



Simple Coax Testing

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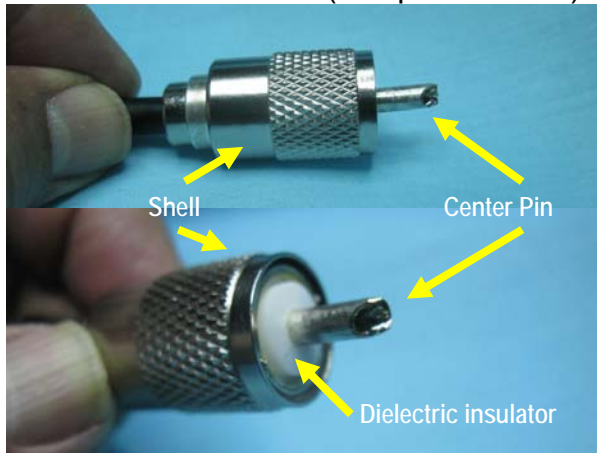
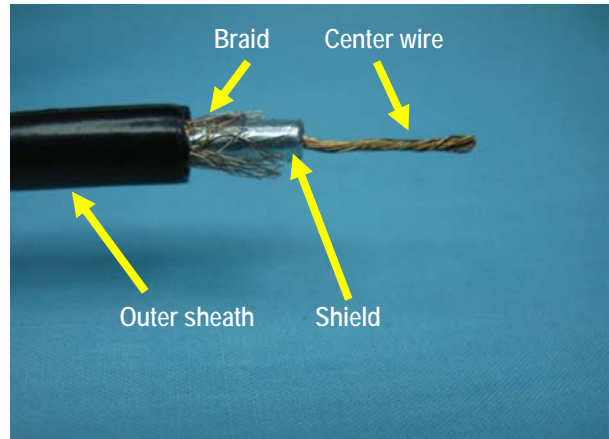
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After installing PL259 connectors when making coax jumpers and feed lines, it is a good idea to “test” these before putting them into service.

The coax has 2 conductors: the braid and the center wire (see right photo). PL259 connector has 2 basic parts: the shell and the center pin. These are separated by the white dielectric insulator. The center pin is connected to the center conductor of the coax. The coax braid is connected to the shell (see photo below).



When properly installed, there should be no electrical connectivity (conductivity) between the PL259 center pin and shell. So the first and obvious test is for continuity using a VOM. This will tell you if you have any shorts in the PL259 fitting you installed which also affects the entire coax assembly.

Ohms (“Ω”) measures resistance (the opposite of conductivity). Zero ohms (“0Ω”) means “no resistance” which also means “conductivity”.

The photo on the right shows the VOM with test leads connected and a coax jumper with two PL259 fittings for a test demo. This is considered a binary test. There is either “no resistance” or “resistance”. There is no in between. For certain parts of the PL259/coax assembly we want conductivity. For other parts we do not want any conductivity.



The next series of photos will show how to use a VOM step-by-step to check a typical PL259 / coax assembly. This is the first test you should do on any coax before connecting it to your radio / antenna system.

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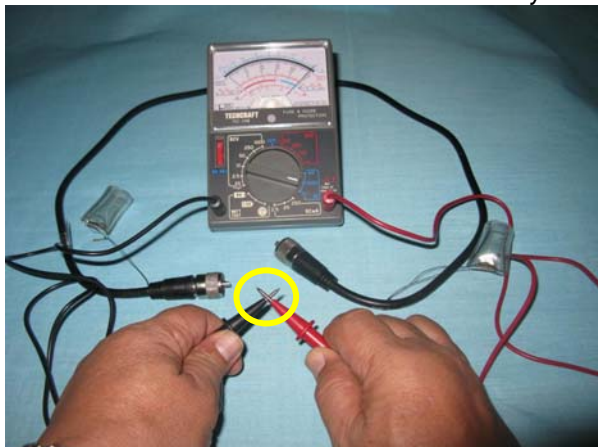
[**Note:** Don't forget to make sure the batteries are in good condition before doing any tests. If in doubt, replace the batteries with fresh ones before starting any tests.]



Turn the selector to "Ω" to measure continuity.



We selected the mid-range of the choices.



Check the calibration by touching the probes together.



The reading should be "0 Ω" meaning no resistance.

