High frequency inverter with air gap

Overview

How does air gap affect the B-H curve in a high-power inductor?

Therefore, the air gap is one of the most important parts of magnetic circuits, especially in high-power inductors. Thanks to the gap, a larger current is required for the magnetic material to reach its saturation point . The effect of air gap on the B-H curve in an air–gap inductor is seen in Fig. 1 .

Why is air gap important in a magnetic circuit?

However, placing an air gap in the core decreases the total inductance of the magnetic circuit. Therefore, the air gap is one of the most important parts of magnetic circuits, especially in high-power inductors. Thanks to the gap, a larger current is required for the magnetic material to reach its saturation point .

What happens if you put an air gap in an inductor?

The flux in the core of an inductor without an air gap depends on the core geometry. In this case, even a small current value in an inductor with a certain number of turns can easily saturates the core. However, placing an air gap in the core decreases the total inductance of the magnetic circuit.

Why do inductor cores have an air gap?

The air gap in the inductor cores creates fringing flux, which increases losses in the conductors located near the air gap, as seen in Fig. 3. To reduce this problem, the air gap can be divided into smaller lengths. The air gap is distributed as evenly and uniformly as possible throughout the entire core structure.

Why is the design of air-gapped inductors important?

However, the design of air-gapped inductors is important because the nonlinear properties of the B-H curve of the core material are related to saturation and power losses, and also it is difficult because the fringing flux

level around the air gap will increase, thus resulting in the propagation of higher levels of electromagnetic disturbance .

Does inductance change and fringing flux around the air gap?

There are many studies in the literature on the sizing of inductors and determination of gap lengths, but there are few studies on the investigation of the inductance change and fringing flux around the air gap depending on the core material and gap length.

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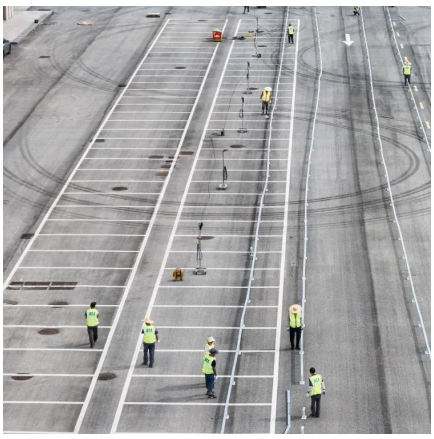
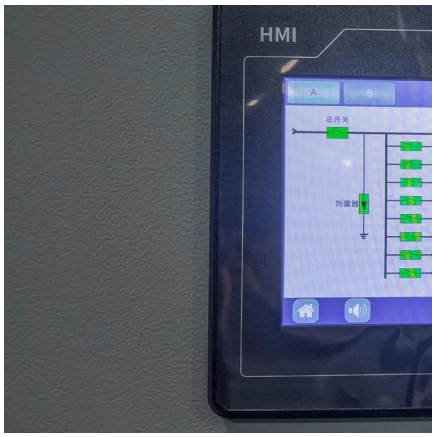


Experimental investigation on detection of air gap eccentricity in

The contents of this paper reports an experimental investigation carried out to detect the air gap eccentricity faults under varying load conditions using non-invasive transducers to ...

Air gap fringing flux reduction in a high frequency inductor for a

This paper presents a detailed analysis to evaluate the performance changes of a high frequency inductor used in a solar inverter by new arrangement scheme of the air gap ...



Analysis of inductive energy transmission systems with large air gap ...

Inductive energy transmission through a large air gap is becoming more and more attractive especially for automatic battery charging stations and for energy supply of inductively ...

Analysis of inductive energy transmission systems ...

Inductive energy transmission through a large air gap is becoming more and more attractive

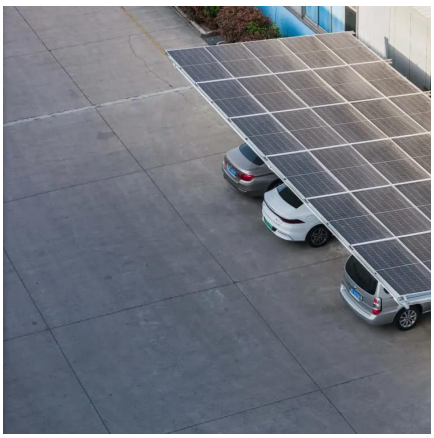
especially for automatic battery charging stations ...

