

W23

W31

W23/W31 series

TOGGLE OR PUSH/PULL ACTUATOR THERMAL CIRCUIT BREAKER



FEATURES

- 0.5 amp to 50 amp ratings may be used as on/off switch.
- Cannot be reset against overload.
- W23 has visible trip indicator.
- Screw termination.

AGENCY APPROVALS

W23 and W31 are UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734.

ELECTRICAL DATA @ +25 °C

Calibration: Will continuously carry 100% of rating, may trip between 101% and 134% of rating at 25°C. Must trip at 135% in one hour.

Maximum Operating Voltages: 50VDC or 250VAC (to 400 Hz).

Interrupting Capacity: 0.5-25 amp models — 2,500 amps at 50VDC, 1000 amps at 250VAC. 26-50 amp models — 1000 amps at 50VDC or 250VAC.

Resettable Overload Capacity: Ten times rated current.

Dielectric Strength: Over 1,500 volts RMS.

RESISTANCE CHART

Current Rating In Amps	Maximum Resistance In Ohms $\pm$ 30%
1	.61
5	.03
10	.01
15	.006
20	.004
30	.003
40	.002
50	.002

MECHANICAL/ENVIRONMENTAL DATA

Endurance Cycling: More than 6,000 cycles at 100% of rating or 10,000 mechanical cycles.

Humidity: Will meet requirements of MIL-STD-202, Method 1

Salt Spray: Will meet requirements of MIL-STD-202, Method Test Condition B.

Termination: Two #8-32 screw terminals.

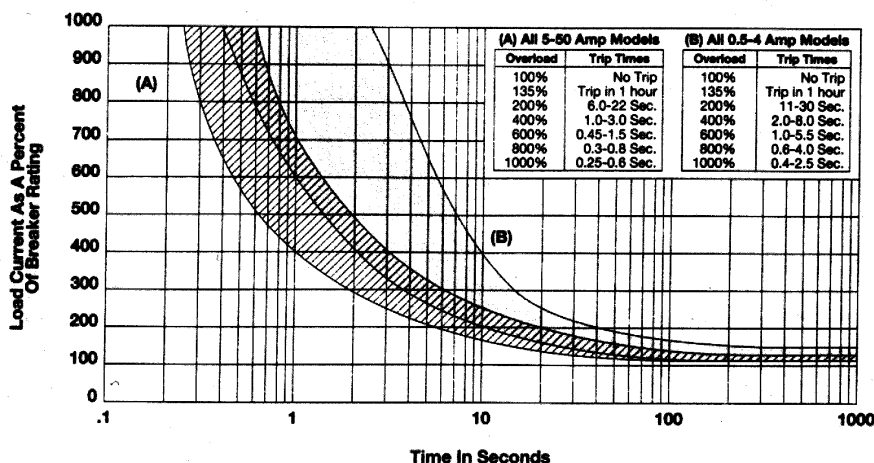
Mounting: W23 — Threaded bushing, 3/8" (9.53 mm) diameter

W31 — Threaded bushing, 15/32" (11.91 mm)

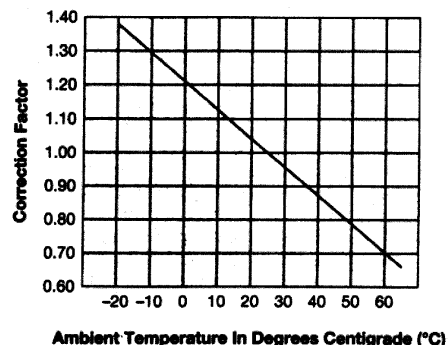
diameter, with or without anti-rotation flats.

Weight: Less than 2 oz. (57 g).

TIME VS. CURRENT TRIP CURVE @ +25 °C



AMBIENT COMPENSATION CHART



TO USE THIS CHART: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

ORDERING INFORMATION

Typical Part No. >		W	23	-X	1	A	1	G	-5
1. DESIGNATOR: W = Circuit breaker									
2. SERIES NUMBER: 23 = Single pole, push/pull									
3. CIRCUIT FUNCTION: X = Series trip									
4. BUTTON: 1 = Black with white amp rate marking and white trip band.									
5. MOUNTING BUSHING: A = 3/8"-24 threaded bushing .375" (9.53mm) long, silver color									
6. TERMINALS (See drawings for relative terminal positions): 1 = Screw terminals situated 90° to each other with #8-32 screws and washers installed. 3 = Screw terminals situated parallel to each other pointing upward with #8-32 screws and washers installed.									
7. MOUNTING HARDWARE: A = Knurled nut/hex nut installed G = Two hex nuts/lockwasher installed Z = No mounting hardware supplied									
8. AMP RATING:									
0.5	3	7.5	20	35					
1	4	10	25	40					
2	5	15	30	50					

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery

W23-X1A1G-1	W23-X1A1G-7.50	W23-X1A1G-25	W23-X1A1G-50
W23-X1A1G-2	W23-X1A1G-10	W23-X1A1G-30	
W23-X1A1G-3	W23-X1A1G-15	W23-X1A1G-35	
W23-X1A1G-5	W23-X1A1G-20	W23-X1A1G-40	

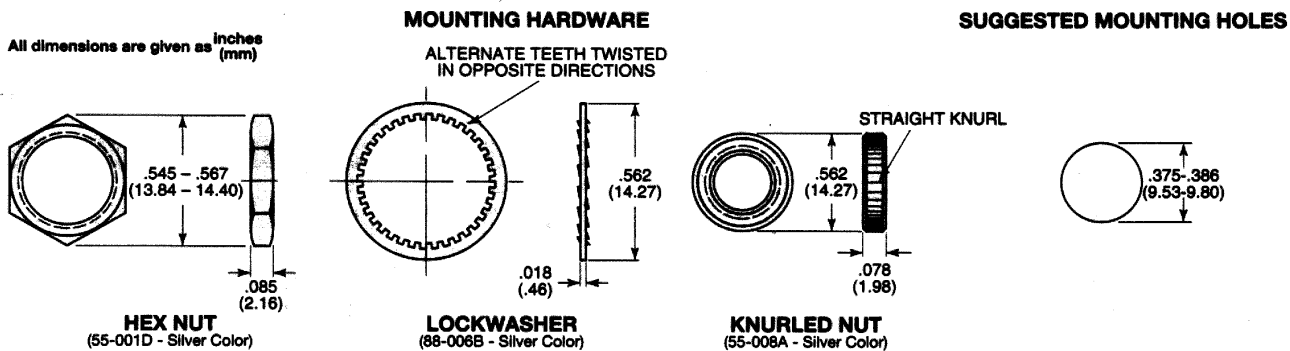
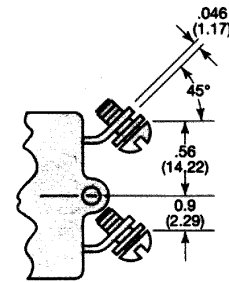
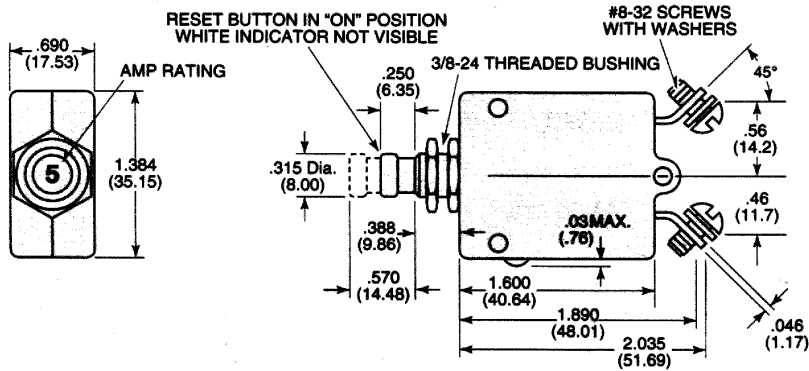
ORDERING INFORMATION

Typical Part No. >		W	31	-X	2	M	1	G	-5
1. DESIGNATOR: W = Circuit breaker									
2. SERIES NUMBER: 31 = Single pole, toggle actuator									
3. CIRCUIT FUNCTION: X = Series trip									
4. MOUNTING BUSHING: 1 = 15/32"-32 threaded bushing .320" (8.13 mm) long, round, silver color 2 = 15/32"-32 threaded bushing .320" (8.13 mm) long, double "D", silver color									
5. TOGGLE: M = Silver color metal toggle, round, with amp rate marking on end									
6. TERMINALS (See drawing for relative terminal positions): 1 = Screw terminals situated 90° to each other with #8-32 screws and washers installed. 5 = Screw terminals situated parallel to each other pointing downward with #8-32 screws and washers installed.									
7. MOUNTING HARDWARE: A = Knurled nut/hex nut installed G = Two hex nuts/lockwasher installed Z = No mounting hardware supplied									
8. AMP RATING:									
0.5	3	7.5	20	35					
1	4	10	25	40					
2	5	15	30	50					

