



**Electrically-operated oil circuit breakers** should be operated from sources of constant potential, preferably a storage battery in the case of d-c operation. Control from exciter circuits is not recommended. In the case of a-c operation, a reliable source of power should be used. A Rectox<sup>®</sup> full-wave rectifier, which changes the alternating current of any commercial frequency into direct current, may be utilized for the operation of the standard solenoid type of circuit breaker mechanism. The d-c solenoid with Rectox provides a closing unit having few moving parts.

Standard control voltages and their range for electrically-operated oil circuit breakers, measured at the mechanism terminals for solenoid mechanisms, are as follows:

**table A: standard control voltages**

control voltage	operating range—volts	
	to close	to trip
<b>direct current</b>		
24	.....	14 to 30
48	.....	28 to 60
125	90 to 130	70 to 140
250	180 to 260	140 to 280
<b>alternating current (Rectox solenoid)</b>		
115	95 to 125	95 to 125 ▲
230	190 to 250	190 to 250 ▲

▲ D-c potential trip coils for use with Rectox solenoid-operated breakers have the same ratings as listed above for d-c solenoid-operated breakers.

The closing and tripping currents listed in tables B and C refer only to our standard solenoid mechanisms for d-c operation. The values given in tables B and C are not applicable to Rectox operation and the E-R value of the coil must be used in selecting the Rectox.

The tripping mechanism consists of a d-c magnet acting as a trigger which releases a latch permitting the breaker to open.

Coils for other than standard voltages with the same proportional operating range can be furnished on special order.

All currents given are actual values as would be recorded with an oscillograph. On Westinghouse breakers, the current is cut off as soon as the breaker reaches the closed position, so the current does not rise to the full value that would be indicated by an ammeter or obtained by dividing the circuit voltage by the resistance of the coil.

**values listed for estimating purposes only:** The values listed in tables B and C for operating currents are subject to change and should be used for estimating purposes only.

**table B: operating currents • indoor circuit breakers**  
electrically operated • three pole • single throw

circuit breaker			solenoid operating mechanism <sup>Ⓢ</sup>					
type	kv	amps	type	closing current		tripping current		
				125 volts	250 volts	24 volts	125 volts	250 volts
<b>F-122</b>	4.16	600	<b>SAF-2</b>	42	22	9	4	4
<b>F-124-A</b>	7.2	600	<b>SAF-2</b>	66	32	9	4	4
<b>F-124-A</b>	4.16	1200	<b>SAF-2</b>	32	32	9	4	4
<b>F-100</b>	7.2	600	<b>SA-3</b>	43	25	20	4	3
<b>F-100</b>	7.2	1200	<b>SA-3</b>	53	25	20	4	3
<b>F-100</b>	7.2	2000	<b>SA-3</b>	53	25	20	4	3
<b>F-100</b>	4.16 and below	600-1200-2000	<b>SA-3</b>	100	37	20	4	3
<b>138-F-150</b>	13.8	600	<b>SA-3</b>	43	25	20	4	3
<b>138-F-150</b>	13.8	1200	<b>SA-3</b>	53	25	20	4	3
<b>138-F-150</b>	7.2 and below	600-1200-2000	<b>SA-3</b>	100	37	20	4	3
<b>138-B-250</b>	13.8	1200	<b>SA-3</b>	80	37	20	4	3
<b>138-B-250</b>	13.8	1200	<b>SA-3</b>	80	37	20	4	3
<b>138-B-250</b>	11	1200	<b>SA-3</b>	100	57	20	4	3
<b>138-B-250</b>	6.6	1200	<b>SA-3</b>	100	81	20	4	3
<b>138-B-250</b>	4.16	1200	<b>SA-3</b>	170	88	20	4	3
<b>138-B-500</b>	13.8	600-1200-2000	<b>SAF-4</b>	119	58	20	4	3
<b>138-B-500</b>	11	600-1200-2000	<b>SAF-4</b>	150	86	20	4	3
<b>138-B-500</b>	6.6 and below	600-1200-2000	<b>SAF-4</b>	228	143	20	4	3

Ⓢ Refer to Westinghouse for values of closing currents for solenoid-operated breakers when applied at other than rated kv, or if the breaker is to be used for reclosing service.



