

Installation Manual

1963-67 MERCEDES 230
1966-68 MERCEDES 250
1967-71 MERCEDES 280SL

DOCUMENT #RA-1-1041

©2017 Classic Auto Air / 04.17





Congratulations...

**You have just purchased the highest quality, best performing
A/C system ever designed for your Mercedes Benz.**

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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

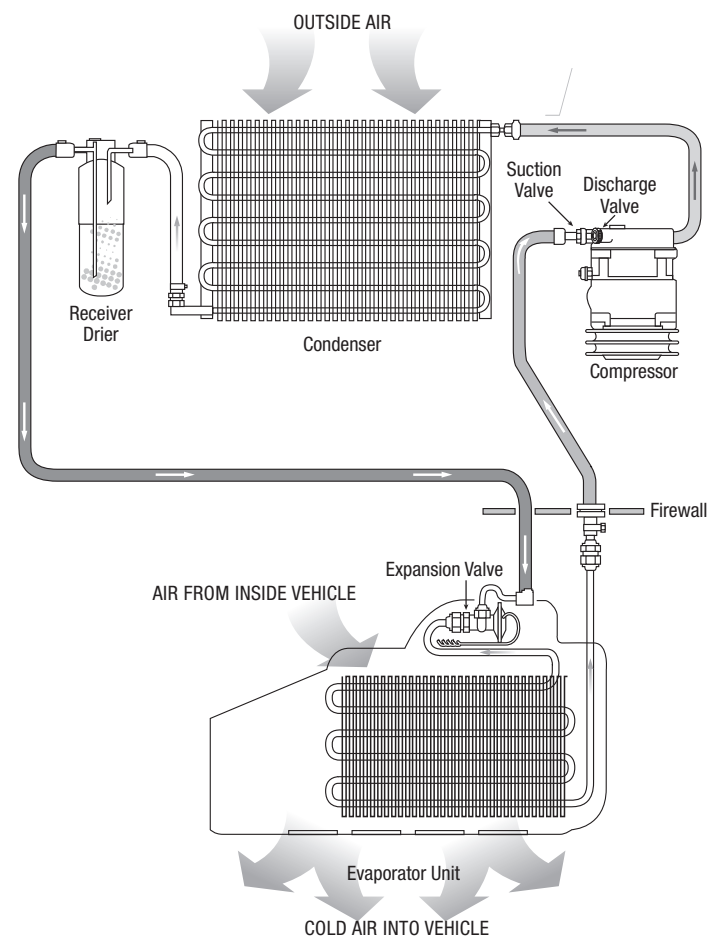
- ☐ Fittings: Use one or two drops of mineral oil (supplied with your kit) on ALL rubber o-rings, threads and rear of bump for o-ring where female nut rides. Do not use thread tape or sealants.
- ☐ Measure twice (or more), cut once
- ☐ **Should you have any technical questions, or feel you have defective 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 Compressor Bracket will be mounted to the front of the Engine using the existing Engine Bolt, and included m12-1.50 X 55 Bolt and spacers. It may be necessary to loosen the Water Pump Pulley to mount the Bracket properly. Once the bracket is mounted, the Compressor Adapter and Compressor can be mounted to the Bracket at the side of the Engine- Adjust so the belt lines up with the existing Water pump Pulley. There are 2 90 deg fittings with Service ports (makes a "T") that attach to the Compressor Fittings to charge the system once completed. The Idler Pulley is mounted at the end of the Bracket. The Belt goes from the Water pump to the Compressor to the Idler Pulley and around the New Crankshaft Pulley.



The super efficient Condenser included in this kit can be installed with the four custom brackets and hardware provided, fittings facing Right (small fitting on the bottom). Keep the Condenser to the right (Passenger side) to facilitate Hose installation. Keep the condenser at least one inch from the radiator so the heat from either unit will not “feed” off each other. Be sure all air possible, either entering the grille or pulled through the radiator by the fans will be forced through the condenser.

Keep the Hose connection in mind when positioning the Condenser- The small fitting is on the bottom!

Keep covers on the fittings until connecting all the hoses at one time.



The new Drier will mount on to the Right Front inner fender with the “in”, or <- fitting connected to the Hose coming from the Condenser. New brackets are included. Fit the Hi-Lo Switch to the exposed side port on the Drier. Connect the “live” Compressor wire to either end of the Switch Harness, then the new Evaporator Wiring Harness long Green wire to the other end of the Drier Switch Harness with the enclosed connectors. This switch will shut the Compressor off if too much, or too little pressure is in the system.



