



NC-S¹ Install & Operations Guide

12 Volt model

Ver. 240621



2904 Airport Parkway

Elkhart, IN 46514

(480) 576-2489

www.NomadicCooling.com

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INTRODUCTION

The NC-S¹ Mini-Split Air Conditioner ("AC unit") is designed and intended for installation on the side of a semi-truck, overland rig, van or RV during or after the vehicle is manufactured. The NC-S¹ is an excellent choice for maintaining a comfortable and cool environment in your vehicle. Our NC-S¹ models offer several advantages, including simplified installation, reduced noise levels, improved energy efficiency, and the power to cool your vehicle during the hot summer months. Nomadic Cooling is based in Arizona, so we know a little bit about extreme heat environments!



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Keep a record of the following information:

Model **NC-S¹ Split System AC Unit (12V)**

Serial No. _____

Date Purchased _____

Installed By _____

Due to ongoing improvements, Nomadic Cooling reserves the right to modify appearance and specifications without notice.



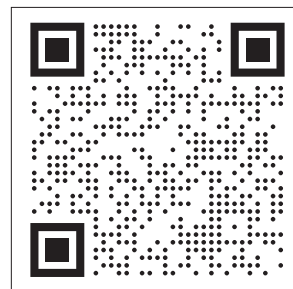
Always bench test AC unit before installing.



Check to ensure all required parts are included.

NC-S¹ warranty, return and cancellation policies, and all technical documents can be viewed and downloaded from our website by scanning the QR code below.

NOMADIC TECHNICAL SUPPORT



**WE ARE HERE
TO HELP!**

Just scan the QR code.



IMPORTANT SAFETY INSTRUCTIONS

The NC-S¹ can be installed by one person with brief assistance from a second person (during mounting). A mini-split system is easier to install than other systems. A person moderately proficient in plumbing and electrical work may prefer to undertake the installation independently. This guide provides the DIYer and professional installers with safety guidelines and instructions that can help minimize or eliminate the risk of bodily injury or damage to components, tools, or other equipment.

Recognizing Safety Information

The safety alert symbol is utilized to notify potential physical injury hazards. To avoid possible injury or death, follow all safety messages that come after this symbol.

Understanding Signal Words

Signal words identify safety and property damage messages and indicate the degree of hazard seriousness.



WARNING is used for hazardous situations that could result injury (including death, severe, moderate or minor injury if not avoided).



NOTICE is used for situations that could result in AC unit or vehicle damage or unnecessary complications in the installation process.



HELPFUL TIP is used for useful information or best practices.

General Safety Instructions

- A qualified service technician should install or service this product, including filling and testing after installation.
- Avoid allowing any wires to come into contact with the compressor, refrigerant tubing, or moving fan components.
- Always check for pipes or wiring behind a vehicle wall before drilling any holes.
- Do not modify this product in any way. Modifications can be dangerous and void any warranties.
- Do not add any devices or accessories to the AC unit unless specifically authorized by Nomadic Cooling Co.

Supplemental Directives

To avoid potential injury and even death, read and follow all of the safety information and instructions.

Follow all instructions. Read and comprehend these all instructions before installing, using, servicing, or maintaining this AC unit.

Poor installation, operation, servicing, or maintenance of this AC unit can result in serious injury or damage to the equipment.

The installation must comply with all applicable local and national codes, including the latest edition of the following standards:

USA

- ANSI/NFPA70, National Electrical Code (NEC)
- ANSI/NFPA1192, Recreational Vehicle Code

