Typical modern relay

Original 6RA relay fitted to the MGBGTV8

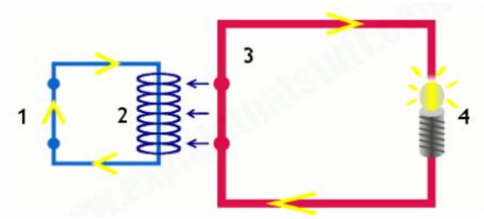
Using relays in a classic car

With a classic car there are concerns with both the potentially damaging effect of heavy loads on both ageing original switches and on sections of the circuit in wiring looms. Where a headlight upgrade is made using a replacement H4 headlamp unit with high power Halogen bulbs there are concerns over the capability of the switches and the capacity of the existing loom to cope with the increased load. Fitting a relay is a way of avoiding those difficulties and ensuring maximum power is delivered to the headlamps. Two 6RA relays were Factory fitted as original parts on the MGBGTV8 model – one for the starter motor and another for the cooling fans where both components draw a heavy current when activated.

Here we look at what a relay does and then how fitting relays is a useful modification when a headlight upgrade is made using a replacement H4 headlamp units with high power Halogen bulbs.

What is a relay?

A relay is essentially a switch that is operated electrically rather than mechanically. Although there are various relay designs, the relays most often found in low voltage auto applications are electro-mechanical relays that work by activating an electromagnet to pull a set of contacts to make or break a circuit. These are used extensively throughout vehicle electrical systems and are useful where an in-line switch or the existing circuit does not have the capacity to handle the current required.



How do relays work?

A relay uses one circuit with a relatively small electric current that can turn on or off a second circuit with a much larger electric current. So used in a classic car the low current circuit uses the existing switches and loom and the second circuit has to cope with heavy loads - typically where upgraded headlights with powerful Halogen bulbs are installed together with a relays wiring kit.

The simple illustration above of a relay used in a headlights upgrade shows (right) the switch (**1**) in the **blue circuit** is turned off. It's an example of a "normally open" (NO) relay where the contacts in the second **red circuit** are not connected by default, and switch on only when a current flows through the magnet (**2**). Other relays are "normally closed" (NC); the contacts are connected so a current flows through them by default and switch off only when the magnet is activated, pulling or pushing the contacts apart. Normally open (NO) relays are the most common.

Looking at the illustration above (left), when a small current flows in the input **blue circuit**, it activates the electromagnet, shown here as a dark blue coil (**2**), which produces a magnetic field all around it. The energized electromagnet pulls the metal bar in the output circuit toward it, closing the switch (**3**) and allowing a much bigger current to flow through the output **red circuit** and Halogen bulb (**4**). See a useful note and animation of a relay in action. Animation

Using relays for an H4 Halogen headlamp upgrade

Where a headlight upgrade is made using a replacement H4 headlamp unit with high power Halogen bulbs there are concerns over the capability of the switches and the capacity of the existing loom to cope with the increased load. Fitting a relay leaves the ageing switches handling small current flows and enables more of the electrical power to reach the Halogen bulbs providing a much improved beam on the road ahead.

In our article on installing an H4 Halogen headlamps upgrade using a **headlamp relays and wiring kit** supplied by Moss Europe (Part number 117-515), we provided wiring diagrams showing how the kit is connected to the existing wiring on an MGBGTV8. But it may not be immediately clear for many members how they work. A **useful diagram** was produced by Chris Hunt Cooke that can help illustrate how the two switches – the main side/headlights switch in the dashboard and the main beam/dip beam stalk switch fitted to the steering column - are protected by using the relays. A copy of that diagram is below.

See H4 headlamp upgrade article. More