



Technical guide

ADVAC™

5/15 kV ANSI spring mechanism vacuum
circuit breaker

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ADVAC breaker

General overview

The ADVAC breaker is a spring mechanism breaker with an easy to maintain design. Fully compliant with IEEE Standards C37.04, C37.06 and C37.09, the ADVAC breaker is a great fit for many applications.

Featuring a modular design surrounding the EL-mechanism for breakers 50 kA and below and the ABB classic mechanism for 63 kA. ADVAC breakers are among the most reliable breakers on the market.

Features

- Mechanical operations counter
- Optional roll-on-floor design
- Breaker status open or closed indicator
- Mechanical anti-pump device
- Spring charge status
- Built-in manual charge handle (50 kA and below)



Available ADVAC breaker ratings

Voltage class	Nominal voltages	Continuous current	Short circuit/withstand (2 sec)	Close and latch	BIL (lightning impulse withstand)	Low frequency withstand (Hi-Pot)
kV	kV	A	kA, rms	kA, peak	kV, crest	kV, rms
5	2.4, 4.16, 4.8	1200, 2000, 3000	25	65	60	19
			31.5	82		
			40	104		
			50	130		
			63	164		
8.25	4.8, 6.9, 7.2	1200, 2000, 3000	40	104	95	36
			63	164		
15	6.9, 7.2, 8.4, 11, 12, 12.47, 13.2, 13.8, 14.4	1200, 2000, 3000	25	65	95	36
			31.5	82		
			40	104		
			50	130		
			63	164		

ADVAC breaker

Capacitor bank switch ratings

Voltage class	Continuous current	Short circuit current	Capacitor switching ratings	
kV	A	kA	Type	Notes
5	1200	25	C2	630 A back to back capacitor bank
		31.5	C2	25 A rated cable charging
		40	C2	25 A rated cable charging
		50	C2	1200 A back to back capacitor bank
		63	C1	1770 A back to back capacitor bank
	2000	25	C2	25 A rated cable charging
		31.5	C2	25 A rated cable charging
		40	C2	1200 A back to back capacitor bank
		50	C2	1200 A back to back capacitor bank
		63	C1	1770 A back to back capacitor bank
	3000	25	C2	1200 A back to back capacitor bank
		31.5	C2	1200 A back to back capacitor bank
		40	C2	1200 A back to back capacitor bank
		50	C2	1200 A back to back capacitor bank
		63	C1	1770 A back to back capacitor bank
8.25	1200	40	C2	1200 A back to back capacitor bank
	2000	40	C2	1200 A back to back capacitor bank
	3000	40	C2	1200 A back to back capacitor bank
15	1200	25	C2	630 A back to back capacitor bank
		31.5	C2	25 A rated cable charging
		40	C2	1200 A back to back capacitor bank
		50	C2	1030 A back to back rated cable charging
		63	C1	1770 A back to back capacitor bank
	2000	25	C2	25 A rated cable charging
		31.5	C2	25 A rated cable charging
		40	C2	1200 A back to back capacitor bank
		50	C2	1030 A back to back rated cable charging
		63	C1	1770 A back to back capacitor bank
	3000	25	C2	1200 A back to back capacitor bank
		31.5	C2	1200 A back to back capacitor bank
		40	C2	1200 A back to back capacitor bank
		50	C2	1030 A back to back rated cable charging
		63	C1	1770 A back to back capacitor bank

ADVAC breaker

Timing characteristics

Total interrupting time consists of opening time plus the time required for arc interruption. Total interrupt time is 50 ms or less for three cycle breakers and 83 ms or less for five cycle breakers.

Voltage class kV	Continuous current A	Short circuit current kA	Interrupt time Cycles	Closing time ms
5	1200	25	3	30-60
		31.5	3	30-60
		40	5	50-80
		50	5	50-80
		63	3	45-80
	2000	25	3	30-60
		31.5	3	30-60
		40	3	50-80
		50	5	50-80
		63	3	45-80
	3000	25	3	50-80
		31.5	3	50-80
		40	3	50-80
		50	5	50-80
		63	3	45-80
8.25	1200	40	3	50-80
	2000	40	3	50-80
	3000	40	3	50-80
15	1200	25	3	30-60
		31.5	3	30-60
		40	3	50-80
		50	3	50-80
		63	3	45-80
	2000	25	3	30-60
		31.5	3	30-60
		40	3	50-80
		50	3	50-80
		63	3	45-80
	3000	25	3	50-80
		31.5	3	50-80
		40	3	50-80
		50	3	50-80
		63	3	45-80

ADVAC breaker

Mechanical endurance ratings

Voltage class kV	Continuous current A	Short circuit current kA	No load mechanical operations	
5	1200	25	10000	
		31.5	10000	
		40	5000	
		50	5000	
		63	2000	
	2000	2000	25	10000
			31.5	10000
			40	5000
			50	5000
			63	2000
	3000	3000	25	5000
			31.5	5000
			40	5000
			50	5000
			63	2000
8.25	1200	40	5000	
	2000	40	5000	
	3000	40	5000	
15	1200	25	10000	
		31.5	10000	
		40	5000	
		50	5000	
		63	2000	
	2000	2000	25	10000
			31.5	10000
			40	5000
			50	5000
			63	2000
	3000	3000	25	5000
			31.5	5000
			40	5000
			50	5000
			63	2000

