# ACCESSORIES

# AIR CONDITIONER

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## GENERAL DESCRIPTION

The 1954 Cadillac Air Conditioner is available as a factory installed assembly or as a package kit which may be installed by distributors and dealers.

Operating on the same basic principles as the modern home air conditioner, the main function of the Cadillac Air Conditioner is to filter, cool, dehumidify, and circulate the air within the car. In addition, a controlled amount of outside air is supplied through air scoops located in each side of the body, for comfortable ventilation. The fresh air control knob is located on the left side of the package shelf.

Cool air is delivered to the passenger compartment through grilles located at each side of the package shelf. Concealed roof ducts which distribute cool air from the package shelf to the, front and rear compartments are also available on sedans only. Four individually controlled outlets in the roof ducts (six on series 75 cars) direct cool air as desired.

The conditioning unit, located in the luggage compartment below the package shelf, consists of an insulated housing, two blowers, baffles, drain pan, cooling coil, thermostatic expansion valve, two air filters, and outlet air ducts. Fig. 16A-1.

Heat laden air from the passenger compartment passes under the rear seat cushion, up behind the seat back, then into the evaporator case where it picks up a quantity of outside air. It is then directed through two filters and across the cooling coils. Heat and moisture are removed from the air and blowers direct the cool air to the passenger compartment.

Condensation formed when warm air contacts the cooling coil is caught in the drain pan and directed to outlets which extend through the luggage compartment floor pan.

The thermostatic expansion valve, located in the conditioning unit behind the cooling coil, regulates

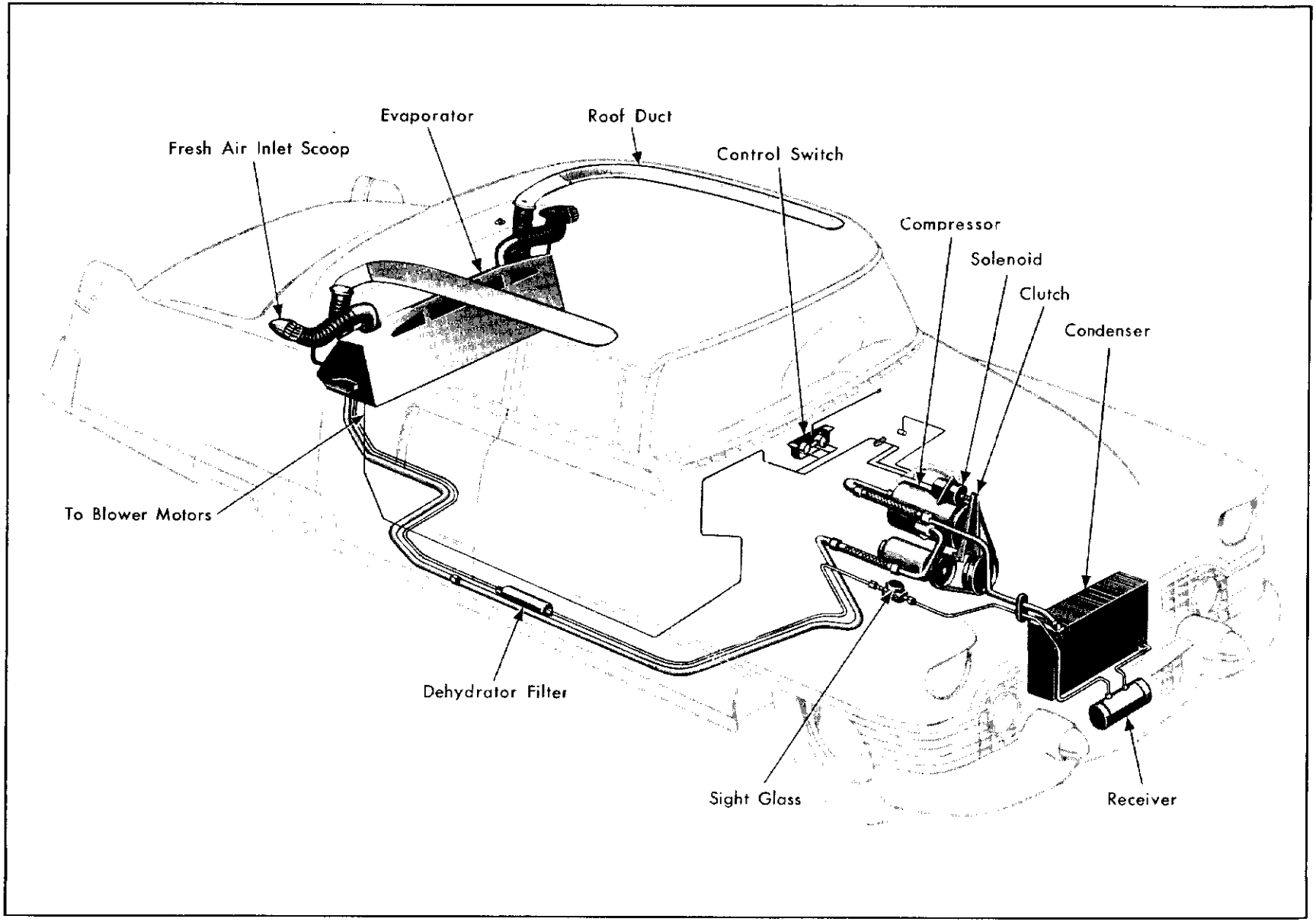


Fig. 16A-1 Location of Air Conditioner Units

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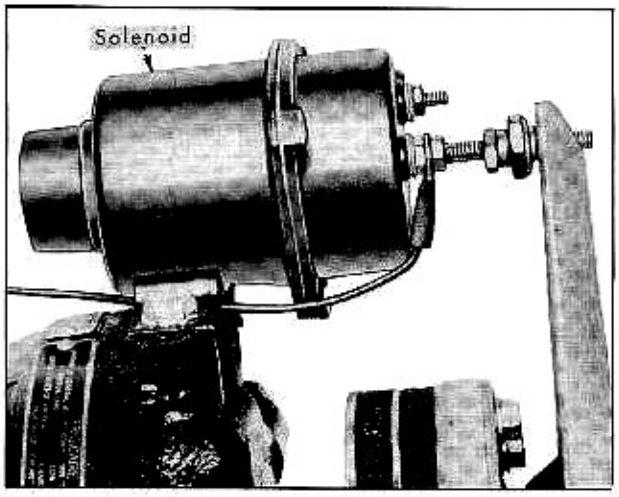


Fig. 16A-2 Clutch Solenoid

the supply of refrigerant according to the requirements of the cooling coil.

