Flywheel energy storage motor patent

What is energy storage Flywheel?

Energy Storage Flywheel environment to minimize windage losses created by the high speed rotor. The rotor losses are dissipated via radiation to the housing and stationary components surrounding the rotor. To minimize rotor heating,low loss permanent magnet homopolar magnetic bearings and a permanent magnet motor generator are utilized.

What is a flywheel system?

The flywheel system incorporates a high speed permanent magnet motor/generator,a five axis active magnetic bearing system with associated controls,and a high strength steel hub,as show in Figure 2,for high operating tip speed. The flywheel is sealed for operation in a vacuum

How fast does a flywheel work?

The flywheel operates at a peak speed of 35,000 rpm,pulling power down to a minimum speed of 20,000 rpm. The tests conducted on the system have verified expected peak power output,energy storage capacity,maximum operating speed,and steady state thermal performance.

How does a flywheel work?

In this initial unit the steel housing is over two inches thick. In addition, until burst testing is conducted, the flywheel is operated within a burst cell during high speed testing. Stored energy is based on the mass of the flywheel and its operating speed. Usable energy is what is removed from the flywheel by the generator.

What is a flywheel target market?

The flywheel target market as related to the selection of the power and duration for the flywheelis also defined. The key subsystems in the flywheel system are described to show how the flywheel system is successfully integrated into a mechanical system. Test results are then presented.

What is a low cost energy storage Flywheel?

12880 Moore Street Cerritos, CA 90703 USA CALNETIX The design and development of a low cost 0.71 KW-HR energy storage flywheel to provide 100 KW for 15 seconds is described. The flywheel target market as related to the selection of the power and duration for the flywheel is also defined.

Energy Storage Systems (ESSs) play a very important role in today"s world, for instance next-generation of smart grid without energy storage is the same as a computer without a hard drive [1].Several kinds of ESSs are used in electrical system such as Pumped Hydro Storage (PHS) [2], Compressed-Air Energy Storage (CAES) [3], Battery Energy Storage (BES) ...

DESIGN AND DEVELOPMENT OF A 100 KW ENERGY STORAGE FLYWHEEL FOR UPS AND POWER CONDITIONING APPLICATIONS Patrick T. McMullen, Lawrence A. Hawkins, Co S. Huynh, Dang R. Dang CALNETIX 12880 Moore Street Cerritos, CA 90703 USA (pat@calnetix) ABSTRACT The

design and development of a low cost 0.71 KW-HR ...

Dai Xingjian et al. [100] designed a variable cross-section alloy steel energy storage flywheel with rated speed of 2700 r/min and energy storage of 60 MJ to meet the technical requirements for energy and power of the energy storage unit in the hybrid power system of oil rig, and proposed a new scheme of keyless connection with the motor ...

An energy storage system comprises a housing and a flywheel having a drive shaft portion attached to a cylindrical ferromagnetic rotor portion. The drive shaft portion defines a substantially vertical axis about which the rotor portion is mounted for rotation. A magnetic bearing assembly comprised of an annular permanent magnet having no electromagnetic components is ...

The application relates to the technical field of flywheel energy storage and discloses a flywheel energy storage motor and a flywheel energy storage device, wherein the flywheel energy storage motor comprises a machine base and a stator assembly, the stator assembly is arranged in the machine base, and the stator assembly comprises a stator core, a stator winding, a first ...

In another aspect of the invention, a method for reducing electric arc discharge in a high-voltage flywheel energy storage system includes providing a flywheel in a flywheel ...

Abstract: An example flywheel energy storage device includes a fiber-resin composite shell having an elliptical ovoid shape. The example device also includes an axially oriented internal compressive support between the axial walls of the shell. The example device also includes an inner boss plate and an outer boss plate on each side of the shell.

A flywheel mass storage device for a motor vehicle is described, consisting of a rotatably mounted flywheel (SR), an electric motor (EM) and a drive unit of the motor vehicle, the flywheel (SR) and electric motor (EM) being connected to a summation shaft via a summing gear (SG) Gear members (RSW, RSR) connected to the drive of the vehicle act, whereby the flywheel (SR) ...

The flywheel energy storage system is connected to the power grid without needing to use a power electronic device, so that necessary voltage and frequency support can be ...

The invention discloses a flywheel energy storage system grid-connected control method and an energy storage system thereof. A grid side converter control method of the flywheel energy storage system grid-connected control method comprises the following steps: converting grid side currents ia1, ib1 and ic1 and converter side currents ia2, ib2 and ic2 under a static coordinate ...

Flywheel energy storage relies on the inertia of the rotating flywheel rotor to convert electrical energy into kinetic energy and store it, so as to achieve uninterrupted power supply...

Flywheel energy storage motor patent

Embodiments of the subject invention are directed to a homopolar motor and its mechanical coupling with a flywheel rotor. The homopolar motor includes a rotor and no additional bearings, shafts, gears, pulleys, etc., are required to couple the flywheel rotor and the rotor of the homopolar motor. The homopolar motor includes a stator with a stator laminate and a number ...

