1941

PACKARD AIR CONDITIONING OPERATION, SERVICE AND OWNER'S INSTRUCTION

Packard Air Conditioning, which is supplied on 1941 Packard cars as factory-installed special equipment at extra cost, is a mechanical refrigeration system which provides cool, filtered, dehumidified air for passenger comfort.

With the compressor belt installed and the engine running, Air Conditioning is always available. It can be turned on by merely regulating a switch on the instrument panel. Cooling starts instantly when the car engine is started.

The Instrument Panel Switch is conveniently located on the instrument panel, to the left of the steering column. When the switch is turned on the cooling fan is in operation. There are three positions on the switch, so that the amount of cool air delivered into the car can be controlled.

If Air Conditioning is not desired, simply turn the switch to the "off" position.

The Adjustable Louvres, located in the air stream from the cooling fan discharge, direct the flow of air into the car. They may be adjusted to any desired position by simply turning a small knob.

Ventilation—For maximum cooling, the cowl ventilator and all windows should be closed. Ordinarily, ventilation is adequate under these conditions. However, if additional ventilation is required, it may be obtained by partially opening the cowl ventilator or window vents.

Refrigeration Cycle—Fundamentally, the refrigerant, which is circulated through the system by the compressor, picks up heat at the cooling coil, carries it to the condenser, and there discharges it to the outside air.

The refrigerant, Freon (F-12), a non-toxic, non-inflammable and practically odorless gas, is stored in the Receiver in a liquid state under relatively high pressure.

From the Receiver, the liquid passes through the Expansion Valve and into the Cooling Coil, where it expands into a gas at relatively low pressure. This expansion or evaporation from a liquid to a gas, absorbs heat from the metal coil and the air drawn over it by the Blower Fan, thus cooling the air.

The Compressor, mounted on the engine block, draws the refrigerant gas from the ~~Condenser~~ EVAPORATOR at relatively low pressure and discharges it at high pressure into the Condenser. In the Condenser, the gaseous refrigerant is cooled sufficiently to condense into a liquid. From the Condenser the liquid refrigerant flows into the Receiver, and the cycle starts again.

Air Circulation—When the Cooling Fan is turned on, by means of the 3-position Switch located on the instrument panel, air in the car is drawn under the rear seat, through the Air Filter and Cooling Coil. It is then discharged into the car, through the Adjustable Louvres, so that it follows the contour of the roof and circulates throughout the car.

Air Filtering is accomplished by passing all the air discharged into the car by the Blower Fan through an oil coated fibre board Air Filter, which removes dust and other impurities from the air.

Air Cooling takes place when the air drawn from the car passes over the Cooling Coil. The air gives up its heat to the coil, where the temperature is normally from 40 to 50 degrees, and is discharged into the car at a temperature a few degrees higher than the coil temperature.

Winter Operation—During cold weather, when Air Conditioning is not required, remove the Compressor drive belt. Nothing else need be done.

When Air Conditioning is again desired, simply install the belt and the unit is ready for operation.

Air Filters—To insure proper air filtering and maximum cooling efficiency, the Air Filters, located at the inlet to the Cooling Coil, should be changed at least once a year, preferably in the Spring.

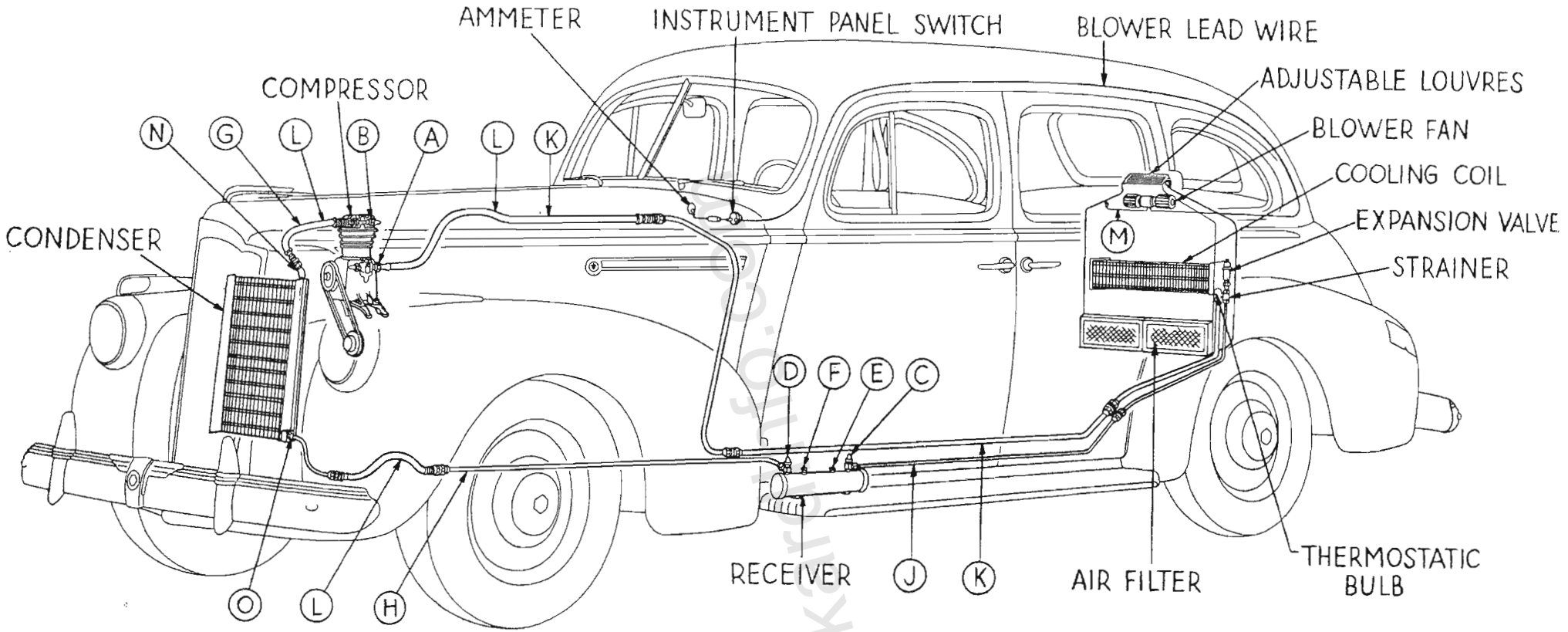


Fig. 1

A—Compressor Suction Service Valve
B—Compressor Discharge
C—Receiver Shut-off Valve
D—Condenser Shut-off Valve.
E—Fusible Plug
F—Freon Level Tester
G—½" High Pressure Gas Line
H—½" High Pressure Liquid Line
J—⅜" High Pressure Liquid Line
K—⅝" Low Pressure Gas Line
L—Flexible Line (Vibration Eliminator)
M—Blower Fan Ground Wire
N—Condenser Inlet Connection
O—Condenser Outlet Connection

OPERATION AND SERVICE

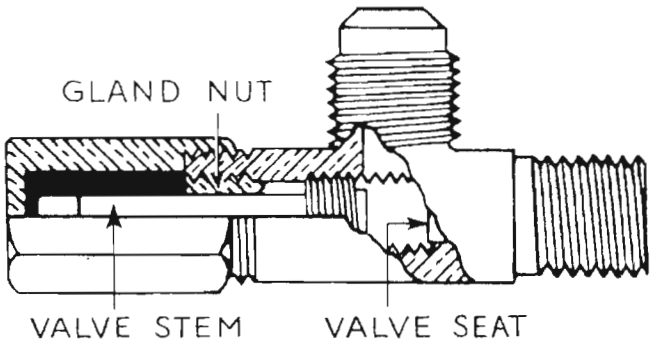


Fig. 2

The Compressor Suction Service Valve "A," Fig. 1, is located at the Compressor inlet connection. It is of the double-seating type which seats or closes when it is screwed in all the way and also when it is screwed out all the way. (See Fig. 2.) When the valve is in the "in" position, the suction line is shut off from the Compressor. When the valve is in the "out" position or "back-seated" it is in the operating position, the Service Port Plug may be removed to permit attachment of the low-pressure or compound gauge or the charging line.

