



Technical guide

# Vmax/A™ 5/15 kV ANSI/IEC spring mechanism vacuum circuit breaker

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# Vmax/A circuit breaker

## General overview

### Vmax/A ANSI circuit breaker

Compliant with IEEE C37.04, C37.09, the Vmax/A is a reliable, light-weight, and flexible breaker used in the ReliaGear ND platform. The Vmax/A breaker features a modular, easy to maintain design with only a single screw to remove the smart coil assembly and the spring charge motor. Using this design, maintenance time on breakers is greatly reduced - lowering maintenance costs and limiting employees' exposure to the switchgear, thereby increasing personnel safety.

The Vmax/A breaker's lightweight design, with optional roll-on-the-floor wheels, provides direct roll-in access to lower breaker cubicles without the use of a lift truck for convenient removal and insertion of breaker elements.



### Vmax/A breaker ratings

Voltage (kV)	Main bus	Isc (kA)	Interrupt	Close & latch	BiL	Low frequency withstand
5	1200	25	25	65	60	19
		31.5	31.5	82	60	19
	2000	25	25	65	60	19
		31.5	31.5	82	60	19
15	1200	25	25	65	95	36
		31.5	31.5	82	95	36
	2000	25	25	65	95	36
		31.5	31.5	82	95	36

# Vmax/A circuit breaker

## Ratings tables

### Timing characteristics

Voltage (kV)	Continuous current (A)	Short circuit current (kA)	Interrupt time (cycles)	Closing time (cycles)
5	1200	25	3	5
		31.5	3	5
	2000	25	3	5
		31.5	3	5
15	1200	25	3	5
		31.5	3	5
	2000	25	3	5
		31.5	3	5

Total interrupting time consists of opening time plus the time required for arc interruption. Total interrupt time is 50 ms or less for 3 cycle breakers and 83 ms or less for 5 cycle breakers.

### Mechanical endurance ratings

Parameter	5 kV	15 kV
No load mechanical operations	10,000	10,000
Operations between servicing	2,000	2,000

### Dimensions and weights

Voltage (kV)	Continuous current (A)	Short circuit current (kA)	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Weight (lb/kg)
5	1200	25	26.07/662.2	19.37/492	26.05/662	215.6/98
		31.5	26.07/662.2	19.37/492	26.05/662	215.6/98
	2000	25	26.07/662.2	19.37/492	26.05/662	215.6/98
		31.5	26.07/662.2	19.37/492	26.05/662	215.6/98
15	1200	25	26.07/662.2	19.37/492	26.05/662	215.6/98
		31.5	26.07/662.2	19.37/492	26.05/662	215.6/98
	2000	25	26.07/662.2	19.37/492	26.05/662	215.6/98
		31.5	26.07/662.2	19.37/492	26.05/662	215.6/98

# Vmax/A circuit breaker

## Power requirements

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

### Auxiliary switch ratings - wiping contact rotary switch

UN	Rate current (A)
24 VDC	20
48 VDC	20
100 DVC	15
250 VDC	8

# Vmax/A circuit breaker

## Construction

### 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.

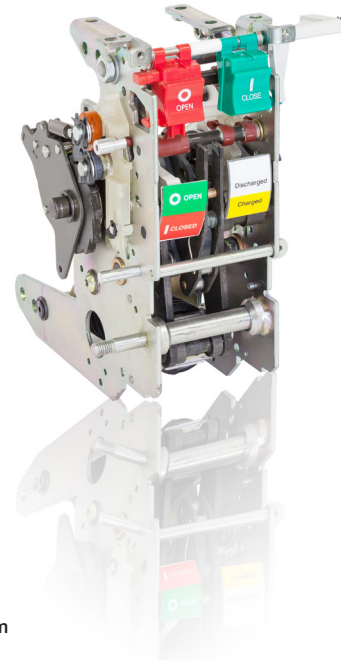
The EL-mechanism also features a mechanical anti-pump device to eliminate reliance on electrical anti-pump devices

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.

