



# NC-S<sup>1</sup> Install & Operations Guide

24V | 12V models

Ver. 240119



16680 N 51st Ave Units 4 & 5  
Glendale, AZ 85306  
(480) 576-2489

[www.NomadicCooling.com/Support](http://www.NomadicCooling.com/Support)

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



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Keep a record of the following information:

Model **NC-S' Split System AC Unit** | 24V  
12V

Serial No. \_\_\_\_\_

Date Purchased \_\_\_\_\_

Installed By \_\_\_\_\_

## INTRODUCTION

The NC-S' 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-S' is an excellent choice for maintaining a comfortable and cool environment in your vehicle. Our NC-S' 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!



Always bench test AC unit before installing.



Check to ensure all required parts are included (refer to page 6).

Get social with us!



@nomadiccooling

## IMPORTANT SAFETY INSTRUCTIONS

The NC-S<sup>I</sup> 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-S<sup>1</sup> TECHNICAL SPECIFICATIONS

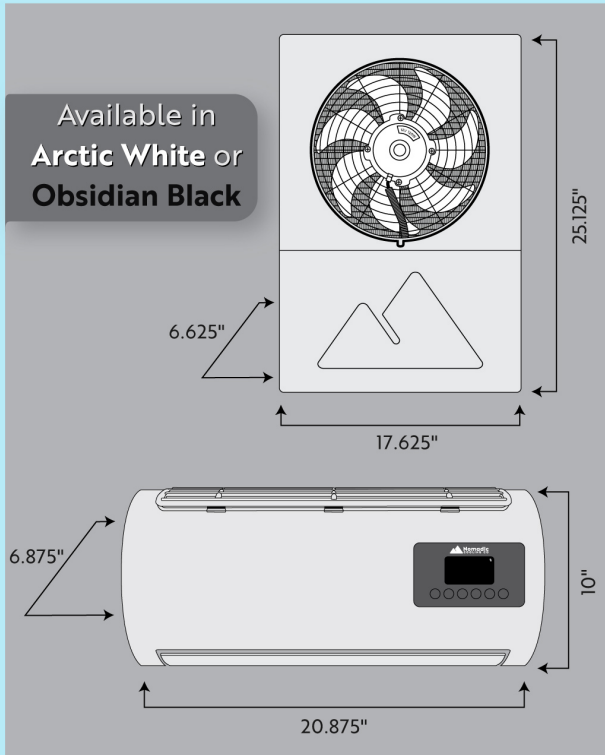


OFF-GRID AIR CONDITIONING SYSTEMS FOR VANS, RVS & RIGS



PRODUCT:  
MODELS:

NC-S<sup>1</sup> Split System AC Unit  
24V/12V AW/OBS



MODEL	24V	12V
Rated Voltage	24V	12V
Current (Range)	tbd	60-80A
Current ECO Mode	18A	35A
Current POWERFUL Mode	28A (tbd)	55A (tbd)
Rated Cooling Capacity	11,280 BTU	9,600 BTU
Rated Power	1,120W	960W
Air Volume (m <sup>3</sup> /h)	600m <sup>3</sup> /h	600m <sup>3</sup> /h
Fuse Size	50A	60A
Under Voltage protection	tbd	9-11.2
Under Wattage recovery	tbd	12.5
System Protection (shutdown)	tbd 2.5 MPa	2.45 MPa
System Protection (recovery)	tbd 0.18 MPa	0.23 MPa
Weight	12lbs Interior   48lbs Exterior	
Exterior Unit Size	25 <sup>1</sup> / <sub>8</sub> " x 17 <sup>5</sup> / <sub>8</sub> " x 6 <sup>5</sup> / <sub>8</sub> "	
Interior Unit Size	20 <sup>7</sup> / <sub>8</sub> " x 10" x 6 <sup>7</sup> / <sub>8</sub> "	
Noise (dBA levels)	≤36 Interior   ≤60 Exterior	
Operational Parameters	5°F to 118°F   Humidity ≤90%	
Temperature Setting Range	54°F to 89°F	
Refrigerant Type / Pressure	R134a @ 600g ±30g	
Refrigerant Oil	POE68	
Rotating Speed Range	1,600 - 3,800 RPM	
Power Cord Specs (AWG)	10 (≤6.5'), 16 (≤16'), 25 (>16')	
Warranty	One (1) Year	

## COOL NC-S<sup>1</sup> FEATURES

- Spring bushing-mounted compressor
- Quiet, brushless blower motor
- All stainless steel hardware
- Powder-coated exterior shroud
- Easy to install and remove



All-new, crisp LCD interior control panel!



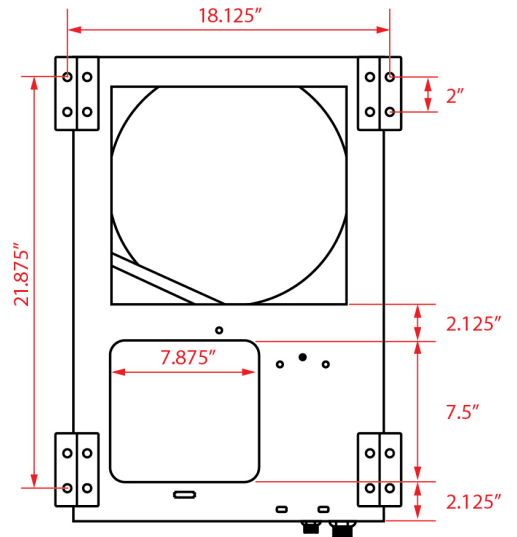
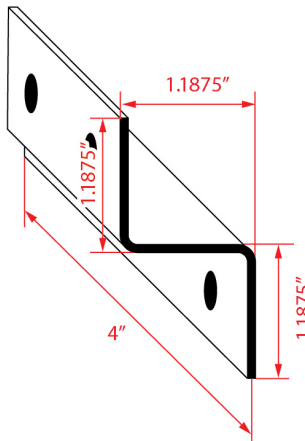
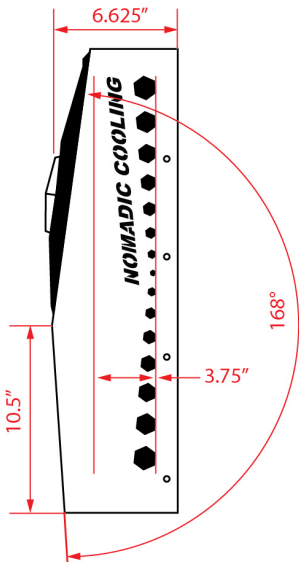
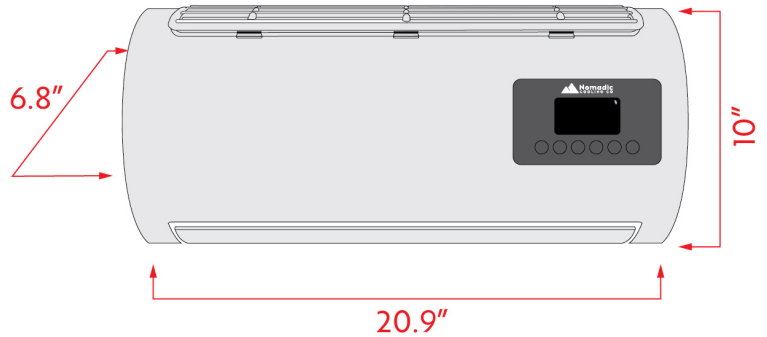
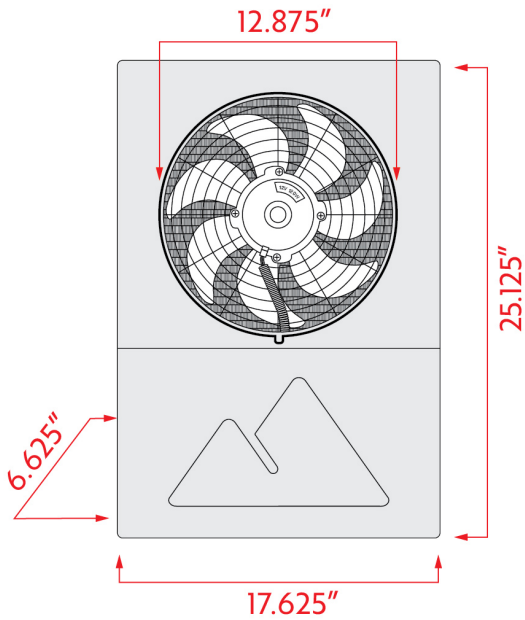
An infrared remote puts control of the modes, swing, sleep, and five fan speeds at your fingertips!



