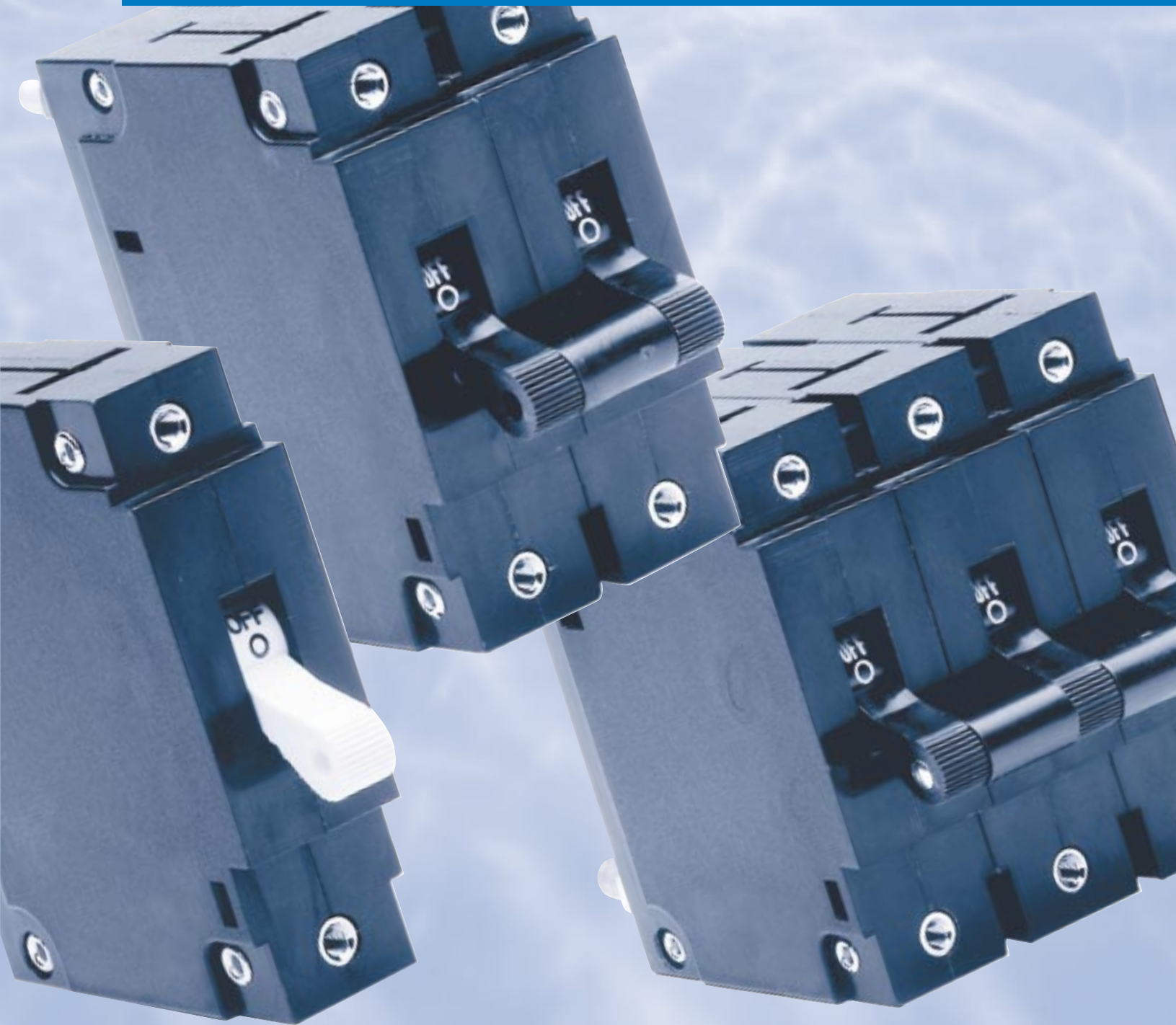
EATON | Heinemann

Heinemann® AM/R and AM1P Series Circuit Breakers



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

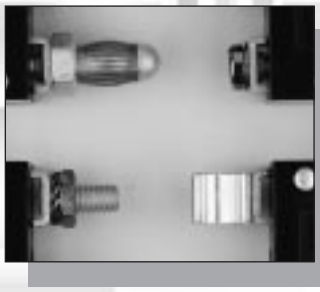
The hydraulic-magnetic load-sensing and time delay mechanism of the AM/R Series is insensitive to changes in ambient or enclosure temperature, adapting it to service conditions encountered. Unlike thermal breakers, the AM/R can be loaded to rated capacity without causing nuisance tripping when ambient 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°C to +85°C.

Heinemann® is a registered trademark of the Eaton Corporation, Molded Case Business Unit.

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 moisture-resistance 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 accordance 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 time-delay 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 AM1P AGENCY APPROVALS						
Standard	**Voltage**	**Frequency** (1)	**Phase/Pole Spaces**	**Current Range**	**Standard Interruption** (4)	**High Capacity** (4)
UL 489 CSA	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
	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	—
UL 489a	80 VDC	—	DC/1	0.02 – 100	5,000	50,000@65VDC
	80 VDC	—	DC/2	101 – 150	10,000	50,000@65VDC
	80 VDC	—	DC/3	151 – 200	10,000	50,000@65VDC
UL1077 CSA	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)	—
	80 VDC 240 VAC	50-60	1 & 3/1 & 3	0.02 – 100	5000 (2)	—
	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	—
Switch only per UL508	80 VDC	—	DC	.02 – 100	—	—
	415 VAC	50-60	3	.02 – 50	—	—
	240 VAC	50-60	1 & 3	.1 – 100	—	—
	277 VAC	50-60	1	.02 – 50	—	—
	277/480 VAC	50-60	3	.1 – 30	—	—
Marine Ignition UL 1500	240 VAC	50-60	1	.1 – 75	2000 (2)	—
	65 VDC	—	DC	.1 – 60	2000 (2)	—
	65 VDC 240 VAC	50-60/DC	1 & 3	.1 – 60	2000 (2)	—
TUV	80 VDC	—	DC	.1 – 70	5000	—
	80 VDC	—	DC	70.1 – 100	1500	—
	240/400 VAC	50-60	3	.1 – 50	1500 (5)	—

(1) DC and 1 Phase 277 V max ratings are 1 or 2 pole breaking. 3 phase ratings are 3 pole breaking

(2) 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).

(4) A clearance of 1 inch for DC and 2 inches for AC is required between the arc vent and conductive surfaces or components.

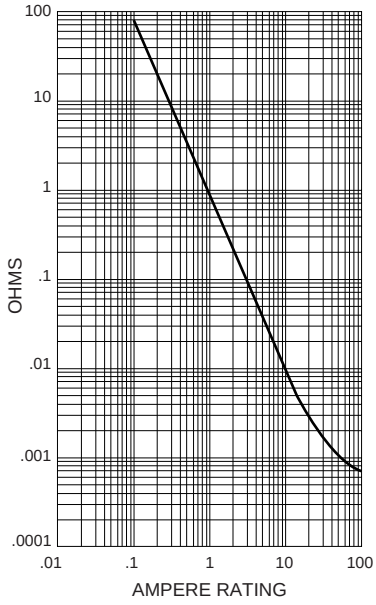
(5) TUV Certification at 400 volts.

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

Nominal DCR and Impedance

Current Rating Amps	DC Delays (Resistance in Ohms)			60 Hz Delays (Impedance in Ohms)			400 Hz Delays (Impedance in Ohms)
	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 ±20%, 2.6 amps to 20 amps ±25% 21 amps to 100 amps ±50%.



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

Heat-induced nuisance tripping eliminated

Heinemann® hydraulic-magnetic 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.

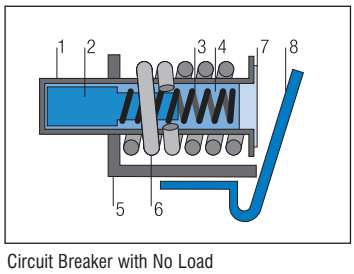
3. Immediate reset. Since there are no thermal elements, heat build-up is not a factor. Therefore, no "cooling off" period is required after fault interruption.