### Smart coils

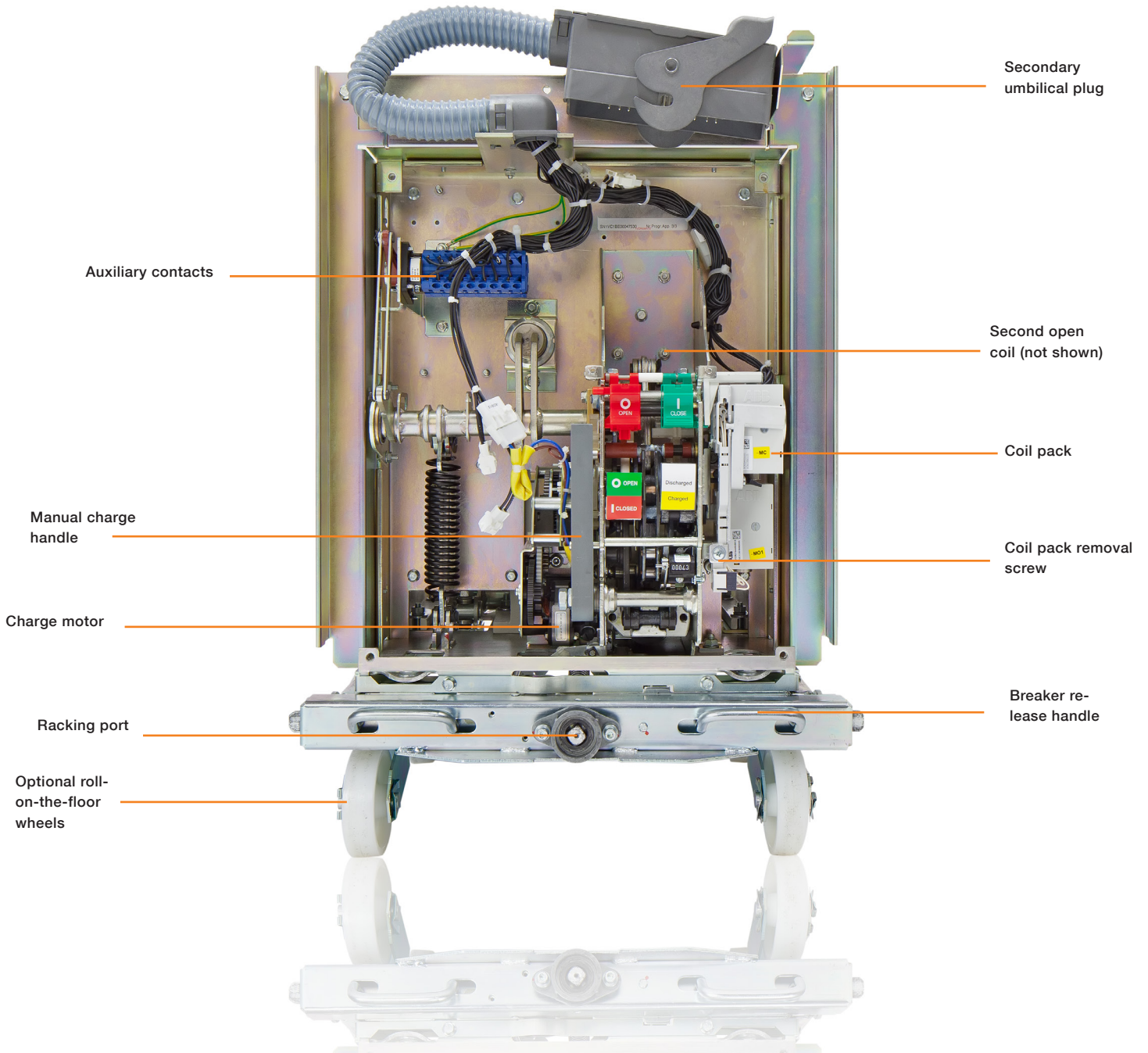
ADVAC breakers feature smart coils with on-board microprocessors that monitor for coil continuity, over-current and over temperature scenarios and provide a more efficient response than standard coils. Options for a second open coil or under-voltage coil are also available.



