SERVICE REFERENCE BOOK

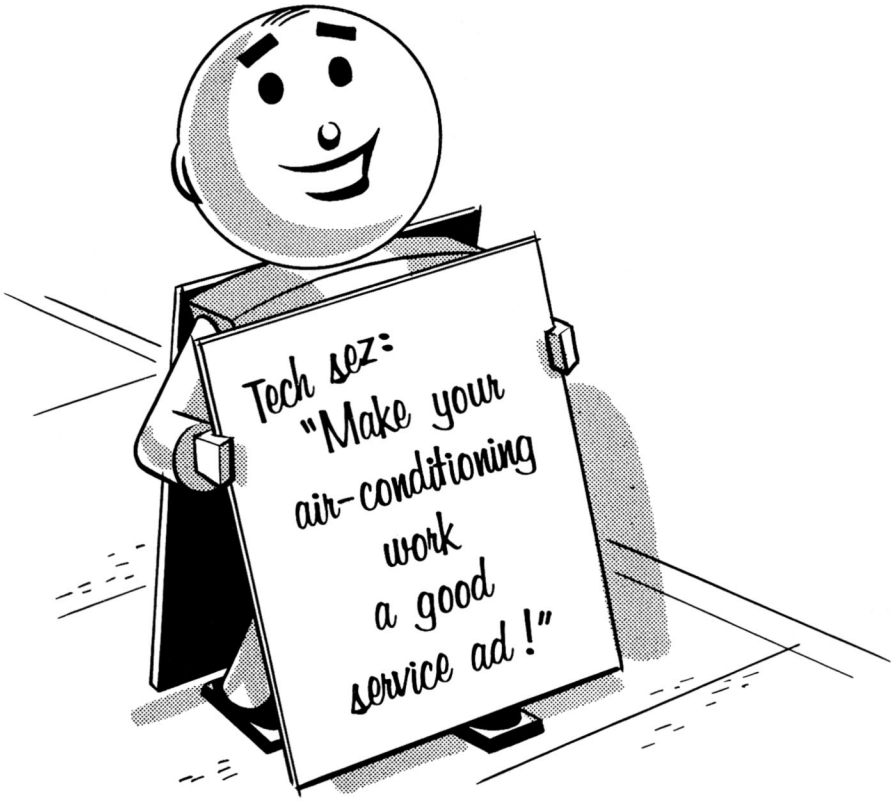
of the MASTER TECHNICIANS SERVICE CONFERENCE

session no. 123

Air-Conditioning Service – 1958

PREPARED BY CHRYSLER CORPORATION

Plymouth • Dodge • De Soto • Chrysler • Imperial



A wise man said, "Make your job *important* and it will return the favor." That's especially true when you service an air-conditioning system. Maintain it well, and it can be a good service advertisement for you. Each time the unit's turned on the owner will remember that you serviced the system well.

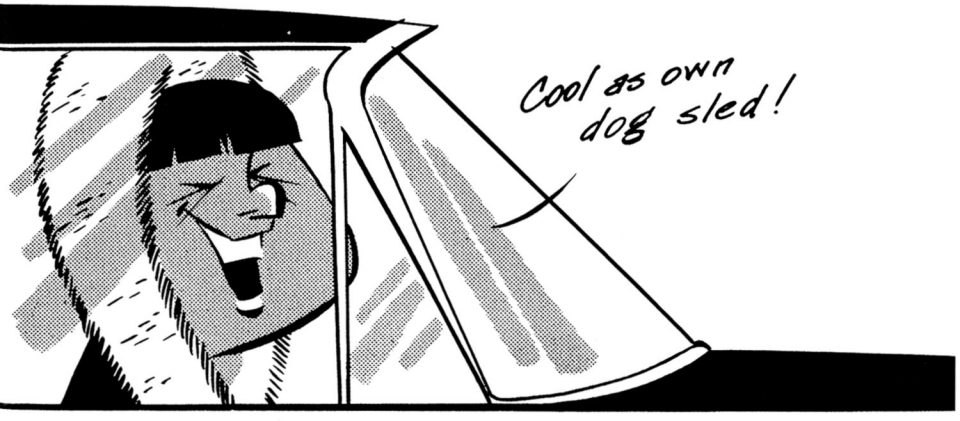
Obviously, an owner who is favorably reminded of your work will keep bringing his business back to you. That, of course, is the best testimonial to the quality and value of any service.

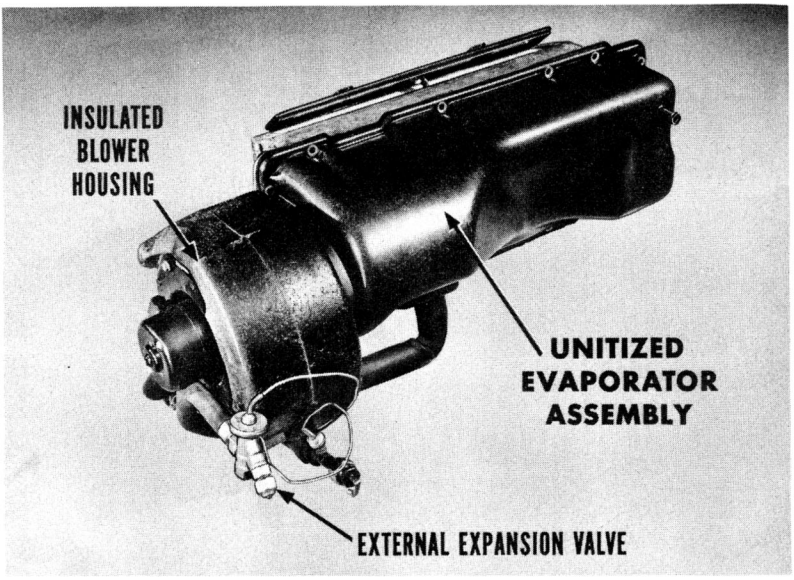
To help you in that respect, this reference book covers what's new on 1958 air conditioning. Improvements are outlined, operation is reviewed, and certain tests you should make when performance is questioned are spelled out.

You'll find this helpful information on the following pages:

1958 AIR-CONDITIONING FEATURES

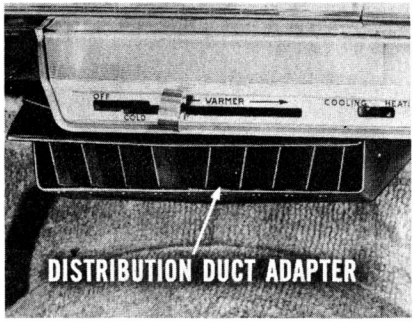
Owners of cars equipped with a 1958 air-conditioning system will enjoy more cooling and greater comfort as a result of many new improvements. For one thing, there's "unitized" construction. "Unitized" simply means that the evaporator, heater core, and housing are assembled and sealed *before* they're installed.



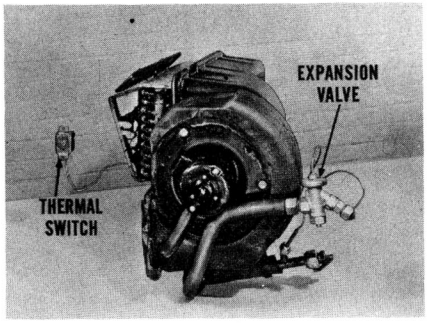


This new construction provides improved sealing and insulation for both the evaporator assembly and blower housing. It minimizes hot air leak possibilities, which means an increase in cooling. Only one joint remains to be sealed. It's the seam between the flange of the unitized assembly and the dash panel.

