

E-Series

CIRCUIT BREAKER

The E-Series hydraulic-magnetic circuit breaker is ideally suited for higher current and voltage applications. It is UL listed and CSA certified for branch circuit protection, which does not require a fuse back up. It is also UL recognized and CSA certified as a supplementary protector and as a manual motor controller.

Its physical features include front and back mounting, screw and stud terminals and heavy duty box wire connectors for solid wire or a pressure plate connector for standard wire. The E-series is available with handle actuators and can be configured as .1-125 amps, up to 600VAC or 125VDC, with choice of time delays, actuator colors and 1 to 6 poles configuration. Additionally, a Power Selector device is also available.



Product Highlights:

- ♦ UL listed and CSA certified
- ♦ Certified for circuit branch protection
- ♦ Recognized as a supplementary protector and as a manual motor controller
- ♦ Optional power selector device

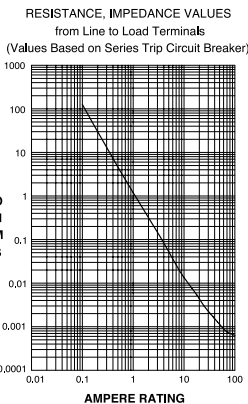
Typical Applications:

- ♦ High Voltage/High Current Applications
- ♦ Renewable Energy
- ♦ Military
- ♦ Industrial Controls
- ♦ Generators



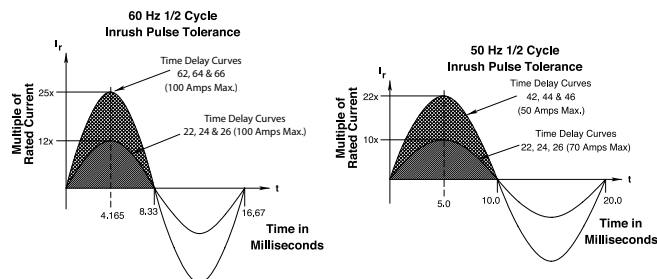
Electrical

| | |
|-------------------------|---|
| Maximum Voltage | 600VAC 50/60 Hz, 125VDC (See Table A) |
| Current Ratings | Standard current coils: 0.100, 0.250, 0.500, 1.00, 2.50, 5.00, 7.50, 10.0, 15.0, 20.0, 25.0, 30.0, 50.0, 60.0, 70.0 & 100 Amp. |
| Auxiliary Switch Rating | SPDT; 10.1A 250VAC, 1.0A 65VDC; 0.5A 80VDC, 0.1A 125VAC (with gold contacts). |
| Insulation Resistance | Minimum of 100 Megohms at 500 VDC. |
| Dielectric Strength | UL, CSA: 2200 V 50/60 Hz for one minute between all electrically isolated terminals. E-Series Circuit Breakers comply with the 8mm spacing and 3750V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxiliary circuits per Publications EN 60950 and VDE 0805. |
| Resistance, Impedance | Values from Line to Load Terminal - based on Series Trip Circuit Breaker. |



| CURRENT (AMPS) | TOLERANCE (%) |
|----------------|---------------|
| 0.10 - 5.0 | ± 15 |
| 5.1 - 20.0 | ± 25 |
| 20.1 - 50.0 | ± 35 |

Pulse Tolerance Curves



Mechanical

| | |
|-----------------|--|
| Endurance | 10,000 ON-OFF operations @ 6 per minute; with rated Current and Voltage. |
| Trip Free | All E-Series Circuit Breakers will trip on overload, even when Handle is forcibly held in the ON position. |
| Trip Indication | The operating Handle moves positively to the OFF position when an overload causes the breaker to trip. |

Physical

| | |
|--------------------------------|--|
| Number of Poles | 1 - 6 |
| Mounting | A 3" minimum spacing must be provided between the circuit breaker arc venting area on back connected E-Series circuit breakers and grounded obstructions. E-Series circuit breakers must be mounted on a vertical surface. |
| Connectors, Box Type | Front connected E-Series circuit breakers are supplied with box type pressure connectors that accept copper or aluminum conductors as follows: 1/0-14 Copper, 1/0-12 Aluminum. |
| Internal Circuit Configuration | Series and Switch Only, (with or without auxiliary switch). Shunt with current coils. |
| Weight | Approximately 252 grams/pole (Approximately 9 ounces/pole) |
| Standard Colors | Housing-Black; Actuator - See Ordering Scheme. |

Environmental

| | |
|--|---|
| Designed in accordance with requirements of specification MIL PRF-55629 & MIL-STD-202G as follows: | |
| Shock | Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". |
| Vibration | Withstands 0.060" excursion from 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A. |
| Moisture Resistance | Method 106D, i.e., ten 24-hour cycles @ +25°C to +65°C, 80-98% RH. |
| Salt Spray | Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96 hrs). |
| Thermal Shock | Method 107D, Condition A (Five cycles @ -55°C to +25°C to +85°C to +25°C). |
| Operating Temperature | -40° C to +85° C |

*Manufacturer reserves the right to change product specification without prior notice.

Electrical Tables

Table A: Lists UL Listed (489) & CSA Certified (C22.2 No. 5) configurations & performance capabilities as a Molded Case Circuit Breaker.

| E SERIES TABLE A : UL489 LISTED BRANCH CIRCUIT BREAKERS | | | | | | |
|---|-------------|-----------|-------|----------------|------------------------------|-----------------------------------|
| CIRCUIT CONFIGURATION | VOLTAGE | | | CURRENT RATING | INTERRUPTING CAPACITY (AMPS) | HIGH INTERRUPTING CAPACITY (AMPS) |
| | MAX. RATING | FREQUENCY | PHASE | FULL LOAD AMPS | WITHOUT BACKUP FUSE | |
| SERIES | 80 | DC | --- | 0.10 - 100 | 5,000 | 50,000 |
| | 125 | DC | --- | 0.10 - 100 | 5,000 | 10,000 |
| | 125 | DC | --- | 0.10 - 125 | 10,000 | --- |
| | 120 | 50 / 60 | 1 | 0.10 - 125 | 10,000 | --- |
| | 240 | 50 / 60 | 1 | 0.10 - 30 | 5,000 | 10,000 |
| | 240 | 50 / 60 | 1 | 31 - 100 | 5,000 | --- |
| | 120 / 240 | 50 / 60 | 1 | 0.10 - 30 | 5,000 | 10,000 |
| | 120 / 240 | 50 / 60 | 1 | 31 - 100 | 5,000 | --- |
| | 120 / 240 | 50 / 60 | 1 | 101 - 125 | 10,000 | --- |
| | 240 | 50 / 60 | 3 | 0.10 - 100 | 5,000 | --- |

Table B: Lists UL Recognized & CSA Accepted configurations & performance capabilities as a Component Supplementary Protector.