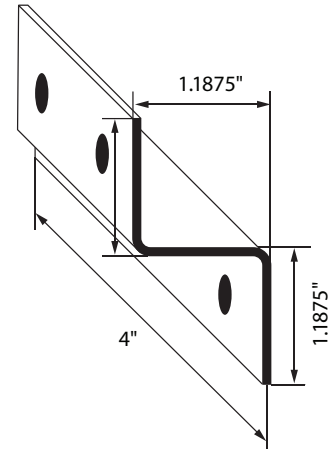
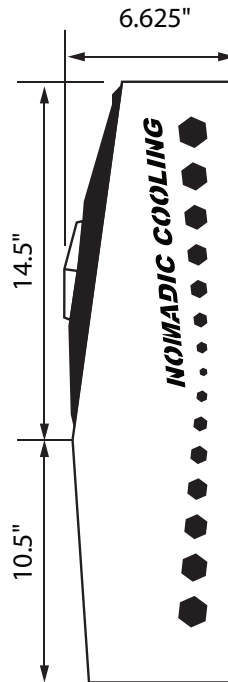
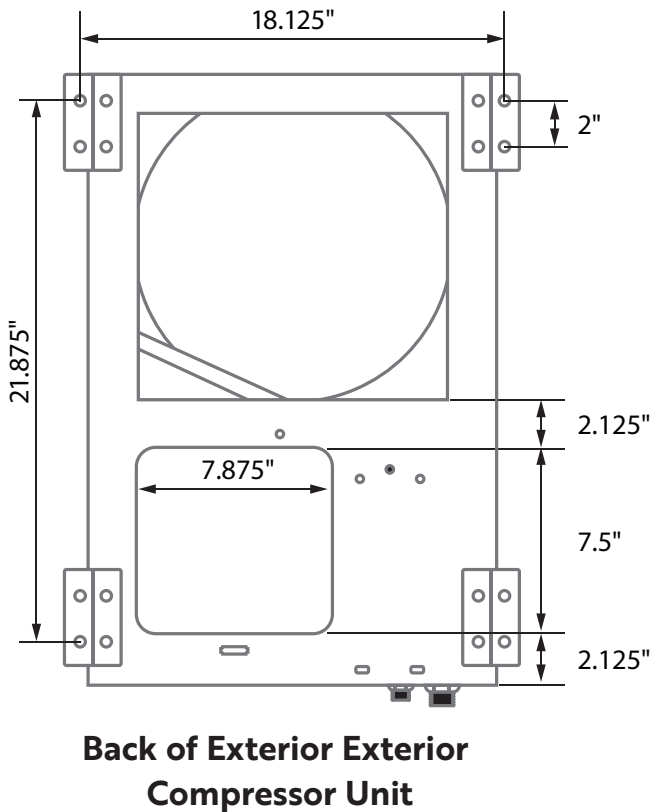
CANADA

- CSA C22 1. Parts I & II, Canadian Electrical Code
- CSA Z240 RV Series, Recreational Vehicles

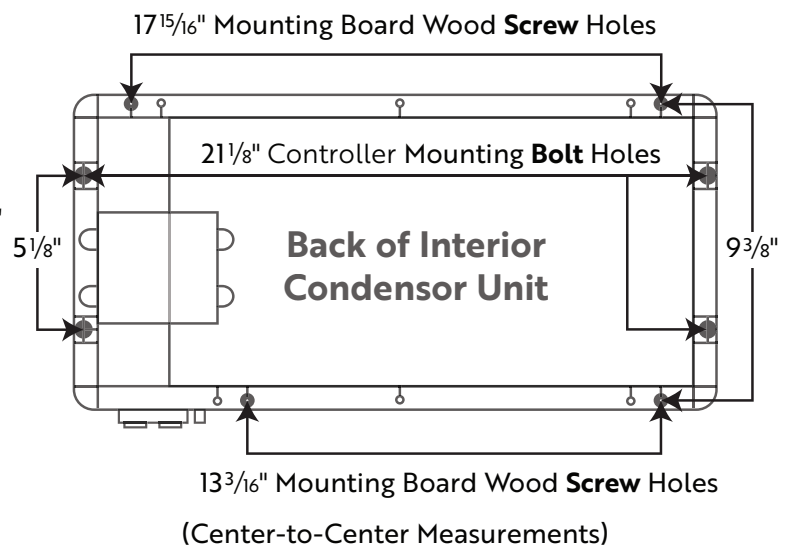
NC-S¹ DIMENSIONS



Nominal Dimensions



Mounting Hole Spacings



Hose and Wire Lengths provided:

Refrigerant Hoses	144" (12 ft)	Interior Unit ↔ Exterior Unit
Power Cables	118" (9 ft 10 in)	Exterior Unit ↔ Battery Bank
Communication Harness	108" (9 ft)	Interior Unit ↔ Exterior Unit
Drainage Hose	36" (3 ft)	Interior ↔ Exterior
Optional Drainage Hose Extension	36" (3 ft)	Exterior



Nomadic
COOLING CO.

NC-S¹ AC Unit includes:

Box 1 (Host Box)

ID	Qty	Part Name	
A	1	Exterior unit, power harness*, communication wires*, capped valves*	<input checked="" type="checkbox"/>
B	1	9'10" Power Harness with 100A inline fuse, Anderson style connector, copper rings	<input type="checkbox"/>
C	2	12' aluminum pipes (capped) and hoses: 3/4" high pressure, and 3/8" low pressure	<input type="checkbox"/>
D	2	Blue charging caps with rubber o-rings*	<input type="checkbox"/>
E	4	Mounting brackets	<input type="checkbox"/>
F	8	Short black bolts, washers, lock washers	<input type="checkbox"/>
G	8	Long black bolts, washers, lock washers	<input type="checkbox"/>
H	8	Black nuts for long bolts	<input type="checkbox"/>

Box 2 (Interior Controller)

