

Installation Manual

1959-61 Jaguar Mark IX

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Congratulations...

You have just purchased the highest quality, best performing A/C system ever designed for your 1959-61 Jaguar Mark IX.

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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

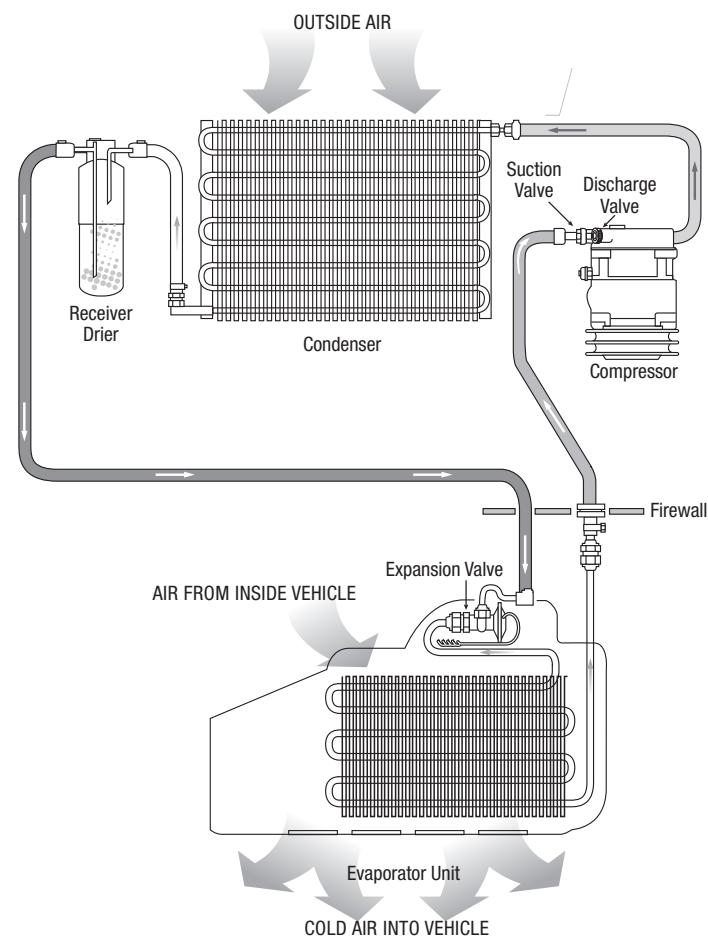
- ☐ Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- ☐ Measure twice (or more), cut once
- ☐ **Should you have any technical questions, or feel you have defective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





After removal of the battery, battery tray and passenger carpeting, remove the battery tray and any insulating material from the outer Firewall. Prior to placing the Blower Motor under the “shelf” inside the car, make accurate measurements so the enclosed RA-00004-03 4” Oval Hose Adapter will be attached to the Blower from the top of the shelf to attain maximum Air Flow. When the correct position is attained, mark the shelf by tracing the inside of the blower housing opening. Cut the opening after checking for obstacles and wiring. Be sure that blower opening is maximized for airflow before attaching.



DO NOT SUBSTITUTE EVAPORATOR HARDWARE- IT CAN CAUSE DAMAGE!!

The evaporator is shipped with (2) covers- the Plain front cover (with insulation on the inside) and the rear cover with (4) Hose Adapters. To mount the evaporator, determine where the inside edge of the Dashboard brace (inside the car) and the highest point on the Firewall where you can cut an area adequate to allow the Hose Adapters to protrude through the Firewall. When mounted as an assembly in a Mark IX, this will leave the Evaporator next to and almost on top of the Temperature Gauge line and high enough to clear the Tachometer Generator and allow room for the drain tubes. Use the included ½" Drain Hose between the Evaporator Drains and the enclosed 90° tubes that will allow the condensation to drain past the "shelf". This will leave the top of the Evaporator as high as or slightly higher than the Mark IX Heater Box.

ENSURE THERE IS ADEQUATE ROOM TO CONNECT THE DUCT HOSE AND TIE WRAP CLAMPS INSIDE THE CAR!!



Before permanently attaching the Evaporator, use Silicone sealer to seal all insulation and cover edges. Also attach Duct Hoses to Evaporator Hose Adapters (using enclosed tie wraps) and feed them through the Firewall prior to permanently attaching Evaporator!! Once the Evaporator has been fitted and all clearances checked, drill 2 holes to fasten the box from the inside after drilling one hole for the Temperature Switch capillary tube to go through to be embedded in the Evaporator Core. Use the enclosed Capillary Tube grommet to protect the tube (already installed). You can then permanently mount the Evaporator and install the Capillary Tube- be sure not to penetrate the core too far (opening already made- secure tube with weather-strip or silicone). The Engine Bay Evaporator Brackets can also be mounted at this time (the right side will have to be formed to avoid the Temp Gauge line on a Mark IX). They are installed upside-down for shipping.