| E -SERIES TABLE B: COMPONENT SUPPLEMENTARY PROTECTORS | | | | | | | | | |
|---|------------------|-----------|------------|----------------|----------------------|-------------------------------|---------------------|-------------------|----------------|
| CIRCUIT CONFIGURATION | VOLTAGE | | | CURRENT RATING | | SHORT CIRCUIT CAPACITY (AMPS) | | APPLICATION CODES | |
| | MAX. RATING | FREQUENCY | PHASE | FULL LOAD AMPS | GENERAL PURPOSE AMPS | UL/CSA | | UL | CSA |
| | | | | | | WITH BACKUP FUSE ³ | WITHOUT BACKUP FUSE | | |
| SERIES & SHUNT | 125 | DC | --- | 0.02 - 100 | --- | --- | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 |
| | 125 | DC | --- | --- | 101 - 120 | --- | 5,000 | TC1,2, OL0, U1 | TC1,2, OL0, U1 |
| | 150 | DC | --- | --- | 0.02 - 125 | --- | 5,000 | TC1, OL0, U3 | TC1, OL0, U3 |
| | 160 | DC | --- | 0.02 - 100 | --- | --- | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 |
| | 150 / 300 | DC | --- | 0.02 - 100 | --- | --- | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 |
| | 120 / 240 | 50 / 60 | 1 | --- | 0.02 - 100 | --- | 5,000 | TC1,2, OL0, U1 | TC1,2, OL0, U1 |
| | 240 | 50 / 60 | 1 | 0.02 - 100 | --- | --- | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 |
| | 250 | 50 / 60 | 1 | 0.02 - 100 | --- | 10,000 | --- | TC1,2, OL1, C1 | TC1,2, OL1, C1 |
| | 277 | 50 / 60 | 1 | 0.02 - 100 | --- | --- | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 |
| | | | | | | 10,000 | --- | TC1,2, OL1, C1 | TC1,2, OL1, C1 |
| | 480 | 50 / 60 | 1 & 3 | 0.02 - 100 | --- | 10,000 | --- | TC1,2, OL1, C1 | TC1,2, OL1, C1 |
| | 480 ¹ | 50 / 60 | 1 & 3 | 0.02 - 50 | --- | 10,000 | --- | TC1,2, OL1, C1 | TC1,2, OL1, C1 |
| 600 | 50 / 60 | 1 & 3 | 0.02 - 100 | --- | 10,000 | --- | TC1,2, OL1, C1 | TC1,2, OL1, C1 | |
| 600 ² | DC | --- | --- | 0.02 - 125 | --- | 5,000 | TC1, OL0, U3 | TC1, OL0, U3 | |
| SWITCH ONLY | 125 | DC | --- | 0.02 - 120 | --- | --- | --- | --- | --- |
| | 160 | DC | --- | 0.02 - 100 | --- | --- | --- | --- | --- |
| | 240 | 50 / 60 | 1 | 0.02 - 100 | --- | --- | --- | --- | --- |
| | 277 | 50 / 60 | 1 | 0.02 - 100 | --- | --- | --- | --- | --- |
| | 480 | 50 / 60 | 1 & 3 | 0.02 - 100 | --- | --- | --- | --- | --- |
| | 600 | 50 / 60 | 1 & 3 | 0.02 - 100 | --- | --- | --- | --- | --- |

Notes:

- 1 Per pole opposite polarity rating - Delta Configuration.
- 2 4 Poles connected in series
- 3 Requires branch circuit backup with a UL Listed Type K5 or RK5 fuse rated 15A minimum and no more than 4 times full load amp rating and not to exceed 225A.

Electrical Tables

Table C: Lists UL Recognized, CSA Accepted and VDE Certified configurations and performance capabilities as a Component Supplementary Protector.

| E -SERIES TABLE C: COMPONENT SUPPLEMENTARY PROTECTORS WITH VDE | | | | | | | | | | |
|--|-------------|-----------|-------|----------------|-------------------------------|---------------------|---------------------|-------------------|----------------|--|
| CIRCUIT CONFIGURATION | VOLTAGE | | | CURRENT RATING | SHORT CIRCUIT CAPACITY (AMPS) | | | APPLICATION CODES | | CONSTRUCTION NOTES |
| | MAX. RATING | FREQUENCY | PHASE | FULL LOAD AMPS | UL/CSA | | VDE (Icn) | UL | CSA | |
| | | | | | WITH BACKUP FUSE ¹ | WITHOUT BACKUP FUSE | WITHOUT BACKUP FUSE | | | |
| SERIES & SHUNT | 125 | DC | --- | 0.1 - 100 | --- | 5,000 | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 | 1 or 2 Poles |
| | 240 | 50 / 60 | 1 & 3 | 0.1 - 100 | --- | 5,000 | 5,000 | TC1,2, OL1, U1 | TC1,2, OL1, U1 | 1 - 5 Poles. Up to 4 Current Poles, 1 Voltage Pole |
| | 415 | 50 / 60 | 1 & 3 | 0.1 - 100 | 10,000 | --- | 4,000 | TC1,2, OL1, C1 | TC1,2, OL1, C1 | 2 - 5 Poles. Up to 4 Current Poles, 1 Voltage Pole |
| SWITCH ONLY | 125 | DC | --- | 0.1 - 125 | | | | | | |
| | 240 | 50 / 60 | 1 & 3 | 0.1 - 100 | | | | | | |
| | 415 | 50 / 60 | 1 & 3 | 0.1 - 100 | | | | | | |

Notes:

¹ Requires branch circuit backup with a UL LISTED Type K5 or RK5 fuse rated 15A minimum and no more than 4 times full load amp rating and not to exceed 225 amps.

Table D: Lists UL Recognized, CSA Accepted configurations and performance capabilities as Protectors, Supplementary for Marine Electrical and Fuel Systems (Guide PEQZ2, File E75596). Ignition Protected per UL 1500. UL Classified Small Craft Electrical Devices, Marine in accordance with ISO 8846 (Guide UZMK, File MQ1515) as Marine Supplementary Protectors.

| E SERIES TABLE D : UL1500 (Marine Ignition Protection) | | | | | | | |
|--|-------------|-----------|------------|----------------|-------------------------------|-------------------|---------------------|
| CIRCUIT CONFIGURATION | VOLTAGE | | | CURRENT RATING | SHORT CIRCUIT CAPACITY (AMPS) | APPLICATION CODES | |
| | MAX. RATING | FREQUENCY | PHASE | | | FULL LOAD AMPS | WITHOUT BACKUP FUSE |
| | | | | SERIES | 65 | | |
| 125 | 50 / 60 | 1 | 0.02 - 100 | | 1,500 | TC1,2,OL1,U1 | TC1,2,OL1,U1 |
| 250 | 50 / 60 | 1 | 0.02 - 100 | | 1,500 | TC1,2,OL1,U1 | TC1,2,OL1,U1 |

Agency Certifications

UL Recognized

UL Standard 1077



Component Recognition Program as Protectors, Supplementary (Guide QVNU2, File E75596)

CSA Accepted



Component Supplementary Protector (Class 3215 30, File 047848 0 000) CSA Standard C22.2 No. 235

Component Recognition Program as Manual Motor Controls (Guide NLRV2, File E135367)

CSA Certified



Circuit Breaker Molded Case (Class 1432 01, File 093910), CSA Standard C22.2 No. 5.1 - M

UL Standard 1500



Protectors, Supplementary for Marine Electrical & Fuel Systems (Guide PEQZ2, File E75596) Ignition Protection

TUV Certified



EN60934 under License No. R72031056

UL Listed

UL Standard 489



Circuit Breakers, Molded Case (Guide DIVQ, File E129899)

