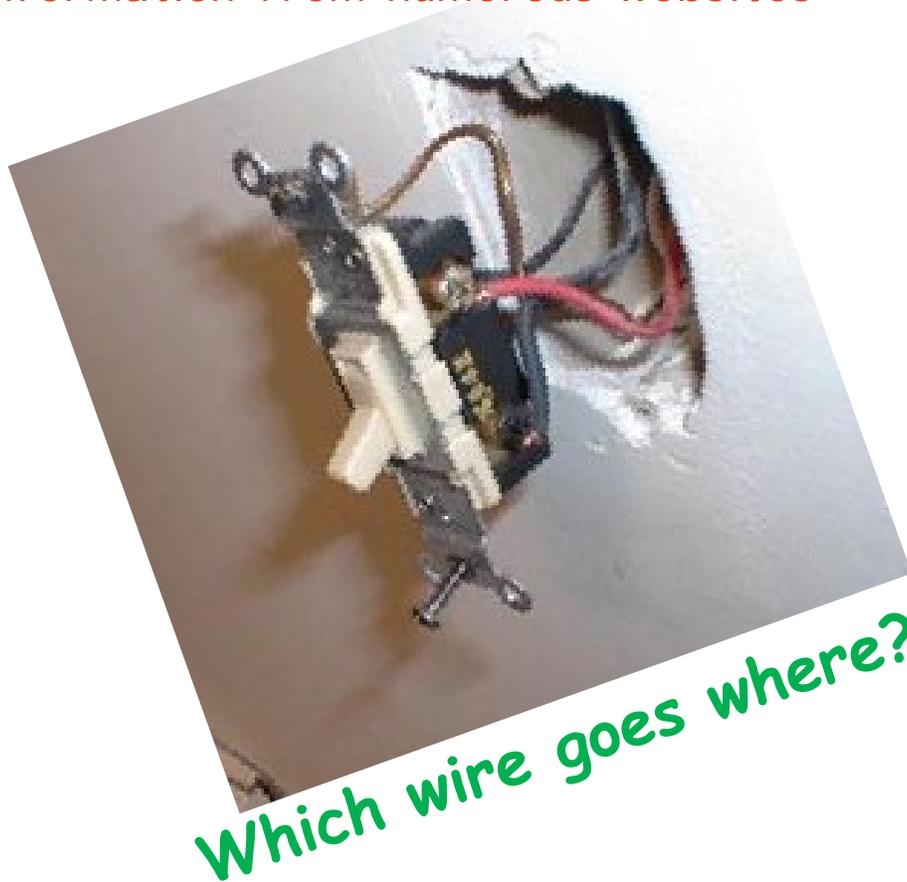


Wiring 3-Way Switches (and 4-Way too)

Information from numerous websites

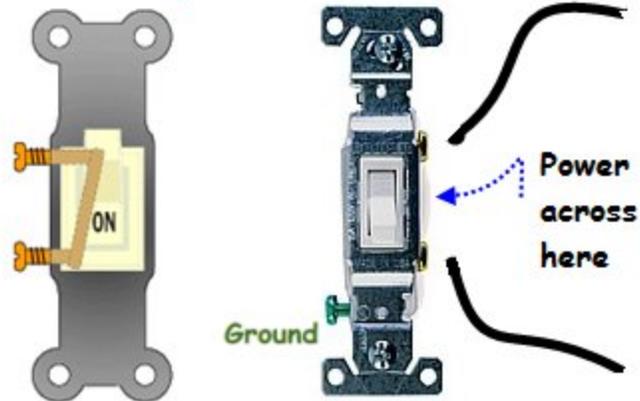


Switches for Lights

- A normal switch has 2 screw terminals that are either connected or disconnected ... depending on the open or closed position of the switch.

Normal Switch ... Single Pole

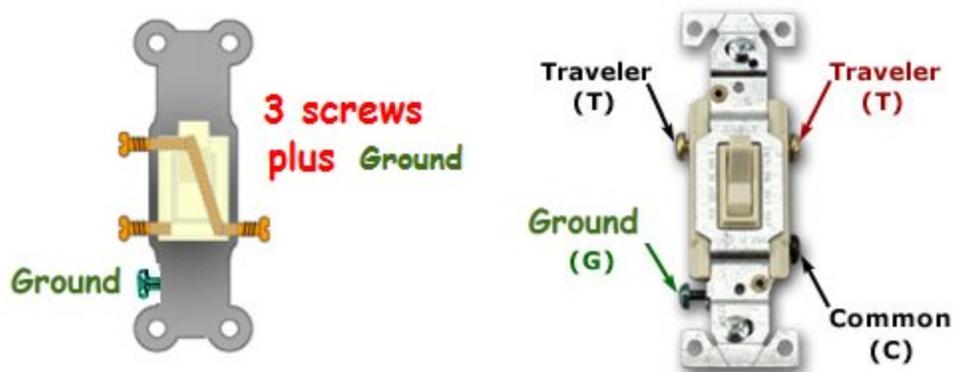
A single pole switch has 2 screw terminals and is wired to the hot (black) wire. One **brass** colored terminal for incoming hot wire and the other is for outgoing hot wire to the device. Switch may or may not come with a **ground terminal** (green screw).



