VES
ICEBOX
INSTALLATION
MANUAL

VES ICEBOX INSTALLATION SHEET

Included Components:

Qty.1 ICEBOX Evaporator Qty.1 Compressor Assembly
Qty.1 Single Fan Condenser Assembly Qty.1 Condensation tube 3/8” 12 feet Qty. 2 4” Vents (customer to supply ducting

Not Included:

*Optional Refrigeration Hose Kit CNC Part# VES-HK / NC or SAE standard or reduced barrier hoses

Qty. 1 Complete refrigerant hose kit:

Hose #1
7 feet #8 standard barrier with Qty. 2- 90 degree fittings crimped on

Hose #2
13 feet #6 standard barrier hose with Qty. 2- 90 degree fittings crimped on

Hose #3
2 feet #6 standard barrier hose with Qty. 1- straight fitting and 1 90 degree fitting crimped on

Hose #4
6 feet #10 standard barrier hose with Qty. 2- 90 degree fittings crimped on

***Main power cable and circuit breaker/fuse not included. Please see Blue Sea’s circuit wizard for assistance on proper sizing for your breaker and wiring. http://circuitwizard.bluesea.com . This calculator will help you determine the appropriate wire size and breaker/ fuse size for your application. The current consumption for the units are listed below.**

VES 12L ICEBOX 12 volts @ 55 amps
VES 24L ICEBOX 24 volts @ 33 amps
VES 48L ICEBOX 48 volts @ 16 amps

*4” insulated ducting
*Various mounting hardware to mount components
*Evacuation and charging with R134a

Components to evacuate and charge the system are available on Amazon, at Harbor Freight, or at your local auto parts store. For guidance on this, please see the customer supplied charging videos on our website under the manuals and videos tab or call us.
Unit can also be charged by a certified home, commercial or automotive a/c technician. Secure a technician ahead of time and give them the attached charging sheet.

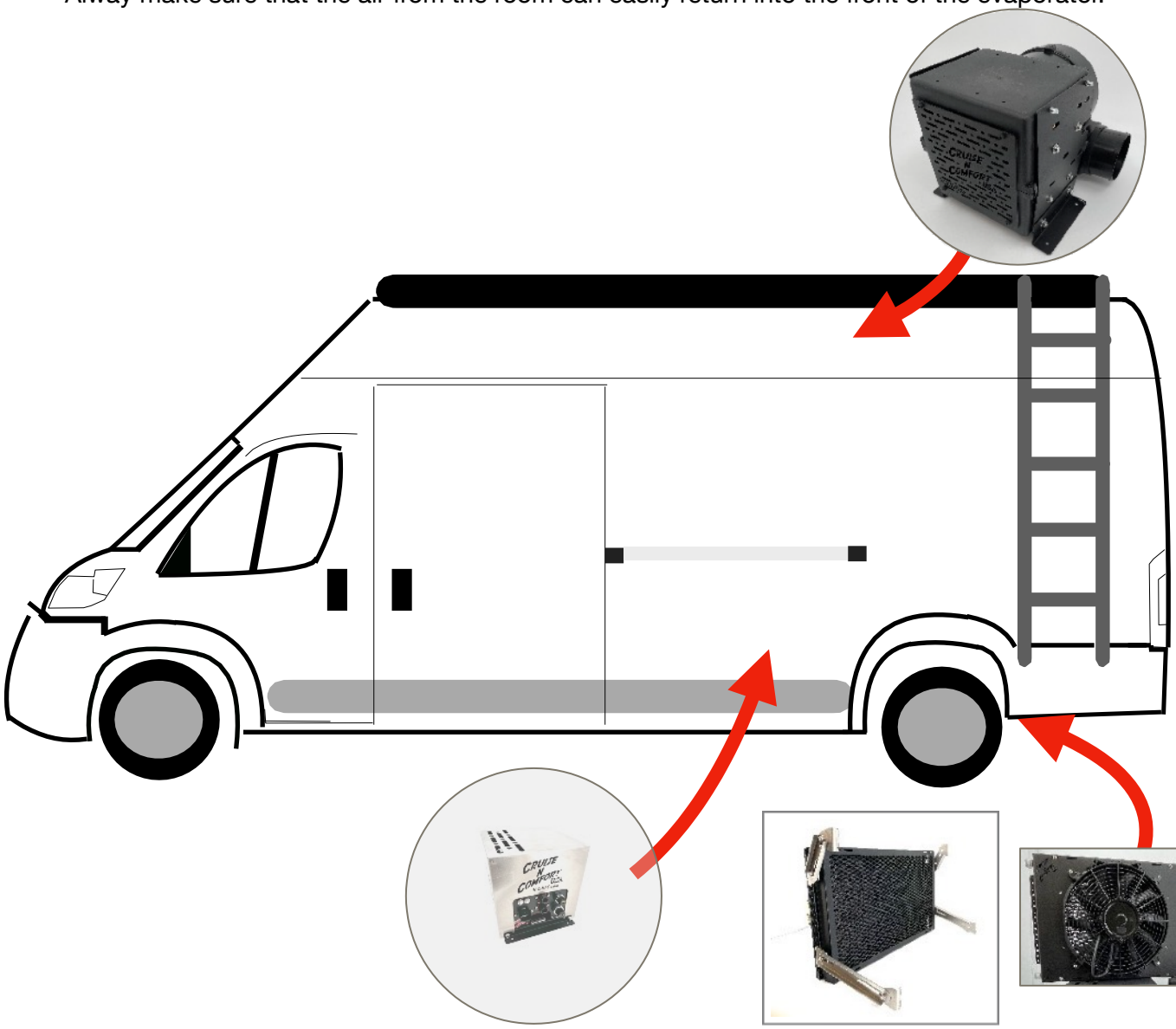
DO NOT LIFT UNIT BY COVER AND DO NOT OPERATE UNIT WITOUT ALL LINES AND COVER IN PLACE. THE COMPRESSOR IS PRE-FILLED WITH PVE COMPRESSOR OIL. TAKE CAUTION WHEN REMOVING CAPS.