Increased Air Flow. In addition to sealing advantages, output of the blower has been increased about 15%. This means more cool air is delivered inside the car. Besides the boost in blower output, a distribution duct adapter is used for more effective air distribution. It's an addition to the air duct. It directs cool air better, especially to the rear compartment.

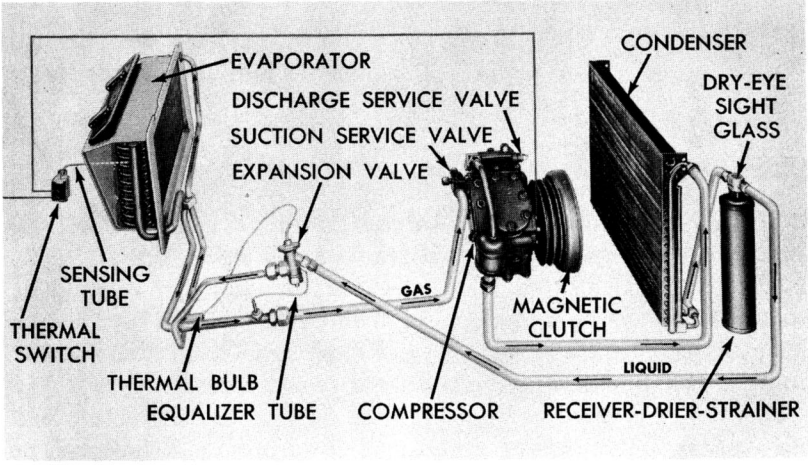


Customer advantages aren't all that's new. There are service features as well. The expansion valve and thermal switch are now located on the *outside* of the evaporator housing for maximum accessibility. Actually, there are no moving parts, nor any electrical connections inside the evaporator housing that should require your attention.

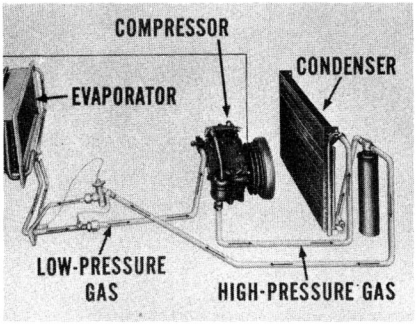


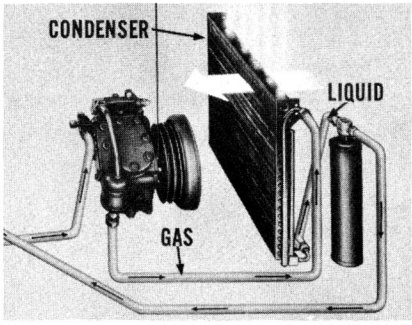
FUNCTION OF COMPONENTS

Reviewing what each major unit of the air-conditioning system does will help you understand why certain tests are necessary. It will also help narrow down the probable cause of a condition when performance isn't up to standard. This saves time, and simplifies work.



Compressor. Take the compressor, for instance. It pumps refrigerant through the system. It pulls refrigerant gas under low pressure from the evaporator, compresses it, and sends hot, highly pressurized gas to the condenser. The compressor, then, must have the ability to deliver adequate volume and pressure under all operating conditions. Knowing how to make an accurate compressor capacity test, therefore, is important.

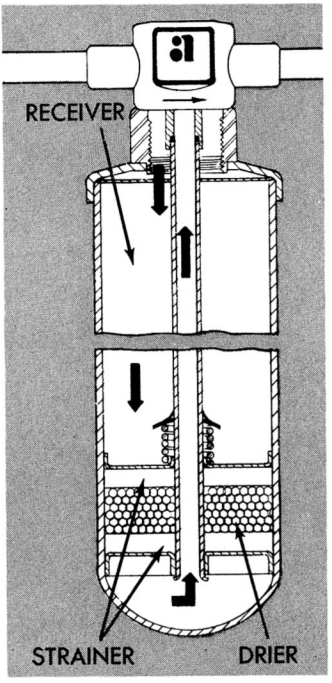


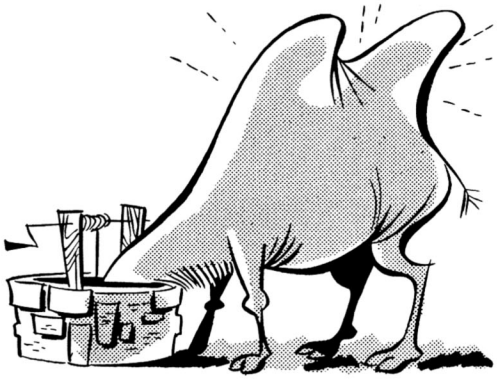


Condenser. At the condenser, heat from the compressed refrigerant gas is transferred to outside air flowing through the condenser fins. In this process, the refrigerant is condensed. It changes from a gas to a liquid. Unrestricted air flow around the fins is vital if the condenser is to do its job.

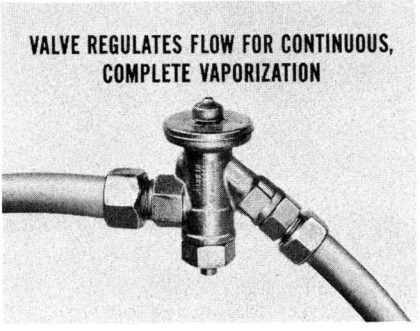
Receiver-Drier-Strainer. Here's where liquid refrigerant from the condenser is received and stored temporarily, unless full supply is demanded by the system. Filter packs above and below the drier strain out any foreign particles. The chemical drier has a big appetite for any moisture present, and "dries out" the refrigerant. Incidentally, the drier in a refrigeration system works exactly the opposite of the atmosphere in relation to moisture. The atmosphere can accept and retain much more moisture at higher temperatures, and condenses or

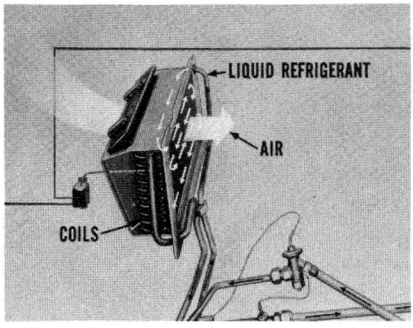
releases the moisture at lower temperatures. The drier can absorb and retain much more moisture at lower temperatures and releases the moisture at higher temperatures. So, a drier containing excessive moisture may let a system operate efficiently on a normally warm day, but can release enough moisture to cause an expansion valve freeze-up on a hot day.





Expansion Valve. From the drier, the "dried" liquid refrigerant goes to the expansion valve and then into the evaporator. The expansion valve is a metering device. It controls the flow of refrigerant into the evaporator so the coils are never starved nor flooded. This flow control is necessary to insure complete and continuous vaporization inside the coils no matter what the operating conditions may be. Temperature and pressure signals trigger the expansion valve.

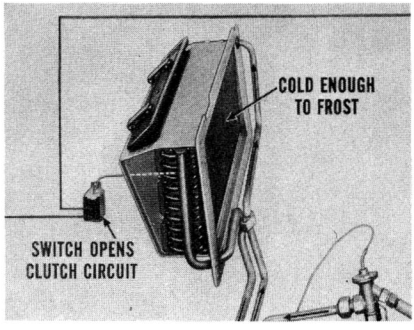




Evaporator. The evaporator works like a radiator in reverse. It has a lot of coils through which liquid refrigerant flows. Air is directed over the coils. Liquid refrigerant flowing inside the coils absorbs heat from the air that is circulated over the coils. As this heat is absorbed, the liquid changes to a gas.

Magnetic Clutch. A magnetic clutch automatically connects and disconnects the compressor drive pulley. This means the compressor may operate, or may remain idle, depending on the demands placed on the air-conditioning system. Clutch engagement is controlled by a thermal switch.