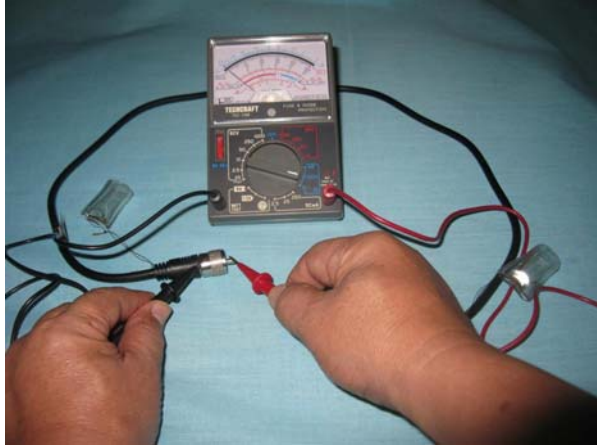


If it is not "0 Ω" use the "0 Ω Adj" knob to adjust the needle to read "0 Ω"



Recap: Resistance ("Ω") is the opposite of conductivity. A low resistance value means conduction can easily take place. A high resistance value means conduction is not occurring. In the PL259 / coax assembly, conduction is desired through the center pin / wire (essentially pin to pin through the length of the coax). The same is true of the

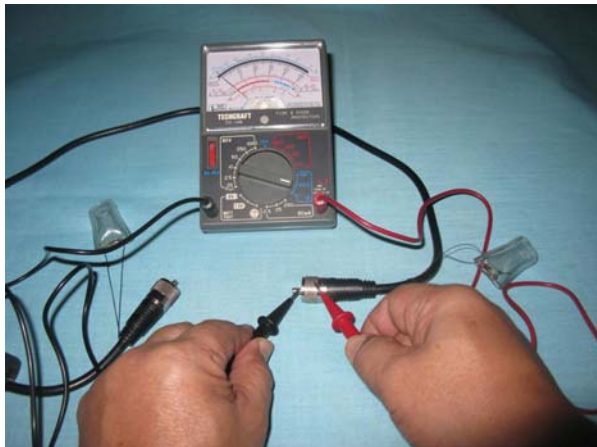
shell / braid. However, any conduction taking place between the center pin / wire and the shell / braid is a “short” and means the PL259 / coax assembly is faulty.



Check one of the PL259s by putting a test lead on the shell and the other on the center connector.



A high reading on the Ω scale means there is no conductivity between the shell and the center pin.



Check the other PL259 by putting a test lead on the shell and the other on the center connector.



So far, so good. There should be no electrical conductivity between the shell and the center pin.

So far, so good. The high value in Ω shows no conductivity is taking place between the center pin and the shell. There is no short in either PL259 connector.

To check on the conductivity through the length of the coax, touch one test lead to



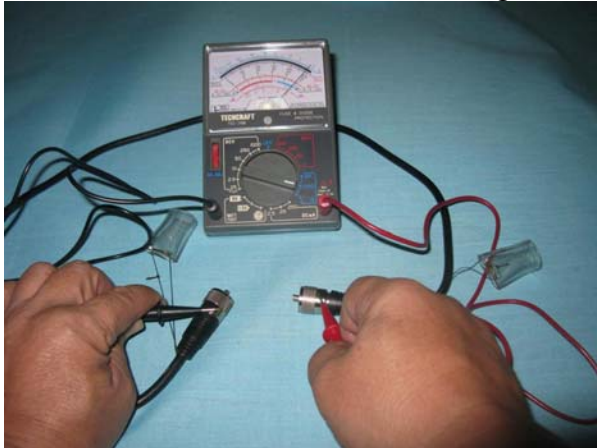
Put a test lead on each center pin and check the reading.



The reading should be “0 Ω ” meaning no resistance.

The center pin on one end of the coax and the other test lead to the center pin on the opposite end of the coax. A low Ω value shows conductivity is taking place. This is good. We want the signal to go through the coax.

Repeat the process, but this time put a test lead on the PL259 shells at opposite ends of the coax. A low Ω value shows conductivity is taking place. This is good. This shows the wire braid is intact through the length of the coax. (See photos below.)



Testing for continuity from shell to shell.



The reading should be "0 Ω " meaning no resistance.

Connection	Good (OK)	Not Good
Pin 1 to Shell 1	High Ω	Low Ω
Pin 2 to Shell 2		
Pin 1 to Shell 2		
Pin 2 to Shell 1		
Pin 1 to Pin 2	Low Ω	High Ω
Shell 1 to Shell 2		

The summary table on the left lists the connection combinations for a typical PL259 / coax assembly. [The table is redundant as a double check.] The resulting binary high / low Ω values and Pass / Fail ratings are also listed. This simple test can be done on any PL259 /

coax assembly shortly after you complete installing a PL259. You can also periodically check your existing coax inventory. After all, coax conditions can change over time due to exposure to weather or wear and tear from routine use.

The following photos show what happens when you encounter faulty PL259 / coax assemblies.



