

Installation Manual

1975-89 Porsche 930

Left Hand Drive Kit

DOCUMENT #RA-1-9999

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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

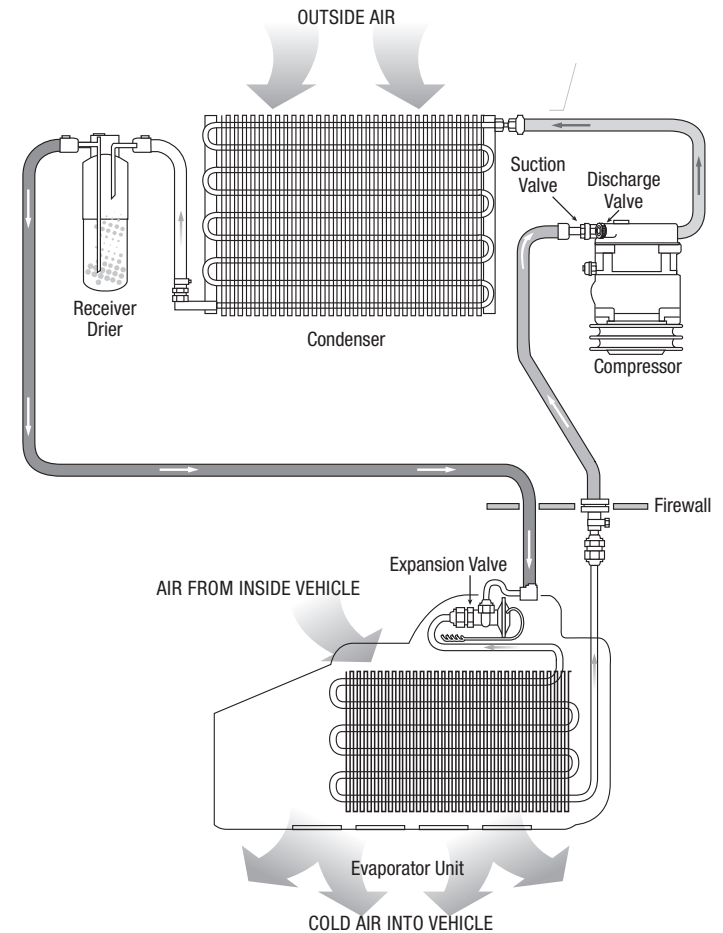
- Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- Measure twice (or more), cut once
- Should you have any technical questions, or feel you have defective components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



The Box comes split to facilitate installation in a Non-A/C equipped car. With the bottom part of the case empty and using it for a pattern, the case round hole in the lower Drivers side should fit over the existing round, protruding rim built into the body. The case hole may need to be modified to fit correctly. If unable to get it to fit, the protruding rim may have to be cut off even with the body sheet metal.

Make sure you have a good fit into the “smugglers box” cavity, if not, you may need to re-shape the sheet metal inside. The box lid should close over the evaporator assembly when fitted properly!

Mark the Evaporator drain hole at the bottom of the Box Sheet metal. Check all clearances on both sides for any interference! If all appears good, carefully trace the lower, odd shaped, opening onto the Firewall- making sure there is no interference with anything inside the car. That area will have to be cut out so the intake Flange can be snugly inserted into the box from inside the car. The next step will be to mark and drill a 3” hole in the Firewall (See Pictures) for the airflow going to the Louvers inside the car. The 3” Hose adapter with the square mounting surface is screwed to Firewall and sealed on the Evaporator side and connected with the 3’ Hose and clamps provided when ready. Inside, the “Y” adapter is fastened to the Firewall in a similar fashion, making sure there are no airflow obstructions. Use Silicone sealer when installing these parts. Before installing the case into the box, place the Evaporator in the case, with outlets to the left, and assemble the case with the 1/8” Pop rivets enclosed. This is a very tight fit and it may be necessary to tape the case assembly to install the rivets. Use Silicone to seal the case. Let it dry overnight and install in opening. Use small Foam Gasket around Drain.



The Louvers should be mounted on either side of the Ash Tray, with the Fan switch unit closest to the Driver, using the enclosed brackets. The 2 ½" 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 ½" Duct Hose. Use the enclosed tie wraps around the Duct hose to ensure a tight fit and no air loss.

The Temperature Switch is on the right Louver assembly and will go through the Firewall, using the enclosed grommet, and into the hole on top of the box where indicated with an arrow.





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!

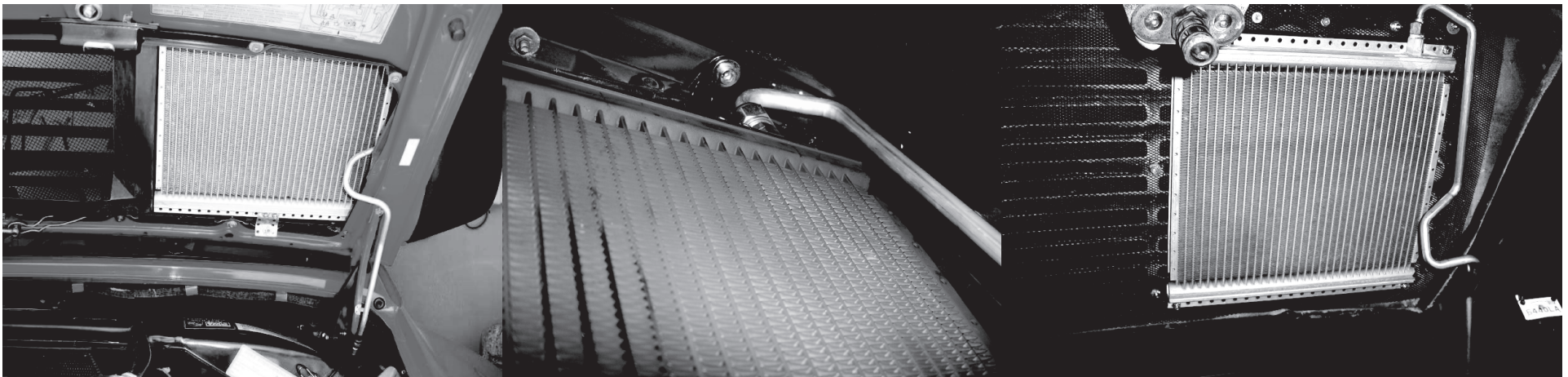
Install the wire connector on the compressor to the wire running along the # 10 Hose from the Evaporator to the Receiver/Drier Hi/low pressure switch wiring harness. Establish a connection to "switched ignition" source with the included length of Black wire, so it is "live" when the Fan switch is on and "dead" when the ignition switch is off. The lone yellow & Black wire on the Motor (with "eye" connector) 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 assembled.

