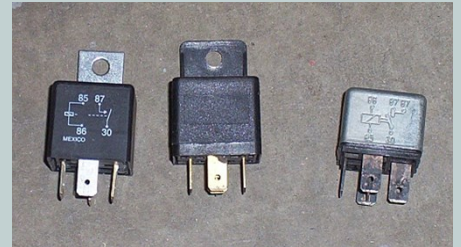


Aug 23, 2013

RELAYS; how they work and how to wire it up...\

A relay is a device that allows you to control a high-current electrical load with a low-current electrical 'signal'. Relays are usually electro-magnetic, but are also available in solid-state forms. They can be used with a switch to allow control of a high-current load with a small switch or they can be hooked to a switched power source in the car like the ignition or accessory power circuits to allow power to be switched on/off automatically with the ignition key.

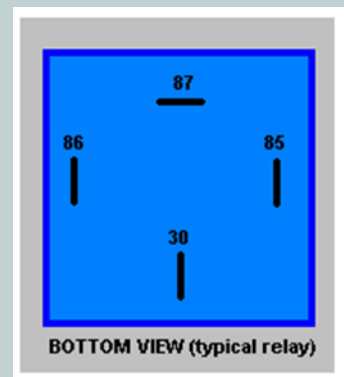


Relays are used to control high current devices such as horns, headlights, brake lights, etc.. It is not a good idea to run high currents through 50 year old switches in the dash, so many car builders use their switches to control the relay coils which only need about 1/10 the current of the contacts and let the relay contacts control the high current draw devices.

When connecting anything to a car's factory wiring, it's important to remember that factory wires are designed to carry the load of only the factory installed components. They are not 'general use' power circuits like the power outlets in your house. For example, the ignition (IGN) circuit is designed to power the car's ignition system and nothing else. Hooking up a high-current device to this circuit can create a fire hazard. By using a relay, you can use the IGN circuit to control a high-current device without directly powering it from the IGN circuit itself.

A standard Bosch-style relay will have 4 or 5 numbered leads (30, 85, 86, 87, and sometimes 87a).

- 30 = constant [positive (+)] power (usually wired directly to car battery)
- 85 = coil ground (wired to the negative (-) battery terminal or any grounded metal panel in the car)
- 86 = coil power (wired to the control source. could be a switch, or it could be the car's IGN or ACC circuit.)
- 87 = switched [positive (+)] power output. (when the relay coil is powered, lead/pin 87 is connected to lead/pin 30)
- 87a = [on 5 lead/pin relays only] this lead/pin is connected to lead/pin 30 when the coil is NOT powered.



What happens inside a 4-lead/pin SPST relay is shown in the graphic on the next page.

On the left, the coil is NOT powered. On the right, the coil IS powered. Notice the switch changes positions when the coil is powered. When the coil is powered, pins 30 and 87 are connected. When the coil is NOT powered, then pin 30 is not connected to anything,



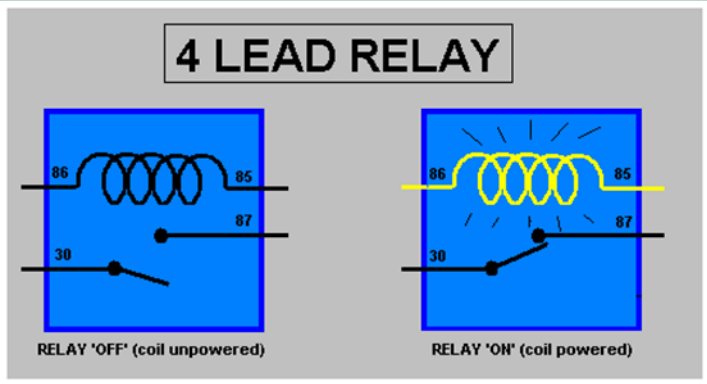
New Mexico Corvette Association

We're on the Web nmcorvette.org

therefore it is in the 'off' position.

They are both powered when they key is in the 'RUN' position, and they are both not -powered when they key is in the 'OFF' position.

The IGN circuit is powered when the key is in the 'START' position, but is not powered when the key is in the 'ACC' position. this circuit avoids the issue stated above, but requires that the key is left in the 'RUN' position if you want to use the ECM with the engine off.

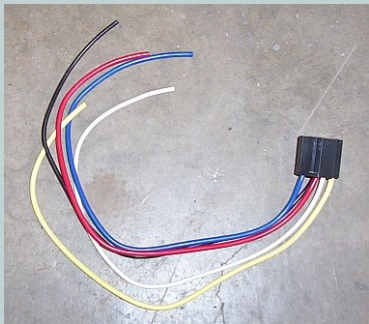


A quick list of functions that should be energized by relays are:

- Headlights (+12V turns on)
• Horn (GND turns on)
• Back up lights (+12V turns on)
• Ignition (+12V turns on)
• Starter (+12V turns on)

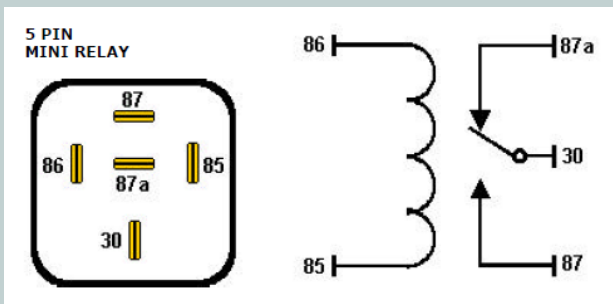
Automotive relay pins are labeled with numbers which indicate what their purpose is and the relay pigtail has a standard color code as follow:

Coil
85: Ground - Black wire
86: +12V - White wire



NOTE: in many pigtails, the black and white wires were reversed! It shouldn't make a difference as the coil is not polarized.

Contacts
30: Common - Blue wire
87: Normally Open (NO) - Yellow wire
87a: Normally Closed (NC) - Red wire



From the internet