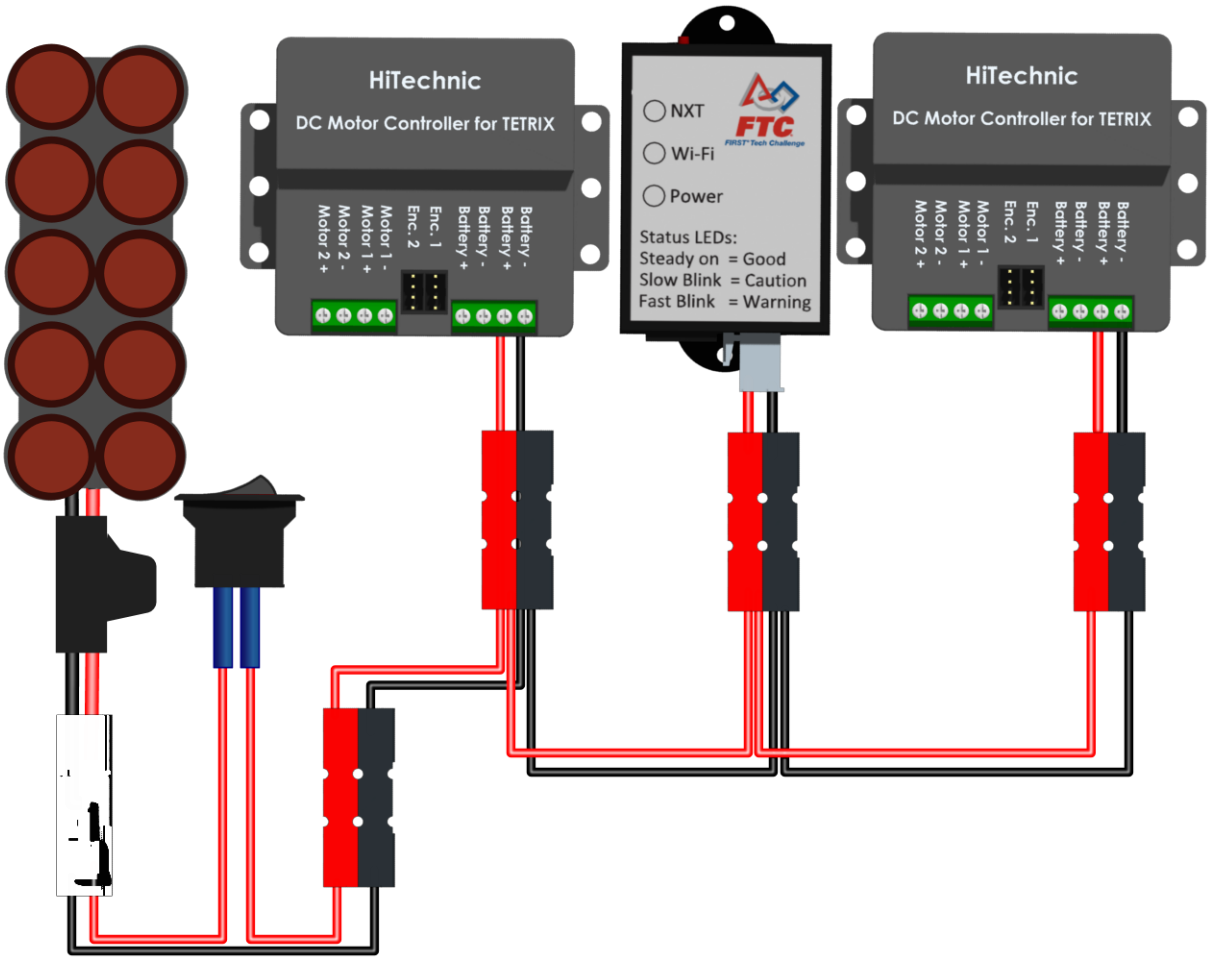
FIRST® Tech Challenge

Robot Power Management Using Anderson Powerpole® Connectors



Acknowledgement

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PURPLE GEARS
TEAM 2901

Why should I consider using Anderson Powerpoles for my connections?

