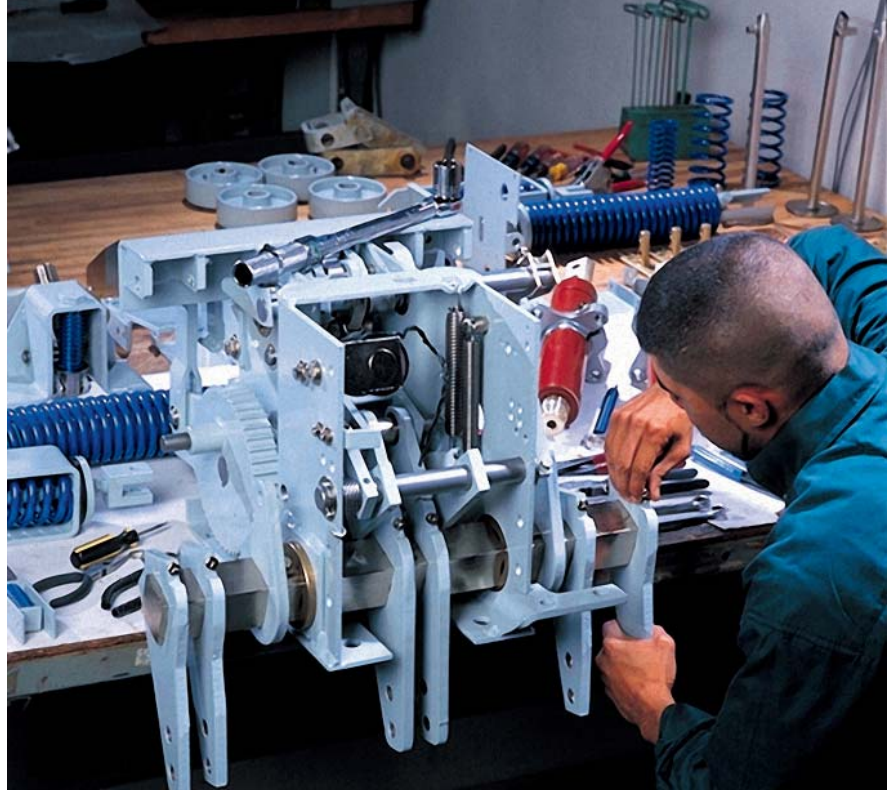


Life-Extension Services

Retrofit. Refurbish. Renew.

- *Enhanced electrical system reliability and communication capabilities*
- *Reduced maintenance and operating costs*
- *Conforms to all applicable standards*
- *Ensure increased level of safety*
- *Superior technology and monitoring ability*



Introduction

The components comprising your electrical distribution system will eventually become worn or obsolete, especially when considering today's rapid rate of technological advancement.

Depending on where you are in your plant's life cycle, the cost to keep these assets in operation can continue to rise despite best efforts to maintain the equipment. And, the cost of complete system replacement can be prohibitive.

The experts at Emerson can assist you in designing a cost-effective

solution to upgrade and retrofit your existing electrical assets with the latest technology—at a fraction of the cost of replacement. Your aging plant can quickly benefit from the enhanced digital and safety capabilities available with today's latest protection devices and component upgrades. This results in enhanced efficiency and reliability from your electrical components, effectively extending the life of your assets while

improving their efficiency and reliability.

Life-Extension Services

Aging electrical equipment presents a variety of concerns for today's asset manager. These systems have higher maintenance requirements, that not only cost more but also pose higher safety risks for your personnel. The potential for failure is higher, potentially leading to millions in lost profits.

Let the experts at Emerson help you identify and recommend solutions for properly extending the life of your electrical assets, while maximizing your investment. We have the solutions and expertise to upgrade many types of equipment with the latest technology. By upgrading components, you not only benefit from advanced technologies that improve efficiency, digital microprocessors that enhance stability and communications, and increased personnel safety; but also a significant savings of up to 2/3 the cost of direct replacement.

Are you planning a turnaround at your plant? Emerson can also assist you with identifying which assets can benefit from upgrading and retrofitting prior to taking your system offline. As part of our Smart Turnaround™ services, we can maximize your time for maintenance and repair while lowering your overall costs.

And, all of our upgrades conform to applicable standards. This ensures that you receive increased levels of safety, compliance, and reliability from your rebuilt equipment.

Retrofit and Renew Services

Emerson is equipped to provide complete life-extension services for all your critical electrical assets — regardless of age or manufacturer. From preventive maintenance and trip unit upgrades to complete retrofits, rebuilds, and replacement breakers, Emerson can help you improve the reliability and performance of your equipment. Our technical staff can perform life-extension services in the field or in the shop on the following electrical assets:

- *480v Circuit Breakers*
- *2,400v to 15,000v Circuit Breakers*
- *High Pressure Switches, Starters/Contactors, Motor Control Centers*
- *Electromechanical (EM) Relays*
- *Direct Replacement Breakers*

These life-extension services are designed to fit your budget and your specific operating requirements and application. Choose from the following service levels:

Refurbish

Periodic preventive maintenance is recommended for all electrical equipment to protect

it from adverse effects of heat, dust, moisture, and other contaminants—and to identify incipient problems before failure occurs. Emerson's Refurbishment Services include the following preventive maintenance activities:

