

Limora Zentrallager

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Fitting Instruction

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.

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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.
- FIRST: Wear eye protection while drilling/ cutting, deburr sharp edges, and never get in a hurry or force apart.
- 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:

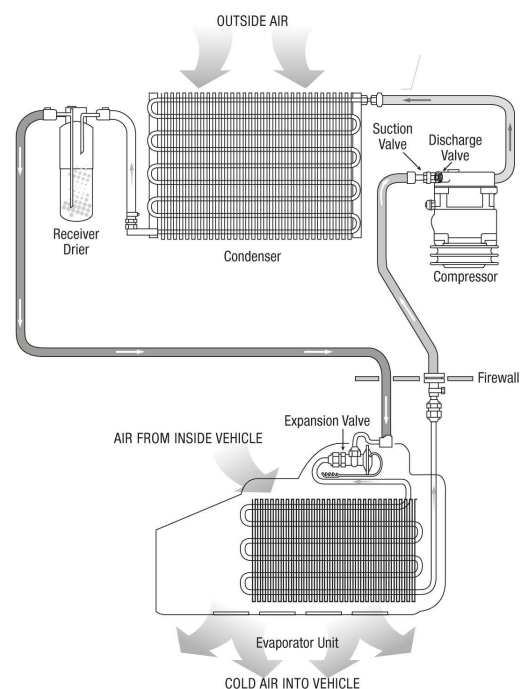
- Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- Measure twice (or more), cut once
- Should you have any technical questions, or feel you have defective components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

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.



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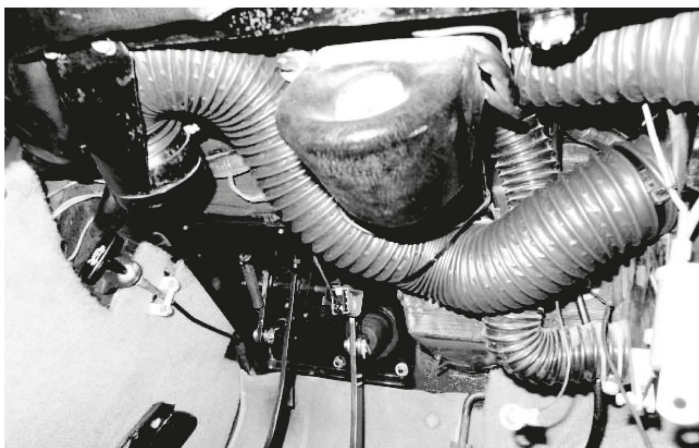
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Interior Ducting and Vents

Remove the plastic glove box cubby and dash reinforcement bracket on passenger's side. Remove the hoses and splitters going to both side and lower vents. Remove leg vent units and also the ashtray, if using the center vent. Remove hose from passenger's side windshield defrost vent, replace with the included longer hose when all the other duct hoses are in place.



Glove box removed showing the vent hose and the longer defroster hose.



The view from the driver's foot well. The heater hoses now attach only to the downward facing vents. The left A/C duct hose routes above the steering column.

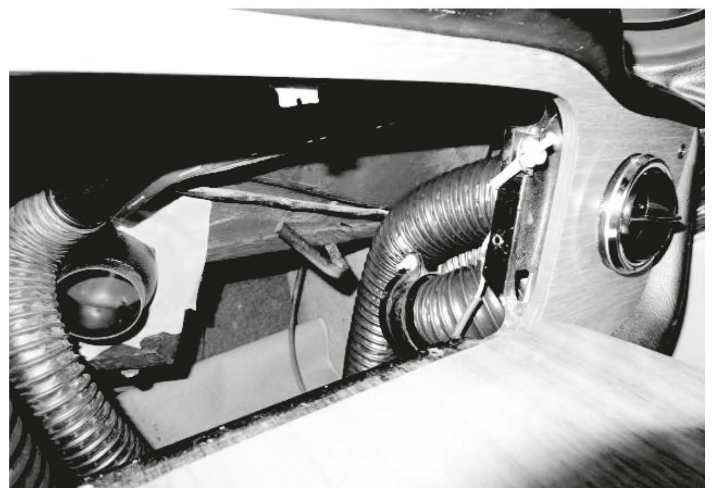
Round Outer Vents

When using the hi-flow ball louvers included in this kit, use leather gloves when pushing the stock side vents out from

the back, There are sharp edges that will deeply cut your hand when the stock vents finally pop out with the needed force.



