

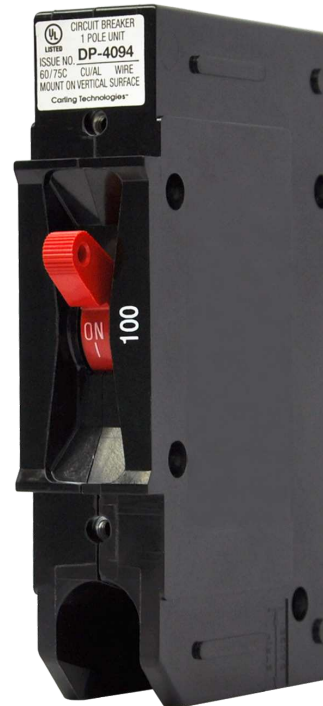
E-Series Circuit Breaker

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:

- ♦ Ideal for higher current and voltage applications
- ♦ Renewable energy systems
- ♦ Military
- ♦ Industrial controls
- ♦ Generators



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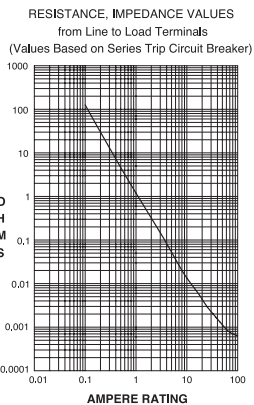
Innovative Designs. Powerful Solutions.

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Carling Technologies, Inc.
60 Johnson Avenue • Plainville, CT 06062-1177
Phone: (860) 793-9281 • Fax: (860) 793-9231
Email: sales@carlingtech.com • www.carlingtech.com

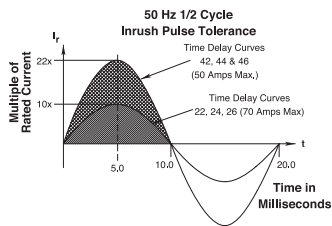
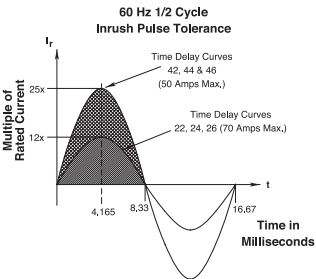
Electrical

Maximum Voltage 600VAC 50/60 Hz, 125VDC (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 & 125 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 - 125.0	± 35%

Pulse Tolerance Curves



Mechanical

Endurance 6,000 ON-OFF operations @ 6 per minute; with rated Current and Voltage. Additional 4,000 ON-OFF mechanical.
 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.

Agency Certifications

UL Recognized

UL Standard 1077



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

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

UL Standard 1500



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

UL Listed

UL Standard 489



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

CSA Accepted



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

CSA Certified



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

TUV Certified



EN60934 under License No. R72031056

VDE Certified



EN60934, VDE 0642 under File No. 10537

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 FULL LOAD AMPS	INTERRUPTING CAPACITY (AMPS) WITHOUT BACKUP FUSE	HIGH INTERRUPTING CAPACITY (AMPS)
	MAX. RATING	FREQUENCY	PHASE			
SERIES	80	DC	---	0.10 - 100	5,000	50,000
	125	DC	---	0.10 - 100	5,000	10,000
	125	DC	---	101 - 125	10,000	---
	120	50 / 60	1	101 - 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	
							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	---	---	---	---	---	

Table B 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 FULL LOAD AMPS	SHORT CIRCUIT CAPACITY (AMPS)			APPLICATION CODES		CONSTRUCTION NOTES
	MAX. RATING	FREQUENCY	PHASE		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						

Table C 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 FULL LOAD AMPS	SHORT CIRCUIT CAPACITY (AMPS) WITHOUT BACKUP FUSE	APPLICATION CODES	
	MAX. RATING	FREQUENCY	PHASE			UL	CSA
SERIES	65	DC	---	0.02 - 100	5,000	TC1,2,OL1,U1	TC1,2,OL1,U1
	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

