AIR-CONDITIONING *Service*

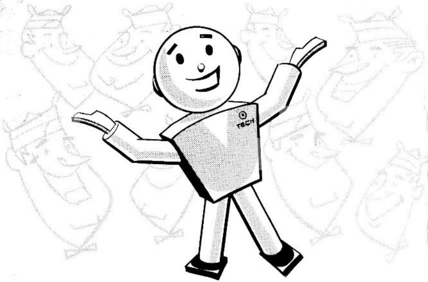
SESSION NO.
104

SERVICE REFERENCE BOOK

PREPARED BY CHRYSLER CORPORATION

PLYMOUTH · DODGE · DE SOTO AND CHRYSLER DIVISIONS

"KEEPING CAR AIR-CONDITIONING SYSTEMS IN TOP CONDITION IS EVERYBODY'S JOB"



Anybody who says you have to be an expert to keep an Airtemp car air-conditioning system in top condition is talking through his hat. Actually, *any technician can check the system* completely, and correct the more common causes that might affect operation. In fact, thousands of technicians do it every day.

This reference book, therefore, goes into the basic checks that should be made any time a car comes in with an air-conditioning system that needs attention. In addition, there's a section on further tests you can make, in case you find it necessary to service the refrigeration part of the system.

Here's your guide to this helpful service information:

INTRODUCTION

On our cars, two types of Airtemp air-conditioning units are available: a standard, and a de luxe model. Basically, the standard model differs from the de luxe in that it cools air inside the car without taking in any air from the outside. Besides that, the de luxe model has a magnetic clutch. This is available on standard units as optional equipment.

Regardless of the model, however, you'll find the service suggestions outlined on the following pages equally helpful on both air-conditioning units.

THREE PHASES OF AIR-CONDITIONING SERVICE

Service on Airtemp units divides itself into three main phases:

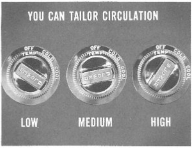
(1) Operation of Controls
(2) Air Circulation
(3) Refrigeration System

OPERATION OF CONTROLS

You'd be surprised how many owners don't really know how to operate the controls to get the most out of air conditioning. Sometimes, frankly, that's all that's actually at fault.

You may have owners who fail to turn the temperature control switch *on*. They just turn the blower switch *on*. What happens? They don't get any cooling from the unit. Some owners don't even know how to use the system during the winter.

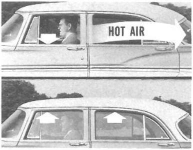
Using the air-conditioning system properly in the winter is important, because good circulation offers many benefits. For one thing, you may want to remove odors without opening the windows. On cold, damp days, too, you can lower the inside humidity to keep all the window glass clear. Incidentally, reversing the outlet air grille 180° in winter helps keep the back window clear.



One important thing to keep in mind is that you can regulate the circulation to suit yourself. The blower switch, for instance, which controls air circulation, can vary blower motor speeds from "low" to "high", and even "in-between".

On hot days, you can control how much heat you want removed. The temperature control dial has "off", "cold", and "cool" positions. With the control on "cold", and with the blower set at a high speed position, you can enjoy *maximum* cooling.

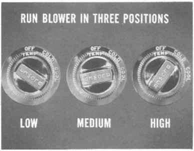
If a car had been parked in the hot sun all day, you'd want a fast cool-down job. To do this, you'd just set the temperature control on "cold", leave the blower on "low", start the engine and lower the windows.



Then, you'd drive a few blocks to draw off the oven-hot air. Next, close the windows, and turn the blower dial to a "high" speed position. In a few minutes, the inside temperature will be right down to where it is really comfortable. As you can see, the controls let you adjust air circulation and cooling to your liking.

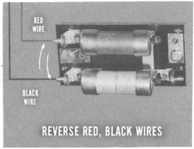
AIR CIRCULATION

Checking Blower Operation. Suppose an owner comes in and, by what he tells you, shows that he knows how to operate the controls properly. Yet, he still feels that the unit isn't working satisfactorily. The easiest check to make first, of course, is one on blower operation—a circulation check.