- To create lights that operate with two separate switches, the electrician uses two special pieces of equipment in the circuit:

- Special switches known as **three-way switches**
- Special Romex wire that has an extra **red insulated wire** along with the black and white wires within the sheath

- A three-way switch has **three terminals**, and the switch connects the first terminal to either the second or the third terminal, as shown here:

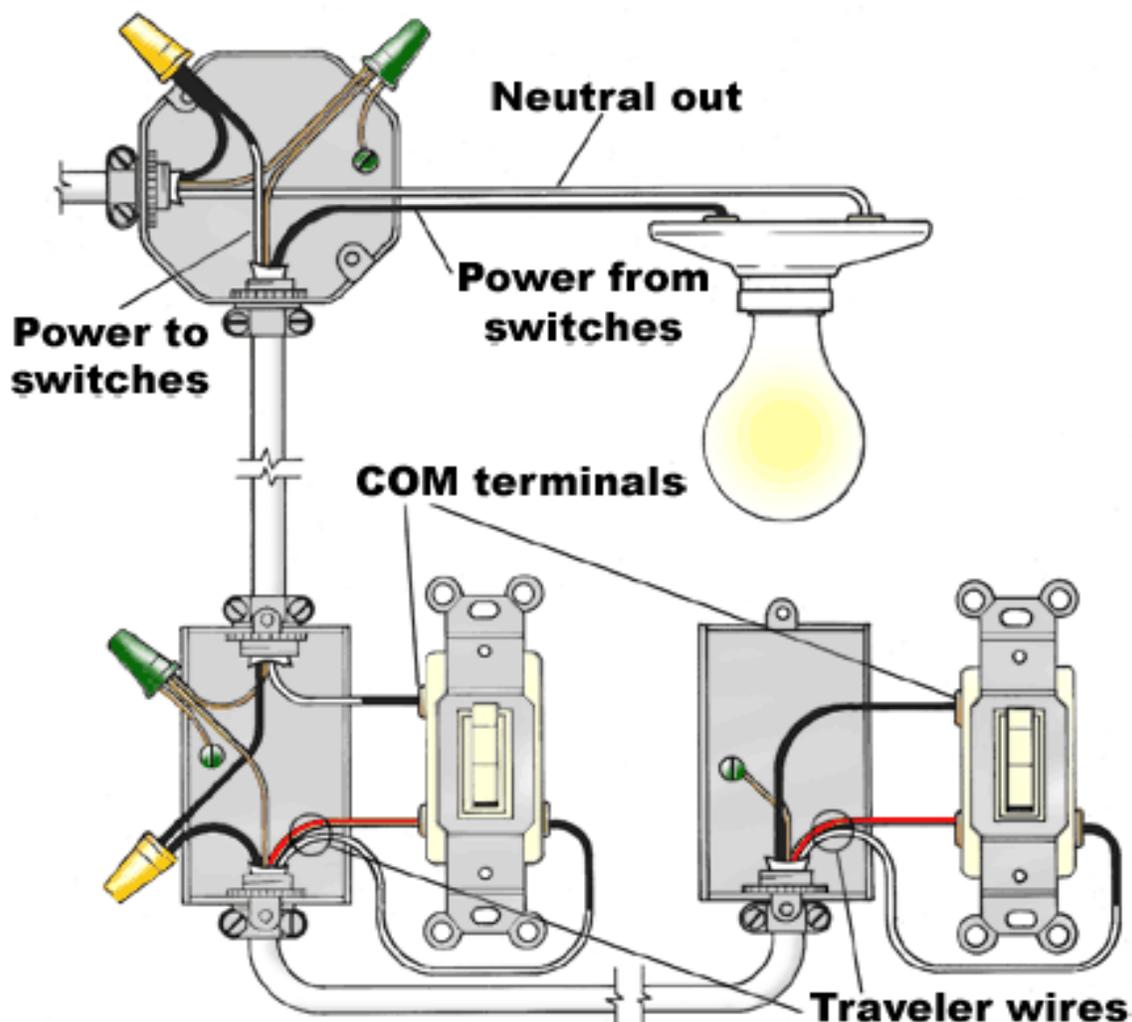


Three-Way Lights

Miscellaneous

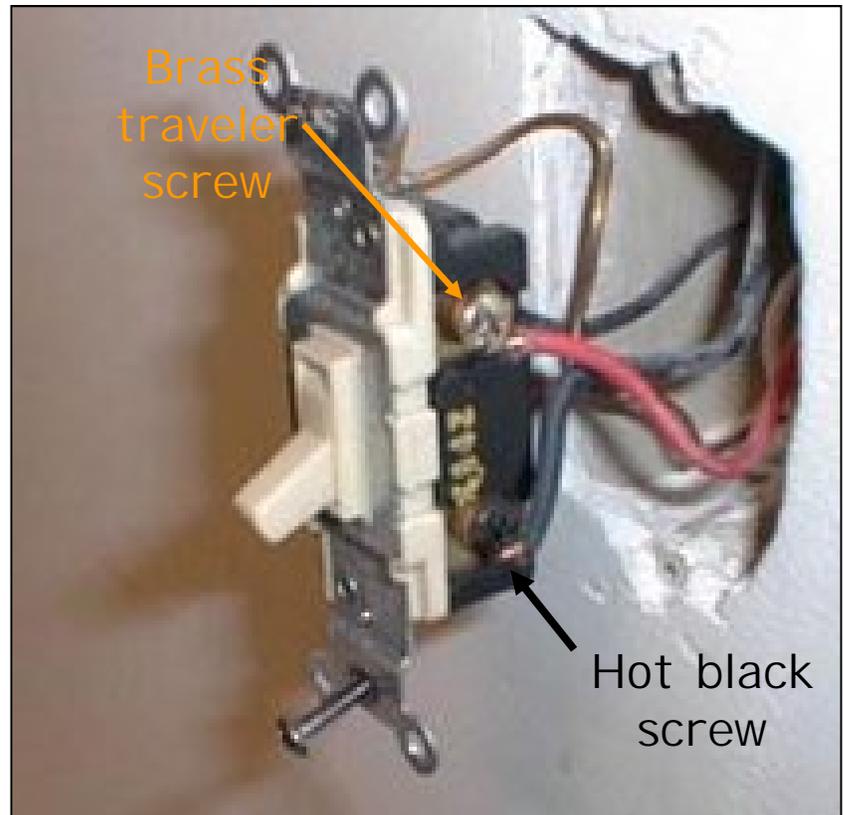
Remember three things:

- The two travelers will always be in the same cable with each other.
- The only wire in a 3-and/or/4-way system that is hot all the time when all the wires at the switches are disconnected is the hot (which is to attach to the "common" terminal of a 3-way switch).
- The pair of switch screws that are the same color as each other are for a traveler pair.



