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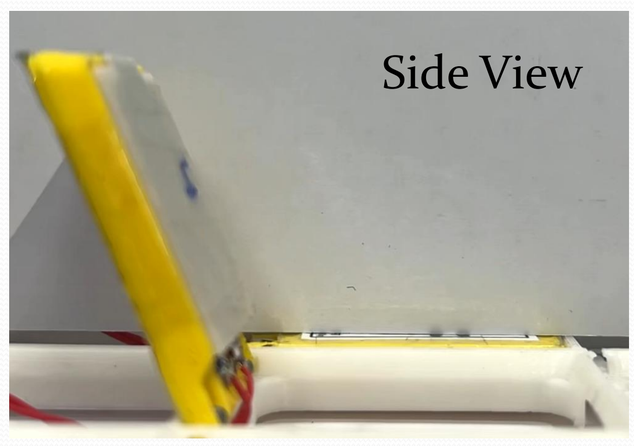
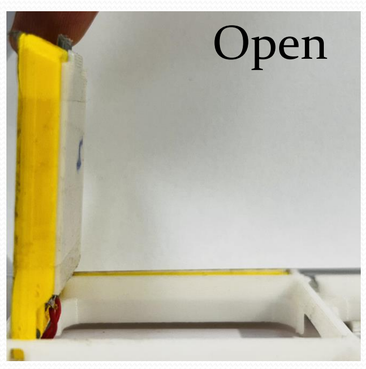
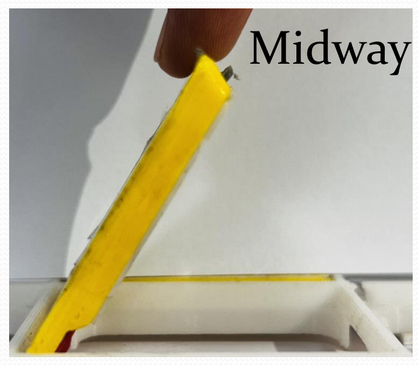
Shape Memory Alloy Actuated Unlatching/Unlocking Lid Device for Engineering Applications

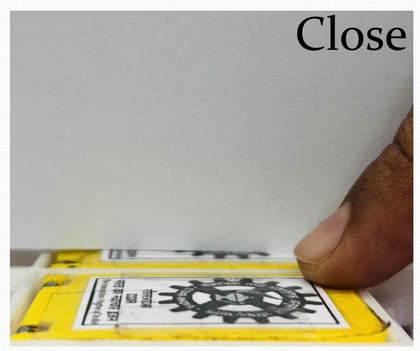
INTRODUCTION

Automated unlatching mechanisms are integral to numerous engineering systems, typically implemented using electromagnetic actuators such as motors and solenoids. While effective, these actuators often introduce design limitations due to their size, weight, and complexity. In applications where spatial and weight constraints are critical, Shape Memory Alloy (SMA) actuators present a compelling alternative. SMAs exhibit a high power-to-weight ratio and can be precisely controlled through electronic control, enabling compact and efficient unlatching solutions in geometrically constrained environments. Utilizing these advantages, CSIR-AMPRI has developed an SMA-powered unlatching/unlocking lid device that specifically addresses spatial dimensional constraints while adding insignificant weight. This solution exemplifies the potential of an unlatching/unlocking device to enable space-efficient and low-weight automation in next-generation systems..









Features

- High power-to-weight ratio
- Adjustment of the actuator in a constrained space
- Lightweight
- Quick operation of unlatching
- Silent operation
- Long fatigue life

Specification

- Activation time: < 2 seconds
- Resetting time: < 5 seconds
- Power requirement: max 5 Watts
- Electronically controlled driver
- Lid thickness: 8mm
- Microcontroller with Wi-Fi enabled

Engineering Applications

- Drug storage and administration system
- Security Safes, Different types of lockers
- Automobiles: Fuel lid, Glove box/cup holder, Seat belt system, etc.
- Defence, Space and Aerospace applications
- Robotics and Biomedical unlatch mechanism

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