

# **The 12-Volt Solar Panel Powered Room Cooler (Home-Build)**

(6. Wiring the Cooler)

A simple but effective way to cool a room using only sunshine.

This is a home build project that is fairly easy to build requiring minimal use of power tools and minimal wiring.

This will be difficult for me as I will have a hard time trying to take photos and/or video inside the frame of the cooler with the cooler pads installed. I will do my best, I may have to resort to a hand drawn diagram of the wiring and make it as simple and easy to understand as possible.

I am NOT an electrician, IF you would feel more comfortable hiring an electrician who works on 12 volt wiring that would be appropriate.

But I will make this as simple as possible and do this step by step.

If you have a solar panel that is new you will have the appropriate connectors attached and all you will need is an extension cable with an attached connector to run this wire from the solar panel into your home.

As per the example below.

Note: The connectors with attached cable will attach to your connectors from your solar panel. They just plug in. And you will not be able to attach a negative connector to the positive connector.

Be sure to measure from where your solar panel will set outside and through a window and to your cooler. It is better to buy a little extra than not quite enough.

Also keep in mind transmission loss when running 12 volt wire over 30 feet you may need to consider a heavier gauge wire.



[https://www.amazon.com/BougeRV-Extension-Female-Connector-Adaptor/dp/B075424L8R/ref=sr\\_1\\_19\\_sspa?crid=2UXJ1XHJEB6V8&dib=eyJ2ljojMSJ9.Q99vVZZ\\_uNN1dT\\_Eb04v9-AX0V1AIEwg5K9SHUnd-tk0zGbvANFZojOnyyK08-N0ChQ2Rw6gUDC1pRIPZ3gEcKkSF\\_3O2wAeJB\\_2WJ9UIOZc8iheA7duIV2zQImJ5SOC8Aybjfs0LJtYgw3QOZbtr-aSm5bgCy0YGLMwP0iPCaZilgXiFKIbO9R2cIFptsfaL0DxyfTDBywBfSETK1tHRpW6abTMWEgVDkndym-N8N4fDBEqN3kwzzLVZoCSIFB0qwb6T5HnDZ\\_fdP3chC7g\\_-UNUiHnx1OMn7zTqMLEQqU.6Gsev5OQc78VpsTJXVF\\_gAkWto2EIYMTfEmFw0XRe0E&dib\\_tag=se&keywords=solar%2Bwire%2Bconnectors%2B8%2Bawg&qid=1722059377&srefix=solar%2Bwire%2Bconnectors%2Caps%2C119&sr=8-19-spons&sp\\_csd=d2lkZ2V0TmFtZT1zcF9tdGY&th=1](https://www.amazon.com/BougeRV-Extension-Female-Connector-Adaptor/dp/B075424L8R/ref=sr_1_19_sspa?crid=2UXJ1XHJEB6V8&dib=eyJ2ljojMSJ9.Q99vVZZ_uNN1dT_Eb04v9-AX0V1AIEwg5K9SHUnd-tk0zGbvANFZojOnyyK08-N0ChQ2Rw6gUDC1pRIPZ3gEcKkSF_3O2wAeJB_2WJ9UIOZc8iheA7duIV2zQImJ5SOC8Aybjfs0LJtYgw3QOZbtr-aSm5bgCy0YGLMwP0iPCaZilgXiFKIbO9R2cIFptsfaL0DxyfTDBywBfSETK1tHRpW6abTMWEgVDkndym-N8N4fDBEqN3kwzzLVZoCSIFB0qwb6T5HnDZ_fdP3chC7g_-UNUiHnx1OMn7zTqMLEQqU.6Gsev5OQc78VpsTJXVF_gAkWto2EIYMTfEmFw0XRe0E&dib_tag=se&keywords=solar%2Bwire%2Bconnectors%2B8%2Bawg&qid=1722059377&srefix=solar%2Bwire%2Bconnectors%2Caps%2C119&sr=8-19-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9tdGY&th=1)

The above link is where you can buy this solar panel connector wire with attached connectors for your solar panel.