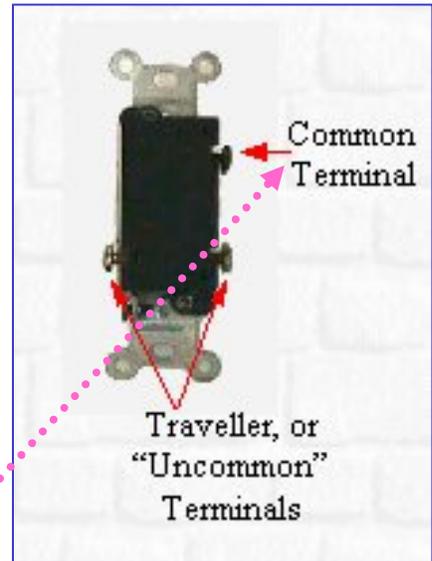
View of a 3-way switch.

Note the different colored screws.

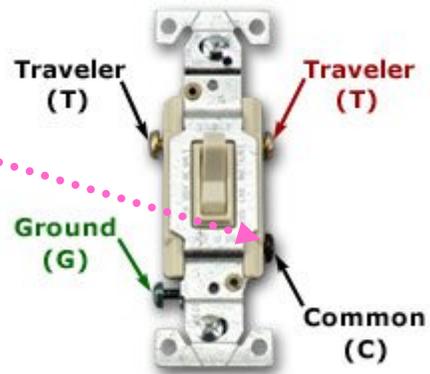


- The top one is brass and the bottom one is black. The other two screws you can't see are brass and green.
- The continuous hot wire and/or the wire that goes to the light connect to the black screw.
- The ground wire connects to the green screw and the travelers connect to the two brass screws.

The heart of a 3-way circuit is the 3-way switch. The 3-way switch has three active terminals (plus a ground in up-to-date installations). Only one is important to identify for the purposes of replacement... the **COMMON TERMINAL**.



Picture shows the **COMMON TERMINAL** in a certain position, it could be any terminal on your individual switch.



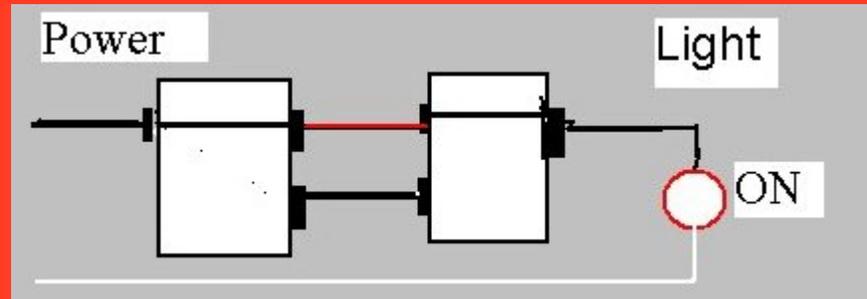
The **COMMON TERMINAL** is the "bridge" between the power supply and the load (typically a light fixture) ...the wire that attaches to the common terminal is either (1) a hot wire from the main board or (2) leads to the load (fixture).

TRAVELLERS are two wires connecting the two 3-way switches. Referring to the picture, the two traveler terminals on one 3-way switch are connected to the two traveler terminals on the other 3-way switch by the two traveler wires. **Either traveler wire can be connected to either traveler terminal... it doesn't matter!**

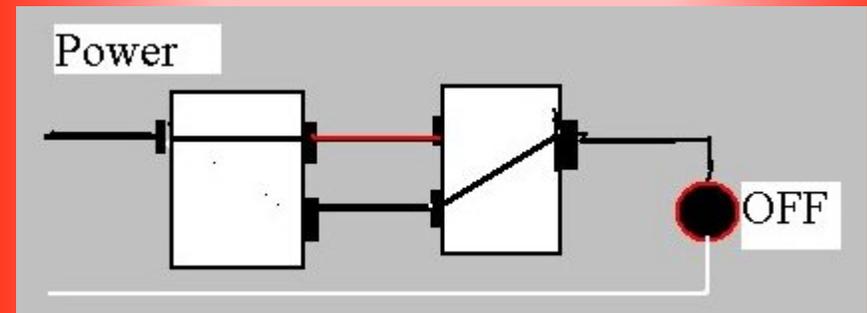
3 WAY SWITCHES ...