Anderson Powerpoles make it easier to disconnect and reconnect electronics without having to disassemble the entire robot. They hook to each other to make wiring compact, and form snug connections to prevent wires from coming loose. Also, because they allow you to use a parallel circuit to wire your power, if one motor controller loses power, the rest will still work (an improvement over the current daisy-chain method).

Tools and Materials

To construct your Powerpole chain you will need the following tools and materials:

Wire:

1. 16 gauge Red and Black

Tools:

2. Crimping Tool
3. Wire Strippers
4. Needle-nose pliers
5. Wire cutters

Powerpole connectors:

6. 30 AMP red and black Anderson Power-pole and contact set *

Connectors and contacts may be purchased from:

** http://www.powerwerx.com/anderson-powerpoles/powerpole-sets/

Preparing the Wires and Connectors

1

Determine the length of wire required between controllers. For this example, we are assuming you need the same length of wire between all controllers. Bend wire over to insure you always have an equal length in between the controllers.

You are creating the same wire with multiple connections (each is the same distance apart from another). The amount of connections you add to the wire depends on how many you need for your particular robot. For example, we need five, two motor controllers, one servo controller, and the Samantha module

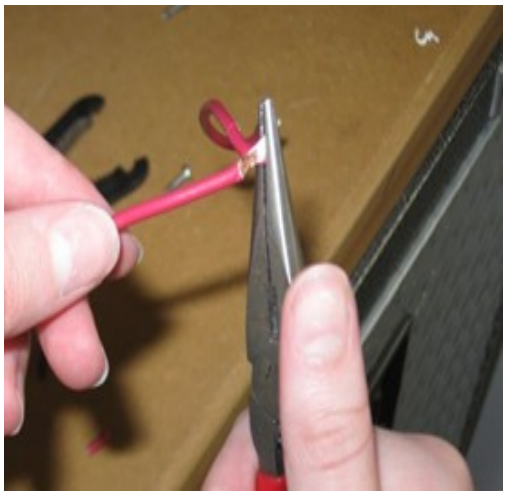
2

Create two nick marks in the insulation of the wire using the wire stripping tool, a half an inch on either side of the fold mark.

Now you have two nick marks in your wire, an inch apart from each other. But since you have used the wire strippers (which are set to your gauge wire) you have not cut the copper.

3

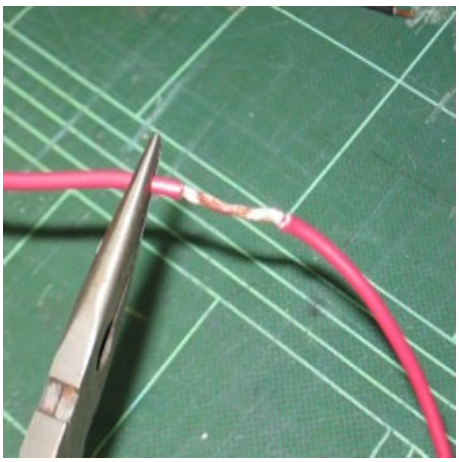
Fold the wire at the nick marks so that the two pieces of insulation pull away from each other and expose the copper. Use the wire cutters to carefully snip a piece of the insulation away.



Be careful not to cut through the wire.

Use the needle nose pliers to remove the insulation from between the two nicks, exposing all the wire.

Now you have an inch of exposed wire.



4

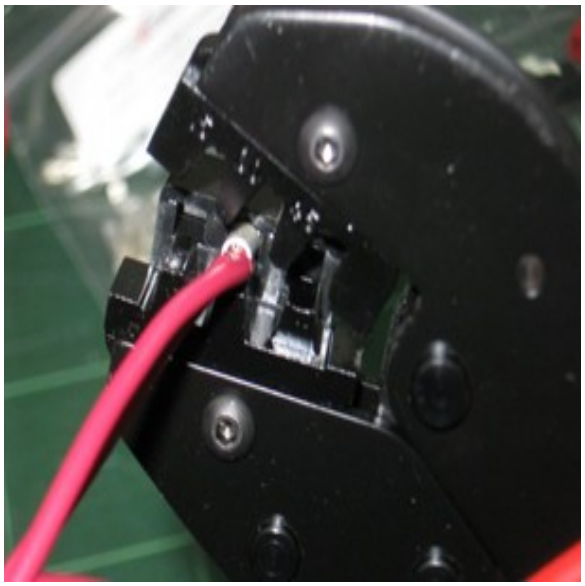
Bend the exposed wire in half and pinch tight with needle nose pliers.

