Frequently Asked Questions

MV Switchgear
Lake Mary, FL

General

- How long has ABB been in the switchgear business?
  - ABB has ties to forms of switchgear that date back to approximately 1905.
- How many employees work in the switchgear facility?
  - 205 regular full-time employees.
- What quality assurance standards or procedures are followed in the facility?
  - The facility is in conformance with ISO 9001:2000.
- What continuous improvement plans have been implemented in the facility?
  - Some examples of continuous improvement tools applied at the facility include Kaizen, quality audits, 4Q process for root cause searching & elimination, 5S, 6 Sigma & FMEA analyses, and an operational excellence / lean program.
- Is local support, technical service, or training available through ABB?
  - ABB provides a full range of after market support and field service for switchgear, indoor circuit breakers, and protection and control relays. In addition, ABB offers a variety of seminars that include hands-on application training and product training. Training sessions can be customized to meet the customer's request and are offered on site or at the factory.

Metal-Clad Switchgear Design

- What is the ABB approach to the design of switchgear?
  - The design philosophy is to keep operators out of HV compartments and away from the equipment as much as possible. In result, the design features a dedicated Instrumentation Compartment and self-aligning automatic secondary disconnects for Breakers and PTs which include a Delrin sleeve/receptacle that allows for a very small isolating gap to contain and extinguish the arc safely.
- What are some of the design features that differentiate ABB switchgear from the competition?
  - Modular design - This design enables the equipment to be put back into service faster and more economically in the event of repair or maintenance in the field. The smaller modular design maintains a compact product and allows ABB to offer a customized solution to the customer.
  - Hem bending - Eliminates sharp edges for increased safety, improves frame rigidity, reduces arc propagation, and creates a self supporting structure.
  - Galvanized steel construction – Galvanized steel does not require painting, is 3x as reflective as white interior paint, and is resistant to rust, corrosion, and scratches.
- Can ABB switchgear be built in a two-high configuration?
  - Yes, feeder breakers may be stacked vertically in any combination of 1200 A and 2000 A ratings. Main breaker cubicles can be stacked utilizing (1) 1200 A and (1) 2000 A circuit breakers.

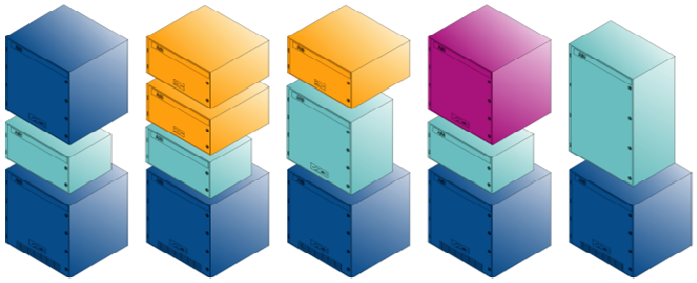
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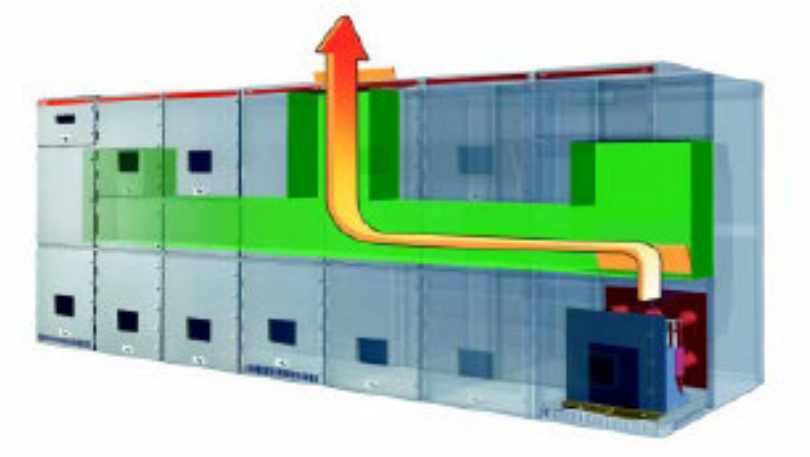
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- What are the standard frame dimensions?
  - Width – 36", Height – 95", and Depth – 85"
- What is the difference between the Type 2, Type 2C, and Type 2BC arc resistant ratings?
  - Type 2 rated switchgear has arc resistant construction on the front, back, and sides. Type 2C rated switchgear is Type 2 compliant but also includes arc resistant features or designs between compartments within a section or between adjacent vertical sections, except the main bus compartment. Type 2BC rated switchgear is 2C compliant but also has low voltage isolation. ABB SafeGear can meet IEEE C37.20.7-2007 Type 2, 2C, or 2BC arc resistant standards.
- What material is used for circuit breaker primary contacts?
  - Silver-plated copper contacts.
- What materials are used for bus construction?
  - The bus is constructed of 100% copper, silver plated at the joints, and insulated with an advanced epoxy powder coat. Removable, reusable boots are installed at each joint.
- How are relays selected for switchgear? Can relays of other manufacturers be installed in ABB switchgear?
  - Typically, ABB relays are quoted. However, relays from SEL, GE Multilin, and a variety of others are quoted if a different relay is a better fit for a particular application or specification.

