

REAL TIME DURABILITY DESTRUCTIVE MONITORING SYSTEM FOR SEMICONDUCTOR INDUSTRY

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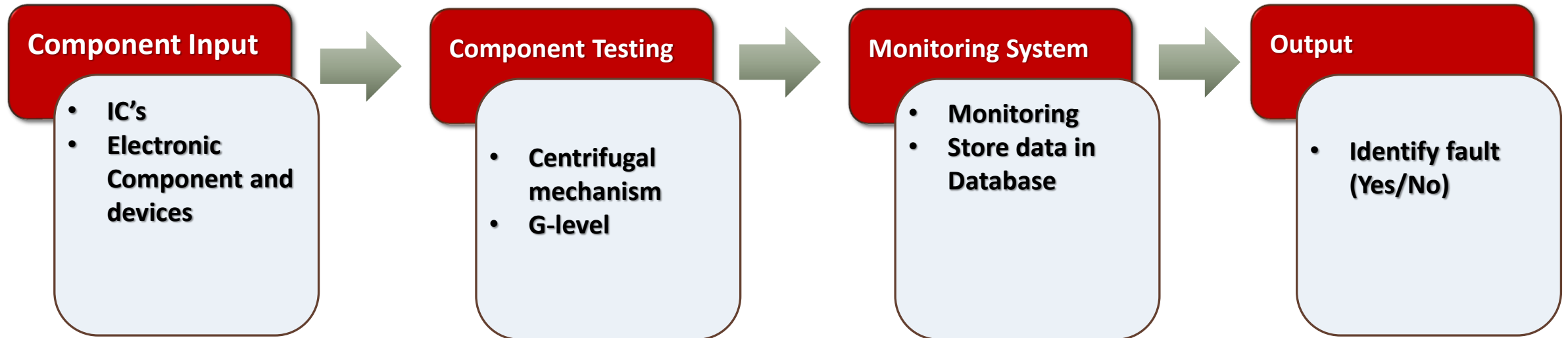
Mr.Sachinda Ekanayake

OBJECTIVES AND AIM

- ❖ To analyze the behavior of the electronic components.
- ❖ To study and observe testing conditions.

“ Build a Real time device separation observation system using centrifuge mechanism which can determine the condition of electronic components and devices.”

SIMPLEST OVERVIEW OF THE PROJECT



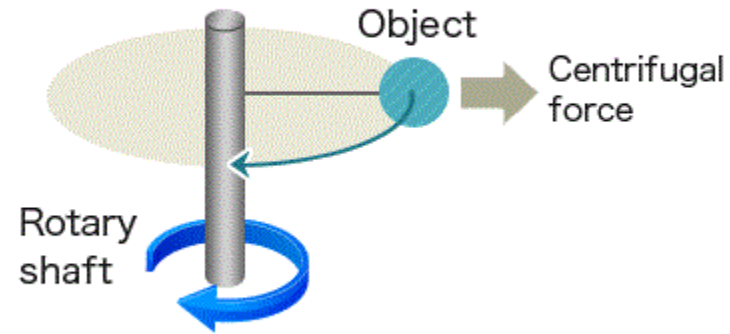
IMPLEMENTED TECHNIQUE

❑ Centrifugal mechanism

❖ Centrifugal force is the outward force, away from the axis of rotation, acting on a revolving object.

❖ Testing Types

- High-Speed rotation centrifuge mechanism
- Dual- environment Centrifuge mechanism
- Centrifugal shock compound mechanism
- Centrifugal vibration compound mechanism



Mechanism of centrifuge

IMPLEMENTATION PLATFORM



LabVIEW Software



Arduino Software

WORKING PROCESS

Step 1: Place the IC on the plate for testing.

Step 2: Lock the lid.

Step 3: Adjust the laser beam horizontal to the IC.

Step 4: Set the testing parameters from the LabVIEW software.

Step 5: Data logging functionalities there when the process starts.

