2017

SafeGear® Motor Control Center Controller Catalog

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SafeGear® Motor Control Center Controller

1. General overview

The Controller is a magnetically actuated and latched contactor capable of a very high number of operations due to its simple and rubust design. The contactor's ratings are 400 and 720 A and NEMA Class E2. It conforms to latest International Standards such as UL 347and ICS3 part 2.

Controller Features

- Withdrawable design
- Fuse status indicator
- Position indicator
- Operation counter
- Controller status
- Local trip on the front side
- Blown Fuse Mechanism

Fig. 1 Controller

Contactor Model	HCV- 5HA	HCV-5HAL (Latched Type)	HCV-6KAU	HCV-6KALU (Latched Type)
Rated Voltage	2400/4200/6900 V (7.2 kV Max)		2400/4200/6900 V (7.2 kV Max)	
Rated Current	400 A		720 A	
Interrumpting Capacity	7000 A RMS Symmetrical @5000 V Max.		7200 A	
	4500 A RMS Symmetrical @7200 V Max			
Peak withstand current	15.8 kA		20 kA	
Impulse Withstand	60 kV			
Permissible Switching	1200/Hour	300/Hour	600/Hour	300/Hour
Mechanical Life Operations	2,500,000	250,000	1,000,000	200,000
Electrical life Operations	250,000	250,000	200,000	
Closing Time	50-110 ms		80-120 ms	
Opening time	10-60 ms		35-85 ms	
Arcing Time	10 ms or less			
Rated Control Voltage AC	120 or 240 V 50/60 Hz		100-240 VAC	
Rated Control Voltage DC	125 or 250 V		125-250 VDC	
Trip Voltage		24, 32, 48, 125, 250 VCD		24, 32, 48, 125, 250 VCD
Control Circuit Burden (Closing)	5.4 A peak @120 VAC, 670 VA (AC), 700 W (DC)		6 to 7.0 A @ 120 VAC, 840 VA (AC), 875 W (DC)	
Control Circuit Burden (Holding)	0.12 A Avg. @120 VAC, 85 VA (AC), 85 W (DC)		0.8 to 1 A @ 120 VAC 48 VA	
Auxiliary Contact Arrange	3 N.O.- 3 N.C.	2 N.O.-2N.C.	3 N.O.- 3 N.C.	2 N.O.-2N.C.
Auxiliary Contact Rating	10 A, 600 VA (NEMA Class A600)			

Table 1 Contactor assembly ratings.

2. Normal Service Conditions

Normal operation conditions	
Minimum ambient temperature	-5°C
Maximum ambient temperature	40°C
Maximum 24 hours ambient relative humidity	85% Non-condensing
Normal operational altitude above sea level	1000m
Normal non-corrosive and non-contaminated atmosphere	

Table 2
If the contactor is to be used in conditions other than those specified above, please consult the factory.

Controller Weight Approximate		
Controller	**400 A**	**720 A**
Maximum Weight approximate - lbs (kg)	375 (170)	750 (240)

Table 3
The table shows approximate values for controller weight with 500VA CPT.

Storage

Place the equipment on the shipping base. Store all equipment indoors in a well-ventilated area. The location where the contactor is to be installed should be free from dust, corrosive gas and moisture. When it is to be used in a chemical plant or in outdoor applications, take necessary precautions against corrosion, water seepage and condensation.

The storage building should have a well-drained paved floor. The temperature should be between 23°F (-5°C) and 104°F (40°C). The air should be dry (50% maximum humidity).

3. Power Fuses

Recognized Component R and E-Rated Fuses can be used. The following fuses are used with the contactor for motor or transformer applications.

Motor Protection							
5.08kV				7.2kV			
Mersen Catalog Number	Size	Continuous Ampere Rating	No. of Barrels	Mersen Catalog Number	Size	Continuous Ampere Rating	No. of Barrels
A051B1DAR0-2R	2R	70	1	A072B1DAR0-2R	2R	70	1
A051B1DAR0-3R	3R	100	1	A072B1DAR0-3R	3R	100	1
A051B1DAR0-4R	4R	130	1	A072B1DAR0-4R	4R	130	1
A051B1DAR0-6R	6R	170	1	A072B1DAR0-5R	5R	150	1
A051B1DAR0-9R	9R	200	1	A072B1DAR0-6R	6R	170	1
A051B1DAR0-12R	12R	230	1	A072B1DAR0-9R	9R	200	1
A051B2DAR0-18R	18R	390	2	A072B1DAR0-12R	12R	230	1
A051B2DAR0-24R	24R	450	2	A072B2D0R0-18R	18R	390	2
A051B2DAR0-32R	32R	600	2	A072B2D0R0-24R	24R	450	2
A051B2DAR0-38R	38R	700	2	A072B2D0R0-32R	32R	540	2
A051B3DAR0-48X	48X	750	3	A072B2D0R0-48X	48X	750	2

Table 4
R-Rated fuses are intended to provide short circuit protection only. An R-Rated fuse is not designed to protect against overloads. Relays must be the means of protection against overloads.

