W6/W9 SERIES

MAGNETIC HYDRAULIC POTTER & BRUMFIELD CIRCUIT BREAKERS

INTRODUCTION

TE Connectivity (TE)'s W6/W9 series magnetic hydraulic P&B circuit breakers were developed for the international marketplace with ratings up to 50 Amps. Available in many different configurations and with multiple trip curve options, this circuit breaker can be used in a wide variety of applications.

FEATURES

- Designed for the international market. UL Recognized (UL1077), CSA accepted and VDE approved
- Ratings to 50 amps
- Heavy duty #10-32 stud connections (W9)
- Quick-connect or screw terminals (W6)
- Several delay curve options
- Trip-free operation

APPROVALS

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

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to confirm the product meets the requirements for a given application.

ELECTRICAL DATA

Characteristic	Specification
Calibration	Breakers will hold 100% of rated current. Breakers may trip between 101% and 124% of rated load (134% for AC/DC units). Breakers must trip at 125% of rated load and above (135% for AC/DC units).
Dielectric Strength	50/60 Hz., 1500V: DC, 1100V
Insulation Resistance	100 Megaohms 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.

TYPICAL RESISTANCE AND IMPEDANCE

Current (Amps.)	DC Resistance (Ohms)	50/60 Impedance (Ohms)
0.2	90	90
1.0	1.2	1.2
2.0	0.28	0.28
5.0	0.04	0.04
10.0	0.013	0.013
20.0	0.004	0.005
30.0	0.0027	0.004
40.0	0.002	0.002
50.0	0.0015	0.0015

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

MECHANICAL/ENVIRONMENTAL DATA

Characteristic	Specification
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 (100g @ 6 ms)
Vibration	Tested per Mil-STD-202, method 201, 10-55 Hz., 0.06" 1.52mm) total excursion in 2 planes.
Fungus and Moisture resistance	Special moisture resistant finish applied to all ferous parts. Plastic parts are made of inherently fungus resistant material.
Marking	International '1' and '0' symbols are marked on the toggle for both W6 and W9. W9 units have "ON" and "OFF" molded into the area at the base of the toggle.
Mounting	Units are mounted two #6-32 screws from the front of the panel. Metric models for use with M3 x 0.5 screws are available. Recommended mounting torque: Front screws, both options: 6 - 8 in-lb. Rear termination screws #8-32: 10 - 12 in-lb.Rear termination screws #10-32: 14 - 16 in-lb. 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.

APPROVALS AND RATINGS TABLE 1

W6 Series - UL1077/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

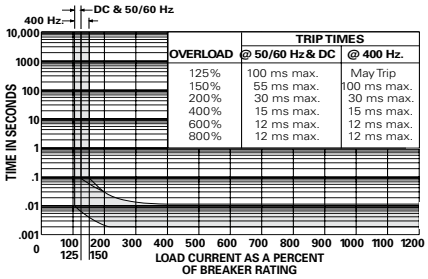
W9 Series - UL1077/CSA (All Circuit Functions)				
Maximum Voltage	**Frequency (Hz)**	**Phase**	**Current Rating (Amps)**	**Interrupting Capacity (Amps)**
65	DC	-	0.2 - 50	2,000
277	50/60	1	0.2 - 50	5,000
277/480	50/60	3Ø-Wye	0.2 - 20	5,000

W6 or W9 Series - VDE (Circuit Function 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

TIME VS CURRENT TRIP CURVES FOR W6 SERIES AND W9 SERIES

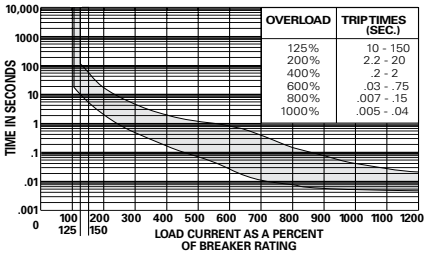
AC 50/60 Hz.

