Installation Manual

1969-1970 Mustang Factory Air

DOCUMENT #1-2027FA
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Congratulations...

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

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 During the installation you might find the opportunity to repair or upgrade non-working or out of date components.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

☐ Drain the radiator. Retain the coolant and reuse, or dispose of properly.

☐ 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...
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 and turns into a gas. In the condenser, this 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 receiver-drier separates gas and liquid.
Control & Operating Instructions

Your new Perfect Fit-Elite system offers complete comfort capabilities in virtually every driving condition. This includes temperature control in all of the modes. This system also provides the ability to blend the air between Face, Heat, and Defrost modes simultaneously. To illustrate the various ways you can adjust the airflow direction and temperature - we’ve provided these handy illustrations and chart to show exactly how you can adjust your Perfect Fit-Elite for maximum comfort...

The FAN switch works like the OEM switch, the far left position is OFF (all power to the system is OFF in this position).

The COLD/HOT positions works like any traditional adjustment lever.

There are 11 levels of adjustment within the range of the DASH/FLOOR lever.

<table>
<thead>
<tr>
<th>Left Lever Position</th>
<th>DASH</th>
<th>DEF</th>
<th>FLOOR</th>
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<tbody>
<tr>
<td>Distribution</td>
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<td>1</td>
<td>Face A/C 100%</td>
<td>Defrost 20%</td>
<td>Floor 80%</td>
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<td>2</td>
<td>Face A/C 80%</td>
<td>Defrost 40%</td>
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<td>3</td>
<td>Face A/C 60%</td>
<td>Defrost 60%</td>
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<td>Face A/C 40%</td>
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<td>Face A/C 20%</td>
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<td>11</td>
<td>Floor 100%</td>
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Remove Glovebox, Console (if equipped), Facia, Radio and Bezel, and set them aside for reinstall later (see figure 1).

The removal of the Original Heater Assembly can be accomplished by disconnecting three control cables. One is attached to the Heat/Defrost door (see figure 2). One is attached to the Temperature door, and one is attached to the Vent / Heat door (see figure 3). Disconnect the electrical harness from the assembly. Also remove attachment screw located in front of the air inlet (see figure 4).

When retaining parts it’s a good idea to store parts in a zip lock bag, labeled with info where the parts came from and what size/type of tool is needed to reinstall. Cleaning the parts before you need to reinstall them is a good idea too.
Locate blower motor on the firewall (Passenger Side) in the engine compartment. Remove all 4 nuts around blower. Also disconnect the electrical connector from the blower motor (see figure 5A). Cut wires at grommet in firewall.

Next, remove the OEM defrost duct and set aside for later modification.

**DRAIN COOLANT FROM RADIATOR** and store safely to reuse or recycle accordingly. Cut heater hose approximately 1” from firewall (see figure 5B). Also, to prevent forgetting to refill the coolant when the installation is completed, do not put the cap back into place - instead put the cap to the side and cover radiator hole with a clean rag or something similar (this will help remind you to add coolant before starting the engine at the end of the installation).
THESE ARE THE PARTS YOU WILL FIND IN THE CONTROL BOX
You will use all of these parts and hardware during the next series of installation steps.

D.E.R. Control
PN#16-3027

NOTE: Illustrations NOT shown actual size
THESE ARE THE PARTS YOU WILL FIND IN BAG KIT B

You will use all of these parts and hardware during the next series of installation steps.

Evap Support Bracket
PN# 0022-4

Face Duct Assembly (Pre-attached)
PN# 2-2027-1

Defrost/Heat Duct Assembly (Pre-attached)
PN# 2-2025-2

Illustrations NOT shown actual size

One Fresh Air Inlet Block Off
PN# 10-1025-2

Two 1/4 - #20 x 5/8" Bolts

Four #10 - 16 x 3/4" Tek Screws

One Male Spade Connector

Six #10 - 10 x 5/8" Phillips Screws

One J-Clip

One 1/4" Washer
Locate the Fresh Air inlet block off from kit B. Install over hole in inlet cowl as shown on the passenger side (see figure A). Attach with three #10 - 16 x 3/4" Tek Screws.

The second Fresh Air Block off is for the Drivers side inlet cowl. We recommend discarding factory air cowl assembly and install supplied blockoff. If you wish to keep the option of fresh air then discard supplied block off.

**NOTE:** Your OEM fresh air cowl is controlled by an underdash mounted push/pull cable. Make certain that the cable and door are in good working condition and will fully block air coming from the outside of vehicle. Failure to have a correctly operating fresh air door will greatly effect cooling on the interior of your vehicle in extreme weather conditions.

