



Consulting, Resource, Education, Training, and Support Services for Home Inspectors  
*"A candle loses no light when it lights another candle."*

## ***Electrical Receptacle Outlet Reverse Polarity & Open Ground***

### **Explaining Reverse Polarity**

This article is the result of a question from **ProSpex** subscriber Lee Cunningham: "When it comes to reverse polarity what kind of discussion did you have with the customer?"

I would typically explain reverse polarity in the following manner:

Electrical receptacle "polarity" refers to the manner in which the "hot" (live) side wiring and the "neutral" side wiring of an electrical circuit are connected to the receptacle. I would point to a receptacle and explain that, when it is properly wired, the black or "hot" wire is connected to the terminal on the receptacle for the short slot and the white or "neutral" wire is connected to the terminal on the receptacle for the long slot.

Correct "polarity" helps reduce the potential for shock by isolating the "hot" side of the wiring at the "on/off" switch of electrical equipment such as lamps, fans, and other electrical equipment, appliances, and electronic devices.

"Reverse polarity" is a term that describes an electrical condition in which the "hot" wire is connected to the terminal on the receptacle intended for the "neutral" wire and the "neutral" wire is connected to the terminal on the receptacle intended for the "hot" wire. The wires are, in effect, "reversed."

Manufacturers design and assemble certain electrical devices with polarized plug ends so that they can only be inserted into a receptacle one way. In the case of a lamp that is plugged into a correctly polarized receptacle, when the lamp's switch is in the "off" position, the electrical circuit is open and the flow of electrical current is interrupted at the switch. All of the other electrical components beyond the lamp switch are "dead" because no current can flow past the open switch.

But, if the polarity is reversed at the receptacle, then the lamp's "hot" wire becomes the "neutral" wire because it is connected through the plug to the neutral side of the receptacle and the lamp's "neutral" wire becomes the "hot" wire.

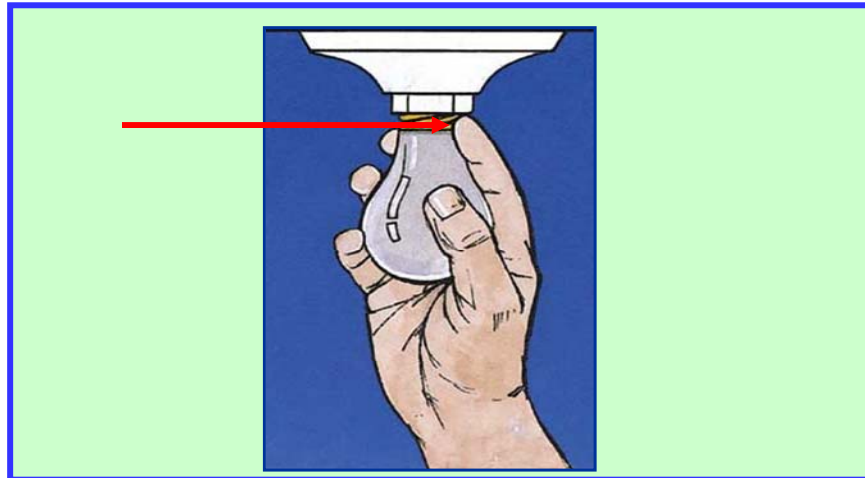
When the lamp's switch is in the "off" position, the lamp won't turn on because the circuit is open, but it is open on the "neutral" side of the circuit. The wire in the lamp that's intended by the manufacturer to serve as the "neutral" wire is now acting as the "hot" wire because it's connected to the "hot" side of the wiring at the receptacle where the polarity is reversed.

"Now," I would say, "let's look at how this could shock someone."

I would take out a small, 7½ watt light bulb that I carried with me and show my customer(s) the two points on the screw base where electrical contact is made when the bulb is screwed into a lamp screw socket. I would explain that the contact point on the tip of the base of the bulb connects with a contact point that is in the bottom of the socket which is, in turn, connected to the "hot" wire through the lamp's switch. The rest of the metal on the bulb's screw base contacts the threaded metal portion of the socket and that metal portion of the socket is connected to the "neutral" wiring in the lamp.