New "Swing" function oscillates the lower louver to maximize airflow and overall cooling effect!

**GO FURTHER  
IN COMFORT**

# NC-S' DIMENSIONS



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\*, comm wires\*

B 1 9'10" power harness, with inline fuse, Anderson style connector, copper rings\*

C 2 12' aluminum pipes and hoses: 3/4" high pressure, and 3/8" low pressure

D 2 Rubber o-rings and blue caps\*

E 4 Mounting brackets

F 8 Short black bolts, washers, lock washers

G 8 Long black bolts, washers, lock washers

H 8 Black nuts for long bolts

I 1 Drainage hose extension (optional)

J 1 Adhesive tape

K 1 Heat-reducing foam wrap

L 1 White polyurethane wall sleeve

M 1 Black foam ring for wall sleeve

N 1 Interior mounting board (optional)

O 4 Stainless steel mounting board screws

P 4 Stainless steel bolts for interior unit

Q 4 Stainless steel nuts for interior unit

R 1 Remote (2 AAA batteries not included)

S 1 Black plastic cap, dust covers, 2 long bolts\*

T 1 Expansion valve, bracket, 1 bolt, 2 long bolts

U 1 Rubber stopper, metal plate, bolt\*

V 1 3/4" and 3/8" couplings

**Box 2 (Interior Controller)** \_\_\_\_\_

**ID Qty Part Name**

W 1 Interior controller, communications wire harness\*, drainage tube\*, capped hose valves\*

\*pre-installed



# INSTALLATION INSTRUCTIONS

## Additional Tools and Resources required:

- Hole Cutting Drill 2"-3" (or a jig saw) that will cut through vehicle wall.
- Wrench Set
- Allen Key Set
- Torx Screwdriver Set
- Permanent Marker
- Mounting hardware for interior unit
- Can of DIY R134a refrigerant (600g)  
- and/or -  
A licensed air conditioning technician to vacuum, fill and test the AC unit once it has been installed.
- Two AAA batteries for remote control

## Optional Tools and Resources (not included):

- Rubber dampening feet (4)
- Cable glands or clams (1-3)
- Wall clamps (1-3)
- Custom refrigerant hoses (2)
- Insulation tape

## Compliance With U.S. Laws

Because the NC-S<sup>1</sup> 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.

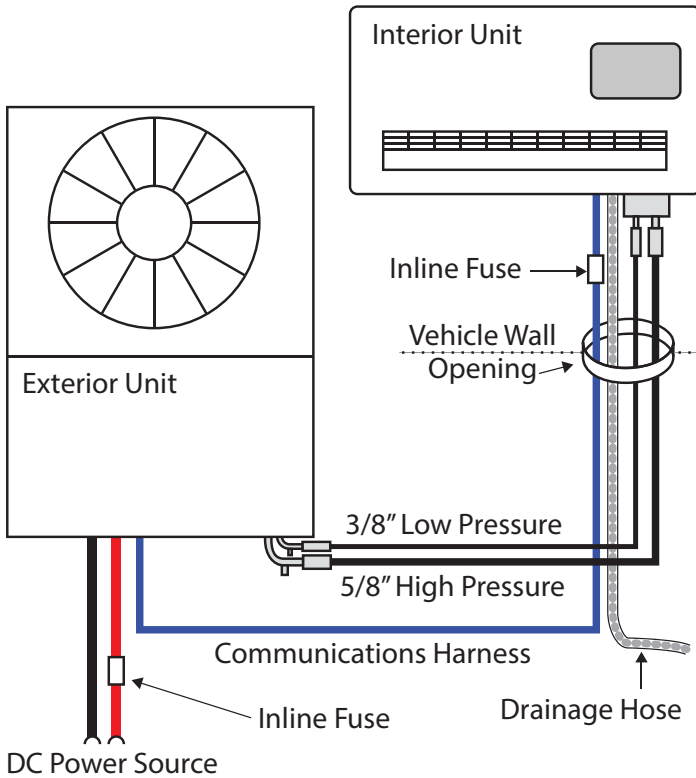


Avoid allowing any wires to come into contact with the compressor, refrigerant tubing, or moving fan components.

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: Installing 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.

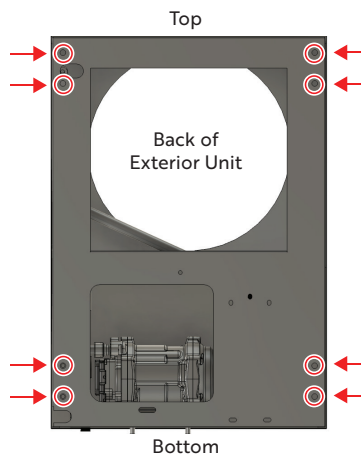


Select a central location for optimal airflow, or position it by your bed to provide maximum sleeping comfort.

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

### 2. Connect the mounting brackets to the back of the exterior unit.

Use 4-8 short bolts with washers and lock washers to connect brackets to the threaded holes in the rear of the exterior unit.