Time delay eliminates breaker tripping due to transient current surges

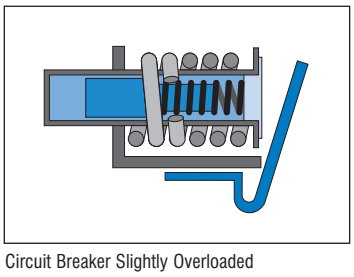
Elimination of transient current surges as a cause of nuisance tripping is accomplished through the creation of a controlled time delay. In any installation where a power supply or compressor motor is on the line, an inrush of current occurs when the equipment is first turned on. The bigger the equipment, 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.

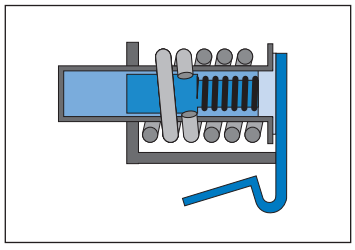
The hydraulically-controlled time-delay mechanism of a Heinemann® breaker eliminates nuisance tripping without lessening overload protection. The delay is inversely proportional to the overload; response is quicker on large overloads, where greater potential danger exists, and slower on small overloads. 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.)

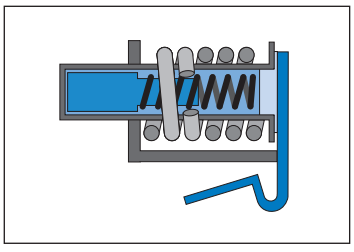
For added protection, the time-delay is self-adjusting to ambient temperature conditions. At high ambients, where the overload tolerance of most circuits is lowered, the viscosity of the special fluid in the breaker's dashpot is lessened, and the time-delay response is correspondingly longer to allow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



Circuit Breaker with No Load


Circuit Breaker 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

HEINEMANN® AM/R AND AM1P SERIES CIRCUIT BREAKERS

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.

Inrush	Time Delay Curve vs. Percent of Rated Current															
	Curve	100%	125%	135%	150%	200%	300%	400%	500%	600%	700%	800%	900%	1000%	1100%	1200%
50/60 Hz 8x	1	No trip	50-700	–	32-350	10-90	–	1.50-15	–	.5-7	–	.02-3	–	.006-2	–	.005-1
	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	.015-.80	.011-.41	.01-.20	.009-.10	.008-.05
	3	No trip	1-12	–	.40-5	.15-1.9	.054-.64	.03-.30	.017-.20	.01-.14	.007-.09	.005-.06	.004-.05	.004-.05	.004-.046	.004-.04
50/60 Hz 18x	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
	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	.013-.75	.01-.50	.01-.25	.01-.10
	6	No trip	1-12	–	.40-5	.15-1.9	.052-.73	.03-.40	.02-.27	.015-.20	.012-.14	.01-.10	.008-.074	.006-.06	.005-.053	.005-.05
50/60 Hz 25x	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
	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	.06-.90	.05-.70
	9	No trip	1-17	–	.40-4.5	.16-1.6	.06-.46	.05-.40	.04-.35	.03-.30	.025-.25	.020-.22	.015-.20	.012-.15	.009-.12	.008-.08
DC 8x	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	.005-.90	.005-.50
	2	No trip	6-80	–	2.5-30	.80-10	.25-3.7	.15-2	.09-1.2	.05-.80	.021-.50	.01-.30	.006-.17	.005-.10	.004-.06	.004-.04
	3	No trip	1-12	–	.40-5.0	.15-1.9	.054-.64	.03-.30	.017-.20	.01-.14	.007-.09	.005-.06	.004-.052	.004-.05	.004-.046	.004-.04
DC 18x	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
	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	.013-.75	.01-.50	.01-.25	.01-.10
	6	No trip	1-12	–	.40-5.0	.14-1.9	.052-.73	.03-.40	.02-.27	.015-.20	.012-.14	.01-.10	.008-.074	.006-.06	.005-.053	.005-.05
DC 25x	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
	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	.06-.9
	9	No trip	1-17	–	.4-4.5	.16-1.6	.06-.46	.05-.4	.04-.35	.03-.3	.025-.25	.02-.22	.015-.2	.012-.15	.009-.12	.008-.08
400 Hz 8x	1	No trip	–	–	30-350	10-120	3.4-35	2-25	.86-19	.25-10	.06-2.6	.02-.60	.012-.25	.01-.15	.008-.12	.008-.10
	2	No trip	–	–	6-70	2.5-26	.85-8.5	.40-5	.23-3.1	.10-2	.02-1.1	.01-.60	.01-.30	.01-.15	.009-.085	.008-.05
	3	No trip	–	–	.60-7	.20-2.3	.075-.84	.04-.50	.02-.37	.01-.25	.006-.18	.005-.12	.004-.075	.004-.05	.004-.042	.004-.04
50/60 Hz DC 8x	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
	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	.015-.80	.011-.41	.01-.20	.009-.10	.008-.05
	3	No trip	–	.60-9	.40-5	.15-1.9	.054-.64	.03-.30	.017-.20	.01-.14	.007-.09	.005-.06	.004-.052	.004-.05	.004-.046	.004-.04
50/60 Hz DC 18x	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
	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	.013-.75	.01-.50	.01-.25	.01-.10
	6	No trip	–	.60-9	.40-5	.15-1.9	.052-.73	.03-.40	.02-.27	.015-.20	.012-.14	.01-.10	.008-.074	.006-.06	.005-.053	.005-.05
50/60 Hz DC 400 Hz	Instant. Delay "P" Max.Time	No trip	.100	.060	.050	.034	.020	.015	.012	.011	.011	.011	.011	.011	.011	.011

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.

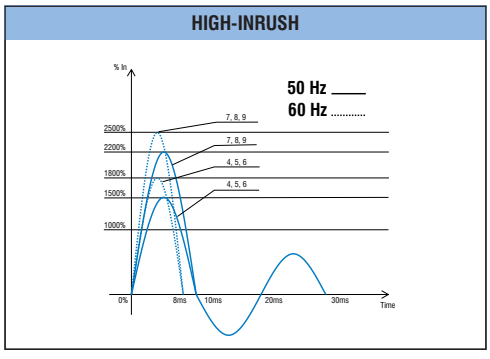
High-Inrush

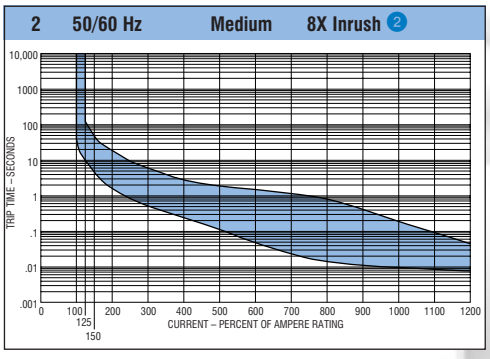
Influence of line frequency is shown below.

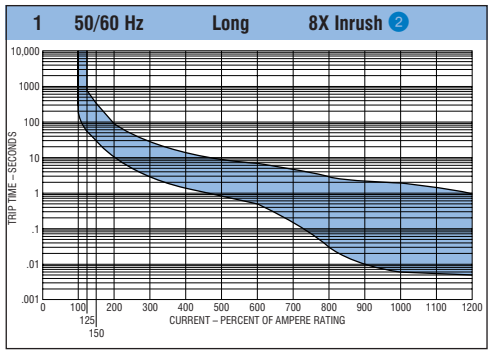
For high-inrush rates, see graph below. For curve P, high-inrush is not possible.

