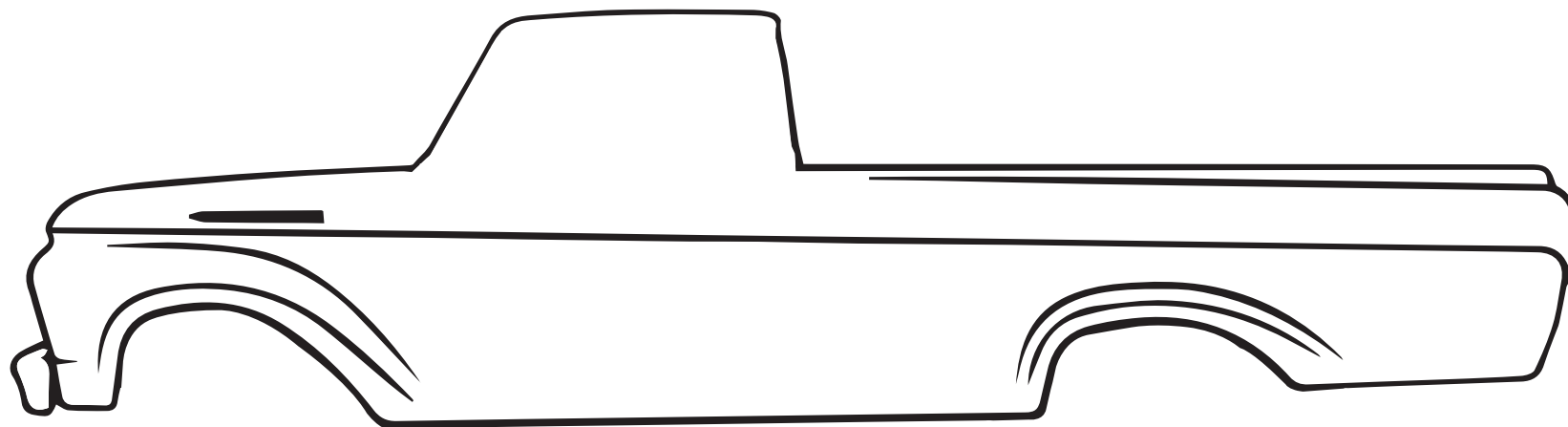




Installation Manual

1961-64 Ford Truck

Document #1-3071

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Congratulations...

You have just purchased the highest quality, best performing A/C system ever designed for your 1961-64 Ford Truck.

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 through 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.

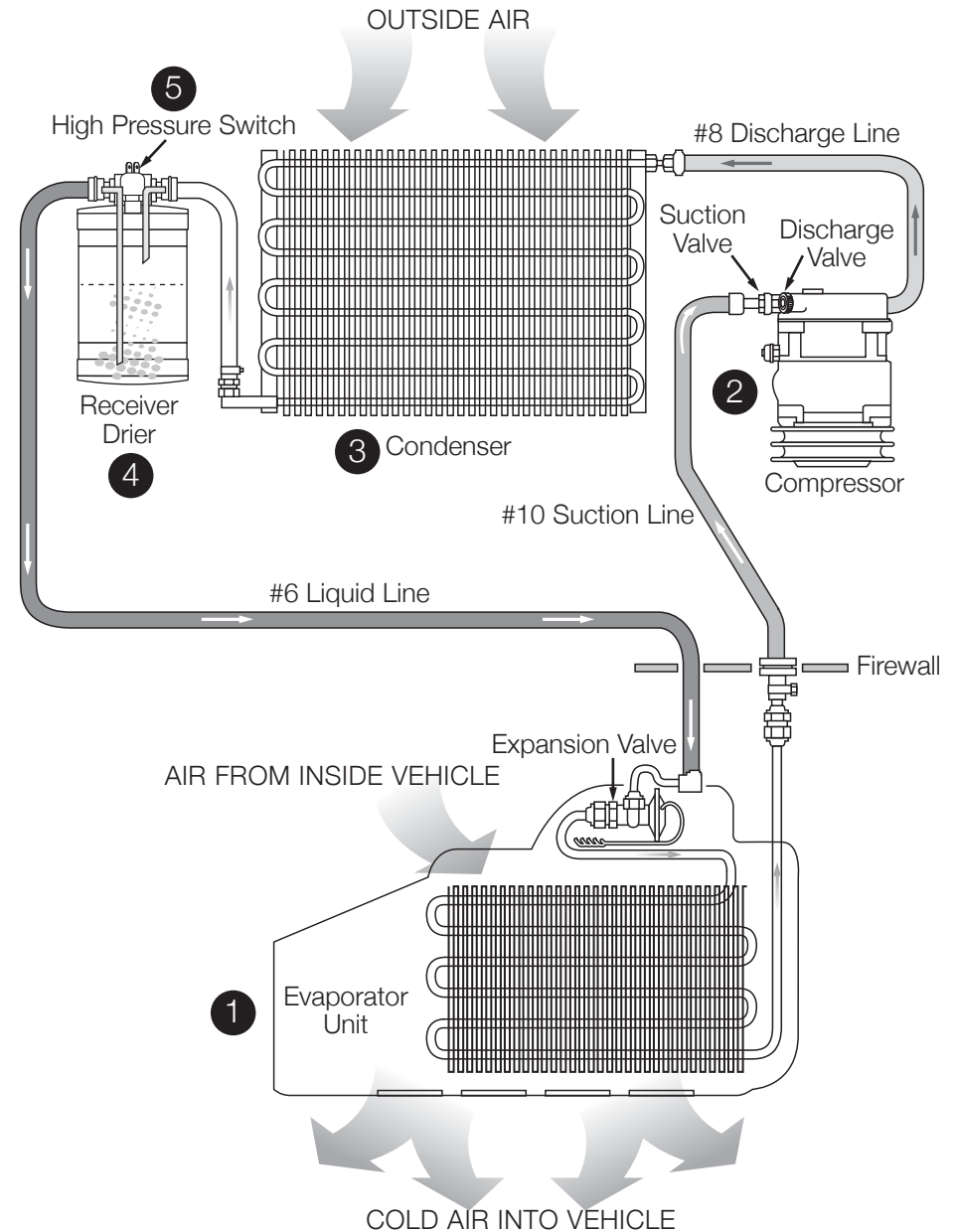
Overview



A Basic Overview of Automotive A/C....

- 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.

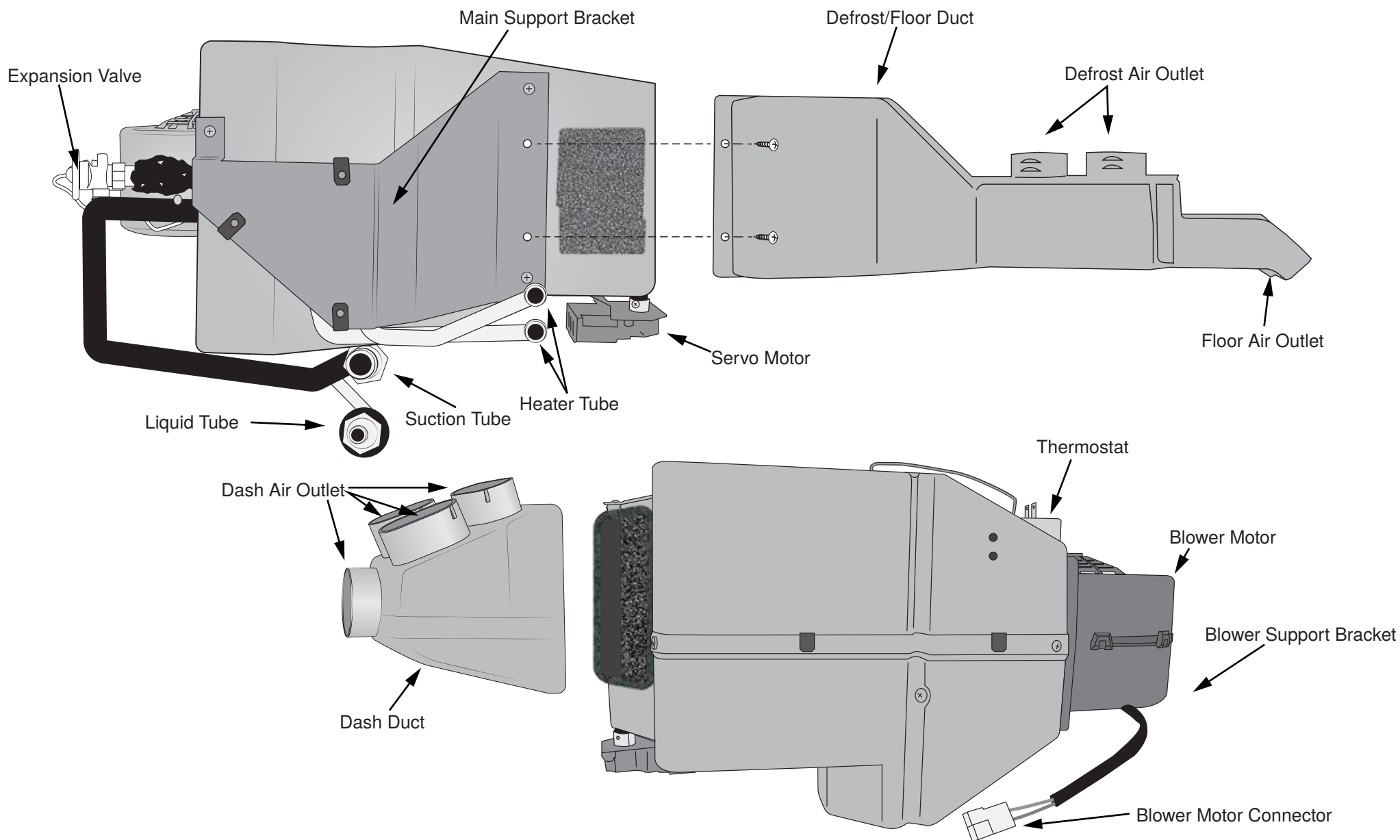
The air conditioning system in your vehicle is comprised of a compressor, condenser, expansion valve, receiver/drier, and evaporator. Refrigerant (also known as Freon) is compressed in the compressor. In the condenser, gas is cooled to a liquid state and travels to the expansion valve. As the liquid 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.



Overview



First, take a minute to familiarize yourself with the evaporator unit.



Check List, Pre-Installation:

- ☐ Before beginning the installation check the shipping box for the correct components. Your boxed unit includes a list of major components and bagged parts.
- ☐ A basic cleaning of the engine compartment and interior before beginning will make things go more smoothly.
- ☐ Check the condition of the engine mounts. Excessive engine movement can damage hoses to A/C and/or heater.
- ☐ Check the 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.
- ☐ Tools: Your installation only requires the basic tools everyone has in their garage, nothing exotic or specific to A/C or heat equipment.
- ☐ **SAFETY FIRST:** Wear eye protection while drilling/cutting, deburr sharp edges, and never get in a hurry or force a part.

Procedures During Installation:

NOTE: If your vehicle has been or is being modified, some procedures will need to be adjusted to fit your particular application.

- ☐ Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads, and where o-rings seat in fittings. Do not use thread tape or sealants.
- ☐ Measure twice (or more), cut once.
- ☐ Should you have any technical questions, or feel you have defective or missing components, call us immediately. We will be glad to assist you.

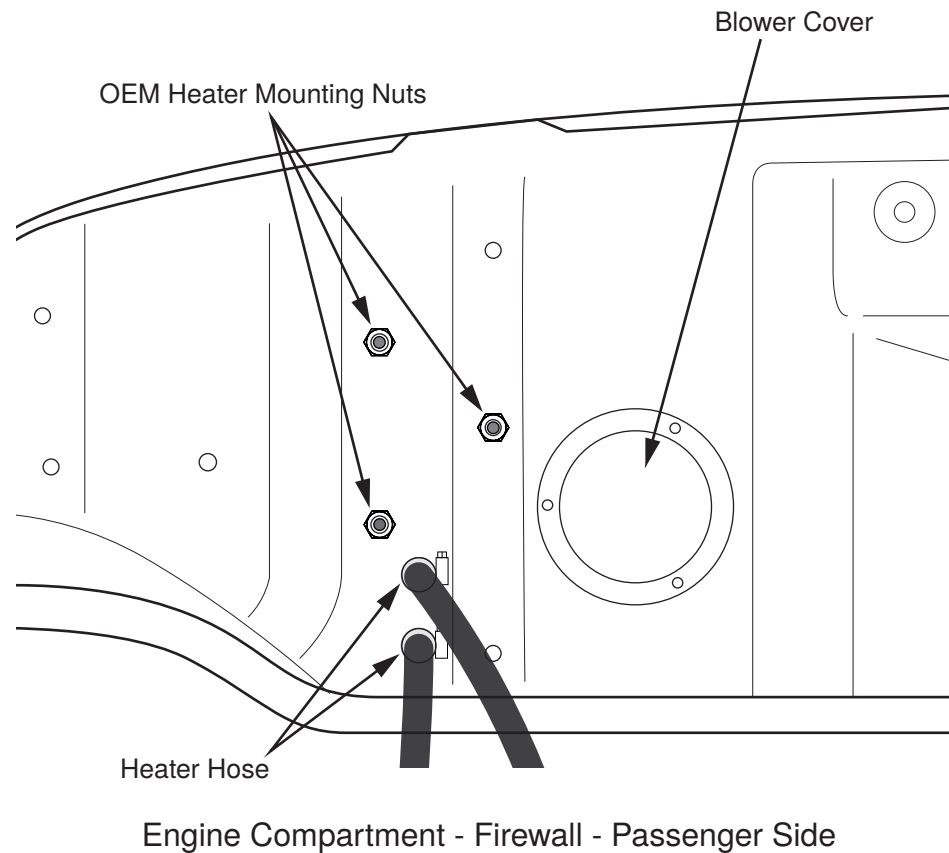
You Can Now Begin The Installation.

Install Prep



WARNING: Before continuing, make sure battery is disconnected and coolant is drained from the radiator. Store safely for reuse or recycle accordingly.