"HOW THEY WORK"

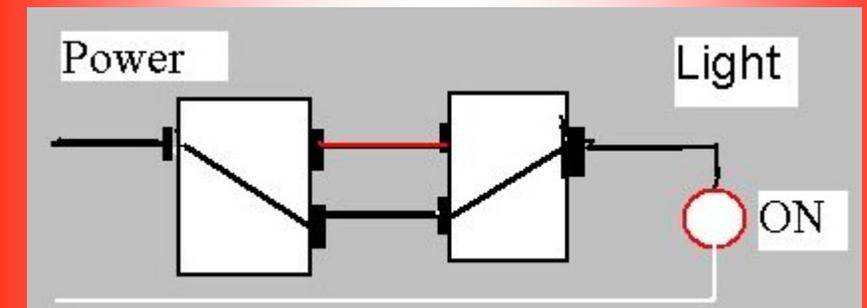
ON



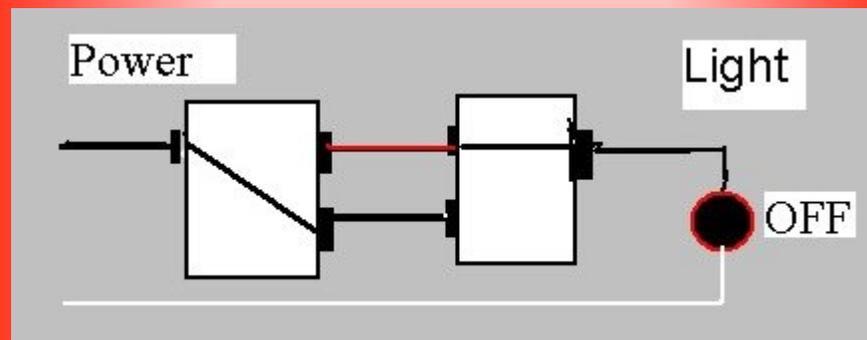
OFF



ON

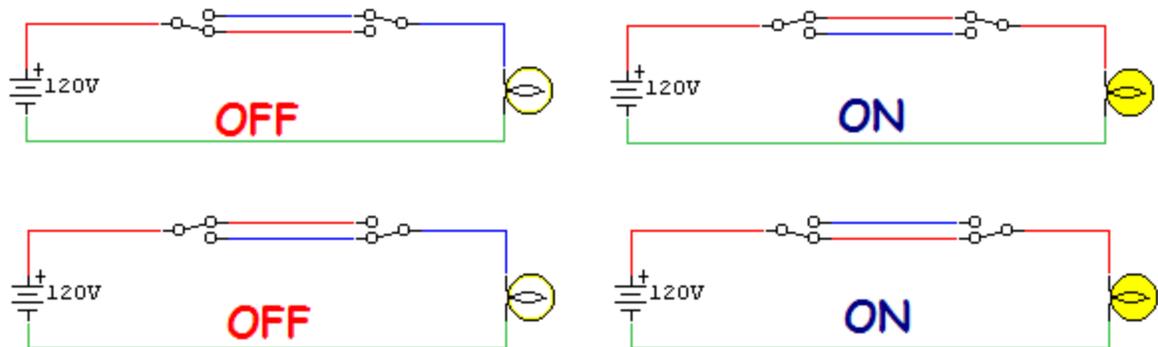


OFF

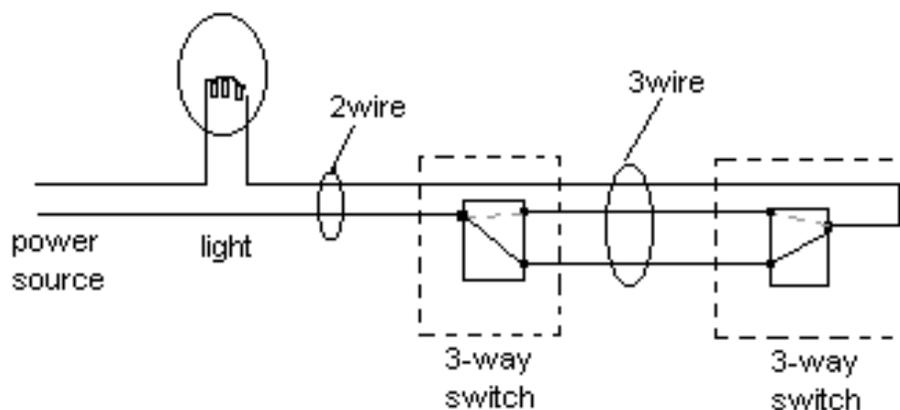
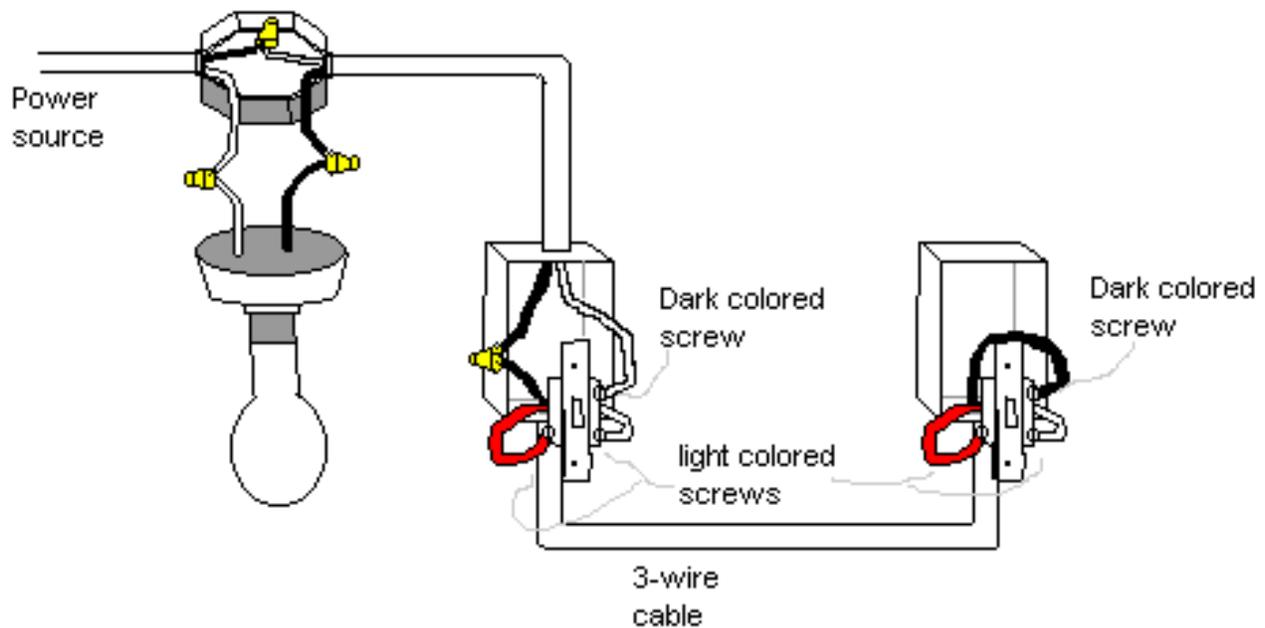