The Compressor Discharge Service Valve "B," Fig. 1, is located at the Compressor outlet connection. This valve is identical to the Compressor Suction Service Valve, except that it is for ½" tubing instead of ⅜" tubing. The Discharge Service Valve controls the outlet for refrigerant gas from the Compressor to the Condenser, and provides a connection for the attachment of the high pressure gauge.

Note: Always back seat valve before removing plug "A" for attaching gauges to Compressor Service Valves.

The Receiver Shut-off Valve "C," Fig. 1, is of the single-seating type as shown in Fig. 3. It is located at the outlet of the Receiver and is used when it is desired to pump all the refrigerant into the Receiver to permit removal of some part of the refrigeration apparatus.

The Condenser Shut-off Valve "D," Fig. 1, is of the same type as shown in Fig. 3. It is located on the inlet of the Receiver and is used to retain the gas in the Receiver, after pumping back, so that the Condenser may be removed without loss of charge.

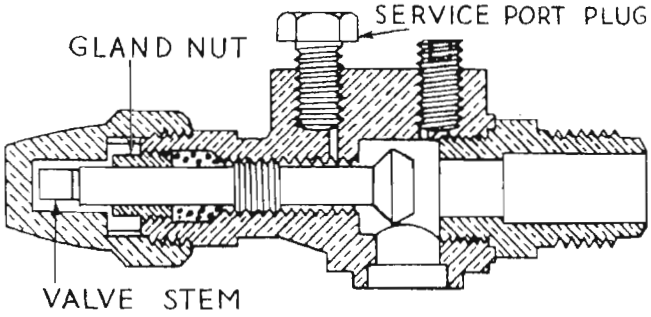


Fig. 4

The Expansion Valve is mountd in the ⅜" high pressure liquid line at the inlet of the Cooling Coil, and its Thermostatic Bulb is clamped to the ⅝" low pressure gas line at the outlet of the Cooling Coil. The purpose of the Expansion Valve is to meter the amount of liquid refrigerant passing into the Cooling Coil. The flow of refrigerant through the valve is controlled thermostatically by the Feeler Bulb. If too much refrigerant passes into the coil it will not evaporate completely and some liquid will flow into the low pressure gas line. This liquid will cool the Thermostatic Bulb, which causes the valve to close partially, thus reducing the amount of liquid entering the Cooling Coil. If not enough liquid is entering the coil, the bulb will warm up, opening the Expansion Valve wider to let more liquid enter the Cooling Coil.

Do not attempt to adjust the Expansion Valve.

The Expansion Valve is of the Thermostatic type, ⅜" S.A.E. Inlet, ½" S.A.E. Outlet, 5/32" Orifice, 55 pound Freon-12, Gas charged power element, with 24" capillary.

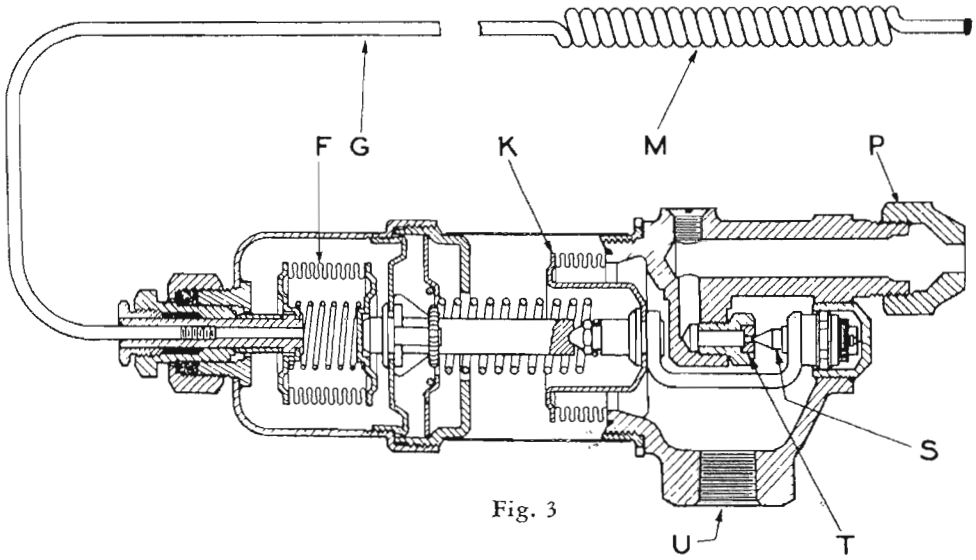


Fig. 3

F—Temperature Bellows
G—Thermostatic Tube
K—Pressure Bellows
M—Thermostatic Feeler Bulb
P—Inlet Connection
S—Needle Valve
T—Needle Valve Seat
U—Outlet Connection

FUSIBLE PLUG

The Liquid Receiver is equipped with a fusible plug set to discharge at 190° F. This is a safety device to prevent excessive pressure in the event the system is overcharged with Freon gas. When an excessive pressure is reached the Fusible Plug will melt, allowing all of the Freon to escape. It is then necessary to replace this plug with a new plug having the same temperature setting (190° F.) before recharging. In replacing the plug make sure it is screwed in tightly.

Note: If the fusible plug melts, be sure to check the condenser to see if it is stopped up with bugs and dirt. If it is, clean it before recharging the system.

AIR FILTERS

The Air Filters used in the Packard Air Conditioner are a replacement type of filter, constructed of oil coated, corrugated fibre board.

The filters should be replaced with new clean filters at least once a year, in the Spring. This insures that the air supplied by the Air Conditioner is properly cleaned at all times. Also, it insures maximum operating efficiency of the Air Conditioner.

To replace the filters, remove the rear seat, slide the old filters out of position and replace with new filters.

TO CLEAN AND DEODORIZE THE COOLING COIL

In any air conditioning system, smoke and body odors will be picked up by the circulating air and carried back to the Cooling Coil, where they will be deposited. As a result, unless the Cooling Coil is cleaned occasionally, the odors will accumulate and be carried back into the air conditioned space.

To prevent the possibility of objectionable odors thus created being carried into the passenger compartment, it is recommended that the Air Conditioner Cooling Coil be cleaned occasionally with a solution of Diversol or other bacteria insecticide which will not attack the tin plated interior parts of the cooling coil assembly. Use a solution strength of 4 ounces of cleanser to a gallon of water.

To clean and deodorize the coil, remove the cover plate on the coil housing in the trunk compartment and spray the coil, using about a gallon of the cleaning solution. After passing over the coil, the solution will drain from the return duct through the drain tube located in the bottom of the duct.

TO TEST FOR LEAKS

HALIDE TORCH METHOD

Connect the Halide Leak Detector S.T. 10105 to a Presto-Lite Tank or to the acetylene tank on the welding equipment.

Light the torch on the Halide Gas Leak Detector. Pass the end of the Leak Detector searching tube around the joint or connection to be tested. (After service work, all joints and connections in the system should be checked.) If there is a leak in the joint the color of the flame in the torch will turn to a brilliant green. This is a positive indication of a leak.

