Introduction and Overview

The Power-Assist Back Angle Controller will allow the user to adjust the bed or platform that the patient is lying on. This device will be controlled with a force sensitive handle located on the most accessible side of the bed. This device will adjust the speed proportional to the force applied to the handle. This design will accommodate for those with limited mobility and dexterity; as well as prevent injuries to caretakers that attempt to sit the patients upright. In contrast to the current technology, which involves an open-loop switch, this is an upgrade to the controller. The open-loop switch only allows for a single constant speed whereas the force-sensitive handle will include variable speeds from zero to a set maximum. Overall, this device will be user-friendly and less time consuming, making the operation less stressful.

Realistic Constraints

Naturally, when designing a new device, there will be some constraints. The only ethical concern is that this device must be designed with the patients and users safety in mind. Safety precautions include maintaining a safe maximum speed, having a safety lock, and a surge protection such as a circuit breaker. All materials used must be durable so that they can lift and hold up to 400lbs, be readily available, environmentally safe and be able to be sterilized. Some final constraints include the availability of the parts used in manufacturing the device so that it will be economically feasible for mass production.

Technical Specifications

Mechanical Parameters

Handle
- Length: 6” – 1’
- Diameter: 1” – 2”
- Force Input Range: 1 – 20 lbs
- Functional Input: 5 lbs

Clamps (2)
Hydraulic Lift
- Maximum Supported Load: >180 lbs
- Vibration: minimized
- Maximum Device Weight: 100 lbs

Electrical Parameters

- Input Voltage: 120 V

Voltages
Impedences
Gains
Ranges
Current Capabilities
Stability
Accuracy
Precision
Power Consumption
Digital Isolator
Wires
Microprocessor

Environmental Parameters

Operating Temperature
Storage Temperature
Relative Humidity

Software Parameters

Execution Time <1 second