

# **Installation Manual**

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## **1975-89 Porsche 930**

*Right Hand Drive Kit*

DOCUMENT #RA-1-9998

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# ***Congratulations...***

**You have just purchased the highest quality, best performing A/C system ever designed for your 1975-89 Porsche 930.**

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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

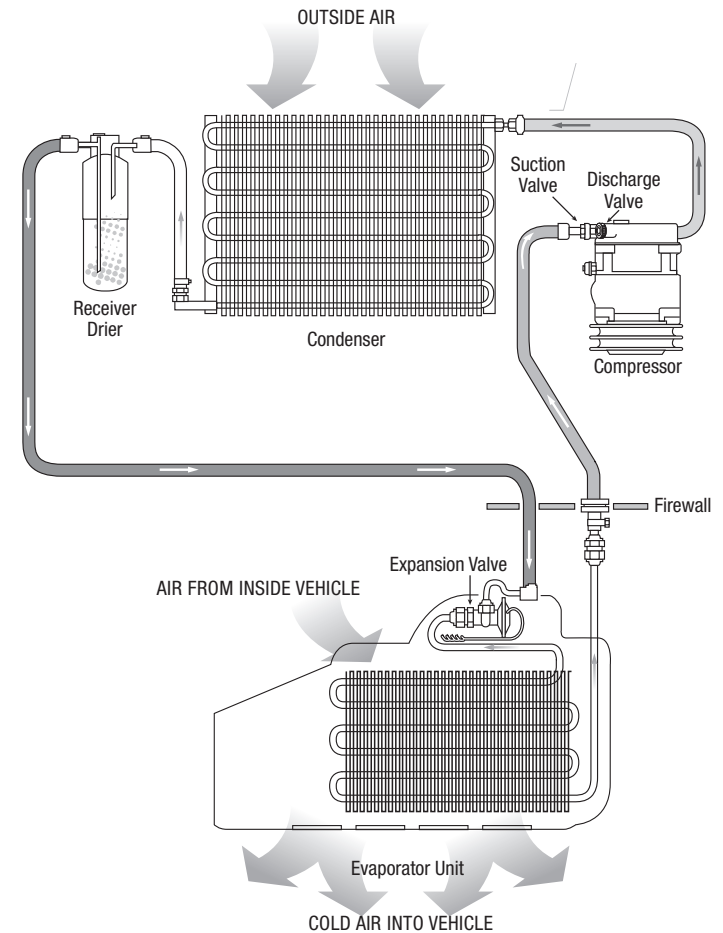
- Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- Measure twice (or more), cut once
- Should you have any technical questions, or feel you have defective components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