The (2) 2" outlets are going to connect the (2) upper Louvers under the Top Dash rail and the bigger 2 ½" outlets will go to the Louvers that are to be mounted under the Dash on each side. When routing the hoses to the Dash, be sure they are not cut on the sharp edges of the Dash.

THE EVAPORATOR MUST BE FIRMLY AGAINST THE FIREWALL



The metal Flanges at the top of the dash will have to be opened up to allow as much air through the top Duct Hoses- it is tight under there, so choose the route that allows the most air flow! The under dash finish panel on the passenger side will have to be shortened or an additional empty speaker grille must be installed on the right side so sufficient air will get to the blower motor. If shortening the panel, cut the board and trim the vinyl so it can be reattached in the same manner as original with contact cement.

You can cut out holes in the lower finish panel for the duct hose and attach the louvers at this time. You may mount the switches in a number of places, as long as you have enough wire and capillary tube length. There is an enclosed "pod" to use as well.

This tube senses the temperature of the air coming in and switches the compressor on and off as needed. When routing the tube from the switch, make every effort to keep the tube from touching any metal or ducts which may affect the temperature sensing. **DO NOT CRIMP THIS TUBE!** Attach the 30 amp circuit breaker under the dash. This will be wired later.



Place battery and tray on right side (passenger) of trunk (boot). Position it the best way to retain access to the jack stand and mark trunk floor where battery cables should come through from under the car (see picture). Check underneath the car to insure there are no obstructions to the battery cable coming through the floor. Be mindful of the fuel lines and suspension travel. Drill two holes next to each other and fit the supplied grommets. Mark and drill the battery tray holes as well. IT IS IMPORTANT THAT YOU MATCH THE + OR - TERMINALS TO THE BATTERY IN THE TRUNK! DOES THE CAR HAVE POSITIVE OR NEGATIVE GROUND? KEEP TRACK! In the engine compartment, remove the old battery cables and insure that there is a good electrical connection from the engine to the car frame. Crimp and/or solder an "eye" cable connector to one end of cable supplied and connect that to the old battery cable's position on the firewall mounted solenoid. Feed the cable down under the car along the right frame rail. From under the car, space out and drill 6-holes along the frame rail, avoiding other lines already there, hanging the cable with the supplied hangers and screws.

Feed the cable through one of the drilled holes in the trunk and calculate where to cut the cable to fasten to the battery and terminal. The end of the long cable will now need the appropriate + or - terminal to be crimped and/or soldered on. Fit the Grommets before soldering the ends!! Do the same to an "eye" for the short cable end and insert in the remaining hole and attach to the frame with self-taping bolt. That cable now gets cut to length and the remaining terminal is crimped and/or soldered on. Do not connect the battery until all A/C wiring is done!



The Wiring harness has 5 electrical connectors on one end- connect to Fan Switch as follows: Black to "B", 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.

Install one of the snap-apart wire connectors on the free compressor wire and the mate to a length of supplied 14 ga wire which is routed in front of the radiator to the 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. FOR EITHER GROUND- attach the Black large harness wire to the circuit breaker terminal "BAT". There must be a ground wire from the motor to the car body. Route all the wires out of the way of obstructions that may develop when the dash and ducts are put together. Make sure all connections are good and hook up the harnesses and switches. Connect the battery and turn on the ignition to test the motor. When switched on, the motor should draw air from the passenger compartment and blow vigorously through the louvers. If not, something may be wired incorrectly.



The Condenser will be installed between the Passenger Front Door Rocker Panel and the Frame keeping it out of the way of tall obstacles. Please see the enclosed pictures to guide you in installation. Mount the (2) fans on the top of the Condenser with the supplied connectors and run the wiring, prior to mounting the Condenser to the car using the included long stainless brackets. The fittings will be to the front and the Plastic Mud Shield will be attached to the Inner Fender to protect the Condenser.

