

M998

CLIMATE CONTROL SYSTEM

by RESTOMOD AIR 

08.23

CONGRATULATIONS...

You have just purchased the highest quality, best performing A/C system ever designed for your M998.

To obtain the high level of performance and dependability our systems are known for, please pay close attention to the following instructions. Our installation steps and procedures are derived from a long history of research and development and the combined experience achieved thru thousands of successful installations (and feedback from customers like you). Please remember that our #1 goal is that you'll have a successful installation and a system that performs at a very high level for many years to come.

Before starting, read the instructions carefully, from beginning to end, and follow the proper sequence. On the next page you'll find a safety and general checklist that you should read before starting your installation.

Thank you from our entire staff.

CHECK LIST & PROCEDURES

PRE - INSTALLATION:

- Before beginning the installation check the shipping box for the correct components. YOUR BOXED UNIT INCLUDES A LIST OF MAJOR COMPONENTS AND A LIST OF BAGGED PARTS. We have a 5 stage check process to make sure you have everything you'll need.
- If your vehicle has been or is being modified, some procedures will need to be adjusted to fit your particular application.**
- A basic cleaning of the engine compartment and interior before beginning will make things go more smoothly.
- Check condition of engine mounts. Excessive engine movement can damage hoses to A/C and/or heater.
- Before starting, check vehicle interior electrical functions (interior lights, radio, horn, etc). Make a note of anything that does not work as it's supposed to. During the installation you might find the opportunity to repair or upgrade non-working or out of date components. When you're ready to start the installation, **DISCONNECT THE BATTERY FIRST.**
- Drain the radiator. Retain the coolant and reuse, or dispose of properly.
- SAFETY FIRST: Wear eye protection while drilling/cutting, deburr sharp edges, and never get in a hurry or force a part.
- Tools: Your installation only requires the basic tools everyone has in their garage, nothing exotic or specific to A/C or Heat equipment.

DURING INSTALLATION:

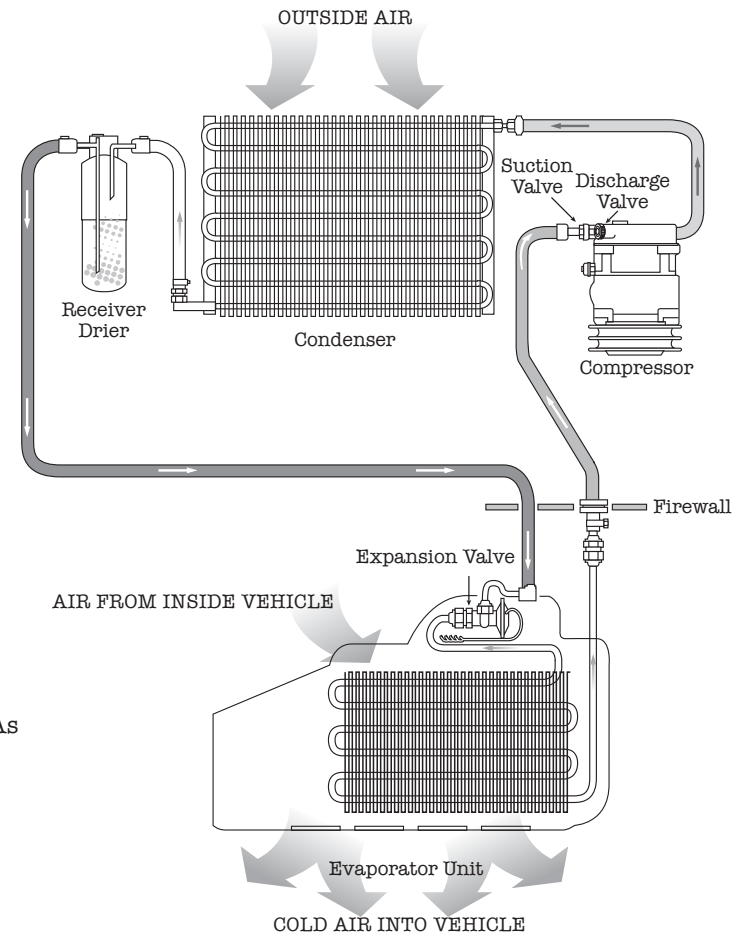
- Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- Measure twice (or more), cut once
- Should you have any technical questions, or feel you have defective components (or missing items), call us immediately, we will be glad to assist you. Our toll-free number is listed on every page, we're here to help!**

YOU CAN NOW BEGIN THE INSTALLATION...

CHECK LIST & PROCEDURES

- 1 Evaporator with Blower Fan** In order to remove the heat from the air in the vehicle, the A/C evaporator allows the refrigerant to absorb the heat from the air passing over it. The blower fan moves cool air out into the car interior.
- 2 Compressor** The compressor pumps and circulates the refrigerant through the system.
- 3 Condenser** The condenser is a heat exchanger mounted at the front of the vehicle. Heat drawn out of the interior of the car is expelled here.
- 4 Receiver/Drier** The drier not only dries refrigerant, it also filters the refrigerant and stores it under certain operating conditions.
- 5 High Pressure Switch** A pressure switch is used to shut down the system if high or low pressure is detected, basically it acts as a safety switch.

The air conditioning system in your car is comprised of a compressor, condenser, expansion valve, receiver/drier, and evaporator. Refrigerant (also known as Freon) is compressed in the compressor. In the condenser, gas is cooled to a liquid state and travels to the expansion valve. As the liquid refrigerant goes through the expansion valve it rapidly cools in the evaporator. A fan blows over the evaporator and cools the air that blows out your vents



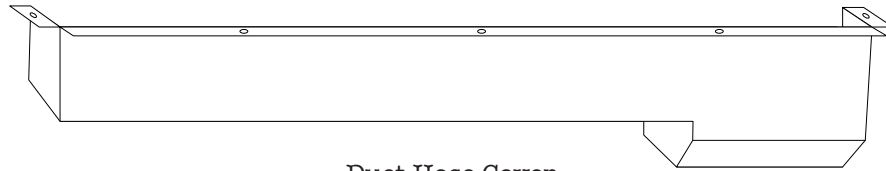
PARTS INTERIOR

Note: Parts not to scale

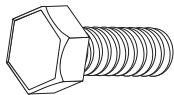
PLENUM KIT



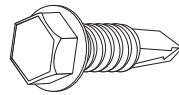
Plenum
PN#HMV001-62WA



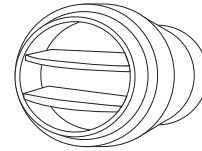
Duct Hose Cover
PN#HMV002-58



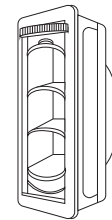
1/4 - 20 x 1" Bolts (5)
PN#25C100HHB5Z



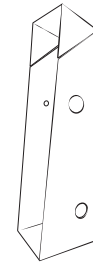
#10 - 14 x 3/4"
Tek Screws (6)
PN#10B75HW3Z



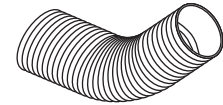
Vents (3)
PN#477



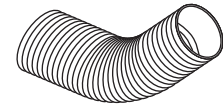
Louver, Pacifica
PN#2-1075



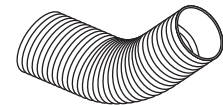
Louver, Housing
PN#HMV001-48



2" Duct Hose, 8FT
PN#2-1013



2" Duct Hose, 4FT (1)
PN#2-1013

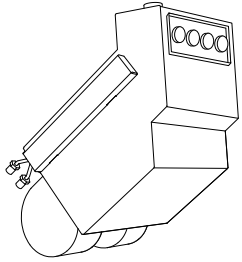


2" Duct Hose, 1FT (2)
PN#2-1013

PARTS INTERIOR

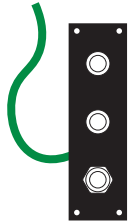
Note: Parts not to scale

EVAPORATOR UNIT



Evaporator
PN#HMV-1-200

CONTROLS BAG KIT



Panel, Controls HMV
PN#16-HMV-100



Sticker Plate
PN#HMV001-60

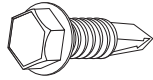


8 - 32 x 1/2" PHP (4)
PN#8C50PPHZ

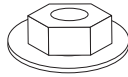


Knobs (3)
PN#28-51606

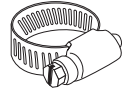
HARDWARE BAG KIT



#10 - 14 x 3/4" Tek Screws (4)
PN#10B75HW3Z



1/4 - 20 x 1" Flange Nuts (4)
PN#25CNFLZ/S



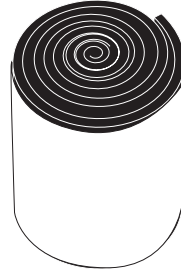
Hose Clamps (6)
PN#6274



8" Black Zip Ties (12)
PN#AL-08-40-0-M



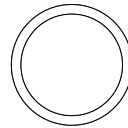
90° Drain Tube 1/2" (2)
PN#1875



Refrigerant Tape
PN#Q-201



1/4" Washer (4)
PN#25NWSAZ

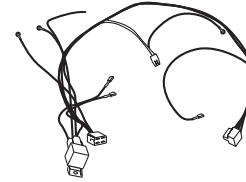


Cap Plug 7/8" (2)
PN#SR-7/8

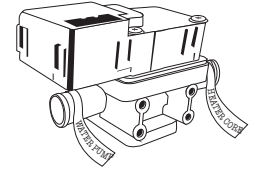


Drain Tube 1/2" (4ft)
PN#31004845

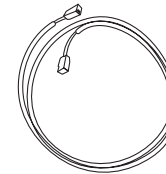
WIRING BAG KIT



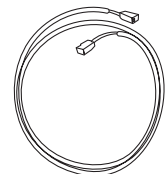
Main Power Harness
PN#HMV001-90



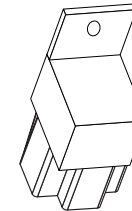
Water Valve
PN#16-1023



Dash/Defrost Harness
(Yellow)
PN#HMV-001-91



Water Valve Harness
(Orange)
PN#HMV-001-92

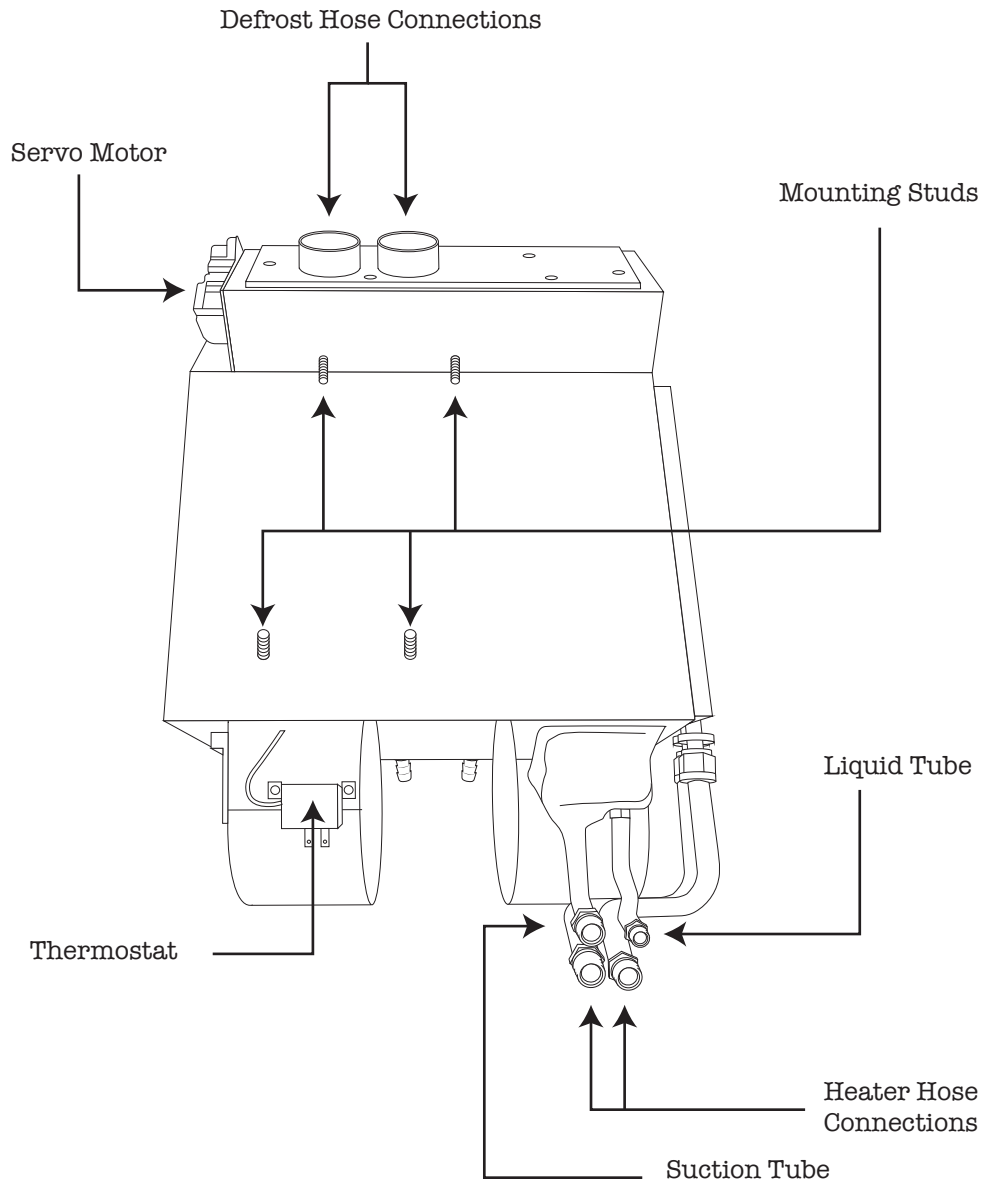
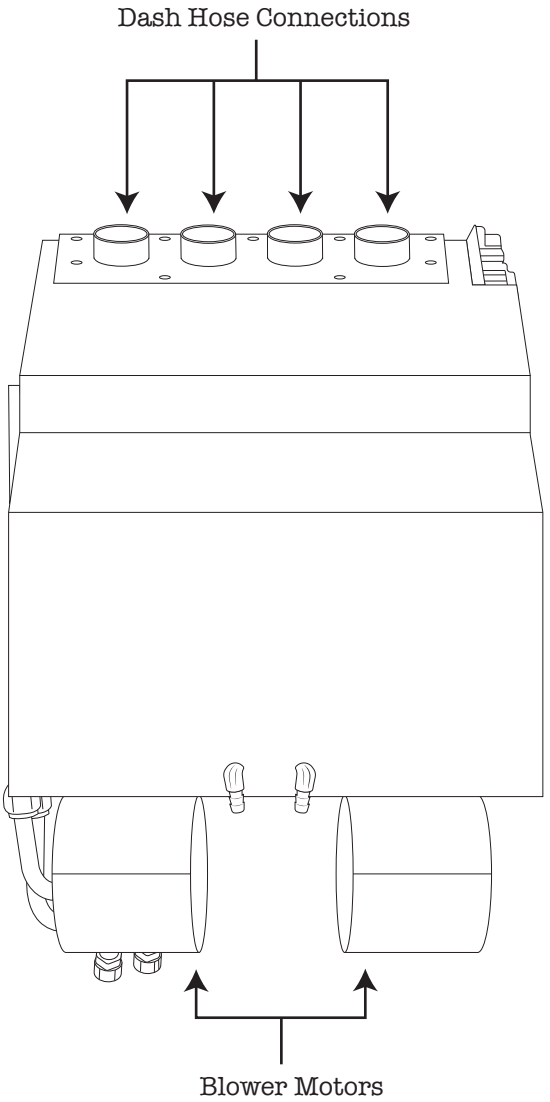


12V Relay
PN#30-13373



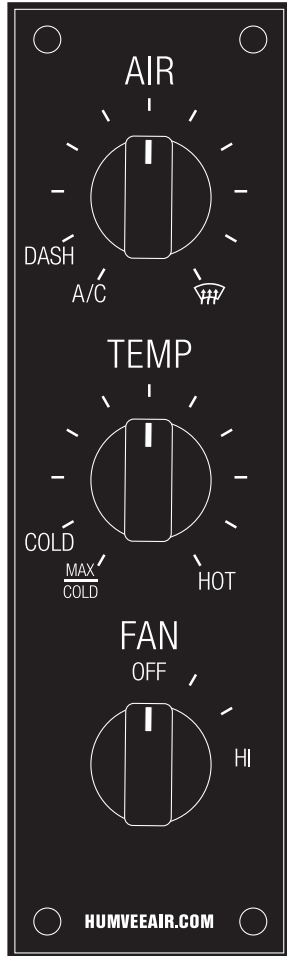
ECU & Calibration Key
PN#RM16-1050

FAMILIARIZE YOURSELF WITH EVAPORATOR UNIT



KNOW YOUR SYSTEM

Your new M998 system offers complete comfort capabilities in virtually every driving condition. This includes temperature control in all of the modes. To illustrate the various ways you can adjust the airflow direction and temperature - we've provided these handy illustrations and chart to show exactly how you can adjust your M998 system for maximum comfort...



Mode Lever

There are levels of adjustment within the range of the A/C to DEFROST lever.

Temp Lever

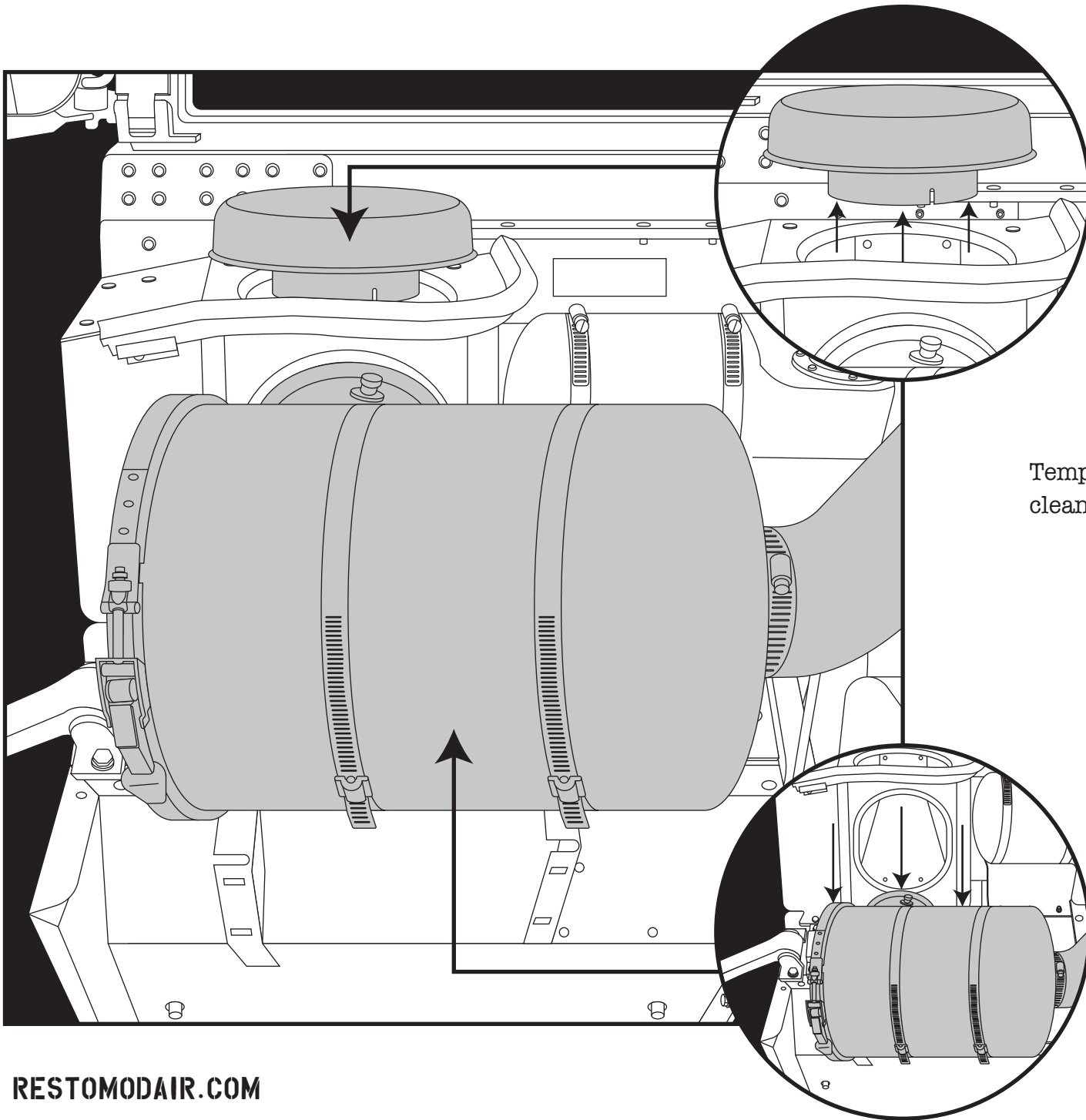
The MAX COLD/HOT positions work like any traditional adjustment lever.