The condensing unit, located under the hood, consists of the compressor, condenser, and receiver.

The compressor is rigidly mounted on brackets at the front of the right cylinder block and is driven by two belts off the crankshaft pulley. Here, low pressure refrigerant vapor from the cooling coil is compressed to a high pressure, high temperature vapor and directed to the condenser.

In the condenser, located in front of the radiator core, the high temperature vapor is cooled by outside air and converted to a liquid. This liquid refrigerant collects in the receiver which is mounted below the lower radiator air deflector. The liquid refrigerant is stored in the receiver and is available for use in the cooling coil when required. Fig. 16A-1.

The 1954 compressor is controlled by a solenoid operated clutch-pulley assembly, mounted at the front end of the compressor. Fig. 16A-2.

The clutch assembly is splined to the compressor shaft and drives the compressor when the clutch is engaged by the action of the solenoid.

The assembly consists of the pulley housing, clutch plates, bearing, teaser spring, actuating balls and front cover. Fig. 16A-3.

Pulley Housing - acts as a clutch housing and has a sealed ball bearing pressed into the inner diameter of the pulley. The ball bearing is retained at the rear side by a shoulder in the bearing cavity. The outer (front) race of bearing is retained by a Truarc lock ring. When pulley and bearing are installed on the compressor shaft, the pulley is free to rotate without turning the shaft. Another retainer ring is snapped into a groove in the shaft to retain the bearing and pulley assembly on the shaft.

Clutch Plates - two clutch plates are used: One clutch plate is counterweighted, and the other is known as the clutch plate-actuator. The counterweight plate has a splined center which matches the splines on the compressor shaft. A flat ring of friction material is bonded to one face of the plate which, when pressed against its mating surface in the pulley housing, transmit the driving power to the compressor shaft. Weights are riveted to the plate to balance the pulley end of the compressor.

The actuator plate is similar to the counterweight plate. It also has a flat ring of frictional material bonded to one face of the plate, which engages the front cover of the clutch. The clutch counter-weight plate and actuator plate is constructed with three tear drop type depressions. In the center of the actuator plate is a pin, the small diameter end of which fits in the compressor shaft hole. A TEASER SPRING which fits in the shaft hole keeps the pin from going all the way into the hole, except under pressure applied to the large end of the pin.

Actuating Balls - When the clutch actuator plate is installed on the shaft, three balls which fit in the tear drop depressions space the two clutch plates in relation to each other. As can be visualized, when the balls are in the deepest portion of the depressions, the two plates are close together, and when the actuating plate is rotated, the balls

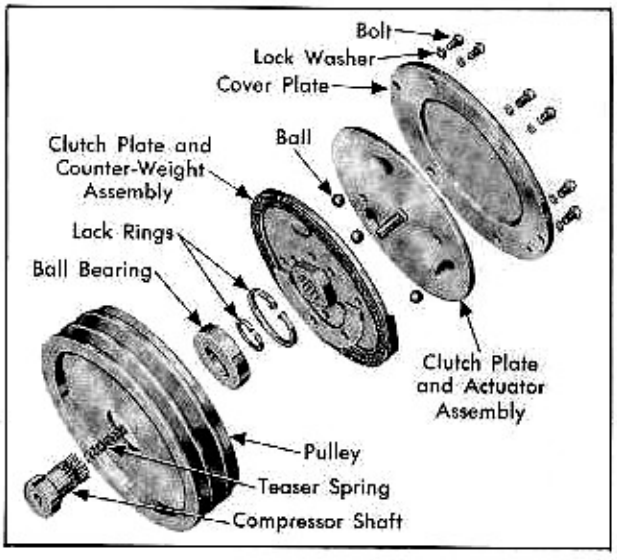


Fig. 16A-3 Clutch Disassembled

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are rolled by centrifugal force toward the shallow end of the depressions, forcing the clutch plates farther apart.

Front Cover Plate - The clutch cover plate is bolted to the open face of the pulley and has a hole in its center, through which the pin of the actuating plate projects. The pin is free to move in the hole without contacting the cover plate.

Operation of Clutch - The clutch is actuated by a solenoid (mounted on top of the compressor) that is connected to a pivoted lever which in turn contacts the large end of the clutch actuating plate pin, projecting through the clutch cover. In the "off" (de-energized) position of the solenoid, a spring within the solenoid pulls the actuating arm lever in against the pin, keeping the pin depressed and the clutch disengaged. Thus, the pulley is free to rotate without driving the compressor.

When cooling is desired, the air conditioning control switch in the car is turned "on" and the solenoid is energized. This in turn moves the pivoted arm outward and relieves the pressure on the clutch plate pin. When pressure is removed from the actuating plate pin, the teaser spring pushes the actuating plate far enough forward to engage the cover plate. The outward movement permits the three balls located between the two clutch plates, to roll toward the shallow end of the tear drop type depressions in the plates and thus force the two plates apart with great force. This results in full engagement of the two plates with their mating surface on the pulley and cover plate. As the clutch plates are engaged, the pulley and clutch assembly then drives the compressor shaft. Turning the control switch "Off", pushes the actuating clutch pin in and releases the clutch. The pulley then again rotates freely without driving the compressor.

