Switches

"Shopping for Switches", Important Considerations
by Steve Watson

In order to achieve the new look in dash boards and/or consoles we need to consider switch options that are completely different from what existed "back then" . We want switches for everything and we want them to look right in our ride. But before we go shopping for switches, let's review a few terms and details that will help us to make good choices so we get exactly what we want.

To begin, we should know what we want to switch, for example: ignition/start, headlights, park lights, wipers, etc. What is the function of each switch? Ignition and headlights are on/off switches, while start and power windows are momentary switches that only energize while we hold them.

Next, determine for each function what the load will be. Load parameters include both the voltage limits and the amperage rating. Make sure that they are listed in dc values for automotive use. As a rule of thumb, a switch capable of handling a larger amperage will also be a larger (and often ugly) switch. The trick way to get around this is to use a relay.

A relay is a switched switch. That is, we can use a small, attractive switch on the dash to signal a relay to switch on the power to a high amperage circuit. Our dash switch only needs enough rating to signal the relay, about 200 milliamps (0.200 amps) or less. While the relay (which is hidden out of sight) can then do the power switching of 20, 30, 40 amps or more. We get our small attractive switch and power, too! (See Figure #1)

For either a switch or relay, the bigger the rating the better. If we use a 15 amp rated switch to control a 15 amp draw circuit, we are asking the switch to max-out every time and its life expectancy goes down. But if the switch is rated well above the circuit draw, its life expectancy goes up and will probably wear out before it will burn out.

A major factor in the rating of a switch is its contacts. This info may not be available to you but it's good to know. Contacts are the point inside the switch were the circuit actually makes/breaks and the switching occurs. "Wiping" types of contacts, where one contact moves across the other, help to clean or wipe dirt, tarnish, and oxide off the contact surface and increase switch life. "Butt" contacts, where one contact butts up against the other, provide no cleaning motion.

The typical hydraulic brake switch uses butt contacts. (See Figure #2.) When the hydraulics pressurize, a small contact plate is pushed against two stationary contacts and the circuit is made. But as the contacts are close to connecting, an arc will occur, both as the contacts make and break. This arc produces oxides and carbon on the contact surface, neither one of which are good conductors. Without cleaning action, these bad guys build up and it takes more pressure to make the connection until, eventually, they are too thick to overcome. A switch with wiping contacts (See Figure #3), cleans itself and actually reduces arcing to begin with.

Size, material and shape determine the rating of contacts. Plain copper or copper alloy contacts are sometimes used (like in those hydraulic brake switches) but are susceptible to oxides. Silver is better and more common because of its excellent conductivity. Gold contacts are used for low

amperage switching where long periods of no use are common, like for air bags, but are less common due to higher cost.

The term poles refers to the number of different circuits that one switch can handle at the same time. (This can be equated to the number of positive leads into the switch.) A single-pole switch handles one circuit, a double-pole switch handles two, etc. In fact a double pole switch is like having two single pole switches inside the same switch body and having both controlled by the same lever or button.

The term throws tells the number of circuit paths that any one pole of a switch can accommodate. (This can be equated to the number of "down-stream" lines out of the switch for each pole.) For example, most switches are single-pole/single-throw (abbreviated SPST) and switch one circuit "on" or "off". In comparison, a single-pole/double-throw switch (SPDT) can switch power from one source to two different outputs (one or the other but not both at the same time) and may or may not have a center "off" position (See Figure #4 and #5). What you want the switch to do determines how many poles and throws you need it to have.

Switches are available with different terminals for connecting the switch to the circuit wiring. Solder lug, screw-on, and push-on are the most common. Thanks to the variety of wire terminal connectors available, it hardly matters what the switch has, we'll still be able to connect to it. Warning! Be careful soldering wires onto switches. Don't overheat switch terminals as you can melt plastic units or damage the switch internally.

And finally, we'll have to choose the basic type of switch that we want - toggle, push button, rocker, slide switch. Will it be metallic, black, or some color; illuminated or non-illuminated. The choices are many. But when it comes to getting that just right look for the street rod or custom car, it¹s worth the effort to make sure we get exactly what we want.

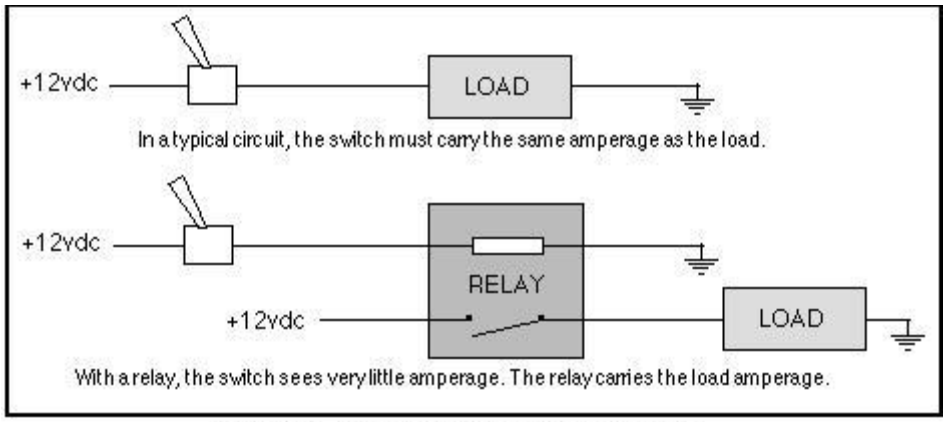

Figure #1 - Circuits With and Without a Relay

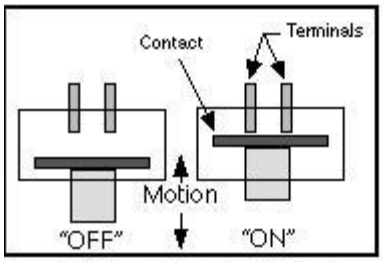

Figure #2 - Butt Contacts
(Single-Pole/Single-Throw)

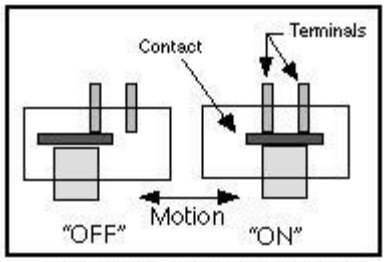

Figure #3 - Wiping Contacts
(Single-Pole/Single-Throw)

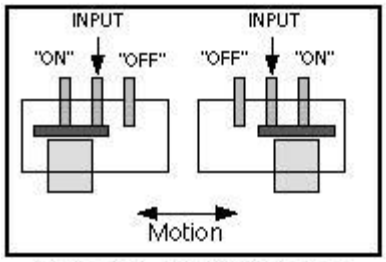

Figure #4 - Wiping Contacts
(Single-Pole/Double Throw)

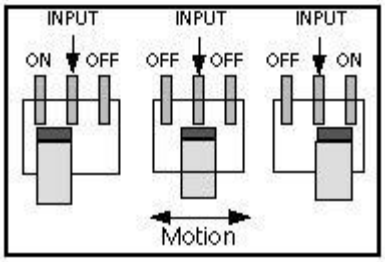

Figure #5 - Wiping Contacts
(Single-Pole/Double Throw)
with Center Off