Reliability of power electronic converter systems pdf

What is reliability of power electronic converter systems?
Reliability of Power Electronic Converter Systems outlines current research into the scientific modeling, experimentation, and remedial measures for advancing the reliability, availability, system robustness, and maintainability of Power Electronic Converter Systems (PECS) at different levels of complexity.

How reliable is a power converter based on historical data?
In the conventional power engineering, the reliability is modeled based on historical data provided by the system operator or handbooks such as MIL 217 7. However, these approaches suffer from poor accuracy. Moreover, they have failed to identify the weakest points of converters, thus not suitable for reliability reinforcement 8.

Are rated power converters reliable?
This fact shows that the conventional approaches which rely on rated power of converters,cannot guarantee reliable performanceof the system. This is because the device lifetime depends on the junction temperature and its fluctuations according to (1).

Are power electronic converters fault tolerant?
This paper presents a comprehensive review of conventional fault-tolerant techniques regarding power electronic converters in case of power semiconductor device failures. These techniques can be classified into four categories based on the type of hardware redundancy unit: switch-level, leg-level, module-level, and system-level.

Is there a long-term reliability indicator for power electronic converters?
This paper has proposed an efficient and compact long-term reliability performance indicator for power electronic converters. This performance indicator is represented by the constant lifetime curves, which are modeled and estimated employing an Artificial Neural Network (ANN).

What factors affect the reliability of a converter?
The converter loading,ambient temperature,humidity and vibrationare also some of the factors affecting the lifetime of the converter components. Therefore,unlike the short-term indicators,the reliability cannot be presented by just a single number in a converter datasheet.

Download full-text PDF. Read full-text. ... it is of high importance to map the converter reliability into power system reliability. ... the lifetime management of power electronic systems has ...

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Reliability of power electronic converter systems pdf

Request PDF | Reliability engineering in power electronic converter systems | Electrical energy conversion by power electronic systems can be classified into the following four categories: 1.

Long-term performance and reliability of a power electronic converter have gained increasing interest for optimal design and operation of power electronic systems 1.So far, the short-term ...

This paper proposes a reliability prediction approach for converters modeling the hardware random failures within the useful life and the wear-out period under two operating conditions and it is exemplified for a single-phase PV inverter. Reliability modeling of power electronic converters is of paramount importance for optimal design, control and operation of ...

COPY ABSTRACT Due to its high impact on the cost of electricity and its direct correlation with customer satisfaction, distribution reliability continues to be one of the most important topics in the electric power industry.

This paper provides an overview of the application of the key aspects of new approaches in reli-ability engineering for power electronic converters. The focus of this paper is on power switch ...

Reliability of Power Electronic Converter Systems . 2015. If you have the appropriate software installed, you can download article citation data to the citation manager of your choice. ... Buy chapter PDF Lifetime modeling and prediction of power devices. $16.00. ... Active thermal control for improved reliability of power electronics systems ...

He was with the ABB Corporate Research Center, Switzerland, in 2009. He received the Richard M. Bass Outstanding Young Power Electronics Engineer Award from the IEEE Power Electronics Society in 2016 for his ...

The converter reliability has widely been explored in device- and converter-levels according to physics of failure analysis. However, optimal decision-making for design, planning, operation, and maintenance of power electronic converters require system-level reliability modeling of power electronic-based power systems. Therefore, this article ...

Suitable topology selection, converter components sizing, and proper control strategy adoption in a single unit converter together with operation of a multi-converter systems require to predict ...

This review serves to provide a clear picture of the state-of-the-art research in this area and to identify the corresponding challenges and future research directions for capacitors and their dc-link applications. DC-link capacitors are an important part in the majority of power electronic converters which contribute to cost, size and failure rate on a considerable scale. ...

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A collection of methodologies based on Physics-of-Failure approach and mission profile analysis are presented in this paper to perform reliability-oriented design of power electronic systems and corresponding design procedures and reliability prediction models are provided. Advances in power electronics enable efficient and flexible processing of electric ...

