

# **Installation Manual**

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## **1969-89 Porsche 911 (Non-Turbo)**

*Right Hand Drive Kit*

DOCUMENT #RA-1-1008

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# ***Congratulations...***

**You have just purchased the highest quality, best performing A/C system ever designed for your 1969-89 Porsche 911.**

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.

Again, thank you from our entire staff.



## 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 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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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.**
- 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.

## Procedures, During Installation:

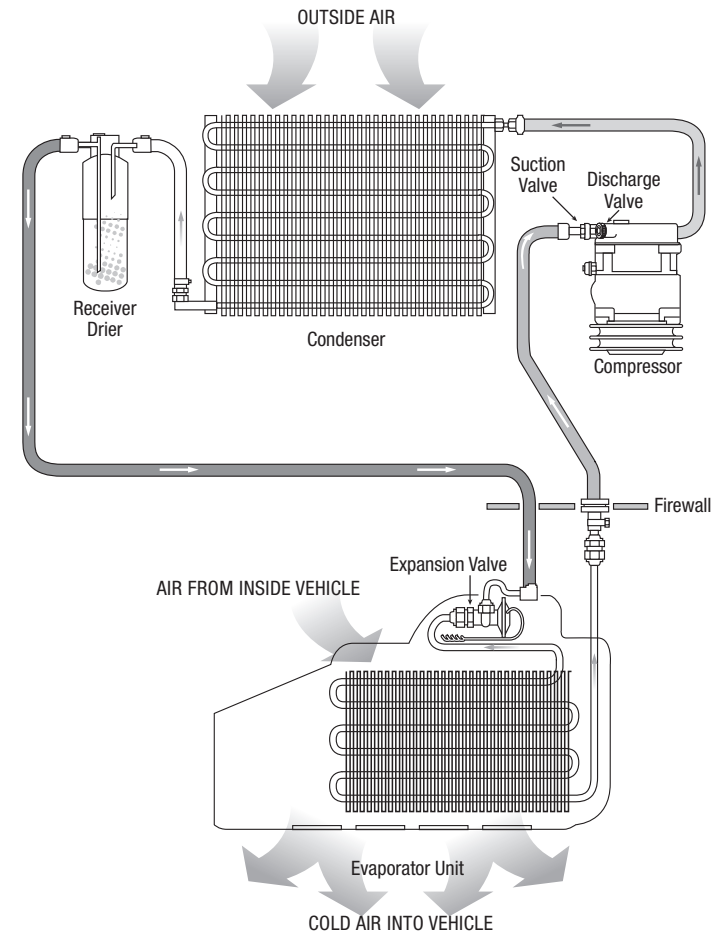
- Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- Measure twice (or more), cut once
- Should you have any technical questions, or feel you have defective components (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...***

## 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 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.





Use the enclosed pictures to place the Evaporator, Brackets and Hoses

The case arrives in two halves to facilitate installation in a car not originally equipped with air conditioning. The half towards the front of the car is the Blower Case. Both halves together are referred to as the Evaporator/Blower Assembly. With the Evaporator Core removed and referring to the photos, drill the three holes into the blower case needed to fasten the three mounting brackets to it, making sure critical parts are not damaged. Fasten the Foot Board brackets to the case, making sure they are oriented correctly to fit nicely onto the carpeted foot board. Mark the spots where the corresponding holes will need to be drilled into the floor. Mark the place for the drain hole on the floor, directly under the drain fitting of the evaporator box. Mock up the upper "S" brackets that attach under the dash and test fit the wooden Toe Board upper Holes, and with evaporator assembly in place. Make any necessary adjustments before starting the permanent installation process. Once assembled, seal the joining edges of the case with Silicone to prevent leaks and let it dry overnight. Drill the holes in the floor for the evaporator mounts and a 1/2" hole for the drain. Epoxy the plastic floor drain fitting into place then fasten the whole evaporator assembly to the floor with sheet metal screws. Cut the drain hose to fit and plug it in. Fasten the flexible duct hose to the assembly. Mount the wood Foot Board after electrics and hosing is completed.