The Receiver/ Drier can be mounted under the L/F fender, to the rear, as original using the (2) Drier clamps included. The Hi-Lo Pressure switch wiring goes from the switch through the “Smugglers Box”, where one wire connects to the long blue wire from the Thermostatic Switch. The other Hi-lo switch wire will run along with the Large # 10 A/C Hose back to the Compressor. Use the enclosed wire and connectors to connect.

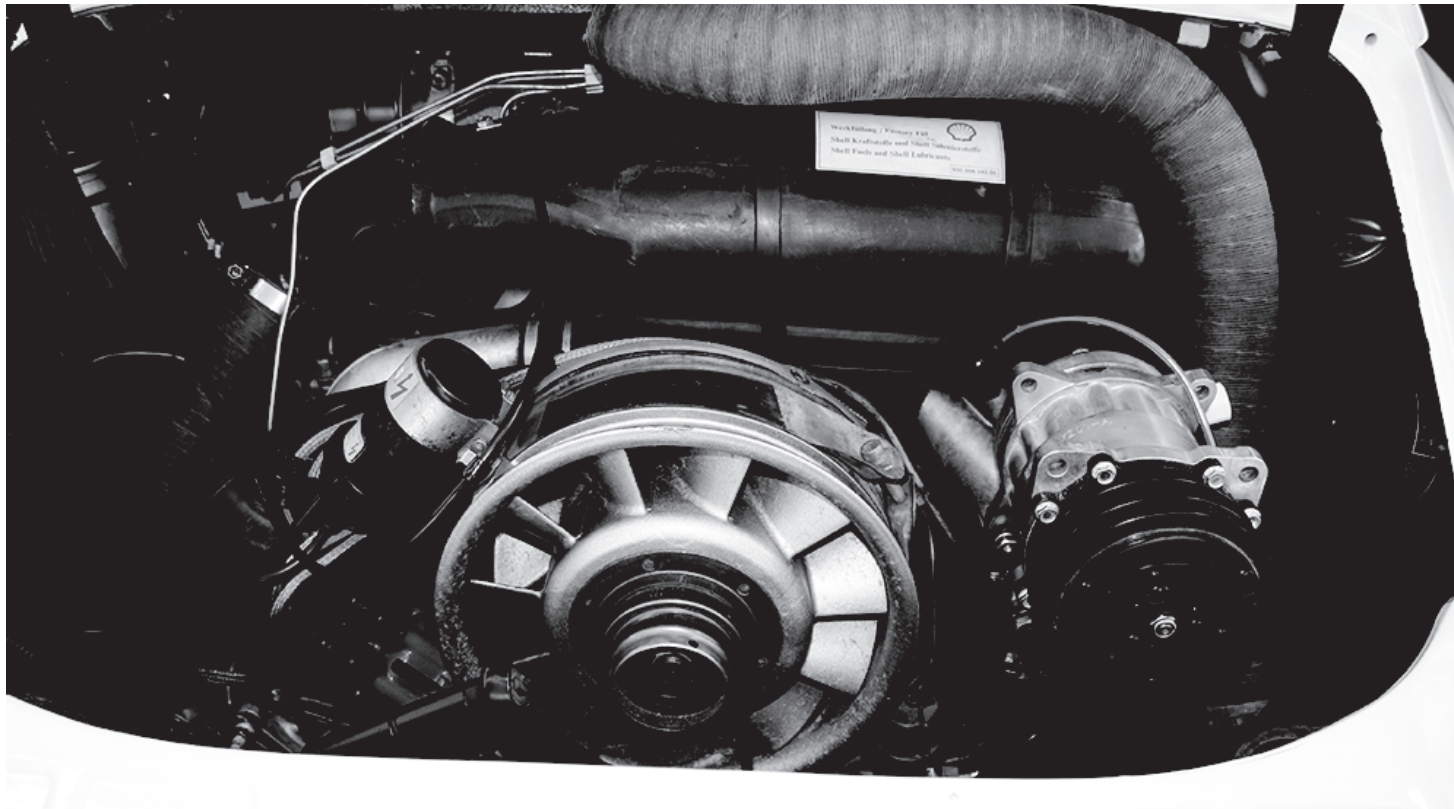


Before installing the Multi-Flow Condenser with the brackets provided, “dry fit” the condenser to the engine lid. **MAKE SURE THE CONDENSER IS NOT HITTING OR RUBBING WHEN THE LID IS CLOSED.** The Condenser fittings should face the rear of the “Whale Tail” with the smaller one on the left (drivers) side. Attach the custom brackets to the Condenser and original mounting holes (if available or fabricate bosses on the Lid), using the Machine screws, “Nyloc” nuts and original screws. The Condenser, Hard Line & Hose assembly should be installed on the #8 Condenser fitting prior to fitting into Engine Lid. The Hardline assembly will be connected to the outside of the right Lid hinge with the enclosed hose clamps. The #6 (smaller) hose with 90° fitting will attach on the left hinge and wrap the left edge and top of the Intercooler and top of the Condenser. Secure 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 pic), with the enclosed Brackets (which may have to be altered slightly, 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.