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	3	Three	5	Five
2	Two	4	Four	6	Six

4 CIRCUIT²

A ³	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.D.T. 0.110 Q.C. Terminals
2	S.P.D.T. 0.110 Q.C. Terminals	7	S.P.D.T. 0.110 Q.C. Terminals (Gold Contacts)
3	S.P.D.T. 0.139 Solder Lug	8	S.P.D.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

34	DC, 50/60Hz Medium
03 ³	DC 50/60Hz, Switch Only
36	DC, 50/60Hz Long
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
92 ⁶	DC, 50/60Hz Short, Hi-Inrush
26	50/60Hz Long
94 ⁶	DC, 50/60Hz Medium, Hi-Inrush
30	DC, 50/60Hz Instantaneous
96 ⁶	DC, 50/60Hz Long, Hi-Inrush
32	DC, 50/60Hz Short

7 CURRENT RATING (AMPERES)⁷

CODE	AMPERES	
020	0.020	235 0.350
025	0.025	240 0.400
030	0.030	245 0.450
035	0.035	250 0.500
040	0.040	255 0.550
045	0.045	260 0.600
050	0.050	265 0.650
055	0.055	270 0.700
060	0.060	275 0.750
065	0.065	280 0.800
070	0.070	285 0.850
075	0.075	290 0.900
080	0.080	295 0.950
085	0.085	410 1.000
090	0.090	512 1.250
090	0.095	415 1.500
210	0.100	517 1.750
215	0.150	420 2.000
220	0.200	522 2.250
225	0.250	425 2.500
230	0.300	527 2.750
430	3.000	614 14.000
435	3.500	615 15.000
440	4.000	616 16.000
445	4.500	617 17.000
450	5.000	618 18.000
455	5.500	620 20.000
460	6.000	622 22.000
465	6.500	624 24.000
470	7.000	625 25.000
475	7.500	630 30.000
480	8.000	635 35.000
485	8.500	640 40.000
490	9.000	650 50.000
495	9.500	660 60.000
510	10.000	670 70.000
710	10.500	680 80.000
611	11.000	690 90.000
711	11.500	810 100.000
612	12.000	811 110.000
712	12.500	812 120.000
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 w/ either front or back connected terminals. Shunt construction available w/ 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)

1 ⁹	10-32 Stud (All Terminals)	MAX. RATING	50 A
2 ⁹	1/4-20 Stud (All Terminals)		120 A
A ⁹	M5 Stud (Line & Load)		50 A
B ⁹	M6 Stud (Line & Load)		100 A

FRONT CONNECTED (BACK MOUNTED ONLY)

3 ¹⁰	Box Wire Connector (Line & Load)	MAX. RATING	100 A
C ¹¹	Box Wire Connector w/ 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
6 ¹⁰	10-32 "Bus-Type" Screw (Line), Box Wire Connector (Load)		100 A
F ¹¹	10-32 "Bus-Type" Screw (Line), Box Wire Connector w/ Pressure Plate (Load)		100 A
7	1/4-20 Screw (Line & Load)		100 A
G	M6 Screw (Line & Load)		100 A
8	1/4-20 "Bus-Type" Screw (Line), 1/4-20 Screw (Load)		100 A
H	M6 "Bus-Type" Screw (Line), M6 Screw (Load)		100 A
9 ¹⁰	1/4-20 "Bus-Type" Screw (Line), Box Wire Connector (Load)		100 A
J ¹¹	1/4-20 "Bus-Type" Screw (Line), Box Wire Connector w/ Pressure Plate (Load)		100 A

