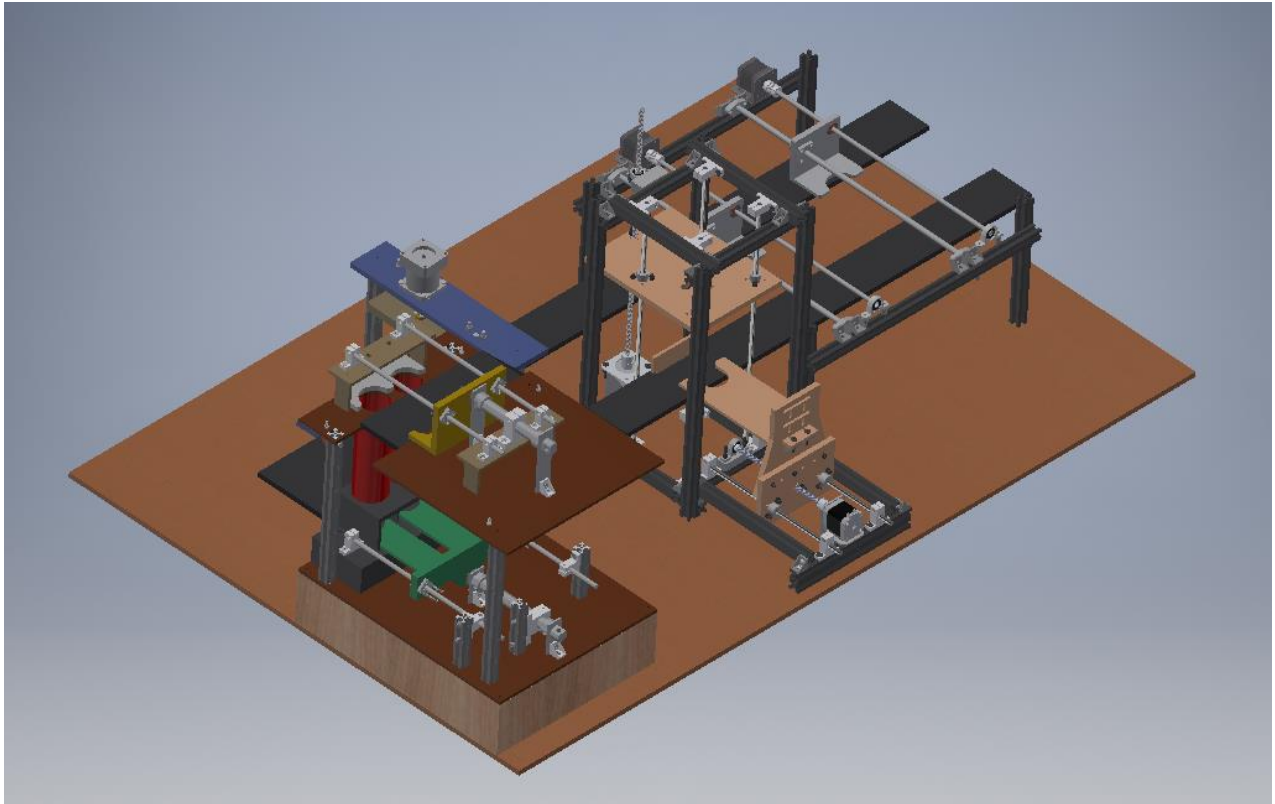


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CAD Models :

Feeding Station :

The feeding station is supposed to push the parts to the conveyer belt when the IR sensor detect them , also the station is supposed to push the parts that come from the disassembly station to the tubes in order to be pushed in the lower part to feed the parts to the assembly station

We used 2 IR sensor one up and one down to detect the parts and we used 2 hydraulic cylinders as actuators

