HVAC 12V Cooling Unit for Models:

N600, 610, 611, 621, 641, 643, 810, 811, 821, 822, 841, 843, 941, 1095, 962, 963, 982, 983, 9162, 9163, 9182, 9183, With universal controller

JC REFRIGERATION INSTALLATION MANUAL



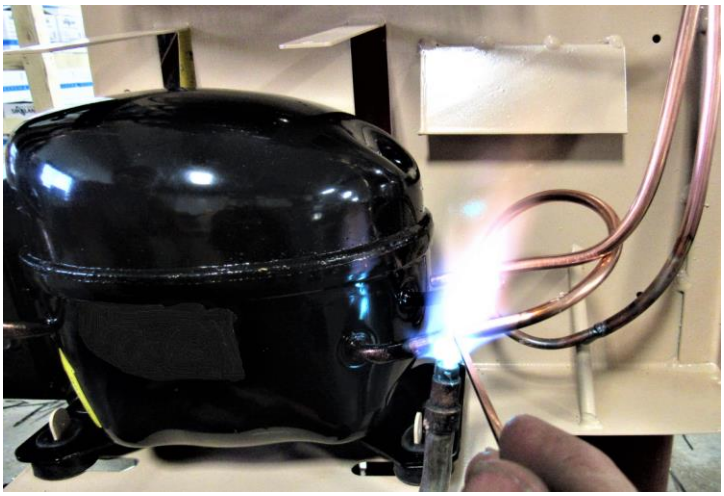
Jr & Jeremy Lambright

INFO@JC-REFRIGERATION.COM www.jc-refrigeration.com

Good Day Friends, this is how it all begins, hope you find this helpful thru your installation.



Units prepped for compressors.



Brazed welded for strength.



Tools needed to do the install:

Screw gun 5/16 ¼ Phillips wrench putty knife knife caulk gun zip ties





1 or 2





And enough time to think things thru at times, so don't give up and hang in there to the end it will be all worth it. A cold fridge is about to be had!!







We at JC Refrigeration try to build these as easy to install as possible, and so these are DIY cooling units but please be aware tho that our upgrades might not look quite the same, and brackets, frames, hole plates might not always line up perfectly as fridge boxes can vary at times, and so some modifications, foam shaving or tweaking might need to be done at times to install it. A thing to remember is these are made out of thick steel tube and plates so some twisting or pushing into place is very normal and nothing to be alarmed about. We offer installation manuals for the Hvac conversion cooling units to help you thru this install and feel free to send us a picture along with your question, and we will help you to the best of our ability.

JR & Jeremy Lambright

Please read through these notes before starting:

- Throughout this manual, there will times when you see (RA), (YA), or (BA). These are referring to red arrow, yellow arrow, and blue arrow. We use these to point to a certain spot or part in the pictures.
- There are some differences between this install manual and the install videos on our website because the videos are for the gas/electric cooling units. So, to avoid confusion, follow only the instructions in this manual.
- If you are installing a cooling unit with a 12V compressor, there is a chance that you will need to run a new wire from the house batteries to the back of the fridge. Most manufacturers use 12awg or 14awg wire to supply 12V to the fridge. Depending on the distance between the batteries and the fridge, this existing wire might not be big enough to handle the load of the compressor. To know for sure if you will need a new wire, you have to install the new cooling unit and push the fridge back into the cabinet. Check your house fuse panel supplying 12V to the fridge and make sure this fuse is a 15A fuse, (location of this fuse varies from coach to coach). Then hook it up with the existing 12V wire and turn the fridge on. If it only runs for a couple seconds and then shuts back down, and then keeps repeating that cycle, you will need a new wire. We recommend using a 10awg wire and hook it directly to the batteries. Install a 30-amp fuse/breaker in line at the battery to protect your wire going to the fridge.
- Remember your old rear or front control boards will no longer be used, they can be taken completely out or just left in and not used. Same with wires and fans, what you take off will no longer be used but can be saved for future use if needed or discarded.

PLEASE NOTE: Not all of our cooling units look exactly the same. So, to avoid confusion, only follow the instructions in this manual when installing the unit.

To start this process, begin by taking the cooling unit out of the box, if box appears to be damaged don't panic as we foam package them into the box (YA) and so the box can be practically destroyed and the unit is still not damaged. So, when you take the box apart you will notice a spray foam packing inside and this needs to be removed and then the unit will slide out. Inside the box you should have the cooling unit, and parts needed to do the install (RA)





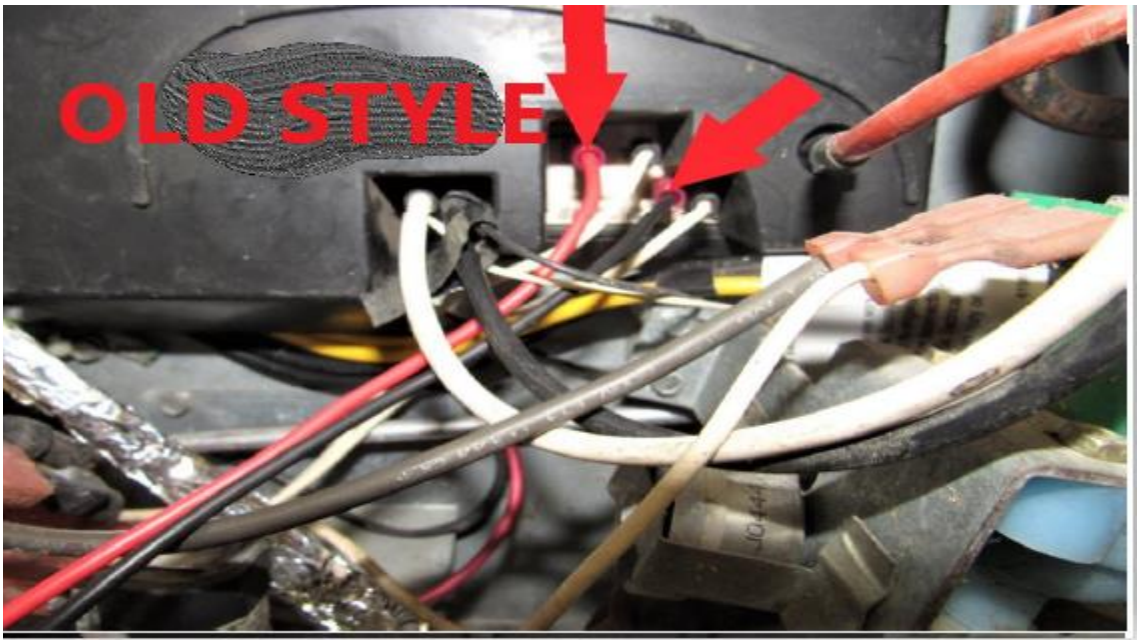
Begin by covering up your floor with blankets and removing any door handles or smoke alarms that might hinder the exit of your refrigerator from your cabinet. Turn off the water pump (if you have an ice maker in your fridge) and the refrigerator control panel.

: WARNING:

Make sure to turn off LP gas at the tank before starting the install.



Locate your refrigerator side vent on the outside of your RV. Good idea to label these so you know which one is the 12V DC positive.Take the main 12V wires (RA) loose from your board. The wire colors will vary from coach to coach, and there is an old style or new style as seen.

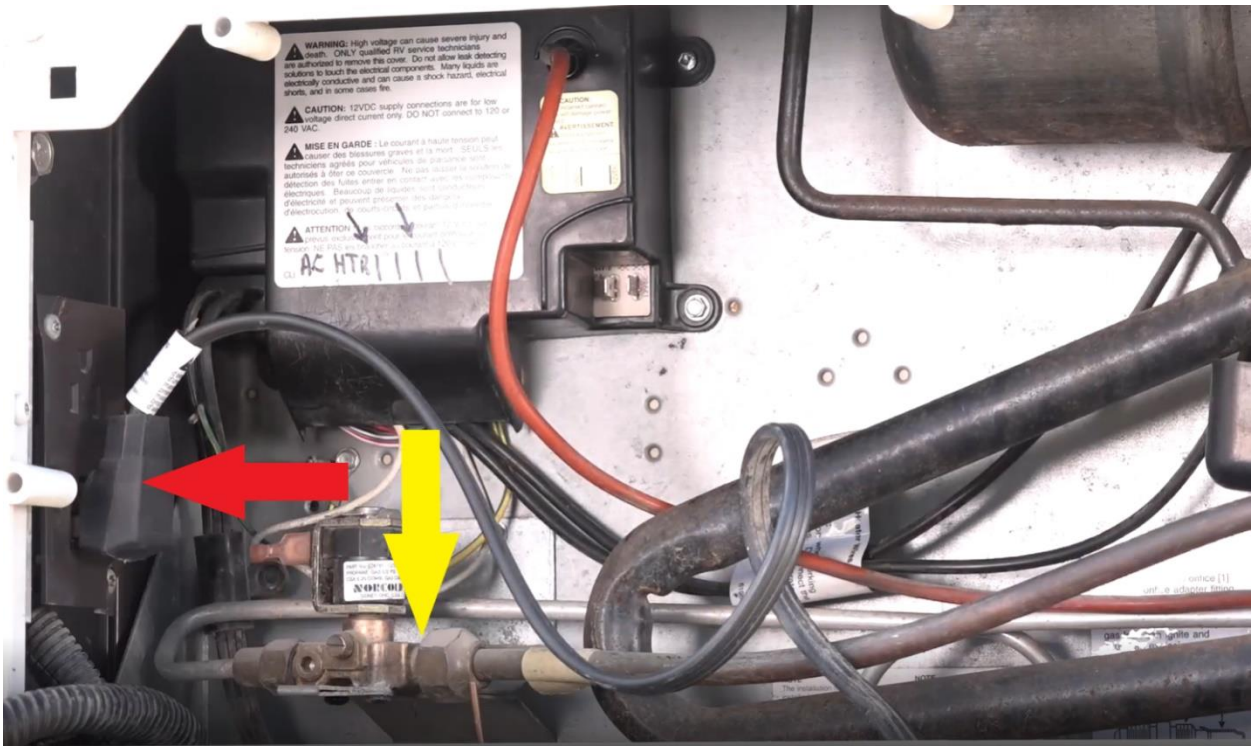




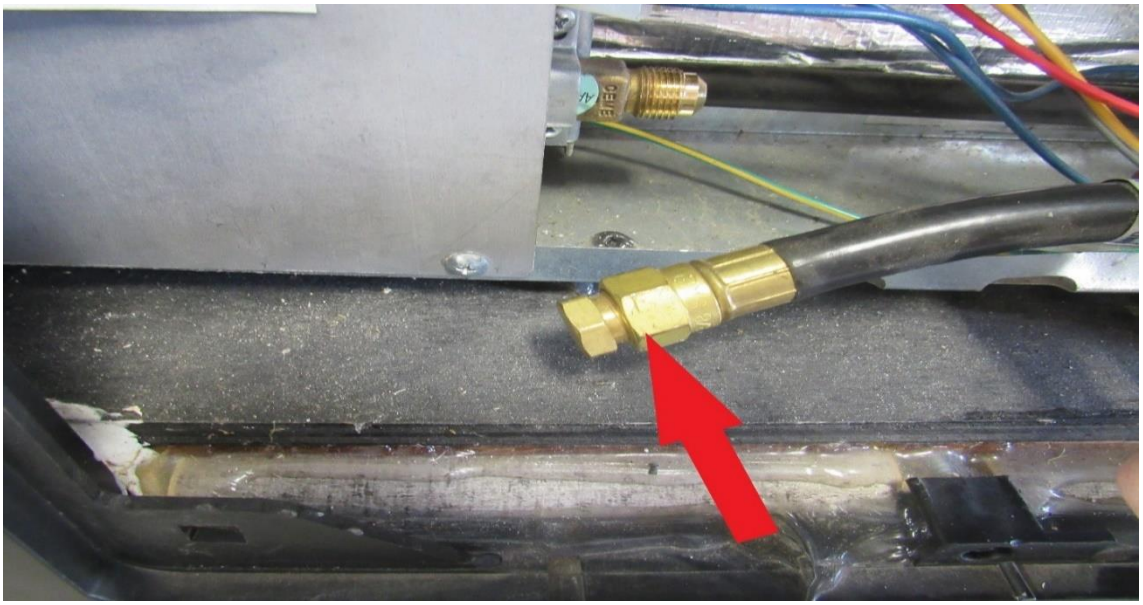
Note: If your wire ends are not insulated, wrap the end in electrical tape on positive so you don't pop the fuse.

Unplug your 120V plug (RA) from your RV receptacle.