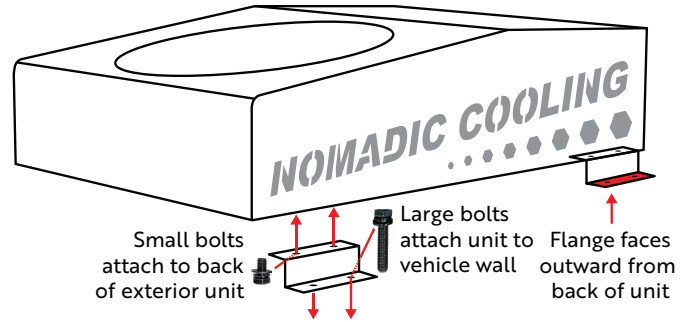
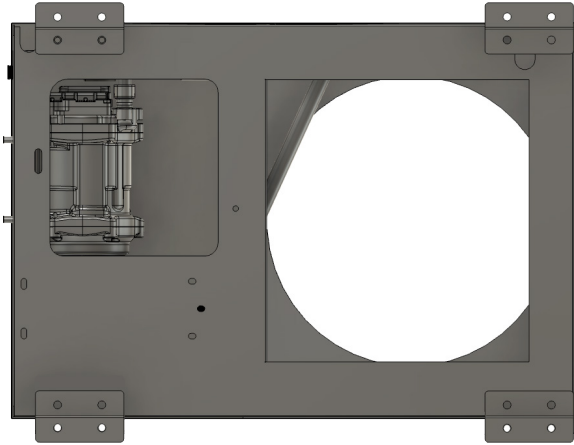


4 bolts mandatory  
8 bolts optional



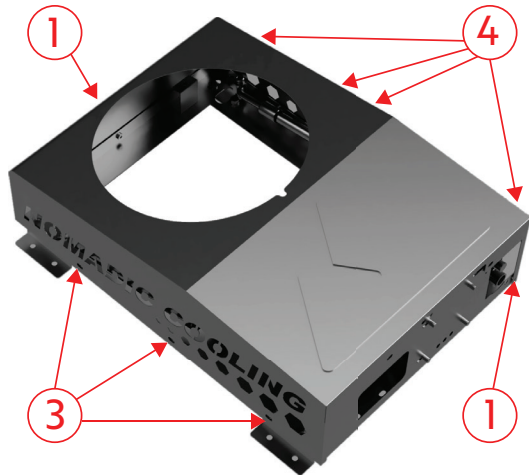
# INSTALLATION INSTRUCTIONS

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



## 2. Remove the exterior shroud.

There are 4-8 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 unit on the vehicle where it will be installed.



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.

## 5. Secure the exterior unit to the vehicle.

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



Compressor can be installed with vibration dampening foot pads added between the brackets and the vehicle wall (purchase separately).



If the interior of the vehicle does not allow access for attaching the mounting bracket bolt, nut and washers, you will have to instead use expansion bolts or plugs, spring toggles or similar fasteners (purchased separately). The type of fastener you will use depends on the wall thickness, structure and type of material used on the vehicle wall. The fasteners must be capable of supporting 50 lbs (as the exterior unit weighs 44 lbs, which excludes the cables and mounting hardware).


# INSTALLATION INSTRUCTIONS


## Part 2: Installing the Interior Unit

### 1. Consider the optional mounting board.

You have two options for hanging the interior unit: use the provided mounting board (cosmetic) or attach it directly to the wall.


Note: Because of the variety of vehicle wall surfaces and substructures, mounting hardware is not included. Use screws, bolts, wall anchors, expansion plugs, spring toggles or other fasteners to mount the unit (and board if it is being used) to your interior wall. Consider any beam or stud locations, if any, in the vehicle's wall for mounting location.

 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.

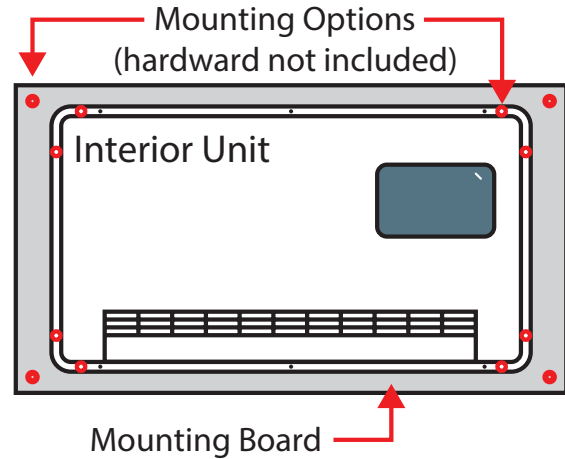
### A. Mounting the optional board on your vehicle's interior wall:

1. Position the mounting board at your chosen location, ensuring it is level.
2. Mark hole locations with a permanent marker, then remove the board.
3. Use a drill to create holes for fasteners.

 Make sure the panel is flush against the wall. Any space between the wall and the unit can cause noise and vibration.


### B. Mounting the interior controller:

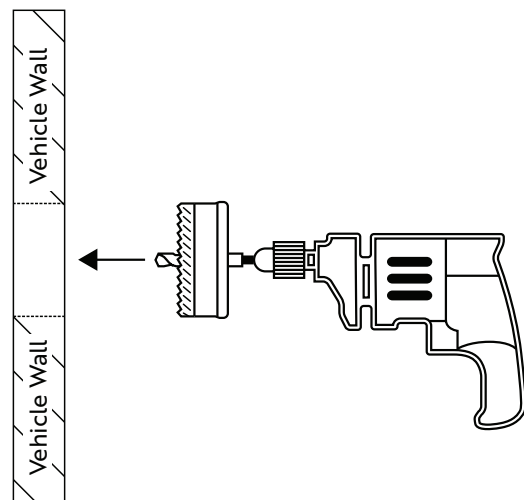
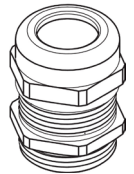
There are multiple mounting holes on the interior unit. Use at least 4 screws or bolts, whether you choose to use the mounting board or mount directly to the wall.



### 2. Create the wall opening.

If using the white sleeve, drill a 2"-3" hole through the wall below the controller.

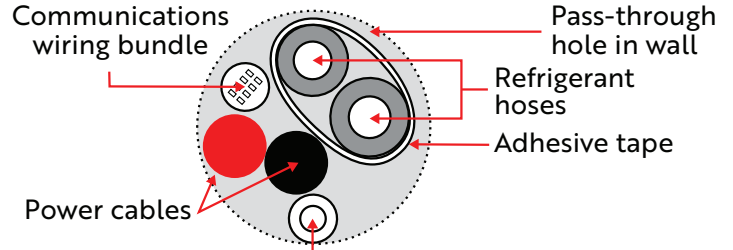
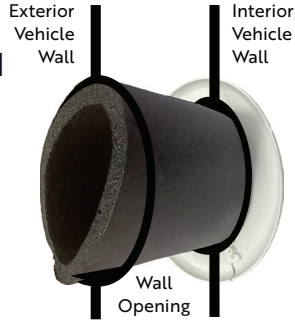
 Instead of using the white sleeve provided, you may purchase and install individual cable glands. If you do, the number and size of the holes you will drill will vary, and you should follow the instructions for installation that are included with the product. Skip to Step 4.