The round vent collar on the left is sanded down to fit into place.



A view of the new dash vent.

The downward facing vent will be heat only. Some sanding of the 2" Hose Adapters will be needed to fit into the stock dash holes (left picture). After test fitting to satisfaction, use clear silicon caulking to affix the ball louver in place. Also use silicon and a zip ties to attach the duct hose to the backs of the vents. The A/C will use the upper round vents and you will re-attach the bottom facing vents to the heater

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system. For the center dash vent, remove the ash tray assembly. Test fit the new vent assembly as some vent sanding may be required to narrow the louver where it fits into the dash. Attach the duct hose with clear silicon and thread it through the ashtray hole toward the evaporator location.

Center Vent

The 3-exit airflow „splitter“ included in the kit will spread the incoming cold air between the (2) side vents and the center top vent (ashtray). Use the odd shaped outlet on the „splitter“ for the center/top vent and the airflow will be balanced correctly. Some creative arrangement of the hoses in the dash will be necessary. You will not be able to use the glove box bin unless drastically trimmed!



The air splitter will be located under the dash with the odd shaped outlet feeding the center/top vent which occupies the ashtray hole (prototype shown).



The center vent replaces the ashtray. Use silicon caulking to glue it to the dashboard semi-permanently. The louver may need to be narrowed to fit.

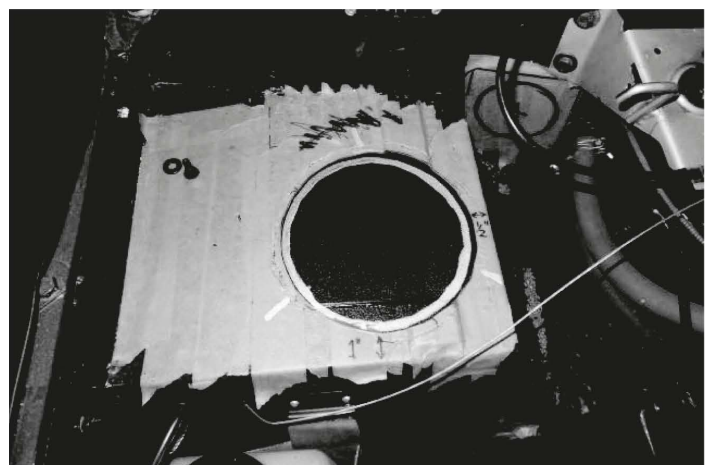
Flexible Duct Hose Lengths

- Driver's A/C vent- 4'
- Driver's Leg Heater Vent- 2 1/2'
- Dash/Center Vent- 2'
- Passenger A/C Vent- 2'
- Passenger's Legs Heater Vent- 2 1/2'
- Passenger's Side Windshield Defroster- 2' of 1 1/2" DIA. Hose

Preparing the Car for the Blower

On the passenger's side foot well deck (in the engine bay), accurately trace around the outside diameter of the blower's stack.

The stack is the 6" diameter tube with a flange. It must be placed a minimum of 1" from the front edge and 1/2" from the center edge. Cut out the circle as accurately as possible using an appropriate saw. The blower stack needs to fit through this hole and into the top of the evaporator case.



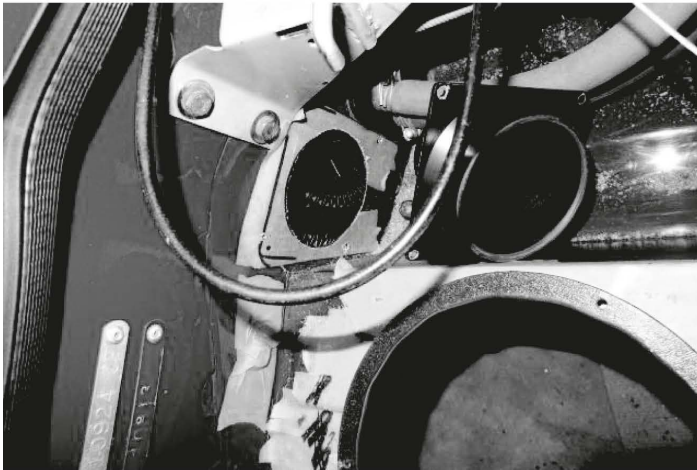
Marking and cutting the hole in the firewall deck and evaporator case for the blower stack (large hole). The two black bolts on the vertical wall (top of pic) are for the evaporator case's mounting brackets inside. Use the nylon washers here to seal.