VDE Certified



EN60934, VDE 0642 under File No. 10537

E A 2 - B 0 - 24 - 450 - 1 2 A - C B

1 Series 2 Actuator 3 Poles 4 Circuit 5 Auxiliary Switch 6 Frequency & Delay 7 Current Rating 8 Terminal 9 Actuator Color 10 Mounting/Barriers 11 Maximum Application Rating 12 Agency Approval

1 SERIES
E

2 ACTUATOR
A Handle, one per pole

3 POLES¹
1 One 2 Two 3 Three 4 Four 5 Five 6 Six

4 CIRCUIT²
A³ Switch Only (no coil) E Shunt Trip (voltage)
B Series Trip (current) F Relay Trip (current)
C Series Trip (voltage) G Relay Trip (voltage)
D Shunt Trip (current)

5 AUXILIARY SWITCH⁴
0 without Auxiliary Switch 6 S.P.S.T. 0.110 Q.C. Terminals
2 S.P.D.T. 0.110 Q.C. Terminals 7 S.P.S.T. 0.110 Q.C. Terminals (Gold Contacts)
3 S.P.D.T. 0.139 Solder Lug 8 S.P.S.T. 0.187 Q.C. Terminals
4 S.P.D.T. 0.110 Q.C. Terminals (Gold Contacts) 9 S.P.D.T. 0.187 Q.C. Terminals

6 FREQUENCY & DELAY
03³ DC 50/60Hz, Switch Only 34 DC, 50/60Hz Medium
10⁵ DC Instantaneous 36 DC, 50/60Hz Long
12 DC Short 62 50/60Hz Short, Hi-Inrush
14 DC Medium 64 50/60Hz Medium, Hi-Inrush
16 DC Long 66 50/60Hz Long, Hi-Inrush
20⁵ 50/60Hz Instantaneous 72 DC, Short, Hi-Inrush
22 50/60Hz Short 74 DC, Medium, Hi-Inrush
24 50/60Hz Medium 76 DC, Long, Hi-Inrush
26 50/60Hz Long 92⁶ DC, 50/60Hz Short, Hi-Inrush
30 DC, 50/60Hz Instantaneous 94⁶ DC, 50/60Hz Medium, Hi-Inrush
32 DC, 50/60Hz Short 96⁶ DC, 50/60Hz Long, Hi-Inrush

7 CURRENT RATING (AMPERES)⁷

| CODE | AMPERES | | | | |
|------|---------|-----|-------|------------------|---------|
| 020 | 0.020 | 235 | 0.350 | 430 | 3.000 |
| 025 | 0.025 | 240 | 0.400 | 435 | 3.500 |
| 030 | 0.030 | 245 | 0.450 | 440 | 4.000 |
| 035 | 0.035 | 250 | 0.500 | 445 | 4.500 |
| 040 | 0.040 | 255 | 0.550 | 450 | 5.000 |
| 045 | 0.045 | 260 | 0.600 | 455 | 5.500 |
| 050 | 0.050 | 265 | 0.650 | 460 | 6.000 |
| 055 | 0.055 | 270 | 0.700 | 465 | 6.500 |
| 060 | 0.060 | 275 | 0.750 | 470 | 7.000 |
| 065 | 0.065 | 280 | 0.800 | 475 | 7.500 |
| 070 | 0.070 | 285 | 0.850 | 480 | 8.000 |
| 075 | 0.075 | 290 | 0.900 | 485 | 8.500 |
| 080 | 0.080 | 295 | 0.950 | 490 | 9.000 |
| 085 | 0.085 | 410 | 1.000 | 495 | 9.500 |
| 090 | 0.090 | 512 | 1.250 | 610 | 10.000 |
| 090 | 0.095 | 415 | 1.500 | 710 | 10.500 |
| 210 | 0.100 | 517 | 1.750 | 611 | 11.000 |
| 215 | 0.150 | 420 | 2.000 | 711 | 11.500 |
| 220 | 0.200 | 522 | 2.250 | 612 | 12.000 |
| 225 | 0.250 | 425 | 2.500 | 712 | 12.500 |
| 230 | 0.300 | 527 | 2.750 | 613 | 13.000 |
| | | | | 912 ⁸ | 125.000 |

OR VOLTAGE COIL (MIN. TRIP RATING, VOLTS)⁵
A06 6 DC, 5 DC A65 65 DC, 55 DC J48 48 AC, 40 AC
A12 12 DC, 10 DC B25 125 DC, 100 DC J65 65 AC, 55 AC
A18 18 DC, 15 DC J06 6 AC, 5 AC K20 120 AC, 65 AC
A24 24 DC, 20 DC J12 12 AC, 10 AC L40 240 AC, 130 AC
A32 32 DC, 25 DC J18 18 AC, 15 AC
A48 48 DC, 40 DC J24 24 AC, 20 AC

Notes:

- VDE approval on 1-5 poles only. Standard multi-pole units identical poles except when specifying auxiliary switch - (see Note 4). For mixed ratings, consult factory.
- Switch Only & Series Trip construction available with either front or back connected terminals. Shunt construction available with back connected terminals, (Terminal Codes 1 & 2) only. Circuit Codes B,C & D are VDE approved.
- Switch Only construction: 30 amps or less select Current Rating Code 630; 31-70 amps, select Current Rating code 670; 71-100 amps, select Current Rating Code 810; 101-125 amps Select Current Rating Code 912. Switch Only is VDE approved only if tied to a protected pole.

8 TERMINAL¹²
BACK CONNECTED (FRONT MOUNTED ONLY) **MAX. RATING**
1⁹ 10-32 Stud (All Terminals) 50 A
2⁹ 1/4-20 Stud (All Terminals) 120 A
A⁹ M5 Stud (Line & Load) 50 A
B⁹ M6 Stud (Line & Load) 100 A

FRONT CONNECTED (BACK MOUNTED ONLY) **MAX. RATING**
3¹⁰ Box Wire Connector (Line & Load) 100 A
C¹¹ Box Wire Connector with Pressure Plate (Line & Load) 100 A
4 10-32 Screw (Line & Load) 50 A
D M5 Screw (Line & Load) 50 A
5 10-32 "Bus-Type" Screw (Line), 10-32 Screw (Load) 50 A
E M5 "Bus-Type" Screw (Line), 10-32 Screw (Load) 50 A
6¹⁰ 10-32 "Bus-Type" Screw (Line), Box Wire Connector (Load) 100 A
F¹¹ 10-32 "Bus-Type" Screw (Line), Box Wire Connector with Pressure Plate (Load) 100 A
7 1/4-20 Screw (Line & Load) 100 A
G M6 Screw (Line & Load) 100 A
H 1/4-20 "Bus-Type" Screw (Line), 1/4-20 Screw (Load) 100 A
8 M6 "Bus-Type" Screw (Line), M6 Screw (Load) 100 A
9¹⁰ 1/4-20 "Bus-Type" Screw (Line), Box Wire Connector (Load) 100 A
J¹¹ 1/4-20 "Bus-Type" Screw (Line), Box Wire Connector with Pressure Plate (Load) 100 A

9 ACTUATOR COLOR & LEGEND¹³

| Actuator Color | I-O | ON-OFF | Dual | Legend Color |
|----------------|-----|--------|------|--------------|
| White | A | B | 1 | Black |
| Black | C | D | 2 | White |
| Red | F | G | 3 | White |
| Green | H | J | 4 | White |
| Blue | K | L | 5 | White |
| Yellow | M | N | 6 | Black |
| Gray | P | Q | 7 | Black |
| Orange | R | S | 8 | Black |