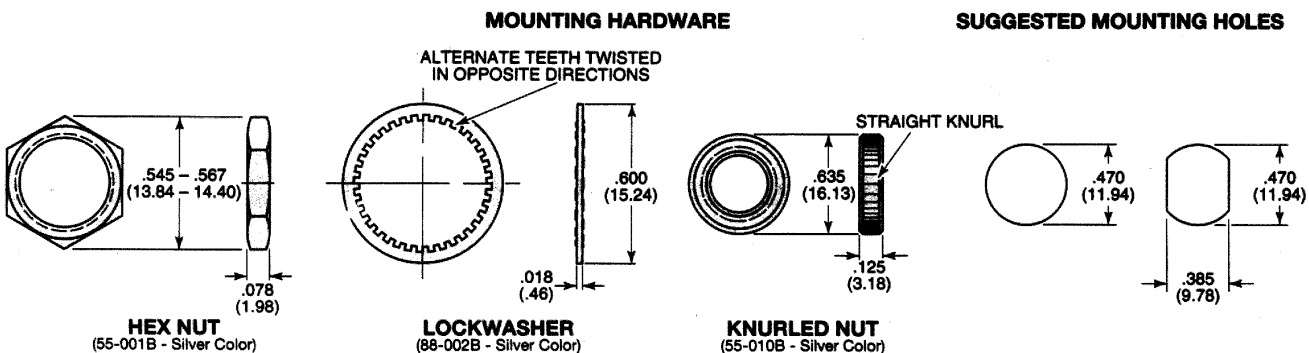
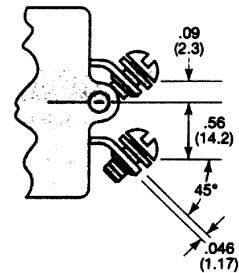
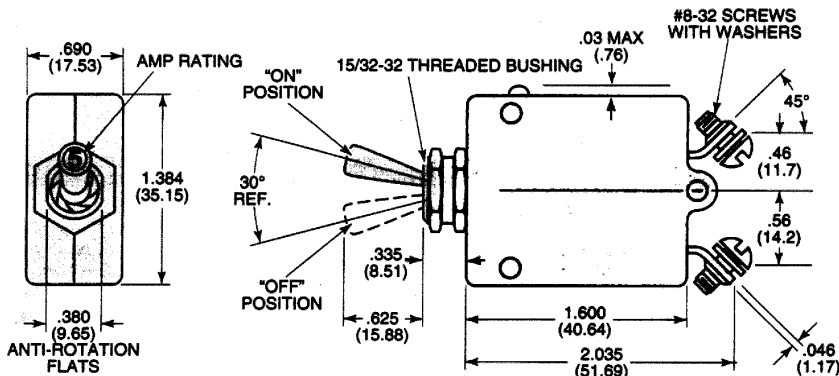
STOCK ITEMS - The following items are normally maintained in stock for immediate delivery

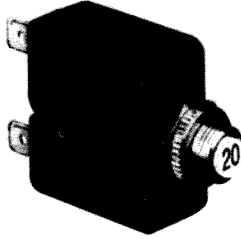
W31-X2M1G-1	W31-X2M1G-7.50	W31-X2M1G-25	W31-X2M1G-50
W31-X2M1G-2	W31-X2M1G-10	W31-X2M1G-30	
W31-X2M1G-3	W31-X2M1G-15	W31-X2M1G-35	
W31-X2M1G-5	W31-X2M1G-20	W31-X2M1G-40	

W23 OUTLINE DIMENSIONS



W31 OUTLINE DIMENSIONS





W58 series

PUSH TO RESET ONLY THERMAL CIRCUIT BREAKER



FEATURES

- 0.5 amp to 35 amp ratings.
- Cannot be manually tripped.
- Button extends for visual trip indication.
- Push button to reset breaker.
- Termination is screw or .250" QC.

AGENCY APPROVALS

W58 Series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734.

MAXIMUM RESISTANCE VS. CURRENT RATING @ +25°C

Current Rating In Amps	Maximum Resistance In Ohms	Current Rating In Amps	Maximum Resistance In Ohms
0.5	5.0	7	0.020
0.75	2.5	8	0.020
1	1.35	9	0.020
1.5	0.75	10	0.014
2	0.32	12	0.010
2.5	0.25	15	0.010
3	0.18	20	0.006
3.5	0.15	25	0.005
4	0.10	30	0.004
5	0.026	35	0.004
6	0.026		

ELECTRICAL DATA @ +25 C

Calibration: Breaker will continuously carry 100% of rated load. It may trip between 101% and 145% of rated load, but must trip at 145% at 25°C.

Dielectric Strength: Over 1,500 volts RMS.

Maximum Operating Voltages: 50VDC; 250VAC.

Interrupt Capacity: 2,000 amps at 50VDC (0.5 - 35 amp models).
1,000 amps at 250VAC (0.5 - 35 amp models).

Note: 30 and 35 amp models not UL or CSA.

Resettable Overload Capacity: Ten times rated current.

MECHANICAL/ENVIRONMENTAL DATA

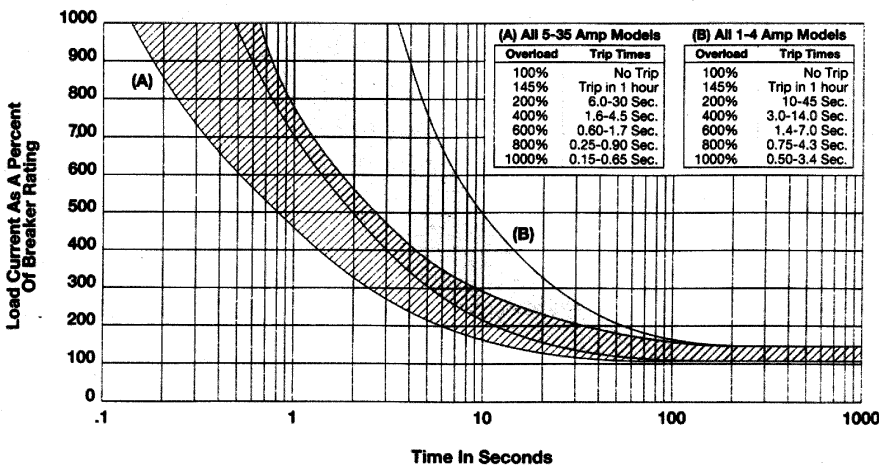
Shock: Withstands to 10 g.

Endurance Cycling: Over 1,000 cycles at 200% of rated load.

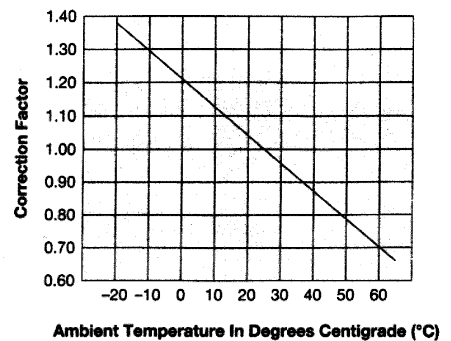
Vibration: Withstands to 10 g at 10-55 Hz.

Weight: Less than 1 1/2 oz. (42.5 g).

TIME VS. CURRENT TRIP CURVE @ +25 C



AMBIENT COMPENSATION CHART



TO USE THIS CHART: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

ORDERING INFORMATION

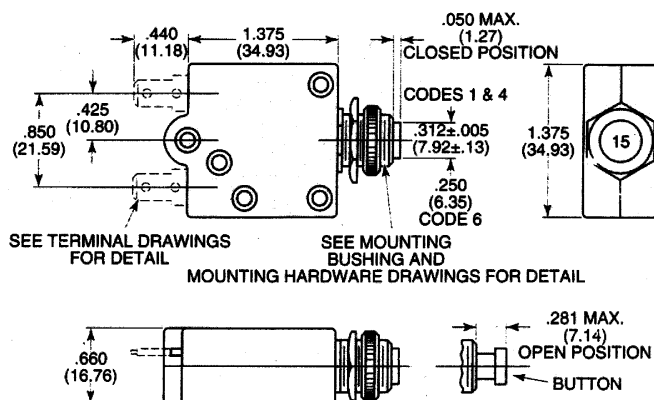
Typical Part No. >		W	58	-X	B	1	A	4	A	-5	
1. DESIGNATOR: W = Circuit breaker											
2. SERIES NUMBER: 58 = Single Pole, Push-to-Reset											
3. CIRCUIT FUNCTION: X = Series Trip											
4. BUTTON: A = White, plain, no rate marking, no trip band E = White with red rate marking no trip band B = White with red rate marking, red trip band F = White with black rate marking, no trip band C = White with black rate marking, red trip band											
5. MOUNTING BUSHING: 1 = 7/16" x .500" (12.70 mm) long 4 = 15/32" x .300" (7.62 mm) long, black 6 = 3/8" x .465" (11.81 mm) long, round											
6. TERMINALS: A = Quick connect .250" (6.35 mm) straight B = Quick connect .250" (6.35 mm) 90° C = 6/32 screw 90° (screws installed) D = 6/32 screw 90° (screws bulk packed)											
7. MOUNTING HARDWARE: 4 = Knurled nut/hex nut 15 = Two hex nuts/lock washer 6 = Knurled nut/hex nut/lock washer 99 = No mtg. hardware supplied (Use C, Step #8) 12 = Knurled nut/lock washer											
8. MOUNTING HARDWARE PACKAGING: A = Assembled to bushing B = Bulk unassembled C = No mounting hardware											
9. SPECIFY AMP RATING:											
0.5	1.5	3	5	8	12	25					
0.75	2	3.5	6	9	15	30*					
1	2.5	4	7	10	20	35*					

*Not UL or CSA

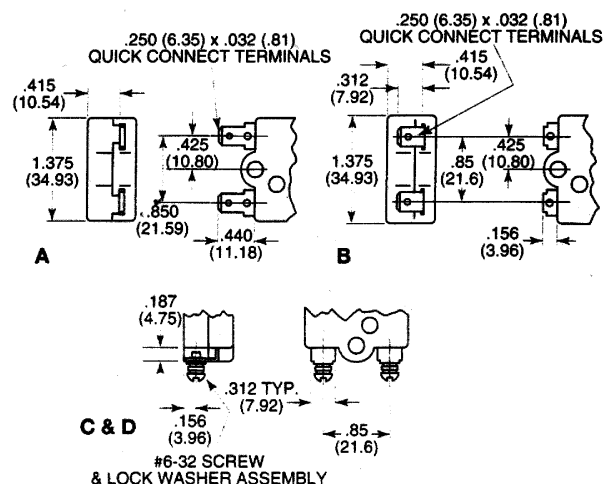
STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

W58-XB1A4A-1	W58-XB1A4A-6	W58-XB1A4A-15	W58-XC4C12A-1	W58-XC4C12A-10	W58-XC4C12A-35
W58-XB1A4A-2	W58-XB1A4A-7	W58-XB1A4A-20	W58-XC4C12A-2	W58-XC4C12A-15	
W58-XB1A4A-3	W58-XB1A4A-8	W58-XB1A4A-25	W58-XC4C12A-3	W58-XC4C12A-20	
W58-XB1A4A-4	W58-XB1A4A-10	W58-XB1A4A-30	W58-XC4C12A-5	W58-XC4C12A-25	
W58-XB1A4A-5	W58-XB1A4A-12	W58-XB1A4A-35	W58-XC4C12A-7	W58-XC4C12A-30	

OUTLINE DIMENSIONS

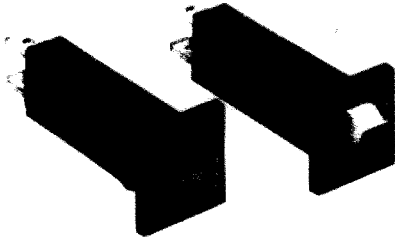


TERMINAL OPTIONS



6
CIRCUIT BREAKERS & FUSES

**SWITCHABLE VERSION
NOW AVAILABLE**



W28 series

**SWITCHABLE OR
PUSH TO RESET
FUSEHOLDER-TYPE
THERMAL CIRCUIT BREAKER**



Note: Some approvals pending for switchable type.

