Technology Disclosure

PowerCheq™ - Battery String Equalizer

Abstract

PowerCheq™ is a revolutionary battery string equalizer that extends battery life and capacity up to 300%, and extends range by more that 20% over the life of the battery This patented technology serves a critical market need for modular, low cost, and proven battery equalizers in the wheeled mobility industry. Unlike all other battery "equalizer" products on the market that burn excess energy of fully charged batteries during over charge cycles, PowerCheq™ transfers energy between good and weak batteries within a string. This eliminates the development of weak batteries. In addition, PowerCheq™ is a real time equalization device operating during charge, discharge, and while sitting idle. In response to customer requests, PowerCheq™ has an added benefit of two easily replaceable fuses that makes maintenance simple and cost effective. Benefits extend to application in traditional power wheelchairs, scooters, power assists and power add-ons. PowerCheq™ represents an opportunity for significant cost savings. The average wheeled mobility user or their third party reimbursement agency can save approximately $300 per year on battery costs by using the PowerCheq™ as a result of reduced frequency of battery replacement, and reduced operating cost.

Market Description

The market for power wheelchairs has shown tremendous growth in recent years, experiencing annual growth rates in excess of 55% (1). Calculations based on data from the Centers for Medicare and Medicaid Services show that in 1996, the power wheelchair market was drawing in approximately $176.5 million(2). In 2001, this figure had grown to over $1.4 billion. The Health Care Finance Administration estimated the growth rate for Durable Medical Equipment at 10.1% annually (3). Following this rate, the power wheelchair market is currently producing over $1.7 billion in revenue. An estimated 675,000 powered mobility devices including power wheelchairs and scooters are currently in use in the United States (4).

Power management and cycle life of power wheelchair batteries has historically been a major concern of consumers (5). Although rapid advancements have been made in mainstream battery technologies, the deep cycling energy requirement of power mobility devices causes an undue strain on the batteries and significantly reduces their life expectancies. The higher end nickel cadmium and lithium ion batteries are designed to be lightweight and long lasting. However, it is impractical for use in powered mobility devices due to high cost and maintenance requirements. In summary, the possibility for application of a light-weight, durable, and inexpensive battery for powered wheelchairs and scooters remains a distant reality. More over, current lead acid batteries that drain rapidly require on average 10 hours of recharging. The PowerCheq™ represents an opportunity to eliminate many of the inherent problems that unequal or poor battery charge can cause for people using powered mobility devices.

Technology Description

The PowerCheq™ Battery String Equalizer is a power management technology that dramatically extends the life, capacity, and range of power wheelchair batteries and greatly improves battery

Technology Description

performance. The PowerCheq is a modular, bi-directional battery string equalizer that uses a patented algorithm to ensure that all batteries within a string are kept at the same charge level. By equalizing individual batteries, they are never over or undercharged. This enhances battery string performance allowing for longer battery life, longer run time, reduced charging frequency and increased battery capacity. At the customers' request, this core equalization technology has integrated an enhanced feature of replaceable fuses. PowerCheq is the first real time balancing system that equalizes and maintains batteries during charge, discharge and while sitting idle.

Outstanding benefits to users include:

* Extended battery capacity and life (close to a 300% increase in battery life)
* Increased driving range (more than 20% further per battery charge on average)
* Lower ownership and operating costs (less frequent battery replacement greatly reduces cost)
* Easily retrofitted onto power wheelchairs (owners of old or new power wheelchairs can benefit)
* Two easy to replace fuses
* Ability to add 12 V electronic accessories (protects batteries from harm by extra load)
* Operates while battery charges, discharges, or even while sitting idle.

PowerCheq™

Please visit www.powerdesigners.com for a demo

Patent Information

US Patent Awarded #6,150,795

Business Objective

PowerDesigners is pursuing original equipment manufacturing and licensing agreements in the United States for the integration of the PowerCheq™ system.

Contact Information

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Keywords

PowerCheqTM, Power Designers, battery equalizer, Kutkut, Wiegman, Marion, Wheeled Mobility products, Series connected battery string, power equalization

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