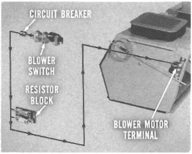


In this case, first run the blower in each of its three operating positions: "low", "medium", and "high". See if there's a definite change in operation and circulation. If so, the blower control and motor are okay.

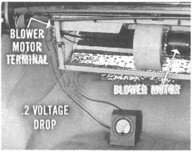
If you get only two speeds, check the blower motor resistor assembly. It's in the engine compartment on the left side. Now, different make resistors have been used, and they're wired differently. So, try reversing the red and black wires at the resistor terminals, and check blower speeds again. Usually, reversing the leads corrects the condition.



If the blower doesn't work at all, check out the entire electrical circuit. Follow the wiring diagram for the model you're working on. Check the circuit from blower switch to circuit breaker, resistor block assembly, and to the blower motor. Keep an eye peeled for shorts, high resistance, loose or corroded connections.

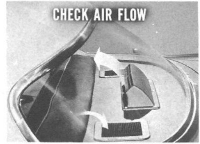


There should be no more than a total of .2 voltage drop from the battery to the blower motor. When you make this voltage drop test, be sure the blower switch is on "high" and that the battery is up to its full charge.

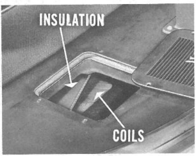


If you ever have to replace a unit, be sure you use 12-volt units in a 12-volt system, and 6-volt units in a 6-volt system.

And remember . . . even though you might get three definite blower speed operations, it doesn't give air circulation a clean bill of health. For instance, you may get variations in blower speeds, but the flow of air could still be restricted in some way. For example, there might be a restriction between the inlet and outlet grilles.



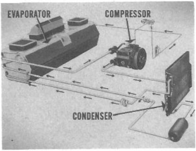
Checking for Restrictions. On a 1955 model, if the blowers work okay but there seems to be reduced air circulation, check the insulation inside the evaporator unit. To do this properly, remove the air inlet grilles and see if the insulation has worked loose and is resting on the coils. If it has, use rubber cement to re-cement it in place.



A clogged air filter can also restrict air flow. Check the filter about once a month—more frequently if the car is operated under extremely dusty conditions. Always replace a dirty or clogged filter.

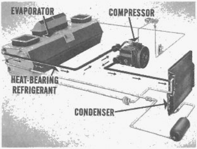
REFRIGERATION SYSTEM

If the electrical controls are operating properly, and air circulation is up to standard, it's time to check the units of the refrigeration system. The three main parts that do the cooling are the evaporator, compressor, and condenser. Basically, these three units circulate refrigerant through the system so it can take heat units from the air inside the car and dump them outside the car.



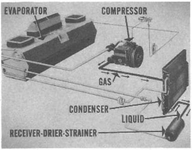
The air-conditioning system uses a special refrigerant. A plate on the compressor states the type of refrigerant used in that particular car. Be sure to use the same type if you have to recharge the system.

The compressor moves refrigerant through the system so it can pick up heat from the air at the evaporator, and transfer the heat to the outside air at the condenser.

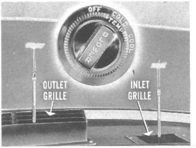


The compressor pulls heat-bearing refrigerant from the evaporator. It compresses the refrigerant, and sends it to the condenser in hotter pressurized gas form. This helps it lose heat more quickly to the surrounding air.

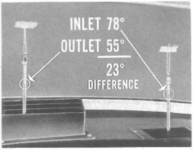
As the compressed refrigerant gas gives up its heat, it changes back to a liquid. This liquid then goes through a receiver-drier-strainer, and back to the evaporator. Hot air from inside the car is circulated by the blower around the evaporator coils, where the refrigerant can again pick up heat.



Road-Test the Car. Now, if an owner reports that the air-conditioning system isn't cooling well, you can check it easily on a road test. But before you go out, get a couple of thermometers. Mount one at the air inlet grille, and the other at the air outlet grille. If it's a hot, sunny day, shield the thermometers from the hot rays of the sun so you won't get false readings. Turn the temperature control on "cold", and the blower control to "high". Then, with the windows and the fresh air vent handles in the luggage compartment closed, drive the car at 25 m.p.h.