Take the LP line (YA) off of the LP solenoid valve. Make sure gas is turned off (see step one)



Cap off the LP line with the supplied cap in the parts bag (RA). Check this joint with soap and water once gas has been turned back on.



There are many different styles out there but most have at least 2 mounting screws through the back plate holding the fridge to your RV floor. Screw size and bit needed will vary from coach to coach.

Remove these screws or Bolts (RA).



On Winnabago coachs you will have 4 bolts lagged to a steel side plate, 2 on each side of the fridge, also the top roof vent cap needs to be removed and 2 to 4 philips screws need to be loosend from the top of the fridge.



Going inside again start by removing the black trim covers on the top and bottom.

Remove the two mounting screws on top and bottom (RA). Screw size and bit needed will vary from coach to coach.



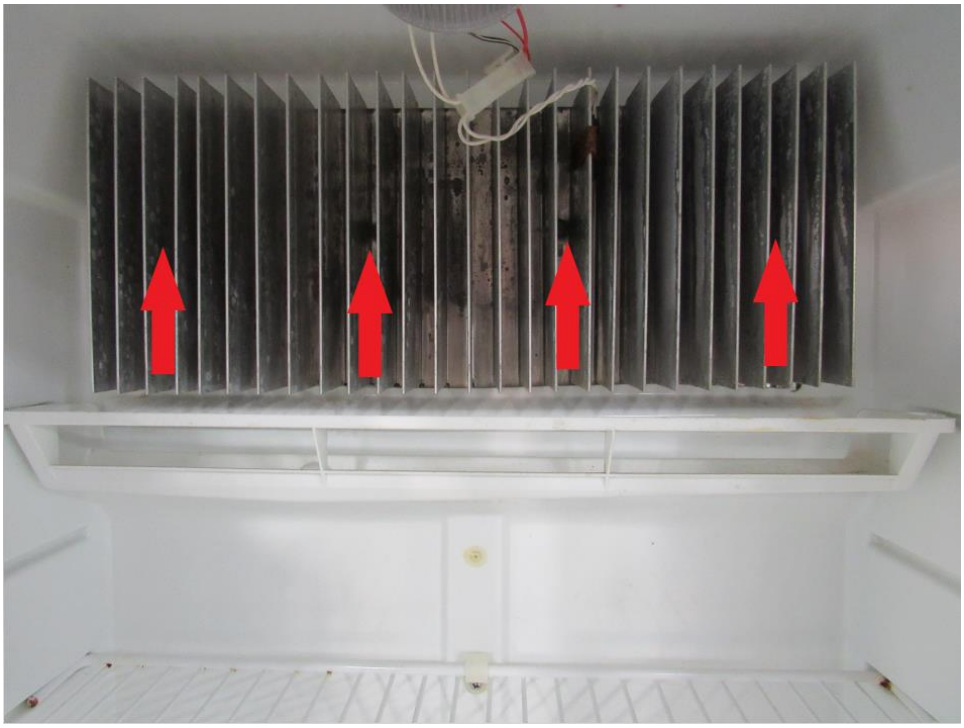






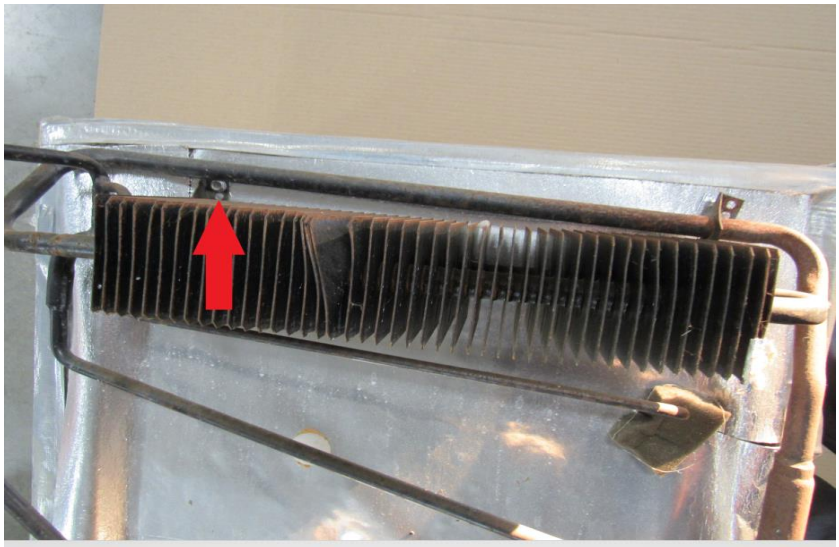
Take a 5/16” hex bit and cordless impact driver and proceed to remove all the screws (RA) in the freezer and the refrigerator. Unclip thermistor and leave it hanging down into the fridge box. Removing your freezer shelve or top fridge shelve is optional.



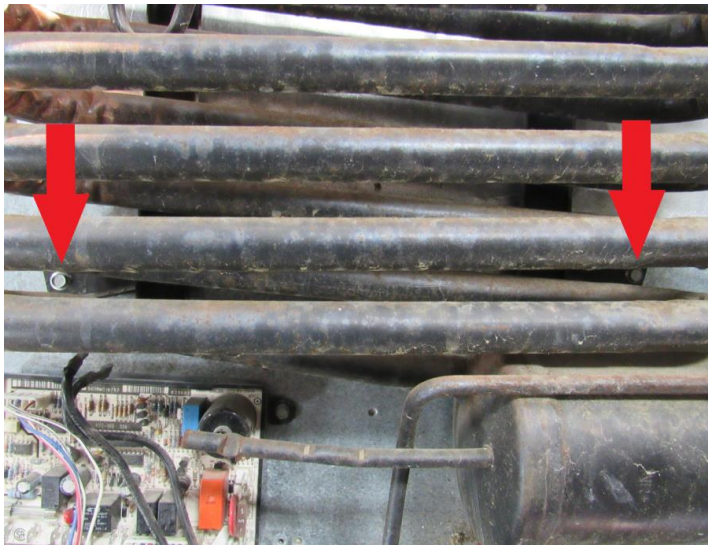


We do not show the fridge being slid out onto the floor, as the lay out of the coaches vary greatly and so it could be misleading to your scenario. But the object is to have 1 guy on each side of the fridge and as your fridge starts to exit lift up gently so when the rear end of the fridge fully exits the cavity that it does not drop, but needs to be gently and carefully set on the floor and pushed or carried to your open floor area. Lay fridge face down on the floor, making sure doors are latched shut so they don't swing open and we normally put a pile of blankets on the floor by the top freezer door so the fridge is lying face down on an angle.

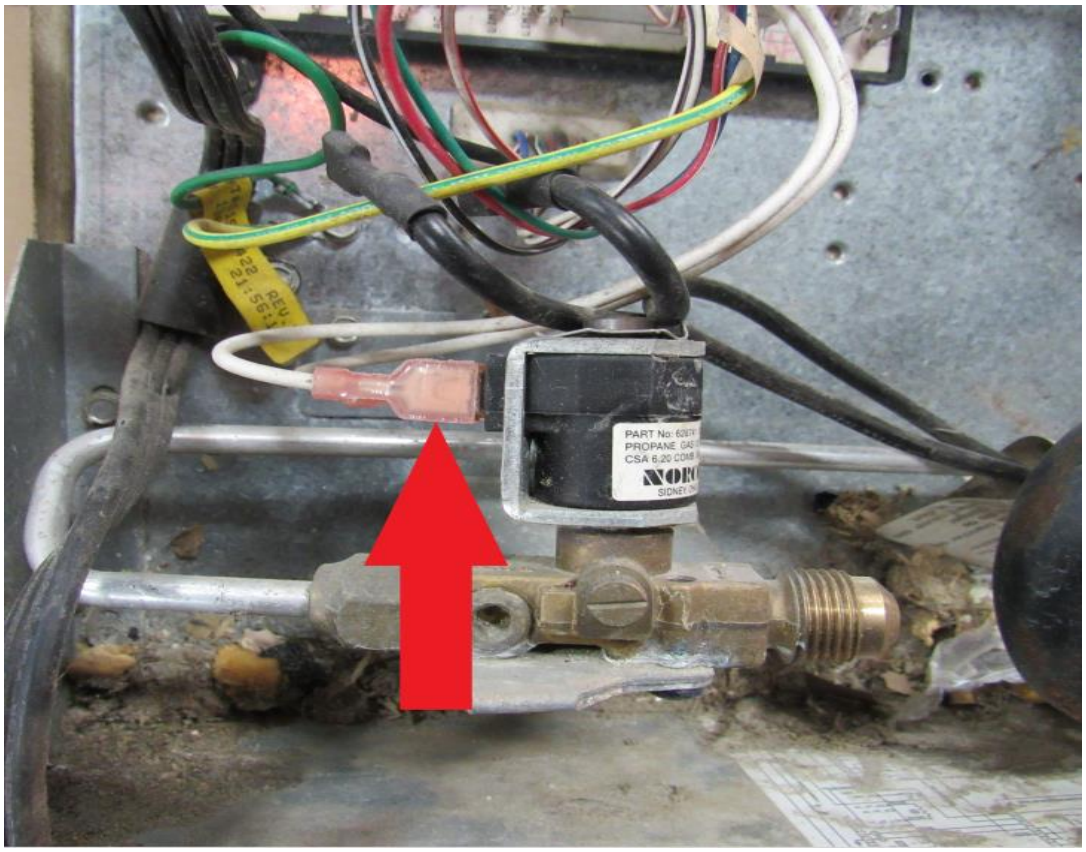
Take out mounting screw (RA) on top, Placement can vary



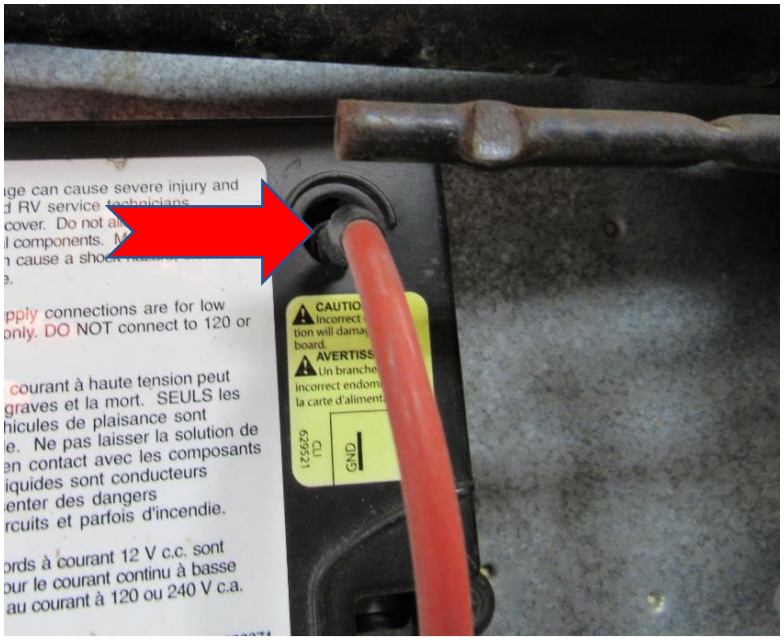
Remove bottom 2 mounting screws, may vary in location (RA).



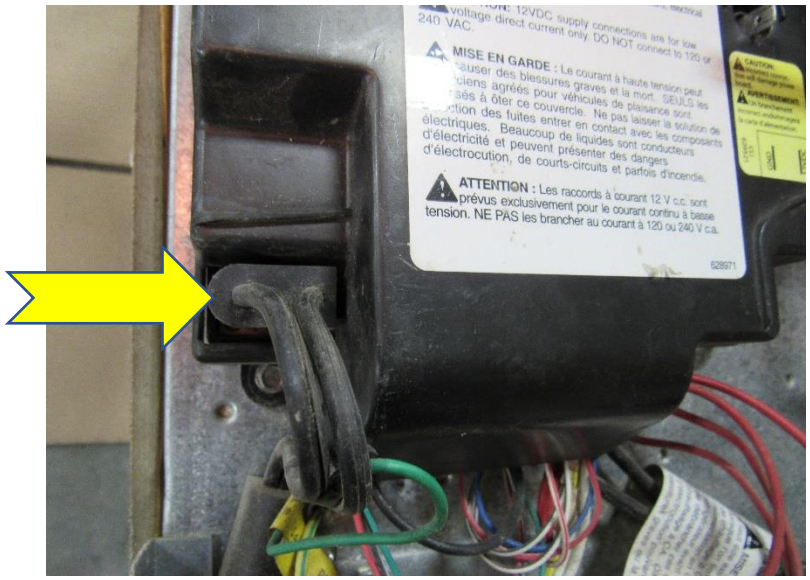
Take off the 2 white LP valve wires (RA).