Thermal Switch. The thermal switch gets its temperature signals from the evaporator. Just before the evaporator gets cold enough to frost over, the thermal switch opens the clutch circuit. This stops the compressor, which stops the flow of refrigerant. As the evaporator warms up, the thermal switch closes the circuit and engages the clutch. The compressor starts running, and the system begins to function again. Knowing that will help you understand why the thermal switch occasionally requires testing.

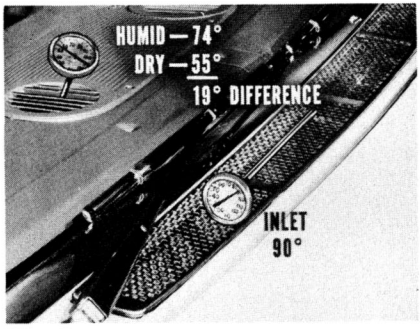


EFFECT OF HUMIDITY

Humidity, the amount of moisture in the air, has an important influence on how much cooling will be available. This is true of all

air-conditioning systems whether in the home, office, or car. Some technicians may not realize the effect humidity has on the performance of the system. When the air is humid, the evaporator has to do double duty. It must lower the air temperature, and wring out the moisture. Condensing water uses up so much evaporator energy that less of it is available for the cooling part of the job.

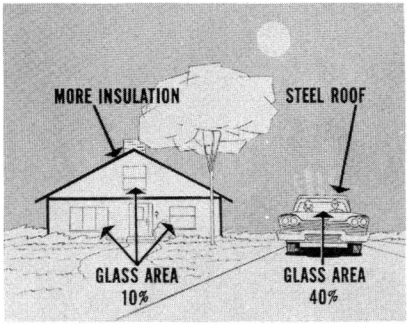
Here's a specific example. When it's 90° F. and the air is very dry, the system is able to deliver air at a temperature of 55° F. at the distribution outlet. But, when it's 90° F. outside and humidity is high—say 100%—the system is able to lower temperature of the air it delivers to only 74° F. The difference, 19° F., shows the effect of humidity on the cooling efficiency of the system. The evaporator has had to use much of its energy for the job of removing moisture from the air.



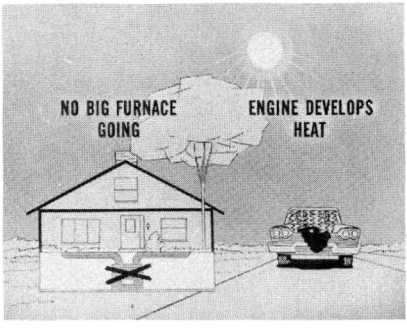
One more thing to keep in mind is that the number of people in a car also affects the cooling job that can be done. That's because body heat and perspiration of the passengers can add an additional load on the evaporator.

An owner may expect too much from his air-conditioning system on humid days. If he feels he should be getting more cooling, a performance test will tell whether or not the unit does what it's designed to do, and may furnish clues to possible trouble.

Some owners may try to compare car air conditioning with whatever air conditioning they have in their homes, or offices. That's not exactly a fair comparison.



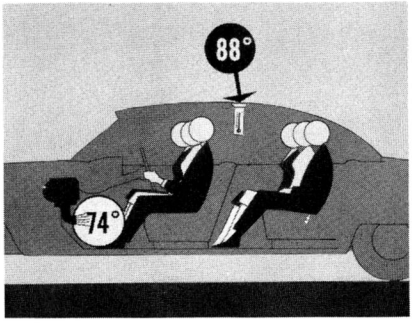
After all, homes certainly carry more insulation. Attics and walls insulate better than a steel roof and steel and glass sides. Homes also have a glass area of about 10%. Cars, on the other hand, have a glass area of about 40%!



What's more, homes are easier to cool. During the summer, they have no furnace going. The car engine, on the other hand, develops a lot of heat. A home stays put. It's partly in the shade and rests on a cool foundation. But a car moves over hot pavement. It picks up ground heat as well as undergoing a hot sun blast all over.

Sometimes it is well to call these differences to the owner's attention so he will have a better appreciation of the practical limitations of the car air-conditioning system.

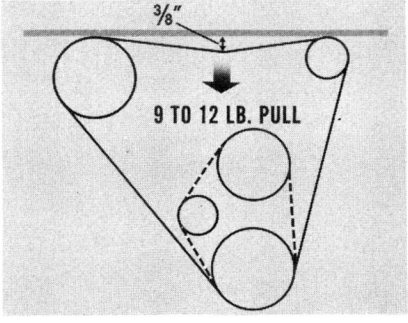
So, even though there is a low temperature at the outlet duct, a thermometer swinging from the domelight can tell a different story. Customers need to be reminded of the effect a car full of passengers has on temperature and comfort.

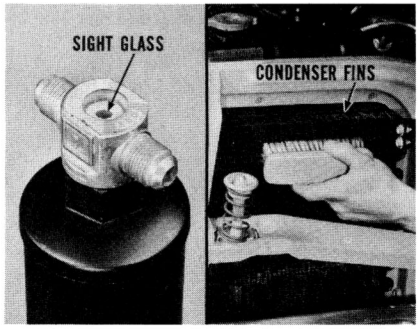


To summarize . . . when the air is dry, it's easy for the evaporator to lower temperature. On humid days, however, the evaporator has a lot of condensation to take care of in addition to cooling the air. So never overlook humidity when you check performance.

HOW TO SERVICE THE AIR-CONDITIONING SYSTEM

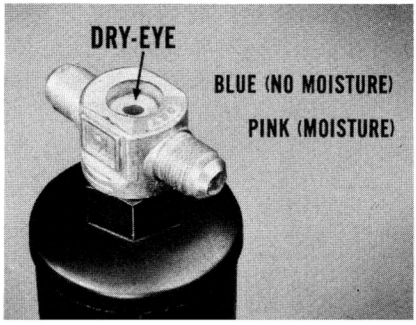
Visual Inspection. Whenever a unit comes in for attention, a quick visual inspection can save a lot of time and effort. Always check belt tension first. There should be a 3/8" deflection with a 9- to 12-pound pull. If tension is okay, start the engine and see if the compressor is being driven.



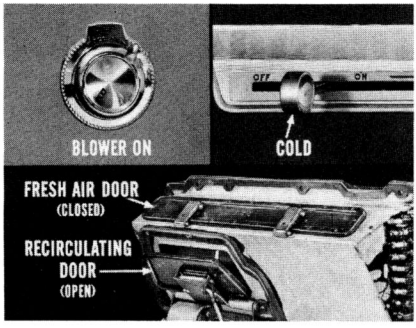


While the unit runs, inspect the sight glass. Bubbles mean a low refrigerant supply. Take a look at the condenser fins, too. If they're cluttered up with bugs, brush them off so air flow won't be restricted.

Inspect the lines next to see if they are free from kinks that would restrict refrigerant flow.

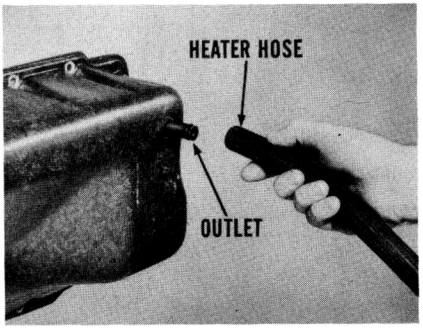


Dry-Eye. On models that use a combination "dry-eye" and sight glass, a *blue* element means no moisture is in the system. But a *pink* element means there is excessive moisture in the system, and you'll have to correct this condition before you go to other tests.