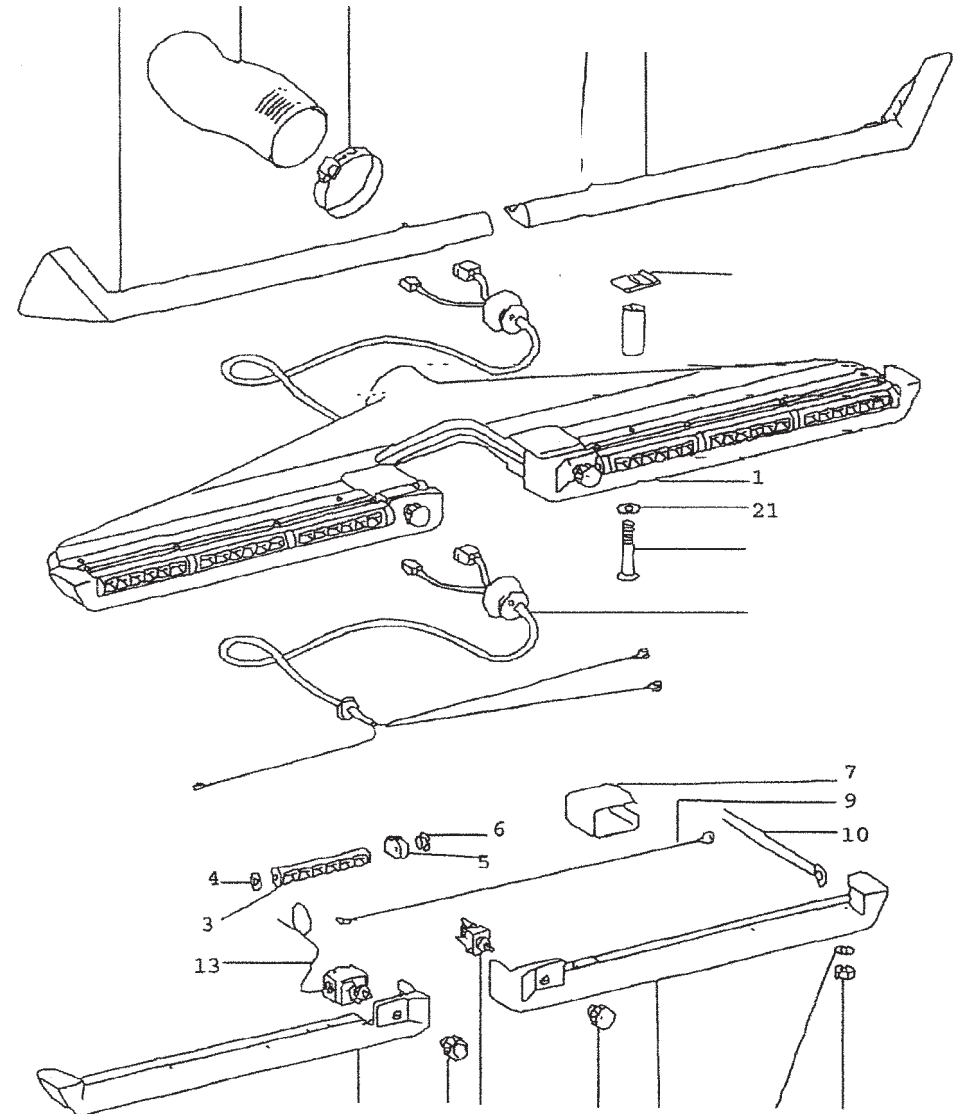




Use the enclosed pictures to place the Evaporator, Brackets and Hoses. The case arrives in two halves to facilitate installation in a car not originally equipped with air conditioning. The half towards the front of the car is the Blower Case. Both halves together are referred to as the Evaporator/Blower Assembly. Fasten the brackets to the case, making sure they are oriented correctly to fit nicely onto the un-carpeted foot well. 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. 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 ½" hole for the drain. Epoxy the 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 wooden kick panel 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.

The Louvers should be mounted on either side of the Ash Tray, with the Fan switch unit closest to the Passenger, using the enclosed brackets. The 2.5" Hose Adapters need to be close (next to the Ashtray) to the "Y" outlet already mounted on the Firewall. 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 bottom rear of the Evaporator Case, as indicated with an arrow. Use the enclosed grommet.

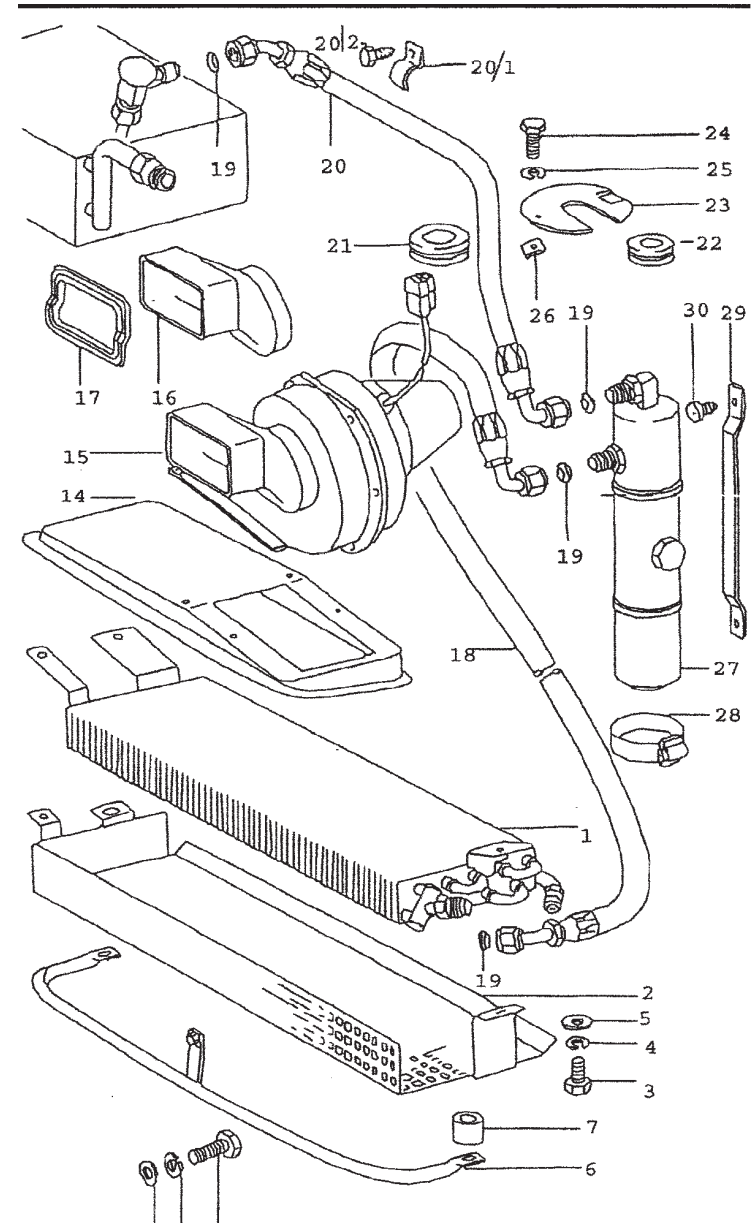




The Wiring harness has 5 electrical connectors on one end- connect as follows: Black to "B" on the Fan Switch, Red to "M", Yellow to "L", Orange to "H". The remaining Blue wire is connected to either side of the Thermostatic Switch. The short Blue wire goes from "C" on the Fan Switch to the other thermostat connector. Test with Motor Connected! Install the wire connector on the free compressor wire to the wire running along the # 10 Hose from the Evaporator and Receiver/Drier Hi/low pressure switch wiring harness. 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. Connect this wire to the supplied circuit breaker at "AUX" terminal on the Circuit Breaker. Attach the loose Black wire in the large harness to the circuit breaker terminal "BAT". The lone yellow wire on the Motor will be attached to the vehicle's body for "GROUND". That leaves the red and blue wire connected. Route all the wires out of the way of obstructions that may develop when in operation.