ADVAC breaker

Dimensions and weight

Voltage class	Continuous current	Short circuit current	Height	Width	Depth	Weight
kV	A	kA	in/mm	in/mm	in/mm	lb/kg
5	1200	25	28	28	27	298
		31.5	28	28	27	298
		40	28	28	27	364
		50	30	28	27	419
		63	30	28	31	573
	2000	25	28	28	27	364
		31.5	28	28	27	364
		40	28	28	27	364
		50	30	28	27	441
		63	30	28	31	573
	3000	25	28	28	27	419
		31.5	28	28	27	419
		40	28	28	27	419
		50	30	28	27	463
		63	30	28	31	650
8.25	1200	40	28	28	27	364
	2000	40	28	28	27	397
	3000	40	28	28	27	419
15	1200	25	28	28	27	298
		31.5	28	28	27	298
		40	28	28	27	364
		50	30	28	27	419
		63	30	28	31	573
	2000	25	28	28	27	364
		31.5	28	28	27	364
		40	28	28	27	364
		50	30	28	27	441
		63	30	28	31	573
	3000	25	28	28	27	419
		31.5	28	28	27	419
		40	28	28	27	419
		50	30	28	27	463
		63	30	28	31	650

ADVAC breaker

Construction - 50 kA and below

EL-mechanism

The EL-mechanism is used in many breakers across ABB's portfolio, thereby reducing required spare parts inventory. By using the EL-mechanism, the ADVAC breaker maintains a lightweight, modular design that is easy to maintain in the case of normal maintenance or repair.

The EL-mechanism also features a mechanical anti-pump device to eliminate reliance on electrical anti-pump devices

By utilizing a modular design featuring the EL-mechanism, the ADVAC breaker has a quick change trip/close coil and charge motor design that makes repair of these commonly repaired parts easy.

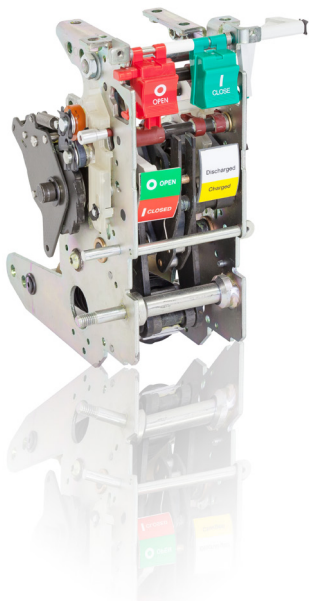
For breaker rebuilds or repairs, the entire EL-mechanism can be removed and replaced in under an hour.

Vacuum interrupters

ABB vacuum interrupters (VIs) are embedded in a solid insulation material to protect the VIs from collecting dust or moisture and from accidental bumps. The solid insulation also improves tracking resistance making ABB circuit breakers one of the lightest available in the market. Because of the embedded design, these vacuum interrupters are maintenance free for the life of the VI.

1 EL-mechanism | 2 Vacuum interrupters

1



Smart coils

ADVAC breakers feature smart coils with on-board microprocessors that monitor for coil continuity, over-current and over temperature scenarios and provide a more efficient response than standard coils. Options for a second open coil or under-voltage coil are also available.

Breaker racking truck

ABB's breaker racking truck for switchgear is integral to the breaker itself in lieu of being inside the switchgear breaker cell. Rated for 180 foot-pounds of torque, the breaker racking truck exceeds the industry standard of 50-60 foot-pounds by a factor of 3 thereby greatly reducing the possibility of an over-torque condition.

