



SafeGear™ Motor Control Center

Arc resistant metal-clad construction

Power and productivity
for a better world™



Contents

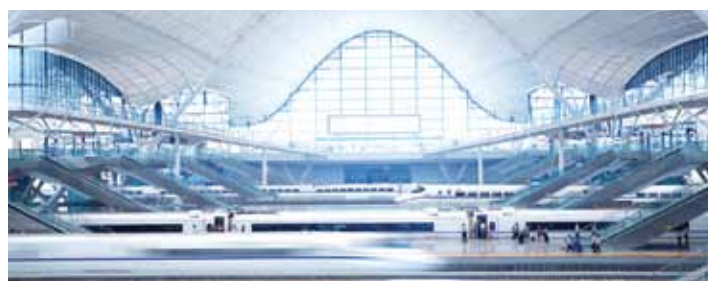
Description	2
SafeGear™ MCC applications	3
Electrical features	3
Standards	3
Standard service conditions	4
HCV vacuum contactor	4
Cubicle features	6
SafeGear MCC section view	7
General dimensions	7

1. Description

Designed for the highest degree of safety and reliability, the arc-resistant metal-clad construction Motor Control Center, SafeGear MCC, provides the greatest case of use on the market.

SafeGear MCC is equipped with mechanical interlocks between the draw-out contactor truck and the front door to increase operation and maintenance safety.

For optimal flexibility, the SafeGear MCC is designed to be used in combination with SafeGear® Metal-Clad switchgear so a transition section is not required.



2. SafeGear MCC applications

Suitable for most applications

Utilities and power plants

- Substations
- Power generation stations
- Transformer stations
- Switching stations
- Main and auxiliary switch-gear

Infrastructure

- Shops
- Hospitals
- Educational
- Waste water treatment

Industry

- Pulp and paper
- Cement
- Textiles
- Chemicals
- Food
- Automotive
- Oil and gas facilities
- Metallurgy
- Rolling mills
- Mines

Transportation

- Airports
- Ports



3. Electrical features

Electrical features		SafeGear MCC
Enclosure Type		Type 1 Gasketed*
Arc resistance accessibility type		Type 2B
Rated voltage	(kV)	Up to 7.2
Insulation level / Power Frequency / Lighting impulse BIL	(kV)	7.2 / 20 / 60
Rated frequency	(Hz)	60
Rated main bus current	(A)	1200, 2000 or 3000
Rated contactor current	(A)	400

* Also known in Mexico as NEMA 1A

4. Standards

The SafeGear MCC and main apparatus contained in it comply with the following standards:

UL 347, 5th edition	Medium-Voltage AC contactors, controller and control centers
UL 50/50E	Enclosure for Electrical Equipment
IEEE C37.20. 2	Standard for Metal-clad switchgear
IEEE Guide C37.20.7	Guide for test metal-enclosed switchgear for internal arcing faults
CSA C22.2 No. 253-09	Medium-voltage ac contactors, controllers, and control centers
CSA 22.2 No. 14	Industrial Control Equipment
NMX-J-564/106-ANCE	Asociación de Normalización y Certificación, A.C
NRF-146	Tableros de Distribución en Media Tensión
NRF-048	Diseño de instalaciones eléctricas

5. Standard service conditions

The rated SafeGear MCC features are guaranteed under the following conditions:

- Minimum ambient temperature: -5°C
- Maximum ambient temperature: $+40^{\circ}\text{C}$
- Maximum 24 hour ambient relative humidity: 95% non-condensing
- The normal operational altitude is up to 1000m above sea level. For higher altitude applications, please contact your ABB sales representative
- Non-corrosive and non-contaminated atmosphere
- Transition section is not required for connections with ABB's SafeGear Metal-Clad switchgear of similar rating



6. HCV vacuum contactor

Description

The medium voltage V-Contact HCV contactors are suitable for alternating current operation and are normally used to control customer's requirements for a high number of hourly operations.

The basic contactors consist of:

- Molded polyester resin monoblock containing the vacuum interrupters
- Bistable electromagnet drive
- Multi-voltage feeder
- Auxiliary contacts
- Mechanical status indicator (open/closed).

