



# **HEINEMANN® CIRCUIT BREAKERS**

### **AM/R and AM1P Series Circuit Breakers**

#### **DESCRIPTION**

Heinemann® Series AM/R circuit breakers are the logical choice for high quality service entrance and panelboard installations, as well as control and protection. The precisely tailored time delays and ability to interrupt high currents make them ideal for critical applications.

### NEW – Enhanced Ratings with AM1P Series

Eaton's new line of AM1P Circuit Breakers are rated up to 200 A with 50,000 A interrupting capacity protection which makes it ideal for telecommunications sites with space constraints. The AM1P breaker was designed to be streamlined and durable featuring an improved arc structure that provides enhanced ratings and a high-strength, low shrink molding compound for added resilience in harsh environments. It is also a proprietary precision current equalization breaker (PCE) which helps prevent uneven current distributions unlike conventional parallel pole breakers. Therefore nuisance tripping is highly reduced. The AM1P Series is UL489A listed.



#### UL489 LISTED / MEETS INTERNATIONAL STANDARDS

Heinemann® wrote the book on the HYDRAULIC MAGNETIC CIRCUIT BREAKERS by patenting the original technology back in 1932. Today, Eaton Corporation continues the tradition of technical leadership by introducing the latest innovation in the evolution of the hydraulic magnetic circuit breaker – the rugged and versatile AM/R Series.

The AM/R is designed to be a "World Product" and solve the toughest equipment circuit protection problems around the globe. It combines the proven high quality and reliability of the former AM Series with the spacing, dielectric and interrupt requirements of International Standards. The AM/R is UL489 Listed and CSA Certified for industrial controls as a branch circuit breaker. It is also UL1077 Recognized for appliance protection. Available in a wide variety of configurations, the AM/R is rated as high as 100 A at 240 V AC or 80 V DC.

It is the solution for demanding DC applications requiring up to 50,000 A interrupting capacity.

# HYDRAULIC-MAGNETIC BENEFITS

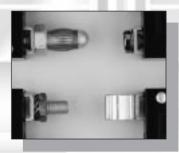
The hydraulic-magnetic load-sensing and time delay mechanism of the AM/R Series is insensitive to changes in ambient or enclosure temperature, adapting it to service conditions encountered. Unlike thermal breakers, the AM/R can be loaded to rated capacity without causing nuisance tripping when ambient temperature rises.

#### **OPTIONS**

- 1 to 8 pole models.
- Short, medium, slow or instantaneous response times to accurately match load conditions.
- Auxiliary switch for signaling.

#### AM/R FEATURES:

- Current range up to 100 A 50/60 Hz, 60 A 400 Hz, 100 A DC.
- · Available with AC/DC rating.
- Common trip on multi-pole breakers.
- UL and CSA Recognition and UL Listing available.



- International Standards approvals.
- Shock, vibration, humidity and moisture according to MIL-STD.
- Ignition protected.
- · Tamper-proof terminals.
- Mid-trip alarm.
- Handles knurled for positive grip.
- Custom marked handles and colors.
- Replacement for previous AM and NAM/S models.

#### **SPECIFICATIONS**

International Specifications AM/R Series breakers are designed to meet the requirements of EN60947-2.

Maximum Current Rating AM/R — Up to 100 A per pole. AM1P — Up to 200 A.

#### **Terminal Types**

Back-connected and many special terminals are available. Consult Application Engineering.

Multi-Pole Trip Construction
Multi-pole breakers incorporate
true common trip construction.
When an overload condition
occurs on any pole, the
mechanism of that pole actuates
an internal tripper bar which is
connected to and operates all
poles simultaneously. Thus an
overload condition on any pole
causes all poles to trip.

**Trip Curves**See page 6.

Operating Temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

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#### **Environmental Data**

Designed to meet MIL-C-55629 as specified below.

#### Fungus- and Moisture-Resistance

Provided by treating all ferrous parts with a special moisture-resistant finish and by using special springs and inherently fungus-resistant cases, covers and handles.

Tested for moistureresistance per MIL-STD-202, Method 106: tested for salt-spray resistance per MIL-STD-202, Method 101.

#### Humidity

Tested in accordance with MIL-STD-202, Method 103, test condition A.

#### Shock

Tested for shock in accordance with MIL-STD-202. Method 213, test condition I (100 G's at 6 milli-seconds).

#### Vibration

Tested for vibration in accor-

dance with MIL-STD-202. Method 204: 10 to 500 Hz. 1,5 mm (0.06") total excursion on three mutually perpendicular planes. Shock and vibration tests are conducted with breakers carrying full rated current. Shock and vibration specifications apply to timedelay breakers only.

#### Life

Breakers are subjected to an endurance test consisting of 10,000 On/Off operations.

100 A or less: 6000 at rated current and voltage, 4000 at no load

101-200 A: 4000 at rated current and voltage, 4000 at no load.

#### **Approximate Weights**

1 pole, 100 g; 3 oz. 2 poles, 200 g; 6.5 oz. 3 poles, 300 g; 9.5 oz. 4 poles, 400 g; 12.5 oz.

#### **Dielectric Strength**

Tested in accordance with MIL-STD-202, Method 301;

1500 V at 50/60 or 400 Hz, 1100 V DC (or twice rating plus 1000 V).

Meets 8mm international spacing and 3750 V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuit to auxiliary circuit.

#### **Insulation Resistance**

100 Megaohms minimum at 500 V DC, per MIL-STD-202, Method 302.

#### **Impedance**

(Internal Resistance) See impedance chart on page 4. Impedance or internal resistance across cold breaker at full rated load.

**Flammability Specifications** UL 94-VO, UL 94-HB

#### **APPROVALS**







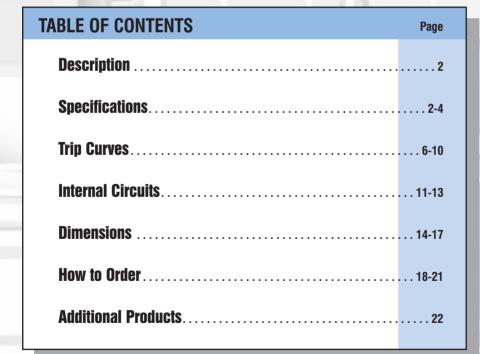
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The technical information published in this handbook is subject to change without prior notice. Modifications may occur as part of continual improvement of our products. For up-to-date information, please contact our Customer Service Center at 1-800-962-0820.

