

# Protective Relay Market Assessment, By Voltage [Low, Medium, High, Very High], By Technology [Electromechanical and Static Relay, Digital and Numerical Relays], By Application [Overcurrent Protection, Distance Protection, Differential Protection, Carrier-Current Protection, Motor Protection, Frequency Protection, Others], By End-use [Utilities, Industrial, Railway, Others], By Region, Opportunities and Forecast, 2018-2032F

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### **Report description:**

Global protective relay market is projected to witness a CAGR of 5.42% during the forecast period 2025-2032, growing from USD 3.14 billion in 2024 to USD 4.79 billion in 2032.

Protective relays are in high demand with the rising infrastructure development and integration of renewable energy. Technological advancements and safety concerns around industrial and expanding railway networks. Futuristic innovations comprise the incorporation of advanced communication technologies. The transition towards digital platforms, allowing seamless communication between relays, intelligent devices, and control centers, will likely shape the market's future dynamics. Another latest addition to the innovative ideas is the utilization of advanced algorithms and machine learning techniques in relay protection setups. These algorithms process vast amounts of data in real time, allowing effective detection while classifying faults accurately.

Enhancement initiatives for protection and control systems are of great importance in the present relay protection market. It is through enabling the advancement of new technologies, improving safety and dependability, maintaining regulatory standards, and increasing operational efficacy and market demand. With the shift from conventional power systems to integrated smart grids, the need for advanced protective devices to keep pace with the changing demands of power control is prevalent.

For instance, in February 2023, ABB Ltd. launched a new relay retrofit program to modernize protection and control systems. The program is to replace select SPACOM protection relays with the latest protection and control technology, REX610. The REX610 all-in-one protection relay is a versatile, sustainable, and future-proof option since it is made to adjust to the demands of changing power grids. Customers will benefit from longer switchgear lifespans, complete relay life cycle services, and the capacity to modify the power protection system to satisfy evolving needs.

Digitalization and Adaptive Protection to Shape Market Growth Dynamics

The transition towards digital relay protection systems is already underway and will continue to accelerate in the future. Digital relays offer numerous advantages, including enhanced accuracy, faster fault detection, flexible communication options, and improved monitoring capabilities. Additionally, digital relays facilitate integration with supervisory control and data acquisition (SCADA) systems, enabling real-time data exchange and advanced fault analysis.

The future is likely to witness the integration of artificial intelligence (AI) and machine learning (ML) techniques into relay protection systems. Al-based algorithms can analyze vast amounts of data collected from the power network, enabling intelligent tripping decisions based on the system's dynamic conditions. These intelligent and adaptive protection schemes will enhance system stability, minimize tripping during transient events, and improve the overall reliability of power networks. Furthermore, the expanding number of distribution networks is resulting in a rise in demand for protective relays owing to the need for sophisticated fault detection and management systems. With the growth of grids realizing the incorporation of renewable energy sources, protective relays play a key role in supporting the stability of the systems in operation, the proper delivery of electrical energy, and the protection of all the facilities from overloads and short circuits.

For instance, in December 2022, Siemens AG delivered new protection relays for distribution grids. With the release of the 7SR46, Siemens is growing its line of Reyrolle protection devices. The Reyrolle 7SR46 is primarily used to provide overcurrent and ground fault protection in medium voltage distribution transformer stations, complementing a wide range of protection relays for distribution and industrial grids.

Infrastructure Modernization and Widened Railway Network to Fuel the Market Growth

Outdated electric power systems are present in many areas, and upgrades are necessary to preserve reliability and safety. Modernizing protection systems is vital to improving grid reliability and operation efficiency. Smart grid development is a multifaceted process; transitioning towards smart grids entails the deployment of various technologies that enhance communication and data control within a power system. Smart protective relays are necessary for controlling power flows and the integrity of the entire system.

More wind and solar-powered power plants are being built to improve energy efficiency. However, their use raises power supply variability, which can cause an imbalance in "ordained" electrical grids. To increase efficiency and lower emissions, electrification is becoming increasingly popular as railway networks grow. The electrification calls for sophisticated protective relays to control and protect the electrical systems that fuel the power to trains and related infrastructure.

For instance, in January 2024, ComatReleco AG launched a new overcurrent protection relay named MRS13R for railway applications. The new MRS13R offers a versatile and efficient defense against short-circuit hits and excessive currents. When overcurrent situations arise, the relay guarantees prompt and dependable activation. With its lightning-fast reaction to overcurrent situations, the MRS13R completely satisfies the needs and expectations of our railway industry clients. Advanced Functionality and Smart Grid Compatibility to Fuel Digital and Numerical Relay Segment

Based on technology, digital and numerical relays segments are likely to lead in the market. Digital and numerical relays integrate multiple protection functions into a single unit, enhancing their utility in various applications. They can perform tasks such as metering, monitoring, and fault analysis, which traditional electromechanical relays cannot offer. These relays utilize microprocessor technology to measure voltage, current, and power quality accurately. This precision enhances fault detection capabilities, allowing for quicker and more reliable responses to electrical faults.

