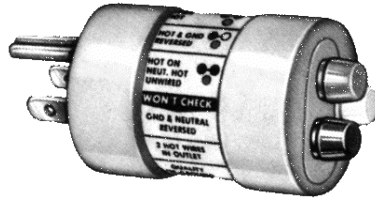




### 3 Light Electrical Circuit Testers Guide & Code References



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**Note:** These testers do not indicate all possible wiring errors.

Unless otherwise noted, equivalent NEC<sup>®</sup> references are from the 2014 edition of the NEC<sup>®</sup> code.

The testers are not infallible and can indicate erroneous results or even indicate correct wiring under multiple fault conditions. Additional testing would be required in those situations.

Some testers indicate conditions which are equipment diagnostic related and not necessarily a safety hazard.

These types of instruments, which are UL listed, are typically listed to UL Standard 1436 "Outlet Circuit Testers". UL specifically states that "these devices are not comprehensive diagnostic instruments", and further states they only "identify probable wiring conditions". The UL listing does not insure that the instrument will perform any or all tests with any degree of accuracy. The UL listing is for electrical safety for the user of the instrument.

**Correct wiring:** The tester can be "fooled" to indicate this under multiple fault conditions. If the test is part of an accident, incident or fatality investigation, additional tests are required.

Does not indicate more complex serious conditions such as "Boot-Leg" or High impedance (High Z) ground.

**Open Hot:** Typically indicates an electrically "dead" or de-energized outlet. Can be fooled under multiple fault conditions, where there can be voltage present. There can also be energized conductors in the receptacle box which are not connected to the outlet.

**Open Neutral:** Equipment won't run. Typically a hazard exposure to people working on the branch circuit or equipment plugged into the branch circuit. 1910.304(g)(2), 1926.404(f)(4), NEC<sup>®</sup> Article 250.26 (1)-(5) - 2014

**Open Ground:** Equipment will run normally. **Serious electrocution hazard**, unless a double insulated tool is used and/or GFCI. 1910.304(g)(5), 1926.404(f)(6),

**Open Ground Cont'd:** NEC<sup>®</sup> Article 250.4(A)(5) – 2014 Edition & previous  
NEC<sup>®</sup> Article 250-2 (1999 Edition)  
NEC<sup>®</sup> Article 250-51 (1996 & previous editions)

**NOTE:** The three light tester does NOT indicate the quality or effectiveness of the grounding conductor circuit and a more sophisticated instrument should be used to ascertain same for an accident or fatality investigation in order to positively identify causal factors. The three light tester will indicate presence of a ground to upwards of 100,000Ω. This value is equivalent to having no ground. An Ohmmeter can NOT be used for this test.

**Reverse Polarity:** Reversal of the ungrounded conductor (hot) and grounded conductor (neutral) in the branch circuit. “Reverse Polarity” does NOT energize the case or enclosure of the tool or equipment. There are other hazards associated with this condition. Equipment will run normally. Hazard exposure is to personnel working on circuits and or equipment. Ground faults in tools with reverse polarity could result in the tool not stopping when the control switch is released exposing the user to severe reaction hazards or, **Electrocution hazard** depending on the appliance.  
1910.304(a)(2), 1926.404(a)(2),  
NEC<sup>®</sup> Article 200.11

**Hot & Ground  
Reversed:**

**Serious electrocution hazard** perhaps **imminent danger** because any metal case tool plugged into such a receptacle will have an energized case.  
1910.304(a)(3), 1926.404(a)(3)  
NEC<sup>®</sup> Article 406.(10)(C)

**Hot on Neutral**

**With Hot unwired:** See reverse polarity.  
1910.304(a)(2), 1926.404(a)(2),  
NEC<sup>®</sup> Article 200.11  
1910.304(g)(2), 1926.404(f)(4), NEC<sup>®</sup> Article 250.26

Note: Students attending Grizzys “Electrical Safety Standards” course, test these and additional hazardous fault conditions using test equipment on specially designed electrical fault outlet test boards. The individual tests, associated hazards and applicable standards are analyzed and discussed in the course, along with the limitations of these testers and additional testing options for analyzing receptacle faults.