How 3-Way Switches Function:

Here is a typical circuit in its 4 possible stages ...

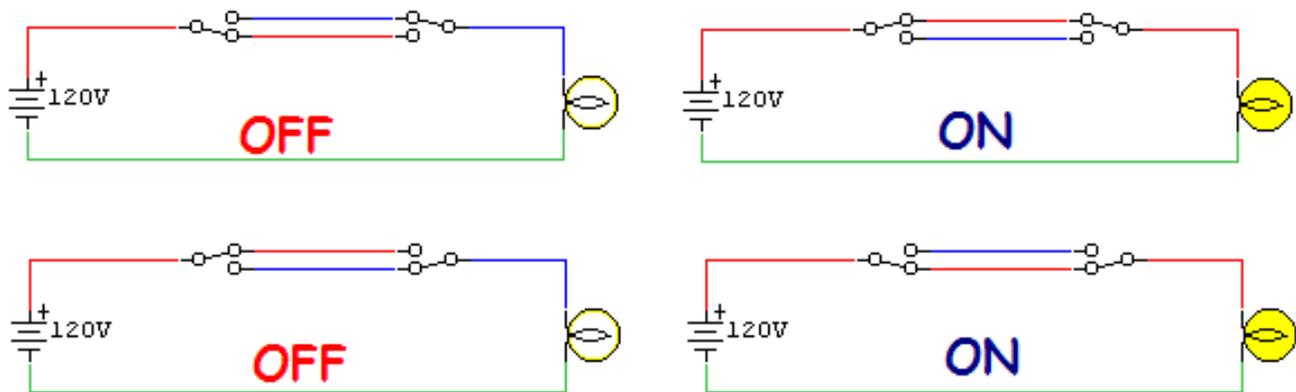


Typical 3-Way Setup ...



More How 3-Way Switches Function:

Here is a typical circuit in its 4 possible stages ...



- The switches must create a complete circuit for current to flow and the bulb to light.
- When both switches are up, the circuit is complete (top right).
- When both switches are down, the circuit is complete (bottom right).
- If one switch is up and one is down, the current reaches a dead end, no current flows and the bulb is off (top left and bottom left).

Note that the above color scheme does NOT reflect wire color. It is functional coloring intended to illustrate the voltage state of each wire segment.

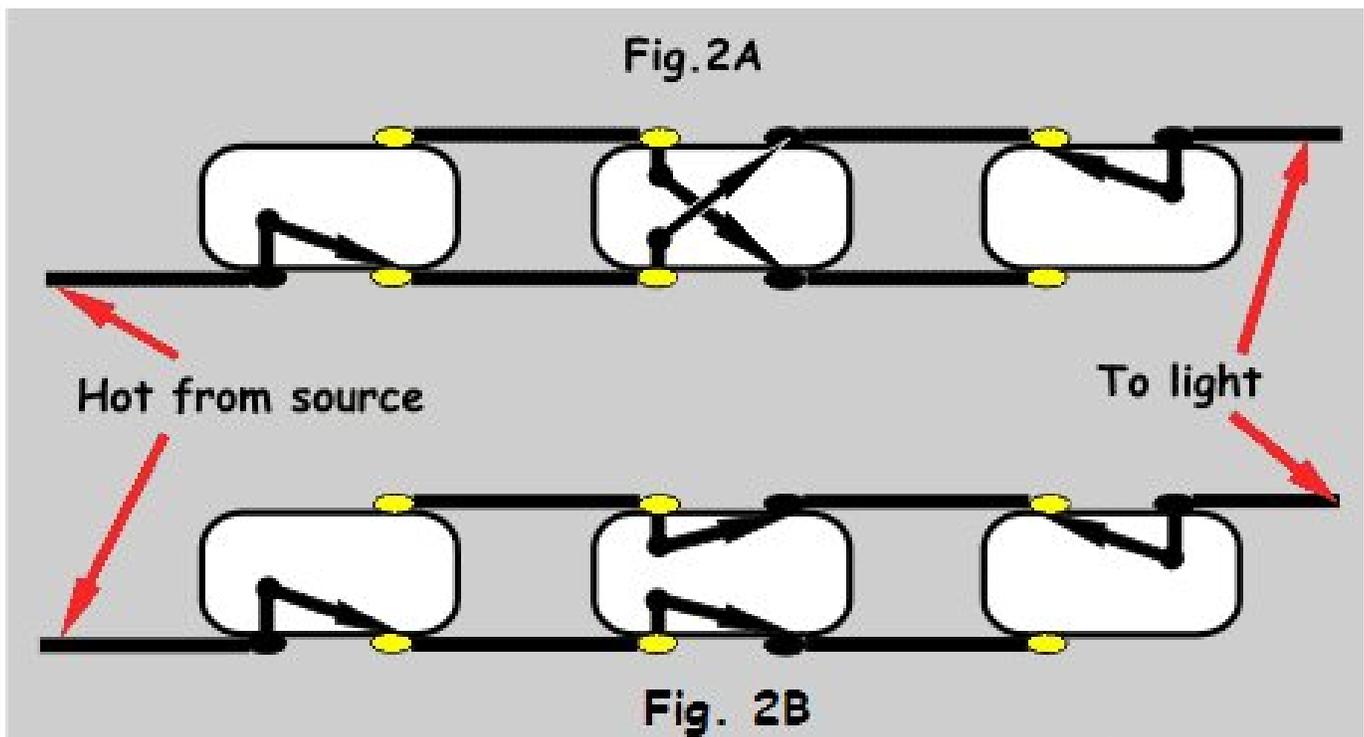
- **Red** indicates a hot wire (120 volts ac).
- **Green** indicates a neutral wire at ground potential.
- **Blue** indicates a wire that is floating. "Floating" here means isolated from hot and neutral by switches and/or light bulbs.