Fan Switch

Air Lever	Distribution	Compressor
A/C	Dash 100%	ON
DASH	Dash 100%	OFF
-	Dash 80% Defrost 20%	OFF
-	Dash 70% Defrost 30%	OFF
-	Dash 60% Defrost 40%	OFF
-	Dash 50% Defrost 50%	OFF
-	Dash 40% Defrost 60%	OFF
-	Dash 30% Defrost 70%	OFF
-	Dash 20% Defrost 80%	OFF
-	Dash 10% Defrost 90%	OFF
DEFROST	Defrost 100%	ON

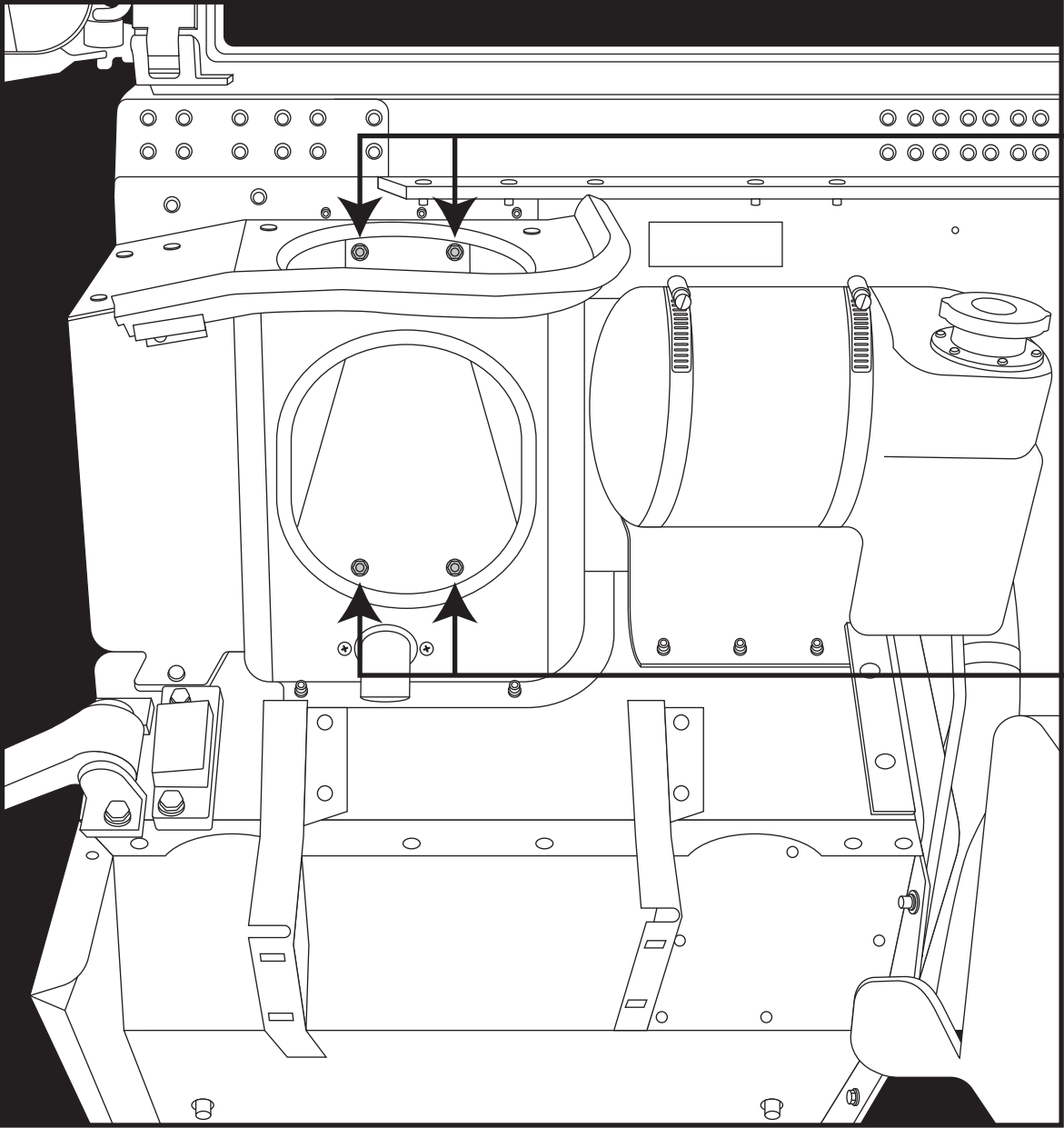
Temp Lever	Blend	Compressor
MAX/COLD	Cold 100%	ON
COLD	Cold 100%	OFF
-	Cold 80% Hot 20%	OFF
-	Cold 70% Hot 30%	OFF
-	Cold 60% Hot 40%	OFF
-	Cold 50% Hot 50%	OFF
-	Cold 40% Hot 60%	OFF
-	Cold 30% Hot 70%	OFF
-	Cold 20% Hot 80%	OFF
-	Cold 10% Hot 90%	OFF
HOT	Hot 100%	OFF

INSTALLATION PREP



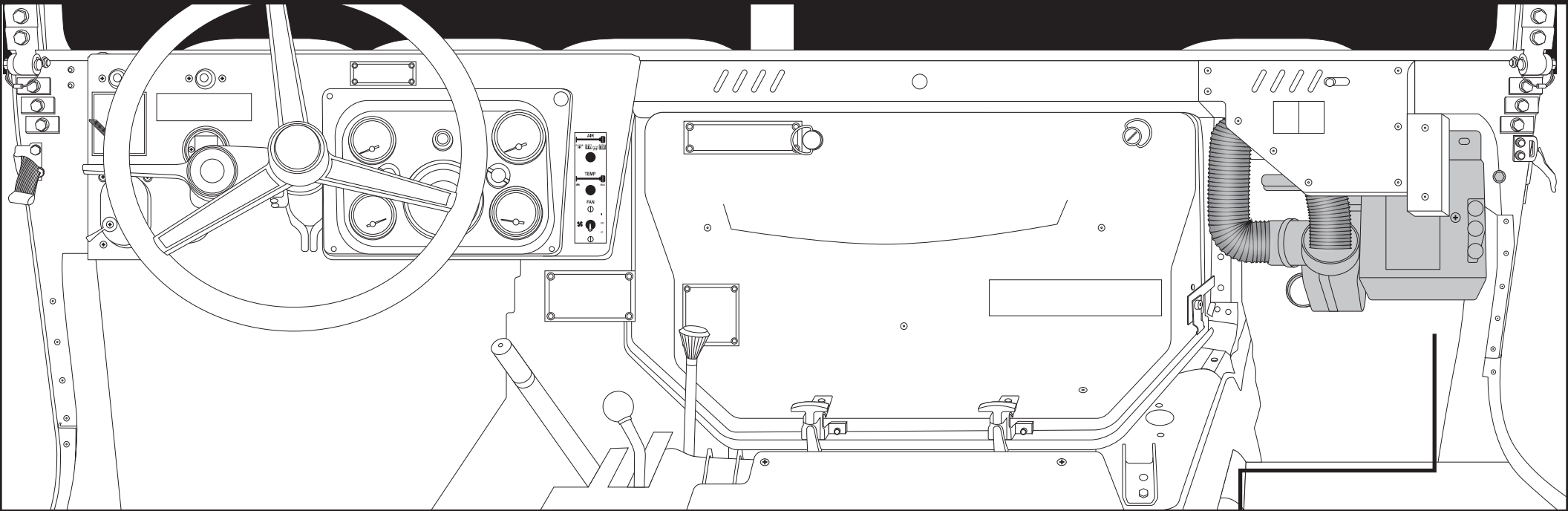
Temporarily remove air intake and cleaner.

FACTORY REMOVAL

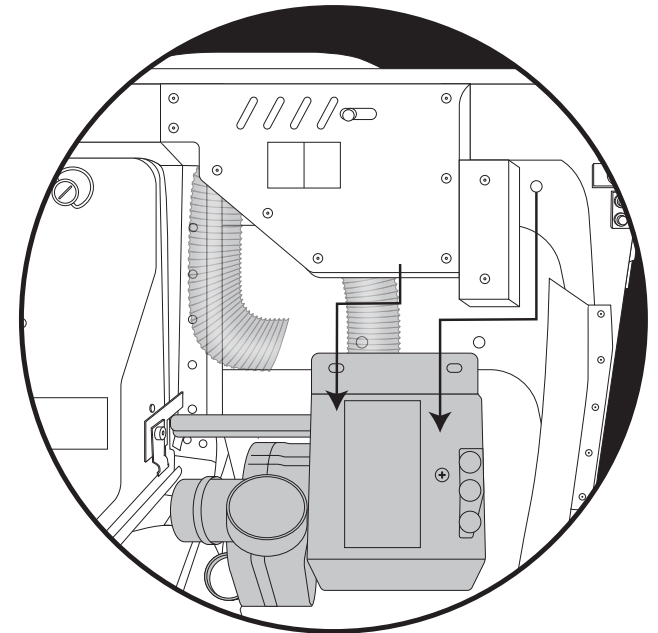


Remove 4 bolts that hold the original heater.

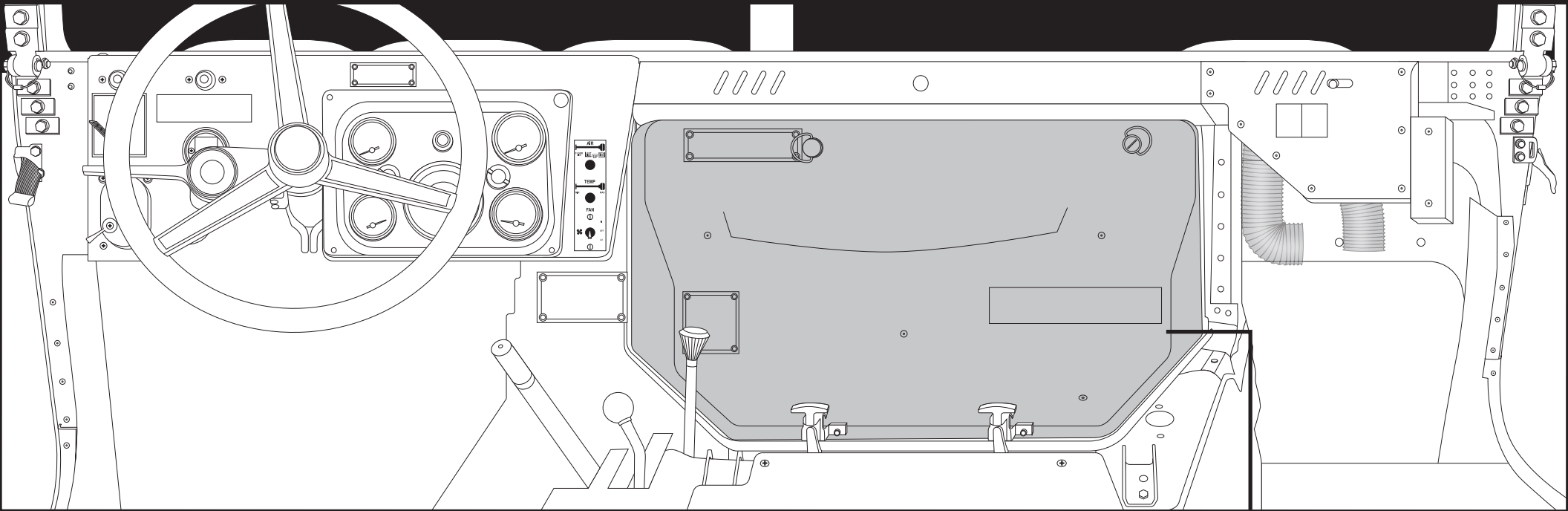
FACTORY REMOVAL



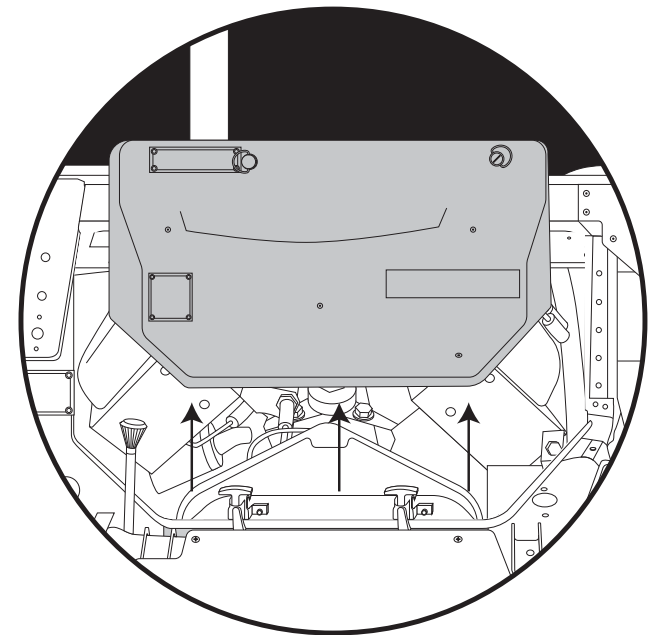
Remove original heater assembly and discard.



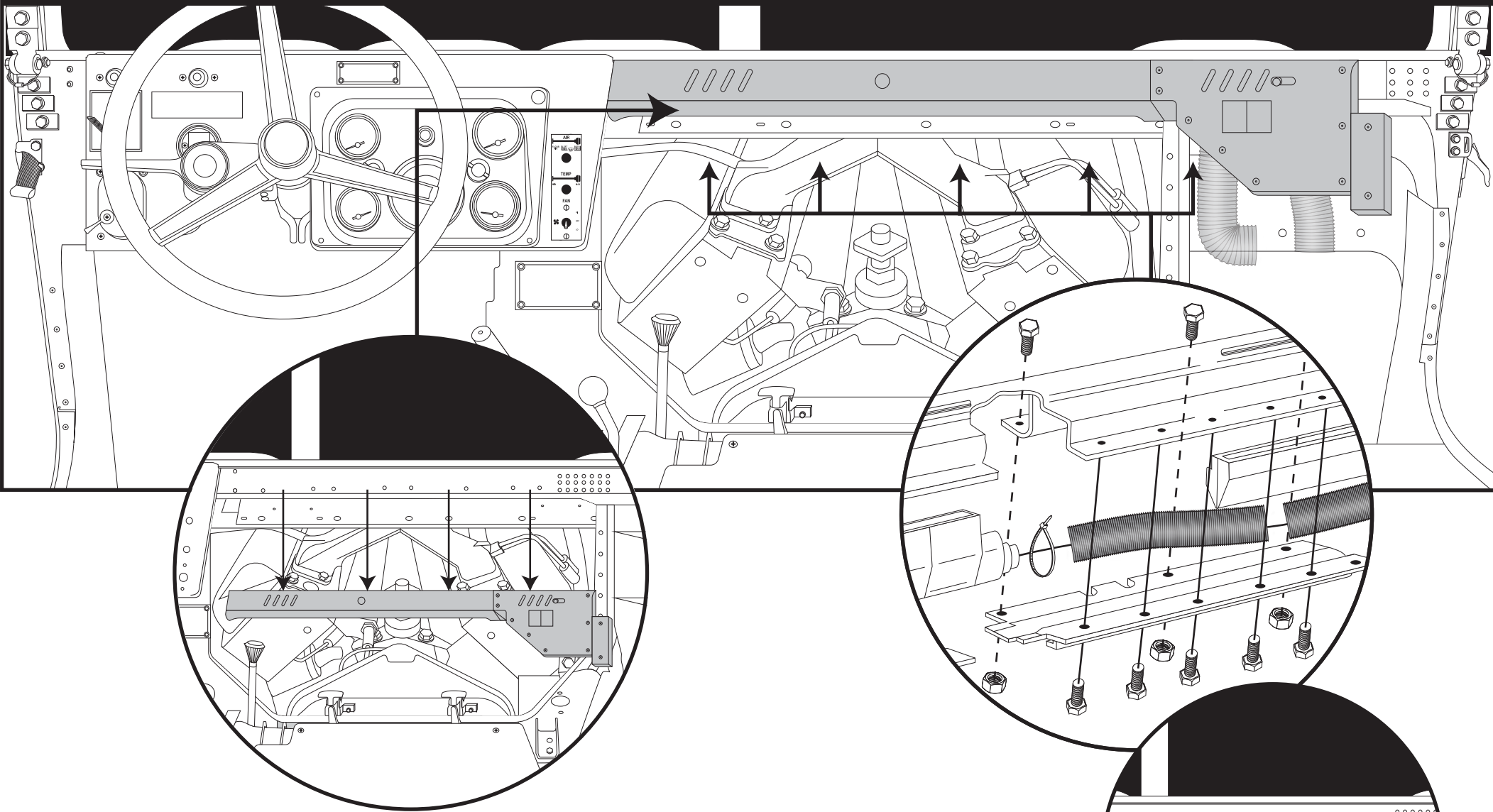
INSTALLATION PREP



Temporarily remove engine cover.



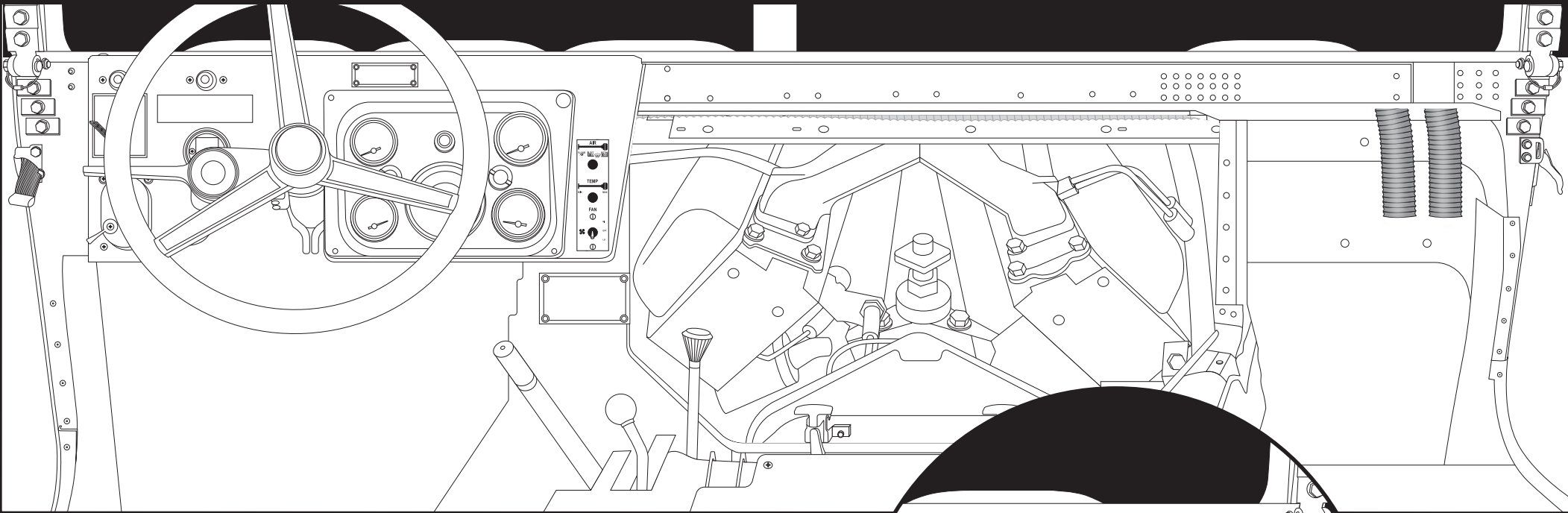
DEFROST PREP



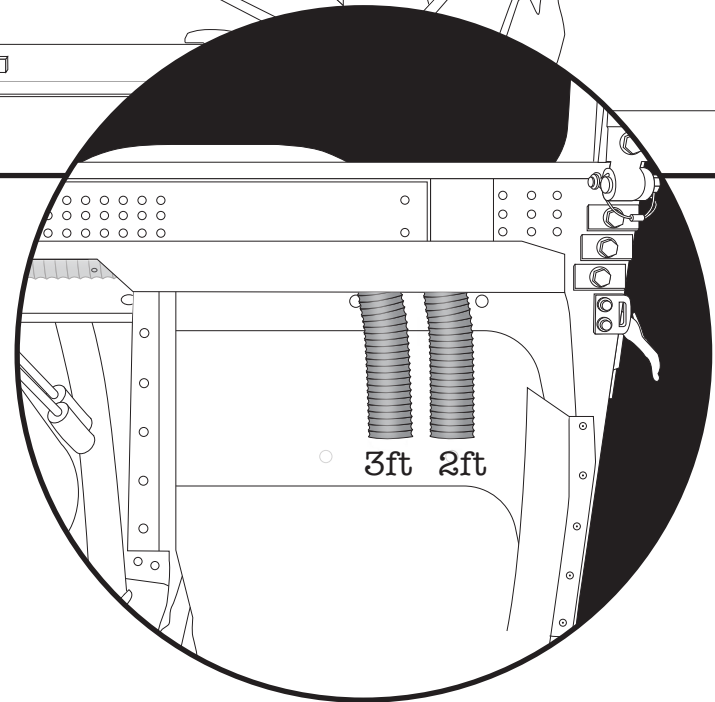
Detach plenum by removing 5 screws.

Remove 5 nuts and bolts from underneath to reveal original duct hoses. Remove original duct hose and discard. Replace with provided duct hose.