# INSTALLATION INSTRUCTIONS

### 3. Insert the wall sleeve.

Place the foam ring around the wall sleeve and insert into the wall opening from the interior of the vehicle. All cables and hoses will pass through this opening.



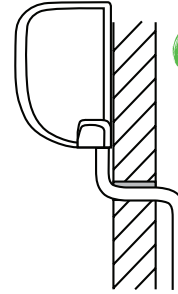
Drainage hose must be at the bottom of wrapped bundle where it passes through hole in the wall.

### 4. Tape the refrigerant hoses together.

Bundle the two refrigerant hoses together and wrap them using the tape provided from end to end. As you wrap the hoses, overlap half of each previous tape turn. Pass the wrapped hoses through the wall from the outside to the inside of the vehicle.

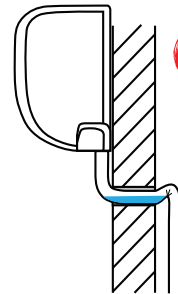


Do not wind the tape too tightly around the hoses, as this will decrease the heat insulation effect.



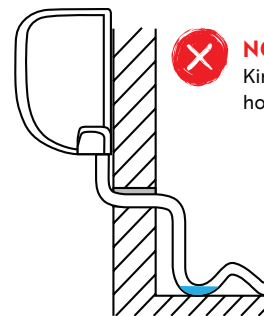
#### CORRECT

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



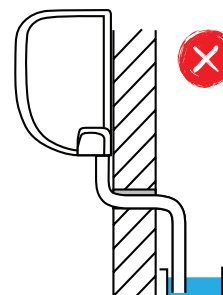
#### NOT CORRECT

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.

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

To help facilitate proper drainage, keep the drainage hose at the bottom of white sleeve as it passes through the wall.



You may add the optional the drainage hose extension at this time.



The heat insulating foam wrap should be used to bundle all of the cables and hoses where they pass through the wall.

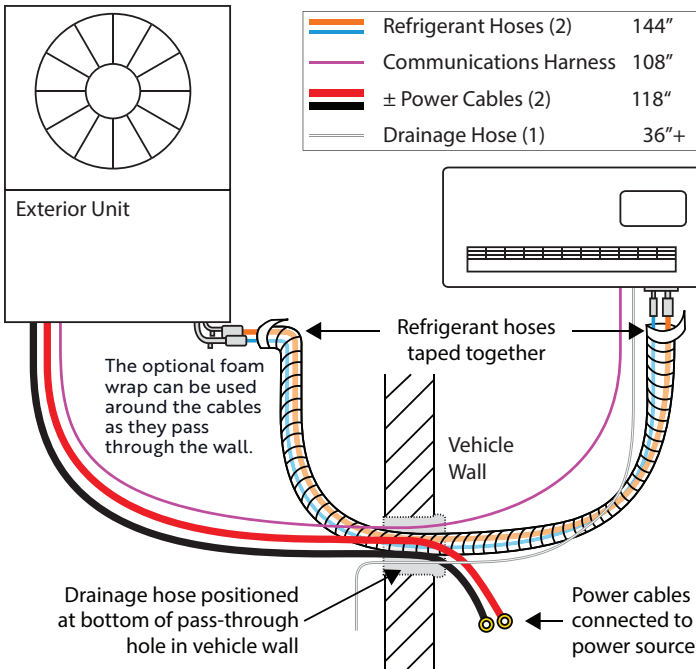


Where the conduit passes through the wall, you can pull it out a few inches and add layers of tape at the pass-through point. The goal is to fill that hole space in the wall before spraying foam or putty.


### 6. From the outside, pass the two power cables and communications harness through the wall to the inside of the vehicle.

# INSTALLATION INSTRUCTIONS

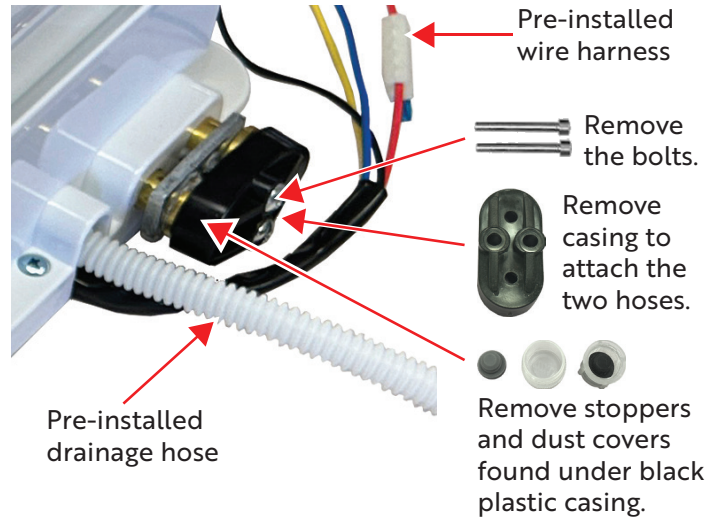
## Part 3: Make the Connections



The NC-S<sup>1</sup> boxes contain all of the hoses, cables and wires necessary to connect the interior and exterior units with minimal effort.

 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.

1. **Connect the power cables** coming from the bottom of the external unit to your power source and/or turn on the breaker.
2. **Connect the external communications harness** to its matching interior terminal.
3. The pipes on both units are capped coming out of the box. **On the interior unit**, use a hand driver to remove the black casing, the two stoppers and dust covers from the bottom of the interior controller.



4. **Slide the expansion valve onto the brass pipes**, and secure it with the 2 bolts you removed from the casing (above). Use  $8 \pm 1$  lbs ( $11 \pm 1$  nm) torque.

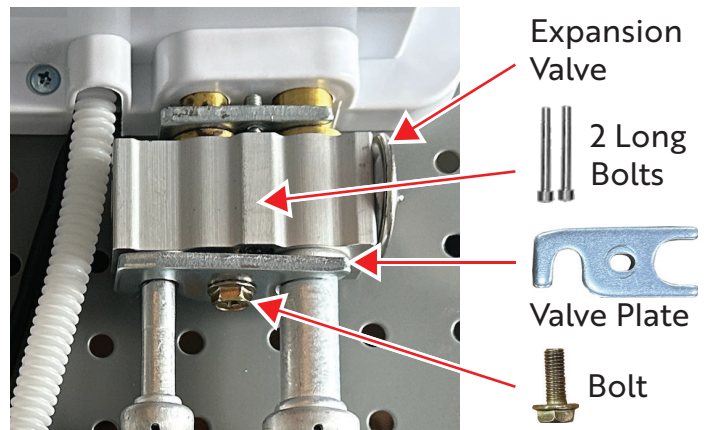


Adding a drop of POE oil to the valve helps it to slide on more easily.