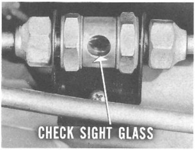


You're trying to find out if the temperature at the outlet grille is 23 to 25 degrees lower than the temperature at the inlet grille. Keep in mind that while this temperature difference might vary, depending on the inlet temperature, a temperature difference of less than 23 degrees between inlet

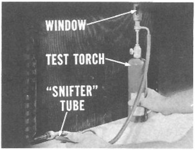


and outlet air means the system is not cooling properly. But, even if you do get the right difference, the owner might not feel cool enough if the volume of air isn't right. That's why you checked blower operation and air circulation first.

Test for Leaks. If the circulation was found to be up to specifications but the system still doesn't cool satisfactorily, here's what you ought to do. First of all, check the sight glass. It should be perfectly clear of bubbles after the system has been operating with the temperature switch on "cold" for more than 7 minutes. If you do see bubbles, the system is low on refrigerant. So, test for leaks.



Use a test torch (Part No. C-3444) adjusted to a small flame, and move it over all connections. Watch the color of the flame through the window in the burner shield. If the flame turns green or blue, you've located a leak. Use two flare wrenches to tighten a leaking connection. A single wrench may damage the tube or connection, increasing the leak. Remember that the refrigerant gas is heavier than air. So, a leak at the top of a fitting will be detected by the snifter tube held at the bottom of the fitting.



CAUTION: Be sure the area in which you are working is well ventilated when testing for leaks. The flame and refrigerant gas combine to form a toxic gas. Avoid inhaling any poisonous fumes.

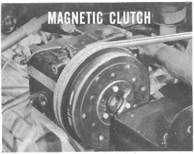
After correcting any leaks you may find, recharge the system. Check the plate on the compressor to be sure you use the proper refrigerant.

Check the Compressor. Next, make sure the refrigerant is being circulated. In other words, see that the compressor belts are properly adjusted and don't slip. Generally, you'll know a belt is okay when a 9- to 12-lb. pull on each belt mid-way between the compressor and generator pulleys will cause a ¼″ deflection.

NOTE: Belt deflection varies slightly, depending on make and model of the car. Refer to the specifications listed in the table below:

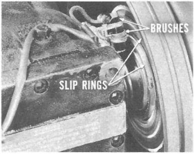
MAKE	MODEL	COMPRESSOR BELT DEFLECTION
Chrysler	1955-56	¼ inch
De Soto	1955-56	¼ inch
Dodge	1955-56	Adjust to 15 ft.-lbs. tension
Plymouth	1955-56	¼ inch

Incidentally, if it is necessary to replace a belt, *replace both belts.* Never run a new belt with an old one; replace them in pairs.



If the belts on the compressor you are testing appear to be properly adjusted, see if the magnetic clutch engages when the temperature control switch is turned "on". The front pulley should "free wheel" without driving the compressor when the temperature switch is "off", and the magnetic clutch should engage so the pulley will drive the compressor when the temperature control switch is "on".

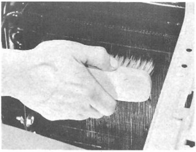
Now, if the magnetic clutch *doesn't* drive the compressor when the temperature control switch is "on", you'd better check the brushes for proper seating. The brushes may be worn or burned. Check the slip rings, too, as they might be burned from arcing of the brushes that contact the rings. You can reface a slip ring in a lathe, if it happens to be burned. Above all, make sure that the electrical circuit from the switch to the brushes is complete.



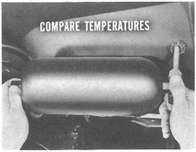
Another thing, if an owner reports poor cooling at high speed, you'll quite likely trace the cause to clutch slippage. Belts might be slipping, too. So, always check belts and magnetic clutch operation carefully.

Check for Restrictions. If the clutch and compressor check out all right, look for restrictions in the systems. Kinks in the refrigerant lines will restrict the flow of refrigerant, and will affect cooling.