5

Gently fit the contact onto the folded wire.

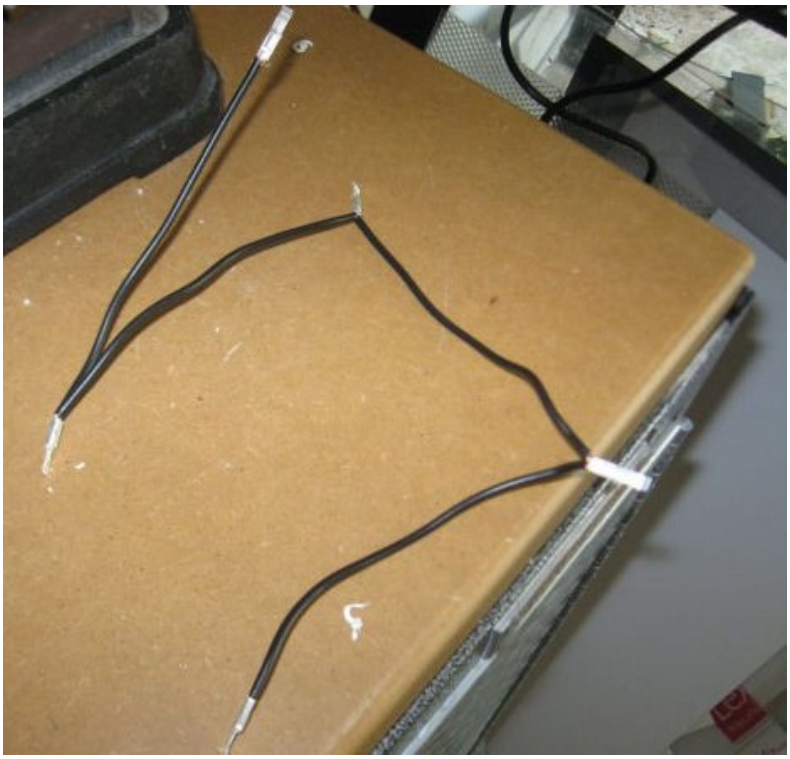
6

Insert the contact (while on the wire) into the crimping tool. Squeeze the crimp onto the wire.



The finished crimped wire should look like this. Give it a good tug to make sure the crimp is solid.

This is an example of one wire with multiple folds and crimps in place.



7

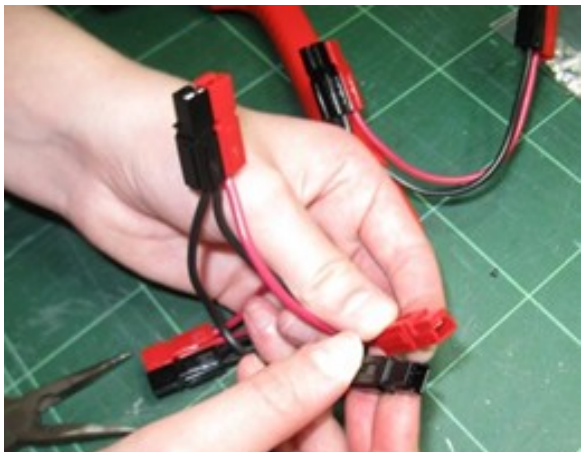
Gently insert the (crimped) contact into the contact cover (Powerpole). The orientation of the pin is relative to the connector. With the connector bump side up, the pin goes in bump up.
Tip: It's fully in when you hear a click.

Cut-away view.

The click you will hear is the Contact going over this ridge and locking into place.

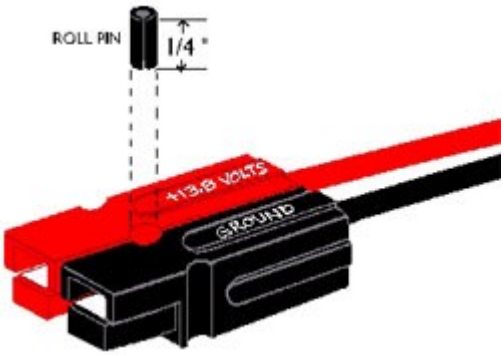
8

Clip the two housings together. There is a slot on one side of each housing that will slide into a groove on the other.

