



**Relays, Applications For**  
**(One Of An Installars Most Powerful Installation Devices)**

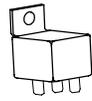
Document# 999404

For additional information on similar topics, please consult the following technical documents:

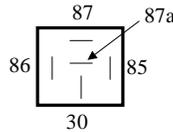
**999403** Relays, The Basics Of (How They Work)

**999003** Radio Install Basics (How Aftermarket Radios Integrate Into Electronics Of Vehicles)

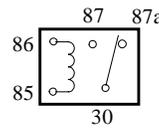
## SPDT Automotive Relays



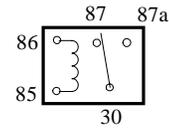
3D View



Bottom View



Schematic View (off)



Schematic View (on)

## Typical Car Audio Applications For Relays

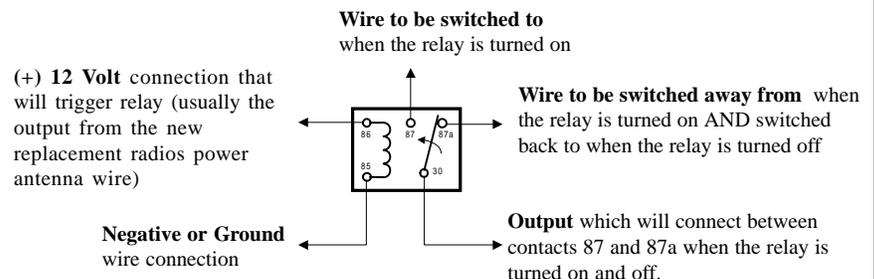
### A Basic Switch. Switching Between 2 Different Wires

**Application:** From this relay setup, virtually all car audio applications requiring a relay can be wired.

#### To Understand This Relay Configuration:

A (+) 12 Volt connection from a switch or a new radios power antenna trigger will turn on the relay switching the arm from pin 87a to pin 87. With the relay off, pins 87a and 30 are in contact. When the relay is turned on, pin 30 switches to makes contact with pin 87.

**Note:** for this SPDT relay style, the relay is switched on only when a (+) 12 Volt connection (either a temporary pulse, or a constant connection) is made to the relays coil along with a (-) negative or ground



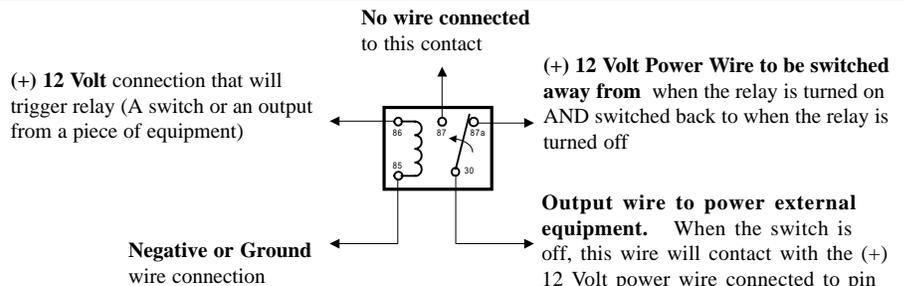
### A Basic On/Off Switch That Turns A Device Off When A Device Or Switch Is Turned On

**Application:** This circuit is commonly used to turn off a radio when a cellular phone rings

#### To Understand This Relay Configuration:

This relay configuration will allow a low current wire to turn off external equipment when a switch is turned on.

A (+) 12 Volt wire connected to the coil of the relay will switch the relays arm from a (+) 12 Volt wire attached to pin 87a to pin 87 where there is no wire attached. When the arm switches from 87a to 87, power will be disconnected from the device attached to pin 30.

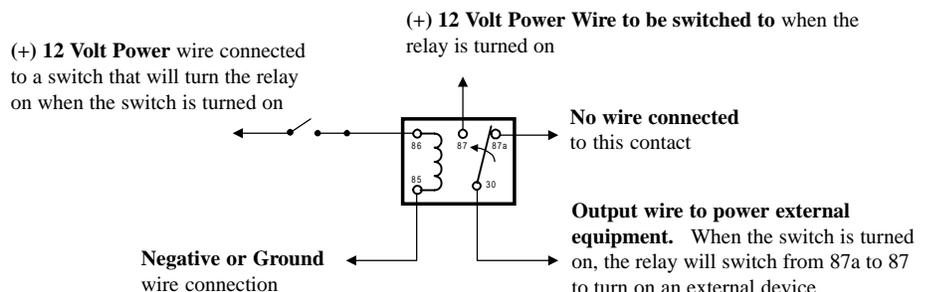


### A Basic On/Off Switch That Turns A Device On Only When A Switch Is Turned On

**Application:** Use this relay configuration with a manual switch to turn on accessories without having the switch bear the full voltage and current load

#### To Understand This Relay Configuration:

This relay configuration will allow an operator to manually turn a switch on and off to control the power to external equipment.



### Allow A Small Voltage Wire To Control A High Current Power Wire

**Application:** Allows a low current wire to control an electronic device that requires high current by turning it on and off . Turn an amp of fog lights on and off.