Also, it pays to inspect the condenser fins. They should be free of bugs or other particles that tend to restrict the flow of air over the fins and tubing. Outside air must flow freely over the fins in order to pick up heat from the refrigerant. Use a medium-stiff bristle brush to clean the fins.

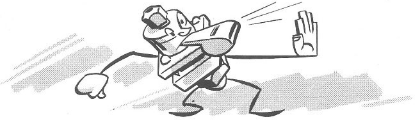


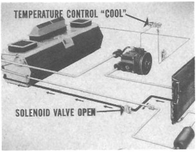
Normally, liquid refrigerant goes through the receiver-drier-strainer



with no change in temperature. But if it gets plugged, the refrigerant will cool down on the way through. So, use both hands to compare temperature at both ends of the receiver unit. If there is a temperature difference, replace the entire unit and, of course, recharge the system.

Check the Solenoid Valve. The next check point is the solenoid valve. It's in the line running along the fender panel, and does an important control job. With temperature control on "cool", the system operates at less than full cooling. This is because the solenoid is de-energized when the switch is in "cool" position, and the valve remains open.

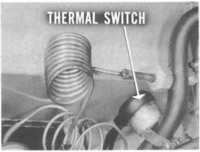




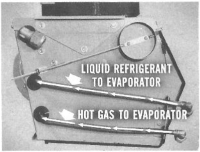
An open solenoid valve lets part of the hot, high-pressure gas from the compressor mix with liquid refrigerant entering the evaporator coils. This cuts down the heat-absorption rate of the evaporator, and air returned will be "cool" rather than "cold".

When the temperature control switch is in the "cold" position the solenoid is energized, and the valve is closed. Hot gas from the compressor cannot mix with the liquid refrigerant entering the evaporator, so full cooling is obtained from the system.

Now, there's a second control, called a thermal switch, in the system. It's wired *in series* with the temperature control switch. This switch opens the solenoid valve when the evaporator gets too cold. This can happen if the blower is on "low" and the temperature control is on "cold". In fact, the evaporator can collect frost which will restrict hot air circulation around the coils. But that's where the thermal switch gets into the act.



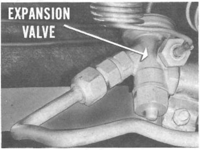
If gas leaving the evaporator cools down to the frosting point, the thermal switch opens. This, in turn, de-energizes the solenoid, and the valve opens. The cooling capacity of the evaporator is reduced by hot gas mixing with the liquid refrigerant entering the evaporator.



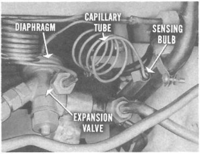
When gas leaving the evaporator warms up above the frost point, the thermal switch points close. This, then, closes the solenoid valve, which shuts off the hot gas by-pass. The system then returns to full cooling.

So, remember . . . the solenoid valve normally is open. It is magnetically closed when the temperature control is turned to its coldest setting. Also, to prevent coil frosting, the thermal switch can override the coldest setting by opening the circuit to the solenoid valve.

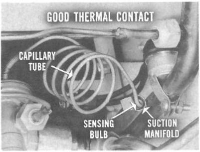
Check the Expansion Valve. Following the solenoid inspection, you would check expansion valve next. It's located at the evaporator, and has the job of feeding the right amount of liquid refrigerant into the coils. You see, enough liquid refrigerant must be fed in without flooding, and without starving the evaporator. Too little liquid would make it all change to gas, and be warmer than normal as it leaves the evaporator.



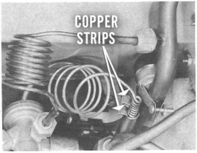
To control that, there's a *thermal sensing bulb* at the outlet side of the evaporator. The bulb is connected to the expansion valve by means of a small sealed capillary tube. If gas leaving the evaporator gets too warm, the bulb sends pressure through its tube to the expansion valve. Inside the valve, this pressure moves a diaphragm which opens the valve. That increases the flow of liquid refrigerant until the right amount is fed into the evaporator.