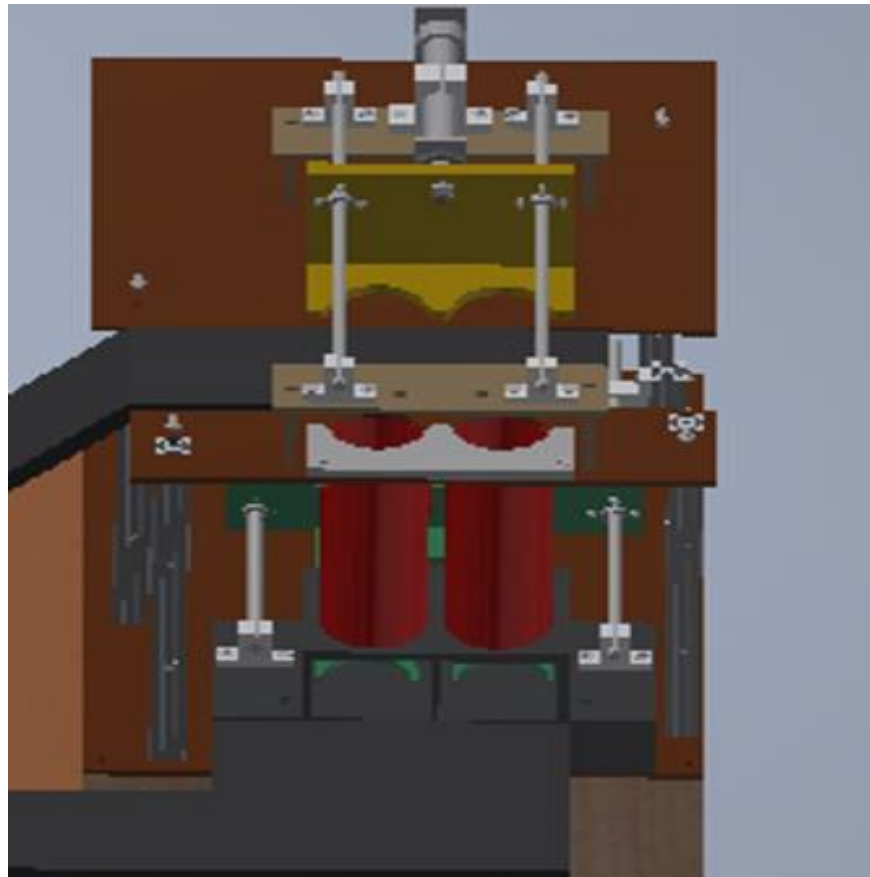


Figure 1 : Feeding Station

Assembly Station :

The assembly station is supposed to take the parts from the feeding station and assemble it on 2 phases

The first phase is that the sensor detects the first part then it stops the belt, and the motor descends the vacuum generator in order to lift the first part then the belt is activated again until the sensor detect the second part then the motor descends the part then the belt start again and give the parts for the sorting station

We used an IR sensor and a Stepper motor and a driver for the stepper motor and a lead screw and a vacuum generator to grab the parts

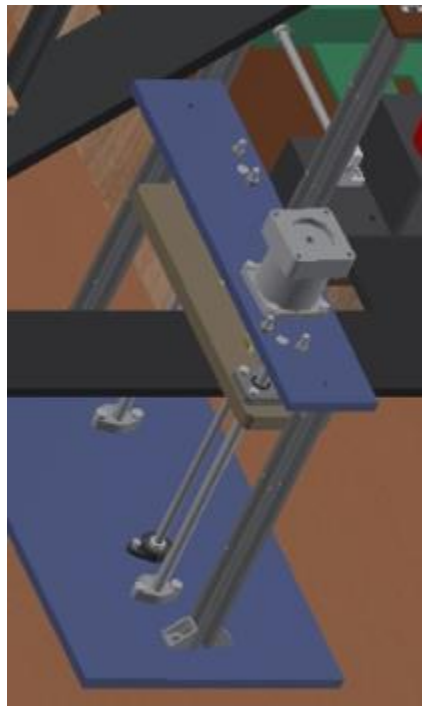


Figure 2 : Assembly Station

Sorting Station :

The sorting and storing station take the parts from the assembly station and pass it through a piezoelectric sensor to identify the nature of the product (metal or non-metal) and according to the sensor reading the part will be pushed by a pusher on a table to be stored

Then after some time the pusher will push the part to give it to the disassembly station