The operating controls are located on a panel mounted in the center of the instrument panel lower flange. Fig. 16A-4. The toggle switch has three positions: VENT, ON, and OFF.

VENT - Blowers operate to provide ventilation without refrigeration. Clutch solenoid is de-energized, disengaging the clutch at the pulley. Knobs on each side of the panel permit control of blower speed.

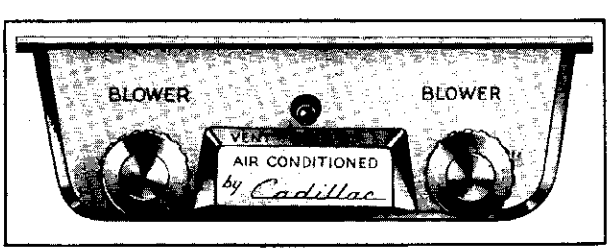


Fig. 16A-4 Control Panel

ON - Blowers are turned on, clutch solenoid is energized, engaging the clutch and compressor to the pulley. The system is now in operation for maximum cooling. The blower speed may be decreased if the car becomes too cool.

OFF - Compressor clutch is disengaged from the pulley and the blowers are inoperative for no cooling or ventilation.

Cycle of Operation - Fig. 16A-5 illustrates a schematic arrangement of all the components in the system. With control switch "On" and the engine and compressor (clutch engaged) operating, here is what takes place to secure cooling.

Low pressure vapor in the compressor is compressed and discharged into the condenser. Here the vapor changes from a high pressure vapor into a high pressure liquid and, as liquid, flows into the receiver under pressure.

The high pressure liquid leaves the receiver, passing through the sight glass and the dehydrator-filter to the expansion valve. At the orifice (or restriction) of the expansion valve, the liquid changes to low pressure liquid and enters the cooling coil.

Heat enters the evaporator unit housing from the passenger compartment and from the outside air by the action of the blowers. Because the cooling coil is colder than this air, some of the heat passes through the refrigerated tubes of the coil into the liquid refrigerant, causing the liquid to vaporize. This vapor is drawn through the low pressure line to the compressor.

NOTE: When the clutch is dis-engaged ("Off" or "Vent" position) the compressor and the refrigerant action in the system stop functioning for no cooling.

## SERVICE INFORMATION

### (1) Precautions in Handling Freon-12

While Freon-12 was selected as the safest and best refrigerant to use in the Cadillac Air Conditioner, it is very important that the following precautions be observed to avoid serious accidents and personal injury.

a. Do not leave drum uncapped. The metal cap furnished with the drum when it is shipped is to protect the valve and safety plug from damage. It should be replaced after each use of the drum.

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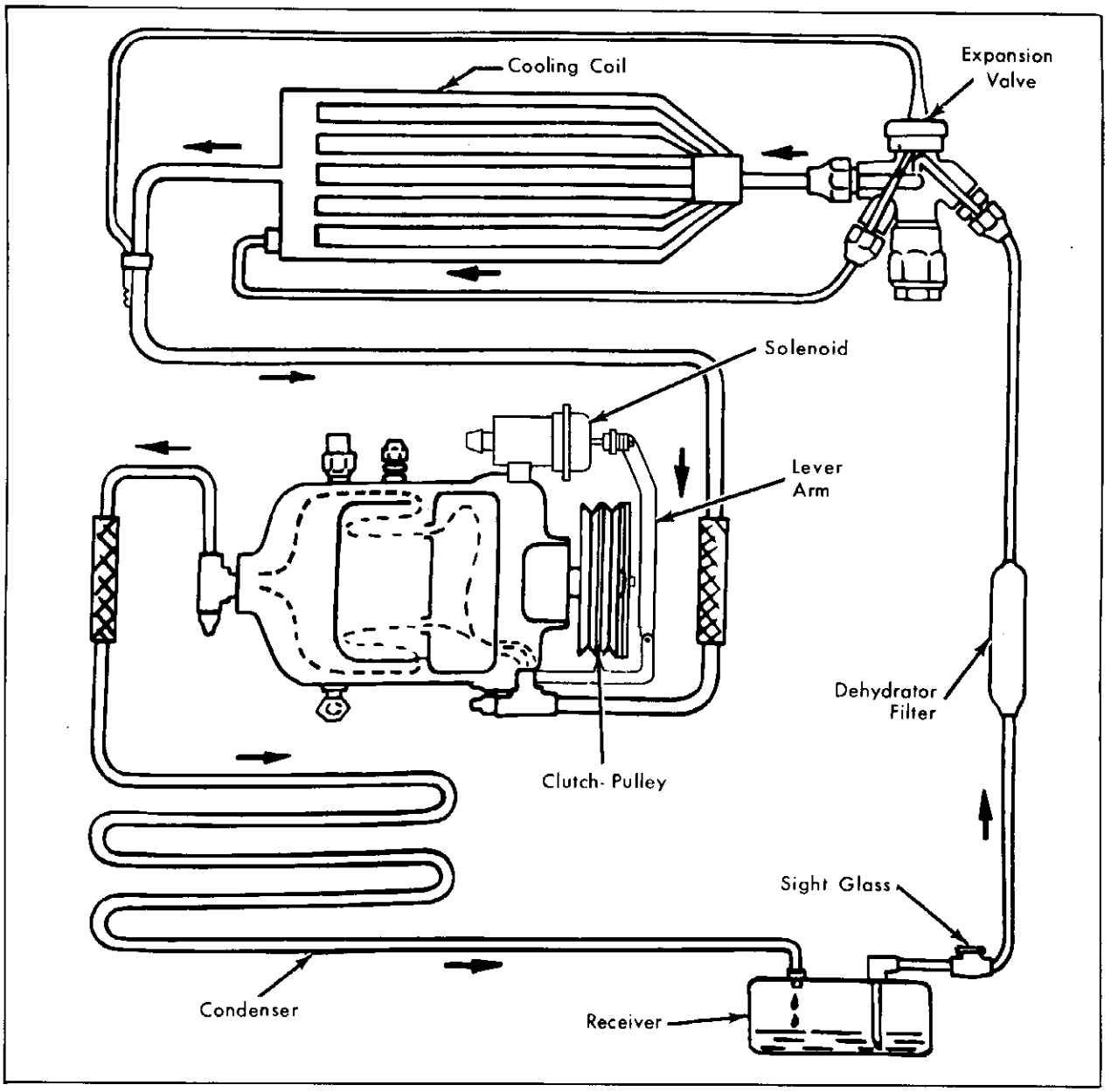