The RHD Evaporator/Blower case will be rotated 90° backward. The rear (bottom in picture) half case is different, also. The hose outlets and expansion valve will be on the diagonally opposite corner.

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The 2 Louvers/Plenums should be mounted on either side of the Ash Tray, with the Fan switch unit closest to the Passenger, using the enclosed brackets. “L” brackets are supplied for each Plenum end. The 2.5” Hose Adapters will be close (next to the Ashtray). The 3 inch end of the “Y” outlet connects to the Blower Outlet, while the two 2.5 inch openings are to be attached to each under dash Plenum. Use Tie wraps to keep hidden. Again, double check all clearances and determine if you are going to leave the “Knee Pads”, under the Dash, in place. Connect the Louver assembly to the “Y” outlet with the enclosed 2.5” Duct Hose. Use the enclosed tie wraps around the Duct hose to ensure a tight fit and no air loss.

The Temperature Switch capillary tube on the Louver assembly will go into the hole on the Evaporator Case, as indicated with an arrow. Use the enclosed grommet. Do not kink or break the Capillary Tube!



The Wiring harness has 5 electrical connectors on one end- connect as follows: Black to "B" on the Fan Switch, Red to "M", Yellow to "L", Orange to "H". The short Blue wire goes from "C" on the Fan Switch to either one of the thermostat connectors. The other Thermostat Connector will attach to the Drier Hi-Lo switch as indicated above. Test with Motor Connected!

Establish a connection to the ignition switch with the included length of Black wire, so it is "live" when the switch is on and "dead" when the switch is off. The lone yellow wire on the Motor will be attached to the vehicle's body for "GROUND". Route all the wires out of the way of obstructions that may develop when in operation.





The Receiver/Drier can be mounted under the L/F fender, to the rear, as original using the 2 Drier clamps. The Hi-Lo Pressure switch wiring (either wire) goes from the switch to the Compressor with the included long wire- run the wire along with the Large # 10 A/C Hose back to the Compressor. The remaining switch wire is connected to either one of the Temperature switch (on the under dash louver) connections. Use the enclosed wire and connectors to connect.



The original Porsche Condenser attachment points were the Hinges and the rear center of the Engine Lid. Before permanently installing the new High Efficiency Condenser with the brackets provided, “dry fit” the condenser to the engine lid. **MAKE SURE THE CONDENSER IS NOT HITTING THE FAN SHROUD OR THE REAR BODY WHEN THE LID IS CLOSED!!** Early model cars may have to reposition their Coil to allow the Condenser to clear! Put the new wide center bracket in place on the new Condenser and mark where holes will have to be drilled. Attach the “L” shaped brackets to the Condenser using the Machine screws and “Nylon” nuts. (Hose connections will be on the left side (Passenger Side). Fasten the hoses to the left hinge with the enclosed metal hose clamps as shown. **THE SMALL (#6) FITTING IS TO THE REAR OF THE ENGINE LID!! DO NOT TIGHTEN UNTIL ALL CLEARANCES AND ALIGNMENT IS CHECKED! RECHECK AFTER TIGHTENING!**

!



The Compressor is mounted on its side (see pics), with the enclosed Brackets using the attached illustrations as a guide (they are not exact replicas of the original. The Enclosed Pulley is mounted to the Crankshaft using the enclosed Bolt and Washer. Some Alterations to the Engine Surround sheet metal may have to be made to accommodate the Bracket.