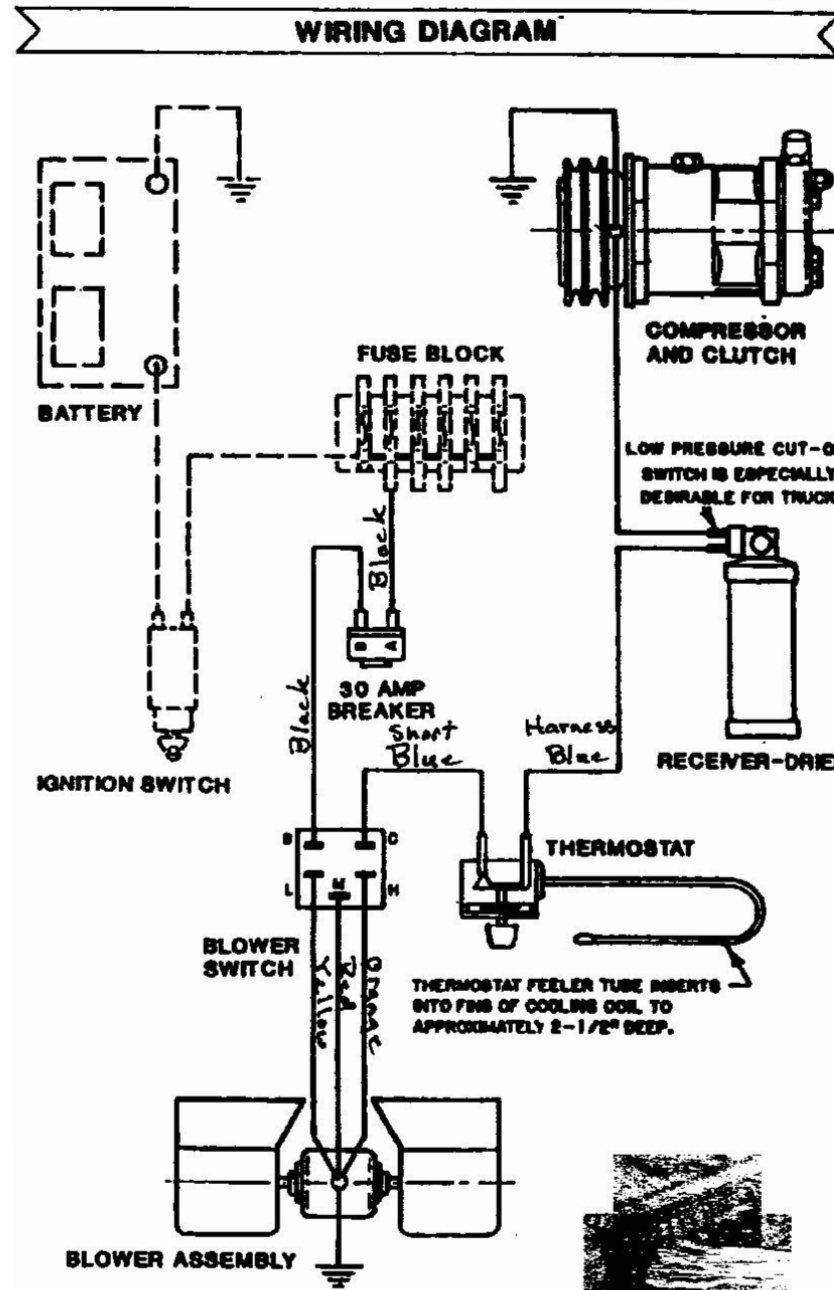


Before installing the hoses, review the Diagrams at the rear of these instructions. RA-00001-30 liquid hose will go from the lower Drier connection to the small connection on the rear Condenser, while RA-00001-10 liquid hose will go from the top Drier connection to the Expansion Valve already on the installed Evaporator/Blower Assembly Box. RA-00001-13 suction hose will go from the other fitting on the Evaporator and 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 “Smugglers Box”). RA-00001-31 discharge hose with Hard line will go from the other Compressor fitting and run up the Hinge on the right side. Some Foam around the Hoses may be needed to keep dust from entering the Engine Compartment



After evacuating the system, add 16-22 oz. of R134a refrigerant. At 90-95 degrees Outside Temperature, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 30-40 PSI. All of these pressures would be at "high Idle" (Approx. 1,000 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!!



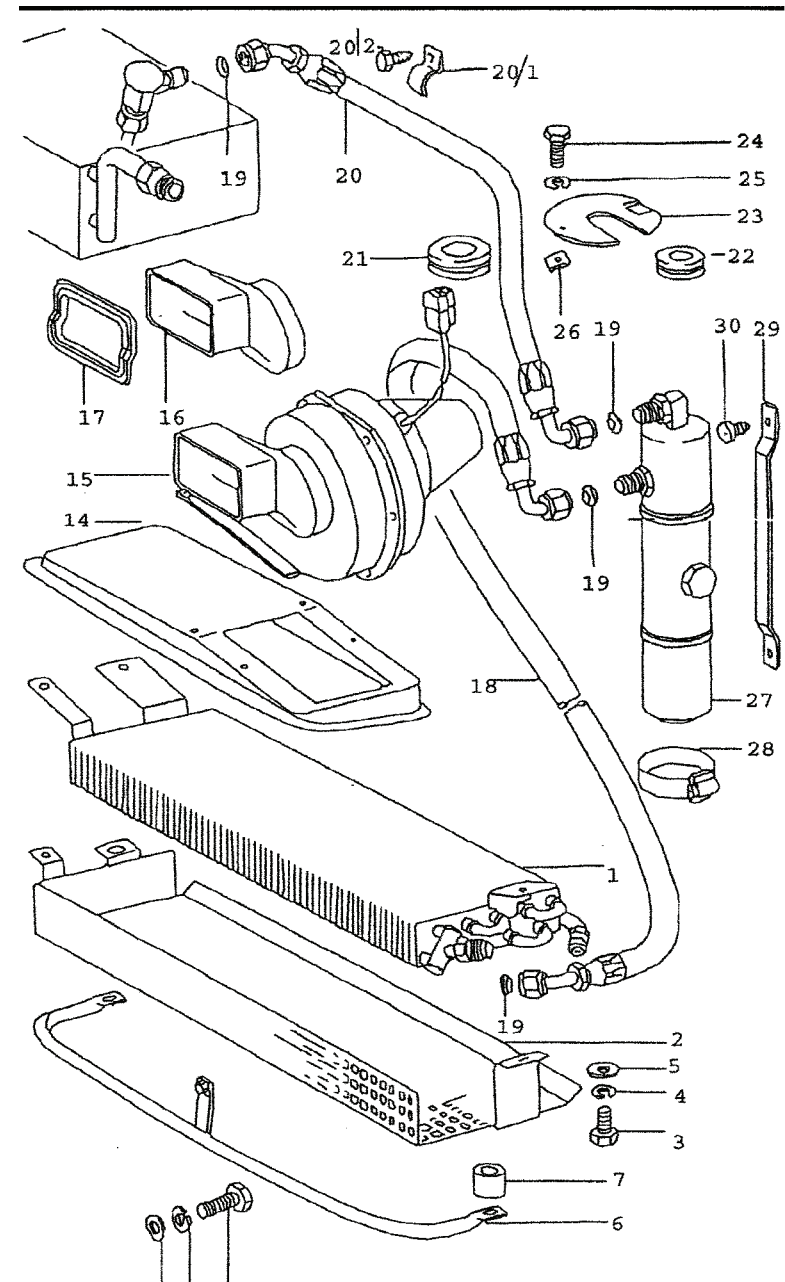
1975-85 Porsche 930 LHD Upgrade Kit

Evaporator/Expansion Valve



Carefully remove the capillary tube, electrical connections and hoses. You will also have to remove the Blower Motor Trapezoidal Resistor/Air Intake from inside the car. Remove the Case and separate the top half of the box which houses the Blower Motor Assembly by removing the clamps on the side of the box.

The Evaporator/Expansion Valve Assembly should be easily pulled from the bottom half. After cleaning the box, 17-RA1001-1 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. There are (2) electrical connections to be made between the Hi-Lo Pressure switch and the Compressor wire in the "Smuggler's Box". The Compressor wire will be the yellow one in the main A/C wire harness relay inside the "box". The wire will have to be cut with one end going to either wire on the Hi-Lo switch and the other end to the remaining switch wire. The switch will shut down the Compressor if it detects a too low or too high pressure condition. The (2) wires from the switch should be run next to the hose from the drier and connected to the cut ends of the Harness Compressor wire with the enclosed Butt ends.