10 MOUNTING / BARRIERS
BACK CONNECTED (FRONT MOUNTED ONLY)
Mounting Inserts
A 6-32
B ISO M3
FRONT CONNECTED (BACK MOUNTED ONLY)¹⁴
Back Mounting Foot Type **Front Mounting Inserts (Optional Use)**
C Short 6-32
D Short ISO M3
E Long 6-32
F Long ISO M3

11 MAXIMUM APPLICATION RATING¹⁵
A 65 VDC, 120 A G¹⁶ 600 VAC, 100 A
B 125 VDC, 120 A H¹⁶ 480 VAC, 100 A
C 120/240 VAC, 100 A J¹⁶ 415 VAC, 100 A
D 240 VAC, 100 A L¹⁶ 160 VDC, 100 A
E¹⁶ 277/480 VAC, 100 A T 125 VDC/240 VAC, 100 A
F 277 VAC, 100 A W¹⁶ 125 VDC/415 VAC, 100 A

12 AGENCY APPROVAL
B UL 1077 / UL508 Recognized & CSA Accepted
D UL 1077 Recognized, CSA Accepted, & VDE Certified

- Auxiliary Switch available on Switch Only and Series Trip units. On multi-pole units, only one auxiliary switch is normally supplied mounted in the extreme right pole. Back mounted units require special mounting provisions when auxiliary switch is specified. VDE approval on Auxiliary Switch Codes 0,2,3 & 4 only.
- Voltage Trip Coils are not rated for continuous duty. Available only with Frequency & Delay Codes 10 & 20. Series Trip construction with a voltage coil s VDE approved only if tied to a protected pole.
- Frequency & Delay Codes 92,94 & 96 are not VDE Certified.
- Current Coil Ratings 0.100 - 100 amps are VDE Certified.
- 125 A rating (Code 912) available as a Switch Only (Circuit Code A), rated 125 VDC (Code B).
- An Anti-Flash Over Barrier is supplied between poles on multi-pole units with 10-32 (Terminal Code 1), 1/4-20 (Code 2), M5 (Code A), and M6 (Code B) terminals per UL requirement.
- Box Wire Connector will accept #14 through 0 AWG. copper wire or #12 through 0 AWG. aluminum wire.
- Box Wire Connector with Pressure Plate for stranded wire, consult factory for details.
- Terminal Codes A,B,D,E,G & H are not VDE Certified.
- VDE approvals require Dual (I-O, ON-OFF) or I-O markings on all handles.
- Back Mounted breakers can also be front mounted by utilizing the proper front panel mounting inserts normally supplied. However, terminal connections must be made prior to mounting.
- Application ratings B,D,J,T & W are available with VDE.
- 415, 480 & 600 VAC ratings require 3 or 4 pole break 3Ø and 2 pole break 1Ø.



1 SERIES
E

2 ACTUATOR
A Handle, one per pole

3 POLES¹

| | | | | | |
|---|-----|---|-------|---|------|
| 1 | One | 3 | Three | 5 | Five |
| 2 | Two | 4 | Four | 6 | Six |

4 CIRCUIT²

| | |
|-----------------------|-----------------------|
| B | Series Trip (current) |
| C ³ | Series Trip (voltage) |

5 AUXILIARY SWITCH⁴

| | | | |
|----------|---|----------|---|
| 0 | without Auxiliary Switch | 6 | S.P.S.T. 0.110 Q.C. Terminals |
| 2 | S.P.D.T. 0.110 Q.C. Terminals | 7 | S.P.S.T. 0.110 Q.C. Terminals (Gold Contacts) |
| 3 | S.P.D.T. 0.139 Solder Lug | 8 | S.P.S.T. 0.187 Q.C. Terminals |
| 4 | S.P.D.T. 0.110 Q.C. Terminals (Gold Contacts) | 9 | S.P.D.T. 0.187 Q.C. Terminals |

6 FREQUENCY & DELAY

| | | | |
|------------------------|-----------------------|-----------|---------------------------|
| 10 ⁵ | DC Instantaneous | 62 | 50/60Hz Short, Hi-Inrush |
| 12 | DC Short | 64 | 50/60Hz Medium, Hi-Inrush |
| 14 | DC Medium | 66 | 50/60Hz Long, Hi-Inrush |
| 16 | DC Long | 72 | DC, Short, Hi-Inrush |
| 20 ⁵ | 50/60Hz Instantaneous | 74 | DC, Medium, Hi-Inrush |
| 22 | 50/60Hz Short | 76 | DC, Long, Hi-Inrush |
| 24 | 50/60Hz Medium | | |
| 26 | 50/60Hz Long | | |

7 CURRENT RATING (AMPERES)⁷

| CODE | AMPERES | | | | | | |
|------|---------|-----|-------|-----|--------|------------------|---------|
| 020 | 0.020 | 235 | 0.350 | 430 | 3.000 | 614 | 14.000 |
| 025 | 0.025 | 240 | 0.400 | 435 | 3.500 | 615 | 15.000 |
| 030 | 0.030 | 245 | 0.450 | 440 | 4.000 | 616 | 16.000 |
| 035 | 0.035 | 250 | 0.500 | 445 | 4.500 | 617 | 17.000 |
| 040 | 0.040 | 255 | 0.550 | 450 | 5.000 | 618 | 18.000 |
| 045 | 0.045 | 260 | 0.600 | 455 | 5.500 | 620 | 20.000 |
| 050 | 0.050 | 265 | 0.650 | 460 | 6.000 | 622 | 22.000 |
| 055 | 0.055 | 270 | 0.700 | 465 | 6.500 | 624 | 24.000 |
| 060 | 0.060 | 275 | 0.750 | 470 | 7.000 | 625 | 25.000 |
| 065 | 0.065 | 280 | 0.800 | 475 | 7.500 | 630 | 30.000 |
| 070 | 0.070 | 285 | 0.850 | 480 | 8.000 | 635 | 35.000 |
| 075 | 0.075 | 290 | 0.900 | 485 | 8.500 | 640 | 40.000 |
| 080 | 0.080 | 295 | 0.950 | 490 | 9.000 | 650 | 50.000 |
| 085 | 0.085 | 410 | 1.000 | 495 | 9.500 | 660 | 60.000 |
| 090 | 0.090 | 512 | 1.250 | 610 | 10.000 | 670 | 70.000 |
| 090 | 0.095 | 415 | 1.500 | 710 | 10.500 | 680 | 80.000 |
| 210 | 0.100 | 517 | 1.750 | 611 | 11.000 | 690 | 90.000 |
| 215 | 0.150 | 420 | 2.000 | 711 | 11.500 | 810 | 100.000 |
| 220 | 0.200 | 522 | 2.250 | 612 | 12.000 | 811 | 110.000 |
| 225 | 0.250 | 425 | 2.500 | 712 | 12.500 | 812 | 120.000 |
| 230 | 0.300 | 527 | 2.750 | 613 | 13.000 | 912 ⁸ | 125.000 |