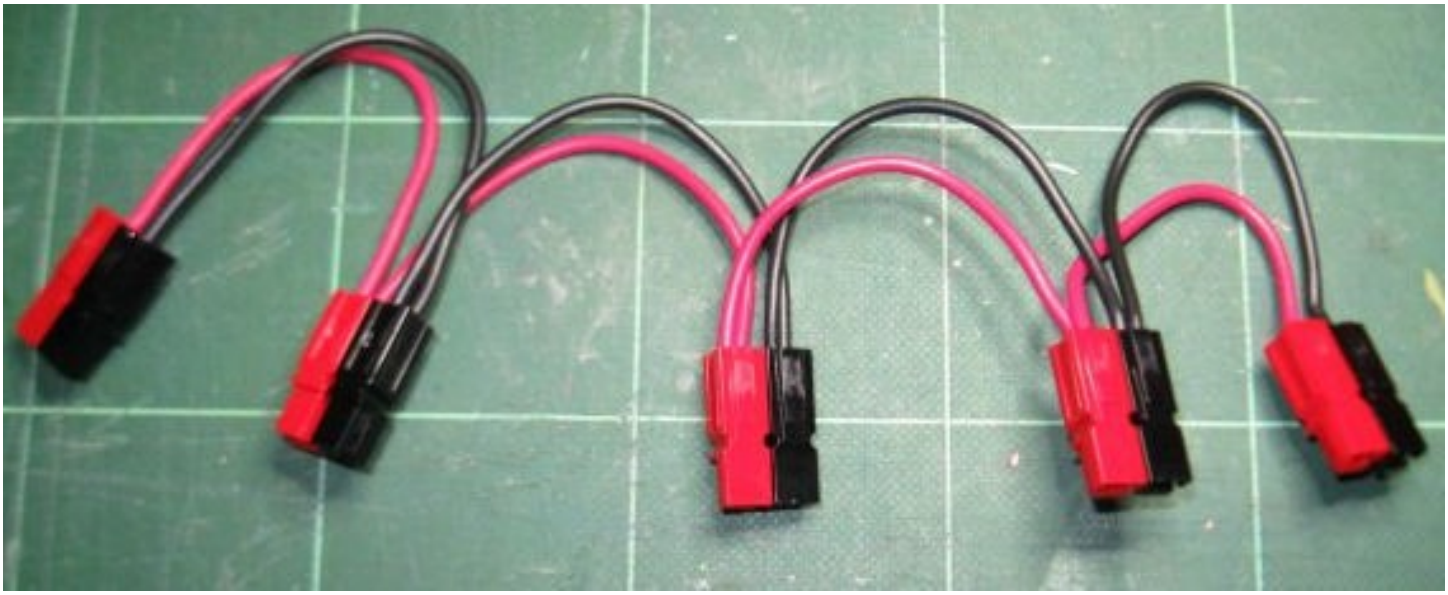


Gently slide them together. If it does not go smoothly, it means they are not matched evenly.

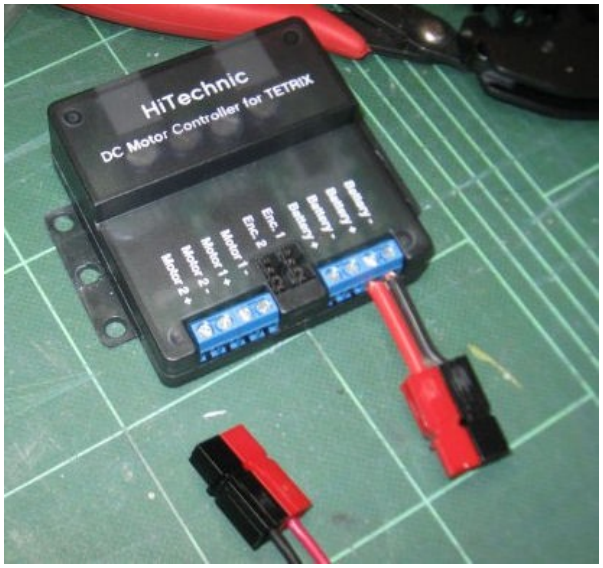
Tip: Use the small roll pin that came with the connector set. This will keep the housings from sliding away from each other when you plug or unplug them.

