

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 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. |

W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

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 ferrous parts. Plastic parts are made of inherently fungus resistant material. |
| Marking | International 'I' and 'O' 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. |

W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

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 |

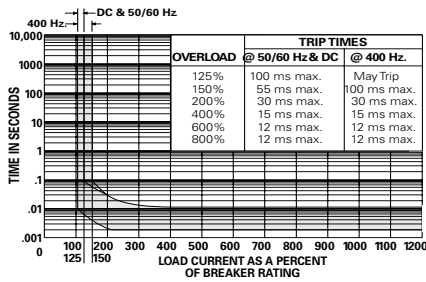
W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

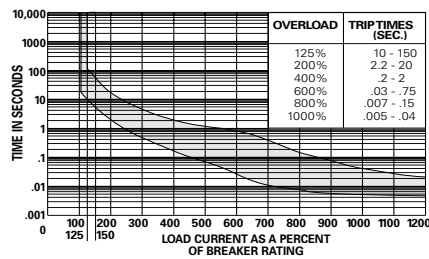
TIME VS CURRENT TRIP CURVES FOR W6 SERIES AND W9 SERIES

AC 50/60 Hz.

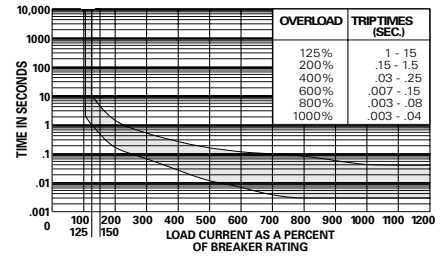
CURVE 0 INSTANTANEOUS



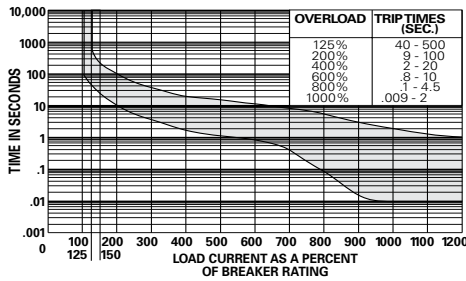
CURVE 2 STANDARD DELAY 50/60 Hz.



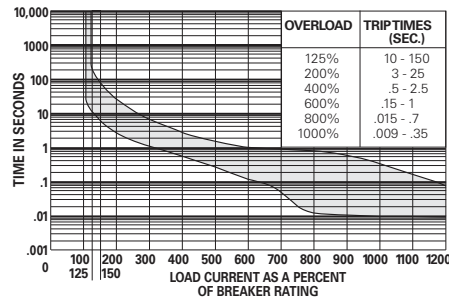
CURVE 3 SHORT DELAY 50/60 Hz.



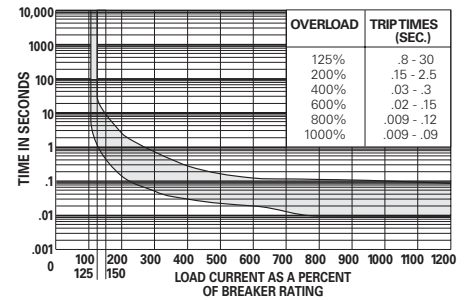
**MOTOR START / LONG DELAY
CURVE 10 HIGH INRUSH 50/60 Hz AC**



CURVE 12 HIGH INRUSH 50/60 Hz.

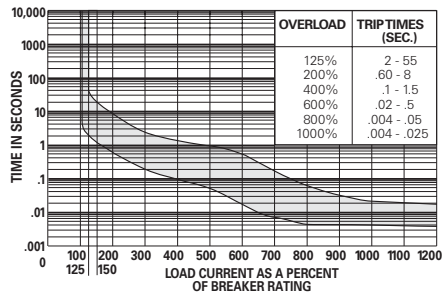


CURVE 13 HIGH INRUSH 50/60 Hz.

