

**ABB
Power Products Medium Voltage**



MV SERVICE



**Florence, SC
Napa, CA
Coral Springs,
FL**



Issues of Aging Switchgear

- Switchgear and Breakers are beyond a reasonably expected life
- Existing breaker technology is old and unreliable
- Replacements parts are difficult or impossible to locate, and costly
- Arc Chutes may contain Asbestos and can not be safely maintained
- Mechanisms are complicated and difficult to lubricate effectively without a comprehensive overhaul
- Operator safety is in question – arc flash hazards
- Customer is facing forced outages poor equipment reliability
- Maintenance support – workforce attrition

What is the Solution Criteria?

- Improve equipment reliability
- Improve the safety of equipment operation and operator's safety
- Reduce outage time required to execute the switchgear reliability improvement solution
- Be an ANSI engineered and tested solution
- Be cost effective
- Reduce the interval of maintenance through the use of new technology
- Fill the voids of maintenance support

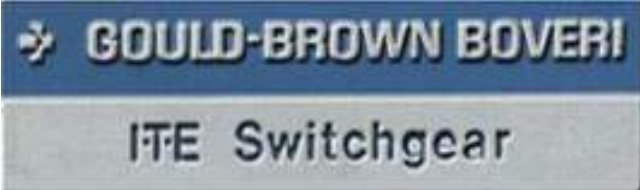
Aftermarket Product & Service Offering



- Aftermarket components (nuclear & non-nuclear)
- Match in line switchgear
 - MV – HK, HKII
 - LV - KLine
- LV & MV roll-in replacement breakers (RIR) (nuclear & non-nuclear)
 - Direct roll-in replacement
 - Cradle-in-cradle, where a cradle is racked or affixed to the existing cradle and a standard breaker is racked into this new cradle.
- Refurbishment (nuclear & non-nuclear)
 - In Florence facility (PSC)
 - On site
- Service (nuclear & non-nuclear)
 - Education & training
 - Power service
 - Relay service



Who is ABB?



Authentic Replacement Aftermarket Components

- Replacement parts for the full line of ABB switchgear and power circuit breakers
 - Contacts, supports, operating mechanisms, trip units, control components, hardware, etc
 - Plated bus, relays, panels, instrument transformers, etc
- Extensive inventory of most common parts for fast shipment
- Factory-based resources assure exact replacement parts are supplied to original equipment standards
- Nuclear & non-nuclear



*Low Voltage Breaker
Retrofit Kit*

Roll-in Replacements

- Cost effective
- Life extension for aging switchgear
- Nuclear & non-nuclear



McGraw Edison MV Breaker



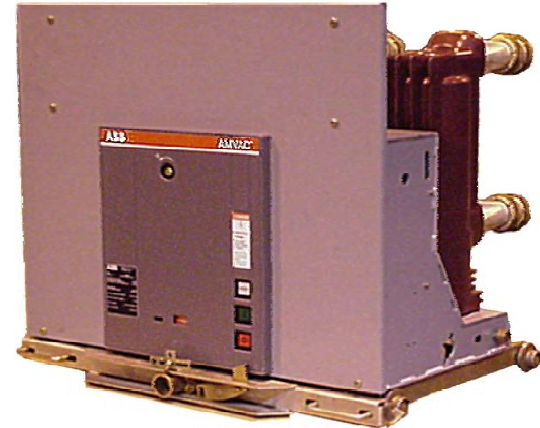
GE LV Breaker



GE MV Breaker

MV Replacement Breakers with AMVAC

- Operating mechanism rated for 100,000 no-load operations. 10 times normal!
- Virtually maintenance free
 - 10 year maintenance interval
 - Minimized lubrication requirements
- 90% less parts
- Interrupter assemblies rated for 30,000 load operations or 100+ short circuit operations
- Operate on a multitude of different control voltages without component changes
- Provide consistent and reliable operation



Emax Air Power Circuit Breakers

- Uniform Depth and Height

Depth < 12"
Height < 16.5"



Only width changes
From 800A-5000A

modular construction



Why the EMax?