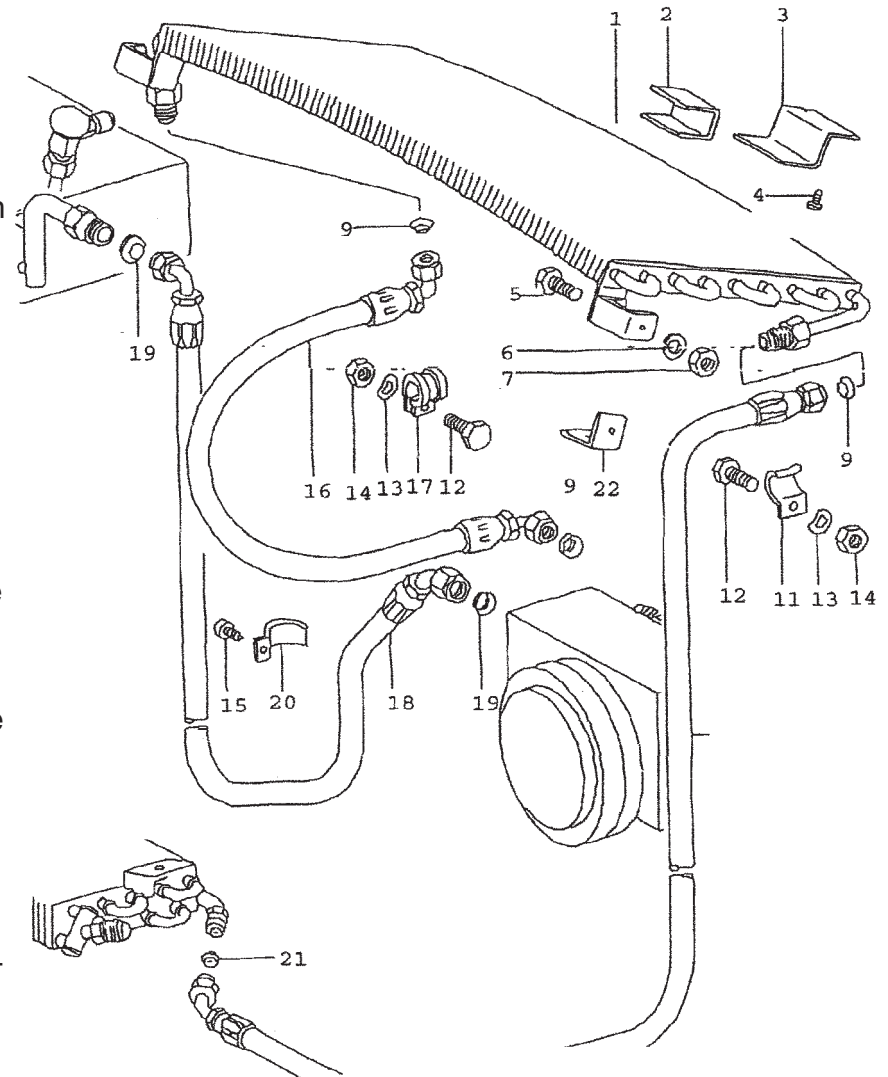


The Receiver/Drier can be mounted under the L/F fender, to the rear, using the 2 Drier clamps included. The Hi-Lo Pressure switch wiring goes from the switch to the Compressor with the long wire—run the wire along with the Large # 10 A/C Hose back to the Compressor. Use the enclosed wire and connectors to connect.

