Iranian National Energy Relay Protection



Overview

Iran national grid blackout, power system protection point of view. In this paper, one of the major blackouts in the Iran national grid is studied. Some.

Key Takeaways

Iran employs a combination of imported and locally manufactured protective relays to safeguard its national power grid, covering both low-voltage and high-voltage systems.

Low-

Voltage Relay Protection

In Iran, undervoltage releases (UVRs) and phase failure relays are widely used to protect motors and industrial equipment from voltage drops and phase-related faults in three-phase networks.

UV

Rs automatically trip circuit breakers when voltage falls below a safe threshold, while phase failure relays detect phase loss, asymmetry, incorrect sequence, and under/overvoltage conditions to prevent motor damage and system instability. These devices are often integrated into molded case circuit breakers (MCCBs) from international brands like Hyundai, Chint, and ABB, distributed through local suppliers for industrial applications. Local manufacturers, such as Electrokaveh, produce models like the KRP102, which monitor three-phase parameters and are deployed in major projects including the South Pars Gas Field.

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High-

Voltage Relay Protection

Iranian researchers and companies have developed protective relays for high-voltage substations, enabling local production of relays that manage overcurrent, overvoltage, reverse power flow, over-frequency, and under-frequency conditions. These relays are equipped with hardware and algorithms to measure voltage parameters and detect faults, issuing automatic power cut commands when necessary. The University of Tehran's Technology Park team has commercialized over 3,000 different protective relays, capable of meeting the protocols required by electrical distribution substations.

High-voltage relays are critical for substations that transform and distribute electricity across the national grid, ensuring reliability in a meshed network of interconnected substations.

Historical and Technical Context

Relay protection in Iran has evolved from analog wired telephony and manual control to modern digital systems, including telesignaling, SCADA integration, and anti-islanding protections for renewable energy sources. Simulation studies, such as those using Matlab/Simulink for photovoltaic systems, demonstrate the application of over/under current, voltage, and frequency relays, as well as rate-of-change-of-frequency (ROCOF) protections, highlighting Iran's adoption of advanced relay technologies in both conventional and renewable energy sectors. National Grid ConsiderationsIran's power system is heavily reliant on thermal power plants, with over 130 plants generating a combined capacity of 78,000 MW.

Protective relays are essential to maintain stability across this large, decentralized network, preventing faults from cascading and ensuring continuous supply to millions of residential and industrial users. The integration of both low-voltage and high-voltage relays across generation, transmission, and distribution levels reflects standard practice in Iran's energy sector, particularly in high-demand industries like oil, gas, and manufacturing. In summary, Iran's national energy relay protection strategy combines imported and domestically produced relays, advanced fault detection algorithms, and integration across low- and high-voltage systems to ensure grid stability, equipment safety, and reliable electricity delivery.

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In this paper, one of the major blackouts in the Iran national grid is studied. Some suggestions and solutions are also given which could improve the system performance during abnormal events and

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FASBA-Power Industry and Energy Technology > Projects > Fasba

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Undervoltage Release and Phase Failure Relay in Iran

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He added that the knowledge-based product will also reduce post construction costs and facilitate the operation and monitoring process. Sadeqi underlined that construction of the

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Introduction — Why Securing Protection Relays Matters More Than Ever Substations are critical nexus points in the power grid, transforming high-voltage electricity to ensure its safe and

Societal and technology trend report

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