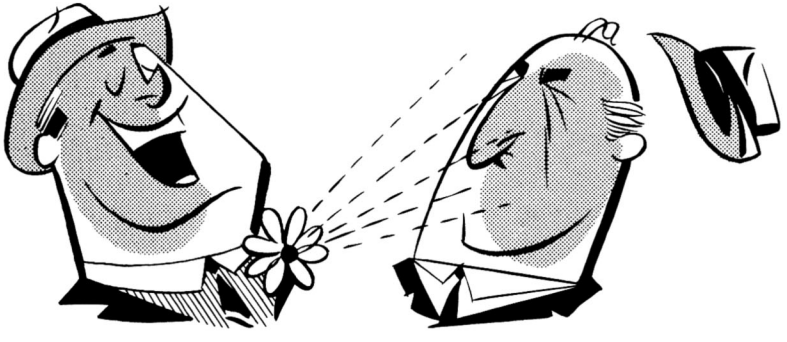


Check the Controls. Make a brief check of the controls next. Turn the blower *on*. See if it delivers plenty of air. Then, start the engine. Put the temperature control lever in "COLD" position. The fresh-air door should be closed, the recirculating door open.

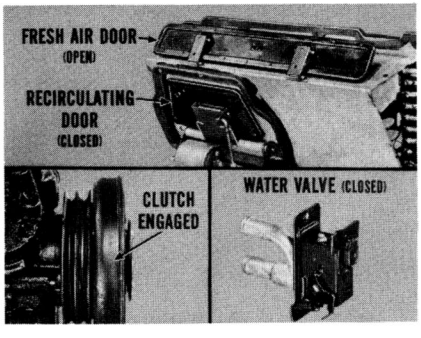
Also, the clutch should be engaged, and the water flow valve closed tightly. The best way to tell whether or not the water valve *is* closed is to remove the heater hose from the outlet connection. No water from the core means the valve is tightly closed.



NOTE: If the engine's hot, and the cooling system is under pressure, coolant may pour out of the hose and surprise you. So, make the water valve closing test with the radiator cap off, and *before* the engine gets hot.



Be sure to check control operation with the temperature lever moved ⅜″ to the right (down on Imperial) of "COLD". This is the position for maximum fresh-air cooling. With the lever there, the fresh-air door should be open, the recirculating door closed, the clutch engaged, and the water flow valve should still be closed.

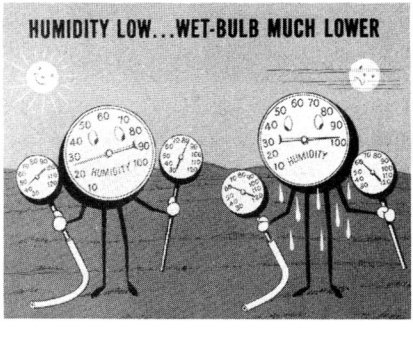


Checking what happens with the temperature control on "COLD" and 3/8" to right of COLD will tell you whether they are doing their job. It's not a complete check, of course, but you'll know the controls are doing what they should to provide maximum fresh and recirculated air cooling.

The performance test, remember, tells whether or not an owner's complaint is due to high humidity, or below-standard operation. Then, if the system is doing all it can, you won't waste time looking for possible trouble.

When you do test performance, allow for humidity's effect by taking wet-bulb as well as dry-bulb readings. The wet-bulb thermometer is one cooled by evaporation.

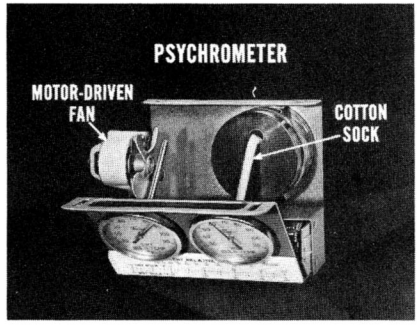
NOTE: Wet-bulb temperature, by the way, is not a humidity reading. It merely shows how humidity affects temperature.



When humidity is low, the wet-bulb reading will be much lower than the dry-bulb reading. If humidity is high, wet-bulb and dry-bulb temperatures will be closer together. In fact, when wet-bulb and dry-bulb temperatures are exactly the same, you'll know relative humidity is 100%.

Accurate Temperatures are a "Must!" At most commercial refrigeration supply houses, you can find several types of psychrometers that will give accurate wet-bulb and dry-bulb readings. One shown here

has a motor-driven fan that directs air over two dial thermometers. The wet-bulb thermometer stem is covered with a cotton sock suspended in water for uniform wetness. This is a quick and easy way to get dry-bulb and wet-bulb temperatures right at the inlet grille.



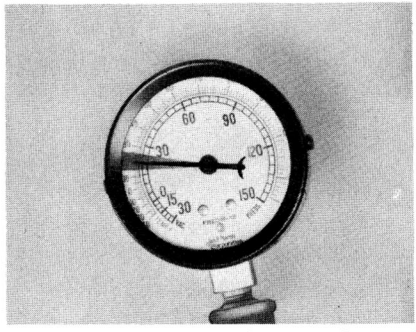
Thermal switch test

Since you must put the system under load to make this and the following tests, install the manifold gauge set (C-3627) before heating up the engine. When the gauge set is installed, open the suction and discharge service valves two turns. If no pressure shows on the gauges, the system's empty and has a leak. In a case like this, evacuate, charge with a sweep test charge to locate and correct the leak. Then, evacuate and recharge with the proper amount of refrigerant 12.

A thermal switch test will tell you if the switch is cycling the clutch properly. Run the engine at 1200 r.p.m., turn the air control UP, and move the temperature control lever to COLD. Turn the selector switch to COOLING, the blower switch to LOW, and leave the car windows closed.

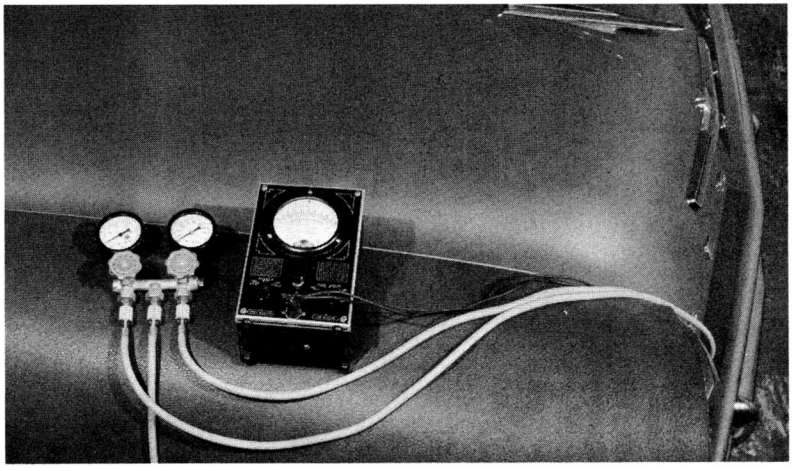
There is a direct relation between evaporator temperature and suction pressures. In this test we will check the thermal switch by measuring the suction pressure at the instant the clutch disengages. Suction pressure should go down to 15 to 20 psi before the thermal switch opens the circuit to disengage the compressor clutch. When the clutch disengages, suction pressure should go back up to about 35 psi. As soon as the evaporator starts to warm up, the thermal switch will automatically close the circuit to the magnetic clutch. The clutch will then engage, and suction pressure will gradually decrease.

Let the thermal switch cycle the clutch several times until you're sure the clutch always disengages when suction pressure is in the 15 to 20 psi range. If that happens, the evaporator gets cold enough, and the thermal switch is okay. A faulty switch, or poor sensing bulb contact, will cause the evaporator to frost over. That, in turn, will restrict air flow. The expansion valve will try to stop refrigerant flow, which will cause abnormally low suction pressures. Remember that the sensing bulb should be inserted in the coil to a depth of 3¾". This is marked on the bulb so you can check it.