As you might guess, the expansion valve won't work right unless the bulb makes *good thermal contact* with the suction manifold, and unless the capillary tube is *unrestricted*. Said another way, poor bulb contact, or a damaged capillary tube, will cause no cooling–poor cooling–or erratic cooling.



Checking bulb contact, however, is simple. The bulb is wedged against the manifold by two copper or bronze strips. If you can wiggle the bulb easily, it's not making good contact. So, to improve it, just use a thin, clean copper strip and rewedge the bulb for better contact.



Summary of Preliminary Service. All of the service operations discussed up to this point are of a strictly mechanical nature—such as can be performed by any mechanic. They do not require special knowledge of air-conditioning systems or, to be more specific, of refrigeration. And, these operations will correct a large share of the conditions which affect the operation of the air-conditioning system.

REFRIGERATION SYSTEM SERVICE

If you've made all the preliminary inspections and adjustments, and the unit still fails to cool satisfactorily, further tests of the refrigeration system may be needed. This calls for some special tools because it probably will be necessary to discharge, evacuate, and recharge the system.

Evacuating the system is done primarily to remove moisture. Moisture is the *worst enemy* of the refrigeration system. The smallest amount of water present can:

(1) Form ice crystals. These block small passages and cause erratic cooling.

(2) Combine with the refrigerant to form acids. These attack metal and can result in extensive damage throughout.

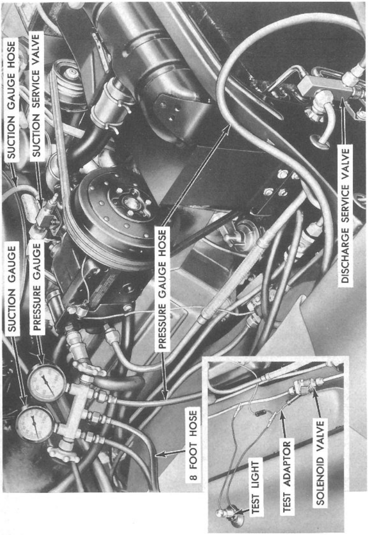
(3) Form sludge as a result of acid-formation. Sludge can clog screens, valves and tubes.

Any time the air-conditioning system is opened to repair or to replace a part, outside air enters the system. Untreated air carries a lot of moisture, especially on humid days. This moisture condenses and sticks to metal surfaces inside the system.

NOTE: Don't try any short cuts for removing moisture. For example, don't add methanol (methyl alcohol) to prevent ice crystal formation in the system. The silica-gel in the receiver-drier-strainer prefers alcohol to water. It will absorb the alcohol and release the water.

How to Discharge the System. Whenever you handle refrigerant, wear protective goggles (C-3355). A tiny drop splashing into your eye can freeze the eyeball—and that's really painful.

Now, you'll need to install the manifold gauge set (C-3354), but be sure both valves of the gauge set are closed by turning them clockwise. Then remove the valve stem protective cap from the compressor discharge service valve at the upper right corner of the condenser. Remove the suction valve protective cap at the left side of the compressor. Use the ratchet wrench (C-3361) and completely *backseat* both service valves by turning the valve stems *counterclockwise*.


SUCTION GAUGE HOSE
SUCTION SERVICE VALVE
SUCTION GAUGE
PRESSURE GAUGE
PRESSURE GAUGE HOSE
DISCHARGE SERVICE VALVE
8 FOOT HOSE
TEST LIGHT
TEST ADAPTOR
SOLENOID VALVE

Next, remove the protective caps from both the discharge and suction service ports on the condenser and compressor. Install the 4′ test hose from the 600-lb. (right-hand) gauge of the manifold gauge set to the discharge service valve port. Install the 4′ hose from the 300-lb. (left-hand) gauge of the gauge set to the suction service valve port. Now, turn both service valve stems two turns clockwise.

Attach the 8′ hose to the center connection of the gauge set and run the other end into an operating exhaust system so gas will be carried out of the building.

Crack the right-hand valve of the gauge set a fraction of a turn counterclockwise. This lets gas escape from the system slowly.