Attention: User serviceable parts inside, make sure units can be accessed for future servicing.

Installation and Component Placement

*Please do not attempt to install this system if you feel it is above your skill or comfort level.

The ICE BOX Evaporator can be wall mounted, ceiling mounted, cabinet mounted or even floor mounted right next to the compressor. The figure below shows an upper cabinet mounted option. The blower is rotatable 360 degrees for optimal placement. We include 2- 4” vents for optimal air flow. You may be able to use only 1 if the ducting is really short (typically 3 feet or less). Longer ducting runs will decrease the temperature output but will reduce the amount of air that is exchanged in the cooling area. The reduced capacity will be more evident on times with more sun exposure and higher temperatures. Reducing ducting, adding 90 degree angles and/or reducing vent size to less than 4” can also reduce air flow and reduce cooling capacity.
***Alway make sure that the air from the room can easily return into the front of the evaporator.



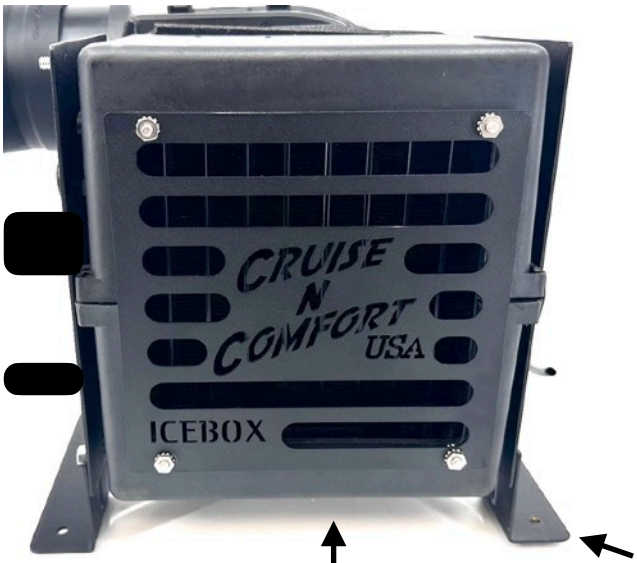
VES Compressor box is mounted in a lower cabinet or storage area inside the vehicle.

Under-mounted condenser shown with optional Rock Guard and Universal Condenser Brackets

Attention: User serviceable parts inside, make sure units can be accessed for future servicing.

1. Mount Evaporator

The evaporator needs to be secured to either the ceiling or inside a cabinet and needs to be mounted so that the internal condensation drain pan can drain the condensed water out of the drain tube on the bottom. Too much of a tilt will not allow for proper drainage, mount as flat as possible. Make sure if this evaporator is mounted inside a cabinet that return air can enter through the front of the unit. This can be achieved by removing the front grill and using this for a intake grill.