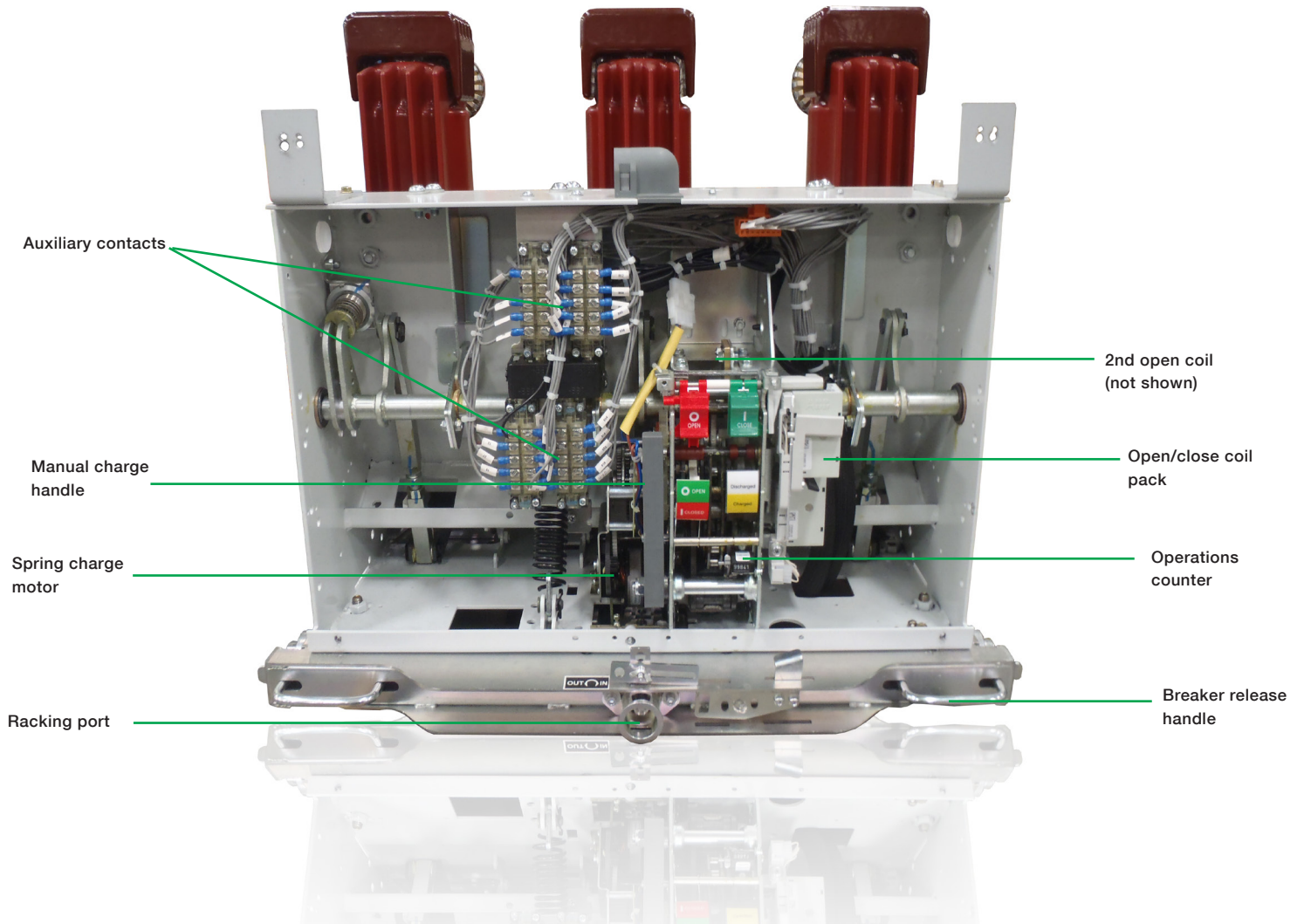
The breaker racking truck is rated for 1000 rack in-rack out operations, exceeding the ANSI Standard of 500 operations.