### **Specifications**

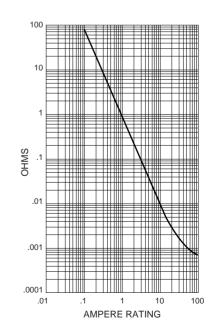
		AM/R AND AI	M1P AGENCY APPRO	IVALS		
Standard	Voltage	Frequency	Phase/Pole Spaces	Current Range	Standard Interruption 4	High Capacity
	80 VDC	_	DC/1	0.02 - 100	5,000	50,000@65VDC
	120 VAC	50-60	1/1	0.02 - 20	5,000	7,500
UL 489 CSA	120 VAC	50-60	1/1	21 - 50	5,000	_
	120/240 VAC	50-60	1/2	0.02 - 20	5,000	7,500
	120/240 VAC	50-60	1/2	21 - 50	5,000	_
	80 VDC	_	DC/1	0.02 - 100	5,000	50,000@65VDC
UL 489a	80 VDC	_	DC/2	101 – 150	10,000	50,000@65VDC
	80 VDC	_	DC/3	151 – 200	10,000	50,000@65VDC
	80 VDC	_	DC/1	0.01 - 100	7,500	_
	120/240 VAC	50-60	1/2	0.02 - 100	3,000	_
	240 VAC	50-60	1 & 3/1 & 3	0.02 - 100	5000 2	_
UL1077 CSA	80 VDC 240 VAC	50-60	1 & 3/1 & 3	0.02 - 100	5000 2	_
ULIU// USA	240/415 VAC	50-60	3	.1 – 50	5000 3	_
	277/480 VAC	50-60	3	.1 – 30	5000 3	_
	277 VAC	50-60	1	.1 – 50	5000 2	_
	240 VAC	50-60	1 & 3	.1 – 50	1,500	_
	80 VDC	_	DC	.02 - 100	_	_
Switch only per	415 VAC	50-60	3	.02 - 50	_	_
UL508	240 VAC	50-60	1 & 3	.1 – 100	_	_
01300	277 VAC	50-60	1	.02 - 50	_	_
	277/480 VAC	50-60	3	.1 – 30	_	_
Marina Ignition	240 VAC	50-60	1	.1 – 75	2000 2	_
Marine Ignition UL 1500	65 VDC	_	DC	.1 – 60	2000 2	_
UL 1500	65 VDC 240 VAC	50-60/DC	1 & 3	.1 – 60	2000 2	_
	80 VDC	_	DC	.1 – 70	5000	_
TUV	80 VDC	_	DC	70.1 – 100	1500	_
	240/400 VAC	50-60	3	.1 – 50	1500 5	_

- DC and 1 Phase 277 V max ratings are 1 or 2 pole breaking. 3 phase ratings are 3 pole breaking
- Requires branch circuit backup with UL listed type K5 fuse rated (15A minimum) at no more than 175A for 51 thru 100A rating
- 3 UL recognized/CSA certified. Refers to 3 and 4 pole versions used only in a 3 phase, WYE connection with series fusing as stated in note 2.
- A clearance of 1 inch for DC and 2 inches for AC is required between the arc vent and conductive surfaces or components.
- 5 TUV Certification at 400 volts.

RESISTANCE AND	IMPEDANCE VALUES
Tolerance Limits Current (amps)	Tolerance (%)
0.1 to 19.9 20 to 100	±25 ±35

Current	DC Dela	ys (Resistance i	n Ohms)	60 Hz Del	ays (Impedance	in Ohms)	400 Hz Delays (Impedance in Ohms)	
Rating Amps	P-2-3 10-20-30	Curves 251-252-253	DuCon 2-3-20-30	P-2-3 10-20-30	Curves 251-252-253	DuCon 2-3-20-30	Curves P-1-2-3	
0.05	447	730	730	418	836	809	744	
0.10	127	182	174	139	176	186	200	
0.5	4.12	7.0	6.4	3.99	7.3	6.4	9.36	
1	.86	1.65	1.67	.917	1.580	1.780	1.74	
5	.050	.069	.069	.051	.073	.068	.074	
10	.014	.0181	.0177	.016	.0172	.0158	.021	
15	.0059	.0164	.0146	.0060	.0162	.0155	.0101	
20	.0045	.0068	.0067	.0046	.0067	.0068	.0060	
30	.0031	.0028	.0019	.0031	.0031	.0029	.0037	
50	.0017	.0020	.0019	.0017	.0020	.0019	.0024	
70	.0007			.0007				
100	.0006			.0006				

DCR and impedance based on 100% rated current applied and stabilized a minimum of one hour. Tolerance 0.02 amps to 2.5 amps  $\pm 20\%$ , 2.6 amps to 20 amps  $\pm 25\%$  21 amps to 100 amps  $\pm 50\%$ .



# PRECISE OVERLOAD PROTECTION — WITH HEINEMANN® HYDRAULIC-MAGNETIC CIRCUIT BREAKERS

# Heat-induced nuisance tripping eliminated

Heinemann® hydraulicmagnetic circuit breakers offer three major advantages over thermal devices:

- 1. Reduces nuisance tripping caused by high ambient temperature in or near the installation. The breaker responds only to current variations, not to temperature change.
- 2. Assurance that 100% of the rated current will be carried. There is no such assurance with thermal devices, which may fail to carry rated current when subjected to above-normal ambient temperatures. A Heinemann® breaker rated at 20 A, for example, will sustain 20 A, even at elevated temperatures. Derating and other forms of temperature compensation are unnecessary.
- **3.** Immediate reset. Since there are no thermal elements, heat build-up is not a factor.

Therefore, no "cooling off" period is required after fault interruption.

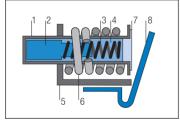
#### Time delay eliminates breaker tripping due to transient current surges

Elimination of transient current surges as a cause of nuisance tripping is accomplished through the creation of a controlled time delay. In any installation where a power supply or compressor motor is on the line, an inrush of current occurs when the equipment is first turned on. The bigger the equipment, the larger the surge. Although inrush surges are, in fact, transient overloads, they usually pose no threat of damage to the line or to the equipment. So it is not necessary or even desirable to interrupt the power when they occur.

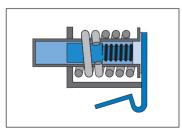
The hydraulically-controlled time-delay mechanism of a Heinemann® breaker eliminates nuisance tripping without lessening overload

protection. The delay is inversely proportional to the overload; response is quicker on large overloads, where greater potential danger exists, and slower on small overloads. Except in special high-inrush models, heavy overload and short-circuit currents of greater than 10 times the breaker's rating provide instantaneous response. (An instantaneous-trip breaker is available for use on, for example, modern medical and communication equipment, which cannot tolerate even brief overloads.)

