

## Gripper Mechanism

- Ecoflex 00-20 Super Soft Silicone (A and B) -: We are using Ecoflex 00-20 Super Soft Silicone to make the soft fingers of the gripper for our pick and place operation. The material's properties are ideal for creating flexible, durable, and gentle gripper fingers that can handle delicate and irregularly shaped objects effectively.
- The AUTO Addict 12V DC Air Compressor Pump -: being utilized in our project to provide the necessary positive and negative pressure required to operate the silicone soft fingers of the gripper. This compressor enables the inflation and deflation of the fingers, allowing them to grip and release objects effectively.
- The 3-Way 2-Position Pneumatic Solenoid Valve (12V) -: used in our project to control the direction of air flow to the silicone soft fingers of the gripper. This valve is essential for switching between positive (inflation) and negative (deflation) pressure, enabling the gripper to effectively pick up and release objects.
- The inner tube -: used to transfer air pressure from the air compressor to the silicone soft fingers of the gripper. These tubes play a crucial role in delivering both positive and negative pressure to the gripper fingers, enabling them to inflate and deflate for gripping and releasing objects.
- 1/4 inch Air Hose T Connector 4PCS -: used to create connections between the air tubes and various components in the pneumatic system, such as the air compressor, solenoid valves, and gripper finger

## Motor Torque calculation:

3d printing Material PLA density =  $1.24\text{gm/cm}^3$

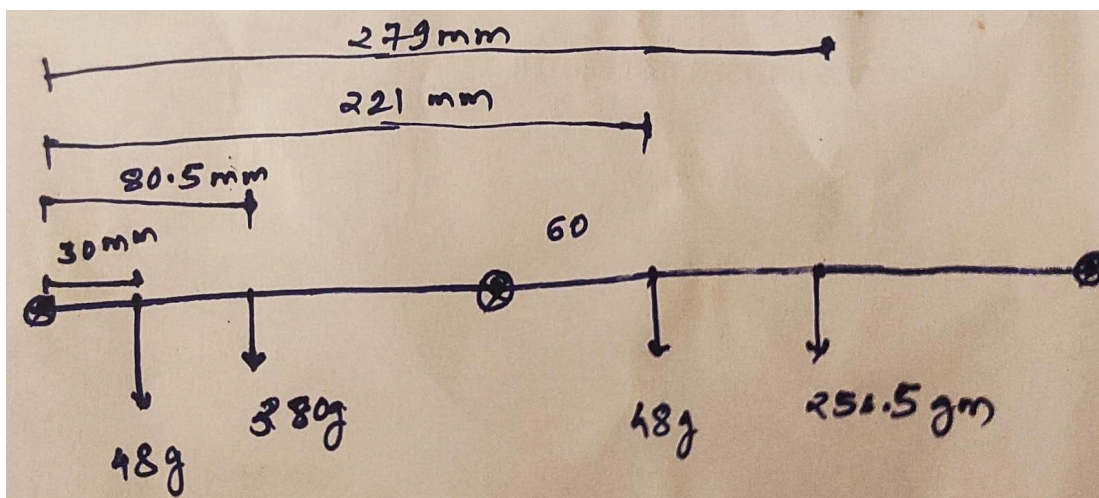
Volume of Link 1 =  $307.2\text{ cm}^3$

Volume of Link 2 =  $206.8\text{ cm}^3$

Mass of Link 1 =  $380.9\text{ gm}$

Mass of Link 2 =  $256.5\text{ gm}$

Mass of Servo Motor =  $48\text{ gm}$



$$\begin{aligned}\text{Moment} &= (48 \cdot 30 + 380 \cdot 80.5 + 48 \cdot 221 + 250.5 \cdot 279) \cdot g \cdot 10^{-6} \\ &= (112527.5) \cdot 9.8 \cdot 10^{-6} \\ &= 1.102769 \text{ Nm} \\ &= 11.245 \text{ kg-cm}\end{aligned}$$

So, after going through some servo motor models we have finalized with torque value to be 14 kg-cm.