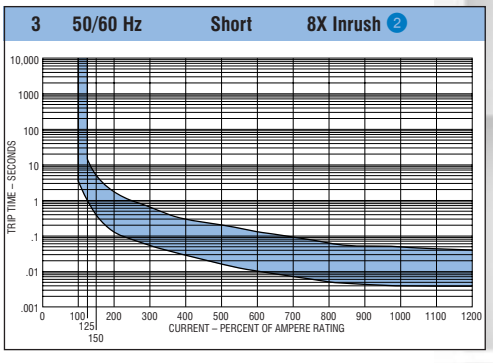
TRIPPING SPECIFICATIONS

Frequency				High-Inrush Tolerance			Curve Characteristics				Curve No
50/60 Hz	400 Hz	DC	AC/DC	8X	18X	25X	Long	Medium	Short	Inst.	
•	•	•	•	•			•				1
•	•	•	•	•				•			2
•	•	•	•	•					•		3
•		•	•		•		•				4
•		•	•		•			•			5
•		•	•		•				•		6
•		•				•	•				7
•		•				•		•			8
•		•				•			•		9
•	•	•	•							•	P





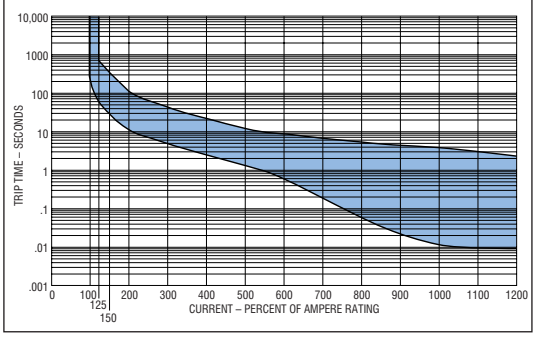




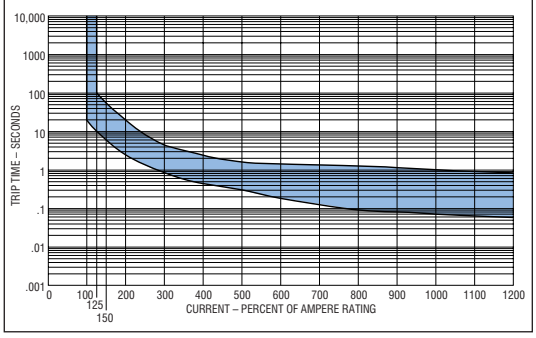
2 Not available with AM1P series.

HEINEMANN® AM/R AND AM1P SERIES CIRCUIT BREAKERS

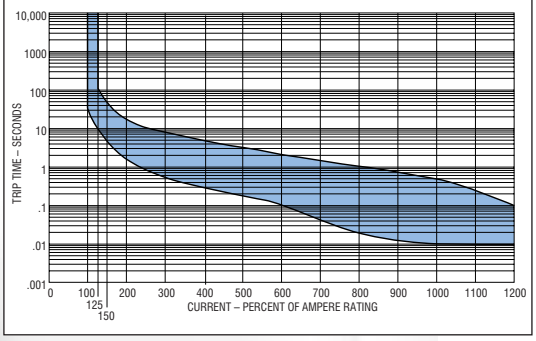
4 50/60 Hz or DC Long 18X Hi-Inrush [1]



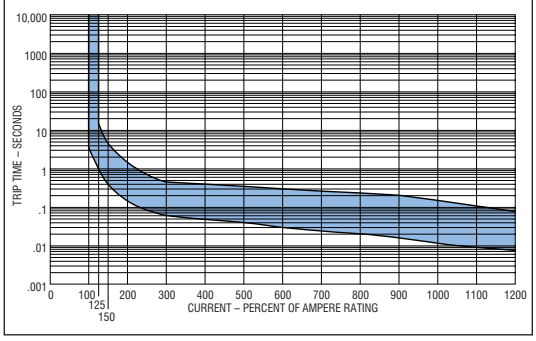
8 50/60 Hz Medium 25X Hi-Inrush [1]



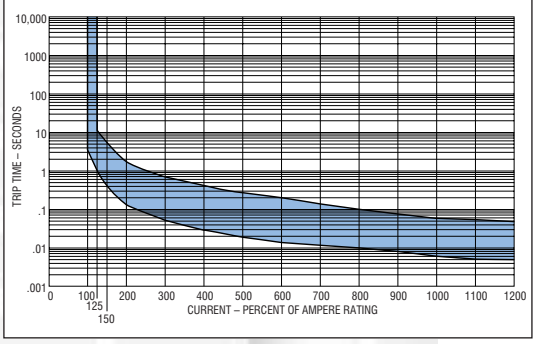
5 50/60 Hz or DC Medium 18X Hi-Inrush [1]



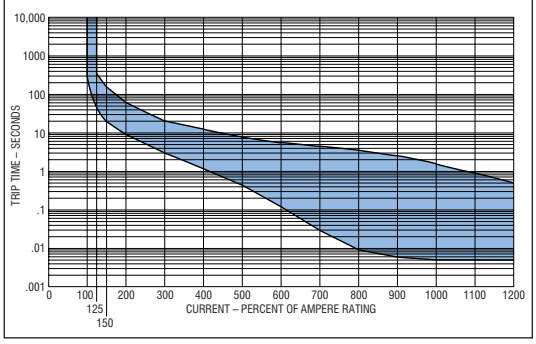
9 50/60 Hz Short 25X Hi-Inrush [1]



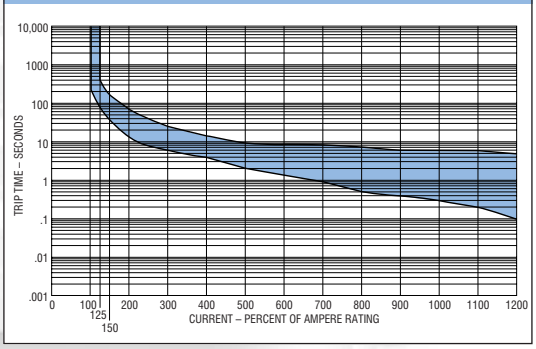
6 50/60 Hz or DC Short 18X Hi-Inrush [1]



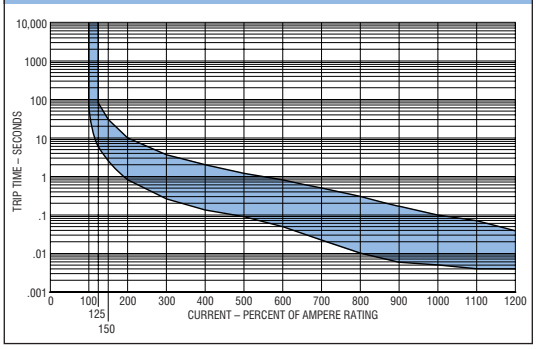
1 DC Long 8X Inrush



7 50/60 Hz Long 25X Hi-Inrush [1]



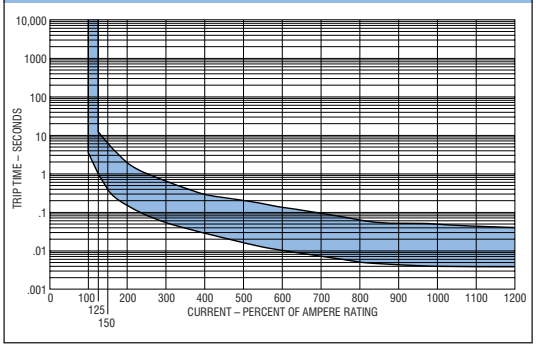
2 DC Medium 8X Inrush



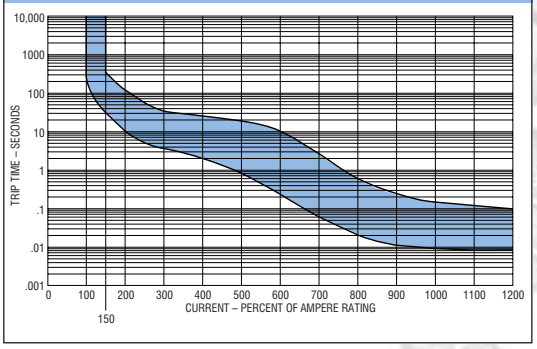
[1] Not available with AM1P series.