The center vent (10.897.02) can be mounted with screws to the top of the center console (or Bottom of Dash), although this necessitates removal of the console components. We prefer not to disfigure the console with holes by using Black Silicone Sealant to adhere the vent to the console. It could then be removed without leaving holes in the console. Before mounting the vent, remove the lower Butterfly Vent and rubber gasket. You should now have a tube showing with space around it. The enclosed 2" tubing (02-1103) should "screw" into the space and turn, at least, two times. That should secure the duct hose to the A/C Plenum. The other end gets attached to the vent and gets secured as previously described above, using wire ties to hold it in place until completely dry.

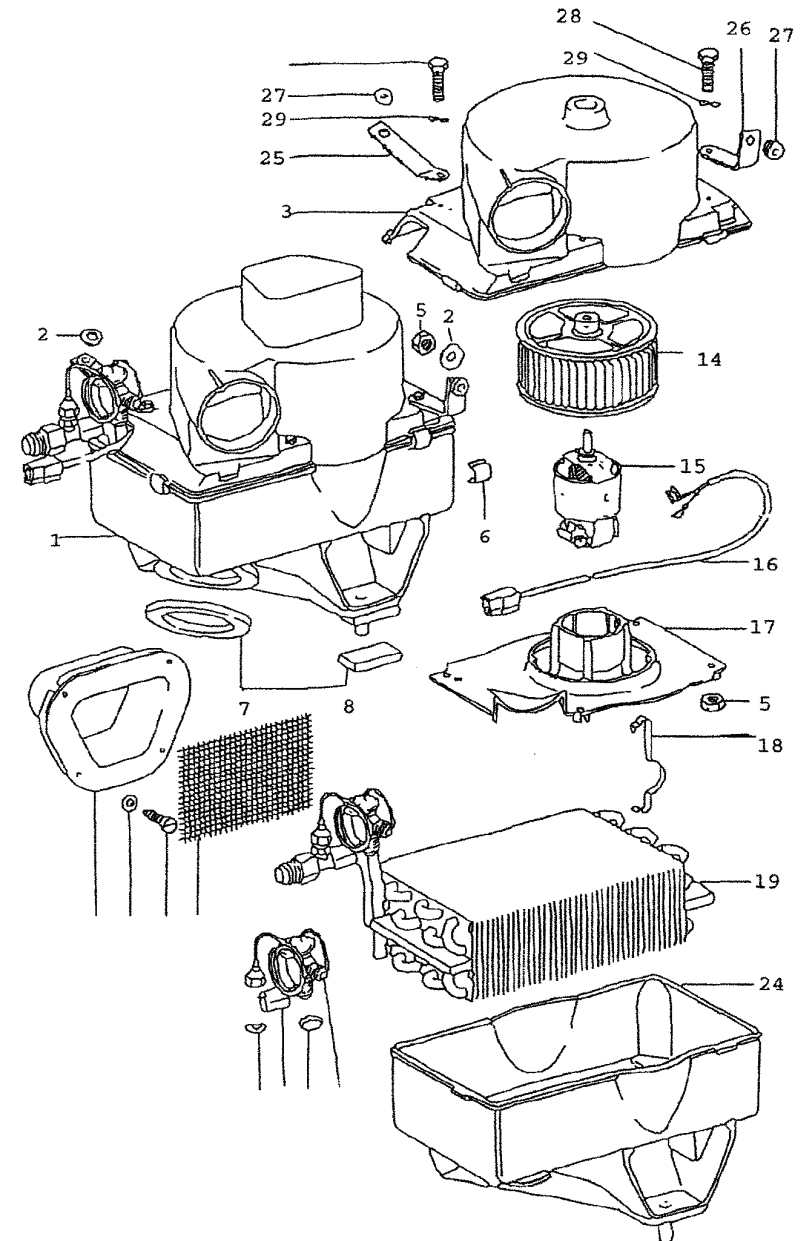
1975-85 Porsche 930 LHD Upgrade Kit

Optional Early Blower Motor



Before Installing- REMOVE Original Blower and Mounting Plate, Resistor Pak Inside Car (Drill out Pop Rivets Holding it in), Blower Wheel From Motor (Being careful not to distort while removing). 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!



**Optional Early Blower Motor**

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. Before drilling holes, make sure the motor Fan Hub is centered in top "button".

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. 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 (Q-201). This will ensure air-tight performance.



The new Receiver/Drier should be an exact replacement for the old one except for the Hi-Lo Pressure switch, but will connect the same. Do not use sight glass to regulate the R134a refrigerant!

**Rear Condenser**

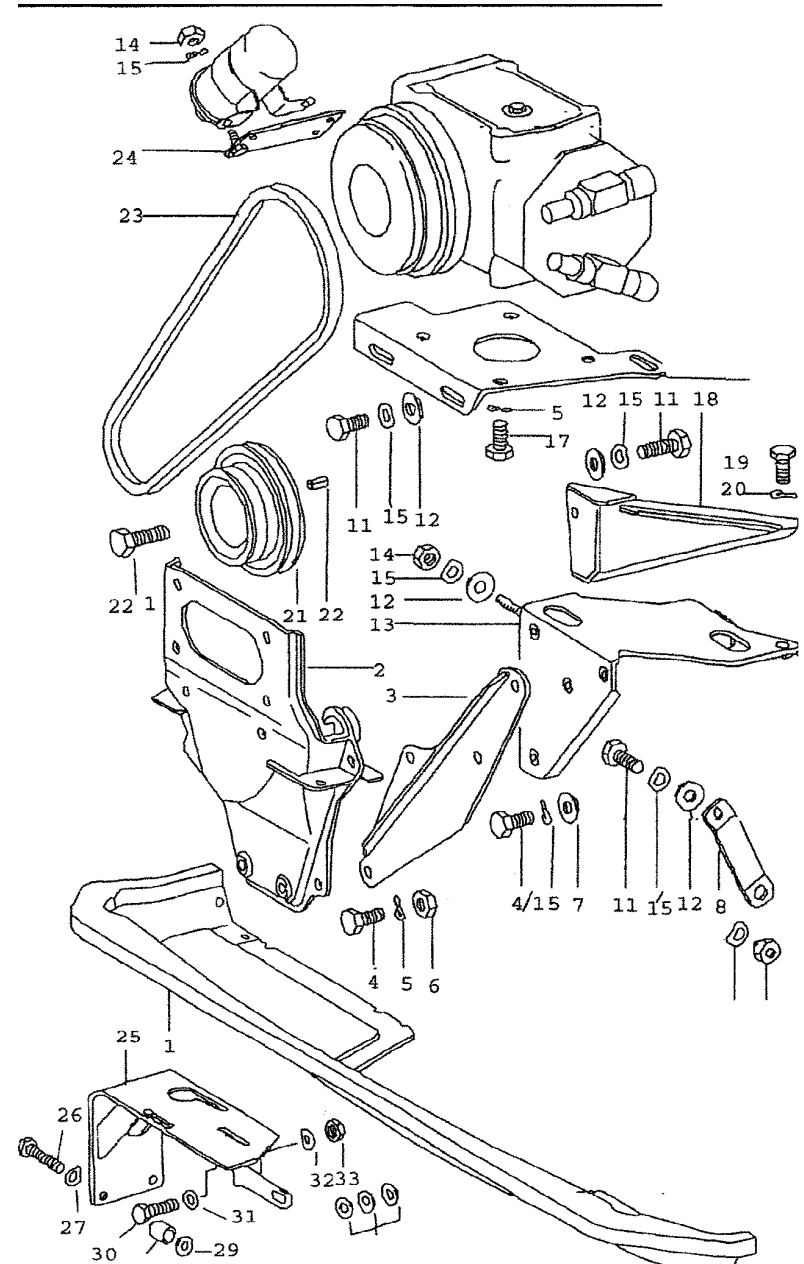
Before installing the Multi-Flow Condenser with the brackets provided, “dry fit” the condenser to the engine lid to make sure the condenser is not hitting or rubbing when the lid is closed. The Condenser fittings should face the rear of the Engine Lid with the smaller one on the left (drivers) side.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