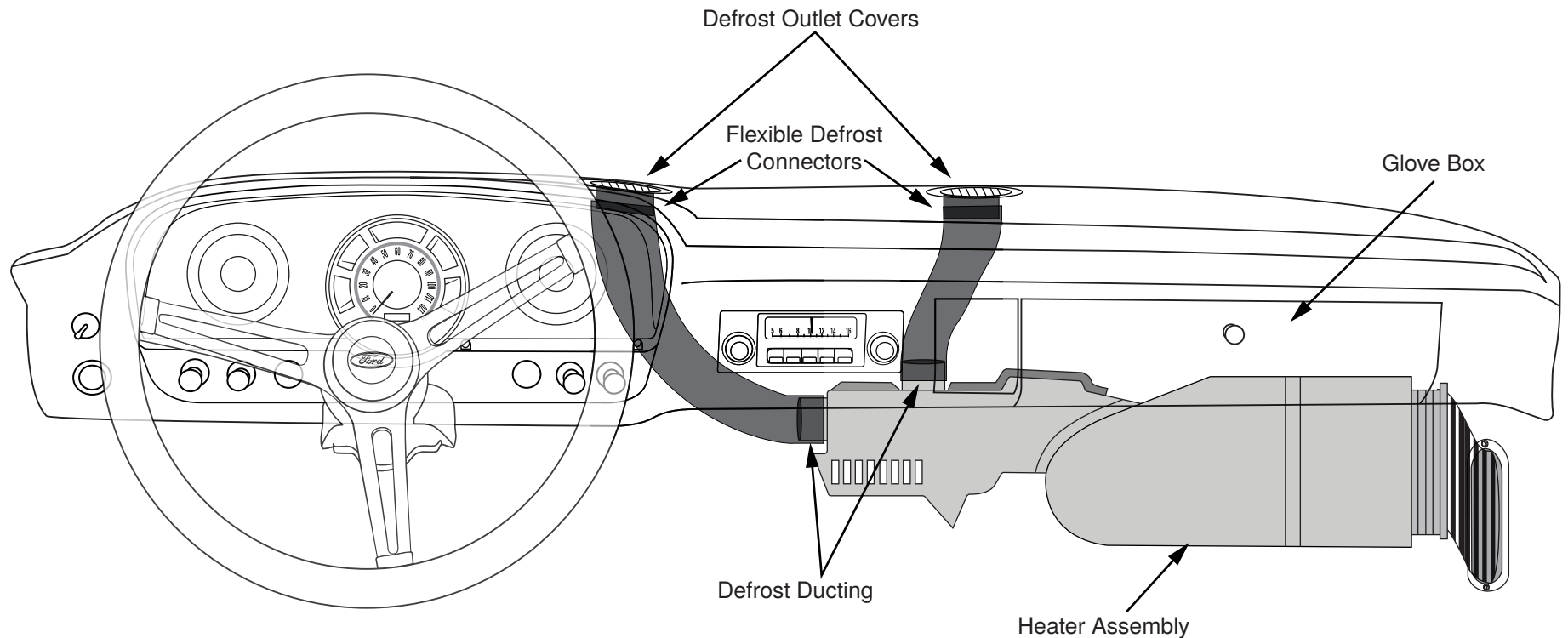
- In the engine compartment at the firewall, remove the battery tray and blower cover and retain all original hardware.
- Remove 3 nuts from OEM heater mounting bolts and discard.
- Remove heater hoses from the heater connections.



Install Prep

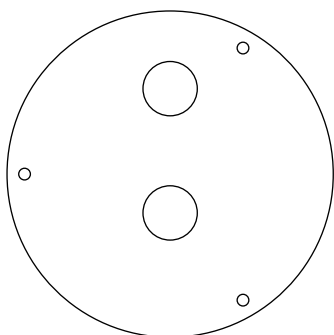


- Remove glove box door and glove box. Retain the glove box door and all original hardware. Discard glove box housing.
- Disconnect all cables and electrical harnesses from the heater assembly and discard.
- Disconnect defrost ducting and discard.
- Remove defrost outlet covers and flexible defrost connectors. Retain covers and original hardware. Discard flexible defrost connectors.
- Remove heater assembly and discard.



These are the parts you will find in Bag A

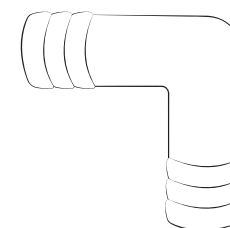
You will use all of these parts and hardware during the next series of installation steps.



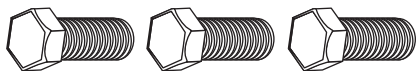
Firewall Block Off Assembly (Qty. 1)
Part# 10-1071-2



#10 x 5/8" PHP Screw (Qty. 2)
Part# 10B62PPBB



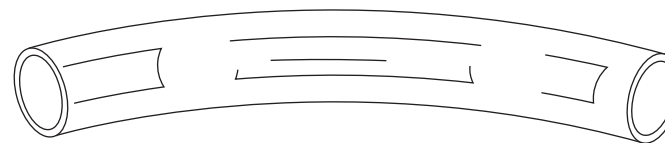
90 Degree Elbow (Qty. 1)
Part# 1875



1/4"-20 x 1" Hex Bolt (Qty. 3)
Part# 25C100HHB5Z



1/4" Flat Washer (Qty. 3)
Part# 25NWSAB

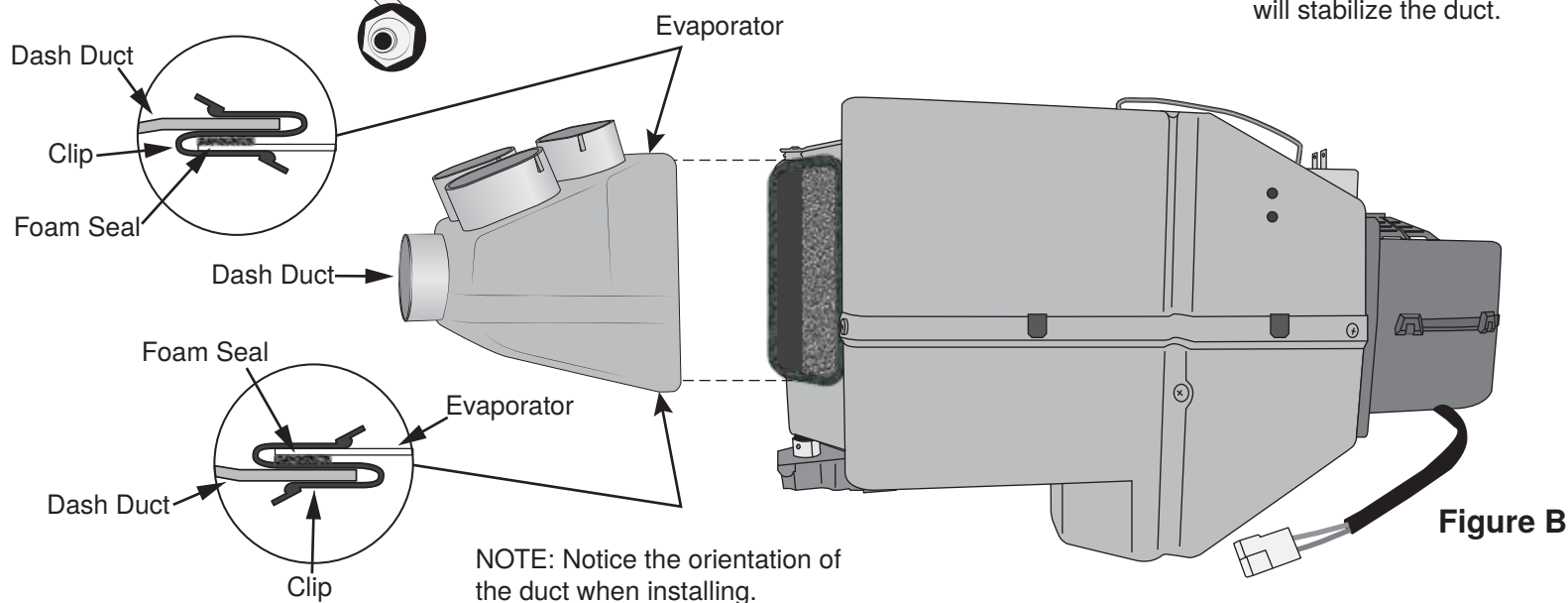
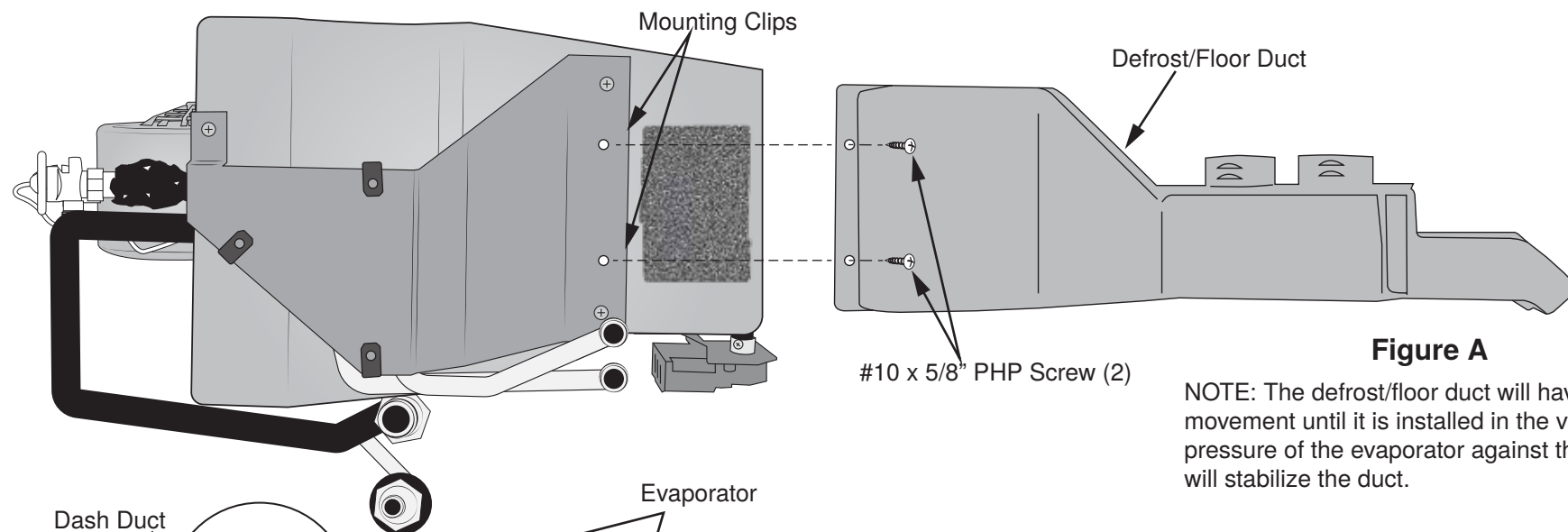


1/2" ID x 12" Long Drain Tube (Qty. 1)
Part# 31004845

Install Prep



- Install the defrost/floor duct to the evaporator using (2) #10 x 5/8" PHP screws into the mounting clips for the duct (Figure A).
- Install the dash duct to the evaporator using the pre-installed clips on the duct (Figure B).



Installation - Evaporator

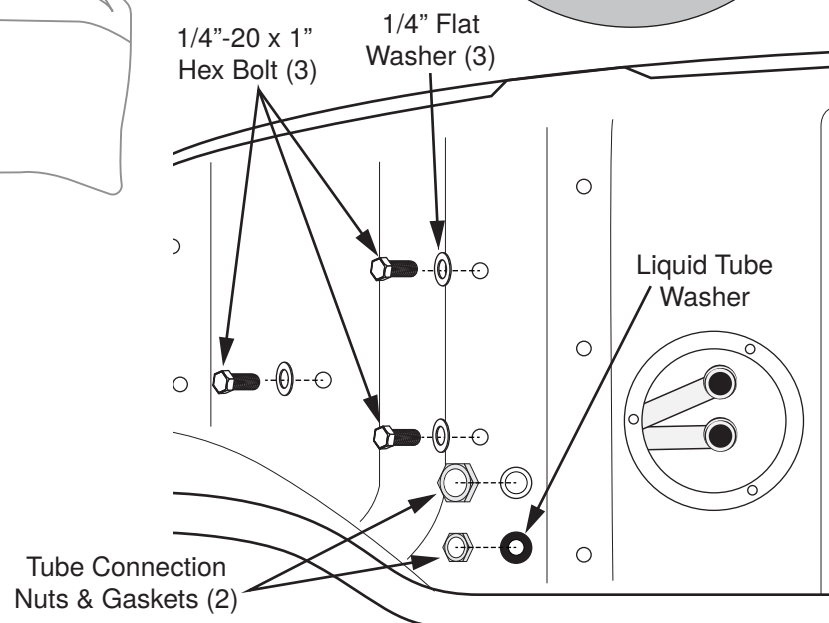
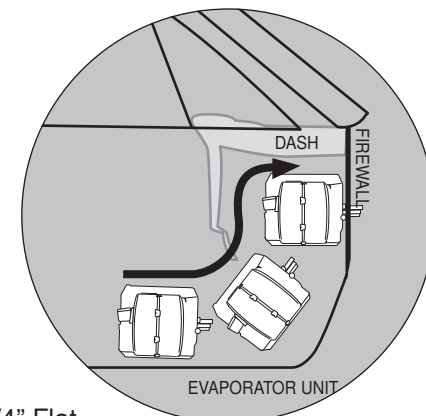
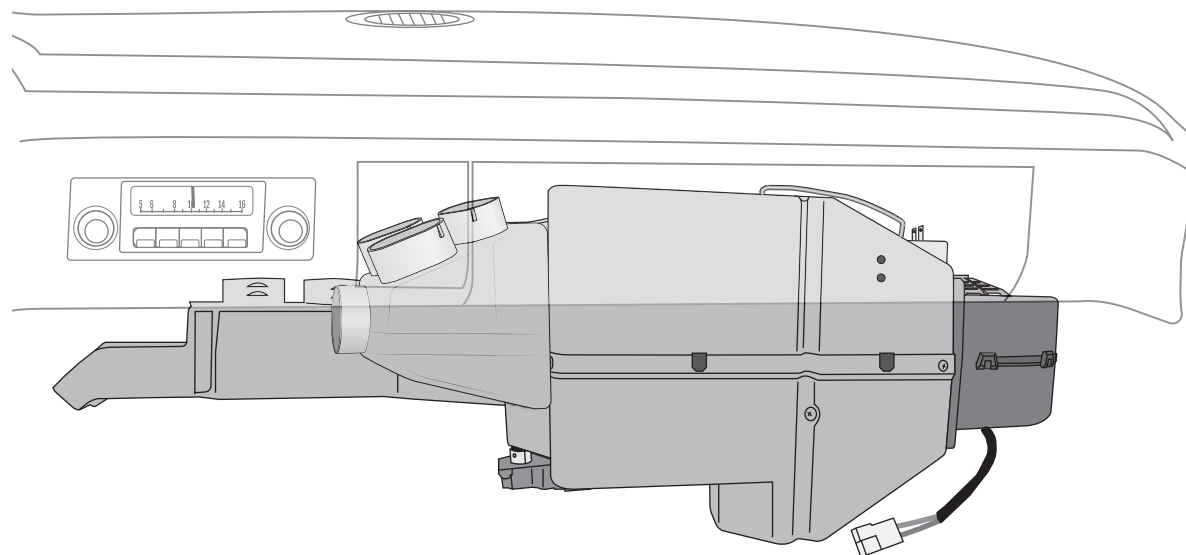


NOTE: Two people are needed for this step for easy installation.

NOTE: The cable mounting bracket on the passenger side fresh air inlet assembly will need to be bent up to allow clearance.

- Remove the nut and gasket from the suction tube connection on the evaporator and retain for re-installation later.
- Remove the nut, gasket, and one of the washers from the liquid tube connection on the evaporator and retain for re-installation.
- One person can take the unit within the car and “roll” up and under the dash. Make sure to have the suction and liquid tube connections go through the factory heater holes in the firewall, and the heater tubes go through the blower opening in the firewall.
- The second person can be at the engine compartment to loosely install (3) 1/4”-20 x 1” bolts and (3) 1/4” flat washers to the mounting bracket and re-install the washer, gaskets, and nuts to the tube connections.
- Once the evaporator is secured in place, tighten all bolts.

NOTE: Only loosely hand tighten the bolts until the evaporator is secured in place.