Time delay curves

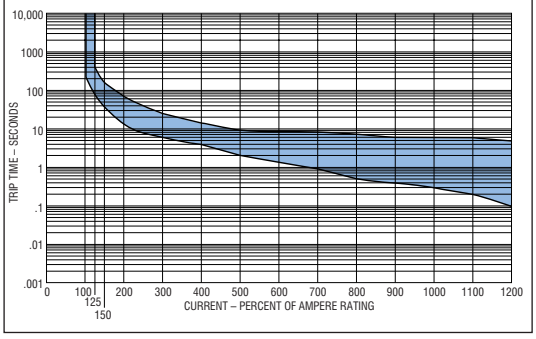
3 DC Short 8X Inrush



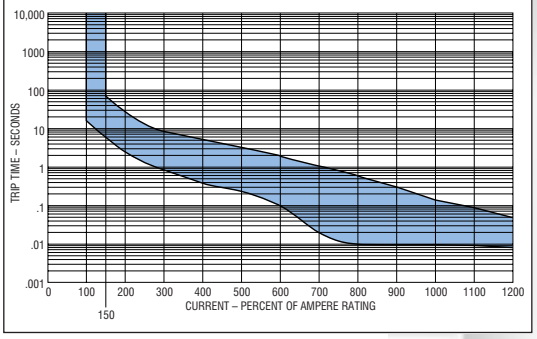
1 400 Hz Long 8X Inrush (1)



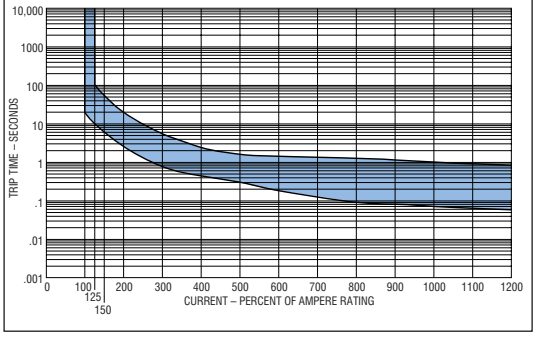
7 DC Long 25X Hi-Inrush



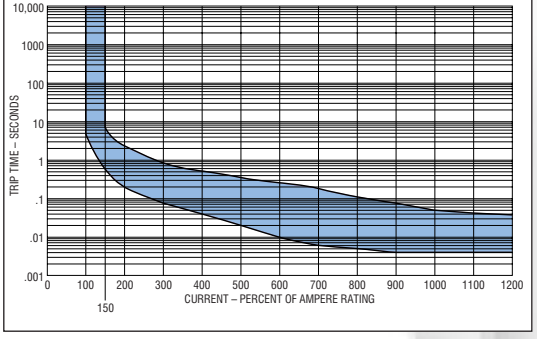
2 400 Hz Medium 8X Inrush (1)



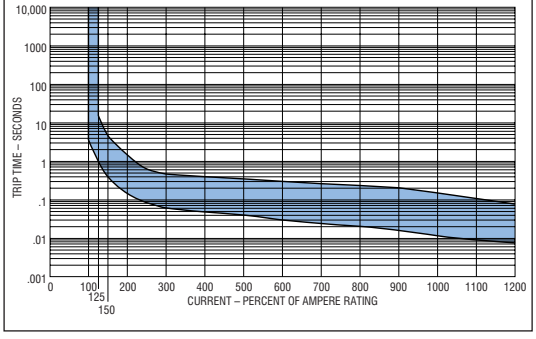
8 DC Medium 25X Hi-Inrush



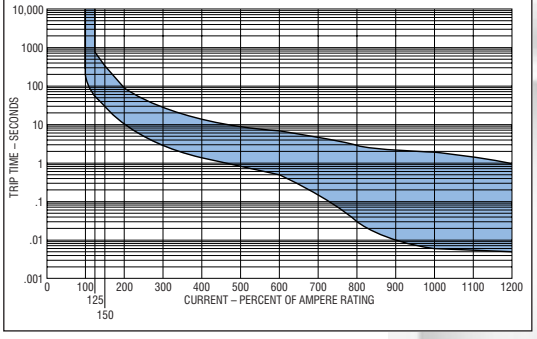
3 400 Hz Short 8X Inrush (1)



9 DC Short 25X Hi-Inrush



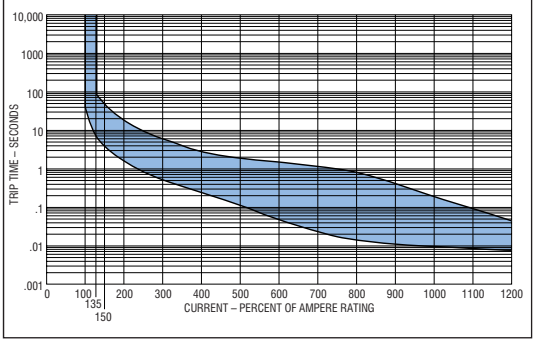
1 DC 50/60 Hz Long 8X Inrush (1)



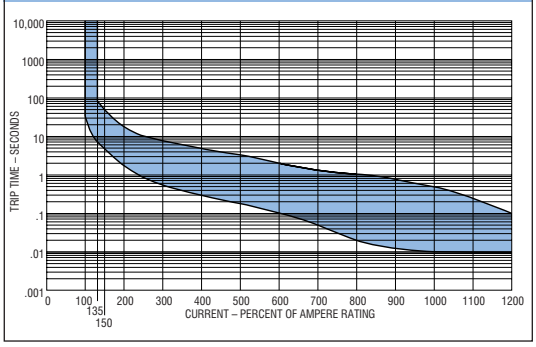
(1) Not available with AM1P series.

HEINEMANN® AM/R AND AM1P SERIES CIRCUIT BREAKERS

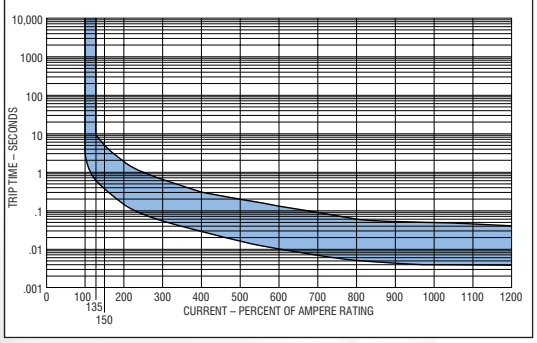
2 DC 50/60 Hz Medium 8X Inrush [1]



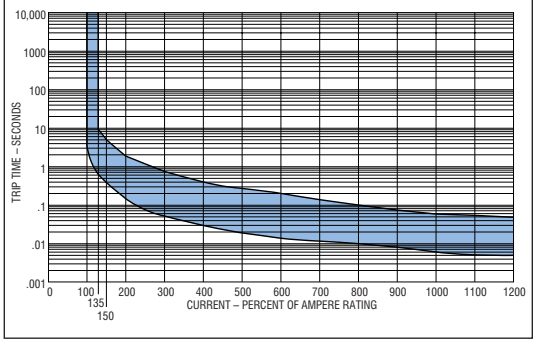
5 DC 50/60 Hz Medium 18X Hi-Inrush [1]



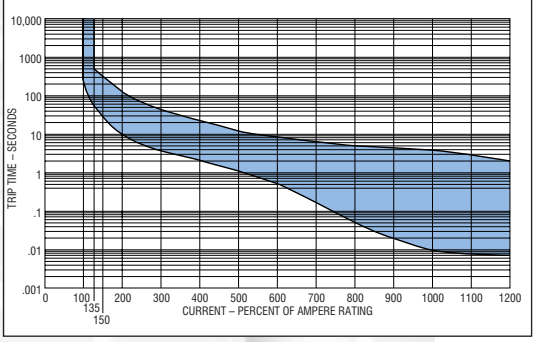
3 DC 50/60 Hz Short 8X Inrush [1]