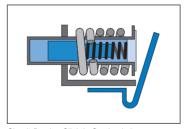
For added protection, the time-delay is self-adjusting to ambient temperature conditions. At high ambients, where the overload tolerance of most circuits is lowered, the viscosity of the special fluid in the breaker's dashpot is lessened, and the time-delay response is correspondingly longer to allow cold-equipment startups.



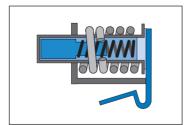
Circuit Breaker with No Load



Circuit Breaker Overloaded



Circuit Breaker Slightly Overloaded



Circuit Breaker Severely Overloaded

Hydraulic-magnetic circuit breaker parts:

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



#### TRIP CURVE EXPLANATION

#### **Tripping Specifications**

Breakers (in standard wall-mounted position) shall hold 100% rated current. For table and ceiling mount – consult Application Engineering.

#### 50/60 Hz or DC

Breakers may trip between 101% and 125% rated load; must trip at 125% rated load and above, as shown on time-delay curve selected.

#### AC/DC

Breakers may trip between 101% and 135% rated load; must trip at 135% rated load and above.

#### 400 Hz

Breakers may trip between 101% and 150%, must trip at 150% and above.

#### **Non-Time Delay Trip Ranges**

Breakers that have no deliberately imposed delay (less than 100ms) are specified as follows.

Breakers shall hold 100% rated current.

Breakers for 50/60 Hz or DC service may trip between 101% and 125% rated current, must trip at 125% rated current and above.

Breakers for AC/DC service may trip between 101% and 135% rated load; must trip at 135% rated load and above.

Breakers for 400 Hz service may trip between 101% and 150% rated current, must trip at 150% rated current and above.

Note: All the curves shown describe breaker response with no pre-loading. (Breakers do not carry current prior to application of overload for calibration testing.) Curves are plotted at an ambient temperature of 25°C (77°F), with breakers in the standard wall-mounted position.

	Time Delay Curve vs. Percent of Rated Current															
Inrush	Curve	100%	125%	135%	150%	200%	300%	400%	500%	600%	700%	800%	900%	1000%	1100%	1200%
50/60 Hz	1	No trip	50-700	-	32-350	10-90	_	1.50-15	_	.5-7	-	.02-3	_	.006-2	-	.005-1
8x	2	No trip	10-100	-	4.5-50	1.7-18	.55-6	.25-2.8	.11-1.9	.05-1.5	.025-1.2	.01580	.01141	.0120	.00910	.00805
υ <b>λ</b>	3	No trip	1-12	-	.40-5	.15-1.9	.05464	.0330	.01720	.0114	.00709	.00506	.00405	.00405	.004046	.00404
50/60 Hz	4	No trip	60-700	-	30-350	10-120	3.4-42	2.0-22	1.1-12.5	.50-8	.17-5.2	.05-4	.02-3.4	.01-3	.008-2.5	.008-2
18x	5	No trip	10-110	-	4.5-50	1.7-18	.54-6.9	.30-4	.18-2.75	.10-2	.04-1.4	.02-1	.01375	.0150	.0125	.0110
101	6	No trip	1-12	-	.40-5	.15-1.9	.05273	.0340	.0227	.01520	.01214	.0110	.008074	.00606	.005053	.00505
50/60 Hz	7	No trip	75-400	-	35-170	15-70	5-25	3-15	2-9.5	1.5-8	.9-7	.5-6	.4-5	.3-5	.2-5	.1-4
25x	8	No trip	10-100	-	6-55	2.5-20	.85-4.5	.45-2.5	.30-1.8	.22-1.6	.15-1.5	.10-1.4	.08-1.2	.07-1	.0690	.0570
234	9	No trip	1-17	-	.40-4.5	.16-1.6	.0646	.0540	.0435	.0330	.02525	.02022	.01520	.01215	.00912	.00808
DC	1	No trip	45-345	-	20-150	9-60	3-20	1.4-11.4	.45-7.5	.15-5.8	.03-4.5	.009-3.7	.006-2.6	.005-1.7	.00590	.00550
8x	2	No trip	6-80	-	2.5-30	.80-10	.25-3.7	.15-2	.09-1.2	.0580	.02150	.0130	.00617	.00510	.00406	.00404
OX	3	No trip	1-12	-	.40-5.0	.15-1.9	.05464	.0330	.01720	.0114	.00709	.00506	.004052	.00405	.004046	.00404
DC	4	No trip	60-700	-	30-350	10-120	3.4-42	2-22	1.1-12.5	.50-8	.17-5.2	.05-4	.02-3.4	.01-3	.008-2.5	.008-2
18x	5	No trip	10-110	-	4.5-50	1.7-18	.54-6.9	.30-4	.18-2.75	.10-2	.04-1.4	.02-1	.01375	.0150	.0125	.0110
IOX	6	No trip	1-12	-	.40-5.0	.14-1.9	.05273	.0340	.0227	.01520	.01214	.0110	.008074	.00606	.005053	.00505
	7	No trip	75-400	-	35-170	15-70	5-25	3-15	2-9.5	1.5-8	.9-7	.5-6	.4-5	.3-5	.2-5	.1-4
DC 25x	8	No trip	10-100	-	6-55	2.5-20	.85-4.5	.45-2.5	.3-1.8	.2-1.6	.15-1.5	.10-1.4	.08-1.2	.07-1.1	.07-1	.069
	9	No trip	1-17	-	.4-4.5	.16-1.6	.0646	.054	.0435	.033	.02525	.0222	.0152	.01215	.00912	.00808
400 Hz	1	No trip	-	-	30-350	10-120	3.4-35	2-25	.86-19	.25-10	.06-2.6	.0260	.01225	.0115	.00812	.00810
8x	2	No trip	-	-	6-70	2.5-26	.85-8.5	.40-5	.23-3.1	.10-2	.02-1.1	.0160	.0130	.0115	.009085	.00805
OX	3	No trip	-	-	.60-7	.20-2.3	.07584	.0450	.0237	.0125	.00618	.00512	.004075	.00405	.004042	.00404
50/60 Hz	1	No trip	_	35-520	20-350	9-90	3-26	1.4-15	.45-10	.15-7	.03-4.8	.009-3.7	.006-2.5	.005-2	.005-1.6	.005-1
DC	2	No trip	-	7.0-80	4.5-50	1.7-18	.55-6	.25-2.8	.11-1.9	.05-1.5	.025-1.2	.01580	.01141	.0120	.00910	.00805
8x	3	No trip	-	.60-9	.40-5	.15-1.9	.05464	.0330	.01720	.0114	.00709	.00506	.004052	.00405	.004046	.00404
50/60 Hz	4	No trip	-	45-500	30-350	10-120	3.4-42	2-22	1.1-12.5	.50-8	.17-5.2	.05-4	.02-3.4	.01-3	.008-2.5	.008-2
DC	5	No trip	-	7-80	4.5-50	1.7-18	.54-6.9	.30-4	.18-2.75	.10-2	.04-1.4	.02-1	.01375	.0150	.0125	.0110
18x	6	No trip	-	.60-9	.40-5	.15-1.9	.05273	.0340	.0227	.01520	.01214	.0110	.008074	.00606	.005053	.00505
50/60 Hz	Instant.															
DC	Delay "P"	No trip	.100	.060	.050	.034	.020	.015	.012	.011	.011	.011	.011	.011	.011	.011
400 Hz	Max.Time															