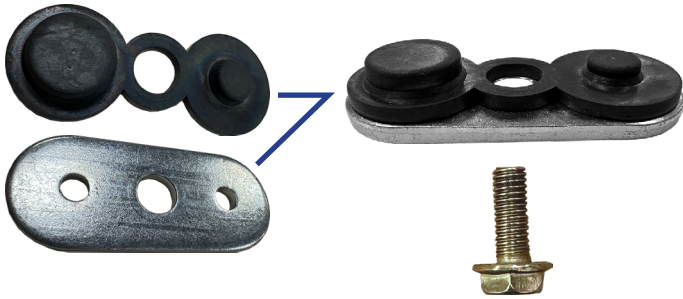
Do not "shimmy" the expansion valve onto the pipes. The soft **brass** and **aluminum alloy** can create leak points if either of them become bent or warped.

5. **Add the valve plate** below the expansion valve and secure it with the bolt using  $8 \pm 1$  lbs ( $11 \pm 1$  nm) torque.



## INSTALLATION INSTRUCTIONS

6. **On the exterior unit**, remove bolt, plate and rubber plugs from the valves.



7. **Repeat** steps 4 through 7 to connect the refrigerant hoses from the interior unit to exterior valves.

- Or -

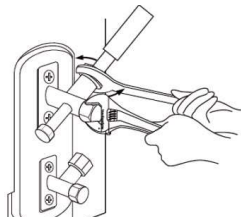
**7. Connect the two hoses to exterior unit.**

With the shroud still removed, you can attach the hoses to the compressor motor.

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

Is a torque wrench to attach exterior hoses?

If above is to be described, we can use line art like this but showing our external valve configuration.



If necessary on exterior unit:

7. **Align pipe ends** with the valves and hand tighten.
7. **Use a fixed or adjustable wrench** to support the valve.
7. While supporting the body of the valve, tighten the nut to  $8 \pm 1$  lbs ( $11 \pm 1$  nm) with a torque wrench.

**8. Replace the exterior shroud.**

Use the bolts and screw removed in Part 1 Step 2 to reattach the shroud.

**9. Seal the wall opening with expanding 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.
- Ensure the opening in the wall is completely sealed to prevent the ingress of hot air, moisture, or insects.

### Other Options:

Insulation tape can be added to suction valves on the exterior unit. Rob: The cold pipe mainly for this. The hot valve just gets warm, not burn-you-hot.



**Insulation tape** should be wrapped around the aluminum **or zinc** valves.

Direct contact with the bare valves can result in burns or frostbite.

### Wall Clamps



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. There are a variety of shapes, colors and styles available depending on your preferences. Use rubber or plastic coated clamps, not bare metal clamps which can potentially damage the cables.



# REFRIGERANT INSTRUCTIONS

## Part 4: Filling Refrigerant

### FILLING REFRIGERANT



It is illegal to vent refrigerant into the atmosphere. Most jurisdictions restrict disposing of hazardous gas such as the R134a refrigerant in the NC-S<sup>1</sup>.



We highly recommend utilizing a professional to vacuum the lines before filling and testing, to insure optimal performance of the AC unit.

The NC-S<sup>1</sup> ships uncharged [or it may ship with up to 290 psi (2 MPa) of nitrogen]. The R134a refrigerant used to charge the AC unit is available at most auto stores. The NC-S<sup>1</sup> is a sealed system that, once filled, should not need to be vacuumed again unless leakage is suspected. If the AC unit ever needs to be "topped off", we recommend purging the system first simply because it can't hurt.

1. Connect the manifold pressure gauge set to compressor inlet and outlet hoses.
2. Connect the vacuum pump to the pressure gauge.
  - A. Power on and vacuum unit. The vacuum pressure should be  $\leq 14\text{psi}$  ( $\leq 0.1\text{MPa}$ ).
  - B. If dust caps are removed and exposed the system to air for less than 2 minutes, vacuum for 15 minutes. If exposure exceeds 2 minutes, a full purge for 45 minutes is recommended.
  - C. Turn off the vacuum pump. Watch the pressure gauge for 5 minutes to see if pressure is maintained. If pressure goes up, leakage is indicated.
3. If leakage is indicated:
  - A. Fill the system with nitrogen to 290 psi (2 MPa) and maintain pressure.
  - B. Brush the tubes and connections with soap water to locate the leak(s).

4. Repair any leakage points and repeat Steps 1 to 3 until there are no leaks indicated.

### RUN TRIAL PRIOR TO INSTALL

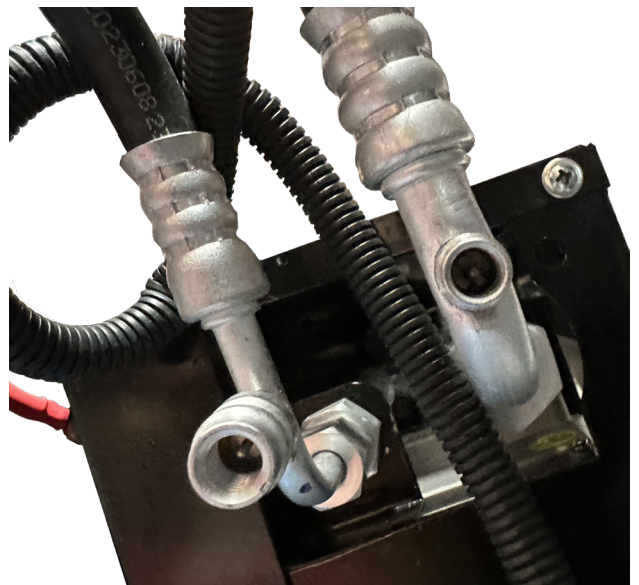
1. Remove the vacuum pump.
2. Connect the refrigerant cylinder and fill the refrigerant from high pressure end.
3. Pressure controlled to 72~116 psi (0.5~0.8 MPa) (within the limits of pressure gauge).
4. Turn off the refrigerant cylinder.
5. Power on and start the system.
6. Listen for any audible leaks coming from the compressor, evaporator or condenser as the systems spool up.
7. The voltage should meet the requirements.
8. Watch for changes in pressure on gauge(s).
9. Open the refrigerant cylinder and fill the refrigerant from the compressor inlet (low pressure end).