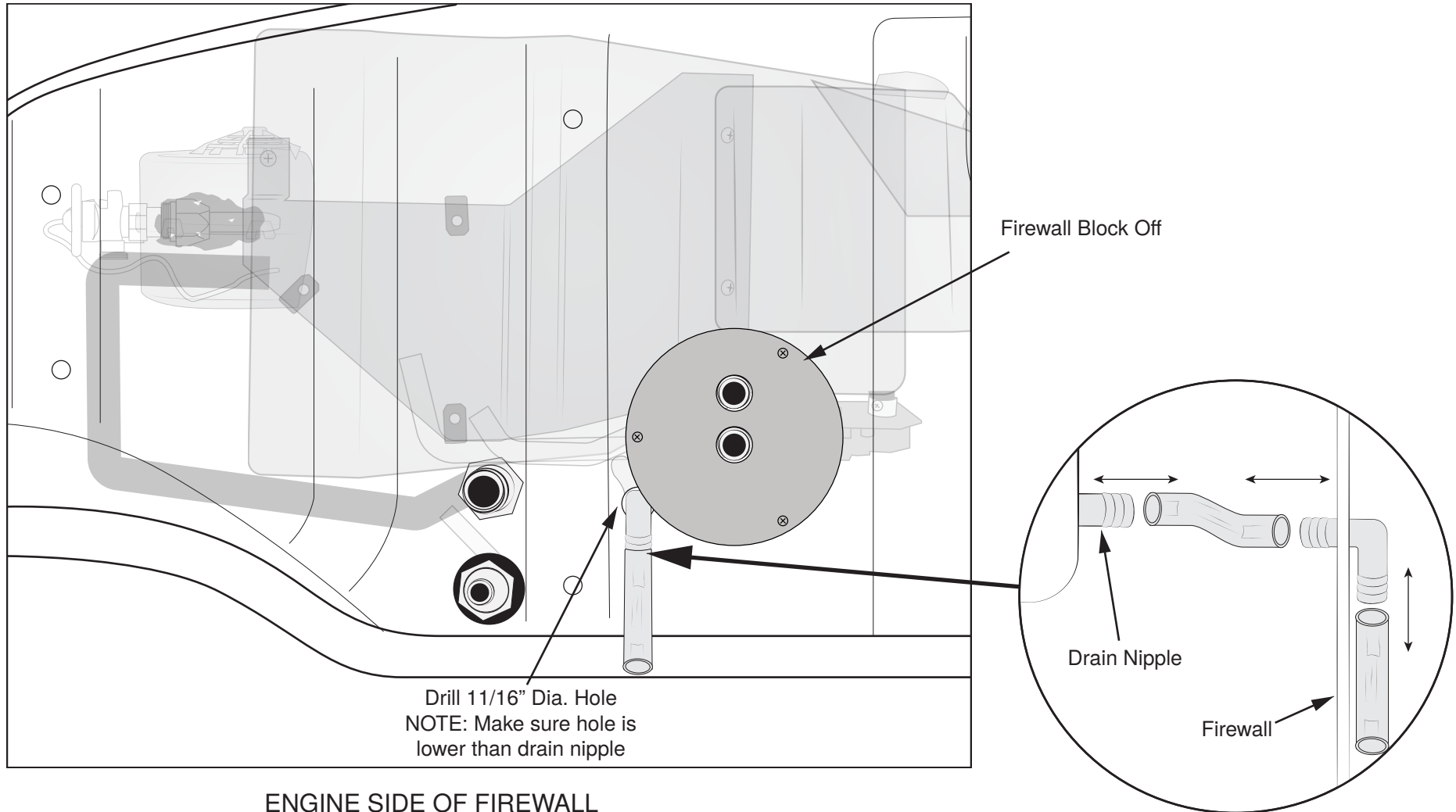


ENGINE SIDE OF FIREWALL

Installation - Drain Tube & Block Off

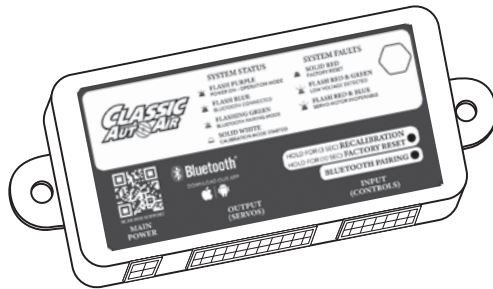


- Drill an 11/16 inch diameter hole in the firewall below the level of the evaporator drain nipple, approximately as shown below.
- Cut the clear drain tube to a length that will reach from the drain nipple to the firewall, and attach to the drain nipple.
- Insert the 90 degree elbow into the hole in the firewall from the engine side, and connect the clear drain tube from the drain nipple.
- Connect the remainder of the clear drain tube to the other side of the 90 degree elbow in the engine compartment.
- Install the firewall block off over the heater tubes using the original blower cover hardware.

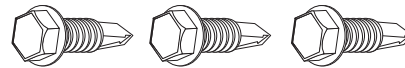


These are the parts you will find in Bag B

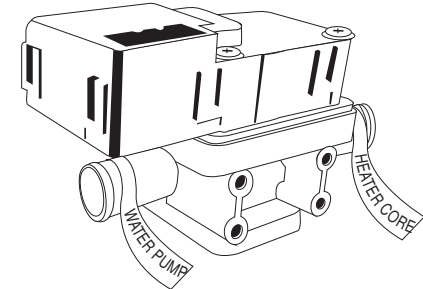
You will use all of these parts and hardware during the next series of installation steps.



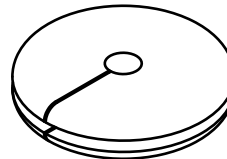
ECU (Qty. 1)
Part# 16-2500



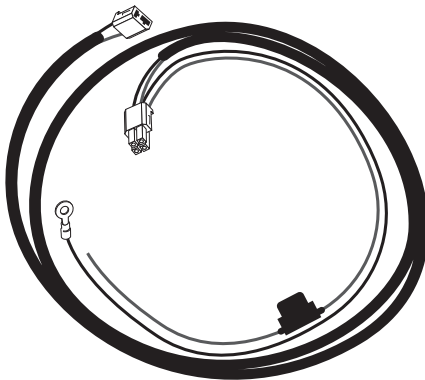
#10-16 x 3/4" Tek Screw (Qty. 3)
Part# 10B75HW3Z



Electronic Water Valve (Qty. 1)
Part# 16-1023



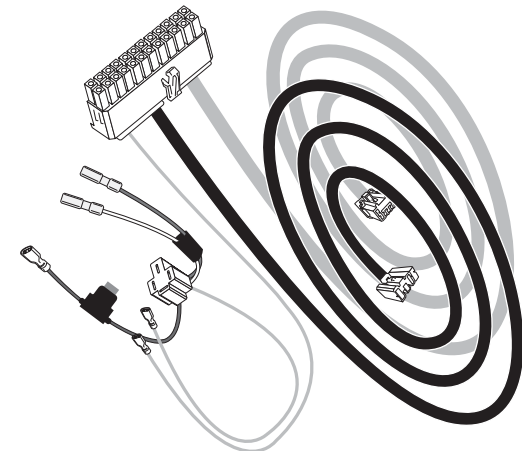
1-1/8" Firewall Grommet (Qty. 1)
Part# G3



Wire Harness, Power Supply (Qty. 1)
Part# 0125-5R1



Relay (Qty. 1)
Part# 30-13373



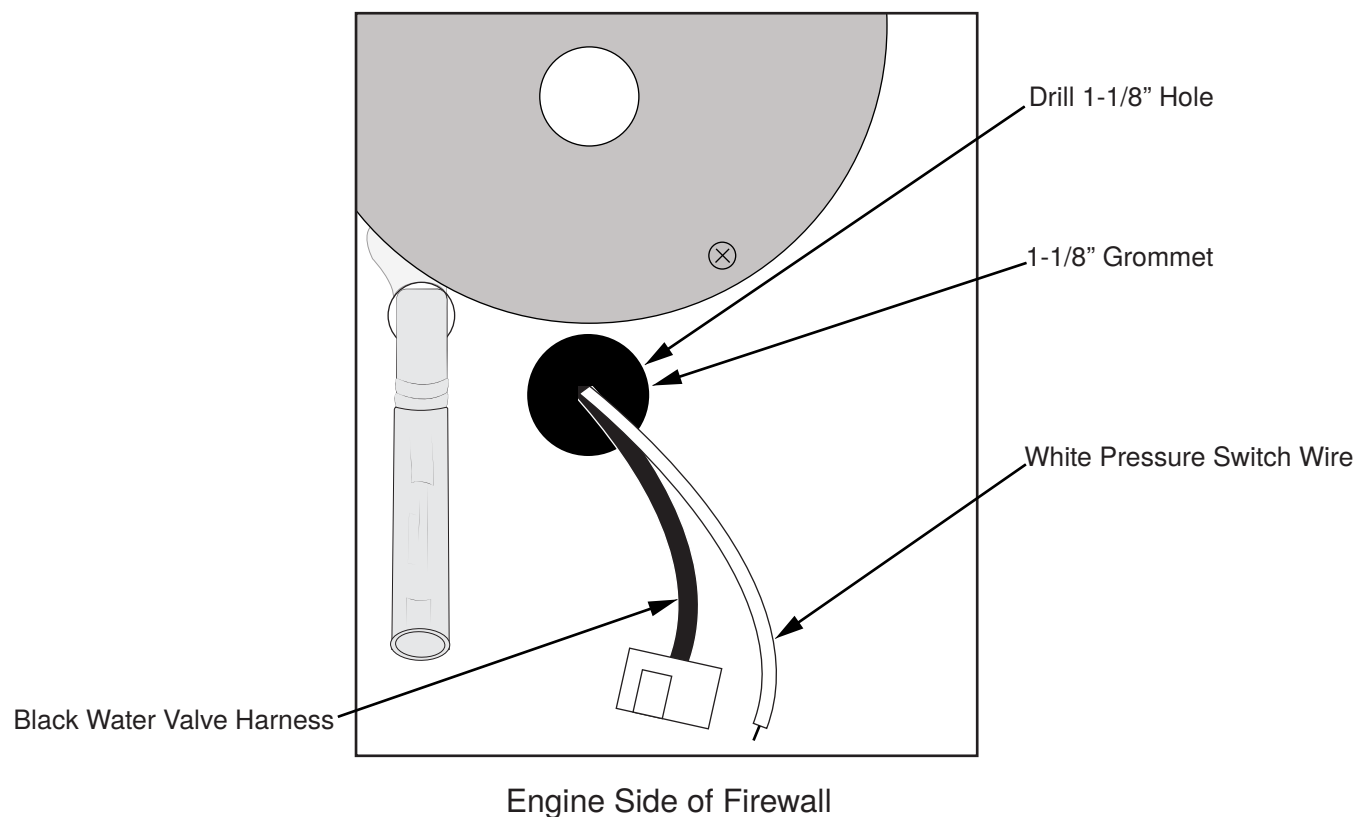
Wire Harness, Output (Servo) (Qty. 1)
Part# 0125-20R3A

Installation - Electrical

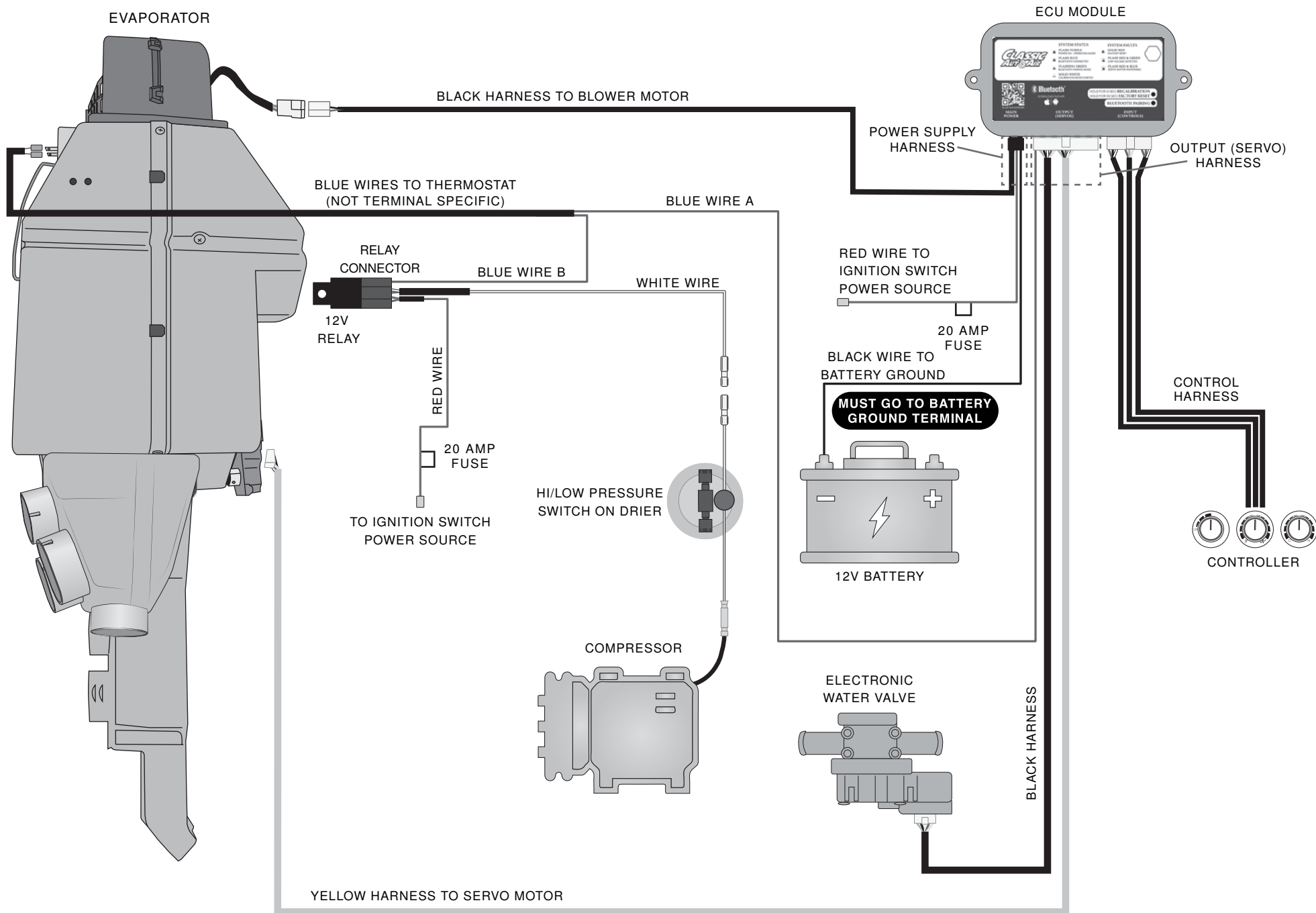


NOTE: The following wire harness installation steps are shown in the wiring diagram on the next page.

- Drill a 1-1/8 inch diameter hole in the firewall near the drain tube and under the firewall block off as shown below.
- Install the output (servo) wire harness according to the wire diagram on the next page.
- Run the black water valve harness and white pressure switch wire through the 1-1/8 inch hole in the firewall.
- Wrap the 1-1/8 inch grommet around the wires and insert into the hole.

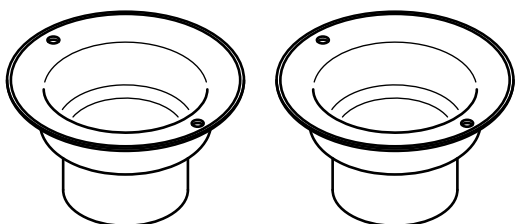


- Install the power supply wire harness according to the wire diagram on the next page.
- Mount the ECU with (2) #10-16 x 3/4" Tek screws.
- Secure the relay with the remaining #10-16 x 3/4" Tek screw.

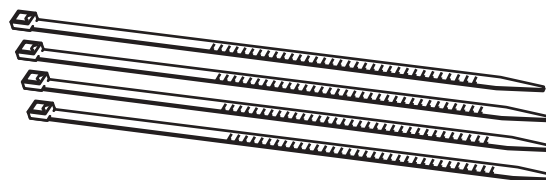


These are the parts you will find in Bag C

You will use all of these parts and hardware during the next series of installation steps.