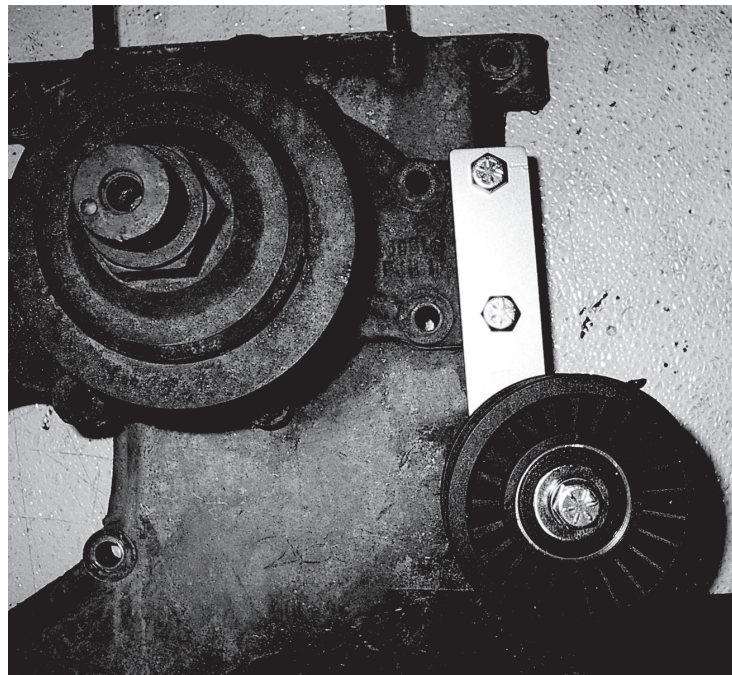


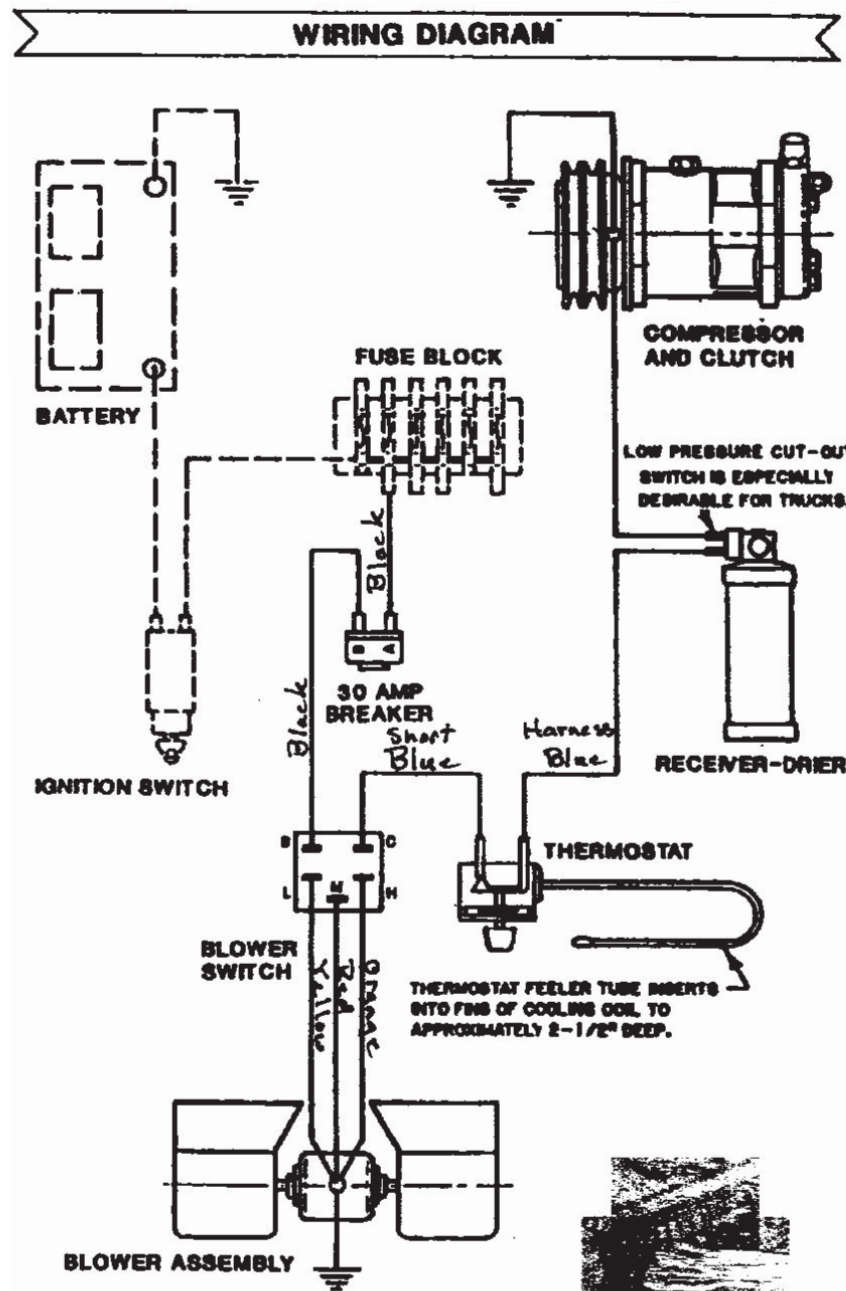
Prior to installation, it will be necessary to cut a section from the left inner fender so the Compressor and Bracket can clear. To cut, mark 2 ½" from the bottom of the L/F Fender flange 4 ½" from the back of the Radiator Support for the top and front cut. The rear cut will be 9 ½" from the back of the Radiator support and the bottom cut will be 10" below the top cut. All this clearance is needed for the compressor, Bracket and Belt. CHECK ALL AREAS FOR HOSES, WIRING ETC. CLEARANCE!