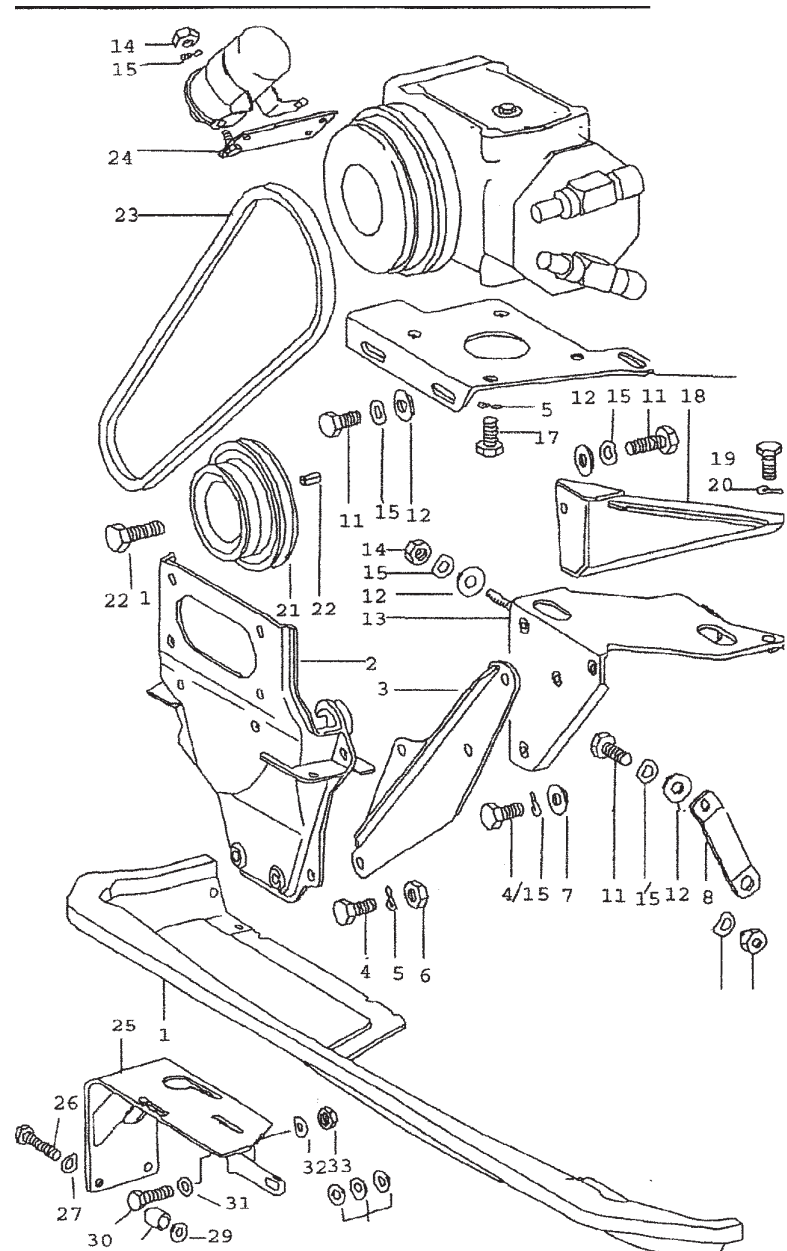


Before installing the Multi-Flow Condenser with the brackets provided, “dry fit” the condenser to the engine lid. **MAKE SURE THE CONDENSER IS NOT HITTING OR RUBBING WHEN THE LID IS CLOSED.** The Condenser Hose fittings should face the rear of the Engine Lid with the smaller one on the bottom. Attach the brackets to the Condenser and original mounting holes, using the Machine screws, “Nylon” nuts and the original screws. The Condenser, Hardline & Hose assembly should be installed on the #8 Condenser fitting prior to fitting Condenser into Engine Lid. The Hardline assembly will be connected to the outside of the right Lid hinge with the enclosed hose clamp. The #6 (smaller) hose with 90° fitting will attach on the left hinge and wrap the left edge and top of the Condenser. Secure loose Hose with enclosed Tie Wraps.

**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 (which may have to be altered, depending on Engine configuration), 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 will have to be made to accommodate the Bracket.





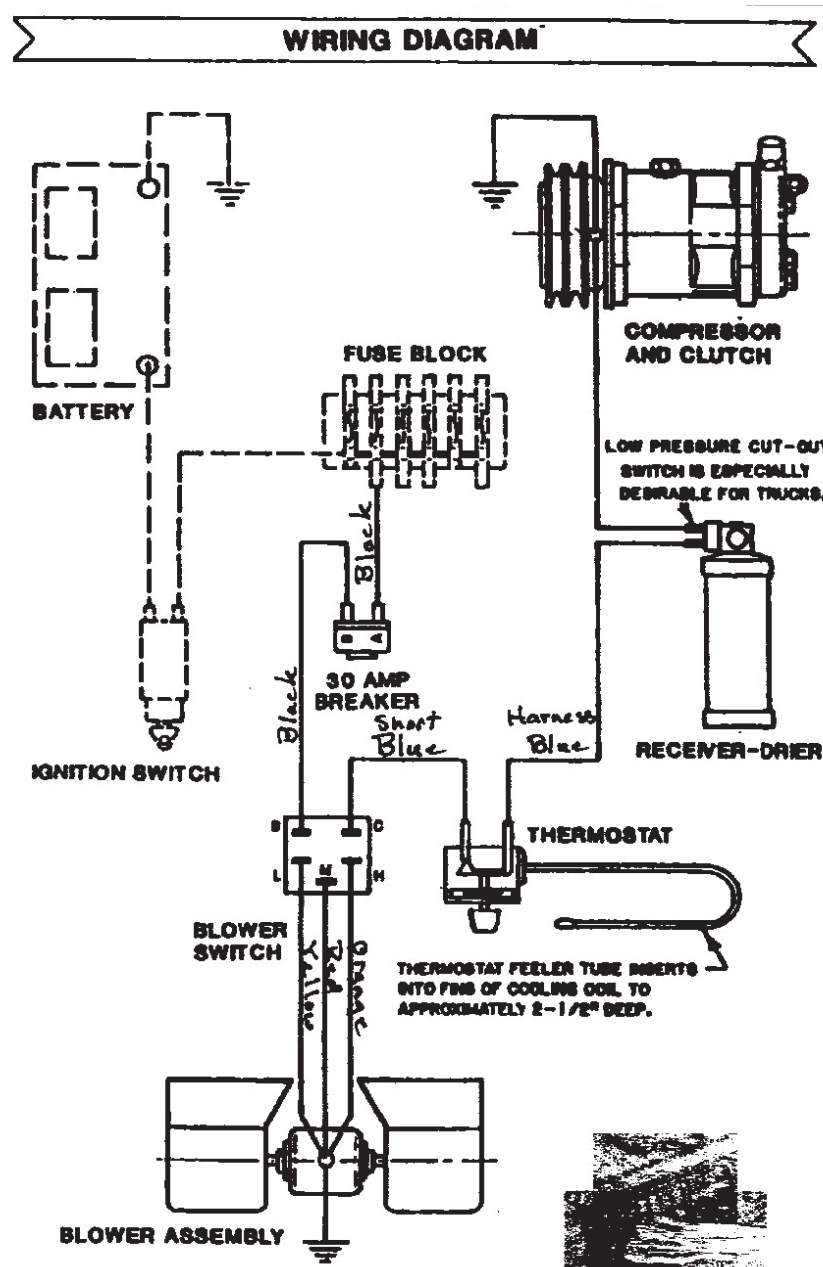
**TO AVOID CONTAMINATED HOSES, DO NOT REMOVE COVERS UNTIL CONNECTION TIME AND BLOW OUT ALL HOSES WITH CLEAN, DRY AIR PRIOR TO CONNECTING!**