- *Complete visual and mechanical inspection*
- *Clean and lubricate all mechanisms*
- *Perform electrical PM tests per NETA specifications*
- *Perform mechanical function tests*
- *Perform electrical function tests*

Recondition

As equipment ages, components begin to wear and insulation deteriorates leading to electrical leakage, tracking, and possible flashover. Damage is normally evident on the surface of insulating members and if it has not progressed to significant depths, can usually be resurfaced. Emerson's Reconditioning Services enable you to renew your aging equipment without the cost of rebuilding or replacement—extending the useful life and improving reliability. Emerson's Reconditioning services include the same preventive maintenance activities included in the refurbish services plus the following:

- *Perform "as found" inspection and electrical tests*
- *Complete disassembly*
- *Thorough inspection of all parts for physical integrity*

Electrical Reliability Services

- *Worn parts are replaced*
- *Arc-chutes removed and inspected*
- *Components are bead-blasted and polished*
- *Current-carrying elements are reconditioned*
- *Reassembly per manufacturer's specifications*

Rebuild

Once your electrical equipment has reached the end of its useful life, renew your assets with Emerson's Rebuild Services. These services enable you to renew your existing assets at a fraction of the cost of replacement. Our rebuild services for switches, starters, contactors, and motor control centers include replating, polishing, hardware replacement, and painting. Once completed, the asset can be installed into its existing cell, minimizing downtime. The rebuilt units are thoroughly tested, calibrated and evaluated to ensure longevity and reliability. Emerson's Rebuild Services include the same services included in our reconditioning service plus:

- *All steel components are replated*
- *All painted steel parts are stripped and powder coated*
- *All hardware is replaced*
- *Bearings and bushings are replaced*
- *Damaged or worn control wiring is replaced*
- *All components are bench tested prior to reassembly*
- *All insulators re-varnished*

Retrofit

Retrofit your old outdated equipment with new technology and experience the benefits of improved reliability, performance, and personnel safety. Low voltage breakers can be upgraded with new solid-state trip units featuring digital communication, adjustable settings, and enhanced protection capabilities, allowing for more robust and efficient operation than previous generations of breakers. Retrofitted breakers also have the ability for remote operation and increased energy management capabilities—reducing the overall operating costs of the equipment. Medium voltage breakers are updated and retrofitted with vacuum and SF₆ technology delivering improved reliability and decreased maintenance intervals. The large, heavy arc chutes and hot ionized gases are eliminated, making the retrofitted breaker much safer. Interrupting rating time is also improved, as well as momentary and continuous current ratings, bringing them up to the level of typical replacement breakers. Emerson's Retrofit Services include:

- *Perform basic Refurbish PM tests*
- *Remove existing trip unit*
- *Install new microprocessor based trip unit*
- *Verify trip unit operation by primary injection*

Electromechanical Relay Upgrades

Representing one of the best values in equipment upgrades is the replacement of electromechanical relays (EM) with new solid-state digital packages from trusted names such as Schweitzer Engineering Laboratories, GE, Basler, Multilin, and more. Digital relays are beneficial from the moment they are installed as they are designed to fit into existing switchgear lineups and can easily replace an entire rack of existing EM relays, while dramatically improving performance. Digital relays also have LCD displays for real-time metering and system monitoring, advanced communication ports, alarms and fault data monitoring from remote locations. You'll also benefit from reduced maintenance and calibration costs.

Direct Replacement Breakers

Advances in circuit breaker technology have enabled asset managers to exchange older, often obsolete equipment for upgraded replacements without disrupting existing switchgear. Most replacement breakers are designed to fit into the existing switchgear cells with minimal modifications and will interface with the existing switchgear structure while maintaining safety interlocks inherent in the original design. Benefits of replacement

circuit breakers typically include:

- *Enhanced electrical system reliability*
- *Less cost and downtime compared to new equipment installation*
- *Reduced maintenance and operating costs*
- *No need for obsolete or hard-to find spare parts—available for most manufacturers' LV ANSI switchgear*
- *Various digital trip devices for short circuit and overload protection*
- *Extended range of short circuit and continuous current capabilities*
- *Increased safety by adding ground fault protection*
- *All applicable ANSI standards met*
- *Through-door racking and trip unit display*
- *Increased safety by replacing with arc flash limiting breakers*

Summary

Emerson has the experience and technical knowledge necessary to handle your life-extension and renewal projects. Not only can we analyze your equipment and offer recommendations on how to effectively utilize today's technology and retrofits in the most cost-efficient way, but we also stand by our work that is backed by over 35 years of experience in electrical reliability testing and maintenance. We implement strict quality control programs, adhere to ANSI standards and provide a one-year warranty on parts and labor. We have the ability to work on equipment from every manufacturer and have the established network necessary to locate many hard-to-find parts and accessories.

Other benefits of Emerson's Life-Extension Services are:

- *Emergency service and support - 24 hours a day*
- *Warranty on all retrofits and rebuilds*
- *National network of 35 service locations*
- *State-of-the-art rebuild shop*
- *Qualified and accredited technicians*

Ordering Information

To learn more about this service and other Emerson Process Management solutions, contact your local Electrical Reliability Services sales representative office or visit us on the web at: www.assetweb.com/ers.

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.

**Emerson Process Management
Asset Optimization Division**
8760 Orion Place, Suite 110
Columbus, Ohio 43240
T 1 (877) 468-6384

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