ID	Qty	Part Name	
I	1	Interior controller, communications wire harness*, drainage tube*, capped valves	<input checked="" type="checkbox"/>
J	1	Heat-reducing wrap	<input type="checkbox"/>
K	1	Long foam sleeve	<input type="checkbox"/>
L	1	White polyurethane wall sleeve	<input type="checkbox"/>
M	1	Black foam ring for wall sleeve	<input type="checkbox"/>
N	1	Interior mounting board**	<input type="checkbox"/>
O	4	Stainless steel mounting board wood screws	<input type="checkbox"/>
P	4	Stainless steel bolts for interior unit	<input type="checkbox"/>
Q	4	Stainless steel nuts for interior unit	<input type="checkbox"/>
R	1	Remote (2 AAA batteries not included)	<input type="checkbox"/>
S	1	Black cap*, dust covers*, bracket*, 2 M4 bolts*	<input type="checkbox"/>
T	1	Expansion valve, valve plate, 3 bolts, 2 o-rings	<input type="checkbox"/>
U	1	3/4" and 3/8" couplings	<input type="checkbox"/>
V	1	Drainage hose extension**	<input type="checkbox"/>

*Pre-Installed/Connected **Included - Installation optional



INSTALLATION INSTRUCTIONS

Additional Tools and Resources required:

- Hole Cutting Drill 2.25" (or a jig saw) that will cut through vehicle wall.
- Wrench Set
- Allen Key Set (M4-6)
- Torx Screwdriver Set
- Permanent Marker
- Mounting hardware for interior unit
- Duct Tape for drain extension (if used)
- Two AAA batteries (for remote control)
- A professional air conditioning service to vacuum, fill and test the unit after installation (recommended)

Optional Tools and Resources (not included):

- Rubber dampening feet (4)
- Cable glands or clams (1-3)
- Wall clamps (1-3)
- Custom refrigerant hose lengths (2)
- Insulation tape
- Mounting fasteners, if necessary (4)
- Foam or putty to fill pass through hole

Compliance With U.S. Laws

Because the NC-S¹ ships without refrigerant in the unit, it will be necessary to fill the unit as specified. It is advisable to use a third party licensed technician for this. You must comply with all Federal, State, County and Municipal codes related to electrical wiring and refrigerant handling. Even if you live in an area where you may lawfully fill the AC unit yourself, we strongly recommend having Part 4 of the installation performed by a licensed service technician.

This guide provides the information to make this process easy for an AC service technician to perform. A professional will have all of the tools necessary for vacuuming, filling, and testing the AC unit once it has been installed on your vehicle.

If you reside outside of the U.S., you must adhere to the codes and laws related to electrical wiring and refrigerant handling within your jurisdiction. In the European Union, for example, laws make it mandatory to have a qualified F-Gas engineer install your air conditioning unit in compliance with EC/517/2014. Installing these systems without the requisite qualifications is illegal.

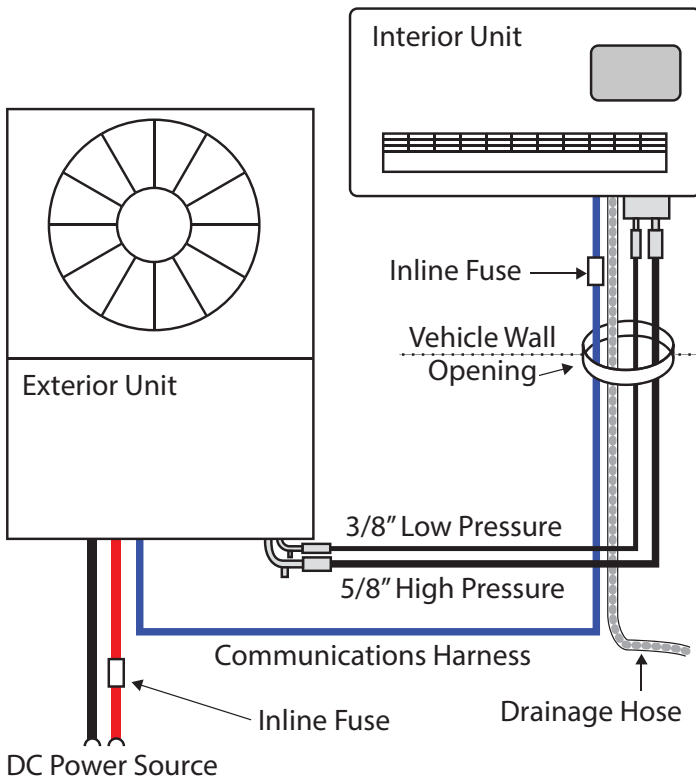


Avoid allowing any wires to come into contact with the compressor, refrigerant tubing, or moving fan components.

Note: The photos, renderings and illustrations in this guide serve a purely explanatory function. The physical configuration of the product may exhibit minor variations from the depicted images. The physical configuration should be considered the authoritative reference, superseding any graphical representations.

INSTALLATION INSTRUCTIONS

Part 1: Mounting the Exterior Unit



1. Determine the ideal locations for exterior and interior units, and the wall opening(s).

A. EXTERIOR UNIT: Position the outdoor unit at least 3' away from vehicle exhaust, heavily trafficked, dusty, or hot areas. Allow 12" of space around the exterior unit for proper ventilation and peak performance. Allow 10' of space away from any radio or television antennas.