Fig. 16A-5 Cycle of Operation

b. Do not carry the drum in the passenger compartment of a car. Always place drum in luggage compartment of car or if in an open truck, cover drum to protect it from radiant sun heat. The resultant increase in pressure may cause safety plug to release or drum to burst.

c. Do not subject drum to high temperature when charging system. Use water no warmer than 125°F. to heat drum. Never place drum on radiator, stove, or use torches for heating during charging.

d. Do not fill drum completely--when filling one drum from another, always allow space above liquid for expansion.

e. Do not discharge Freon-12 into a room having an exposed flame -- concentrations of this gas in contact with an open flame will produce a toxic gas.

f. Do not expose the eyes to liquid -- protect them with glasses or goggles. If Freon-12 liquid should strike the eyeballs:

1. Apply a few drops of sterile mineral oil to the eyes as an irrigator.

2. If irritation continues wash the eyes with a weak solution of boric acid.

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3. See an eye specialist at once.

If liquid Freon-12 comes in contact with the skin, the injury should be treated for frostbite.

## (2) Precautions in Handling Lines

a. Refrigerant pipe lines should be carefully stored to avoid crushing or kinking. If a line is kinked, it should not be used as the flow of refrigerant will be restricted and will result in poor air conditioner operation.

b. Lines should be kept sealed and dehydrated in stock. Do not remove caps from lines until just before installation.

c. When tightening fittings, use the proper size wrenches to avoid over or under tightening. Always use two wrenches, when tightening fittings, to prevent twisting the soft copper tubing. A drop of Frigidaire oil on the pipe flare will allow the flare nut to be tightened without twisting the pipe.

d. Close ends of lines, which have been disconnected for any reason, to prevent entrance of moisture or dirt.

e. Gage set and lines should be kept clean and free from moisture.

f. Do not leave Frigidaire oil container open any longer then necessary, as the special oil is moisture-free and will absorb moisture from the air if left uncapped.

g. Use the Vacuum Pump, Tool No. J-5428, to remove any air or moisture which may have entered the system when it was opened to replace a part.

## (3) Maintenance and Inspection

### a. Preliminary Check

1. High and low pressure shut-off valves on compressor must be fully open.

2. Drive belts must be installed properly to prevent slippage.

3. Listen to clutch solenoid to make certain clutch is engaging and disengaging when operating the "On" and "Off" switch. Make certain clutch is not slipping.

4. Using the Leak Detector, Tool No. J-5419, test the entire system for Freon leaks, and make necessary repairs.

5. If there is evidence of oil leaks, check oil level in compressor.

6. Check both blower fans to see that they are operating properly at all control knob positions.

### b. Seasonal Operation

1. Winter Operation

During the winter or when outside temperature is below 45°F, the clutch should be disengaged. Outside air intake ducts should also be closed.

2. Summer Operation

To start the Air Conditioner after the winter season, the following operations should be performed:

Leak test complete system and make necessary repairs.

Check all parts of unit for trace of oil, which might indicate a leakage of Freon.

If leak is found, check compressor oil level.

Check belts for proper tension.

Check clutch solenoid to see that the clutch engages and disengages when the "On" and "Off" switch is operated. Make certain clutch is not slipping.

Place toggle switch in "On" position and operate engine for fifteen minutes at 1300 RPM.

Check sight glass for absence of bubbles which would indicate that system has sufficient Freon-12 charge.

Open outside air intake ducts.

Check conditioning unit blower fans for variable speed control at panel.

Check the conditioning unit outlet air temperature differential with the temperature outside the car.

### c. 2000 Mile Inspection

The procedure outlined below may be used as a guide to check the Air Conditioner system when the car is brought in for the 2000 mile inspection.

1. Check unit for an indication of leaks and make necessary repairs.

2. If there is an indication of an oil leak, check compressor for proper oil level.

3. Tighten compressor mounting brackets and check belt tension.

4. Check sight glass for absence of bubbles indicating proper charge of Freon-12. This should only be done after running engine at a speed of 1300 RPM for fifteen minutes in the "On" position - clutch engaged.

## (4) Service Precautions

### a. Collision Service

It is very important that the Air Conditioner system be inspected as soon as possible whenever a car, so equipped, has been involved in a collision. If the system has been opened as a result of the collision, it will permit the entrance of air, moisture, and dirt which will cause internal damage. As the length of time the system has been open and the extent of damage to the components will govern the replacement of parts and the service operations required, a definite procedure cannot be recommended which will cover all cases. The following procedure, however, may be used as a guide:

1. Make certain clutch is disengaged if car is to be operated before repairs are made. Disconnect solenoid lead wire if necessary.

2. Close both valves at compressor.

3. Inspect all units and pipes, noting any damage.

a. If the condenser is damaged, it should be replaced. No repairs such as soldering, brazing, or welding should be attempted.

b. Replace receiver if welded joints are fractured.