If the clutch remains continuously engaged and suction pressure remains *high,* that points to an open expansion valve. This could be caused by moisture in the system or poor expansion valve thermal bulb contact.

Performance test



Operate the engine at 1200 r.p.m. with the *hood down* to keep hot engine compartment air from entering the cowl vent opening. Set the temperature control lever to COLD and the selector switch to COOLING.

Move the temperature control lever ⅜" to the right of "COLD" (down on Imperial) or until the second micro-switch is actuated. The clutch should be energized. The fresh-air door should be open, and the recirculating door closed.

Open both front door windows. Check for proper order of switching blower speeds. Run the blower at high speed, and adjust the defroster control to direct all air up through fully open outlet grille louvers, directed toward passengers.

Insert the stem of a dial thermometer completely into the grille opening of the discharge outlet in the right side of the instrument panel. This thermometer will give you an accurate discharge air temperature. A second thermometer at the inlet grille will give you inlet temperature.

Temperature in the test room should be at least 75° F. (dry-bulb). Set engine speed at 1200 r.p.m., leave the blower on HIGH, and set the temperature control lever 3/8" to the right of COLD. Run the engine for 15 minutes to stabilize the system.

To test stability of the system read inlet and outlet temperatures. One minute later, repeat temperature readings. If readings change more than 1°, continue operation until you get constant readings.

Read discharge pressure at the compressor. Discharge pressure will vary with the surrounding temperature and heat load on the evaporator. At 1200 r.p.m. pressures should fall within the ranges indicated below:

SURROUNDING TEMPERATURE	DISCHARGE PRESSURE
60° F.	100–150 psi
80° F.	140–190 psi
100° F.	190–240 psi
110° F.	230–280 psi

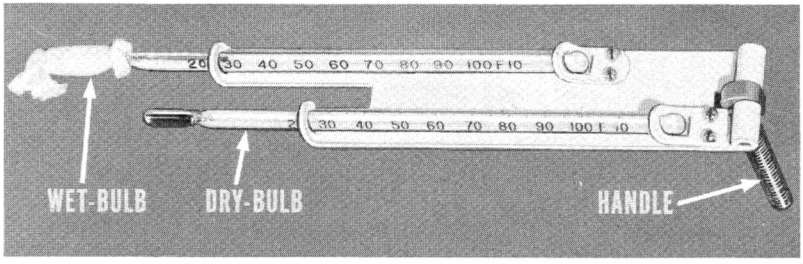
Abnormally *high* discharge pressures may mean too much refrigerant, air in the system, or restricted air flow through the condenser fins. Abnormally *low* discharge pressures may point to too little refrigerant, moisture in the system, too much compressor oil.

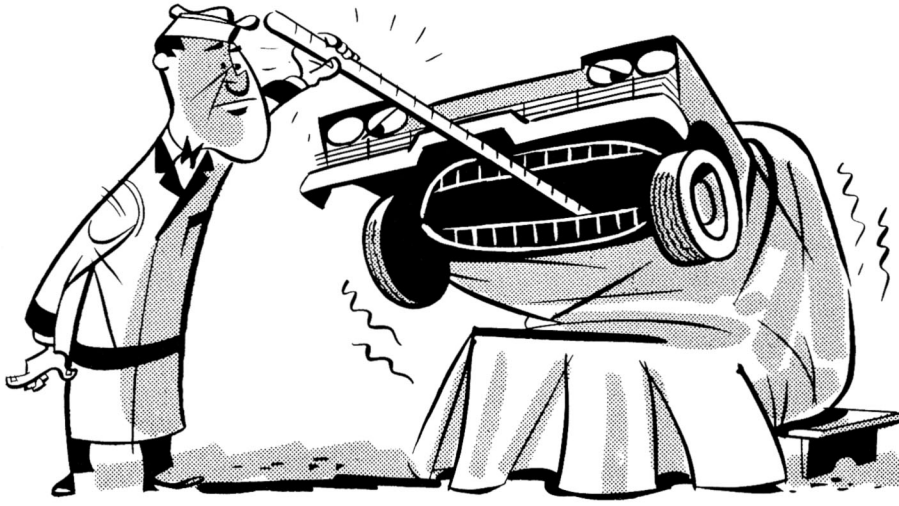
Test must be made at discharge pressures of 190 to 210 psi. If necessary, restrict air flow across the condenser by blocking it with cardboard to increase pressure. Use an external floor fan to increase air flow across the condenser to decrease pressure.

A portable psychrometer, placed at the cowl vent, will give you accurate wet- and dry-bulb inlet air temperature. With a little practice, however, you can get quite accurate readings with a sling-type psychrometer. One thermometer placed at the cowl vent for dry-bulb

readings, and a second thermometer wrapped in wet gauze and swung on the end of a piece of string will give you a wet-bulb reading.

The sling-type psychrometer shown below is a very practical instrument for determining wet-bulb and dry-bulb inlet air temperatures. It is now available under special tool number C-3668.





Read the air inlet wet- and dry-bulb temperatures. Read the discharge air temperature. From the Performance Temperature Chart, determine the acceptable discharge air temperature for the combination of wet- and dry-bulb readings you obtained.

PERFORMANCE

INLET AIR		WET-BULB																
		52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
DRY BULB TEMPERATURE	75	46	46	46	47	47	47	48	48	49	49	50	50	51	52	52	53	54
	76	47	47	47	47	48	48	48	49	49	50	50	51	51	52	52	53	54
	77	47	48	48	48	48	49	49	49	49	50	50	51	51	52	52	53	54
	78	48	48	48	49	49	49	49	50	50	50	51	51	52	52	53	53	54
	79	49	49	49	49	50	50	50	50	50	51	51	51	52	52	53	53	54
	80	49	49	50	50	50	50	50	50	50	51	51	51	52	52	53	53	54
	81	50	50	50	50	50	50	50	51	51	51	51	52	52	53	53	54	54
	82	50	51	51	51	51	51	51	51	51	52	52	52	53	53	54	54	55
	83	51	51	51	51	51	52	52	52	52	52	52	53	53	54	54	55	55
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	87	53	53	53	53	53	53	53	54	54	54	54	54	55	55	55	56	56
	88	54	54	54	54	54	54	54	54	55	55	55	55	55	55	56	56	56
	89	55	55	55	55	55	55	55	55	55	55	55	55	56	56	56	56	57
	90	X	X	X	55	55	55	55	55	55	55	55	56	56	56	56	57	57
	91	X	X	X	X	55	56	56	56	56	56	56	56	56	56	57	57	57
	92	X	X	X	X	56	56	56	56	56	56	56	57	57	57	57	57	58
	93	X	X	X	X	X	57	57	57	57	57	57	57	57	57	58	58	58
	94	X	X	X	X	X	58	58	58	58	58	58	58	58	58	58	58	58
	95	X	X	X	X	X	58	58	58	58	58	58	58	58	58	58	59	59
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	101															62	62	62
	102															62	62	63
	103															63	63	63
	104															63	63	63
	105															63	63	63
	106															64	64	64
	107															64	65	65
	108															65	65	65
	109															65	65	65
	110															66	66	66

MAXIMUM DISCHARGE AIR TEMPERATURE

TEMPERATURE CHART

TEMPERATURE

69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
54	55	56	56	57	58																
54	55	56	57	57	58	58															
54	55	56	57	58	58	58	60														
55	55	56	57	58	59	58	60	61													
55	55	56	57	58	59	59	60	61	62												
55	55	56	57	58	59	60	60	61	62	63											
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56	56	57	58	59	59	60	61	62	63	64	65	66	67								
56	57	57	58	59	60	60	61	62	63	64	65	66	67	68							
56	57	58	58	59	60	61	61	62	63	64	65	66	67	68	69						
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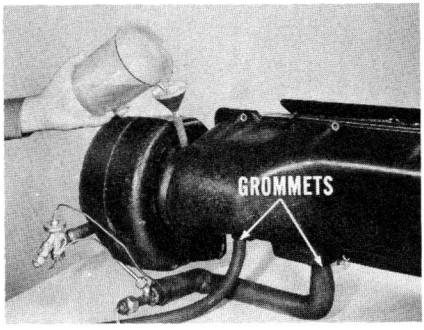
66	66	66	66	66	66	67	67	67	68	68	69	69	70	71	71	72	73	74	75	76	77
66	66	66	66	66	66	67	67	67	68	68	69	69	70	71	71	72	73	74	75	76	77

Unit Doesn't Cool Down Enough. If your delivered air isn't as cold as called for on the performance chart, you'll have proof that something is wrong. In short, it's not just high humidity, or the owner's imagination. It is a condition that needs attention.