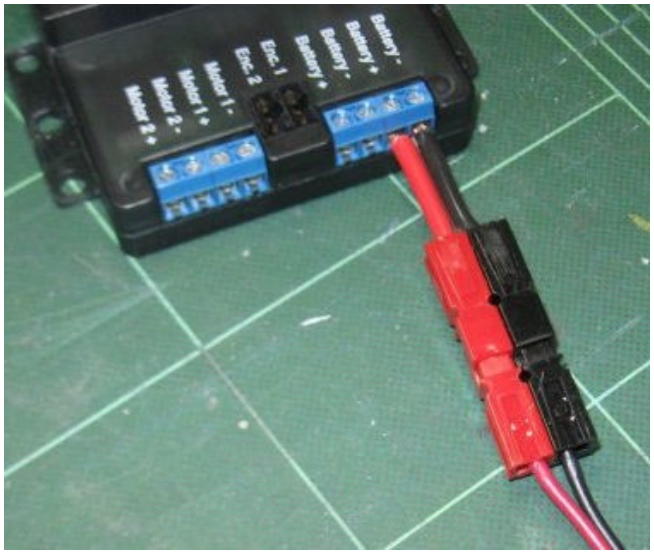


Using Anderson Powerpoles with the TETRIX® Switch / Battery



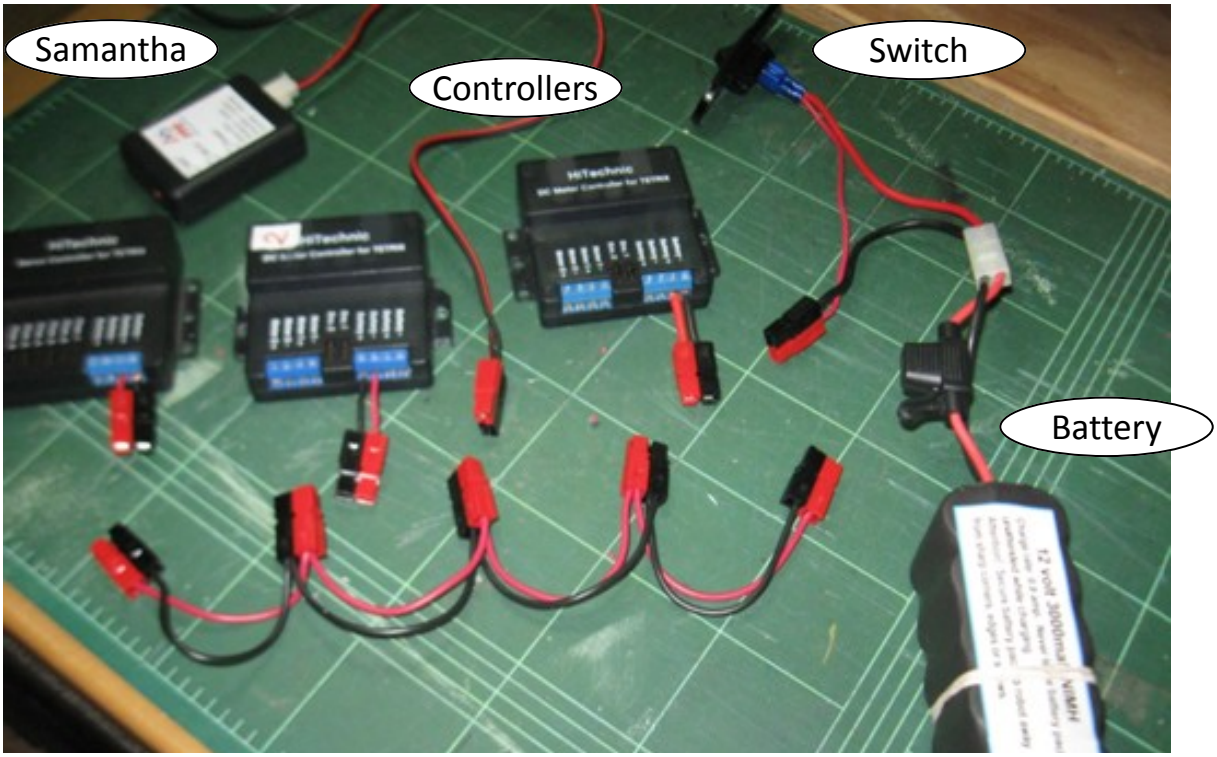
After you complete your Powerpole chain, use the same methods described for creating small single connectors to be used on each of the components you want to use on your robot.