4. Check compressor and clutch pulley for cracks. If compressor does not show evidence of external damage, it may be used.

5. The dehydrator filter should be replaced if it is damaged, leaks, clogged, restricted, or if the system has been open for any period of time.

### b. Steam Cleaning and Welding

Excessive heat applied at any section of the refrigerant lines will create excessively high pressures. For this reason, steam cleaning or welding should not be performed on any portion of the car adjacent to the refrigeration units or lines.

### c. Undercoating

To facilitate service operations, under-coating should not be applied to any connections on the refrigeration system. While it is permissible to undercoat the copper refrigerant lines, all flare joints and connections should first be masked.

## (5) Purging the System

In replacing any of the air conditioning components, (except compressor) the system must be completely purged (drained) of refrigerant. The purpose is to lower the pressure inside the system so that a component part can be safely removed.

To save time and repetition, we will cover the step-by-step procedure for purging the system of refrigerant and then, in future operations which require this, only a reference to it will be made.

1. Connect lines of gage set to the high and low pressure gage connections on the compressor. Fig. 16A-6.

2. Remove protective caps from high and low pressure shut-off valves on the compressor.

3. Remove plug from end of line connected to the center fitting on gage set.

4. Purge the refrigerant from the system by opening the valves on the gage set.

NOTE: Do not open valves wide until pressure in the system has been lowered. Otherwise, refrigerant under pressure will force oil out of the compressor.

5. Close valves on gage set from time to time for the purpose of allowing 5 pounds of refrigerant pressure to remain in the system, then close both valves on gage set.

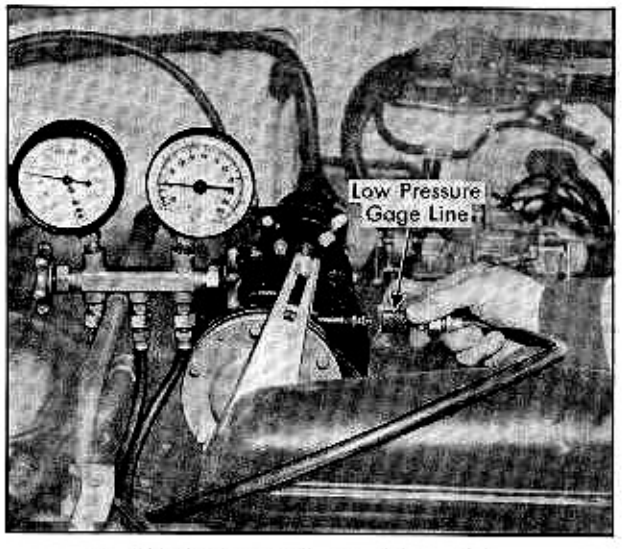


Fig. 16A-6 Connecting Low Pressure Gage

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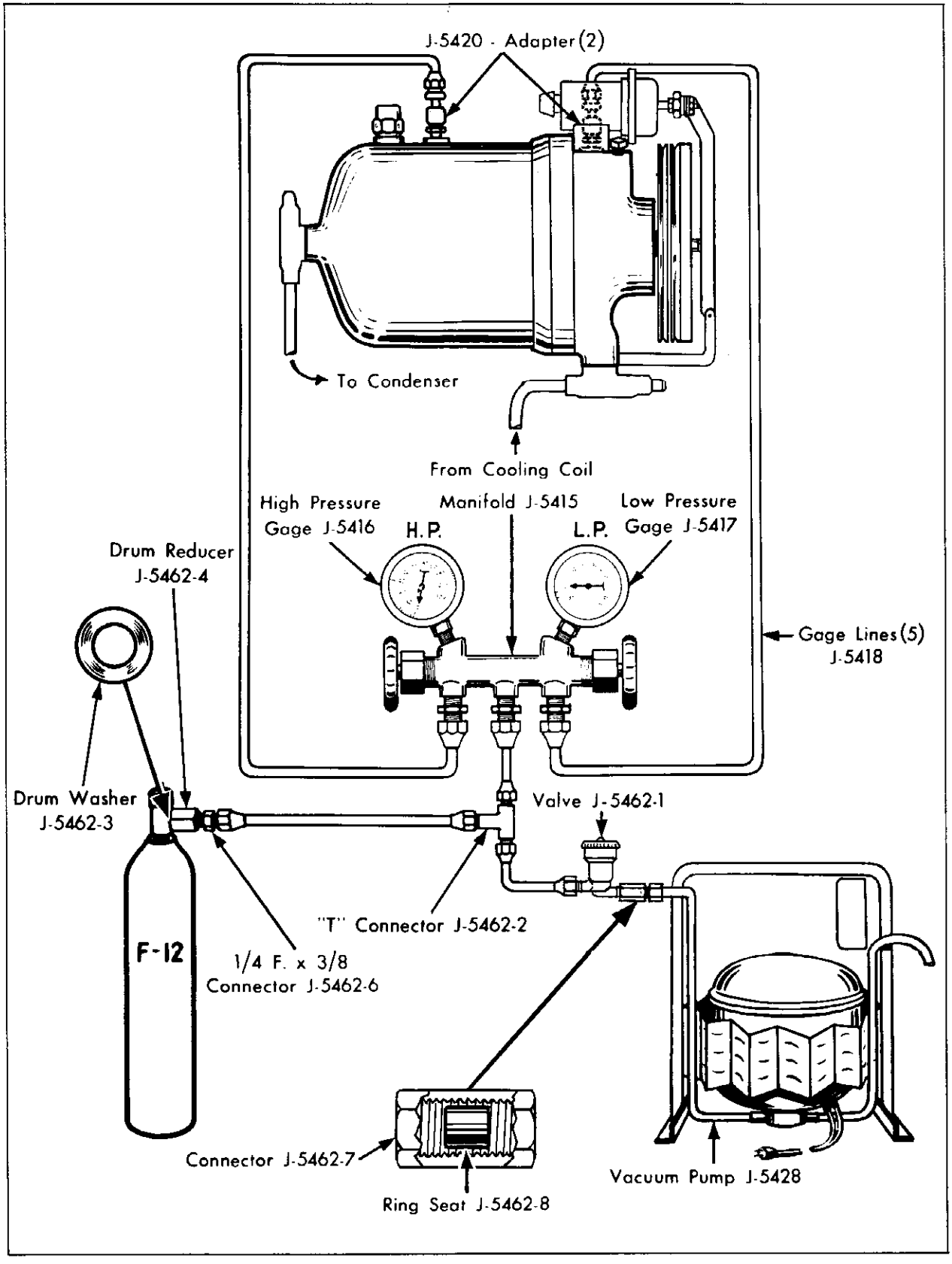