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The passenger compartment's air inlet hole positioning (small hole), viewed from the engine bay. The smaller diameter of the hose adapter faces inside.

Preparing the Car for the Blower

On the vertical firewall next to the blower's position, mark the position of the air inlet hole using the square-flanged 3" to 2 1/2" hose adapter. Line up the top of the flange with the fold in the sheet metal (this description will be more obvious when looking at firewall). Also, move the adapter, towards the center as far as possible, with the flange nearly touching the heater hose outlets. Then trace the inside diameter with the bottom of the traced circle about 1 11/16" from the bottom. Cut out the inlet hole using a 3" hole saw, place the plastic piece back on the firewall, then mark and drill its mounting screw holes. It will be attached with sheet metal screws.

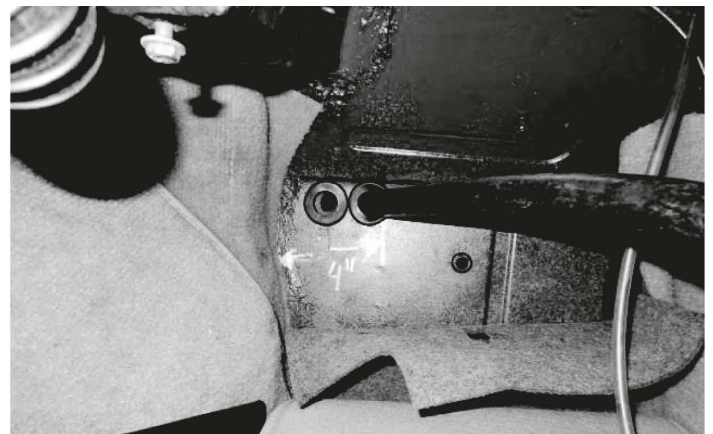
The 2 1/2" end will be facing into the car, and its larger end towards the front. Press 3 hose barbs onto each side. Squeeze them with pliers first to ensure a tight fit, if necessary. Apply silicon caulking to the flange and screw the unit.

Evaporator

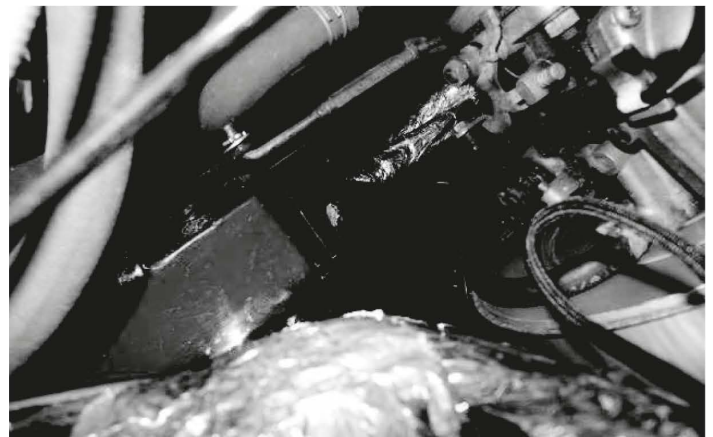
Assemble the evaporator case to fit into car. Attach the (3) mounting brackets to the evaporator case tight enough to allow for final positioning while inside the car. Position the evaporator assembly in the foot well to mark the mounting holes, with the beveled top edge to the rear of the car. The case should be as far to the front of the car, and left as possible. It will be slightly angled inward to follow the folds of the car's sheet metal. Peek through the hole you just made in the firewall deck to make sure the blower's stack will go into the evaporator case and not into thin air.

On the inside, mark the (2) positions for the rear evaporator mounting holes. Drill for 1/4" bolts. Use the nylon washers during the final assembly for sealing.

Make (2) marks where the refrigerant hoses will enter into the passenger's compartment through the vertical firewall. They should be within 4" of the transmission tunnel. They must line up with the outlets on the evaporator. Mark the drain hose exit next. The drain hose exit must be slightly below the outlet on the case for drainage.



The refrigerant hose holes' approximate positioning as viewed from the passenger's foot well. Transpose your own holes with the evaporator assembly in place; yours may end up slightly different from the prototype shown.