DO NOT TIGHTEN UNTIL ALL CLEARANCES AND ALIGNMENT IS CHECKED! RECHECK AFTER TIGHTENING!

Optional Compressor



The Sanden/Behr Compressor has the correct R134 Oil in it and is mounted at 90° to the left (see pic), with the enclosed Adapter Brackets (which may have to be altered slightly, depending on Engine configuration. If using our Denso Compressor, you will have to drain the shipping oil and install the same amount of PAG46.

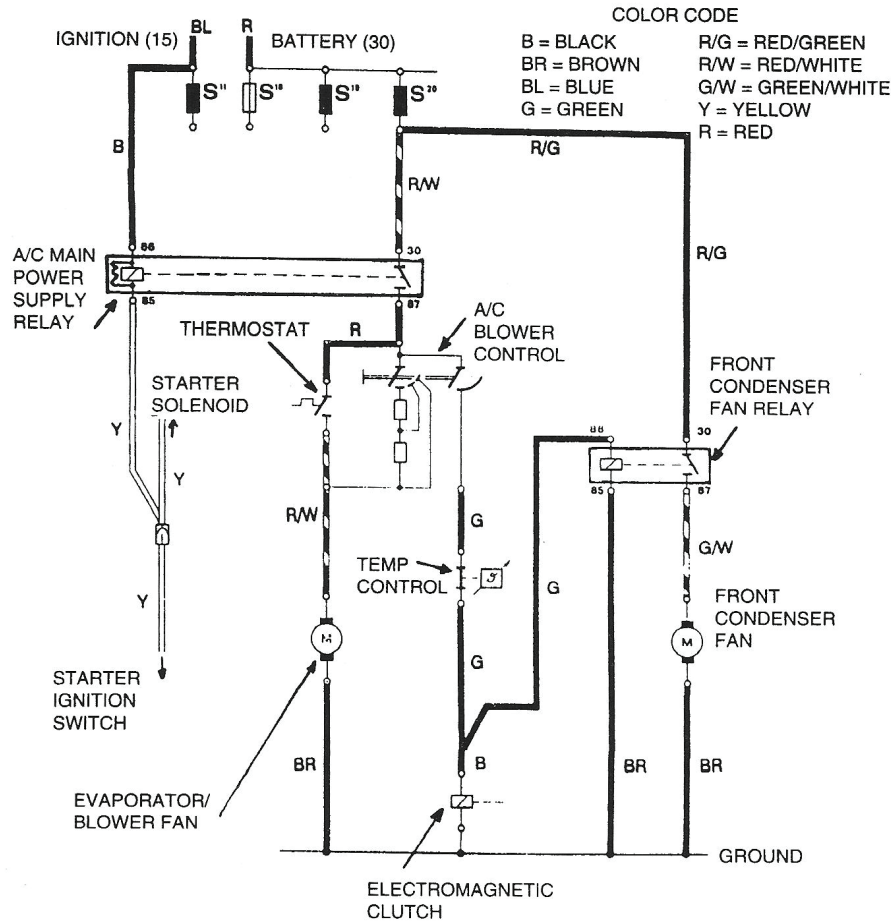


**DO NOT REMOVE COVERS UNTIL CONNECTION TIME AND USE O-RINGS AND LUBE ON EACH CONNECTION!**

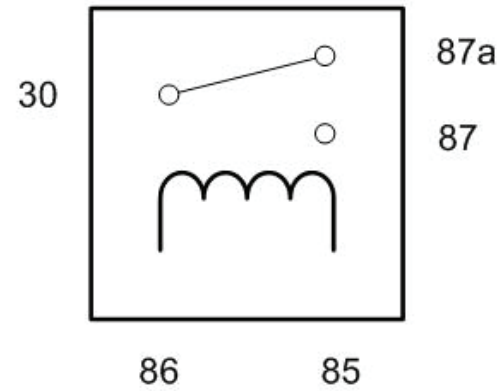
After removing the old assemblies and noting the re-assembly procedure, replace with the new Barrier Hose assemblies, but keep in mind that some of the new hoses are not the same length. RA-00015-07 liquid hose from the front condenser to the rear condenser is longer than original. The liquid hose (OE Front Condenser RA-00015-02 or Upgrade Front Condenser RA-00015-04) goes from the front condenser to the lower Drier connection under the L/F fender, should be of the same approximate length. RA-00001-10 liquid hose goes from the upper Drier connection to the Expansion Valve. RA-00015-06 suction hose goes from the Evaporator (same approximate length) to the Compressor. The discharge hose (Denso RA-00015-08 or Sanden RA-00001-31) from the Compressor to the rear Condenser will be longer than original and is routed to the front of the Engine (Firewall End).



After evacuating the system add 16 to 22 oz. R134a refrigerant. At 90-95 degrees, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 30-40 PSI. All of these pressures would be at “high Idle” (Approx. 1200 RPM) with Air flowing over the Condenser. Do not use the sight glass to determine the amount of refrigerant- it is only for R12 refrigerant!