Fig. 16A-7 Gage Connections for Evacuating or Adding Refrigerant

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NOTE: Allowing 5 pounds of refrigerant pressure to remain in system will prevent air and dirt from entering the system when a part is replaced.

## (6) Evacuating the System

Whenever the air conditioning system is opened for any reason, it should not be put into operation again until it has been evacuated. For this operation, use Vacuum Pump, Tool No. J-5428, to remove air and moisture which may have entered the system when it was opened to replace a part.

In discussing service operations requiring evacuating, only a reference to it will be made. The following step-by-step procedure will explain the complete evacuating process.

### a. Connection of Gage Lines

1. Install the low and high pressure lines of gage set to gage connections on compressor if this has not previously been done.

2. Install gage line from center connection of gage set to a tee connector, Tool No. J-5462-2, Fig. 16A-7.

3. Install female connector, Tool No. J-5462-7, at the inlet side of the vacuum pump.

4. Insert flare seat, Tool No. J-5462-8, in the connector, Tool No. J-5462-7, at the vacuum pump.

5. Install hand shut-off valve, Tool No. J-5462-1, to the connector at the vacuum pump.

6. Install a gage line from one side of tee connector to the valve at the vacuum pump. Valve should be closed.

NOTE: Make sure dust cap on discharge side of vacuum pump has been removed. Check fluid level. This should be between the high and low screws in the side of the pump, Fig. 16A-8. Add Frigidaire 75 viscosity oil to bring to proper level. Change oil in pump every 250 hours of operation by removing top and laying pump on its side with discharge oil trap up. Hold rotor firmly in position to prevent its coming out while draining oil. Do not use the vacuum pump as an air compressor as it will not receive proper lubrication under such usage. Keep suction and discharge fittings capped when not in use. A small amount of 75 viscosity oil may be drawn into the pump occasionally to insure protection of internal parts during periods of disuse. If the pump should fail to start; check capacitor, relay, or remove the top and turn the rotor by hand to relieve a temporary stuck condition.

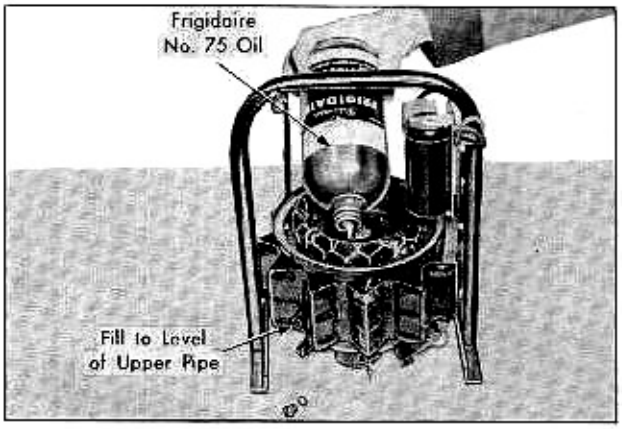


Fig. 16A-8 Adding Oil to Vacuum Pump

7. Install connectors, Tool Nos. J-5462-4 and J-5462-6, on one end of a gage line, J-5418.

8. Insert lead washer, Tool No. J-5462-3, in large end of the drum connector, Tool No. J-5462-4.

9. Install this gage line from the remaining tee connection to a drum of Freon-12.

NOTE: Whenever gage lines are installed for the purpose of adding a small charge of refrigerant or checking pressure, the AIR in the lines must be removed by purging - that is, allowing refrigerant pressure to blow the air out to the atmosphere. This is accomplished by slightly opening and closing the valves on the gage set.

### b. Evacuating the System

1. Make certain low and high pressure shut-off valves at the compressor are open.

2. Open low and high pressure gage valves on gage set.

3. Connect and start vacuum pump.

4. Slowly open the two-way shut-off valve at the vacuum pump to avoid forcing oil out of pump.

5. Operate to obtain approximately 28" vacuum for 10 minutes. If vacuum cannot be obtained, vacuum pump or gage may be faulty. Close the shut-off valve at the pump and then stop the pump. Check gage to see if vacuum holds.

6. Open the Freon drum valve and allow system to come to drum pressure. Close drum valve. Leak test complete system, including gage fittings, with leak detector, Tool No. J-5419; if leak cannot be found, the vacuum pump or gage may be faulty.

NOTE: If oil is blown out of vacuum pump, it should be refilled to proper level with Frigidaire 75 viscosity oil. Fig. 16A-8.

7. If a leak is found, fix the leak and operate pump to obtain the vacuum again as in Step 5. Watch the gage and see if vacuum will hold for 5 minutes. If not, repeat Step Number 6.

8. With all leaks eliminated, open Freon drum and bring the system to drum pressure again. Both gages should equalize. Close drum valve.

9. Evacuate the system once again as previously described. This second charging and evacuating is for the purpose of picking up any air or moisture that may have remained in the system.

