Safety, reliability and performance under critical conditions

Eaton Heinemann Hydraulic-Magnetic Circuit Breakers

Eaton Heinemann Hydraulic-Magnetic Circuit Breakers offer the most reliable, stable and accurate means of protecting your electrical equipment against overload or short-circuit, without creating nuisance tripping.

Invented by Heinemann, and first patented in 1932, Eaton Heinemann hydraulic-magnetic circuit breakers will reduce your total cost of ownership by eliminating downtime caused by nuisance tripping, and optimizing the cross-section of cables.

The results are optimized performance, an enhanced reputation for your business, and improved profitability.

Features

- Broad range of electrical protection from 0.02 to 1,200 amperes
- Choice of sizes
- Fixed current tripping value from -40°C to +80°C
- Compliance with major approvals and certifications

Benefits

Eaton Heinemann circuit breakers avoid nuisance tripping caused by:

- High starting current on motor start or capacitive circuits
- Derating of tripping value due to ambient T° variations
- Interference caused by long wiring acting as an antenna
- Shock and vibration
- Long service life

Choose your best protection

The wide choice of options offered by Eaton Heinemann hydraulic-magnetic circuit breakers means you can find the ideal protection for your specific equipment.

Options comprise:

- Instantaneous, short, medium or long tripping curve
- Standard InRush level of 8x, 15x, 22x nominal current at 50Hz and 8x, 18x, 25x at 60Hz
- Series trip, shunt, relay, dual control, dual rating, switch-only circuits
- Auxiliary contact one circuit breaker's pole in many configurations such has single (SPDT), double (DPDT) and can be protected or not
- Mid-Trip option available for all series. This option puts the handle on horizontal position when circuit breaker is triggered electrically

You can also choose:

- Size
- Internal circuits
- Handle's size, lenght, color (with possible LED illumination on AR series)
- Markings
- Terminals

Customization

Eaton Heinemann's in-house development and production capabilities enable customization to meet your specific application, including integrated customized busbars or specific terminals.

Our application engineers can also provide expert advice on even the most challenging circuit protection choices and customized solution developments.