This means that if I screw in a bulb into the screw socket of a lamp that is plugged into a correctly polarized receptacle, if the lamp's switch is in either the "on" or "off" position and my finger is touching the metal on the side of the base of the bulb, I am protected against potential electrical shock even if I am grounded because I am touching the "neutral" portion of the base and there is no completed circuit.

### Why correct polarity is important



But, when the polarity is reversed, even with the lamp's switch in the "off" position, the threaded metal portion of the screw socket is now connected to the "hot" wiring in the receptacle. If my finger is touching the metal on the side of the base of the bulb and if I am grounded, I will complete the circuit and I will get shocked.

I let them know that reverse polarity would be designated for **IMMEDIATE ACTION** in the report because it is an **ADVERSE CONDITION** in the electrical system but I also reassured them that it is a relatively common condition and that it is usually simple and inexpensive to correct.

This may seem like a lot to say and it may seem like will take a long time to explain, but that is not the case. Once you have your explanation down pat and can vary it according to your own style and to your customer's interest and attention span, it is a pretty quick process.



Consulting, Resource, Education, Training, and Support Services for Home Inspectors  
"A candle loses no light when it lights another candle."

## DRAFT COPY Prototype Document

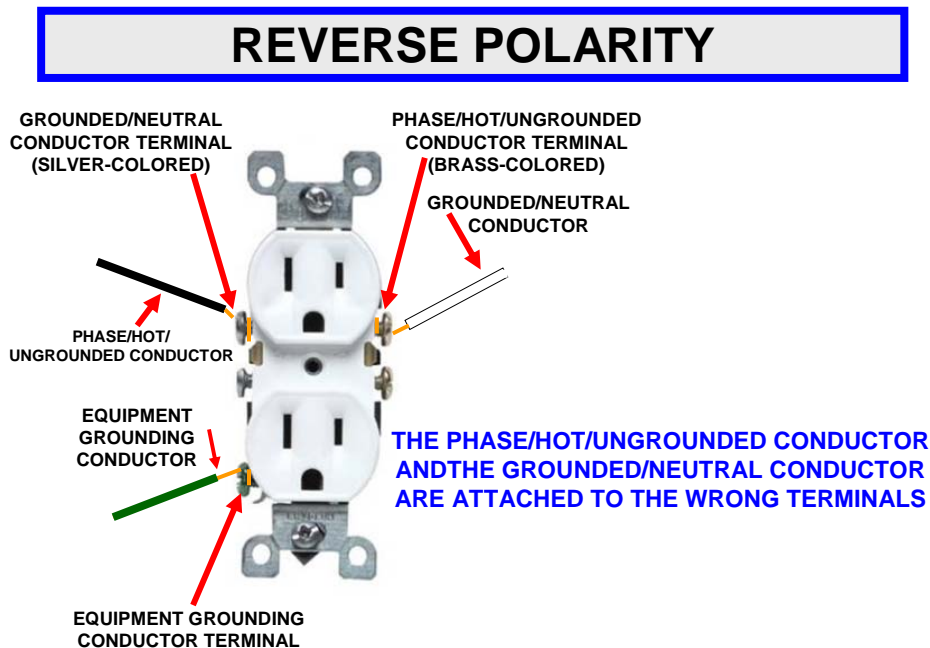
**THE WRITTEN WORK PRODUCT WHICH ACCOMPANIES THIS COVER PAGE IS NOT INTENDED AS OR REPRESENTED AS LEGAL ADVICE OR LEGAL OPINION OF ANY KIND WHATSOEVER NOR IS IT TO BE CONSIDERED OR CONSTRUED AS SUCH. DO NOT USE ANY OF THIS MATERIAL IN ANY MANNER WITHOUT PRIOR DISCUSSION WITH AND REVIEW AND APPROVAL BY A COMPETENT ATTORNEY!**

