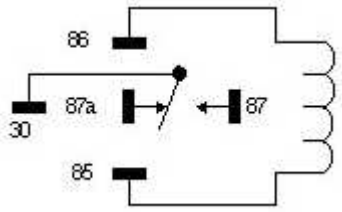
RELAYS WIRING

WHY USE RELAYS?

Power for the headlights is controlled by a switch on the dash. This is *not* a great place to tap into the system, for two reasons: The headlamp switch uses tiny, high-resistance contacts to complete circuits, and the wire lengths required to run from the battery to the dashboard and all the way out to the headlamps creates excessive resistive voltage drop, especially with the thin wires used in most factory installations.

In many cases, the thin factory wires are inadequate even for the stock headlamp equipment. Headlamp bulb light output is **severely** compromised with decreased voltage. For example, normal engine-running voltage in a "12-volt" automotive electrical system is around 13.5 volts. At this voltage, halogen headlamp bulbs achieve 100 percent of their design luminous output. When operating voltage drops to 95 percent (12.85v), headlamp bulbs produce only 83 percent of their rated light output. When voltage drops to 90 percent (12.15v), bulb output is only 67 percent of what it should be. And when voltage drops to 85 percent (11.475v), bulb output is a paltry 53 percent of normal! [Source: Hella KG Hueck AG, Germany]. It is much more common than you might think for factory headlamp wiring or switch setups to produce this kind of voltage drop, especially once they're no longer brand new and the connections have accumulated some corrosion and dirt.

The numbers on relays and sockets are universal (by Bosch decree...) terminal designators. On relays, we have:



- **86** is the relay switching (control) circuit input.
- **85** is the relay switching (control) circuit output (ground).
- **30** is the power circuit input.
- **87** is the power circuit output.
- **87a** is the power circuit output (open then the relay works).

Some relays have dual 87 terminals.

On headlamp sockets, the terminal designations are as follows:

- **56a** is the high beam feed.
- **56b** is the low beam feed.
- **31** is ground.

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