Locate the mounting tab location as shown and attach the 1/4" 20 J-clip supplied (see figure B).
Take a minute to familiarize yourself with the evaporator unit:

**FRONT**
- Dash Servo Motor
- Capillary Tube
- Blower Motor Plug
- Blower Motor
- Thermostat
- Defrost/Heat Duct Assembly
- Dash Servo Motor
- (4) Dash Air Outlets
- Dash Duct Assembly
- Evaporator Case

**BACK**
- Liquid Tube
- Heater Tubes
- Dash Servo Motor
- Defrost Adapters
- Defrost/Heat Duct Assembly
- Floor Air Outlet
- Expansion Valve
- Suction Tube
- Condensation Drain Outlet
- Firewall Lower Mounting Bracket
WIRING PREP

- Locate Evaporator Unit from Main Box
- Locate Face Duct Assembly from Bag Kit
- Locate Defrost/Heat Duct Assembly from Bag Kit
- Locate electronic water valve from Bag Kit
- Locate Blue, Yellow, Orange wiring harness from Bag Kit
- Locate main wiring harness from Bag Kit
- Locate the Controls
- Locate ECU and Calibration Key from Bag Kit

DO NOT USE CALIBRATION KEY WITHOUT TECH SUPPORT

- Acquire a 12V Battery (NOT a battery charger)
Push S-Clips over flange securing with two #10x5/8” screws, from back

Attach to front outlet securing with pre-installed S-Clips
1. Connect Blue Harness into Defrost/Heat Servo Motor
2. Connect Yellow Harness into Face/Floor Servo Motor
3. Connect Orange Harness into water valve

Click!
Plug Yellow Harness into Face/Floor Port on ECU

Plug Blue Harness into Defrost/Heat Port on ECU

Plug Orange Harness into Water Valve Port on ECU

From your controls, connect Green Harness into Control Port on ECU
8. Connect corresponding Fan Switch harness to the Bower Switch on Controls. Connect Power lead to 12V.

9. Connect red tagged power harness to POWER port on ECU. Connect ground.
   
    
11. Connect both BLUE leads into thermostat. (either lead into either terminal)
    
12. Connect ground.

Click!

12V Power (20 amp fuse)
• Function Test, Steps 1 thru 3

1. Move FAN knob to HIGH
   Move MODE knob to DASH

   AIR OUT OF DASH VENTS

2. Move MODE knob to DEF

   AIR OUT OF DEFROST VENTS

3. Move MODE knob to FLOOR

   AIR OUT OF FLOOR VENTS
You will be able to see thru water valve passage

You will NOT be able to see thru water valve passage

Return all wiring harnesses, water valve, and ECU to their originally bags/boxes (this keeps them organized for future installation steps).

Your controls are now fully calibrated to your unit. Please refer to the next steps in your installation manual for installing the system in your vehicle.

NOTE: IF DURING ANY OF THESE STEPS YOU DO NOT GET THE CORRECT OUTCOME, PLEASE CALL TECH SUPPORT BEFORE INSTALLING INTO VEHICLE.
Locate drill template in back of installation instructions and tape to firewall on passenger side (ON THE INTERIOR)
Align template to OEM heater hole. Drill all holes using small pilot holes to locate centers. Open holes to correct sizes labelled on template.

**CAUTION: On the engine side of the firewall there is a brake line.**
*Be careful not drill through the brake line.* It may be necessary to carefully push this line out of the way, securing it a bit lower is usually all that is necessary.
NOTE: Two people are needed for this step!

Place evaporator unit on floor panel. Roll unit up behind glovebox opening, inserting tubes through large opening in firewall.
ONE PERSON ON THE INTERIOR HOLDING EVAPORATOR UNIT IN PLACE:

In bag kit B locate one 1/4" washer and 1/4-20x5/8" bolt. Attach to lower mounting bracket through lower OEM hole as shown.

NOTE: Leave bolt loose at this time.

Be sure to align the evaporator unit level with the bottom of instrument panel (assuming the vehicle is sitting level) as shown above, but with a small degree of tilt toward the back to allow proper drain of condensation.
In bag kit B locate one 1/4” washer 1/4-20x5/8” bolt. Attach blower motor bracket to J-Clip previously installed.