We used a piezoelectric sensor and 2 Stepper motors and two leadscrew and 2 drivers for the 2 motors

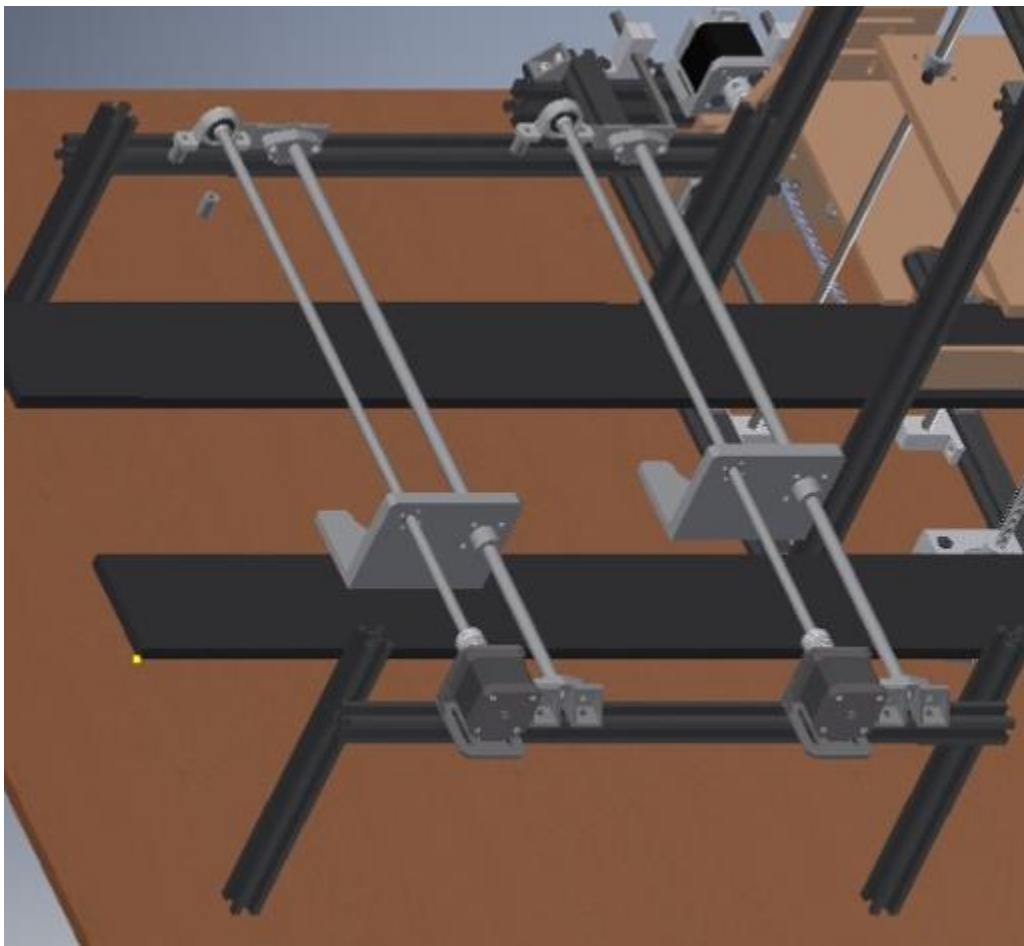


Figure 3 : Sorting and Storing Station

Disassembly Station :

The disassembly station takes the parts from the storing station , the IR sensor detect the parts and stops the conveyer belt then the motor starts descending the vacuum generator just like the assembly station and grabs the part then it starts the belt for a couple of seconds then it stops the belt again and descends the part again then it gives the disassembled parts back to the feeding station for the cycle to continue from the start