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#### TRIP CURVE EXPLANATION Time Delay Curve Selection

- **1.** Determine required frequency.
- 2. Determine required high-inrush tolerance (tolerance to starting surges caused by high-resistance loads such as ferro-resonant power supplies which may last up to 10 milliseconds 8 at 60 Hz). Select lowest high-inrush tolerance compatible with application.
- **3.** Determine required curve characteristics based on application:

**Long Time Delay Curve** 

Motor starting, locked rotor tolerance, general purpose applications.

#### **Medium Time Delay Curve**

Transformer protection, capacitor loads, special incandescent lamp loads, general purpose applications (most widely used curve).

Short Time Delay Curve Electronic equipment.

Instantaneous Curve (no deliberate time delay provided) Unusual circumstances in electronic equipment and other special applications. The magnetic shunt used offers maximum possibilities on half wave which is 10 ms when frequency is 50 Hz.

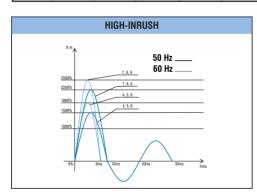
#### **High-Inrush**

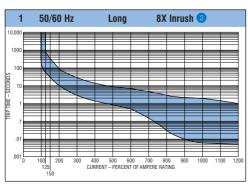
Influence of line frequency is shown below.

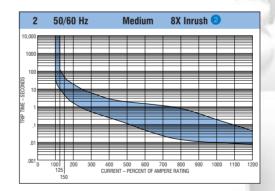
For high-inrush rates, see graph below. For curve P, high-inrush is not possible.

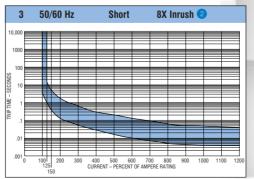
#### TRIPPING SPECIFICATIONS

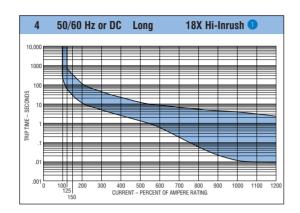
	Frequ	iency		High-l	Inrush Tole	rance		3	Curve		
50/60 Hz	0/60 Hz 400 Hz DC AC/DC			8X	8X 18X 25X			Medium	Short	Inst.	No
•	•	•	•	•			•	•	•		1 2 3
•		•	•		•		•	•	•		4 5 6
•		•				•	•	•	•		7 8 9
•	•	•	•							•	Р

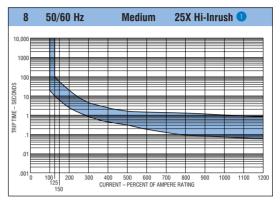


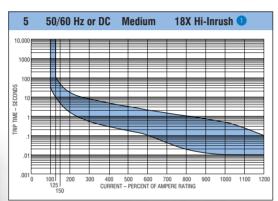


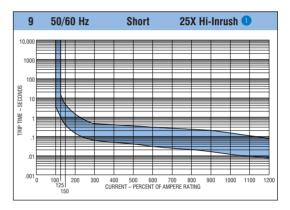


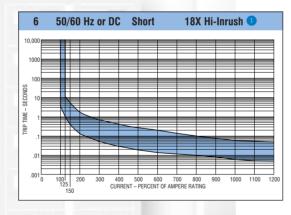


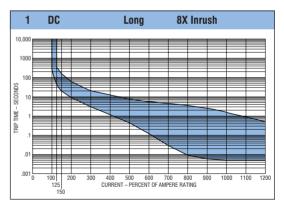


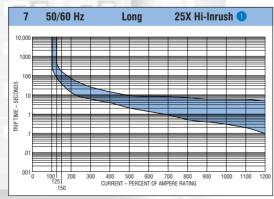


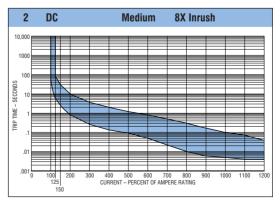










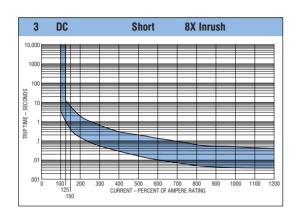


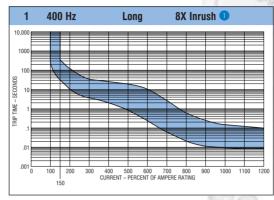
1 Not available with AM1P series.

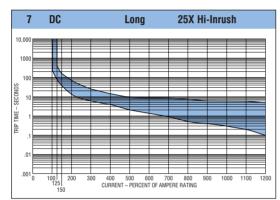
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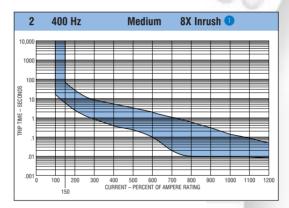
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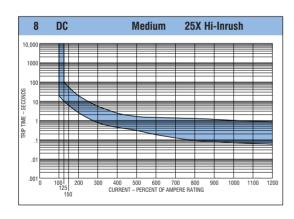
# FAT-N

