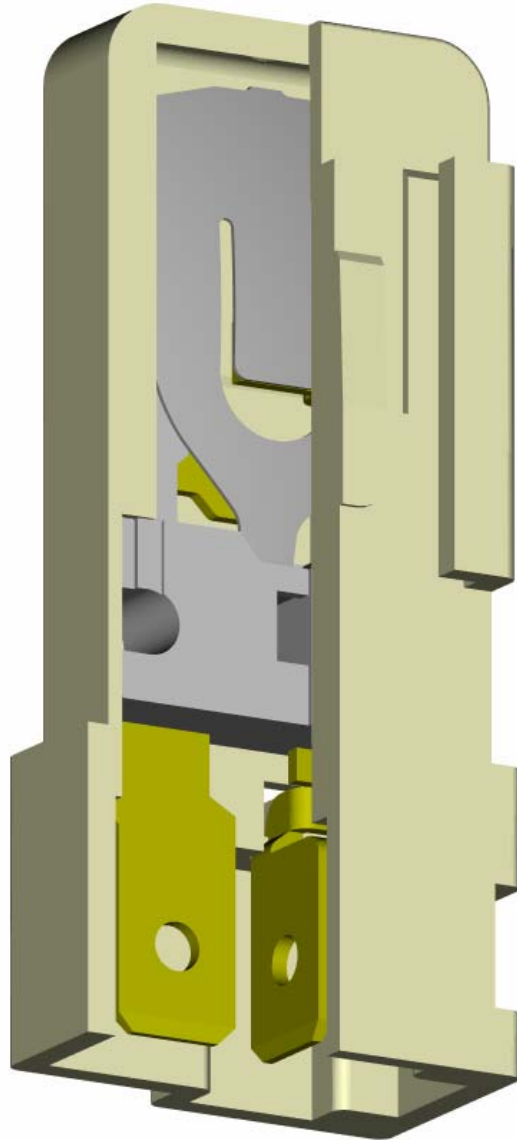


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# the B4 series

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vehicle wiring harness protector

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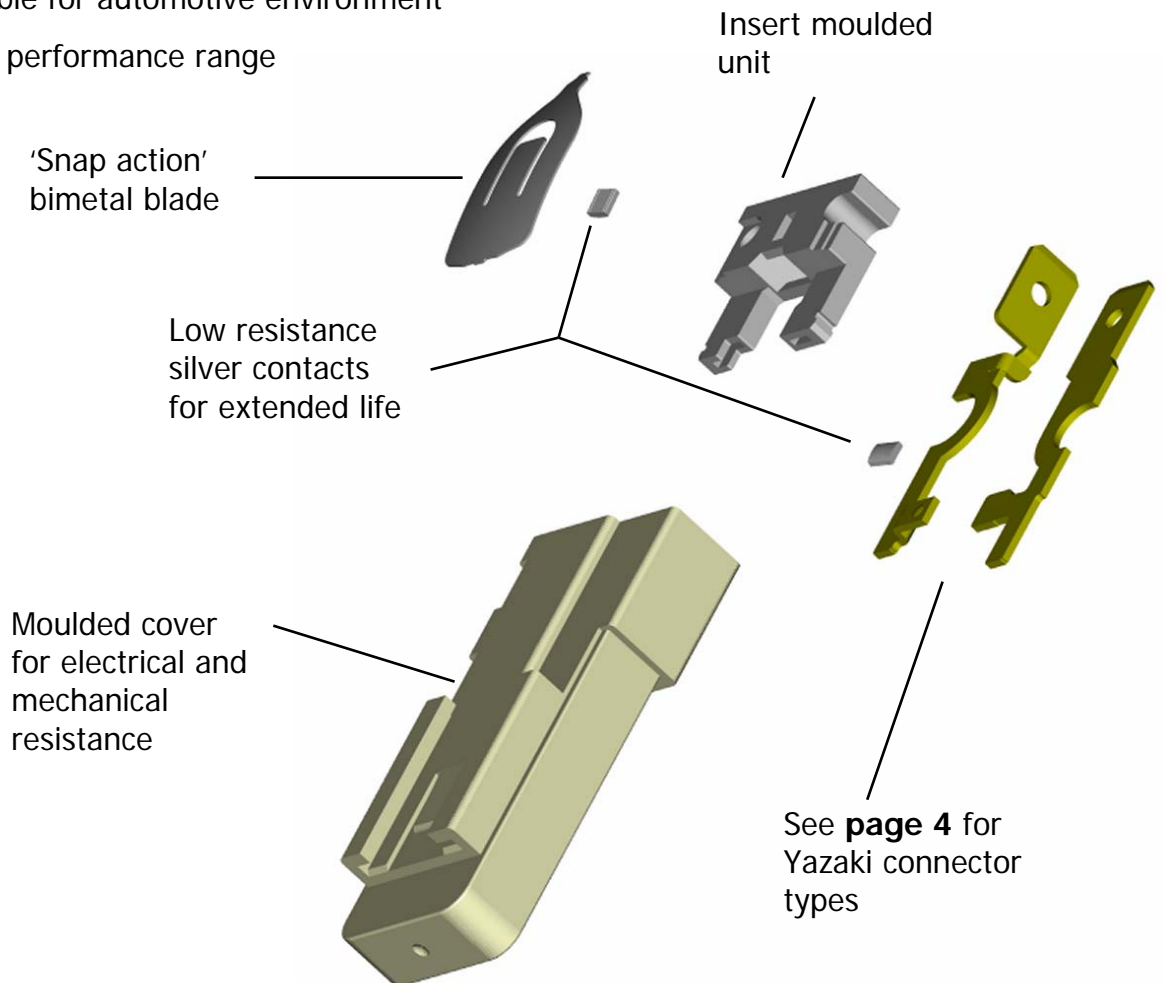