US Patent 5,614,777: Flywheel based energy storage system by Jack Bitterly et al, US Flywheel Systems, March 25, 1997. A compact vehicle flywheel system designed to minimize energy losses. US Patent 6,388,347: ...

The invention discloses an energy storage flywheel, which comprises a shell, a rotor assembly and a motor assembly, wherein the shell is provided with a vacuum chamber, the rotor assembly is rotatably arranged in the vacuum chamber and comprises a shaft, a plurality of support rods and a carbon fiber ring, the carbon fiber ring is sleeved on the shaft, and the inner peripheral ...

The patent pending flywheel system, presented in Figure 1, was developed to address the needs of the UPS market where a flywheel power source could offer significant ...

Flywheel energy storage systems store energy in a rotating flywheel that is supported by a low friction bearing system inside a housing. A connected motor/generator ...

The disclosure relates to a flywheel energy storage system including a casing, shaft, flywheel, and electric motor assembly. The casing has an inner vacuum chamber, at ...

The invention discloses an energy storage flywheel, which comprises a shell, a rotor assembly and a motor assembly, wherein the shell is provided with a vacuum chamber, the rotor ...

The invention discloses a stator electro-magnetic flywheel energy storage motor, belonging to the technical field of electric energy storage, comprising: the flywheel rotor, two sections of stator cores and armature windings are arranged on the outer side of the flywheel rotor in a surrounding mode; the upper end cover and the lower end cover are respectively arranged on the upper ...

Fig. 1 The energy storage flywheel. Brg 1: Radial Bearing Motor/ Generator Flywheel Hub Brg 2: Combo Bearing The flywheel module, shown in Fig. 1, is designed to store a total of 1.25 kWh at 36,000 rpm and deliver 160kW (200 kVA) for more than 18 seconds, or 300kw for 5 seconds. In many flywheel designs that have been

A magnetic levitation flywheel energy storage motor generator has an integrated one-time heat dissipation system of a vacuum shell, a flywheel, a rotor, a stator iron core, a stator shaft and an auxiliary bearing; without relying on an external power supply, the flywheel energy storage is in standby. In the mode and power generation mode, the flywheel power generation ...

Flywheel energy storage motor patent

An elevator system, having a three phase rectifier (20) which converts energy from a three phase AC main (21) to provide DC power on a bus (19) to a three phase inverter (18) that drives a three phase inductive hoist motor (17), utilizes regenerated energy applied (46, 47) to a boost regulator (52) to drive (54, 55) a flywheel motor generator (26) to store the regenerated energy in the ...

The flywheel is the main energy storage component in the flywheel energy storage system, and it can only achieve high energy storage density when rotating at high speeds. ... Based on the barrel type with dual hubs combined flywheel driven by switched flux permanent magnet motor. Journal of Energy Storage, Volume 47, 2022, Article 103604.

Flywheel energy storage (FES) technology, as one of the most promising energy storage technologies, has rapidly developed. ... accelerate the response of the system, and reduce damage to the flywheel motor. Second, currently available flywheels generally have a high loss, which is related to their charge-holding ability. ... Patent text mining ...

Flywheel batteries, a new concept of energy storage devices, push the limits of chemical batteries and achieve physical energy storage through the high-speed rotation of a flywheel [1] [2] [3 ...

flywheels are usually coupled to motor-generators, such that the motor receives input power from a power source (e.g., a local utility grid or renewable energy source) and stores the energy in the flywheel via the inertia of the rotating flywheel. Subsequently, the stored kinetic energy in the flywheel is transferred out of the flywheel by operating the flywheel motor as a generator, ...

Accordingly, the invention provides a speed control for a flywheel energy storage system that provides accurate and reliable speed control for long-term operation. The speed control uses a current limiting means that safely limits the acceleration current to the motor for accelerating flywheel, and a rate controller that digitally switches the acceleration current on and off to ...

Beacon Power is a pioneer and technology leader in the design, development, and commercial deployment of grid-scale flywheel energy storage. Beacon"s proprietary designs are at the heart of a cost-effective and durable energy storage device that enables grids to operate more reliably.

The invention discloses a flywheel energy storage motor, belonging to the technical field of electric energy storage, comprising a flywheel rotor and a stator arranged at the outer side of the flywheel rotor in a surrounding way, and the flywheel energy storage motor also comprises: the bearing unit is used for positioning and supporting the flywheel rotor along the vertical ...

When energy is required, the motor functions as a generator, because the flywheel transfers rotational energy to it. This is converted back into electrical energy, thus completing the cycle. As the flywheel spins faster, it experiences ...

Flywheel energy storage motor patent

Beacon Power will design, build, and operate a utility-scale 20 MW flywheel energy storage plant at the Humboldt Industrial Park in Hazle Township, Pennsylvania for Hazle Spindle ... hub, shaft, and motor/generator assembly form the rotor. The rotor is sealed in a strong vacuum chamber and levitated magnetically, which nearly eliminates ...

An example flywheel energy storage device includes a fiber-resin composite shell having an elliptical ovoid shape. The example device also includes an axially oriented internal compressive support between the axial walls of the shell. The example device also includes an inner boss plate and an outer boss plate on each side of the shell.

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