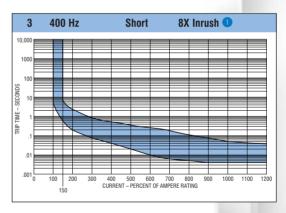


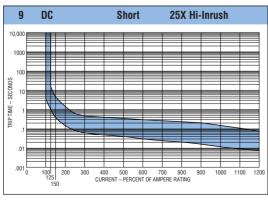


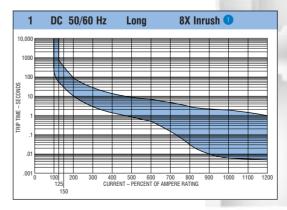




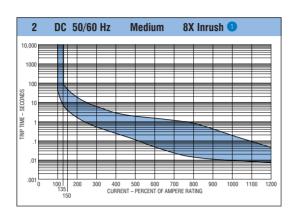


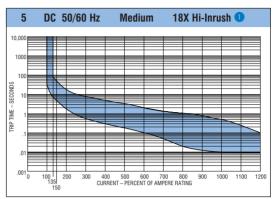


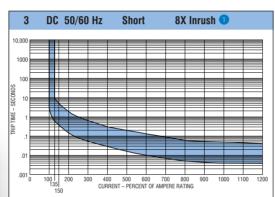


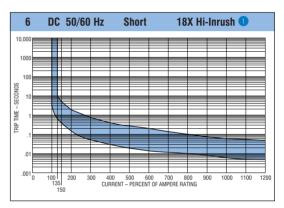


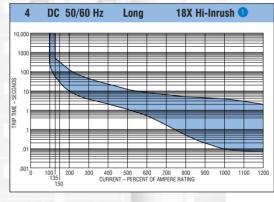
1 Not available with AM1P series.

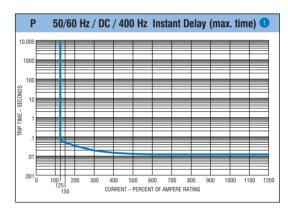












Not available with AM1P series.

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SHE BARA

# **Internal Circuits**



Circuit	Diagrams	Description	Auxiliary Contact	Inrush	Internal Circuit Codes
Switch	Internal Circuit represented: 12  Line (1)  C (11)  NO (14)  NC (12)	Switch only (without coil) with or without auxiliary contact.	No	No	0 •
	Load (2)		Yes	No	12 0
	Internal Circuit represented: 3, 8, 38	The contacts and the coil	No	8X	3
Series Trip		are in series. This is the standard execution of the AM/R circuit breaker. It is often used as main switch at the same time.	No	18X	8
	Load (2)		No	25X	38
	Internal Circuit represented: 2, 9, 39	The contacts and the current	Yes	8x	2
Series Trip With Auxiliary Contact	C (11) NO (14) NC (12)	sensing coil are in series.  Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system.	Yes	18x	9
	Load (2)		Yes	25x	39
	Internal Circuit represented: 5, 22, 32	Enables two loads to be checked by means of a single circuit breaker. However it only releases if there is an overload	No	8X	5
Shunt Trip	Shunt (3) D	in the main circuit – (2)A. The sum of the two nominal currents must not exceed the peak current of the contacts.  With this execution, it is also	No	18X	22
	Load (2) A	possible to adjust the tripping through a potentiometer between the load terminals.	No	25X	32

	Circuit	Diagrams	Description	Auxiliary Contact	Inrush	Codes
		Internal Circuit represented: 6, 23, 33	Relay tripping can be used for releasing the circuit breaker by the intermediary of a monitor or a safety device installed at a distance. The contacts are electrically separated	No	8x	6 •
	Relay Trip	Load (2) C Relay (A1) D	from the coil. Consequently, all the currents and voltages within the permissible limits can be used. Coils are either current or voltage sensitive. The circuit breaker can be	No	18x	23
		Relay (A2) A	supplied on request with a dielectric strength ranging up to 2500 V on alternating current 50/60 Hz between the coil and the contacts.	No	25x	33 💿
		Internal Circuit represented: 7, 27, 37	Dual rating circuit breakers are suitable for apparatus operating under two different currents or	No	8X	7 0
	Dual Rating	Shunt (3) D	voltages. For example, same breaker may be used in USA (110 V AC) or Europe (220 V AC). As far as possible, the currents	No	18X	27
		Load (2) A	must be in the ratio of one to two with a maximum of 15 to 30 A.	No	25X	37 🔍
	Dual Control	Internal Circuit represented: 15, 25  Line (1) B  Shunt (3) D	This version is used both for the protection of the load finding itself in series with the circuit breaker and for the release via a	No	8x	15
2000	(Ducon)	Load (2) A	voltage. The main coil is in series with the contact and the Ducon coil is shunt trip.	No	18x	25 1
		Internal Circuit represented: 16, 26		Me	0	16
	Dual Control Ducon	Line (1) B Relay (A1) C	Same function as codes 15 and 25, but both coils are electrically	No	8x	16
	(Series + Relay	Relay (A2) D	separated from main contact.	No	18x	26



Circuit	Diagrams	Description	Auxiliary Contact	Inrush	Codes
	Internal Circuit represented: 76, 86, 96	These internal circuits have no main contact. When combined	No	8x	76 •
Relay Trip (safety execution)	C (11) NO (14) NC (12)	with another pole, they permit compliance with the safety regulations dictated by IEC 950.  The required minimum creep distance between two	No	18x	86 1
	Load (2)	galvanically separated electric circuits can thus be attained.	No	25x	96 1
	Internal Circuit represented: 98, 99, 79		No	8x	98
Mid-Trip	Shunt (3) D	Series overload. Mid-trip handle position.	Yes	8x	99
	Load (2) A		Yes	18x	79 💶

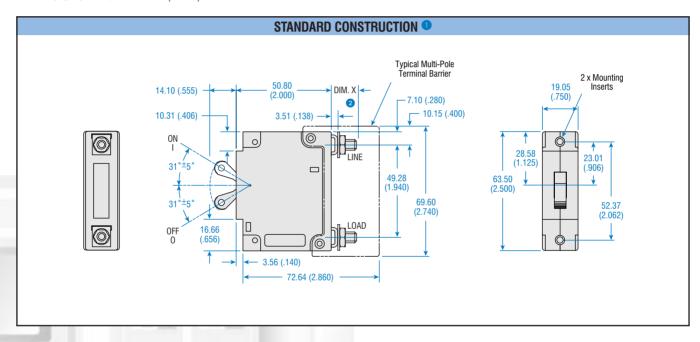
Not available with AM1P series.

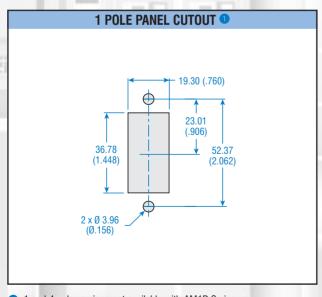
#### **Dimensions**

Dimensions are given here only as a preliminary guide to specifying. Final engineering drawings should be made from the latest Heinemann drawings. Contact Customer Service Center.