Defrost Adapter (Qty. 2)
Part# 0037-19



8" Zip Tie (Qty. 4)
Part# AL-08-40-0-M



2" Dia. x 2' Long Duct Hose (Qty. 1)
Part# 2-1013



2" Dia. x 1' Long Duct Hose (Qty. 1)
Part# 2-1013

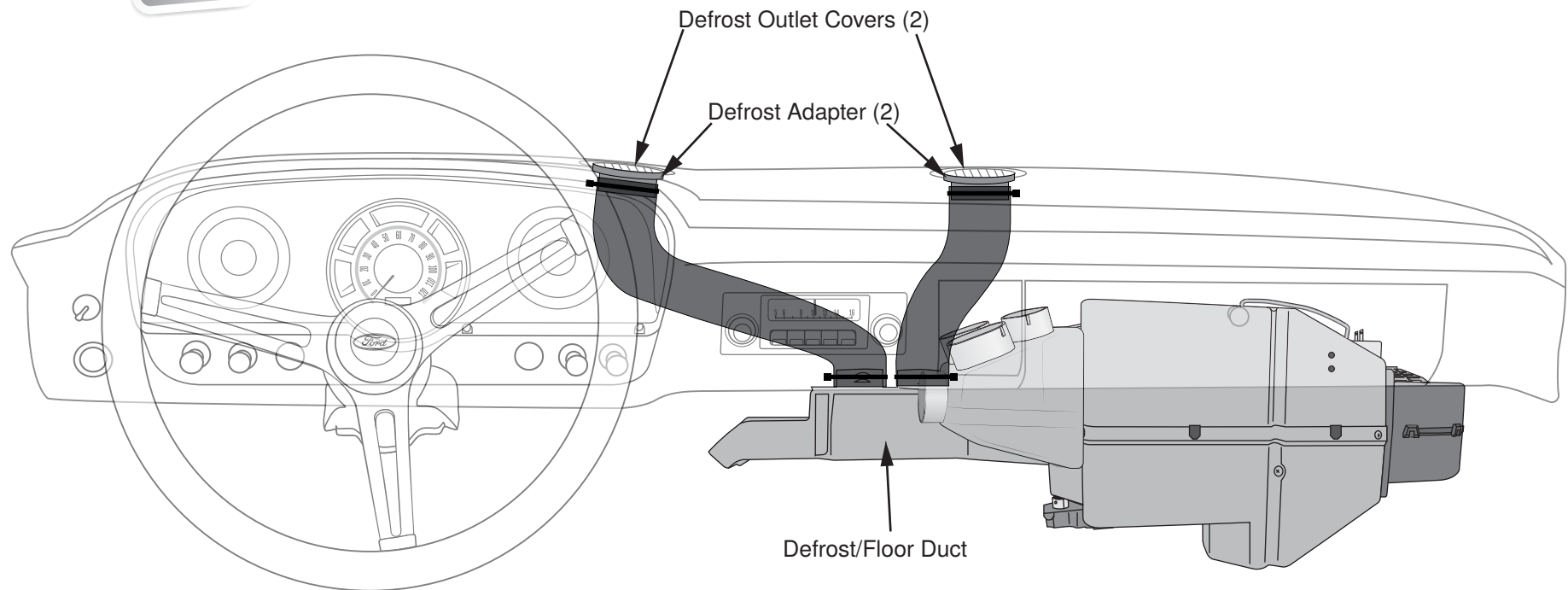
Installation - Defrost



- Insert a defrost adapter into each defrost opening in the dash, and reinstall the defrost outlet covers using the original hardware.
- Attach the 2 foot long duct hose to the driver side defrost adapter and the driver side hose adapter on the defrost/floor duct. Secure both ends with provided zip ties.
- Attach the 1 foot long duct hose to the passenger side defrost adapter and the passenger side hose adapter on the defrost/floor duct. Secure both ends with provided zip ties.



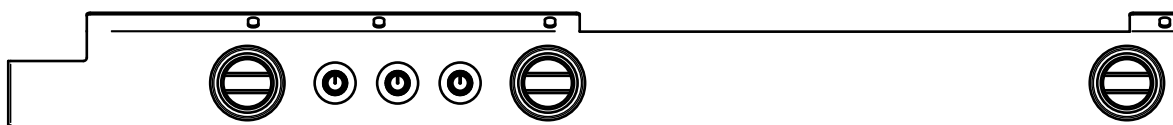
The smoother the route of the duct hose, the better the airflow.



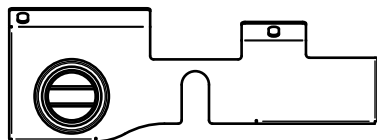
These are the parts you will find in the Control / Vent Panel Box and Bag D

You will use all of these parts and hardware during the next series of installation steps.

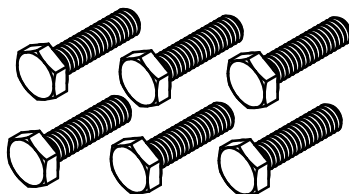
Control / Vent Panel Box



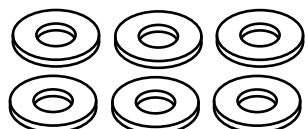
Passenger Side Vent Panel with Controls (Qty. 1)
Part# 16-4071V-1



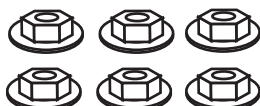
Driver Side Vent Panel (Qty. 1)
Part# 16-4071V-2



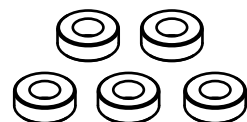
1/4"-20 x 1" Hex Bolt (Qty. 6)
Part# 25C100HHB5Z



1/4" Flat Washer (Qty. 6)
Part# 25NWSAB



1/4"-20 Flange Nut (Qty. 6)
Part# 25CNFLZ/S



1/4" Space (Qty. 5)
Part# X114

Bag D



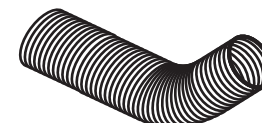
8" Zip Tie (Qty. 8)
Part# AL-08-40-0-M



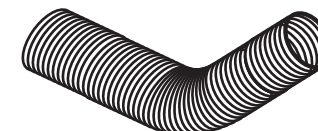
2" Dia. x 1' Long Duct Hose (Qty. 1)
Part# 2-1013



2" Dia. x 2' Long Duct Hose (Qty. 1)
Part# 2-1013



2" Dia. x 3' Long Duct Hose (Qty. 1)
Part# 2-1013



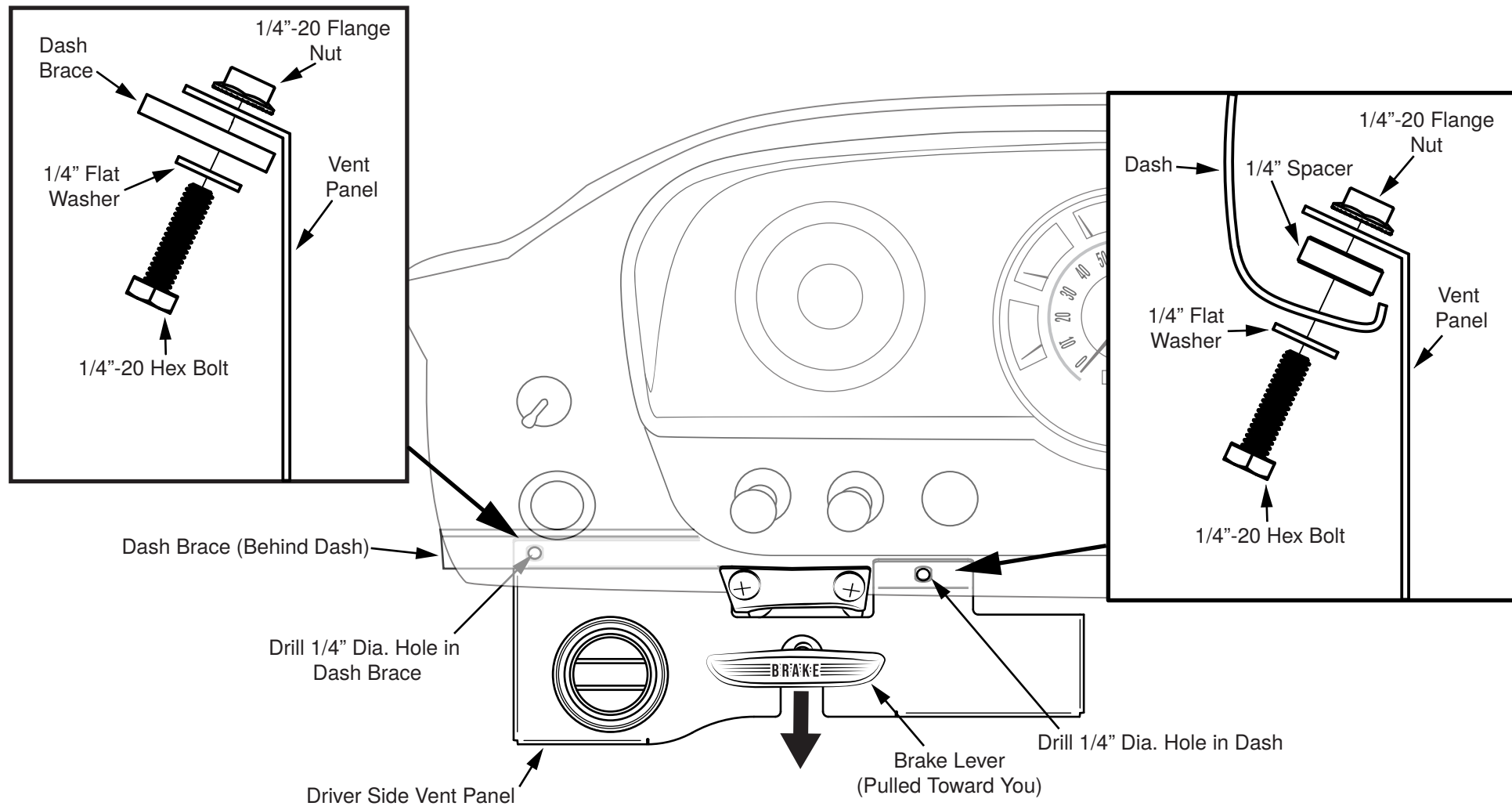
2" Dia. x 4' Long Duct Hose (Qty. 1)
Part# 2-1013

Installation - Driver Side Vent Panel



NOTE: You must pull the brake lever towards you all the way for clearance of the vent panel when installing.

- Slide the vent panel over the top of the brake lever and up behind the dash.
- Match drill a 1/4 inch diameter hole in the dash brace (behind the dash) on the left side.
- Match drill a 1/4 inch diameter hole in the dash on the right side.
- Secure the vent panel with (2) 1/4"-20 hex bolts, (2) 1/4"-20 flange nuts, (2) 1/4" flat washers, and (1) 1/4" spacer on the right side.

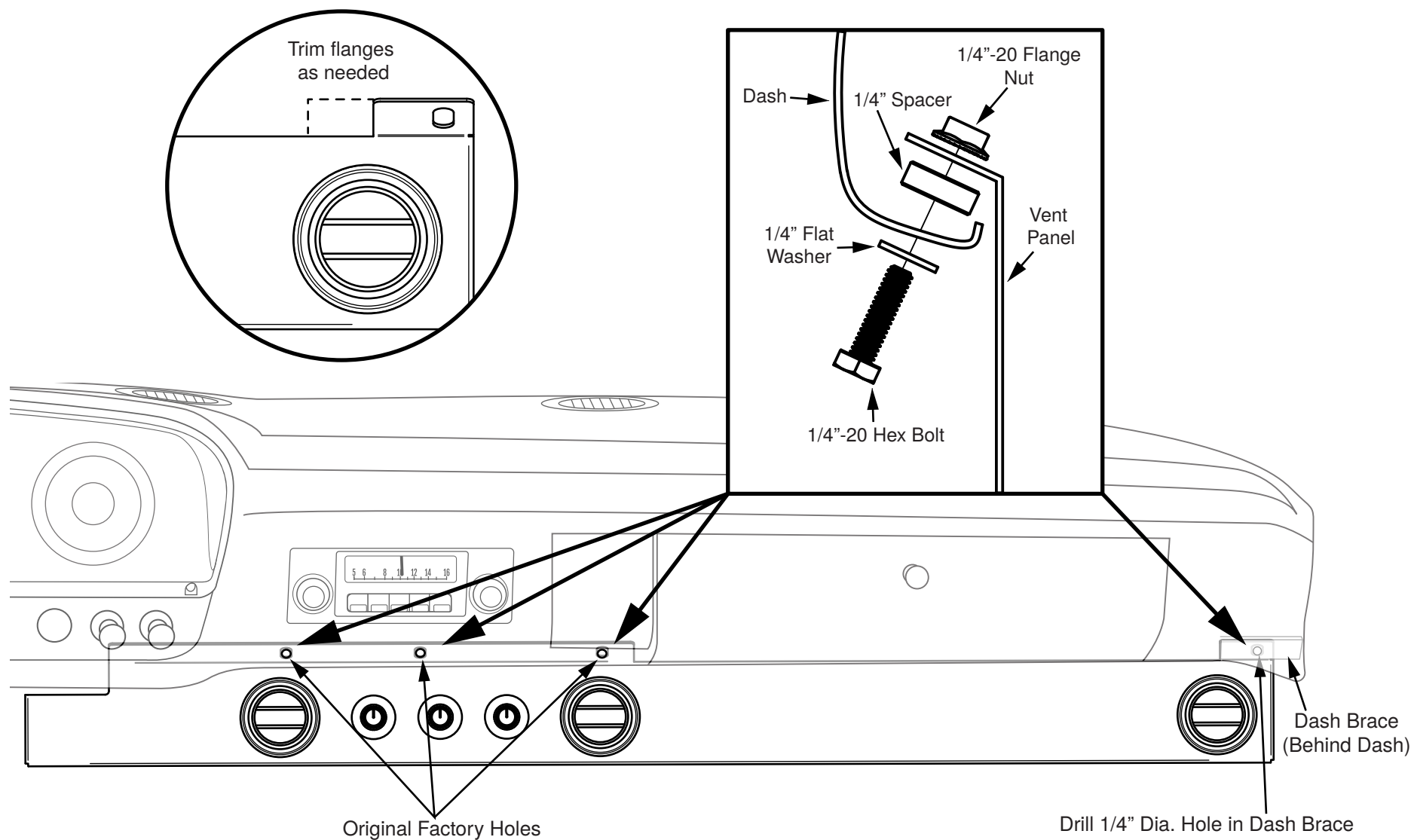


Installation - Passenger Side Vent Panel



- Slide the vent panel up behind the dash.
- Match drill a 1/4 inch diameter hole in the dash brace (behind the dash) on the right side.
- Secure the vent panel with (4) 1/4"-20 hex bolts, (4) 1/4"-20 flange nuts, (4) 1/4" flat washers, and (4) 1/4" spacers.
- Plug the control wire harness into the control connection on the ECU.

NOTE: It may be necessary to trim the vent panel flanges in order to get the perfect fit for your dash.



