

One Ham's DC Power Connector Preference

Mal explains why he has converted to Anderson Powerpoles for dc connectivity.

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I love Anderson Powerpoles. You will too after reading this article. Why? Before I answer that, a short disclaimer: I am in no way related to nor do I have any financial interests in the Anderson Company.

As amateurs, we need reliable and low resistance connections for our 12 V equipment. Although there have been many connector types used for this function over the years, my strong preference is now for Anderson Powerpoles. I previously used Molex type connectors for this purpose and will describe here the reasons I decided to move to Powerpoles.

Powerpoles are Genderless

If you want to run your 12 V rig from a storage battery, in the Molex system you will have to choose a male or female connector housing for the battery supply cable and the opposite for the radio cable. Note that Molex male housings and male pins are different items — thus there can be four variations of housing and pin gender.

Usually and by convention you will need male connector housings (on the right in Figure 1) for the battery cable plug and female housings on the radio power cord connector. The reasoning there is that pins can short out if stray metal objects contact the exposed pins of the female housing.

In addition you may also want to power the radio from a power supply. Same conventional wisdom here — male housing on the power supply cable (with female pins) and female housing (with male pins) again on the radio cable. So far so good.

But what happens if you want to use that power supply to charge your battery? A male housing cannot connect to another male connector in the Molex system so you have to construct a two wire cable with female housings and male pins on each end called a gender converter. (See Figure 2.)

You will also probably find a need to have one for male to male and another for female to female housings. Extra gender converting

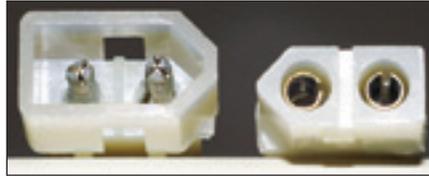


Figure 1 — Molex type connectors. On the right, female pins in a male housing; on the left, male pins in a female housing. The female pins in male housing should be used for supply side connections since they are less likely to short.



Figure 2 — Molex gender changer — typically used to connect two usual supplies as when charging a battery with a power supply.



Figure 3 — A pair of disconnected Powerpole connectors. Note that the two connectors are identical, but can be connected together — this is what we mean by genderless connections.

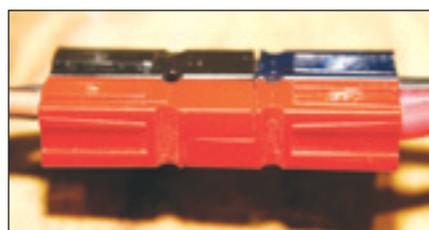


Figure 4 — The connectors from Figure 3 interconnected.

cables are inconvenient, time consuming, costly and add resistance to the circuit. And if you are anything like me, you can never find the converter when you need it. Now comes an unexpected emergency and time is wasted trying to find where you hid the gender adapter. All of this is avoided with genderless connections as everything fits everything else if Powerpoles are used as shown in Figures 3 and 4.

In addition you or your friend might not set up the Molex pins correctly. The proper way is to place the male pins in the female housing and vice versa. Some people place them differently, however. The way shown in Figure 1 is correct. If you look at the RadioShack Web site, and look for Molex connectors they show them wired with female pins in the female housing. None of this can happen with the Powerpole connectors.

That configuration makes a quick connection less likely as the wide metal flange of the female pin can get caught on the plastic male housing. But the real relevance is that when you bring your radio to ARRL Field Day you might find your Molex scheme won't connect to someone else's, not only because of housing incompatibility but due to pin incompatibility as well.

Powerpoles Handle Heavy Current Without Getting Hot

It's always important to use wires sized to radio manufacturers' specifications. As a test, I have run 30 A through #12 AWG wires and 30 A Powerpole pins for extended times with the Powerpoles becoming only minimally warm. Standard

Molex pin connectors are rated for 7 A and Tamiya connecting pins at 10 A, and they both get hot if operated at their rated current.