The above cable is only 20 ft. if you need a longer cable, they have them available.

This item is NOT included in the parts list.



**NOTE: Above is my solar panel, you see that I do not have the plug-in connectors so I had to cut and solder my wires to the two leads coming off my solar panel.**

**You should not have this problem unless you are using an older solar panel or if you have a used panel you are working with.**

**These connector plugs are the best way to go as they make everything so easy, you just plug them in and you are done with that part.**

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Now I will wire up one thing at a time so you can see exactly what I am doing.

The Solar panel wire coming into the cooler, you will run it into the tote and under the cooler pad between the pad and the bottom frame (PVC pipe) of this cooler.

You want to avoid running the wire under the bottom PVC pipe as that may cause the frame to rock back and forth sitting on the cables.





Above is my main power cable coming into my cooler (your wires should be black for Negative and Red for Positive).

My cable has black writing on the positive wire so I know which is Positive & which is Negative.

IF you have any questions or confusion, do what I did and hook up a meter that will show you WHICH is Positive and which is Negative.

AS you DO NOT want to assemble the cooler and have to swap the color coded wires as that will get very confusing as you proceed. Take your time double check everything TWICE before you make a connection.



Above I show my Positive 12 gauge incoming POWER wire soldered to my two red 14 gauge wires, this step down in wire size is OK as you are doubling the two wires, and soldering TWO 14 gauge wires to a 12 gauge wire. I use flux, I twist the wires together and then I use a gas burner to heat the wires and I solder all of them together.

I do the same with my Negative wires, SO I end up with 3 ft. of my main power cable (the 12 gauge wire coming into the bottom of the cooler,



then I have attached 2 more wires, 3 more feet each, of two 14 gauge wires BLACK Negative wire attached (soldered) to my negative main cable coming into the cooler from your power supply (your solar panel)

NOTE: VERY IMPORTANT: YOU should NOT be hooked up to the power source yet, and IF it is you need to attach a switch BEFORE this connection so you can shut the power OFF before attempting to do any work on any of this.

NOW 12 volt will not hurt you and 150 watts will not kill you. BUT it can do damage to what ever you are hooking up if it inadvertently gets turned on or energized WHILE you are working on it.

And it can spark and become a fire hazard

.

Remember the Water Pump is NOT made to operate dry and WILL burn the motor out if you attempt or accidently start it up with NO WATER in it.

SO MAKE SURE NO POWER CAN GET TO ANYTHING YOU ARE HOOKING UP (UNTIL) YOU ARE READY FOR power.



Above is a common wire nut almost everyone knows this is an easy, cheap and quick wire connection.

But for this project it has its drawbacks.

This is considered a low power device and any connection that is weak, NOT making a very good connection will probably fail, maybe not today, but it will fail right when you will need this cooler the most.