**To Understand This Relay Configuration:**

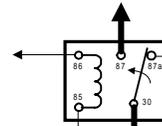
This relay configuration will be spliced in-line of a power wire. When the relay is turned on, relays switch arm will move from pin 87a, where no wire is connected, to pin 87 where the power wire will connect to the relays output at pin 30.

When the relay is off, the power wire is disconnected and no voltage flows to the output at pin 30 since no wire is connected to pin 87a.

**Power Antenna Wire**  
from new replacement radio  
OR  
Can also be a (+) 12 Volt Power Wire from a toggle switch controlled by the operator

Negative or Ground wire connection

(+) 12 Volt Power Wire usually from a reliable connection directly to the battery or other source with enough voltage and current handling (add a fuse 6-10 inches from the battery)



No wire connected to this contact

**Output** (add a high current fuse)  
Output can now be used as a power wire for a high current device

**Note:** check the current capacity the relay can handle. This style of automotive relay is manufactured in 3 power or current handling ranges: up to 20 amps, up to 30 amps, up to 40 amps. For proper operation, select the proper relay to handle the power requirements of the equipment being connected.

### Power Antenna Wire Boost (Allows Adding Additional Equipment To This Low Current Wire)

**Application:** Convert the small current power antenna wire from a radio to control multiple external components preventing a loss in current (Pre-Amp)

**To Understand This Relay Configuration:**

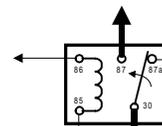
This relay configuration allows a small current power wire, such as a power antenna wire from a new radio, to output more current than the wire would normally be able to output. Normally, a radios power antenna wire drops in current each time another piece of equipment is adding, dropping the signal so low the equipment may not turn or inadvertently turn off during operation.

The low current power antenna wire will turn on the relay, switching the arm from pin 87a to pin 87 where a larger current power wire is attached.

**Power Antenna Wire**  
from new replacement radio  
OR  
Can also be a (+) 12 Volt Power Wire from a toggle switch controlled by the operator

Negative or Ground wire connection

(+) 12 Volt Power Wire usually from a reliable connection directly to the battery or other source with enough voltage and current handling



No wire connected to this contact

**Output** (with fuses)  
this wire can now be split and connected to multiple remote on inputs at other equipment

**Installation Note:** ALL remote on wires should be INDIVIDUALLY fused with no greater than a 1 amp fuse to prevent damage to equipment if a problem occurs.

### Convert A (+) Positive Voltage Wire To A (-) Negative Voltage Or Ground Wire

**Application:** Commonly used in alarm installations as well as converting Mazda power antennas up to 1992 to work with new replacement radios

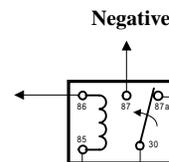
**To Understand This Relay Configuration:**

This relay configuration will turn the (+) 12 Volt output from a new radios power antenna wire or from a switch controlled by the operator to a (-) negative power or ground wire. When the (+) 12 Volt wire triggers the relay, the relays switch arm flips from pin 87a to a (-) negative ground wire attached to pin 87 and sent to pin 30.

For best results and quicker installation, use the same (-) negative or ground wire for both 85 and 87

(+) 12 Volt Power Wire  
(For Mazda Power Antenna Application)  
Power Antenna Wire from the new replacement radio  
(A Switch Application)  
a (+) 12 Volt Power wire connected to a toggle switch controlled by the operator

Negative or Ground connection



Negative or Ground wire connection

No wire connected to this contact

**Output Wire** going to equipment that needs to be a (-) negative

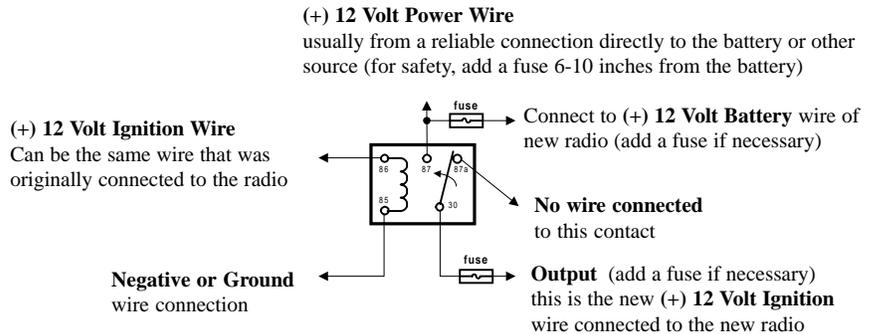
**Does Your Radio Have Strange Pops And Clicks When You Turn On Your Air Conditioner, Or Wipers, Or Turn Signals ?**

**Application:** Radio power wires may have noises induced by the air conditioner, turn signals, wipers, and other devices connected to the same fuse box circuit.

**To Understand This Relay Configuration:**

This relay configuration replaces the current radios (+) 12 Volt Ignition and (+) 12 Volt Battery wires that are included in the auto makers factory radios wire harness with a new wire routed to avoid noises caused by other electronic components being connected to the same electric circuit in the automobiles electronic wiring.

The current radios (+) 12 Volt Ignition wire will trigger the relay and switch the relay to pin 87 where a new power wire will be sent to the radio at pin 30.



**Installation Note:** Cut the original (+) 12 Volt Ignition and Battery wires to the radio. Add the relay. Add fuses where shown if no fuses are attached to the radio.