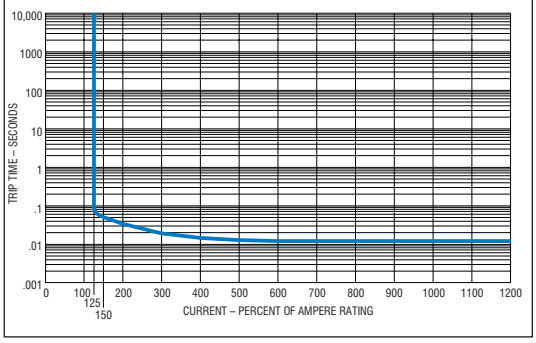
6 DC 50/60 Hz Short 18X Hi-Inrush [1]



4 DC 50/60 Hz Long 18X Hi-Inrush [1]

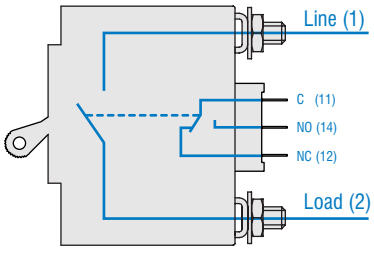
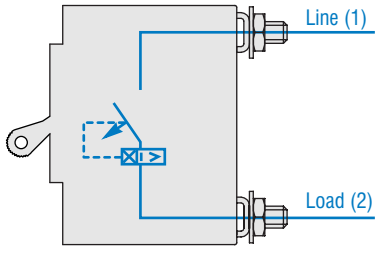
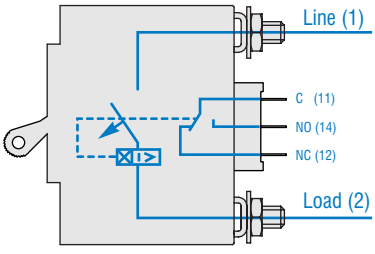
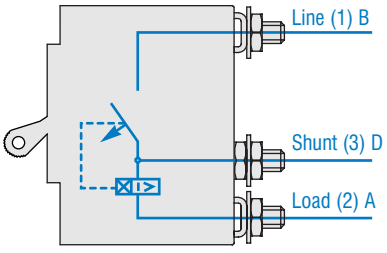


P 50/60 Hz / DC / 400 Hz Instant Delay (max. time) [1]

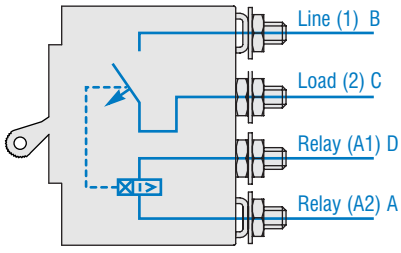
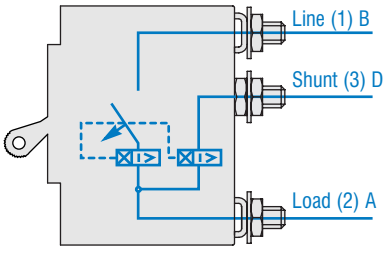
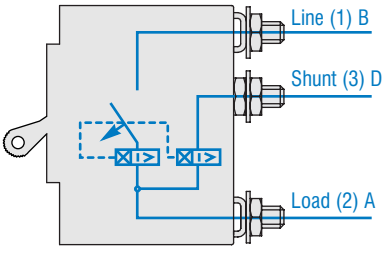
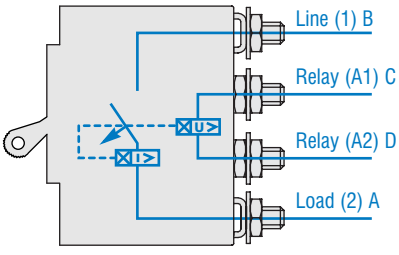


[1] Not available with AM1P series.

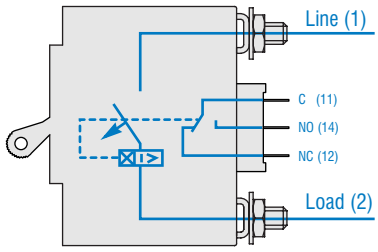
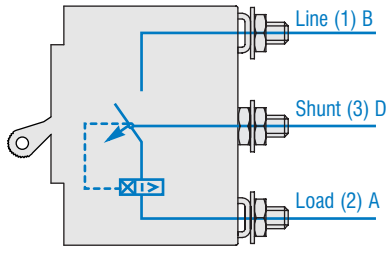
Internal Circuits

Circuit	Diagrams	Description	Auxiliary Contact	Inrush	Internal Circuit Codes
Switch	Internal Circuit represented: 12 	Switch only (without coil) with or without auxiliary contact.	No	No	**0** [1]
			Yes	No	**12** [1]
Series Trip	Internal Circuit represented: 3, 8, 38 	The contacts and the coil 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	8X	**3**
			No	18X	**8**
			No	25X	**38**
Series Trip With Auxiliary Contact	Internal Circuit represented: 2, 9, 39 	The contacts and the current sensing coil are in series. Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system.	Yes	8x	**2**
			Yes	18x	**9**
			Yes	25x	**39**
Shunt Trip	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 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 possible to adjust the tripping through a potentiometer between the load terminals.	No	8X	**5**
			No	18X	**22**
			No	25X	**32**

[1] Not available with AM1P series.

Circuit	Diagrams	Description	Auxiliary Contact	Inrush	Codes
Relay Trip	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 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 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	8x	**6** [1]
			No	18x	**23**
			No	25x	**33** [1]
Dual Rating	Internal Circuit represented: 7, 27, 37 	Dual rating circuit breakers are suitable for apparatus operating under two different currents or voltages. For example, same breaker may be used in USA (110 V AC) or Europe (220 V AC). As far as possible, the currents must be in the ratio of one to two with a maximum of 15 to 30 A.	No	8X	**7** [1]
			No	18X	**27**
			No	25X	**37** [1]
Dual Control (Ducon)	Internal Circuit represented: 15, 25 	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 voltage. The main coil is in series with the contact and the Ducon coil is shunt trip.	No	8x	**15**
			No	18x	**25** [1]
Dual Control Ducon (Series + Relay	Internal Circuit represented: 16, 26 	Same function as codes 15 and 25, but both coils are electrically separated from main contact.	No	8x	**16**
			No	18x	**26**

[1] Not available with AM1P series.

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

[1] Not available with AM1P series.

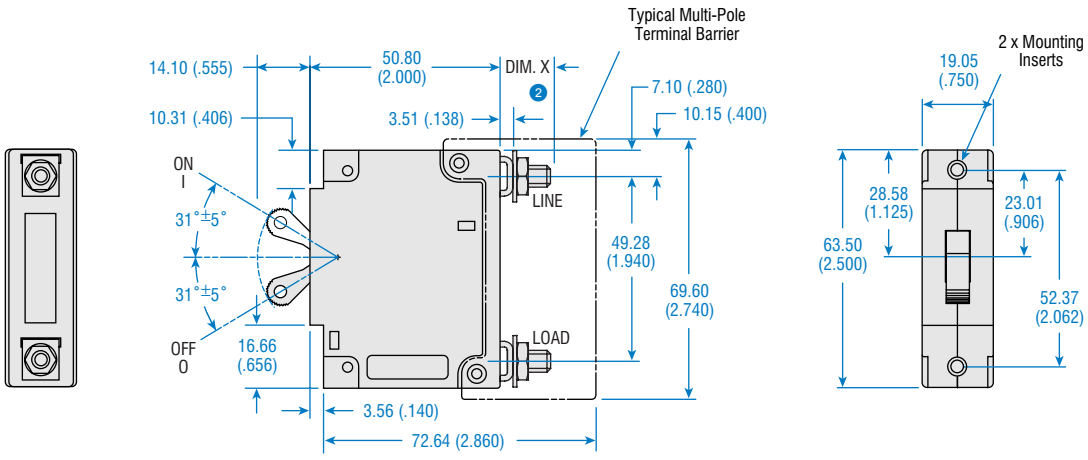
Dimensions

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.