**ALL NEW LUBRICATED “O” RINGS MUST BE USED AT ALL HOSE CONNECTIONS!!**

Before installing the hoses, review the Diagrams at the rear of these instructions. The smallest diameter, #6 long hose will go from the lower Drier connection to the small connection on the rear Condenser, while the short #6 hose will go from the top Drier connection to the Expansion Valve already on the installed Evaporator/ Blower Assembly. The short #10 hose (largest diameter), will go from the other fitting on the Evaporator to the “Smuggler’s Box” in the front trunk, The second (long) #10 hose will go across the car (see picture) and down the right side to the compressor (Suction) side (this would also be a good route for the Compressor wire, coming from the Wiring Harness in the cabin. The medium size hose, #8 will go from the other Compressor fitting, around the back of the Engine and run up the Hinge next to the #6 hose coming from the front Drier. Some Foam around the Hoses may be needed to keep dust from entering the Engine Compartment

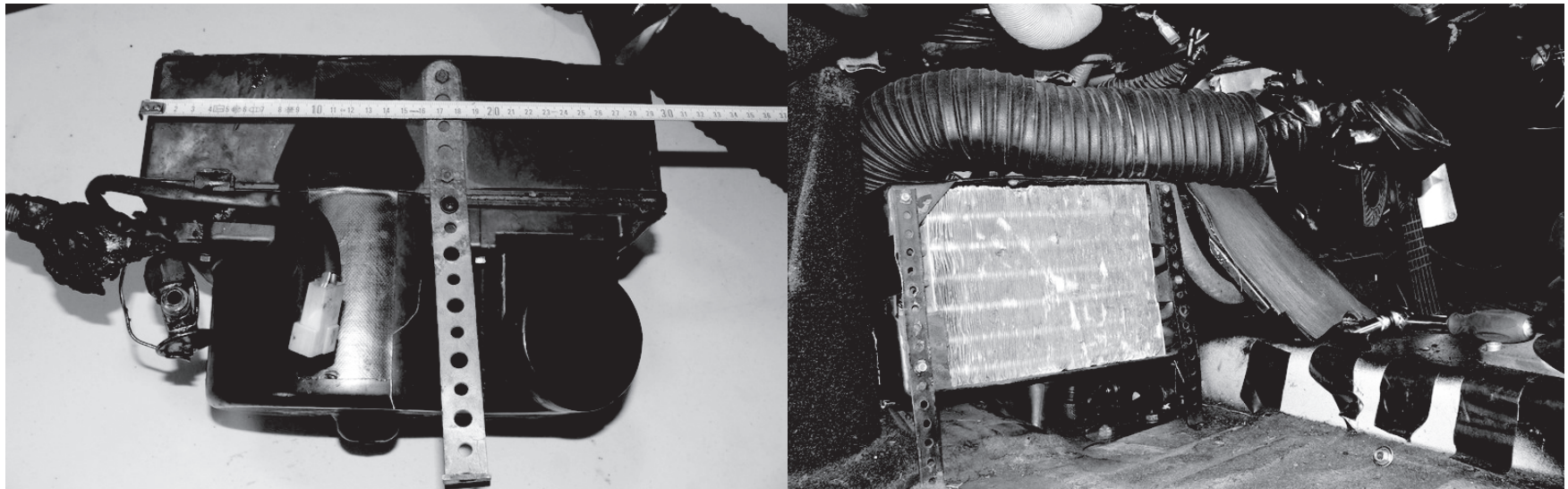


After evacuating the system, add 453 to 624 Grams of R134A refrigerant. At 32-35 deg C Outside Temperature, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 25-35 PSI. All of these pressures would be at "high Idle" (Approx. 1000 to 1200 RPM) and good airflow running through the Condenser. Do not use the sight glass to determine the amount of refrigerant- it is only for R12 refrigerant!



The RHD Evaporator/Blower case will be rotated 90° backward. The rear half case is different, also. The hose outlets and expansion valve will be on the diagonally opposite corner. Before extracting the stock Evaporator from the passenger's foot well, carefully remove the capillary tube, electrical connections and hoses. You will also have to remove the Blower Motor Resistor. Separate the rear half of the box which houses the Evaporator Core by removing the clamps on the side of the box.

