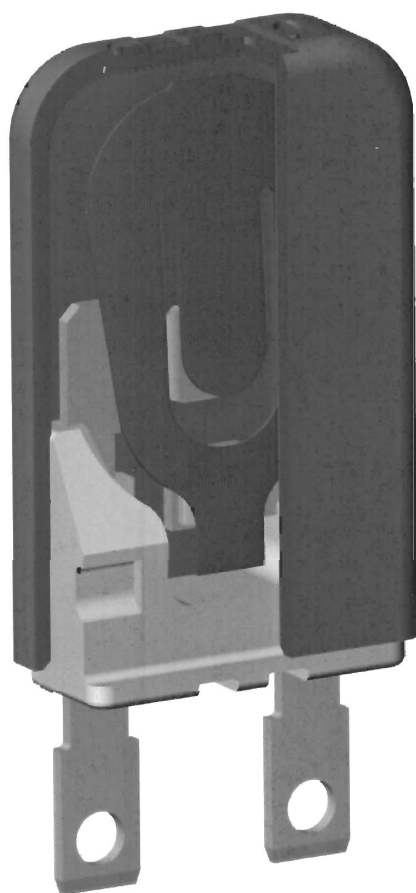


*Otter*<sup>®</sup>

## The Q/QR Cut-out

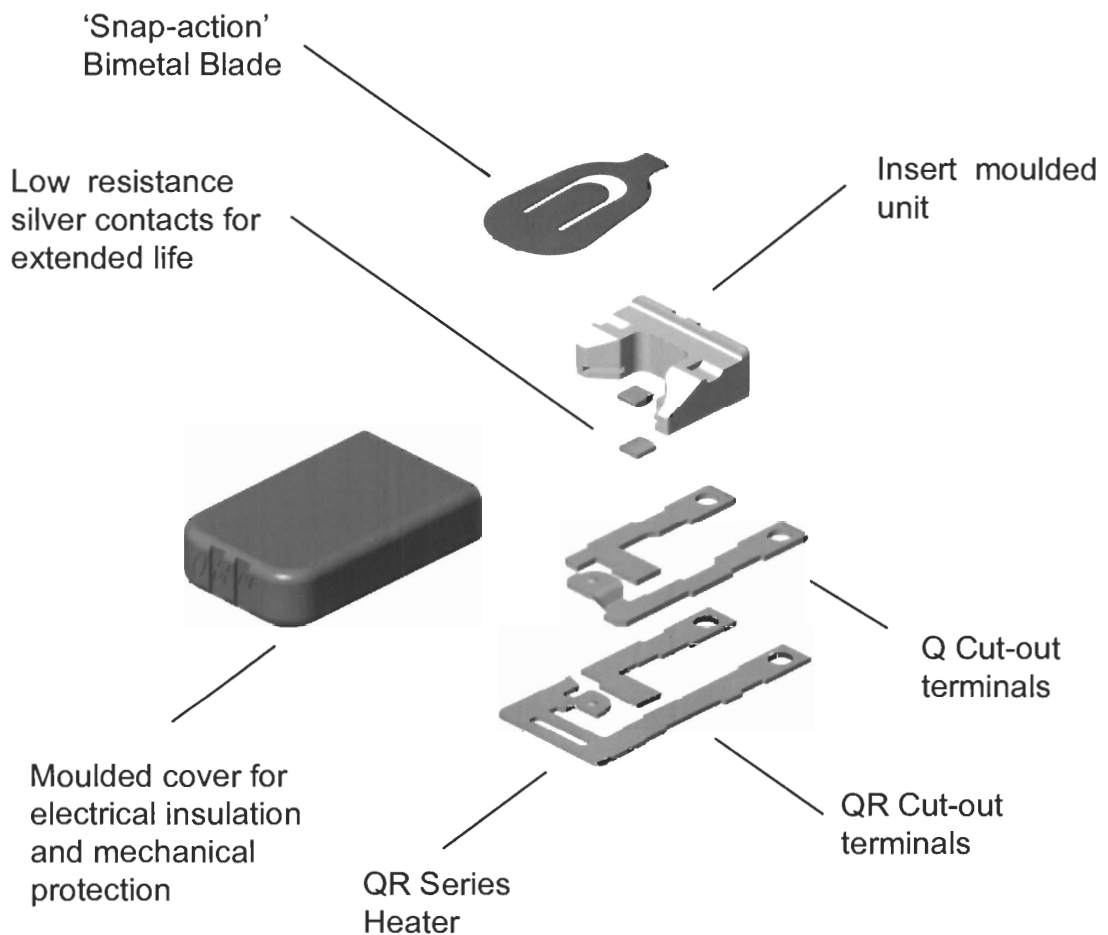




## Q/QR Product Design



The Q cut-out is a compact and versatile snap-action auto-reset protector that has been designed to meet the challenges set by the automotive industry. Suitable for use in intermittent and continuously rated motors, the Q series combines snap-action switching and good on to off ratio to offer excellent protection of motors.



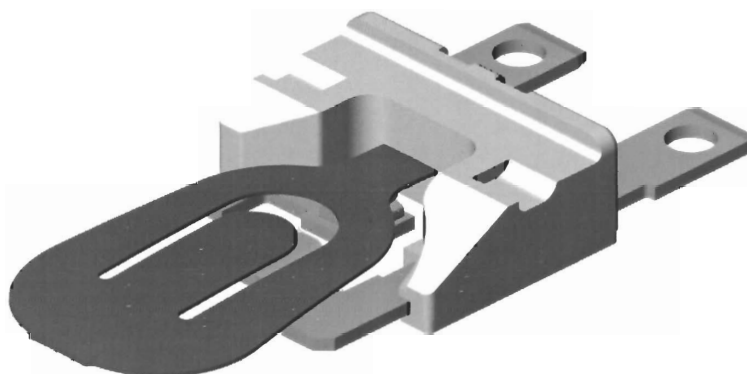
The Q/QR cut-out series can accommodate a wide range of operating currents. This is achieved by selecting a combination of unit material and bimetal grade to match the characteristics of each application.



## Q/QR OPERATION OF CONTACTS



### Q/QR Contacts Closed



Current flows through the unit and bimetal blade. When a fault condition occurs, the increased current flows through the bimetal and raises the temperature. The bimetal blade will snap, opening the contacts to break the current.

### Q/QR Contacts Open



The circuit is broken, allowing the motor winding temperature to reduce to a safe level before the blade snaps back, closing the contacts and allowing the current to flow again.

The QR unit has been designed to include a resistive series heater beneath the blade. This feature allows additional heat to be stored in the unit and this extends the time that the contacts remain open, allowing greater cooling of the motor.