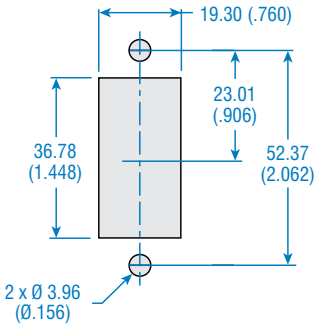
Tolerance:
±(0.9) 0.031 except where noted.

DIMENSIONS APPROXIMATE IN MM (INCHES)

STANDARD CONSTRUCTION [1]



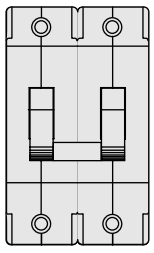
1 POLE PANEL CUTOUT [1]

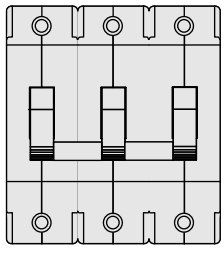


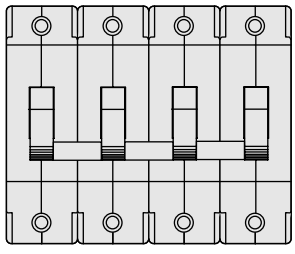
[1] 1 and 4 pole versions not available with AM1P Series.
[2] See page 16.

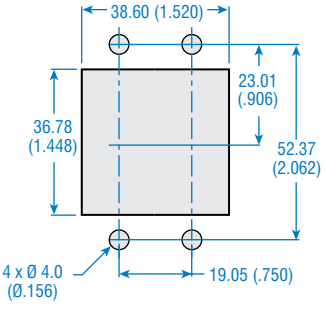
APPROXIMATE IN MM (INCHES)

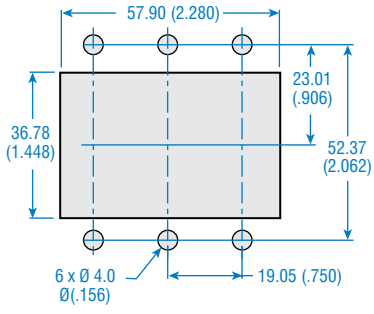
2, 3 AND 4 POLE PANEL CUTOUT [1] [2]

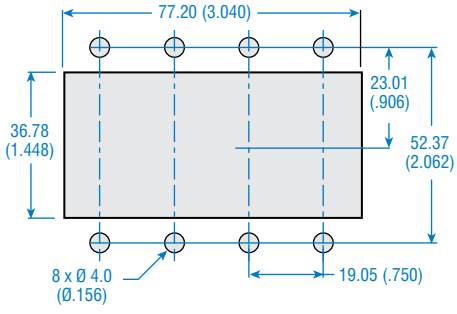


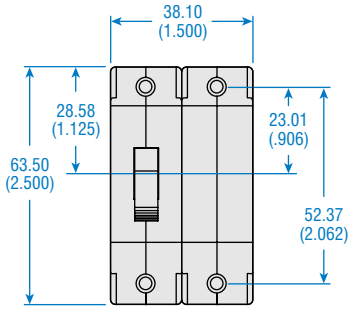


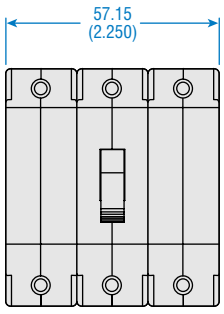


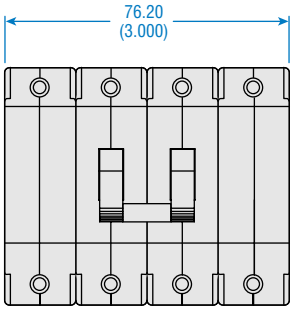


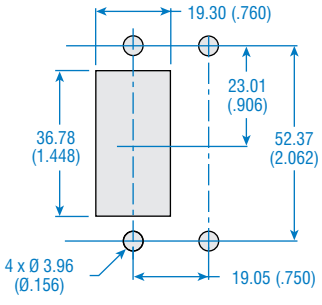


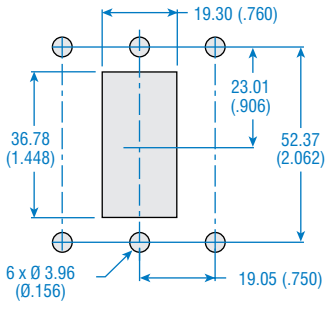


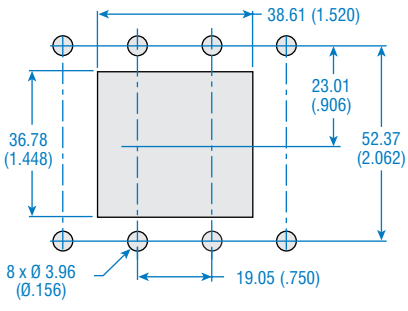












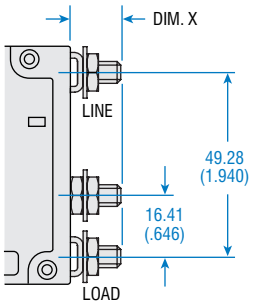
[1] M3 mounting inserts, 2 per pole, 5 mm (.195) deep clearance recess provided in moldings for mounting screw threads (also available with 6-32 mounting inserts).

[2] 1 and 4 pole versions not available with AM1P Series.

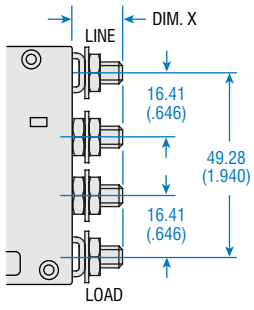
Dimensions

APPROXIMATE IN MM (INCHES)

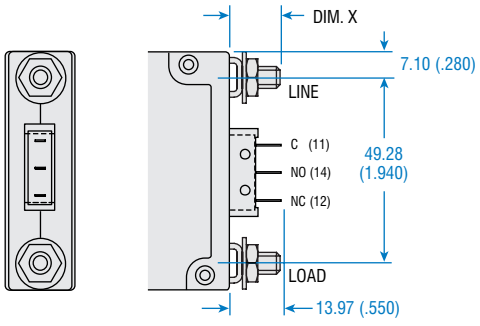
SHUNT/TAP CONSTRUCTION



RELAY TRIP CONSTRUCTION



AUXILIARY SWITCH CONFIGURATION



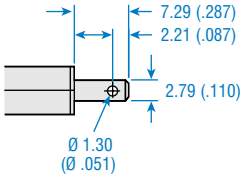
Line Load Terminal Chart (standard length) 1

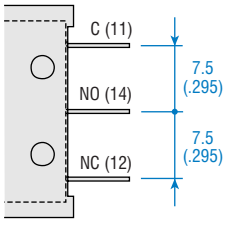
Terminal	0-70 A	71-100 A
Ø Metric	M5 x 0,8	M6 x 1
Length "X"	20,63 (,812)	21,64 (,852)
Ø Inches	10-32	1/4-20
Length "X"	16,26 (,640)	17,65 (,695)

Torque Specifications

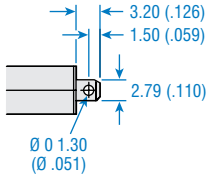
Dimensions	Torque allowed
Inserts M3; 6-32	0,6-0,8 Nm (5-7 in.-lb.)
Terminals M5; 10-32	1,7-2,3 Nm (15-20 in.-lb.)
Terminals M6; 1/4-20	3,4-4,0 Nm (30-35 in.-lb.)