Rotating the ICEBOX blower.

In between the blower and the ice box is a square metal interface covered in foam tape. There are 4 screw (2 on each side) you can feel these through the tape and I believe they are marked with yellow dots. Stick a Phillips screw driver through the tape
And back the screws out . This will allow separation and exposure to the screws for the blower. You can also simply rotate the entire thing and put the 4 screws back in the outside for a 180 rotation. The foam tape can stay on the outside square interface.

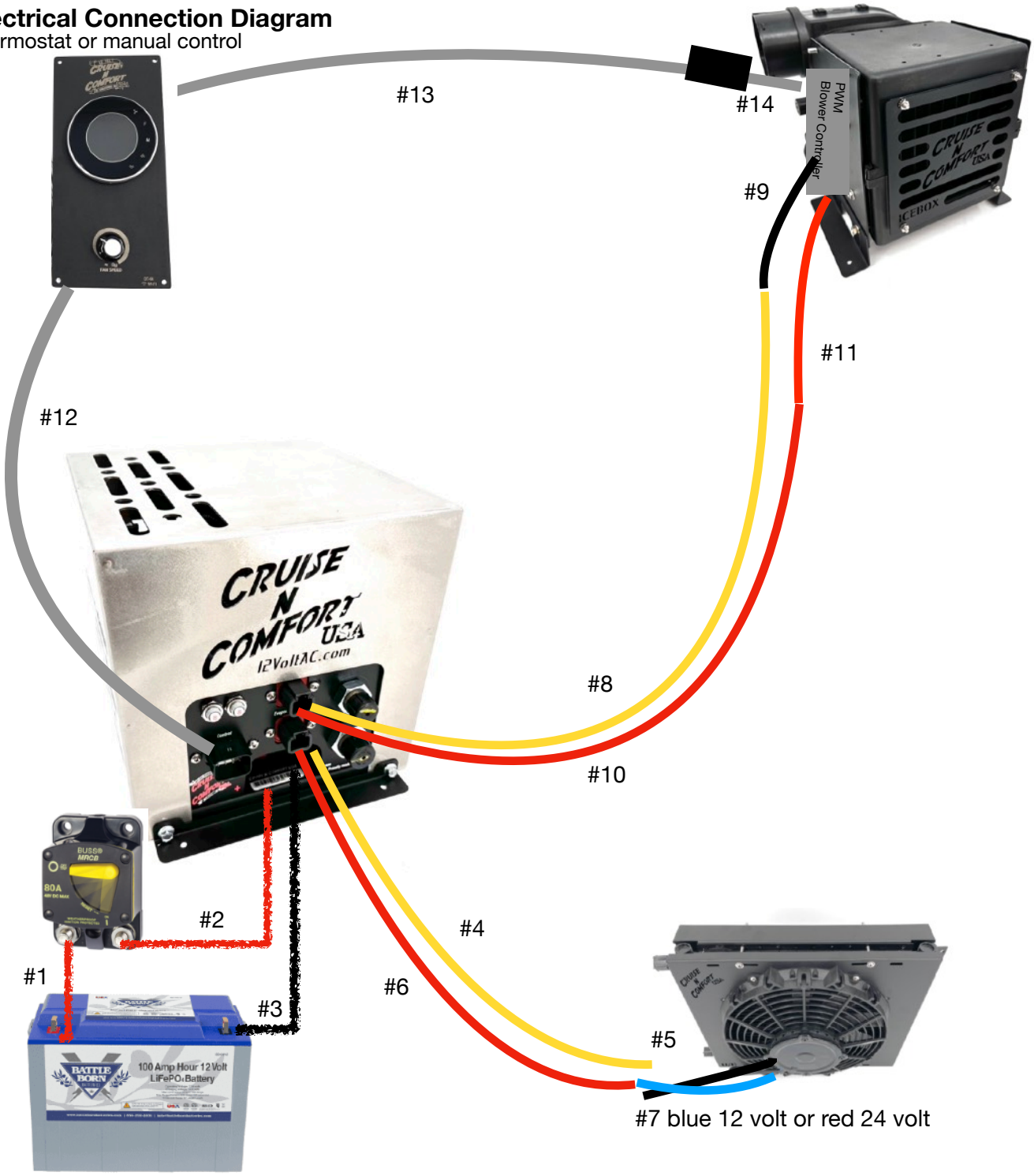
2. Mount Compressor Box

The compressor box needs to be secured to the chassis of the vehicle using the brackets provided. We always recommend thru bolting with a high grade #8 bolt washer and nut. Run wiring and attach hoses as per diagrams below. Remember to allow distance around unit to remove the cover for charging and servicing. Always have the cover in place when operating the unit.

