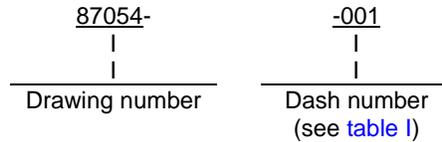




1. SCOPE

1.1 Scope. This drawing describes the requirements for a family of circuit breakers with illuminated handles for use in overcurrent protection.

1.2 Part or Identifying Number (PIN). The complete PIN is as follows:



2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

**MIL-PRF-39019** - Circuit Breakers, Magnetic, Low-Power, Sealed, Trip-Free, General Specification for

(Copies of this document is available online at <http://quicksearch.dla.mil>.)

2.3 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contract (see 6.2).

SAE INTERNATIONAL

**SAE-AMS-QQ-N-290** - Nickel Plating (Electrodeposited).

(Copies of this document are available online at <http://www.sae.org/>.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interface and physical dimensions. The individual item requirements shall be as specified herein and [table I](#), [table II](#), and [table III](#).

3.2 Voltage and frequency rating. 50 V dc, maximum and 240 V ac, maximum at 60 and 400 Hz.

3.3 Current rating. See [table I](#).

3.4 Interface and physical dimension requirements. See [figure 1](#).

3.5 Time delay. Time delay shall be in accordance with [tables I](#), [II](#), and [III](#).

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3.6 Shock.

3.6.1 Shock (100 g's). When circuit breakers are tested as specified in 4.2.1, main circuit breaker contacts shall not trip. There shall be no closing of open main contacts, nor opening of closed main contacts in excess of 10 μs duration, nor shall there be any evidence of mechanical or electrical damage.

3.6.2 Shock (150 g's). When circuit breakers are tested as specified in 4.2.2, the main circuit breaker contacts shall not trip. There shall be no evidence of mechanical or electrical damage.

3.6.3 Shock (200 g's). When circuit breakers are tested as specified in 4.2.3, the main circuit breaker contacts shall not trip. There shall be no evidence of mechanical or electrical damage.

3.7 Endurance. Endurance shall be in accordance with MIL-PRF-39019, except that the number of operations shall be 5,000.

3.8 Resistance or impedance. See table I.

3.9 Interrupting capacity. Interrupting capacity shall be in accordance with MIL-PRF-39019.

3.10 Dielectric withstanding voltage. Dielectric withstanding voltage shall be in accordance with MIL-PRF-39019.

3.11 Vibration. Vibration shall be in accordance with MIL-PRF-39019.

3.12 Insulation resistance. Insulation resistance shall be in accordance with MIL-PRF-39019.

3.13 Lever operating force. Lever operating force shall be in accordance with MIL-PRF-39019 except for the following: one-pole breaker - 7 pounds maximum; two-pole breaker - 10 pounds maximum; three-pole breaker - 16 pounds maximum.

3.14 Marking. Marking shall be as specified in MIL-PRF-39019, except the drawing part number in accordance with 1.2 herein shall be used instead of the military part number.

3.15 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.16 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the MIL-PRF-39019 Qualified Product List for at least one part, or perform the Group A inspection specified herein on a sample of parts agreed upon by the manufacturer and DLA Land and Maritime-VA.

3.17 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.

3.18 Workmanship. Parts shall be free of flash pits, voids, and excessive mold marks. Visible parting line is acceptable.

4. VERIFICATION

4.1 Conformance inspection.

4.1.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspections of MIL-PRF-39019.

4.1.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group A requirements in lieu of performing group A tests (see 6.2c).

4.1.3 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-PRF-39019.

4.2 Shock.

4.2.1 Shock (100 g's).

a. Mounting method: Normal mounting means.

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- b. Test condition: [Method 213 of MIL-STD-202](#), test condition I (100 g's, 6 ms).
- c. Electrical-load conditions and measurements: Of the three shocks in each direction required, two shocks shall be performed with the circuit breaker energized at 100 percent of rated current, at 12 V dc, except that for the directions with the operating lever pivot up (table mount) and the operating lever pivot down (ceiling mount), no voltage or current shall be applied. Each energized shock shall be monitored to determine opening of the main circuit breaker contacts. The remaining shock in each direction shall be performed with the circuit breaker contacts open and unenergized and shall be monitored to determine closing of the main contacts.