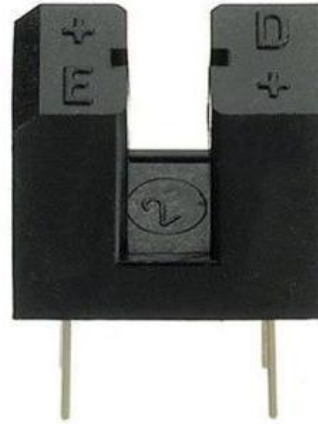
Step 6: After finish the process, unlock the lid and see the IC conditions.

Step 7: Finally damages can be detected.

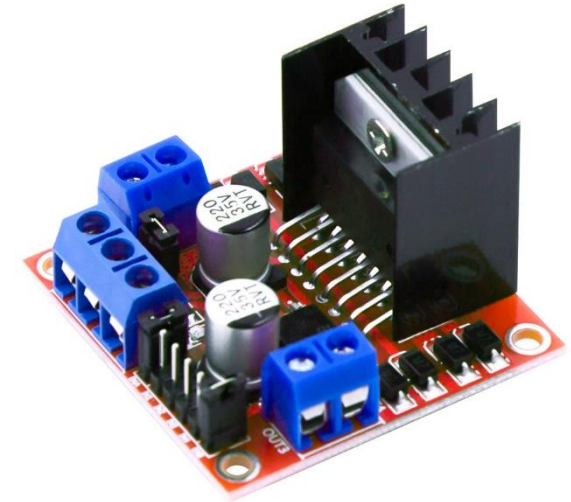
MAIN COMPONENTS



ACS712 Current Sensor



Photocell LTH301-07