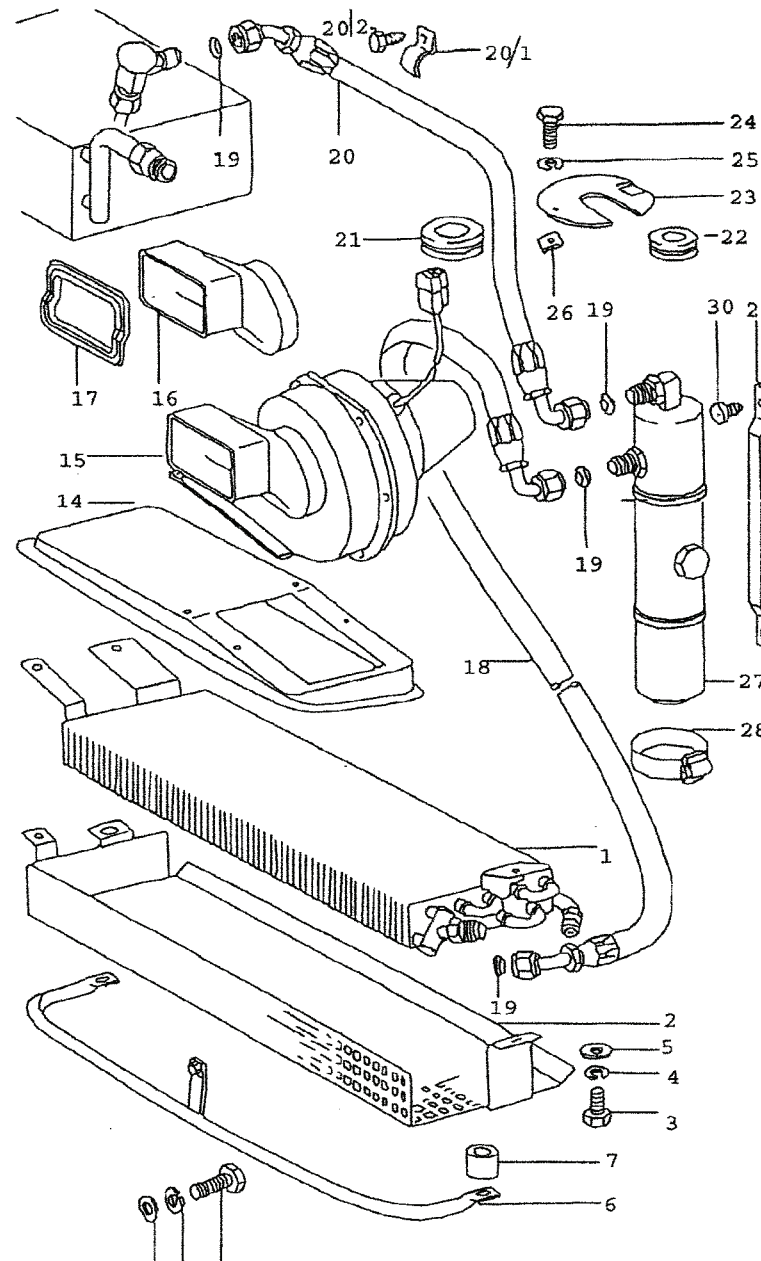
Relay Wiring Guide and Terminal Numbers



- 30 - High Power Feed (Must be Fused!)
- 85 - Relay Coil Ground
- 86 - Relay Coil Feed (Trigger Wire)
- 87 - High Power Output - Normally Open Contact
- 87a - High Power Output - Normally Closed Contact

Carefully remove the capillary tube, electrical connections and hoses. You will also have to remove the Blower Motor Trapezoidal Resistor/Air Intake from inside the car. Remove the Case and separate the top half of the box which houses the Blower Motor Assembly by removing the clamps on the side of the box.

The Evaporator/Expansion Valve Assembly should be easily pulled from the bottom half. After cleaning the box, the new, High Efficiency 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. There are (2) electrical connections to be made between the Hi-Lo Pressure switch and the Compressor wire in the “Smuggler’s Box”. The Compressor wire will be the yellow one in the main A/C wire harness relay inside the “box”. The wire will have to be cut with one end going to either wire on the Hi-Lo switch and the other end to the remaining switch wire. The switch will shut down the Compressor if it detects a too low or too high pressure condition. The (2) wires from the switch should be run next to the hose from the drier and connected to the cut ends of the Harness Compressor wire with the enclosed Butt ends.





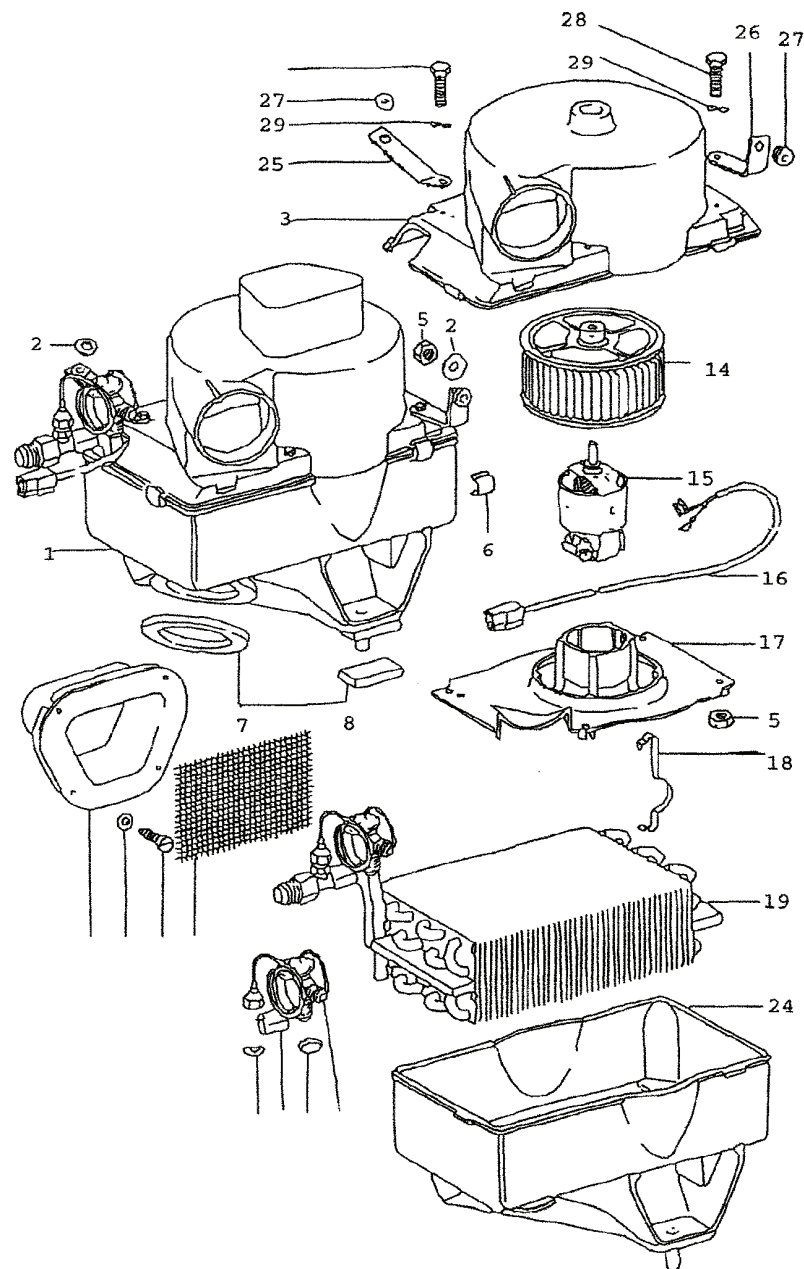
The included center vent can be mounted with screws to the top of the center console (or Bottom of Dash) with screws, although this necessitates removal of the console components. We prefer not to disfigure the console with holes by using Black Silicone Sealant to adhere the vent to the console. It could then be removed without leaving holes in the console. Before mounting the vent, remove the lower Butterfly Vent and rubber gasket. You should now have a tube showing with space around it. The enclosed 2" tubing should "screw" into the space and turn, at least, two times. That should secure the duct hose to the A/C Plenum. The other end gets attached to the vent and gets secured as previously described above, using tape to hold it in place until completely dry.