# B4 series design



The B4 series offers a cost effective solution to Vehicle and Wiring Harness manufacturers to protect against the possibility of serious overload which can damage the harness.

- High current switching
- Insulated cover
- Robust construction
- Positive snap action
- Suitable for automotive environment
- Wide performance range



The improvement in vehicle equipment specifications include such features as electric window lifts, sun roofs and seat adjust systems. This has resulted in the wiring harness having to carry much higher currents than its rating, often for lengthy periods. This can lead to deterioration in the harness insulation.

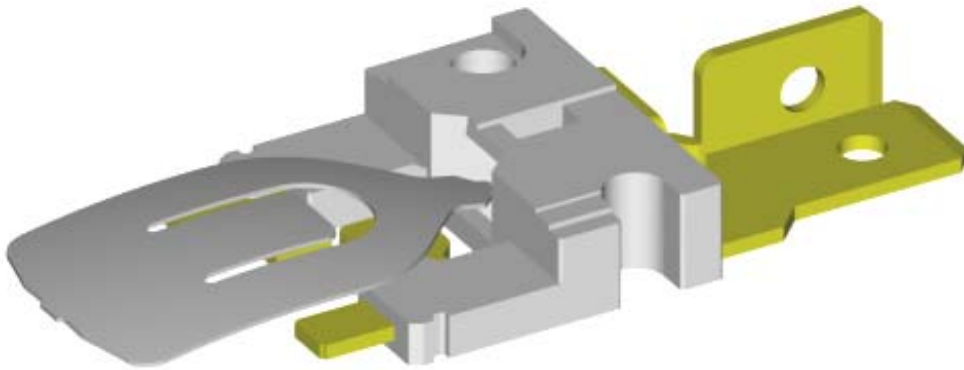
The B4 over-current, auto reset cut out is designed to limit the duration of these high currents therefore protecting the wiring harness.



# B4 series in operation

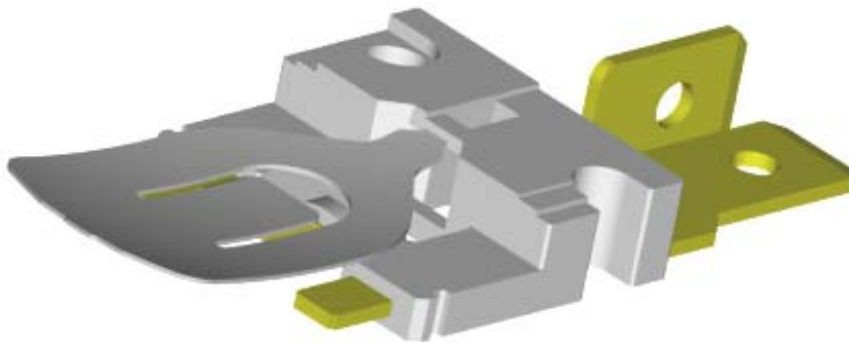


## B4 contacts closed



Current flows through the high performance '**snap acting**' bimetal blade. When a **fault** condition occurs, the increased current flow increases the temperature in the blade, which snaps open breaking the circuit.