Moving on to

4-Way Switches

When more than two switches control a light, the additional ones must have four terminals, and their mechanism must relate the incoming traveler-pair to the outgoing pair in the two ways shown in Fig. 2A&2B -- crossed or straight through.

Fig. 2A would complete the path through the light, but in Fig. 2B the path would be disrupted.



Wiring at the 4-Way Switch ...

With any 4 way switch circuit , a 3 way switch must start and end it, you may have as many 4 way switches between 3 way switch (1st) and 3 way switch (last).

One 3 way switch MUST have the circuit power supply ungrounded conductor (aka hot) attached to its common screw, and the at the other end of the switch circuit another 3 way switch must have the switched fixture feed (ungrounded conductor {aka hot}) attached to its common screw.

The common screw of a 3way switch is the odd color screw. If you look at each of the main connection screws on a 3 way switch you should have no problem in determining that one of the screws is distinctly different in color or one screw is darker than the others. That one screw that stands out from the other 2 is the common screw connection.

The correct wire must be connected to the common screw of the 3 way switch, or the switch circuit will not operate properly. Of the remaining 2 wires that connect to a 3 way switch, it doesn't matter which of the remaining 2 wires connect to which of the remaining 2 screws, as long as one goes on each of the remaining screws.

Wiring at the 4-Way Switch ...

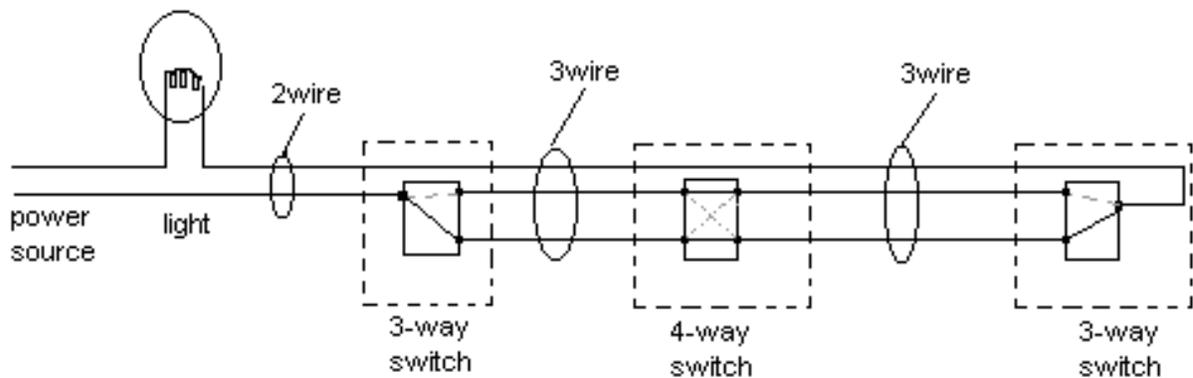
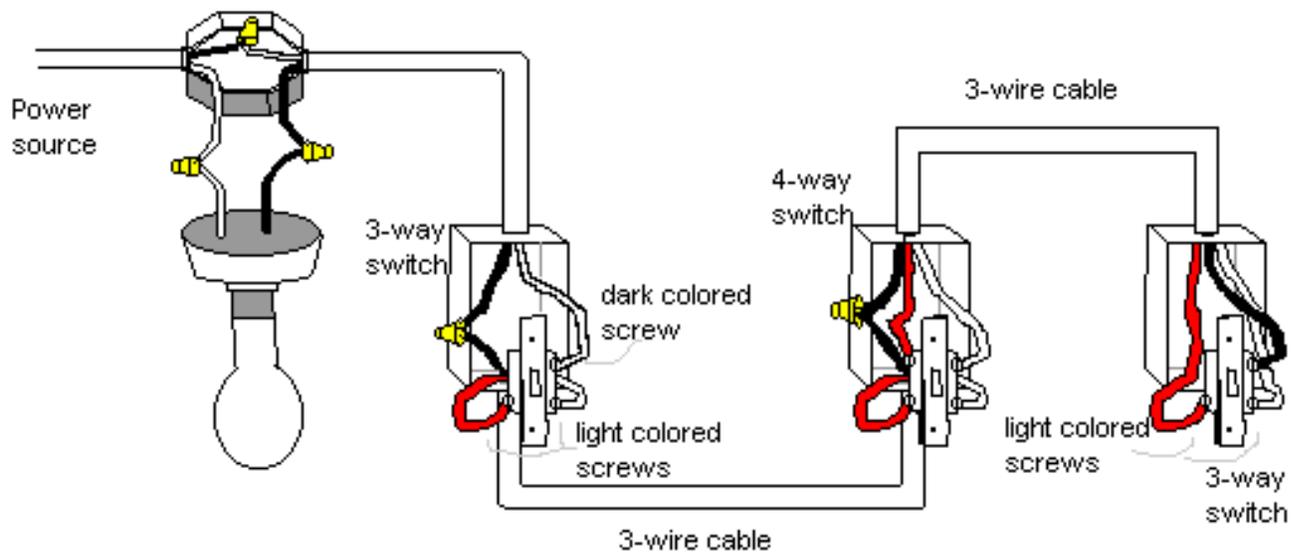
Continued