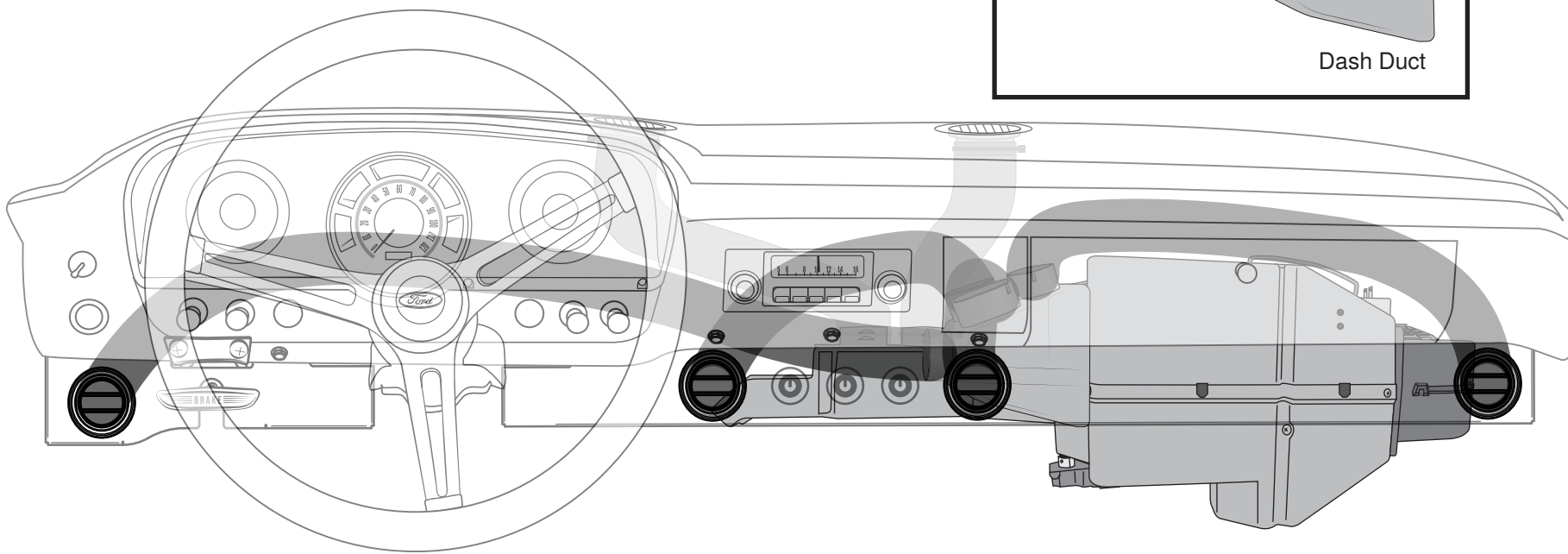
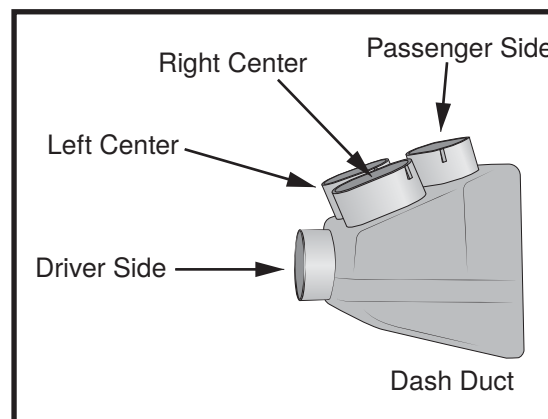
Installation - Duct Hose



- Attach the 4 foot long duct hose to the driver side louver assembly and the driver side hose adapter on the dash duct. Secure both ends with provided zip ties.
- Attach the 3 foot long duct hose to the left center side louver assembly and the left center side hose adapter on the dash duct. Secure both ends with provided zip ties.
- Attach the 1 foot long duct hose to the right center side louver assembly and the right center side hose adapter on the dash duct. Secure both ends with provided zip ties.
- Attach the 2 foot long duct hose to the passenger side louver assembly and the passenger side hose adapter on the dash duct. Secure both ends with provided zip ties.

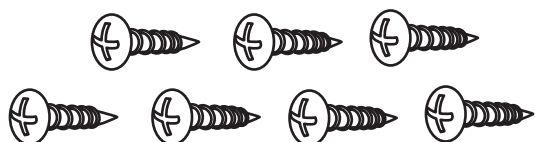


The smoother the route of the duct hose, the better the airflow.



These are the parts you will find in Bag E

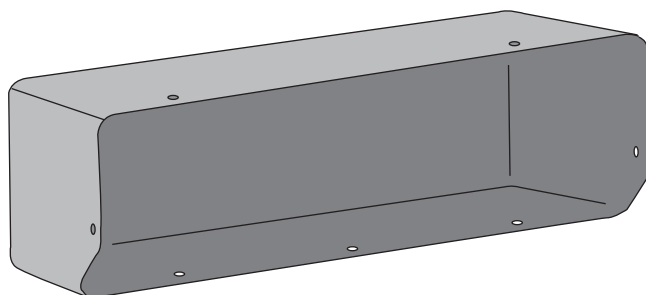
You will use all of these parts and hardware during the next series of installation steps.



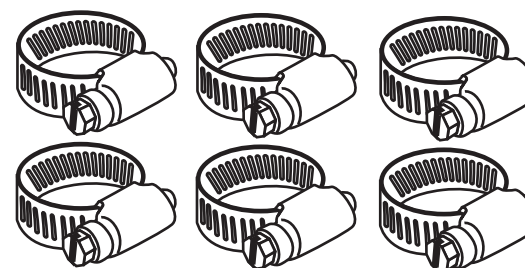
#10-16 x 5/8" PHP Screw (Qty. 7)
Part# 10B62PPBB



1' Long Refrigerant Tape (Qty. 1)
Part# Q-201



Glove Box (Qty. 1)
Part# 0037-15



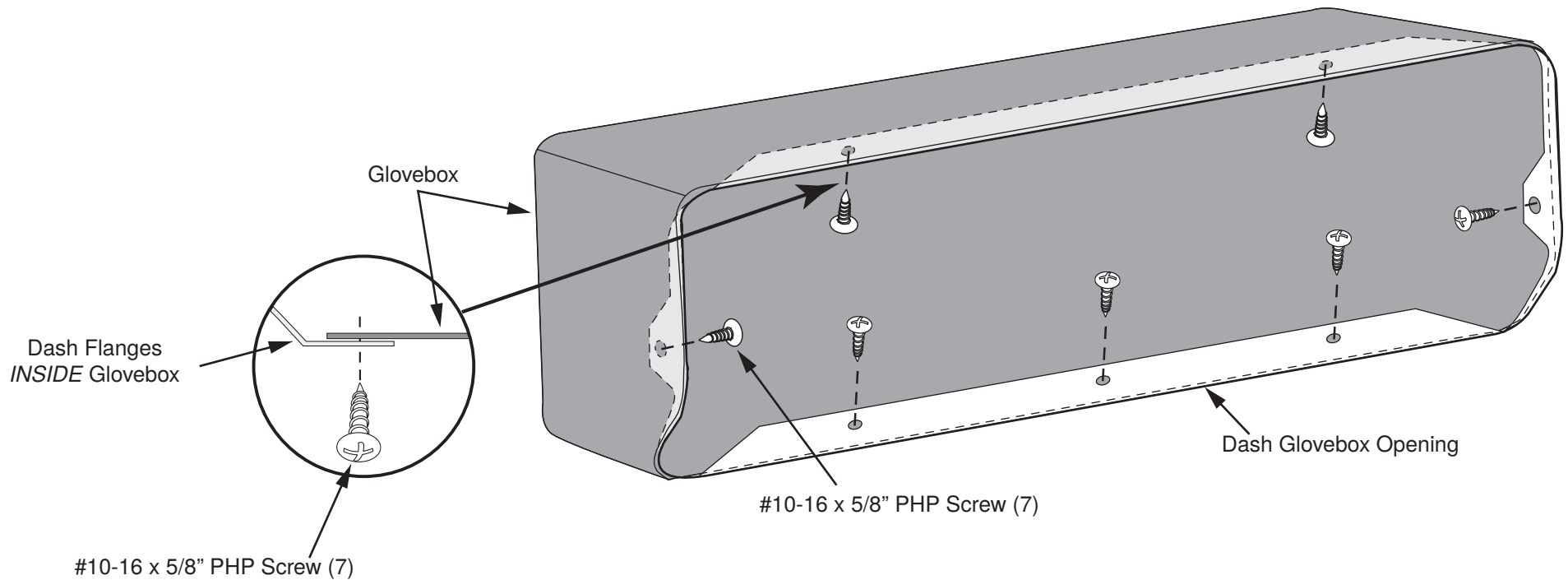
Worm Gear Clamp (Qty. 6)
Part# 6274 IDEAL

Installation - Glovebox



- Install the glovebox in the dash. The flanges of the dash opening should fit inside of the glovebox.
- Secure glovebox with (7) #10-16 x 5/8" PHP screws through the dash flanges and into the glove box.
- Re-install the glovebox door using the original hardware.

NOTE: Be careful not to over tighten the screws.



This completes the interior portion of the installation.
Continue on to the exterior engine compartment section.

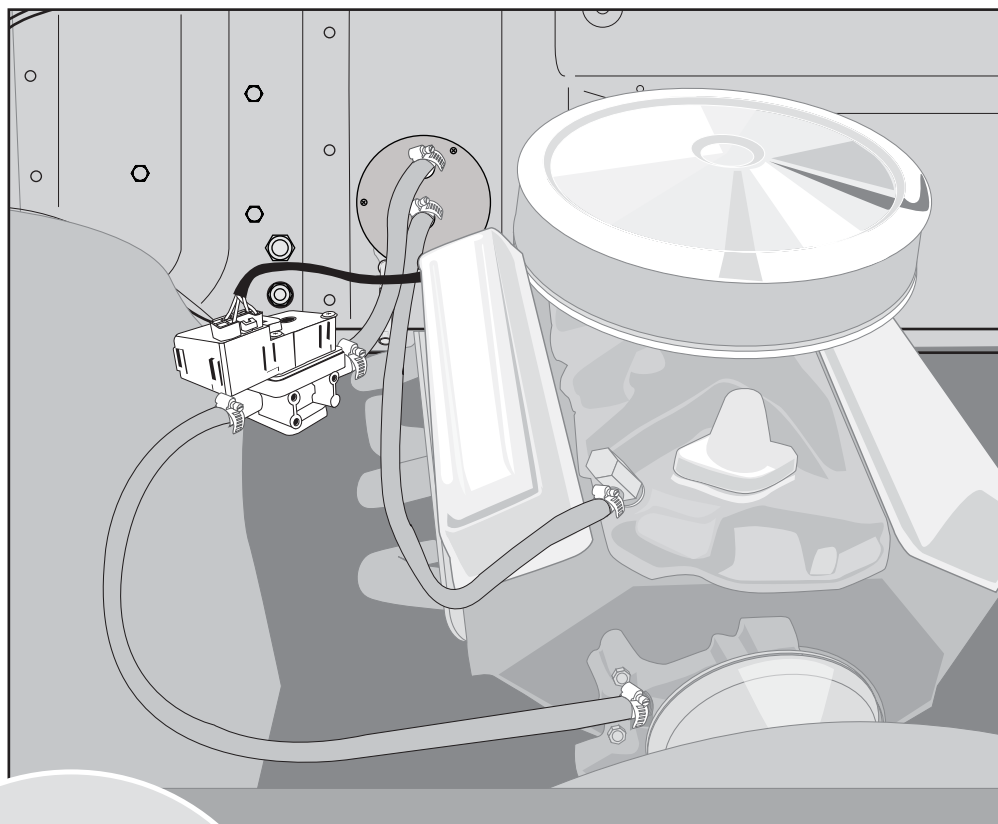
Installation - Water Valve



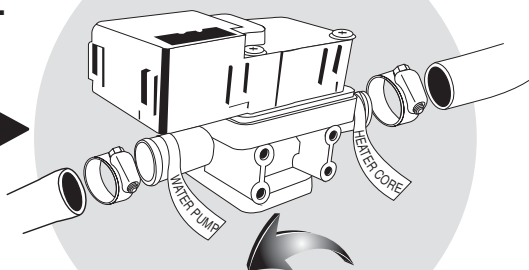
IMPORTANT NOTE:
Your water valve **MUST** be installed
per these instructions.

- The bottom heater connection on the firewall will be routed to the water connection on the intake manifold using 5/8" dia. heater hose and (2) provided worm gear clamps.
- The top heater connection on the firewall will be routed to the electronic water valve connection labeled HEATER CORE using 6 inches of 5/8" dia. heater hose and (2) provided worm gear clamps.
- The remaining water valve connection labeled WATER PUMP will be routed to the water pump using 5/8" dia. heater hose and (2) supplied worm gear clamps.
- Apply refrigerant tape where needed to seal the firewall.

NOTE: It is time to install the compressor. Included in your box is a premium compressor mount kit with all the parts you'll need to install the compressor. This kit includes easy to follow instructions specifically written for your engine. Once you've installed the compressor, continue on to the next page.

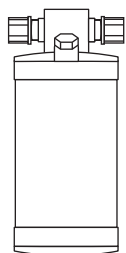


**FOLLOW THESE
TAGS... CHECK IT
TWICE BEFORE
PROCEEDING!**

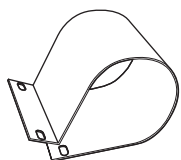


These are the parts you will find as part of the Condenser Kit

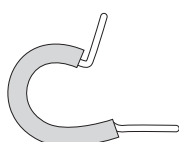
You will use all of these parts and hardware during the next series of installation steps.



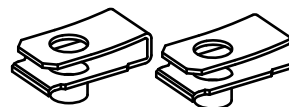
Drier (Qty. 1)
Part# 12-1008



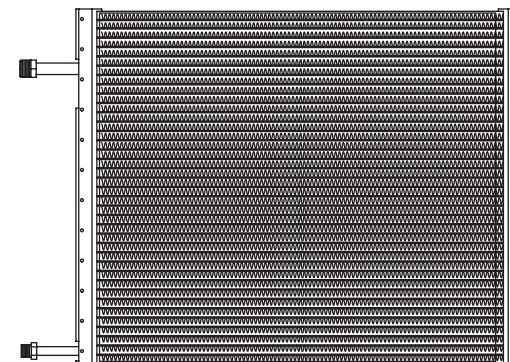
Drier Bracket (Qty. 1)
Part# 19-1003



#8 Hose Clamp (Qty. 1)
Part# 14-1096



1/4"-20 J-Clip (Qty. 2)
Part# LUGS142059PG



Condenser (Qty. 1)
Part# 11-1044-926



#10-16 x 3/4" Tek Screw (Qty. 3)
Part# 10B75HW3Z



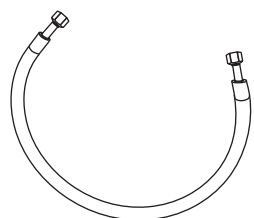
1/4"-20" x 5/8" Hex Bolt (Qty. 2)
Part# 25C62HHB5Z



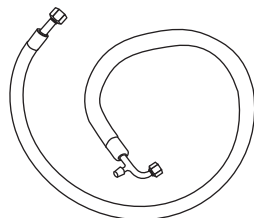
#10-20 x 1/4" Hex Screw (Qty. 10)
Part# 10B25SHBZ



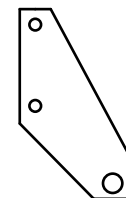
#8 (13/32") Discharge
Refrigerant Hose (Qty. 1)
Part# H0046-85



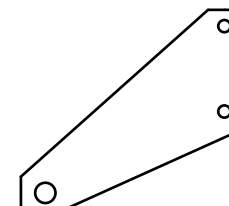
#6 (5/16") Evaporator Liquid
Refrigerant Hose (Qty. 1)
Part# H0046-87



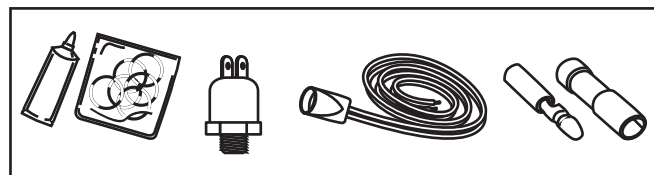
#10 (1/2") Suction
Refrigerant Hose (Qty. 1)
Part# H0046-86