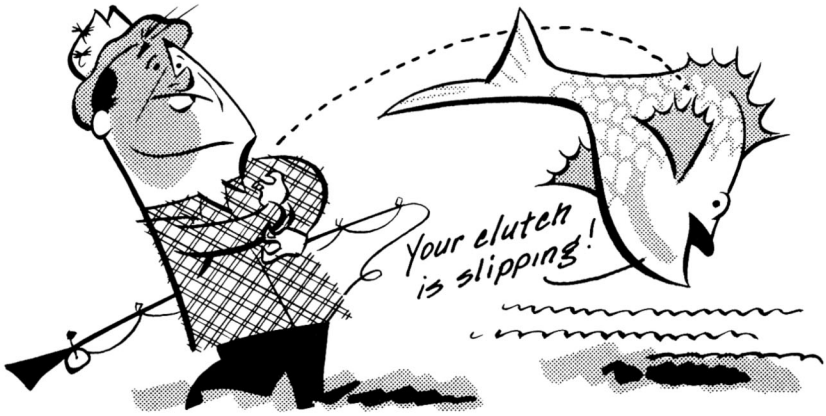
As an example, there might be *hot air leaks.* To check for this, remove the blower rubber coupling. Pour in about a pint of water, and watch for leaks at the grommets along the bottom. A stream of water means there are leaks. Use heavy body sealer at the grommets and around the entire outside edge of the housing to correct any leaks you may discover.



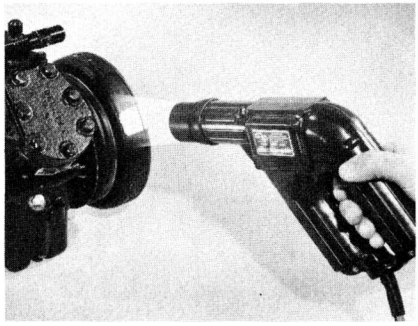
Blower Housing Insulation. You may have to insulate the blower housing. Adjust the fan so it does not rub at any point and clears the housing intake no more than $\frac{1}{16}$". Greater clearance will allow recirculation of air within the blower. Seal all points of possible leakage in the blower housing. Then, install the blower assembly. Make sure there is a good seal at the blower outlet and at the sleeve connector between the evaporator housing and blower inlet.

NOTE: You may install the new high-capacity blower motor (Part No. 1842762) now available if more air is desired.

Clutch Slippage. A slipping clutch can also cause poor refrigeration. To test for this, paint a 1" white mark across both elements. Unhook the feed wire from the thermal switch to the clutch.

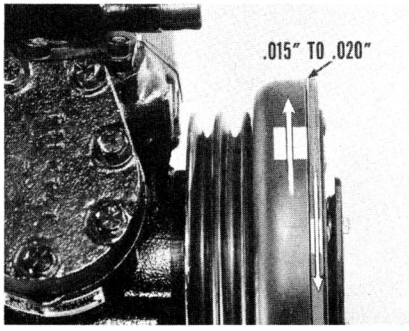


Connect a jumper from the clutch to the battery. Connect a timing light to the ignition coil secondary cable terminal. Start the engine and set idle at 500 r.p.m. Turn the blower on HIGH. Also, cover the condenser to raise compressor discharge pressure to 300 psi.



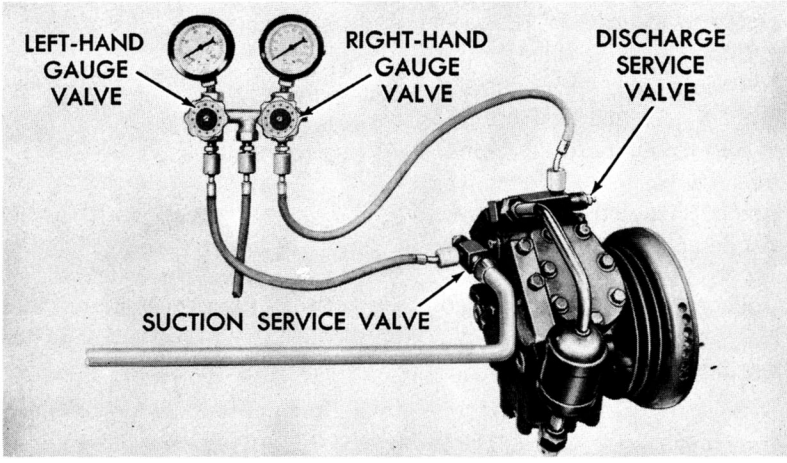
There should be almost no creep between the two white marks at 300 psi. A slight movement during starting should settle down to no more than a slight creep.

Slippage of more than one revolution per minute of running is too much. So, check clutch plate clearance. It should be .015″ to .020″. Also, see if the terminal and brush contacts are good. If clearance and brushes are okay and the clutch still slips, install a new clutch.



Compressor capacity test

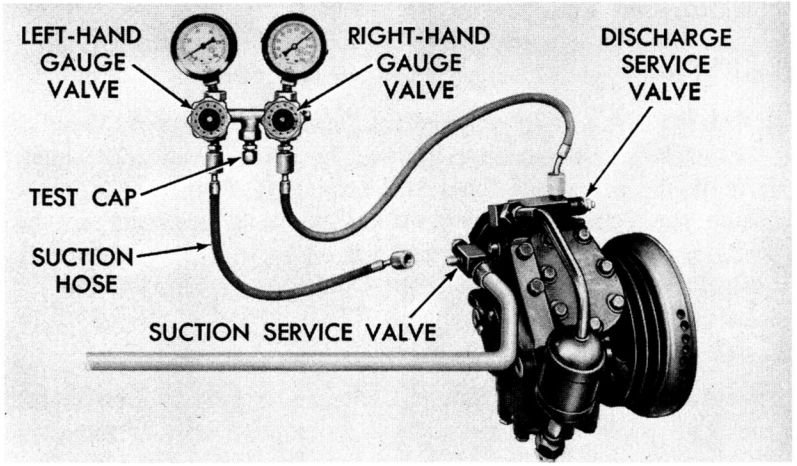
Suction and discharge pressures, remember, still won't tell you enough to be sure about the compressor or the expansion valve. In fact, variations in pressures may only mean that there are other restrictions in the system. To know for sure, then, you'll have to isolate the compressor and test its capacity. So, turn the blower switch on HIGH, move the temperature control lever to ⅜″ to the right of COLD, and run the system for about 15 minutes at 1200 r.p.m. This will return most of the compressor oil in the system and provide lubrication for good compression. Also, it will bring the compressor up to normal operating temperature, a "must" in making this test.