FEATURES

- Switchable version combines on-off switch and circuit protection in a single unit.
- Approved to many international standards (push to reset type).
- Replaces slow blow glass cartridge fuse.
- Labor-saving snap-in mounting.
- Button extends for visual trip indication on push to reset model.
- Rocker on switchable model moves to "overload" position upon trip.

AGENCY APPROVALS

W28 series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734. W28 breakers have been issued Certificate of Suitability CS2190N as supplementary Equipment Protectors by the Energy Authority of New South Wales, Australia. W28 breakers are also DEMKO (Denmark) and SEV (Switzerland) approved. VDE approved for use in office equipment and provides 8mm isolation. 20 amp models do not have VDE, DEMKO and SEV approvals at present. W28-S is UL 1077 Recognized, with other approvals pending.

ELECTRICAL DATA @ 25°C

Calibration: Will continuously carry 100% of rating.
3-20 amp models – may trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
0.25-2 amp models – may trip between 101% and 174%, but must trip at 175% of rating within one hour at +25°C.

Dielectric Strength: Over 1,500 volts RMS.

Maximum Operating Voltages: 32VDC; 250VAC, 50/60 Hz.

Interrupt Capacity: 1,000 amps at 250VAC, 50/60 Hz, and 32VDC in accordance with UL standard 1077.

Resettable Overload Capacity: Six times rated current for 0.25 through 2 amp models. Ten times rated current for 3 through 20 amp models.

Reset Time: 180 seconds max. for 0.25 through 2 amp models. 10 to 60 seconds for 3 through 20 amp models.

TYPICAL RESISTANCE VS. CURRENT RATING @ +25°C

Current Rating (A)	Resistance (mΩ)	Current Rating (A)	Resistance (mΩ)
0.25	14.0	8.0	0.016
0.50	3.55	9.0	0.014
0.75	2.0	10.0	0.011
1.0	0.89	11.0	0.01
2.0	0.17	12.0	0.009
3.0	0.089	13.0	0.009
4.0	0.043	14.0	0.007
5.0	0.030	15.0	0.007
6.0	0.026	16.0	0.007
7.0	0.017	20.0	0.006

MECHANICAL/ENVIRONMENTAL DATA

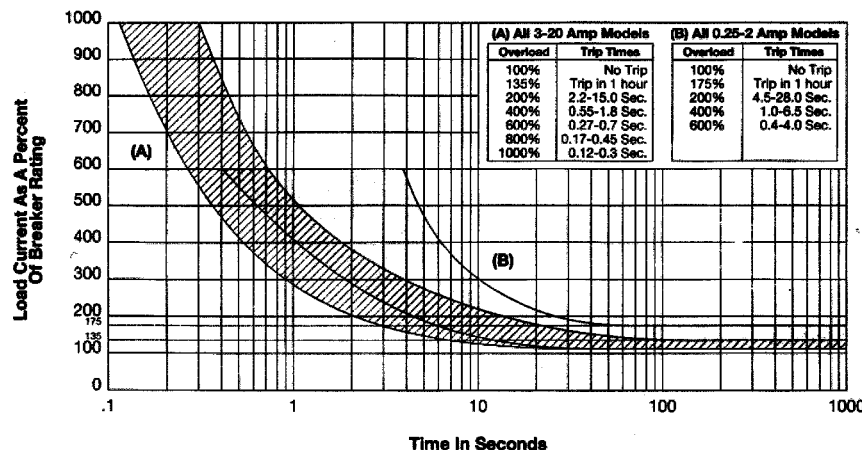
Endurance Cycling (switchable type): Typically 30,000 operations at 100% of rating.

Termination: .250" (6.35 mm) quick connects. Soldering to terminals is not recommended.

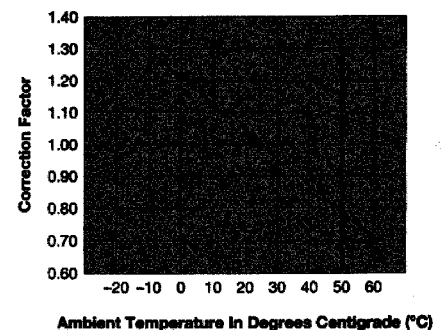
Mounting: Snaps into panel from front. See Recommended Panel Cutouts.

Approximate Weight: 0.35 oz. (10 g).

TIME VS. CURRENT TRIP CURVE @ +25°C



AMBIENT COMPENSATION CHART



TO USE THIS CHART: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

ORDERING INFORMATION

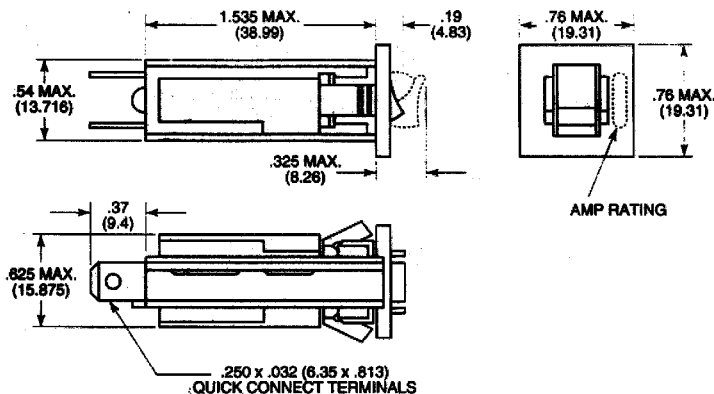
Typical Part No. >		W	28	-X	Q	1	A	-5																											
1. DESIGNATOR: W = Circuit breaker																																			
2. SERIES NUMBER: 28 = Single Pole Fuseholder Type																																			
3. CIRCUIT FUNCTION: X = Series Trip, Push-to-Reset Button S = Series Trip, Switchable Rocker																																			
4. TERMINAL TYPE AND MOUNTING: Q = .250" (6.35 mm) Quick Connect will mount in .032"-.062" (.813 mm - 1.574 mm) thick panel. T = .250" (6.35 mm) Quick Connect will mount in .075"-.105" (1.905 mm - 2.667 mm) thick panel. For panel thicknesses other than above, order "Q" type and 55-025B Internal Tooth Push-On Lockwasher.																																			
5. BEZEL COLOR: 1 = Black with White Rate Marking † 11 = Black with No Rate Marking 2 = Red with Black Rate Marking † 21 = Red with No Rate Marking † Not available with Circuit Function "S". B = Black with White "Reset" Marked On Bezel (No Rate Marking) †																																			
6. BUTTON COLOR: A = Black B = Red																																			
7. AMP RATING: <table border="0"> <tr> <td>0.25†</td><td>1†</td><td>4</td><td>7</td><td>10</td><td>13</td><td>16</td><td></td><td></td></tr> <tr> <td>0.50†</td><td>2†</td><td>5</td><td>8</td><td>11</td><td>14</td><td>20*</td><td></td><td></td></tr> <tr> <td>0.75†</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td></td><td></td><td></td></tr> </table> † Not available with Circuit Function "S".									0.25†	1†	4	7	10	13	16			0.50†	2†	5	8	11	14	20*			0.75†	3	6	9	12	15			
0.25†	1†	4	7	10	13	16																													
0.50†	2†	5	8	11	14	20*																													
0.75†	3	6	9	12	15																														

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

W28-SQ11A-3	W28-SQ11A-12	W28-XQ1A-0.75	W28-XQ1A-4	W28-XQ1A-8	W28-XT1A-10
W28-SQ11A-5	W28-SQ11A-15	W28-XQ1A-1	W28-XQ1A-5	W28-XQ1A-10	W28-XT1A-12
W28-SQ11A-8	W28-XQ1A-0.25	W28-XQ1A-2	W28-XQ1A-6	W28-XQ1A-12	
W28-SQ11A-10	W28-XQ1A-0.50	W28-XQ1A-3	W28-XQ1A-7	W28-XQ1A-15	

OUTLINE DIMENSIONS

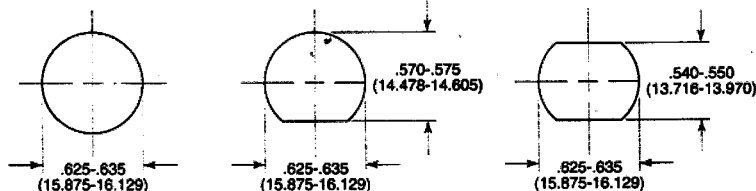
PUSH-TO-RESET TYPE



SWITCHABLE TYPE

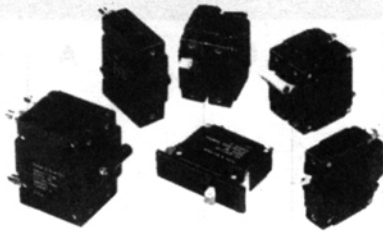


RECOMMENDED PANEL CUTOUTS



- Note:**
1. Soldering to terminals is not recommended.
 2. Recommended Panel Thickness: Style Q: .032" - .062" (.813 mm - 1.574 mm)
Style T: .075" - .105" (1.905 mm - 2.667 mm)
 3. Internal tooth push-on washer available for panel thickness not covered above.
Part No. 55-025B.