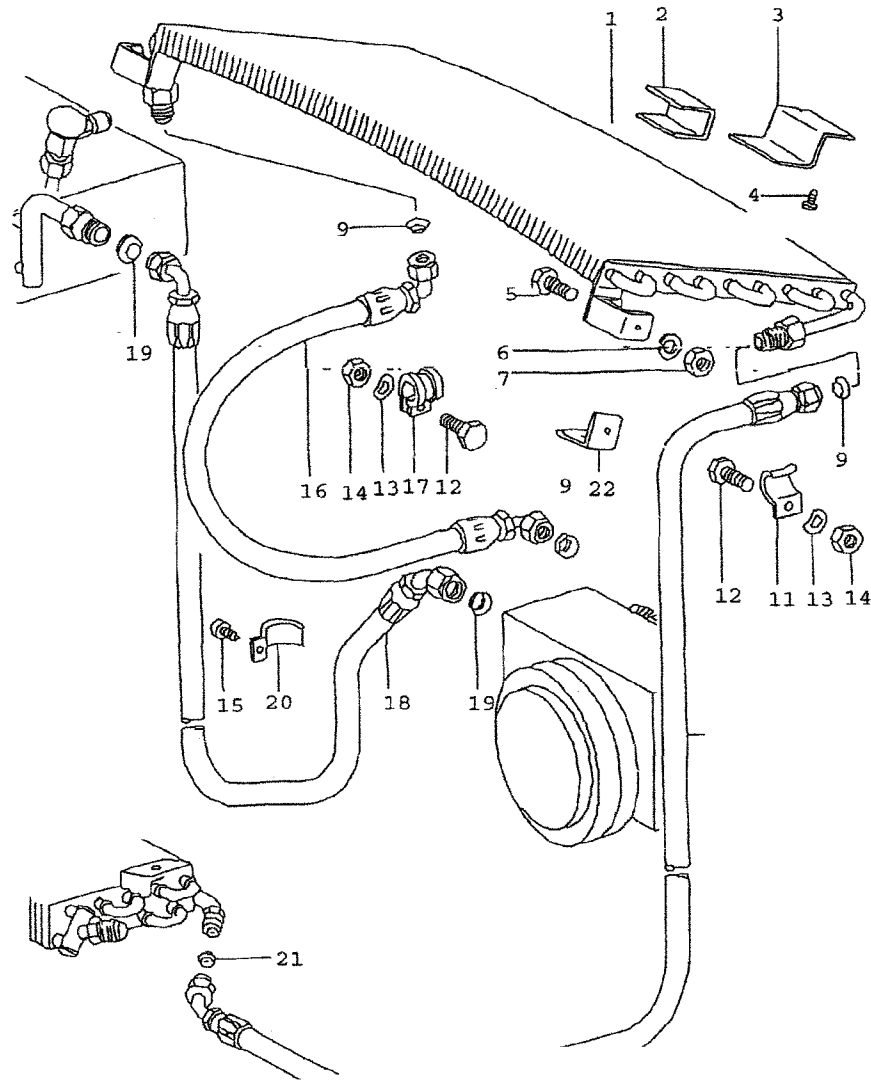
O-RINGS MUST BE USED AND LUBRICATED AT ALL HOSE CONNECTIONS!!