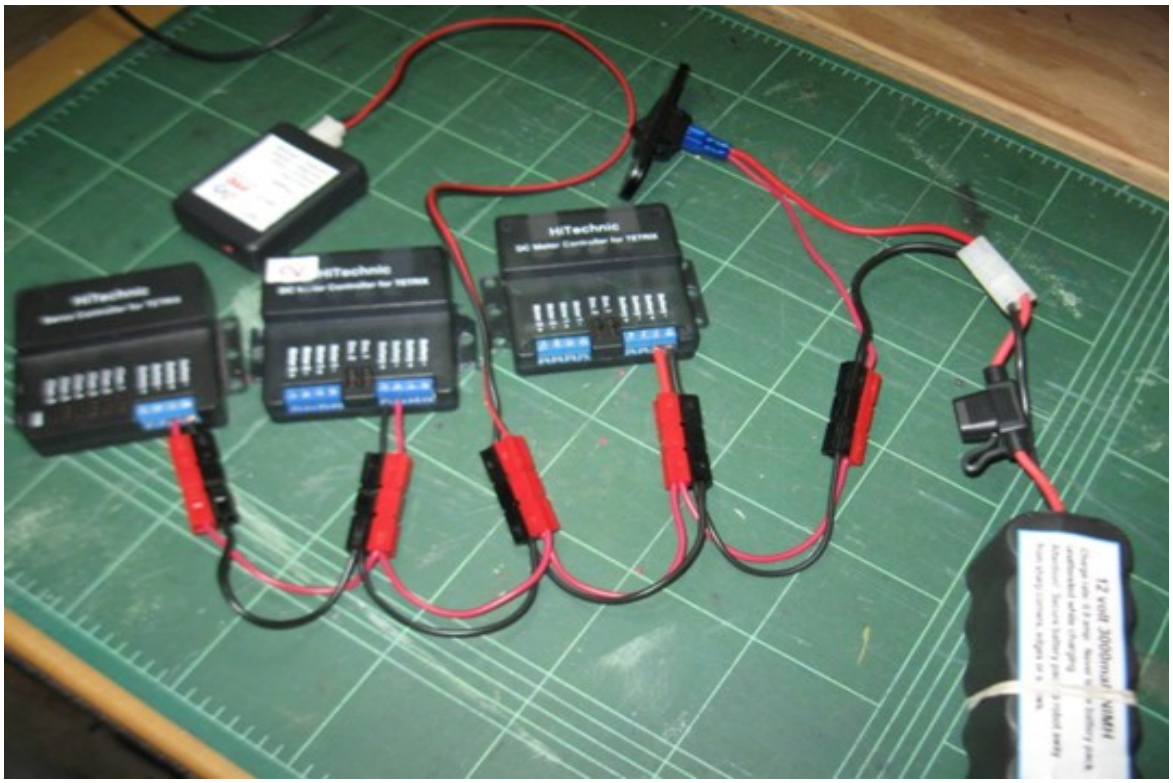




IMPORTANT: Do NOT tin the wires (no solder because it flows and the connection will become looser over time).