2



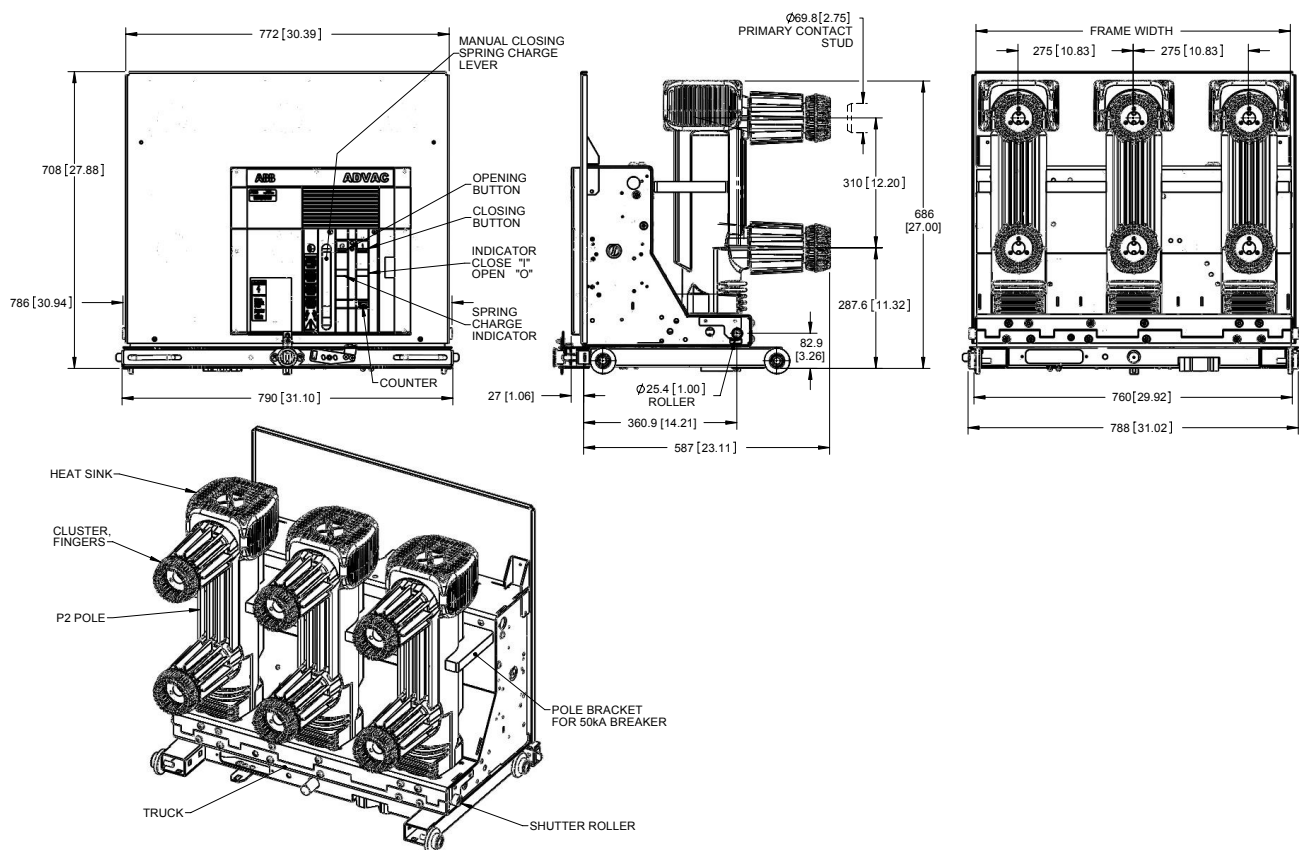
ADVAC breaker

Internal diagram - 50 kA and below



ADVAC breaker

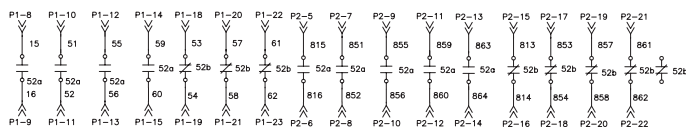
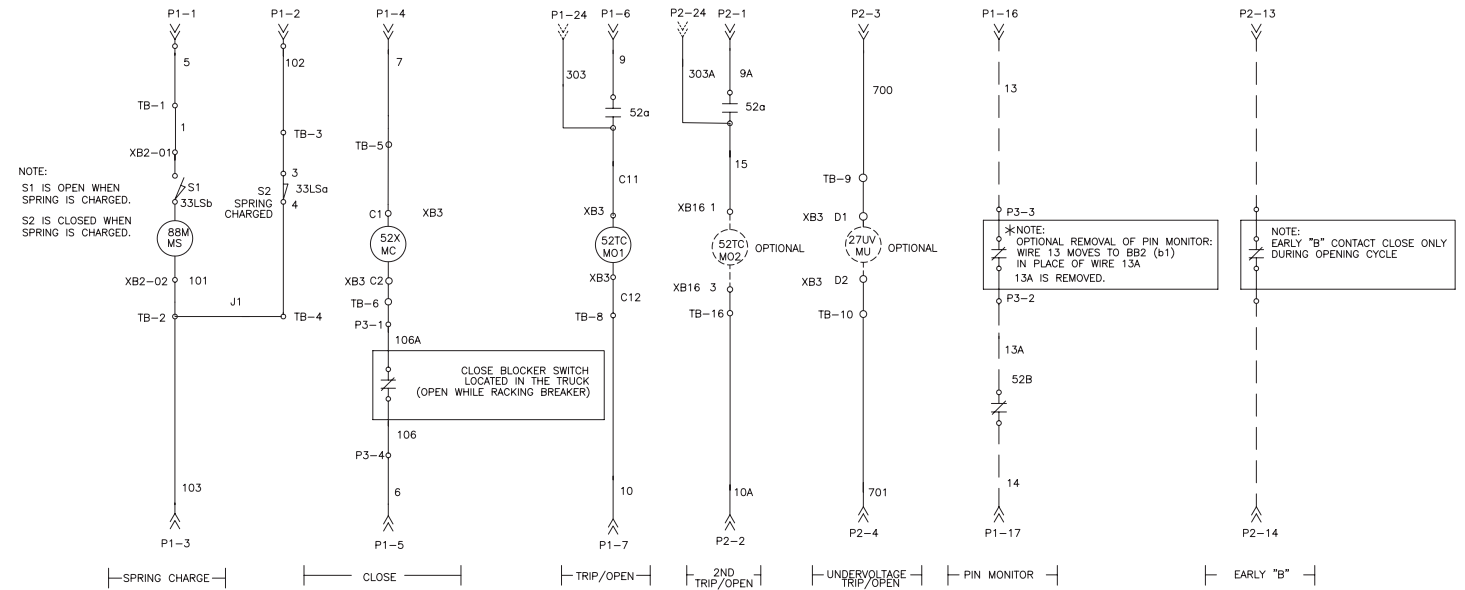
Outline drawing - 50 kA and below