3. Wire Components

Electrical Connection Diagram

Thermostat or manual control



#1 Power lead from Battery + to Circuit breaker / fuse
#2 Power lead from circuit breaker to main power connection +
#3 Power lead from battery- to main power terminal -
#4 / #5 Power connection - from condenser out to black - on condenser fan #5
#6 /#7 Power connection + from condenser out to blue + on condenser fan #7
(#7 will be red on 24 and 48 volt systems. IMPORTANT! 48 volt units currently ship with two 24 volt fans wired in series. You can not wire these in parallel.
#8 Power connection - from evaporator out to black - on pwm blower controller fan #9
#10 Power connection + from evaporator out to red + on pwm blower controller fan #11
#12 Plug to thermostat / manual control
#13 Gray control wire from blower speed control knob to black 3 pin connector on pwm blower controller #14
*When connecting main power terminals inside the compressor box unit you MUST torque the power post to 140 in-lb (15.82 Nm).

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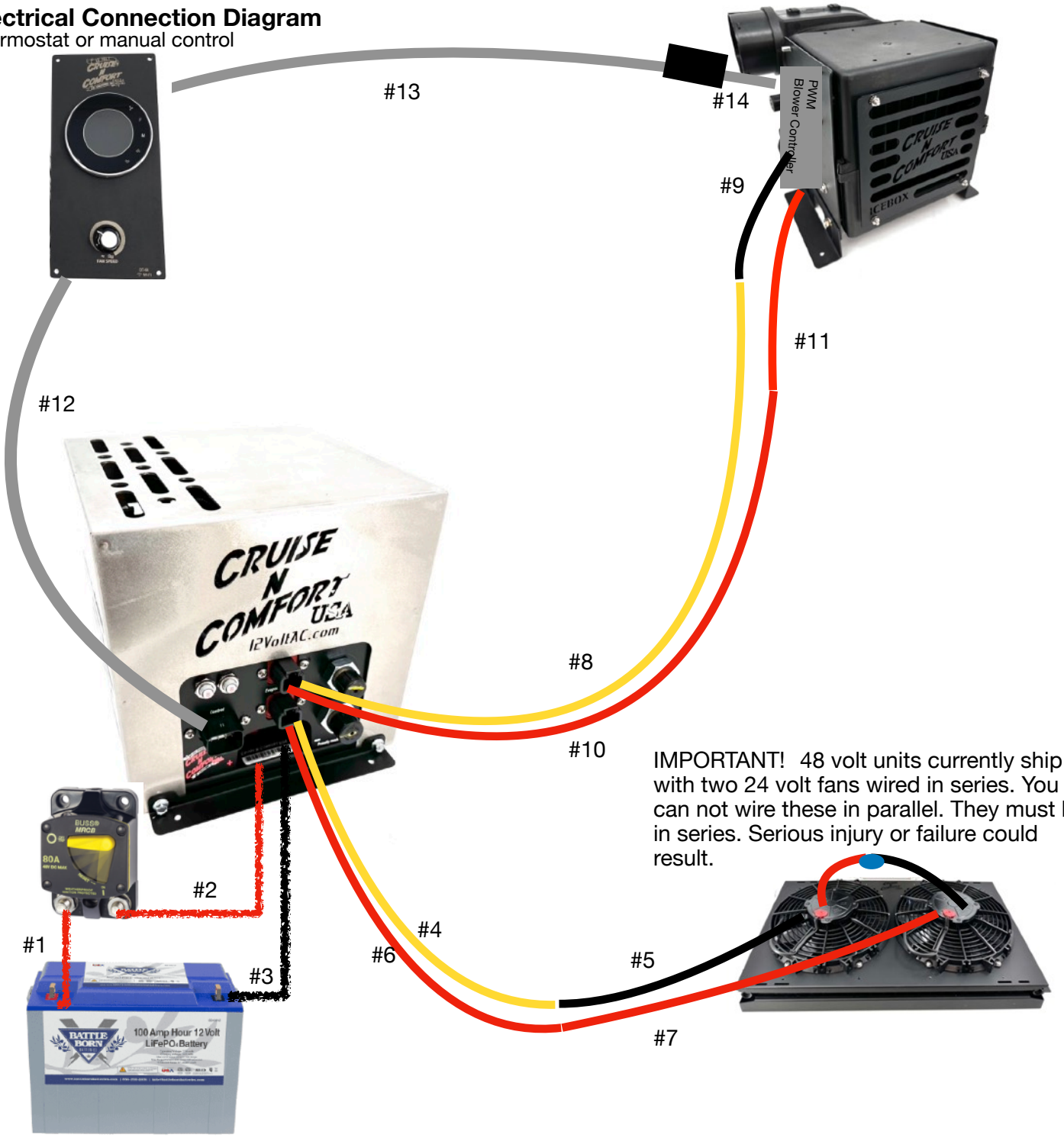
Thermostat or manual control