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Powering Business Worldwide

Eaton Heinemann Hydraulic-Magnetic Circuit Breakers







SERIES		JS		AR / AMP		ADS (DIN)		C		GH		GJ		GJ1P	
Maximum number of poles															
		4 poles		4 poles, 3 poles in //		4 poles		6 poles		3 poles		3 poles		6 poles in //	
Electrical characteristics															
Rating		DC:	0.1 - 50A	DC (AR series):	0.1 - 100A	DC:	0.1 - 63A	DC:	0.1 - 120A	AC:	15-100A	AC:	100 - 250A	DC: GJ1P:	100 - 700A (160Vdc)
		AC:	0.1 - 30A	DC (AP series):	101 - 300A	AC:	0.1 - 63A	AC:	0.1 - 100A	DC:	15-100A	DC:	60-250A	DC: GJ1P:	701 - 1200A (65Vdc)
				AC (AR series):	0.1 - 100A										
Voltage range		DC:	up to 80 Vdc	DC:	125 Vdc	DC:	80 Vdc	DC:	125 Vdc	DC:	160/250 Vdc	DC:	125/250 Vdc	DC:	65/160Vdc
		AC:	up to 415 Vac	AC:	480 Vac	AC:	480 Vac	AC:	600 Vac	AC:	480/600Vac	AC:	240 Vac		
Breaker ratings	UL rating	32/65 Vdc:	50A	80 Vdc:	100A (300A)	80 Vdc:	63A	65 Vdc:	120A	250 Vdc:	100A	250 Vdc:	250A	65 Vdc:	1200A
		72/80 Vdc:	30A	125 Vdc:	50A	400V 50/60 Hz:	63A	125 Vdc:	100A	480 Vac	100A	240V 60Hz:	250A	160 Vdc:	700A
		250/277V 50/60Hz	30A	250V 50/60/400 Hz:	100A	480V 50/60 Hz:	30A	240V 50/60/400 Hz:	100A			240V 400Hz :	250A		
		415V 50/60 Hz:	30A	277V 50/60 Hz:	50A			277V 50/60 Hz:	100A						
		240/400V 400Hz	30A	415V 50/60 Hz:	50A			480V 50/60 Hz:	100A						
				480V 50/60 Hz:	30A			600V 50/60 Hz:	77A						
	DIN EN rating	230/400V 50/60Hz :	25A	AR DC:	100A	80Vdc	0,1-63A	230/400V 50/60Hz :	0,1 -100A						
		65Vdc	50A	AR 50/60Hz:	100A			125Vdc	0,1-100A						
		80Vdc	30A	AP : 65Vdc	200A										
Interrupting capacity	UL rating	32 Vdc:	5 kA	80 Vdc:	7.5 kA	80 Vdc:	5 kA	65 Vdc:	5 kA	250Vdc	14kA (UL489)	65 Vdc:	100 kA	65 Vdc:	100 kA
		72 Vdc:	2.2 kA	125 Vdc:	5 kA	250V 50/60 Hz:	5 kA	125 Vdc:	5 kA	480Vac	14kA (UL489)	125/250Vdc:	10 kA	160Vdc:	10 kA
		80 Vdc:	1.5 kA	250V 50/60 Hz:	5 kA	480V 50/60 Hz:	3 kA	240V 50/60 Hz:	7.5 kA			240 Vac:	10 kA (1 pole)		
		250V 50/60 Hz:	5 kA	277V 50/60 Hz:	5 kA			277/480V 50/60 Hz:	5 kA	480V ac/dc	10 kA (UL 508)	240 Vac:	18 kA (2-3 poles)		
		415V 50/60 Hz:	1.5 kA	415V 50/60 Hz:	5 kA			600V 50/60 Hz:	5 kA	600V ac/dc	10 kA (UL 508)	240V 400Hz :	1kA		
		240V 400 Hz:	1kA	480V 50/60 Hz:	3 kA			240V 400 Hz:	5 kA						
	DIN EN rating	230/400V 50/60Hz :	1kA	AR DC:	10kA	80Vdc	3kA	230/400V 50/60Hz :	4kA						
		65Vdc	1.5kA	AR 50/60Hz:	5kA			125Vdc	5kA						
		80Vdc	1.5kA	AP series (DC) :	10kA										
Dielectric strength		3'750 Vac 50/60 Hz													
Insulation resistance		100 MOhm @ 500 Vdc								100 MOhm @ 470 Vdc		100 MOhm @ 470 Vdc			
Trip specification															
Trip options		Series, shunt, relay, remote trip off (Ducon), switch, dual-rating				Series, remote trip off (Ducon), relay, switch		Series, shunt, relay, remote trip off (Ducon), switch, dual-rating						Series, remote trip off (Ducon)	
Trip delay		Instantaneous, short, medium, long delay, motor start													
High inrush		50Hz : 8x, 15x, 22x In 60Hz : 10x, 18x, 25x In										60Hz : 10x, 25x In			
Operating conditions, standards and approvals															
Operating temperature		-40°C to +85°C (-40°F to +185°F)													
Shock		IEC 60068-2-27, MIL-STD-202 method 213													
Vibration		IEC 60068-2-6 MIL-STD-202 method 204													
Humidity		IEC 60068-2-78, MIL-STD-202 method 103													
UL/CSA Approvals		UL1077, UL489A, CSA C 22.2		UL1077, UL489, UL489A, CSA C 22.2		UL1077, CSA C 22.2		UL1077, UL489, UL489A, UL508, CSA C 22.2		UL489, UL508		UL1077, UL489, UL489A		UL1077, UL489, UL489A	
Other approvals		DIN EN 60934/60947-2, CCC		DIN EN 60934/60947-2, CCC		DIN EN 60947-2, CCC		DIN EN 60947-2							
Approvals - Rail		NFF, IEC, ASTM, Bombardier SMP, Boeing BSS, SNCF						NFF, ASTM, Bombardier SMP, Boeing BSS							
Auxilary contacts		SPDT, DPDT, protected or not-protected				SPST		SPDT							
Mid trip		Optional													
Physical characteristics															
Poles		1 to 4 poles						1 to 6 poles		1 to 3 poles		1 to 3 poles		1 to 6 poles	
Dimensions WxHxD (per pole)		19 x 51 x 49.5 mm		19 x 63.5 x 67 mm		19 x 105 x 73 mm		26 x 147.5 x 85.73 mm		35x152.4x104.4 mm		38.1 x 181 x 109.6 mm		38.1x264x107.5 mm	
Weight / pole		65 grams		95 grams		145 grams		262 grams		500 grams		850 grams		1130 grams (2 poles)	
Mounting, Handle, Terminals															
Mounting styles		Front, Snap-in, DIN adapt		Front, Snap-in		35mm DIN rail		Front, Rear		Front, Rear		Front, Rear		Front, Rear	
Handle		Toggle, rocker, metal sealed		Toggle, illuminated toggle, rocker, flat rocker		Toggle		Toggle		Toggle		Toggle		Toggle	
Power terminals		Fast-on, screw terminals, PCB		Bullet, stud, fuse or screw terminals		Pressure wire terminal		Screw terminals (CD), pressure wire terminal (CF)		Pressure-wire terminals		Pressure wire, stud, threaded inserts		Solderless connector, bus bar	
Power connection		Rear		Rear		Top and bottom		Front or rear		Front or rear		Front or rear		Front or rear	