Pressure controls:

High: 232~348 psi (1.6~2.4 MPa)

Low: 14~43 psi (0.1~0.3 MPa)

Refrigerant charge: 600g  $\pm$ 30g



# NC-S<sup>1</sup> FEATURES

## Cool NC-S<sup>1</sup> features:

- Spring bushing-mounted compressor
- Quiet, brushless blower motor
- All stainless steel hardware
- Powder-coated black shroud
- Easy to install and remove

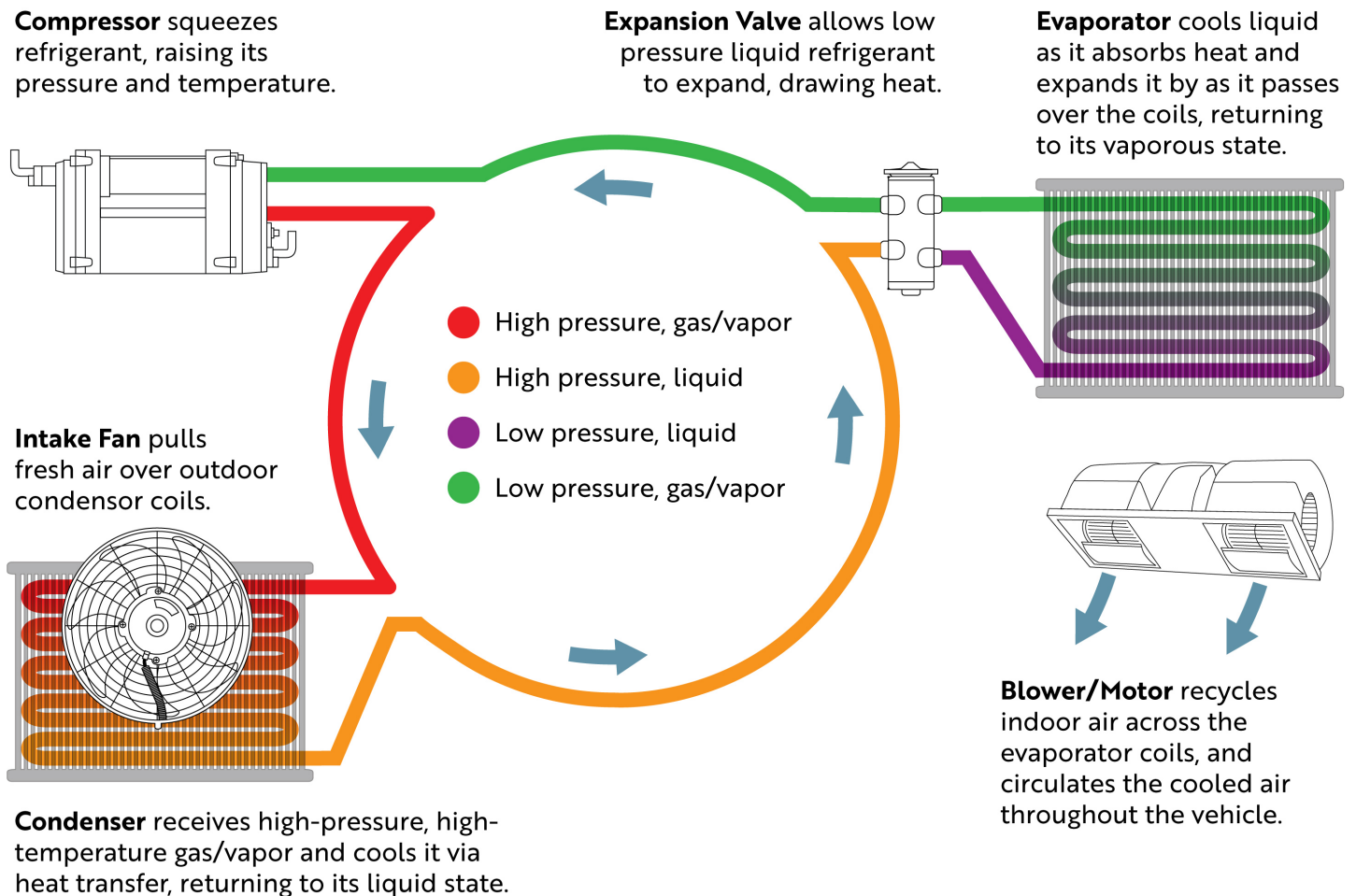
Install Checklist?

Maintenance Tips?

Purge Steps?

Expanded features and benefits list beyond what is included on the Spec Sheet. This includes information we don't have, particularly with regards to individual components and materials used. Copper, brass, aluminum, zinc, alloy, stainless steel, etc.

## The Components and Working Principals of the NC-S<sup>1</sup> Mini Split System AC Unit



## Operational Considerations

From existing guide, attempt at translating here... decide what is being said, and if it should be included in this guide, and where.

There is up to a six second delay after the condenser starts up before the compressor starts. This reduces pipeline pressure at startup, which helps prolong the life of the interior components. After the compressor is stopped, the condenser can be delayed for up to 10 seconds.

Independent fuses are recommended for compressor branches, which are not suitable for parallel use with parts related to vehicle safety (such as using the same set of relays and fuses).

AC unit will not start if the compressor low pressure is less than 5.7 lbs. (2.6kg).

After shutdown, it may be necessary to turn off the power before restarting the AC unit.

Exhaust pressure should be adjusted to 26 lbs to 31 lbs (12-14kg) when high pressure exceeds 48 lbs (22kg). When this occurs, the AC unit will automatically stop. Allow it to let off some refrigerant for about 5 minutes and then restart.

In order to maximize the efficiency of the electric air conditioner, it is recommended to install a set of power batteries of 200A or above and a generator of 70A or so, which can be used for parking for about 5 hours during the day when it is very hot and for more than 10 hours at night driving the electric air conditioner has no influence!

Add battery must be equipped with power battery (electric tricycle traction battery), it is forbidden to add the same model battery of the original car.

The positive pole of electric air conditioner must be connected to the battery positive pole or motor terminal, but not to the instrument. The negative pole is connected to the battery negative pole.

Vacuum must be in place during installation because the compressor is sensitive to moisture and air. Vacuum high and low pressure tubes simultaneously at -0.098 [g?] for more than 15 minutes if valves were open for longer than 1 minute during installation. Maintain vacuum pressure for at least 45 minutes if the valves were open to air for any extended period of time. It can't hurt, and will help increase AC unit longevity and overall efficiency.

If using the AC unit while driving, the voltage fluctuates greatly, or drops below 25V, you can prevent battery power loss by stopping the AC unit. (is this for car batts?)

Use the battery after it is fully charged every time as much as possible. Running at low power will reduce the speed of the compressor and cause sub-par performance.

When using electric air conditioner while driving, the battery should be fully charged, and the generator must be above 75A. Vehicles smaller than 75A must pay attention to the electricity storage on the instrument panel during driving. Once the battery is low, stop using the electric air conditioner immediately, especially when driving at night! When starting, the generator is running and the voltage is high. The compressor controller will mistakenly think that the battery is fully charged, but in fact, the battery power is gone. When parking, the compressor controller will automatically control, which will not cause battery feeding. In addition, when the generator is less than 55A, there will be under-voltage and the air conditioner will stop and turn on (This is because the power in the battery has been used up, and when the engine speed is low, the point cannot keep up, resulting in under voltage).

