SafeGear™ Motor Control Center
Arc resistant metal-clad construction
Motor Control Center
Descriptive bulletin
1. Introduction

SafeGear MCC is an arc-resistant metal-clad construction Motor Control Center. SafeGear MCC is ABB's ANSI platform for 7.2kV rated featuring a narrow footprint and designed and tested per IEEE C37.20.2, IEEE C37.20.7, UL-347 5th edition and CSA C22.2. Featuring galvanized steel construction, hem bending techniques, and Delrin® arc-quenching contacts (PTs module), SafeGear MCC is designed with safety, reliability and durability in mind.

2. Product highlights

- Fully compliant to CSA & UL 347 5th edition for Motor Control Centers
- Meets the IEEE C37.20.2 for metal-clad switchgear construction
- Type 2B arc resistance accessibility
- One and two-high construction
- No transition section required for coupling to ABB SafeGear® SwitchGear
- Dead front that avoids access to live parts
- Automatic secondary disconnects
- Closed door PT racking
- SmartRack™ remote racking system for contactors as well as PTs
- Optional ground studs for safety during maintenance
- Optional infrared windows available for temperature monitoring
- Optional surge arresters for lightning protection

3. Available configuration/competitive footprint

SafeGear MCC is the only metal-clad construction MCC in the ANSI market with two-high configuration. Each MCC frame is 30 inches wide, 68 inches deep and 95 inches high regardless of one or two-high construction. Each frame includes a separate isolated low voltage compartment that separates relays, meters and other instruments using grounded metal barriers, protecting maintenance personnel from exposure to high voltage.
4. PT arc-quenching contacts

SafeGear MCC uses Delrin arc-quenching contacts for PT contacts. A sleeve with a round conductor probe is inserted into a receptacle with recessed contacts. Due to its unique properties, Delrin performs as self-lubricating contacts, arcs created during load break conditions are extinguished by a gas emitted by the Delrin material as it heats. The PT contact design also includes a shutter assembly as standard.

5. Galvanized steel construction

ABB’s SafeGear MCC is built using galvanized steel construction to enhance protection from rust, scratches and corrosion. Galvanized steel is used inside low voltage compartments for enhance illumination properties to provide a better instrument viewing.

6. Hem bending

Hem bends, being the process of folding a single sheet of steel over upon itself, is used throughout construction of SafeGear MCC for increasing rigidity and reducing arc propagation. This construction technique also protects maintenance personnel and any low voltage wiring inside the MCC as it eliminates sharp edges and burs in the metal work.

7. Accessories

− Racking Crank
− Test Cabinet
− Test Jumper
− Lift Truck

8. SafeGear MCC Options

− Infrared monitoring window ports
− Ground CTs
− Surge arresters
− Ground studs

9. Vacuum contactor

The Vacuum Contactor consists of a unique technology that decreases maintenance requirements, increases reliability and enhance personnel safety.

**Reduced maintenance:** Vacuum bottle contacts have long life with virtually no maintenance required.

**No external surge protection:** Special main contact materials minimize chopping current. No surge suppresser required.

**Designed for safety:** High voltage and low voltage compartments are totally separated by an insulated barrier (non-flammable molded frame).

**Electronic control drive unit:** All contactors include electronic control of the operating coil which offers a wide control voltage of 100-240Vac & 100-250Vdc, anti-chopping feature and reduce power consumption.
HCV-5HA contactor ratings