The location should be firm and solid, with minimal vibration, and it needs to be strong enough to support the weight of the unit. Unit should be flush with the wall of the vehicle for top performance, and it cannot be installed at an angle greater than 5°. Favor a location that can provide any additional protection from sunlight, wind, and dust to help maintain maximum efficiency.

B. INTERIOR UNIT: Choose an unobstructed wall location that permits easy passage for the connecting pipes to the outdoor unit.

Allow at least 6" of open space around the top of the unit for air intake. Maintain a minimum distance of at least 36" from antennas, power lines, or devices related to television, radio, security systems, intercoms, or telephones to prevent electrical interference.

Favor a location that will be shielded from direct sunlight (windows, skylights) and heat, steam or combustible gas. It should not be near flammable items such as curtains. It should not be near doorways.

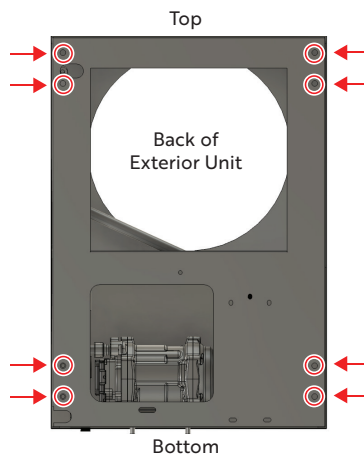


Select a central location for optimal airflow, or position it by your bed to provide maximum sleeping comfort.

C. WALL OPENING: Determine vehicle wall opening location. The conduit should be below the interior controller and allow for the attachments of hoses and cable between the interior and exterior units.

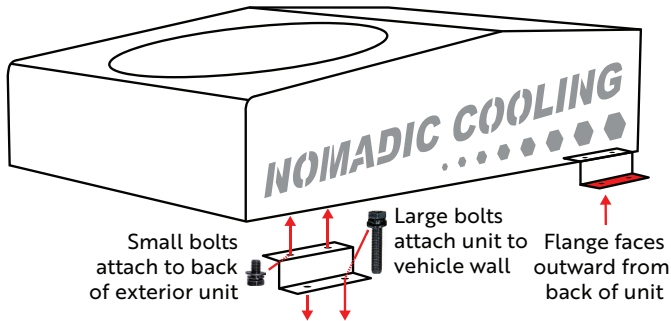
1. Connect the mounting brackets to the back of the exterior unit.

Use the 8 short bolts with washers and lock washers to connect brackets to the threaded holes in the rear of the exterior unit.



8 bolts recommended
4 bolts minimum

INSTALLATION INSTRUCTIONS

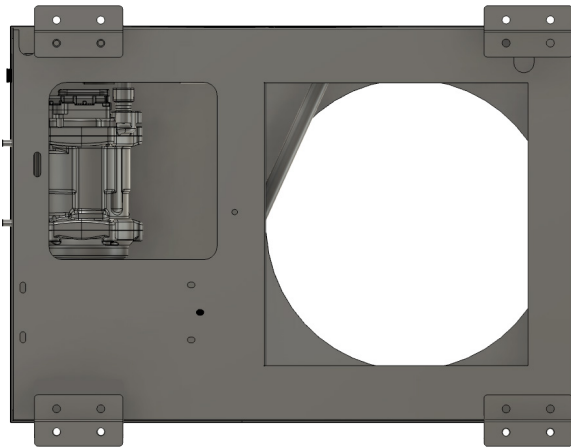


Enlist a friend's assistance in holding the unit in place when marking and securing the location.



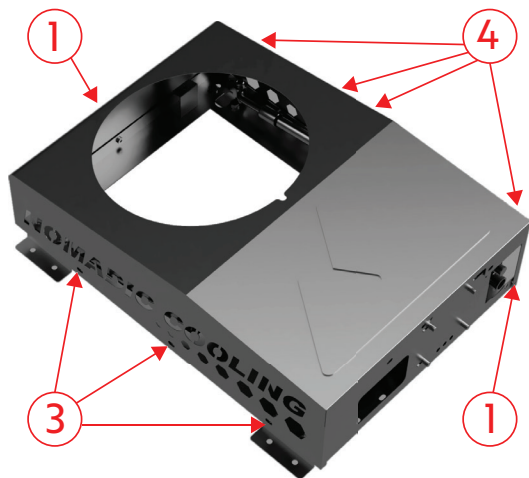
A bubble level should not be used because the vehicle may not be level. Use a focal point (such as a rooftop or a door) to measure instead.

The brackets should be mounted so the flanges extend outward, away from the unit.



2. Remove the exterior shroud.

There are 8 bolts and 1 screw to be removed from the shroud. Set these safely aside.