- Experience – over 500,000 installed worldwide
- Modularity & dimensions
- Endurance & reliability - Mech 20K – Elec 10K
- Advance trip units
- UL Listed
- Meets and exceeds ANSI 37.16 & 37.59 conversion standards
- Ratings up to 5000A

Microprocessor Trip Units

- Operation without the need for an external power supply
- Microprocessor Technology
- High Precision
- True R.M.S. measurements for the current values
- Trip Cause indication and trip data recording
- Interchangeability among all types of trip units
- Bluetooth technology



ABB Low Voltage Replacement Circuit Breaker



GE AKR-30

Cradle in a
Cradle Type
Replacement

ABB Low Voltage Replacement Circuit Breaker

- Benefits of a Cradle in Cradle replacement
- Fits into and strengthens breaker cubicles that may have settled or shifted over time.
- Allows for the replacement breaker to roll into the cubicle without complications.
- Avoids misalignments of breaker connections
- Creates interchangeability between different breaker types for the customer. Many cradle types for many cubical types which will all hold the EMAX breaker.

Factory Circuit Breaker Refurbishment

- ABB provides refurbishment and repair of MV & LV legacy breakers
 - On-site engineering expertise
 - Factory certified technicians
 - Excellent synergy between factory knowledge & field experience
 - Loaner breaker program for many ratings
- Nuclear & non-nuclear



Service: Overview



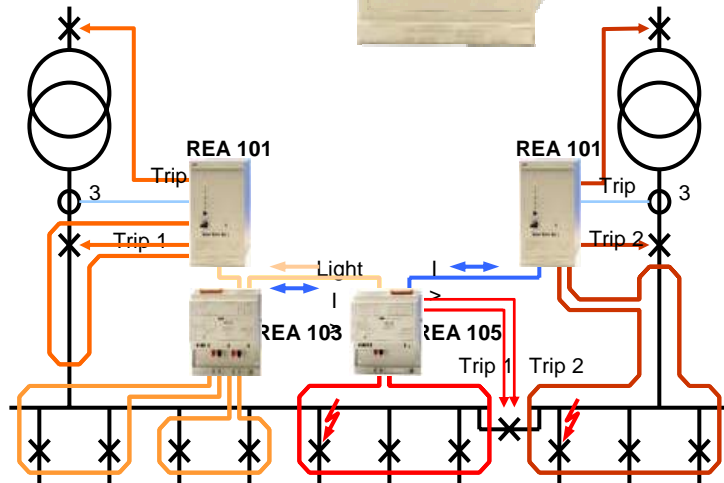
- Structured to provide support for our products and our customer's assets. Our service portfolio includes...
 - Technical supervision
 - Preventative and corrective maintenance
 - Upgrade and retrofit services
 - Engineering services
 - Service contract & extended warranties
 - Training

Relay Service: Offering



- Maintenance, retrofit, testing and calibration services
- Relay and protection services
 - Provide full line of maintenance, testing, calibration services
 - Support upgrade and replacement projects
 - Support ABB and other OEM products
 - Engineering study capabilities to complement relay services
- Nuclear & non-nuclear

The REA Features



- REA 101 Arc Protection Relay
- Fast trip time (< 2.5 ms)
- Unique fiber optic sensor technology with self supervision
- Current supervision for secure and reliable arc detection
- Easy to configure via front mounted dip switches
- Suitable for existing LV / MV switchgear installations or new applications
- Minimize potential risk of injury or death while increasing reliability
- Includes standard 12 year warranty

REA to upgrade existing Gear

- What ABB has to offer:
 - Service Group can offer Arc Flash Calculation
 - We can design and install the REA system for customers
 - We can design and train customer to install the REA system
 - Customers can and have installed systems themselves
- The REA has been tested in some of the vintage air magnetic breaker type switchgear with more testing scheduled

What are the aftermarket services & products MV Service provides?

- Emergency Repair Services
- Switchgear Upgrades
- Installation and Commissioning Services
- Training Services
- Preventative Maintenance and Testing Services
- Condition Assessment and Predictive Maintenance Services
- Refurbishment Services
- Match & Line swgr
- Replacement parts
- Safety Upgrades
- Engineered Solutions
- Breaker Retro-Fill and Replacements
- Relay Protection Panel Upgrades
- Modular Protection and Control Buildings