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Rated Voltage</td>
<td>7200 Volts</td>
</tr>
<tr>
<td>Rated Current</td>
<td>400 Amps</td>
</tr>
<tr>
<td>Interrupting Capacity</td>
<td>7000A RMS Symmetrical @5000V Max.</td>
</tr>
<tr>
<td></td>
<td>4500A RMS Symmetrical @7200V Max.</td>
</tr>
<tr>
<td>Permissible Switching Frequency</td>
<td>1200/Hour</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>2,500,000 Operations</td>
</tr>
<tr>
<td>Electrical Life</td>
<td>250,000 Operations</td>
</tr>
<tr>
<td>Closing Time</td>
<td>75-100 ms</td>
</tr>
<tr>
<td>Opening Time *</td>
<td>20-30 ms</td>
</tr>
<tr>
<td>Arcing Time</td>
<td>10 ms or less</td>
</tr>
<tr>
<td>Pick-Up Voltage AC or DC</td>
<td>85% Rated (Hot) - 70% Rated (Cold)</td>
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<tr>
<td>Drop-Out Voltage AC or DC</td>
<td>50% Rated (Hot) - 40% Rated (Cold)</td>
</tr>
<tr>
<td>Rated Control Voltage AC</td>
<td>115/120 or 230/240 V 50/60 Hz</td>
</tr>
<tr>
<td>Rated Control Voltage DC</td>
<td>120/125 or 240/250 V</td>
</tr>
<tr>
<td>Coil Circuit Inrush</td>
<td>670 VA AC (700 W DC)</td>
</tr>
<tr>
<td>Coil Circuit Holding</td>
<td>85 VA AC (85 W DC)</td>
</tr>
<tr>
<td>Auxiliary Contact Arrangement</td>
<td>3 N.O. - 3 N.C.</td>
</tr>
<tr>
<td>Auxiliary Contact Rating</td>
<td>10 A, 600 V (NEMA Class A600)</td>
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</tbody>
</table>

* - DC switching, opening terminals 3 & 4.

HCV-5HAL (latched type only)

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Permissible Switching Frequency</td>
<td>300/Hour</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>250,000 Operations</td>
</tr>
<tr>
<td>Tripping Voltage</td>
<td>40-60% Rating DC</td>
</tr>
<tr>
<td>Tripping Current</td>
<td>4.8 A DC Max</td>
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10. Current transformers

Suitable for CT type SAB and SAB-D
Suitable up to 3 set of indoor current transformers type SAB-1
Suitable for one set of indoor current transformers type SAB + SAB-D

Product features
- 600 volt indoor, 10 kV BIL
- 60 Hz /contact factory for 50Hz styles)
- Primary amperes: 50-5000
- Mechanical rating: 180 X rated current
- Thermal rating: 80 x rated current, one second
- Continuous current rating factor: 50-4000 primary amperes:
  1.33 @ 30°C ambient, 1.00 @ 55°C ambient 5000 primary amperes: 1.00 @ 30°C ambient, 0.50 @ 55°C ambient

Application
The SAB and SAB-D current transformers are used as the source of current or relaying and metering. Each type is available in two internal window diameter sizes, applicable to the current rating on the switchgear. The deeper case SAB-D is used when high burden relaying and metering is required.

Construction features
The ring-type core is insulated and toroid wound with a fully distributed secondary winding. The protective case, made of an impact-resistant polycarbonate, is assembled using self-tapping screws.
Secondary terminals
Secondary terminals are 10-32 brass terminal screws with hardware. Space is available for a maximum of five terminals to accommodate multi-ratio designs.

Curves
Saturation, overcurrent, ratio correction factor, and phase-angle curves are available upon request.

11. Potential transformers

Types VIY-60 Indoor potential transformers (wye or delta connection)

Product features
- 5 kV indoor
- 60kV BIL, 60 Hertz
- Primary volts: 2400-4800
- UL recognized component

Application
The VIY-60 indoor voltage transformer is designed for service in metal-clad switchgear and is used for relaying, metering and control power applications.

Construction features
The primary and secondary coils are wound using special winding and shielding techniques for improved voltages stress distribution. The coils are designed to withstand continuous operation at 1.1 times the line to line voltage level and the line-to-ground voltage units, a short-time withstand voltage of 1.9 is available upon request.

Each coil is insulated with Mylar film to provide a high dielectric strength between layers. The coils and core are combined to create a complete winding structure that is assembled to a support frame. The entire assembly is vacuum cast in polyurethane for added insulation and protection.