The Evaporator Assembly “mimics” the original system in appearance only- it is much more efficient! Carefully set the unit inside the car to plan where the mounting brackets, A/C hose entry points, drain hoses and wiring will be attached. The Unit is attached to the underside of the Dashboard, using the existing holes in the top of the unit. After measuring and drilling the holes in the dash, the enclosed screws will be installed after pulling the plastic plugs on the bottom of the Evaporator and replacing them when finished. A rear Bracket is supplied to support the rear of the Evaporator! Drill one 1/2” hole in the Floor or Firewall for the enclosed Drain Hose fittings to be attached by epoxy and the drain hoses from the Evaporator connected to them. These holes should be angled down from the hose drain tubes on the Evaporator case.

MAKE SURE THE DRAIN HOLES ARE AWAY FROM FOOT ACTIVITY AND WILL PROPERLY DRAIN UNDER THE CAR!

Make Sure Everything is Lined Up Before Drilling Any Holes!!



The wires on the unit are bundled together- choose an already existing hole in the firewall to feed the long green wire through and connect to either end of the Drier Hi-Lo Switch harness as described previously. The other end of the Drier Harness connects to the compressor with the enclosed wire and connector. Mount the circuit breaker in a remote location and attach the long red wire from the main harness to the “Bat” post. Take the loose black wire and attach it to the “Aux” side of the Circuit Breaker and the other end to a “switched” ignition source (key turns A/C on & off). The “loose” (Red-LHD, Yellow-RHD) wire on the motor is the Ground- attach to a good Body grounding source. With the engine not running and the ignition on, there should be an audible compressor “click” when the fan and temp switches are on. The fan should operate in all 3 speeds- if not, there is a wiring problem. The “relay” wire from the Evaporator should be connected to the original fan relay so the fans turn on when the A/C is turned on!

**BE SURE EVERYTHING LINES UP AND THE MOTOR WORKS
BEFORE MOUNTING THE UNIT!!**

**THE HOSES WERE SENT WITH EXTRA LENGTH!**

They must be cut to the proper length and the enclosed correct angle Fitting will have to be Crimped on.

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

There are 4 A/C hoses with your kit. Install "O" rings before installing hoses!! There are 2 small Diameter hoses (#6)-the shorter one is attached between the evaporator and the rear drier fitting. The longer hose will attach between the Condenser and Drier. The medium size hose (#8) goes between the condenser and the compressor. The largest diameter hose (#10) attaches between the Evaporator, and the Compressor. The Compressor will have the two different sized 90 degree Service Port fittings already installed. Attach hose fittings hand tight, making sure the Service Ports are on the Compressor, "O" Rings are installed, and Everything is Clear and Aligned Before Fully Tightening.

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

USE ENCLOSED TIE WRAPS & HOSE CLAMPS TO SECURE ALL HOSES



The Compressor comes with the correct Refrigerant oil from the factory. **DO NOT ADD OIL.** Evacuate the system for a minimum of 30-45 minutes before charging. Longer if possible. This will remove any moisture and reveal any small leaks. After evacuating, the initial R134A charge will be 12-14 oz. and the total will depend upon the outside temperature. At 95-100 deg F, you can expect 225-250 psi high side and 25-30 psi low side at 1000-1200 RPM with a strong Fan blowing across the Condenser!

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

Please read thru these procedures before completing this new A/C system charging operation.

A licensed A/C technician should be utilized for these procedures to insure that your new system will perform at it's peak, and that your compressor will not be damaged.

- 1) Evacuate the system for 45 minutes (minimum).
- 2) **Your new compressor MUST be hand-turned 15-20 revolutions before and after charging with liquid. Failure to do this may cause the reed valves to become damaged** (this damage is NOT covered by your warranty).
- 3) Your new system requires 134a refrigerant. It will require 1.5 lbs (or 24 oz).
- 4) Your new compressor comes charged with oil - NO additional oil is needed.
- 5) Insure that the new belt is tight.
- 6) **DO NOT CHARGE SYSTEM WITH LIQUID REFRIGERANT!**

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

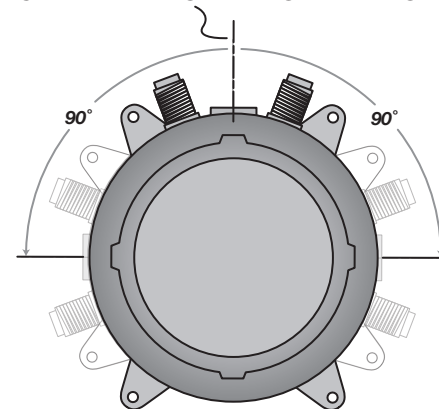
- Determine the temperature outside of the car
- Connect gauges or service equipment to high/low charging ports
- Place blower fan switch on medium
- Close all doors and windows on vehicle
- Place shop fan directly in front of condenser
- Run engine idle up to approx. 1500 Rpm