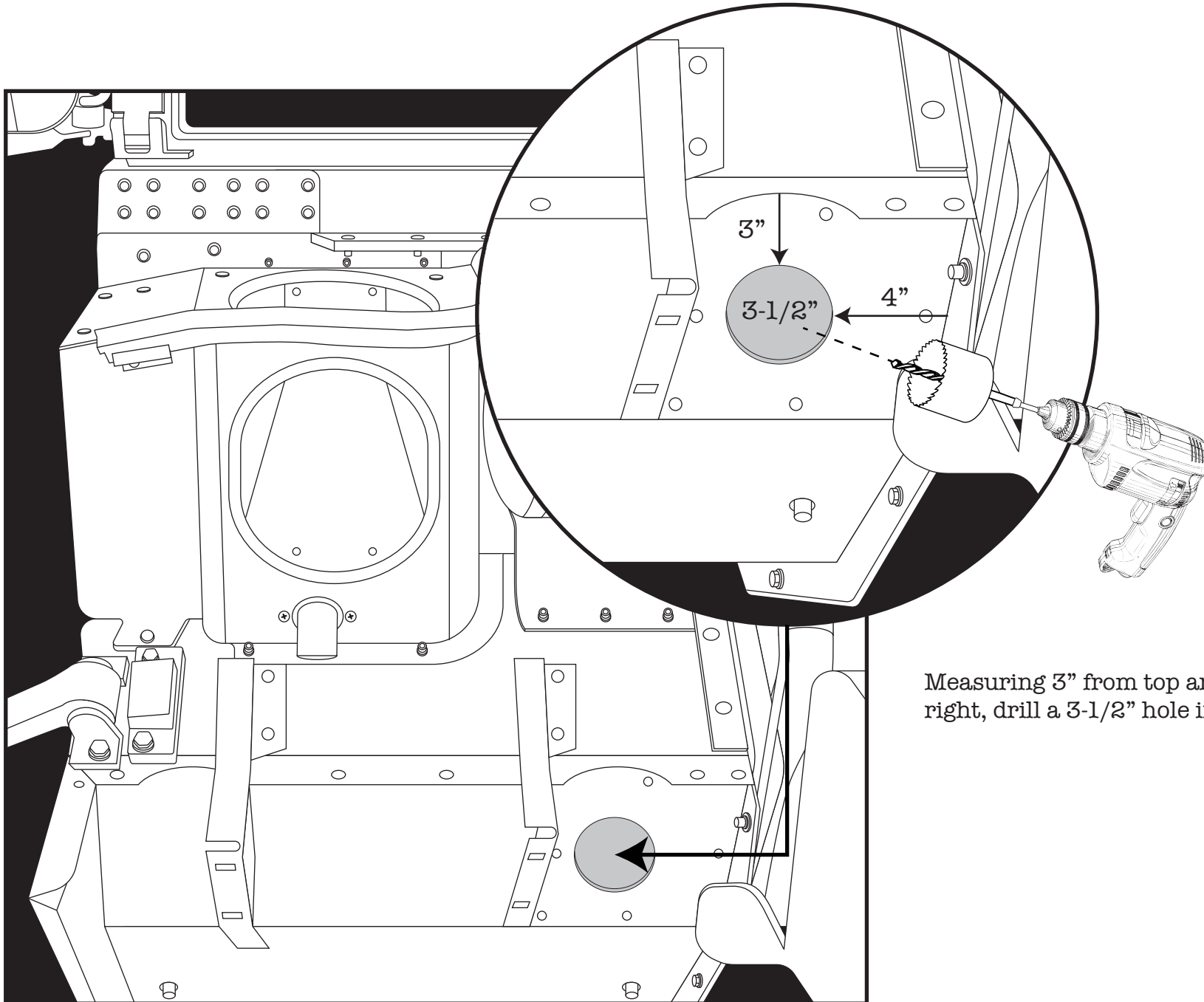
DEFROST PREP



Replace original duct hose with the provided duct hose.
Cut the duct hose as needed.

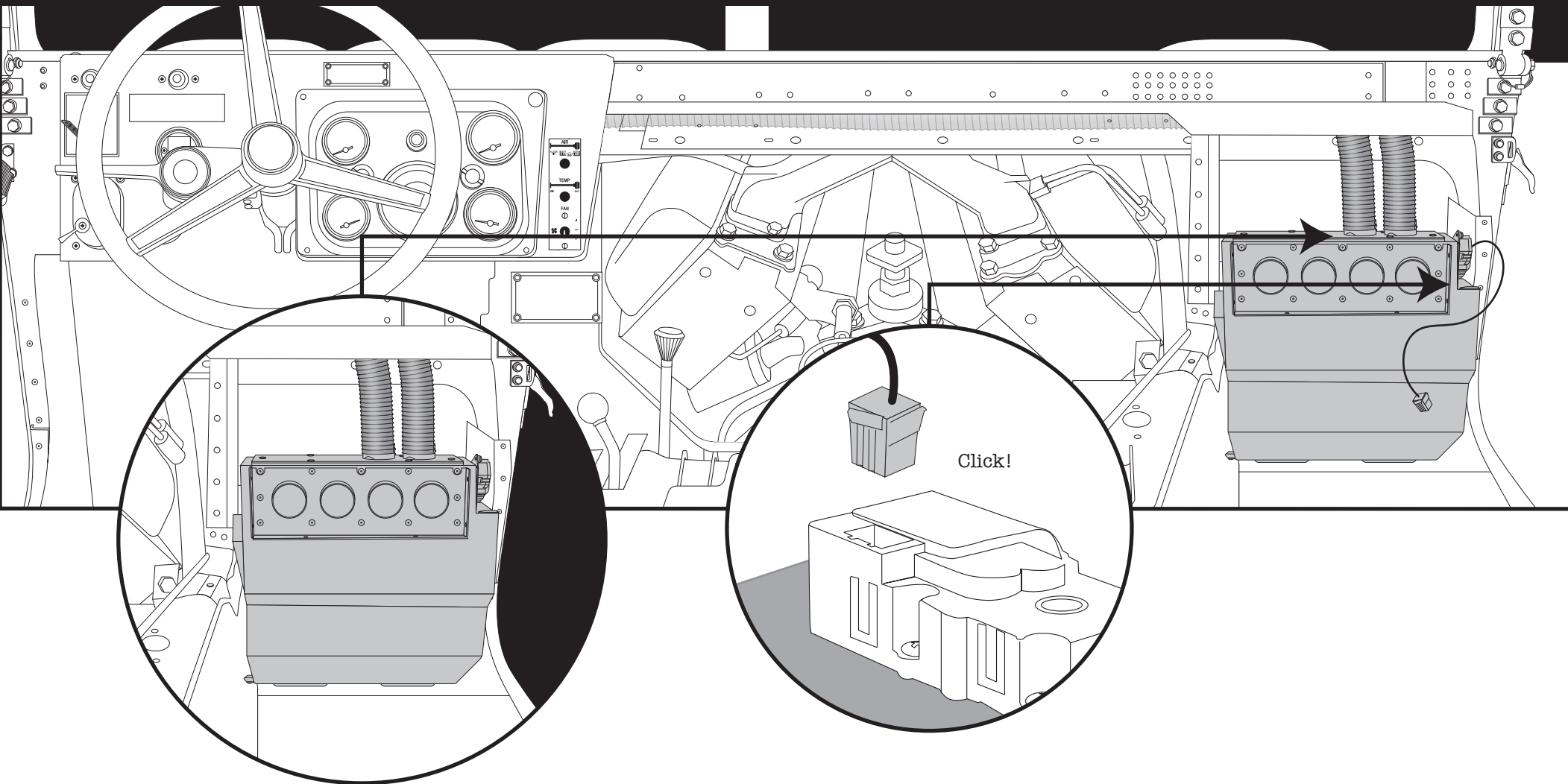


FIREWALL INSTALLATION PREP



Measuring 3" from top and 4" from right, drill a 3-1/2" hole in firewall.

EVAPORATOR INSTALLATION

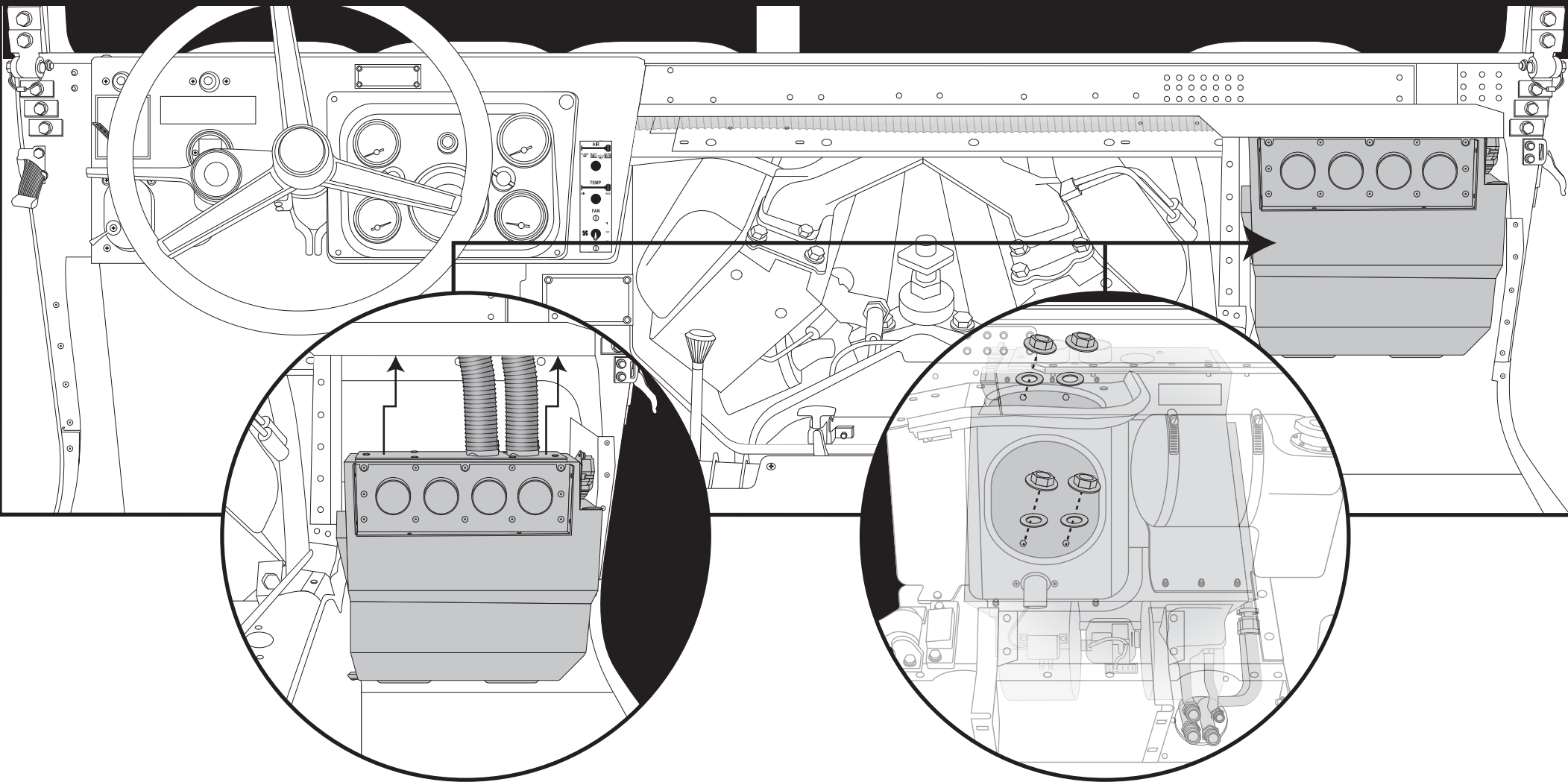


Place the evaporator on the floor inside the vehicle.

Before mounting the evaporator, attach duct hoses to defrost hose connections.

Also, connect yellow harness into defrost/heat servo motor.

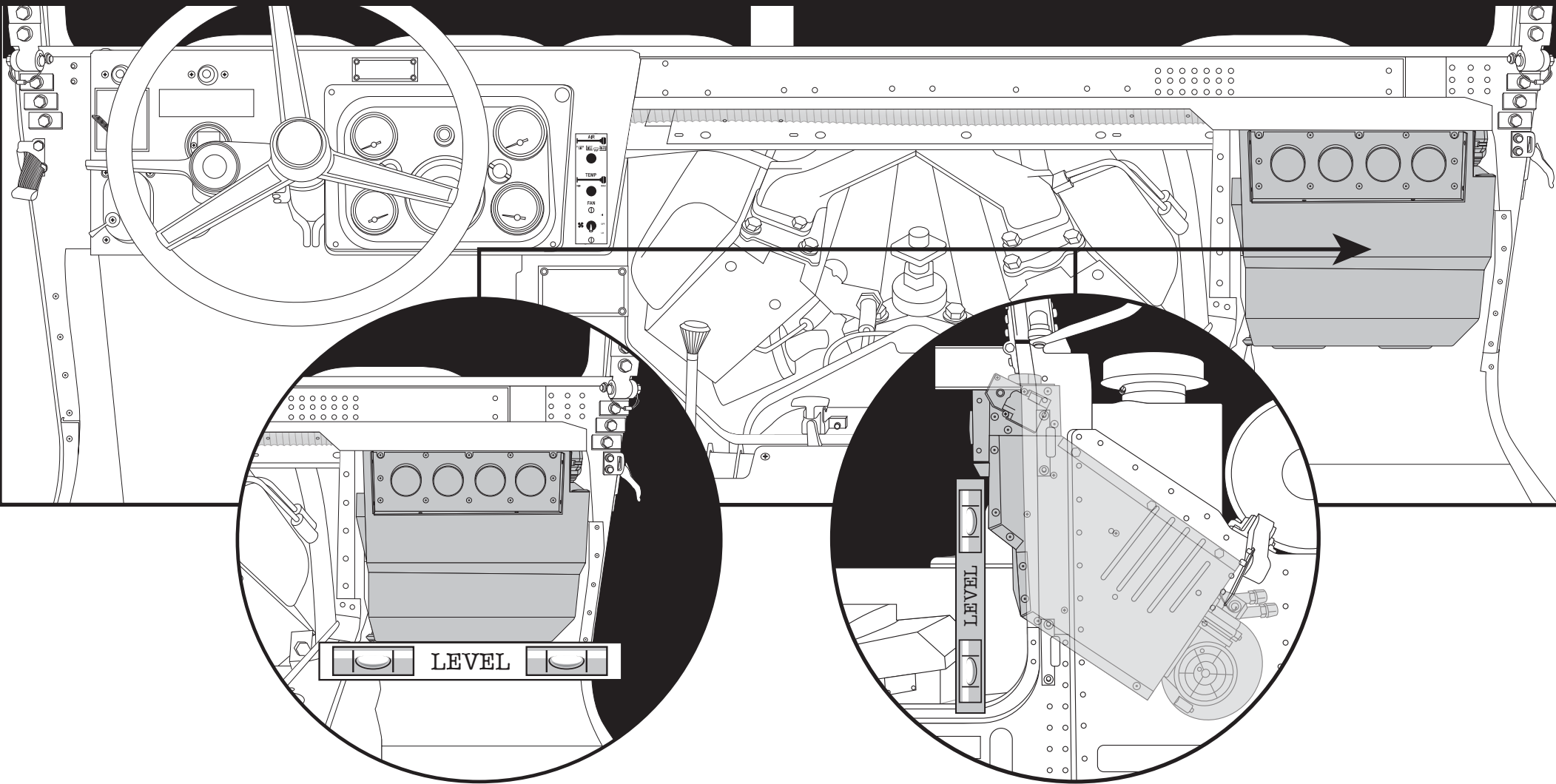
EVAPORATOR INSTALLATION



NOTE: This is a two person job.

With one person holding evaporator in place inside the vehicle, mount unit from the engine compartment using (4) 1/4 20 x 1" flange nuts and (4) 1/4" washers on studs as shown above. Leave loose at this time.

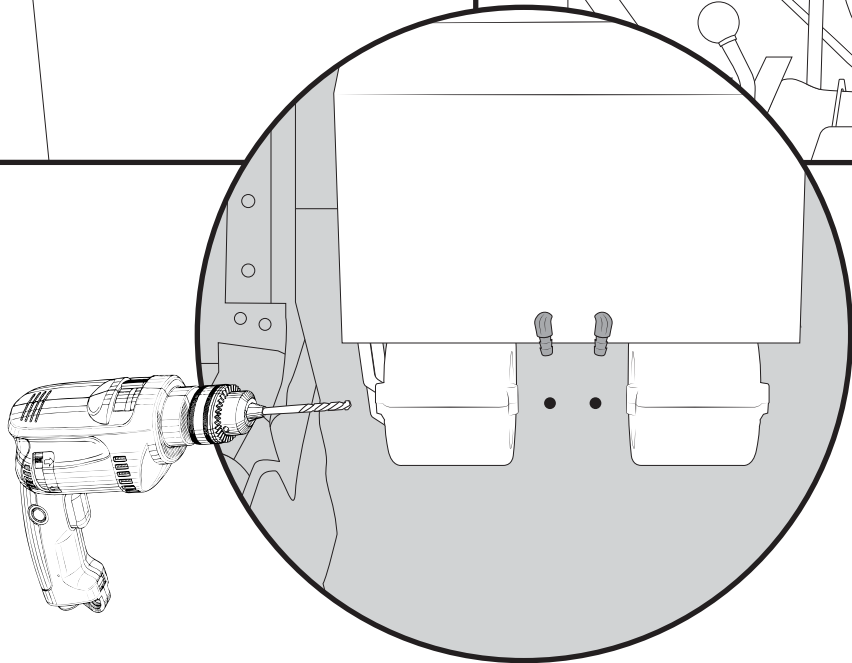
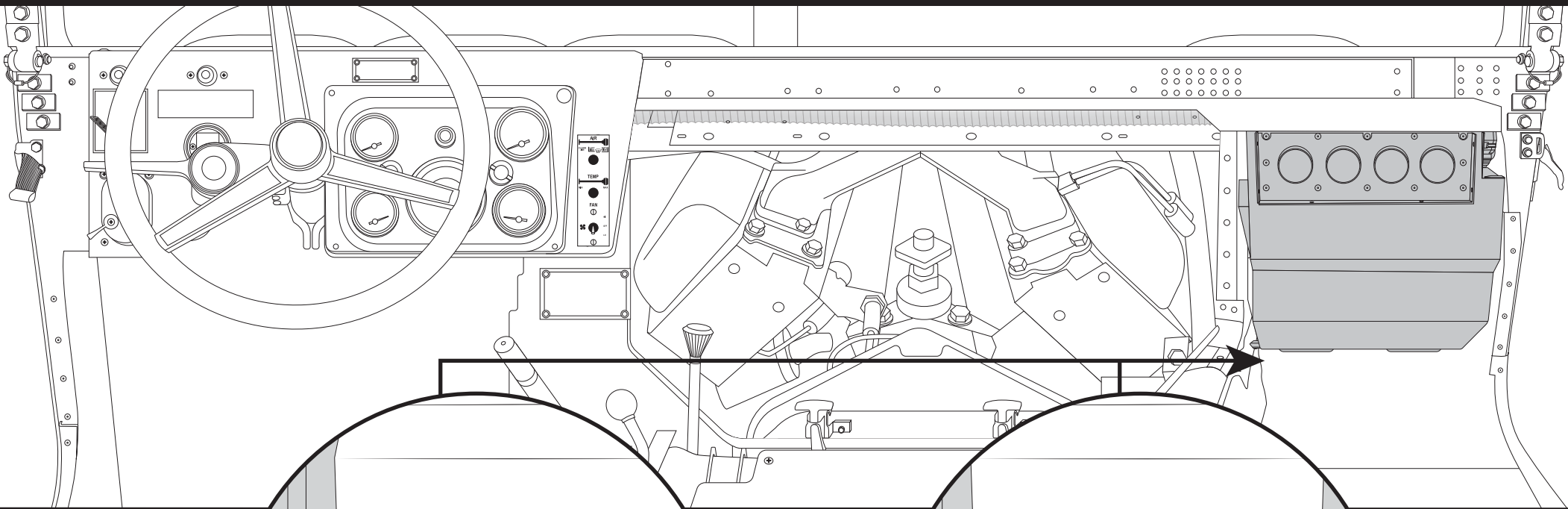
EVAPORATOR INSTALLATION



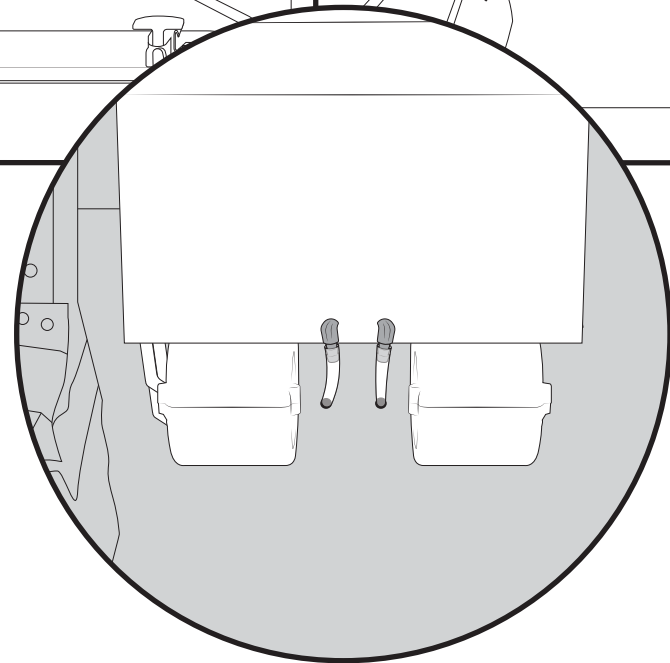
Be sure to check that evaporator is level.
Check front to back and side to side.

After verifying the unit is level, tighten the
four mounting bolts.

