Big or small, let market leaders with extensive industry experience and advanced technical expertise help you solve your most challenging power protection problems.

Safeguarding your electrical power system starts with the development of a protection scheme that will keep your infrastructure stable by isolating components under fault conditions — all while leaving as much of your network as possible still in operation. Protective relays, current and potential transformers, circuit breakers, batteries and communication channels are all key players in any protection scheme. Keeping up with the rapid advances in technology and the increasing demand for improved power system control and reliability can be difficult. Finding and retaining the technical resources that understand the technology and philosophies utilized in power system protection schemes can also be difficult.

The experts at Emerson’s Electrical Reliability Services (ERS) understand your challenges. Our power system protection services provide solutions to address your needs. Whether you need commissioning and startup during the deployment stage; require testing and maintenance during operation; or are executing upgrades or retrofits for optimization, we can support your requirements. Our experience with both industrial and electric utilities allows us to deliver a high degree of efficiency and effectiveness to help you solve even your toughest protection problems.
Power System Protection Services
Emerson’s Power System Protection services help ensure the safe, reliable operation of your system. Depending on your specific operating requirements and application, ERS can customize a program to best fit your needs. Choose from the following power system services:

- Engineering
- Startup & Commissioning
- Maintenance & Testing
- Compliance Audit
- Life-Extension

Engineering Services
Emerson’s highly trained power engineers use advanced technology to create a comprehensive computer model of your system to analyze and deliver the information and recommendations you need to make informed decisions. This approach is essential for ensuring an efficient, integrated system that meets the growing and changing demands of your business. Our comprehensive engineering services include:

**Power System Studies**
Analyze the operation of your power system during normal and fault situations enabling you to optimize the design, function and operation of your protection system. Our power system studies include short circuit calculations, load flow, power factor correction, motor starting, power quality, harmonics and selectivity/coordination of relays and other protective devices.

**Protective Scheme Design Review**
Emerson’s technical staff can conduct a protective scheme design review and operational assessment to help you reduce potential arc flash hazards. Results from the study will uncover potential hazards so options can be evaluated and improvement/mitigation strategies can be employed.

**Short Circuit & Coordination Studies**
These studies determine the magnitude of currents flowing throughout your power system at various time intervals after a fault occurs, and evaluate the size and settings of a system’s protective devices to ensure minimum service interruption under overload and short-circuit conditions.

**Single-Line & Three-Line Diagrams**
ERS can conduct a comprehensive site survey to update existing diagrams or develop new ones as required.

These diagrams are essential for all future testing, service and maintenance activities, and need to change as your infrastructure changes to ensure your systems are adequately protected.

Arc Flash Analysis & Labeling
Arc flash studies provide recommendations for personal protective equipment (PPE); boundaries for limited, restricted and prohibited approaches; and recommendations for flash protection and safe work practices. Once Emerson’s technical staff has completed an arc flash analysis, the appropriate hazard warning labels will be applied.

Logic Programming & Settings
Not all equipment manufacturers or engineering firms include the development of protective relay logic settings in their projects. The importance of accurate logic settings is critical. Correct logic settings affect the speed, selectivity, and reliability of your protective relays. They ensure that your equipment does what it’s intended to do and that it performs at its optimum capability.

Startup & Commissioning Services
Like all other mission-critical systems, the power system protection system, including relays, should be commissioned to confirm operational reliability. The process of commissioning can be considered a documented quality assurance program that finds and resolves potential protection system-related problems before the system is started. The result is a documented verification that the entire system — as defined in the National Fire Protection Association’s NFPA 70: National Electrical Code and the North American Electric Reliability Corporation (NERC) PRC-005-2 standards — performs according to the design intent and the owner’s needs.

These tests are designed to prove that a particular protection scheme has been installed correctly prior to startup. All aspects of the scheme are thoroughly checked, from installation of the correct equipment through wiring checks and operation checks of the individual items of equipment, to testing of the complete scheme including end-to-end testing. It also includes system functional checks such as current injection, transfer trip, Automatic Transfer System (ATS), Uninterruptible Power Supply (UPS) and generator testing. Properly done, commissioning a project can help you avoid a whole range of problems, from nuisance tripping to failure to trip under fault conditions leading to major equipment damage, disruption to service and potential hazards to personnel.

Maintenance & Testing Services
Periodic testing is necessary to ensure that your protection scheme continues to provide satisfactory performance for many years after installation and is a requirement of NFPA 70E and NERC. All equipment is subject to gradual degradation over time, and because a protection scheme only operates under fault or other abnormal conditions, defects may not be revealed until such an event occurs. With proper maintenance and regular testing you can identify and correct problems that would otherwise go undetected — helping you avoid potential equipment damage, downtime, and ensure the safety of your personnel.
Only qualified and experienced personnel should perform maintenance and testing on your critical protection system. If maintenance is not done properly, problems may be introduced as a direct result of the remedial work. ERS power engineers and testing technicians have been performing testing and maintenance on all makes and models of protection components and all types including generation, transmission and distribution protection systems. Utilizing state-of-the-art test equipment from Manta, Doble, Megger, OMICRON and AVO; and software tools such as Enoserv RTS, Doble ProTest and PowerDB, we ensure the highest levels of efficiency and flexibility in testing. And, as an accredited SEL expert, ERS demonstrates a thorough knowledge and understanding of electric power systems and has the vast field experience required to properly maintain today’s complex and multi-functional relays within your protection system.