**NOTE:** Leave bolt loose at this time.
Locate evaporator mounting bracket from bag kit B (PN #0022-4). Attach to evaporator with four #10x5/8” screws. USE HAND POWERED SCREWDRIVER. The Bracket is slotted to allow adjustment for proper tilting of unit toward firewall for condensation drainage. Once proper angle is found use one #10-16 3/4” TEK screw and fasten to interior cowl.

LEVEL UNIT WITH BOTTOM EDGE OF DASH AND TIGHTEN ALL BOLTS.
Installing the Drain tube

Mount Evaporator level to firewall.

Locate Drain nipple on Evaporator and drill a 3/4” hole below the nipple on the firewall. This will allow condensation to drain properly.

Attach 1/2” clear drain tube to Evaporator nipple and run through 3/4” hole you just drilled.

All condensation will now drain out into the engine bay.
Mount controls into dash using OEM hardware.
THESE ARE THE PARTS YOU WILL FIND IN BAG KIT C

You will use all of these parts and hardware during the next series of installation steps.

The ECU will be found in its own box

Illustrations NOT shown actual size
Wiring Installation Steps 1 and 2

1. Connect Blue Harness into Defrost/Heat Servo Motor

2. Connect Yellow Harness into Face/Floor Servo Motor

3. Connect Orange Harness into water valve

Click!
Wiring Installation Steps 3 thru 6

3. Connect Yellow Harness into Face/Floor Port on ECU

4. Connect Blue Harness into Defrost/Heat Port on ECU

5. Connect Orange Harness into Water Valve Port on ECU
   Next route other end of harness out of firewall opening

6. From your OEM Controls, Connect Green Harness into Control Port on ECU

Mount your ECU under the dash with included tek screws.
1. Connect corresponding Fan Switch harness to the Bower Switch on Controls. Connect Power lead to 12V.

2. Connect red tagged power harness to POWER port on ECU. Connect ground.

3. Connect corresponding fan motor harness. Connect ground.

4. Connect both BLUE leads into thermostat (either lead into either terminal).

5. Connect ground.

12V Power (20 amp fuse)
THESE ARE THE PARTS YOU WILL FIND IN BAG KIT D
You will use all of these parts and hardware during the next series of installation steps.

Illustrations NOT shown actual size
In **Bag Kit D** you’ll find the firewall block off. Install this over the hose connections coming thru the firewall within the engine compartment. Attach with six #10 - 16 x 3/4" Tek screws (Figure 25). Seal around the tubes with the included refrigerant tape. This will keep unwanted moisture and debris from entering thru the firewall... so seal carefully and thoroughly.

**IMPORTANT NOTICE** Classic Auto Air has done extensive testing on the correct method to install the water valve in order to get a repeatable and progressive temperature control. **The water valve must be installed per these instructions!....**

The **lower** connection on the tubes coming thru the block off assembly is going to be routed to the water outlet on the intake manifold. Attach your hose with cable clamps on both ends and route where it will not interfere with linkage or come in contact with exhaust manifolds or headers.

The **upper** port coming thru the firewall will be routed to and thru your new your electronic water valve (the water valve is marked for easy installation). First Attach a 6" piece of 5/8" dia. heater hose with the supplied worm gear clamp. Attach to the inlet side of the water valve using another supplied hose clamp. Attach a heater hose from the outlet side of the electronic water valve and route to the connection on the water pump.

Insert a 6" piece of the clear, 1/2" drain tube we included through the hole previously drilled and attach over the drain nipple (see figure 26). Seal around tube with refrigerant tape.

**NOTE:** Water valve harness will go through the firewall.
Electronic Water Valve Installation

IMPORTANT NOTICE: PROPER INSTALLATION OF WATER VALVE

Your water valve MUST be installed per these instructions!... if not, your system will not work properly.

The lower heater tube connection on firewall will be routed to the water connection on intake manifold using 5/8" dia. heater hose with the supplied worm gear clamp.

The upper heater tube connection on the firewall will be routed to the water valve connection labeled heater core, using a 6" piece of 5/8" heater hose attached with supplied worm gear clamp.

Connect the remaining outlet on water valve labeled water pump to the water pump using 5/8" dia. heater hose with the supplied worm gear clamp.
THESE ARE THE PARTS YOU WILL FIND IN BAG KITS E, F, and G

You will use all of these parts and hardware during the next series of installation steps.