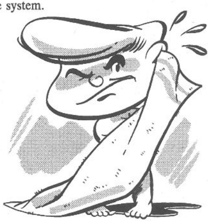
CAUTION: Discharging the system too fast will sweep lubricant out of the compressor. Be sure gas is exhausted from the room because, if it comes in contact with a live flame it will form a very poisonous gas. An accurate leak test, incidentally, is impossible to make in a room filled with refrigerant gas.

Finally, let the system discharge until the gauges show zero pressure.

Evacuate the System. Once the manifold gauge set gauges register zero, you'll have to pump out the remaining gas (evacuate the system). To do this, connect the free end of the 8′ hose leading from the center of the manifold gauge set to the vacuum pump (C-3372). Start the vacuum pump and open both manifold gauge set valves by turning them counterclockwise. Watch the 300-lb. (left-hand) gauge until it registers 26 to 29 inches of vacuum. Then, let the pump run five more minutes. After five minutes are up, close both manifold gauge set valves (clockwise). Stop the vacuum pump; disconnect the 8′ hose from the pump and connect it to the tank of refrigerant.

NOTE: Keep the refrigerant tank upright at all times so gas rather than liquid refrigerant will flow when the tank valve is opened.

Open the tank valve one turn. Loosen the hose attaching nut at the center connection of the manifold gauge set just enough to allow refrigerant gas to purge the hose of air. About two seconds is long enough. Re-tighten the nut to stop the escape of gas. Having removed gas and air from the system, you are now ready to put a one-pound sweep-test charge into the system.



The Sweep-Test Charge. This test clears the system of moisture. To do it right, the test charge must fill the entire system. That means the solenoid valve must be closed; otherwise, the test charge will bypass the condenser and receiver units. So, install a test light (C-744) across the solenoid valve circuit so you'll know the valve is *closed* as the system is being charged.

Start the car and let it run at 1200 r.p.m. Open the windows, turn the blower on "high" and the temperature control to "cold". This starts the compressor, and the test light should come "on", indicating that the solenoid valve is *closed*.

Slowly open the hand valve on the left of the manifold gauge set so refrigerant will enter the system through the suction port. Keep your hand on this valve and watch the 300-lb. gauge. Regulate the valve to hold the gauge reading below 60 psi.

Watch the discharge gauge (600-lb.) also, and when its pressure reads 125 psi, the system has absorbed about one pound of the refrigerant. That's your cue to close the left-hand manifold valve.

Close the refrigerant tank valve, but don't disconnect the hose or the manifold gauge set. Escaping gas would make an accurate leak test impossible. Turn off the ignition and get ready to test for leaks.

Making the Leak Test. Remember, refrigerant gas is colorless, odorless, and is heavier than air. When it passes through a flame, it turns the flame to a bright green or blue. Small amounts of gas produce green, large amounts produce blue.

Use the test torch (C-3444) as before, with the flame adjusted until it is very small, and move the leak-detecting snifter tube over all connections while you watch the color of the flame through the small window in the burner shield. If the flame turns green or blue, you've located a leak.

Use two flare wrenches to tighten any connections you suspect, and don't forget to use plenty of ventilation to guard against toxic fumes.

Discharge and Evacuate the System. Once you're sure the system's tightly sealed, you're ready to remove the sweep-test charge and, with it, any moisture present. Follow the discharge and evacuation procedure described earlier, with one exception.

Instead of letting the vacuum pump run only five more minutes when the 300-lb. gauge registers 26 to 29 inches of vacuum, let it run *30 minutes!* This will completely dry the system for recharging.

Charging the System. You charge the system just about the same way you put in the sweep-test charge. But, since you need to put in exactly *four pounds* of refrigerant, you'll have to use a scale, and a pail partly filled with hot water. Be sure the water is no hotter than 125°F. Place it on an accurate scale (C-3429), as a bathroom scale won't do. Put the refrigerant tank in the pail and note the total weight. Slowly charge the system as before. When 2½ to 3 pounds of refrigerant have entered the system, the sight glass will begin to clear. Continue adding gas until the scale registers *four pounds below its starting weight.*

Close the left-hand valve of the manifold gauge set and close the tank valve. Remove the tank hose and install the protective screw plug in the free end of the hose. The system is now properly charged, and you are ready for final refrigeration tests.