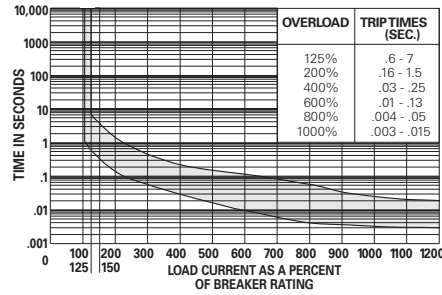


DC

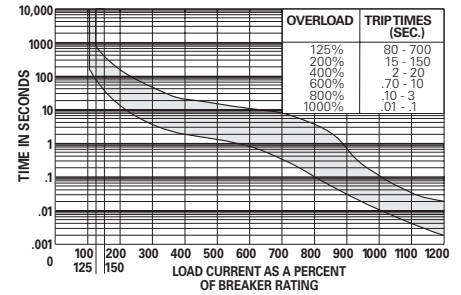
CURVE 2 STANDARD DELAY DC



CURVE 3 SHORT DELAY DC

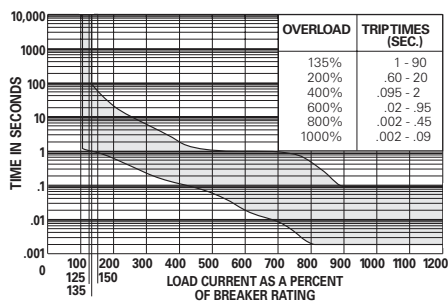


CURVE 53 DC HIGH INRUSH



AC/DC

CURVE 34 DC, 50/60 Hz. STANDARD DELAY



Note:

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

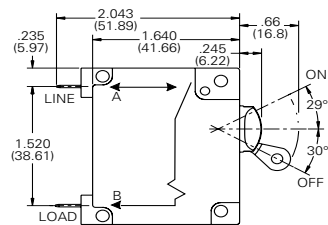
W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

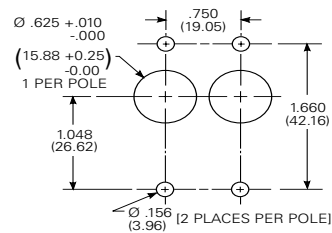
OUTLINE DIMENSIONS - TOGGLE ACTUATOR MODELS

Dimensions in Inch (mm)

W6 SERIES

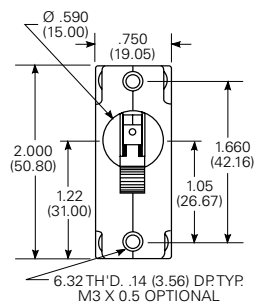


PANEL MOUNTING CUTOUT

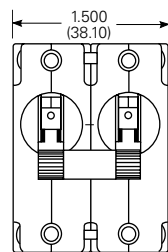


W6 SERIES - ONE ACTUATOR PER POLE

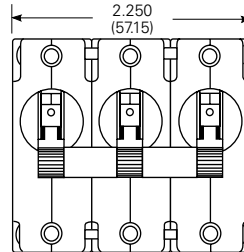
1 Pole



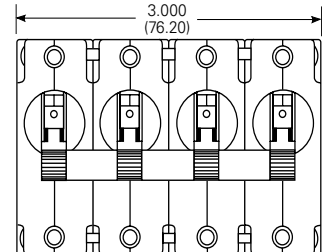
2 Pole



3 Pole



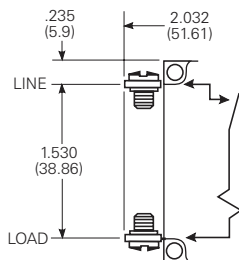
4 Pole



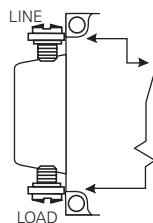
Note: Multi-pole models furnished with separate handle tie hardware

TERMINATION OPTIONS

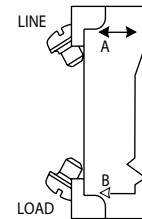
UL/CSA Models W/Screw Terminals



VDE Models W/Screw Terminals



30° bent inwards



Notes:

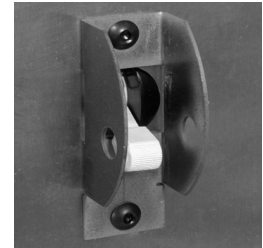
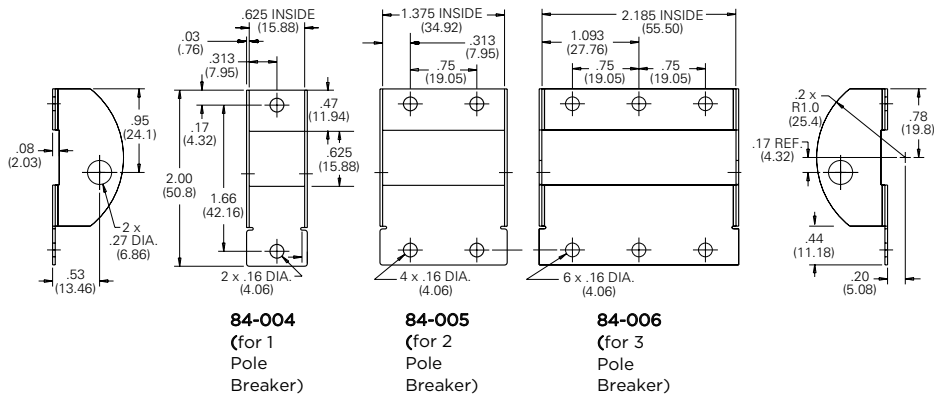
1. Terminal protrusion dimensions are referenced from back of mounting panel
2. Main terminals are male quick connect type .250 (6.35) wide x .031 (.79) thick x .377 (9.58) long. Optional 8-32 x .250 (6.35) or 10-32 x .250 (6.35) screw type
3. Panel mounting cutout detail mtg. detail tol.: $\pm .005$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

W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

OUTLINE DIMENSIONS - OPTIONAL TOGGLE GUARDS

W6 SERIES



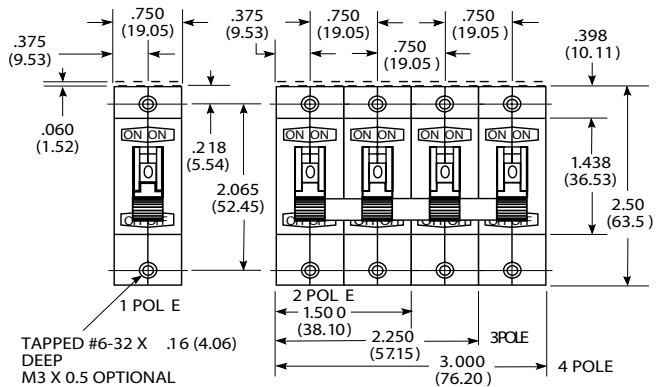
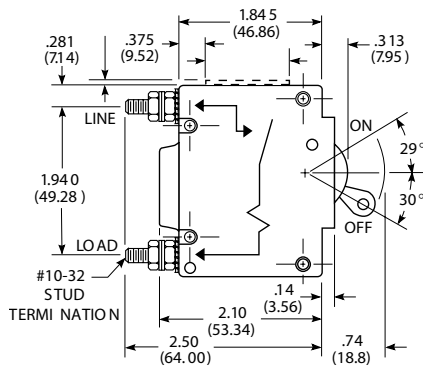
84-004 toggle guard shown with W67 series circuit breaker mounted in a panel.

Optional toggle guards may be ordered separately 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.

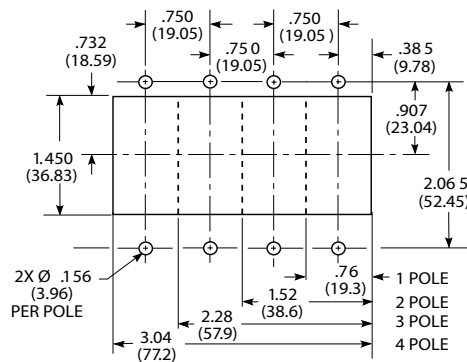
W9 SERIES

Series Trip Model

Series Trip Model



Panel Mounting Cutout Detail



Notes:

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

W6/W9 Series Magnetic Hydraulic P&B Circuit Breakers

General Purpose Relays

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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