OR VOLTAGE COIL (MIN. TRIP RATING, VOLTS)⁵

| | | | | | |
|------------|--------------|------------|----------------|------------|----------------|
| A06 | 6 DC, 5 DC | A65 | 65 DC, 55 DC | J48 | 48 AC, 40 AC |
| A12 | 12 DC, 10 DC | B25 | 125 DC, 100 DC | J65 | 65 AC, 55 AC |
| A18 | 18 DC, 15 DC | J06 | 6 AC, 5 AC | K20 | 120 AC, 65 AC |
| A24 | 24 DC, 20 DC | J12 | 12 AC, 10 AC | L40 | 240 AC, 130 AC |
| A32 | 32 DC, 25 DC | J18 | 18 AC, 15 AC | | |
| A48 | 48 DC, 40 DC | J24 | 24 AC, 20 AC | | |

8 TERMINAL⁷

| BACK CONNECTED (FRONT MOUNTED ONLY) | MAX. RATING |
|---|-------------|
| 1 ⁸ 10-32 Stud (All Terminals) | 50 A |
| 2 ⁸ 1/4-20 Stud (All Terminals) | 125 A |

| FRONT CONNECTED (BACK MOUNTED ONLY) | MAX. RATING |
|--|-------------|
| 3 ⁹ Box Wire Connector (Line & Load) | 100 A |
| C ¹⁰ Box Wire Connector with Pressure Plate (Line & Load) | 100 A |
| 4 10-32 Screw (Line & Load) | 50 A |
| 5 10-32 "Bus-Type" Screw (Line), 10-32 Screw (Load) | 50 A |
| 6 ⁹ 10-32 "Bus-Type" Screw (Line), Box Wire Connector (Load) | 100 A |
| F ¹⁰ 10-32 "Bus-Type" Screw (Line), Box Wire Connector with Pressure Plate (Load) | 100 A |
| 7 1/4-20 Screw (Line & Load) | 125 A |
| 8 1/4-20 "Bus-Type" Screw (Line), 1/4-20 Screw (Load) | 100 A |
| 9 ⁹ 1/4-20 "Bus-Type" Screw (Line), Box Wire Connector (Load) | 100 A |
| J ¹⁰ 1/4-20 "Bus-Type" Screw (Line), Box Wire Connector with Pressure Plate (Load) | 100 A |

9 ACTUATOR COLOR & LEGEND¹²

| Actuator Color | ON-OFF | Dual | Legend Color |
|----------------|----------|----------|--------------|
| White | B | 1 | Black |
| Black | D | 2 | White |
| Red | G | 3 | White |
| Green | J | 4 | White |
| Blue | L | 5 | White |
| Yellow | N | 6 | Black |
| Gray | Q | 7 | Black |
| Orange | S | 8 | Black |

10 MOUNTING / BARRIERS

BACK CONNECTED (FRONT MOUNTED ONLY)

Mounting Inserts

| | |
|----------|--------|
| A | 6-32 |
| B | ISO M3 |

FRONT CONNECTED (BACK MOUNTED ONLY)¹¹

| | Back Mounting Foot Type | Front Mounting Inserts (Optional Use) |
|----------|-------------------------|---------------------------------------|
| C | Short | 6-32 |
| D | Short | ISO M3 |
| E | Long | 6-32 |
| F | Long | ISO M3 |

11 MAXIMUM APPLICATION RATING¹⁵

| | |
|------------------------|--------------------|
| 1 | 120 VAC |
| B | 125 VDC, 120 A |
| C ¹³ | 120/240 VAC, 100 A |
| D | 240 VAC, 100 A |

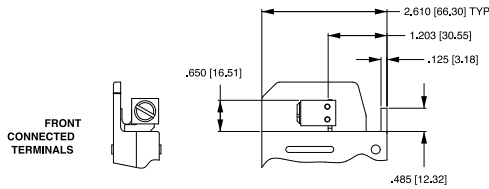
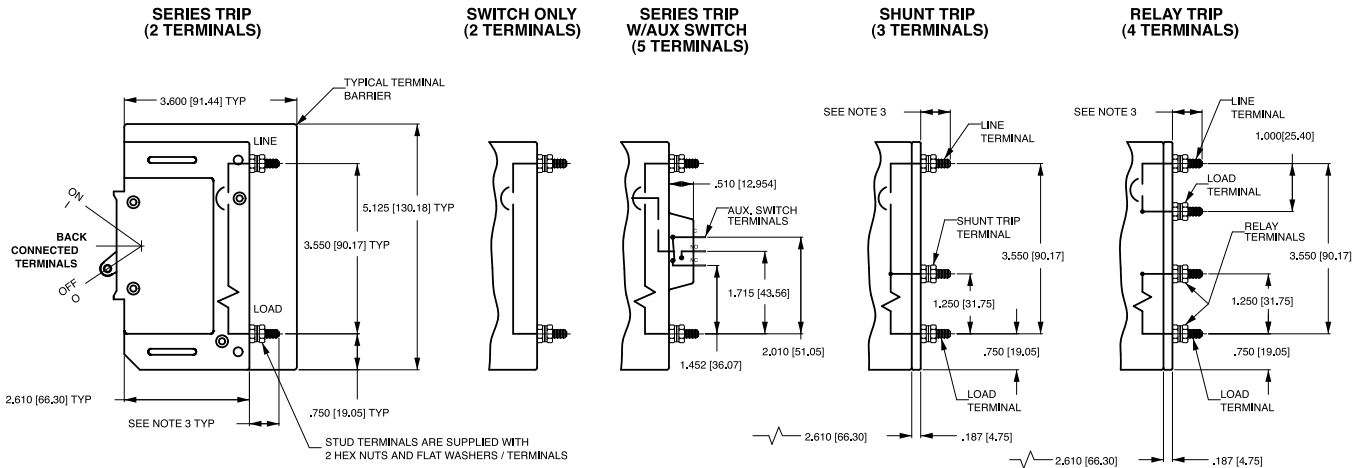
12 AGENCY APPROVAL

| | |
|----------|---|
| C | UL 489 Listed & CSA Certified |
| F | UL 489 Listed, CSA Certified, & VDE Certified |

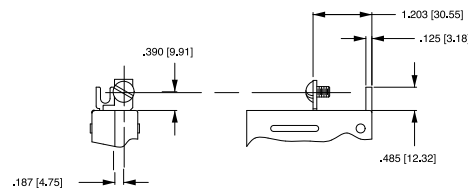
Notes:

- Standard multi-pole units identical poles except when specifying auxiliary switch - (see Note 4). For mixed ratings, consult factory. VDE Certification on 1-5 poles only.
- Series Trip construction available with either front or back connected terminals.
- Series Trip construction with a voltage coil is not available as a single pole unit and must be tied to a protected pole.
- On multi-pole units, only one auxiliary switch is normally supplied mounted in the extreme right pole per Figure A. Back mounted units require special mounting provisions when auxiliary switch is specified. VDE Certification on auxiliary switch codes 0, 2, 3 & 4 only.
- Voltage Trip Coils are not rated for continuous duty. Available only with Frequency & Delay Codes 10 & 20.
- Frequency & Delay Codes 92, 94 & 96 are not VDE Certified.
- Current Ratings under 0.100 amps are not VDE Certified.
- An Anti-Flash Over Barrier is supplied between poles on multi-pole units with 10-32 Stud (Terminal Code 1) or 1/4-20 Stud (Code 2) terminals per UL requirement.
- Box Wire Connector will accept #14 through 0 AWG. copper wire or #12 through 0 AWG. aluminum wire.
- Box Wire Connector with Pressure Plate for stranded wire, consult factory for details.
- Back Mounted breakers can also be front mounted by utilizing the proper front panel mounting inserts normally supplied. However, terminal connections must be made prior to mounting.
- VDE Certification requires dual (I-O, ON-OFF) markings on all handles.
- Not available with VDE Certification.