10. Close gage valves.

11. The system is now ready for a complete charge of refrigerant.

## (7) Adding Refrigerant

If the diagnosis indicated a shortage of refrigerant, add Freon-12 as outlined in procedure "c" below.

If the entire charge of refrigerant has been lost through accident, or in the replacement of any of the components, a complete charge will be necessary. Procedure "b", below, outlines the steps to be followed.

An important rule to follow in charging is that refrigerant should always be added to the low pressure side of the compressor in a vapor state. Another important rule is never to add a complete charge of refrigerant until the system has been leak tested and properly evacuated.

In order to charge refrigerant in the vapor state, the Freon-12 drum will require the use of heat. This can best be accomplished by placing the drum in a bucket of hot water. The temperature of the water should not exceed 125°F. Since the temperature of the water and drum will decrease, as the vapor leaves the drum, the water and drum will be cooled. This may result in a lowering of the drum pressure and temperature to the extent where it will be necessary to replenish or reheat the water.

Both the Freon-12 drum and bucket of hot water should be placed on suitable scales, with the drum in an upright position. Note the scale reading before opening the valve on the drum so you can determine when a complete charge of seven (7) pounds of refrigerant has been added to the system.

### a. Charging Precautions

In all refrigerant charging procedures where the compressor is in operation, the following cautions should be observed:

1. Always wear goggles whenever handling Freon-12. This is also necessary when breaking line connections.

2. The high pressure should not exceed 275 pounds.

3. The low pressure hand shut-off valve on the gage set should be closed completely at frequent intervals to make certain the pressure in the low side of the compressor is always maintained above 12 pound gage pressure. When the low side hand shut-off valve on the gage set is closed, the gage will then indicate the low side pressure in the compressor. When the low side hand shut-off valve on the gage set is open, the gage indicates drum pressure.

4. The drum pressure should not exceed a maximum of 90 pounds.

5. Since the system would have been prepared by evacuating as recommended, the gage set would be connected according to procedures previously described in Note 6a. See Fig. 16A-7.

### b. Adding Refrigerant—Complete Charge

1. Evacuate complete system as described in Note 6b.

2. Open low pressure valve on gage set.

3. Open drum valve to obtain a maximum pressure of 90 pounds.

4. Freon-12 vapor under pressure will flow into the system without operating the compressor. This amount should not exceed 7 pounds.

NOTE: If it is not possible to charge the total of seven pounds by the method just described, it is permissible after 1-1/2 to 2 pounds has been forced into the system, to operate the engine and compressor at slow idle. The hand shut-off valve on the high pressure side of gage set should be CLOSED. Continue to operate engine and compressor at slow idle until the 7 pounds is charged into the system.

5. Close drum valve.

6. Close low pressure shut-off valve on gage set.

7. Operate the engine at 1500 RPM with compressor clutch engaged to observe the high and low pressure gages as well as sight glass and general performance of the system. Fig. 16A-9.

8. Stop engine and remove gage line connections.

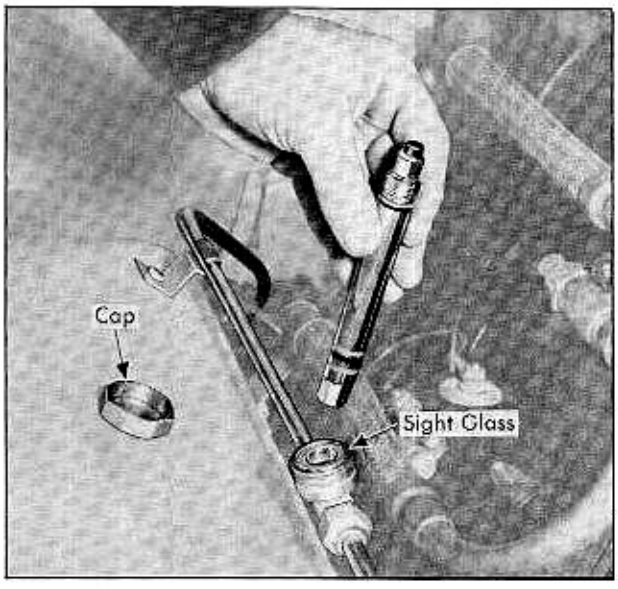


Fig. 16A-9 Checking Sight Glass

**c. Adding Refrigerant—Partial Charge**

This operation is performed when a shortage of refrigerant is noted without any evidence of leakage or necessary part replacement.

1. Connect gage set lines to compressor and Freon-12 drum.

2. Purge air from gage lines, Fig. 16A-10.

3. Operate the engine and compressor at slow idle.

4. Open the low pressure valve on gage set. High pressure valve on gage set must be closed.

5. Open drum valve to obtain a maximum pressure of 90 pounds.

6. Watch sight glass until solid column of liquid appears without bubbles, Fig. 16A-9.

7. Note scales and allow compressor to operate until 1 additional pound of Freon-12 has been charged into the system.

8. Close drum valve.

9. Close low pressure hand shut-off valve on gage set.

10. Operate engine at 1500 RPM with the compressor clutch engaged.

11. Observe gages, sight glass, and entire system for proper performance.

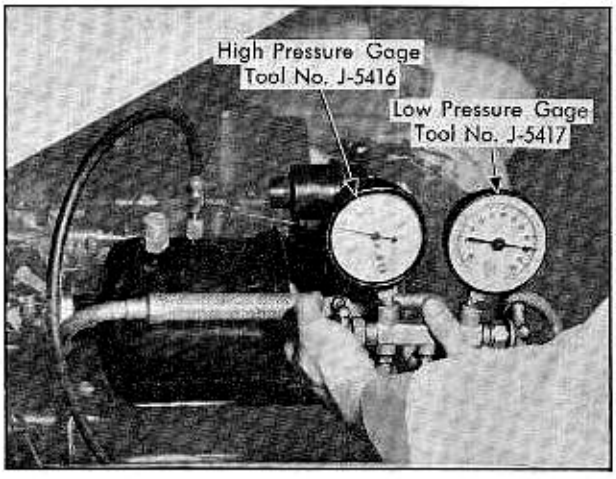


Fig. 16A-10 Purging Gage Lines

12. After five minutes of operation, should bubbles reappear at sight glass, add 1 more pound of refrigerant.

13. Remove the gage connections on the compressor and disconnect Freon drum.

14. Cap the gage connections on the compressor.

## (8) Checking and Adding Oil

The compressor was originally charged with 20-22 ounces of 525 viscosity Frigidaire oil. During normal operation, due to the affinity of Freon-12 for oil, a certain amount of oil will circulate throughout the system along with the liquid and vapor.