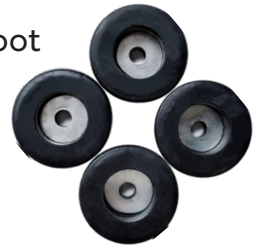
3. Use a permanent marker to **mark the 8 punch holes** for the brackets by positioning the bracketed unit on the vehicle where it will be installed.

4. Secure the exterior unit to the vehicle.

Secure the unit to the vehicle wall using eight long bolts, washers, lock washers and nuts.



Vibration dampening foot pads can be added between the brackets and the vehicle wall (sold separately).



If the the vehicle does not allow for attaching the mounting brackets using the provided fasteners, you will have to use expansion bolts or plugs, spring toggles or similar fasteners (sold separately). The type of fastener will depend on your needs, considering the thickness, structure and material used in the vehicle wall. The fasteners must be capable of supporting at least 50 lbs (the exterior unit weighs 40 lbs, excluding cables and mounting hardware).

INSTALLATION INSTRUCTIONS

Part 2: Mounting the Interior Unit

1. Consider your mounting options.

- A. Every vehicle build is different, but most installations will require a mounting surface. A mounting board has been provided, which can either be used behind the wall as an anchor for the provided wood screws, or it can be finished or upholstered to match the vehicle interior walls. You can then mount the board to your wall and the controller to the board.



Because of the variety of vehicle wall surfaces, if the hardware provided won't work, you need to purchase fasteners that will work for your situation.

- B. You may not need to use a mounting board if you have a location where the mounting bolt holes line up with existing beams, or a mounting surface that is already capable of holding 12 lbs.



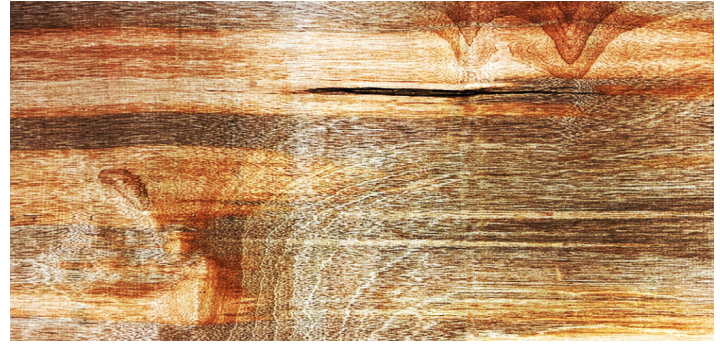
Enlist a friend's assistance in holding the unit in place while marking and securing the location.



A bubble level is not ideal for making sure the unit is straight, because the vehicle itself may not be level. Instead, use a focal point (such as a rooftop or a door) to measure and mark distances.

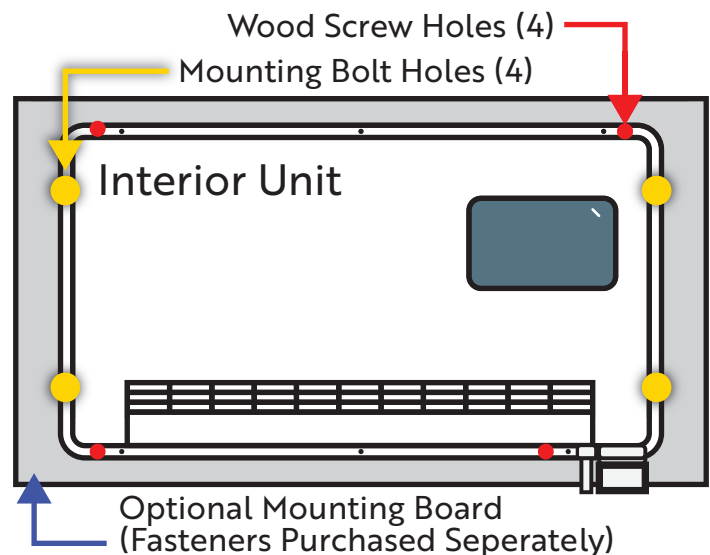
2. If NOT using a mounting board:

- A. Position the controller at your chosen location and mark the hole locations.
- B. Mark and drill pilot holes for the 4 nuts and bolts provided (parts R and S).
- C. Attach the controller using the mounting bolt holes. Locations shown in yellow in the graphic (right).



3. If using a mounting board:

- A. Position the mounting board at your chosen location and mark the desired hole locations.
- B. Make sure the panel sits flush against the wall. Any space between the wall and the unit can cause noise and vibration.
- C. Use a drill to create holes for fasteners.
- D. Fasten the board to your vehicle wall, using the 4 nuts and bolts provided, or your own fasteners if necessary.
- E. Attach the controller to the mounting board using the four wood screws provided (Part Q). Mounting locations are shown in red (below).