ADVAC breaker

Schematic drawing - 50 kA and below

STANDARD TOLERANCE INFO. ON DWG. 52016
 TOLERANCES - UNLESS SPECIFIED - ±
 DIMENSIONS ARE IN INCHES



ADVAC breaker

Power requirements - 50 kA and below

Tripping (-MO1 & -MO2) coils	Nominal control power voltage					
	24 Vdc	48 Vdc	125 Vdc	250 Vdc	120 Vac	240 Vac
-MO1 launch current	8.5 A	4.5 A	2.0 A	1.0 A	2.0 A	1.0 A
-MO1 launch duration	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms
-MO1 hold current	250 mA	150 mA	50 mA	50 mA	50 mA	50 mA
-MO2 launch current	8.5 A	4.5 A	2.0 A	1.0 A	2.0 A	1.0 A
-MO2 launch duration	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms
-MO2 hold current	250 mA	150 mA	50 mA	50 mA	50 mA	50 mA
Operating range	14 - 28 Vdc	28 - 56 Vdc	70 - 140 Vdc	140 - 280 Vdc	104 - 127 Vac	208 - 254 Vac
1 min Low freq. withstand	1500 V	1500 V	1500 V	1500 V	1500 V	1500 V

Closing (-MC) coils	Nominal control power voltage					
	24 Vdc	48 Vdc	125 Vdc	250 Vdc	120 Vac	240 Vac
-MC launch current	5.45 A	4.5 A	2.0 A	1.0 A	2.0 A	1.0 A
-MC launch duration	150 ms	150 ms	150 ms	150 ms	150 ms	150 ms
-MC hold current	750 mA	150 mA	50 mA	50 mA	50 mA	50 mA
Operating range	18-28 Vdc	36 - 56 Vdc	100 - 140 Vdc	200 - 280 Vdc	104 - 127 Vac	208 - 254 Vac
1 min Low freq. withstand	1500 V	1500 V	1500 V	1500 V	1500 V	1500 V

UnderVoltage (-MU) coil	Nominal control power voltage					
	24 Vdc	48 Vdc	125 Vdc	250 Vdc	120 Vac	240 Vac
-MU launch current	8.5 A	4.5 A	2.0 A	1.0 A	2.0 A	1.0 A
-MU launch duration	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms
-MU hold current	250 mA	150 mA	50 mA	50 mA	50 mA	50 mA
-MU dropout (trip)	8 - 17 Vdc	17 - 34 Vdc	44 - 88 Vdc	88 - 175 Vdc	42 - 84 Vac	84 - 168 Vac
-MU reset	20 - 26 Vdc	41 - 53 Vdc	106 - 138 Vdc	213 - 275 Vdc	102 - 132 Vac	204 - 264 Vac
Operating time	30 ms	30 ms	30 ms	30 ms	30 ms	30 ms
1 min Low freq. withstand	1500 V	1500 V	1500 V	1500 V	1500 V	1500 V

Spring charging motor	Nominal control power voltage					
	24 Vdc	48 Vdc	125 Vdc	250 Vdc	120 Vac	240 Vac
Motor (\leq 40 kA) inrush amps	2.5 A	12.5 A	5.0 A	2.5 A	5.0 A	2.5 A
Motor (\leq 40 kA) inrush duration	0.2 sec	0.2 sec	0.2 sec	0.2 sec	0.2 sec	0.2 sec
Motor (\leq 40 kA) run amps	8.37 A	4.5 A	2.0 A	1.0 A	2.0 A	1.0 A
Motor (\leq 40 kA) run time	6-7 s	6 - 7 s	6 - 7 s	6 - 7 s	6 - 7 s	6 - 7 s
Motor (50 kA) inrush amps	37.5 A	19.0 A	7.5 A	4.0 A	7.5 A	4.0 A
Motor (50 kA) inrush duration	0.2 s	0.2 sec	0.2 sec	0.2 sec	0.2 sec	0.2 sec
Motor (50 kA) run amps	14.58 A	7.5 A	3.0 A	1.5 A	3.0 A	1.5 A
Motor (50 kA) run time	6-7 s	6 - 7 s	6 - 7 s	6 - 7 s	6 - 7 s	6 - 7 s
Operating range	18-28- Vdc	36 - 56 Vdc	100 - 140 Vdc	200 - 280 Vdc	104 - 127 Vac	208 - 254 Vac
1 min Low freq. withstand	1500 V	1500 V	1500 V	1500 V	1500 V	1500 V

Auxilliary contacts	Nominal control power voltage					
	24 Vdc	48 Vdc	125 Vdc	250 Vdc	120 Vac	240 Vac
Rated carrying current	10 A	10 A	10 A	10 A	10 A	10 A
Rated breaking current	10 A	7.6 A	4.4 A	1.8 A	2.6 A	2.3 A
Maximum breaking current	12 A	10 A	6 A	0 A	26 A	23 A

ADVAC breaker

Construction - 63 kA

Classic mechanism

The ADVAC classic mechanism uses a simple, front-accessible, stored-energy operating mechanism designed specifically for use with vacuum technology. This provides the benefits of dependable vacuum interrupters, with advanced contact design and proven reliability, without the complexity of mechanisms and linkages found in previous generation circuit breakers. The unique ADVAC mechanism uses a single toroidal spring mounted on a drive shaft to rotate the shaft in the same direction during opening and closing. The spring can be charged manually via the chain drive and ratchet wheel, or electrically by the spring charging gear motor.