4.2.2 Shock (150 g's).

- a. Mounting method: Normal mounting means.
- b. Test condition: Special.
  - (1) Peak: 150 g's.
  - (2) Duration: 6 ms.
  - (3) Waveform: Sawtooth.
- c. Electrical-load conditions and measurements: Of the three shocks in each direction required, all shocks shall be performed with the circuit breaker energized at 100 percent of rated current at 12 V dc, except that for the directions with the operating lever pivot up (table mount), and the operating lever pivot down: (ceiling mount), no voltage or current shall be applied.

4.2.3 Shock (200 g's).

- a. Mounting method: Normal mounting means.
- b. Test condition: Special.
  - (1) Peak: 200 g's.
  - (2) Duration: 1.5 ms.
  - (3) Waveform: Half-sine.
- c. Electrical-load conditions and measurements: Of the three shocks in each direction required, all shocks shall be performed with the circuit breaker energized at 100 percent rated current at 12 V dc, except that for the directions with the operating lever pivot up (table mount) and the operating lever pivot down (ceiling mount), no voltage or current shall be applied.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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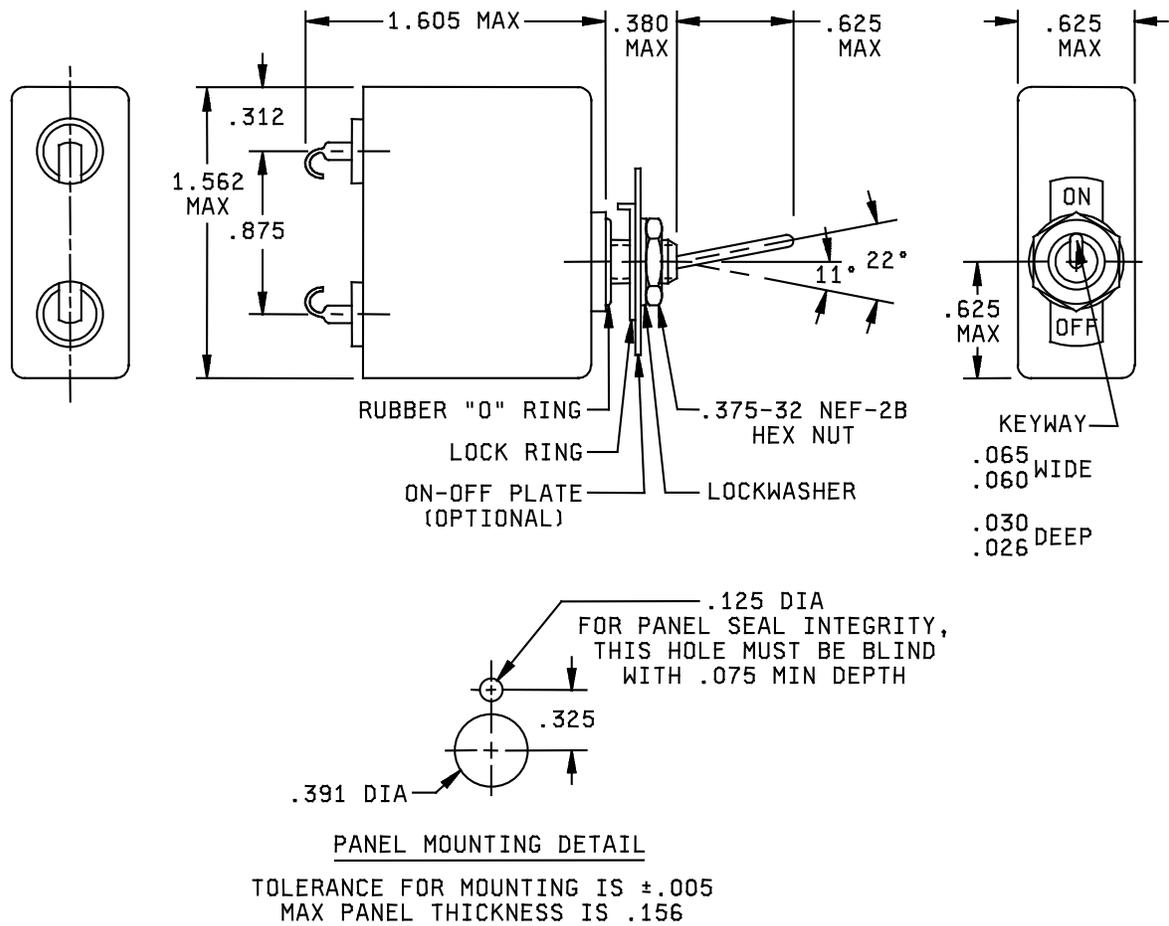


FIGURE 1. Dimensions and configurations.