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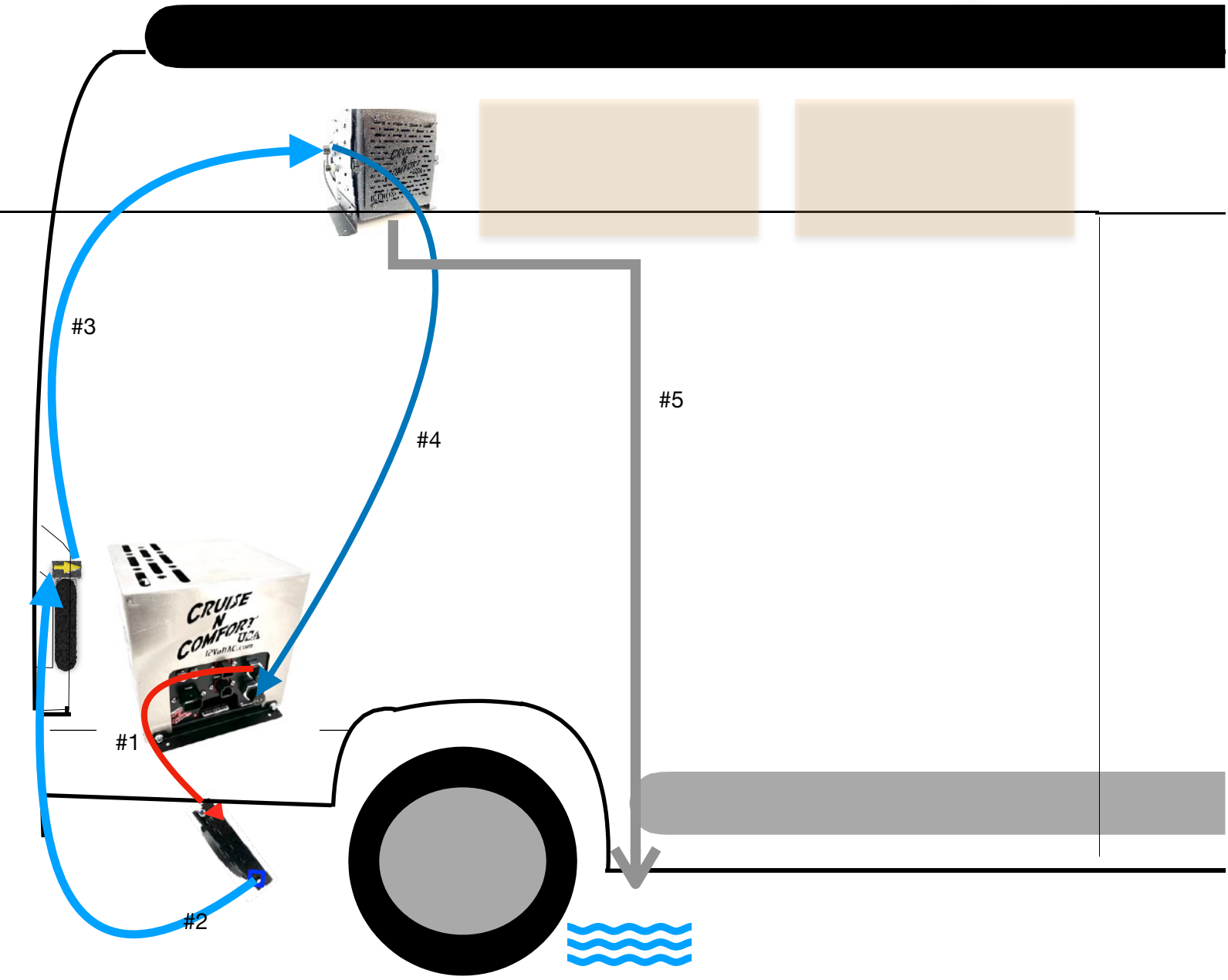
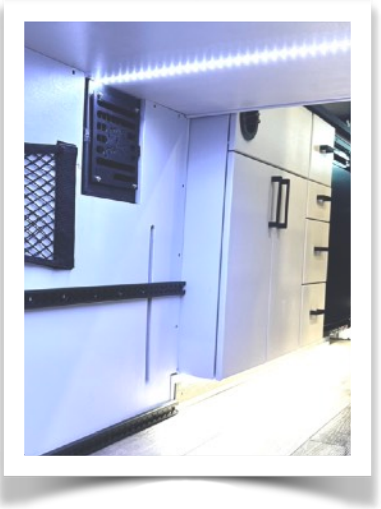