Transformer Protection					
5.5kV			8.25kV		
Mersen Catalog Number	Amp. Rating	No. of Barrels	Mersen Catalog Number	Amp. Rating	No. of Barrels
A055B1DAR0-10E	10E	1	A083B2DAR0-125E	125E	2
A055B1DAR0-15E	15E	1	A083B2DAR0-150E	150E	2
A055B1DAR0-20E	20E	1	A083B2DAR0-175E	175E	2
A055B1DAR0-25E	25E	1	A083B2DAR0-200E	200E	2
A055B1DAR0-30E	30E	1	-	-	-
A055B1DAR0-40E	40E	1	-	-	-
A055B1DAR0-50E	50E	1	-	-	-
A055B1DAR0-65E	65E	1	-	-	-
A055B1DAR0-80E	80E	1	-	-	-
A055B1DAR0-100E	100E	1	-	-	-
A055B1DAR0-125E	125E	1	-	-	-
A055B1DAR0-150E	150E	1	-	-	-
A055B1DAR0-175E	175E	1	-	-	-
A055B2DAR0-200E	200E	1	-	-	-
A055B2DAR0-250E	250E	2	-	-	-
A055B2DAR0-300E	300E	2	-	-	-
A055B2DAR0-350E	350E	2	-	-	-
A055B2DAR0-400E	400E	2	-	-	-

Table 5 Transformer protection.

4. Maximum load ratings for motors and transformers

The maximun load ratings for motor and transformer applications are shown below. The maximum sizes of fuses for motor are only 24 R for 400 A and 48 X for 720 A.

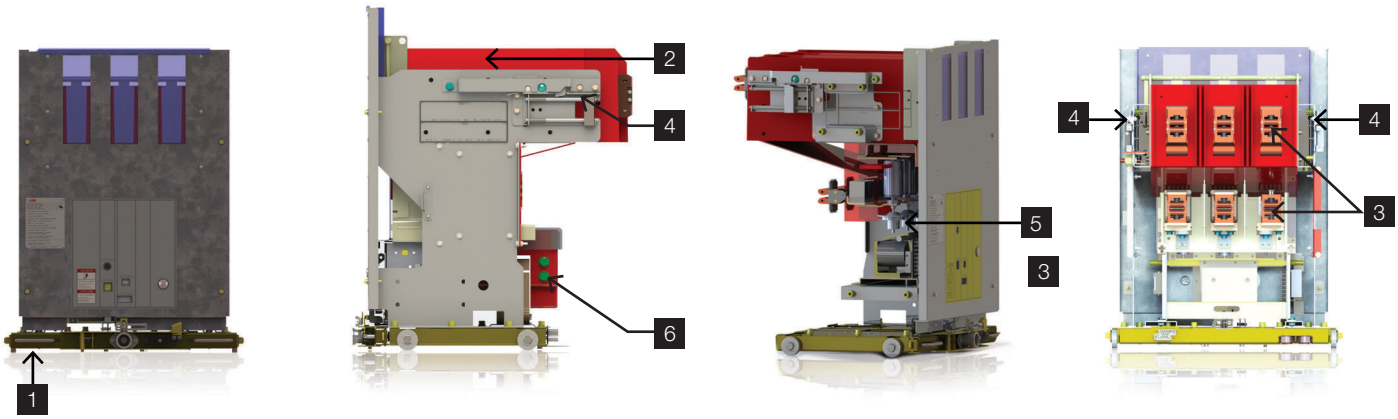
Maximum load Ratings for motors										
Voltage Rating (kV)	2.4		4.16		4.8		6.6		6.9	
Contactor Rating (A)	400	720	400	720	400	720	400	720	400	720
Induction motors (HP)	1500	2700	2600	4700	3000	5400	4200	7500	4400	7800
Induction motors (kW)	1100	2000	1900	3500	2200	4000	3100	5800	3200	5800
Fuse type	24R	48X	24R	48X	24R	48X	24R	48X	24R	48X

Table 6
Considerations: Efficiency 95%, PF=0.9, Start time: 10 sec, Service Factor=1.25 (Accorgind to NEC), Fusing Factor=1.33. The fuses shown in chart above were selected with the values above mentioned and they should only be taken as reference. The final selection of power fuses is the resposabilty of the customer based on system and load parameters and shall be confirmed during engineering stage of the project.