By the way, and let me emphasize this: Tamiya pins and not Molex pins are used in the six slot plugs on 12 V power connectors on some Amateur Radio transceivers. Be aware that female Molex pins are of slightly wider diameter than Tamiya pins, so using those on the plug end of power cords to



Figure 5 — Comparison of 20 A (on left) and 7 A Molex connectors. While appearing similar, they cannot be connected.

power a ham radio will cause intermittent loss of power as the fit is not tight. If you have replaced the factory Tamiya with Molex pins, reach around to the power connector while the radio is on and wiggle the plug. If you see a flickering of the display replace the pins with the correct Tamiya pins to avoid problems. Those are available at any hobby store and are inexpensive. The Molex pin connectors are routinely sold at hamfests as replacements or to make spare plugs. The substitution is not satisfactory in most cases.

Bright Colors Make Polarity Identification Easy

I love the colors of Powerpole connectors. The colors make it easy to identify the polarity of the wire from the connector housing, assuming it was set up properly when the connector was first made. It's easy — red always goes to red and black to black. (See Figure 3.) The physical size of the Powerpole connector is the same as the standard 7 A Molex connector but carries at least four times the current. They are also significantly



Figure 7 — End view of pin wire attachment mechanism of Powerpole (left) and Molex (right) connector pins. Note the additional thickness of the Powerpole connectors.



Figure 8 — Comparison of the three sizes of Powerpole pins (left) with the 20 and 7 A Molex pins. Note that all three sizes of Powerpole pins fit in the same size housing and that they can be interconnected.



Figure 6 — Standard orientation of Powerpole connectors.

smaller than the 20 A Molex and still they handle about twice the current of those larger types. In addition, if you use large and smaller Molex connectors they will not match up with one another. That means that you not only need gender changers for both sizes but size adapters as well. That makes for a waste of time and funds in purchasing extra connectors and in making up the extra cables (see Figure 5).

All of that is not necessary in the Anderson system. I hope you are starting to see why I love Anderson Powerpoles.

Orientation

If you orient the connectors properly in relation to the wire with red (positive) on the left and black (negative) on the right looking into the ends of the connector with the metal contacts at the bottom — they cannot be connected improperly. That is the orientation that I have seen on several Internet sites and seems to be the conventional standard (see Figure 6).

Comparison of Contact Material

The materials and construction are much better for the Powerpole pins. Molex pins are thin gauge tin plated steel while the Powerpole connectors are twice as thick and are silver plated solid copper (see Figures 7 and 8).

If you look up the resistivity of metals you will find that silver and copper have much less resistance than tin or steel. The lower resistivity plus the extra thickness of the Powerpole pins is why they are able to carry higher current. They easily handle 30 A, and in fact even more depending on the wire gauge as heavier wire draws the heat away and acts like a heat sink. Some of the people at Anderson feel that the 30 A Anderson connectors can handle 40 A or more. I have done

exactly that and it will work but the connector does become unpleasantly hot.

Three Size Pins all Fit the Same Plastic Housings

Powerpole connectors that fit the regular size plastic housings used in 12 V amateur service come in three ratings. They are different only in the crimp or back part of the pin with the smallest rating at 15 A, the mid size at 30 A and the largest at 45 A ratings. Therefore they will mate perfectly with any of the other pin sizes. Externally you cannot see a difference when a Powerpole connector is hooked up. Figure 8 shows the relative sizes.

And in Closing

The cost of a Molex connector with two pins and housing is \$1.99 at RadioShack for either the 7 A or 20 A versions. Anderson Powerpoles are usually around a dollar for two of the 15, 30 or 45 A pins with one red and one black interlocking plug housings.

Note that if you are part of an EmComm group that has adopted a connector standard, it makes sense to use whatever connector series the group has adopted for any gear that might be deployed in an emergency. If your group doesn't have a standard, by all means help them decide to adopt one. Many groups have standardized on Powerpoles and I suggest you consider them for your group.

I have written this article because it was my prior incorrect opinion and assumption that these pretty little red and black connectors offered no advantages. I now know differently and wanted to share this with you.

Photos by the author.

ARRL member Mal Eiselman, NC4L, has been licensed since 1961 and has been a member of the ARRL for the past 30 years. He currently holds an Amateur Extra class license. He is a trained cardiologist who practiced in Hollywood, Florida for 30 years before retiring in 2003. His Amateur Radio interests include keeping in contact with old friends as well as making new friends on the air on a daily basis. His second interest is making electronic things work better. You can reach the author at 3650 N 55th Ave, Hollywood, FL 33021 or at NC4L.Mal@aol.com. Visit his Web site at www.w8kvk.com.nc4l.

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