If a leak is detected in a flare connection, draw up the flare nut tightly. If the leak still exists the flare on the tubing is probably defective. The gas will then have to be pumped into the Receiver, as described in the section "Pumping Down Entire System," and the tubing disconnected and another, new flare made in the tubing.

If a leak is detected in a soldered joint, relieve the pressure in that part of the system down to zero on the gauge, either by pumping the refrigerant from that part of the system to another part, or, in the case of the Receiver, purging the gas out of the system to the air or into a small Refrigerant cylinder (Service Drum). Do not attempt to solder the joint while there is pressure in that part of the line.

If the system has lost its charge of refrigerant, there must be a leak, and it must be found rather than simply to add more refrigerant which will in turn be lost unless the leak is found and repaired. Do not give up until the leak is found.

Note: If the system has completely lost its charge, it will be necessary to add some refrigerant before the leak can be found.

To determine whether there is any refrigerant in the system, open the Liquid Tester "F," Fig. 1, on the Receiver, using Liquid Receiver Key S.T. 10074. If gas escapes from the tester, there is refrigerant in the system. If no gas escapes, the refrigerant has been lost and it is quite probable that air has entered the system. In this case, proceed as described in the first four steps in the section "To Completely Recharge the System from a Freon Drum."

SOAP AND WATER SOLUTION METHOD

Make a solution of soap (yellow laundry soap) and water. Prepare it at least an hour or so before using so that all bubbles have disappeared and the solution is of a thick "ropy" consistency about the same as heavy oil. Spread this solution on all joints or connections with a soft brush. Examine closely under a strong light. Leaks will show up by the presence of bubbles under or bursting through the film of the solution. Use a small mirror in examining the rear sides of joints otherwise not directly visible.

ATTACHING GAUGES TO READ SUCTION AND DISCHARGE PRESSURES

1. Remove cap from Compressor Suction Service Valve "A," Fig. 1.
2. Back seat valve by turning valve stem counterclockwise as far as possible.
3. Remove plug from service port (Fig. 2).
4. Attach hose from Compound Gauge of Charging and Testing Gauge Unit S.T. 5198 to service port.
5. Purge gas line by opening valve on Compound Gauge side of gauge manifold and then opening Compressor Suction Service Valve ½ turn. This will allow the refrigerant to blow the air out of the low pressure line through the center charging line. After a few seconds close valve in gauge block.
6. Repeat the above operations with the Compressor Discharge Service Valve "B," Fig. 1, attaching the High Pressure Gauge line to service port in this valve and purging the line as before by opening the valve on the High Pressure Gauge side of the gauge block.

7. Start engine and adjust Suction and Discharge Service Valves until gauges show pressure with minimum fluctuation of the needles.
8. Check all connections for leaks.

PUMPING DOWN LOW PRESSURE SIDE

1. Attach gauges to Compressor as described under section "Attaching Gauges To Read Suction and Discharge Pressures."
2. Remove cap from 3/8" Receiver Shut-off Valve "C," Fig. 1, and close valve by turning valve stem clockwise as far as it will go.
3. Start engine and run at slow speed. The Compressor will now pump all the gas from the 3/8" Liquid Line, the Expansion Valve, the Cooling Coil, and the 5/8" Low Pressure Gas Line (Suction Line) and store it in the Receiver.
   Run the engine until the Compound Gauge reads 2" vacuum. Then stop the engine. It is desirable not to open the refrigerant lines while the Compound Gauge registers a vacuum. If necessary, "crack" the Receiver Shut-off Valve "C" until the Compound Gauge reads one pound pressure, when the lines may be opened.
4. It is now possible to remove any piece of equipment on the low side of the system without losing the Freon charge.

   Watch both gauges while pumping down the system. If the High Pressure Gauge goes above 250 lbs., stop the engine, as either the Compressor has been run at too high a speed or the installation has received too much Freon gas when initially charged. If the pressure is due to excessive Compressor speed the pressure can be reduced by allowing the Compressor to remain idle for a few minutes until the pressure drops to normal, when the engine can be restarted.

   However, if there has been too much Freon charged initially the pressure will not drop when the engine is stopped and it will be necessary to vent the excess gas by loosening the flare nuts on the inlet and outlet of the Expansion Valve (See Fig. 4) and allowing the gas to escape slowly to the atmosphere until the lines are empty.

IMPORTANT: Do not run Compressor while low pressure side is pumped down.

PUMPING DOWN ENTIRE SYSTEM

1. Follow directions given in first three steps under section "Pumping Down Low Pressure Side."
2. When all the Freon has been pumped from the low pressure side into the Receiver close the Condenser Shut-off Valve "D," Fig. 1, located at the front of the Receiver.
3. It is now possible to remove any piece of equipment from the system without losing the Freon charge.

Note: It is not possible to pump all the gas in the Condenser into the Receiver and therefore a small amount of gas will be lost when a connection is broken on the high pressure side. In some cases it may be necessary to add Freon to the system to make up for this loss.

IMPORTANT: Do not run Compressor while system is pumped down.

AIR AND MOISTURE IN THE SYSTEM

DEHYDRATORS

All outside air has some moisture in it in vapor form. Just how much moisture it has, varies considerably from the dry air of Arizona to the humid air of any location on a hot, sultry or rainy day. If moist air is allowed to get into the refrigeration system both the air and water are harmful. If the air itself were perfectly dry it would do no more harm than to increase the discharge pressure (thus decreasing the capacity of the Compressor), cause excessive heating of the Compressor and in general take up room in the system that could be advantageously used for the Freon which performs the cooling.

The introduction of moisture is more serious as it may freeze up in the Expansion Valve and Cooling Coil and stop or retard the cooling action and also corrode many of the finely finished metal surfaces such as the Discharge and Suction Valves and other parts of the Compressor and the seat and needle of the Expansion Valve.

Air and moisture can be accidentally sucked into a system if a leak is present on the evaporator or other portions of the low pressure part of the system when for any reason the low pressure part of the system is on a vacuum; or they may be introduced by allowing lines or apparatus to stand open for long periods when the system is being opened for repairs either to the system or to some part of the car that is inaccessible except by removal of a part of the conditioning system.

Air has a tendency to collect in the Condenser as it does not condense or turn into a liquid and pass on to the Receiver. Air can be purged by removing the plug from the Service port of the Compressor Discharge Service Valve, closing the Compressor Suction Service Valve, and "cracking" the Discharge Service Valve. This can best be done after the engine has been stopped a few minutes as the air tends to collect in the upper part of the Condenser. It may be necessary to run and stop the engine a few times to remove all the air from the system, and thus reduce the excessive discharge pressure.

Moisture—There is only one effective correction to moisture in the system—remove it! Special non-freezing liquids may be put in the system that combine with the moisture and, diluting it, prevent freeze-ups at the Expansion Valve needle and seat. However (disregarding freeze-ups), the moisture is still in the system to cause corrosion and some of these liquids are corrosive in themselves. Do not use this method.

The Dehydrator, S.T. 5186, is a cylinder with inlet and outlet connections in which is a material known as a desiccant. The approved desiccant is "Drierite," but activated alumina or silica gel may also be used. (DO NOT USE CALCIUM-CHLORIDE.) These are in granular form that allow Freon to pass but absorb the moisture in the Freon.