9 ACTUATOR COLOR & LEGEND¹³

Acuator 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

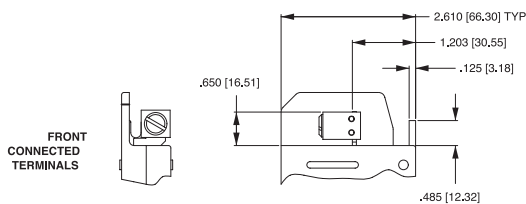
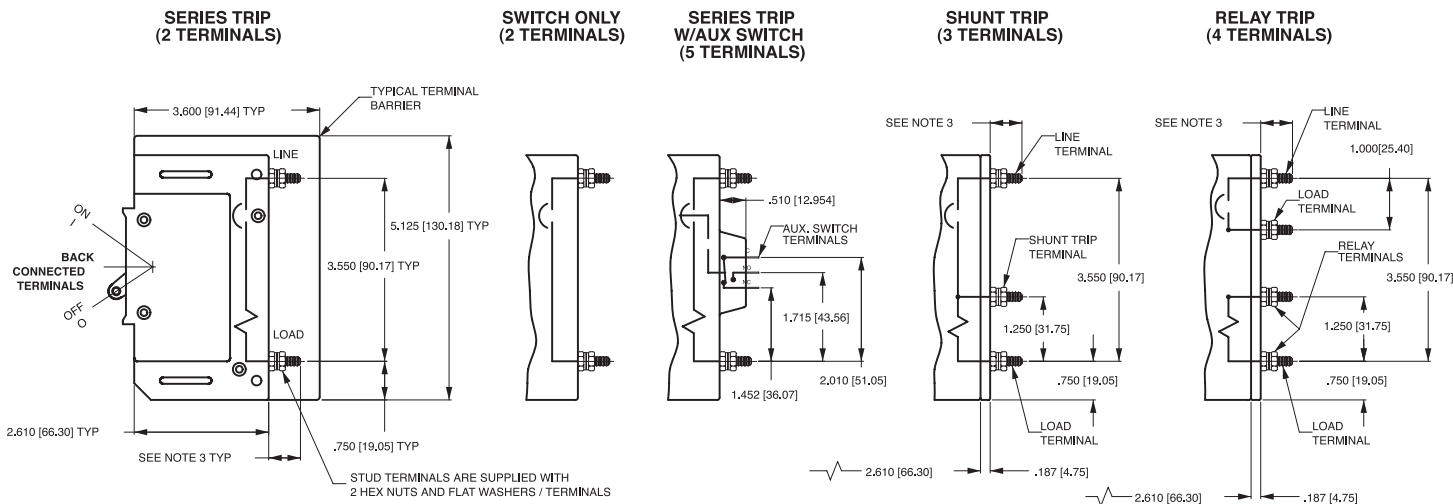
11 MAXIMUM APPLICATION RATING¹⁵

A	65 VDC, 120 A	G ¹⁶	600 VAC, 100 A
B	125 VDC, 120 A	H ¹⁶	480 VAC, 100 A
C	120/240 VAC, 100 A	J ¹⁶	415 VAC, 100 A
D	240 VAC, 100 A	L ¹⁶	160 VDC, 100 A
E ¹⁶	277/480 VAC, 100 A	T	125 VDC/240 VAC, 100 A
F	277 VAC, 100 A	W ¹⁶	125 VDC/415 VAC, 100 A