We used an IR sensor and a Stepper motor and a leadscrew and a vacuum generator

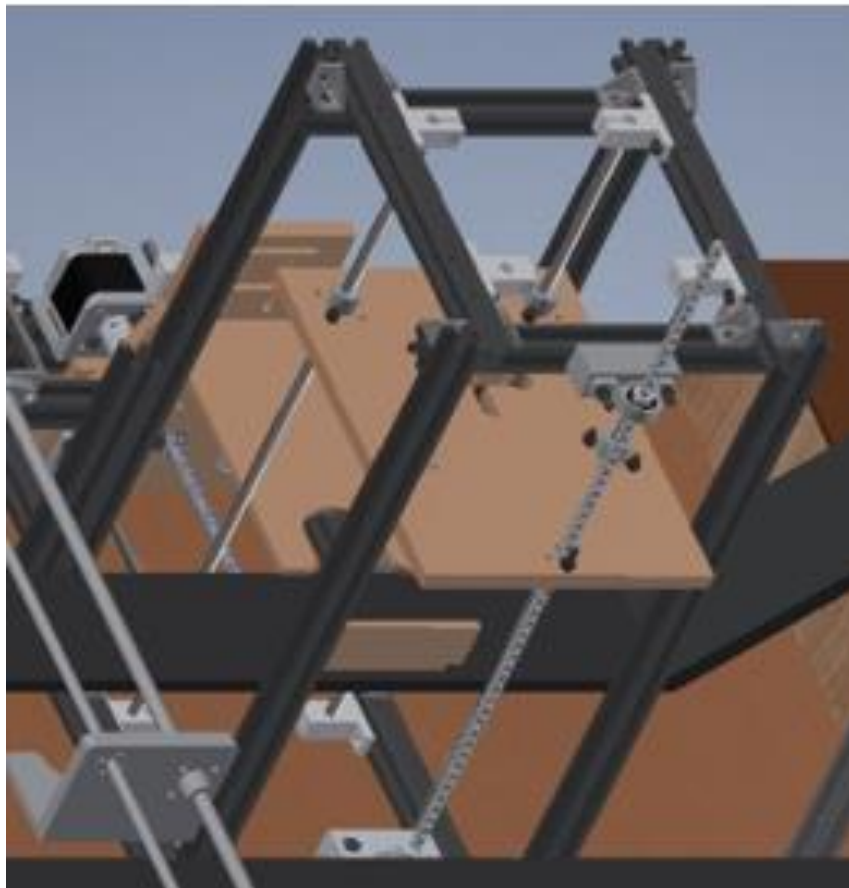


Figure 4 : Disassembly Station

Handling :

The handling station is in charge of the belts that moves the parts from a station to another