CURVE 0 INSTANTANEOUS



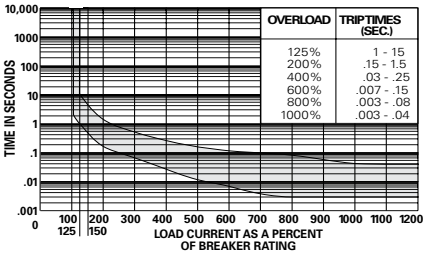
OVERLOAD	TRIP TIMES @ 50/60 Hz & DC	TRIP TIMES @ 400 Hz.
125%	100 ms max.	May Trip
150%	55 ms max.	100 ms max.
200%	30 ms max.	30 ms max.
400%	15 ms max.	15 ms max.
600%	12 ms max.	12 ms max.
800%	12 ms max.	12 ms max.

CURVE 2 STANDARD DELAY 50/60 Hz.



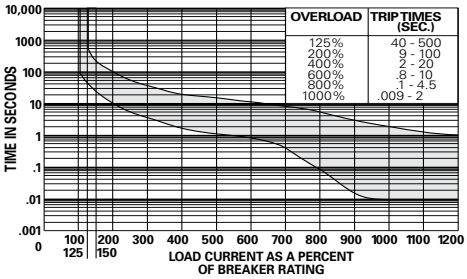
OVERLOAD	TRIP TIMES (SEC.)
125%	10 - 150
200%	2.2 - 20
400%	.2 - 2
600%	.03 - .75
800%	.007 - .15
1000%	.005 - .04

CURVE 3 SHORT DELAY 50/60 Hz.



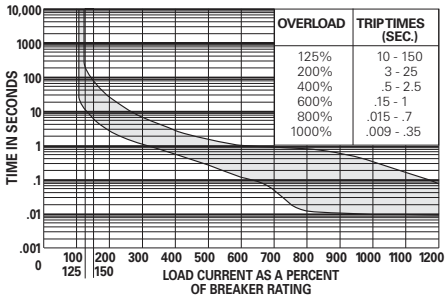
OVERLOAD	TRIP TIMES (SEC.)
125%	1 - 15
200%	.15 - 1.5
400%	.03 - .25
600%	.007 - .15
800%	.003 - .08
1000%	.003 - .04

MOTOR START / LONG DELAY
CURVE 10 HIGH INRUSH 50/60 Hz AC



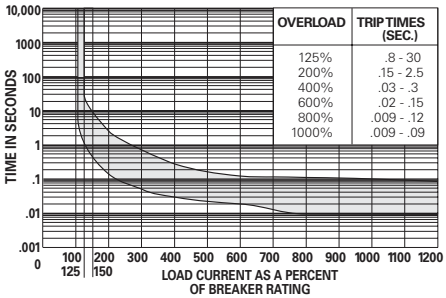
OVERLOAD	TRIP TIMES (SEC.)
125%	40 - 500
200%	9 - 100
400%	2 - 20
600%	.8 - 10
800%	.1 - 4.5
1000%	.009 - 2

CURVE 12 HIGH INRUSH 50/60 Hz.



OVERLOAD	TRIP TIMES (SEC.)
125%	10 - 150
200%	3 - 25
400%	.5 - 2.5
600%	.15 - 1
800%	.015 - .7
1000%	.009 - .35

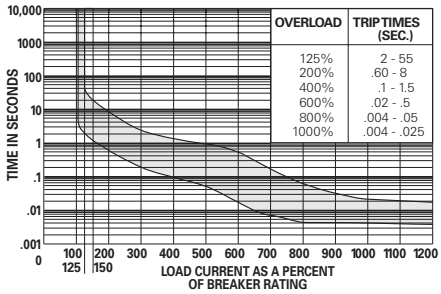
CURVE 13 HIGH INRUSH 50/60 Hz.