If it is suspected or known that there is moisture in the system proceed according to the instructions under the section "Pumping Down Low Pressure Side," and then as follows:

1. Loosen nut and remove 3/8" line from inlet connection to Strainer, Fig. 1.

2. Connect the Dehydrator to the 3/8" line and, by means of another short piece of 3/8" tubing, to the inlet connection to the Strainer, leaving 3/8" nut on the Strainer connection loose.

   "Crack" the Receiver Shut-Off Valve and purge the air from the 3/8" tubing and dehydrator.

4. Tighten the 3/8" nut at the Strainer inlet connection.
5. Open the Receiver Shut-off Valve and start engine.
6. Allow the Dehydrator to remain in the line while the cooling system is in operation for at least an hour, then remove by repeating operations for pumping the refrigerant out of this line.
7. Remove Dehydrator and replace original 3/8" connection to inlet on Strainer, pull up tightly, open Receiver Shut-off Valve and test for leaks.
8. System should now be free of moisture and ready for use.

Note: Always be sure that both ends of the Dehydrator are sealed when not in use. If this is not done the desiccant will absorb moisture from the air and may become saturated. If it were used in this condition it would do more harm than good. The safest procedure is to always put a fresh charge of desiccant in the Dehydrator each time it is to be used.

TO REPLACE EXPANSION VALVE

1. Pump all the Freon from the low pressure side of the system as described in section "Pumping Down Low Pressure Side."
2. Remove the Thermostatic Bulb from its clamp on the 5/8" line leaving the Cooling Coil.
3. Remove Expansion Valve by loosening inlet and outlet flare nuts. Some gas may escape, but the loss should be negligible if the Receiver Shut-off Valve is closed tightly.

   NOTE: WHEN THE EXPANSION VALVE IS REMOVED OR AT ANY TIME WHEN THE LINES ARE OPEN CARE MUST BE TAKEN NOT TO START THE ENGINE UNLESS THE COMPRESSOR HAS BEEN UNBELTED.

4. Install new valve and pull flare nuts tight.
5. Clamp Thermostatic Bulb to 5/8" line as before.
6. "Crack" Receiver Shut-off Valve "C" until Compound Gauge reads 30 to 40 pounds, then close.
7. Test around Expansion Valve nuts for leaks.
8. Open Receiver Shut-off Valve "C" by turning valve stem counterclockwise. Tighten gland nut around valve stem. Replace cap tightly.
9. Start engine and watch gauges. The Compound Gauge should read 20 to 40 pounds, and the High Pressure gauge 140 to 190 pounds, after the engine runs at slow speed for a few minutes (with the blower running).
10. "Back seat" the Compressor Discharge and Suction Service Valves "B" and "A" by turning the valve stems counterclockwise as far as they will go. Remove gauges, replace plugs, tighten gland nuts and replace caps tightly.

TO REMOVE AND REPLACE CONDENSER

1. With the Blower running, start the engine and run at slow speed until the Condenser is warm.
2. Stop engine, remove caps from the Compressor Discharge Service Valve "B," Fig. 1, and the Condenser Shut-off Valve "D," Fig. 1, and turning stems clockwise as far as they will go.
3. Loosen flare nut on the Condenser Inlet Connection "N," Fig. 1, and allow the gas in the Condenser to escape slowly.
4. Unscrew this flare nut after all the gas has escaped and also unscrew the flare nut on the Condenser outlet connection "O," Fig. 1.
5. Remove Condenser, cover inlet and outlet to keep damp air out of Condenser.
6. When it is desired to replace the Condenser, put it back in place.
7. Connect flare nut to Condenser Outlet Connection "O" and tighten.
8. Connect flare nut to Condenser Inlet Connection "N" and tighten.
9. Loosen service port plug "A" in Compressor Discharge Service Valve (See Fig. 2).
10. "Crack" the Condenser Shut-off Valve "D", allowing gas from the 1/2" line to the Receiver to pass up through the Condenser and out at the loose plug on the Compressor Discharge Service Valve, thus purging the air from the Condenser. It is necessary to purge only a few seconds.
11. Tighten the plug in the Compressor Discharge Service Valve.
12. Open Compressor Discharge Service Valve "B" and Condenser Shut-off Valve "D" by turning counterclockwise. Replace and tighten valve caps.
13. Check all joints for leaks.

TO REPLACE COMPRESSOR

1. Run engine at slow speed for a few minutes until Compressor is warm.
2. Stop engine, remove caps from Compressor Discharge and Suction Service Valves "B" and "A," Fig. 1, and close both valves by turning stems clockwise as far as they will go.
3. Loosen Plug (See Fig. 2) in Service Port of Suction Service Valve "A" and allow gas in the Compressor to slowly escape. Also remove plug in service port of Discharge Service Valve "B" and allow gas in Compressor head to escape.
4. Remove cap screws securing the Compressor Service Valves to the Compressor and carefully lift the valves away from the Compressor.
5. Loosen bolts securing the Compressor to the Compressor base, and remove the drive belt.

6. Remove bolts and Compressor from base.
7. Take off nut holding Compressor pulley to shaft and remove pulley. See that Woodruff key is in place on replacement Compressor and transfer pulley to replacement Compressor. Slide it in place and tighten shaft nut.
8. Put replacement Compressor on base, put in bolts loosely, put on belt and pull up Compressor until belt is tight—not too tight, just so it does not slip. Also see that belt and pulleys are lined up. Tighten bolts.
9. Put in new copper flange gaskets between the Service Valves and Compressor. Put valve flanges down against the copper gasket, run in cap screws finger tight. Tighten cap screws evenly so that flange fits flat against the gasket.
10. Replace plug in the service port of the Suction Service Valve and crack this valve by opening ¼ turn to blow gas from the suction line up through the Compressor and out the service port of the Discharge Valve. Turn Compressor pulley over by hand to assist in purging the air from the Compressor.
11. Tighten plug in Service port of Suction Service Valve, open valve stem to back seat, tighten gland nut, put on and tighten valve cap.
12. Put in and tighten plug in service port of Discharge Service Valve, back seat valve stem, tighten gland nut, replace and tighten cap.
13. Test for leaks around Service Valve flanges, service ports, and caps. If there are no leaks, the Compressor is ready for use.

CHECKING OIL LEVEL IN COMPRESSOR

If there has been a loss of liquid Freon from the system some of the oil (which mixes readily with Freon and is present in all parts of the system) may also have been lost. The level in the Compressor may be checked as follows:

1. With the blower running, start the engine and run at slow speed for a few minutes until the Compressor crankcase is warm. Then stop engine.
2. Remove cap and close (clockwise) the Compressor Suction Service Valve as far as it will go. Loosen the plug in the Service port and allow the gas in the Compressor to slowly escape.
3. When there is no further escape of gas, remove the Oil Filler Plug, a hex head plug on the side of the Compressor crankcase.
4. Insert a clean rod to the bottom of the Compressor crankcase, and measure the height of the oil level. It should be up to, or within ⅜" below the centerline of the Compressor shaft.
5. If the oil level is low, add oil as necessary. USE SPECIAL PACKARD COMPRESSOR OIL ONLY.
6. Replace Oil Filler Plug, tighten plug in Service Port on Suction Service Valve, open valve to back seat, tighten gland nut and replace, and tighten cap. Test for leaks. No purging of the Compressor is necessary for this operation.

CHECKING FREON LEVEL

It is very simple to determine if there is a sufficient amount of Freon in the system for normal operation. With the Compressor running, open (slightly) the Liquid Tester "F," Fig. 1, which is a small test cock on the Receiver. If there is liquid refrigerant up to the level of the Tester, liquid Freon will come out in a milky white flow. If gas only blows out, this indicates that the system is short of refrigerant and some should be added, as described below.