Compressor Capacity Test. This test tells you if the compressor is delivering full volume and pressure. Set the blower on "high", temperature on "cold". Leave the manifold gauge connected, but instead of running the engine at 1200 r.p.m., reduce engine speed to *exactly* 500 r.p.m. Turn the stem of the suction service valve clockwise until it is fully front-seated. Also, remove the hose from the center connection of the manifold gauge set.

When pressure on the left-hand gauge drops below zero and begins to register vacuum, turn the stem of the discharge service valve clockwise until it is fully front-seated. Open both right and left manifold-gauge-set hand valves.

Inspect compressor capacity test vent cap (SP-2922) to make sure it is perfectly clean and that the .020" orifice is open. Attach this test cap to the center connection of the gauge set. Next, disconnect the hose from the suction service valve port, leaving the port open.

Now, slowly close the left-hand valve of the gauge set until it is seated. The compressor will now pump air through the orifice in the test cap. Pressure on the right-hand gauge should build up 140 to 160 psi with the engine running at 500 r.p.m. Repeat this check several times by opening and closing the left valve. Successive readings above 140 psi means the compressor output is okay. Lower readings mean the compressor needs service.

If the compressor is okay, leave the engine running. Remove the test cap and place it where it will remain clean. Leave the right manifold gauge set hand valve open, left hand valve closed. Reconnect the hose to the suction service port valve. The compressor can then pump air out of its crankcase. The left gauge will register 25 to 28 inches of vacuum.

Turn the suction service valve stem slightly counterclockwise. Wait two or three seconds, then turn the stem clockwise to front-seat the valve again. This step puts a small amount of gas through the compressor to "sweep out" moisture.

When gas stops flowing from the center connection of the gauge set, close the right-hand valve. If you plan to make a thermal switch and solenoid test next, let the engine continue running.

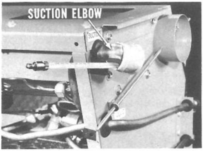
Thermal Switch and Solenoid Test. To test these units, first disconnect the Wade (black) connector at the solenoid valve. Insert a special adapter in series with the disconnected connector and Wade terminal. This special adapter may be made by using two terminals (Part No. 903895), one Wade connector (Part No. 1310489), and a 2" piece of 16-gauge copper wire, stripped at the ends and in the center. Fasten the terminals on the ends of the wire, and solder.

Connect a lead from the test lamp (C-744) to the adapter and ground the remaining test lead to a good clean ground. Place the test lamp so the light is visible from the right rear of the car.

Start the engine. Run it at 1200 r.p.m. Turn the blower switch to "low" and the temperature switch to "cold". Close all car windows and the cowl vent.

Install a thermometer clip (C-3421) on the evaporator suction line outlet elbow. Place a thermometer (C-3356) in the clip and wrap the clip and bulb with a cloth. Check temperature reading at the evaporator outlet elbow.

If the temperature is 45°F. (plus or minus 5°), or higher, the test lamp should light. Continue this test and when the temperature of the suction line at the evaporator drops to 30° (plus or minus 5°), the test light should go out.



With the temperature of the suction pressure evaporator outlet at 45°F., or above, the thermal switch contacts should be closed and the electrical circuit to the solenoid valve complete, thus closing the valve.

If you get these test results, the solenoid valve is working properly, or the temperature wouldn't change. If the light goes off and on, the thermal switch is also working. If it isn't, replace the switch.

On some late 1956 model cars a different type thermal switch has been used and is available for service. It can be used to replace the earlier type switch. The late model switch is not attached to the suction elbow. It is located under the air inlet grille on the left side of the package shelf.

To reach it, you must remove the left air inlet grille. This late model switch has a 6" sensing tube that extends down between the evaporator fins. Also, it is an adjustable type. You can set it by using a screwdriver to turn a slotted eccentric.

This eccentric has three positions: "Cold" (completely clockwise); "Normal" (factory setting, which is mid-way); and "Warm" (fully counterclockwise).