ERS power system protection maintenance and testing services include:

- Inspection, cleaning and calibration
- Maintenance and performance testing (including current injection testing)
- Grounding, ground grid and soil resistivity testing
- Troubleshooting and fault analysis

Compliance Audit Services

Staying abreast of the changes in regulatory requirements and understanding how those changes impact your business is a challenge — one that may require assistance from an external resource. The experts at ERS have extensive experience in the power industry, working with both industrial and utility clients. Field engineers undergo rigorous training that incorporates the latest in regulatory guidelines from the North American Electric Reliability Corporation (NERC), National Electrical Code (NEC), National Fire Protection Association (NFPA) and more. Don’t risk the fines, penalties, and dangers of non-compliance. Work with the experts at ERS to conduct a compliance audit to ensure your system is optimized while meeting applicable regulatory requirements.

Life-Extension Services

When your aging infrastructure has obsolete equipment that needs to be replaced but you cannot take on massive capital expenditures, ERS can help with upgraded and retrofitted equipment — at a savings of up to two-thirds the cost of new replacements. These life-extension services are ideal for circuit breakers and relays delivering enhanced digital, communication and safety capabilities available with today’s latest protection devices and component upgrades. Our Life-Extension services include:

Relay Upgrades:

Upgrade outdated protective systems from electro-mechanical to digital processing and achieve better system protection flexibility, more independent function availability, real-time metering and system monitoring, and reduced maintenance and calibration costs.

Relay Retrofits & Replacements

ERS also can provide turnkey design, installation and commissioning of retrofit and new replacement relays designed to ensure your protection scheme is stable and operates as efficiently as possible balancing dependability and security.

Circuit Breaker Retrofits

Upgrade low-voltage circuit breakers with new technology for improved protection, monitoring and energy management capabilities. For medium-voltage circuit breakers, upgrade to vacuum and SF6 technology for improved interrupting, momentary and continuous current ratings. These upgrades effectively extend the life of the equipment while improving performance and safety.

Direct Replacement Breakers

Replace old technology with new, fully engineered and tested direct replacement breakers. Replacements are designed to fit into the existing switchgear cell with little to no modification. They will interface with the existing switchgear structure and maintain safety interlocks inherent in the original design.
Expertise
In today’s competitive environment, it’s important to recognize that asset reliability is at the core of every successful operation. Emerson’s Electrical Reliability Services (ERS) brings together the best technical talent to help customers ensure their protection scheme is stable and that it operates as efficiently as possible. As an accredited SEL expert, ERS demonstrates a thorough knowledge and understanding of electric power systems and has the vast field experience required to properly maintain today’s complex and multi-functional relays within your protection system. Reliability is the number one concern for our dedicated engineering staff and NETA-trained and certified technicians with years of experience.

Comprehensive Reports
With all Power System Protection services, you’ll receive detailed reports with infrastructure data and clear recommendations for improving safety and reliability. Included with each report are the physical test data sheets, which include information on each asset’s location, defined maintenance period, test dates and results. These reports help with compliance as they meet the NFPA 70E and NERC requirements for documentation.

Innovative Technology
ERS combines world-class services with innovative technologies. Through state-of-the-art test equipment from Manta, Doble, Megger, OMICRON and AVO; and software tools such as Enoserv RTS, Doble ProTest and PowerDB, we ensure high levels of efficiency and flexibility in testing. This flexibility is necessary when testing a wide variety of complex equipment designed for different applications in multiple phases of a power protection system’s life cycle.

Unparalleled Responsiveness
Whether it’s an emergency or an ongoing project, you need service partners who can respond where and when you need them. With strategically located service centers across the United States, ERS is able to provide local response with nationwide capability.

Summary
Managing the complexities of your power system protection and ensuring the safe reliable operation can be a difficult challenge that requires multi-discipline expertise. In addition to designing the scheme; installing the infrastructure assets specific to your needs; properly programming protective devices; and executing ongoing system testing and maintenance; you must also comply with multiple, changing industry standards and regulatory requirements. It’s not always easy or even efficient to do it all yourself. However, you don’t have to do it alone. Trust ERS, an experienced partner with comprehensive resources to help you with your power system protection challenges. The team at ERS has the specialized skills you need for all phases of your infrastructure’s life cycle — design, deployment, operation or optimization. With exceptional employees, and advanced tools and technology, you can trust ERS to deliver the most complete power protection solutions.

Ordering Information
To learn more about this service and other Emerson Network Power solutions, please contact your local Electrical Reliability Services sales representative office or visit www.electricalreliability.com. In the U.S., call 1-877-468-6384.

Emerson — Your Partner in Reliability
From installation to operation, only Emerson has the knowledge and experience to seamlessly integrate all the essential services to deliver “high nines” reliability required by today’s critical facilities. Look to us as your partner. We’ll be with you every step of the way with the right combination of technology, people and services. Contact Emerson to realize the true potential of your assets.