On 4 way switches there is no common screw as such, but there are matching pairs. you will find that of the 4 main connection screws on a 4 way switch , 2 screws will match , and there will be another 2 screws that match , one set will be distinctly different in color or darkness than the other pair.

Now the matching pair could be on one side of the switch and the other pair could be on the other side of the switch, OR it could be that the matching pair be on the top left and right and the other matching pair could be on the bottom left and right.

Now when wiring the traveler wires between switches, make certain that when connecting to the 4 way switch that the 2 wires coming from the previous switch connect to a matching pair of screws on the 4 way switch, and the other matching pair of screws on the 4 way switch connect to the 2 wires leading to the next switch, otherwise the switch circuit will not operate properly.

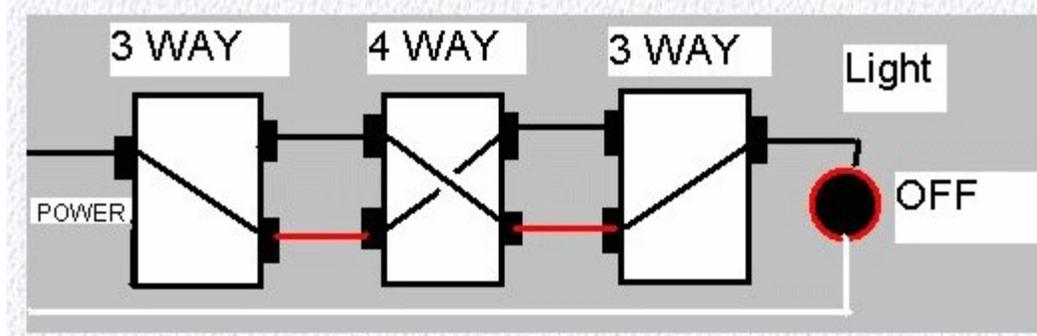
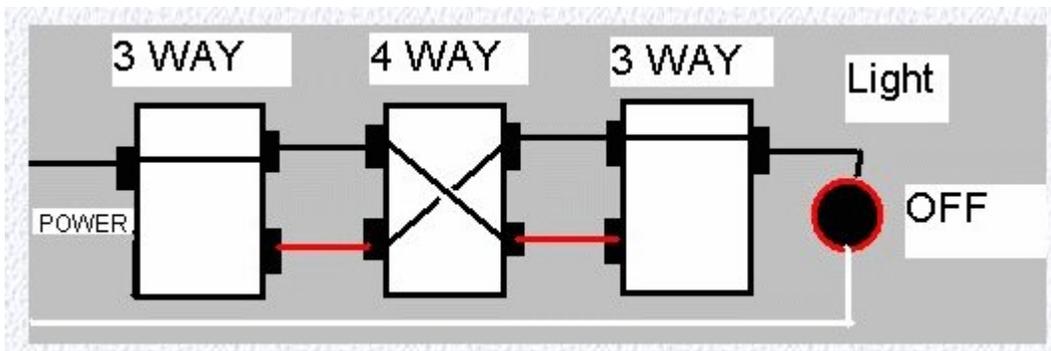
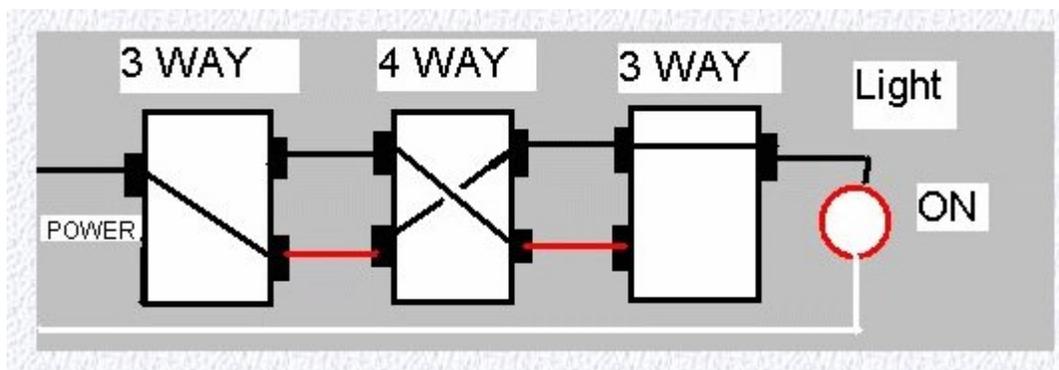
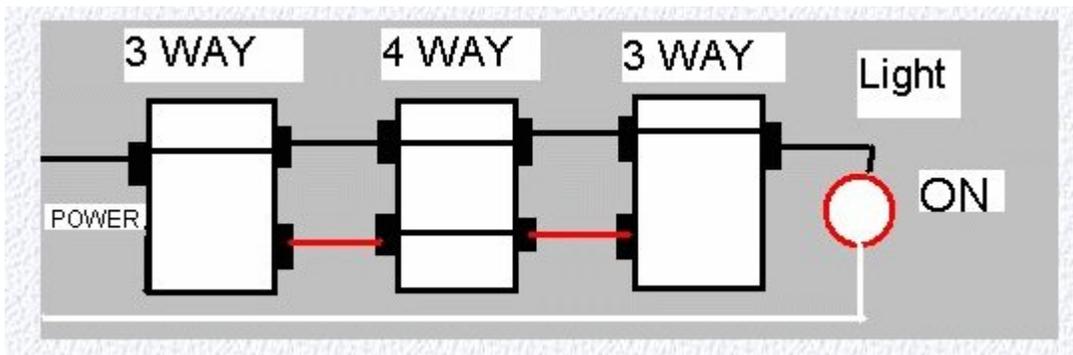
4-Way Switch