A High-Frequency Inverter Architecture for Providing Variable

This paper introduces a new high-frequency inverter architecture, termed the variable compensation inverter (VCI), which can compensate for coupling variations in WPT systems ...

High frequency resonant inverter for contactless energy ...

The different switching events of the inverter with freewheeling SiC Schottky diodes are investigated in detail. An experimental arrangement transfers an electric power of 1 kW ...



Design and Development of High Frequency Inverter for ...

The paper presents an effective design and implementation of High Frequency Inverter for WPT applications in MATLAB/Simulink at 1KW,230V and 90KHz frequency with open and closed ...

High frequency resonant inverter for contactless energy ...

An experimental arrangement transfers an electric power of 1 kW through an air gap of 300mm. At a 100kHz transmission frequency the overall efficiency, including magnetic and power ...

NDLI: Air gap fringing flux reduction in a high frequency inductor ...

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A Review on the Recent Development of High-Frequency ...

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Air gap fringing flux reduction in a high frequency inductor for a

In a gapped inductor, air gap fringing flux induces eddy currents in conductors in the vicinity of the air gap producing unwanted power loss and heat in the coi

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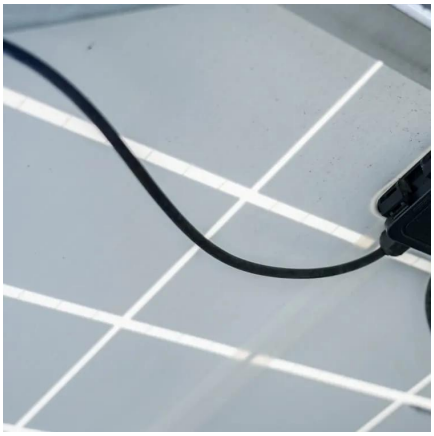

Design of High-frequency Resonant Inverter for Capacitive Wireless

This paper proposes a class F 2 inverter topology in a small air-gap CPT system to mitigate misalignments in the coupling capacitors. The output capacitor of the load network in the class ...

Alabakhshizadeh2013

Furthermore, Air gap fringing flux is a frequency inductor used in a galvanically isolated solar significant factor that has to be considered while doing high inverter is presented and analyzed.

A Review on the Recent Development of High-Frequency Inverters ...

The main objective of this paper is to summarize the current topologies and related technologies of high-frequency inverters for WPT systems and to study the key issues in high ...

'Magnetics Design 5

The sole purpose of the high permeability core mate- rial is to provide an easy, low reluctance flux path to link the energy stored in the gap to the winding, thus efficiently coupling the energy ...

Design of High-frequency Resonant Inverter for Capacitive ...

This paper proposes a class F 2 inverter topology in a small air-gap CPT system to mitigate misalignments in the coupling capacitors. The output capacitor of the load network in the class ...

How to design inductors for inverters

In inverter design, inductor is a key component to achieve energy conversion and waveform shaping. Its design needs to be combined with inverter topology, power level and ...

Air gap fringing flux reduction in a high frequency inductor for a

The effect of air gap positioning in the core and the ac-resistance and leakage inductance of the high frequency inductor used in a solar inverter is investigated by using the 2-D finite element ...

Kilowatt-scale large air-gap multi-modular capacitive wireless ...

Each module comprises a high-frequency inverter and rectifier, and two matching networks that enable effective power transfer by providing voltage and/or current gain and reactive ...

Air gap fringing flux reduction in a high frequency inductor for a

In a gapped inductor, air gap fringing flux induces eddy currents in conductors in the vicinity of the air gap producing unwanted power loss and heat in the coil. This paper presents a detailed ...

A comparative analysis of core material and gap sizing effect on ...

In this study, saturation flux values and inductance change graphs of high-power and medium-frequency inductors designed with soft magnetic core materials such as ...

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