DRAIN TUBE INSTALLATION



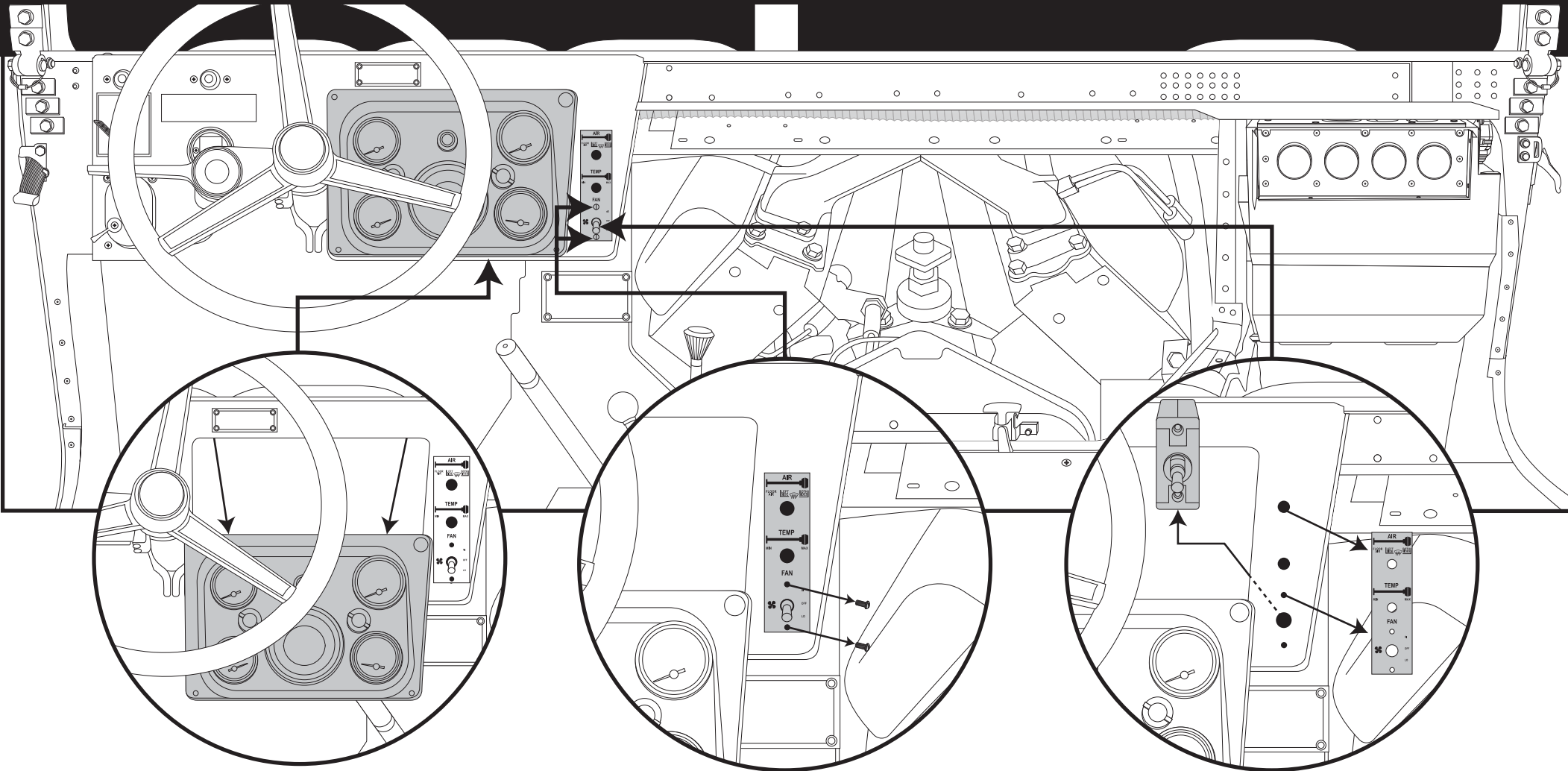
Locate drain nipples on each side of the evaporator and drill a 3/4" hole below each nipple on the firewall. This will allow condensation to drain properly.



Attach 1/2" clear drain tube to both evaporator nipples and run one drain tube through each 3/4" hole you just drilled.

All condensation will now drain out.

CONTROL INSTALLATION

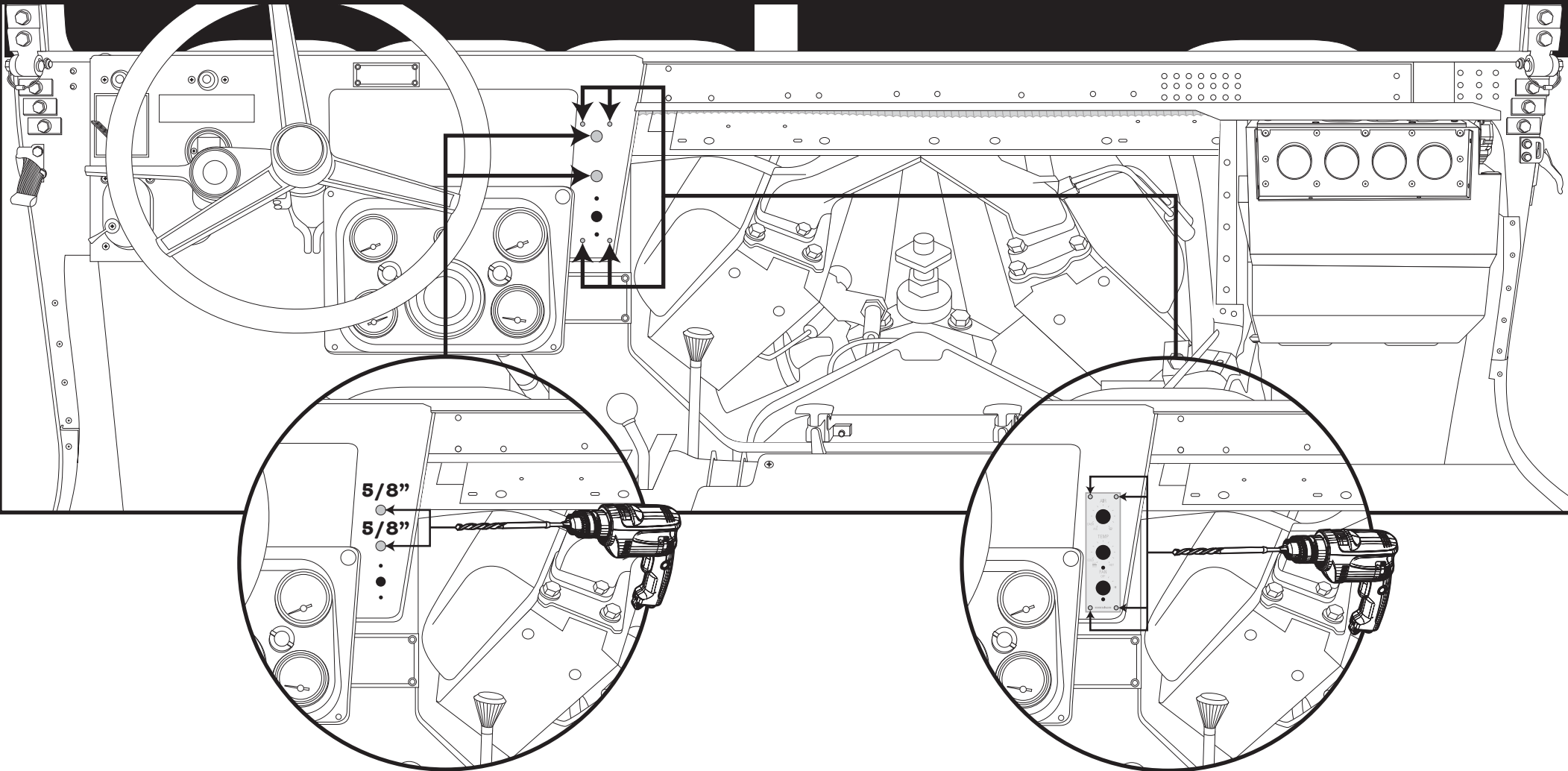


Remove gauge cluster by four bolts.

Remove two screws from faceplate.

Remove faceplate, switch and cables. Discard.

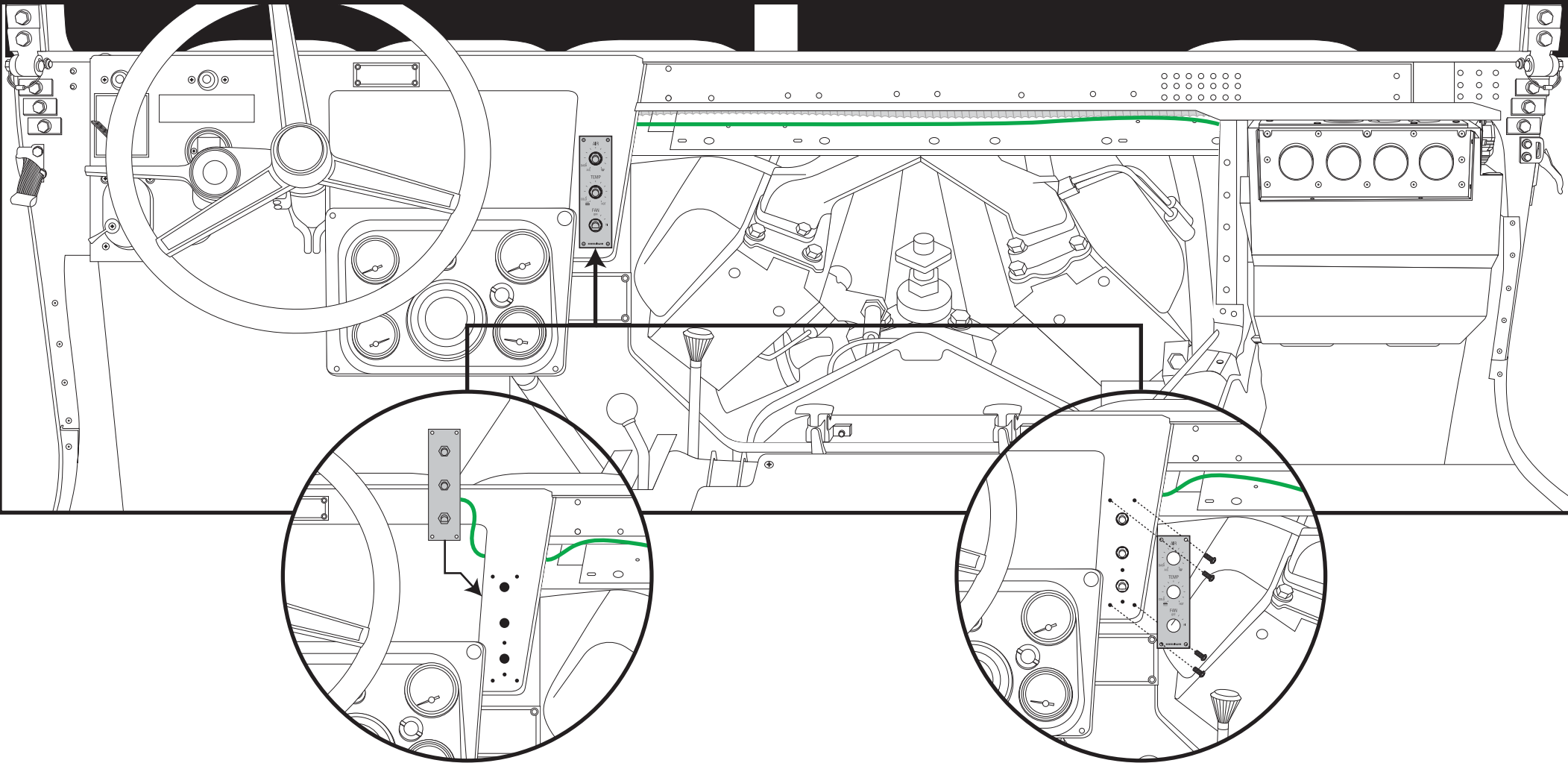
CONTROL INSTALLATION



Open top two holes to 5/8".

Use the provided faceplate to match
drill four holes.

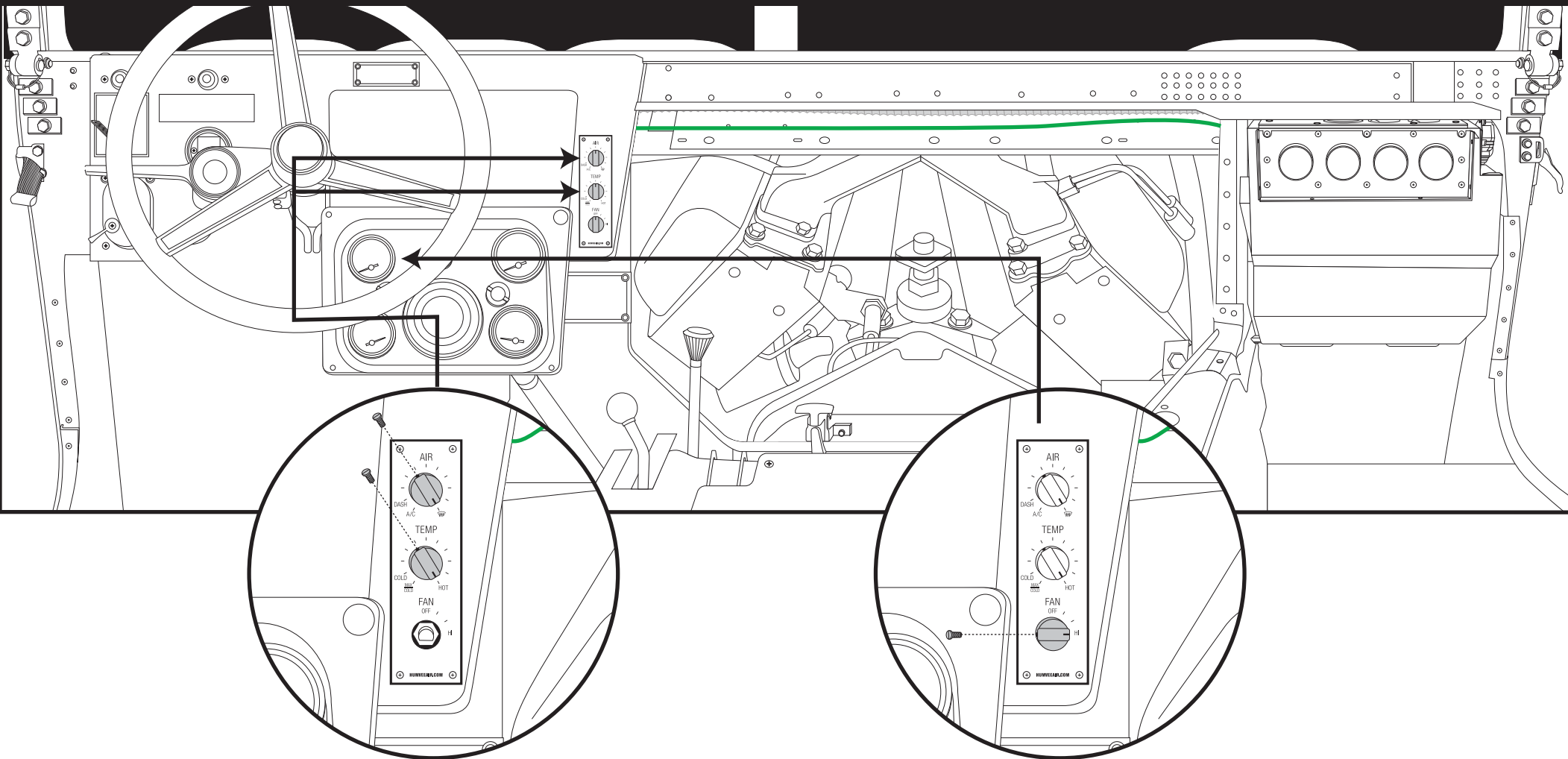
CONTROL INSTALLATION



Route green wire along defrost ducting towards ECU. Attach the control backing through the existing holes from behind.

Use provided screws to mount the faceplate.

CONTROL INSTALLATION



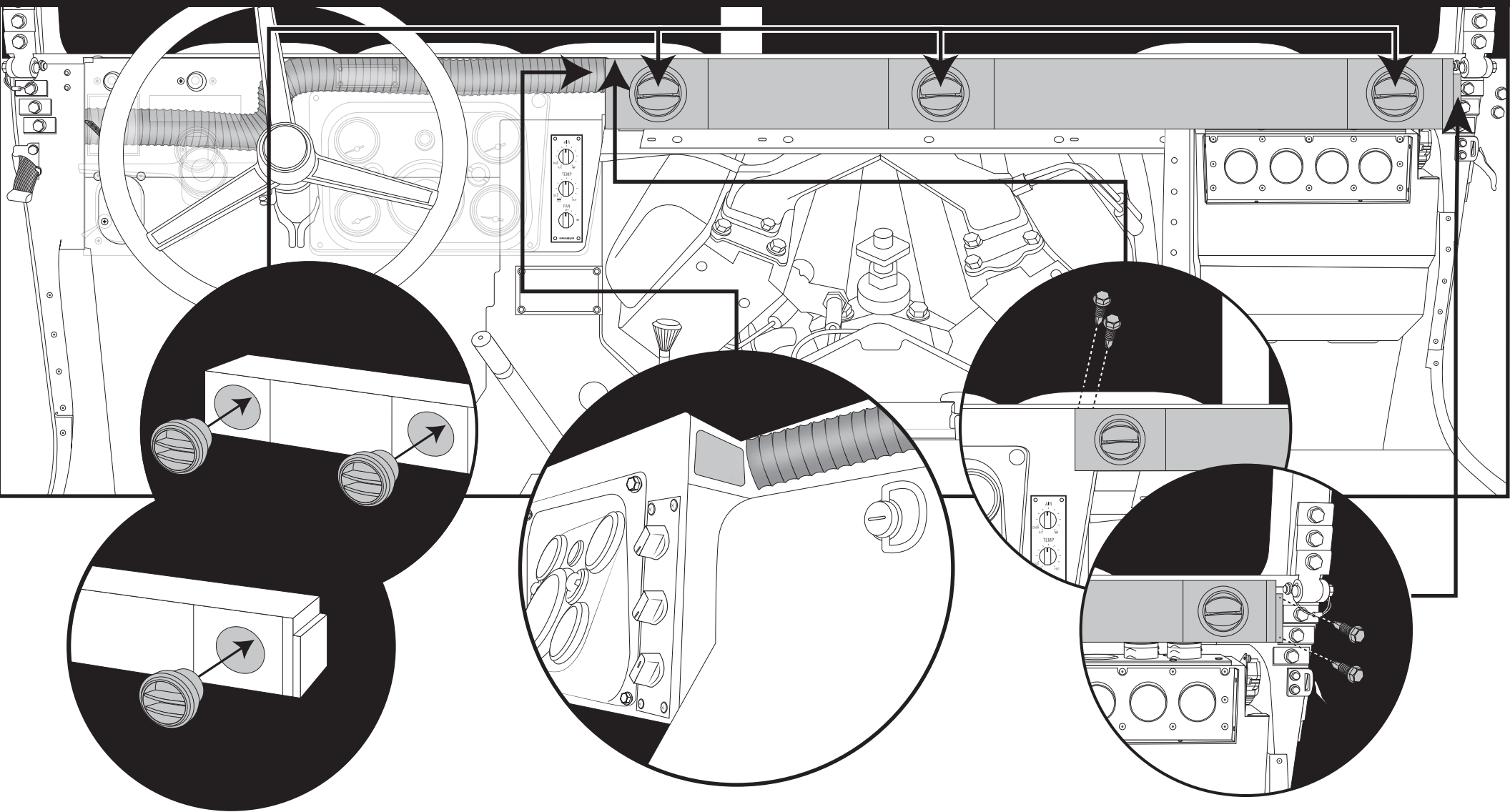
For **AIR** and **TEMP** knobs:

Turn pots all the way to the right. Place the knob with the line matching up with the line furthest right on the faceplate as shown above. Mount with flat head.

For **FAN** knob:

Turn pot so the bottom is flat. Place the knob with the line matching up with "HI" on the faceplate as shown above. Mount with flat head.

PLENUM INSTALLATION

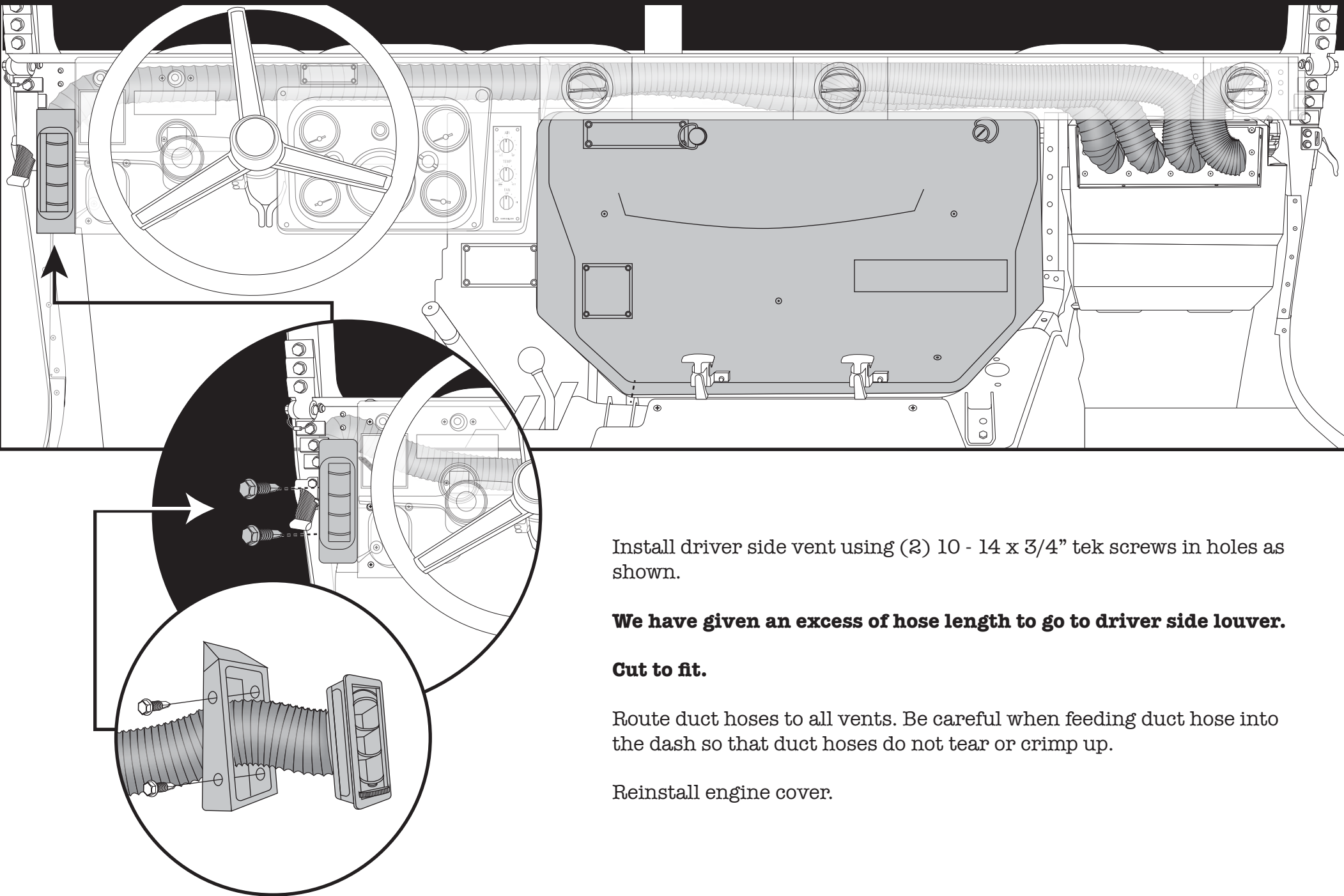


Install three vents into the plenum.