Test leads are on Shell 1 and Pin 1.



The reading shows "0 Ω " meaning no resistance; there is a short in this assembly.



Test leads are on Pin 2 to Shell 2



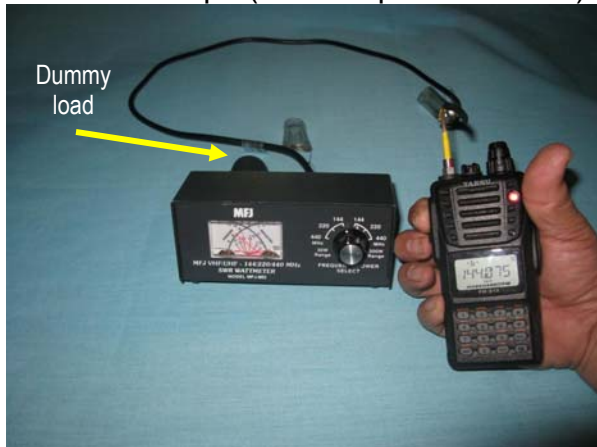
The reading shows "0 Ω" meaning no resistance.

Something is not right. There should be high resistance / no conductivity between the center pins and the shells of both the PL259s on this jumper. This PL259 / coax unit has a short in it. This test doesn't tell you which PL259 has the problem as a short in one end of the coax may cause continuity throughout the entire unit.

Dummy Load / SWR Test

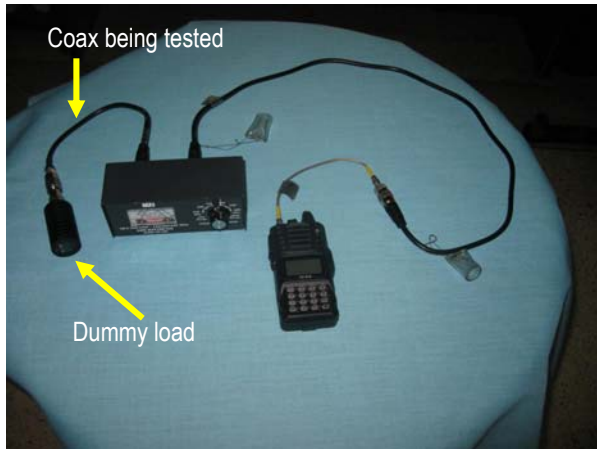
If the PL259 / coax assembly passes the VOM test, there another simple test you can do before using the assembly with your radio / antenna system: the Dummy Load / SWR test. Be sure the radio is turned OFF before you connect it to the SWR meter.

The basic set up calls for a dummy load connected to the "antenna" position of the SWR meter with your radio connected to the "transmitter" position. Turn on your radio, key the mic, and record the SWR reading (it should be 1.0 : 1 or 1.1 : 1). This is the calibration step. (See the photos below.)



To test a PL259 / coax assembly, check to make sure your radio is turned "OFF". Then insert the coax to be tested between the SWR meter and the dummy load. Check to be sure all connections are firm (finger tight). Lay the coax out. Don't coil up any "excess" coax.

Turn the radio "ON", key the mic, and watch / record the reading. If all is well, the SWR reading should be close to 1.0 : 1 or 1.1 : 1. If there is a problem, the SWR reading will be very high indicating that much of the transmitted energy is not making it through.



Here's the set up to test a coax jumper. The coax being tested is at the antenna position to the dummy load.



The SWR is off the scale indicating a problem with the coax being tested.

PL259 Assembly Discussion

Proper PL259 assembly is one of the challenges for new hams. The two basic approaches are to solder or crimp the fitting. Soldering is the more common approach. Many find the upfront cost for crimping tools a bit daunting.

Poor soldering is a leading cause of PL259 / coax assembly failures. This ranges from cold solder joints (insufficient heat) to excessive heat damage to the insulation to corrosion due to excess rosin residues.

There are some alternative assembly methods requiring only the soldering of the center pin while by-passing soldering the braid to the PL259 shell. Two such alternatives can be found at:

- <http://www.hamuniverse.com/ve3vdcpl259.html>
- For installing PL259 on RG8X coax: <http://w4trc.org/PL259.pdf>

We don't advocate any particular method. We believe in freedom of choice. Every ham is an individual operating in a different environment. Keep an open mind, try different methods, and find out what works best for you. Whichever way you decide to install PL259 / coax assemblies, we strongly suggest you test them before putting them into service. It is also a good idea to periodically test your coax as exposure to the elements and frequent uncoiling and coiling of your coax in field operations exerts stress and strain on them. 🌐