After that warm-up run, reduce engine speed to exactly 500 r.p.m. Close the suction service valve (clockwise) so suction pressure drops to zero and then a vacuum. Next, turn the discharge service valve clockwise till it's completely front seated. Open the right-hand valve on the gauge manifold to let a small amount of trapped discharge pressure to vent to zero through the gauge manifold center hose. Open the left-hand valve on the gauge manifold and turn it completely counterclockwise to open position. Both gauges will now register zero pressure.

Install Test Cap. Remove the hose from the center connection and attach the compressor capacity test cap (SP-2922) to the gauge center connection.

NOTE: Be sure the test cap is perfectly clean. Particles sticking to the cap's metered vent hole can restrict the opening and cause false readings. Wash with clean solvent and dry with air hose whenever in doubt.



Disconnect the suction hose from its service port. Slowly close the left-hand gauge and watch discharge pressures and tachometer. At exactly 500 r.p.m. pressure should build up slowly to the figures listed in the following table. Open and close the left-hand valve several times to allow pressure to drop and build up, and recheck your readings.

COMPRESSOR CAPACITY PRESSURE TABLE

Model Year	Compressor Type	Pressure Range—PSI
1955-1956	Tecumseh	140 - 160
1956	Copeland	110 - 120
1957	Tecumseh	165 - 185
1957-1958	Air Temp V2	190 - 210

If compressor pressures *are* within limits as shown in the table on preceding page, compressor is up to capacity and you can continue with the following portion of the test.

If the gauge and tachometer are accurate and pressure does not build up as shown on the table, capacity is *not* satisfactory. In a case like this, stop the engine, and leave service valves as they are. Replace gaskets and valve plate assemblies, tighten head bolts 26 to 28 foot-pounds torque. Lubricate the head bolts and gaskets with refrigerant oil so you'll get accurate torque readings. Then, warm up for 15 minutes, retorque head bolts and re-test the compressor.

CAUTION: A new or repaired compressor that has been handled before it is installed on a car may have refrigerant oil trapped above the pistons. If this condition exists, oil under high pressure can damage the reed valves and head gaskets when the compressor is first installed and run on a car. To avoid damage, always crank a newly installed compressor six revolutions by hand before starting the engine. This will return trapped oil to the crankcase without damaging the valves.

Leave the manifold right- and left-hand valves in their counterclockwise open position. Reconnect the suction hose to the suction service valve port. Turn the left-hand gauge valve clockwise to closed position. The compressor will now pump all air out of the compressor and discharge it through the test cap orifice.

When the suction gauge shows 25 to 30 inches of vacuum and discharge gauge is at zero, turn the right-hand gauge valve clockwise to closed position.

CAUTION: As you do the next step, always remember to *open the discharge service valve first.* Otherwise, serious damage can result to the compressor.

With a ratchet wrench, turn the valve stem of the *discharge service valve* counterclockwise to back-seat it, then turn it two turns clockwise. Next, rotate the valve stem of the suction service valve counterclockwise to back-seat it, then turn it two turns clockwise. Remove

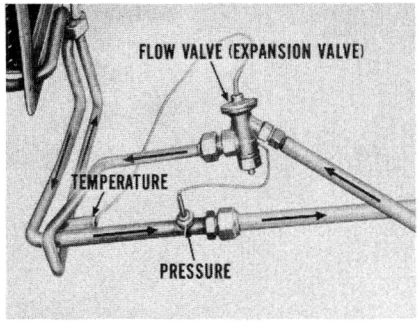
the capacity test cap. Store it in a clean covering for future use. Replace the manifold center hose, and stop the engine. Open the right-hand gauge valve (counterclockwise) slightly to remove any air trapped in the discharge recess or hose. Back-seat both service valves and remove the gauge set.

What you've done is run the compressor as an air pump at exactly 500 r.p.m. Measuring discharge pressure developed against flow through the test cap orifice tells you if the compressor delivers adequate volume.

Expansion valve test

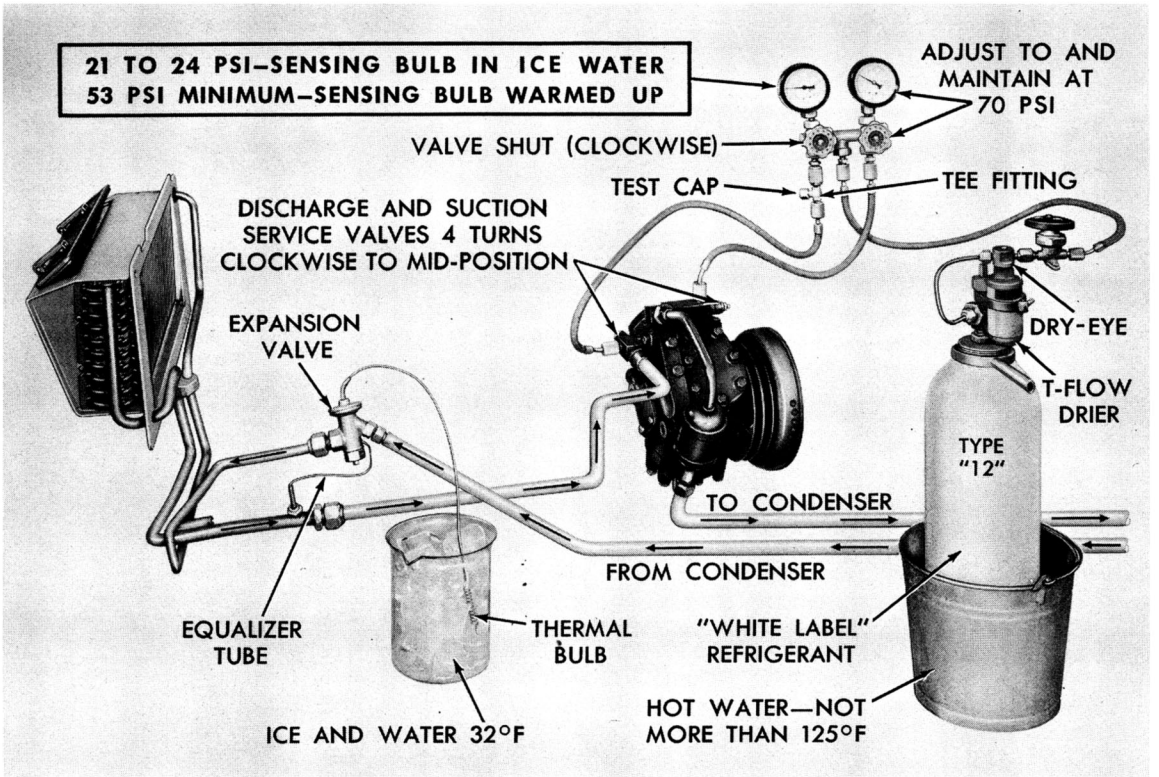
Always test compressor capacity before blaming the expansion valve. Once you're sure the compressor's okay, then you can go ahead and test the expansion valve while it is still in the system.

The expansion valve is a flow valve. How much refrigerant it feeds *into* the evaporator depends on the temperature and pressure of the refrigerant *leaving* the evaporator. If every part of the system has been tested and found satisfactory, then the following test will tell if the expansion valve is working properly.



When you test a valve on a 1955 or 1956 system, the normally open hot gas solenoid by-pass valve must be energized. This will prevent flow of gas from the discharge to the suction side. Run a hot lead from the battery to the solenoid terminal to energize the valve.

When you test the 1957 or 1958 dual front and rear end units, test each evaporator unit with its expansion valve separately. Alternately disconnect and cap the liquid and suction lines leading to the other evaporator.