The Evaporator/Expansion Valve Assembly should be easily pulled from the lower half. After cleaning the box, the Serpentine Evaporator can be installed after removing the rubber "bumpers" on the bottom of the lower box and one rubber bumper on the upper box, nearest the Hose connections.





Before Installing Original Blower, Mounting Plate, Resistor Pak inside Car (Drill out Pop Rivets holding it in), Blower Wheel From Motor (Being careful not to distort while removing). Before drilling holes, make sure the motor Fan Hub is centered in top "button". Fit the new mounting plate in upper housing. Mark and drill the holes necessary to mount to the blower housing, and one hole to allow the capillary tube to enter the evaporator. Place the motor in the Motor Mount cradle without tightening it down. Check for clearance with the Evaporator top cover after attaching the old Blower wheel to the new motor, making sure the wheel is as close to the motor without rubbing. Make sure the blower wheel is not hitting the top cover, and the motor "Button" on the bottom is not hitting the Evaporator Core.

**THERE SHOULD BE APPROXIMATELY ¼" BETWEEN THE CRADLE VENTURI  
AND THE BOTTOM OF THE BLOWER WHEEL!**

Once that is done, correctly orient the wires to exit the case in the same direction of the original. Install and tighten the clamp around the motor after the correct depth is obtained. Clean & rough the edges of the Mounting Plate and the Motor Mount before applying epoxy to the edges and installing the enclosed screws to the Motor Mount cradle - we do not want the motor coming down onto the Evaporator Core. The enclosed Wire Harness can be connected directly to the OE Fan switch in the Console or spliced into the wires before the OE resistor at the Intake located behind the Passenger Floorboard.



**Center Interior Vent**

Using the enclosed wire connectors and shrink wrap, splice the original Porsche low speed wire to the yellow wire on the wire harness. Then the original medium speed wire to the red wire and the high speed to the orange wire. The loose yellow/black wire on the motor goes to ground. Use the enclosed wire ties to eliminate loose wires.

Confirm that the motor is turning and the Fan speeds are correct! Removing the Resistor Pak is important to allow more re-circulated air to enter the system so there can be more volume expelled (higher CFM). After testing and prior to reinstalling back in the Evaporator Box Silicone the edges of the mounting plate where it meets the sides of the Box. Also seal the hole where the hose outlets exit the Evaporator Case with the enclosed Cork Sealing Tape. This will ensure air-tight performance.



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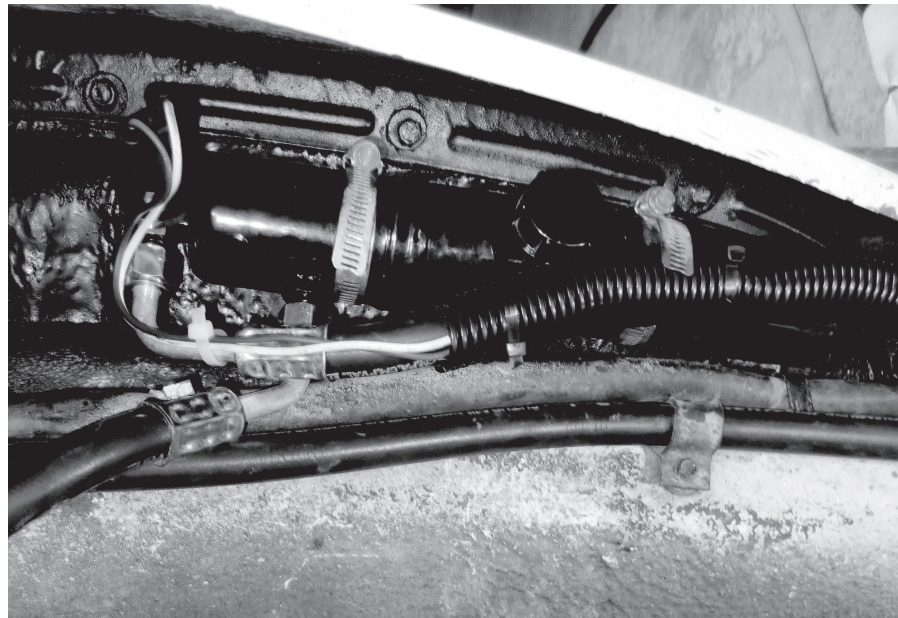