The refrigerant hoses (the furthest insulated hose going under the carb) as viewed from the engine bay looking downward. Take special care so they clear all the body's sheet metal ribs
After, placing the Evaporator in the designated position, accurately trace through the big 6" hole on the firewall deck

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onto the top of the plastic evaporator case.

Remove the evaporator case assembly from the car and separate the top half. Cut out the big hole you just traced on the top half. Apply the foam tape around the edge of this hole, with about 1 /16" hanging off into the hole. Drill small pilot holes on the marks you made for the refrigerant hoses on the firewall. Check the clearance where the hoses will go through and sheet metal bulkheads in the engine bay. Check it from the engine bay as well. Spend extra effort on this step and life will be easier later in the installation. Again, they should be within 4" of transmission tunnel, otherwise they will not clear a hidden longitudinal bulkhead in the engine bay. Once satisfied with the holes' position, drill the 1 3/4" holes and insert the (2) rubber grommets. Drill the 7/8" hole for the condensation drain hose grommet.

Mounting the Evaporator

Re-assemble the evaporator case halves and use the cork sealing tape to seal the hard-line exit hole in the plastic case.

Seal this area good. Install the drain hose. Install the #6 Hose before the evaporator case is fully mounted, then slide the A/C hose, along with the drain hose, through their grommets and fire wall.

Bolt in the (3) brackets, mounting the assembly, making sure the large top hole is aligned and up against the deck. Run the #10 hose from the engine bay through the grommet into the foot well and attach. The fitting may have to be bent slightly in a vice. When tightening, make sure to use a second wrench so you don't bend or break the aluminum hard-lines of the evaporator core. Due to the confined space, make double sure the O-rings are seated properly, and the couplings aren't cross threading. This will be the most difficult part of this installation.

Installing the Blower

The blower stack also needs to be trimmed to the minimum height needed to access its (3) mounting brackets. Attach the stack to the blower unit, seal with silicon. Place the unit in the car to mark for bracket holes. Orient the blower like the photos insuring that the flexible duct hose lays low enough for the hood release mechanism to function properly (watch the safety catch hook when hood is closed). Mark and drill holes then remove unit.



The hole you will trace through the firewall deck to the positioned evaporator case.



What the evaporator/blower unit looks like together out of the car (for reference only). The blower and evaporator will have to be attached together in the car. The production stack doesn't have a bottom flange. The only flange will be the one used to mount the stack to the blower case.

Installing the Blower

With the evaporator assembly aligned and mounted, run the (3) colored fan wires rearward through the 5/8" grommet of the evaporator's top case, one at a time, with the black plastic plug going forward. Connect the harness' plug with the blower motors. Run the blower's black ground wire through the same grommet and screw it into the sheet metal behind the dash to establish a ground connection. Unwind the ca-

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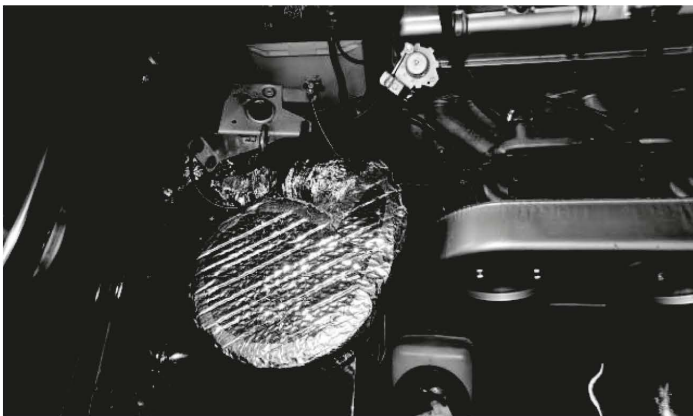
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pillary tube of the thermostatic switch and follow the reverse route into the case.

Take care not to kink the tube. Put a 90° bend in it (no kink) and shove it down into the fins of the evaporator. It should terminate about half way through the evaporator's core (approximately 1 1/2"). Slide the blower/stack assembly into its place and fasten it to the deck with the brackets and sheet metal screws. Seal that junction with sealing tape. Install insulation on Blower Assembly and insulate the 3" diameter duct hose.