If neither liquid nor gas escapes from the Tester, the system must be completely recharged, either from a Freon drum or from a charged Receiver. Both of these methods are described below. A complete charge is **6¼ pounds of Freon.**

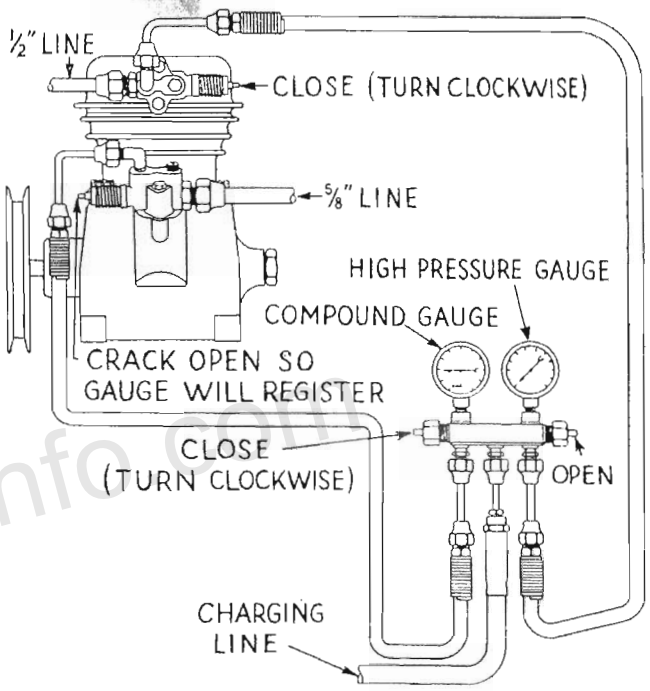


Fig. 5

TO PUMP AIR FROM SYSTEM

When the entire charge of Freon has been lost, it is quite probable that air has been introduced into the system at the point where the leak occurred. It is necessary to remove this air before adding a new charge of Freon. By using the Compressor as a suction pump, the air can be removed as follows:

1. Install gauges and adjust valves as shown in Figure 5.
2. Be sure both valves in Receiver Tank are open.
3. Start engine and run at slow speed until Compound Gauge reads 20-28 inches vacuum.

   Note: If oil is discharged through the charging line along with the air during this operation, stop the engine for a few minutes, then start up again and proceed until the proper vacuum is reached.
4. When the system has been pumped down to 20-28 inches of vacuum, stop the engine. If the vacuum holds for several minutes, this is an indication that

any leak in the system is comparatively small and it will be safe to recharge the system before finding the leak.

Note: If the vacuum does not hold when the engine is stopped, there must be a bad leak in the system. Be sure to find this leak before recharging the system. To find the leak, attach the Freon drum to the end of the charging line and open the valve in the drum, allowing Freon to enter the lines until both gauges register 60-70 pounds. Now check the entire system for leaks as described under the section "To Test for Leaks."

When the leak has been found and repaired, again pump air from system and proceed as described in "To Completely Recharge System from a Freon Drum."

If all the Freon charge has not been lost it is not necessary to pump air from the system. Proceed as follows.

TO ADD FREON TO SYSTEM

1. Install gauges and adjust valves as shown in Fig. 6.
   Note: Be sure to purge the air from both gauge lines, also from the charging line.
2. Open valve on Freon drum.
3. Start the engine and run at slow speed. The Compressor is now drawing gaseous Freon out of the drum.

   Note: Stand the Freon drum upright so that only gaseous Freon is drawn into the Compressor. Do not invert the drum or lay it on its side as this will allow liquid Freon to enter the Compressor, perhaps damaging the Compressor valves and causing oil pumping and slugging. If the drum gets cold, set it in pail of warm water to hasten the vaporizing of the liquid Freon.
4. Keep trying the Liquid Tester on the Receiver. When a milky white spray comes from it, shut the valve on the Freon drum and stop the engine.
5. Find out where the Freon leaked out and repair the leak.
6. Start engine and check liquid level in receiver tank. Charge in more refrigerant if necessary.
7. Remove gauges from Compressor.

TO COMPLETELY RECHARGE THE SYSTEM FROM A FREON DRUM

When the refrigerant charge has been completely lost, all air must be removed from the system as described in section, "To Pump Air From System." When air has been completely exhausted, proceed as described in "To Add Refrigerant."

TO COMPLETELY RECHARGE THE SYSTEM BY THE CHARGED RECEIVER METHOD

1. Remove the old Receiver from car.
2. Install the new Receiver, which is charged with Freon.
   Note: Receiver should contain 6¼ lbs. of Freon.
3. Loosen flare nut on ½" line at Compressor Discharge Service Valve "B," Fig. 1.
4. Purge ½" line from Receiver to Compressor by cracking Condenser Shut-off Valve "D," Fig. 1, and allowing gas to pass through the line, forcing the air out ahead of it through the loose connection at the Compressor. When all the air is purged and Freon begins to escape (use Halide torch to detect the Freon), tighten the ½" nut at Compressor.
5. Loosen flare nut on ⅝" line at Compressor Suction Service Valve "A," Fig. 1.
6. Purge the ⅜" and ⅝" lines from Receiver to Compressor in same manner as ½" line was purged, by cracking Receiver Shut-off Valve "C," Fig. 1, and allowing air to escape through loose connection on ⅝" line at Compressor. When the air is purged, tighten the ⅝" nut.
7. Check entire system for leaks.