Maximum load rating in KV for transformers				
Voltage Rating (kV)	2.4	4.16	4.8	6.9
Contactor Rating (A)	400	400	400	400
Transformers (KVA)	1000	2000	2500	1500
Fuse type	400E	400E	400E	200E

Table 7
Fuses will conduct transformer magnetizing inrush current of 25 times transformer primary rated current for 0.1 seconds and 12 times for 0.01 second.

5. Construction



1. Extraction Truck
2. Fuse Box
3. Contact Finger (They are different between 720 A and 400 A)
4. Shutter's charge mechanism
5. Vacuum bottles
6. CPT (Control Power Transformer)

6. Shutter's Charger Mechanism

When the controller is removed, the shutter cover the primary contacts of the controller compartment. When the springs are charged and the controller is inserted, the shutter's charge mechanism provides the energy required to activate the opening of the shutter's charge mechanism and to permit the connection with the primary contacts.

Procedure

Before placing the contactor inside the module, is necessary to charge the springs shown manually.

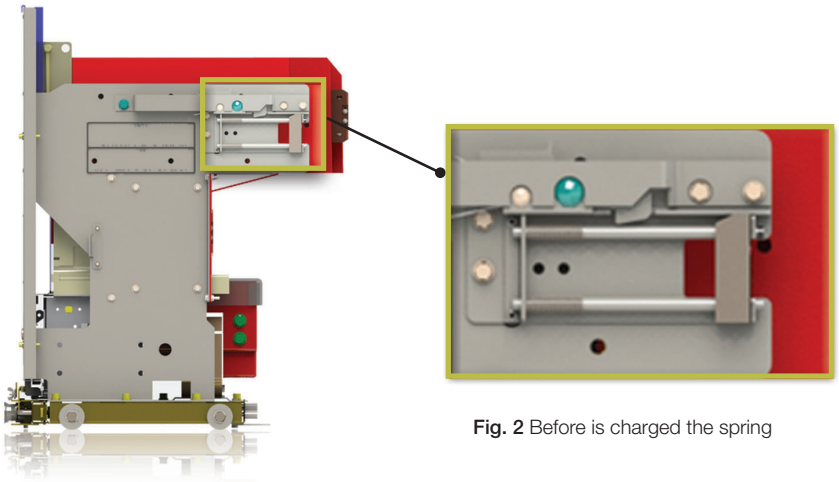


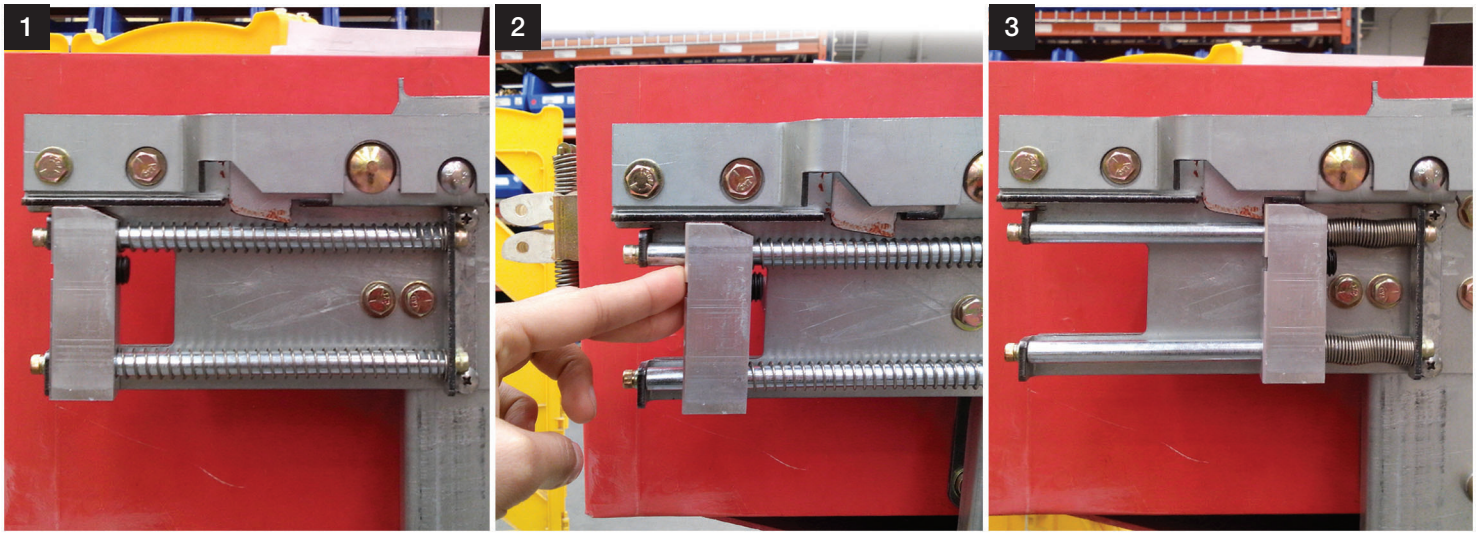
Fig. 2 Before is charged the spring

Steps for charging the springs manually:

1 The spring is in its normal position.

2 Charge the spring manually by pushing the metal block (as shown in the picture).

3 In this position, the spring is charged. (Note: When the spring is charged, it maintains its position as shown in the picture).



7. Anti-single phasing

What is a Phase Loss?

When one phase of a three-phase system is lost, a phase loss occurs. This is also called 'single phasing'. Typically, a phase loss is caused by a blown fuse, thermal overload, broken wire, worn contact or mechanical failure. A phase loss that goes undetected can rapidly result in unsafe conditions, equipment failures, and costly downtime.

Voltages and currents in a three-phase system do not typically just drop to zero when a phase is lost. Often measurements yield confusing values that require a great deal of complex analysis to correctly interpret. Meanwhile, damage and downtime of the equipment continues to rise.

What happens with a phase loss?

When a 3-phase motor runs with one phase missing, the remaining 2 phases will take more load from the missing phase making them work harder, over heat and burn out.