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

Environment resistant: Ideal for use in high dust areas. Switching arc is contained within the vacuum bottle, shielding the main contacts.

Electronic control drive unit: All contactors include electronic control of the operating coil which offers a wide control voltage of 115/120 or 230/240V ac 50/60Hz (120/125 or 240/250V dc), anti-chopping feature and reduced power consumption.

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

HCV -5HA coil drive unit

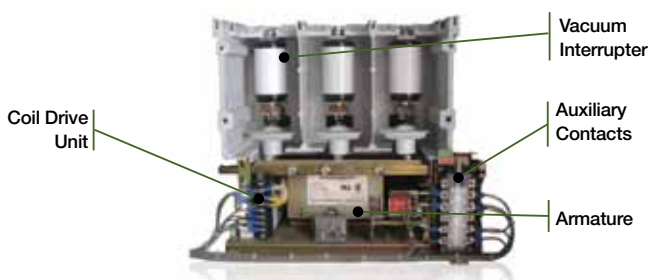


Vacuum contactors are rated to perform switching operations before the unit requires maintenance, typically 2.5 millions.

Since vacuum contactors are not designed for interrupting currents higher than a few kiloamperes, a fuse in series is required to protect the distribution system against faults. A contactor requires a holding current in the solenoid coil to keep it in the closed position.

Although the holding current is often quite small, customers are sometimes concerned that the contactor will open during a brief control power outage. Some designs incorporate mechanical latches to keep the contactors in a closed position. However, these latches do not perform all the functions of conventional circuit breakers.

A latched vacuum contactor is not a circuit breaker in terms of functionality or in terms of its rating. However, properly utilized it can provide long service and trouble-free operation.



Electrical Characteristics of HCV

Description	HCV-5HA
Rated Voltage	7200 Volts
Rated Current	400 Amps
Interrupting Capacity	7000A RMS Symmetrical @5000V Max. 4500A RMS Symmetrical @7200V Max.
Permissible Switching Frequency	1200/Hour
Mechanical Life	2,500,000 Operations
Electrical Life	250,000 Operations
Closing Time	75-100 ms
Opening Time*	20-30 ms
Arcing Time	10 ms or less
Pick-Up Voltage AC or DC	85% Rated (Hot) - 70% Rated (Cold)
Drop-Out Voltage AC or DC	50% Rated (Hot) - 40% Rated (cold)
Rated Control Voltage AC	115/120 or 230/240 V 50/60 Hz
Rated Control Voltage DC	120/125 or 240/250 V
Coil Circuit Inrush	670 VA AC (700 W DC)
Coil Circuit Holding	85 VA AC (85 W DC)
Auxiliary Contact Arrangement	3 N.O. - 3 N.C.
Auxiliary Contact Rating	10 A, 600 V (NEMA Class A600)

Description	HCV-5HAL (Latched Type Only)
Permissible Switching Frequency	300/Hour
Mechanical Life	250,000 Operations
Tripping Voltage	40-60% Rating DC
Tripping Current	4.8 A DC Max

*DC switching, opening terminals 3 & 4.

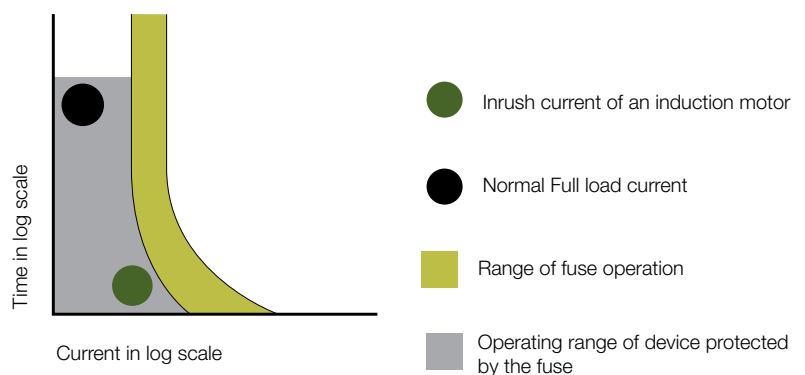
Fuse technology

There are two kinds of power fuses: standard (general purpose) and current limiting fuses.