#1 Hose from compressor box to top of condenser (#8 size 13/32” ID)
#2 Hose from condenser lower port to “IN” on receiver dryer (#6 size 5/16” ID)
#3 Hose from receiver dryer to bottom port on ICEBOX evaporator (#6 size 5/16” ID)
#4 Hose from evaporator top port to compressor box (#10 size 1/2” ID)
#5 Drain tube for draining condensation from evaporator to outside (3/8” ID)

* Hose 1-4 can be Standard Barrier or Reduced Barrier hose and can be purchased from us, most automotive air conditioning shops or automotive parts stores like NAPA. Hose 1 and 4 can be ordered with fill ports on the connector for use at compressor box for easier servicing of refrigerant otherwise the cover has to be removed / reinstalled for servicing refrigerant.
* The receiver dryer has to be mounted straight up and down with the glass circle sight glass easily visible. Being able to view the sight glass will aid when filling with freon or checking charge level. It can be placed anywhere between the condenser and the evaporator but is really nice to have near the compressor box when filling. If removing the cover is challenging you can order fittings with fill ports on the 2 lines exiting the compressor for easy evacuation and filling.

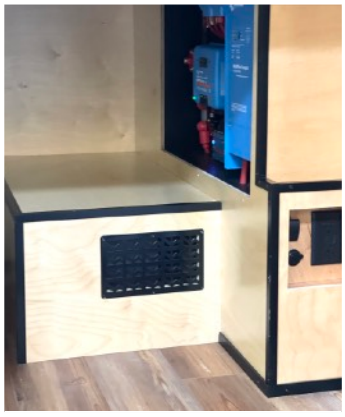
Evaporator

Ideal mounting for the evaporator box would be up high and mid level.



Compressor Box

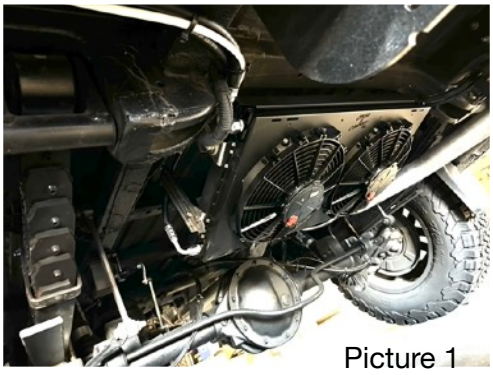
The compressor box can be hidden away in an interior or exterior cabinet to reduce noise and keep out of sight.



Condenser

The IP68 rated condenser can be mounted almost flat underneath or on a roof rack. Condenser can be mounted side to side (picture 1) or front to back (picture 2-3)

*Dual fan, condenser mounts and optional rock guard shown. Customer submitted photos