Blower Motor

When ready, place RA-1-1003-1 Blower Assembly in place.

Position the included metal clips (40-62880) so they hook around the nylon clamp tabs on the New Blower Housing and engage the bottom Evaporator Case clamp tabs- they should snap in.

The enclosed Wire Harness (2174) can be connected directly to the OE Fan switch or spliced into the wires before the OE resistor at the Intake located behind the Passenger Floorboard. Remove the OE Resistor by drilling out the Pop Rivets holding it to the Intake Frame. Using the enclosed wire connectors and shrink wrap, splice the original Porsche low speed wire to the yellow wire on 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.





After confirming the motor is turning and the Fan speeds are correct, secure the wires and seal the drilled holes with silicone. This is important to allow more re-circulated air to enter the system so there can be more volume expelled (higher CFM).

After testing but prior to permanently reinstalling the new Blower Housing, Drill holes in the housing to correspond to the original housing Bracket holes- be careful of interfering items! Use silicone to seal the edges of the Evaporator Box where the two halves meet. Also, use the supplied Cork Sealing Tape (Q-201) to seal the opening where the evaporator ports and electrical wires exit the Case, making it airtight. Re-fasten the brackets and install the new flexible duct hose (RL0030) to the assembled Evaporator Case.

If the Smuggler's Box Lid will not close due to the Front edge of the Housing hitting, it may be necessary to "Dimple" the Lid to obtain the Proper Clearance!!



The new Receiver/Drier should be an exact replacement for the old one except for the Hi-Lo Pressure switch, but will connect the same.

Do not use the sight glass to regulate the R134a refrigerant!

**Rear Condenser**

Before installing the Multi-Flow Condenser with the brackets provided, “dry fit” the condenser to the engine lid to make sure the condenser is not hitting or rubbing when the lid is closed. The Condenser fittings should face the rear of the Engine Lid with the smaller one on the left (drivers) side. Attach the universal brackets to the Condenser and original mounting holes, using the Machine screws, “Nyloc” nuts and original screws. The Condenser, Hard Line & Hose assembly should be installed on the #8 Condenser fitting prior to fitting into Engine Lid. The Hardline assembly will be connected to the outside of the right Lid hinge with the enclosed hose clamps. The #6 (smaller) hose with 90 Deg fitting will attach on the left hinge and wrap the left edge of the Intercooler Lid Seal and top of the Condenser. Secure with enclosed Tie Wraps.

Do not tighten until all clearances and alignment is checked! Recheck after tightening!



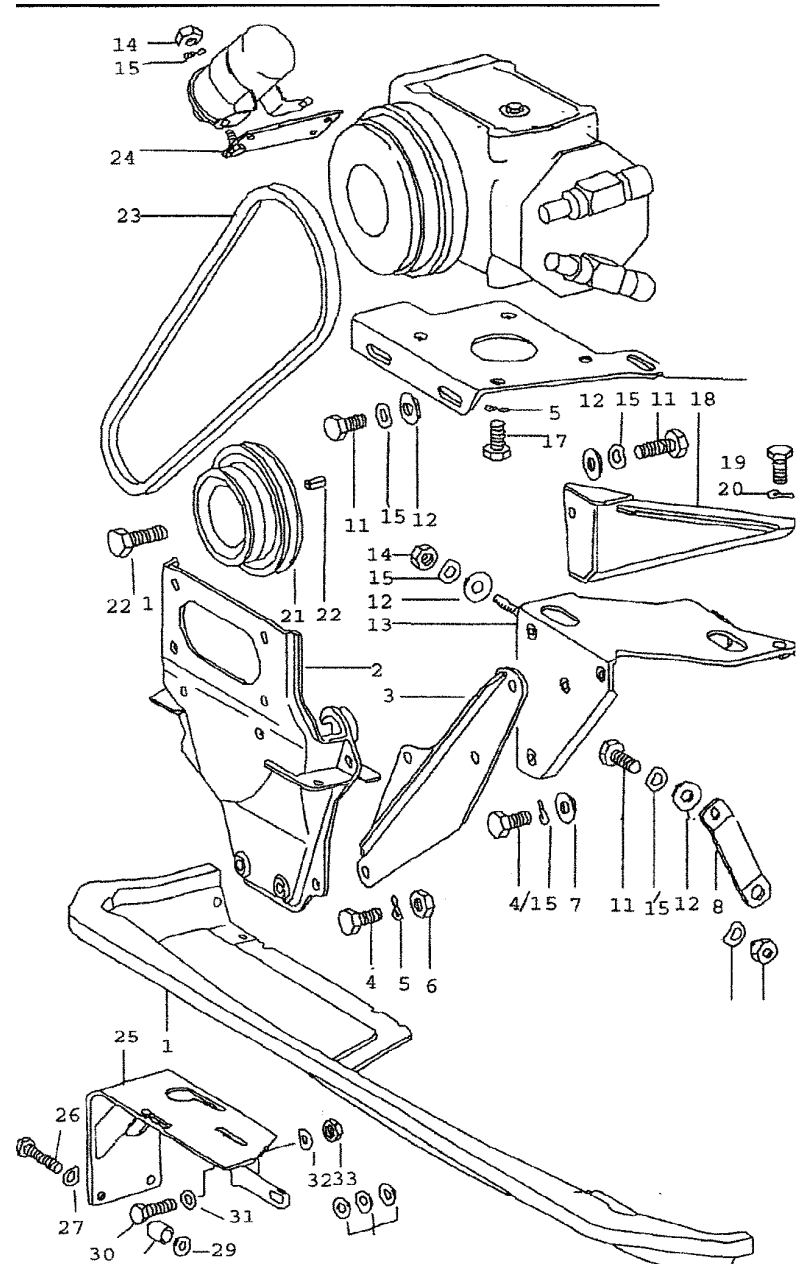
Do not remove covers until connection time and use O-rings and lube on each connection!