Ratings of standard fuses depend on (1) the normal continuous current and (2) the time it takes for the fuses to respond to the different magnitudes of over-current. Fusible links, the principle elements of every fuse, can have different lengths and thickness and can be made of different metals or alloys.

The interrupting medium of a fuse also influences its operating characteristics. This characteristic of the standard fuse is an inversely proportional time-over-current curve, as shown schematically in the figure.

Time-current characteristic curve of a power fuse



Proper selection of a fuse for an induction motor is very important. An improperly selected fuse can permanently damage the motor and other equipment in the system. Both starting inrush and normal load currents have to be considered.

Application	Voltage	Type of fuses	Rated Amps
Motor Protection	5.5	Bolt - In	70, 100, 130, 170, 200, 230, 315, 390
Transformer Protection	7.2	Bolt - In	10, 15, 20, 25, 30, 40, 50, 65, 80, 100, 125, 150, 175, 200, 250, 300, 350
Motor Protection	5.5	Bolt - In	70, 100, 130, 150, 170, 200, 230, 390

7. Cubicle features



Contactor truck assembly



Single phase protection



Shutters



Exhaust plenum



Main bus and supports

Contactor truck assembly

The vacuum contactor and power fuses are mounted on a fully withdrawable rackable truck. This truck assembly eliminates the need of an isolation switch, therefore reducing the number of moving parts and simplifying the handling, maintenance and safety.

Single phase protection

A blown fuse trip system can actuate a limit switch that will trip the contactor and energize an indicating lamp located on the instrument compartment cell door.

Shutters

A metallic shutter blocks access to primary contacts when the contactor is in the Disconnected/Test position or withdrawn from the SafeGear MCC. The motion of the withdrawable contactor opens and closes the shutter automatically.

Exhaust plenum

In the event of an internal arc, the exhaust plenum will safely vent the gases outside the building.

Main bus and supports

The available main bus ratings are 1200, 2000 and 3000A.

Bus supports and insulation materials are flame-retardant, track-resistant and non-hygroscopic.

Bus bars are made of copper and have fully round edges. Bus insulation is heat-shrinkable tubing as standard (solid epoxy coating available as an option).

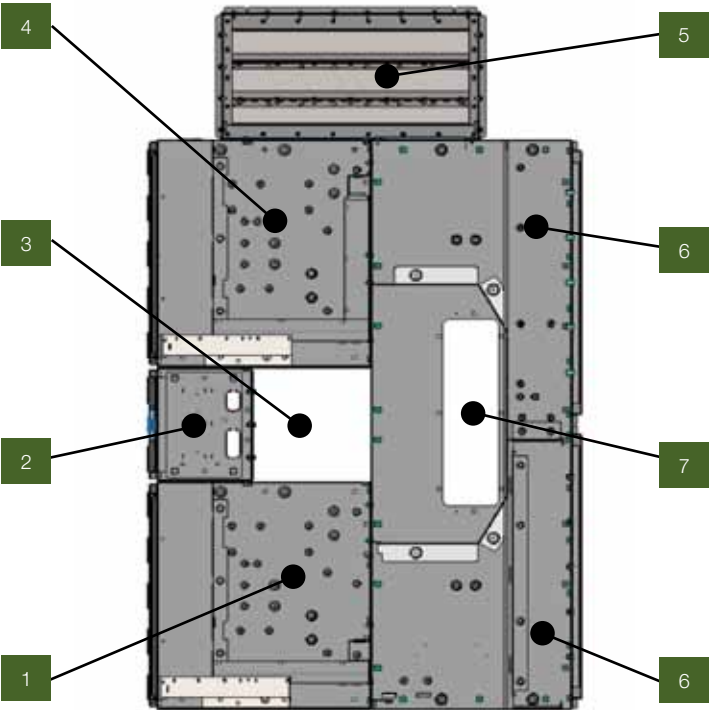
Connection joints, as well as bus bars, are silver-plated (tin plated as an option).