**TITLE OF THE DRAFT DOCUMENT WHICH ACCOMPANIES THIS COVER PAGE:**

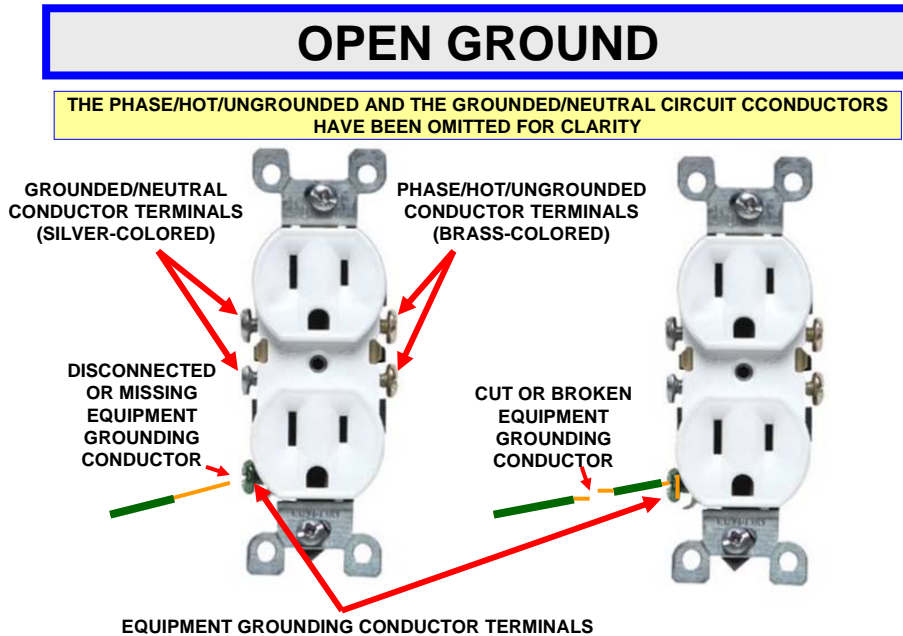
### Report Language to Explain Reverse Polarity and Open Ground

The following prototype language is suggested for use in written inspection report to explain the terms "reverse polarity" and "open ground" as they apply to receptacle outlets.

Reverse polarity is a condition which adversely affects a 120 volt (nominal) receptacle outlet. It results from the incorrect wiring (reversing) of the electrical system hot and neutral wires to the receptacle outlet. An electrical device will typically operate when plugged into a receptacle outlet with reverse polarity. However, any on/off switch for the device will close and open the circuit through the neutral wiring instead of the hot wiring. This increases the potential for electrical shock to users of the device. Therefore, reverse polarity conditions at receptacle outlets should be corrected as soon as possible by a **QUALIFIED** electrical contractor.



Open ground is a condition which adversely affects a grounded type 120 volt (nominal) electrical receptacle outlet (a receptacle outlet which is designed to accept a three-pin plug end). An open ground condition exists when there is a missing or disconnected electrical system equipment grounding wire at the receptacle outlet or between the receptacle outlet and the electrical system grounding source. An electrical device equipped with a three-pin plug end and designed and intended to be grounded will typically operate when plugged into a receptacle outlet with open ground. However, the portions of the device intended to be connected to the electrical system grounding source through the grounding wire will not be grounded. This increases the potential for electrical shock to users of the device. Therefore, open ground conditions at receptacle outlets should be corrected as soon as possible by a **QUALIFIED** electrical contractor.



The following prototype language is suggested for use in written inspection report to explain the terms “**reverse polarity**” and “**open ground.**”

Reverse polarity is a condition which adversely affects a 120 volt (nominal) electrical receptacle outlet. It results from the incorrect wiring (reversing) of the electrical system hot and neutral wires to the receptacle outlet. An electrical device will typically operate when plugged into an outlet with reverse polarity. However, any on/off switch for the device will close and open the circuit through the neutral wiring instead of the hot wiring. This increases the potential for electrical shock to users of the device. Therefore, reverse polarity conditions at receptacle outlets should be corrected as soon as possible by a **QUALIFIED** electrical contractor.

Open ground is a condition which adversely affects a grounded type (designed to accept a three-pin plug end) 120 volt (nominal) electrical receptacle outlet. It results from a missing or disconnected electrical system equipment grounding wire at the outlet or between the outlet and the electrical system grounding source. An electrical device equipped with a three-pin plug end and designed and intended to be grounded will typically operate when plugged into

an outlet with open ground. However, the portions of the device intended to be connected to the electrical system grounding source through the grounding wire will not be grounded. This increases the potential for electrical shock to users of the device. Therefore, open ground conditions at receptacle outlets should be corrected as soon as possible by a **QUALIFIED** electrical contractor.