Carefully feed duct hose through the opening in dash. Ducting will fit above the instrument panel. Route above as shown.

Install plenum using four 10 - 14 x 3/4" tek screws as shown.

DUCT HOSE INSTALLATION



Install driver side vent using (2) 10 - 14 x 3/4" tek screws in holes as shown.

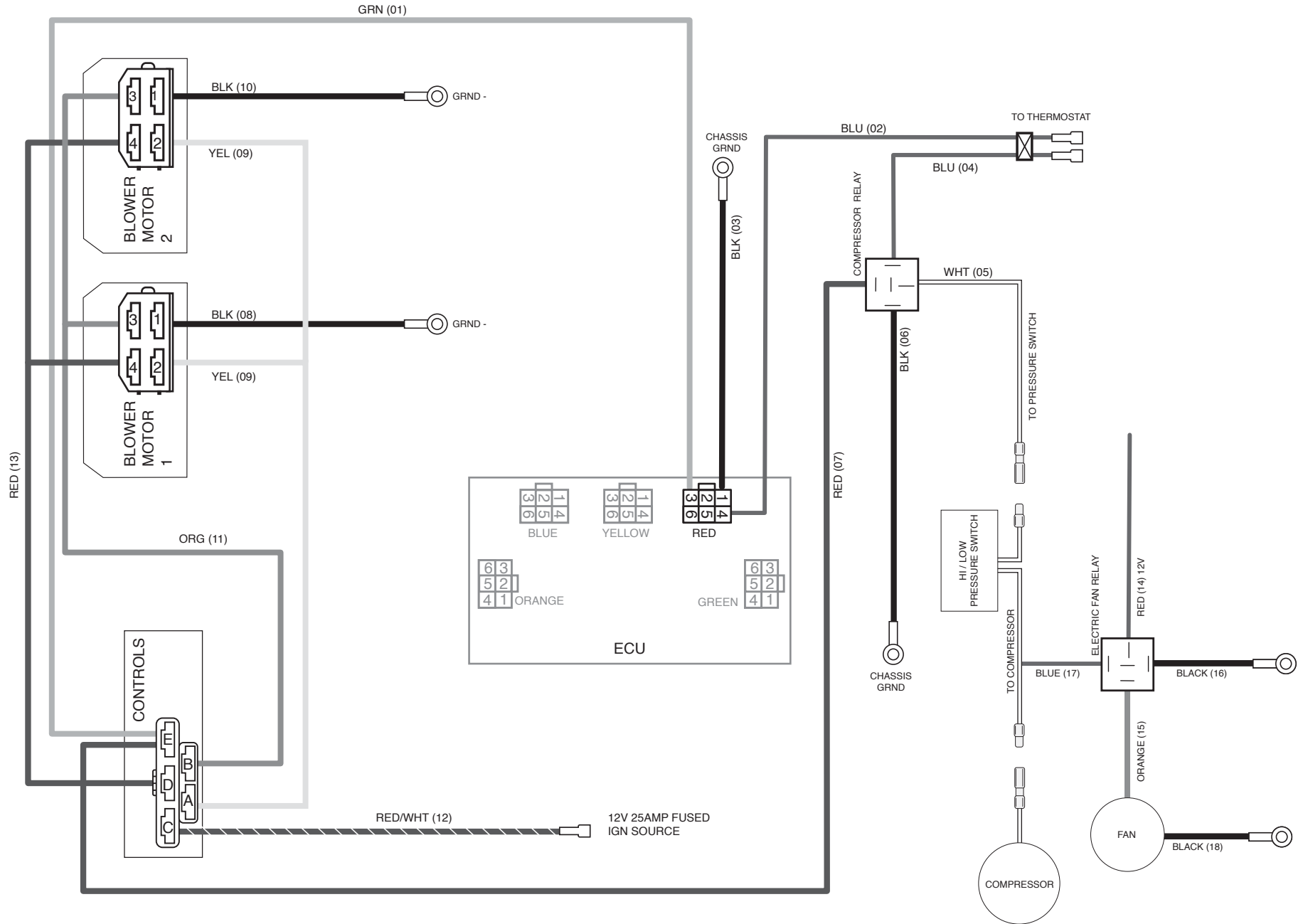
We have given an excess of hose length to go to driver side louver.

Cut to fit.

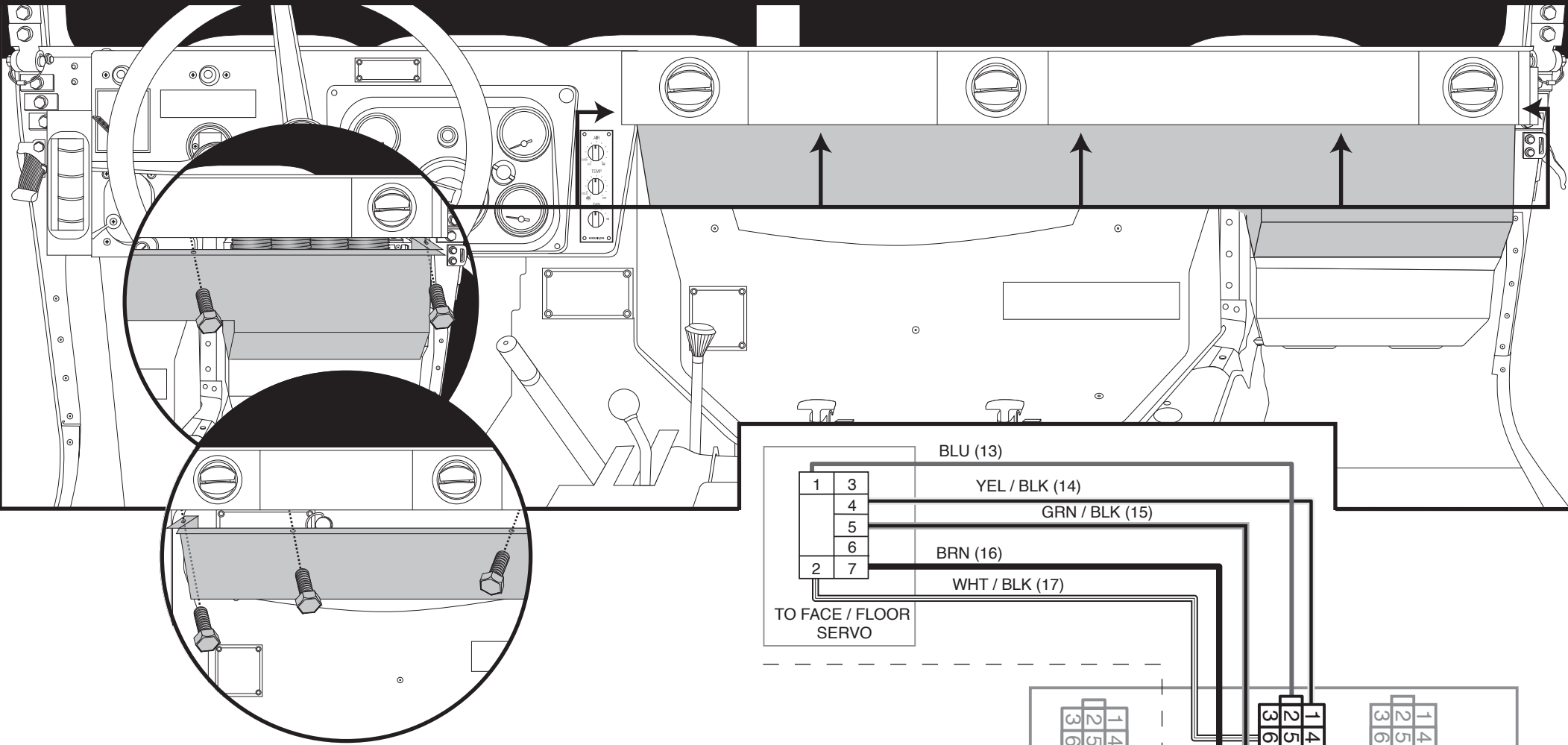
Route duct hoses to all vents. Be careful when feeding duct hose into the dash so that duct hoses do not tear or crimp up.

Reinstall engine cover.

WIRING

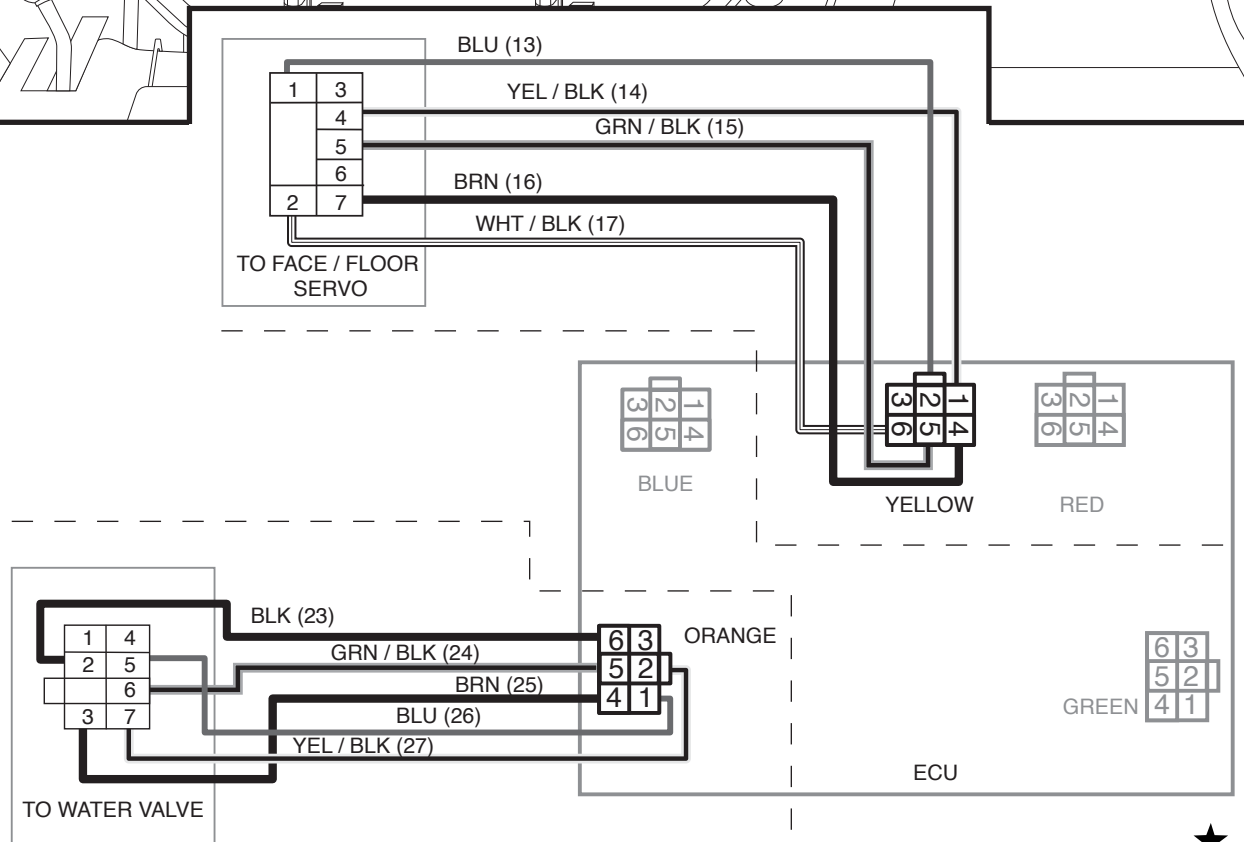


WIRING ECU



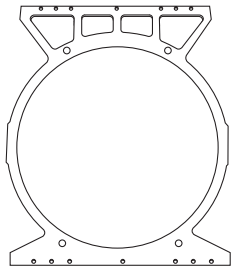
Place duct hose cover underneath plenum as shown above. Install duct hose cover with (5) 1/4 - 20 x 5/8 hex head bolts through duct hose cover tab to plenum as shown.

Wire the ECU. Refer to schematic.

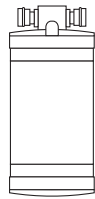


PARTS ENGINE COMPARTMENT

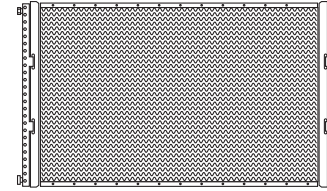
Note: Parts not to scale



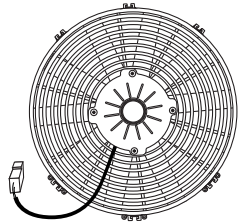
Fan Mounting Bracket
PN #HMV-002-18



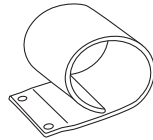
Filter Drier 6"
With Switch Port
PN #12-1008



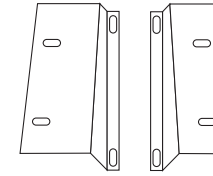
Condenser
PN #11-1117



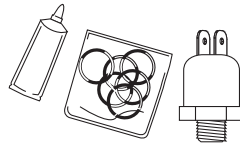
Fan
PN #11-1055



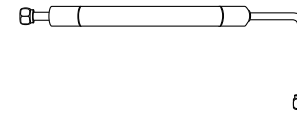
Filter Drier Bracket
PN #19-1003



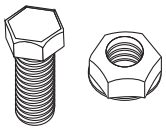
Mounting Bracket
Right PN # HMV-002-16
Left PN #HMV-002-17



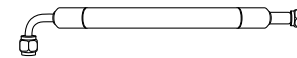
Hi/Low Pressure Switch Kit,
O Rings, Mineral Oil
PN #16-1007



Liquid Hose
PN #HMV-001-70

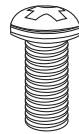


1/4 - 20 x 1" Hex Bolt (4)
PN #25C100HHB5Z

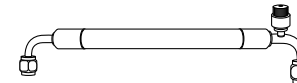


Liquid Hose
PN #HMV-001-71

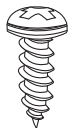
1/4 - 20 Nut (8)
PN #25CNFLZ/S



#10-32 x 1/2" Pan Head
Phillips (2)
PN #10F50PPHZ



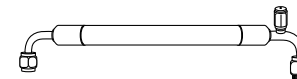
Discharge Hose
PN #HMV001-72



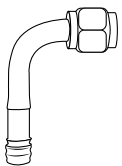
#10-16 x 5/8" Pan Head
Phillips (8)
PN #10B62P8SS



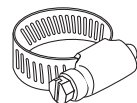
#10-32 Ny-loc Nut (2)
PN #10FNNEZ



Suction Hose
PN #HMV-001-73



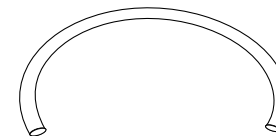
Heater Hose Fitting (2)
PN #14-1102



Worm Gear Clamps (6)
PN #6274



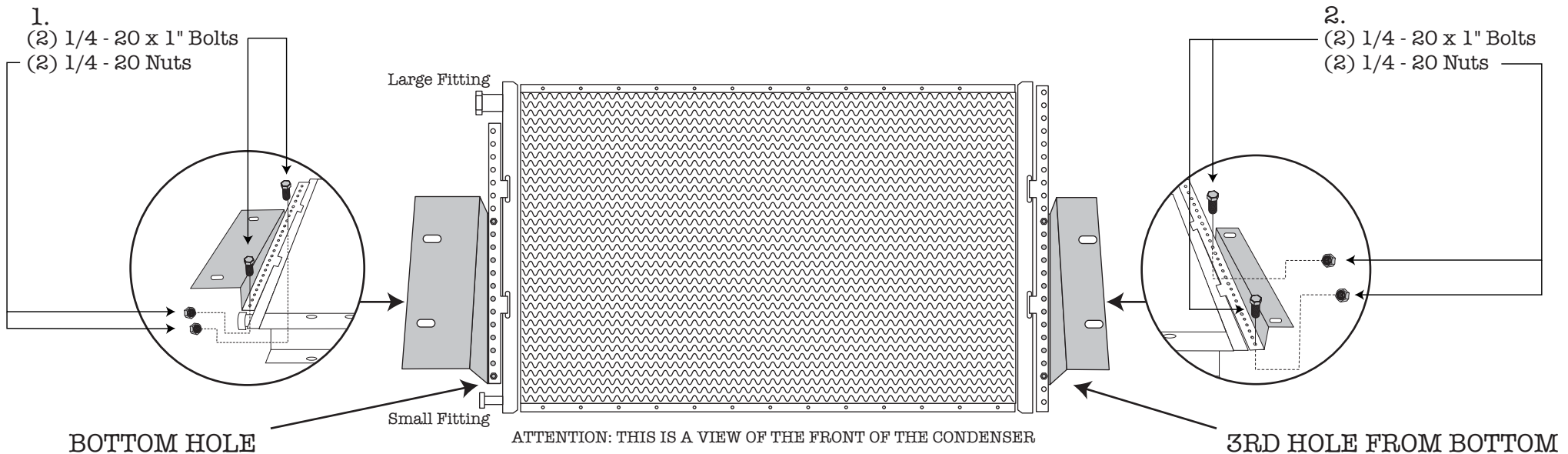
Discharge Tube
PN #0045-4



Heater Hose (2)
PN #34-50004

CONDENSER MOUNTING

CONDENSER PREPARATION: You can perform most of the following steps on a clean flat surface like a workbench. Lay condenser down so the hose connections are on the LEFT side with the larger fitting on the top.



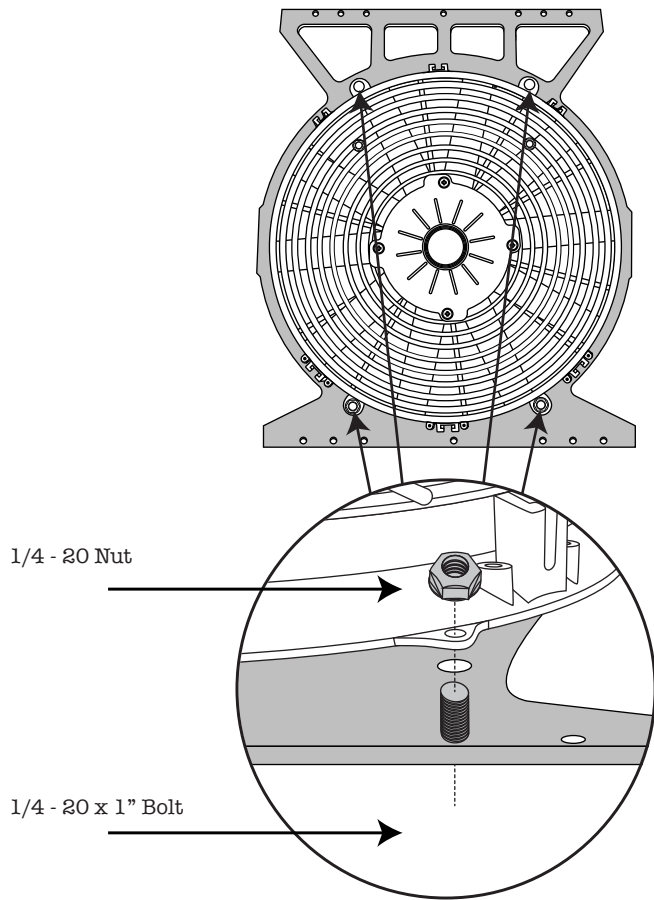
1. Attach the left side condenser bracket (larger bracket) to **bottom hole** using (2) 1/4 - 20 x 1" bolts and (2) 1/4 - 20 nuts. Be sure to attach with bend facing up toward you.

Attach with factory hardware.