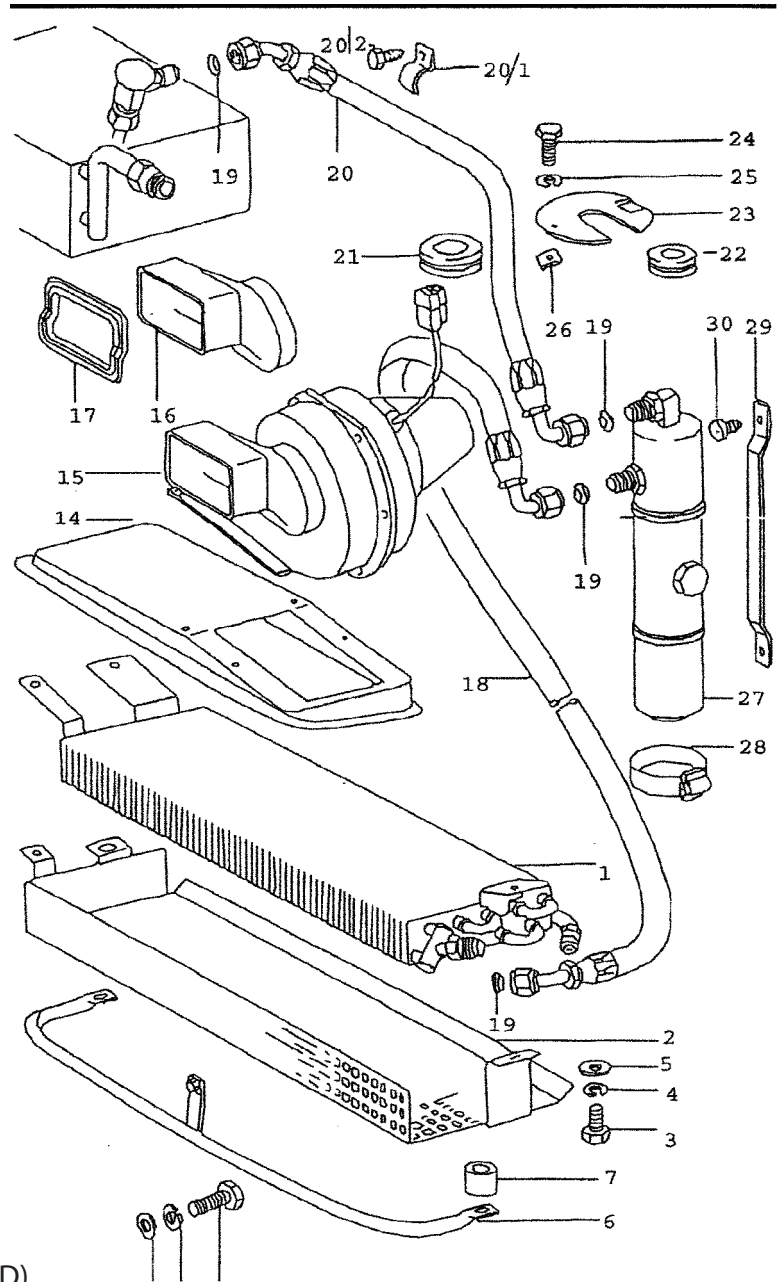
Before installing the hoses, review the Diagrams at the rear of these instructions. The smallest diameter, RA-00001-11 liquid hose will go from the lower Drier connection to the small connection on the rear Condenser, while RA-00001-10 liquid hose will go from the top Drier connection to the Expansion Valve already on the installed Evaporator/Blower Assembly.

RA-00006-04 suction hose (largest diameter), will go from the other fitting on the Evaporator to the "Smuggler's Box" in the front trunk, RA-00001-13 suction hose will go across the car (see picture) and down the right side to the compressor (this would also be a good route for the Compressor wire, coming from the Wiring Harness in the cabin. RA-00001-12 discharge hose will go from the other Compressor fitting, around the back of the Engine and run up the Hinge next to RA-00001-11 liquid hose coming from the front Drier. Some Foam around the Hoses may be needed to keep dust from entering the Engine Compartment.