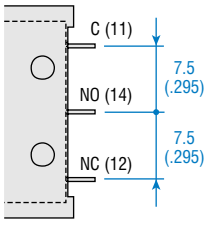
AUXILIARY SWITCH TERMINALS AND DIAGRAM



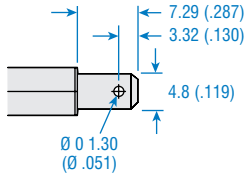


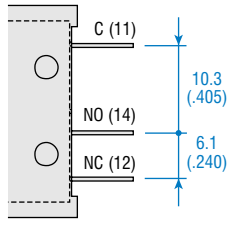
Codes: 52, 54



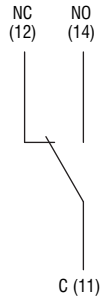


Code: 53





Codes: 07, 11



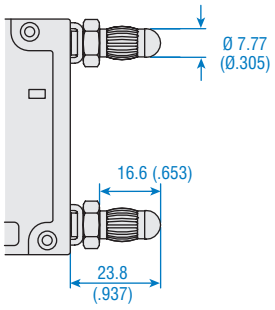
1 Terminal length tol. ± 1,6 (,062)

APPROXIMATE IN MM (INCHES)

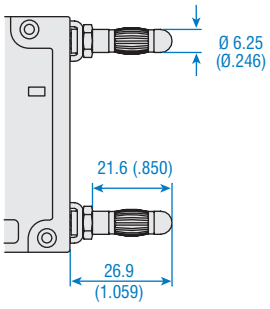
PLUG-IN CONNECTION [1]

Mounting & Terminals Codes:

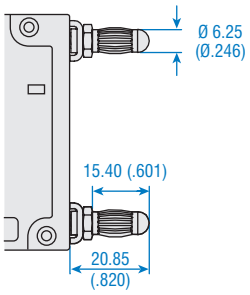
20, 21



22, 23



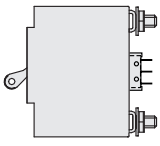
24, 25



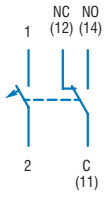
[1] Mating holes for codes 20, 21 Ø 7.90 (.311) - For codes 22, 23, 24 and 25 Ø 6.35 (.250).

STANDARD VS. ALARM-SWITCH / MID-TRIP EXECUTIONS

OFF Position

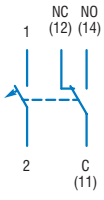


Standard

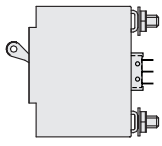


Alarm Switch

Mid-trip

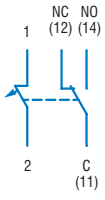


ON Position



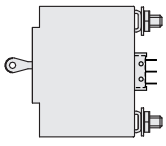
Standard

Alarm Switch



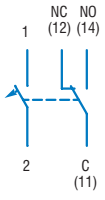
Mid-trip

Mid-trip Position (electrical trip)



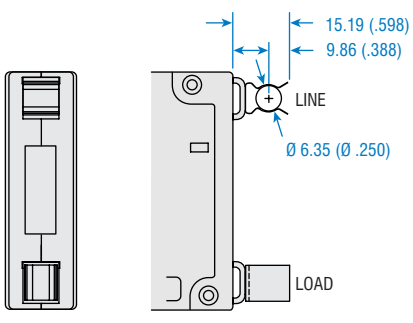
Alarm Switch

Mid-trip



SINGLE FUSE CLIP CONNECTION [2]

Mounting & Terminals Codes: 30, 31



[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 ❶	Series Suffix	Frequency	Internal Circuit ❷	Handle Location	Handle Color & Marking	Mounting & Terminals ❹
AM	2	R–	A	9	– L	C	15

SELECTION TABLE

Series Prefix	Poles ❶	Series Suffix	Frequency		Internal Circuit ❷				Handle Location		Handle Color & Marking		Mounting & Terminals ❸		
			Frequency	Code	Inrush Code	Aux. Switch	Description	Code	Handle	Code	Color & Marking	Code	Mounting	Terminals	Code
AM	1	R–	50/60 Hz	A	–	No	Switch Only	0		– A	Black ON/OFF	A	6-32	10-32 Threads 70 A	07
					8 X	Yes	Series Trip	2					6-32	1/4-20 Threads 100 A	97
	2				8 X	No	Series Trip	3		– B	White ON/OFF	B	M3-0.5	10-32 Threads 70 A	13
					8 X	No	Shunt-Tap	5					M3-0.5	1/4-20 Threads	14
	3		DC	B	8 X	No	Relay Trip	6			Black I/O ON/OFF	C	M3-0.5	M5 Threads 70 A	15
					8 X	No	Dual Rating	7		– C			M3-0.5	M6 Threads	16
					18 X	No	Series Trip	8			Black I/O	I	M3-0.5	Gold Plug-In Ø 7.77 x 16.6	20
					18 X	Yes	Series Trip	9							
	4		400 Hz	C	–	Yes	Switch Only	12		– L	White I/O	J	6-32	Gold Plug-In Ø 7.77 x 16.6	21
					8 X	No	DuCon ❸	15							
	5		50/60 HZ DC	D	8 X	No	DuCon ❸	16		– D	White I/O ON/OFF	K	M3-0.5	Silver Plug-In Ø 6.25 x 21.6	22
					18 X	No	Series + Relay	22							
	6				18 X	No	Shunt-Tap	23			Orange I/O ON/OFF	M	6-32	Silver Plug-In Ø 6.25 x 21.6	23
					18 X	No	DuCon ❸	25		– M					
	7				18 X	No	DuCon ❸ Series+Relay	26			Gray I/O ON/OFF	P	M3-0.5	Silver Plug-In Ø 6.25 x 15.4	24
					18 X	No	Dual Rating	27		– N					
	8				25 X	No	Shunt-Tap	32			Yellow I/O ON/OFF	Q	6-32	Silver Plug-In Ø 6.25 x 15.4	25
					25 X	No	Relay Trip	33		– L			M3-0.5	Double Fuse Clip ❺	27
					25 X	No	Series Trip	38			Black Without	R	6-32	Double Fuse Clip ❺	29
					25 X	Yes	Series Trip	39					M3-0.5	Fuse Clip ❻	30
					18 X	No	Relay Coil	76		– R	White Without	S	6-32	Fuse Clip ❻	31
					25 X	No	Mid-Trip Series Shunt	78					M3-0.5	10-32 Threads 50 A	41
					25 X	Yes	Mid-Trip Shunt Alarm	79		– P	Red I/O ON/OFF	T	M3-0.5	M6 Screw	42
					8 X	No	Relay Coil	86					M3-0.5	1/4-20 Screw	43
					25 X	No	Relay Coil	96		– S	Blue I/O ON/OFF	X	6-32	10-32 Threads 50 A	45
					8 X	No	Mid-Trip	98			Green I/O ON/OFF	Y	6-32	M6 Screw	46
					8 X	No	Mid-Trip with Alarm Switch	99		– L			6-32	1/4-20 Screw	47

❶ Configurations greater than 4 poles must be "without" UL in Step 8.

❷ Other cirucits available. Please contact Customer Service Center.

❸ DuCon 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.

❹ Other mounting and terminal configurations available. Please contact Customer Service Center.

❺ 100 A max for UL Approval. VDE Pending.

❻ 50 A max for UL-Approval. VDE Pending.