Advance and SafeGear Switchgear

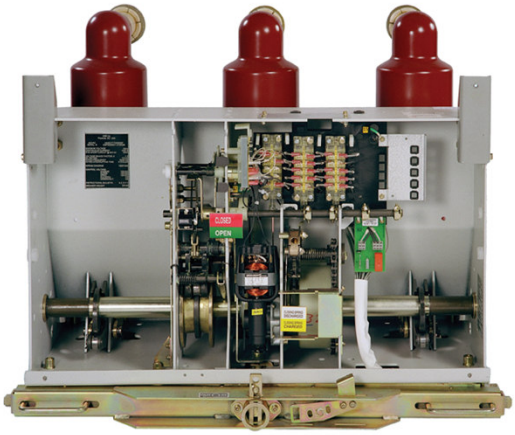
- What standards does ABB switchgear conform to?
  - ANSI, IEEE, and NEMA with optional UL or CSA listing.
- What are the available ratings for ABB switchgear?
  - Up to 15 kV.
- What are the main differences between the design and construction of Advance and SafeGear switchgear?
  - Advance is considered conventional switchgear.
  - All of the design features of Advance are included in SafeGear; however, SafeGear is arc-resistant. SafeGear provides enhanced safety for personnel and equipment by utilizing a design that includes:
    - Gasketed breaker doors secured with heavy duty hinges and bolts
    - Double side wall construction with 3/16" air gap effective in resisting burn through
    - Steel components twice as thick as conventional switchgear
    - An internal exhaust chamber to collect and vent gasses in the event of an arc flash
    - Closed door racking
    - Largest arc resistant window in the industry



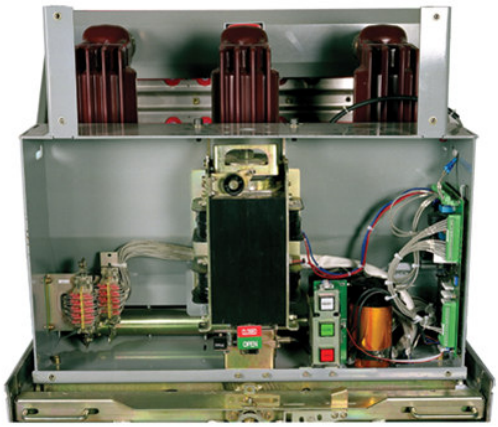
- How long has ABB been in the SafeGear, arc-resistant switchgear, business?
  - Since 1978 in Germany and since 1992 in Sanford, FL. The Switchgear facility was moved to Lake Mary, FL in 2000.
- How often should maintenance be preformed on the switchgear?
  - For SafeGear and Advance switchgear a yearly inspection is recommended.