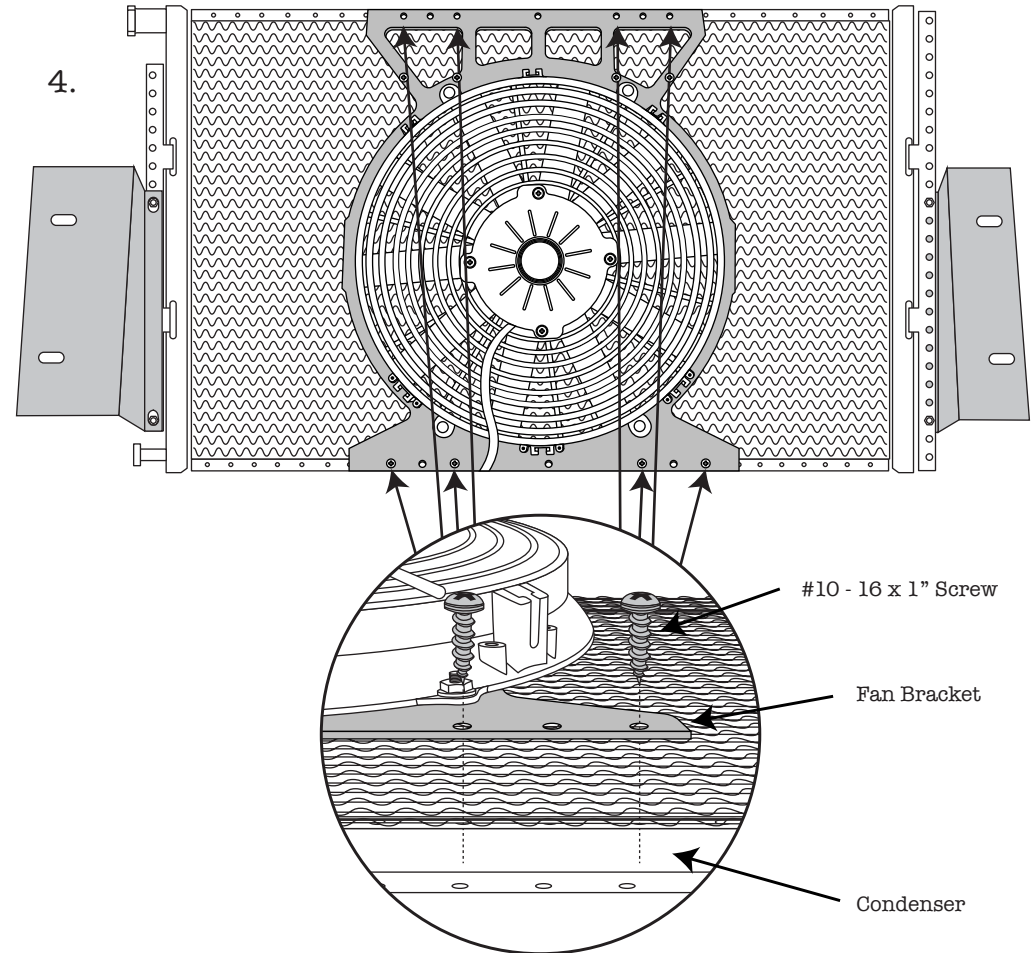
2. Attach the right side condenser bracket (smaller bracket) to the **third hole from bottom** using (2) 1/4 - 20 x 1" bolts and (2) 1/4 - 20 nuts. Be sure to attach with bend facing up toward you.

Attach with factory hardware.

CONDENSER FAN MOUNTING



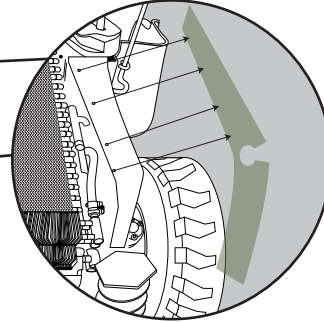
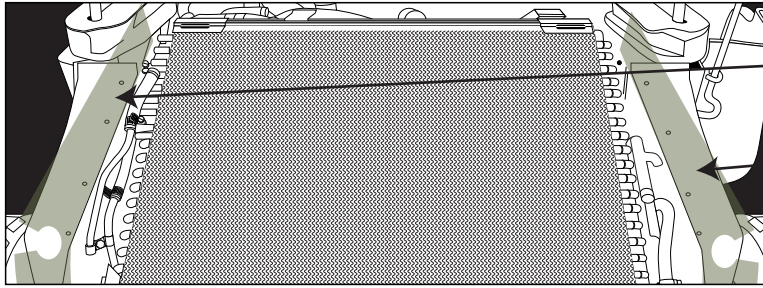
3. Locate the fan and fan mounting bracket. Attach fan to bracket using (4) 1/4 - 20 nuts to stud.



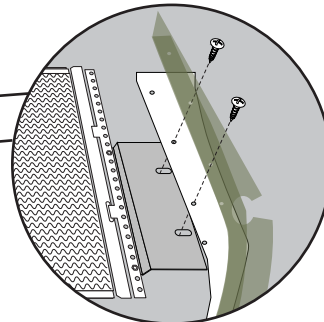
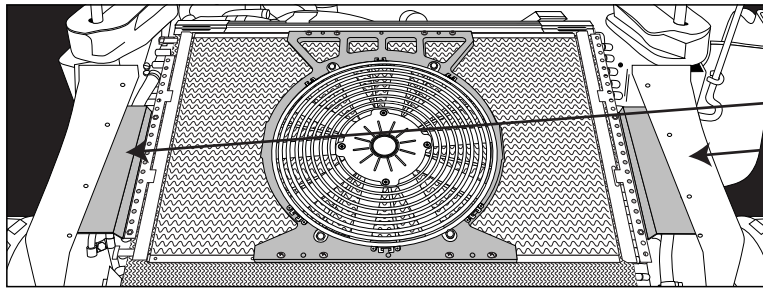
4. Attach fan bracket to condenser using (8) #10 - 16 x 1" screws as shown.

NOTE: DO NOT USE POWER DRILL! IT WILL STRIP OUT CONDENSER!

CONDENSER MOUNTING

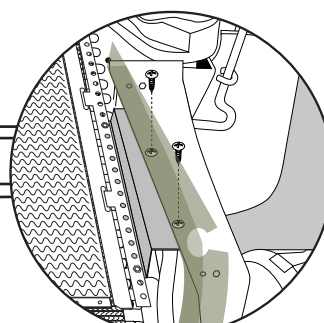
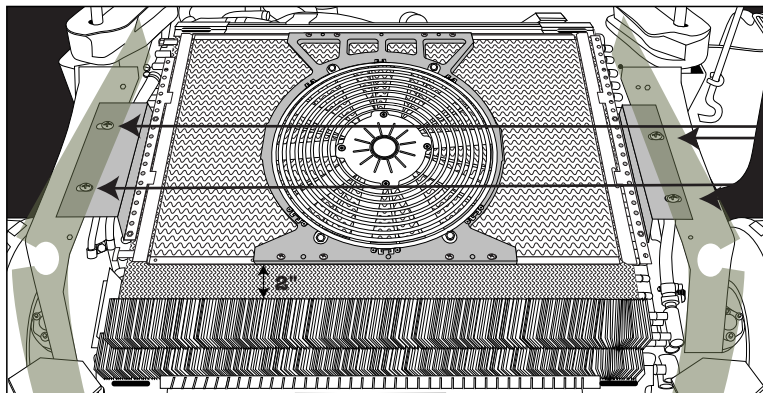


Temporarily remove splash guard seal.
Retain hardware.



Place condenser assembly above
radiator with the brackets underneath
the splash guard as shown.

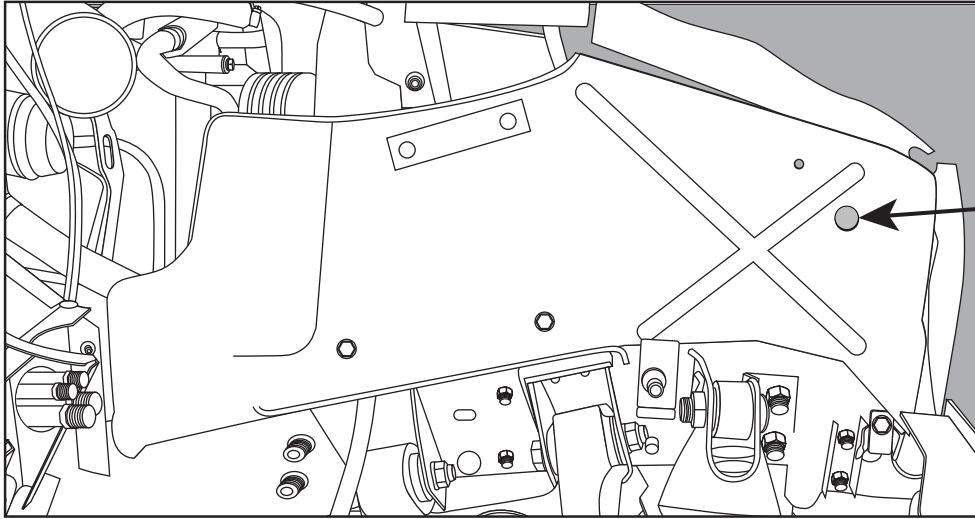
Note: Condenser fittings on left side
(larger fitting on top).



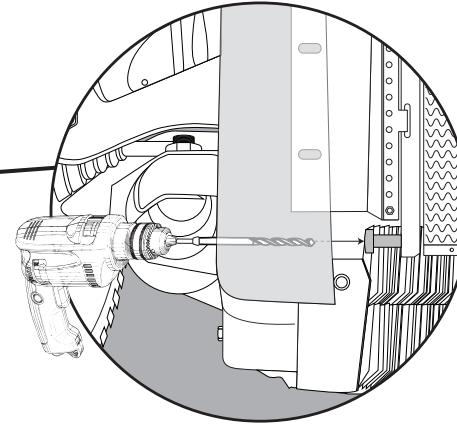
Replace splash guard seal with factory
screws to secure the mounting brackets.
Align condenser assembly with 2nd and
3rd holes from top of the splash guard.

Note: Should have roughly 2" gap
between condenser assembly and oil
cooler.

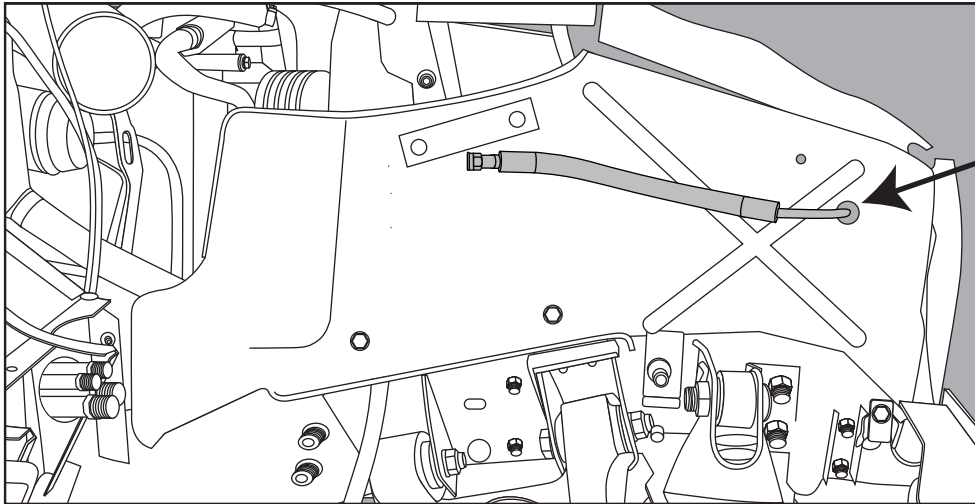
MOUNTING DRIER



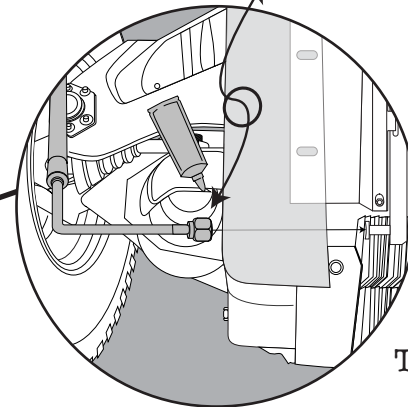
Top View



Project from lower fitting on condenser assembly straight across to splash guard and drill a 1" hole to allow hose fitting (PN# HMV-001-70) to exit into wheel cavity on passenger side.



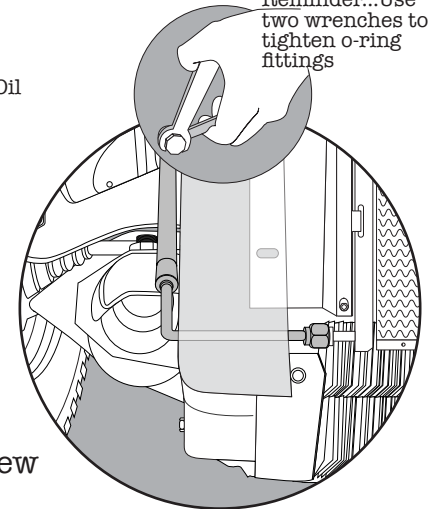
O-Ring and Mineral Oil



Top View

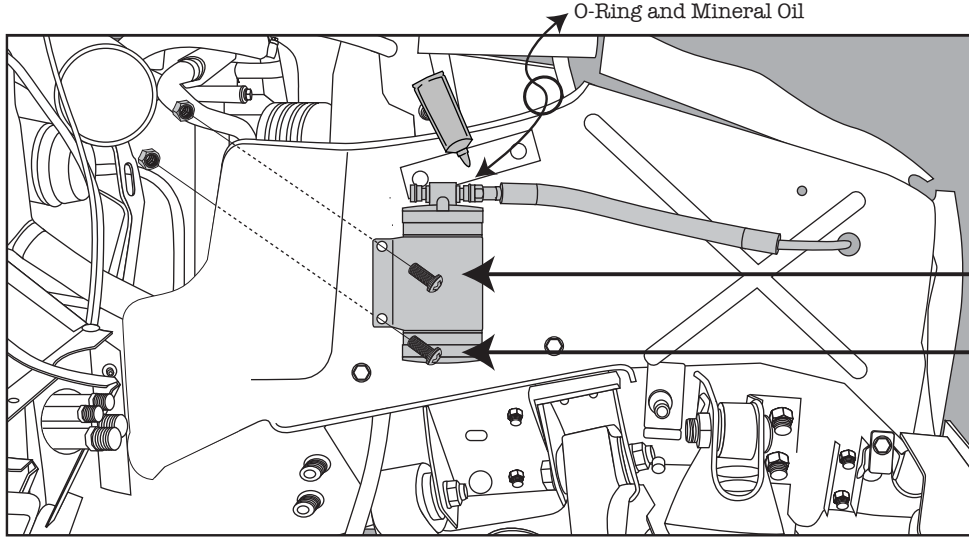
TWO WRENCH METHOD

Reminder... Use two wrenches to tighten o-ring fittings



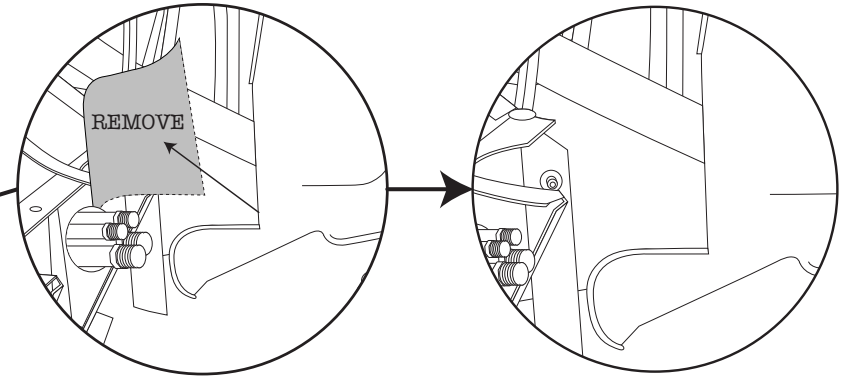
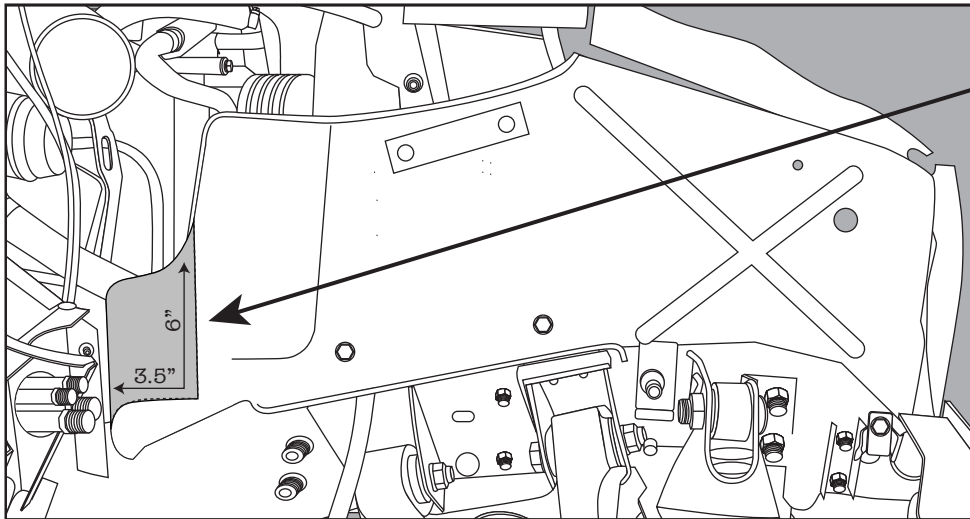
Feed liquid hose (PN# HMV-001-70) through hole drilled as shown and attach to lower connection of condenser.

MOUNTING DRIER



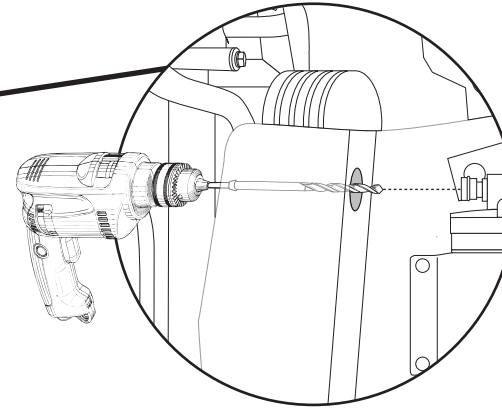
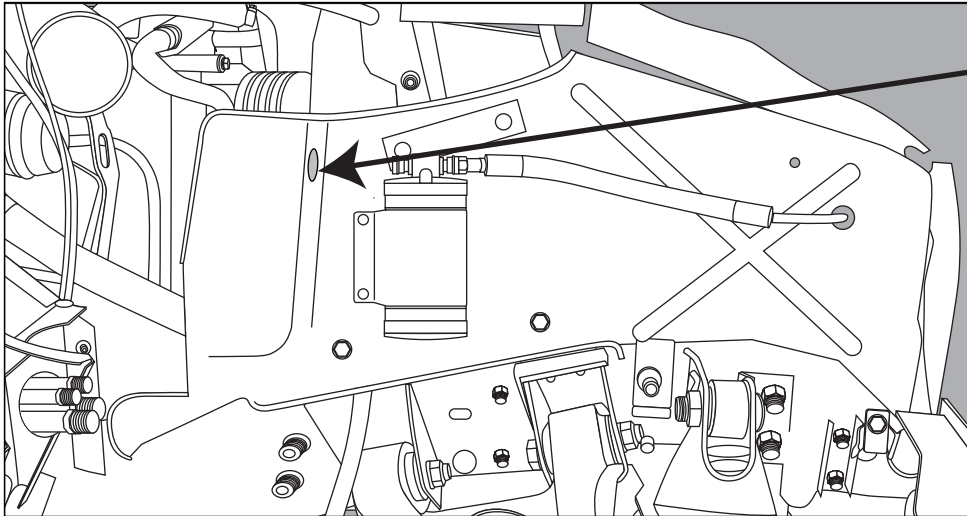
Use the length of the liquid hose as a guide to mount drier and bracket with (2) #10-32 x 1/2" pan head Phillips (PN# 10F50PPHZ) and (2) #10-32 Ny-loc nuts (PN# 10FNNEZ). Match drill mounting points.

Attach liquid hose to drier connection labeled "IN" using (1) #6 O-Ring and mineral oil.



Mark and cut splash guard 6" x 3.5" as shown to allow for hoses to enter engine compartment.

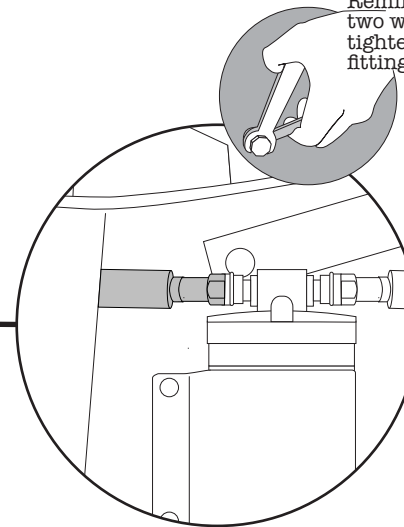
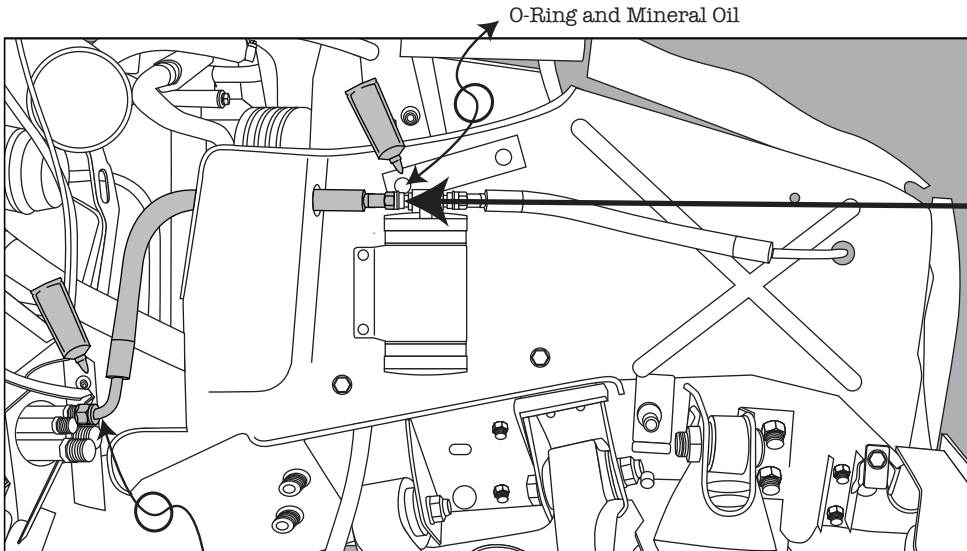
MOUNTING DRIER



Project from fitting on drier straight across and drill a 1" hole to allow hose fitting to enter engine compartment as shown.