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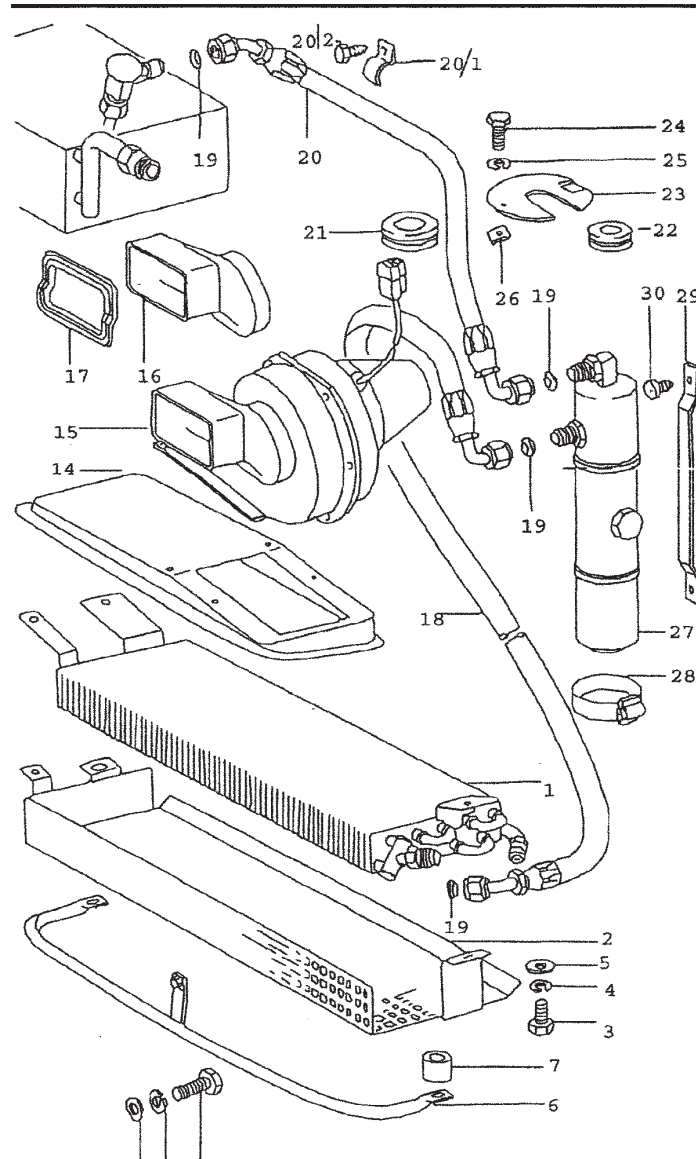
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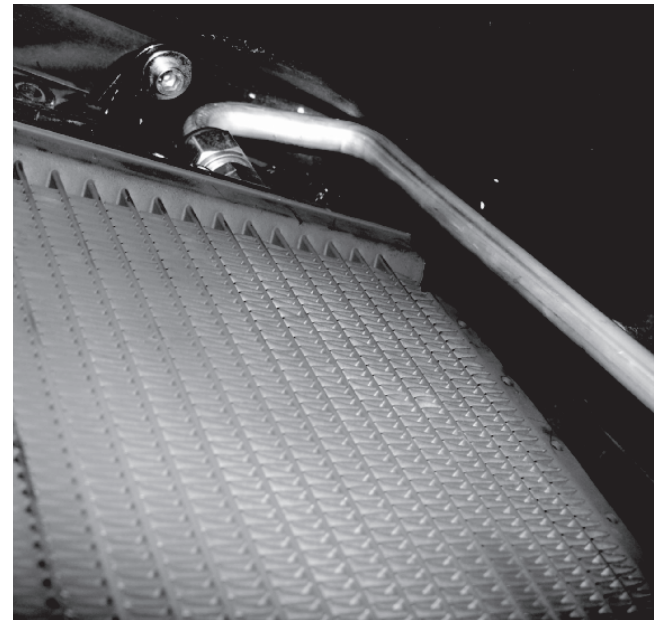
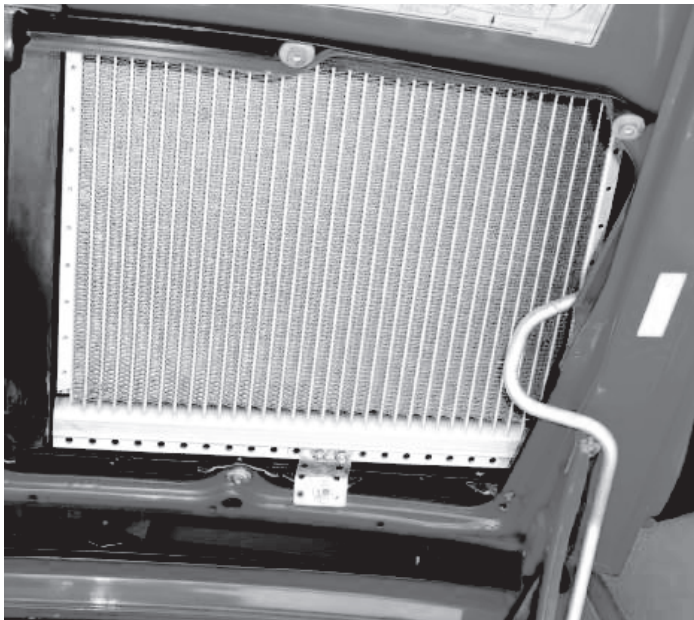
# Porsche 930 RHD Upgrade Kit