## Q/QR Engineering Specification

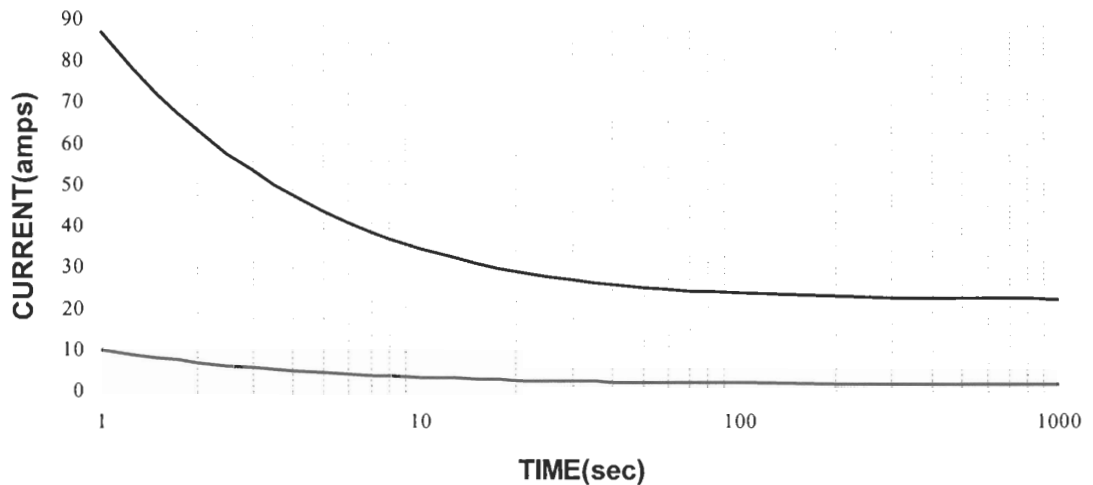
- |  |   |                |  |
|--|---|----------------|--|
| 1. Normal operating voltage :            | 12V: (9-15V)  | 24V (18 - 32V) |  |
| 2. Rated switching current.:             | 12V 6 - 50A   | 24V 6 - 16A    |  |
| 3. Operating ambient temperature range : | - 40 to + 80°C  |                |  |
| 4. Operating characteristics at 20±3°C : | See Time/Current curves over page for full operating range.         |                |  |
| 5. Remake characteristics :              | above 80°C (typical)  |                |  |
| 6. Voltage drop :                        | max 200mV   |                |  |
| 7. Insulation resistance :               | 1MΩ min at 500V   |                |  |
| 8. Terminal materials :                  |   |                |  |
|  | Q4  | QR-4           | Brass CZ108<br>(63% Cu, rem Zn)                            |
|  | Q8  | QR-8           | Nickel Silver NS107<br>(55% Cu, 18% Ni, Rem Zn)            |
|  | QD  |                | Stainless Steel 304S15<br>(18% Cr, 10% Ni, 2% Mn, 0.06% C) |
|  | QE  |                | Ferry Alloy<br>( 55% Cu, 1% Fe, Rem Ni)                    |
|  | QC  |                | Copper / stainless<br>( 97.5% Cu, 2.35% Fe)                |
| 9. Unit material                         | PA 66 Glass filled  |                |  |
| 10. Cover material                       | PA 66 Glass filled  |                |  |
| 11. Contact material                     | 99.9% Ag (surface)<br>CuNi 30Fe (backing)                           |                |  |
| 12. Endurance                            | 1. 48 hour stall test in motor<br>2. 35 000 cycles at rated current |                |  |