Bag E
Defrost Adaptor
Two Duct Hoses, 2” I.D.
Four Zip-Ties

Bag F
Louver Vent Adapters
Two Duct Hoses, 2” I.D.
Four Zip-Ties

Bag G
Center Vent Duct Adaptor
Two Duct Hoses, 2” I.D.
Four Zip-Ties

Illustrations NOT shown actual size
Bag Kit E. In order to use your OEM defrost diffuser, you will need to attach our defrost adapter. Our adapter comes pre-fitted with c-clips, just remove the clips, position the adapter flush with the bottom opening of your OEM diffusers, and re-apply the clips. (see figure 28).

The other end of the duct hoses are installed over the defrost/heat duct assembly outlets (see figure 30).
**Bag Kit F**: Push the flex hose adapter onto back of the OEM vent assembly. Once both vent adaptors are in place, you can attach flex hoses to both (securing with zip-ties) and route to the face/duct assembly and attach as shown.

During installation of the hoses be aware of the eventual movement of the wiper arm components.

The smoother the route of the flex hoses the better the airflow.
Bag Kit G: Center Louver: Attach the center vent duct adapter using the pre-fitted s-clips. Then attach the supplied duct hose with the zip-ties on each on each hose adapter (see figure 32). Route to the face outlet on the evaporator.
You can reinstall the glove box, radio, bezel, facia and the console at this time.

This completes the interior portion of the **PERFECT FIT-ELITE** installation process. This is a good time to make a final check that all the controls still move freely and that nothing is loose or hanging down.

The interior of your car should look pretty much the same as before you started (or better). Plus you probably got to know the underside of your dash a lot better and might even have repaired or upgraded components that needed attention.

*Good Job... Let's move on to the major components within the engine compartment....*
THESE ARE THE PARTS YOU WILL NEED FOR THE ENGINE COMPARTMENT INSTALLATION

You’ll find all of these parts within the main box

- Bag of O-rings and Mineral Oil Tube
- Two #8 - 20 x 5/8" Bolts and Lock Nuts
- Condenser Brackets
- Condenser
- Three Refrigerant Hoses
- Pressure Switch Harness
- Pressure Switch
- Splice and Bullet Connector
- Four Zip-Ties
- Eight #10 - 20 x 5/8" Screws
- #8 13/32" Discharge Hose
- #10 1/2" Suction Hose
- #6 5/16" Liquid Hose
- Drier
- Drier Bracket
- Liquid Tube
ENGINE COMPARTMENT INSTRUCTIONS

STEP ONE: IF YOU HAVE NOT DONE SO ALREADY, DISCONNECT THE BATTERY.

STEP TWO: During the next steps you’ll be installing the condenser, drier, and routing the pressure switch wire and the A/C line(s). Since much of this is installed in the OEM location for the condenser, you’ll need to remove the center grill section, horn(s), and latch support assembly (see figure 33). Be sure to retain all the mounting screws—you’ll reinstall these pieces in the exact reverse order with the OEM screws.
STEP THREE: DRIER AND CONDENSER PREPARATION. You can perform most of the following steps on a clean flat surface like a workbench. Lay the condenser down so that both hose connections are on the right side (the larger connection will be on top). The drier is conveniently mounted on the right hand side of the condenser. First insert the drier into the drier mounting bracket (it’s basically a sleeve for the drier). Attach the drier liquid tube to the drier and also to the connection on the condenser (tighten connections at either end using supplied o-rings on both ends and a few drops of mineral oil to each o-ring). With these two components combined it will easy to find the correct place to attach the drier bracket to the condenser with the included #8-20 x 5/8” bolts and lock nuts (attach drier and bracket from the back of the condenser).

STEP FOUR: Screw the high-pressure switch into the port at the lower end of the drier liquid tube. Go ahead and plug the pressure switch harness into the switch at this time (black electrical boot with two long white wires).

STEP FIVE: Install the upper condenser bracket (A) using four #10 - 20 x 5/8” screws in the 4th, 5th, 8th and 9th holes on the condenser from the left, be sure the bend on the brackets are facing out towards you, (top bracket mounts from the front of the condenser, bottom bracket from the back). Next, attach the lower bracket (B) using four #10-20 x 5/8” screws in the 5th, 6th, 9th and 10th hole from the left hand side. This bracket has a large hole that corresponds to the OEM latch support previously removed from the vehicle.

Reminder... Use two wrenches to tighten o-ring fittings.
STEP SIX: Your OEM radiator support was designed to support a A/C condenser and conveniently has two small indentations on the drivers side core support (aftermarket core supports may or may not have these indentations). Locate these two small indentations and drill a 1 3/8” hole thru each (be sure to check for any obstructions before drilling, and remove any sharp burrs from the drilling before continuing), then the area between the two holes will be easy to remove (example figure 35). You’ll route the discharge hose to the compressor will go thru this hole, as well as the liquid hose and the wiring harness plug for the high-pressure switch.