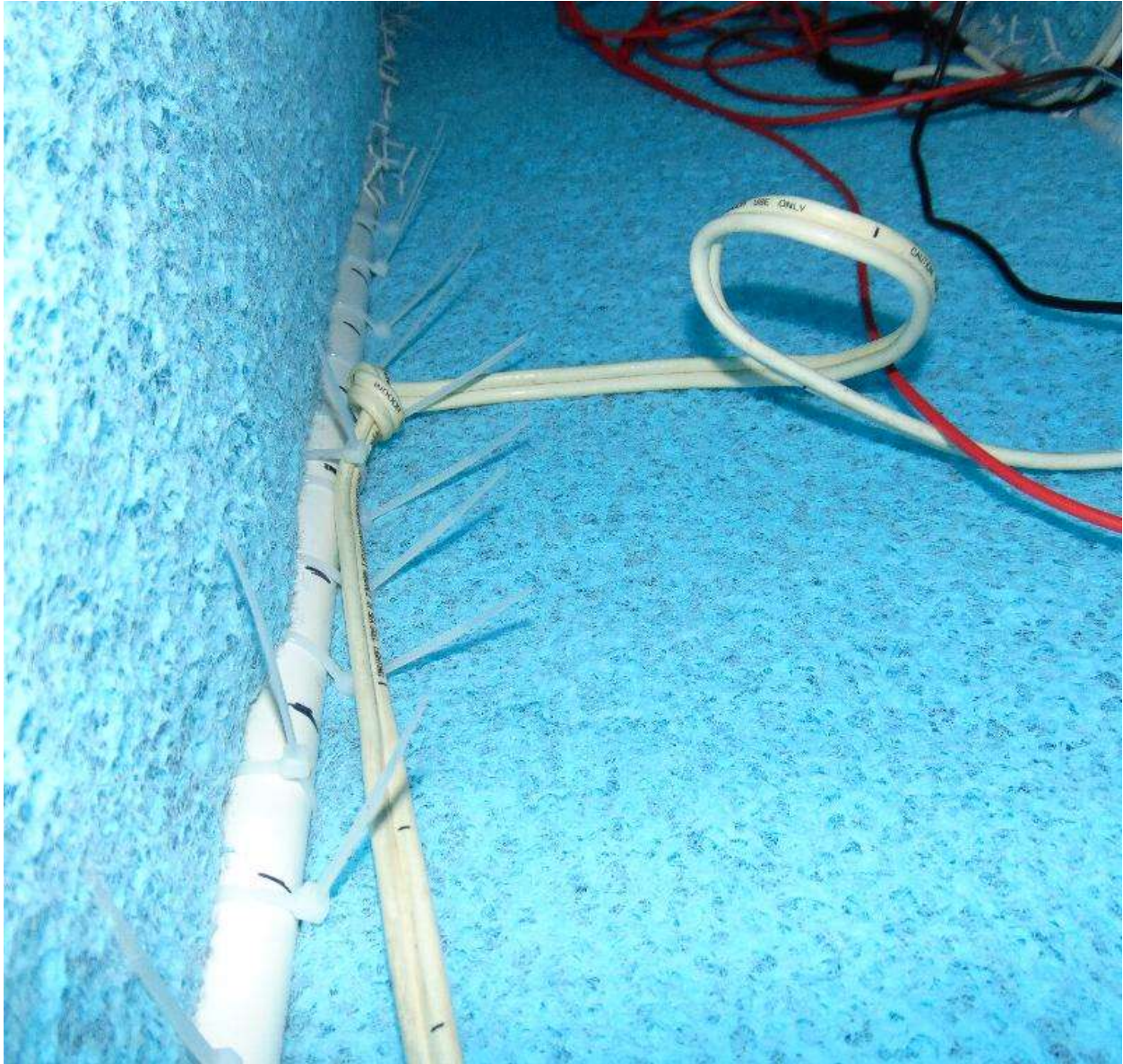
This connection is not water proof and the wires will corrode over time.

NOW is not the time to be cheap and quick as cheap & quick will fail someday.



Above shows where the power cables coming into the unit are ZIP tied to the inside of the cooler about half way up inside the cooler. I pull about 3 feet more up past this ZIP tie and I tie a knot so it can not slip down.





Above photo shows my knot in the power lines coming into the cooler and I have about 2 ½ feet of extra power line ABOVE the knot. This way IF you ever need to remove the top of the cooler you will not have to disconnect all your connections to remove the top, the fan, the switches and all of that.

This will only give you about 2 to 3 feet of leeway depending on how much you add extra to the 14 gauge power line above your knot to hold it all in place. That should be 1 ½ to 2 ft. extra giving you up to 4 ft. total to remove the top.

