

# REVERSE POLARITY

Improper or careless wiring of receptacles (outlets) is the most common electrical defect found in a typical home. Improperly wired outlets are a potential shock hazard and can cause electrical equipment to work harder. Much of today's electronic devices such as TV's, stereos, VCRs, and computers have a 3-prong receptacle with device wiring looking for power from one direction of the outlet – improper wiring may cause the device to prematurely fail.

All receptacles should be wired such that the **hot or live (black)** lead is connected to a specific side of the outlet, and the **neutral (white)** lead to the other. A switch on an appliance you plug into the outlet, as well as your home, will open and close on the **hot** side – so when the switch is off, there will be no voltage inside the device or receptacle. On a typical receptacle, the **hot** side is the **smaller** of the two openings. Likewise the **neutral** is the **wider** of the two. A cord, where it mates to the appliance, will have one of the prongs wider so the hot and neutral sides line up correctly.

**REVERSE POLARITY** or **hot-neutral reverse** occurs when the **hot (black)** and **neutral (white)** wire connections are reversed. The **hot** wire must be connected to the **brass screw**, while the **neutral** wire is connected to the **silver screw**. Some older outlets do not have these colored screws, consider upgrading to avoid confusion.

**OPEN GROUND** receptacles indicate that the **bare copper** wire in the sheathed cable is not connected to the **green screw** on the receptacle. It also occurs frequently in older homes originally wired with a **2-wire system (knob and tube or duplex wiring)** where an upgrade has included a 3-prong receptacle. *This is an unsafe practice and does not comply with current Electrical Codes – which requires that original and replacement outlet be grounded correctly.* If grounding does not exist, the outlet must be replaced with a **2-prong** (non-grounding) receptacle or with a **3-prong GFCI** (ground fault circuit interrupter) receptacle. The 3-prong GFCI receptacle must also be marked as "No Equipment Ground".

In some installations, the **ground (bare copper)** wire may have been connected to the metal receptacle box in which case some homeowners use an **adapter** connected to the cover screw of the outlet to achieve ground. *This is an unreliable method and is against most Electrical Codes.* It is much safer to upgrade to a **3-prong** receptacle with the ground wire connected directly to the receptacle. Note that some small appliances such as radios and lamps do not require a ground.

An **OPEN NEUTRAL** receptacle does not have a **neutral** wire connected. Electrical current works on the simple principal that the hot carries current to the receptacle and back via the neutral wire in a closed system. In open neutral installations, the circuit is completed through the ground wire – which is intended to be the *secondary path*. In older installations, the neutral is shared by the opposing hot leg of the 240-volt service. This results in erratic voltages which could damage electronic equipment and pose a potential shock hazard.

**HOT/GROUND REVERSED** is a very dangerous situation. The receptacle enclosure and housing of the equipment plug into the receptacle may be energized. ***In this case, your body will complete the circuit to ground!***

## **CORRECTING AN IMPROPERLY WIRED RECEPTACLE:**

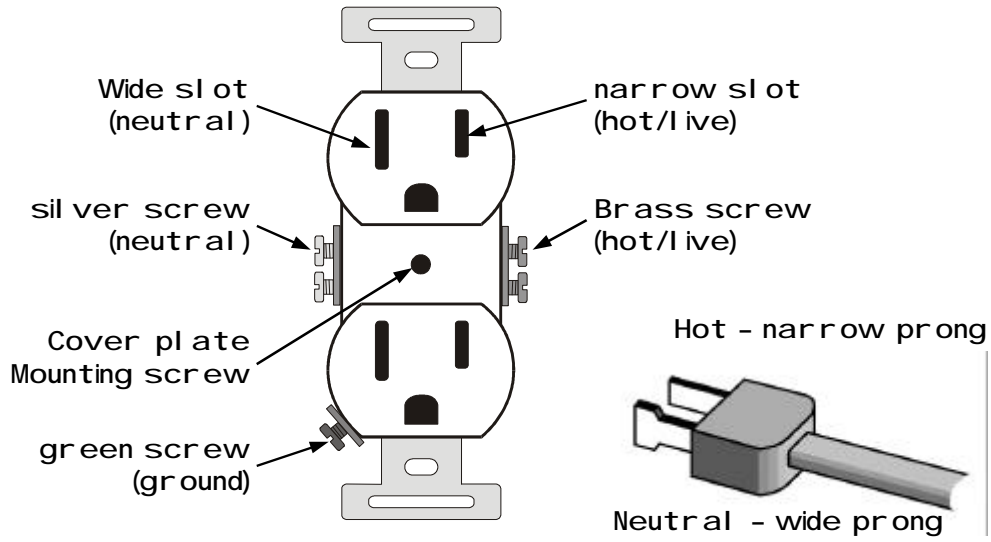
Use a **voltmeter** or receptacle **tester/analyzer** to check the wiring on your receptacle. With a voltmeter, the voltage between the hot (narrow) prong and the ground (semi-circle) prong should measure about 100-125 volts. There should be no reading between the neutral (wider) prong and the ground prong. If these readings are reversed, the outlet has reverse polarity. To correct the problem, the receptacle must be removed from its box and wired as listed below:

- **HOT (BLACK) WIRE CONNECTED TO THE BRASS SCREW (OR THE SIDE WITH THE NARROW PRONG)**
- **NEUTRAL (WHITE) WIRE CONNECTED TO THE SILVER SCREW (OR THE SIDE WITH THE WIDER PRONG)**
- **GROUND (BARE WIRE) CONNECTED TO THE GREEN SCREW**

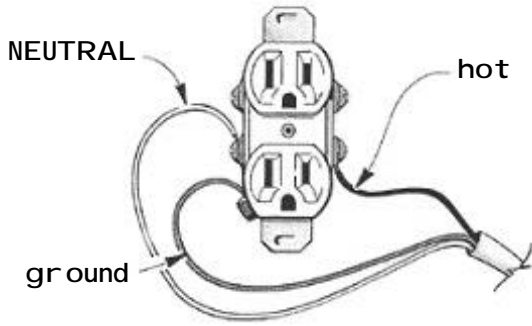
***WARNING: Turn off all power to outlet and verify the power has been cut off to outlet before attempting to repair any outlet on your own. Electrical work is best left to a qualified professional electrician.***

For further information contact your local public utilities office or a licensed electrician.

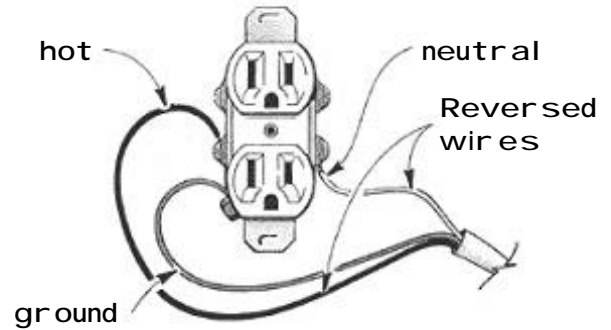
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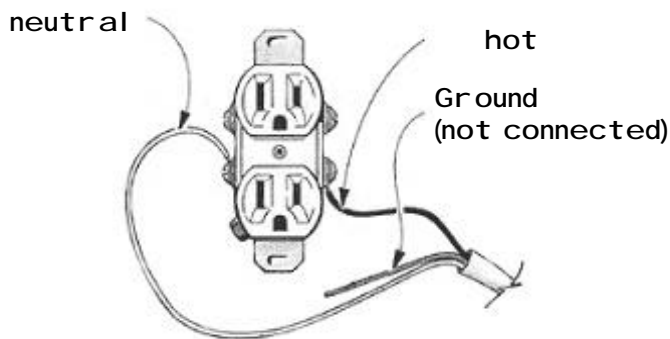
Typical receptacle and polarized cord



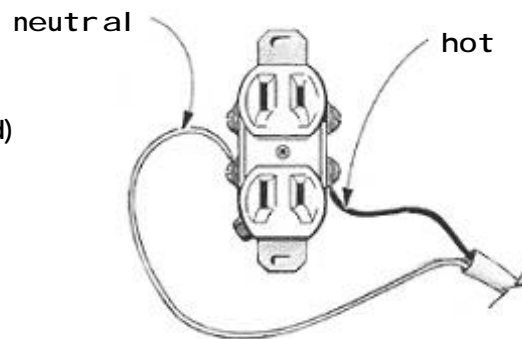
Correct wiring



Reverse polarity



Open ground



2-prong/non-ground