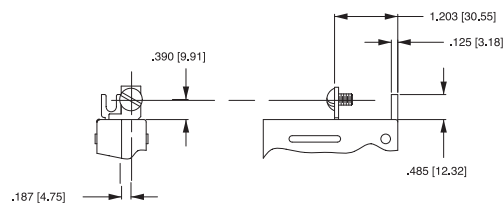
12 AGENCY APPROVAL

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

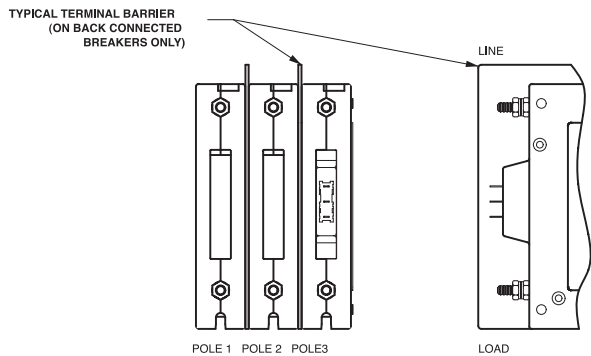
- Auxiliary Switch available on Switch Only and Series Trip units. On multi-pole units, only one auxiliary switch is normally supplied mounted in the extreme right pole. Back mounted units require special mounting provisions when auxiliary switch is specified. VDE approval on Auxiliary Switch Codes 0,2,3 & 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.