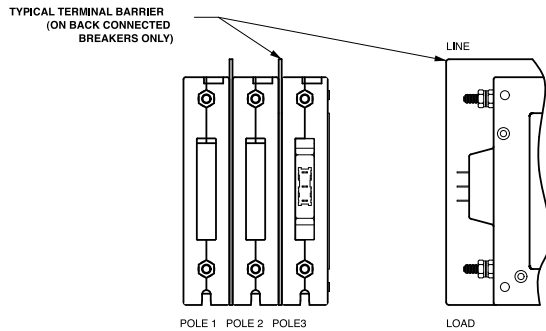
Circuit & Terminal Diagrams: in. [mm]



BOX TYPE WIRE CONNECTORS

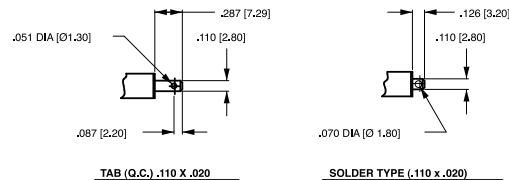


BUS TYPE SCREW TERMINALS



MULTI-POLE IDENTIFICATION SCHEME

AUXILIARY SWITCH TERMINALS



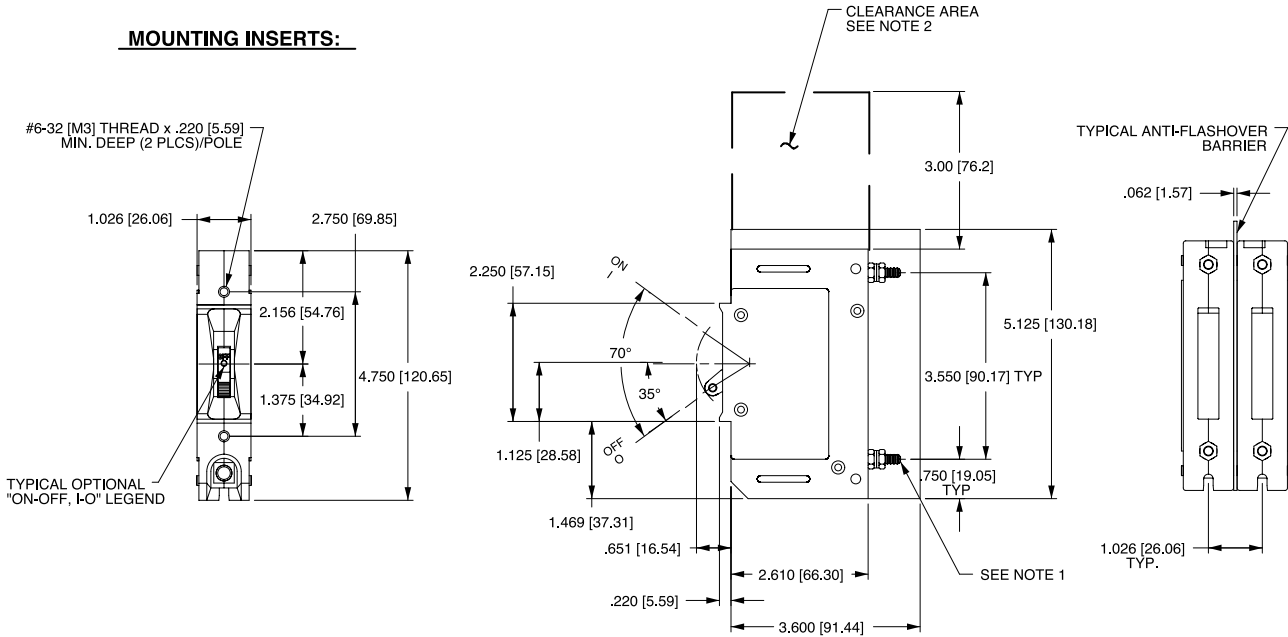
| THREAD SIZE TERMINAL TYPE | WIRE SIZE | TORQUE |
|------------------------------|--------------|-------------------------------|
| #6-32 (M3) HARDWARE | — | 7-9 IN-LBS (0.85-1.0 NMI) |
| #10-32 THD TERMINAL SCREW | ALL | 15-20 IN-LBS (1.7-2.3 NMI) |
| 1/4-20 THD TERMINAL SCREW | ALL | 30-35 IN-LBS (3.4-4.0 NMI) |
| #10-32 STUDS | ALL | 15-20 IN-LBS (1.7-2.3 NMI) |
| 1/4-20 STUDS | ALL | 30-35 IN-LBS (3.4-4.0 NMI) |
| BOX WIRE CONNECTOR | 14-10 AWG | 35 IN-LBS (4.0 NMI) |
| | 8 AWG | 40 IN-LBS (4.5 NMI) |
| | 6-4 AWG | 45 IN-LBS (5.1 NMI) |
| | 3-10 AWG | 50 IN-LBS (5.7 NMI) |

Notes:

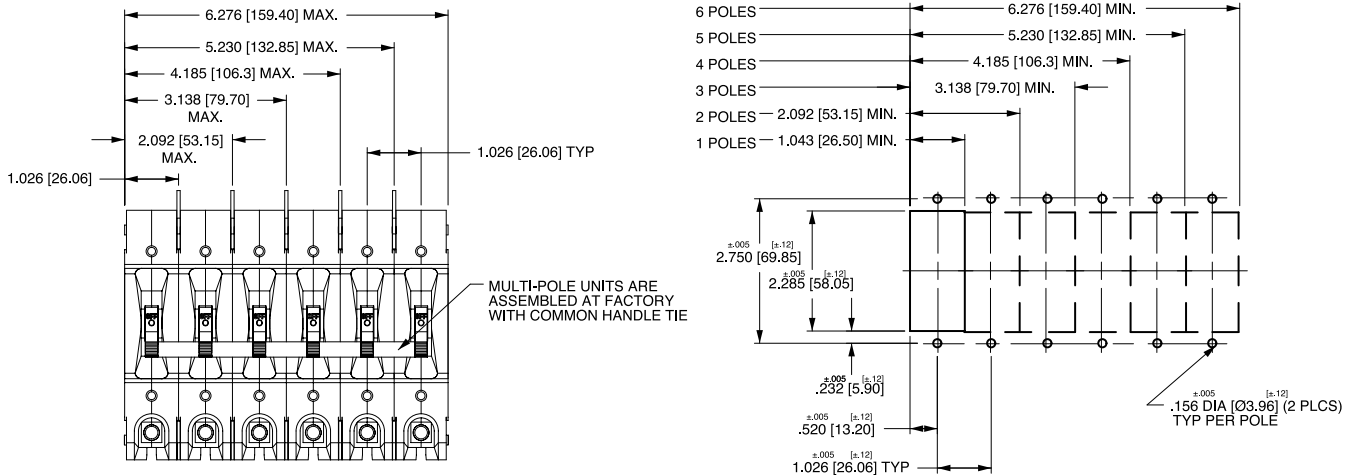
- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ± 0.020 [.51] unless otherwise specified.
- 3 0-50 amps: 10-32 & M5 Studs .625 \pm .062/15.88 \pm 1.574 long.
- 4 51-120 amps: 1/4-20 & M6 Studs .750 \pm .062/19.05 \pm 1.574 long.