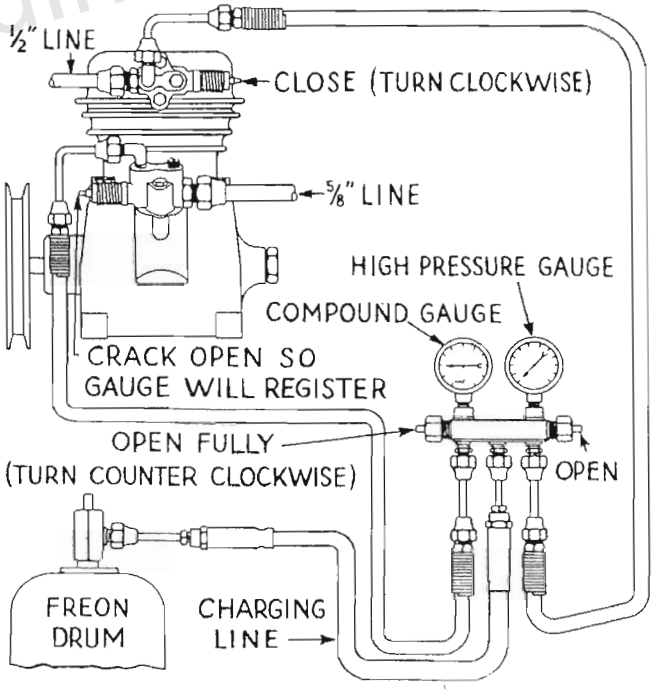


Fig. 6

SERVICE CHART

CAUSE	CHECK	CORRECTION
Air from Evaporator Not Cold		
1. Compressor not running, or running slowly. Belt broken or loose and slipping.	1. Obvious upon inspection.	1. Loosen bolts from Compressor to base and shift Compressor to tighten belt. Be sure to line pulleys up properly.
2. Loss of Refrigerant.	2. Open Liquid Tester on Receiver. If gas only comes out, some Freon has been lost.	2. Test entire system for leaks thoroughly. Find and repair leaking joint, then add refrigerant as described under "Adding Refrigerant to the System." If Fusible Plug in Receiver has melted, check for dirt or bugs in Condenser.
3. Expansion Valve Strainer stopped up with foreign matter.	3. Low suction pressure. Suction tube out of Cooling Coil warm.	3. Stoppage will probably be found in Strainer at inlet of Expansion Valve. Remove and wash in clean naphtha. Follow instruction under "Pumping Down Low Pressure Side" to remove Strainer.
4. Condenser stopped with dirt, bugs or lint.	4. High discharge pressure. Discharge line from Compressor extra hot.	4. Clean Condenser thoroughly with hose.
5. Moisture in Expansion Valve.	5. Same as 3 above, except symptoms may not appear every time unit is operated. Moisture sometimes passes valve and does not appear for several hours.	5. Same as 3 above and also install Dehydrator, see section "Air and Moisture in the System."
6. Loose or improperly insulated Expansion Valve thermostatic bulb.	6. Obvious upon inspection.	6. Tighten Thermostatic Bulb clamp and insulate Bulb from outside air.
Not Enough Air from Blower		
1. Air Filters stopped up.	1. Low suction pressure. Suction line cold.	1. Remove Air Filters and replace with new ones.
2. Blower Fan running under speed—loose or corroded connections, rheostat switch broken, battery charge low.	2. Insufficient air circulation.	2. Trace circuits for bad connections. Check Instrument Board Switch and replace if necessary. Check battery and recharge if low.
3. Cooling Coil stopped with dirt or lint.	3. Low suction pressure, suction line cold.	3. Cleanse Cooling Coil as described in section "To Clean and Deodorize the Cooling Coil."

Interior of Car Not Cool, But Normal Amount of Cold Air from Blower

CAUSE	CHECK	CORRECTION
1. Windows or cowl ventilator open. Doors opened too much of time.	1. Obvious. **Note:** Ventilation requirements for crowded car, especially if occupants are smoking, may impose abnormal load, particularly in hot, moist weather.	1. Use care in regulating ventilation for smoke and in leaving doors open.
2. Car engine idling or running very slowly large portion of time.	2. High suction pressure, high discharge pressure.	2. Set engine idling speed somewhat higher. Pull out hand throttle when standing with engine running. Run Blower Fan full speed.
3. Extra moist weather—perhaps raining.	3. A large part of the cooling capacity is used to remove excess moisture from the air. The inside of the car will be more comfortable than an unconditioned car. However the temperature as read on an ordinary thermometer may not read any lower than a shaded thermometer outside the car.	3. Use very minimum of ventilation and operate Blower Fan at maximum speed.

Compressor Unit Noisy

1. Loose drive pulley or Compressor pulley.	1. Inspect if nut on Compressor shaft is tight, also key from Compressor shaft to pulley may be loose in keyway.	1. Tighten shaft nut and replace key if loose.
2. Squeaky drive belt, loose or greasy.	2. Belt should not have more than 3/8" slack. Inspect for oil on belt.	2. Tighten belt if loose. If greasy, wipe clean with naphtha and coat with powdered talc.
3. Expansion Valve Strainer stopped up with foreign matter.	3. Warm suction line. Vacuum reading low on Compound Gauge. (See Fig. 5.) This causes oil pumping by Compressor—results in knocking sound in Compressor.	3. Remove and wash Strainer in clean naphtha. Follow instructions under "Pumping Down Low Pressure Side" to remove Strainer.
4. Moisture in Expansion Valve.	4. Same as 3 above except noise does not appear every time unit is operated. Moisture sometimes passes valve and does not appear for several hours.	4. Install Dehydrator as described in section "Air and Moisture in the System."
5. Liquid Freon instead of gas being returned to Compressor through suction line. This causes oil pumping and inadequate lubrication of the Compressor. Usually caused by defective Expansion Valve or by thermostatic bulb loose on suction line.	5. Wet and cold suction line—even the Suction Service Valve and the Compressor cylinder housing and crankcase may be cold, although the engine and Compressor are running—causes a knocking sound similar to loose bearings.	5. If thermostatic bulb is loose from suction line, tighten it and also be sure it is properly insulated. If this does not correct the trouble, replace the Expansion Valve.

CAUSE	CHECK	CORRECTION
6. Compressor loose on base.	6. Obvious upon inspection.	6. Tighten four Compressor hold-down bolts.
7. Air in system. Stoppage in valves or lines. Overcharge of Freon.	7. High discharge pressure. Causes pounding, laboring sound.	7. Correction depends on cause of the high discharge pressure. For air in system, purge air or discharge system and entirely recharge. Stoppage: remove stoppage. Overcharge of refrigerant: purge Freon to tester level.
8. Too much oil in Compressor crankcase.	8. Evidenced by a dull, thumping sound.	8. Check at Compressor oil filler plug as under "Checking Oil Level in Compressor."
9. Not enough oil in Compressor crankcase.	9. Usually not evidenced until bearings and pistons are worn and knocking or seal leaking. Denoted by very hot crankcase. Seal may be squeaking due to insufficient oil in Compressor or oil passages to seal stopped with foreign matter.	9. This condition frequently the result of leakage of oil from the system and if noticed and caught soon enough, may be corrected by adding oil to the Compressor, but if damage has already resulted, it will be necessary to change the Compressor.
10. Broken parts in Compressor.	10. Evidenced by a knocking sound similar to loose bearings.	10. Replace entire Compressor.
11. Compressor valve noise telephoned to dash.	11. Tubing fastened to dash may be improperly insulated from dash so that noise carried from Compressor is amplified by dash.	11. Insulate tubing from dash with soft rubber.

Noisy Operation Other Than Compressor

1. Loose tubing, straps, brackets or sheet metal parts.	1. See correction.	1. Trace sound for location and cause and repair as may be required.
2. Noisy Blower Fan motor.	2. See correction.	2. Remove Blower motor and Fan and replace motor.
3. Low Freon charge.	3. Hissing sound at Expansion Valve. May be no more than normal, but if excessive, may indicate low Freon charge.	3. Check Liquid Tester on Receiver. If necessary, add Freon until proper level is reached.
4. Freon passing through Cooling Coil.	4. Gurgling sound in Cooling Coil. Not audible except under very quiet conditions.	4. Entirely normal. No correction required.

Packard Service Letter June 15, 1941
Vol. 15 No. 812

ELECTROMATIC CLUTCH

You may have had complaints on electromatic cars being hard to shift out of gear on deceleration in high gear. In some cases you may find that the clutch does not disengage until the car has almost come to a stop, and in order to make a smooth stop, it is necessary to disengage the clutch with the foot pedal.

In such cases, it will usually be found that the cut-out speed of the governor switch is less than standard. Adjusting the governor cut-in and cut-out speed is a delicate operation requiring a special test fixture, and should not be attempted in the field. Correction should be made by installing a new governor switch.

RADIO WARRANTY SERVICE

Any Authorized Philco Warranty Service Station will handle all warranty and service work necessary for the 1941 Packard Custom Radios. Take your radios to the nearest Philco Service Station for this work.

A new official directory of the Philco Authorized Warranty Service Stations has been mailed to each Packard dealer. Watch for your copy and keep it handy.

TWENTY-FIVE YEARS

Roy Eveland, Service Representative, has been talking to distributers about service problems for twenty-five years. He has covered a lot of miles in that time and is well known to a large number of service men. We all like him, respect his ability and hope he will be with us for a long time.