OVERLOAD	TRIP TIMES (SEC.)
125%	.8 - 30
200%	.15 - 2.5
400%	.03 - .3
600%	.02 - .15
800%	.009 - .12
1000%	.009 - .09

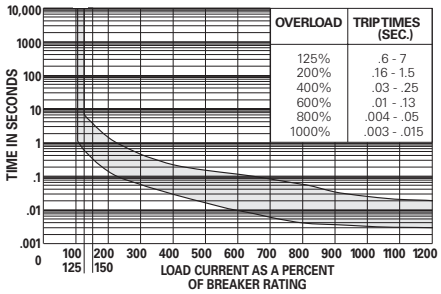
DC

CURVE 2 STANDARD DELAY DC



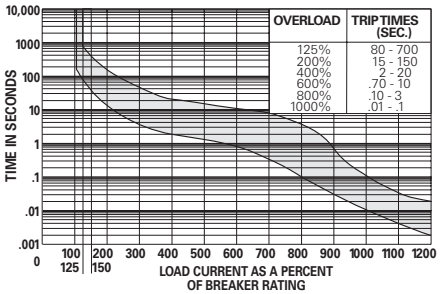
OVERLOAD	TRIP TIMES (SEC.)
125%	2 - 55
200%	.60 - 8
400%	.1 - 1.5
600%	.02 - .5
800%	.004 - .05
1000%	.004 - .025

CURVE 3 SHORT DELAY DC



OVERLOAD	TRIP TIMES (SEC.)
125%	.6 - 7
200%	.16 - 1.5
400%	.03 - .25
600%	.01 - .13
800%	.004 - .05
1000%	.003 - .015

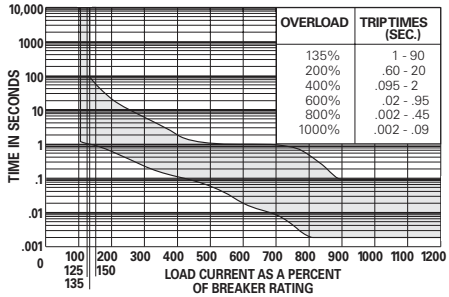
CURVE 53 DC HIGH INRUSH



OVERLOAD	TRIP TIMES (SEC.)
125%	80 - 700
200%	15 - 150
400%	2 - 20
600%	.70 - 10
800%	.10 - 3
1000%	.01 - .1

AC/DC

CURVE 34 DC, 50/60 Hz. STANDARD DELAY



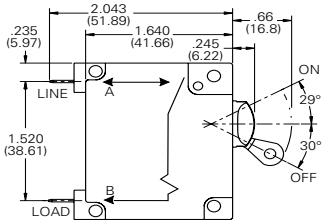
OVERLOAD	TRIP TIMES (SEC.)
135%	1 - 90
200%	.60 - 20
400%	.095 - 2
600%	.02 - .95
800%	.002 - .45
1000%	.002 - .09

Note:
For instantaneous curves for all voltages refer to Curve 0 instananeous under the AC 50/60 Hz. heading

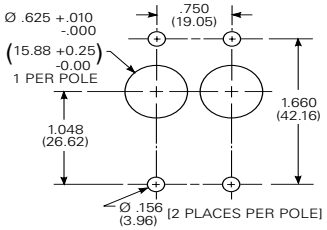
OUTLINE DIMENSIONS - TOGGLE ACTUATOR MODELS

Dimensions in Inch (mm)

W6 SERIES

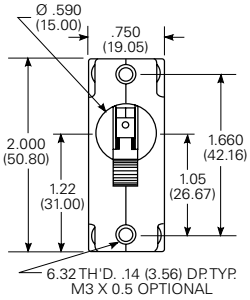


PANEL MOUNTING CUTOUT

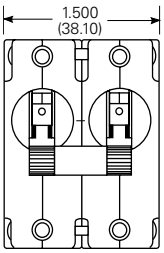


W6 SERIES - ONE ACTUATOR PER POLE

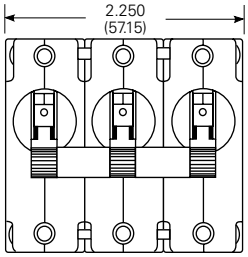
1 Pole



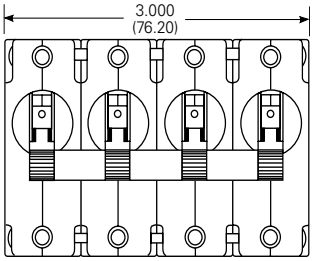
2 Pole



3 Pole



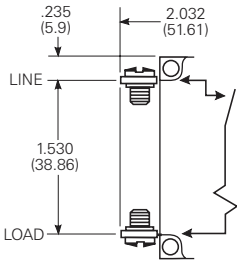
4 Pole



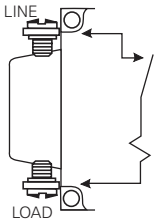
Note: Multi-pole models furnished with seperate handle tie hardware