Blower and flexible return hose installed and insulated

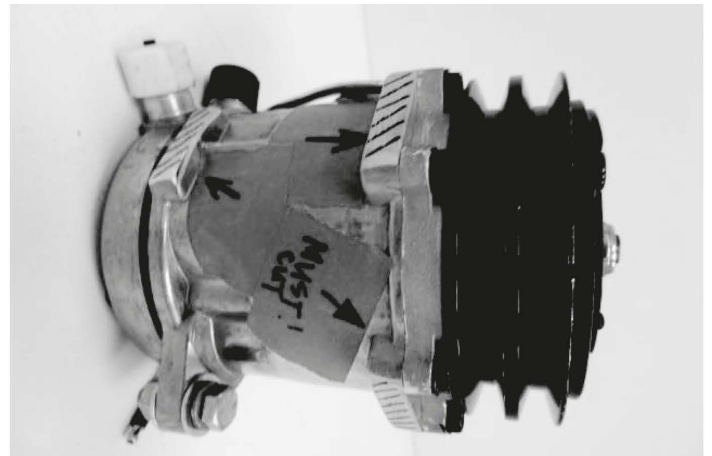


The evaporator unit installed. Hide the wires better.

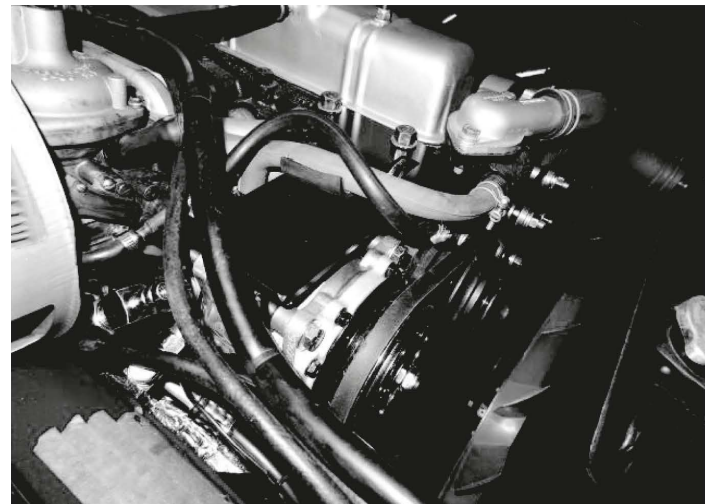
Compressor

You must cut off one of the unused mounting ears from the compressor to clear the water pump. It is the lower, front, left one as it sits in the car. Remember the compressor will be oriented on its side with the ports facing right when doing this. There are (2) additional mounting ears you can cut off to make later steps of the installation easier. They are

the (2) lower rights (front and rear).



Cut the three unused feet off of the compressor for interference and clearance issues. Note the position of the ports relative to the feet



The Compressor installed (rear support bracket not visible). Note the chafe protection on the green coolant hose and the lengthened fuel hose above the bracket.

Remove the front 3/8" bolt from the motor mount to block. Remove the front (2) head bolts. Remove the fuel line connected to the hard line, right above the water pump, to the carbs. If it has an in-line fuel filter, it will need to be replaced with a solid fuel hose and relocate the filter. You may need to remove the water pump-to-manifold coolant hose to install the compressor. The rear hose clamp of this hose will need to be placed with a modern 7/8" clamp if still using the stock type.

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If the coolant hose is rubbing on the compressor bracket, Use a piece of hose for anti-chaffing material. Mount the (2) brackets onto the compressor before installing into the car. Use flat washers against the compressor's aluminum and the lock washer on the bracket's steel. Remember the compressor will have the ports facing 90° to the right of the car.

Attaching the upper bracket; the rear mounting feet of the compressor will go directly in front of the bracket's mounting tabs, using 1 1/4" long bolt. The front feet will need 7/16" spacers between them and the bracket's front mounting tabs, using 1 3/4" long bolt. The lower bracket will be mounted in front of the compressor's bottom, rear, left mounting foot, with a flat washer between. Use a 1 1/4" long bolt. Tighten it enough to allow for movement when installing and positioning inside the car. Mount the assembly in the car, replacing the motor mount bolt with a longer 1" bolt. Align the front pulley of the compressor with the water pump and crank pulleys. Once everything is aligned, do the final tightening of the bolts.