**Tolerance:**  $\pm (0.9) \ 0.031$  except where noted.

#### **DIMENSIONS** APPROXIMATE IN MM (INCHES)



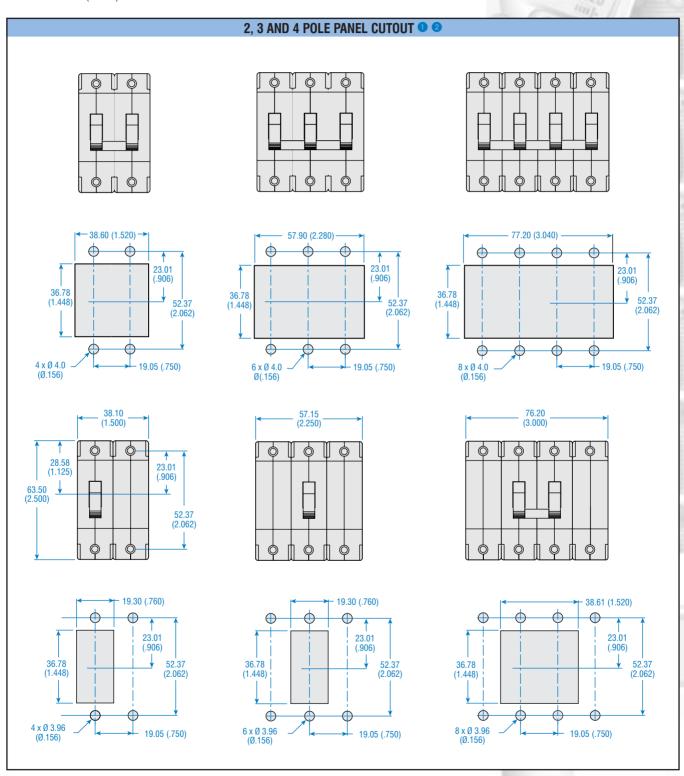




- 1 and 4 pole versions not available with AM1P Series.
- 2 See page 16.

# FAT-N

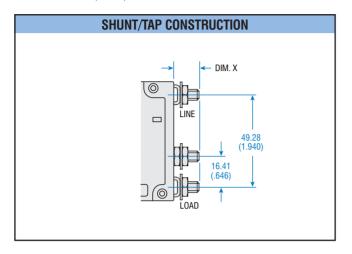
APPROXIMATE IN MM (INCHES)

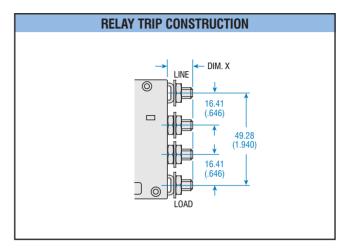


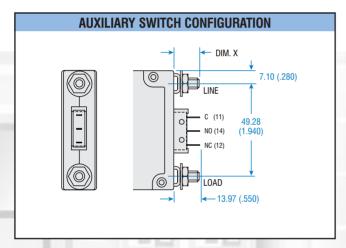
- M3 mounting inserts, 2 per pole, 5 mm (.195) deep clearance recess provided in moldings for mounting screw threads (also available with 6-32 mounting inserts).
- 2 1 and 4 pole versions not available with AM1P Series.

#### **Dimensions**

APPROXIMATE IN MM (INCHES)

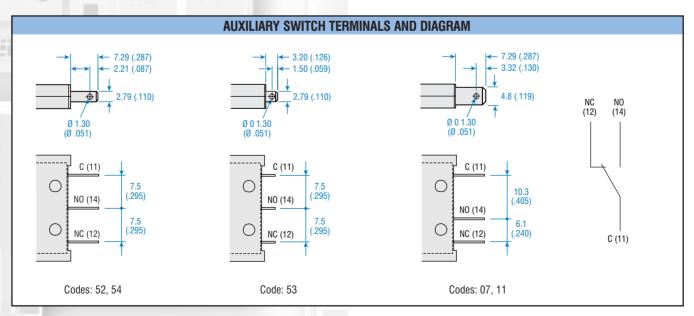






Line Loa	Line Load Terminal Chart (standard length) 🕕										
Terminal	0-70 A	71-100 A									
Ø Metric	M5 x 0,8	M6 x 1									
Length "X"	20,63 (,812)	21,64 (,852)									
Ø Inches	10-32	1/4-20									
Length "X"	16,26 (,640)	17,65 (,695)									

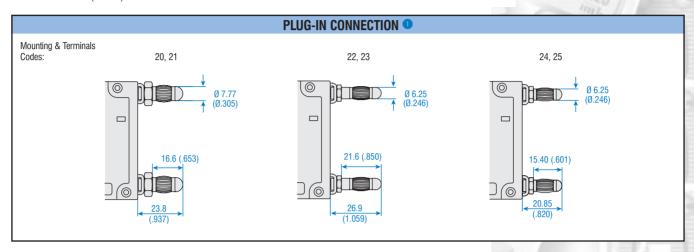
Torque Specifications									
Dimensions	Torque allowed								
Inserts M3; 6-32	0,6-0,8 Nm (5-7 inlb.)								
Terminals M5; 10-32	1,7-2,3 Nm (15-20 inlb.)								
Terminals M6; 1/4-20	3,4-4,0 Nm (30-35 inlb.)								



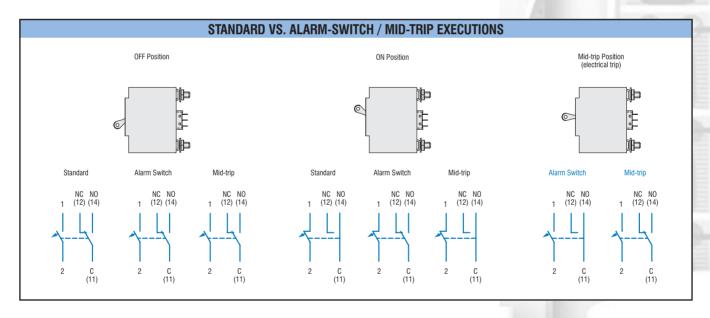
1 Terminal length tol.  $\pm$  1,6 (,062)

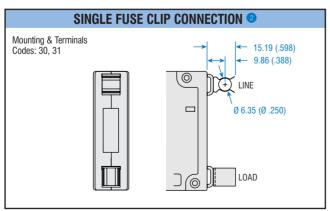


#### APPROXIMATE IN MM (INCHES)



1 Mating holes for codes 20, 21 Ø 7.90 (.311) - For codes 22, 23, 24 and 25 Ø 6.35 (.250).





2 Not available with AM1P series, 200 A version.

### Series AM/R (up to 100 A)

#### **HOW TO ORDER**

To determine your **Complete Catalog Number**, start with **Series Prefix AM** and add the appropriate **Code Letters** and/or **Numbers** as in the example below. Any part number with greater than 26 digits including dashes will be shipped with a factory-assigned part number.