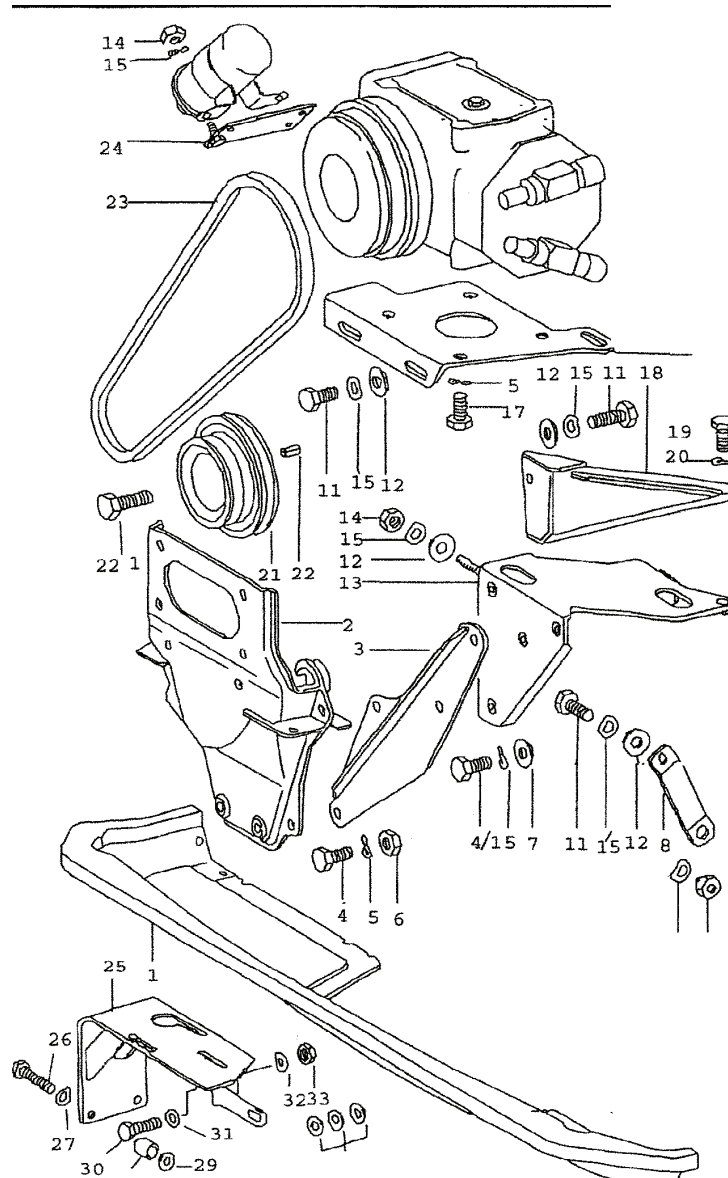


The Compressor is shipped with R134A Compatible oil installed! After evacuating the system add 453 to 567 Grams of R134A refrigerant. At 32-35 deg C Outside Temperature, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 25-35 PSI. All of these pressures would be at "high Idle" (Approx. 1000 to 1200 RPM) and use a Fan to get good airflow running through the Condenser. Do not use the Drier sight glass to determine the amount of refrigerant- it is only for R12 refrigerant!