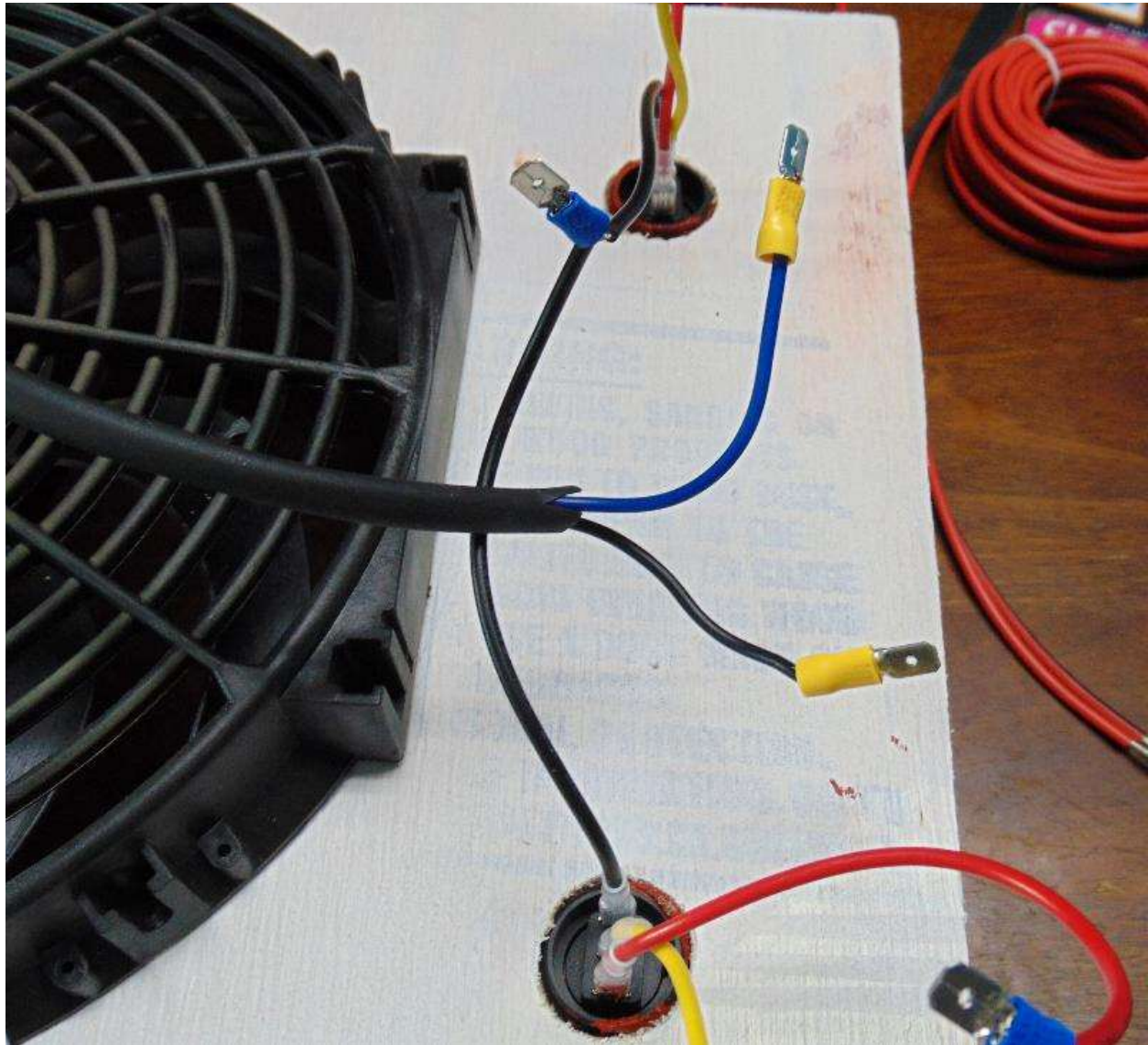
This way someone can hold the top or you can set the cooler frame on towels on the floor and remove the top and set it on a kitchen table to work on it or see inside as to WHAT is going on inside your cooler.

IF water is squirting down inside your cooler and NOT going down the cooler pads you can attempt to remedy the situation with some silicone glue. Silicone glue works wonders with this project.





Above shows a ZIP tie holding the power cord attached to the PVC pipe also note the power cords come in between the PVC pipe and the bottom of the blue pad.



Above: Note these connectors are junk, they easily pull apart, make bad connections and even if they work now, they will fail right when you

need them the most. They can vibrate apart, fall apart and do not make good connections at all.

- The two black wires coming off the two switches are the ground wires for the LED lights in the switch. You can connect these two black wires as noted. But I would NOT trust these connectors.