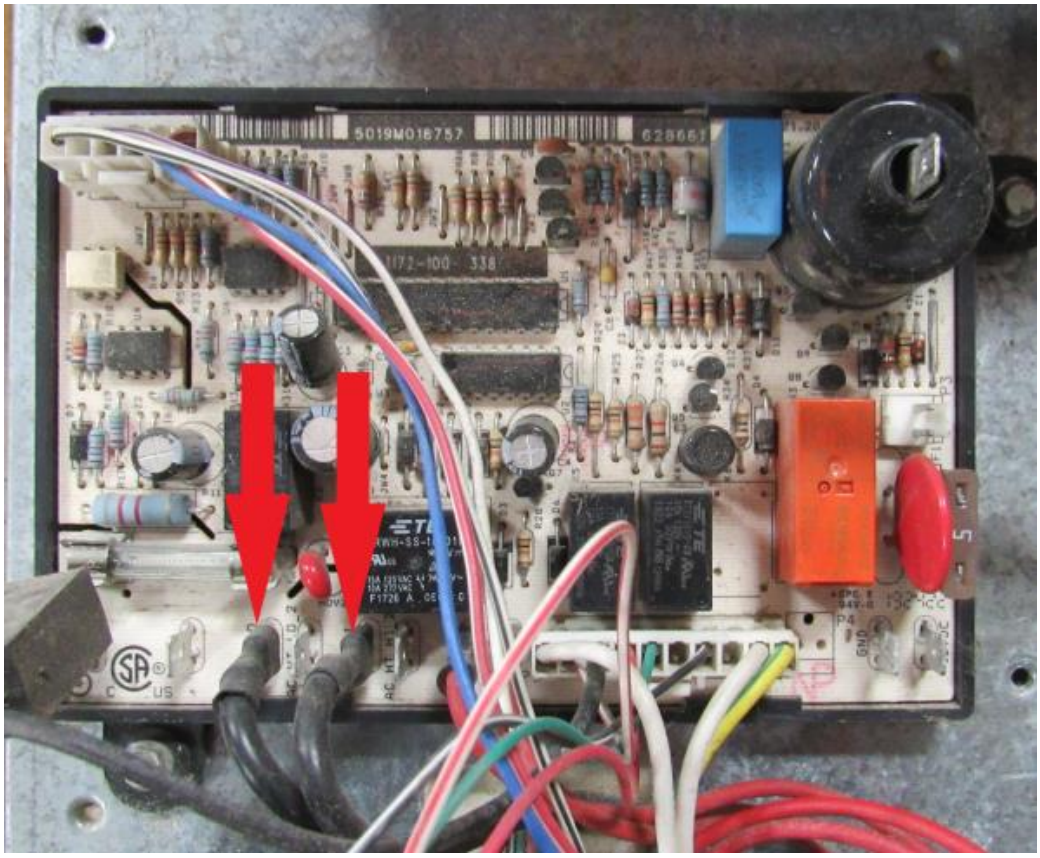
Unclip the igniter wire (RA) from the board.



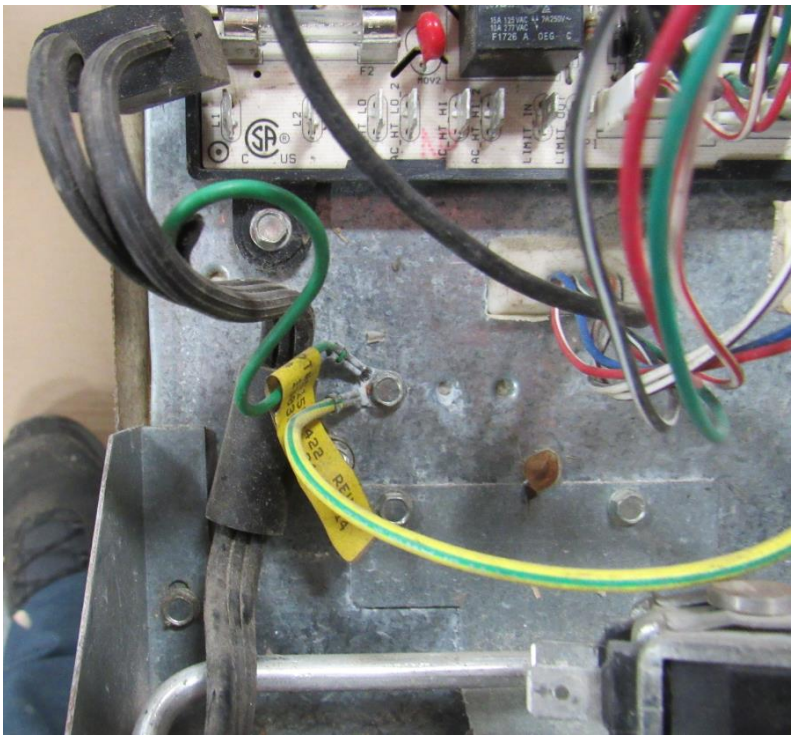
Take the 120V plug (YA) loose from the board in order to remove the cover.



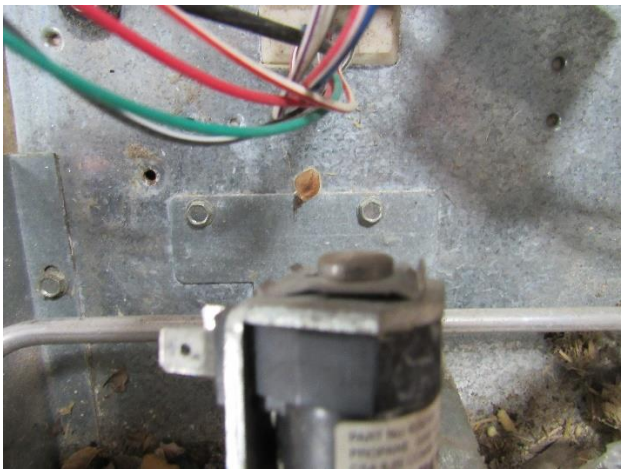
Remove the board cover and then remove the heating element wires. (RA)

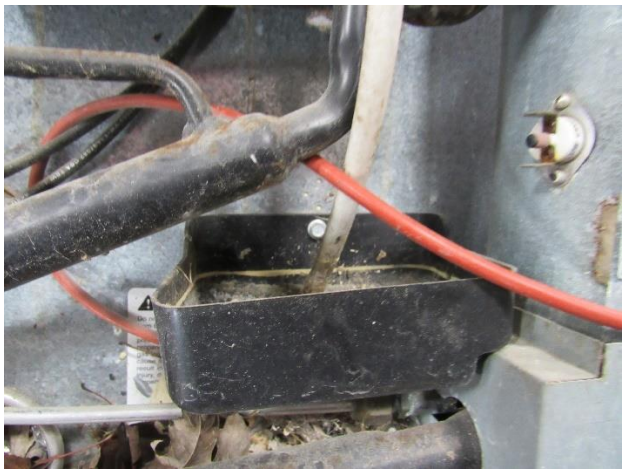


Remove the 120V power cord completely as it will no longer be needed. Also, remove the green board ground wire.



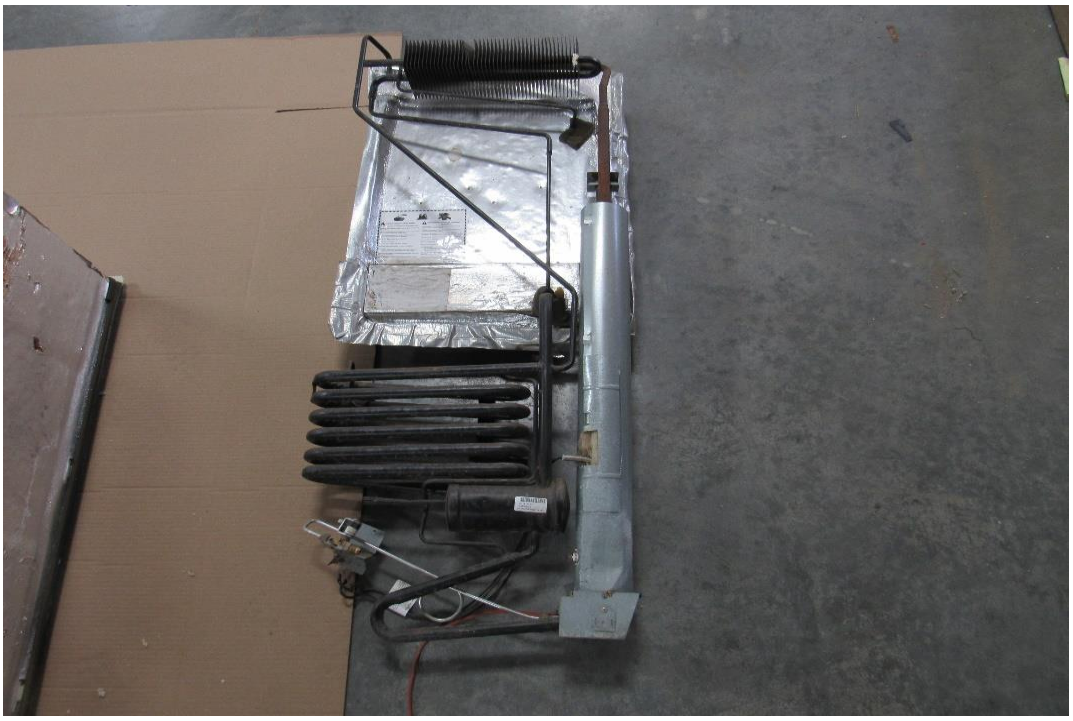
Also remove the gas valve mounting screws, and the defrost cup. The defrost cup will still be needed later.



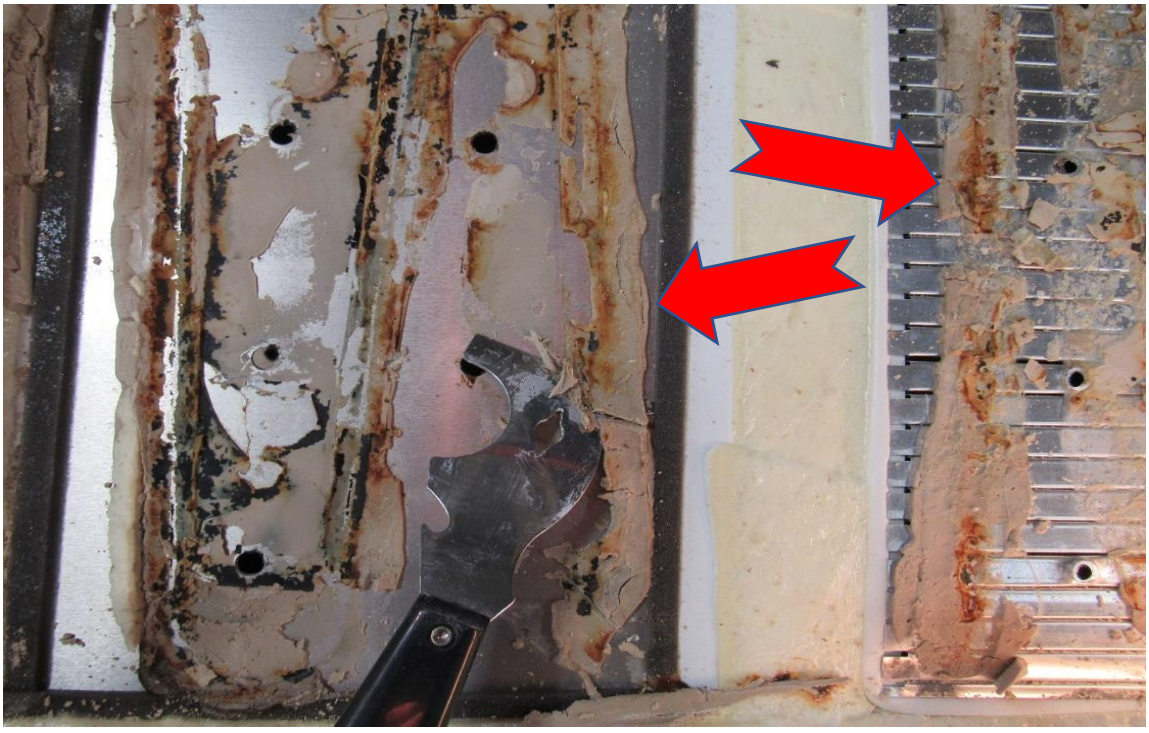


The control board can be removed at this time as well, as it will not be reused.

Take unit off the back of your refrigerator by lifting straight up and out.