AIR CONDITIONING INSTRUCTIONS

The Air Conditioning Service Instruction booklet, which was included as an insert in the Service Managers' copy of the April 15, 1941, Service Letter, has an error in Figure 6. We have corrected the illustration in the reprint of the entire page, which is included with this issue of the Service Letter.

We suggest that you paste or staple this new page in the booklet over corresponding page (8).

AIR CONDITIONING

In order to put the cooling system out of operation during the winter season, the compressor belts have been removed from the great majority of air conditioned cars. The following should be done, in addition to reinstalling the belt when preparing the air conditioner for use again.

The filters which are located in the base of the cooling cabinet and can be reached by removing the rear seat, should be taken out and inspected. If there is a considerable accumulation of dust, or if they are dry, they should be replaced with new filters.

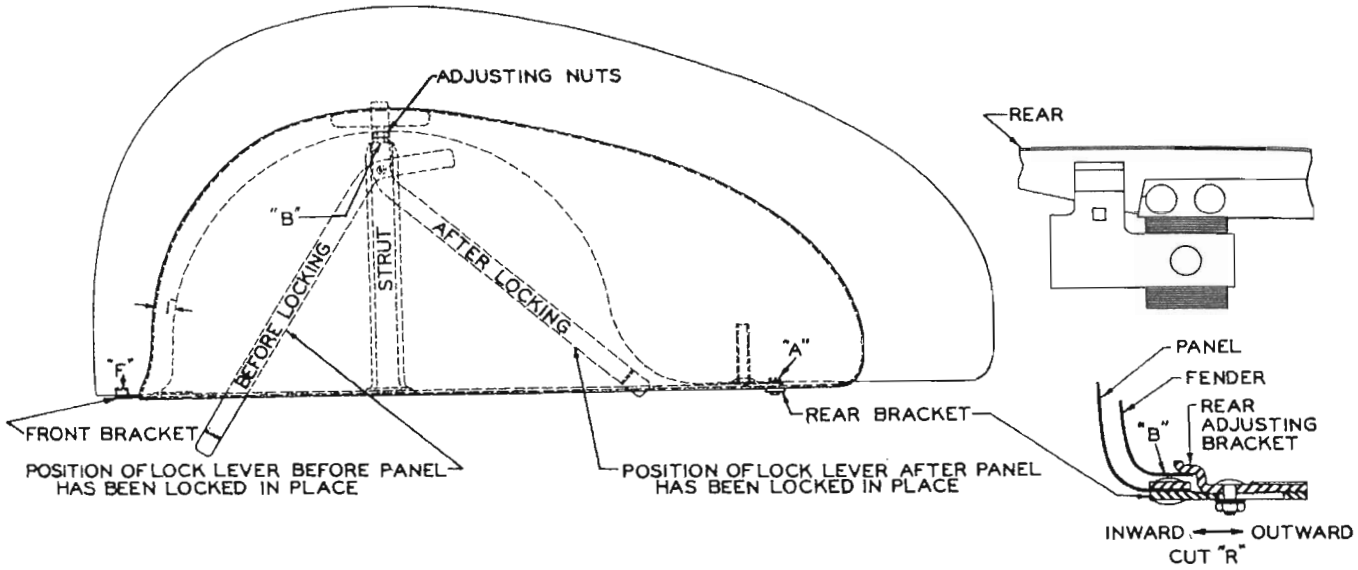
The Freon (refrigerant) level in the receiver tank should be checked after the belt has been installed and the unit run long enough to become thoroughly warm. The level is checked, with the compressor running, by opening slightly the test cock on the side of the receiver tank. If the refrigerant is up to the proper level, it will come out in a milky-white spray. If only an invisible gas blows out, it indicates an insufficient quantity of refrigerant, and enough should be added to bring it up to level.

If the Freon level is found to be low, it indicates a leak somewhere in the system, which should be located and repaired before additional Freon is added. The most common point of leakage is the packing nut around the compressor service valves. Be sure to tighten the packing nut each time the valve stem is turned.

Be careful not to overfill with refrigerant. 6½ lbs. is a complete charge when the receiver tank is empty, and more than this should not be installed. When bringing the refrigerant up to level, keep trying at the level cock, and as soon as the proper level is obtained, as indicated by a milky-white spray, immediately close the valve on the Freon drum and stop the engine.

INSTALLING FENDER WHEEL PANELS

1951 and 20th SERIES CLIPPER



Hook both front and rear adjusting brackets on bottom of panel over lower flange of fender as shown at "F" for front and cut "R" for rear and swing panel up against fender. Front edge of panel to overlap fender about one inch.

The crown in panel exerts sufficient pressure against fender to seal it securely in place. Rear adjusting bracket may be adjusted, to either increase or decrease the pressure of rear end of panel against fender. If there is too much pressure, loosen rear adjusting bracket and move outwardly. If panel does not fit tightly, loosen rear adjusting bracket and move inwardly.

Caution—Before installing panels, be sure that adjusting nuts are not tight against top of strut, as shown at point "B". The adjusting nut should be only finger tight. If it is too tight, the shield will gape at the top.

AIR CONDITION REFRIGERANT

Because of defense restrictions, it is impossible to obtain an adequate supply of Freon for air conditioned equipped cars. Methyl Chloride will be used. This material was very generally used as a refrigerant for many years before Freon was developed. It is slightly toxic and contains a small percentage of odor identifier which will give adequate notice of leakage. Warning plates will be attached where the installation is made at the factory. One plate is attached to the Blower Motor Control Switch Knob and one to the Evaporator Case Assembly.

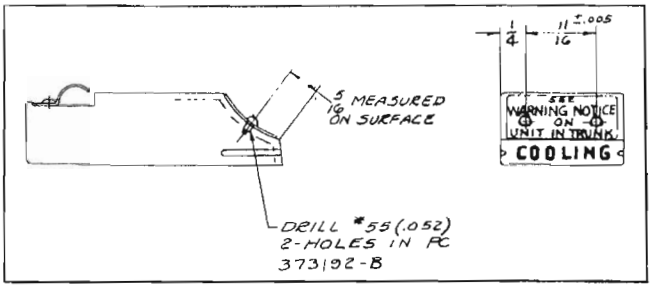
When Methyl Chloride is installed in the field, the warning plates should be obtained and attached.

Piece No. 379637—Air Conditioned Evaporator Case Assembly Warning Plate

Piece No. 379638—Blower Motor Control Switch Knob Warning Plate

Piece No. 379639—Screw (2)

When Methyl Chloride is used as a refrigerant, this fact and the information on the plates should be brought to the attention of the customer.



WARNING — DANGER

BECAUSE OF DEFENSE RESTRICTIONS THE ONLY GAS AVAILABLE AS A REFRIGERANT FOR THIS APPARATUS IS A POISONOUS GAS. IT IS SEALED AND THE PARTS THAT HOLD IT ARE WELL MADE. HOWEVER, THE USER IS CAUTIONED TO DISCONTINUE ITS USE IF A LEAK OCCURS AND THE OWNER, OPERATOR AND ALL OCCUPANTS OF THIS CAR EXPRESSLY ASSUME ALL RISKS FROM THE ESCAPE OF THIS GAS.

Packard Service Letter Oct. 15, 1943
Vol. 17, No. 20

Mailing or hand-out folders are now available for helping the sale of Packard Blue Coral Treatments and Insulation Sealer.

Both of these items are easy to sell this time of year. They are profitable and do not require the time of mechanics.

Folders are supplied without charge when Blue Coral or Insulation Sealer is purchased from Distributers.