TERMINATION OPTIONS

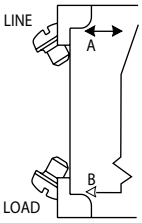
UL/CSA Models W/Screw Terminals



VDE Models W/Screw Terminals



30° bent inwards

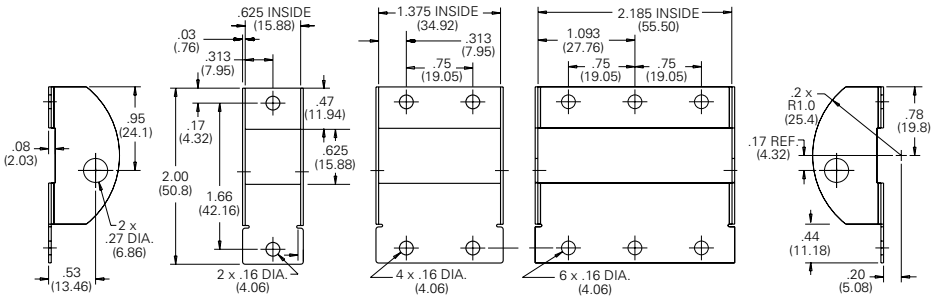


Notes:

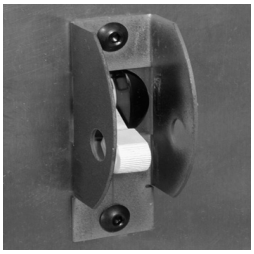
1. Terminal protrusion dimensions are referenced from back of mounting panel
2. Main terminals are male quick connect type .250 (6.35) wide x .031 (.79) thick x.377 (9.58) long. Optional 8-32 x .250 (6.35) or 10-32 x .250 (6.35) screw type
3. Panel mounting cutout detail mtg. detail tol.: ± .005 (.13) unless noted. Add additional cutouts to correspond to number of poles. Outline drawing tolerance ±.015 (.35) unless noted

OUTLINE DIMENSIONS - OPTIONAL TOGGLE GUARDS

W6 SERIES



84-004 (for 1 Pole Breaker) **84-005** (for 2 Pole Breaker) **84-006** (for 3 Pole Breaker)



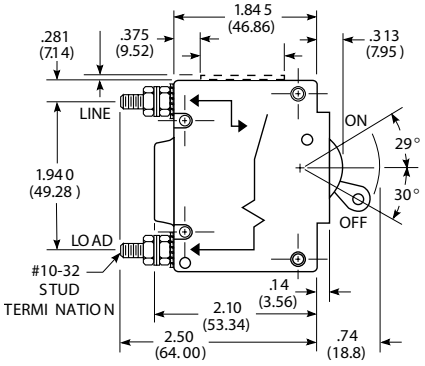
84-004 toggle guard shown with W67 series circuit breaker mounted in a panel.

Optional toggle guards may be ordered seperately for use on W6 toggle actuator models.

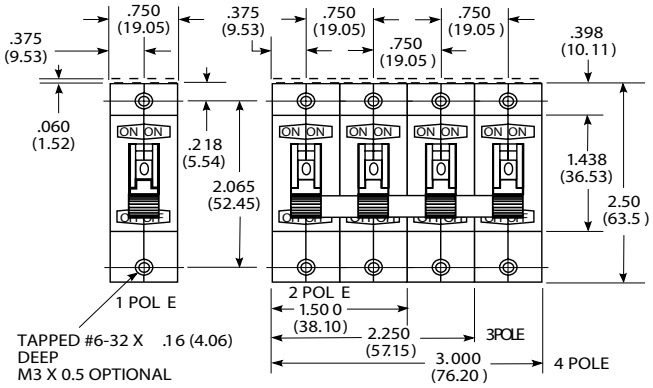
These guards help to prevent accidental operation and allow the breaker to be locked in the “off” position.