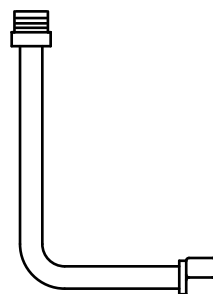
Lower Condenser Mounting
Bracket, Driver Side (Qty. 1)
Part# 0046-51



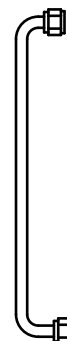
Lower Condenser Mounting
Bracket, Passenger Side (Qty. 1)
Part# 0046-50



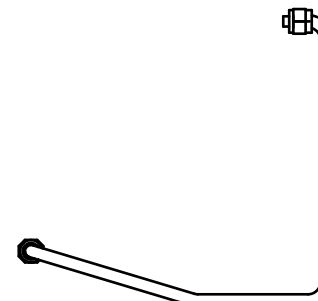
High/Low Pressure Switch Kit
Part# 16-1007



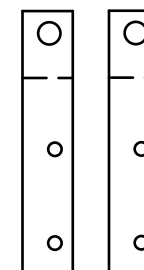
#8 Discharge Tube (Qty. 1)
Part# 0020-65A



#6 Liquid Tube (Qty. 1)
Part# 0028-10-2R1



#6 Liquid Tube (Qty. 1)
Part# 0020-64



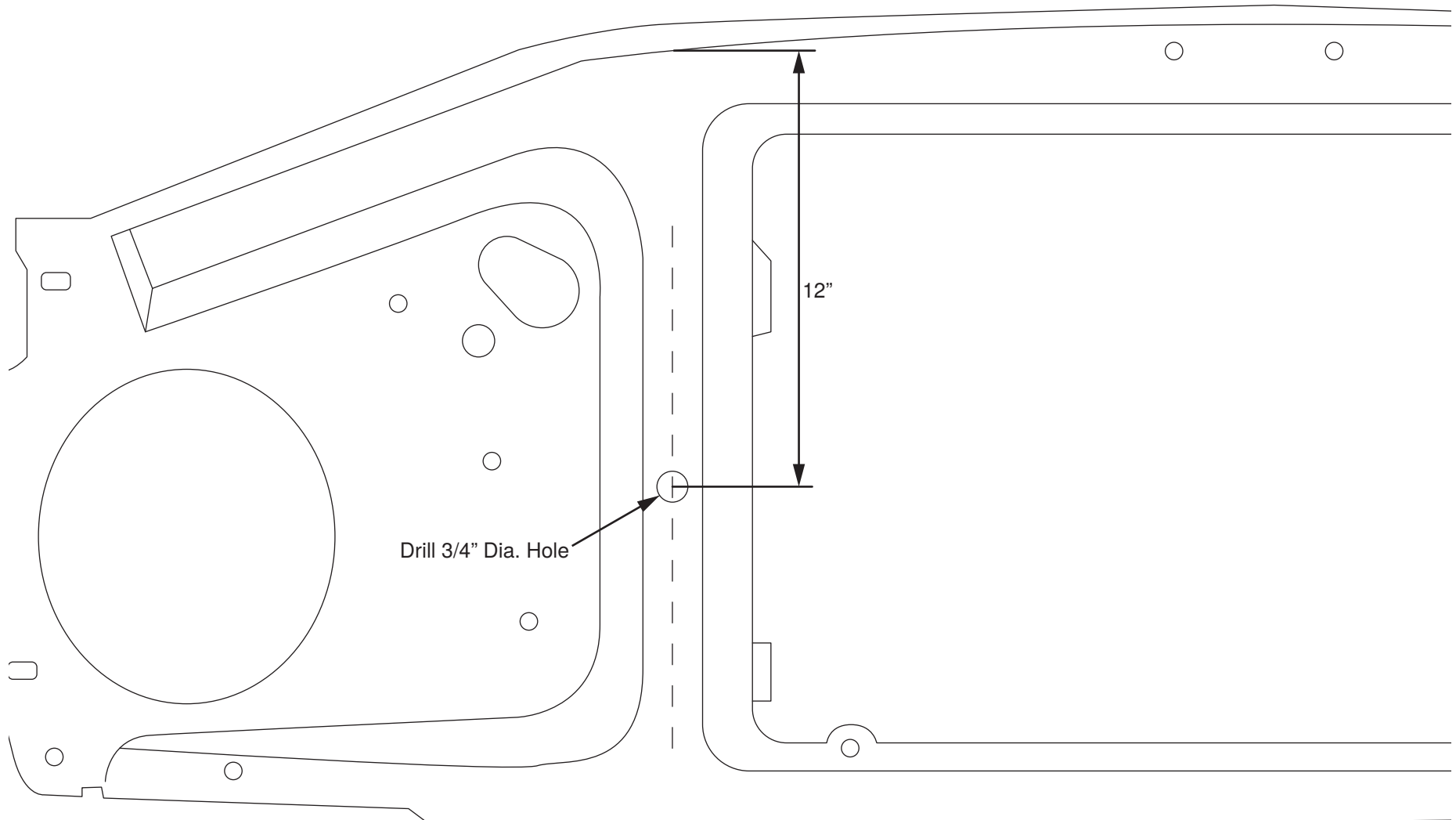
Upper Condenser Mounting
Bracket (Qty. 2)
Part# 0020-63

Install Prep



NOTE: This kit is designed for a radiator support with a 27.5" radiator opening.

- Remove original hood latch assembly, grille, fan, fan shroud, and radiator. Retain all original hardware.
- Measure 12 inches down from the top of the radiator support and drill a 3/4 inch diameter hole centered on the dashed line approximately as shown.

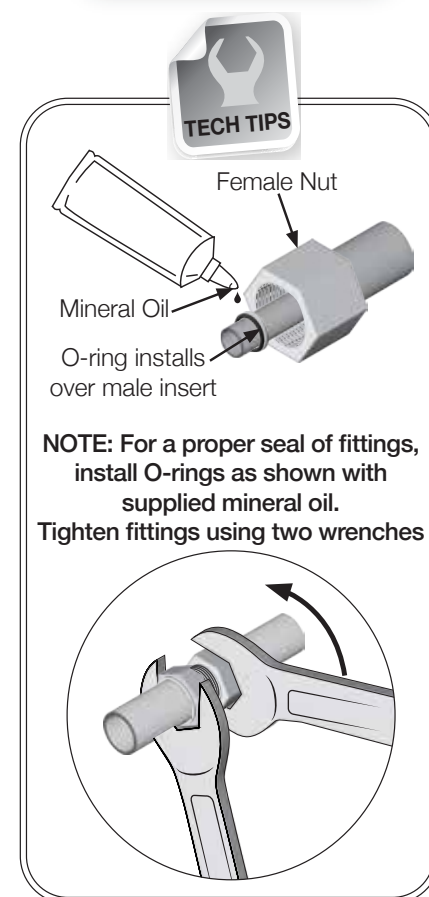
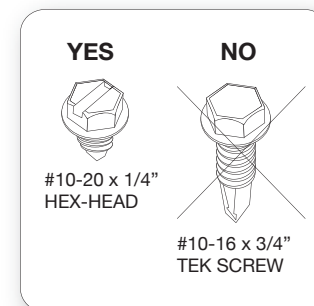
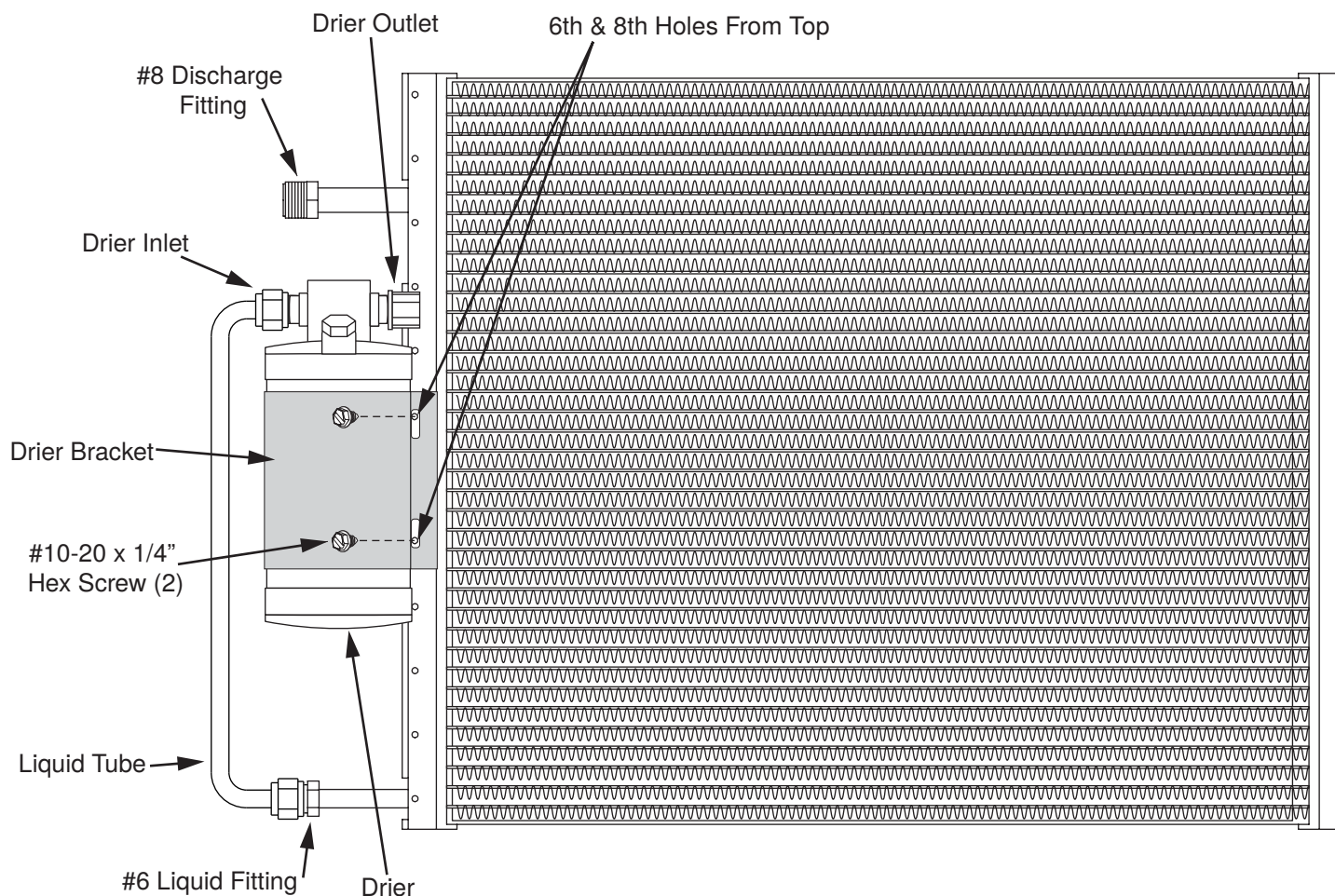


PASSENGER SIDE OF RADIATOR SUPPORT

Install Prep



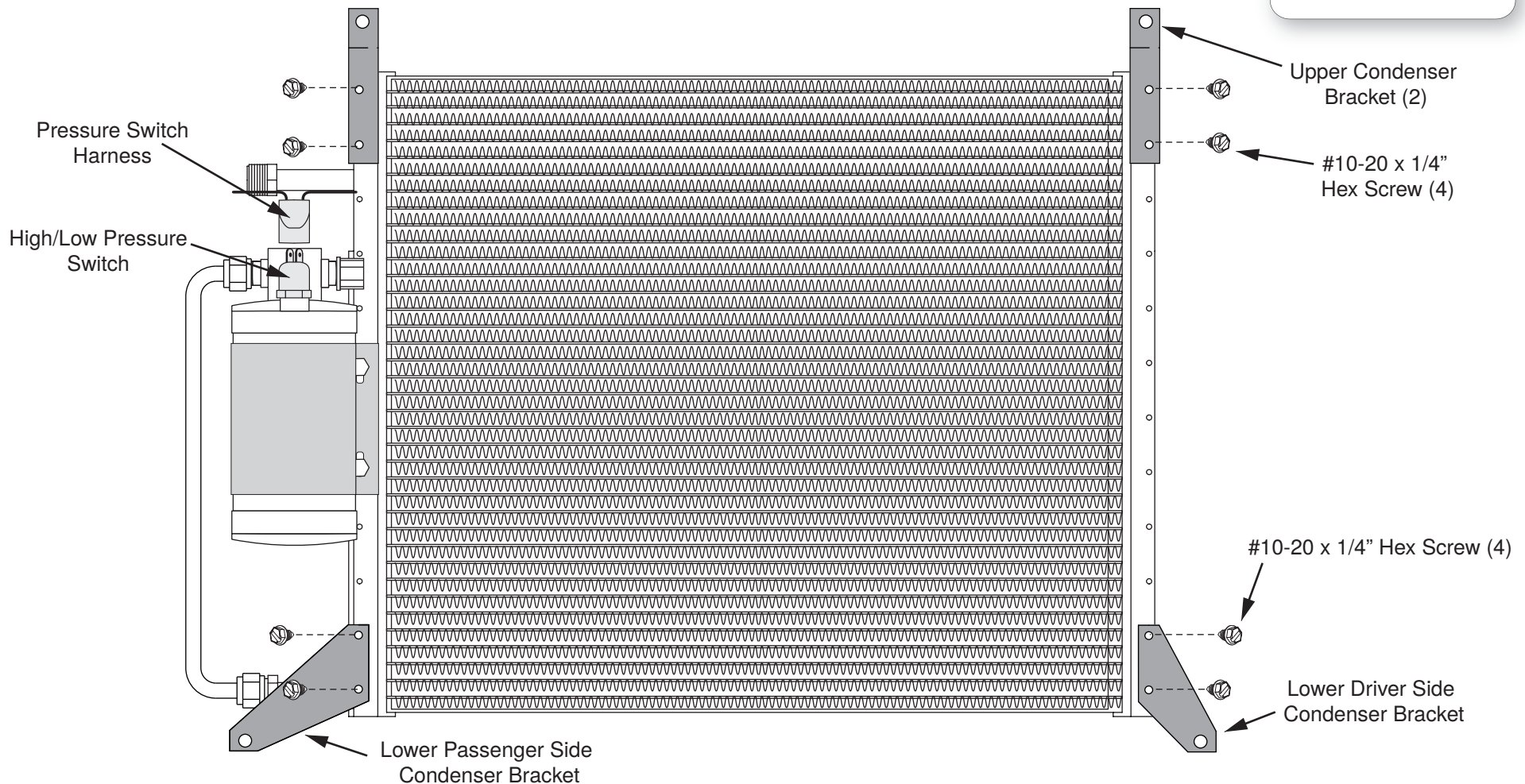
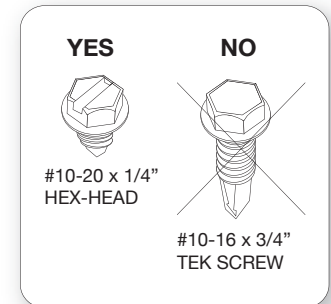
- Place the condenser on a clean, flat surface. Orient it so that the fittings are to the left and the larger #8 discharge fitting is at the top.
- Attach the liquid tube (Part# 0028-10-2R1) to the smaller #6 liquid fitting on the condenser using a #6 o-ring and a few drops of mineral oil.
- Insert the drier into the drier bracket and attach the inlet port on the drier to the other end of the liquid tube with a #6 o-ring and a few drops of mineral oil.
- Secure the drier bracket to the condenser using (2) #10-20 x 1/4" hex screws in the 6th and 8th holes from the top. **NOTE: Make sure to use the #10-20 x 1/4" hex screws and NOT the Tek screws.**



