2017

SafeGear® Motor Control Center
Arc Resistant Metal-Clad Construction
Descriptive Bulletin
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SafeGear® Motor Control Center
Arc resistant Metal-Clad construction

1. Introduction

SafeGear MCC is an arc-resistant Motor Control Center with metal-clad type construction suitable for up to 7.2 kV applications. The SafeGear MCC is designed and tested to meet with IEEE C37.20.2, IEEE C37.20.7, UL-347 5th edition and CSA C22.2. Featuring galvanized steel construction, hem bending manufacture techniques, and Delrin® arc-quenching contacts (PT module), the 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 as per IEEE C37.20.7
- One and two-high construction (Available for both 400 and 720 Amps)
- 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

The SafeGear MCC is the only ANSI Motor Control Center in market with two-high configuration for both 400A & 720A. 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 compartment 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 burrs in the metal work.

7. Accessories

- Racking Crank
- Test Cabinet
- Test Jumper
- Lift Truck
- SmartRack racking device
- Extension ramp
8. SafeGear MCC Options

- Infrared windows for temperature monitoring
- Ground CTs
- Surge arresters
- Ground studs
- Potential Transformers
- Arc-flash protection relay (REA)
- Heaters
- Multipoint latch doors

9. Vacuum contactor

The Vacuum Contactor consists of a unique technology that decreases maintenance requirements, increases reliability and enhances 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 suppressor 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 and 100-250 VDC, anti-chopping feature and reduce power consumption.

## Contactor Assembly ratings

<table>
<thead>
<tr>
<th>Contactor model</th>
<th>HCV-SHA</th>
<th>HCV-5HAL (Latched Type)</th>
<th>HCV-6KAU</th>
<th>HCV-6KALU (Latched Type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>2400/4200/6900 V (7.2 kV Max)</td>
<td>2400V/4200/6900 V (7.2 kV Max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Current</td>
<td>400 A</td>
<td>720 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interrupting Capacity</td>
<td>7000A RMS Symmetrical @5000V Max.</td>
<td>4500A RMS Symmetrical @7200V Max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak withstand current</td>
<td>15.8 kA</td>
<td>20 kA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse Withstand</td>
<td>60 kV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible Switching</td>
<td>1200/Hour</td>
<td>300/Hour</td>
<td>600/Hour</td>
<td>300/Hour</td>
</tr>
<tr>
<td>Mechanical Life Operations</td>
<td>2,500,000</td>
<td>250,000</td>
<td>1,000,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Electrical Life Operations</td>
<td>250,000</td>
<td>250,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closing Time</td>
<td>50-110 ms</td>
<td></td>
<td>80-120 ms</td>
<td></td>
</tr>
<tr>
<td>Standard Opening Time</td>
<td>10-60 ms</td>
<td></td>
<td>35-85 ms</td>
<td></td>
</tr>
<tr>
<td>Arcing Time</td>
<td>10 ms or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Control Voltage AC</td>
<td>115/120 or 230/240 V 50/60 Hz</td>
<td>100-240V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Control Voltage DC</td>
<td>120/125 or 240/250 V</td>
<td>100-240V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip Voltage</td>
<td>-</td>
<td>24, 32, 48, 125, 250 VDC</td>
<td>-</td>
<td>24, 32, 48, 125, 250 VDC</td>
</tr>
<tr>
<td>Control Circuit Burden (Closing)</td>
<td>5.4 A peak @ 120 VAC, 670 VA (AC), 700 W (DC)</td>
<td>6 to 7.0 A @ 120 VAC, 840 VA (AC), 875 W (DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Circuit Burden (Holding)</td>
<td>0.12 A Avg. @ 120 VAC, 85 VA (AC), 85 W (DC)</td>
<td>0.8 to 1 A @ 120 VAC 48 VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Contact Rating</td>
<td>10 A, 600 V (NEMA Class A600)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Current transformers

CT type SAB and SCG
Up to 3 set of indoor current transformers type SAB-1 can be mounted.
One set of indoor current transformers type SAB + SAB-D can be mounted.

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
- UL recognized component

Application
The SAB and SAB-D current transformers are used as the source of current for 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.

Test reports
Test reports are stored electronically and can be e-mailed in various formats at the time of shipment.
11. VIY-60 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 level for Y burden units. For some 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.

Terminals
Compression-type primary terminals accommodate #8 through #2 wire. Secondary brass terminal inserts are 3/8" deep with a .190-32 compression screws. A compression type terminal that accommodates #14 through #4 wire is provided on fused units on the line end of each fuse.

Mounting
The VIY-60 can be mounted in upright, cantilever, or upside-down positions.

Baseplate
The baseplate is constructed of corrosion-resistant aluminum and is secured to the encapsulated base support.

Curves
Type curves are available upon request.

Test reports
Test reports can be e-mailed in various formats at the time of shipment.
12. VIZ-75 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 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 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 level for Y burden units. For some line-to-ground voltages 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
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 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.
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 REM620, REM601 and REM615 are dedicated motor IEDs perfectly aligned for the protection, control, measurement and supervision of asynchronous motors in manufacturing and process industry. The 615 and 620 series IEDs are characterized by flexibility and performance for demanding utility distribution and industrial applications also by their compactness and withdrawable design.

Engineered from the ground up, the 601, 615 and 620 series has been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability between substation automation devices.

REM615 and REM620 offer all the functionality needed to manage motor starts and normal drive operations, including protection and fault clearance in abnormal situations. The main features of the motor IEDs include thermal overload protection, motor start-up time supervision, locked rotor protection, and protection against too frequent motor starts. Furthermore, the IEDs offer negative phase sequence current unbalance protection, motor running stall protection, loss-of-load supervision, phase-reversal protection, and a provision to perform a forced emergency start.

**Key REM615 ANSI features**
- Six setting groups
- Drawout design
- High-speed (< 1 ms) outputs
- Normally-closed output for motor contactors
- Dedicated machine-run-time timers
- Machine differential
- Up to 6 RTD inputs available
- Loss-of-load supervision
- Arc flash detection (AFD)
- Thermal overload protection of motor
- Ring-lug terminals for all inputs and outputs
- Large, easy to read LCD screen
- Environmentally friendly design with RoHS compliance

**Key REM620 ANSI features**
- Six setting groups
- Drawout design
- High-speed (< 1 ms) outputs
- Normally-closed output for motor contactors
- Dedicated machine-run-time timers
- Motor differential protection
- Up to 14 RTD inputs
- 5 mA inputs
- Loss-of-load supervision
- Arc flash detection (AFD)
- Thermal overload protection of motor
- Ring-lug terminals for all inputs and outputs
- Large, easy to read LCD screen
- 2 Programmable push-buttons
- Environmentally friendly design with RoHS compliance
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