We used 2 Stepper motors ,one for each side and we used 2 drivers for the motors

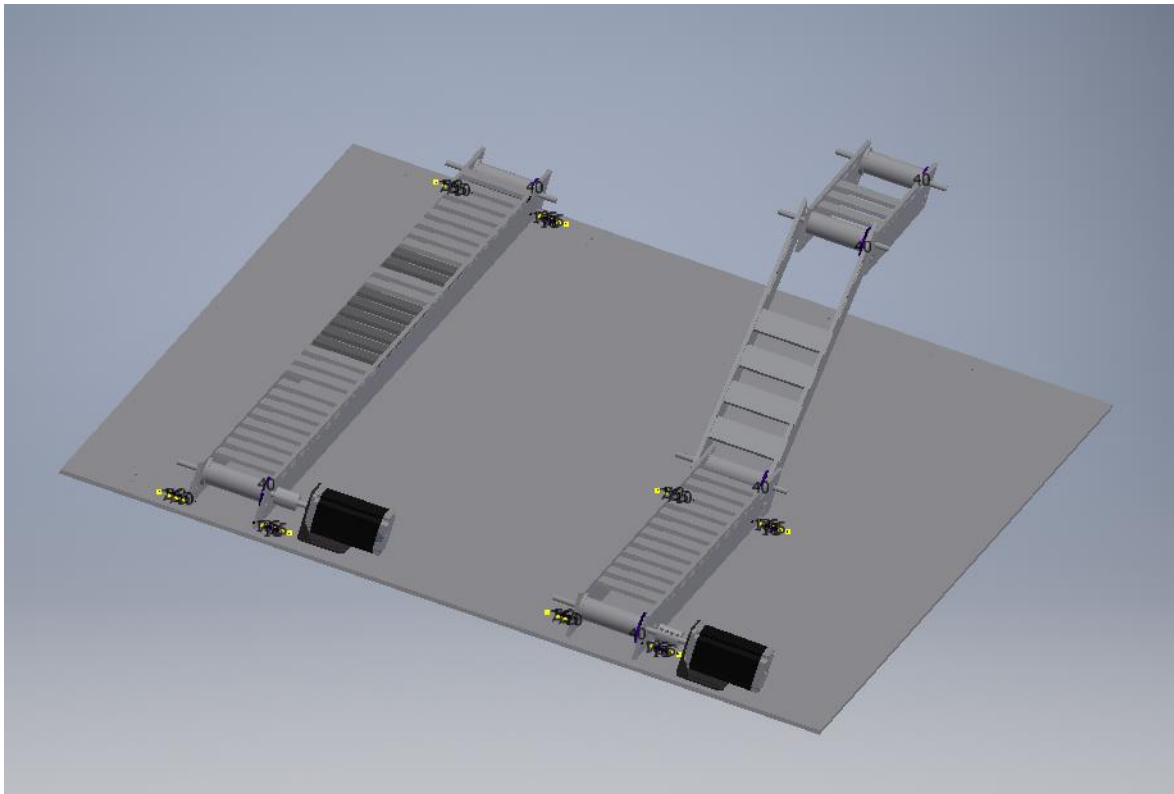


Figure 5 : Handling Station

MATLAB Model :

We exported the cad model into an xml file and started working on the assembled model on MATLAB in order to measure the actuator sizing and do a simulation of the project

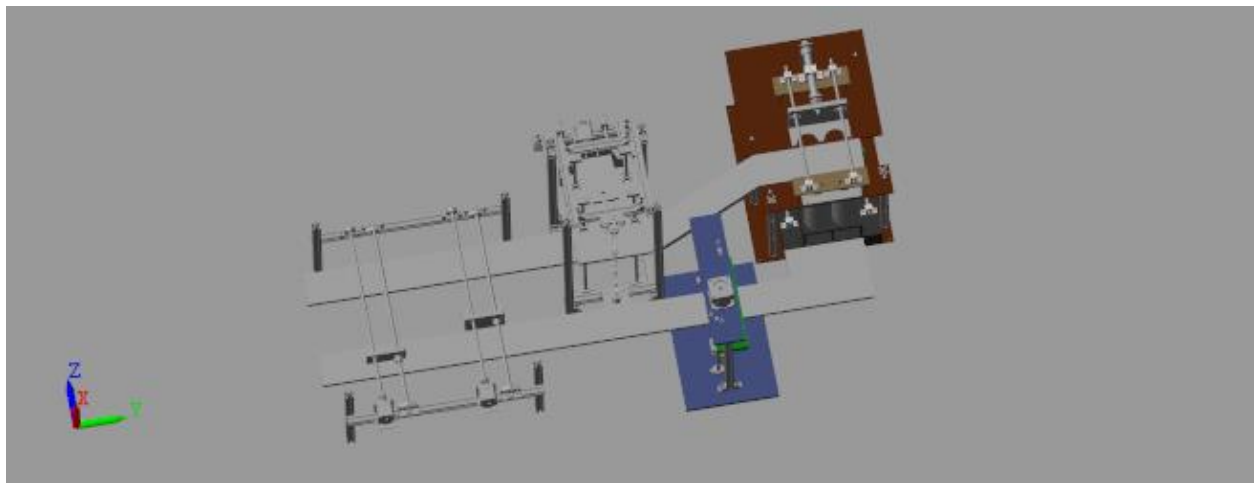


Figure 6 : MATLAB Model

Circuits :

Feeding Station :

The circuit below shows the connection of the relay and the connection of the IR sensor and the connection of the valves with relay (in the figure it is represented by the motors)

And the connection of the Arduino with the sensor and the relay and the connection of the power supply