TWO WRENCH METHOD

Reminder...Use two wrenches to tighten o-ring fittings



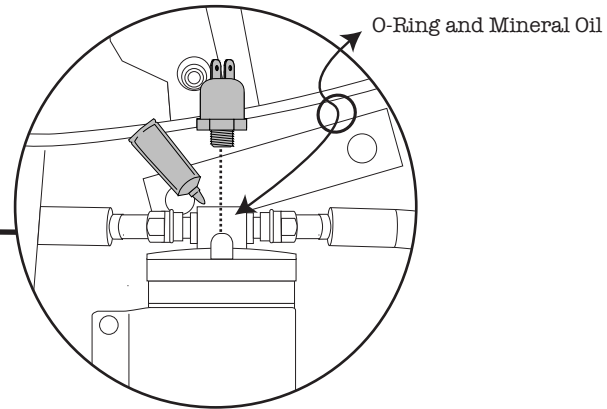
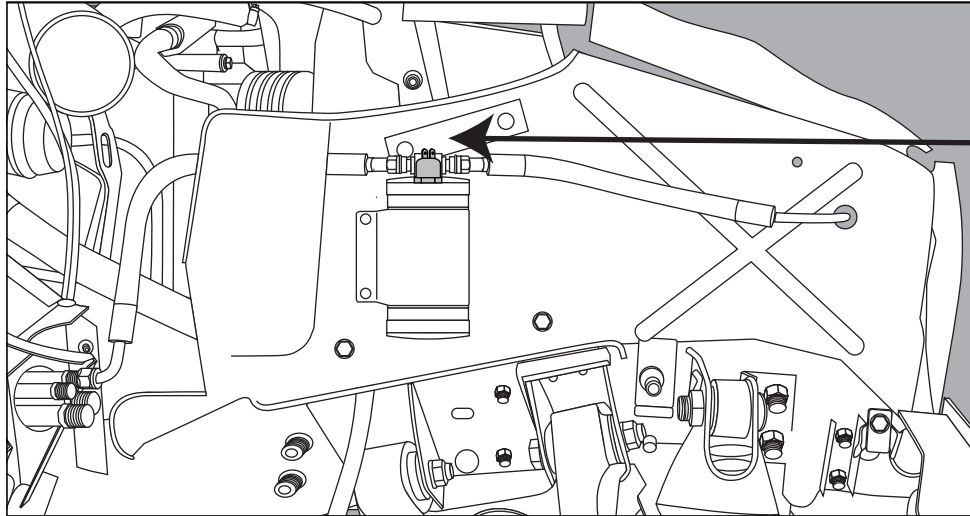
Attach liquid hose (PN# HMV-001-71) to drier connection using (1) O-Ring and mineral oil as shown.

Attach other end of liquid hose (HMV-001-71) to #6 connection evaporator unit using (1) #6 O-Ring and mineral oil.

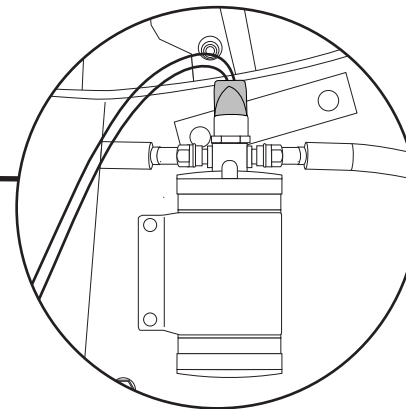
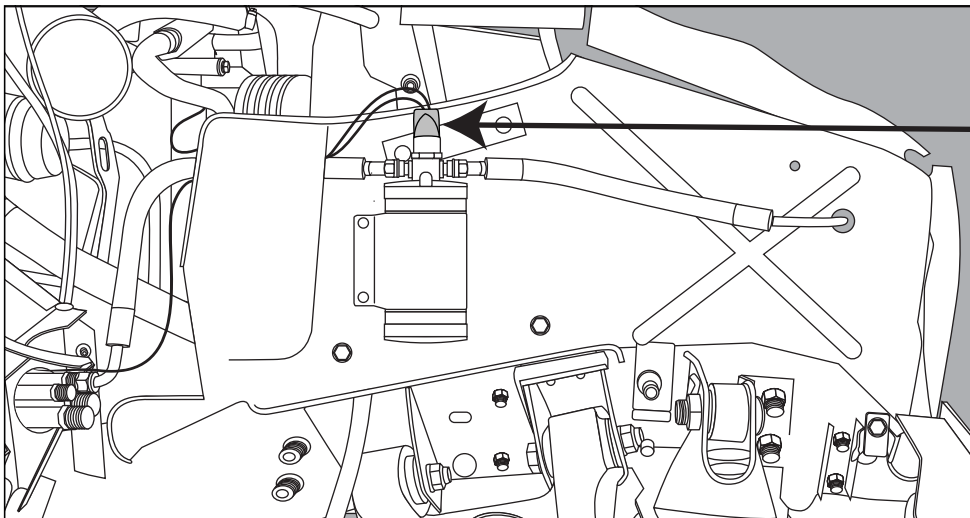
Note: Make certain hose is clear from any obstructions such as belts and sharp edges.

O-Ring and Mineral Oil

PRESSURE SWITCH MOUNTING



Remove nut from top of drier and attach pressure switch using #6 O-Ring and mineral oil.



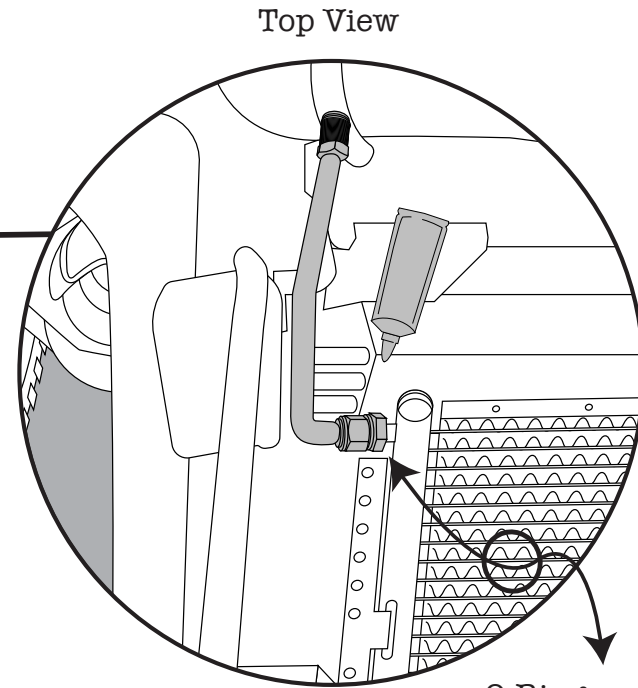
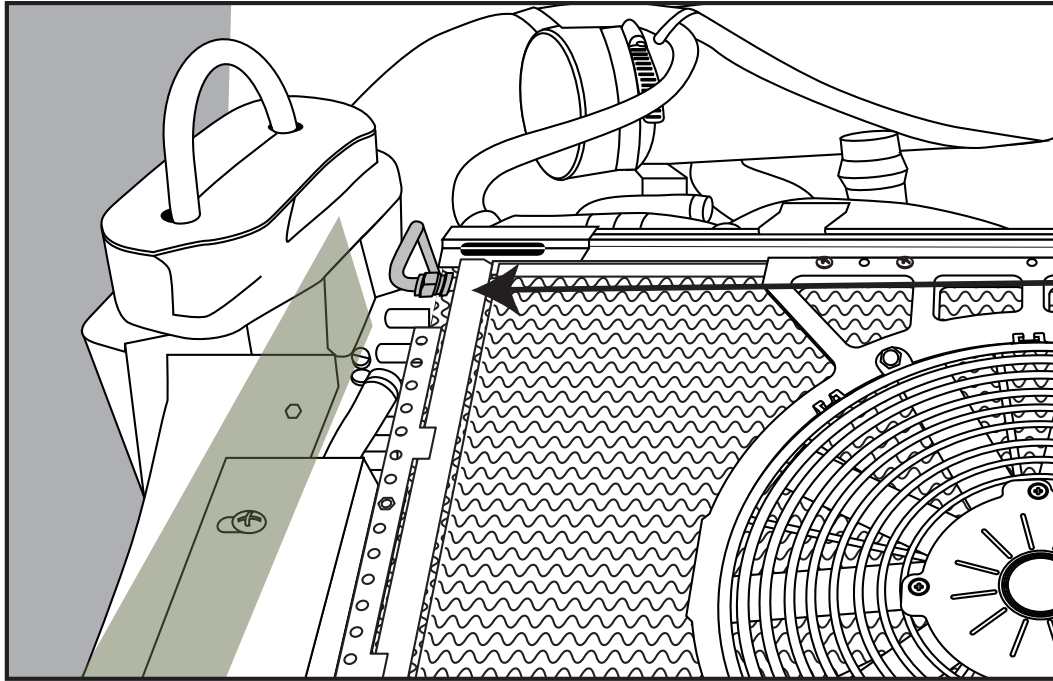
Attach wiring boot to terminals on pressure switch.

Note: Make certain female terminals make contact with male terminals.

Connect one white wire to compressor connection using supplied bullet connection.

Connect other white wire to white wire inside vehicle with supplied butt splice.

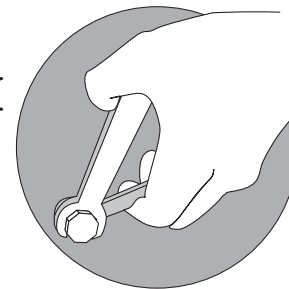
ROUTING HOSES



Attach discharge tube (PN# 0045-4) to the top fitting on condenser using (1) O-Ring and mineral oil as shown.

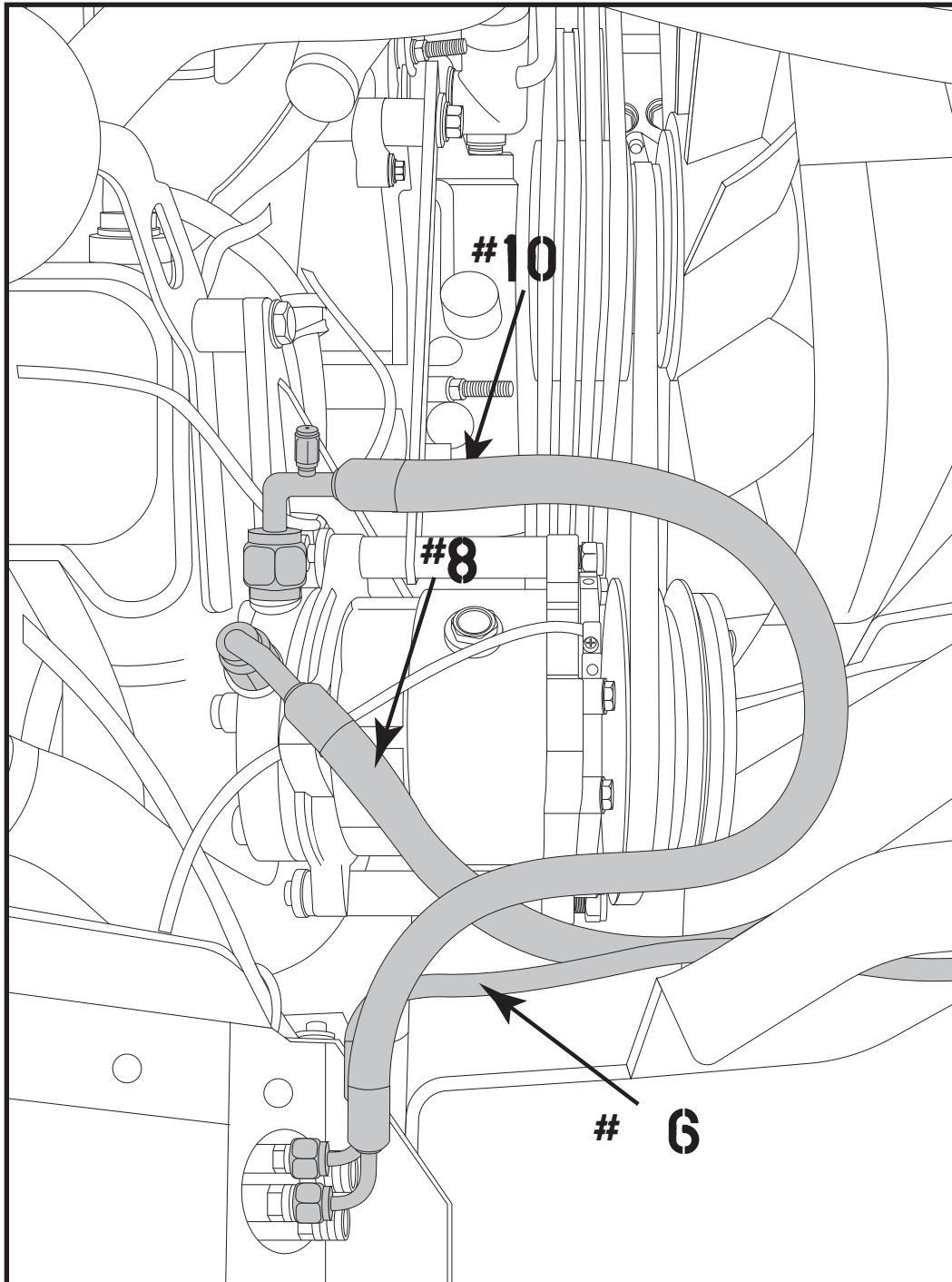
Note: Make certain tube is clear from any obstructions such as belts and sharp edges.

TWO WRENCH METHOD



Reminder...Use two wrenches to tighten o-ring fittings

ROUTING HOSES



CONNECTING THE HOSES:

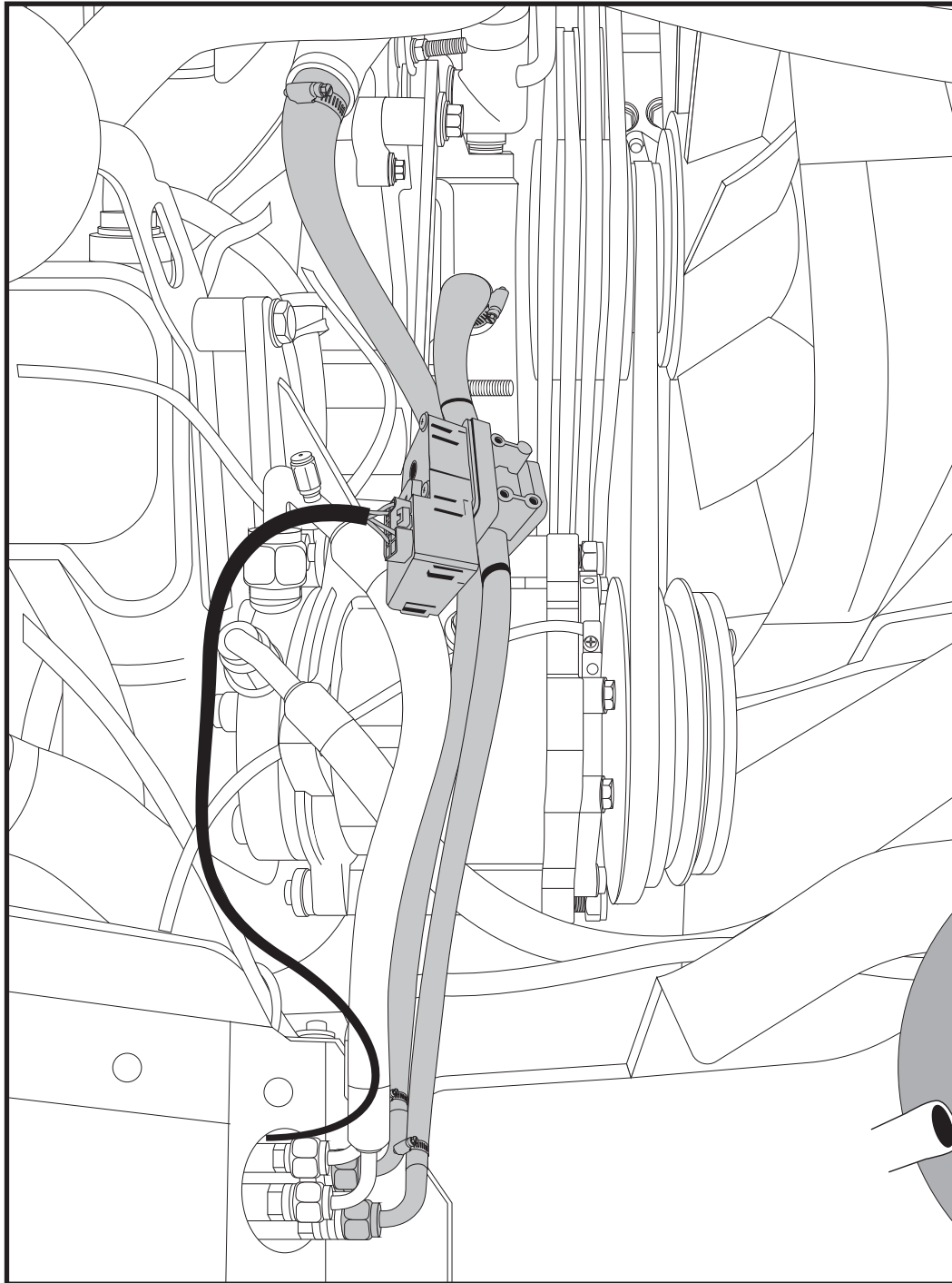
Based on PASSENGER SIDE compressor mounting see illustrations for routing.

The #10 (**LARGEST**) refrigerant hose. Attach end with service fitting to the compressor using (1) #10 o-ring and a few drops of mineral oil. Attach other end to #10 fitting at the firewall. Attach using one #10 o-ring and a few drops of mineral oil. Tighten securely.

The #6 (**SMALLEST**) refrigerant hose. Route behind fender and to the connection on firewall. Attach using two #6 o-ring and a few drops of mineral oil.

The #8 (**MEDIUM**) refrigerant Hose. Route behind fender and to the connection on compressor. Attach using two #6 o-ring and a few drops of mineral oil.

ELECTRONIC WATER VALVE INSTALLATION



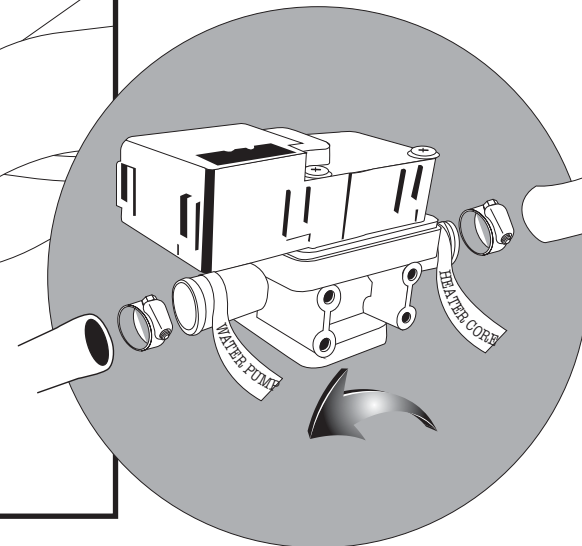
IMPORTANT NOTICE: PROPER INSTALLATION OF WATER VALVE

Your water valve MUST be installed per these instructions!... (If not, your system will not work properly.

The **bottom right** heater tube connection on firewall will be routed to the water connection on intake manifold using 5/8" dia. heater hose with the supplied worm gear clamp.