Step 1	Step 2	Step 3		Steps 4	Step 5	Step 6	Step 7	
Series Prefix	Poles	Series Suffix	Frequency	Internal Circuit ②	Handle Location	Handle Color & Marking	Mounting & Terminals 0	
AM	2	R-	A	9	- L	С	15	

#### **SELECTION TABLE**

Series	Poles	Series	Frequer	псу		Inte	rnal Circuit		Handle Locatio		Handle & Mar			Mounting & Terminals	)	
Prefix	Suffix	Frequency	Code	Inrush Code	Aux. Switch	Description	Code	Handle	Code	Color & Marking	Code	Mounting	Terminals	Code		
AM		Suffix R-	50/60 Hz DC 400 Hz 50/60 HZ DC	A B C			Switch Only Series Trip Series Trip Shunt-Tap Relay Trip Dual Rating Series Trip Series Trip Switch Only DuCon DuCon Series + Relay Shunt-Tap DuCon Series+Relay Dual Rating Shunt-Tap Relay Trip Series Shunt Mid-Trip Shunt Alarm	Code  0 2 3 5 6 7 8 9 12 15 16 22 23 25 26 27 32 33 38 39 76 78	Handle	- A - B - C - L - D - M - N - L - R - P		Code  A B C I J K M P Q R S T	Mounting  6-32 6-32 M3-0.5 M3-0.5 M3-0.5 M3-0.5 6-32 M3-0.5 6-32 M3-0.5 6-32 M3-0.5 6-32 M3-0.5 6-32 M3-0.5 6-32 M3-0.5	Terminals  10-32 Threads 70 A  1/4-20 Threads 100 A  10-32 Threads 70 A  1/4-20 Threads  M5 Threads 70 A  M6 Threads  Gold Plug-In  Ø 7.77 x 16.6  Gold Plug-In  Ø 7.77 x 16.6  Silver Plug-In  Ø 6.25 x 21.6  Silver Plug-In  Ø 6.25 x 21.6  Silver Plug-In  Ø 6.25 x 15.4  Double Fuse Clip  Tuse Clip  Tuse Clip  10-32 Threads 50 A  M6 Screw	Code  07 97 13 14 15 16 20 21 22 23 24 25 27 29 30 31 41 42	
					8 X 25 X 8 X 8 X	No No No	Relay Coil Relay Coil Mid-Trip Mid-Trip with Alarm Switch	86 96 98 99		- S	Blue I/O ON/OFF Green I/O ON/OFF	X Y	M3-0.5 6-32 6-32 6-32	1/4-20 Screw 10-32 Threads 50 A M6 Screw 1/4-20 Screw	43 45 46 47	

- 1 Configurations greater than 4 poles must be "without" UL in Step 8.
- ② Other cirucits available. Please contact Customer Service Center.
- OuCon Internal Circuits are only available with 1 pole versions, 0.01A-50A. For DuCon configurations requiring above 50A or 2 or more poles, please contact Customer Service Center.
- Other mounting and terminal configurations available. Please contact Customer Service Center.
- 100 A max for UL Approval. VDE Pending.
- 50 A max for UL-Approval. VDE Pending.



#### Complete Part Number: AM2R-A9-LC15D-A52-12R5-4

					4
Step 8	Step 9	Step <b>0 (</b>	Step 11	Step 12	
Worldwide Approvals	UL-AIC Approval	Auxiliary Switch	Current Ratings	Time Delay Curves	
D-	Α	52	-12R5	- 4	

Worldwid Approva				App	-AIC proval				Auxiliary Switch  ① ①								Time Delay Curves		
Description	Code	UL Std A	Max. Ratings	Max. V	Freq.	Interrupt Cap.	Code	Function	Contacts	Terminals	UL/ CSA	VDE	Volt AC	Code	Ampere	Inrush Level	Time Delay	Frequency	Code
		UL 1077	100 A	240 V 250 V 80 V	50/60 Hz 400 Hz DC	5K IAC	Α									8 X	Long	50/60 Hz DC 400 Hz 50/60 Hz DC	-1
		Without	100 A	240 V 250 V 80 V	50/60 Hz 400 Hz DC	5K IAC	NU									8 X	Medium	50/60 Hz DC 400 Hz 50/60 Hz DC	-2
		UL 1077 Without	50 A 50 A		50/60 Hz 50/60 Hz		L NL									8 X	Short	50/60 Hz DC 400 Hz 50/60 Hz DC	- 3
Without (Standard) VDE & CE	D-	UL 1077 Without	50 A 50 A		50/60 Hz 50/60 Hz		AD (3) ND	NO-NC	Ag	2.8 Fast-on	10.1 A	-	220	06	From	18 X	Long	50/60 Hz DC 50/60 Hz DC	- 4
in conf. with IEC 950	H-	UL 1077	30 A	480 V	50/60 Hz	5K IAC	AB	NO-NC	Ag AgAuPt	4.8 Fast-on 4.8 Fast-on	10.1 A 0.1 A		220 125	07 11	R02	18 X	Medium	50/60 Hz DC 50/60 Hz DC	- 5
Meets IEC 950 electrical spacing requirements	W-	Without UL 489	30 A 20 A	480 V 120/ 240 V	50/60 Hz 50/60 Hz		NB DK	NO-NC NO-NC	Ag	2.8 Fast-on		1.0 A	220	52	to 100	18 X	Short	50/60 Hz DC 50/60 Hz DC	- 6
TUV approved and CE	т-	UL 489	80 A	80 V	DC	50 K @ 65 VDC	DL	NO-NC	Ag AgAuPt	to be weld 2.8 Fast-on	0.1 A		220	53 54	Amps	25 X	Long	50/60 Hz DC 50/60 Hz	-7
marked		UL 489 A	100 A	80 V	DC	50 K @ 65 VDC	AJ									25 X 25 X	Medium Short	DC 50/60 Hz DC	-8
		UL 489	50A 100 A	120/ 240 V 80 V	50/60 Hz DC	5K IAC	DU									-	Instant	50/60 Hz DC 400 Hz	– P
		UL 489A UL 1077	100 A 50 A	80 V 125 V	DC DC	5K IAC	AU C									-	Switch only	50/60 Hz DC 400Hz	- S
		Without	50 A	125 V	DC	5K IAC	NC									-	Customer specified	50/60 Hz DC 400 Hz	-т

- VDE approval pending. Applicable only with Internal Circuits Codes: 0, 2, 3, 5, 8, 9, 12, 15, 16, 22, 25, 26, 32, 38, 39 and 86.
- ① AD code is only available with a 2-pole execution minimum and AB available only with a 3-pole execution minimum.
- ① Other auxiliary switches available. Please contact Customer Service Center.
- $\textcircled{\mbox{\bf 10}}$  Step 10 is only required if breaker has auxiliary switch. If auxiliary switch is not required, omit Step 10.
- All ratings between .02 A and 100 A are available. A value less than 1 A requires the character "R" in place of the decimal point. For example, 2.5 A would be specified as 2R5.