INSTALLATION INSTRUCTIONS

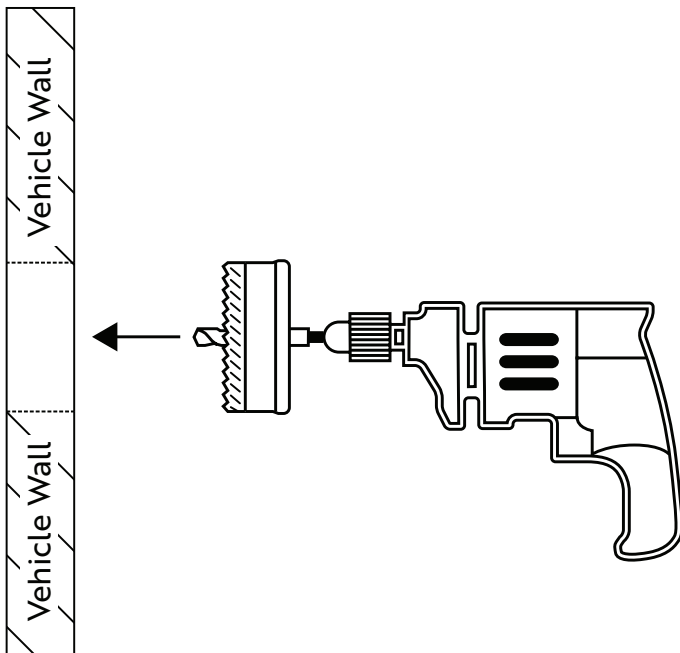
Part 3: Connecting the Units

1. Create the wall opening.

If using the white sleeve provided, drill a 2.25" hole through the wall below the controller.



If you use individual cable glands (purchased separately) for your pass throughs, the number and size of the hole(s) you will drill will vary, and you should follow the instructions for installation included with the product. Skip to Step 3.



2. Insert the wall sleeve.

Place the foam ring (Part N) around the wall sleeve (Part O) and insert into the wall opening from the interior of the vehicle.



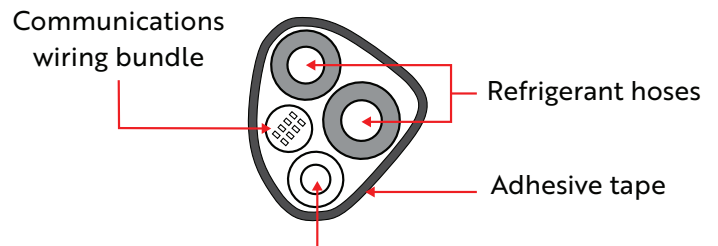
3. Tape the exterior refrigerant hoses.

Bundle the two refrigerant hoses together and wrap them using the heat insulating tape provided (Part L) from end to end. As you wrap the hoses, overlap half of each previous tape turn.



Do not wind the tape as tightly as possible around the hoses, as this will decrease the heat insulation effect.

4. Pass the refrigerant hoses through first.



Drainage hose must be at the bottom of wrapped bundle where it passes through hole in the wall.

Feed refrigerant lines through the long foam sleeve (Part M). Then pass the foam sleeve through the opening you created in Step 1.

5. From the interior unit, pass the drainage hose through the wall to the outside.



Keep the drainage hose at the bottom of opening for optimal drainage.

6. From the exterior unit, pass the communications and power cables through.

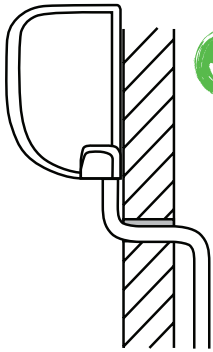


Where the conduit bundle passes through the wall, you can pull it out a few inches and add layers of tape at the pass-through point. The goal is to fill the hole space in the wall before using optional foam or putty into the hole (purchase separately).

INSTALLATION INSTRUCTIONS

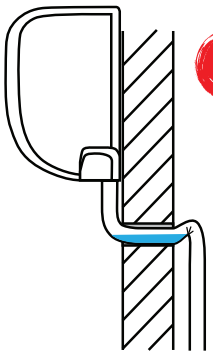


You may insert and tape the optional drainage hose extension at this time.



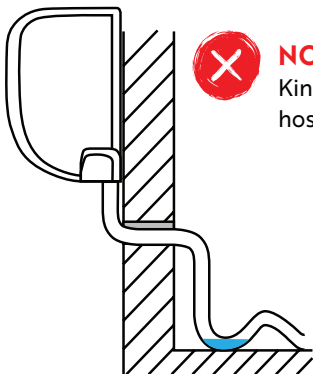
CORRECT

Make sure there are no kinks, dents or siphons in the drainage hose, to ensure proper drainage.