Assembled poles

ABB assembled poles use an epoxy resin material to surround a vacuum interrupter in lieu of the embedded design of the 50 kA and below ADVAC breakers. The vacuum interrupters and associated assemblies are located inside of the epoxy resin housing.

Breaker racking truck

ABB's breaker racking truck for switchgear is integral to the breaker itself in lieu of being inside the switchgear breaker cell. Rated for 180 foot-pounds of torque, the breaker racking truck exceeds the industry standard of 50-60 foot-pounds by a factor of 3 thereby greatly reducing the possibility of an over-torque condition.

The breaker racking truck is rated for 1000 rack in-rack out operations, exceeding the ANSI Standard of 500 operations.

1 Breaker lift truck | 2 ADVAC 63 kA

1



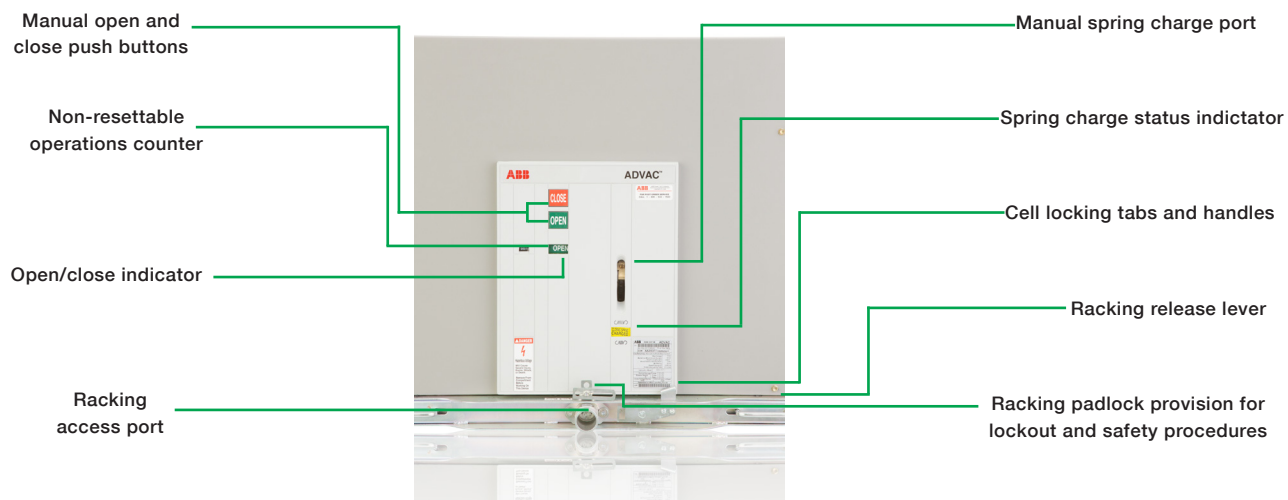
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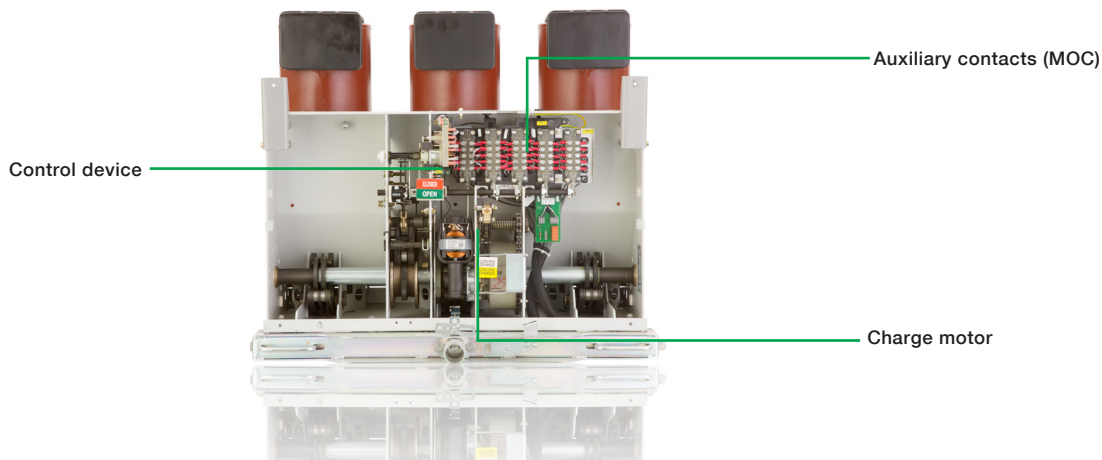
ADVAC breaker