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Inches	mm	Inches	mm
.005	0.12	.325	8.25
.010	0.25	.375	9.52
.025	0.64	.380	9.65
.026	0.66	.382	9.70
.030	0.76	.391	9.93
.031	0.78	.392	9.95
.060	1.52	.493	12.52
.065	1.65	.500	12.70
.075	1.91	.507	12.87
.093	2.36	.625	15.88
.125	3.18	.875	22.23
.156	3.96	1.562	39.67
.280	7.11	1.605	40.77
.312	7.92		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.031 \pm 5^\circ$  on angles.
4. Envelope design optional.
5. Hex mounting nut .375-32 UNEF-2B thread, .500  $\pm 0.010$  across flats, .093  $\pm 0.005$  thick, brass nickel plated, [SAE-AMS-QQ-N-290](#) nonglare, or stainless steel.
6. Internal tooth lockwasher, .507/.493 O.D., .392/.382 I.D., .025  $\pm 0.005$  thick, stainless steel.
7. The effective bushing thread length (not including mounting hardware) is .280 minimum.
8. Marking may appear on any surface except the mounting surface.
9. Lock ring not required if on-off plate has locking tab.
10. Numerical marking optional on circuit diagram.

FIGURE 1. Dimensions and configuration - Continued.

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TABLE I. Circuit breaker dash number and applicable characteristics.

P/N 87054	Current rating (amps)	Time delay 1/	Resistance or impedance (ohms - max) 2/			P/N 87054	Current rating (amps)	Time delay 1/	Resistance or impedance (ohms - max) 2/		
			DC	60 Hz	400 Hz				DC	60 Hz	400 Hz
001	0.05	A	680.0	690.0	710.0	023	4.0	A	0.10	0.10	0.12
002	0.05	B	680.0	690.0	710.0	024	4.0	B	0.10	0.10	0.12
003	0.1	A	150.0	170.0	180.0	025	5.0	A	0.061	0.063	0.072
004	0.1	B	150.0	170.0	180.0	026	5.0	B	0.061	0.063	0.072
005	0.25	A	20.0	26.0	27.0	027	6.0	A	0.042	0.043	0.050
006	0.25	B	20.0	26.0	27.0	028	6.0	B	0.042	0.043	0.050
007	0.5	A	5.4	6.0	6.6	029	7.0	A	0.036	0.036	0.040
008	0.5	B	5.4	6.0	6.6	030	7.0	B	0.036	0.036	0.040
009	0.75	A	2.5	2.7	2.8	031	7.5	A	0.031	0.031	0.038
010	0.75	B	2.5	2.7	2.8	032	7.5	B	0.031	0.031	0.038
011	1.0	A	1.35	1.5	1.61	033	8.0	A	0.027	0.027	0.035
012	1.0	B	1.35	1.5	1.61	034	8.0	B	0.027	0.027	0.035
013	1.25	A	0.9	1.0	1.1	035	9.0	A	0.022	0.022	0.028
014	1.25	B	0.9	1.0	1.1	036	9.0	B	0.022	0.022	0.028
015	1.5	A	0.65	0.70	0.75	037	10.0	A	0.018	0.021	0.024
016	1.5	B	0.65	0.70	0.75	038	10.0	B	0.018	0.021	0.024
017	2.0	A	0.40	0.40	0.50	039	12.5	A	0.012	0.013	0.015
018	2.0	B	0.40	0.40	0.50	040	12.5	B	0.012	0.013	0.015
019	2.5	A	0.25	0.25	0.27	041	15.0	A	0.009	0.009	0.010
020	2.5	B	0.25	0.25	0.27	042	15.0	B	0.009	0.009	0.010
021	3.0	A	0.15	0.15	0.17	043	20.0	A	0.006	0.006	0.007
022	3.0	B	0.15	0.15	0.17	044	20.0	B	0.006	0.006	0.007

1/ All dash numbers include inertial delay with the time delay.