EL-mechanism

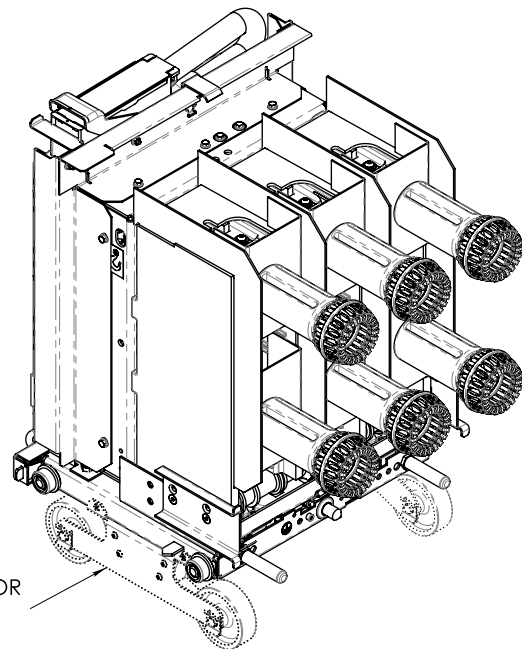
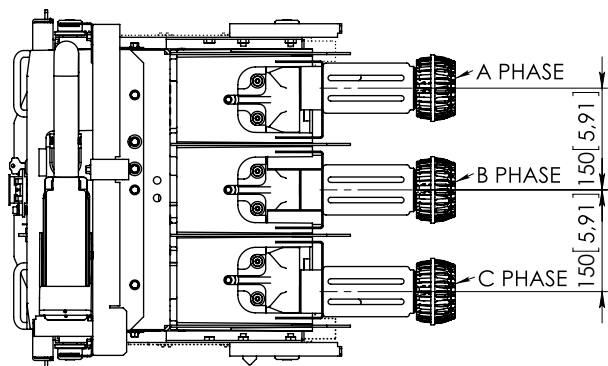
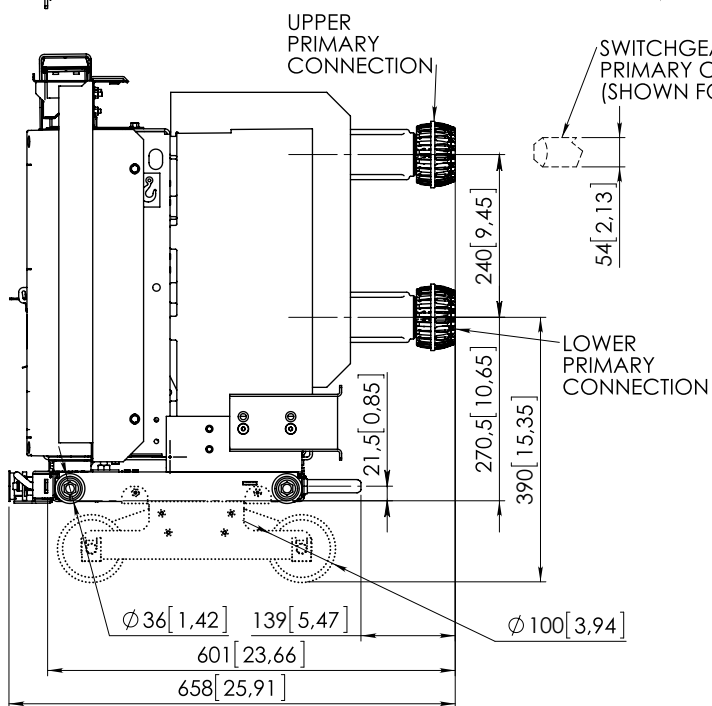
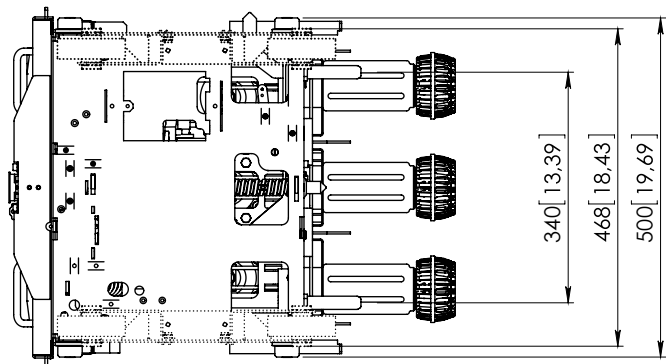
# Vmax/A circuit breaker