ADVAC / AMVAC Circuit Breakers

- What are the main differences between the design and features of ADVAC and AMVAC circuit breakers?
  - ADVAC: Simple front-access, spring mechanism with vacuum breaker technology.
  - AMVAC: Magnetically operated mechanism with vacuum breaker technology. The device utilizes a design with 90% less moving parts, a capacitor to store energy, and a mechanism that is capable of performing 100,000 no load operations. The simple design increases reliability, reduces moving elements, and reduces the need for spare parts.



ADVAC



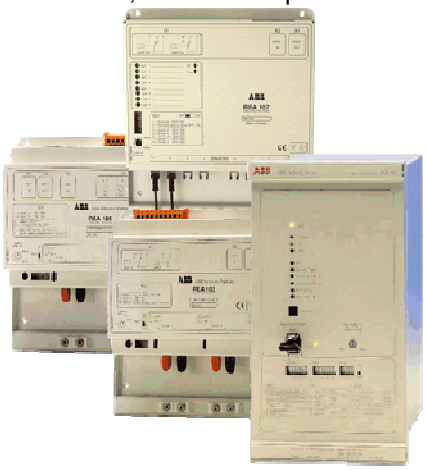
AMVAC

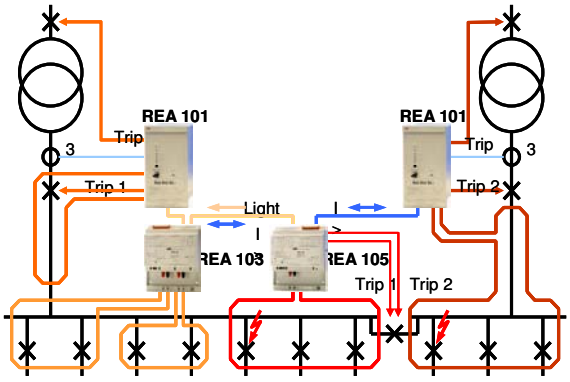
- What is the benefit of using vacuum circuit breaker technology?
  - The vacuum circuit breaker design allows for a drastic reduction in moving parts compared to conventional breakers. In result, ownership costs are reduced through improved reliability and maintainability.
- How long has the AMVAC operating mechanism been in the market?
  - The AMVAC operating mechanism has been in the market since 1997.
- What is the cycle time of each mechanism?
  - The standard ADVAC and AMVAC interrupting time is 5 cycles. However, a 3 cycle interrupting time is available as an option for each mechanism.

- How many operations can each mechanism perform?
  - ADVAC: Capable of 10,000 operations.
  - AMVAC: Capable of 100,000 operations.
- Can ABB circuit breakers be remotely racked?
  - Yes, the breakers can be remotely racked by use of a portable racking device. ABB offers this device that enables the customer to rack an ADVAC or AMVAC breaker at a distance of 10 to 20 feet away.
- Can ABB circuit breakers be rolled directly onto the floor?
  - The standard switchgear design does not enable the circuit breaker to be rolled directly onto the floor. Instead, ABB utilizes a frame design with a lip. The lip of the switchgear breaker compartment ensures proper sealing of the door and prevents the ingress of dirt and other contaminants.
- How often should service be performed on the ADVAC and AMVAC mechanisms?
  - ADVAC: Service according to the instruction manual is recommended every 2 years.
  - AMVAC: Virtually maintenance free, only minor lubrication is needed. However, as a precaution inspection is recommended every 5 years.

REA Arc Mitigation Equipment

- What is the main function of the REA system and how does it work?
  - The REA system is an arc mitigation system that reduces the risk of an arc flash in terms of equipment damage and personnel safety. Using fiber optic sensor technology, the REA system detects light from an arc flash and sends a signal to trip in ≤ 2.5 ms. By reducing the clearing time with the REA, arc flash incident energy is reduced by up to 80%, and PPE requirements may be reduced.