21 TO 24 PSI–SENSING BULB IN ICE WATER
53 PSI MINIMUM–SENSING BULB WARMED UP
ADJUST TO AND MAINTAIN AT 70 PSI
VALVE SHUT (CLOCKWISE)
TEST CAP
TEE FITTING
DISCHARGE AND SUCTION SERVICE VALVES 4 TURNS CLOCKWISE TO MID-POSITION
EXPANSION VALVE
DRY-EYE
T-FLOW DRIER
TYPE "12"
TO CONDENSER
FROM CONDENSER
EQUALIZER TUBE
THERMAL BULB
"WHITE LABEL" REFRIGERANT
HOT WATER—NOT MORE THAN 125°F
ICE AND WATER 32°F

On the typical 1957 or 1958 system, proceed as follows. Discharge the refrigerant from the system. Position discharge and suction service valve stems four turns clockwise from the back-seated position. Attach the compressor capacity test cap to a tee fitting at the suction hose side of the gauge set. You can make this tee adapter from a ¼" female flare connector and a ¼" male flare tee. Turn the left-hand gauge valve clockwise until it's in its completely closed position.

Place a tank of refrigerant 12 equipped with a dry-eye, T-flow drier and valve in a pail of hot water not warmer than 125° F. Attach a hose from the manifold center connection to the tank, and open the refrigerant tank valves. Adjust the right-hand gauge valve to maintain a controlled refrigerant supply of 70 psi on the discharge gauge.

Put the valve sensing bulb in 32° ice and water. That should move the expansion valve diaphragm into "minimum flow" position.

You should now read 21 to 24 psi on the suction gauge, while there is still 70 psi showing on the discharge gauge.

Remove the bulb from the water and warm it up with your hand. Suction pressure should increase to at least 53 psi. That means the valve has opened enough to provide full refrigerant flow and full cooling. If the expansion valve passes this test, it has proper super heat setting, the proper pressure limit, correct rated capacity, and hasn't lost its thermal bulb charge. Since the system is without refrigerant, remove the valve inlet screen. Clean it if necessary, and reinstall it.

But if you don't get the proper suction pressures, replace the expansion valve. Finally, vacuum, sweep, test for leaks. Then, recharge the system.

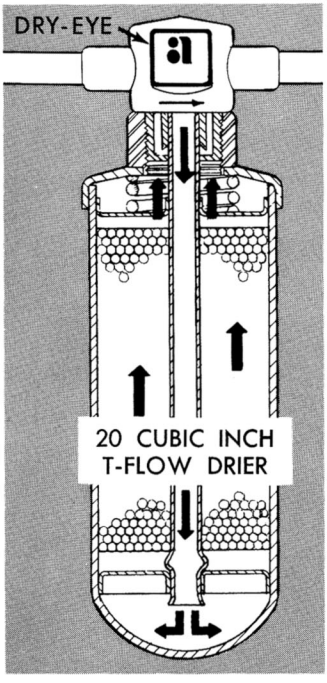
Erratic Performance. Systems that work well in mildly warm weather may suddenly develop expansion valve freeze-up when the weather gets very hot. This symptom points to possible moisture in the system.

When it's cold, the drier can hold a great deal of moisture. When hot, the drier holds less moisture. When hot, in fact, the drier releases moisture into the system. This can freeze at the expansion valve.

If the valve freezes in its open position, it will cause high suction pressures. If it freezes in closed position, it will show up in both low suction and discharge pressures.

Drying a Wet System. Trying to bake water out of a used and saturated drier won't do. Compressor oil has passed through the chemical drier. Applying heat can carbonize this compressor oil and coat the drier particles. That seals them and they'll never work.

If the system is giving erratic performance, indicating that there is moisture freezing in the expansion valve, you'll have to dry the system. Purge the system of refrigerant, and replace the drier. Pull vacuum down to at least 28 inches. Hold that for two minutes. Then, recharge the system.



Here's another way to dry the system and leave the factory-installed drier attached. Purge the system of refrigerant. Remove the sight glass and install a *super dry-eye,* which is a combination dry-eye and sight glass. Also, install a 20 cubic-inch T-flow drier, making sure the arrow on the dry-eye points toward the direction of refrigerant flow. Tighten the drier into the dry-eye only *8 to 12 foot-pounds* torque! Any more torque than that might crack the gasket. Evacuate and recharge the system.

As the system warms up and the wet receiver-drier-strainer releases its moisture, all of it will be absorbed by the T-flow drier. The T-flow, remember, contains 20 cubic inches of chemical compared with the wet drier's 5 cubic inches.

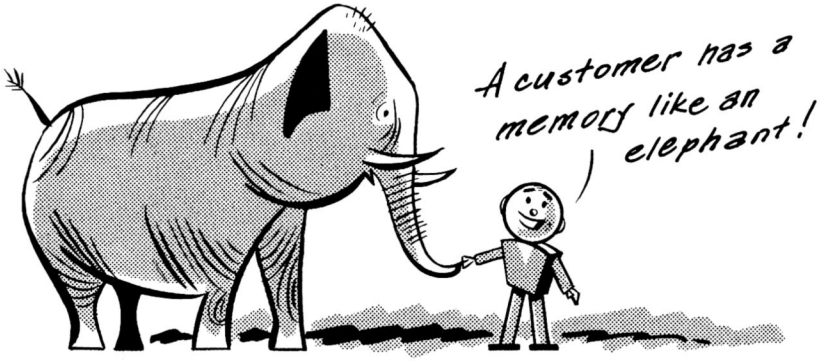
So, all moisture from the wet unit will be absorbed, while ample capacity will remain to take care of any additional moisture.

CAUTION: Never intall a T-flow drier in place of a receiver-drier-strainer. All of the T-flow space is filled with chemical drier. It has no place to store liquid refrigerant. The receiver-drier-strainer, on the other hand, can store about one pint of liquid refrigerant, a function vital to proper air-conditioning operation.

IMPORTANT NOTE: Proper storage of all air-conditioning service parts is very important. This is particularly true of T-flow driers and replacement receiver-drier-strainer units. Take care that their seals do not become damaged. Chemicals in each are so hungry for moisture that they can saturate quickly upon exposure to atmosphere. When installing a drier, or breaking any connection in the system, have parts and tools ready for quick reassembly to avoid keeping the system open any longer than necessary.

SUMMARY

How well you work on any part of the car leaves a lasting impression on the owner. On air conditioning especially, a customer is reminded of your service ability each time he turns the system on.



Each time you work on an air-conditioning system it represents not only a good chance to make your skill speak for you, but also means one more step toward becoming an air-conditioning service *leader* in your community.

RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 123

On the 1958 units, there are no moving parts nor any electrical connections *inside* the evaporator housing that should require attention.	RIGHT	1	WRONG
Before the evaporator gets cold enough to frost over, the thermal switch should open the clutch circuit.	RIGHT	2	WRONG
Compressor belt deflection should be 3/8" with a 9- to 12-pound pull.	RIGHT	3	WRONG
When humidity is high, the evaporator must wring moisture out of the air, in addition to lowering its temperature.	RIGHT	4	WRONG
Relative humidity is what you get by reading the temperature recorded by a wet-bulb thermometer.	RIGHT	5	WRONG
When humidity is 100%, wet-bulb and dry-bulb temperatures will be the same.	RIGHT	6	WRONG
Abnormally high discharge pressures may mean too much refrigerant, air in the system, or restricted air flow through the condenser.	RIGHT	7	WRONG
A faulty thermal switch, or poor sensing bulb contact may cause the evaporator to frost over.	RIGHT	8	WRONG
In a compressor capacity test, you run the compressor as an air pump and measure discharge pressure developed against flow through the test cap orifice.	RIGHT	9	WRONG
When a compressor fails the capacity test, replace it.	RIGHT	10	WRONG

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