**operating currents**  
for electrically operated oil circuit breakers

**table C: operating currents • outdoor circuit breakers**  
electrically operated • three pole • single throw

circuit breaker			solenoid operating mechanism <sup>▲</sup>				pneumatic operating mechanism <sup>‡</sup>				motor			
type	kv	amps	type	closing current		tripping current		type	closing current		tripping current		hp	full load current at 230 v. 1 ph.
				125 volts	250 volts	125 volts	250 volts		24 volts	125 volts	24 volts	125 volts		
144-GC-100	14.4	600	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-250	14.4	600	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-250	14.4	1200	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-500	14.4	600	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-500	14.4	1200	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-G-1000	14.4	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
144-G-1500	14.4	3000	SAF-7 1/2	175	75	10	10	AA-10	17	9	40	10	3/4	5.0
144-G-1500	14.4	4000	SAF-7 1/2	175	75	10	10	AA-10	17	9	40	10	3/4	5.0
230-GC-250	23	600	SAH-4	31	20	11	7	....	..	..	..	..	....	....
230-G-500	23	1200	SAF-4	71	58	11	9	AA-7	17	9	40	10	1/2	3.8
345-G-500	34.5	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
345-G-1000	34.5	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
345-G-1500	34.5	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
345-G-2500	34.5	2000	SAF-6	133	92	10	10	AA-10	17	9	40	10	3/4	5.0
460-G-500	46	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
460-G-1500	46	1200	SAF-4	119	58	11	9	AA-7	17	9	40	10	1/2	3.8
690-G-1000	69	1200	SAF-4	169	109	11	9	AA-7	17	9	40	10	1/2	3.8
690-G-1500	69	1200	SAF-4	169	109	11	9	AA-7	17	9	40	10	1/2	3.8
690-G-2500	69	1200	SAF-4	169	109	11	9	AA-7	17	9	40	10	1/2	3.8
GM-6A	69	2000	SAF-6	187	104	10	10	AA-10	17	9	40	10	3/4	5.0
GM-6	69	2000	....	....	....	....	....	AA-10	17	9	40	10	3/4	5.0
690-GM-5000	69	2000	....	....	....	....	....	AA-10	17	9	40	10	3/4	5.0
GM-3	115	800	....	....	....	....	....	AA-7	17	9	40	10	1/2	3.8
GM-6B	115	1200	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
1150-GM-10000	115	1600	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
GM-5	138	1200	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
GM-7	138	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1380-GM-10000	138	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1380-GM-15000	138	2000	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
GM-5	161	1200	....	....	....	....	....	AA-10	17	9	40	20	1	6.6
GM-7	161	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1610-GM-15000	161	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-5000	230	1200	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-10000	230	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-15000	230	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
2300-GW-20000	230	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
3450-GW-25000	345	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5

<sup>▲</sup> Refer to Westinghouse for values of closing currents for solenoid-operated breakers when applied at other than rated kv, or if the breaker is to be used for reclosing service.

<sup>‡</sup> note: For values of control current for pneumatic operating mechanism at voltages not listed above, refer to d.b. 33-350.



for electrically operated oil circuit breakers

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144-GC-250	14.4	1200	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-500	14.4	600	SAH-4	31	20	11	7	....	..	..	..	..	....	....
144-GC-500	14.4	1200	SAH-4	31	20	11	7	....	..	..	..	..	....	....
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GM-6	69	2000	....	....	....	....	....	AA-10	17	9	40	10	3/4	5.0
690-GM-5000	69	2000	....	....	....	....	....	AA-10	17	9	40	10	3/4	5.0
GM-3	115	800	....	....	....	....	....	AA-7	17	9	40	10	1/2	3.8
GM-6B	115	1200	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
1150-GM-10000	115	1600	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
GM-5	138	1200	....	....	....	....	....	AA-10	17	9	40	20	3/4	5.0
GM-7	138	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1380-GM-10000	138	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1380-GM-15000	138	2000	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
GM-5	161	1200	....	....	....	....	....	AA-10	17	9	40	20	1	6.6
GM-7	161	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
1610-GM-15000	161	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-5000	230	1200	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-10000	230	1600	....	....	....	....	....	AA-10	17	9	40	20	1 1/2	9.5
2300-GW-15000	230	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
2300-GW-20000	230	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5
3450-GW-25000	345	1600	....	....	....	....	....	AA-14	..	18	..	30	1 1/2	9.5

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