Internal diagram - 63 kA

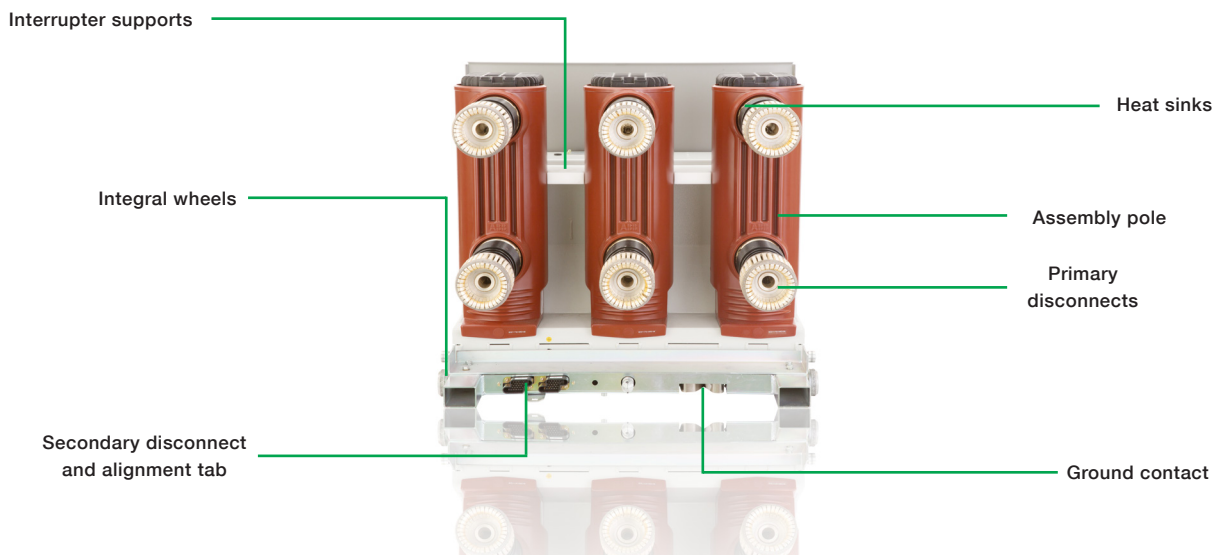
Front view of ADVAC circuit breaker



ADVAC circuit breaker with front panel removed

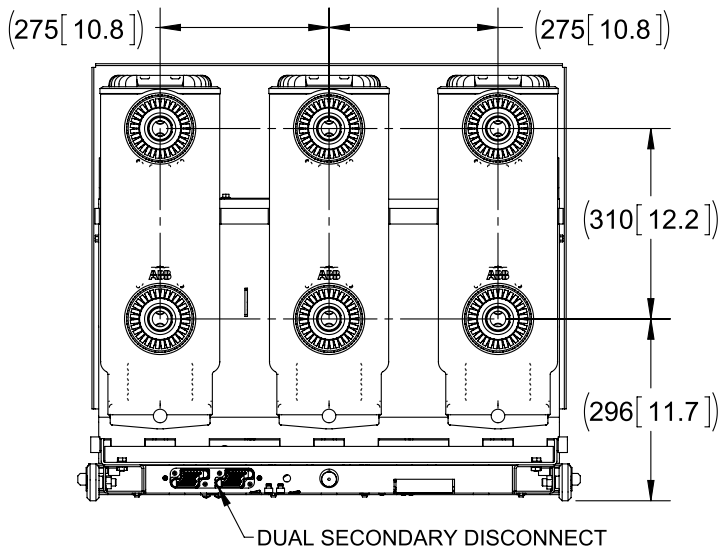


Rear view of ADVAC circuit breaker

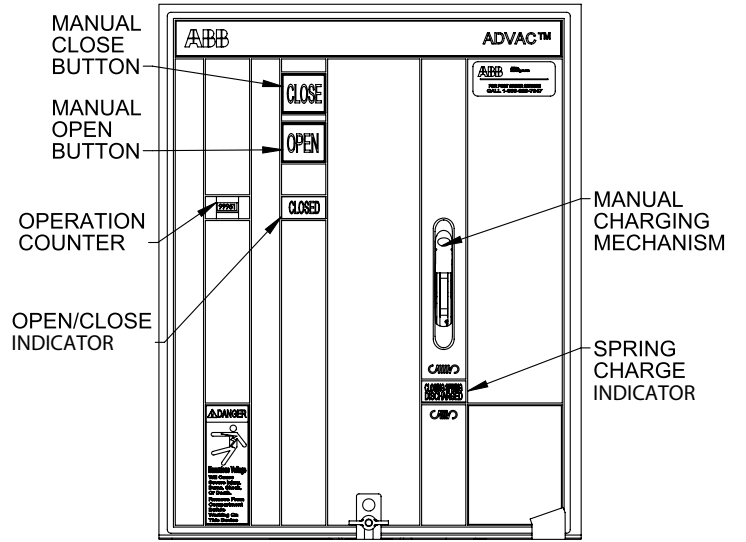


ADVAC breaker

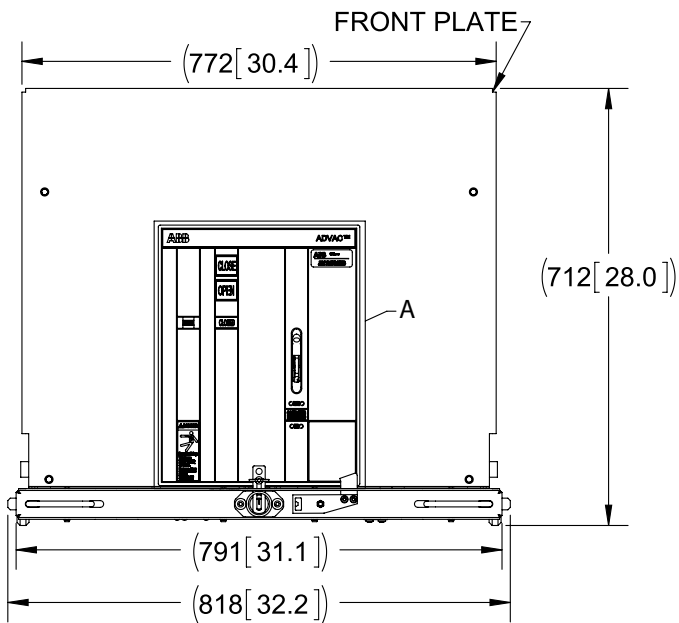
Outline drawing - 63 kA



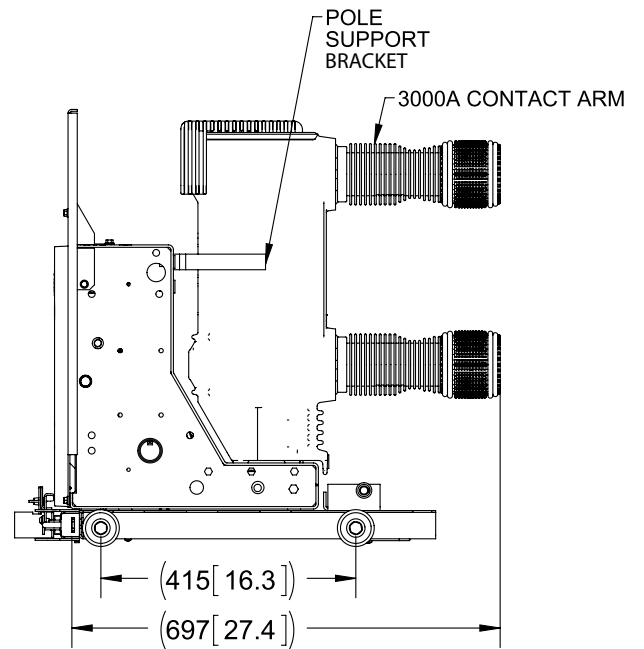
BACK VIEW



DETAIL A
SCALE 1 : 5



FRONT VIEW



SIDE VIEW

ADVAC breaker

Power requirements - 63 kA

Trip/close coil

Parameter	DC	AC
Operating voltage	48-125-250 VDC	120-240VAC
Operating limits	70-110% of operating voltage	70-110% of operating voltage
Power on inrush	200 W	200 VA
Inrush duration	100 ms	100 ms
Continuous power	5 W	5 VA
Insulation voltage	2000 V 50Hz (1 min)	2000 V 50Hz (1 min)

Undervoltage coil

Parameter	DC	AC
Operating voltage	-48-125-250 VDC	120-240VAC24
Operating limits	CB opening: 35-70% of operating voltage CB closing: 85-110% of operating voltage	CB opening: 35-70% of operating voltage CB closing: 85-110% of operating voltage