Dimensional Specifications: in. [mm]

MOUNTING INSERTS:



PANEL CUTOUT DETAIL

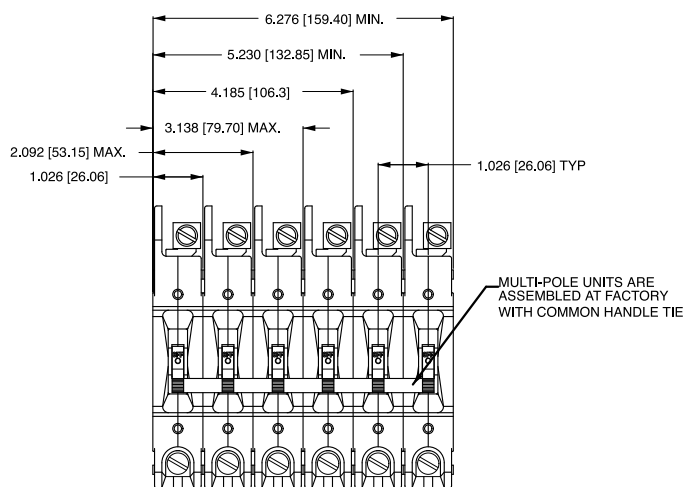
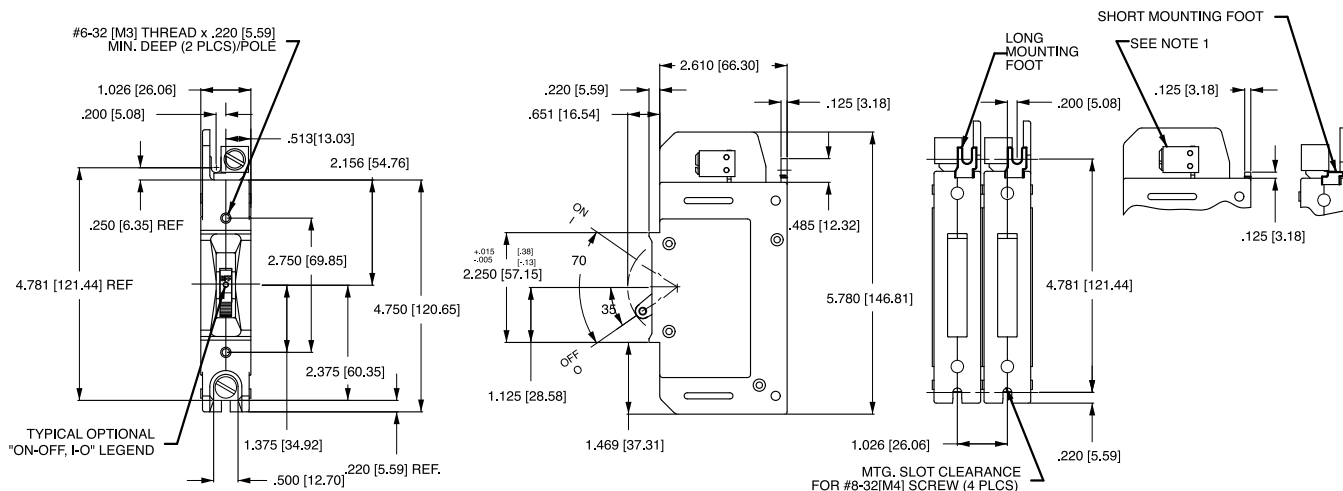


Notes:

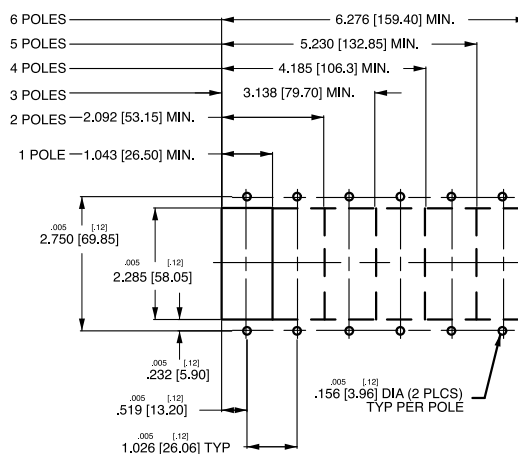
- 1 1/4 -20 stud terminal in Series Trip circuit configuration shown.
- 2 A 3" min spacing must be provided between the circuit breaker arc venting area of back connected E-Series circuit breaker and grounded obstructions.
- 3 All dimensions are in inches [millimeters].
- 4 Tolerance ±.020 [5.1] unless otherwise specified.
- 5 Circuit breakers must be mounted on vertical surface.

Dimensional Specifications: in. [mm]

MOUNTING INSERTS:



PANEL CUTOUT DETAIL



Notes:

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ± 0.020 [.51] unless otherwise specified.
- 3 Box wire connector terminal in Series Trip circuit configuration shown.
- 4 Circuit breakers must be mounted on vertical surface.

| E-SERIES TIME DELAY VALUES | | | | | | | | | | | |
|----------------------------|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|
| TRIP TIME (SECONDS) | PERCENT OF RATED CURRENT | | | | | | | | | | |
| | Delay | 100% | 125% | 135% | 150% | 200% | 400% | 600% | 800% | 1000% | 1200% |
| 10 | No Trip | May Trip | --- | .001 - .038 | .001 - .032 | .001 - .021 | .001 - .019 | .001 - .019 | .001 - .019 | .001 - .019 | .001 - .019 |
| 12, 72 | No Trip | .600 - 7.00 | --- | .330 - 2.00 | .150 - .800 | .033 - .160 | .016 - .071 | .010 - .048 | .008 - .040 | .008 - .040 | |
| 14, 74 | No Trip | 11.0 - 110 | --- | 6.00 - 45.0 | 3.00 - 18.0 | .280 - 3.50 | .013 - 1.50 | .010 - .130 | .009 - .090 | .009 - .080 | |
| 16, 76 | No Trip | 100 - 800 | --- | 50.0 - 360 | 20.0 - 120 | 3.00 - 25.0 | .020 - 11.0 | .010 - .700 | .009 - .230 | .009 - .200 | |
| 20 | No Trip | May Trip | --- | .001 - .040 | .001 - .031 | .001 - .020 | .001 - .020 | .001 - .020 | .001 - .020 | .001 - .020 | |
| 22, 62 | No Trip | .800 - 5.00 | --- | .400 - 2.30 | .150 - .900 | .034 - .170 | .020 - .080 | .012 - .051 | .010 - .040 | .009 - .040 | |
| 24, 64 | No Trip | 7.20 - 90.0 | --- | 4.40 - 35.0 | 2.00 - 15.0 | .500 - 3.50 | .025 - 1.60 | .012 - .330 | .010 - .070 | .009 - .050 | |
| 26, 66 | No Trip | 50.0 - 500 | --- | 32.0 - 250 | 14.0 - 120 | 2.50 - 24.0 | .320 - 7.00 | .0125 - 3.10 | .011 - .130 | .010 - .055 | |
| 30 | No Trip | May Trip | --- | .001 - .040 | .001 - .032 | .001 - .020 | .001 - .020 | .001 - .020 | .001 - .020 | .001 - .020 | |
| 32, 92 | No Trip | May Trip | .450 - 5.20 | .330 - 2.30 | .150 - .900 | .033 - .170 | .016 - .080 | .009 - .051 | .008 - .040 | .008 - .040 | |
| 34, 94 | No Trip | May Trip | 5.80 - 73.0 | 4.40 - 45.0 | 2.00 - 18.0 | .280 - 3.60 | .013 - 1.60 | .010 - .330 | .009 - .090 | .009 - .080 | |
| 36, 96 | No Trip | May Trip | 42.0 - 600 | 32.0 - 360 | 14.0 - 120 | 2.50 - 25.0 | .020 - 11.0 | .010 - 4.10 | .009 - .330 | .009 - .200 | |