NOTE there is more info on this ground wire below.

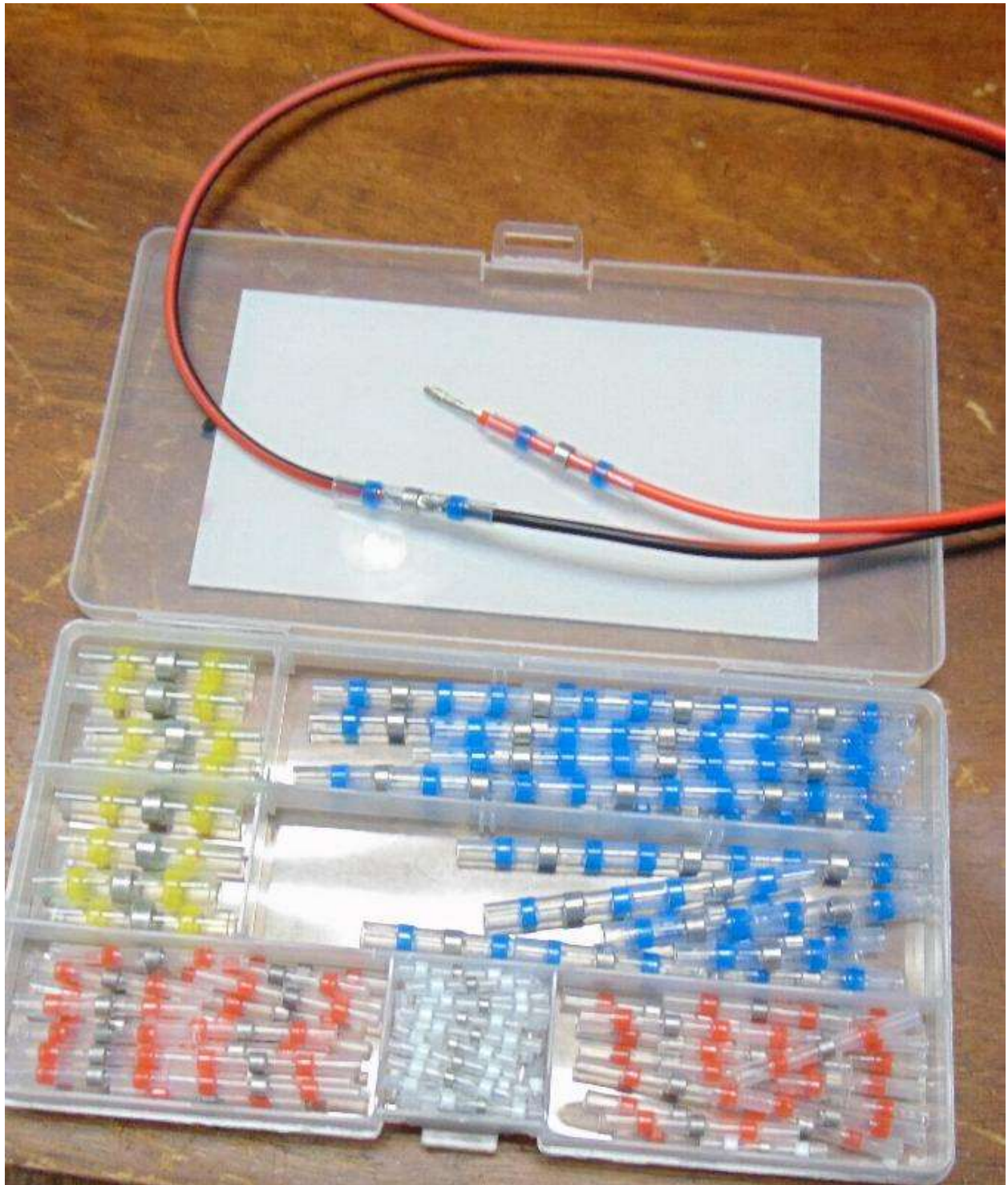
You can use a Solder & Seal connector BUT you will need to add an additional wire that will run down to the ground wire from the pump and it connects there.