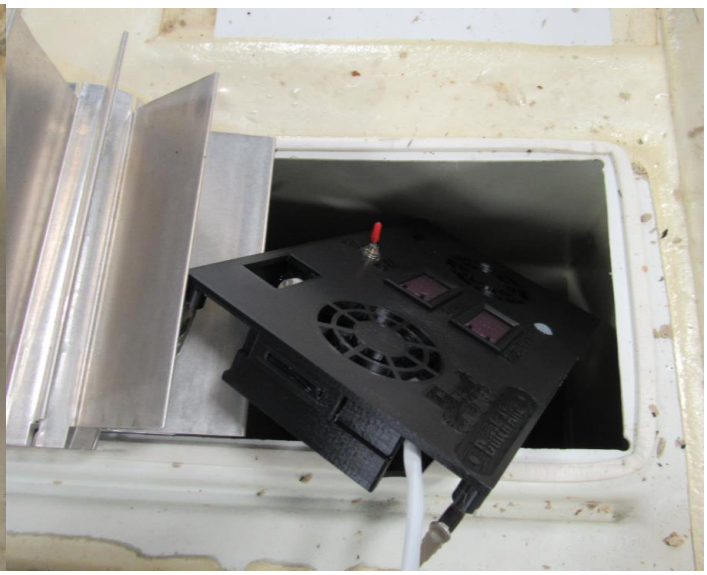


Clean off the old thermal mastic (RA) from the freezer section and the fin section. A large blade putty knife or scraper works well. Leave fin intact to the box, as its very easy to get this back in upside down.



Insert the controller into the fridge box through the fins as shown in the picture below. Lift the right-hand side of the fins and insert the controller inside, clip to the shelf for now so it does not get damaged till you are ready to attach to the fin. Make sure and leave enough wire so it will can be mounted anywhere on the fin. But check to make sure you still have enough wire on the outside so it will reach to the compressors.

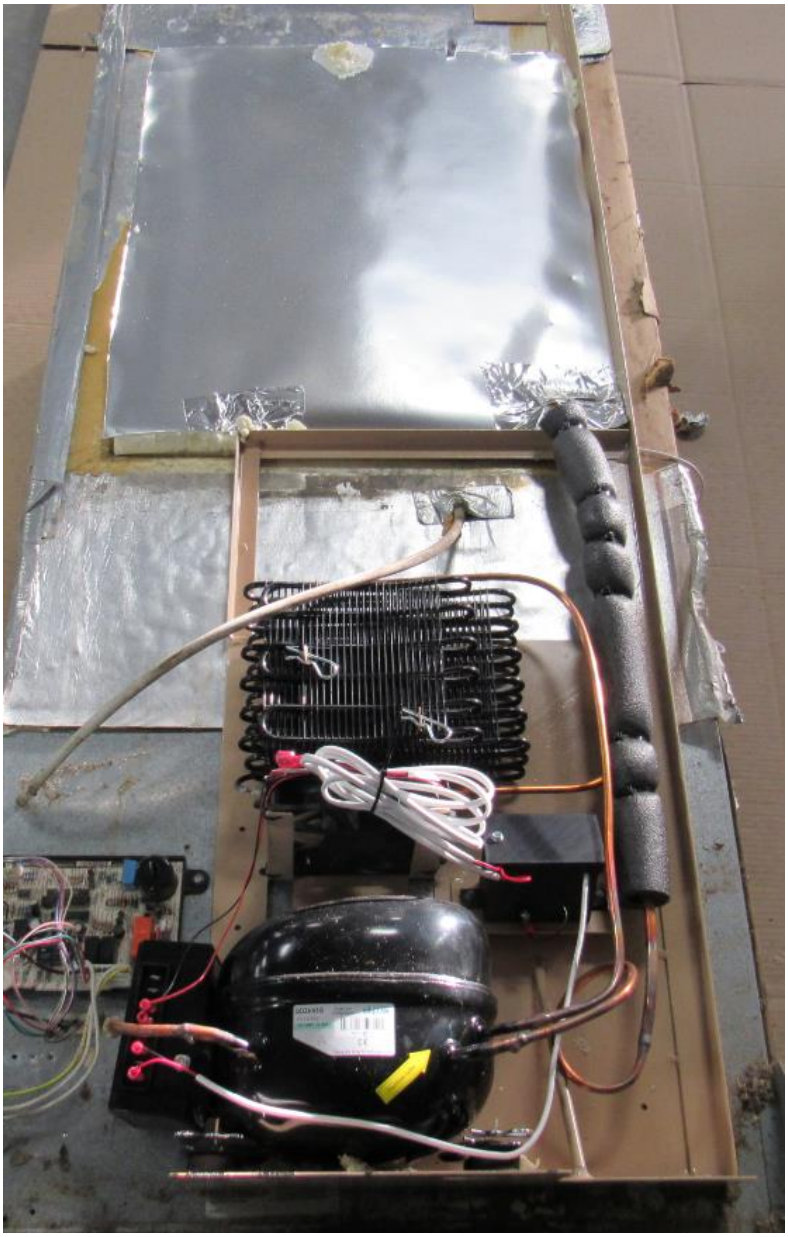




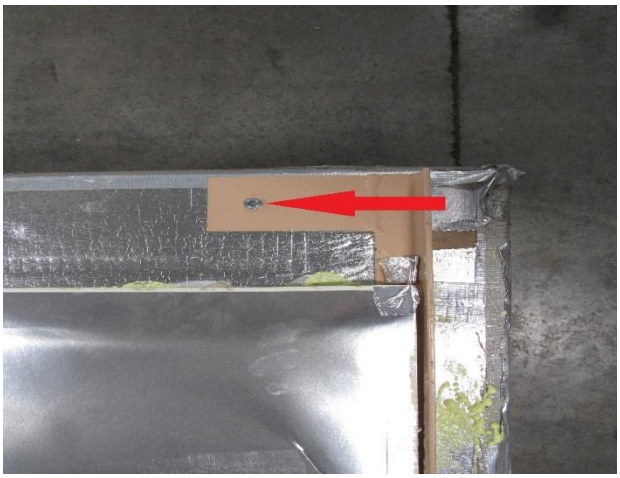


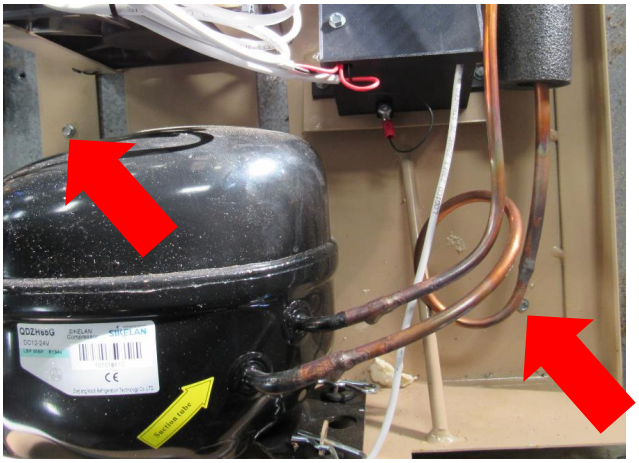
Warning: The next few steps are very important. If done incorrectly, the cooling unit freezer and fin screws might not line up the best. If possible, have someone to help you with the next steps as it will make everything much easier.

First, we will do a "dry run". Set the unit in the box as shown in picture.



If you are alone, screw two self-drilling #10X1" mounting screws (RA) that are included in the parts bag. Your exterior mounting holes will not line up to the original holes. This will hold the unit in place for the next step. If you have another person with you leave these screws out and have the second person hold the unit while you set the refrigerator upright into the standing position now open freezer door and make sure mounting holes in the freezer are aligned with the cooling unit holes.

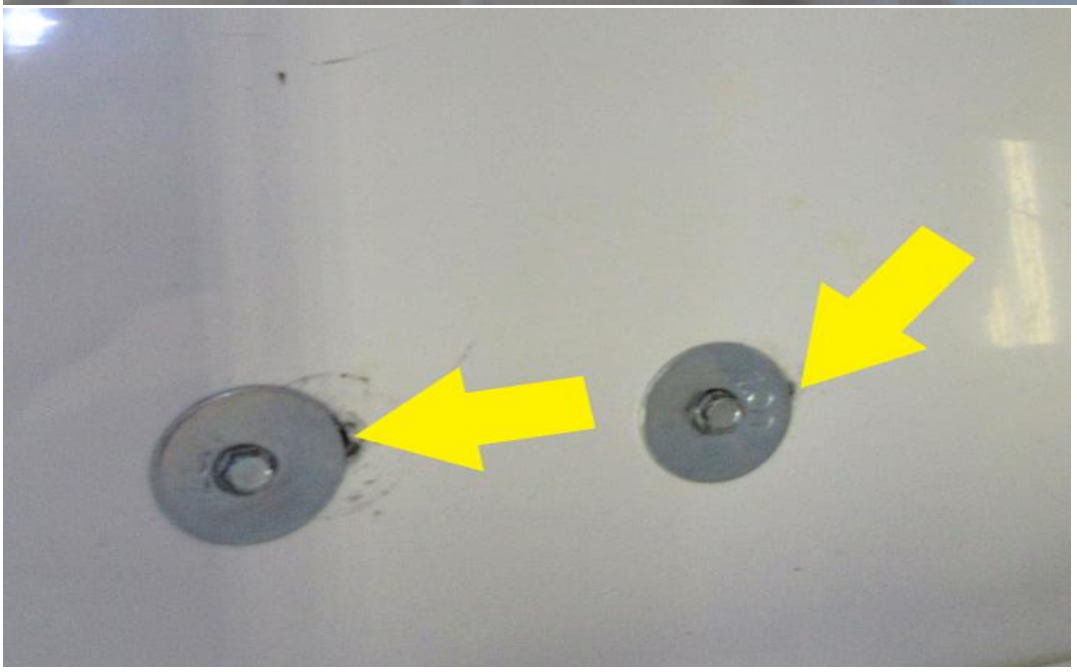




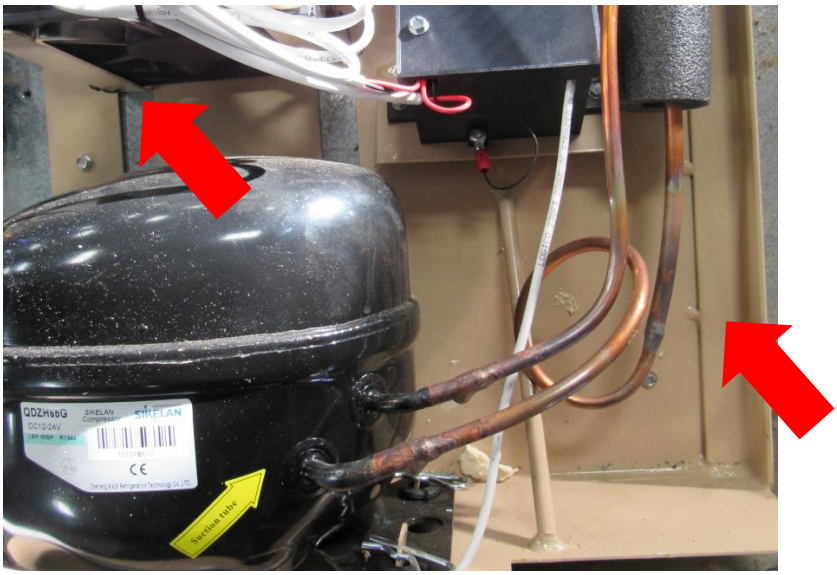
If holes are not aligned have the rear person lift the unit up or down or side to side till holes are aligned, or if alone you have to set fridge back down, take out mounting screws and adjust the unit to where the holes line up. It does not have to be perfect, just close enough where you can see the edge of the screws. Don't be afraid to sand or shave foam off the side, top or bottom to let the unit slide the way it needs to go to line up the freezer screws. Pictured below is an example with the holes just visible on the bottom corner (RA)

Warning: Your box holes can be redrilled or enlarged to make holes line up and then the washers can cover the hole, (RA) <u>but do not *ever* drill new holes</u> into the cooling unit plates as you will hit the cooling tubes causing a rupture. If part of holes are visible you can either leave them as is since unit will be sealed in the back or you can use white silicone caulk to cover the holes.





Once you have positioned the unit to where your holes align with your freezer holes, re-enter the previous mounting screws plus the mounting screws shown in picture below (RA). This way you know exactly where the unit needs to be later. If a second person is there to help these screws do not have to be put back in.