6
CIRCUIT BREAKERS & FUSES



W6/W9 series

MAGNETIC HYDRAULIC CIRCUIT BREAKERS



FEATURES

- Designed for the international market. UL Recognized, CSA Certified, and VDE approved.
- Ratings to 50 amps.
- Heavy duty #10-32 stud connections. (W9)
- Optional 10 amp auxiliary switch.
- Single toggle actuation of multipole units. (W6)
- Optional snap-in mounting. (W6)
- Variety of circuit functions.
- Several delay curve options.

AGENCY APPROVALS

UL: Recognized as Supplementary Protector under UL 1077. File E69543.
CSA: Certified as a Supplementary Protector. File LR15734.
VDE: Approved to VDE 0642/EN 60 934 (Circuit Breakers for Equipment) License No. 73782.

ELECTRICAL DATA

Auxiliary Switch: See Auxiliary Switch Ratings Table 2 for details.
Calibration: Breakers will hold 100% of rated current. Breakers may trip between 101% and 124% of rated load (149% for 400 Hz. units and 134% for AC/DC units). Breakers must trip at 125% of rated load and above (150% for 400 Hz. units and 135% for AC/DC units).
Dielectric Strength: 50/60 or 400 Hz., 1500V; DC, 1100V.
Insulation Resistance: 100 Megohms at 500VDC.
Endurance: 10,000 on/off cycles - 6000 at rated load, 4000 at no load. Units tested at six cycles per minute, 1 second on and 9 seconds off at 25°C ambient.

APPROVALS AND RATINGS TABLE 1

W6 Series UL/CSA (All Circuit Functions)				
Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2 - 50	2,000
277	50/60	1	0.2 - 20	5,000
277	50/60	1	21 - 50	2,500
277/480	50/60	3Ø-Wye	0.2 - 20	5,000
250	400	1	0.2 - 20	2,500
250	400	1	21 - 50	1,250
250	400	3Ø-Wye	0.2 - 20	2,500

W9 Series UL/CSA (All Circuit Functions)				
Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2 - 50	2,000
277	50/60	1	0.2 - 50	5,000
277/480	50/60	3Ø-Wye	0.2 - 20	5,000
250	400	1	0.2 - 50	2,500
250	400	3Ø-Wye	0.2 - 50	2,500

AUXILIARY SWITCH RATINGS TABLE 2

UL/CSA			
Switch Number	Voltage 50/60 Hz.	Current (Amps)	Terminals WxTxL
A	125	10	.093 x .020 x .250 (2.36 x .51 x 6.40)
B	125	10	.110 x .020 x .344 (2.79 x .51 x 8.74)
C	125	10	.187 x .020 x .305 (4.74 x .51 x 7.74)

TYPICAL RESISTANCE AND IMPEDANCE

Current (Amps)	DC Resistance (Ohms)	50/60 Hz. Impedance (Ohms)	400 Hz. Impedance (Ohms)
0.2	90	90	180
1.0	1.2	1.2	2.0
2.0	0.28	0.28	0.50
5.0	0.04	0.04	0.05
10.0	0.013	0.013	0.025
20.0	0.004	0.005	0.0065
30.0	0.0027	0.004	0.004
40.0	0.002	0.002	0.003
50.0	0.0015	0.0015	0.0025

Tolerance: 0.1 - 4.99 ± 15%; 5 - 9.99 ± 20%; 10 - 15 ± 25%; 16 - 30 ± 50%.

MECHANICAL/ENVIRONMENTAL DATA

Operating Temperature: -40°C to +85°C.
Humidity: Meets requirements of Mil-STD-202 method 103.
Shock: Tested per Mil-STD-202, method 213, test condition C (100 g @ 6 ms).
Vibration: Tested per Mil-STD-202, method 201, 10-55 Hz., 0.06" (1.52 mm) total excursion in 2 planes.
Fungus And Moisture Resistance: Special moisture resistant finish applied to all ferrous parts. Plastic parts are made of inherently fungus resistant material.
Marking: W6 units have ON and OFF molded on the rocker of rocker actuated units (rocker actuated VDE units have international "1" and "0"). W9 units have ON and OFF molded into the area at the base of the toggle. International "1" and "0" symbols are marked on the toggle for both W6 and W9.
Mounting: Panel mounted units are mounted with two #6-32 screws from the front of the panel. Metric models for use with M3 x 0.5 screws are available. Units with snap-in mounting option snap through the front of the panel. To maintain published performance specifications, units should not be mounted more than 90° from their normal upright position.
Weight: Approximately 2.5 ounces per pole.

W6 Series VDE (Circuit Functions B, X)				
Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2-50	2,000
250	50/60	1	0.2-30	5,000
250	50/60	1	31-50	2,000
415/240	50/60	3Ø	0.2-30	5,000

W9 Series VDE (Circuit Functions B, X)				
Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2-50	2,000
250	50/60	1	0.2-30	5,000
250	50/60	1	31-50	2,000
415/240	50/60	3Ø	0.2-30	5,000

VDE			
Switch Number	Voltage 50/60 Hz.	Current (Amps)	Terminals WxTxL
V1	250	10	.110 x .020 x .280 (2.79 x .51 x 7.11)
V2	250	5	.110 x .020 x .280 (2.79 x .51 x 7.11)
V3	250	0.1	.110 x .020 x .280 (2.79 x .51 x 7.11)

ORDERING INFORMATION

W6 Series

Typical Part No. ➤

W 67- X 2 Q 1 2- 20

1. CIRCUIT BREAKER MOUNTING:

W = #6-32 mounting threads.
M = M3.0 x 0.5 mounting threads.
X = Snap-in mounting. (Not available in actuator per unit or rocker actuated models.)

2. NUMBER OF POLES:

67 = Single pole 68 = Two pole 69 = Three pole 70 = Four pole

3. CIRCUIT FUNCTION: (Only B and X are VDE approved)

A = Series trip with auxiliary switch (.093" QC) R = Relay trip
B = Series trip with auxiliary switch (.110" QC) S = Shunt trip
C = Series trip with auxiliary switch (.187" QC) X = Series trip
M = Dual coil shunt trip
P = Dual coil relay trip (Step 6A required)
Note: Circuit functions A, B, M and P will appear on left pole only of multiple pole units. For switch only units,

4. ACTUATOR:

One actuator per pole:
1 = Black toggle 4 = White rocker 9 = Red toggle
2 = White toggle 5 = Red rocker
3 = Black rocker 6 = Grey rocker
Note: Use one actuator per pole for single pole and all snap-in models.
One actuator per unit:
7 = Black toggle J = Black rocker M = Grey rocker
8 = White toggle K = White rocker
A = Red toggle L = Red rocker

5. TERMINATION:

Q = .250" QC (DIN 46 244) 25A Max. VDE S = #8-32 screw T = #10-32 screw
Note: "T" termination must be used for all ratings of 31 amps or above.

6. MAXIMUM LINE VOLTAGE: (See Table 1 for current ranges)

UL/CSA TYPES 1 = 277VAC, 50/60 Hz. VDE TYPES 1 = 250VAC, 415/240VAC
2 = 277/480 5 = 65VDC
3 = 250VAC, 400 Hz. 7 = AC/DC 250VAC, 415/240VAC, 65VDC
5 = 65VDC (Delay curve 34 must be specified.)
7 = AC/DC 277VAC or 65VDC
(Delay curve 34 must be specified.)

6A. VOLTAGE COIL RATINGS FOR CIRCUIT FUNCTION "P" (Step 3) ONLY:

0 = 240VAC, 50/60 Hz. 2 = 48VAC, 50/60 Hz. 4 = 12VAC, 50/60 Hz. 6 = 48VDC 8 = 12VDC
1 = 120VAC, 50/60 Hz. 3 = 24VAC, 50/60 Hz. 5 = 6VAC, 50/60 Hz. 7 = 24VDC 9 = 6VDC

7. TIME DELAY CURVE:

0 = Instantaneous 10 = AC high inrush (Motor start) Notes: Curves may be specified with increased pulse tolerance for 1/2 cycle by adding "P" after curve; See delay curve section for availability and details.
2 = Standard delay 12 = AC high inrush version of #2 Curves 10, 12, 13 and 53 not available with circuit functions "M" and "P".
3 = Short delay 13 = AC high inrush version of #3
53 = DC high inrush 34 = Combination AC/DC standard delay

8. AMP RATING:

0.20	0.50	1.0	2.0	3.0	4.0	6.0	7.5	9.0	11.0	15.0	25.0	35.0	45.0	Consult factory for other values.
0.25	0.75	1.5	2.5	3.5	5.0	7.0	8.0	10.0	12.0	20.0	30.0	40.0	50.0	

9. VDE APPROVAL: (See Table 2 for auxiliary switch ratings)

Blank = UL/CSA approved breaker V2 = VDE approved breaker with 5 amp VDE auxiliary switch
V = VDE approved breaker without auxiliary switch V3 = VDE approved breaker with 0.1 amp VDE auxiliary switch
V1 = VDE approved breaker with 10 amp VDE auxiliary switch

ORDERING INFORMATION

W9 Series

Typical Part No. ➤

W 91- X 1 1 2- 20

1. CIRCUIT BREAKER MOUNTING:

W = #6-32 mounting threads. M = M3.0 x 0.5 mounting threads.

2. NUMBER OF POLES:

91 = Single pole 92 = Two pole 93 = Three pole 94 = Four pole

3. CIRCUIT FUNCTION: (Only B and X are VDE approved)

A = Series trip with auxiliary switch (.093" QC) R = Relay trip
B = Series trip with auxiliary switch (.110" QC) S = Shunt trip
C = Series trip with auxiliary switch (.187" QC) X = Series trip
M = Dual coil shunt trip
P = Dual coil relay trip (Step 5A required)
Note: Circuit functions A, B, M and P will appear on left pole only of multiple units. For switch only units,

4. ACTUATOR: (One actuator per pole):

1 = Black toggle 2 = White toggle

5. MAXIMUM LINE VOLTAGE: (See Table 1 for current ranges)

UL/CSA TYPES 1 = 277VAC, 50/60 Hz. VDE TYPES 1 = 250VAC, 415/240VAC
2 = 277/480 5 = 65VDC
3 = 250VAC, 400 Hz. 7 = AC/DC 250VAC, 415/240VAC, 65VDC
5 = 65VDC (Delay curve 34 must be specified.)
7 = AC/DC 277VAC or 65VDC
(Delay curve 34 must be specified.)

