# Parallel capacitor fault detection

## Overview

A dc series arc fault is difficult to detect and localize due to the lack of a current zero crossing point. Unless there is an adequate protection, these faults can pose a threat to the stable operation of a photovoltaic (PV) system. A detection method for series dc arc faults in a PV system based on time and frequency characteristics of a parallel capacitor current is proposed. Series and parallel solar panel array systems are constructed, and a capacitor is parallele. A dc series arc fault is difficult to detect and localize due to the lack of a current zero crossing point. Unless there is an adequate protection, these faults can pose a threat to the stable operation of a photovoltaic (PV) system. A detection method for series dc arc faults in a PV system based on time and frequency characteristics of a parallel capacitor current is proposed. Series and parallel solar panel array systems are constructed, and a capacitor is paralleled with the load. Series arc faults are generated at different locations in the PV system, including locations between panels, on the PV bus and the load side. When a series arc is generated in the system, the high frequency components of the current will pass through the dc bus capacitor. The polarity and amplitude of capacitor currents as well as the integration of the frequency spectrum of capacitor currents are analyzed and identified as key attributes to differentiate dc series arc faults from other system changes. The impact of the harmonics generated by a converter is analyzed. The results indicate that the proposed approach and apparatus could be used to detect and localize series arc faults.••••A dc arc fault detection method using parallel capacitor current is proposed.••The difference of integrated spectrum of capacitor current has a certain range.••The polarity of the capacitor current pulse can localize the series arc fault.••Arc fault in a PV string can be localized comparing capacitor current amplitudes.DC series arc faultPhotovoltaic systemTime and frequency characteristicsParallel capacitor currentWith the growing demand of renewable energy, more and more PV systems are connected with the power grid. T...

## Article Content

FAILURE DETECTION OF THE CAPACITOR BANK OF ...

2. FAULT DETECTION TECHNIQUES 1. Capacitor Aging: The main aging mechanism is the evaporation of the ... parallel capacitors are disconnected from the capacitor bank.

A Method for Parallel Arc Fault Detection and Identification

A Method for Parallel Arc Fault Detection and Identification Yuan Wu, Zhengxiang Song, Jianhua Wang School of Electrical Engineering, Xi''an Jiaotong University ... Capacitor The comparator The Rogowski coil The comparator AND gate Figure 10. The block diagram of the judgment circuits. C. The data of the detection circuit

Development of a Fault Detection and Localization Algorithm for ...

This article shows that the analysis of the amplitude, polarity, and spectrum characteristics of the capacitor current and voltage resulting from perturbations caused by the ...

Estimation of abnormal states in shunt capacitor banks using ...

These simulation results verify the accuracy of the detection algorithm under different conditions. KEYWORDS shunt capacitor bank, state estimation, component breakdown, Prony algorithm, ... content. As a result, exploring parallel capacitor group fault diagnosis methods based on the transient feature analysis of breakdown fault disturbances ...

Arc Fault Detection and Localization in Photovoltaic ...

approach using parallel capacitors is proposed. Five capacitors are. paralleled with the branches of a PV system. Series and parallel. arc faults are tested in the system. The amplitudes...

The Detection of Parallel Arc Fault in Photovoltaic Systems ...

An experimental platform for arc fault of a PV system was built to simulate the DC side parallel arc fault in the PV system and a mixed criterion is proposed to overcome the shortcomings of the above-mentioned criteria. This paper presents the problem of parallel arc fault in the DC side of a photovoltaic (PV) system. First, an experimental platform for arc fault of a ...

Analysis of Arc Characteristics and Fault Detection in

The characteristics of the currents through these capacitors permit fault detection and localization. ... It provides a theoretical basis for the detection of the parallel arc fault in the PV ...

Internal Failure Detection and Protection on Capacitor Banks ...

capacitor internal faults detection. that each fuse is mounted between the capacitor unit and the fuse bus of the capacitor bank . Finally, the protection algorithm developed for the internal

Arc Fault Detection and Localization in Photovoltaic Systems ...

Abstract: Arc faults threaten the safety operation of photovoltaics (PV) systems. An arc fault detection and localization approach using parallel capacitors is proposed. Five capacitors are ...

Application of Thau Observer for Fault Detection of Micro Parallel ...

Fault detection Thau observer nonlinear force micro-parallel plate capacitor noise and uncertainty ABSTRACT This paper investigates the fault detection of a micro parallel plate capacitor ...

Detecting and localizing series arc fault in ...

Arc fault in a PV string can be localized comparing capacitor current amplitudes. A dc series arc fault is difficult to detect and localize due to the lack of a current zero crossing ...

Capacitor bank fault detection system (2015) | Shen Miao | 5 ...

The capacitor bank fault detection system can measure the single-phase capacitance of a parallel connection capacitor bank and measure three-phase capacitors of various connection types at the same time without detaching wires, and detection is simple and efficient.

Detection and Location of Series DC Arc Fault in Photovoltaic ...

Failure to detect and isolate faults in time will result in serious fire hazards. In the document, a new approach to fault arc monitoring and positioning built on variational mode ...

Application of Thau Observer for Fault Detection of Micro Parallel ...

This paper investigates the fault detection of a micro parallel plate capacitor subjected to nonlinear electrostatic force. For this end Thau observer, which has good ability in fault detection of nonlinear system has been presented and governing nonlinear dynamic equation of the capacitor has been presented. Upper and lower threshold for fault detection have been ...

Arc Fault Detection and Localization in Photovoltaic ...

DOI: 10.1109/JPHOTOV.2018.2836986 Corpus ID: 49331439; Arc Fault Detection and Localization in Photovoltaic Systems Using Feature Distribution Maps of Parallel Capacitor Currents

Ije Application of Thau Observer for Fault Detection of Micro Parallel ...

Ije Application of Thau Observer for Fault Detection of Micro Parallel Plate Capacitor

A Comprehensive Review of Detection Methods for DC Arc Fault Detection ...

Based on the high-frequency characteristics of the fault arc, Zhao Tiejun and others obtained the current signal of the filter capacitor branch at the series input end, and proposed a fault arc detection method using sample entropy and standard deviation, mainly based on the DC series fault detection and protection method of the series ...

Fault detection for DC-DC converters using adaptive parameter ...

According to the investigation, converter failure is mainly related to the capacitor and the power switch. A large body of literature exists on the failure of DC-DC converters , a fault diagnosis method for a boost converter for a PVMPPT system is proposed.Jain et al. improves the state observer to address the interference problem of noise and interference.

Arc Fault Detection and Localization in Photovoltaic Systems ...

An arc fault detection and localization approach using parallel capacitors is proposed. A PV system has been analyzed and tested with five capacitors paralleled with the branches in the system. Series and parallel arc faults at nine locations have been tested in the system. When an arc occurred, current pulses were generated in the capacitors ...

Arc Fault Detection and Localization in Photovoltaic Systems ...

An arc fault detection and localization approach using parallel capacitors is proposed. A PV system has been analyzed and tested with five capacitors paralleled with the branches in the ...

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