Long-term performance and reliability of a power electronic converter have gained increasing interest for opti - mal design and operation of power electronic systems 1. So far, the short-term ...

This paper aims to incorporate the reliability model of power electronic converters into power system reliability analysis. The converter reliability has widely been explored in device-and ...

Reliability Into Modern Power System Reliability Analysis Saeed Peyghami, Member, IEEE, Frede Blaabjerg, Fellow, IEEE, and Peter Palensky, Senior Member, IEEE Abstract--This article aims to incorporate the reliability model of power electronic converters into power system reliability analysis. The converter reliability has widely been explored

1 Publications Book [1] Reliability of Power Electronic Converter Systems, edited by Henry Shu-hung Chung, Frede Blaabjerg, Huai Wang, and Michael Pecht, IET Research Book, September 2015. Book Chapters [1] S.Y.R. Hui and H. Chung, "Resonant and Soft-Switching Converters," Power Electronics Handbook, edited by M. H. Rashid, Academic Press, 2000, pp. 271-304.

The main aims of power electronic converter systems (PECS) are to control, convert, and condition electrical power flow from one form to another through the use of solid-state electronics. ... Reliability of power electronic converter systems. / Chung, Henry Shu-Hung; Wang, Huai; Blaabjerg, Frede et al. United Kingdom: Institution of ...

An accurate converter reliability model is, in some cases, required for reliability assessment and management in modern power systems, because of a high calculation burden raised by the physics of failure analysis for large-scale power electronic systems. This article aims to incorporate the reliability model of power electronic converters into power system reliability ...

Reliable operation over the designed lifetime is essential for any power electronics system, particularly because the dependability of power electronics is becoming a prerequisite for system safety in several key areas, e.g., energy, medicine, and transportation. Power electronics systems are used increasingly in a wide range of application fields, such as variable-speed ...

Reliability prediction and assessment play a significant role in determining the performance of power converter designs. Typically, the DC-DC power converters are one of the most required electronic components, and their reliability must be improved to increase the overall efficiency of the entire system.

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Usually, for power converters, the reliability is estimated using ...

Abstract--This article aims to incorporate the reliability model of power electronic converters into power system reliability analysis. The converter reliability has widely been explored in device- ...

More and more efforts are devoted to better power electronic systems in terms of reliability to ensure high availability, long lifetime, sufficient robustness, low maintenance cost and low cost of ...

As discussed above, higher power density and efficiency of power electronic systems are relatively achievable. However, according to a survey [15], the power electronic converter itself has become one of the most fragile parts in the entire system.For instance, in that study, the unscheduled maintenance events due to power electronics account for 37% of the ...

Due to its high impact on the cost of electricity and its direct correlation with customer satisfaction, distribution reliability continues to be one of the most important topics in the electric power industry.

This book was recently published by the Institution of Engineering and Technology. It outlines the current research into the scientific modeling, experimentation, and remedial measures for advancing the reliability, availability, system robustness, and maintainability of power electronic converter systems (PECS) at different levels of complexity. It is written for ...

This article aims to provide an update of the reliability aspects of research on power electronic components and hardware systems. It introduces the latest advances in the understanding of failure mechanisms, testing methods, accumulated damage modeling, and mission-profile-based reliability prediction. Component-level examples (e.g., Si IGBT modules, ...

Power electronics systems are used increasingly in a wide range of application fields, such as variable-speed drives, electric vehicles, and renewable energy systems. These elements have become crucial constituents in the further development of such emerging application fields as lighting, more-electric aircraft, and medical systems [1]. Reliable operation ...

The main aims of power electronic converter systems (PECs) are to control, convert, and condition electrical power flow, from one form to another, through the use of solid-state electronics. This book outlines R& D into the scientific modeling, experimentation and remedial measures for advancing the reliability, availability, system robustness ...

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