# SOLDERLESS PL-259 CONNECTOR

by
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## INTRODUCTION

I would like to draw attention to a PL-59 connector that requires no soldering. No more cutting back the jacket, unbraiding the braid, stripping the center conductor, and trying not to melt the cable or burning fingers when soldering. No investment in expensive or specialized tools is required, and assembly is fast. The cost is about $10 per connector, but it is high quality, gold plated brass. For the casual ham who may only make a few connections per decade to those making connections frequently, this looks to be the answer to an otherwise tedious process.

This is what you do – cut the coax off square, slide a coupling ring and a cover ring on to the cable, slide a O ring on to the cable, shove the end of the coax into the connector, use a pair of ordinary pliers to crimp 6 fingers down on to the cable, and then screw the cover ring over the connection. In less than 2 minutes, it's done.

## APPLICATION

This product has been routinely used by the marine industry for shipboard RF installations for at least 5 years in the Vancouver area, primarily for VHF radio. Reports are that it is reliable and durable, particularly in the harsh salt water marine environment.

However, this author has not been aware of their existence and neither were others within our community. This is surprising as this connector appears to be more than useful for Amateur applications in the HF and VHF bands, probably up to 100W.

It is specifically designed to accommodate 50 ohm coax such as RG-58, RG-8X and LMR-240 Ultraflex © that we commonly use. The only tool required to assembly would be a pair of line-man needle nose pliers with a cutting capability. The connectors are well and truly clamped by the mechanism employed in this connector. One cannot pull the cable out of the shell.

As with any outdoor RF connection, it is essential to make it weatherproof in accordance with an article soon to be published in TCA regarding techniques for ensuring the long term integrity of the connection.

## TECHNOLOGY

This connector appears to be the intellectual property of CenterPin © Technology Inc. Looking at their web page, the company has developed a technique for the connection of wires to a wide range of connectors without the need to make a soldered or specialized crimp connection. This has been applied to RF connectors such as PL-259's, type N's, BNC and others. The overall mechanism is an ingenious method connecting the center conductor of the coax to the connector pin, gripping the coax mechanically, and at the same time making the electrical connection to the braid. The integrity of the connection is ensured with a cover ring that keeps the mechanical grip and electrical connection in place. Also, the connector features an O ring to address moisture ingress, not seen any other PL-259 that this author is aware of. However, this alone does not ensure the weather proofing of this connector system.

Visit CenterPin © Technology Inc. to view the connectors at,

http://www.centerpin.com/CenterHome.cfm

Click on Coaxial Connectors > More Info > View Animation and click the right hand cable, which simulates the RG-8X style with stranded center conductor coax, to view how the connector is installed.

**THE CONNECTOR**

Figure 1 provides and overall view of the connector assembly with the coax in place. The various components are identified.

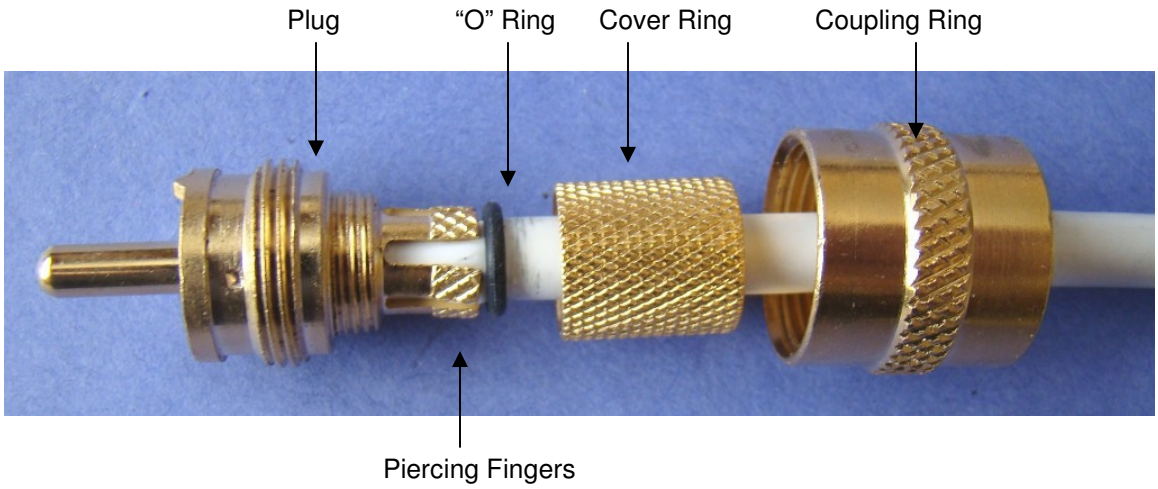


Figure 1 – CONNECTOR ASSEMBLY

The piercing fingers are shown in the compressed position, having been pressed into the coax jacket and braid. This provides the mechanical grip and electrical braid connection. The cover ring is then screwed over top of the fingers to keep them in place. The coupling ring is then moved forward and threaded on to the plug to complete the connector assembly.

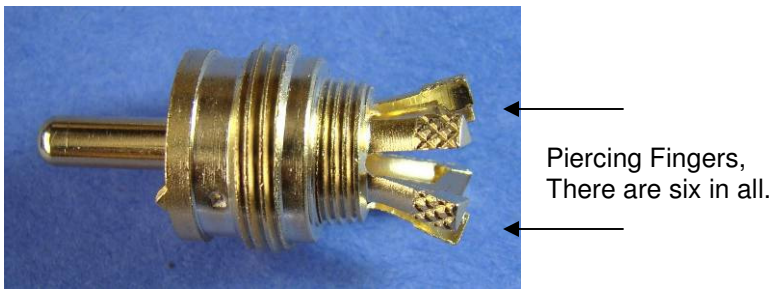


Figure 2 – Piercing Finger Detail

Referring to both Figures 2 and 3, the piercing fingers are seen such that end-on, they have a triangular shape, with an apex pointing inward. This chisel design provides the piercing mechanism.