5A. VOLTAGE COIL RATINGS FOR CIRCUIT FUNCTION "P" (Step 3) ONLY:

0 = 240VAC, 50/60 Hz. 2 = 48VAC, 50/60 Hz. 4 = 12VAC, 50/60 Hz. 6 = 48VDC 8 = 12VDC
1 = 120VAC, 50/60 Hz. 3 = 24VAC, 50/60 Hz. 5 = 6VAC, 50/60 Hz. 7 = 24VDC 9 = 6VDC

6. TIME DELAY CURVE:

0 = Instantaneous 10 = AC high inrush (Motor start) Notes: Curves may be specified with increased pulse tolerance for 1/2 cycle by adding "P" after curve. See delay curve section for availability and details.
2 = Standard delay 12 = AC high inrush version of #2 Curves 10, 12, 13 and 53 not available with circuit functions "M" and "P".
3 = Short delay 13 = AC high inrush version of #3
53 = DC high inrush 34 = Combination AC/DC standard delay

7. AMP RATING:

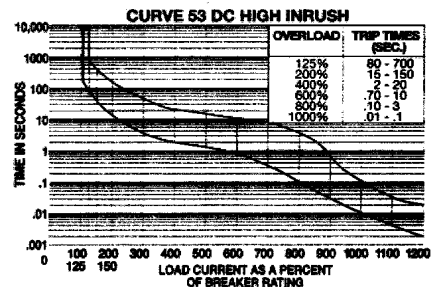
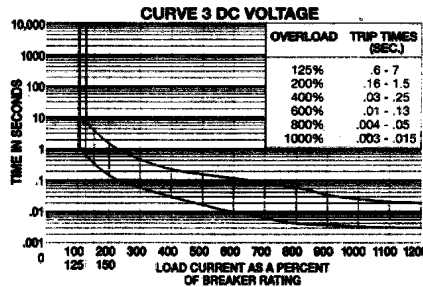
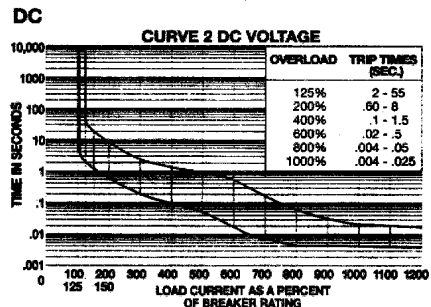
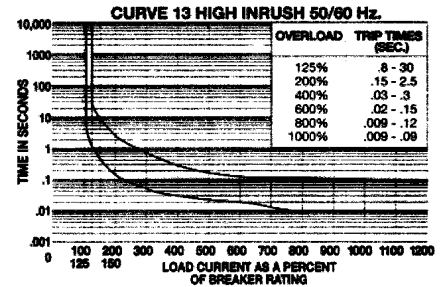
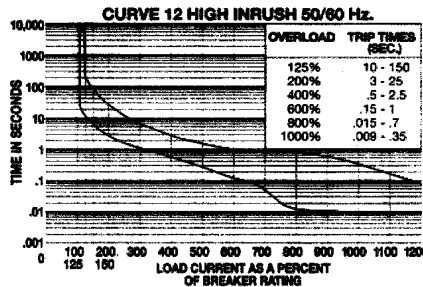
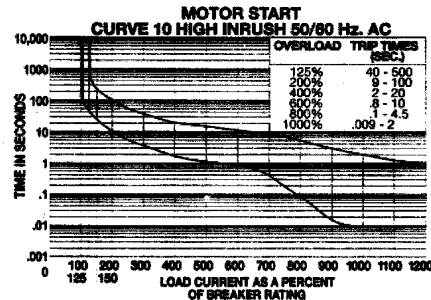
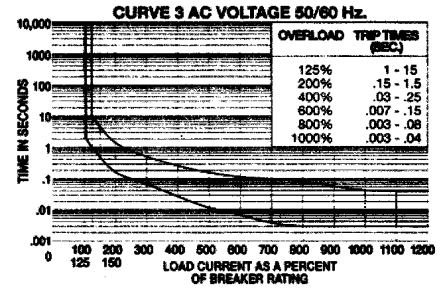
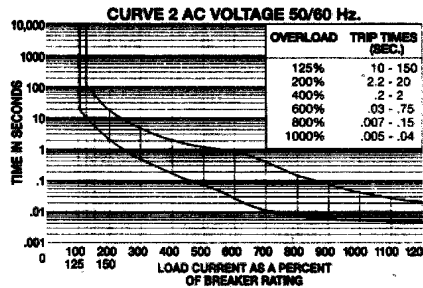
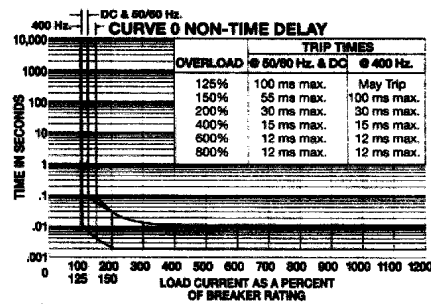
0.20	0.75	2.0	3.5	6.0	8.0	11.0	20.0	35.0	50.0
0.25	1.0	2.5	4.0	7.0	9.0	12.0	25.0	40.0	
0.50	1.5	3.0	5.0	7.5	10.0	15.0	30.0	45.0	

8. VDE APPROVAL: (See Table 2 for auxiliary switch ratings)

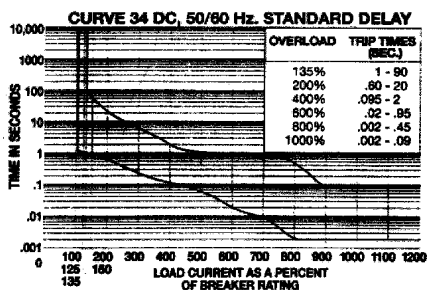
Blank = UL/CSA approved breaker V2 = VDE approved breaker with 5 amp VDE auxiliary switch
V = VDE approved breaker without auxiliary switch V3 = VDE approved breaker with 0.1 amp VDE auxiliary switch
V1 = VDE approved breaker with 10 amp VDE auxiliary switch

TIME VS. CURRENT TRIP CURVES FOR W6 SERIES AND W9 SERIES

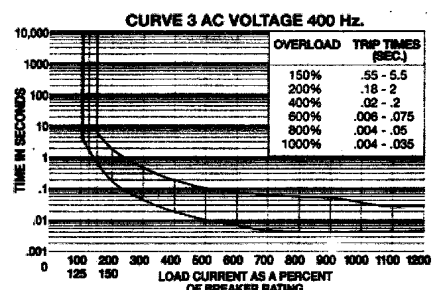
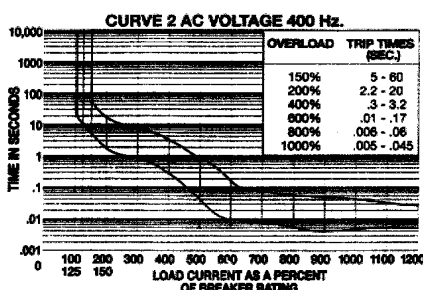
AC 50/60 Hz.



AC/DC



AC 400 Hz.



Note:

For instantaneous curves for all voltages refer to Curve 0 Non-Time Delay under the AC 50/60 Hz. heading.

PULSE TOLERANCE SPECIFICATIONS

Pulse tolerance is defined as a single pulse of a half sine wave (1/2 cycle or 8 milliseconds) that will not trip the breaker. An inertia wheel for increased pulse tolerance is available by specifying "P" after the time delay curve number in the ordering information. The table at right lists pulse tolerance values of standard and inertia delay models.

Voltage	Time Delay Curve	Pulse Tolerance Value	
		Standard	Inertia Delay
AC 50/60 Hz.	2	7.5	18
	3	6	18
	10	18	30
	12	18	30
	13	18	30
AC 400 Hz.	2	6.5	18
	3	5.5	18

To determine pulse tolerance multiply breaker rating by value in table. For example, a 2A breaker with time delay curve 3 has a standard pulse tolerance of 12A (2A x 6). The same breaker with an inertia delay has a pulse tolerance of 36A (2A x 18).

