



ABB Low and Medium Voltage Service

Concerns of Aging Infrastructure

- 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

LV & MV Service Solutions



- Aftermarket components (nuclear)
- Breaker Refurbishment
- Replacement breakers
 - RiR, Retrofits, Legacy breakers
- Match in line switchgear
 - HK & KLine
- Protection & Control Service & Upgrades
- Engineering Studies, Assessments
- Training
- Safety Upgrades
- Field Service
 - Installation & Commissioning
 - Maintenance
 - Turnkey Projects
 - Disaster Mitigation

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

Roll-in Replacement Breakers



*McGraw Edison MV
Breaker*



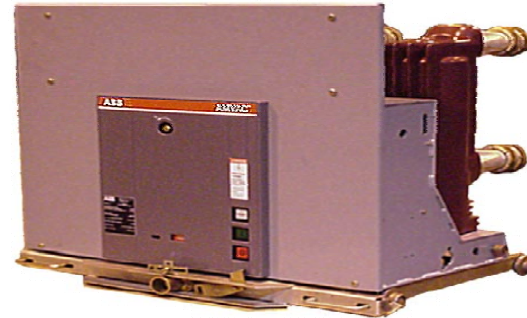
GE LV Breaker



*GE MV
Breaker*

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

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

ABB Low Voltage Replacement Circuit Breaker



- GE AKR-30
- Cradle in a Cradle Type Replacement

Factory Circuit Breaker Refurbishment



- ABB provides refurbishment and repair of MV & LV 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
 - Turnkey Projects
 - Project Management
 - Preventative and corrective maintenance
 - Upgrade and retrofit services
 - Engineering services
 - Service contract & extended warranties
 - Safety upgrades
 - Emergency Response
 - Training
 - Approved Service Partner Network

Turnkey Capabilities



- Typical Project Scope
 - Replacement of switchgear or other equipment
 - Installation & commissioning of large package
- MVS Capabilities
 - Procure all materials
 - Coordination of multiple LBU activities
 - Project Management
 - Manage subcontractors including construction work
 - Demolition of existing equipment – Installation of new
 - Acceptance Testing and Commissioning
 - Operational / Maintenance Training
 - Follow on Service and Maintenance contracts

Asset Assessment & Engineering Studies



- Asset Assessment
 - Phases of Assessment
 - Data Gathering
 - Data and System Analysis
 - Risk Mitigation & Contingency Plan
- Equipment Assessed
 - Medium Voltage Switchgear
 - Low Voltage Switchgear
 - Medium Voltage Motor Control
- Engineering Studies
 - Arc Flash study
 - Short Circuit Analysis
 - Relay Coordination
 - Power factor correction
 - Load balancing
 - Revenue Metering Verification

Relay Services



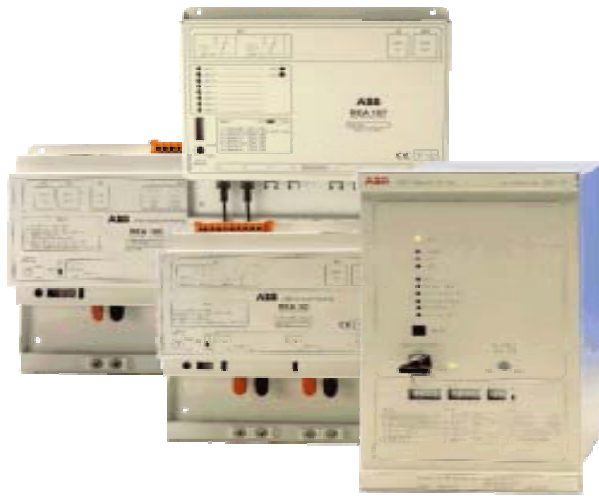
- Maintenance, retrofit, testing and calibration services
- Relay and protection services
 - Provide full line of maintenance, testing, calibration services
 - Support upgrade and replacement projects
 - Support ABB and other OEM products
 - Equipment upgrades
 - Relay Panels
 - REA Installations
 -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

Match & Line Legacy Switchgear



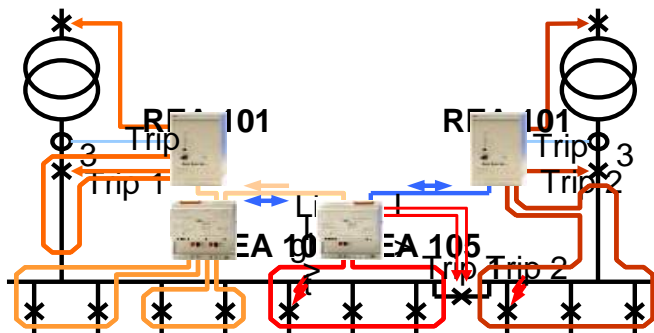
- Supporting add on frames to installed legacy switchgear
- Complete line-ups with turn key services
- 26" wide frames with Amvac technology
- Indoor and outdoor applications
 - HK
 - HKII
 - KLine

The REA Arc Flash Mitigation Relay 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 - upgrade existing equipment

- What ABB can 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
 - ABB 15HK
 - GE AM
 - Westinghouse DHP
 - All MV vacuum breaker switchgear

Power and productivity
for a better world™