## Q/QR T/C Performance Limits

### Operating Range

### Q series performance at 20°C



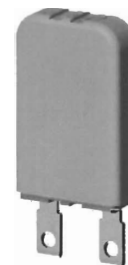
### Production Specifications

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

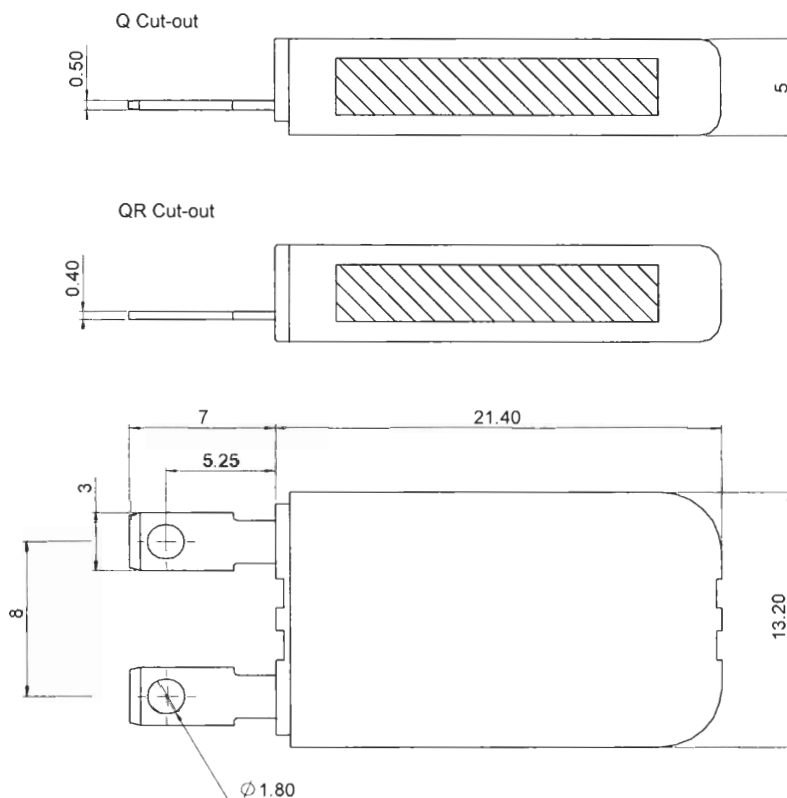
Type	Current (Amps)	Break (seconds)
Q41C	33	4.0 - 5.5
Q81C	27	3.5 - 5.0
QR-8-C	27	3.2 - 4.9
Q81J	15	3.0 - 4.5
Q81U	12	2.5 - 4.7
Q81P	9	3.2 - 5.0
QR-8-P	9	2.3 - 3.8



## Q/QR Outline

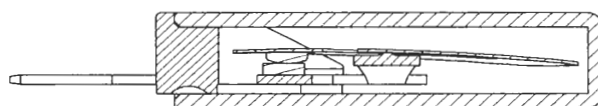


The Q/QR cut-out can be supplied with a range of terminal options to optimise the installation. The views shown below describe the basic cut-out and terminal options are shown on the following pages.

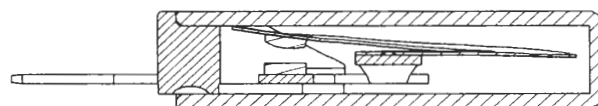


### Sectional Views of Open and Closed Contacts

Contacts Closed



Contacts Open

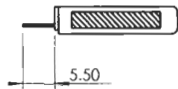


Contact the Sales Office for detailed drawings.

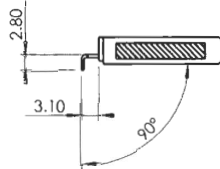


## Terminal Variations

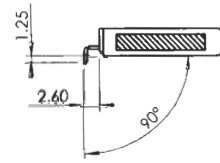
The QQR series can be produced with a range of folded and cropprec terminal options. Contact Sales Office to confirm availability.



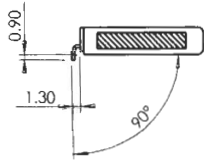
**Q-1-A0**



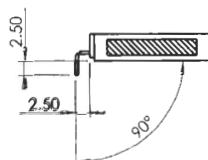
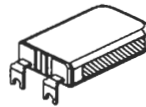
**Q-1-C0**



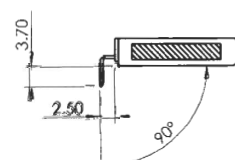
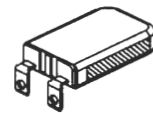
**Q-1-G0**



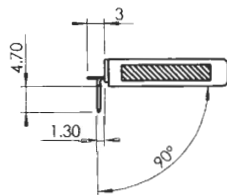
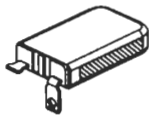
**Q-1-H0**



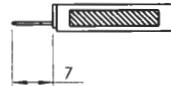
**Q-1-K0**



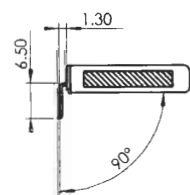
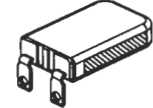
**Q-1-L0**



**Q-1-M0**



**Q-1-00**



**Q-1-P0**