Fuse classification
The unit is provided with three fuse classifications: mounted fuse with hardware, unfused with hardware, or unfused without hardware. Optional fuse kits are offered to convert some unfused styles to fuse styles. Consult your ABB sales representative concerning overvoltage conditions for designs above the standard rated voltage factor 1.1.

Test reports
IEEE test reports are stored electronically and can be e-mailed in various formats at the time of shipment.

Standards
These units meet all applicable IEEE and NEMA standards and are UL Recognized Components Provided.
12. Types VIZ-75 indoor potential transformers

Types VIZ-75 Indoor potential transformers (wye or delta connection)

**Product features**
- 8.3 and 15kV indoor
- 75 and 110 kV BIL, 60 Hertz
- Primary volts: 2400 – 14400
- UL recognized component

**Application**
The VIZ-75 and VIZ-11 indoor potential transformers are designed for service in metal-clad switchgear and are used for metering, relaying or control power. Both units are available in single, double and tapped secondary designs with two accuracy and thermal rating options.

**Construction features**
The primary and secondary coils are wound using special winding and shielding techniques for improved voltage stress distribution. The coils are designed to withstand continuous operation at either 1.1 or 1.25 times the line-to-line voltage level for Z burden units and 1.9 times the line-to-ground voltage level for Y burden units.

Each coil is insulated with Mylar film to provide a high dielectric strength between layers. The coils and core are combined to create a complete winding structure that is assembled to a support frame. The entire assembly is vacuum cast in polyurethane for added insulation and protection.

**Fuse classification**
These units are provided with three fuse classifications: mounted fuse with hardware, unfused with hardware or unfused without hardware. Optional fuse kits are offered to convert unfused styles to fused styles.

**Mounting**
The VIZ-75 and VIZ-11 can be mounted in upright, cantilever or upside-down positions.

**Test reports**
Test reports are stored electronically and can be e-mailed in various formats at the time of shipment.

**Standards**
This unit can be tested to all applicable IEEE, CSA or IEC standards as requested.
13. Distribution protection and control Relion® relays

ABB’s Relion family of protection and control relays for distribution applications provides the performance, safety and ease-to-use that a switchgear user requires. The Relion 615 and 620 series offer complete protection and control for feeders, motors and transformers in switchgear applications and are characterized by their flexibility and performance in today’s and future distribution schemes.

The IEC61850 implementation in Relion includes fast peer-to-peer communication over the substation bus. GOOSE communication is used between Relion devices in switchgear to form a stable, reliable and high-speed bus bar protection system, provide fast and dependable auto transfer schemes and zone interlocking. Separate hard-wiring is not needed for the horizontal communication between the switchgear cubicles.

Relion relays for feeder protection offer an optional cable fault detection function that can detect extremely short duration underground faults. These faults are typically undetectable by conventional protection where there is no operation of the breaker. This feature helps users to learn of these events faster, resulting in a reduced down time.

ABB’s COM600 Grid Automation Controller can be used as a local HMI to display switchgear single line diagrams and the status of devices such as breakers and protection relays. COM600 also provides gateway functionality to enable switchgear integration into SCADA systems. It can be easily installed as part of the switchgear control devices.

Relion 615R, 615 and 620 series include:

- Comprehensive set of protection and metering functions for feeders, transformers and motors
- Draw-out design
- Integrated Open/Close push buttons and Local/Remote selector with indicating lights
- Protection and control for one and two breakers as well as breaker-and-a-half schemes
- Enhanced safety with optional arc fault protection in all 615 and 620 series relays
- Web browser based user interface accessible through an RJ45 front port
- Trip coil monitoring
- Monitoring of breaker health parameters such as travel time, number of operations, wear and tear, and spring charging time
- DNP3 and Modbus protocols included standard in all relays
- Relion Relays are fully IEC61850 compliant for communication and interoperability of substation automation devices
- Fully ANSI and RoHS compliant as well as UL listed
Contact us

Your sales contact:
www.abb.com/contacts

More product information:
www.abb.com/productguide

www.abb.com

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