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

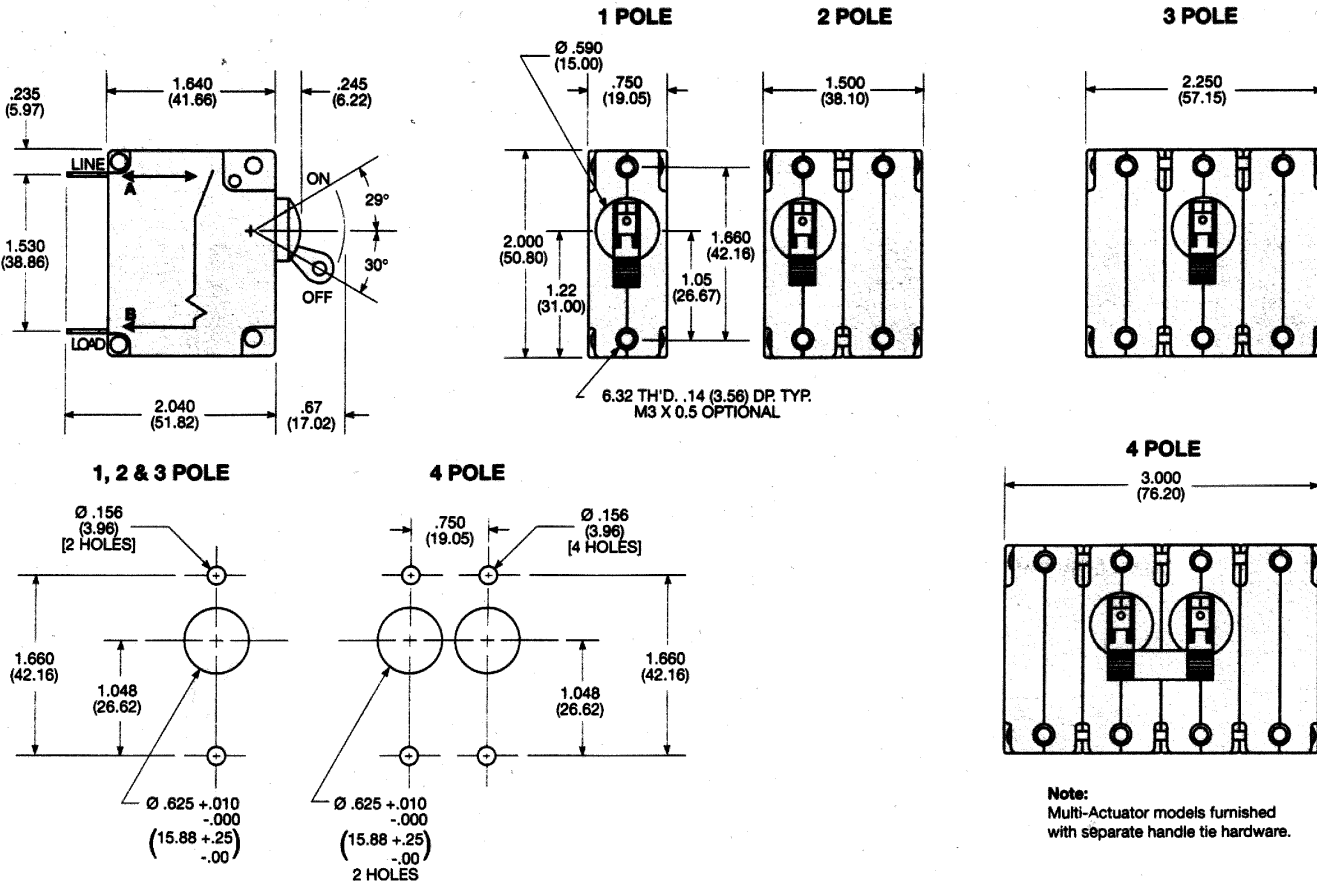
W67-A2Q12-5	W67-X2Q13-1	W67-X2Q52-15	W68-X2Q12-30	W69-X2Q110-30
W67-A2Q12-10	W67-X2Q13-2	W67-X2Q52-20	W68-X2Q13-10	
W67-X2Q10-3	W67-X2Q13-3	W67-X2Q52-30	W68-X2Q13-15	
W67-X2Q10-5	W67-X2Q13-10	W67-X2Q110-15	W68-X2Q110-20	
W67-X2Q12-2	W67-X2Q13-15	W67-X2Q110-20	W68-X2Q110-30	
W67-X2Q12-3	W67-X2Q13-20	W68-X2Q12-3	W69-X2Q12-5	
W67-X2Q12-5	W67-X2Q13-25	W68-X2Q12-5	W69-X2Q12-10	
W67-X2Q12-7	W67-X2Q13-30	W68-X2Q12-7	W69-X2Q12-15	
W67-X2Q12-10	W67-X2Q50-5	W68-X2Q12-10	W69-X2Q12-20	
W67-X2Q12-15	W67-X2Q50-10	W68-X2Q12-15	W69-X2Q12-25	
W67-X2Q12-20	W67-X2Q52-5	W68-X2Q12-20	W69-X2Q12-30	
W67-X2Q12-30	W67-X2Q52-10	W68-X2Q12-25	W69-X2Q110-20	

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

W91-X112-1	W91-X113-5	W91-X1110-20	W92-X112-30	W93-X112-20
W91-X112-2	W91-X113-10	W92-X112-1	W92-X112-40	W93-X112-25
W91-X112-3	W91-X113-15	W92-X112-2	W92-X112-50	W93-X112-30
W91-X112-5	W91-X150-5	W92-X112-3	W92-X113-15	W93-X112-40
W91-X112-7	W91-X152-10	W92-X112-5	W92-X113-20	W93-X112-50
W91-X112-10	W91-X152-15	W92-X112-7	W92-X1110-20	W93-X1110-20
W91-X112-15	W91-X152-20	W92-X112-10	W92-X1110-30	W93-X1110-30
W91-X112-20	W91-X152-30	W92-X112-15	W93-X112-5	
W91-X112-40	W91-X152-40	W92-X112-20	W93-X112-10	
W91-X112-50	W91-X152-50	W92-X112-25	W93-X112-15	

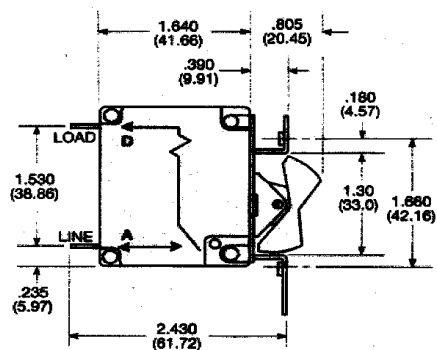
OUTLINE DIMENSIONS - Actuator per unit

W6 Series

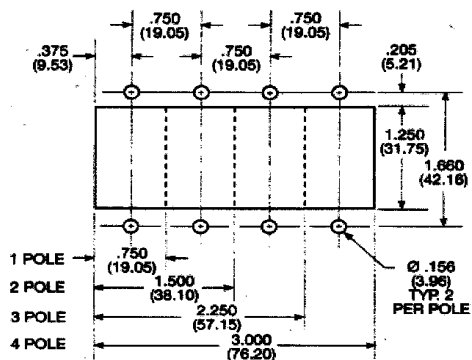


OUTLINE DIMENSIONS - TYPICAL AVAILABLE MODELS

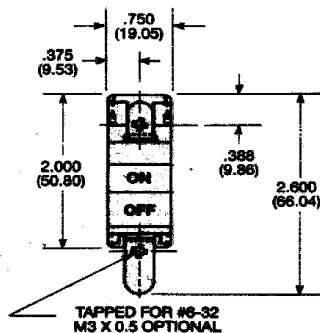
W6 Series



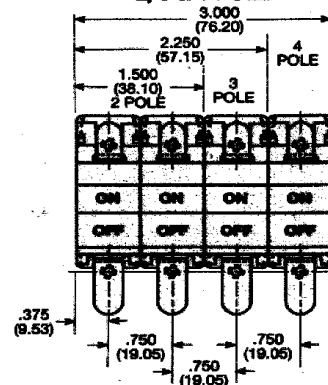
PANEL MOUNTING CUTOUT



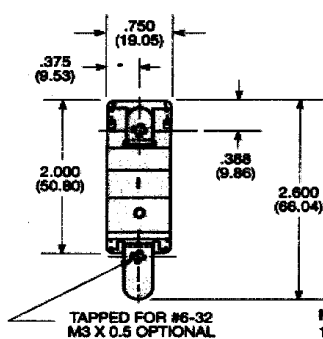
1 POLE



2, 3 & 4 POLE



VDE ROCKER MARKING

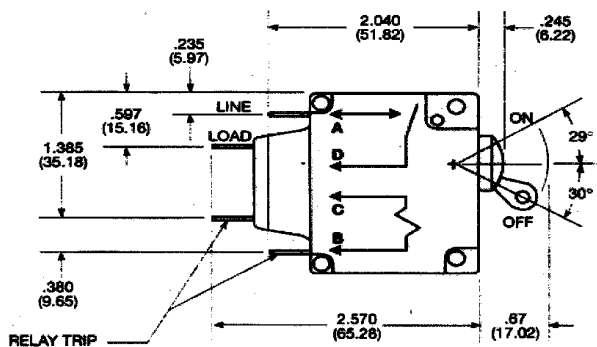


- Notes:
1. Outline drawing tolerance $\pm .015$ (.38) unless noted. Dimensions in brackets () are in millimeters.
 2. Mounting Detail Tol.: $\pm .005$ (.13) unless noted

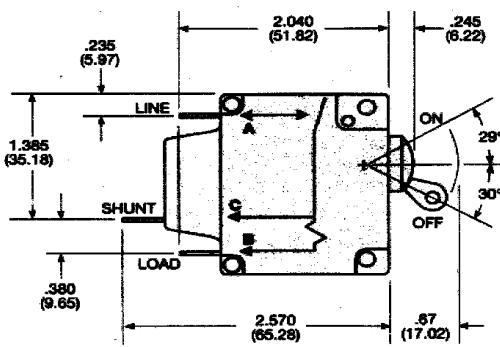
OUTLINE DIMENSIONS - Optional Circuit Configurations

W6 Series

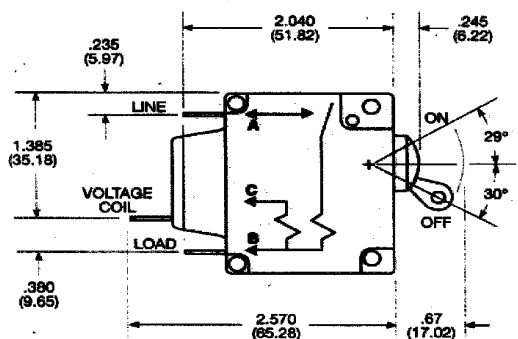
RELAY TRIP MODELS



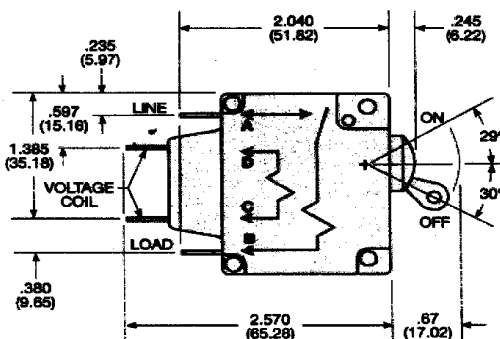
SHUNT TRIP MODELS



DUAL COIL SHUNT TRIP MODELS



DUAL COIL RELAY TRIP MODELS



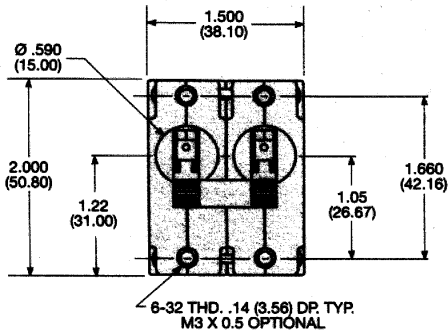
- Notes:
1. The voltage coil on dual coil units is rated for intermittent duty. The voltage coil should be energized no longer than 300 milliseconds.