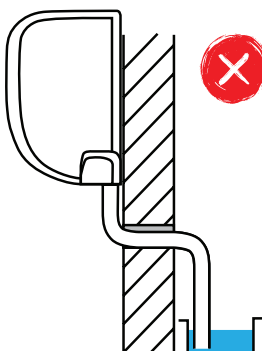
NOT CORRECT

Kinks or siphons in the drainage hose will create water traps.



NOT CORRECT

Kinks or siphons in the drainage hose will create water traps.



NOT CORRECT

Do not place the end of the drainage hose in water or in containers that collect water. This will prevent proper drainage.

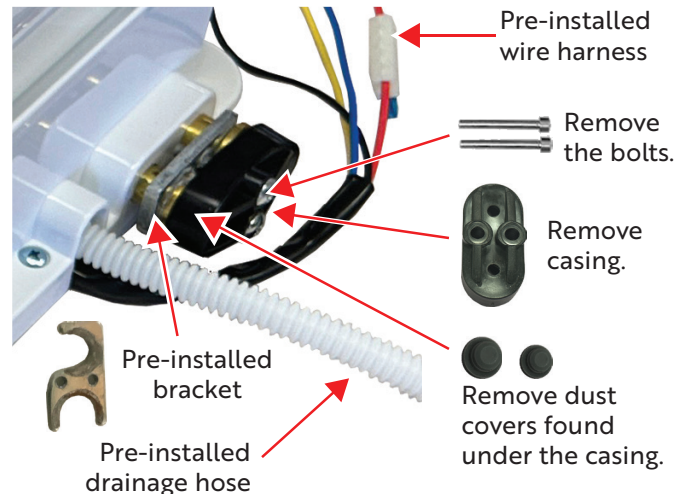


Keep the service port caps on all the pipes until connecting them. Any contaminants that get into the system will affect the performance. If left uncapped for more than 1 minute, the AC unit should be vacuumed before filling with refrigerant.

7. Connect the power cables coming from the bottom of the external unit to your power source and/or turn on the breaker.

8. Connect the external communications harness to its matching interior terminal.

9. On the interior unit, use a hand driver to remove the bolts, black casing and two dust covers from the bottom of the controller pipes. Save these bolts.



10. Slide the expansion valve onto the copper pipes, and secure it with the 2 long bolts you removed from the casing. Use 8 ± 1 lbs (11 ± 1 nm) torque on these bolts.



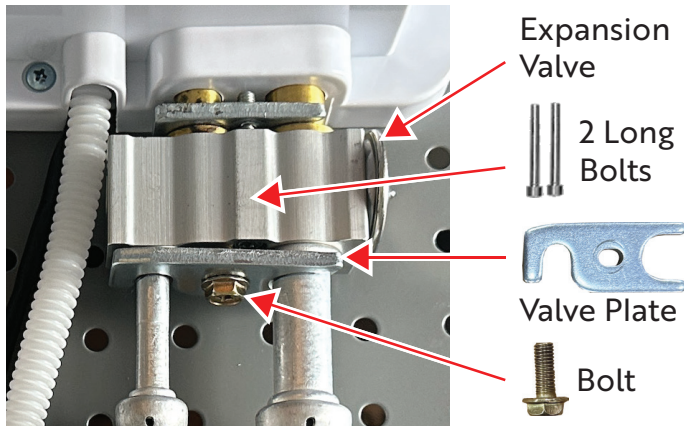
Adding a drop of POE oil to the valve helps it to slide on more easily.



Don't shimmy the expansion valve onto the pipes. This can create leak points.

INSTALLATION INSTRUCTIONS

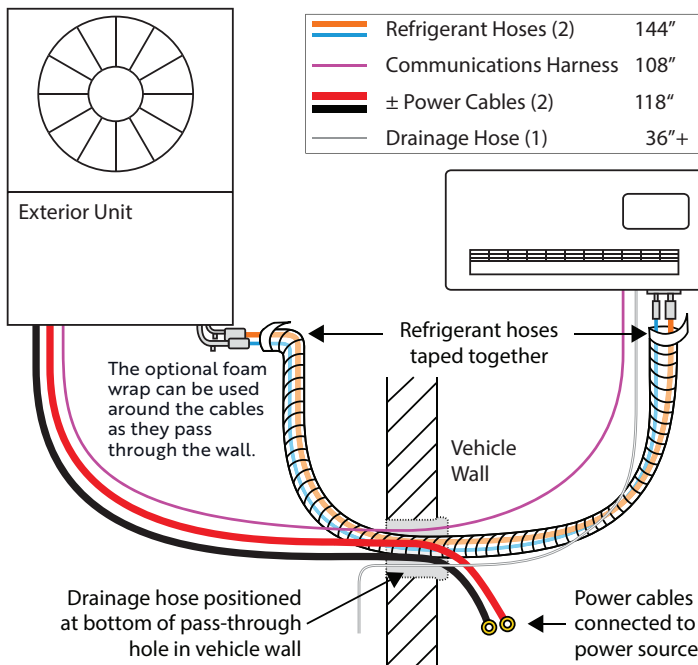
- 11. Add the valve plate** below the expansion valve and secure it with the copper bolt using 8 ± 1 lbs (11 ± 1 nm) torque.