Note: Technical information may differ by product variation, please contact your Eaton representative for more detailed information. In the interests of continual product improvement all specifications are subject to change without notice.

How does the technology works?

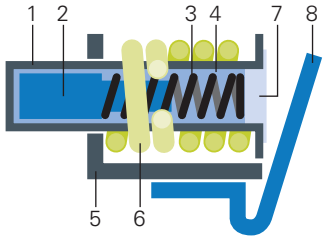
In the event of overload, the magnetic flux force increases. This pulls the iron core (2) into the coil (6) and towards the pole piece (7), and attracts the armature (8).

The silicone oil (4) and spring (3) regulate the core's speed of travel, creating a controlled trip delay that is inversely proportional to the magnitude of the overload.

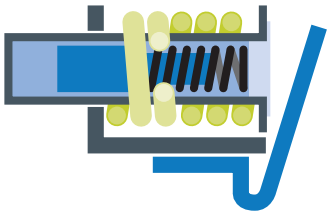
If the overload current subsides before the core reaches the pole piece, the spring (3) returns the core to its original position and the breaker does not trip. However, if the magnetic flux reaches a predetermined value, the armature is attracted to the pole piece and the breaker trips.

The breaker may trip before the core reaches the pole piece if the critical flux value is reached first.

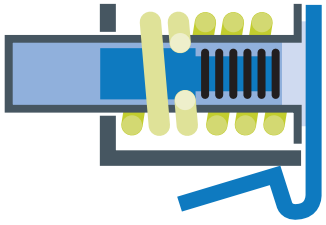
On very heavy overloads, or short circuits, the flux produced is sufficient to pull in the armature regardless of the core position. This provides the valuable benefit of immediate circuit interruption with no intentional delay.



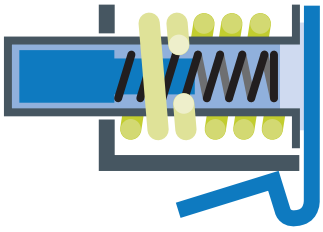
Circuit breaker with no load



Circuit breaker slightly overloaded



Circuit breaker overloaded



Circuit breaker severely overloaded

Hydraulic-magnetic circuit breaker parts:

1. Tube 2. Core 3. Spring 4. Fluid 5. Frame 6. Coil (sensor)
7. Pole piece 8. Armature

Contacts:

For North America: **www.eaton.com/HMCB**

For rest of the world: **www.eaton.eu/HMCB**

For more information please contact **AlexandreZint@eaton.com**

Complementary technology

Remote Breaker Reset:

The remote reset of Eaton Heinemann Hydraulic-Magnetic Circuit Breakers enables you to:

- Reduce operating costs by remote control of the breaker
- Optimize space for more passenger comfort, by delocalization of the function outside the coach
- Optimize weight, size and cost of the function by replacing solutions comprising contactors, motorized switches and protection devices
- Reduce downtime thanks to reset capability on powered circuit, and no-risk reset on short circuit

Remote Breaker Reset (RBR) operation

Circuit Breaker closed (protected circuit is powered)

it Breaker opens (current is cut in the protected circuit)

RBR rests Signal pulse sent to RBR for reset instruction: RBR actuates the Circuit Breakers handle

RBR Back to initial configuration (by gravity)

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