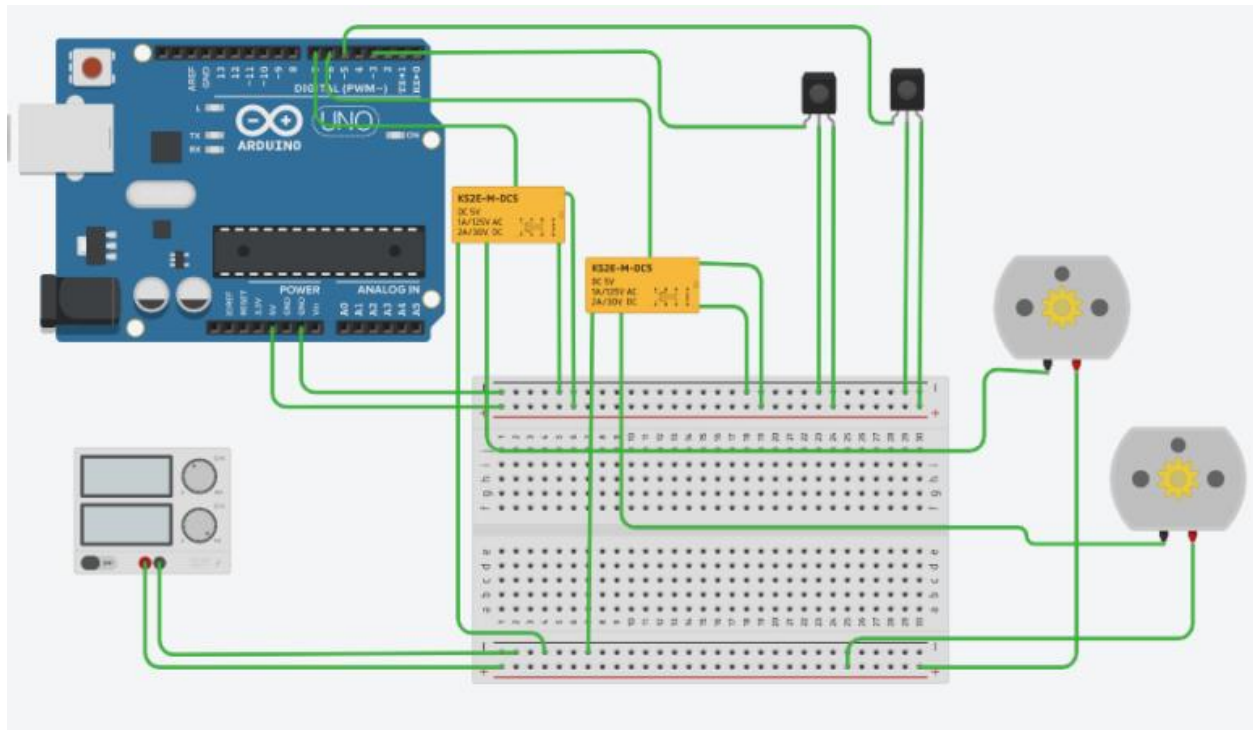


Figure 7 : Feeding Circuit

The figure below shows the circuit of the assembly station including the connection of the relay and drivers and the motor