- 12. On the exterior unit**, when you are ready to make the connections remove the protective caps from the pipes

The compressor is not pre-filled with refrigerant, so there is no danger of pressure releasing when removing the caps. When uncapping, there may be a small amount of nitrogen that escapes. This is normal and perfectly safe.

- 13. Connect the refrigerant hoses** from the interior unit to exterior valves.
- Align pipe ends with the valves and hand tighten.
 - Use a fixed or adjustable wrench to support the valve.
 - While supporting the body of the valve, tighten the nut to 8 ± 1 lbs (11 ± 1 nm) with a torque wrench.
- 14. Replace the exterior shroud** using the bolts and screw removed previously.
- 15. If desired, seal the wall opening with polyurethane foam (not included).**
- Putty or silicone can also be used.
 - Apply according to manufacturer's instructions and allow to completely dry before activating your AC unit.
 - Goal is to ensure the opening in the wall is sealed to prevent the ingress of hot air, moisture, or insects.



Additional Considerations:

- Insulation wrap can be added to suction valves on the exterior unit (primarily the cold pipe).
- If desired, you can use attachment straps or clamps (not included) to affix the cables to the exterior wall. This can help prevent them from shifting or disconnecting. Use rubber or plastic coated clamps, not bare metal clamps, which can potentially damage the cables.



INSTALLATION INSTRUCTIONS

Part 4: Filling Refrigerant

With all the connections made, you are now ready to fill the system with R134a refrigerant. We highly recommend having this performed by a professional service technician. The lines should be vacuumed and filled to the specifications in the tech support PDF shown in the tech support page.

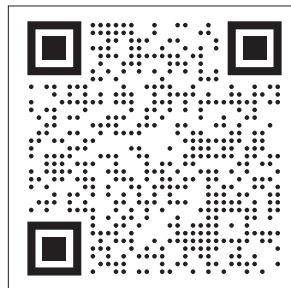
DISCLAIMERS

Nomadic Cooling accepts no liability for any injury or damage resulting from:

- Incorrect assembly or connection, including excess voltage. The responsibility for man-made failure or damage caused by failure to install according to our requirements is borne by the installer/user.
- Incorrect maintenance or use of spare parts other than OEM parts provided by Nomadic Cooling Co.
- Alterations to the product without expressed permission from Nomadic Cooling.
- Use for purposes other than those described in this manual.
- After purchasing the product, the user is deemed to agree with these disclaimers.

NC-S¹ warranty, return and cancellation policies, and all technical documents can be viewed and downloaded from our website by scanning the QR code below.

NOMADIC TECHNICAL SUPPORT



**WE ARE HERE
TO HELP!**

Just scan the QR code.



REMOTE CONTROL OPERATION

The NC-S¹ includes an infrared remote control. When setting the temperature, the difference between ambient and target temperature should be less than 37°F (3°C), otherwise the AC unit will restart frequently, which will increase power consumption.

1. **Power:** Turns AC Unit On or Off
2. **Light:** Turns Backlit Display On or Off
3. **Temp "+":** Temperature Increase 1°F
4. **Temp "-":** Temperature Decrease 1°F
5. **Speed "+":** Increase Air Speed by 1 level
6. **Speed "-":** Decrease Air Speed by 1 level
7. **Mode:** Press to cycle through the following controller modes:



Fan Only. Five speeds appear on right side of display.



"Channel Forwarding Table" Not used at this time. After 7 seconds on CFT, the unit will cycle off and back on.



BP - Snowflake - Cold with variable airflow speed.



ECO mode. Cooling and air-flow set to lowest levels.



VVS - "STRONG" Cooling and airflow set to highest levels.

Each mode allows fan speed adjustments according to user preferences.

8. **VDC:** Not used at this time.

9. **Digital:** Toggles between F° and C°.
10. **Swing:** Swings the louver automatically, distributing the air flow and current.
11. **Sleep:** Automatically puts the unit to sleep once the target temperature is reached. If the ambient temperature rises above that target, it wakes up.
12. **Strong:** Used for fastest cooling effect. (VVS mode with a quick press of a dedicated remote button).



Two (2) AAA batteries for remote are not included.

S¹ CONTROL PANEL OPERATION



Button(s)	Function
	Power On/Off
	Temperature Increase/Decrease 1°F
	Five Speed Fan Increase/Decrease one level
	Step through Modes (see previous page)

S¹ CONTROLLER FAULT CODES

Display	Code	Description
	Err	Temperature sensor error
	Erp	Takes care of the ErF electrical engineering, has no feedback
	Er E	Communication error with mother board
	Er L	Low pressure protection
	Er H	High pressure protection