4-way switch wiring ... need two 3-way switches (one at each end) and then as many 4-way switches as you want in between. 2 wire cable runs from the light to the first switch, and then 3 wire is run between all the switches.

One 4-WAY SWITCH & Two 3-WAY SWITCHES

(Total of 3 switches controlling same fixture)

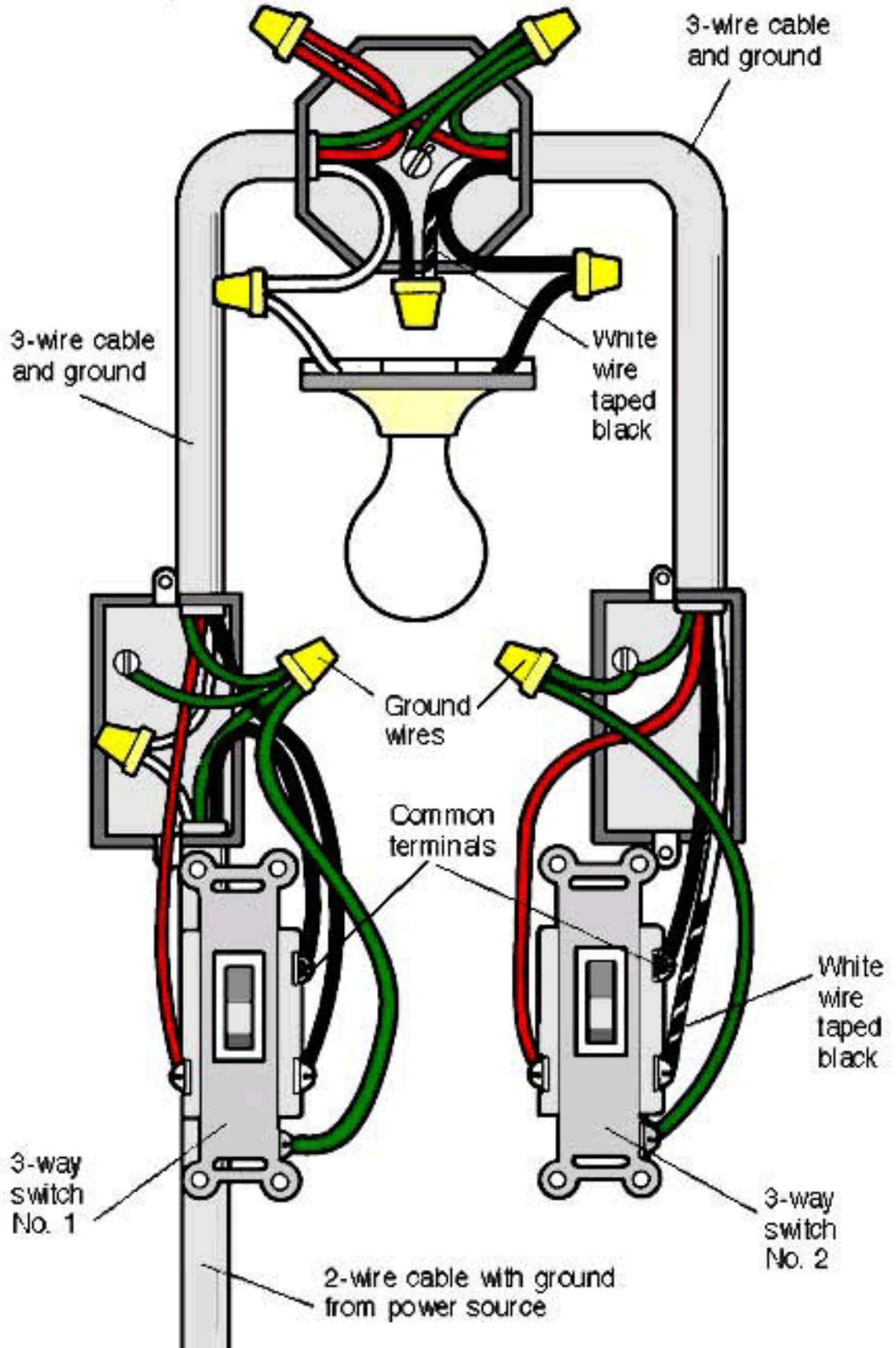


Appendix ---- Other Views

3-Way Switch--- Wiring Example

- White Wires (Neutral)
- Black Wires (Hot)
- Red Wires (Traveller or Switch)
- Green Wires (Ground)

Source: <http://www.homeimprovementweb.com/>



More ---3-Way Switches--- Examples