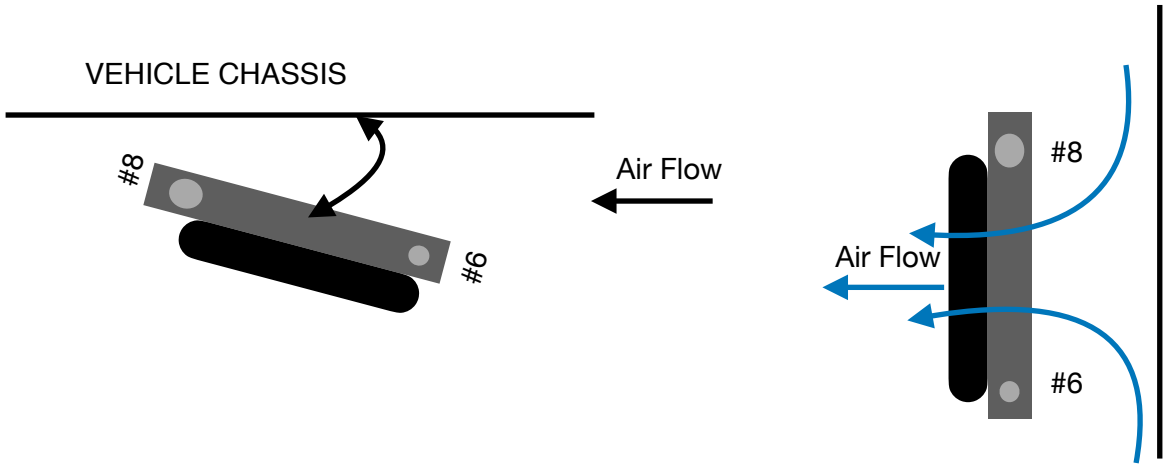


Picture 1

Picture 2

Picture 3

5” minimum to allow proper air flow

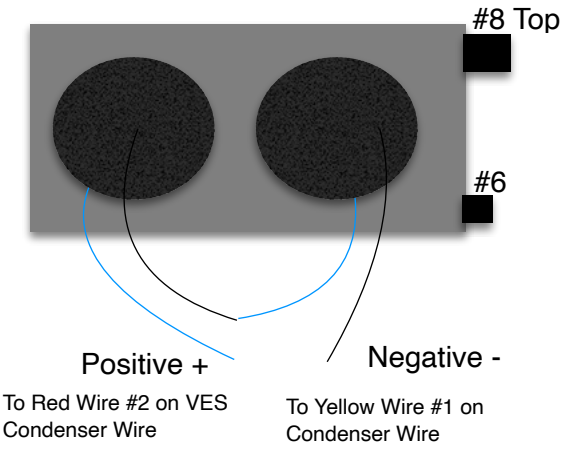


Looking at the end of the condenser, the small port should always be lower than the large port. Condensers can be roof mounted. The refrigerant enters the condenser with the large port and out the small port. If the large port is lower than the small it will cause the oil to not return to the compressor and back up inside the condenser.

If you need to change the side that your ports come out, unbolt the fan shroud and switch sides.

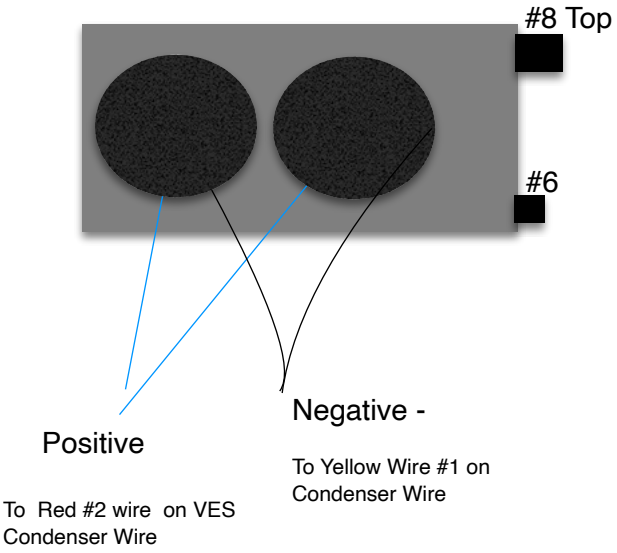
***** PLEASE NOTE WHEN EVACUATING AND CHARGING THE SYSTEM, DO NOT EVER ADD ANY PAG OIL INTO THE SYSTEM, THIS OIL IS CONDUCTIVE AND WILL CAUSE THE COMPRESSOR TO FAIL. BE SURE TO FLUSH LINES AND MAKE SURE THE REFRIGERANT YOU BUY IS R134A AND DOES NOT HAVE A OIL CHARGE!!! THE UNIT SHIPS WITH PVE OIL INSIDE THE COMPRESSOR.

Series: This is a option to make fans run slower and quieter when in cooler climates



Parallel: This is an option to make fans run faster in warmer climates.

PLEASE NOTE!
48 Volt units cannot be wired this way, they have 24 volt fans that are wired in series. Fan failure will result.



