

# How a relay works — and how to test one

*The 85/86/30/87 pinout, what each terminal actually does, and the four tests that tell you whether a relay is good in under a minute.*

## PROCEDURE

### 1 Check the coil

Ohms across 85 and 86. Expect roughly 60–120  $\Omega$ . Open circuit means a burned coil. A few ohms means shorted turns, which will pop the control fuse.

### 2 Check the rest state

Ohms from 30 to 87 should be open. 30 to 87a, if present, should be near zero. Anything else means welded or corroded contacts.

### 3 Energize it

Apply 12 V and ground to 85/86 (mind the diode). You should hear the click, and 30 to 87 should now read under 0.2  $\Omega$ .

### 4 Test it under load

The one that matters. With the circuit running, measure voltage drop across 30 and 87 with the relay closed. Over 0.2 V means the contacts are burned even if the bench test passed.

## NUMBERS

|                     |                                      |                                                                   |
|---------------------|--------------------------------------|-------------------------------------------------------------------|
| Coil resistance     | <b>60–120 <math>\Omega</math></b>    | typical 12 V automotive relay; check the case for a printed value |
| Coil current draw   | <b>0.1–0.2 A</b>                     | why a small switch can control a big load                         |
| Closed contact drop | <b>under 0.2 V</b>                   | measured 30 to 87 with the load running — the real test           |
| Contact resistance  | <b>under 0.2 <math>\Omega</math></b> | bench measurement, energized                                      |

## COMMON MISTAKES

- Reversing 85 and 86 on a diode-equipped relay and assuming the relay is dead.
- Passing a relay on a bench ohms test when its contacts fail under load — resistance at 1 mA tells you nothing about 30 A.
- Replacing a burned relay without asking what burned it. Check the load's current draw before fitting the new one.
- Forgetting that 30 is usually hot at all times — probing it and reading 12 V proves nothing about the relay.

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