L298N Motor Driver Module

MAIN COMPONENTS



5mW 650nm Red Cross
Laser Module



Solenoid Locks / 12V Door
Drawer Electric Lock



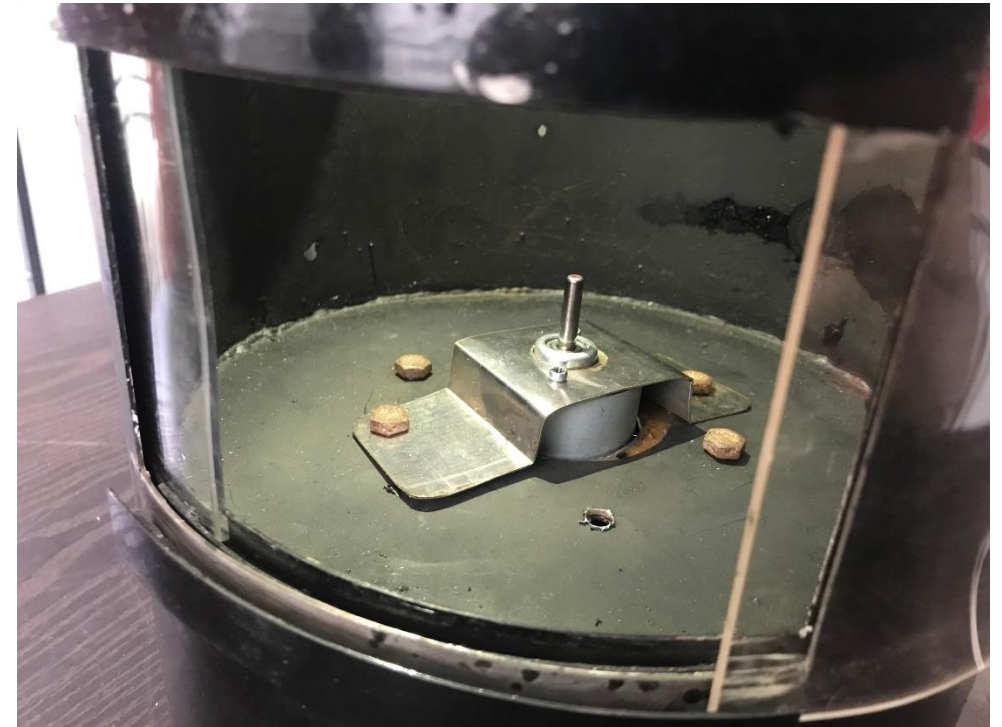
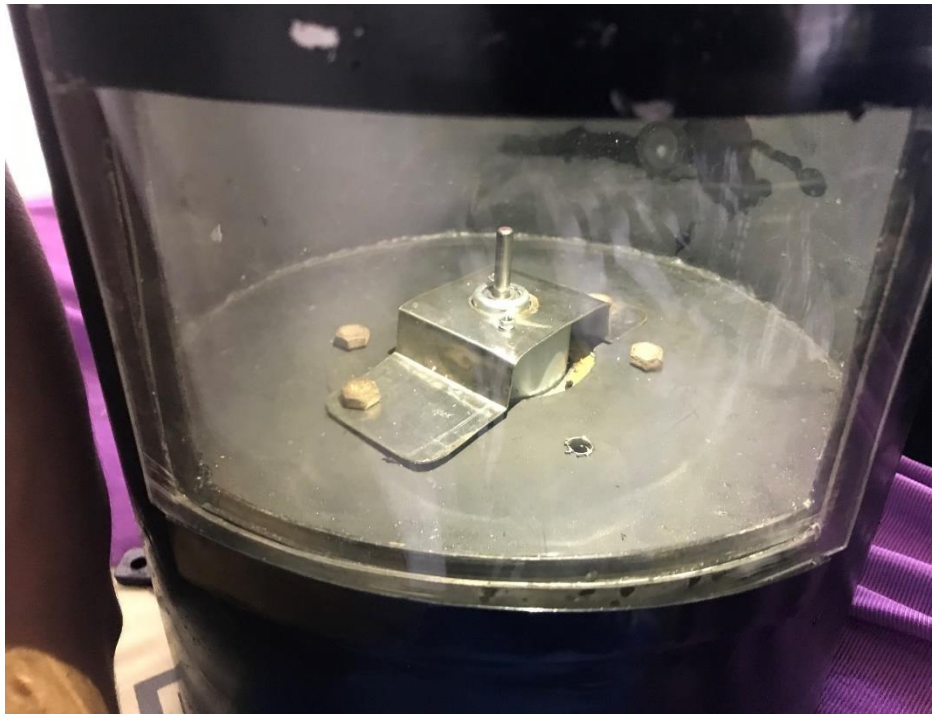
775 DC 12V 14000rpm Motor
Multipurpose Brushed Motor