Digital and numerical relays are designed to work seamlessly with smart grid technologies. They support communication protocols like IEC 61850, enabling real-time data exchange and remote monitoring, which are essential for modern grid management. These relays offer advanced diagnostic features allowing self-testing and real-time system health monitoring. This capability helps in predictive maintenance, reducing downtime and operational costs. Hence, many key player companies are investing in digital platforms to replace the older protective relays.

For instance, in June 2024, Schneider Electric launched the latest device in its PowerLogic range of products, the PowerLogic P7 digital power and control platform. The company stated that the PowerLogic P7 is available to the South African and Anglophone Africa region and will replace the company's legacy protection relays.

Asia-Pacific Accelerates with Higher CAGR in the Protective Relay Market

Based on the region, Asia-Pacific is expected to hold the major share of the global market. Expanding railway networks and focusing on higher protection across end users are anticipated to gain traction for the regional market. Countries like China and India are experiencing significant industrial growth, leading to increased electricity consumption. This necessitates the deployment of protective relays to ensure the reliability and safety of electrical systems in industrial facilities.

Significant government investments in upgrading and expanding electrical grids enhance the demand for protective relays to safeguard new installations. The region is investing heavily in renewable energy sources, such as solar and wind, to meet energy demands sustainably. Protective relays are essential for integrating these variable energy sources into existing grids. In August 2024, Hitachi Energy Ltd. introduced the Relion REF650, a versatile protection and control relay tailored for medium-voltage power distribution networks. Its improved adaptability, modular design, enhanced security, and innovative, user-friendly interface position the REF650 as uniquely fit for the changing power quality needs in both utility and industrial sectors.

#### Future Market Scenario (2025-2032F)

The increasing adoption of smart grid technologies will likely drive demand for advanced protective relays with enhanced communication and monitoring capabilities.

Digital and numerical relays are expected to dominate the market due to their multi-functionality, improved accuracy, and integration with IoT for predictive maintenance.

The growth in renewable energy infrastructure is projected to necessitate sophisticated protective relays to manage these energy sources' variability and integration challenges.

□Ongoing investments in upgrading electrical grids and infrastructure are anticipated to create significant opportunities for protective relay manufacturers.

Key Players Landscape and Outlook

The protective relay market is characterized by a competitive landscape with numerous key players striving to enhance their market presence through innovation and strategic initiatives. These companies focus on developing advanced protective relay technologies, such as digital and numerical relays, to meet the growing demands for reliability and efficiency in electrical systems. Strategic partnerships, mergers, and acquisitions are common as firms aim to expand their product portfolios and geographical reach. Additionally, significant investments in research and development are directed toward integrating smart technologies and IoT capabilities into protective relays, aligning with the industry's shift toward smart grid implementations. As the market evolves, these strategies are crucial for capturing emerging opportunities in various sectors, including utilities, industrial applications, and renewable energy integration.

For instance, in May 2023, ABB Ltd. unveiled the launch of enhanced features for the comprehensive protection and control relay REX610. Introduced in 2022, REX610 represents the newest member of ABB's Relion line of products. Featuring cutting-edge ease of use, REX610 stands as a straightforward, ready-to-use device with integrated components that enable access to all its features.

### Table of Contents:

- 1. Project Scope and Definitions
- 2. Research Methodology
- 3. Executive Summary
- 4. Voice of Customer
- 4.1. Product and Market Intelligence
- 4.2. ☐ Mode of Brand Awareness
- 4.3. [Factors Considered in Purchase Decisions
- 4.3.1. Sensitivity
- 4.3.2. Speed of Operation

4.3.3. Reliability 4.3.4. Construction and Installation 4.4. Consideration of Privacy and Regulations 5. Global Protective Relay Market Outlook, 2018-2032F 5.1. Market Size Analysis & Forecast 5.1.1. By Value 5.1.2. By Volume 5.2. Market Share Analysis & Forecast 5.2.1. By Voltage 5.2.1.1. [Low 5.2.1.2. [Medium] 5.2.1.3.∏High 5.2.1.4. Very High 5.2.2. By Technology 5.2.2.1. Electromechanical and Static Relay 5.2.2.2. Digital and Numerical Relays 5.2.3. By Application 5.2.3.1. Overcurrent Protection 5.2.3.2. Distance Protection 5.2.3.3. Differential Protection 5.2.3.4. Carrier-Current Protection 5.2.3.5. Motor Protection 5.2.3.6. ||Frequency Protection 5.2.3.7. Others 5.2.4. By End-use 5.2.4.1. Utilities 5.2.4.2. Industrial 5.2.4.3. Railway 5.2.4.4. Others 5.2.5. ∏By Region 5.2.5.1. North America 5.2.5.2. [Europe 5.2.5.3.∏Asia-Pacific 5.2.5.4. South America 5.2.5.5. Middle East and Africa 5.2.6. By Company Market Share Analysis (Top 5 Companies and Others - By Value, 2024) 5.3. Market Map Analysis, 2024 5.3.1. By Voltage 5.3.2. By Technology 5.3.3. By Application 5.3.4. End-use 5.3.5. By Region 6. North America Protective Relay Market Outlook, 2018-2032F\* 6.1. Market Size Analysis & Forecast 6.1.1. By Value 6.1.2. By Volume 6.2. Market Share Analysis & Forecast