Install Prep



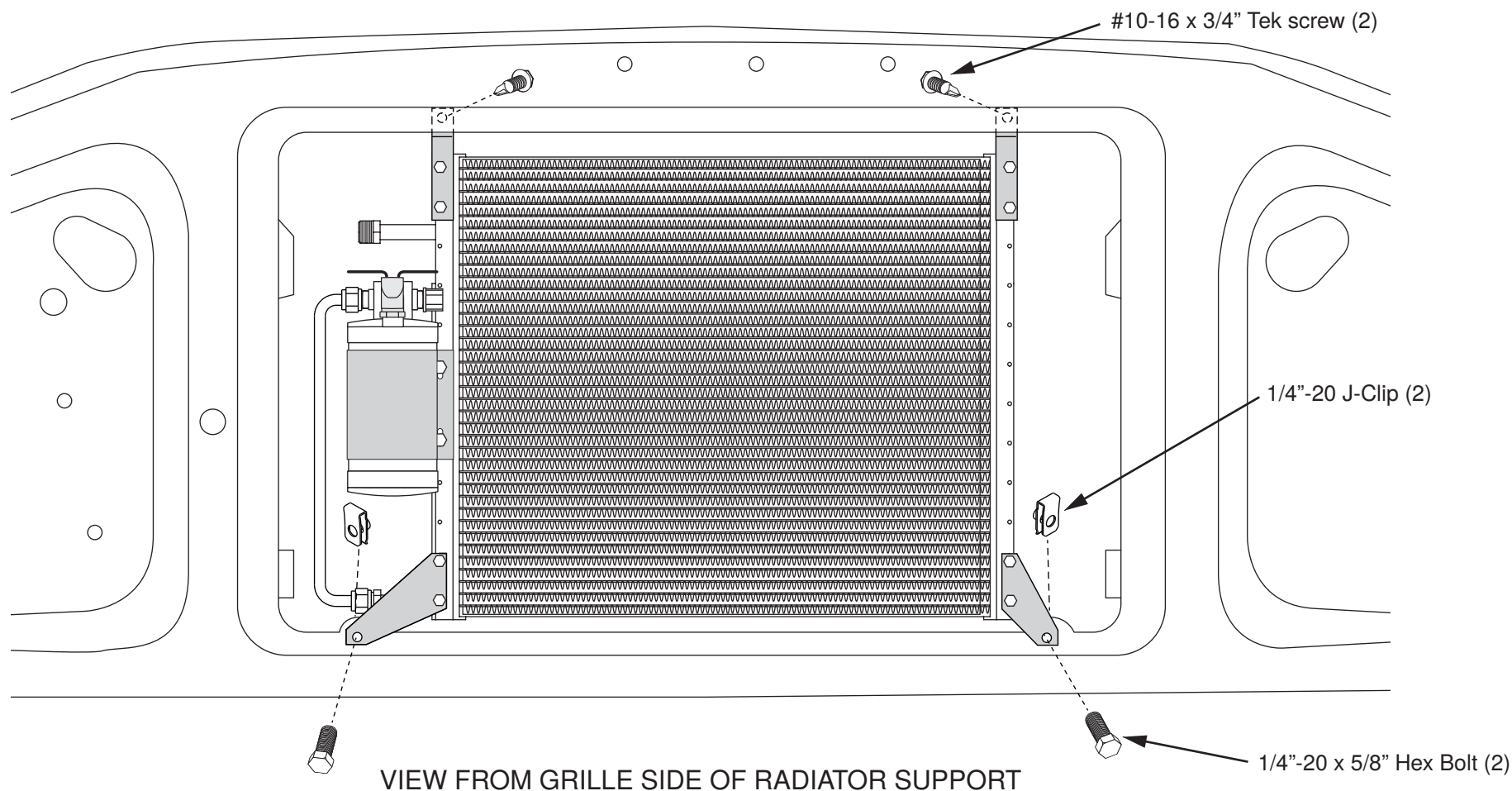
- Install the upper condenser mounting brackets to the condenser using the top two holes on each side. Secure each bracket with (2) #10-20 x 1/4" hex screws. **NOTE: Make sure to use the #10-20 x 1/4" hex screws and NOT the Tek screws.**
- Install the lower condenser mounting brackets to the condenser using the top bottom holes on each side. Secure each bracket with (2) #10-20 x 1/4" hex screws.
- Screw the high/low pressure switch into the port on the drier using the supplied o-ring and a few drops of mineral oil.
- Plug the pressure switch harness into the high/low pressure switch.



Installation - Condenser



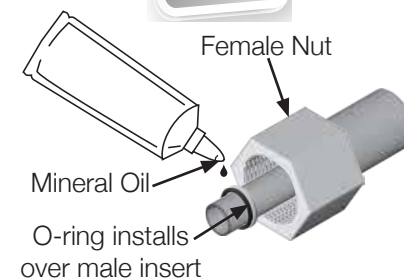
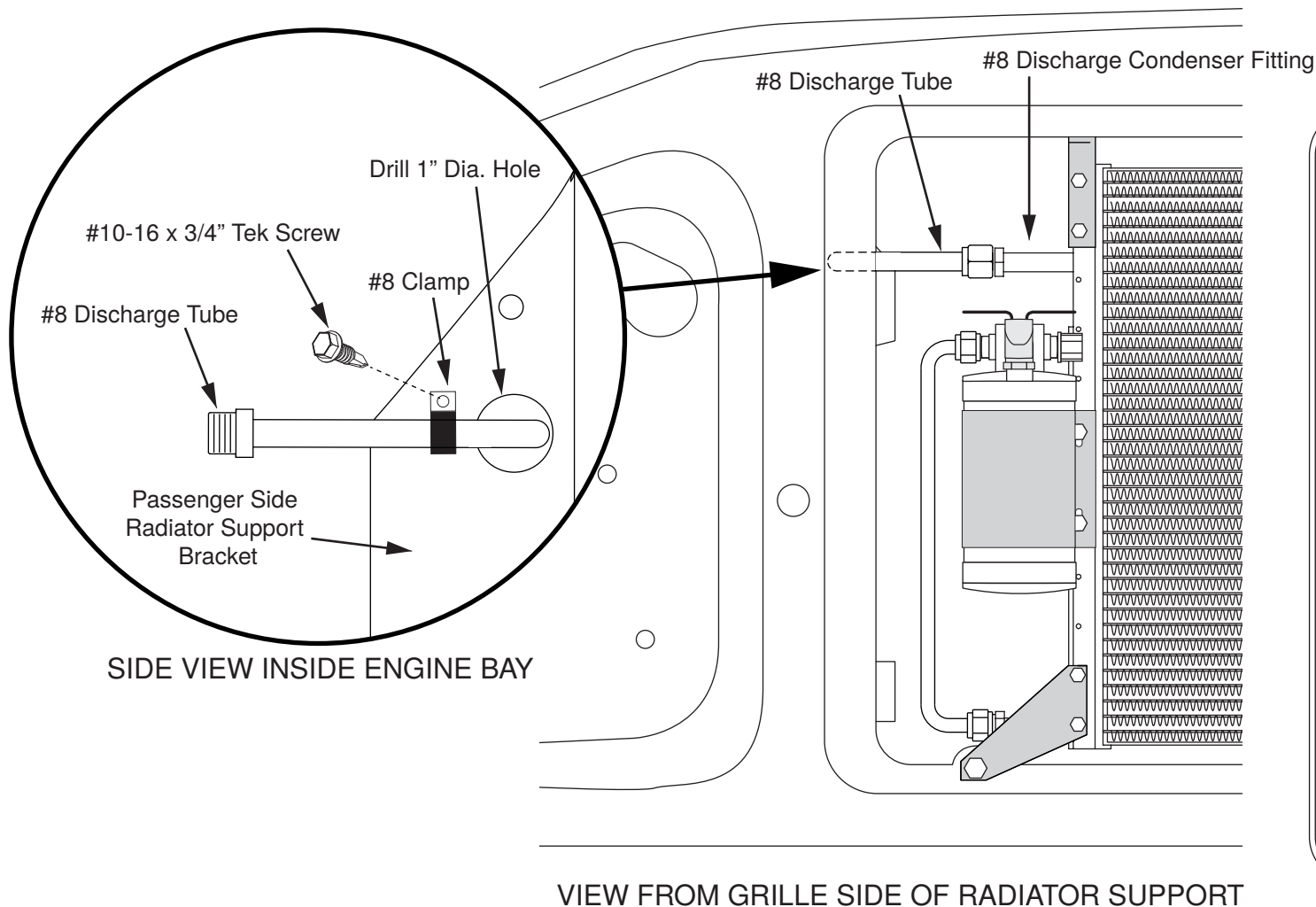
- With the condenser fittings facing the passenger side, slide the condenser assembly into the radiator support opening. **NOTE: The bottom mounting brackets will be on the grill side of the radiator support. The top mounting brackets will be on the engine side of the radiator support.**
- Secure the lower condenser mounting brackets by attaching (2) 1/4"-20 J-clips to the flanges over the factory holes, and using (2) 1/4"-20 x 5/8" hex bolts.
- Secure the upper condenser mounting brackets to the radiator support using (2) #10-16 x 3/4" Tek screws from the engine side.



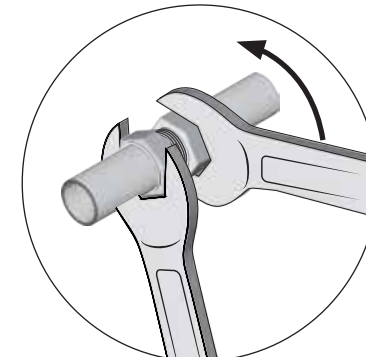
Installation - Discharge Tube



- Using the upper condenser fitting as a guide, drill a 1 inch diameter hole in the radiator support bracket in line with the fitting.
- Attach the #8 discharge tube through the hole and onto the upper condenser fitting as shown with a #8 o-ring and a few drops of mineral oil.
- Use the #8 clamp and a #10-16 x 3/4" tek screw to secure the tube to the radiator support bracket.



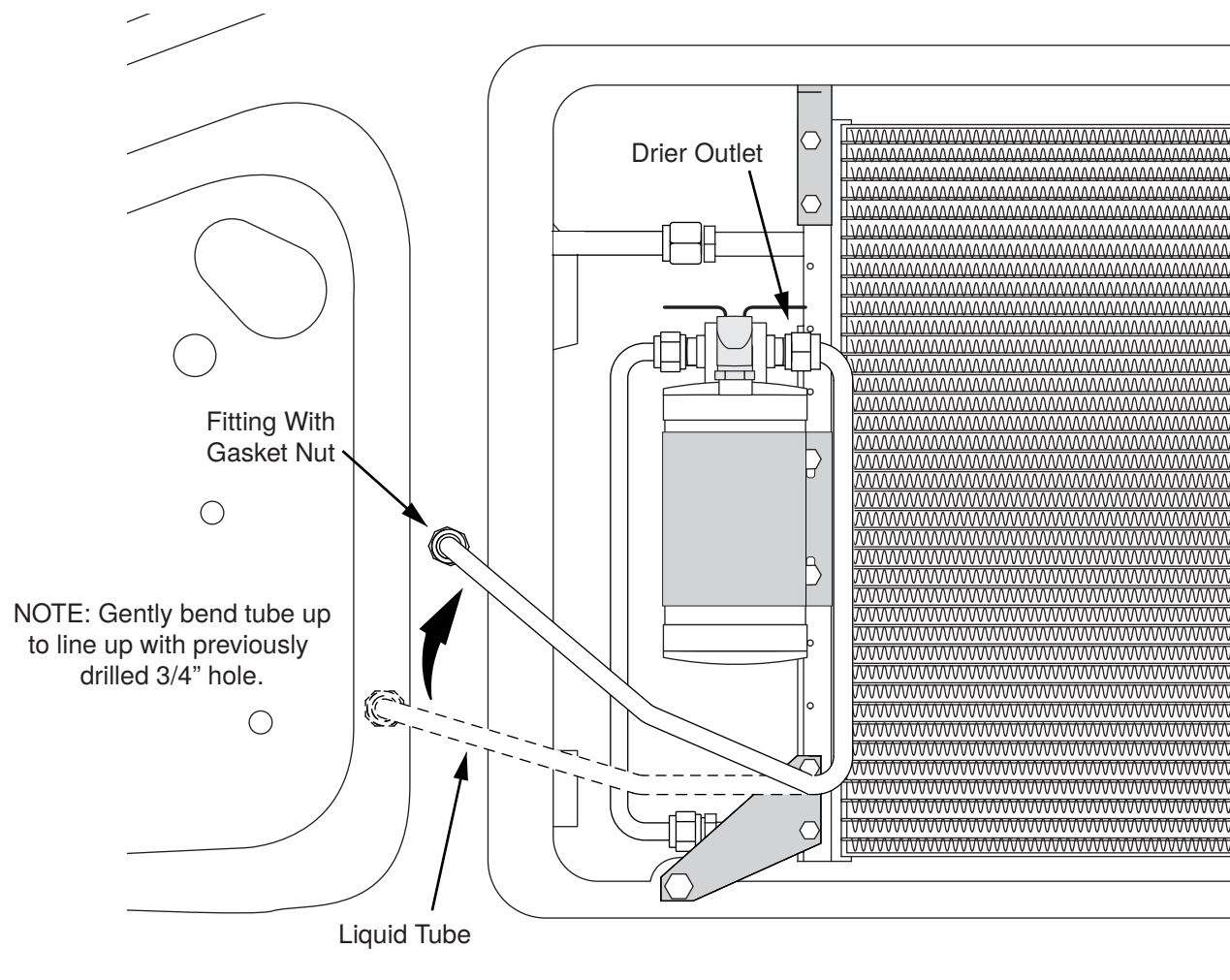
NOTE: For a proper seal of fittings, install O-rings as shown with supplied mineral oil. Tighten fittings using two wrenches



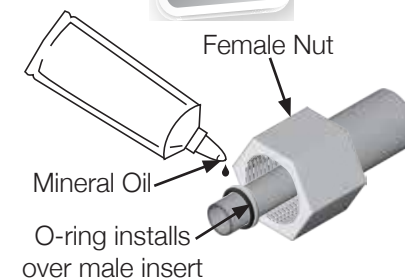
Installation - Liquid Tube



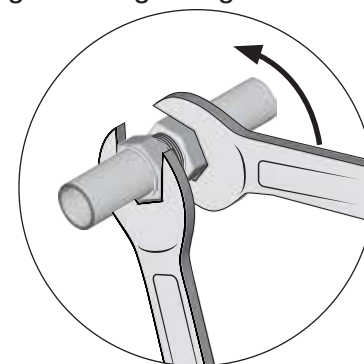
- Remove the gasket and nut from the liquid tube (Part# 0020-64).
- Attach the #6 liquid tube to the outlet port on the drier as shown with a #6 o-ring and a few drops of mineral oil.
- Attach the other end of the liquid tube to the radiator support in the 3/4" hole that was drilled previously by re-installing the gasket and nut. **NOTE: You must gently bend the tube up so that the fitting lines up with the 3/4" hole.**