Power fuses

Current limiting power fuses are installed with the withdrawable contactor and are suitable for use with motor, capacitor or transformer applications.

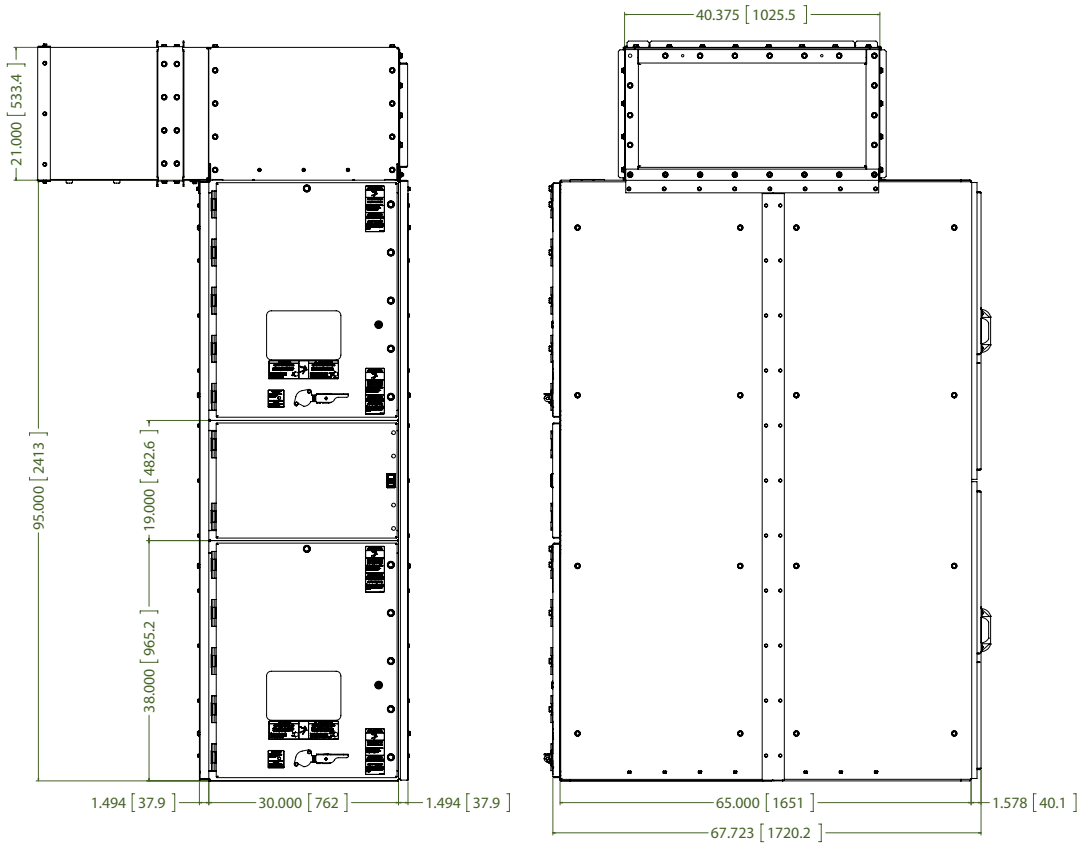
Power fuses for motor protection (type R) will be equipped with bolted type connection. Optional power fuses for feeder or transformer protection (type E) equipped with bolted type connection are also available.

8. SafeGear MCC section view



1.	Lower contactor compartment
2.	Low voltage compartment
3.	Vent chamber
4.	Upper contactor compartment or PT compartment
5.	Plenum
6.	Power cables compartment
7.	Bus compartment

9. General dimensions



in[mm]

Contact us

Your sales contact:

www.abb.com/contacts

More product information:

www.abb.com/productguide

www.abb.com

The information contained in this document is for general information purposes only. While ABB strives to keep the information up to date and correct, it makes no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the information, products, services, or related graphics contained in the document for any purpose. Any reliance placed on such information is therefore strictly at your own risk. ABB reserves the right to discontinue any product or service at any time.

© Copyright 2014 ABB. All rights reserved.

1YERSC 140011A00-REV 0 - SafeGear MCC 2.5