Antisingle phasing device

ABB's anti-single phasing device is a blown fuse indicator mechanism. When a fuse is blown, the mechanism is activated and transmits a signal to the relay and all the three-phases are disconnected.

NOTE: This configuration is available and depends of relay's programming by others.

8. Selection of Controller

		1	2	3	4	5	6	7	8	9	10	11	12	13
México	M													
Contactor	C													
SafeGear MCC	2													
	5													
Contactor Features (Table 8)	X													
	X													
	X													
Trip Coil Voltage	NON-Latched	0												
	24 VCD	1												
	32 VCD	2												
	48 VCD	3												
	125 VCD	4												
	250 VCD	5												
Secondary Control Voltage (AC/DC)	100-110	1												
	115-120	2												
	125	3												
	200-220	4												
	230-240	5												
	250	6												
Number of CPTs	NONE	0												
	1 CPT	1												
	2 CPTs	2												
Control Power Transformer (Table 9)	X													
	X													
Documentation	NONE	0												
	Copy of test data card	1												

Rated Voltage (kV)	Contactor Rated Current (A)	Non latched-latched	Code
4.16	400	Non-Latched	4N5
		Latched	4L5
	720	Non-Latched	7N5
		Latched	7L5
7.2	400	Non-Latched	4N7
		Latched	4L7
	720	Non-Latched	7N7
		Latched	7L7

Table 8 Contactor Features.

CPT USED IN CONTACTOR ASSEMBLIES						
Ratio	Primary Voltage (V)	Secondary Voltage (V)	Frecuency (Hz)	VA's	CPT Vendor Part Number	Code
20:1	2400	120	60	500	CPT3-60-0.5-242FF	01
20:1	2400	120	60	1000	CPT3-60-1.0-242FF	05
30:1	4200	120	60	500	CPT3-60-0.5-422FF	25
34.7:1	4160	120	60	1000	CPT3-60-1.0-4161FF	23
40:1	4800	120	60	450	CPT3-60-0.5-482FF	33
40:1	4800	120	60	1000	CPT3-60-1.0-482FF	39
	6600	120	60	500	CPT-SD02525*	41
60:1	7200	120	60	600	CPT3-60-1.0-722 (UNF)	49
	7200	120	60	1000	CPT3-60-1.0-722	53

Table 9 Control Power Transformer (CPT).
*Confirm the availability with the factory

Contact us

Your sales contact:
www.abb.com/contacts

More product information:
new.abb.com/medium-voltage/switchgear/motor-control-centers/ansi/ansi-air-insulated-motor-control-switchgear-safegear

1YEPMSC2517E012-Rev. A, MCC 2.5 April 2017