ACCEPTABLE OPERATING PRESSURE RANGES:

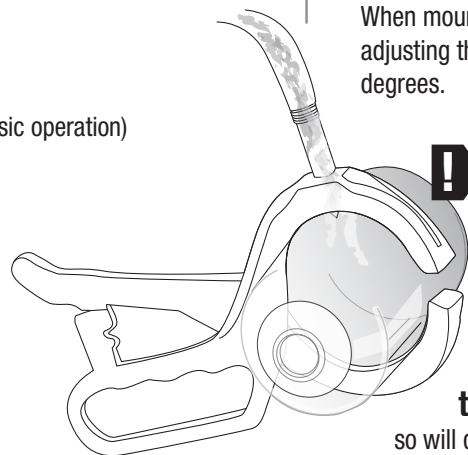
1. HIGH-SIDE PRESSURES (150-275 PSI)
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state)

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

CENTERLINE OF THE OIL FILL BOLT



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



Do NOT tilt, shake or turn refrigerant can upside-down OR use a charging station to install refrigerant while the engine is running. Doing

so will direct liquid refrigerant into the compressor piston chamber, causing damage to reed valves and/or pistons and/or other components, as well as potentially seizing the compressor. Allow a minimum of 30 minutes for liquid to "boil off." You must hand turn the compressor hub (not the pulley) a minimum of 15 complete revolutions prior to starting the engine with the clutch engaged.



TROUBLESHOOTING GUIDE

TEST CONDITIONS USED TO DETERMINE SYSTEM OPERATION

(THESE TEST CONDITIONS WILL SIMULATE THE AFFECT OF DRIVING THE VEHICLE AND GIVE THE TECHNICIAN THE THREE CRITICAL READINGS THAT THEY WILL NEED TO DIAGNOSE ANY POTENTIAL PROBLEMS).

- B. CONNECT GAUGES OR SERVICE EQUIPMENT TO HIGH/LOW CHARGING PORTS.
- C. PLACE BLOWER FAN SWITCH ON MEDIUM.
- D. CLOSE ALL DOORS AND WINDOWS ON VEHICLE.
- E. PLACE SHOP FAN IN FRONT OF CONDENSER.
- F. RUN ENGINE IDLE UP TO 1500 RPM.

ACCEPTABLE OPERATING PRESSURE RANGES (R134A TYPE)

1. HIGH-SIDE PRESSURES (150-275 PSI) **Note- general rule of thumb is two times the ambient (daytime) temperature, plus 15-20%.*
2. LOW-SIDE PRESSURES (10-25 PSI in a steady state).

CHARGE AS FOLLOWS: R134A = 24 OZ.

NO ADDITIONAL OIL IS NECESSARY IN OUR NEW COMPRESSORS.

TYPICAL PROBLEMS ENCOUNTERED IN CHARGING SYSTEMS

NOISY COMPRESSOR. A noisy compressor is generally caused by charging a compressor with liquid or overcharging

- A. If the system is overcharged both gauges will read abnormally high readings. This is causing a feedback pressure on the compressor causing it to rattle or shake from the increased cylinder head pressures. System must be evacuated and re-charged to exact weight specifications.
- B. **Heater control valve installation** - Installing the heater control valve in the incorrect hose. Usually when this occurs the system will cool at idle then start to warm up when raising the RPM's of the motor. **THE HEATER CONTROL IS A DIRECTIONAL VALVE; MAKE SURE THE WATER FLOW IS WITH THE DIRECTION OF THE ARROW.** As the engine heats up that water transfers the heat to the coil, thus overpowering the a/c coil. A leaking or faulty valve will

have a more pronounced affect on the unit's cooling ability. Installing the valve improperly (such as having the flow reversed) will also allow water to flow through, thus inhibiting cooling. Check for heat transfer by disconnecting hoses from the system completely. By running down the road with the hoses looped backed through the motor, you eliminate the possibility of heat transfer to the unit.