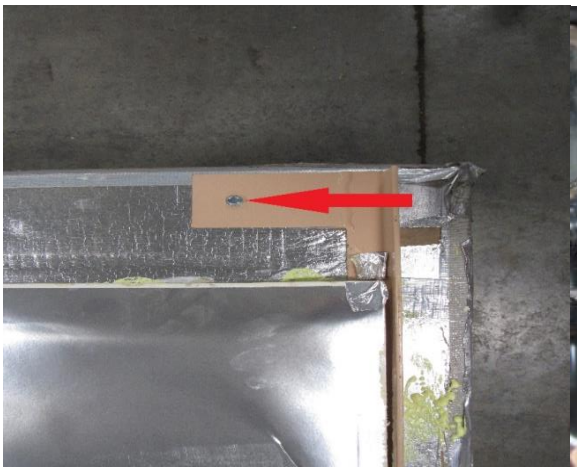


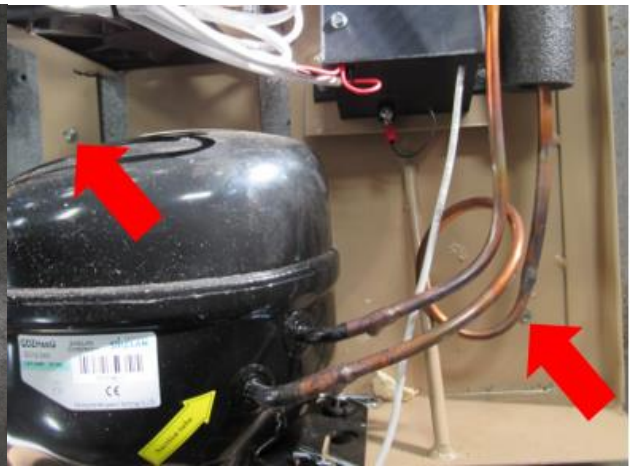
Take the unit completely off the box again. Take a caulk gun and place a small bead of thermal mastic on the cooling unit tubes in this fashion. You will need to use the whole tube.



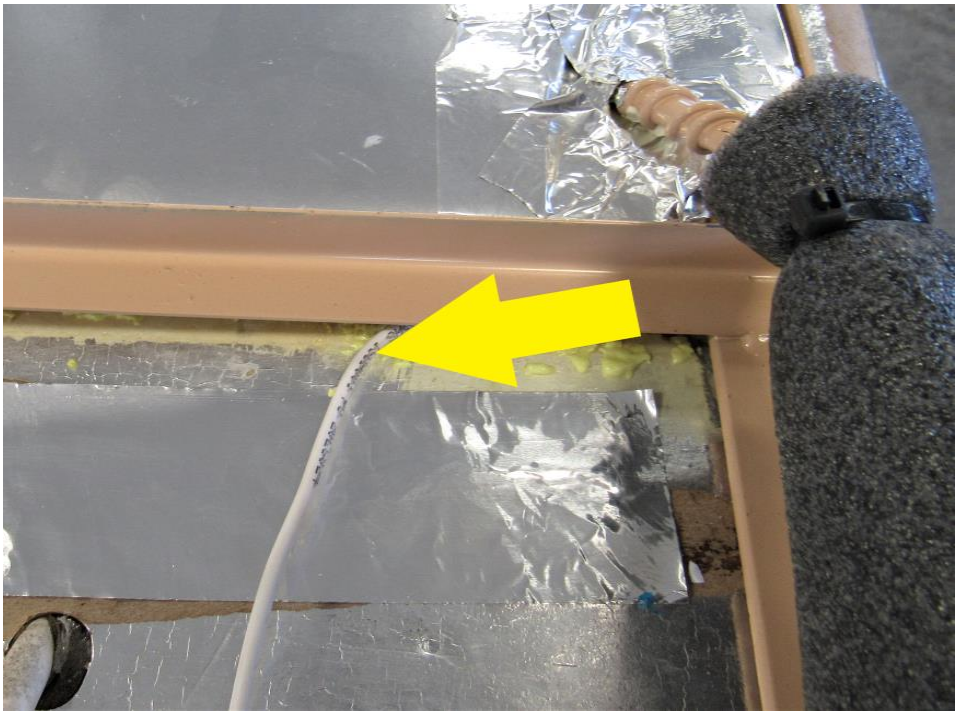


Lay unit back into box being careful so as not to scrape off any thermal mastic on the box, and make sure unit is in position where you had it last so freezer holes line up. Now screw the unit to the back of the fridge

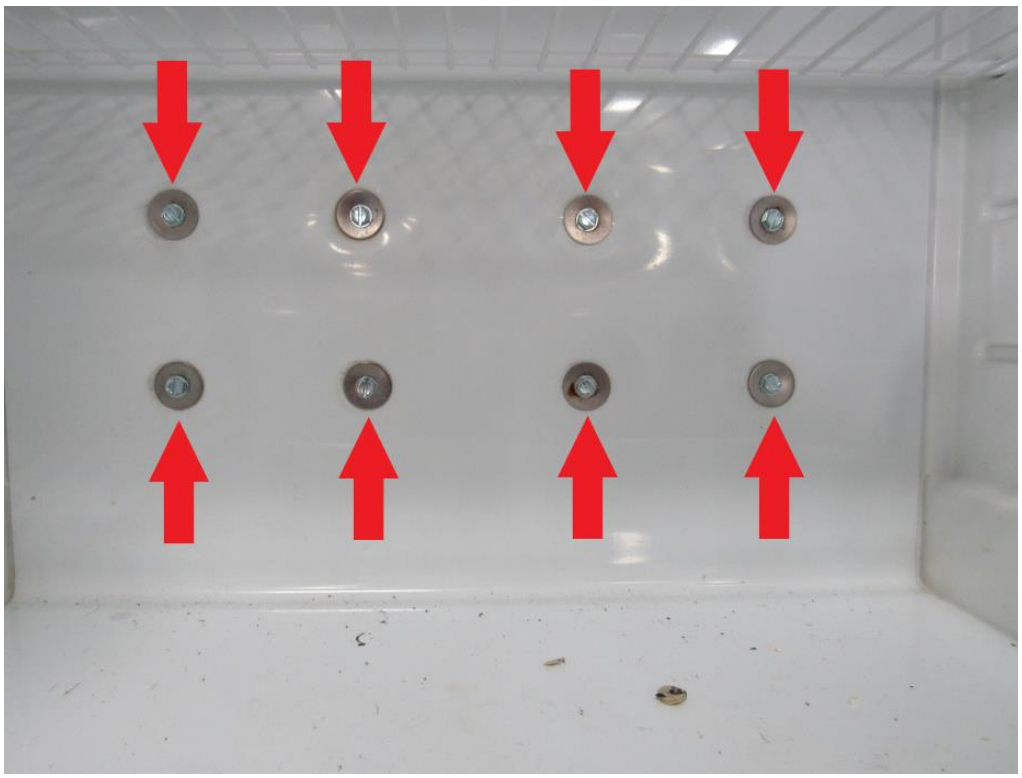




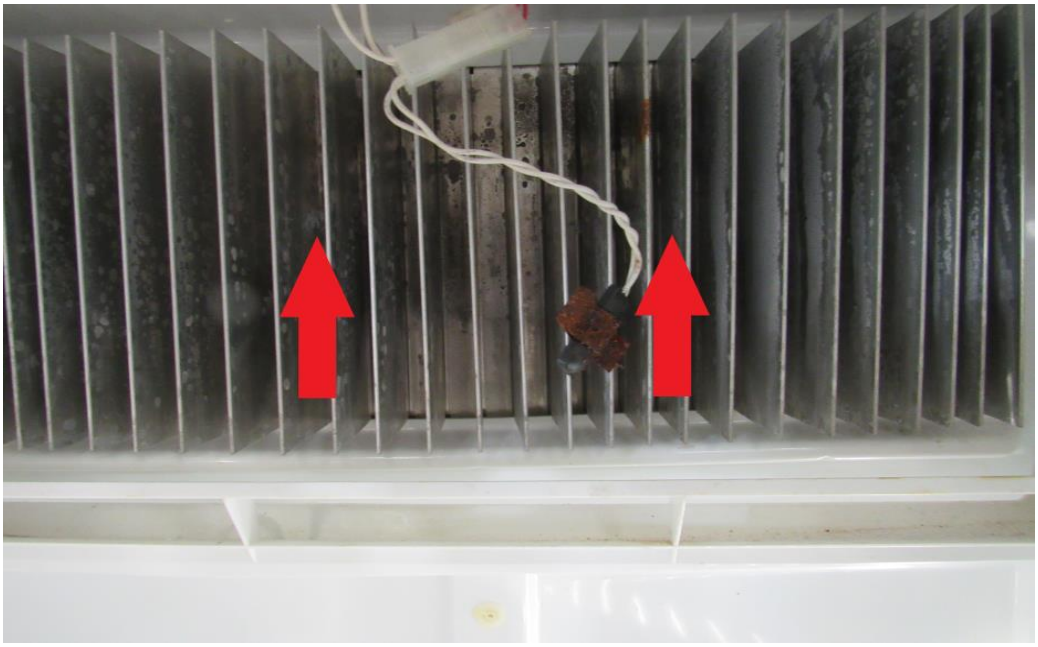
Your controller wire will exit on the bottom of the foam insert between unit and box. (YA)



Set the refrigerator upright into the standing position and install all 8 freezer screws, using the supplied #10X2” screws in the parts bag, pulling the unit tight against the back.



Using the #10X2” screw the 2 center screws in only, the rest of the holes in the fridge fin will no longer be used.

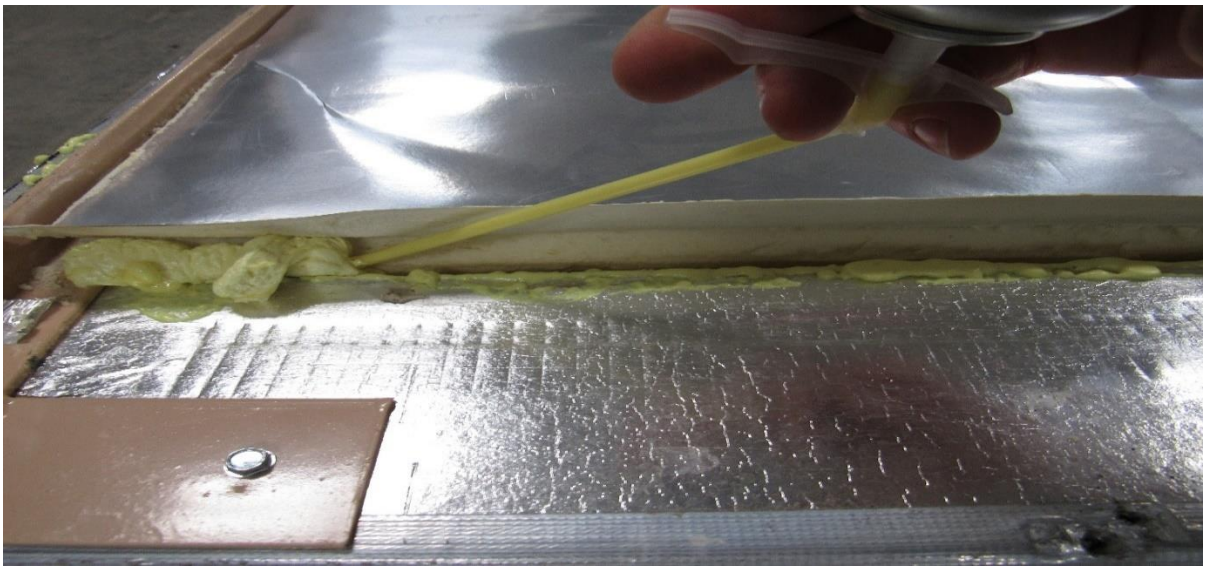


Clip your controller onto the fridge fins, close to center.