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

	Step 8	Step 9	Step 10 ❾ ❿	Step 11 ⓫	Step 12
	Worldwide Approvals	**UL-AIC Approval**	**Auxiliary Switch**	**Current Ratings**	**Time Delay Curves**
	D–	**A**	**52**	**–12R5**	**– 4**

	Worldwide Approval		UL-AIC Approval ❽						Auxiliary Switch ❾ ❿							Current Ratings ⓫	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
	Without (Standard)	D–	UL 1077	100 A	240 V 250 V 80 V	50/60 Hz 400 Hz DC	5K IAC	A									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	50 A	277 V	50/60 Hz	5K IAC	L									8 X	Short	50/60 Hz DC 400 Hz 50/60 Hz DC	– 3
			Without	50 A	277 V	50/60 Hz	5K IAC	NL												
			UL 1077	50 A	415 V	50/60 Hz	5K IAC	AD ❽									18 X	Long	50/60 Hz DC 50/60 Hz DC	– 4
	VDE & CE in conf. with IEC 950	H– ❼	Without	50 A	415 V	50/60 Hz	5K IAC	ND	NO-NC	Ag	2.8 Fast-on	10.1 A	–	220	06	From				
			UL 1077	30 A	480 V	50/60 Hz	5K IAC	AB ❽	NO-NC	Ag	4.8 Fast-on	10.1 A	–	220	07	R02	18 X	Medium	50/60 Hz DC 50/60 Hz DC	– 5
	Meets IEC 950 electrical spacing requirements	W–	Without	30 A	480 V	50/60 Hz	5K IAC	NB	NO-NC	AgAuPt	4.8 Fast-on	0.1 A	–	125	11	to				
			UL 489	20 A	120/ 240 V	50/60 Hz	10K IAC	DK	NO-NC	Ag	2.8 Fast-on	10.1 A	1.0 A	220	52	100	18 X	Short	50/60 Hz DC 50/60 Hz DC	– 6
									NO-NC	Ag	to be weld	10.1 A	1.0 A	220	53	Amps				
	TUV approved and CE marked	T–	UL 489	80 A	80 V	DC	50 K @ 65 VDC	DL	NO-NC	AgAuPt	2.8 Fast-on	0.1 A	0.1 A	220	54		25 X	Long	50/60 Hz DC	– 7
																	25 X	Medium	50/60 Hz DC	– 8
			UL 489 A	100 A	80 V	DC	50 K @ 65 VDC	AJ									25 X	Short	50/60 Hz DC	– 9
			UL 489	50A	120/ 240 V	50/60 Hz	5K IAC	DU									–	Instant	50/60 Hz DC 400 Hz	– P
				100 A	80 V	DC	5K IAC													
			UL 489A	100 A	80 V	DC	5K IAC	AU									–	Switch only	50/60 Hz DC 400Hz	– S
			UL 1077	50 A	125 V	DC	5K IAC	C									–	Customer specified	50/60 Hz DC 400 Hz	– T
			Without	50 A	125 V	DC	5K IAC	NC												

❼ 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.

❽ AD code is only available with a 2-pole execution minimum and AB available only with a 3-pole execution minimum.

❾ Other auxiliary switches available. Please contact Customer Service Center.

❿ Step 10 is only required if breaker has auxiliary switch. If auxiliary switch is not required, omit Step 10.

⓫ 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 [1]	Series Suffix	Frequency	Internal Circuit [2]	Handle Location	Handle Color & Marking	Mounting & Terminals	
AM	1	P –	B	9	– L	C	14	

SELECTION TABLE

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

[1] 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 8	Step 9	Step 10	Step 11	Step 12
	Worldwide Approvals	UL-AIC Approval	Auxiliary Switch ❹ ❺	Current Ratings ❻	Time Delay Curves
	D –	AU	52	–101	– 4

	Worldwide Approval		UL-AIC Approval						Auxiliary Switch ❹ ❺							Current Ratings	Time Delay Curves			
	Description	Code	UL Std.	Max. Ratings	Max. V	Freq.	Interrupt Cap.	Code	Function	Contacts	Terminals	UL/ CSA	VDE	Volt AC	Code	Ampere ❻	Inrush Level	Time Delay	Frequency	Code
	Without (Standard)	D –	Without	101-200	65 V	DC	50K	NU	NO-NC	Ag	4.8 Fast-on	10.1 A	–	220	07	From – 101 to – 200 Amps	8 X	Long	DC	– 1
																	8 X	Medium	DC	– 2
																	8 X	Short	DC	– 3
			UL 489 A	101-200	65 V	DC	50K	GU	NO-NC	AgAuPt	4.8 Fast-on	0.1 A	–	125	11		18 X	Long	DC	– 4
									NO-NC	Ag	2.8 Fast-on	10.1 A	1.0 A	220	52		18 X	Medium	DC	– 5
			UL 489 A	101-200	80 V	DC	10K	AU	NO-NC	Ag	to be weld	10.1 A	1.0 A	220	53		18 X	Short	DC	– 6
																	25 X	Long	DC	– 7
									NO-NC	AgAuPt	2.8 Fast-on	0.1 A	0.1 A	220	54		25 X	Medium	DC	– 8
																	25 X	Short	DC	– 9
																	–	Instant	DC	– P ❼

❹ Step 10 is only required if breaker has auxiliary switch. If auxiliary switch is not required, omit Step 10.

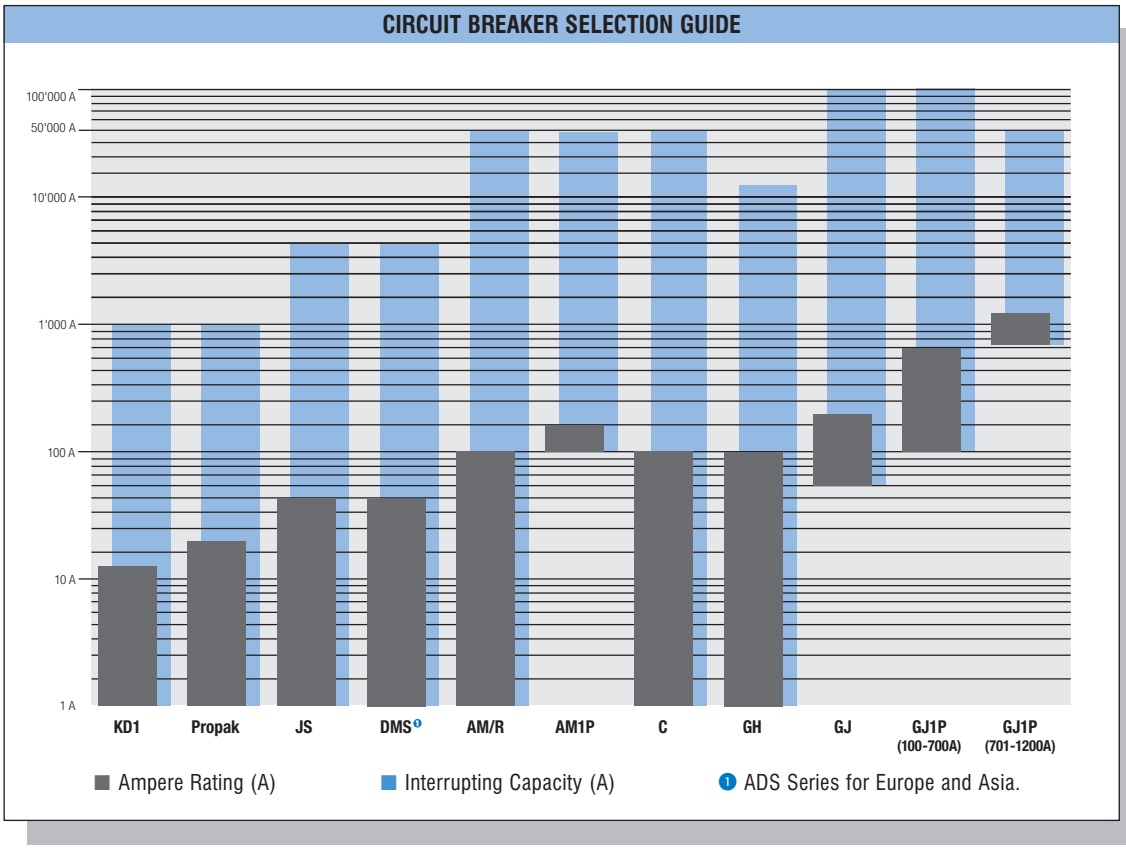
❺ Other auxiliary switches available. Please contact Customer Service Center.

❻ 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.

❼ No deliberate time delay imposed.

HEINEMANN® CIRCUIT BREAKERS

For the Widest Selection of Circuit Protection, from 0.01 to 1200 Amperes, Look to Eaton's Heinemann Brand Products.



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