Frequent Abnormal Fluctuations in 35kV Bus Voltage



Overview

What are the causes of the breakdown and burning of the 35 kV GIS. 1. Accident Overview 1.1 Structure and Connection of 35kV GIS Switchgear Voltage Trans.

Key Takeaways

Abnormal fluctuations in a 35kV bus are typically caused by grounding issues, fuse failures, resonance, or load imbalances, and require careful monitoring and corrective measures to ensure system stability. Common Causes of 35kV Bus Voltage FluctuationsHigh-Voltage Fuse Blows: When a single-phase, two-phase, or three-phase fuse blows, the voltage on the affected phase drops significantly. If the fuse is partially blown, the bus may not issue a grounding signal, leading to unbalanced voltages and abnormal fluctuations.

Single-

Phase Grounding: A grounded phase drops close to zero volts, while the remaining phases rise to line voltage. This can trigger busbar grounding signals and cause transient overvoltages on the healthy phases. Resonance Effects: Capacitive or inductive resonance in the system can cause all three-phase voltages to rise abnormally while remaining balanced.

Overvoltages may reach 1. 5–3. 5 times the normal phase voltage and can persist for fractions of a second or longer, often accompanied by audible buzzing from transformers or bus voltage transformers.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Low-

Voltage Fuse Blows: Secondary voltage drops significantly without triggering a busbar grounding signal, which can also contribute to voltage instability. Load and System Imbalances: Sudden changes in load, switching operations, or high-inertia loads can induce voltage spikes or dips. In systems with variable frequency drives (VFDs), regenerative energy from decelerating motors can feed back into the bus, causing transient overvoltages.

Manifestations

Rapid voltage swings or spikes on the bus. Audible buzzing from transformers or bus voltage transformers. Protective relays or alarms may trigger intermittently.

Equipment connected to the bus may experience nuisance trips or overvoltage faults.

Mitigation and Handling

Monitoring and Measurement: Use high-accuracy voltage transformers and data logging to detect transient events and identify patterns of fluctuation. Grounding Checks: Ensure proper grounding, whether ungrounded or via an arc suppression coil, to prevent single-phase faults from causing large voltage swings. Fuse Inspection and Replacement: Regularly inspect high- and low-voltage fuses for partial or complete failure to prevent unbalanced voltages.

Resonance Mitigation: Analyze system capacitance and inductance to identify potential resonance points. Installing damping devices or adjusting switching sequences can reduce overvoltage events. Load Management: For systems with VFDs or high-inertia loads, adjust deceleration ramps, enable dynamic braking, or use regenerative braking units to absorb excess energy and prevent voltage spikes.

Protective Device Coordination: Ensure relays, surge arresters, and bus protection devices are properly set to respond to abnormal voltage without unnecessary trips.

Conclusion

Frequent abnormal fluctuations in a 35kV bus are usually caused by a combination of grounding issues, fuse failures, resonance, and load-induced transients. Effective mitigation requires accurate monitoring, proper grounding, fuse maintenance, resonance analysis, and load management strategies. Addressing these factors helps maintain system stability, prevent equipment damage, and reduce operational interruptions.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Article Content

What are the causes of the breakdown and burning of the 35 kV GIS ...

1. Accident Overview 1.1 Structure and Connection of 35kV GIS Switchgear Voltage Transformer The ZX2 gas-insulated double-bus switchgear, manufactured in March 2011 and officially put into

Analyzing DC Bus Voltage Fluctuations Under Abnormal Load

This paper analyzes the stresses and harmful effects of single-phase and harmonic loads on the DC bus in EVs. It examines their impact on system stability and performance.

35kV bus voltage is abnormal

Explore the detailed cause analysis and retrofit strategies for a 35kV GIS voltage transformer accident. Learn about design flaws, protection upgrades, and maintenance improvements to prevent failures ...

Regenerative Drive Failures: How to Fix DC Bus Overvoltage

Once you''ve identified where the excess voltage is coming from, you can dial into fixing it. The solution could be as simple as reconfiguring your drive parameters.

Suppression of Multiple Fluctuations in DC-bus Voltage of the Grid ...

This study aims to propose a control scheme based on supercapacitor energy storage and extended state optimal tracking control method to solve the problem of disturbance and oscillation fluctuations

Troubleshooting VFD Problems – Overvoltage Fault

The resulting voltage rise on the low voltage bus could trip or even damage the VFD on overvoltage. Remember that the overvoltage protection on drives is based on the measured DC bus

Troubleshooting VFD Problems – How to Measure DC Bus Voltage

Some of the frequent and troublesome VFD faults are related to the DC bus voltage. The VFD control circuit continuously monitor the magnitude and quality of DC bus voltage (DC link

Managing VFD Overvoltage Faults During Deceleration (Regenerative

To summarize, an overvoltage fault during deceleration is essentially the VFD protecting itself from excessive DC bus voltage. The cure is to give that regenerative energy somewhere to go (time, heat,

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Over-Voltage: Typical Variable Speed Drive Faults and How to ...

One relatively common fault is over-voltage, often shown as “OV” or “OU” or similar, and often with an accompanying description of “DC Link Overvoltage”. Fundamentally, this fault is in

VE.Bus DC Voltage suddenly fluctuating even without load.

The low-voltage alarm is overwhelming occuring on L1 according to the advanced page, however the VE.Bus DC voltage fluctuations (pasted above) as well as the DC ripple alarms (bottom

(PDF) Mitigation of Voltage Fluctuation in Power ...

This work describes the voltage control technique of mitigation of voltage fluctuations and clearing fault using Distribution Static Synchronous Compensator (DSTATCOM).

Voltage Fluctuation

Voltage fluctuations are dependent on the voltage amplitude as well as the rate at which the fluctuation occurs. It is generally very hard to control the rate of fluctuation, but however, the mitigation

Analysis of an accident of abnormal increase in pole bus differential ...

This paper analyzes an accident of abnormal increase of pole bus differential current and pole differential current of a converter station caused by line fault of a ±800 kV extra high-voltage

Eliminating Voltage Fluctuation

We''ve studied the Negative Impacts of Voltage Fluctuation in Facility Management and how to permanently overcome it. Here''s how.

Theoretical and simulation analysis of DC bus current fluctuation ...

ABSTRACT Modular Multilevel Converters (MMCs) play a crucial role in high-voltage DC (HVDC) systems due to their adaptable control and swift response capabilities. However, AC side faults could

Research on 66 kV bus voltage optimization strategy and its stability

Current domestic and foreign research is mainly focused on the stability analysis of the ultra-high voltage main grid, while the refined control of the voltage of the medium voltage distribution network bus is

Empirical approach to regulate bus voltage range in

The target voltage and maintenance range of each bus is restricted by South Korea in its grid code. As the power system becomes increasingly

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Judgment and treatment method of 35 kV system voltage anomaly

Abnormal voltage in the 35 kV system is very common and there are many reasons. How to accurately judge and deal with it is crucial for the corresponding dispatching and operation

Contact Us

Continue your research online:

Website: https://explosivefunctions.co.za
Technical inquiry: https://explosivefunctions.co.za/contact.html
EU project coordination: Parque das Nações, Lisbon, Portugal

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 EXF OPTICAL NETWORKS - All rights reserved