I wired the whole thing up with these connectors but as I was working on new connections other connectors just fell off.

And I used vice grips and I squeezed these connectors BONE tight, so tight I almost could NOT get the vice grips off the connectors after I squeezed them in place.

And some of these connections were squeezed so tight it squeezed all the plastic cover out so the bare metal was exposed and STILL they would easily just pull the wire out of the connector.

I had another connection option: Solder & Seal Wire Connectors, see below.



You can buy a box with different sizes on Amazon for \$15.00. They have several companies who offer different options for these connectors.

You get the size connector that will fit over your wire, push it onto the wire up & out of the way.

You cut a little extra wire from its covering about  $\frac{3}{4}$  inch on each wire you want to connect.

Twist the two bare wires together so they will hold together in place, push the connector down to where the shiny part in the center of the connector is over your bare wires where you want to solder them in place.

They recommend a heat gun, but I use a lighter and I heat the shiny part until it melts under the plastic cover.

Then I heat the two-colored bands and that makes the connection water tight.

As per example above.

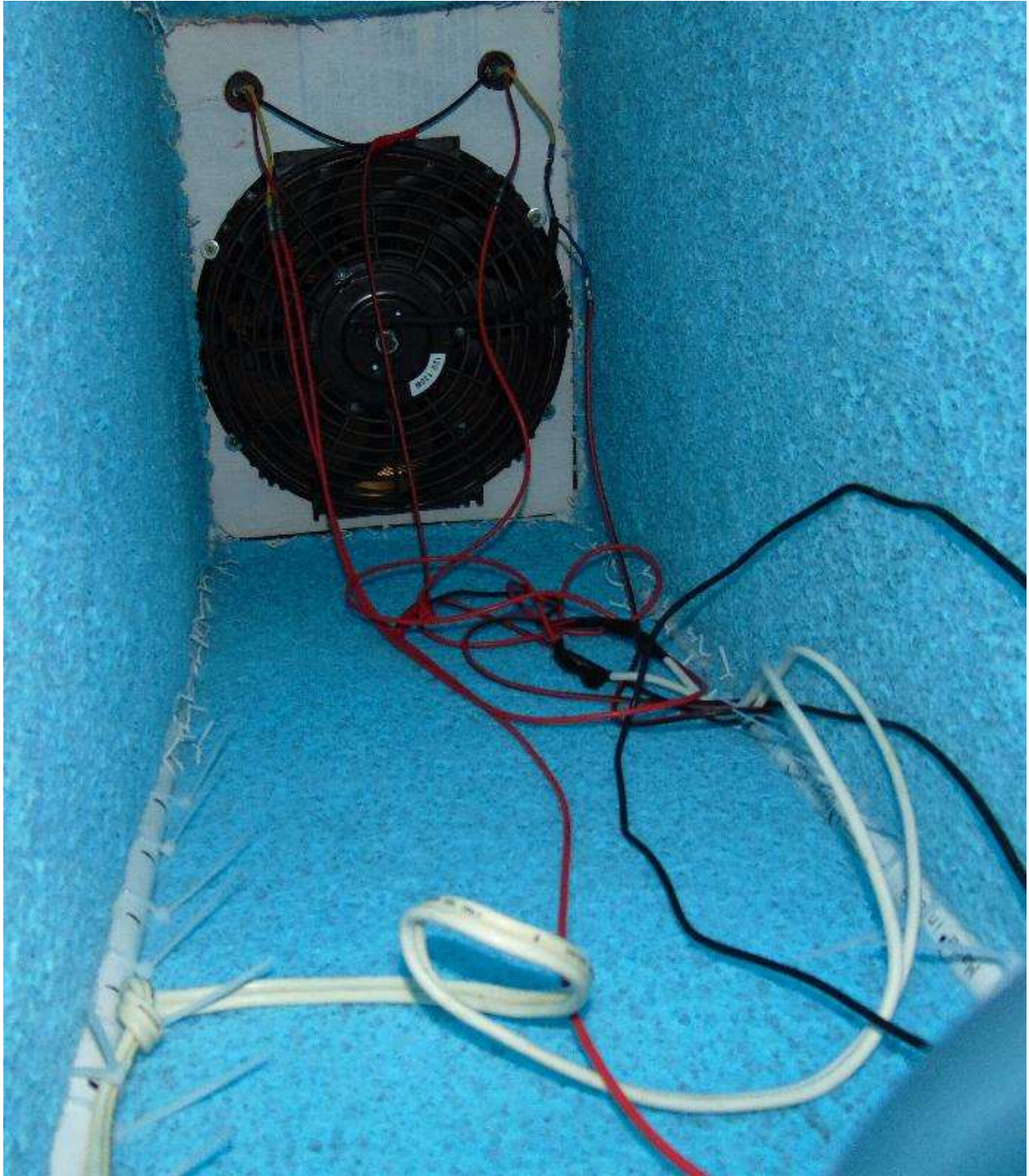
I had one connection where I had three wires to connect. I cut off an end of my connector right at the silver ring, I placed the connector silver ring over the three wires and heated them to make the connection.