## B4 contacts open



Circuit is broken, allowing wiring harness temperature to **cool** to a **safe** level before the blade snaps back and the contacts close.



# B4 engineering specification



The following data gives a brief overview of the specification/capabilities of the B4 series.

1. Normal Operating Voltage	12V [9 - 15V]
2. Operating current:	40 amps [inductive] @ 12V
3. Short circuit breaking:	80 amps [inductive] 150 amps [resistive]
4. Operating ambient temperature range:	55°C to 155°C.
5. Operating characteristics at 20°C	see T/C curves for full operating range. Continuous rated current up to 15 amps.
6. Remake characteristics:	above 25°C.
7. Voltage drop:	max 0.2V at 3 amps load current max 0.2V at 10 amps load current
8. Insulation resistance:	1MΩmin at 500V
9. Terminal material:	Brass CZ108 [64% Cu/36% Zn]
10. Unit Material:	Glass filled PA6,6
11. Cover Material:	Glass filled PA6,6
12. Contact material:	90% Ag 10% Ni [surface] CuNi30Fe [backing]
13. Endurance:	1] 48 hour fault endurance test in application. 2] Capable of 35000 cycles at rated current [d.c.]

All testing has been carried out in accordance with standard Otter production polarity.

Full material content IMDS data is held at [www.mdsystem.com](http://www.mdsystem.com). Please contact [imds@ottercontrols.com](mailto:imds@ottercontrols.com) for details.

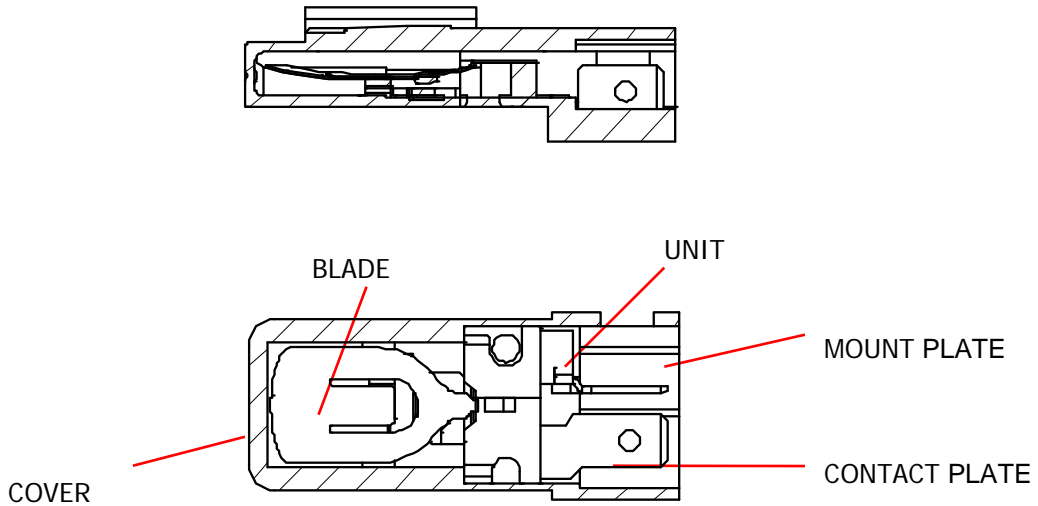




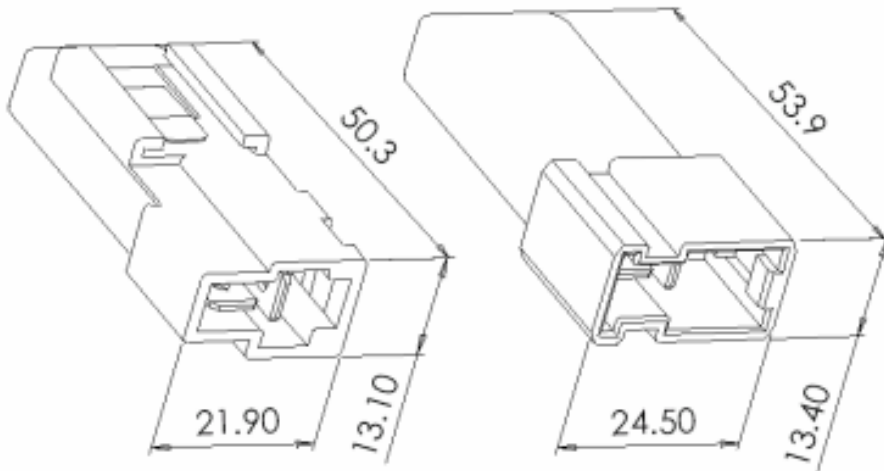
# B4 outline



Sectional Views showing Otter terminology for main parts/features for B4 cut-out



## standard configuration



[Yazaki - connector type 7123-2820]