2. Outline drawing tolerance $\pm .015$ (.38) unless noted. Dimensions in brackets () are in millimeters.

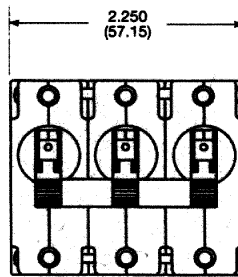
OUTLINE DIMENSIONS - Actuator per pole

W6 Series

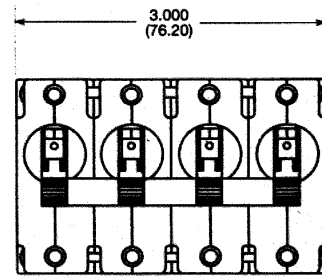
2 POLE



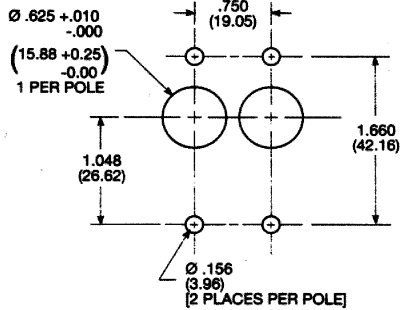
3 POLE



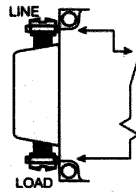
4 POLE



PANEL MOUNTING CUTOUT

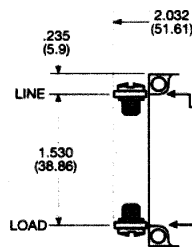


**VDE MODELS
W/SCREW TERMINALS**

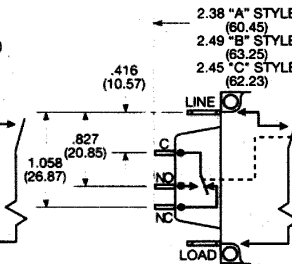


SERIES TRIP

**UL/CSA MODELS
W/SCREW TERMINALS**



**UL/CSA/VDE MODELS
W/AUX. SWITCH**



- Notes:**
1. Terminal protrusion dimensions are referenced from back of mounting panel.
 2. Main terminals are male quick connect type .250 (6.35) wide x .031 (.79) thick x .377 (9.58) long. Optional 8-32 x .250 (6.35) or 10-32 x .250 (6.35) screw type.
 3. Panel mounting cutout detail mtg. detail tol.: $\pm .005$ (.13) unless noted. Add additional cutouts to correspond to number of poles. Outline drawing tolerance $\pm .015$ (.38) unless noted. Dimensions in brackets () are in millimeters.

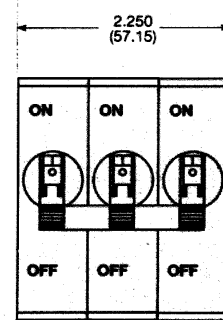
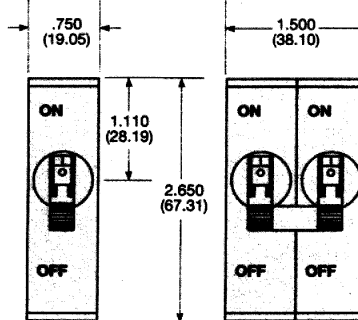
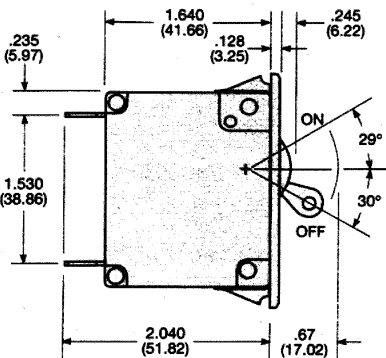
OUTLINE DIMENSIONS - Snap-in Mounted Models

W6 Series

1 POLE

2 POLE

3 POLE



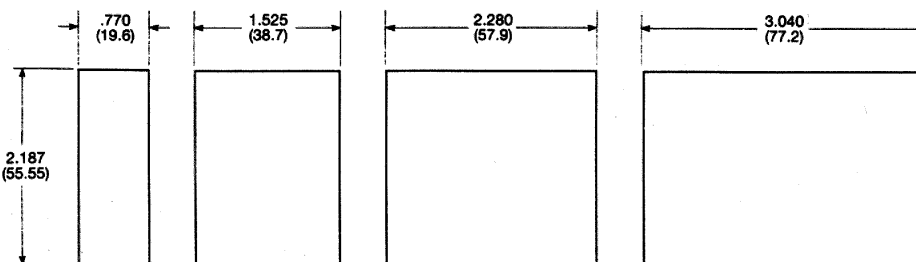
PANEL MOUNTING CUTOUT

1 POLE

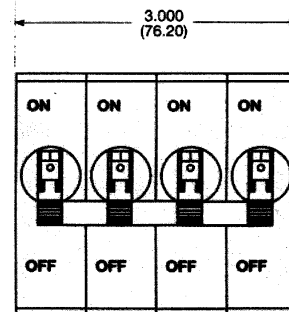
2 POLE

3 POLE

4 POLE



4 POLE

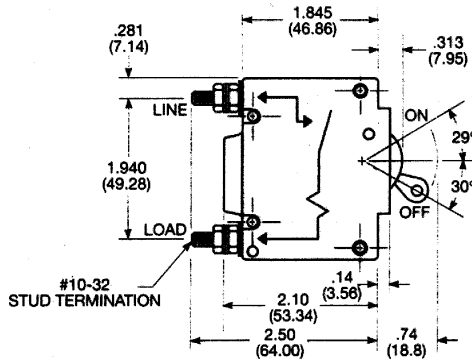


- Notes:**
- Mounting Detail Tol.: $\pm .005$ (.13) unless noted
- Panel Thickness: .047 (1.2) to .110 (2.8)

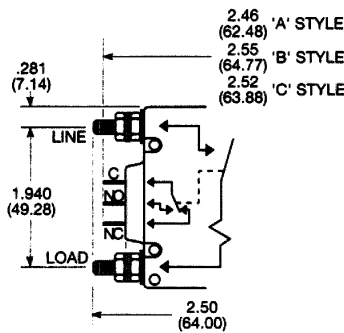
OUTLINE DIMENSIONS

W9 Series

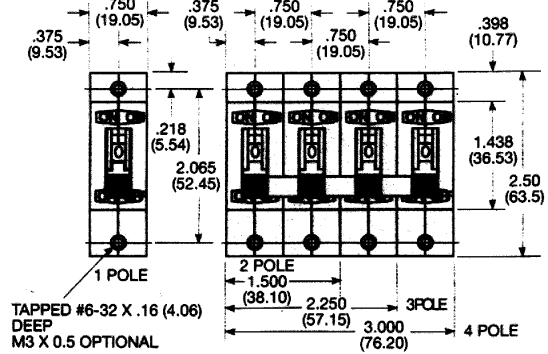
SERIES TRIP MODEL



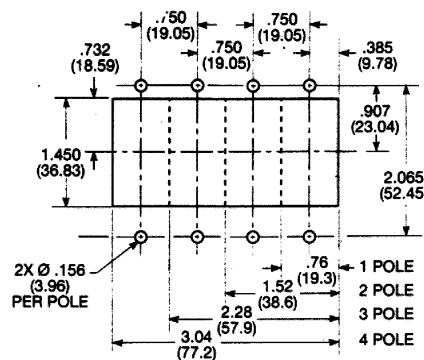
SERIES TRIP MODEL WITH COMMON ENCLOSED AUXILIARY SWITCH



SERIES TRIP MODEL



PANEL MOUNTING CUTOUT DETAIL



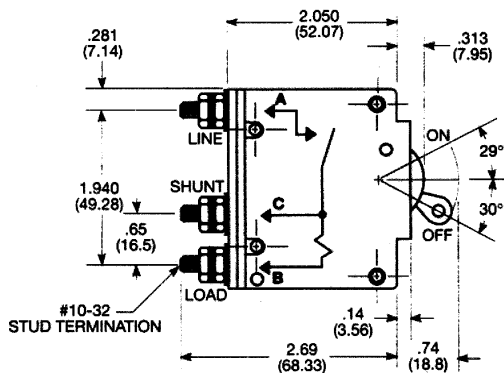
Notes:

1. Terminal protrusion dimensions are referenced from the back of the mounting panel.
2. Mounting detail tolerance $\pm .005$ (13) unless noted.
3. Outline drawing tolerance $\pm .015$ (.38) unless noted. Dimensions in brackets () are in millimeters.