STEP SEVEN: Place the condenser/drier unit into place, locating it so that the holes in the condenser brackets align with the holes in the core support used to attach the hood latch (it will rest on the lower radiator core brace, see figure 36).

If you want to verify that you have the correct indentations in sight before drilling, place fit the condenser into it’s final location. Also, the holes on the upper bracket are larger than needed to allow for small adjustments. The condenser is held in place when the hood latch is reinstalled at a later time.
INSTALL THE COMPRESSOR KIT. Included was a premium compressor kit with all the parts you’ll need to install the compressor. This kit includes instructions specifically written for your engine. Once you’ve installed the complete compressor kit, continue on to connecting the hoses.

CONNECTING THE HOSES:

Based on DRIVERS SIDE compressor mounting see illustrations for routing.

The #10 (LARGEST) refrigerant hose. Route and attach end with service fitting to the compressor using (1) #10 o-ring and a few drops of mineral oil. Attach other end to #10 fitting at the firewall. Attach using one #10 o-ring and a few drops of mineral oil. Tighten securely.

The #6 (SMALLEST) refrigerant hose. Route behind engine and to the connection on drier. Attach using two #6 o-ring and a few drops of mineral oil.

The #8 (MEDIUM) refrigerant Hose. Route from top connection on condenser to the connection on compressor (service port fitting to compressor). Attach using two #6 o-ring and a few drops of mineral oil.

Reminder... Use two wrenches to tighten o-ring fittings
STEP EIGHT: Time to install the compressor kit. Included in your box is a premium compressor kit with all the parts you’ll need to install the compressor. This kit includes instructions specifically written for your engine. Once you’ve installed the complete compressor kit, continue on to connecting the hoses.

STEP NINE: CONNECTING THE HOSES:
1) Attach the #8 Discharge Hose (13/32”) to the upper connection of the condenser and route thru the hole previously drilled in the core support and route to the compressor. Tighten fittings using o-rings and mineral oil provided.

2) Attach the #6 liquid hose (5/16”) to the drier and route thru the remaining hole previously drilled into the core support and along the underside of the fender struts, around the engine, and to the connection at the firewall on the evaporator unit (see figure 41). Using supplied zip-ties you’ll attach this hose, the suction hose and the lead from the high pressure switch to the strut braces, securing all three at once. Tighten fittings using o-rings and mineral oil supplied in kit.

3) Attach the #10 suction hose (1/2”) to the compressor and route as mentioned above. Tighten fittings using o-rings and mineral oil supplied in the kit.

FINAL STEPS: Take a look around at your installation and check all fittings and bolts for tightness, check the heater hose clamps for tightness, and make sure nothing is routed in a way to obstruct any moving parts. You can refill the radiator and reconnect the battery at this time.
New A/C System Preparation... A MUST READ!

Please read through 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) Your radiator/cooling system is an integral part of your new system. Please insure that you have a 50/50 mix of distilled water and antifreeze. The heater coil MUST be purged (cycle heater control valve) to make sure no water, without antifreeze, is in the heater coil before you charge the A/C system.

2) Evacuate the system for 45 minutes (minimum).

3) **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).

4) Your new system requires 134a refrigerant. It will require 1.5 lbs (or 24 oz).

5) Your new compressor comes charged with oil - NO additional oil is needed.

6) Insure that the new belt is tight.

7) **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.

**CAUTION!** When mounting your compressor and/or adjusting the belt use caution. Mount by using the centerline of the oil fill plug as your guide. The compressor can ONLY be mounted inbetween the 9 to 3 positions. DO NOT mount inbetween the 4 to 8 positions. This can cause compressor failure.

**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.
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 (150-250 PSI) *Note- general rule of thumb is two times the ambient (daytime) temperature, plus 15-20%.
2. LOW-SIDE PRESSURES (15-25 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 gages 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 8-25 psi, high side pressures should be between 160-260psi

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 24oz or 1.8lbs of R134 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 24oz or 1.8lbs R134) compressor can cause rattling. If charged with pure liquid there is a high probability you have bent reed valves that are causing tapping sound.
OEM HOLE

5/8"

(RULER FOR CUTTING HEATER MOTOR HARNESS)

5/16"

THIS TEMPLATE IS USED FROM THE INSIDE OF THE CAR!

BLOWER MOTOR HOLE

Note: bottom of template is parallel with floor pan