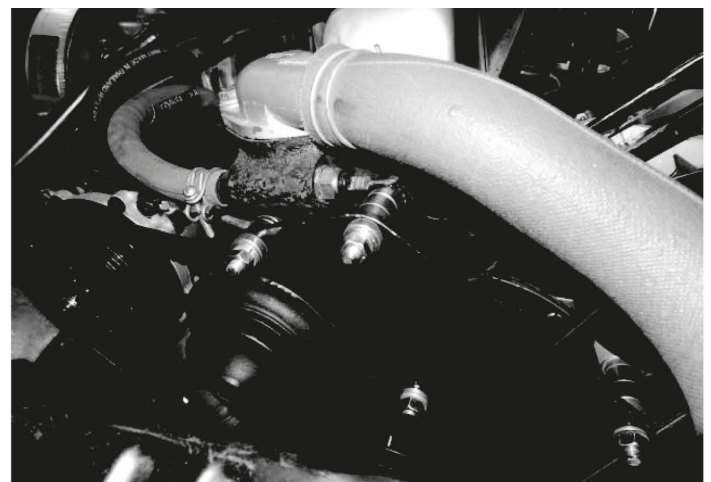
The compressor's belt going to the crank pulley, make sure it doesn't rub on the radiator support strut.

Alternator / Back Idler Pulley

You will replace (3) of the stock bolts with longer ones to mount the back idler pulley plate. Remove the stock 4 3/4" main alternator bolt and replace it with the included 5/16" X 8" bolt. Use the stock spacer bushing and add a 1/2" spacer behind the cast iron mount. Add 1 -9/16" worth of spacers directly in front of the alternator.



The compressor's service port fittings positioned correctly. The #8 hose is going forward to condenser. The #10 going back to the firewall and through to the evaporator

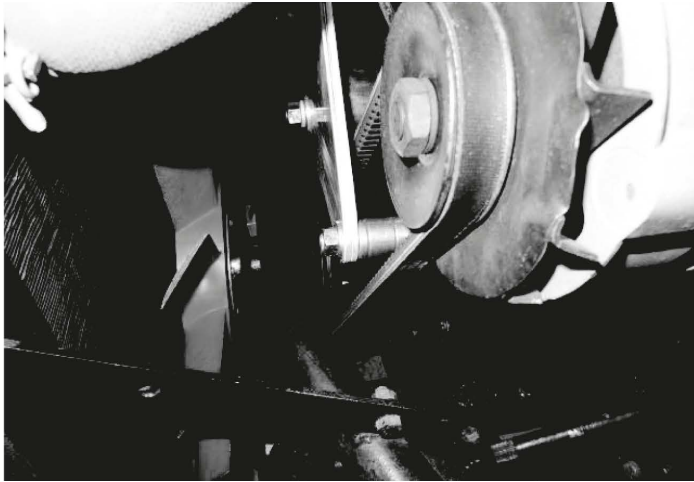


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Remove the (2) top bolts of the water pump, and replace them with the (2) 5" all-thread bolts. Install the new adjustment arm in the stock location on the left bolt, with 1 5/16" worth of spacers in front of it. The right water pump stud needs 5/8" worth of spacers in front. Assemble the 3" back idler pulley onto its plate, using a 5/16" spacer between the idler bushing and plate.

With the 9600 belt on all the pulleys, slide the idler assembly onto the (3) lengthened bolts. The alternator needs to be all the way against the engine to allow for enough slack in the belt to allow this. Tighten the right water pump studs' nut to hold the assembly on. Tension the belt with the alternator, and tighten the other (2) nuts. Insure the belt isn't rubbing on any spacers or hoses, and the belt is centered on the back idler pulley.

Electrical

There are two draws on the electrical system associated with the A/C unit; the air conditioning's blower fan and the condenser's fan. We recommend running them both directly off the battery terminals, using the included 30 amp in-line fuses.

The blower fan will use a relay that is triggered by the ignition so it won't run with the car off. The condenser fan will be triggered when the temp switch is turned on, also activating the compressor clutch. The receiver/drier's high/low pressure switch is wired between the compressor's clutch and the temperature switch.

If your alternator is older, you may have to replace it now that you are demanding more juice from it. A tell-tale sign of this is when the blinkers flash slowly or not at all.

You can choose where you want to mount the (2) switches. The prototype had them mounted in the area where the glove box used to be. There is extra length in the wire harness for you to locate your switches.