[Yazaki - connector type 7123-6020]



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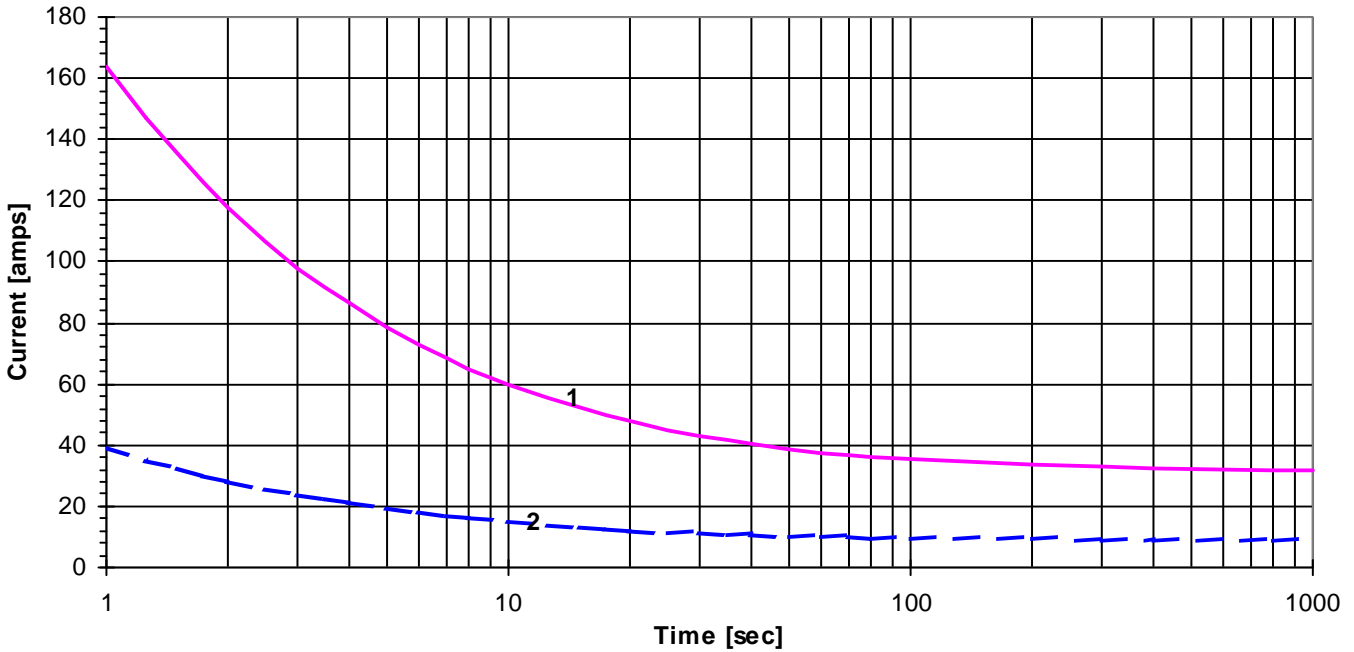
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# B4 T/C performance



## B4 series performance range @ 20°C



## production specifications

A selection of typical production specifications are listed below. Additional specifications are available dependent upon application. Please contact Sales Office for details.

Type	Specification
B4HF	Brk 30A in 10.5 - 45s
B4JF	Brk 30A in 11 - 16s

## product nomenclature

1	2	3	4	5	6	7	8	9	10
Switch Range	Unit Type	Cover Type	Bimetal Grade	Bimetal Supplier	Terminal Arrangement <sup>†</sup>	Special Additions	Setting Method	Checking Instructions	Bimetal Feature
B	4 90° Rotated cold terminal	H Yazaki connector 7123-2820 (cover rails)	F	+ Chase	O No terminal addition	O No fold or crop	C Cabinet	C Special Ident	7 0.007" thick
		J Yazaki connector 7123-6020 (No cover rails)	U	) Kanthal			O Oil set	T Standard Ident	
		K Yazaki connector 7123-2820 (Grey, cover rails)		# Hood			T T/C set		
				* Any can be used					



