Energy storage device fault tolerance

Does fault tolerant DC-DC converter work under two types of faulty working modes?
In this chapter,working performance of the studied fault-tolerant DC-DC converter with fault reconfiguration method and fault tolerant operation principle based on constant-transmitted power control are tested to demonstrate desirable working performanceof the converter under two types of faulty working modes.

Does a DC-DC converter have fault tolerant operating capability under bipolar mode?
The proposed DC-DC converter with fault tolerant operating capability under bipolar modeis supposed to achieve flexible control of transmitted power at output port. The output power expressions are extracted from mathematical model of the DC-DC converter for further analysis on power characteristics.

Why is a fault tolerant operation principle required for converter cell?
In consideration of high requirement of power supply reliability in DC distribution system,a well-designed fault tolerant operation principle is required for converter cell especially when connected with critical electrical equipment,in order to ensure uninterrupted power supply.

What is a bipolar energy storage device?
In bipolar mode, the energy storage device supplies power to the bipolar DC bus in the distribution system.

What is a fault tolerant converter?
When the short-circuit fault occurs on the positive pole or negative pole,the fault-tolerant converter enables to achieve fault reconfigurationand provides continuous,reliable power supply for the normal pole,avoid being forced to quit operation,as shown in Figure 2e.

How reliable is power supply during fault occurrence on bipolar DC BUS?
Therefore, power supply reliability during fault occurrence on bipolar DC bus and great performance of working modes transition have been proved. Figure 18 depicts working characteristics of the converter under bipolar mode and source-port fault mode, which is obtained in PLECS environment.

One level of redundancy for fault tolerance with energy-aware computing can be an acceptable solution to have optimum performance, fault tolerance, and energy efficiency in data centers. The proposed energy-aware fault-tolerant scheduling technique can accommodate most of the data center workloads with significant energy saving and failure ...

Battery energy storage systems (BESSs) can control the power balance in DC microgrids through power injection or absorption. A BESS uses a bidirectional DC-DC converter to control the power flow to/from the grid. On ...

The integration of multiple energy sources including renewable generators, solar power and energy storage is

an attractive option. To facilitate this integration, the EU-funded Super-HEART project will develop an innovative power converter based on fault-tolerance strategies proved in an earlier project.

Wang and dung [118] proposed an energy-efficient fault-tolerant checkpointing approach in which the workload is divided into a set of chucks. In case of failure, it is identified which chucks to re-execute. Hence, it is not required to execute all the chucks in case of loss, thereby conserving energy and fault tolerance.

This section also reviews fault tolerant and fault current limiting converters. ... blinding and over-discharging of batteries during faults which in turn contributes to the fault current are impacts of energy storage devices on DC Protection [72] Table V. Performance comparison of different storage devices. Storage device Charging time

The results obtained validate the efficacy of the adapted fault-tolerant structure, ensuring uninterrupted power supply without compromising output voltage. The results also validate the appropriate charging and discharging of the energy storage device. In addition, an analysis comparing the proposed fault-tolerant multiport converter with ...

a type of fault-tolerant DC-DC converter characterized with dual-transformer series-connected active bridge structure and multiple external ports is used for interconnecting bipolar DC bus ...

Exposure to high-energy particles (triggering radiation effects) or electromagnetic interference (EMI) increases device vulnerability to transient faults, disrupting the electronic charge of one or more storage components within the device and toggling the state of transistors employed for data storage.

Fault Tolerance and Redundancy. Critical applications, such as medical devices or grid-scale energy storage, may demand high fault tolerance and redundancy. In such cases, distributed or hybrid BMS can provide redundancy and maintain system operability even in the event of component failures. Cost Considerations

Balancing control for a multilevel inverter with cascaded H-bridge topology and energy storage (ES-CHBMLI) and fault-tolerant operation have also been studied for electric vehicle (EV) applications [25]. ... Energy efficiency of lithium-ion battery used as energy storage devices in micro-grid. IECON 2015 ...

Applicable to associative caches, it can also reduce storage overhead of check schemes, especially in L2 cache. Moreover, ReBEC is orthogonal to previous protection schemes and can be reconfigured to further enhance the fault-tolerance capability or reduce the energy consumption through employing different check codes as needed.

As the power interface between the energy storage devices (ESD) and the dc link of DC Micro-grids, dc-dc converters, which have been regarded as the heart of many critical applications such as electrical vehicles, data center, and aerospace power systems, have gained more and more attentions recently. The fault diagnosis and tolerant control in dc-dc converters become ...

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This work investigates how to store data as well as process the stored data in mobile cloud with k-out of-n reliability such that the energy consumption for retrieving distributed data is minimized and the energy consumption for processing the distributed data is minimized. In personal mobile devices have gained enormous popularity in recent years. Due to their limited resources (e.g ...

A superconducting magnetic energy storage (SMES) device having a plurality of interwoven windings provides for alternative discharge paths for energy stored as magnetic fields in the windings in response to an open-circuit winding fault in one of the windings.

In order to maintain the operating point at the MPP regardless the load current, we commonly use the architecture in Fig. 1b for the MPTT of the PV cell array though the load device does not have to operate when there is no solar irradiance. The energy storage element in Fig. 1b is, of course, useful to make the PV energy harvesting system functional even if there ...

The traditional fault-tolerant control is not suitable when the state-of-charge (SOC) initial values of the battery modules are not the same. Therefore, a new control strategy is proposed in this ...

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