PHYSICAL APPEARANCE OF THE DESIGN



Final Structural Design

PHYSICAL APPEARANCE OF THE DESIGN



Physical Observation Window

PHYSICAL APPEARANCE OF THE DESIGN



Lid Lock



DC Motor & Lid Controlling Switch

MATHEMATICAL APPROACH

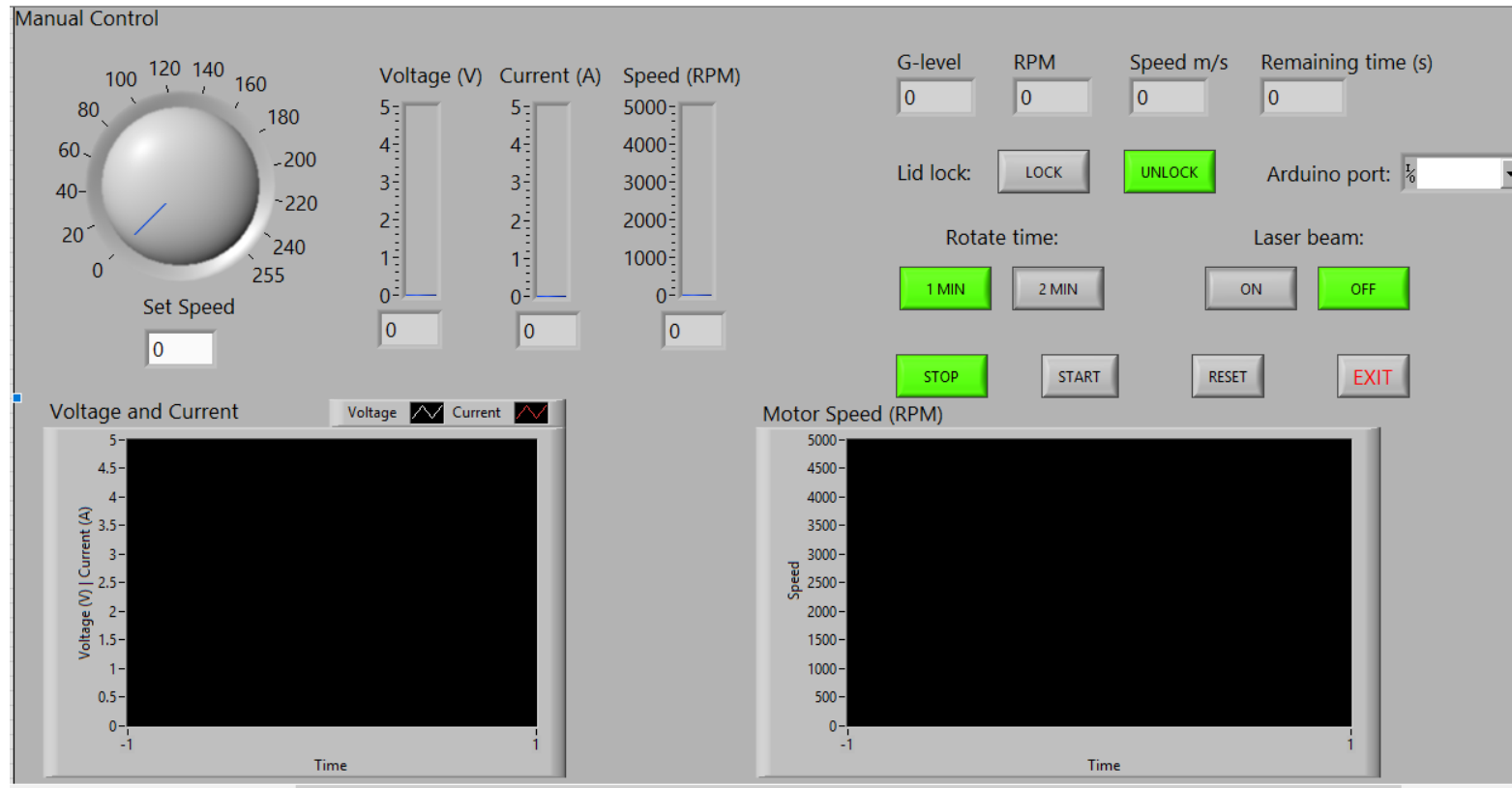
$$\omega = \frac{RPM * 2\pi}{60S}, \text{ } \omega \text{ is the angular frequency } \left[\frac{rad}{s} \right]$$

$$a = \omega^2 * r, \text{ } a \text{ is the acceleration } \left[\frac{m}{s^2} \right]$$

r is the radius of the cylinder where the components are

$$G - level = \frac{a}{g}, \text{ where } g \text{ is the gravitational acceleration at a given location on Earth}$$

FRONT PANEL OF LabVIEW



RISK FACTORS

There are mainly three risk types that we faced in this process.

➤ Strategic risk

- After software implementation interfacing with the microcontroller had some problem. Then we tested with the Arduino.
- Limited references related to this project.

➤ Cost & Weight Risk

- Initially our design is based on the acrylic sheet but the durability is not there as we expected then we used metal as our main structural material.

➤ Time Risk

- With the pandemic situation some components are unable to find in the expected time frame.
- We could not meet each other as a team because one person got infected for Covid-19 unfortunately. Because of that we could not finish hardware part by the planned time frame .

INDIVIDUAL SEGMENTATIONS

W.A.A.D.Jayasekara (Eng-17-068)	R.P.M.Hasini (Eng-17-134)
<ul style="list-style-type: none">➤ Research about :<ul style="list-style-type: none">▪ Centrifugation mechanism▪ Individual component▪ Testing System	<ul style="list-style-type: none">➤ Research about :<ul style="list-style-type: none">▪ LabVIEW Software▪ Arduino LIFA_Base
<ul style="list-style-type: none">➤ Find information about device centrifugation mechanism and implementation the testing system.	<ul style="list-style-type: none">➤ Figure out the implementation is needed which software's and which part could be physically done.
<ul style="list-style-type: none">➤ Analyze all the characteristics, parameters, problems, advantages, disadvantages, requirements and functions which needed to design the device testing system.	<ul style="list-style-type: none">➤ Analyze the most efficient solutions which can apply real time monitoring system.

THANK YOU!