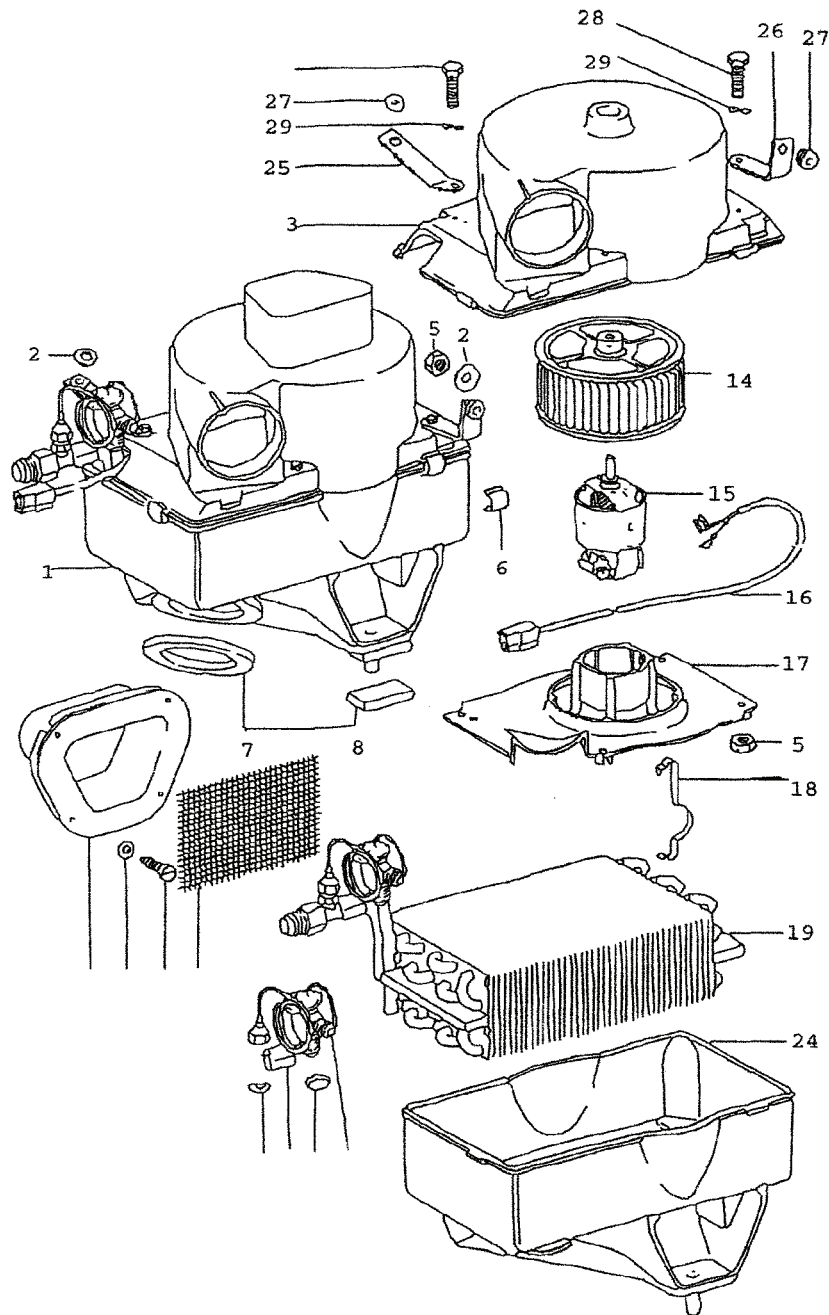


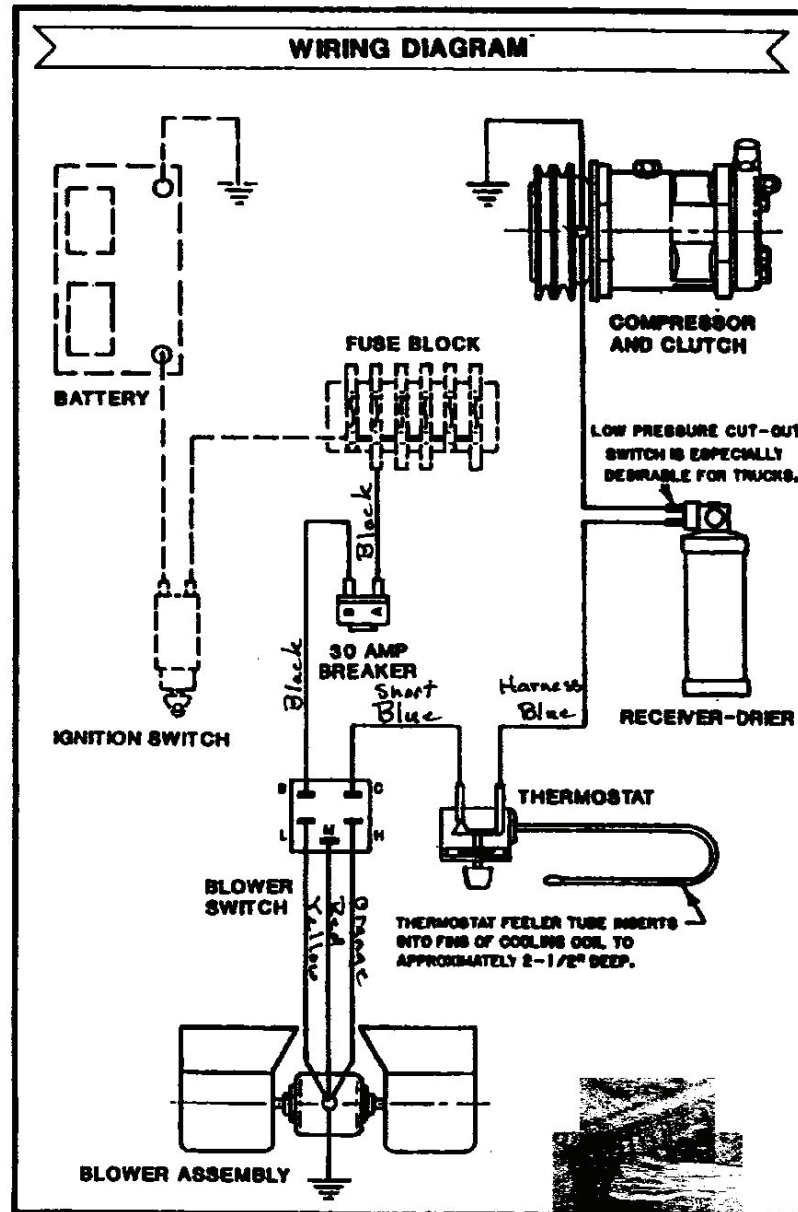


LHD FRONT CONDENSER (NOT INCLUDED)









## New A/C System Preparation... A MUST READ!

Please read thru 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) 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).
- 3) Your new system requires 134a refrigerant. It will require 1.5 lbs (or 24 oz).
- 4) Your new compressor comes charged with oil - NO additional oil is needed.
- 5) Insure that the new belt is tight.
- 6) **DO NOT CHARGE SYSTEM WITH LIQUID REFRIGERANT!**



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

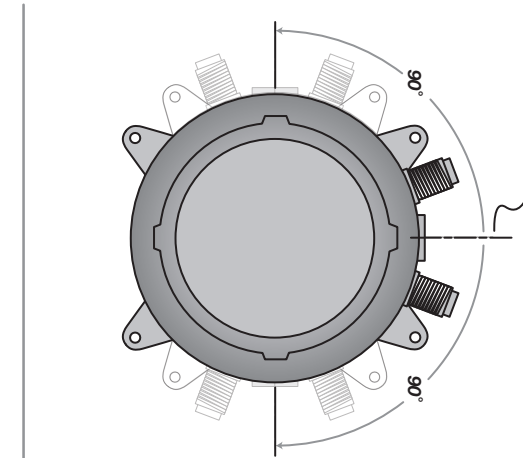
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 rpm

**ACCEPTABLE OPERATING PRESSURE RANGES:**

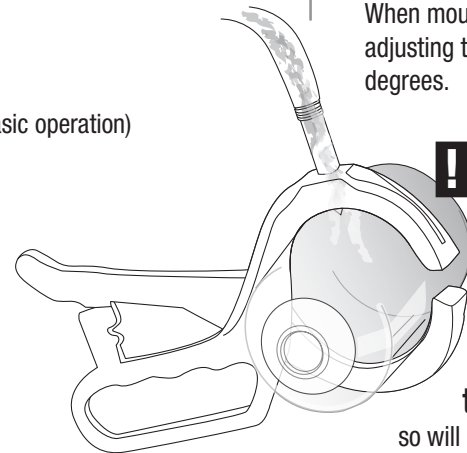
1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

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

CENTERLINE OF THE OIL FILL BOLT



When mounting your compressor and/or adjusting the belt, Set compressor at 90 degrees.



**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 gauges reading excessively high. These simple tests can be performed by a local shop and can help determine the extent of the systems problem.



## Trouble Shooting Your Classic Auto Air A/C System

**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 24 oz or 1.5 lbs of R134A 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 24 oz or 1.5 lbs R134A) compressor can cause rattling. If charged with pure liquid there is a high probability you have bent reed valves that are causing tapping sound.