## Receiver/Drier

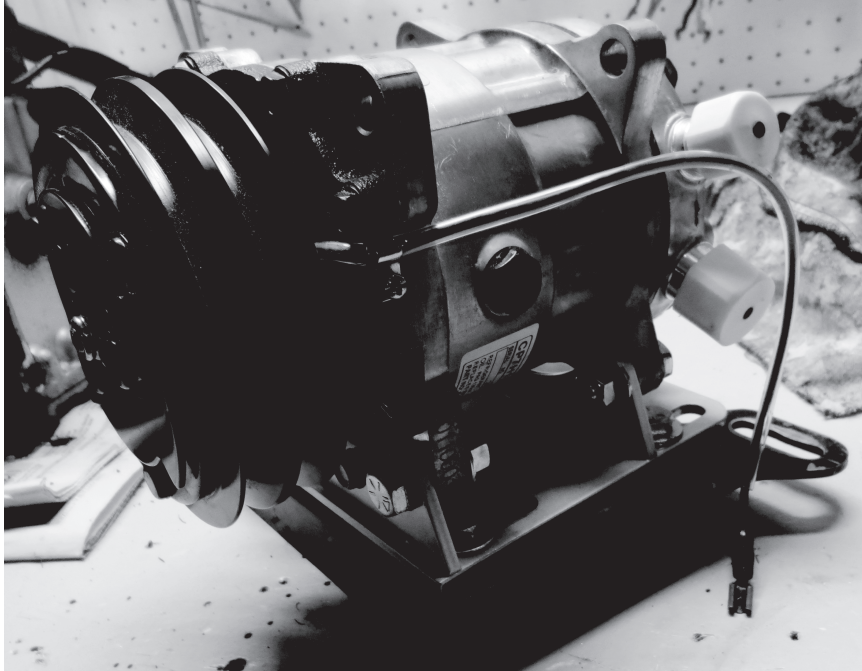


Before installing the Multi-Flow Condenser with the brackets provided, “dry fit” the condenser to the engine lid to make sure that the condenser will not hit or rub when the lid is closed. The Condenser Hose fittings should face the rear of the Engine Lid with the smaller one on the left. Attach the brackets to the Condenser using the Machine screws and Nylon nuts and the original screws. The Condenser, Hardline & Hose assembly should be installed on the #8 Condenser fitting prior to fitting Condenser into Engine Lid. The Hardline assembly will be connected to the outside of the right Lid hinge with the enclosed hose clamp. The #6 (smaller) hose with 90° fitting will attach on the left hinge and wrap the left edge and top of the Condenser. Secure loose Hose with enclosed Tie Wraps.

**Do not tighten until all clearances and alignments are checked and rechecked after tightening!**



The Compressor is mounted on its side (see pic), with the enclosed Brackets (which may have to be altered slightly, depending on Engine configuration).





To avoid contaminating hoses, tape all fitting covers and do not remove covers until connection time and O-Rings must be used and lubricated at all hose connections!

After removing the old hoses and noting the reassembly procedure, replace with the Barrier Hoses, keeping in mind that some of the new hoses are not the same length. RA-00015-07 liquid hose from the front condenser (straight fitting) to the rear condenser (90° fitting) is 232". The #6 liquid hose from the front condenser (45° RA-00015-04 or straight fitting RA-00015-02) to the lower drier connection (45° fitting) is 64". RA-00001-10 liquid hose from the upper Drier connection (90° fitting) to the Evaporator (45° fitting) is 56". RA-00006-04 discharge hose from evaporator (90° fitting) to the inside of the smugglers box (straight male fitting) is 18". RA-00015-06 suction hose from the inside of the smugglers box (90° fitting) to the compressor (90° fitting) is 147". The #8 discharge hose from the Compressor (45° fitting Denso RA-00015-08 or 90° fitting 7H13 RA-00001-31) to the rear Condenser (hardline) is 30".





Have a strong Fan blowing down on the Condenser when charging the system and do not use the sight glass to regulate the R134A Refrigerant it is only for R12 Refrigerant!!

After evacuating the system, add 454-624 Grams of R134A refrigerant. At 32-35 deg C, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 25-30 PSI. All of these pressures would be at "high Idle" (Approx. 1000 RPM) with Strong Airflow over the Condenser.

## 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)

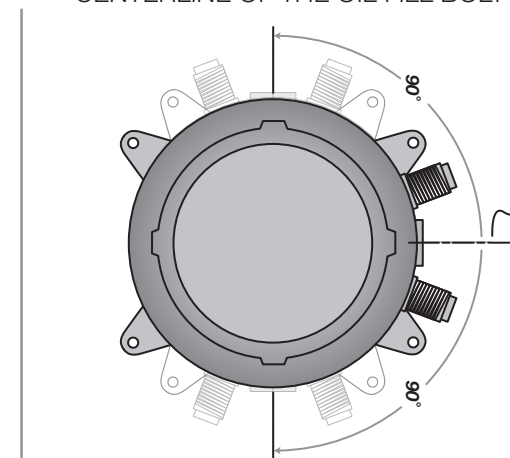
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 rpm

**ACCEPTABLE OPERATING PRESSURE RANGES:**

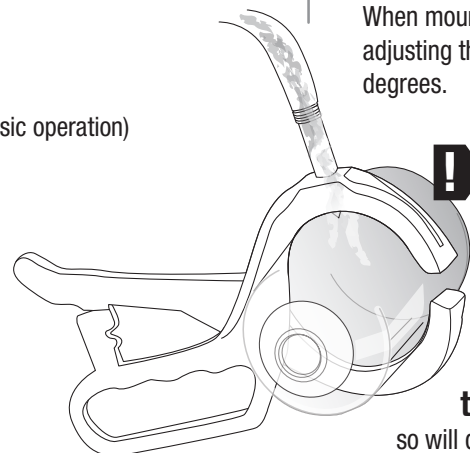
1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

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.