### **HEINEMANN® AM1P SERIES CIRCUIT BREAKERS**

### Series AM1P (101 to 200 A)

#### **HOW TO ORDER**

To determine your **Complete Catalog Number**, start with **Series Prefix AM** and add the appropriate **Code Letters** and/or **Numbers** as in the example below. Any part number with greater than 26 digits including dashes will be shipped with a factory-assigned part number.

Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7	
Series Prefix	Poles	Series Suffix	Frequency	Internal Circuit	Handle Location	Handle Color & Marking	Mounting & Terminals	
AM	1	P –	В	9	- L	С	14	

#### **SELECTION TABLE**

Series	Poles	Series	Frequen	Frequency		quency Internal Circuit					Handle Location		Handle & Mar		ı	Mounting & Terminals		
Prefix		Suffix	Frequency	Code	Inrush Code	Aux. Switch	Description	Code	Handle	Code	Color & Marking	Code	Mounting	Terminals	Code			
											Black ON/OFF White	A B						
					8 X	Yes	Series Trip	2			ON/OFF  Black I/O ON/OFF	C						
					8 X 8 X	No No	Series Trip Shunt-Tap	3 5		- B	Black I/O	I	6-32	1/4-20 Threads 100 A	97			
					18 X 18 X	No Yes	Series Trip Series Trip	8 9		- C	White I/O	J	6-32 M3-0.5	M6 Threads 100 A 1/4-20 Threads 100 A	98 14			
					8 X	No	DuCon	15			White I/O ON/OFF	K	M3-0.5	M6 Threads 100 A	16			
					8 X	No	DuCon Series+Relay	16 🕙		-L			M3-0.5	Plug-ln Ø 7.77 x 16.6	20			
					18 X	No	Shunt-Tap	22			Orange I/O ON/OFF	M	6-32	Plug-ln Ø 7.77 x 16.6	21			
AM	1	P –	DC	В	18 X	No	Relay Trip	23		– D	Gray	_	M3-0.5 6-32	Plug-ln Ø 6.25 x 21.6 Plug-ln Ø 6.25 x 21.6	22 23			
					18 X	No	DuCon Series+Relay	26 🕙			I/O ON/OFF	Р	M3-0.5	Plug-ln Ø 6.25 x 15.4	24			
					18 X	No	Dual Rating	27	4	– M	Yellow I/O ON/OFF	Q	6-32	Plug-ln Ø 6.25 x 15.4	25			
					25 X	No	Shunt-Tap	32			Black		M3-0.5	M6 Screw	42			
					25 X	No	Series Trip	38		- N	Without	R	M3-0.5	1/4-20 Screw	43			
					25 X	Yes	Series Trip	39			White	s	6-32	M6 Screw	46			
					8 X	No	Mid-Trip	98		-L	Without	3	6-32	1/4-20 Screw	47			
					8 X	No	Mid-Trip with Alarm switch	99			Red I/O ON/OFF	Т						
											Blue I/O ON/OFF	х						
											Green I/O ON/OFF	Y						

- For the AM1P series, the part number will always denote "1" as the number of poles in Step 2. However, the number of poles actually received are based on the current rating selected in Step 11. If you order a 100-150A breaker, you will receive a 2 pole breaker and, if you order a 151-200A breaker, you will receive a 3 pole breaker.
- ② Other circuits available. Please contact Customer Service Center.
- 3 For Internal Circuit codes 16 and 26 please select "Without UL" code NU in Step 9.



#### Complete Part Number: AM1P-B9-LC14D-AU52-101-4

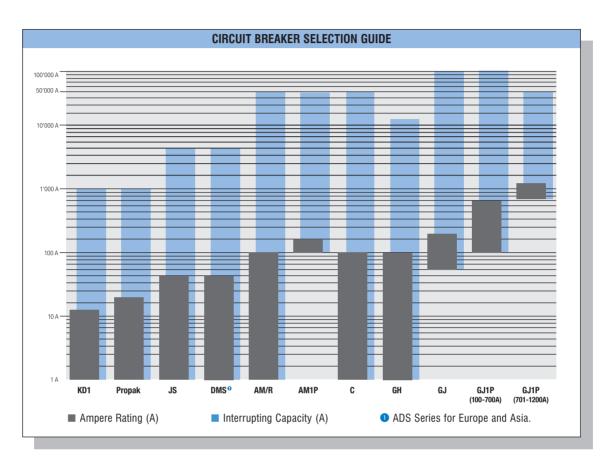
Step	Step	Step	Step	Step
8	9	10	11	12
Worldwide Approvals	UL-AIC Approval	Auxiliary Switch	Current Ratings	Time Delay Curves
D -	AU	52	-101	- 4

	Worldwide Approval														Current Ratings				
Description	Code	UL Std.	Max. Ratings	Max. V	Freq.	Interrupt Cap.	Code	Function	Contacts	Terminals	UL/ CSA	VDE	Volt AC	Code	Ampere	Inrush Level	Time Delay	Frequency	Code
Without (Standard)	D-	UL 489 A	101-200 101-200 101-200	65 V	DC DC	50K 50K 10K	NU GU AU	NO-NC NO-NC NO-NC NO-NC	Ag AgAuPt Ag AgAuPt		0.1 A 10.1 A 10.1 A	– 1.0 A	220 125 220 220 220	07 11 52 53 54	From - 101 to - 200 Amps	8 X 8 X 18 X 18 X 25 X 25 X 25 X	Long Medium Short Long Medium Short Long Medium Short Instant	DC DC DC DC DC DC DC DC	-1 -2 -3 -4 -5 -6 -7 -8 -9 -P

- Step 10 is only required if breaker has auxiliary switch. If auxiliary switch is not required, omit Step 10.
- **1** Other auxiliary switches available. Please contact Customer Service Center.
- All ratings between 101 and 200 A are available. Consult Customer Service Center for availability and delivery time. A value less than 1 A requires the character "R" in place of the decimal point when ordering. For example, 125.5 A would be specified as 125R5 in the part number.
- No deliberate time delay imposed.

### **HEINEMANN® CIRCUIT BREAKERS**

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