2/ The corresponding maximum wattage losses, which in no case shall exceed 3.0 watts, may be calculated as  $I^2R$  or  $I^2Z$ .

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TABLE II. Calibration tripping times (seconds) at 25°C ±2°C.

Percent of rated current	Time delay A (fast)		Time delay B (slow)	
	Min	Max	Min	Max
100	No trip 1 hour	No trip 1 hour	No trip 1 hour	No trip 1 hour
150	0.2	7.0	3.0	70.0
200	0.055	2.0	0.5	20.0
400	Inst <u>1/</u>	0.24	Inst <u>1/</u>	1.75
600	Inst <u>1/</u>	0.13	Inst <u>1/</u>	0.6
800	Inst <u>1/</u>	0.06	Inst <u>1/</u>	0.1 <u>2/</u>
800 at 60Hz <u>3/</u>	No trip	No trip	No trip	No trip
1,400 at 400 Hz <u>4/</u>	No trip	No trip	No trip	No trip

1/ (Inst) instantaneous is defined as less than 0.015 second.

2/ This time is extended to 0.3 second for dc and 400 Hz.

3/ 800 percent peak, one 1/2 sine pulse at 60 Hz.

4/ 1,400 percent peak, one 1/2 sine pulse at 400 Hz.

TABLE III. High and low temperature tripping times (seconds).

Percent of rated current	Time delay A (fast)		Time delay B (slow)	
	-40°C ±2°C	+100°C ±2°C	-40°C ±2°C	+100°C ±2°C
	Min	Max	Min	Max
100	No trip 1 hour	No trip 1 hour	No trip 1 hour	No trip 1 hour
150	800.0	---	1000.0	---
200	10.0	0.015	50.0	0.04
400	0.7	Inst <u>1/</u>	10.0	Inst <u>1/</u>
500	0.5	Inst <u>1/</u>	2.0	Inst <u>1/</u>
800	0.06	Inst <u>1/</u>	0.1 <u>2/</u>	Inst <u>1/</u>
800 at 60 Hz <u>3/</u>	No trip	No trip	No trip	No trip
1,400 at 400 Hz <u>4/</u>	No trip	No trip	No trip	No trip

1/ (Inst.) instantaneous is defined as less than 0.015 second.

2/ This time is extended to 0.3 second for dc and 400 Hz.

3/ 800 percent peak, one 1/2 sine pulse at 60 Hz.

4/ 1,400 percent peak, one 1/2 sine pulse at 400 Hz.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Devices conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application.

6.2 Ordering data. The acquisition document should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data with each shipment of parts by the manufacturer.
- c. Whether the manufacturer performs the group A tests or provides certification of compliance with group A requirements.
- d. Requirements for notification of change of product to the contracting activity, if applicable.
- c. Requirements for packaging and packing.

6.3 Replaceability. Devices covered by this drawing will replace the same commercial device covered by contractor prepared specification or drawing.

6.4 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at [CircuitProtect@dla.mil](mailto:CircuitProtect@dla.mil) or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0548 or DSN 850-0548.

6.5 Approved source(s) of supply. Approved source(s) of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at [CircuitProtect@dla.mil](mailto:CircuitProtect@dla.mil), or by contacting DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614)-692-0548 or DSN 850-0548.

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DLA Land and Maritime drawing PIN 87054- <u>1</u> /	Similar vendor part number	Vendor name and address
	CAGE 82647	
001	AP1-87054-001	Sensata Technologies, Incorporated 529 Pleasant Street Attleboro, MA 02703-2421 Phone number: (508) 236-3287 Facsimile number: (508) 236-1598 E-mail: <a href="mailto:cmbinfopp@sensata.com">cmbinfopp@sensata.com</a> Uniform Resource Locator (URL): <a href="http://www.sensata.com">http://www.sensata.com</a>
002	AP1-87054-002	
003	AP1-87054-003	
004	AP1-87054-004	
005	AP1-87054-005	
006	AP1-87054-006	
007	AP1-87054-007	
008	AP1-87054-008	
009	AP1-87054-009	
010	AP1-87054-010	
011	AP1-87054-011	
012	AP1-87054-012	
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040	AP1-87054-040	
041	AP1-87054-041	
042	AP1-87054-042	
043	AP1-87054-043	
044	AP1-87054-044	

1/ Parts must be purchased to this DLA Land and Maritime PIN to assure that all performance requirements and tests are met.

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