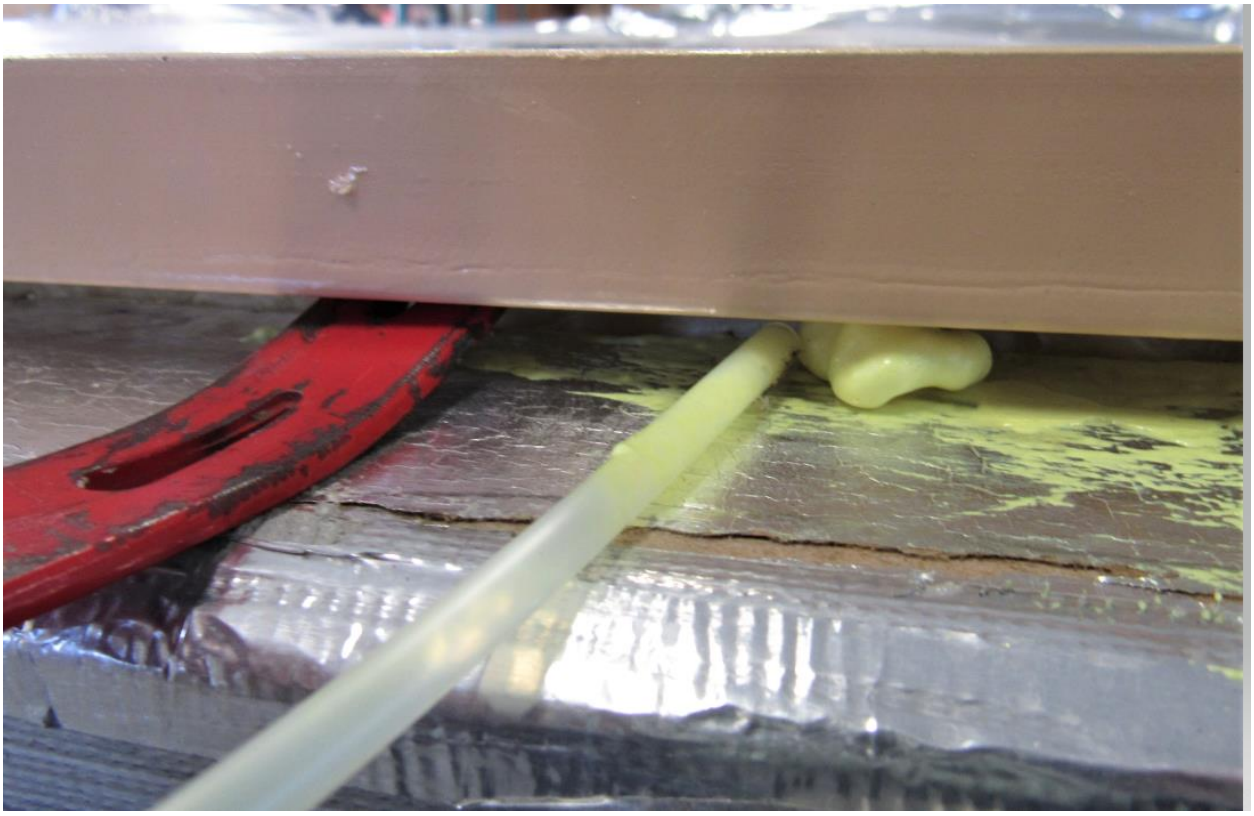
Warning: Make sure this step gets followed precisely, otherwise your fridge is unable to cool properly

Lay fridge back down, take the can of Great Stuff foam (shake can for a few seconds) and apply a bead of foam around all four sides as shown below. Make sure and seal all cracks and gaps. This will help seal all air leaks while travelling down the road.





On areas where the steel frame is tight against the box, take a small pry bar or flat bar and lift up enough to get in there to fill up the gap between unit and fridge box. **Make doubel sure all gaps and cracks are sealed off, very important!!**



After filling all gaps with foam, follow up with the supplied aluminum tape as shown. This is for cosmetic looks only; this tape does not help seal.

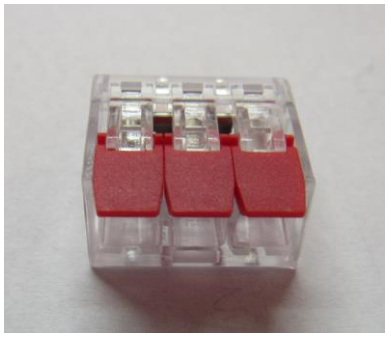


Controller wiring

Included in Package:

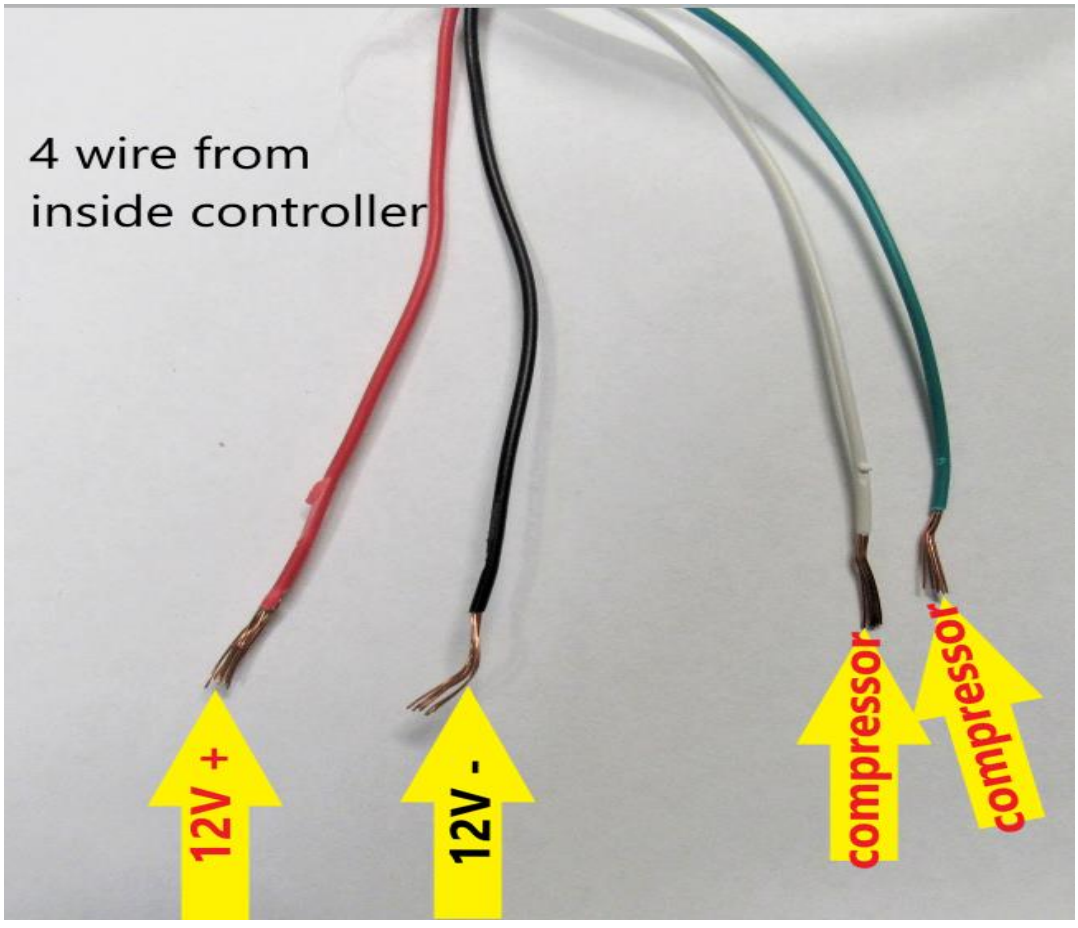
1- Control Assembly 2 – red female wire connectors 2 – Wago connector



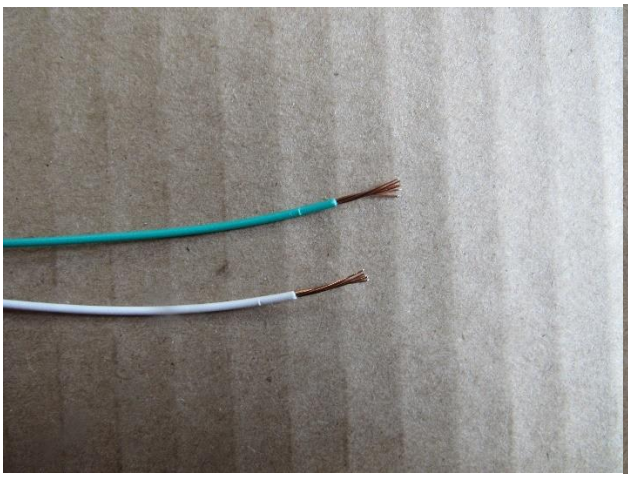


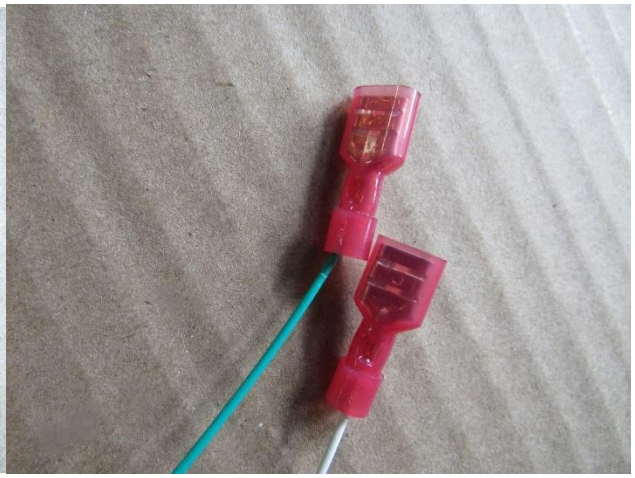
If this wago is something new to you, all you do is lift the flap and push a stripped wire inside and snap the flap back down and it will be secured.

Strip about 6 inches of the white coating off of the end of the wire. Inside there will be 4 smaller wires, red, black, green and white. Please note the green and white wires might be blue and yellow. Red/Black go to coach power, green/white go to the compressor

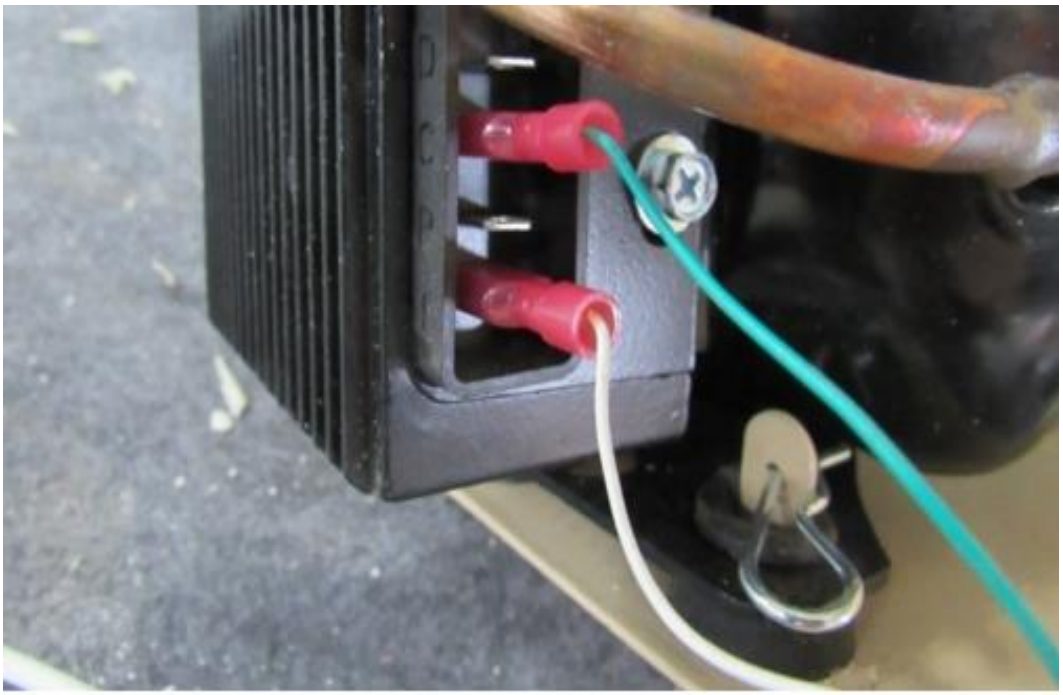


Take the green and white wire and strip about ¼ inch off the end of the wire. Then take the red female wire connectors and crimp it onto the end of the green and white wire.





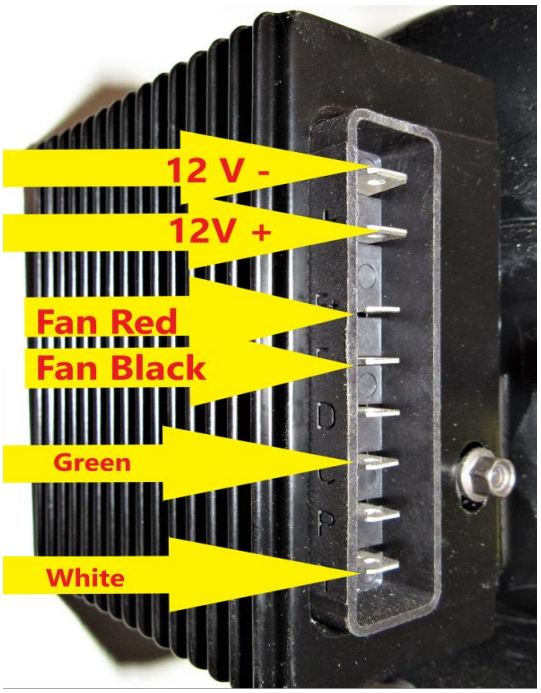
Take the white wire and plug it into the bottom spade on the side of the control box of the compressor. Take the green wire and plug it into the third spade from the bottom up on the control box on the side of the compressor.