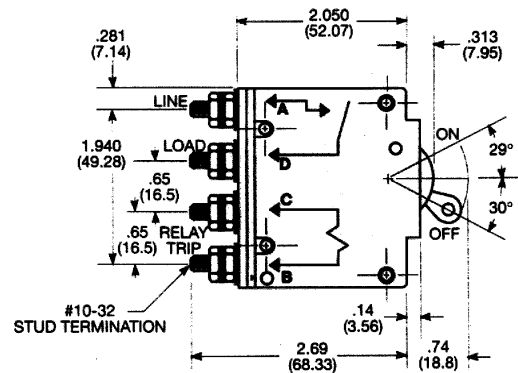
OUTLINE DIMENSIONS - Optional circuit configurations

W9 Series

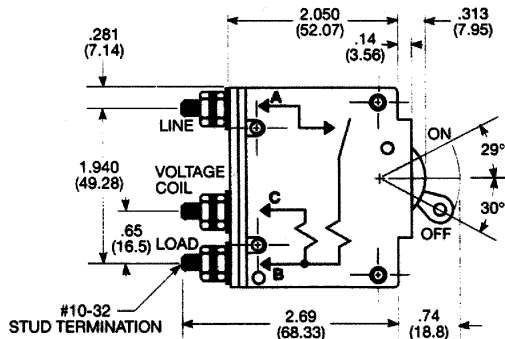
SHUNT TRIP MODELS



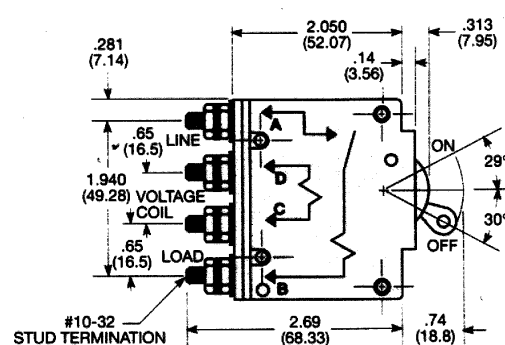
RELAY TRIP MODELS



DUAL COIL SHUNT TRIP MODELS



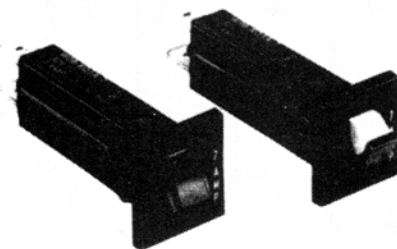
DUAL COIL RELAY TRIP MODELS



Note:

Outline drawing tolerance $\pm .015$ (.38) unless noted. Dimensions in brackets () are in millimeters

**SWITCHABLE VERSION
NOW AVAILABLE**



FEATURES

- Switchable version combines on-off switch and circuit protection in a single unit.
- Approved to many international standards (push to reset type).
- Replaces slow blow glass cartridge fuse.
- Labor-saving snap-in mounting.
- Button extends for visual trip indication on push to reset model.
- Rocker on switchable model moves to "overload" position upon trip.

AGENCY APPROVALS

W28 series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734. W28 breakers have been issued Certificate of Suitability CS2190N as supplementary Equipment Protectors by the Energy Authority of New South Wales, Australia. W28 breakers are also DEMKO (Denmark) and SEV (Switzerland) approved. VDE approved for use in office equipment and provides 8mm isolation. 20 amp models do not have VDE, DEMKO and SEV approvals at present. W28-S is UL 1077 Recognized, with other approvals pending.

ELECTRICAL DATA @ 25°C

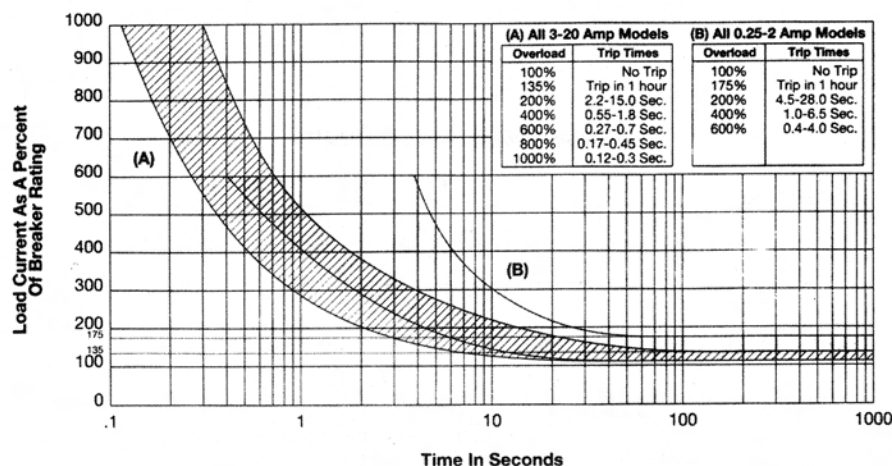
Calibration: Will continuously carry 100% of rating.
3-20 amp models – may trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
0.25-2 amp models – may trip between 101% and 174%, but must trip at 175% of rating within one hour at +25°C.

Dielectric Strength: Over 1,500 volts RMS.

Maximum Operating Voltages: 32VDC; 250VAC, 50/60 Hz.

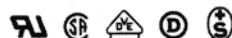
Interrupt Capacity: 1,000 amps at 250VAC, 50/60 Hz. and 32VDC in accordance with UL standard 1077.

TIME VS. CURRENT TRIP CURVE @ +25°C



W28 series

**SWITCHABLE OR
PUSH TO RESET
FUSEHOLDER-TYPE
THERMAL CIRCUIT BREAKER**



Note: Some approvals pending for switchable type.

Resettable Overload Capacity: Six times rated current for 0.25 through 2 amp models. Ten times rated current for 3 through 20 amp models.

Reset Time: 180 seconds max. for 0.25 through 2 amp models. 10 to 60 seconds for 3 through 20 amp models.

TYPICAL RESISTANCE VS. CURRENT RATING @ +25°C

Current Rating in Amps	Typical Resistance in Ohms	Current Rating in Amps	Typical Resistance in Ohms
0.25	14.0	8.0	0.016
0.50	3.55	9.0	0.014
0.75	2.0	10.0	0.011
1.0	0.89	11.0	0.01
2.0	0.17	12.0	0.009
3.0	0.069	13.0	0.009
4.0	0.043	14.0	0.007
5.0	0.030	15.0	0.007
6.0	0.026	16.0	0.007
7.0	0.017	20.0	0.006

MECHANICAL/ENVIRONMENTAL DATA

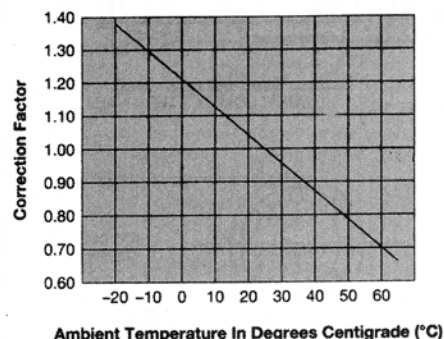
Endurance Cycling (switchable type): Typically 30,000 operations at 100% of rating.

Termination: .250" (6.35 mm) quick connects. Soldering to terminals is not recommended.

Mounting: Snaps into panel from front. See Recommended Panel Cutouts.

Approximate Weight: 0.35 oz. (10 g).

AMBIENT COMPENSATION CHART



TO USE THIS CHART: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

6
CIRCUIT BREAKERS & FUSES

ORDERING INFORMATION

Typical Part No. >		W	28	-X	Q	1	A	-5
1. DESIGNATOR: W = Circuit breaker								
2. SERIES NUMBER: 28 = Single Pole Fuseholder Type								
3. CIRCUIT FUNCTION: X = Series Trip, Push-to-Reset Button S = Series Trip, Switchable Rocker								
4. TERMINAL TYPE AND MOUNTING: Q = .250" (6.35 mm) Quick Connect will mount in .032"-.062" (.813 mm - 1.574 mm) thick panel. T = .250" (6.35 mm) Quick Connect will mount in .075"-.105" (1.905 mm - 2.667 mm) thick panel. For panel thicknesses other than above, order "Q" type and 55-025B Internal Tooth Push-On Lockwasher.								
5. BEZEL COLOR: 1 = Black with White Rate Marking † 11 = Black with No Rate Marking 2 = Red with Black Rate Marking † 21 = Red with No Rate Marking B = Black with White "Reset" Marked On Bezel (No Rate Marking) †								
6. BUTTON COLOR: A = Black B = Red								
7. AMP RATING: 0.25† 1† 4 7 10 13 16 0.50† 2† 5 8 11 14 20† 0.75† 3 6 9 12 15								

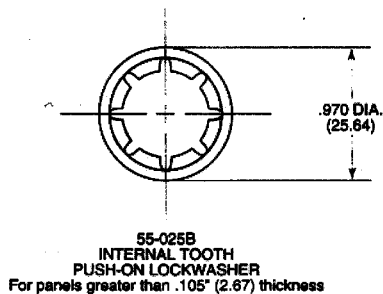
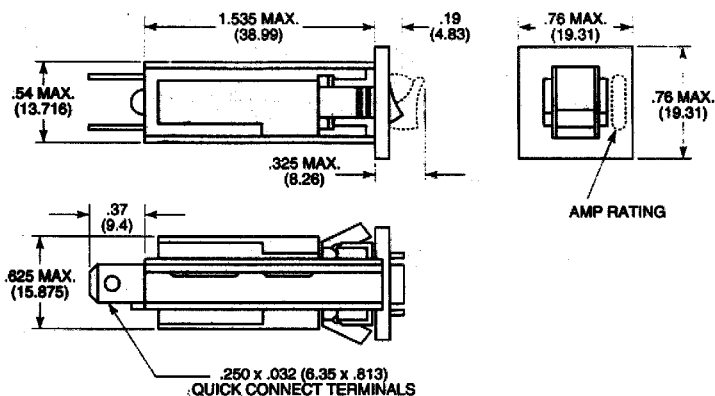
† Not available with Circuit Function "S".

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

W28-SQ11A-3	W28-SQ11A-12	W28-XQ1A-0.75	W28-XQ1A-4	W28-XQ1A-8	W28-XT1A-10
W28-SQ11A-5	W28-SQ11A-15	W28-XQ1A-1	W28-XQ1A-5	W28-XQ1A-10	W28-XT1A-12
W28-SQ11A-8	W28-XQ1A-0.25	W28-XQ1A-2	W28-XQ1A-6	W28-XQ1A-12	
W28-SQ11A-10	W28-XQ1A-0.50	W28-XQ1A-3	W28-XQ1A-7	W28-XQ1A-15	

OUTLINE DIMENSIONS

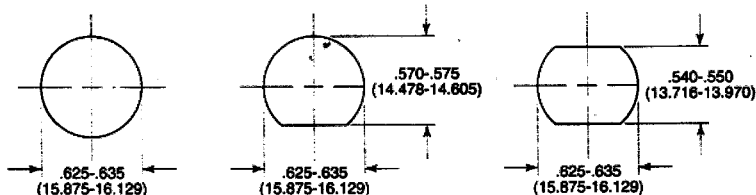
PUSH-TO-RESET TYPE



SWITCHABLE TYPE



RECOMMENDED PANEL CUTOUTS



- Note:**
- Soldering to terminals is not recommended.
 - Recommended Panel Thickness: Style Q: .032" - .062" (.813 mm - 1.574 mm)
Style T: .075" - .105" (1.905 mm - 2.667 mm)
 - Internal tooth push-on washer available for panel thickness not covered above.
Part No. 55-025B.