(If you need to use air conditioner during driving, you need to replace the generator to be more than 30 years larger than the original car) ... "Years?"

When troubleshooting air-conditioning faults, do not rush to dismantle the components, but carry out careful inspection and scientific analysis to accurately determine the fault causes and effectively eliminate the faults.

If any problems exist that you cannot fix, do not hesitate to call a local shop or van upfitter. A list of upfitters approved by Nomadic Cooling can also be found at <https://www.nomadiccooling.com/pages/nomadic-cooling-builder-locator>.



## REMOTE CONTROL OPERATION

The NC-S<sup>1</sup> 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.



ECO mode. Compressor runs at its lowest frequency, and the airflow is defaulted to lowest speed.



BP - Snowflake - Cold with variable airflow speed.



VVS - Cooling and airflow at maximum adjustments.

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 vertically automatically distributing the air flow and current.
11. **Sleep:** Automatically turn the controller off after a specified time\*\*
12. **Strong:** Used for fastest cooling effect. (Same as VVS mode, but with a quick press of a dedicated remote button).

\* "Volts Direct Current?", no reading changes on prototype display.

\*\* To test: Use Temp "+" or "-" to set the timer using half hour increments, for up to 10 hours. Press the timer key again to cancel the timer.



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

## S<sup>1</sup> CONTROL PANEL OPERATION



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

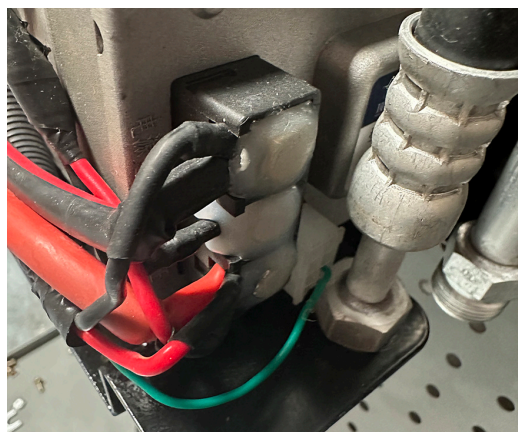
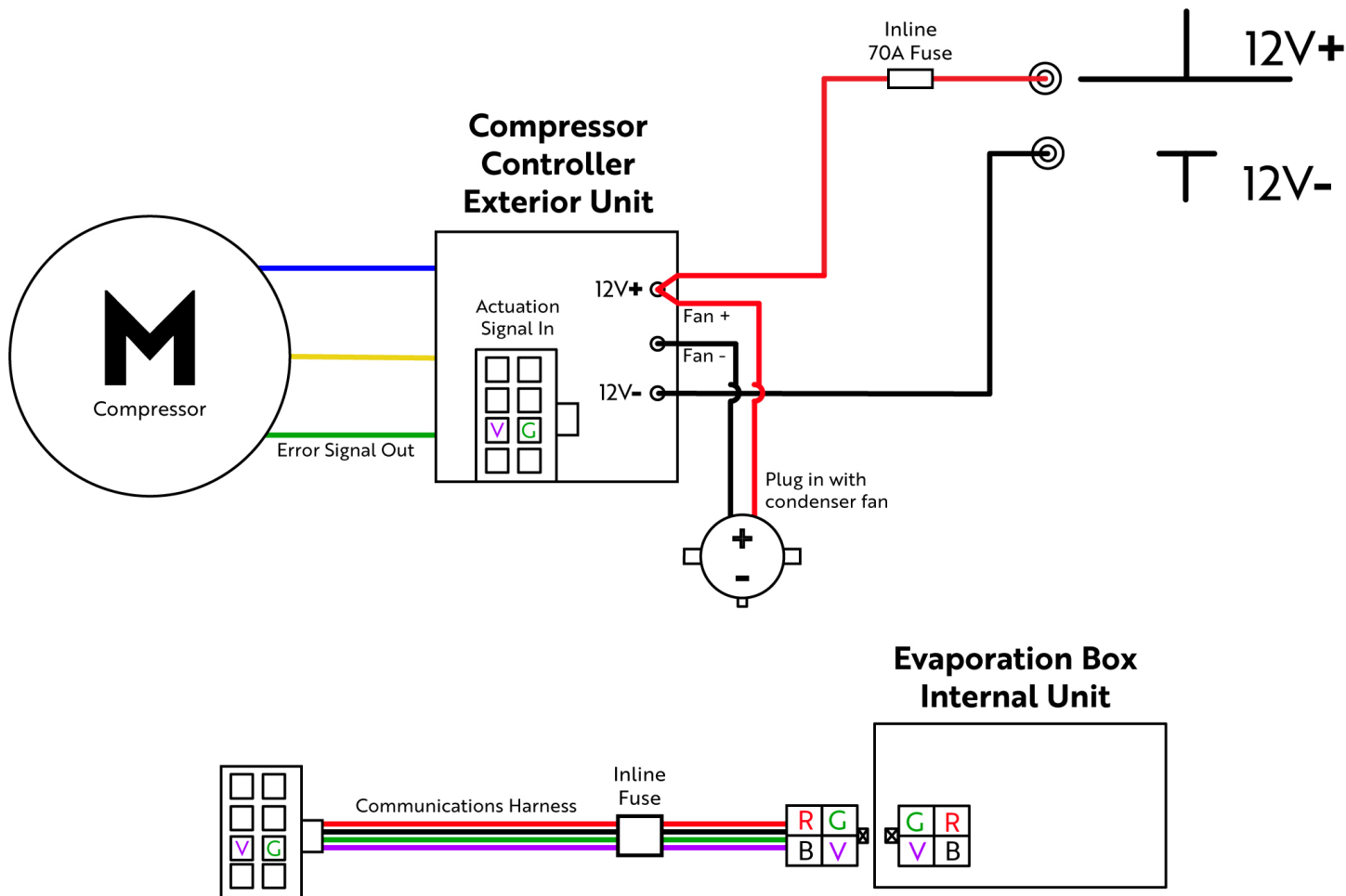
## S<sup>1</sup> CONTROLLER FAULT CODES

Display	Code	Description
	Err	Indoor temperature - ERR = indoor temp? What?
	Erp	Takes care of the ErF electrical engineering, has no feedback
	Er E	Did not link lord plank* (what is a lord plank?)
	Er L	Low pressure protection
	Er H	High pressure protection

\*Communication of Er E did not occur as expected [?]



# 12V ELECTRICAL SCHEMATIC



# S1 OPERATIONS GUIDE

## 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 Co.
- Use for purposes other than those described in this manual.
- Nomadic Cooling reserves the right to change product appearance and product specifications without notification.
- After purchasing the product, the user is deemed to agree with these disclaimers.