## Internal diagram



# Vmax/A circuit breaker

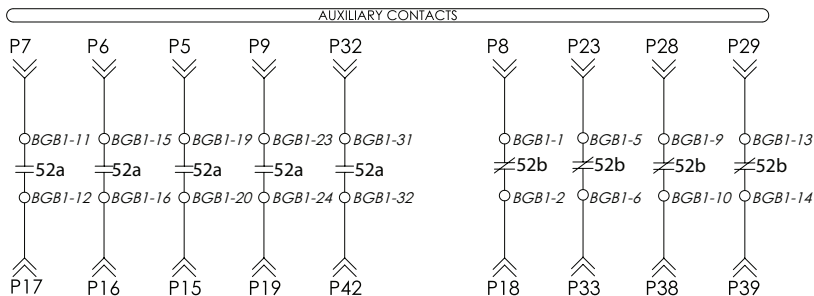
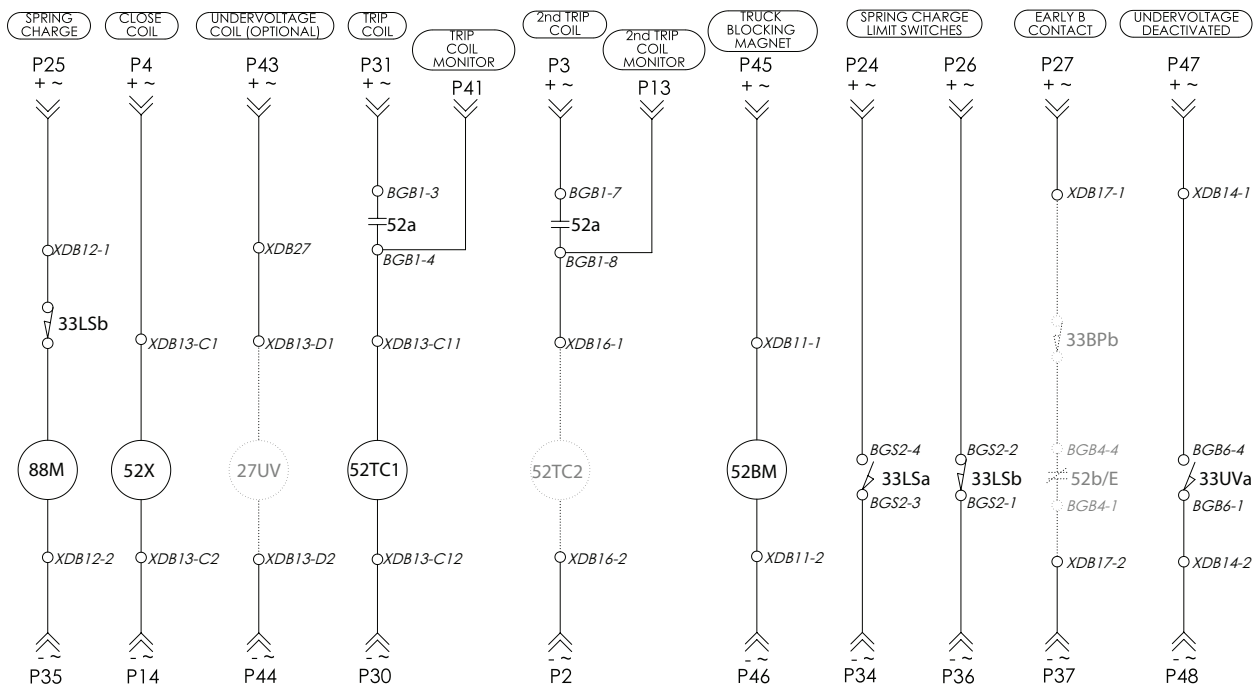
## Outline drawing





# Vmax/A circuit breaker

## Schematic drawing



- NOTES:
- 1.) SECOND TRIP/OPEN AND UNDERVOLTAGE ARE OPTIONAL AS ADDITIONAL COILS WIRING TO PLUG IS STANDARD.
  - 2.) SCHEMATIC SHOWS BREAKER IN OPEN AND CHARGED CONDITION  
 52a IS OPEN WHEN BREAKER IS OPEN  
 52b IS CLOSED WHEN BREAKER IS OPEN  
 33LSa IS OPEN WHEN BREAKER IS DISCHARGED  
 33LSb IS CLOSED WHEN BREAKER IS DISCHARGED
  - 3.) 88M: CHARGING MOTOR  
 52X: CLOSE COIL  
 52TC1: TRIP COIL  
 52TC2: 2ND TRIP COIL (OPTIONAL)  
 52BM: TRUCK BLOCKING MAGNET  
 27UV: UNDERVOLTAGE (OPTIONAL)  
 33LS: CLOSING SPRING CHARGE LIMIT SWITCH  
 33BP: EARLY B MANUAL PUSHBUTTON BYPASS  
 52a, 52b: AUXILIARY CONTACTS
- :CUSTOMER SWITCHGEAR CONNECTION  
 :ELECTRICAL CONNECTION  
 :OPTIONAL CONNECTIONS
- 4) 52b/E: EARLY B CONTACT: CLOSSES BY MECHANICAL INTERFACE TO THE MAIN SHAFT, CONTACT CLOSSES MOMENTARILY AT THE BEGINNING OF THE OPENING OF THE BREAKER.
  - 5) REF: 2RGA024891P0001

# Notes

# Notes

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