Unpowered energy storage device

Energy storage without high energy density is hardly to meet all the performance requests in jumping robots. In order to improve energy density, method of multiple energy storage devices providing energy synchronously begins to be applied in certain jumping robot designs. Also, how to use new materials and shapes to obtain new energy storage is ...

A large number of energy storage devices, such as lithium-ion batteries (LIBs) [[18], [19], [20]], lithium-sulfur batteries [[21], [22], [23]], and supercapacitors (SCs) [[24], [25], [26]], can be the appropriate candidates. For example, under sunlight illumination, a photo-charging process in the semiconductor will convert the solar energy ...

An analysis is conducted on the mechanism and the switching timing for the energy management to automatically store or release the energy according to the biomechanics of walking. In addition, a gravity-balance mechanism embedded inside the exoskeleton is designed as well to minimize the influence of the lower limb weight on muscle work.

Structure and work mode of clutch device. The gait energy in energy storage element is stored and released by the clutch device, and this device has the advantages of small volume, good flexibility, low cost, and high efficiency. The clutch device is composed of elastic energy storage elements, support plate, swing component, and so on.

A novel unpowered load-carrying parallel lower extremity exoskeleton is proposed. ... A variable stiness energy storage device with parts. is designed. e detailed structure is shown in Figure ...

The paper is very well written, and contributes an unpowered exoskeleton assisted device for the knee joint, which is used to reduce the energy consumption of lower limbs based on the energy compensation mechanism, so as to achieve the purpose of assisted walking. The effectiveness of the assisted device was verified by gait experiments and ...

a Schematic design of a simple flexible wearable device along with the integrated energy harvesting and storage system.b Powe density and power output of flexible OPV cells and modules under ...

powered and unpowered conditions improved across sessions from -6.2 ± 3.9% (session one) to -10.3 ± 4.7% (session five), indicating a significant effect associated with training. ... This bodes well for a future with devices that are lightweight, energy-efficient, and relatively inexpensive, yet enhance human mobility.

Unpowered energy storage assisted exoskeletons can be used for daily walking assistance in hemiplegic

patients and normal people. They serve as precise walking aids for paraplegic patients or normal people with different height, weights, and injuries. As a standard component of exoskeletons, the stiffness of energy storage spring is fixed.

This paper studies the energy storage ventilation effect of solar roof ventilation system combined with phase change heat storage materials with different phase change temperatures through experiments, and also studies the daytime ventilation effect of unpowered fans. The solar energy device on the roof of the building is used to supply power ...

Performance analysis of unpowered lower limb ... It consists of elastic energy storage elements, clutch devices, waistband, kneepad, shoes, and so on. The forces of muscles, stiffness of joints, and contribution degree of muscles involve in SU and SD are analyzed in Section 3. Then the exoskeleton-muscular system is analyzed by the Opensim ...

The invention discloses a powerless energy-saving water delivery device for hydraulic engineering, which comprises an outer cover body, wherein a storage tank is arranged at the bottom in the outer cover body, the inner wall of the storage tank is connected with a downward extending frame through an adjustable assembly, a servo motor is arranged on the outer cover ...

In fact, some traditional energy storage devices are not suitable for energy storage in some special occasions. Over the past few decades, microelectronics and wireless microsystem technologies have undergone rapid development, so low power consumption micro-electro-mechanical products have rapidly gained popularity [10, 11].The method for supplying ...

Energy storage element is also an important part in the unpowered lower extremity exoskeletons; it not only transforms mechanical energy of limbs into elastic potential energy during muscle"s ...

DOI: 10.1186/s12984-021-00893-5 Corpus ID: 235355179; Reducing the metabolic energy of walking and running using an unpowered hip exoskeleton @article{Zhou2020ReducingTM, title={Reducing the metabolic energy of walking and running using an unpowered hip exoskeleton}, author={Tiancheng Zhou and Caihua Xiong and ...

Energy storage devices have been demanded in grids to increase energy efficiency. According to the report of the United States Department of Energy (USDOE), from 2010 to 2018, SS capacity accounted for 24 %. consists of energy storage devices serve a variety of applications in the power grid, ...

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