Connection Examples

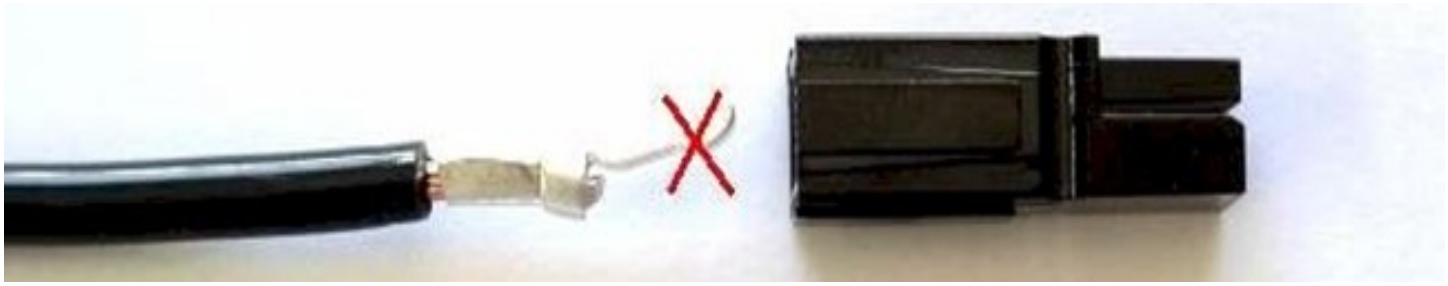




Problems you may encounter

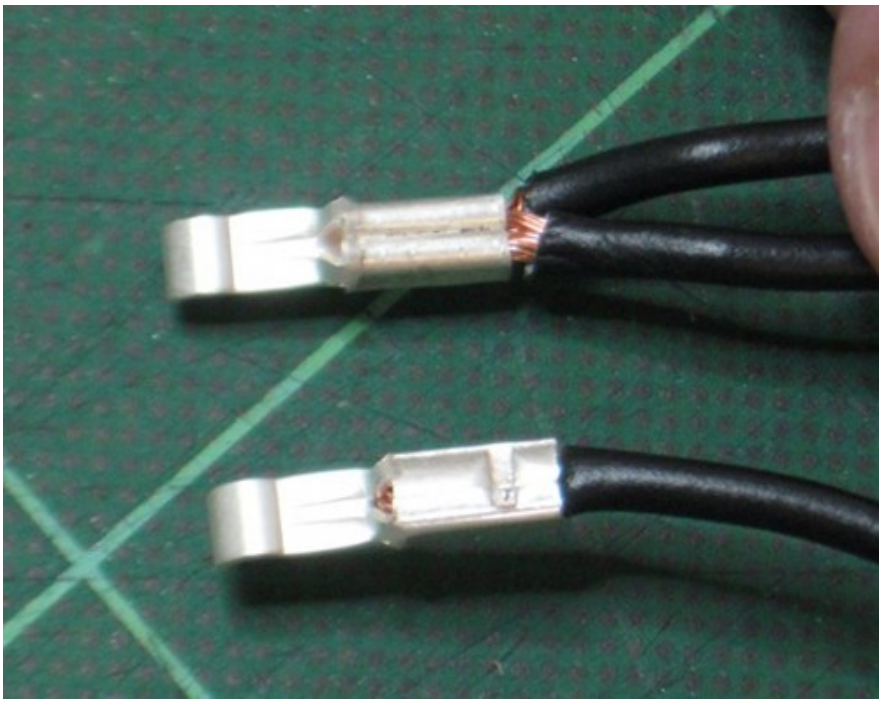
Bad crimps

If you are having a hard time fitting the contact into the house you may need to re crimp it. If you insert the contact into the crimping machine too far the end of it will not crimp and will bulge and won't fit into the contact cover.



The contacts blade is pushed up.

This will make it impossible for it to fit into the house.



One on top has bulged and will not fit into house.

Other Material Resources

Websites to look into for tips and diagrams:

http://www.westmountainradio.com/content.php?page=supportrr
http://www.andersonpower.com/products/singlepole-connectors.html
http://en.wikipedia.org/wiki/DC_connector#Anderson_Powerpole_connectors
http://home.comcast.net/~buck0/app.htm
http://www.westmountainradio.com/content.php?page=supportrr
http://www.wb3w.net/powerpoleinst.htm

Websites to look at when purchasing parts:
(There are also pink and gray housings available for purchase)

http://www.powerwerx.com/anderson-powerpoles/
http://www.powerwerx.com/assembly.asp
http://www.westmountainradio.com/product_info.php?products_id=PWRcrimp