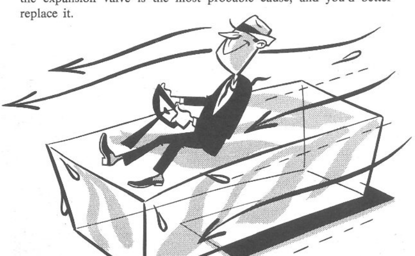
Super Heat Test. This test is important, as it tells whether or not the expansion valve is properly controlling refrigerant flow into the evaporator. It tests the system's ability to raise temperature of the gas in the suction elbow above what is normal for a specific suction line pressure.

To make the test, first use the car heater to raise the temperature at the inlet grilles to at least 80°F. Attach a thermometer to the suction elbow like you did when testing the thermal switch. Connect the manifold gauge as before, but increase engine speed to 1200 r.p.m. Leave the suction and discharge service valves in their test position; both valves turned counterclockwise until back-seated, then two turns clockwise.

Close both manifold gauge set valves. Run the system until suction pressure and evaporator elbow temperature remain steady. Write down both the pressure and the thermometer readings.

Find the suction pressure in column "A" of the Chart on page 27, and also read the corresponding temperature in column "B". Subtract this "B" temperature from the temperature you've observed at the elbow to determine "super heat".

Now, *if "super heat" is between 8 and 15 degrees when the compressor operates at standard capacity, the system is capable of delivering full design refrigeration.* But, if "super heat" is *below 8 degrees,* the expansion valve is the most probable cause, and you'd better replace it.



Temperatures and pressures used in the Super Heat Determination Chart have been corrected to compensate for line losses. They apply to Freon 12 and Genetron 12 types of refrigerant.

SUPER HEAT DETERMINATION CHART

Suction Pressure You Observe "A"	Temperature to Subtract from Elbow Temperature "B"	Suction Pressure You Observe "A"	Temperature to Subtract from Elbow Temperature "B"
6	4	39	48
7	6	40	49
8	8	41	50
9	10	42	51
10	12	43	52
11	13	44	53
12	14	45	54
13	16	46	55
14	18	47	56
15	19	48	57
16	20	49	58
17	22	50	58½
18	23	51	59½
19	25	52	60½
20	26	53	61
21	28	54	62
22	29	55	63
23	30	56	64
24	32	57	65
25	33	58	65½
26	34	59	66½
27	35	60	67
28	36	61	68
29	38	62	69
30	39	63	69½
31	40	64	70½
32	41	65	71
33	42	66	72
34	43	67	73
35	44	68	73½
36	45	69	74
37	46	70	75
38	47		

EXAMPLE: If you read 35 psi suction pressure, and 54 degrees suction elbow temperature: Subtract 44 from 54 degrees temperature: Answer is 10 degrees Super Heat.

RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 104

To get moderate cooling from a car Airtemp air-conditioning system, turn only the blower switch on; leave the temperature control off.	RIGHT	1	WRONG
There should be no more than a .2 voltage drop from battery to the blower motor.	RIGHT	2	WRONG
Check the air filter once a month, more frequently if the car operates under extremely dusty conditions.	RIGHT	3	WRONG
A temperature difference of less than 23° at the inlet and outlet grilles usually means the system is not cooling properly, provided circulation is okay.	RIGHT	4	WRONG
Before recharging a system, always check the plate on the compressor to be sure you use the right refrigerant.	RIGHT	5	WRONG
The front pulley will "free wheel" without driving the compressor, if the temperature control switch is "off".	RIGHT	6	WRONG
There should be a difference in temperature at both ends of the receiver-drier-strainer unit for proper cooling.	RIGHT	7	WRONG
The expansion valve must feed enough liquid refrigerant into the evaporator to avoid flooding or starving of the coils.	RIGHT	8	WRONG
A thermal sensing bulb at the outlet side of the evaporator helps the expansion valve feed refrigerant properly.	RIGHT	9	WRONG
The expansion valve won't work right unless the thermal bulb makes good contact with the suction manifold, and unless the capillary tube is unrestricted.	RIGHT	10	WRONG

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