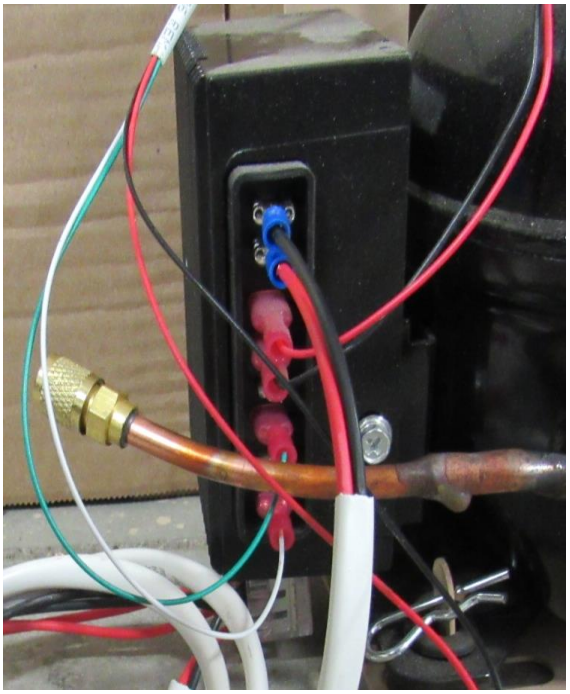


Please note the green and white wires might be blue and yellow.

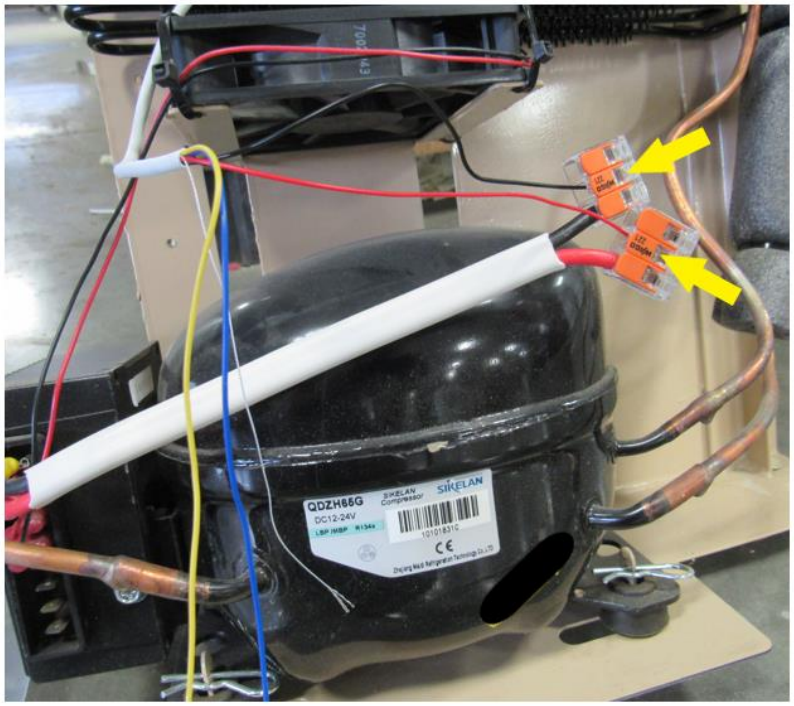
Use blue as green and yellow as white.

Here is how the compressor should be wired when all done:

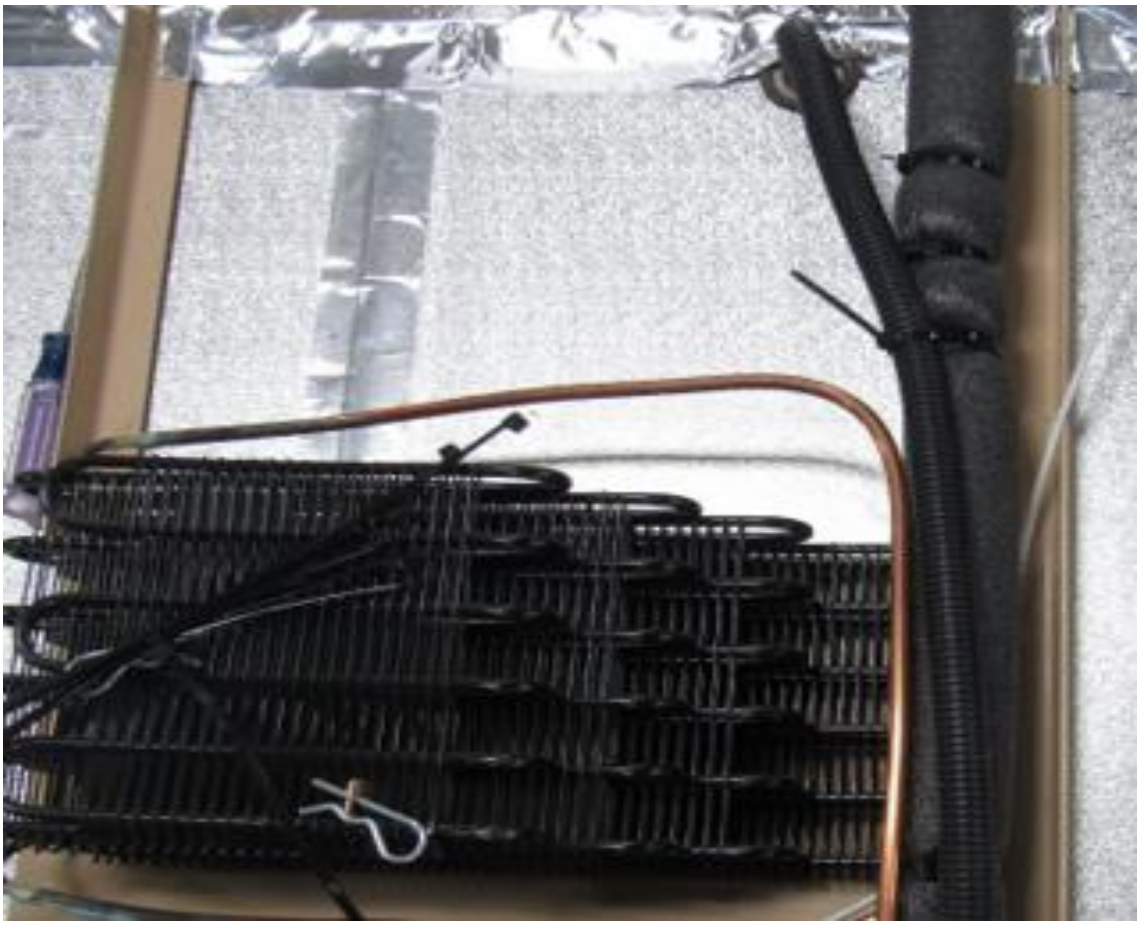




Then connect the red and black wires from the controls to the main power Wagos

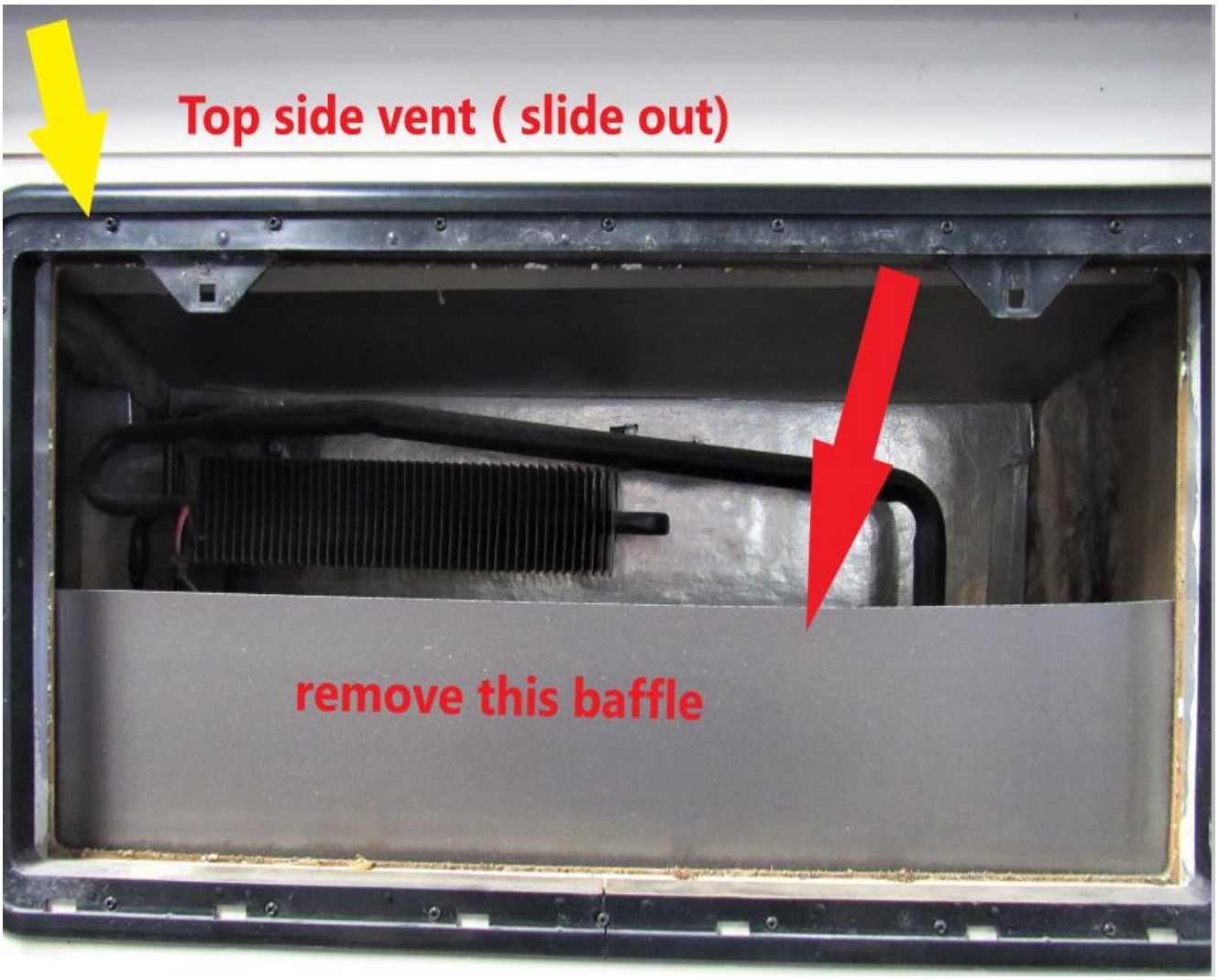


You can attach the drain tube to the copper line with cable ties to hold it in place. Most of these models will drain out of the side vent but if your refrigerator has a drain cup on the back, re attach it somewhere on the back of the fridge where the hose will still reach it.