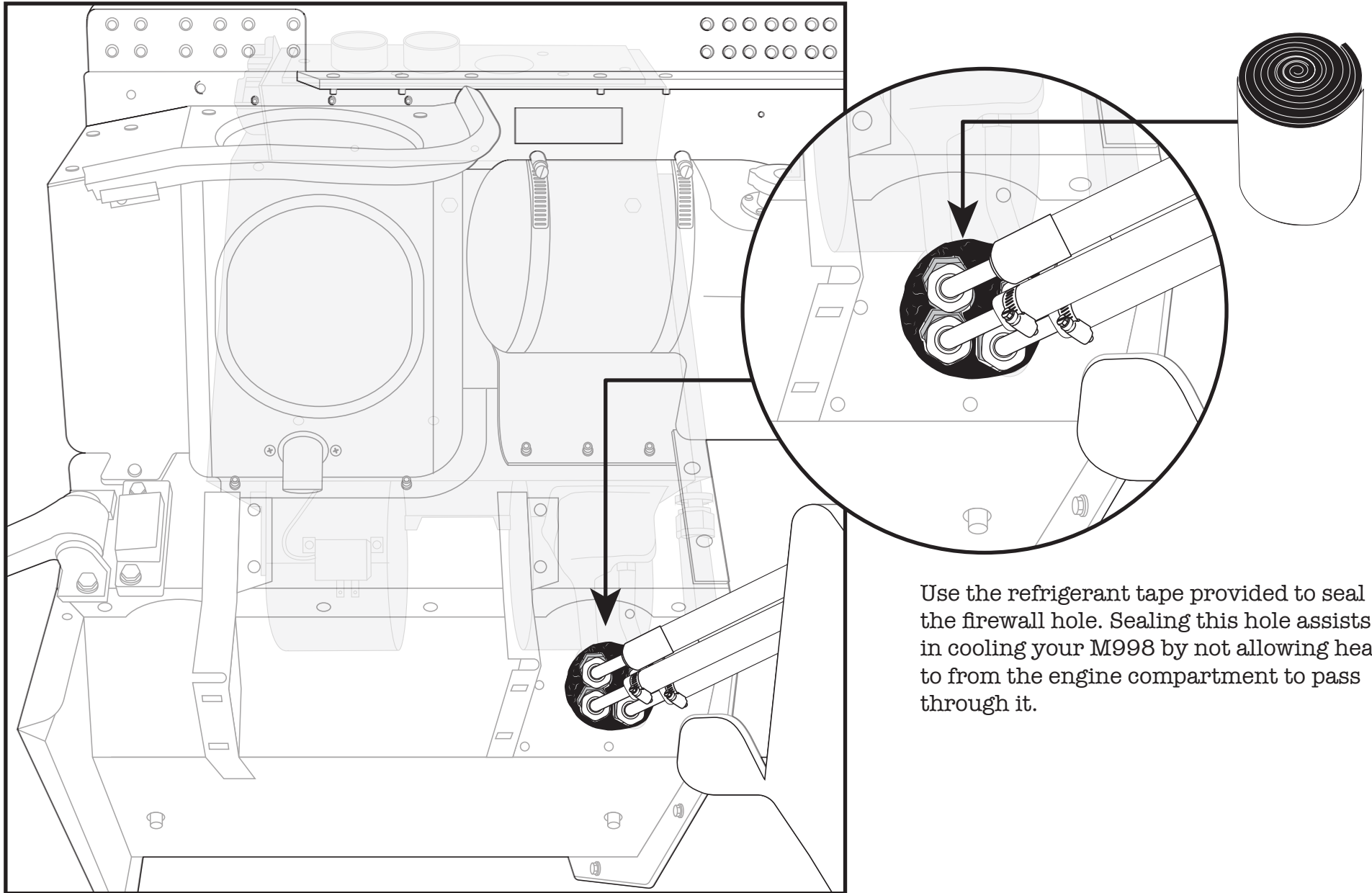
The **bottom left** heater tube connection on the firewall will be routed to the water valve connection labeled **heater core**, using a 6" piece of 5/8" heater hose attached with supplied worm gear clamp.

Connect the remaining outlet on water valve labeled **water pump** to the water pump using 5/8" dia. heater hose with the supplied worm gear clamp.



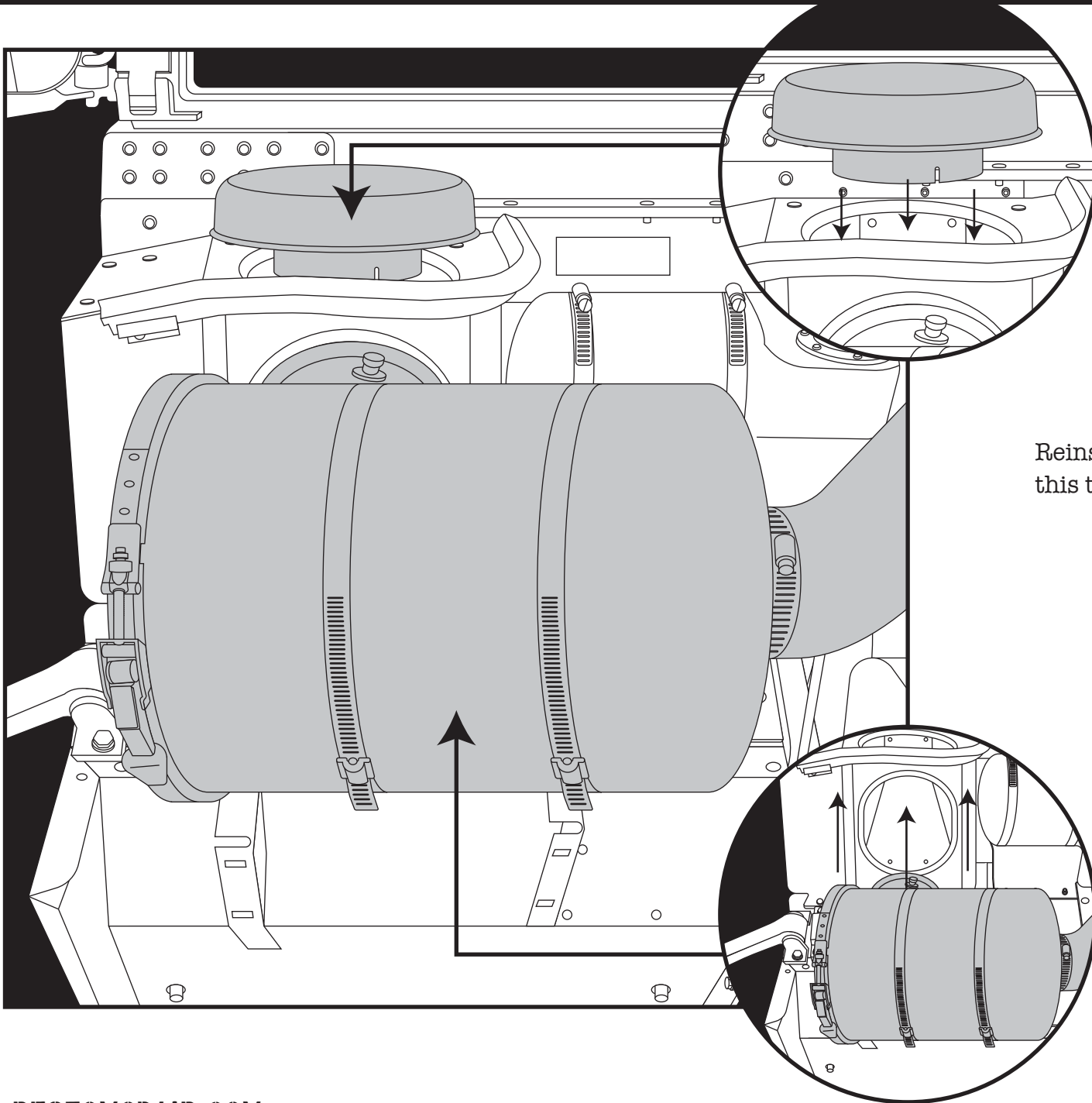
**FOLLOW THESE
TAGS... CHECK IT
TWICE BEFORE
PROCEEDING!**

SEAL FIREWALL



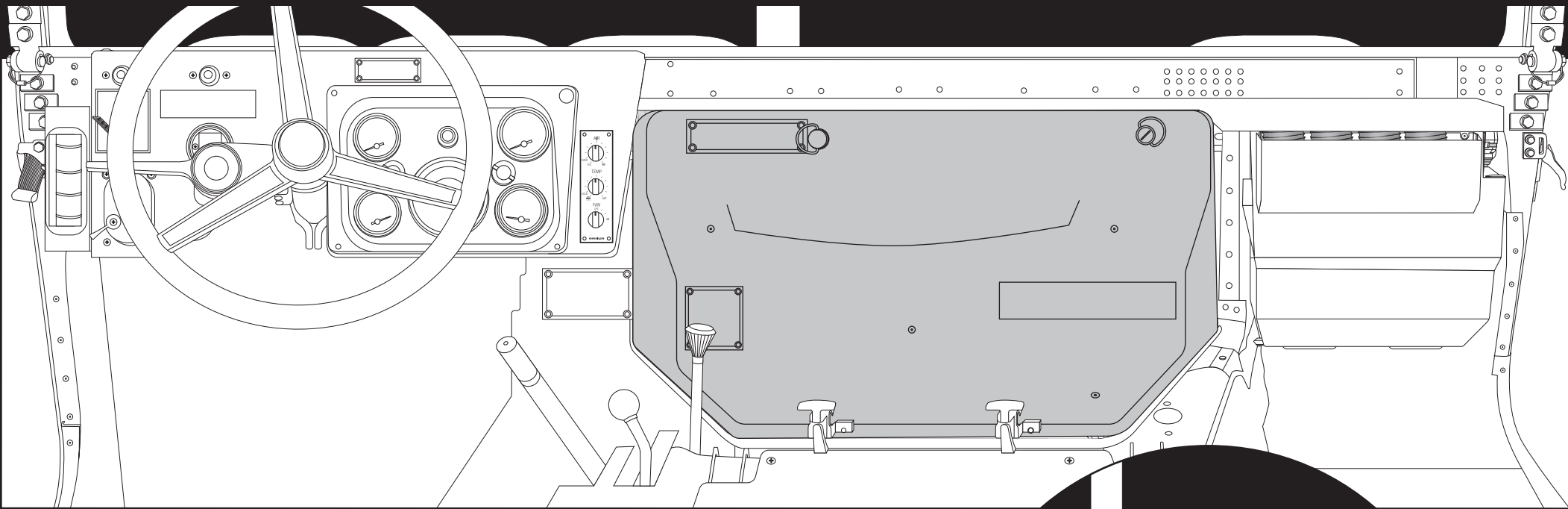
Use the refrigerant tape provided to seal the firewall hole. Sealing this hole assists in cooling your M998 by not allowing heat to from the engine compartment to pass through it.

REINSTALL AIR INTAKE

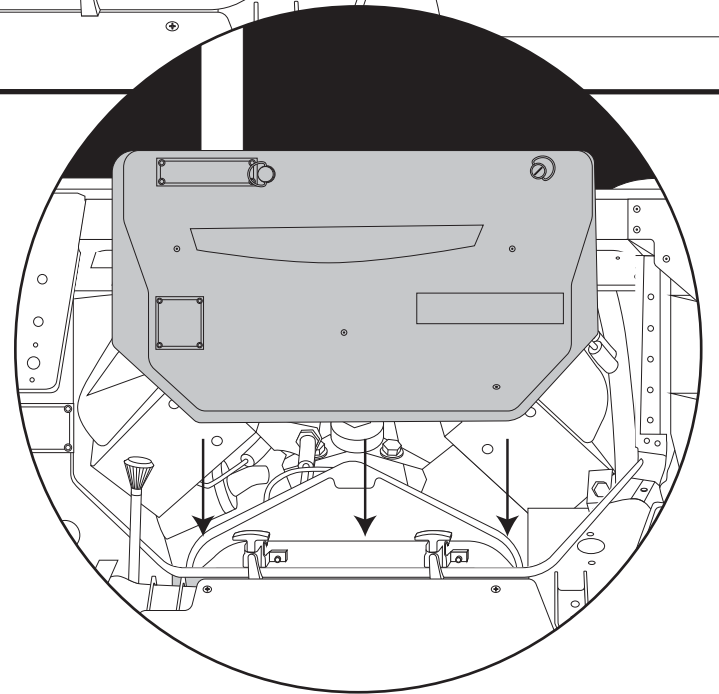


Reinstall air intake and cleaner at this time.

REINSTALL ENGINE COVER



Reinstall engine cover.



NEW A/C SYSTEM PREPARATION...MUST READ!

Please read through these procedures before completing this new A/C system charging operation. A licensed A/C technician should be utilized for these procedures to insure that your new system will perform at it's peak, and that your compressor will not be damaged.

- 1) Your radiator/cooling system is an integral part of your new system. Please insure that you have a 50/50 mix of distilled water and antifreeze, is in the heater coil before you charge the A/C system.
- 2) Evacuate the system for 45 minutes (minimum).
- 3) **Your new compressor *MUST* be hand-turned 15-20 revolutions before and after charging with liquid. Failure to do this may cause the reed valves to become damaged (this damage is NOT covered by your warranty).**
- 4) Your new system requires 134a refrigerant. It will require 1.5 lbs (or 24 oz).
- 5) Your new compressor comes charged with oil - NO additional oil is needed.
- 6) Insure that the new belt is tight.
- 7) **DO NOT CHARGE SYSTEM WITH LIQUID REFRIGERANT!**



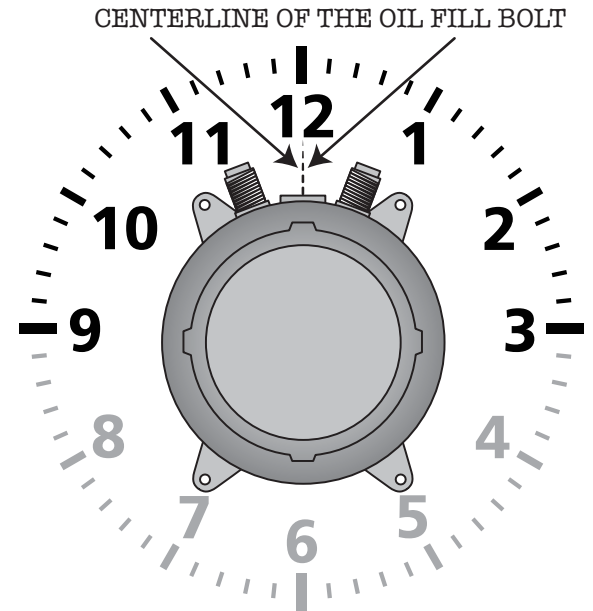
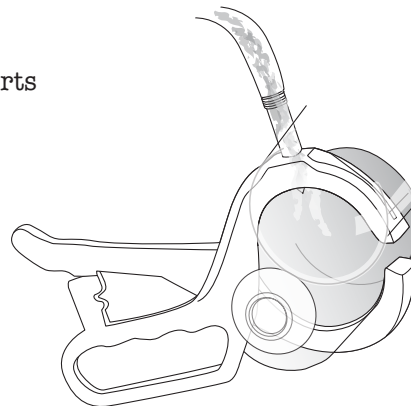
RECOMMENDED TEST CONDITIONS: (After system has been fully charged and tested for basic operation)

- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 rpm

ACCEPTABLE OPERATING PRESSURE RANGES:

1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

Readings above are based on an ambient temperature of 90° with an adequate airflow on condenser



CAUTION! When mounting your compressor and/or adjusting the belt use caution. Mount by using the centerline of the oil fill plug as your guide. The compressor can **ONLY** be mounted in-between the 9 to 3 positions. **DO NOT** mount in between the 4 to 8 positions. **This can cause compressor failure.**



Do NOT tilt, shake or turn refrigerant can upside-down OR use a charging station to install refrigerant while the engine is running. Doing so will direct liquid refrigerant into the compressor piston chamber, causing damage to reed valves and/or pistons and/or other components, as well as potentially seizing the compressor. Allow a minimum of 30 minutes for liquid to "boil off." You must hand turn the compressor hub (not the pulley) a minimum of 15 complete revolutions prior to starting the engine with the clutch engaged.

TROUBLESHOOTING GUIDE

TEST CONDITIONS USED TO DETERMINE SYSTEM OPERATION (THESE TEST CONDITIONS WILL SIMULATE THE AFFECT OF DRIVING THE VEHICLE AND GIVE THE TECHNICIAN THE THREE CRITICAL READINGS THAT THEY WILL NEED TO DIAGNOSE ANY POTENTIAL PROBLEMS).

- B. CONNECT GAUGES OR SERVICE EQUIPMENT TO HIGH/LOW CHARGING PORTS.
- C. PLACE BLOWER FAN SWITCH ON MEDIUM.
- D. CLOSE ALL DOORS AND WINDOWS ON VEHICLE.
- E. PLACE SHOP FAN IN FRONT OF CONDENSER.
- F. RUN ENGINE IDLE UP TO 1500 RPM.

ACCEPTABLE OPERATING PRESSURE RANGES (R134A TYPE)

- 1. HIGH-SIDE PRESSURES (150-275 PSI) *Note- general rule of thumb is two times the ambient (daytime) temperature, plus 15-20%.
- 2. LOW-SIDE PRESSURES (10-25 PSI in a steady state).

CHARGE AS FOLLOWS: R134A = 24 OZ.

NO ADDITIONAL OIL IS NECESSARY IN OUR NEW COMPRESSORS.

TYPICAL PROBLEMS ENCOUNTERED IN CHARGING SYSTEMS

NOISY COMPRESSOR. A noisy compressor is generally caused by charging a compressor with liquid or overcharging

- A. If the system is overcharged both gauges will read abnormally high readings. This is causing a feedback pressure on the compressor causing it to rattle or shake from the increased cylinder head pressures. System must be evacuated and re-charged to exact weight specifications.
- B. Heater control valve installation - Installing the heater control valve in the incorrect hose. Usually when this occurs the system will cool at idle then start to warm up when raising the RPM's of the motor. **THE HEATER CONTROL IS A DIRECTIONAL VALVE; MAKE SURE THE WATER FLOW IS WITH THE DIRECTION OF THE ARROW.** As the engine heats up that water transfers the heat to the coil, thus overpowering the a/c coil. A leaking or faulty valve will have a more pronounced affect on the unit's cooling ability. Installing the valve improperly (such as having the flow reversed) will also allow water to flow through, thus inhibiting cooling. Check for heat transfer by disconnecting hoses from the system completely. By running down

the road with the hoses looped backed through the motor, you eliminate the possibility of heat transfer to the unit.

- C. Evaporator freezing - Freezing can occur both externally and internally on an evaporator core. External freeze up occurs when the coil cannot effectively displace the condensation on the outside fins and the water forms ice (the evaporator core resembles a block of solid ice), it restricts the flow of air that can pass through it, which gives the illusion of the air not functioning. The common cause of external freezing is the setting of the thermostat and the presence of high humidity in the passenger compartment. All door and window seals should be checked in the event of constant freeze-up. A thermostat is provided with all units to control the cycling of the compressor.
- D. Internal freeze up occurs when there is too much moisture inside the system. The symptoms of internal freeze up often surface after extended highway driving. The volume of air stays constant, but the temperature of the air gradually rises. When this freezing occurs the low side pressure will drop, eventually going into a vacuum. At this point, the system should be checked by a professional who will evacuate the system and the drier will have to be changed.
- E. Inadequate airflow to condenser - The condenser works best in front of the radiator with a large supply of fresh air. Abnormally high pressures will result from improper airflow. Check the airflow requirements by placing a large capacity fan in front of the condenser and running cool water over the surface. If the pressures drop significantly, this will indicate the need for better airflow.
- F. Incorrect or inadequate condenser capacity - Incorrect condenser capacity will cause abnormally high head pressures. A quick test that can be performed is to run cool water over the condenser while the system is operating, if the pressures decrease significantly, it is likely a airflow or capacity problem.
- G. Expansion valve failure - An expansion valve failure is generally caused by dirt or debris entering the system during assembly. If an expansion valve fails it will be indicated by abnormal gauge readings. A valve that is blocked will be indicated by high side that is unusually high, while the low side will be unusually low or may even go into a vacuum. A valve that is stuck open will be indicated by both the high and low pressures rising to unusually high readings, seeming to move toward equal readings on the gauges.
- H. Restrictions in system - A restriction in the cooling system will cause abnormal readings on the gauges. A high-side restriction (between the compressor and the drier inlet) will be indicated by the discharge reading excessively high. These simple tests can be performed by a local shop and can help determine the extent of the systems problem.

TROUBLESHOOTING GUIDE

PROBLEM: system is not cooling properly

ISSUE: cold at idle, warmer when raising engine RPM's

Make sure the Water Valve is positioned correctly

The water valve is a directional valve and should be installed with the arrow pointing towards the water pump, it should be connected to the heater hose that runs from the heater core to the water pump. If the water valve is connected to the incorrect hose it allows water to circulate through the system via the heater core over powering the cooling effect of the A/C coil, (normally the air conditioning is functioning properly).

Step 1: Check placement of the water valve, correct if needed. (In some cases changing the location of the water valve may not fix the above problem.) Continue to next step.

Step 2 If changing the location of the water valve does not rectify the issue, then possibly the water valve is permanently damaged and may need to be replaced. To check the integrity of the water valve completely remove the water hoses for the heater core and "loop" together. (This will remove the heater system completely from the possibilities) If the system now cools, replace the water valve

Verify Adequate Air Flow to Condenser

For an air conditioning system to function properly there has to be adequate airflow across the condenser. The function of the condenser is to dissipate heat, without proper airflow your system will not cool correctly in the cabin of your vehicle.

Step 1: connect gauges to a/c hoses. The pressures should be: with the ambient temp is 90, low side pressures should be between 10-25 psi, high side pressures should be between 150-275 psi

Step 2: IF the low side pressures are normal and the high side pressures are high then there might be an airflow issue, continue to next step.

To test air flow to Condenser do the following three tests:

1. Place a piece of paper on the condenser with the car in idle and see if paper is held in place.
2. With car in idle, attach gages, and place a large capacity fan in front of the condenser. What happens to the pressures?
3. With car still in idle and gages attached, pour water down the front of the condenser. What happens to the pressures?

If the paper is held in place you are at least getting some air flow. If the high side decreases during test 2 & 3 then your condenser is not getting enough air which is causing your system to not cool properly. To correct this issue you will need a more powerful mechanical fan.

Step 3: Confirm correct Refrigerant charge in System

All of our systems should be charged with 24oz or 1.5lbs of R134 Refrigerant only. If overcharged you will need to evacuate the system and recharge with the correct amount. *

What measurements mean:

Low Temp and High Pressure seem to be equal...

You have a malfunctioning expansion valve that is stuck open.

High Side is extremely high and Low Side is extremely low (possibly into vacuum)...

There is a blockage in the system. Remove hoses and blow compressed air through in both directions. If pressures don't change its possible that your expansion valve is stuck closed and would have to be replaced.

* Compressor Concerns:

This is often misdiagnosed as a problem for the system not cooling properly. If you have a noisy compressor it is due to improper charging of refrigerant. An overcharged (more than 24oz or 1.5 lbs R134) compressor can cause rattling. If charged with pure liquid there is a high probability you have bent reed valves that are causing tapping sound.

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