- C. **Evaporator freezing** - Freezing can occur both externally and internally on an evaporator core. External freeze up occurs when the coil cannot effectively displace the condensation on the outside fins and the water forms ice (the evaporator core resembles a block of solid ice), it restricts the flow of air that can pass through it, which gives the illusion of the air not functioning. The common cause of external freezing is the setting of the thermostat and the presence of high humidity in the passenger compartment. All door and window seals should be checked in the event of constant freeze-up. A thermostat is provided with all units to control the cycling of the compressor.
- D. **Internal freeze up** occurs when there is too much moisture inside the system. The symptoms of internal freeze up often surface after extended highway driving. The volume of air stays constant, but the temperature of the air gradually rises. When this freezing occurs the low side pressure will drop, eventually going into a vacuum. At this point, the system should be checked by a professional who will evacuate the system and the drier will have to be changed.
- E. **Inadequate airflow to condenser** - The condenser works best in front of the radiator with a large supply of fresh air. Abnormally high pressures will result from improper airflow. Check the airflow requirements by placing a large capacity fan in front of the condenser and running cool water over the surface. If the pressures drop significantly, this will indicate the need for better airflow.
- F. **Incorrect or inadequate condenser capacity** - Incorrect condenser capacity will cause abnormally high head pressures. A quick test that can be performed is to run cool water over the condenser while the system is operating, if the pressures decrease significantly, it is likely a airflow or capacity problem.
- G. **Expansion valve failure** - An expansion valve failure is generally caused by dirt or debris entering the system during assembly. If an expansion valve fails it will be indicated by abnormal gauge readings. A valve that is blocked will be indicated by high side that is unusually high, while the low side will be unusually low or may even go into a vacuum. A valve that is stuck open will be indicated by both the high and low pressures rising to unusually high readings, seeming to move toward equal readings on the gauges.
- H. **Restrictions in system** - A restriction in the cooling system will cause abnormal readings on the gauges. A high-side restriction (between the compressor and the drier inlet) will be indicated by the discharge gauges reading excessively high. These simple tests can be performed by a local shop and can help determine the extent of the systems problem.



Trouble Shooting Your Classic Auto Air A/C System

PROBLEM: system is not cooling properly

ISSUE: cold at idle, warmer when raising engine RPM's

Make sure the Water Valve is positioned correctly

The water valve is a directional valve and should be installed with the arrow pointing towards the water pump, it should be connected to the heater hose that runs from the heater core to the water pump. If the water valve is connected to the incorrect hose it allows water to circulate through the system via the heater core over powering the cooling effect of the A/C coil, (normally the air conditioning is functioning properly).

Step 1: Check placement of the water valve, correct if needed. (In some cases changing the location of the water valve may not fix the above problem.) Continue to next step.

Step 2 If changing the location of the water valve does not rectify the issue, then possibly the water valve is permanently damaged and may need to be replaced. To check the integrity of the water valve completely remove the water hoses for the heater core and "loop" together. (This will remove the heater system completely from the possibilities) If the system now cools, replace the water valve

Verify Adequate Air Flow to Condenser

For an air conditioning system to function properly there has to be adequate airflow across the condenser. The function of the condenser is to dissipate heat, without proper airflow your system will not cool correctly in the cabin of your vehicle.

Step 1: connect gauges to a/c hoses. The pressures should be: with the ambient temp is 90, low side pressures should be between 10-25 psi, high side pressures should be between 150-275 psi

Step 2: IF the low side pressures are normal and the high side pressures are high then there might be an airflow issue, continue to next step.

To test air flow to Condenser do the following three tests:

1. Place a piece of paper on the condenser with the car in idle and see if paper is held in place.
2. With car in idle, attach gages, and place a large capacity fan in front of the condenser. What happens to the pressures?
3. With car still in idle and gages attached, pour water down the front of the condenser. What happens to the pressures?

If the paper is held in place you are at least getting some air flow. If the high side decreases during test 2 & 3 then your condenser is not getting enough air which is causing your system to not cool properly. To correct this issue you will need a more powerful mechanical fan.

Step 3: Confirm correct Refrigerant charge in System

All of our systems should be charged with 24 oz or 1.5 lbs of R134A Refrigerant only. If overcharged you will need to evacuate the system and recharge with the correct amount.*

What measurements mean:

Low Temp and High Pressure seem to be equal...

You have a malfunctioning expansion valve that is stuck open.

High Side is extremely high and Low Side is extremely low (possibly into vacuum)...

There is a blockage in the system. Remove hoses and blow compressed air through in both directions. If pressures don't change its possible that your expansion valve is stuck closed and would have to be replaced.

***Compressor Concerns:**

This is often misdiagnosed as a problem for the system not cooling properly. If you have a noisy compressor it is due to improper charging of refrigerant. An overcharged (more than 24 oz or 1.5 lbs R134A) compressor can cause rattling. If charged with pure liquid there is a high probability you have bent reed valves that are causing tapping sound.