W9 SERIES

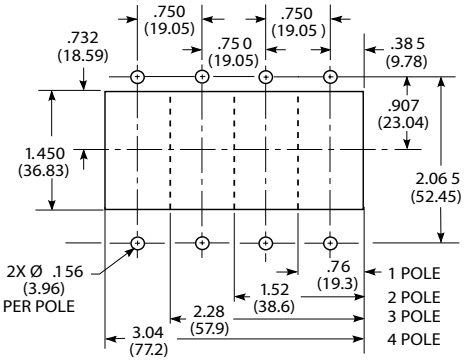
Series Trip Model



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 ± .005 (13) unless noted
3. Outline drawing tolerance ± .015 (.38) unless noted Dimensions in brackets ( ) are in milimeters.

ORDERING INFORMATION - W6 SERIES

Part Number

W 67- X 2 Q 1 2- 20

Circuit Breaker Mounting

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

Number of Poles

67	Single Pole
68	Two Pole
69	Three Pole
70	Four Pole

Circuit Function (Only X is VDE approved)

X	Series trip

Actuator - One actuator per pole

1	Black toggle
2	White toggle

Termination

Q	.250" QC (DIN 46 244) [30A Max. UL/CSA; 25A Max. VDE]
S	#8-32 screw [30A Max.]
T	#10-32 screw [50A Max.]
U	#8-32 screw, nickel plated, bent inward 30° [30A Max.]
V	#10-32 screw, nickel plated, bent inward 30° [30A Max.]

Notes:

- #10-32 termination must be used for all ratings of greater than 30 amps.
- #10-32 termination must be specified for circuit function D, but relay trip pole will be equipped with .250" QC.

Maximum Line Voltage (see Table1 for current ranges)

UL/CSA Types

1	277VAC, 50/60 Hz.
5	65VDC
7	AC/DC 277VAC, 50/60 Hz. or 65VDC (Time delay curve 34 must be specified)

VDE Types

1	250VAC, 415/240VAC
5	65VDC
7	AC/DC 250VAC, 415/240VAC, 65VDC (Time delay curve 34 must be specified)

Agency Approval

Blank	UL1077/CSA breaker
V	VDE approved breaker

Amp Rating

0.2	2.5	7.5	20.0
0.25	3.0	8.0	25.0
0.50	3.5	9.0	30.0
0.75	4.0	10.0	35.0
1.0	5.0	11.0	40.0
1.5	6.0	12.0	45.0
2.0	7.0	15.0	50.0
Consult factory for other values			

Time Delay Curve

0	Instantaneous
2	Standard delay
3	Short delay
10	AC high inrush motor start / long delay
12	AC high inrush version of #2
13	AC high inrush version of #3
34	Combination AC/DC standard delay
53	DC high inrush

ORDERING INFORMATION - W9 SERIES

Part Number

W 91- X 1 1 2- 20

Circuit Breaker Mounting

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

Number of Poles

91	Single Pole
92	Two Pole
93	Three Pole
94	Four Pole

Circuit Function (Only X is VDE approved)

X	Series trip

Actuator - One actuator per pole

1	Black toggle
2	White toggle

Maximum Line Voltage (see Table1 for current ranges)

UL/CSA Types

1	277VAC, 50/60 Hz.
2	277/480VAC, 50/60 Hz. [20A Max.]
5	65VDC
7	AC/DC 277VAC, 50/60 Hz. or 65VDC (Time delay curve 34 must be specified)

VDE Types

1	250VAC, 415/240VAC
5	65VDC
7	AC/DC 250VAC, 415/240VAC, 65VDC (Time delay curve 34 must be specified)

Agency Approval

Blank	UL1077/CSA approved breaker
V	VDE approved breaker

Amp Rating

0.20	2.5	7.5	20.0
0.25	3.0	8.0	25.0
0.50	3.5	9.0	30.0
0.75	4.0	10.0	35.0
1.00	5.0	11.0	40.0
1.50	6.0	12.0	45.0
2.0	7.0	15.0	50.0
Consult factory for other values			

Time Delay Curve

0	Instantaneous
2	Standard delay
3	Short delay
10	AC high inrush motor start / long delay
12	AC high inrush version of #2
13	AC high inrush version of #3
34	Combination AC/DC standard delay
53	DC high inrush

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09/23 ED