Here are the connectors that I used.





Here is my finished project, the only thing that is different here was I tied up my pump wire as it was extra long coming off the pump, so I wired it up near the top to keep the connector out of the water.

You should have Two RED Positive wires 3 ft. long coming off the main power cable and (two RED short wires coming off your switches). Attach one red wire to the red wire off one of the switches.

Next attach the next RED wire coming off the main power cable to the next RED wire coming off the OTHER switch.

AT this point you need to determine WHICH SWITCH goes to the water pump and the other switch goes to the FAN.

SO, the SWITCH you want to control the Water Pump, take that YELLOW wire from THAT switch as it will control the ON/OFF power to your water pump.

Take your yellow wire from the switch (you choose to control your water pump) and attach that wire to the red wire coming off your water pump (or if it has brown and blue wires) then your BROWN wire is your positive wire.

Next take your remaining yellow positive wire from your second switch and attach it to your fans power cable.

**NOTE** these fans are push- pull fans meaning they are designed to push or pull air just by changing the polarity of the power cables.

**BEWARE:** You must be absolutely **SURE** which way to hook your fan up as you **DO NOT** want it pulling in outside air and working in reverse.

Some fans come with instructions on which polarity pulls air and which pushes air.

You need to note & remember which connector was positive & which was negative to blow air in the correct direction. Out the front of the fan.

\* Or if you buy your 12 volt fan at an auto parts store and ask them to determine (or tell you) which connection is positive for the fan to push air out the front of the fan.

\* **OR** as a last resort, you can take your fan to an auto parts store and ask them to help you to determine your polarity to **PUSH** air out the front of your fan. **AS THIS IS VERY IMPORTANT FOR THIS PROJECT**

Now you have **TWO** black negative wires, connect one Negative wire to the Negative wire coming off your fan.

Take your next black (ground wire) and connect that to your remaining ground wire from your water pump, **BUT** First, also attach a 3 ft. length of black Negative wire to that connection and that wire runs up to

connect to the two black wires coming off both switches. This wire grounds your LED lights in your switches so they will operate.

If any of your wiring has connections that are in the water you can pull them up out of the water and ZIP tie them to the inside up as high as you need them, **JUST BE SURE WITH ALL YOUR WIRING EVERYTHING HAS ABOUT A 3 FT. EXTRA LENGTH THAT YOU WILL NEED IF YOU EVER HAVE TO WORK ON THIS COOLER.**

This way you can pull the top off and turn just the water pump on and see what is happening on the inside of your cooler and **IF** you ever need silicone inside for any reason or to replace a fan or a switch you will be glad you have that extra slack in all the wires so it does not un-plug everything to lift or remove the top of this cooler.

God Bless

Tony Lamb

**Please note: that I am not responsible for any damages or injuries caused by your building this device. This information is only provided as reference and educational material ONLY.**

**Sorry but I must include a disclaimer (it is the times we live in).**

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