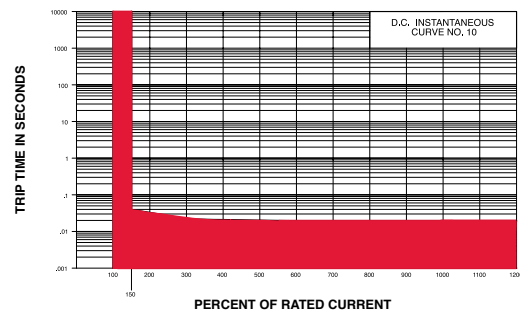
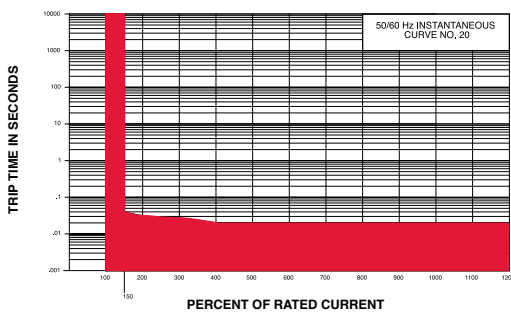
NOTES

Delay Curves 10,20,30: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in these curves.
 Delay Curves 12,14,16,22,24,26,62,64,66,72,74,76: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in these curves.
 Delay Curves 32,34,36,92,94,96: Breakers to hold 100% and must trip at 135% of rated current and greater within the time limit shown in these curves.
 All curves: Data shown represents breaker response at ambient temperature of 77°F (25°C) with no preloading. Breakers are mounted in standard wall-mount position.
 The minimum inrush pulse tolerance handling capacity on the above standard delays is 16 times rated current & 20 times rated current for high inrush delays based on a 60Hz 1/2 cycle, 8.33 ms pulse.

Instantaneous

AC

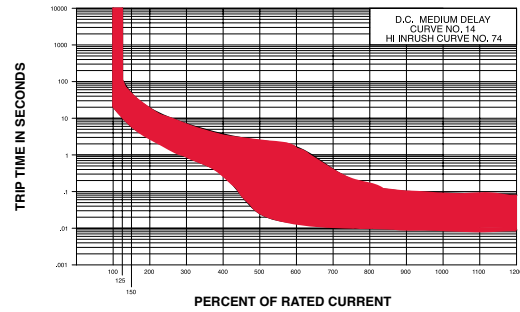
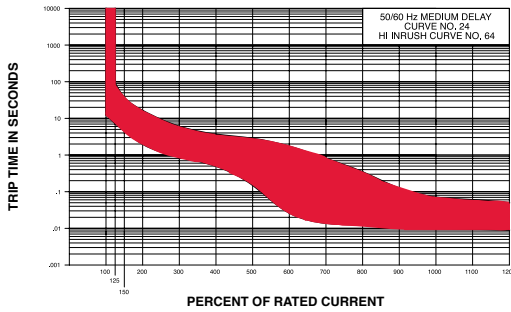
DC



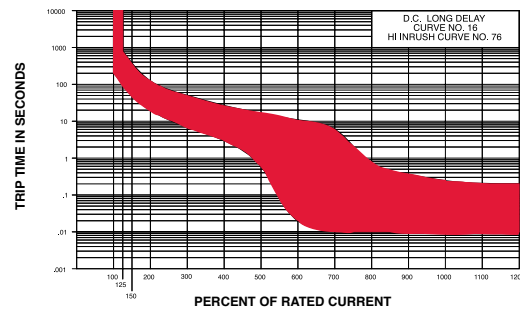
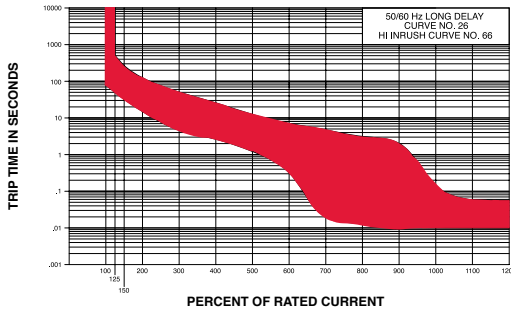
Short



Medium

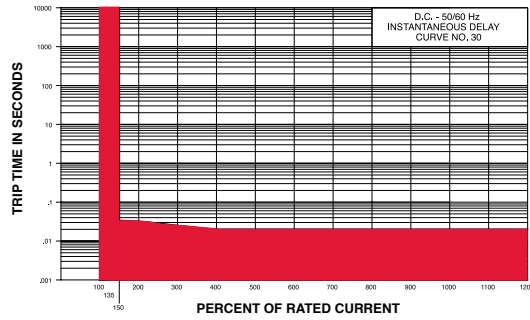


Long

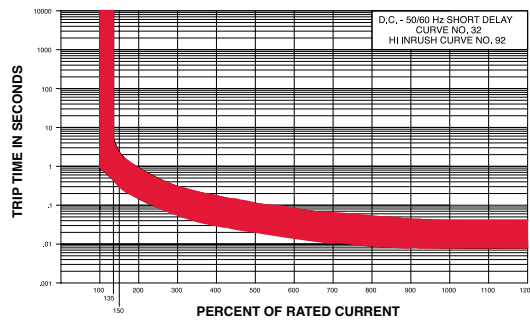


AC/DC

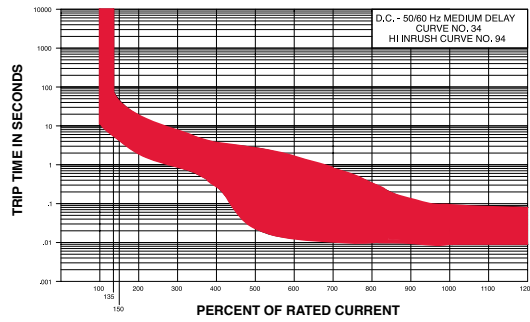
Instantaneous



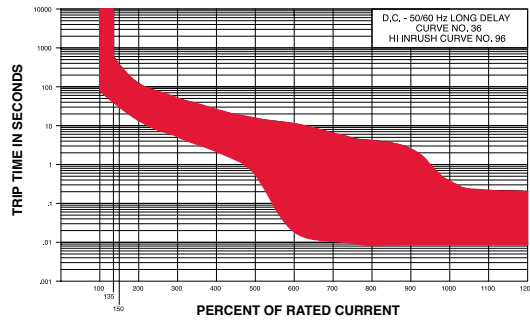
Short



Medium



Long



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