The opening is to be covered by the enclosed "Pan", which can be screwed or bolted to the underside of the inner fender, silicone the edge against the Weather. With the radiator removed, R&R the fan belt and fan blade. Remove the inverted 5/16" head nut and stud directly above the middle generator bracket bolt and install the longer enclosed stud, small compressor bracket followed by the original stud nut & washer. Do not tighten at this time.

The front bracket is installed with the supplied 5/16" bolts & washers in the upper outermost holes in the front timing chain cover (just below the head). Remove any bolts already there. If your generator adjustment bracket is anchored to one of these, you may need a longer bolt in "Grade 8". Leave all the bolts on the brackets somewhat loose and install the compressor with the (3) 3/8" bolts supplied (head of bolts should be against the compressor ears and the lock washers/nuts against the steel bracket). It is important that all motor mounts be in excellent condition to maintain sufficient clearances between inner fender and forward between fan and radiator. Before tightening all compressor bolts followed by the bracket bolts, make sure the compressor is aligned correctly with the engine. Mount the Idler pulley assembly per the accompanying instructions. Make sure all pulleys line up prior to mounting the enclosed fan belt. Reinstall your Fan, but leave the fan belt loose to be tightened after radiator is installed. After rechecking, install Radiator. Tighten fan belt. This will need to be re-checked at 100 miles of operating.

It will be necessary to remove the Radiator and Fan Blade. Remove the Bolt (see pictures). The back of the belt rides on the idler pulley, and goes down to the Crankshaft on the Right side and comes up & over the Water pump pulley on the Left side, to the Compressor, down to the Generator/Alternator to make the complete loop





**REMOVE COVERS ONLY AT CONNECTION TIME and HAVE PROPERLY LUBRICATED****"O" RING ON EACH HOSE CONNECTION!**

There are 3 A/C Hardline/hoses with your kit. The large #10 Compressor hose with the straight fitting w/ Service Port, and Hard Line is attached to the large compressor fitting. Hand tighten and attach other end to the upper fitting inside the evaporator through the hole in the side- again hand tighten. Use the hose hangers to affix the Hard Line and hose to the Evaporator and Heater Box. The #6 Drier hose will need a 1 ¼" hole and supplied grommet in the right inner fender near the right side of the evaporator. Connect the Straight #6 Hose Line to the Evaporator fitting inside through the left side hole and tighten by hand. The other straight end of this hose will go through the inner fender grommet hole. Connect the other end to the Receiver/Drier (mounted under the Right front fender) being sure the flow arrow on the Drier is pointing to the front or the "IN" fitting is receiving the hose from the Condenser!

The other #6 hose has a hard line that attaches to the small fitting on the condenser. The other 180° end will attach to the "IN" fitting on the Receiver/Drier. Be sure there are no obstructions or clearance problems for the drier bracket and screws and attach. Feed the Drier wiring harness into the engine compartment using an existing hole or make a new one.

Hose Insulation: After hose installation, cut insulation to size for hose protection against extreme heat (exhaust manifold), and slit lengthwise to slip over hose. Use enclosed Aluminum Tape to cover slit lengthwise, which should be away from heat source. Use Tie Wraps and Hose Brackets to Secure Hose!

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)

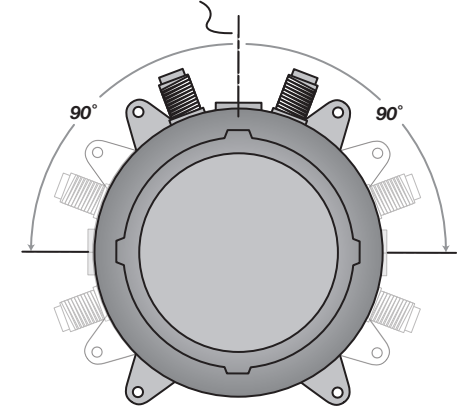
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 rpm

ACCEPTABLE OPERATING PRESSURE RANGES:

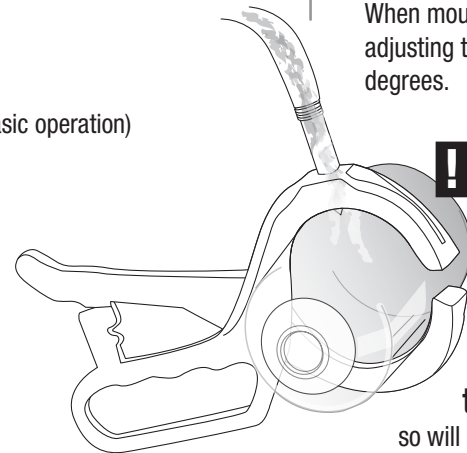
1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

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.