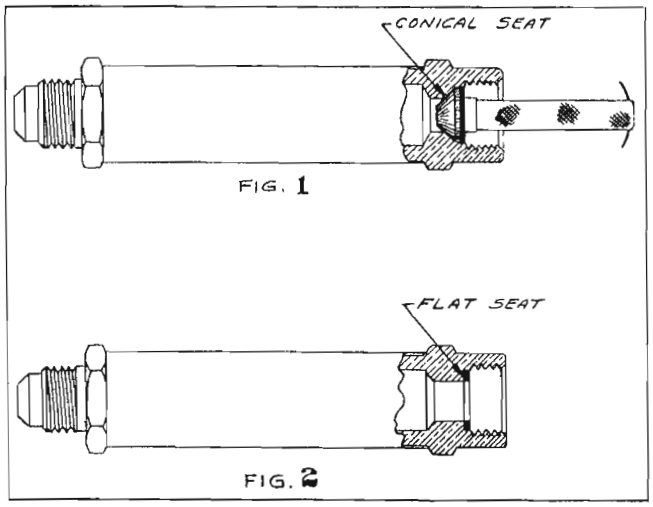
AIR CONDITIONER FILTERS

We have used two types of filters in the air conditioning system, as shown in the attached print.

We do not know which type of filter went into any particular car but the filters are interchangeable if these directions are followed.

The filter shown in figure No. 1 contains a small wire gauze screen at the outlet end. When the threaded connection is tightened, a seal is obtained by forcing the cone on the end of the screen against the tapered seat.

The filter shown in figure No. 2 does not use the small screen. The seal is obtained by screwing the threaded connection against the flat washer which bears against the flat seat.

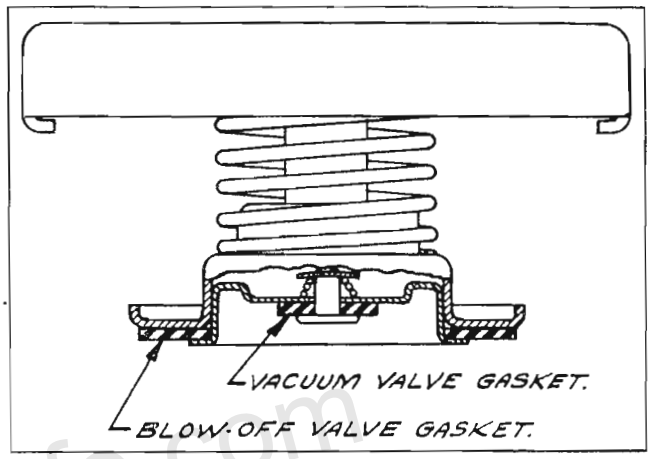


The small screen has been found unnecessary (the large screen inside the filter does the work), but it must be used with the filter having the tapered seat in order to form a tight joint.

When the filter with the flat seat is used the screen should be thrown away.

RADIATOR UPPER HOSE

When it is necessary to replace the radiator upper hose in a car equipped with a sealed cooling system, the hose should be carefully examined. You may find that it is split lengthwise, and that it has the appearance of having collapsed inwardly. If this is the case the radiator cap should be inspected, because it may be the cause of the trouble.



The construction of the cap is shown in the illustration. The large blow-off valve seals the cooling system. It remains closed under normal conditions, raising the boiling point an amount depending on the pressure of the spring. It opens when the temperature rises above the determined point so as to prevent damage from excessive pressure.

In the center of the blow-off valve there is a small vacuum valve. When the system cools off this vacuum valve opens to relieve the vacuum which would otherwise develop. You can see that if the vacuum valve fails to open, the pressure inside the system will fall to a point below the outside air pressure and will cause the upper hose to collapse.

The failure of the vacuum valve to open may be caused by the swelling of the rubber gasket which forms its seat. If the gasket swells, the valve cannot leave its seat. The spring pressure is very light, and if the gasket is normal you can pull the valve off its seat with your finger nails.

If the gasket has swelled, and the valve does not move freely, the radiator cap should be replaced.

Service Counselor June 1944
Vol. 18, No 6

Shop Talk

METHYL CHLORIDE IN AIR CONDITIONING SYSTEMS

It is no longer possible to secure Freon for air conditioning systems. The available supply is being used for war purposes.

You will, therefore, use methyl chloride when the system is recharged. (See the Service Letter of November 15, 1941.) Methyl chloride has been in use for years for this purpose, and is familiar to every one who has worked on refrigerators or air conditioning systems.

If an air conditioning system containing Freon requires an additional charge, methyl chloride can be added. The remaining Freon need not be discarded. When the two gases are mixed there will be a slight change in the pressures shown on the gauges. The high pressure side will show the Freon pressure and the low pressure side will indicate methyl chloride, whose pressure is somewhat lower. The low pressure side, however, should still be within the old mit of 20 to 40 pounds.

Do not use the Halide torch for checking leaks when the system contains methyl chloride, since this method was developed to indicate Freon. Use a soap and water solution as described in the air conditioning instructions.

Except as noted above the two refrigerants are used in the same way and require the same precautions in order to operate satisfactorily. Leakage, moisture and dirt are the three enemies of any system regardless of the refrigerant used.

OVERDRIVE SOLENOID REPAIRS

In the April issue of the Service Counselor we told you how to repair overdrive solenoids by replacing the contact points, and gave you the piece number of the point equipment (No. 382861).

We find that a number of service stations have ignored this information. They are continuing to order solenoid assemblies and have placed o orders for contact points.

We will confine our solenoid shipments to those points which have ordered a supply of contacts.

ELECTRIC OIL PRESSURE GAUGE

When the instrument board oil gauge fails to properly register the oil pressure, it is a simple matter to locate the cause.

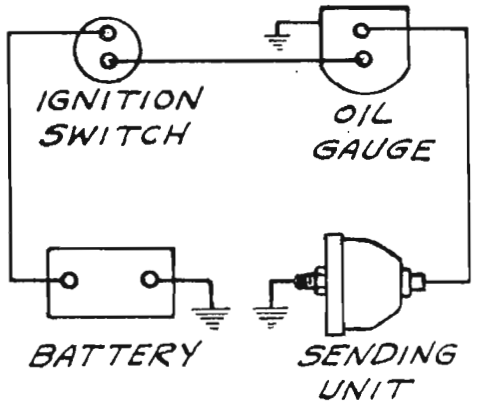
The sending unit on the side of the crankcase contains a variable resistance. The resistance is controlled by a flexible diaphragm in the base of the unit. The movement of the diaphragm is controlled by the oil pressure.

Variations in oil pressure, therefore, vary the amount of current flowing through the sending unit and vary the reading of the instrument board oil gauge.

If the gauge shows no pressure, or abnormally low pressure, the trouble is most likely to be in the sending unit. It can be checked by turning on the ignition switch and grounding the sending unit terminal against the crankcase. If the gauge now shows maximum pressure the trouble is in the sending unit.

The sending unit cannot be repaired. In some cases, however, the passage in the threaded fitting becomes blocked with carbon or sludge. This is evident on examination, and if the condition exists the passage can be cleaned out so that the oil pressure will be able to act on the diaphragm.

If the reading is low, even when the sending unit is grounded, you should check the entire circuit because a poor connection, or anything which reduces the current flow will reduce the gauge reading.



In some cases it may be found that the gauge reading is high instead of low. This is due to the fact that the gauge unit is not properly grounded in the instrument case. You will see in this diagram that part of the current grounds at the gauge and the remainder at the sending unit.