AMBIENT TEMPERATURE (OUTSIDE) F°	LOW SIDE PRESSURE RANGE (PSI)	HIGH SIDE PRESSURE RANGE (PSI)
65°	5-6	17
70°	6-7	18
75°	7-8	19
80°	8-9	22
85°	9-10	28
90°	9-10	31
95°	10-10	34

### Summary of Additional Specs from guide

Dustiness	≤ 30mg
Max Voltage	450VDC
Exterior Angle	≤ 5°
Condenser Spool Up	≤ 6 seconds
Condenser Spool Down	≤ 10 seconds
Pressure controls:	
Ambient 90°F (32°C) High	31 lbs (14kg)
Ambient 95°F (35°C) High	28.5 lbs (13kg)
Ambient 95°F (35°C) Low	5.5 lbs (2.5kg)
Controller pressure protection	21.5V±1V
Restart voltage after under voltage	25.5V 0.5V
Comp. low pressure protection	5.7 lbs (2.6kg)
Expansion Valve	1.2 to 1.3 cold tons
Suction pressure	2.3-3.2 kg
High/Low Temp	95°F / 68°F at valves

Table above shows R134a pressure standards based on ambient temperature (Wikipedia)

Computing ratios on high side based on 90° temp and PSI of 31 provided in existing documentation. Probably not be accurate. Used as placeholder.

We should also show how many ±g of refrigerant to add or remove when hose lengths are extended or shortened from the 12 foot lengths provided? Maybe we can just state something like (for example) add or remove 10g for every 3 feet added or removed?



## WARRANTY POLICY For NC-S<sup>1</sup> DC-Powered Mini-Split System AC Units

Nomadic Cooling is dedicated to delivering top-quality products coupled with outstanding customer service. We provide an industry-leading warranty for our products to ensure your satisfaction and peace of mind. Technical support is available for the lifetime of any NC-S<sup>1</sup> AC unit. Please review the following warranty policy.

### 1. Warranty Period

All NC-S<sup>1</sup> AC units are covered by a one year warranty period which begins on date of purchase. An optional one-year extended warranty is available if purchased prior to initial warranty period expiration.

### 2. Warranty Coverage

During the warranty period, the Nomadic Cooling Warranty covers all NC-S<sup>1</sup> units that experience defects due to manufacturing or workmanship issues. The customer shall be responsible for all shipping costs to get the NC-S<sup>1</sup> AC unit to and from Nomadic Cooling for inspection, repair, replacement or upgrade.

### 3. Optional Extended Warranty

You may purchase a one-year extended warranty for any NC-S<sup>1</sup> AC unit which provides the same coverage as described above (#2).

### 4. Optional Refundable Core Charge

If you wish to have a replacement NC-S<sup>1</sup> AC unit shipped prior to Nomadic Cooling receiving the warranted unit, a core charge of up to 50% of the Manufacturer's Suggested Retail Price (MSRP) may apply. This core charge is intended to ensure the return of the warranted unit to Nomadic Cooling. The core charge will be added to the purchase price of the replacement unit and is refunded upon Nomadic Cooling's receipt and evaluation of the returned unit. If the warranty department determines that a defect was due to Nomadic Cooling's fault, the core charge will be refunded in full.

### 5. Exclusions and Limitations

The following are not covered by the warranty:

- Damage caused by misuse, negligence, accidents, or unauthorized modifications.
- Damage resulting from improper installation, maintenance, or storage.
- Damage caused by natural disasters, fire, water, or any other external factors beyond our control.
- Normal wear and tear, cosmetic damages, or minor imperfections that do not affect the functionality of the product.
- Warranty, including an optional extended warranty, is non-transferable.

### 6. Labor Exclusion

Nomadic Cooling's warranty policy does not cover any labor costs associated with the inspection, repair, or replacement of an NC-S<sup>1</sup> AC unit. Any additional expenses related to labor, including but not limited to installation, removal, or troubleshooting, shall be the sole responsibility of the customer.

### 7. Warranty Claims

To initiate a warranty claim, please e-mail or call us. Our representatives will guide you through the necessary steps and provide instructions on how to proceed with the warranty claim.

Please note that this warranty policy is subject to the terms and conditions stated herein and may be subject to change without prior notice. Nomadic Cooling reserves the right to determine the validity of all warranty claims and to make the final decision regarding repairs, replacements, refunds or upgrades.

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**For warranty claims, additional information  
or any questions, please contact us at:**

**Support@NomadicCooling.com  
or call us at (480) 576-2489.**

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## RETURNS, CANCELLATIONS AND MISSING ITEMS

### Returns

Nomadic Cooling will gladly accept returns within 30 days of acceptance of order. Please e-mail [Info@NomadicCooling.com](mailto:Info@NomadicCooling.com) or call (480) 576-2489. Any returns after 30 days are subject to prior approval.

Only items in their original condition with all packaging, accessories, instruction manuals, warranty cards, and UPC codes will be accepted for return.

A 15% restocking fee will be assessed for all return orders. Customers are responsible for the cost of shipping of any product returned to Nomadic Cooling. We are happy to arrange for return shipping using our provider rates, or shipping can be arranged independently. Returns must include a tracking number.

If a returned product arrives at Nomadic Cooling with damage due to mishandling, poor packaging, or in otherwise unusable condition for resale, then an additional fee may be assessed.

Products should be returned to:

Nomadic Cooling Co  
16680 N 51st Ave Unit 4-5  
Glendale, AZ 85306

Due to some products being shipped directly from the manufacturer, please check with a Nomadic Cooling employee where to send all other returns.

Returned products will be assessed for damage upon receiving at Nomadic Cooling.

Refunds will not be processed until the product is received, inspected, and/or tested by Nomadic Cooling.

All refunds will be processed back to the original payment method and/or store credit.

### Order Cancellations

If you wish to cancel your order for any reason, please let us know as soon as possible. Please e-mail [Info@NomadicCooling.com](mailto:Info@NomadicCooling.com) or call (480) 576-2489.

If you are canceling before the order has been shipped, then we will process a refund back to the original payment method. If you are canceling after the order has been fulfilled, then the cancellation will be processed as a return and is subject the restocking fee and shipping costs. If applicable, you will be responsible for any "stop and return" fees.

### Missing Items

Upon receiving your order from Nomadic Cooling, please immediately open the package and inspect the contents to ensure all items from the order have been included. If you suspect that an item is missing or the incorrect item was sent, please notify a Nomadic Cooling employee ASAP so we can assess the order. If you fail to notify Nomadic Cooling within 14 days of accepting an order with missing or incorrect items, then you will be responsible for shipping costs for the missing or incorrect item(s).

To better prevent orders with missing or duplicate items, and for ease of tracking, Nomadic Cooling will only be shipping orders once all items in the order are ready for shipping. Nomadic Cooling will not send partial shipments. Exceptions may occur when specifically requested by the customer and/or item(s) in the order are on backorder. Products are shipped the same day they are packaged and ready, unless requested otherwise.