Power on inrush	200 W	200 VA
Inrush duration	100 ms	100 ms
Continuous power	5 W	5 VA
Insulation voltage	2000 V 50Hz (1 min)	2000 V 50Hz (1 min)

Charge motor

Parameter	DC	AC
Operating voltage	-48-125-250 VDC	120-240VAC24
Operating limits	85-110% of operating voltage	85-110% of operating voltage
Power on inrush	Less than or equal to 40 kA: 600W Greater than 40kA: 900W	Less than or equal to 40 kA: 600 VA Greater than 40kA: 900 VA
Rated power	Less than or equal to 40 kA: 200 W Greater than 40kA: 350 W	Less than or equal to 40 kA: 200 VA Greater than 40kA: 350 VA
Charging time	6-7 s	6-7 s
Insulation voltage	2000 V 50Hz (1 min)	2000 V 50Hz (1 min)

Auxiliary switch ratings

UN	Timing	Rated current (A)	Breaking capacity (A)
220 VAC		2.5	25
24 VDC	1 ms	10	12
	15 ms	10	12
	50 ms	8	10
	200 ms	6	7.7
60 VDC	1 ms	8	10
	15 ms	6	8
	50 ms	5	6
	200 ms	4	5.4
110 VDC	1 ms	6	8
	15 ms	4	5
	50 ms	2	4.6
	200 ms	1	2.2
220 VDC	1 ms	1.5	2
	15 ms	1	1.4
	50 ms	0.75	1.2
		0.5	1

Notes

Notes

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