# Measuring time/current response of B4 series cut-out using a constant current power supply



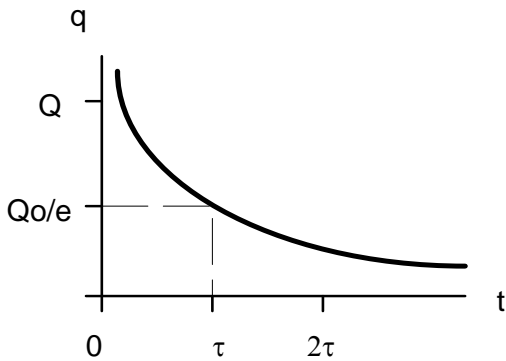
## Introduction

Most Power supplies feature an additional smoothing circuit on the output. When used in switching applications the discharge of these reservoir capacitors used in the smoothing circuit can result in critical damage to the cut-out.

## Effect of Power Supply Characteristics

We recommend the use of a resistive load to dissipate the energy present in the power supply's smoothing capacitors (Ref. Graph 1 + note). Without this additional circuit resistance the rapid discharge of these capacitors, as the contacts close results in a very high intensity arc, which can weld or permanently damage the cut-out contacts.

Graph 1: Power Supply Capacitor Discharging



Where,  $\tau = RC$

Therefore, for a fixed Capacitance (C), if the Resistance (R) is small then the discharge is extremely rapid, which is the condition created with just a cut-out across the supply. Including a resistance lengthens this Time, effectively smoothing the output.

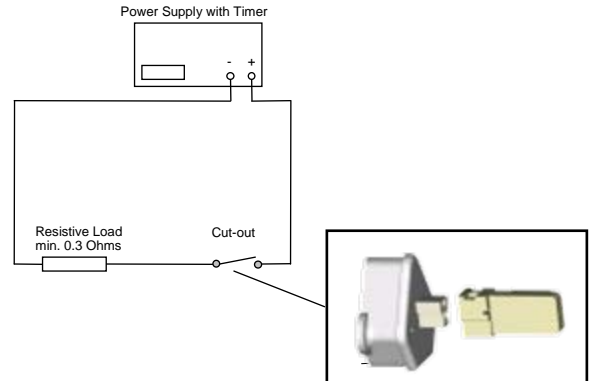
**If a motor/wiring harness or load is connected in series with the supply, this energy (both on Break/ and Remake) is effectively absorbed/dissipated and does not create an arc of such high intensity or time period.** This minimises any potential damage and is closer to the conditions seen within an application.

## Measuring T/C performance with additional Circuit Resistance

In order to correctly measure the Time/Current response of a B4 series cut-out using a Constant Current power supply it is essential to ensure the inclusion of resistive load in series: **min: 0.3Ω** (Ref. Figure 1).

Note: DC motor resistance's are typically between 0.3-0.5Ω. Wiring harness taken as 0.2Ω

Fig 1: Testing Cut-out with additional circuit resistance



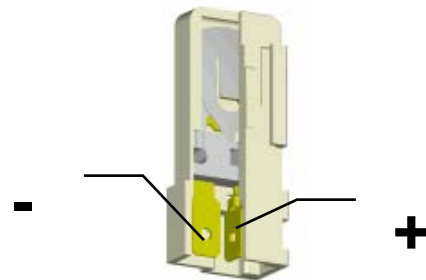
By including a load resistance in series with the cut-out (Ref. figure 1) the rate at which the power supply capacitors discharge is extended, and will ensure more consistent and repeatable Time/Current readings by avoiding damage to contact surface.

## Additional factors:

### Ensure correct orientation of cut-out.

Due to the phenomena associated with current flow through junctions of dissimilar metals variations in cut-out break times can occur. To avoid this it is necessary to ensure consistent orientation of the cut-out (Ref. Figure 2).

Fig 2: Correct Orientation of B4 for T/C testing



## Use a suitable low resistance connection method.

To reduce T/C variation it is also necessary to ensure consistent low resistance connection (avoid the use of crocodile clips or other none repeatable method). We would recommend a typical connection method as Otter Drg: P991090

Completion of the above will minimimise any error resulting from the measurement procedure, ensuring T/C break times which closely correspond to Otter Production specification.



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