After removing the old assemblies and noting the re-assembly procedure, replace with the new Barrier Hose assemblies, but keep in mind that some of the new hoses are not the same length. RA-00015-07 liquid hose goes from the front condenser to the rear condenser is 232". RA-00015-02 (OE Front Condenser) or RA-00015-04 (new Front Condenser) liquid hose goes from the front condenser to the lower Drier connection under the L/F fender is 64". RA-00001-10 liquid hose goes from the upper Drier connection to the Expansion Valve. RA-00015-06 suction hose goes from the Evaporator to the Compressor is 147". RA-00001-31 (Sanden) or RA-00015-08 (Desno) goes from the Compressor to the rear Condenser is 30" and is routed to the front of the Engine (Firewall End).

Compressor

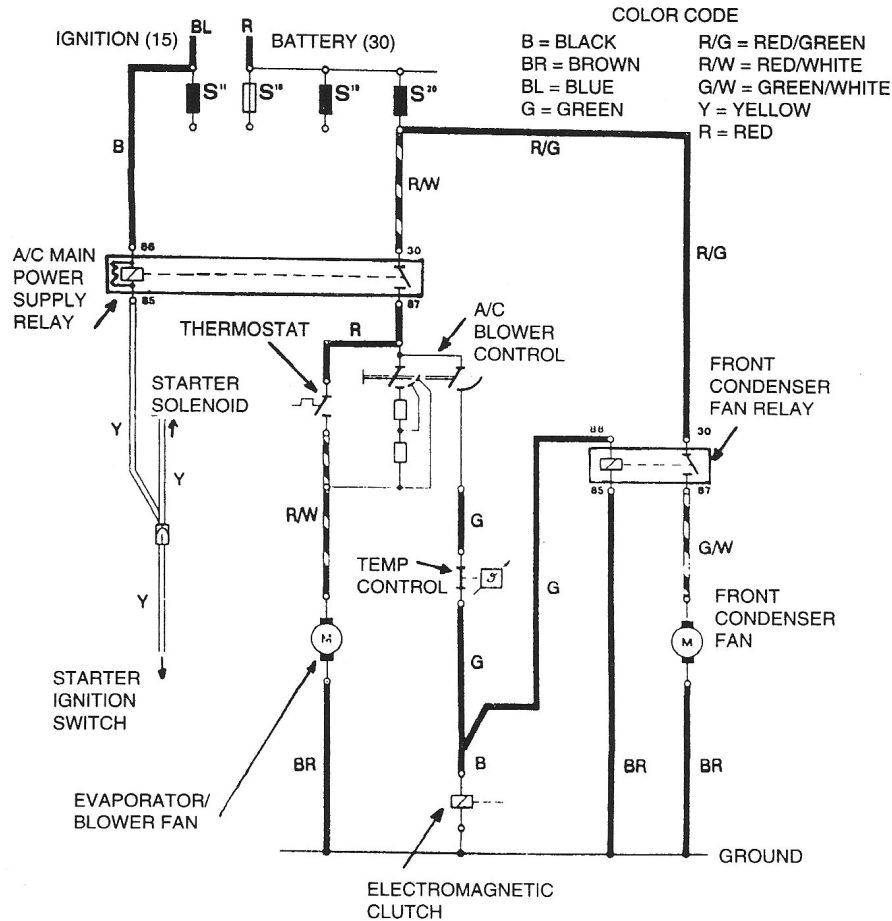


The Sanden/Behr Compressor has the correct R134 Oil in it and is mounted at 90° to the left (see pic), with the enclosed Adapter Brackets (which may have to be altered slightly, depending on Engine configuration. If using our Denso Compressor, you will have to drain the shipping oil and install the same amount of PAG46.

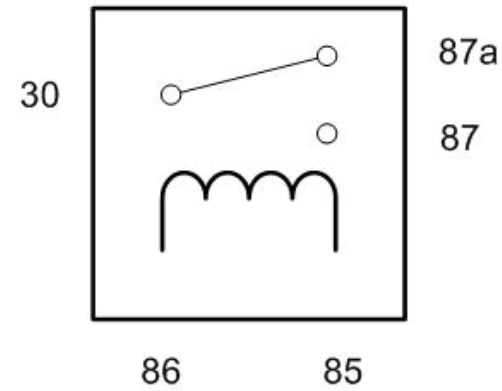


**Charging System**

After evacuating the system add 16 to 22 oz. R134a refrigerant. At 90-95 degrees, we found the High Pressure should read approximately 200-225 PSI and the low side should read approximately 30-40 PSI. All of these pressures would be at “high Idle” (Approx. 1200 RPM) with Air flowing over the Condenser. Do not use the sight glass to determine the amount of refrigerant- it is only for R12 refrigerant!



Relay Wiring Guide and Terminal Numbers



- 30 - High Power Feed (Must be Fused!)
- 85 - Relay Coil Ground
- 86 - Relay Coil Feed (Trigger Wire)
- 87 - High Power Output - Normally Open Contact
- 87a - High Power Output - Normally Closed Contact

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)

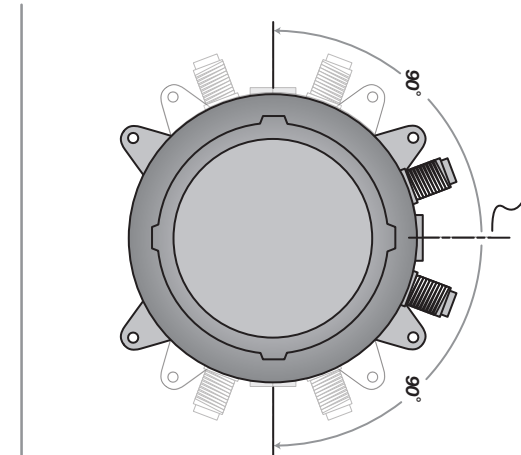
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 rpm

ACCEPTABLE OPERATING PRESSURE RANGES:

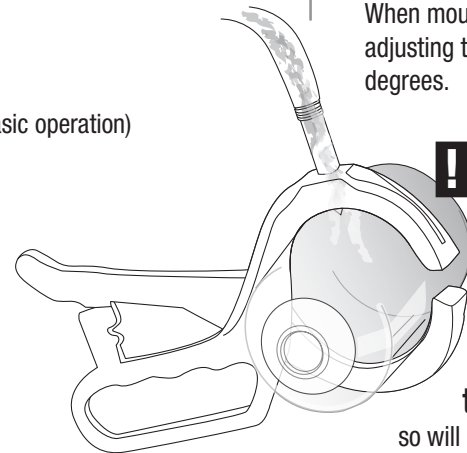
1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

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.