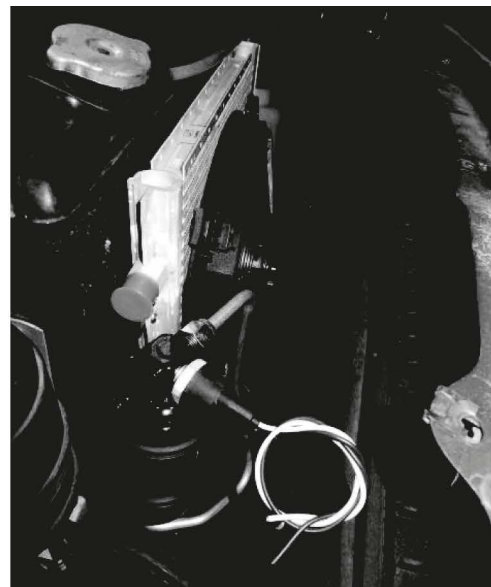
Condenser

Remove the radiator shroud and the (2) bracing struts connected to the wheel wells.

Mount the drier and hard-line to the condenser. The hose fittings will be on the right side of the car, small outlet on the bottom.

Mount the fan in front of the condenser. Since the fan will be in a „pusher“ configuration, the blue wire will be the negative ground (reversed). Attach the (2) upper mounting brackets to the condenser, (4) holes showing from the top, on left side (the side without the outlets), and directly below the #8 inlet on the right side.

The condenser's lower brackets will be attached to the bottom (2) holes on each side of the condenser, with the bent portion going forward. You will have to drill (2) 1/4" holes in the car. Use the black 1/4" X 3/4" bolts for mounting it to the bottom to the car. Mark and trim the radiator shrouding for refrigerant hose exit holes.



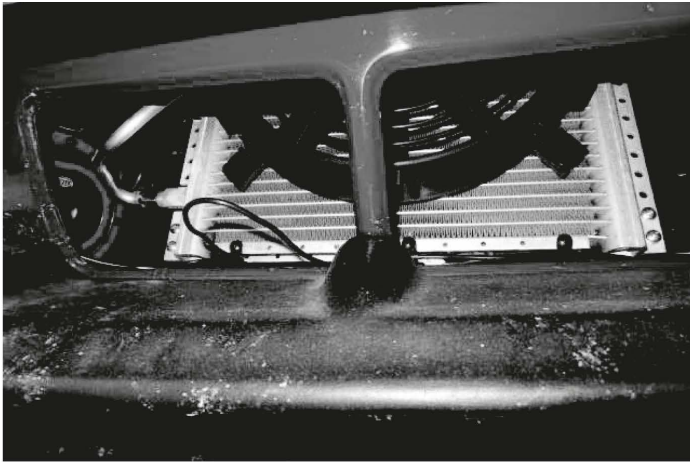
The condenser positioned in front of the radiator with the drier attached.

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Looking through the bottom grill. The #6 hard-line connects the drier to the condenser's bottom outlet.

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)

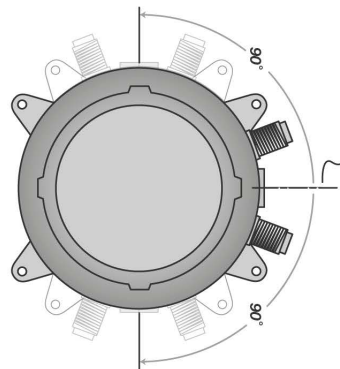
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500

ACCEPTABLE OPERATING PRESSURE RANGES:

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

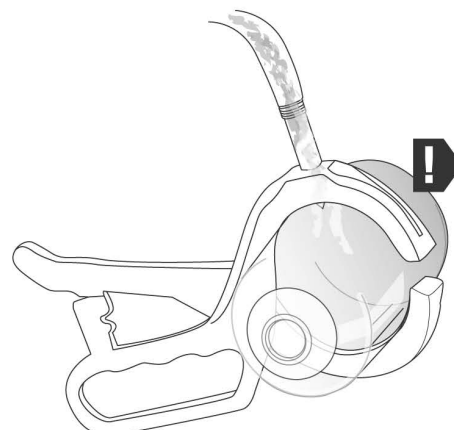
Readings above are based on an ambient temperature of 90° with an adequate airflow on condenser

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 handturn the compressor hub (not the pulley) a minimum of 15 complete revolutions prior to starting the engine with the clutch engaged.



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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: R1134A = 24OZ.

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

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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.