- How long has ABB manufactured the REA system?
  - The first versions of the REA system hit the market in the late 90's.
- How many REA systems have been installed?
  - Approximately 10,000+ REA systems have been installed worldwide.
- Can existing switchgear be retrofitted with the REA system?
  - Yes, the REA system is suitable for installation either on existing LV / MV switchgear or new applications. Electricians can be trained by ABB to equip approximately 10 frames per day with the REA system.
- Does the REA system eliminate the need for SafeGear arc-resistant switchgear?
  - No, SafeGear and the REA are complementary systems and should be promoted together. SafeGear provides premium protection when the system is in operation and all the doors are closed and sealed properly. The REA helps mitigate the effect of an arc flash when the doors are open, benefiting personnel working on or near the equipment.
- How often should maintenance be preformed on the REA equipment? Should the optic cables be cleaned periodically?

- No maintenance on the REA equipment is required. If minor dust or other particulates accumulate on the optics cable, the performance of the equipment will not be affected.

- Is there a warranty that is available with the REA system?
  - The REA system comes standard with a 12 year warranty.

Miscellaneous

- What accessories are recommended with the purchase of Switchgear?
  - Handle – Used for manually charging the circuit breaker operating mechanism.
  - Racking Crank – Used for inserting and removing primary assemblies.
  - Lift Truck – Used for raising or lowering primary devices to the appropriate height and safely rolling the devices into compartments.
  - Test Jumper – Allows for a connection between secondary contacts on a breaker and the switchgear while outside a breaker compartment.
  - Test Cabinet – Separates power source and containing switches to open and close a breaker and serves as an aid to breaker inspection and maintenance.
  - Ground and Test Devices – Drawout assembly compatible with circuit breaker compartments. Provides a means to select and test primary circuits in a controlled manner, and then connect deenergized primary circuits to the switchgear ground bus to support maintenance activity.
  - Dummy Circuit Breakers – No-load disconnect device similar to a drawout circuit breaker but without an operating mechanism, controls, or interrupters.
  - Electric Racking Device – Portable device that allows customer to remotely rack an ADVAC or AMVAC circuit breaker at distances of 10 to 20 feet.
- What products in the switchgear portfolio are safety related?
  - SafeGear switchgear, the REA system, the AMVAC circuit breaker, PDCs, and the VisiVolt are a few of the main switchgear products that are focused on safety.
- What is a PDC?
  - The PDC, or Power distribution Center, is a prefabricated, modular, skid-mounted enclosure for switchgear and auxiliary equipment. A plenum installed on the switchgear provides a path for arc propagation to exhaust outside the building, protecting personnel, equipment, and the PDC itself.





- What is the VisiVolt and where can it be used?
  - A voltage indicator that can be installed on any unshielded MV system from 3 kV to 36 kV. Requires no power supply, indoor or outdoor application, and is compact and easy to install.



- Does ABB offer switchgear that is partially equipped?
  - Yes, ABB offers what is known as abbreviated switchgear for this request.
- Is the exterior finish of the switchgear salt spray tested?
  - Yes, the exterior finish passes the ASTM B117 salt spray test.
- Can ABB paint switchgear special colors?
  - Yes, the switchgear can be painted special colors to meet a customer's specification. As a standard, the switchgear is painted ANSI 61 light gray for indoor switchgear.
- Can ABB switchgear be seismic rated?
  - Yes, the switchgear can be rated up to a UBC Zone 4 rating.
- What altitude and temperature range is the switchgear rated for?
  - The temperature range of the switchgear equipment is compliant with ANSI standards. For altitudes above 3,300 ft. an altitude rating correction factor table must be used to correct published circuit breaker ratings.
- What tests are performed on the switchgear before it is shipped from the factory?
  - All ANSI defined switchgear production tests are carried out on the equipment.
- What type of warranty is included or available for switchgear?
  - A 12 month warranty is included as a standard.

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