6.2.1. By Voltage 6.2.1.1. Low 6.2.1.2. Medium 6.2.1.3. []High 6.2.1.4. Very High 6.2.2. □By Technology 6.2.2.1. Electromechanical and Static Relay 6.2.2.2. Digital and Numerical Relays 6.2.3. By Application 6.2.3.1. Overcurrent Protection 6.2.3.2. □Distance Protection 6.2.3.3. Differential Protection 6.2.3.4. Carrier-Current Protection 6.2.3.5. Motor Protection 6.2.3.6. Frequency Protection 6.2.3.7. Others 6.2.4. By End-use 6.2.4.1. Utilities 6.2.4.2. Industrial 6.2.4.3. Railway 6.2.4.4. Others 6.2.5. By Country Share 6.2.5.1. United States 6.2.5.2. Canada 6.2.5.3.[]Mexico 6.3. Country Market Assessment 6.3.1. United States Protective Relay Market Outlook, 2018-2032F\* 6.3.1.1. Market Size Analysis & Forecast 6.3.1.1.1. By Value 6.3.1.1.2. □By Volume 6.3.1.2. Market Share Analysis & Forecast 6.3.1.2.1. By Voltage 6.3.1.2.1.1.⊓Low 6.3.1.2.1.2.∏Medium 6.3.1.2.1.3. [High 6.3.1.2.1.4. [Very High 6.3.1.2.2. By Technology 6.3.1.2.2.1. [Electromechanical and Static Relay 6.3.1.2.2.2. Digital and Numerical Relays 6.3.1.2.3. By Application 6.3.1.2.3.1. □Overcurrent Protection 6.3.1.2.3.2. Distance Protection 6.3.1.2.3.3. Differential Protection 6.3.1.2.3.4. Carrier-Current Protection 6.3.1.2.3.5. Motor Protection 6.3.1.2.3.6. Frequency Protection 6.3.1.2.3.7. Others

6.3.1.2.4. By End-use 6.3.1.2.4.1. Utilities 6.3.1.2.4.2. Industrial 6.3.1.2.4.3. [Railway 6.3.1.2.4.4. Others 6.3.2. Canada 6.3.3. Mexico \*All segments will be provided for all regions and countries covered 7. Europe Protective Relay Market Outlook, 2018-2032F 7.1.∏Germany 7.2.∏France 7.3.∏Italy 7.4. United Kingdom 7.5. Russia 7.6. Netherlands 7.7. Spain 7.8. Turkey 7.9. Poland 8. Asia-Pacific Protective Relay Market Outlook, 2018-2032F 8.1.∏India 8.2. China 8.3. ]Japan 8.4.∏Australia 8.5. Vietnam 8.6. South Korea 8.7. Indonesia 8.8. Philippines 9. South America Protective Relay Market Outlook, 2018-2032F 9.1. Brazil 9.2.∏Argentina 10. Middle East and Africa Protective Relay Market Outlook, 2018-2032F 10.1. Saudi Arabia 10.2. UAE 10.3. South Africa 11. Demand Supply Analysis 12. Import and Export Analysis 13. Value Chain Analysis 14. Porter's Five Forces Analysis 15. PESTLE Analysis 16. Pricing Analysis 17. Market Dynamics 17.1. Market Drivers 17.2. Market Challenges 18. Market Trends and Developments 19. Case Studies 20. Competitive Landscape 20.1. Competition Matrix of Top 5 Market Leaders

20.2. SWOT Analysis for Top 5 Players 20.3. Key Players Landscape for Top 10 Market Players 20.3.1. Siemens AG 20.3.1.1. Company Details 20.3.1.2. Key Management Personnel 20.3.1.3. Products and Services 20.3.1.4. Financials (As Reported) 20.3.1.5. Key Market Focus and Geographical Presence 20.3.1.6. Recent Developments/Collaborations/Partnerships/Mergers and Acquisition 20.3.2. ABB Ltd. 20.3.3. ||Schnieder Electric SE 20.3.4. Eaton Corporation 20.3.5. Littlefuse Inc. 20.3.6. FANOX ELECTRONIC, S.L. 20.3.7. Mitsubishi Electric Corporation 20.3.8. Hitachi Energy Ltd. 20.3.9. Rockwell Automation 20.3.10. Larsen & Toubro Limited 20.3.11. Beckwith Electric (Hubbell Incorporated) \*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work. 21. Strategic Recommendations

22. About Us and Disclaimer



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