BOX TYPE WIRE CONNECTORS

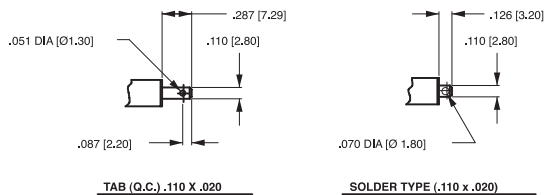


BUS TYPE SCREW TERMINALS



MULTI-POLE IDENTIFICATION SCHEME

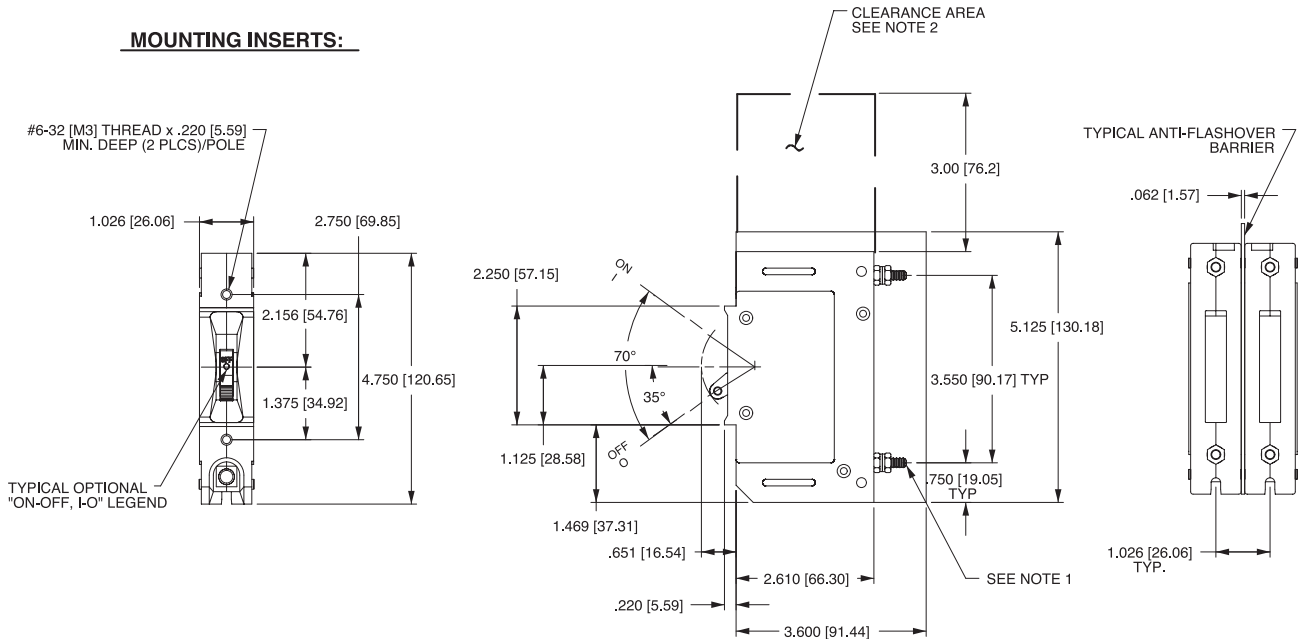
AUXILIARY SWITCH TERMINALS



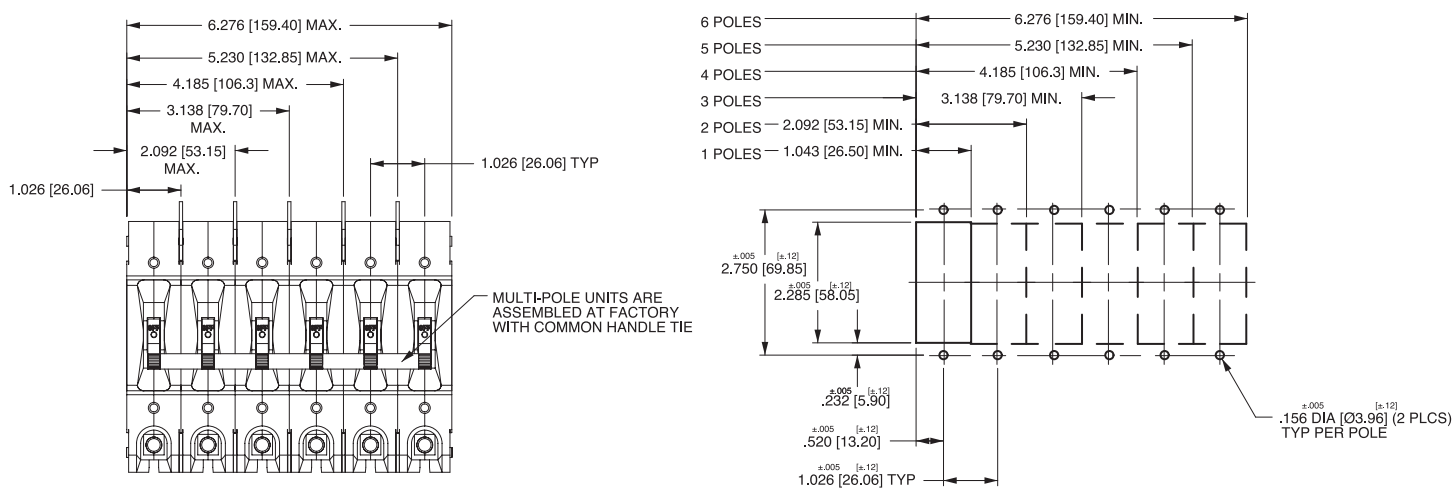
- Notes:
 1 All dimensions are in inches [millimeters].
 2 Tolerance ± 0.020 [.51] unless otherwise specified.
 3 0-50 amps: 10-32 & M5 Studs .625 \pm .062/15.88 \pm 1.574 long.
 4 51-120 amps: 1/4-20 & M6 Studs .750 \pm .062/19.05 \pm 1.574 long.

TABLE A TIGHTENING TORQUE SPECIFICATIONS		
THREAD SIZE TERMINAL TYPE	WIRE SIZE	TORQUE
#6-32 [M5] HARDWARE	—	7-9 IN-LBS [0.8-1.0 NM]
#10-32 THD TERMINAL SCREW	ALL	15-20 IN-LBS [1.7-2.3 NM]
1/4-20 THD TERMINAL SCREW	ALL	30-35 IN-LBS [3.4-4.0 NM]
#10-32 STUDS	ALL	15-20 IN-LBS [1.7-2.3 NM]
1/4-20 STUDS	ALL	30-35 IN-LBS [3.4-4.0 NM]
BOX WIRE CONNECTOR	14-10 AWG	35 IN-LBS [4.0 NM]
	8 AWG	40 IN-LBS [4.5 NM]
	6-4 AWG	45 IN-LBS [5.1 NM]
	3-10 AWG	50 IN-LBS [5.7 NM]

MOUNTING INSERTS:

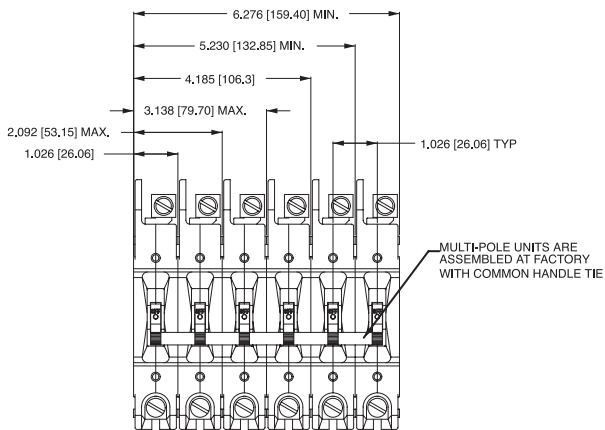
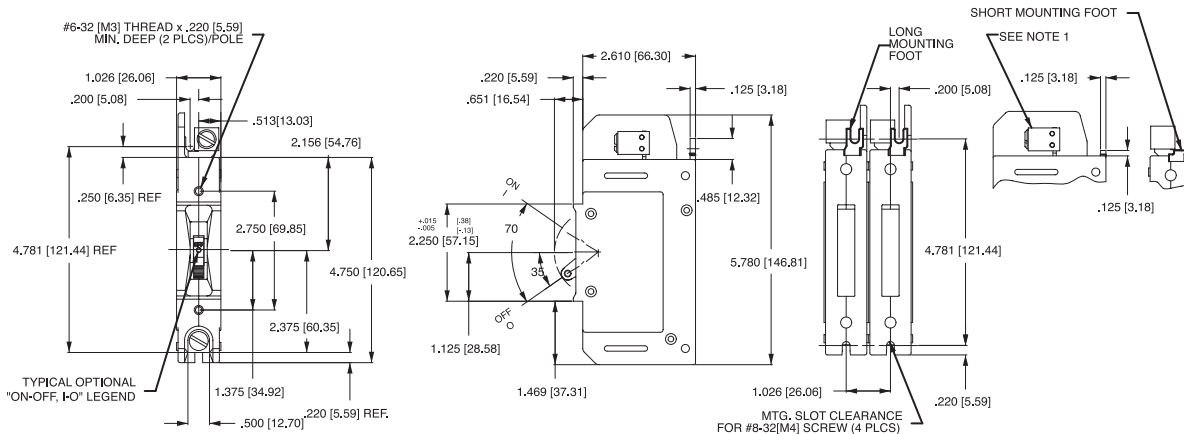


PANEL CUTOUT DETAIL

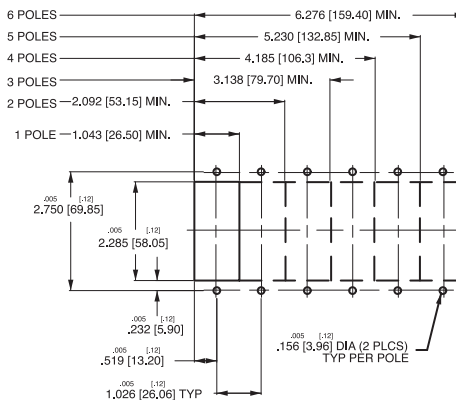


- Notes:
- 1 1/4 -20 stud terminal in Series Trip circuit configuration shown.
 - 2 A 3" min spacing must be provided between the circuit breaker arc venting area of back connected E-Series circuit breaker and grounded obstructions.
 - 3 All dimensions are in inches [millimeters].
 - 4 Tolerance $\pm .020$ [.51] unless otherwise specified.
 - 5 Circuit breakers must be mounted on vertical surface.

MOUNTING INSERTS:



PANEL CUTOUT DETAIL



- Notes:
- 1 All dimensions are in inches [millimeters].
 - 2 Tolerance ±.020 [0.51] unless otherwise specified.
 - 3 Box wire connector terminal in Series Trip circuit configuration shown.
 - 4 Circuit breakers must be mounted on vertical surface.

REV_CB_E_0812