VES Hose Order Sheet

Hose #1:

#8 13/32" I.D. , 29/32" O.D. Hose (Discharge Line)

- From Discharge Fitting On Compressor To Top Fitting On Condenser

Hose Required Length _____

Ends Required Choose Two: 90 Degree Qty. ____ Straight Qty.___

Hose #2

#6 5/16" I.D. , 3/4" O.D. Hose (Liquid Line)

- From Lower Condenser Fitting To Receiver Drier

Hose Required Length_____

Ends Required Choose Two: 90 Degree Qty. ____ Straight Qty.____

Hose #3

#6 5/16" I.D. , 3/4" O.D. Hose (Liquid Line)

- From Receiver Drier To Expansion Valve On Evaporator

Hose Required Length_____

Ends Required Choose Two: 90 Degree Qty. ____ Straight Qty.____

Hose #4

#10 1/2" I.D. , 1" O.D. Hose (Suction Hose)

- From Evaporator To Suction Port On The Compressor

Hose Required Length_____

Ends Required Choose Two: 90 Degree Qty. ____ Straight Qty.____

If you are sure about the lengths you selected we can crimp the ends on for a small fee.

Ends Crimped On? : Yes _____ Or No (Customer Crimps Themselves) _____

Use only pure R134a refrigerant
brand names can vary.

Do not use freon with additives or any cans that say first charge or have oil in them. PAG and other oils will short the compressor. The compressor is pre loaded with 4 OZ of PVE oil before shipment.

Initial Charging:

1. Remove smaller rear cover to expose fill ports.
2. Evacuate unit with vacuum pump and manifold gauge set for at least 20 minutes.
3. Check to make sure the system is holding vacuum.
4. Fill with 2.25 lbs. of R134a Refrigerant (no oil charge! No PAG OIL! PAG oil and other additives will ruin the compressor and void the warranty).
5. Run system and make sure condenser fans are operating correctly.
6. Once the unit is running you may use a soap and water mixture to check the flexible lines that connect the main unit to the condenser for leaks. Spray the fittings and crimps and look for bubbles.
7. Check sight glass for presence of bubbles. A large presence of fast moving bubbles may indicate that the install has longer lines than normal. Up to an additional .25 to .50 lbs may be necessary to reduce these. ***Please call customer support before adding this additional refrigerant.***

Low and high side charge ports are located inside the back of the cover. Always make sure the cover can be removed for servicing the unit. Refrigerant hoses with charge ports on the #8 and the #10 fitting are available to order to eliminate removing the cover for the filling process.

VES Series charging sheet for certified a/c technician

Take this sheet with you when having a certified air conditioning shop charge your system. This sheet is for all VES units that were shipped with our VES Standard Hose Kit. If hoses are custom you will need to adjust charge slightly and /or charged using the sight glass on top of the receiver dryer.

- Make sure the cover is removed so they can easily access the charge ports.
- Make sure the unit powers up and that the inside blower and outside fans come on.
- Make sure your batteries are full so that they can run the system for a few minutes to make sure it is operating properly.
- Make sure your ac lines are high and torqued and that each fitting has a green ring before the hose get installed. Checking the hose fittings and crimps with a soap and water solution after initial charge and while running is highly recommended to look for leaks.

Pressures will vary depending on temperatures but typical high side pressures will run around 125 PSI when it is cool out to around 175 PSI when it warmer and after the unit has been running awhile. Pressures over 200 will indicate a in operating fan,

1. Evacuate System

- Evacuate system with machine or vacuum pump and check for leaks

2. Charge

- Charge system with 2.25 LBS. of R134a refrigerant.
- *Do not* use R134a synthetics or R134a with stop leak or any kind of additives.
- *Do not* add an oil charge, PAG or Ester oils are conductive and will void the compressor warranty. The compressor already has 355cc of PVE Electric oil inside. MAXX systems have 455cc of PVE per compressor. This is the same oil as many electric or hybrids that use PVE oil.
- If leak dye is needed please call us for a suitable solution, most leak dyes contain incompatible PAG or Ester Oil.
- If charging with small cans use Qty.3 12 oz cans of straight R134a *no additives or synthetics*. The back of the can will list out how many oz of R134a and how many oz of additives if it has any.

3. Run

Run system for about 10 minutes and check for leaks with a soapy solution on the hose fitting crimps and nuts.

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