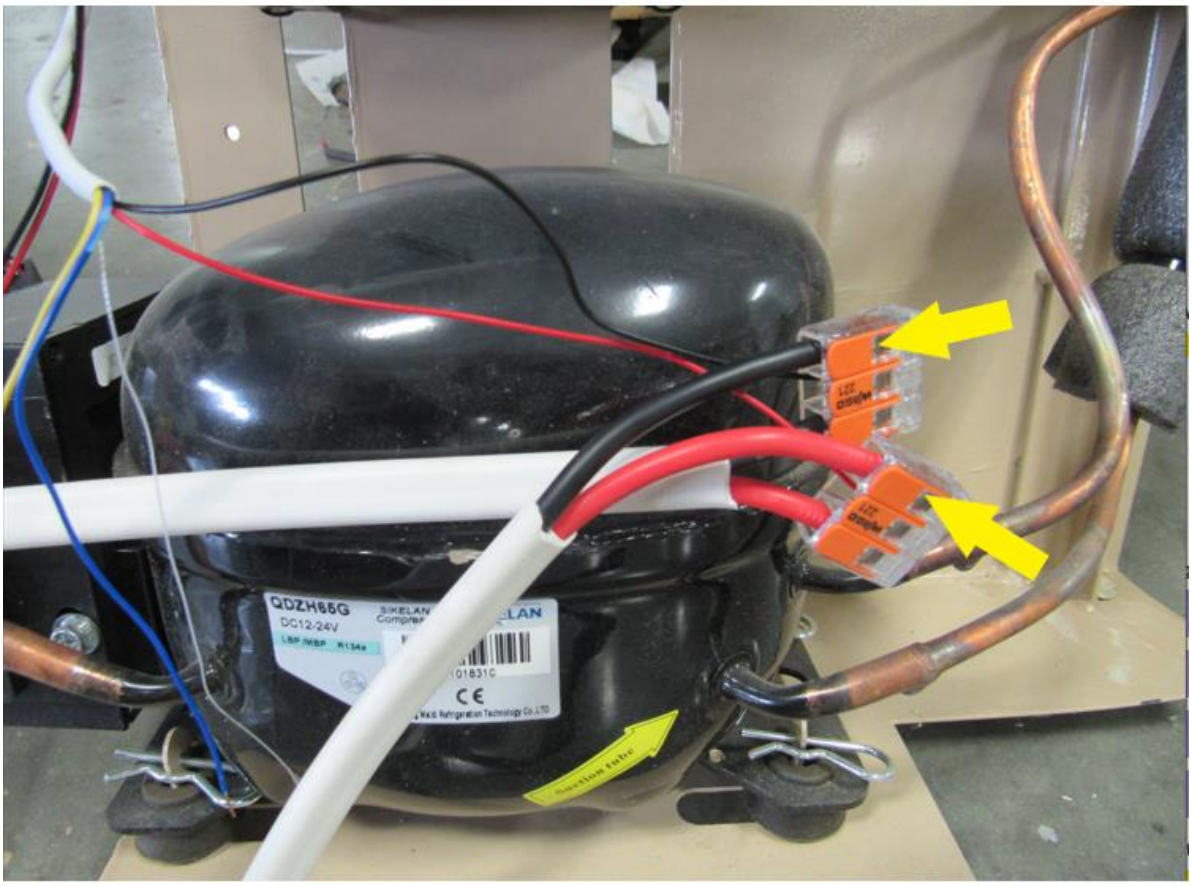
Warning: Please make sure and follow this thru this step, otherwise unit could over heat causing damage to the unit.

Before installing the fridge back into the cavity, check to make sure wall insulation is secured and this is a good time to sweep or vacuum any loose debris. If this fridge is installed into a slide out then make sure and remove the top side vent (YA) baffling (RA), as you will no longer need this and all it will do is slow air flow. If it's installed into a fixed cabinet with a roof vent, then nothing has to be changed, but make sure and leave both vents open, as this unit will still have to breathe.



Now you're ready to slide the refrigerator back into the cavity. Once it's started it helps to have someone outside to watch as you slowly push the fridge back into place, making sure the gas line is out of the way. Do not attach the mounting screws to the cabinet yet, we want to test first in case the fridge has to be slid forward a tad to run a new wire. The system does require 10-gauge 12V power wires to run it properly.

Now the main 12V power wires from the coach need to be hooked to the cooling system. 12V power from the coach needs to be connected to the Wago with the red wires and the coach 12V negative to the Wago with the black wires



This pic shows the coach wires as being red/black, but they could be any color dependant on your coach manufacture. Just make sure you put your coach positive 12V DC wire to red and negative to black.

Install mounting screws (RA)on the top and bottom first before finishing outside.



Attach black trim pieces on top and bottom.



Now we are ready to finish the outside. Put the two mounting screws (RA) back in place. Or if your coach is a Winnebago, see pics above for location of bolts,



WARNING: Make sure this gas plug has been checked for leaks

(RA) this copper tube can be bent carefully and tucked out of the way once the fridge is back in place



Operating the Controller:



The switch on the front is to turn your fridge on or off. When lifting the switch to the on position the temp controller will light up, the fans will turn on and the light will turn on as the motion sensor will detect your movement. (After 30 seconds of no movement, the motion sensor will shut the light off.) The blue number (bottom) on the temp controller is your set point and the red number (top) is the actual temp inside the fridge. The temp is preset to 34F to 38F, temp may need to be tweaked at first to get to your desired temp reading, food zone is 0F to 10F freezer/38F to 41F fridge, to adjust temp up or down use the diagnostic sheet for instructions. If you are using another temp sensor, just be aware the controller temp and your other source of temp reading might not always be the same, and this is ok, just rely on the temp sensor read out you are used to, but make sure yours is either digital wired or wireless. After compressor has turned on you can now put your screws into the cabinet. If it does not turn on and just cycles you will have to run a new 10ga wire to your battery with a 30A breaker at the battery to protect your wire.

Hvac Universal Controller Introduction

This controller eliminates all of your existing Dometic controls. So that means that your front display panel, your interior light, and your rear control board will no longer work and can be taken out if need be. This new controller has its own on/off switch, temp control thermostat, as well as a light bulb that is motion activated. Long Life roller bearing fans to give you frost free satisfaction for years to come



Low Ambient Heat Lamp:

On the back side of the control assembly there is a little switch. By flipping this switch to the up position, it bypasses the motion sensor and keeps the light bulb turned on constantly. If you are using your fridge in cold weather (Usually 40F or lower), your compressor doesn't have to run very long in order to cool the fridge box, and this will cause the freezer to only stay around 25-30 degrees. Turning this switch to on will make so the compressor runs just a tad more thus dropping your freezer down to where it needs to be. Once the weather warms up or you move to a warmer climate, flip this switch back to the down position so that the light bulb is motion activated again. If this switch is in the up position while you are in warm/hot weather, you will cause the compressor to run longer and work harder than it needs to. Make sure this is in off position (down) unless needed.





Set Temp

Press “SET” (top button) briefly, bottom blue number starts flashing. While it is flashing you can adjust temp up using top (SET) button or down using bottom (*C/*F) button.

Enter Diagnostic and Mode settings: **We highly recommend not changing any codes unless it’s absolutely required, as this can change other things as well.** Press and hold top (SET) button for approx. 4 seconds. P0 will flash first. You can then scroll through code settings using (SET) button to the setting needed. Once the desired code is reached, press both (SET)(*C/*F) buttons in at the same time, then the bottom blue letter or number will start to flash. Then use top or bottom button to adjust up or down in order to achieve desired setting. Once reaching desired setting, press both the (SET) button and the (*C/*F) button at the same time and the setting will be saved.

Code meaning:

P0 = Lets you switch between heating (H) or cooling (C). You want to make sure it is set to cooling (C)

P1 = This setting determines how far above the set temp the actual temp in the fridge can rise to before the compressor turns on, preset for 2.5

P2= Not needed or used

P3 = Not needed or used

P4 = If actual temp inside the fridge box does not match the top number on the thermostat, this setting can be used to calibrate up or down to make the thermostat temp match your actual box temp. This setting rarely needs adjusting. (Note: One number adjusts the actual calibration by 2 degrees. So if you set it to 1, the actual temp will be calibrated 2 degrees warmer.)

P5 = This setting can be used to set a delay for turning on the compressor. This setting should not need to be adjusted.

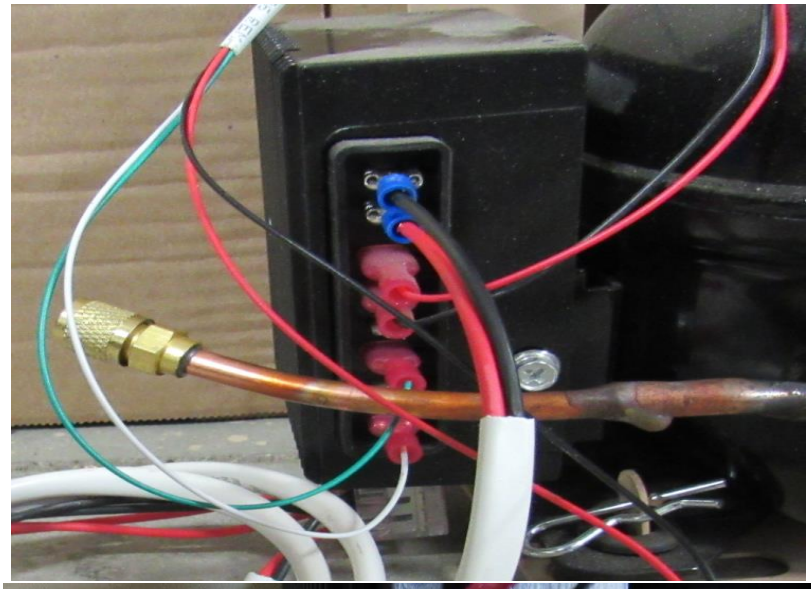
P6 = This setting can be used to set a high temp alarm.

P7 = This setting is used to switch between Celsius (CH) or Fahrenheit (FH). It is preset to Fahrenheit.

P8 = This setting can be used to reset the controller to factory settings. Not recommended to use this setting.

HVAC 12V Direct Wire:

If your compressor is not turning on for any reason and further testing is needed to see what needs to be done, here is a guideline to wire either compressor direct for the time being till the issue can be resolved. Pull off the thin gauge green and white wires that are on the bottom spade and the third spade from the bottom up. Then take a small piece of wire and crimp a female connector onto each end. Then plug one end into the bottom spade and the other into the third spade from the bottom up. This will now make the compressor run full time till your other issue can be resolved





We highly recommend using a digital wireless thermometer to monitor your inside fridge temps, many phone calls or temp misleading's can be avoided by making sure the thermometers you are using are accurate. You do not have to use our brand but we do recommend using something similar to this type.

https://jc-refrigeration.com/product/refrigerator-freezer-digital-wireless-thermometer-free-shipping/

Use digital wireless

DO NOT USE



Image 2



Clip the sensor for the fridge on the bottom side of the first shelf beneath the fin, place it so the sensor is centered, front to back and side to side (RA), if its clipped underneath it will be out of the way and shouldn't interfere with storage.

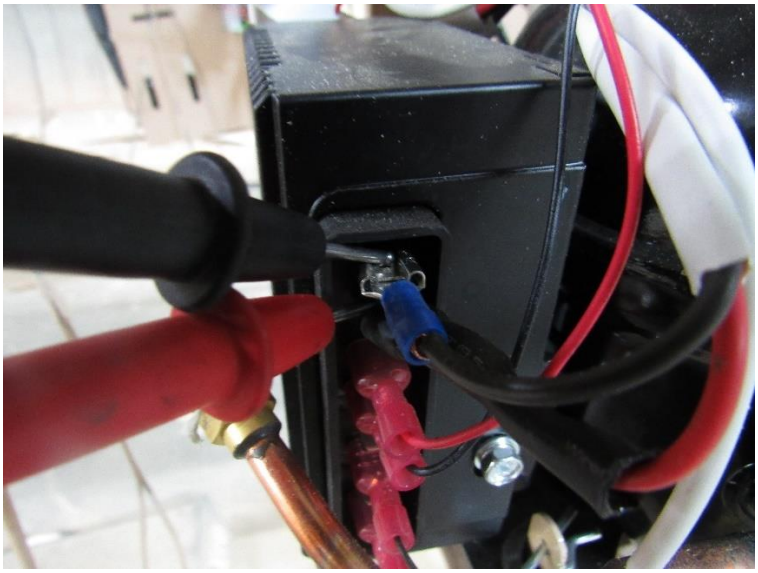


The same applies the with freezer. Clip the sensor underneath the shelf, centered from side to side, but have this one more towards the back of the freezer.



Troubleshooting

12V Model only: If compressor starts but shuts back down after 15 seconds, check your voltage at the compressor at the time it tries to start. Compressor has a built-in low voltage shut off set at 10.4V and on startup is when the compressor will draw the highest amperage. So, if voltage drops below 10.4V, the compressor will shut down. The higher the voltage the lower the amperage, or vice versa, so in order to have compressor running the most efficient the voltage needs to stay above 12V while running. So, make sure that your batteries are not too low.



FAQs

How much will the compressor actually run?

From our testing in 80 degrees, with the fridge and freezer empty, and the doors remaining closed for a 24-hour period, the 12V DC compressor runs approx. 65% of the time. However, keep in mind that this can be very easily affected by a number of variables such as ambient temp, how often the doors are opened, and how much food is in the fridge/freezer.

What is covered under warranty?

Our warranty covers the cooling unit and any of our controls that came with the cooling unit. It does not cover any original Norcold parts such as the control board, the front display, thermistor, etc.

What if the cooling unit needs to be worked on and I'm not close to your location (Shipshewana, IN)?

Contact us first and we will try to help you get the issue resolved. Most problems can be fixed by us through email or phone but if more work, or hands on work is needed, we have a list of dealers/service centers in almost every state that have purchased cooling units from us before and could possibly help you out.

Is there any regular maintenance to perform on these cooling units?

The only thing that needs to be done on these cooling units is to take compressed air and blow any dust or debris out of the condenser fin. This can be done maybe once or twice per year.