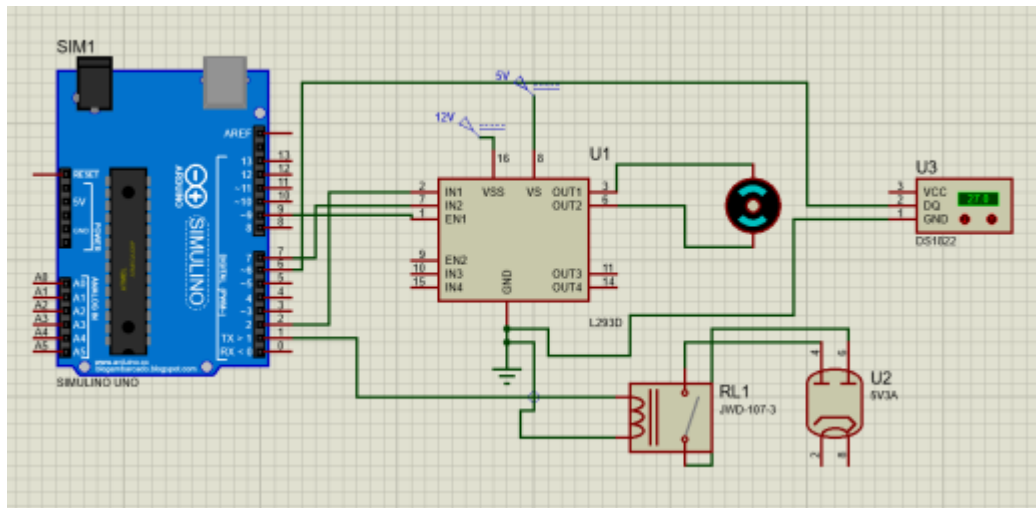


Figure 8 : Assembly Circuit

Sorting and Handling Circuit :

The circuit for both the sorting and the handling stations are similar to the assembly and the disassembly stations because they only use a motor and the driver of the motor

Disassembly Station :

The driver and relay connections are as shown in the next figure :

1. Vin and GND will be connected to 12V Input in PCB and GND in PCB
2. A+, A-, B+ & B- will be connected to the NEMA 17 Cable,
A+ to Black wire
A- to Green Wire
B+ to Red Wire
B- to blue wire
3. EN-, CLK-, CW- will be connected to the ground in PCB

We are going to connect 2 drivers, one for each motor, the First Motor which will move suction plate will be connected as follow to the Arduino Pins:

CW+ to Pin 2

CLK+ to Pin 3

EN+ to Pin 4

the Second Motor which will move Gripper will be connected as follow to the Arduino Pins:

CW+ to Pin 5

CLK+ to Pin 6

EN+ to Pin 7

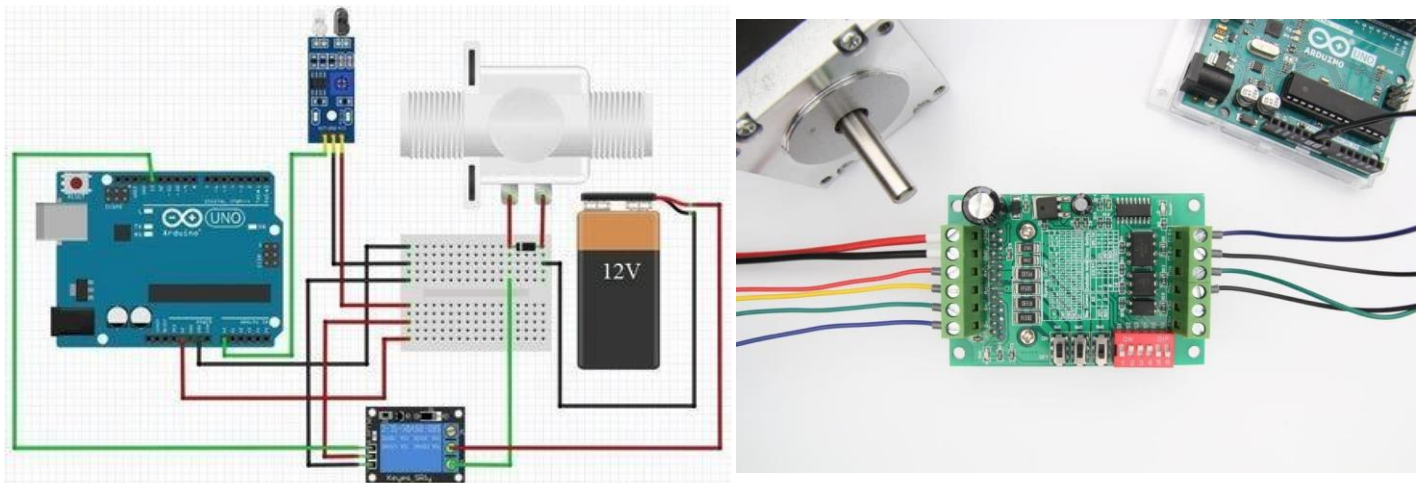


Figure 9 : Disassembly Circuit