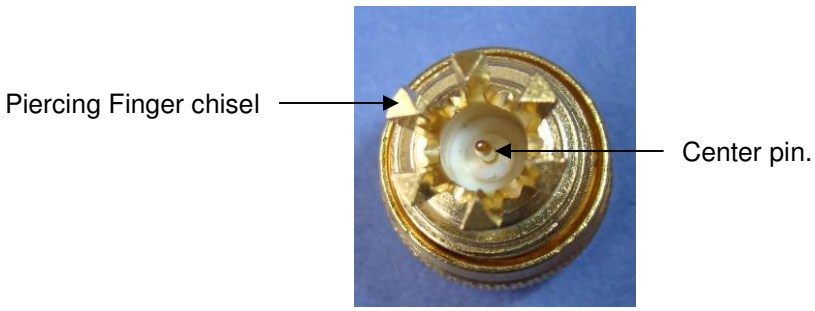


Figure 3 - Center Pin Detail

Regarding Figure 3, the coax cavity is precisely dimensioned to accept RG-8X or LMR-240 so as to ensure centering of the coax center conductor on to the center pin. Note that the outer jacket of the coax must NOT be removed or cut back. It must remain in place to center the coax to the pin.

In the case of the smaller diameter RG-58 coax, a plastic "cup" is provided with the kit to shim the outside diameter of the smaller RG-58 cable so that it remains centered on the center pin.

Can one re-use the connector? I don't know. The fingers would be of critical concern, work hardening and breaking off perhaps, but careful, slow prying might give one a second chance to salvage the plug to make another connection.

There is another product worth mentioning, the PL-258. A PL-258 is the PL style double female connector known as a "barrel". Normally when one joins two coax's together, a barrel is used to join the two PL-259's on each end of the cables. This is OK if the connection is temporary, but if permanent, it requires 2 plugs and a barrel which can become expensive. However the CenterPin © PL-258 product offers a permanent barrel using the same techniques as the PL-259. The no-solder PL-258 simply connects the two cable ends together with piercing fingers on each end of the barrel. Two cover rings complete the installation. No PL-259 connectors are required.

**ASSEMBLY**

Having seen the no-solder PL-259 installation performed, I installed two no-solder connectors on a length of RG-8X and two more on another same length of LMR-240 Ultraflex © .

My notes: Cut the end of the coax cleanly and at right angles to the coax. While lineman needle nose pliers with cutter will work, I personally use a cable cutter to lessen distortion when cutting the cable. It is important to keep the coax round, not squashed, so it will fit easily into the Plug recess. If the coax is out-off round, use the pliers to gently restore roundness. Inspect the cut end to be certain that a strand of braid has not shorted to the center conductor. Make sure the dielectric surface is clean of debris. Slide the coupling ring, the cover ring and the O ring on to the coax. Push the plug body on to the coax with a twisting motion. Keep pushing and rotating the plug until the coax is snug to the bottom. The internal pin will be aligned with the center conductor and will slide up into the strands to make the connection. Start crimping the fingers down on to the coax, opposite pairs at a time. Go around and press all fingers into the coax. The chisel points on the fingers will pierce the outer jacket and make contact with the braid. Slide the O ring down and butt it up to the fingers. Slide the cover ring down and screw it on to the plug. You might want to hold the plug with the pliers when tightening the cover ring. Slide the coupling ring over the assembly and screw it past the plug so that it is free and ready to connect. Time taken, less than 2 minutes.

With an ohmmeter, check for shorts between the braid and center pin and continuity of center pin to center pin and braid to braid, end to end.

## TESTS

How does the no-solder connector perform? An SWR comparison was made between a soldered silver-teflon PL-259 RG-8X cable and the no-solder PL-259 with RG-8X cable. Also, a same length LMR-240 Ultraflex © cable was made using the no-solder PL's. SWR was measured with an Array Solutions AIM-4170 Antenna Analyzer. All cables were 4.3 meter long and terminated with a 50 ohm load. All cables were scanned from 1 MHz to 160 MHz. The differences between soldered and no-solder, and cable types was insignificant, that is, no more than 1%.

## SUMMARY

I can only say it is about time an easy, inexpensive, reliable, no-solder PL-259 showed up. This could be the one. It will surely prove to simplify life for many hams who struggle with or have not been able to make soldered connections to standard PL-259's. My own experience has shown that connectors are probably the most unreliable component in the station due to the difficulty of making a proper solder connection.

## SUPPLIERS

Burnaby Radio Communications in Vancouver. Contact them at

sales@burnabyradio.com

The PL-259 examined is marketed under the Shakespeare Marine product line as a PL-259-CP-G Connector. For detailed information, visit

http://www.shakespeare-marine.com/home.asp

Mouse over Products, then click Connectors Adaptors Cables. To browse through the entire line of connectors, click on Shakespeare Connectors and Adaptors – the link is under "Hook'em up. To view the Solder-less PL-259, click CenterPin © Solderless Connectors

Shakespeare connectors are available from the chain of West Marine stores.

http://www.westmarine.com/

As described on the website, their part number 3757747 listed at $9.99 USD, in stock in Vancouver.

## ACKNOWLEDGEMENTS

Thanks to Jay Willoughby, VE7JKW, for showing me this family of connectors, and supplying samples to evaluate. Jay works in the marine industry as an installer and commonly uses these connectors.