VIEW FROM GRILLE SIDE OF RADIATOR SUPPORT



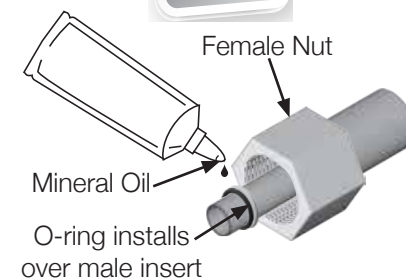
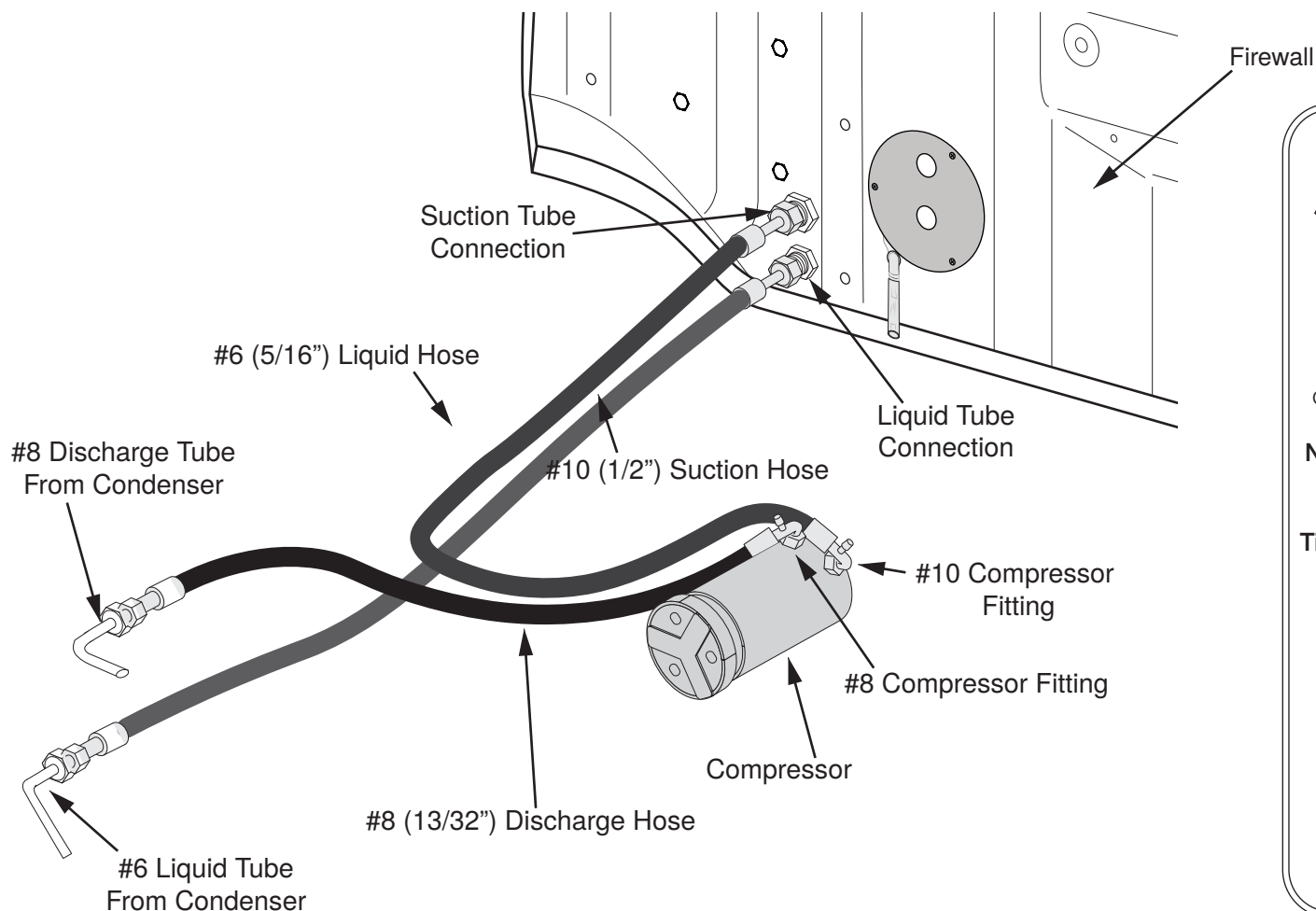
NOTE: For a proper seal of fittings, install O-rings as shown with supplied mineral oil. Tighten fittings using two wrenches



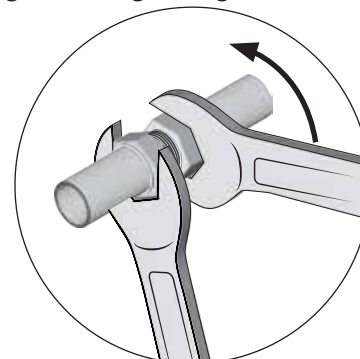
Installation - Hoses



- Attach one end of the #6 (5/16") liquid hose to the liquid tube connection from the evaporator at the firewall, and the other end to the liquid tube at the radiator support. Use #6 o-rings and a few drops of mineral oil at both ends.
- Attach the straight end of the #8 (13/32") discharge hose to the discharge tube at the radiator support, and the other end to the #8 fitting on the compressor. Use #8 o-rings and a few drops of mineral oil at both ends.
- Attach the straight end of the #10 (1/2") suction hose to the suction tube connection from the evaporator at the firewall, and the other end to the #10 fitting on the compressor. Use #10 o-rings and a few drops of mineral oil at both ends.



NOTE: For a proper seal of fittings, install O-rings as shown with supplied mineral oil. Tighten fittings using two wrenches



Installation - Pressure Switch Wire Harness



- Splice one white wire from the pressure switch harness to the white wire coming through the firewall from the output (servo) wire harness using the connectors in the high/low pressure switch kit.
- Connect the other white wire from the pressure switch harness to the compressor wiring using the connectors in the high/low pressure switch kit.
- Reinstall radiator, fan and fan shroud, grille, and hood latch assembly using original hardware.

NOTE: It might be necessary to modify the hood latch assembly to allow clearance for the new condenser.

NOTE: Take a look around at your installation and check all fittings, bolts, and clamps for tightness, and make sure nothing is routed in a way to obstruct any moving parts.

You can refill the radiator and reconnect the battery at this time.

**You've just completed the installation of your new A/C system.
The very final step is to fully charge and test your new system.**

On the next pages you'll find specifications for final preparation and operations for your A/C technician.

New A/C System Preparation... A 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 ensure that your new system will perform at it's peak, and that your compressor will not be damaged.

1. Your radiator/heater coil are an integral part of your new system. Please ensure that you have a 50/50 mix of distilled water and antifreeze. The heater coil **MUST** be purged (cycle heater control valve) to make sure no water without antifreeze is in the heater coil before you charge the A/C system.
 1. Evacuate the system for 45 minutes minimum.
2. 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**).
 1. Your new system requires 134a refrigerant. It will require 1.5 lbs (or 24 oz).
 2. Your new compressor comes charged with oil - NO additional oil is needed.
 3. Ensure that the new belt is tight.
4. **DO NOT CHARGE SYSTEM WITH LIQUID REFRIGERANT!**

Recommended Test Conditions:

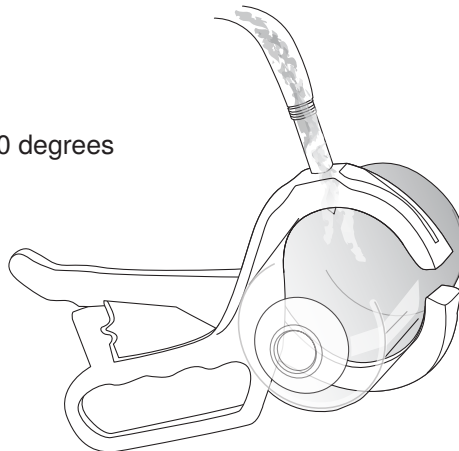
(After system has been fully charged and tested for basic operation)

- 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

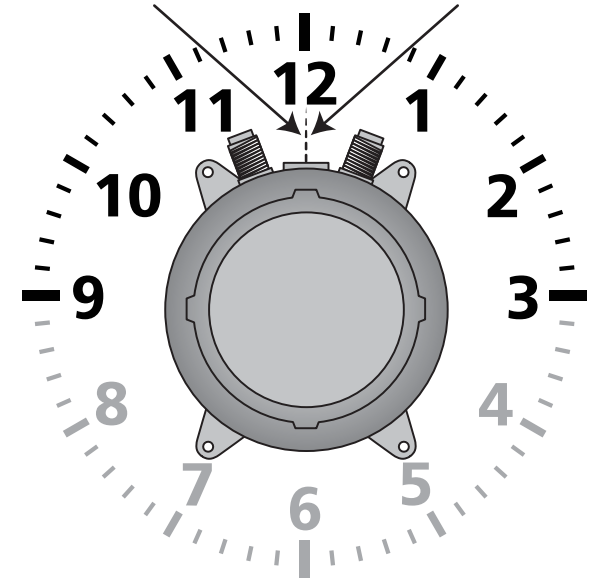
Acceptable Operating Pressure Ranges:

- High Side Pressures (150-275 PSI)*
- Low Side Pressures (10-25 PSI in a steady state)*

*Readings above are based on an ambient temperature of 90 degrees with an adequate airflow on condenser.



CENTERLINE OF THE OIL FILL BOLT



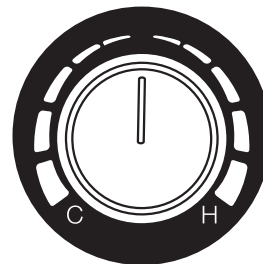
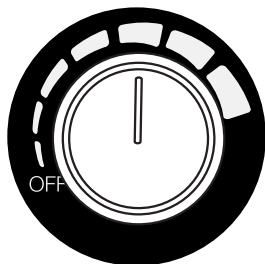
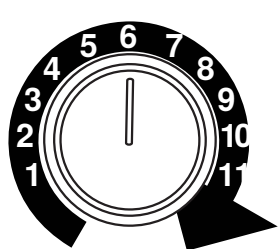
CAUTION! When mounting your compressor and/or adjusting the belt use caution. Mount by using the centerline of the oil fill plug as your guide. The compressor can **ONLY** be mounted in between the 9 to 3 positions. **DO NOT** mount in between the 4 to 8 positions.

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.

Operations



Your new Smart A/C Series system offers complete comfort capabilities in virtually every driving condition. This includes hot and cold temperature control in all of the modes. This system also provides the ability to blend the air between dash, defrost, and floor modes simultaneously. To illustrate the various ways you can adjust the airflow direction and temperature, we've provided this illustration and chart to show exactly how you can adjust your Smart A/C Series system for maximum comfort.



FAN	POSITON	MODE			TEMP	
SPEED		DASH	DEFROST/FLOOR	COMPRESSOR	HEATER VALVE POSITION	COMPRESSOR
0%	1	100%	0%	ON	CLOSED - COLD	ON
10%	2	90%	10%	ON	VARIABLE	ON
20%	3	80%	20%	ON	VARIABLE	ON
30%	4	70%	30%	ON	VARIABLE	ON
40%	5	60%	40%	ON	VARIABLE	ON
50%	6	50%	50%	ON	VARIABLE	ON
60%	7	40%	60%	ON	VARIABLE	ON
70%	8	30%	70%	ON	VARIABLE	ON
80%	9	20%	80%	ON	VARIABLE	ON
90%	10	10%	90%	ON	VARIABLE	ON
100%	11	0%	100%	ON	OPEN - HOT	OFF

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.)

1. Connect gauges or service equipment to high/low charging ports
2. Place blower fan switch on medium
3. Close all doors and windows on the vehicle
4. Place shop fan in front of condenser
5. Run engine idle up to 1500 RPM

Acceptable Operating Pressure Ranges

- High Side Pressures (150-275 PSI) NOTE: General rule of thumb is two times the ambient daytime temperature, plus 15-20%
- Low Side Pressures (10-25 PSI in a steady state)

Typical Problems Encountered In Charging Systems

- **Noisy Compressor**
 - A noisy compressor is generally caused by charging a compressor with liquid or overcharging. If the system is overcharged both gauges will read abnormally high. 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 recharged to exact weight specifications (R134a refrigerant - 1.5 lbs or 24 oz).
- **Incorrect Heater Control Valve Installation**
 - Usually when this occurs the system will cool at idle then start to warm up when raising the RPM of the motor. THE WATER VALVE IS A DIRECTIONAL VALVE; MAKE SURE THE WATER FLOW IS WITH THE DIRECTION OF THE ARROW ON THE VALVE. As the engine heats up, the water transfers the heat to the coil, thus overpowering the A/C coil. A leaking or faulty valve will have a more pronounced effect 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 the heater hoses from the evaporator completely, and "loop" the ends together. By driving down the road with the hoses looped back to the motor, you eliminate the possibility of heat transfer to the evaporator.
- **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). This restricts the flow of air that can pass through it, which prevents the air from flowing through the system and out the vents. A common cause of external freezing is high humidity in the passenger compartment. All door and window seals should be checked in the event of constant freeze up.
 - 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.
- **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 of the condenser. If the pressures drop significantly, this will indicate the need for better airflow.
 - These symptoms can also be caused by inadequate condenser capacity, which can be solved by using a larger condenser.
- **Expansion Valve Failure**
 - An expansion valve failure is generally caused by dirt or debris entering the system during assembly. A valve that is blocked will be indicated by high side pressures that are abnormally high, while the low side pressures are abnormally 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.
- **Restrictions In System**
 - A high side restriction (between the compressor and the drier inlet) will be indicated by the discharge gauges reading excessively high.

Troubleshooting Guide



PROBLEM: System is not cooling properly (Cold at idle, warmer when raising engine RPM)

Make Sure The Electronic 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, overpowering the cooling effect of the A/C coil.

Step 1: Check placement of the water valve and correct if needed. (In some cases, changing the location of the water valve may not fix the above problem. If so, continue to the 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 heater hoses from the heater core and "loop" together. (This will remove the heater system completely from the set up.) If they system now cools, replace the water valve.

Verify Adequate Air Flow To Condenser

The function of the condenser is to dissipate heat, and for it to function properly there has to be adequate airflow across the condenser. Without proper airflow your system will not cool correctly, leaving the air in the cabin of your vehicle too hot.

Step 1: Connect gauges to high/low charging ports. The high side pressures should be between 150-275 PSI, and the low side pressures should be between 10-25 PSI (based off an outside ambient temperature of 90 degrees). If the low side pressures are normal and the high side pressures are high, then there might be an airflow issue. Continue to the next step.

Step 2: Test airflow to the condenser using the following three tests:

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

3. With the car still in idle and the gauges attached, pour water down the front of the condenser. If the paper is held in place, you are getting at least some air flow. If the high side pressures decrease 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.

Confirm Correct Refrigerant Charge In System

All of our systems should be charged with 1.5 lbs (or 24 oz) of R134a refrigerant only. If overcharged you will need to evacuate the system and recharge with the correct amount.

Check For Unusual Pressure Measurements

Certain unusual pressure measurements can indicate specific issues within the system. Attach gauges to the high/low charging ports to get pressure readings.

Step 1: Check for high and low side pressure readings that seem to be equal. This indicates that you have a malfunctioning expansion valve that is stuck open and needs to be replaced.

Step 2: Check for high pressure readings that are extremely high, accompanied by low pressure readings that are extremely low. This indicates that there is a blockage in the system. Remove hoses and blow compressed air through in both directions. If pressures don't change, it is possible that your expansion valve is stuck closed and needs to be replaced.

PROBLEM: Noisy Compressor

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 1.5lbs or 24 oz of R134a refrigerant) compressor can cause rattling. If charged with pure liquid, there is a high probability the reed valves are bent which causes a tapping sound.

SCAN QR code
with your mobile camera

Get the technical support you want the moment you need it, with no wait times. Simply **SCAN** the QR code and be directly taken to our support section to troubleshoot all things A/C.