To determine if the compressor has sufficient oil, an elbow fitting has been placed on the underside of the compressor housing, Fig. 16A-11. It has a Schrader valve core, and is capped with a flare nut.

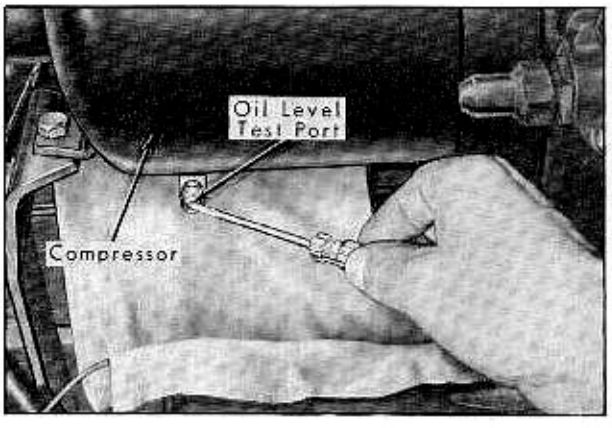


Fig. 16A-11 Checking Oil Level

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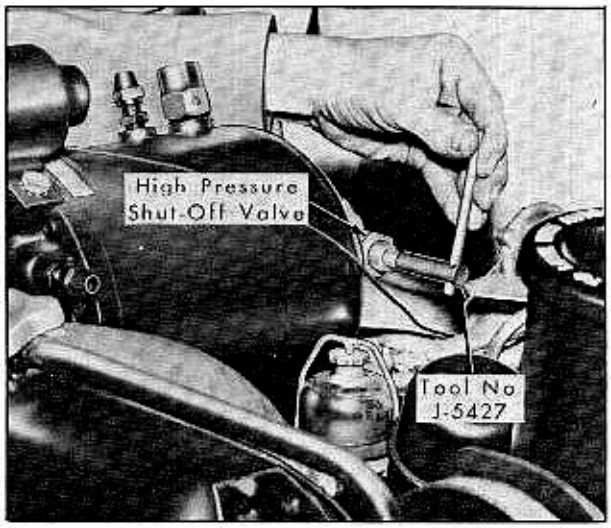


Fig. 16A-12 Closing High Pressure Valve

### a. Checking Oil Level

1. Start the engine and operate at 1700 RPM for ten minutes with cooling control switch "On" and blowers on high speed.

NOTE: It may be necessary to place a 12 or 15 inch electric fan in front of car grille and direct a flow of air over the condenser. This will eliminate excessive engine temperatures which would reduce the efficiency of the condensing unit.

2. Stop the engine.

3. Remove flare nut from the oil test fitting.

4. Depress the Schrader core allowing the first surge of oil to escape. If oil continues to escape with Freon vapor, the oil level of the compressor is to be considered satisfactory. Fig. 16A-11.

NOTE: It is desirable to allow the escaping oil and vapor to blow against a clean white cloth. The cloth should become oily.

5. If oil does not continue to escape from test fitting, the oil is below the minimum level, and therefore, oil will have to be added.

### b. Adding Oil—Minor Loss

If the oil level is low, 525 viscosity Frigidaire oil should be added as outlined below:

1. Shut off high and low pressure hand shut-off valves at the compressor, using 1/4" key, Tool No. J-5427. Figs. 16A-12 and 16A-13.

2. Depress Schrader valve core on high pressure test connection to purge Freon until a low audible hiss is heard. Allow to stand a few minutes and repeat purging.

3. Remove high pressure relief valve and gasket.

4. Pour from the graduated bottle four ounces of 525 viscosity Frigidaire oil into the high pressure relief valve opening. Fig. 16A-14.

5. Install high pressure relief valve using a new copper gasket.

6. Open high pressure hand shut-off valve. Fig. 16A-12.

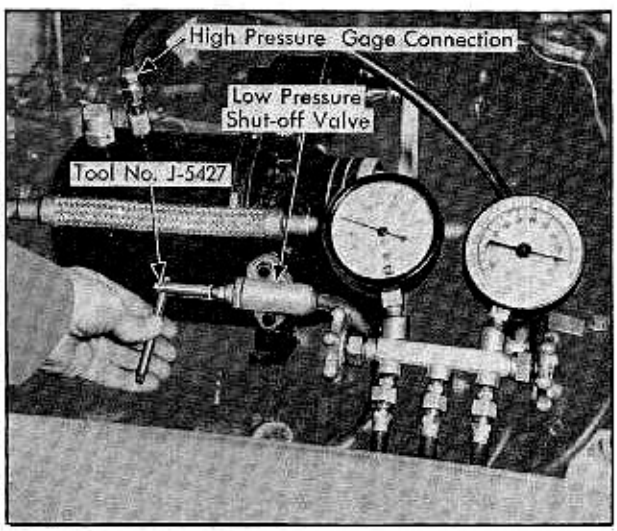


Fig. 16A-13 Closing Low Pressure Valve

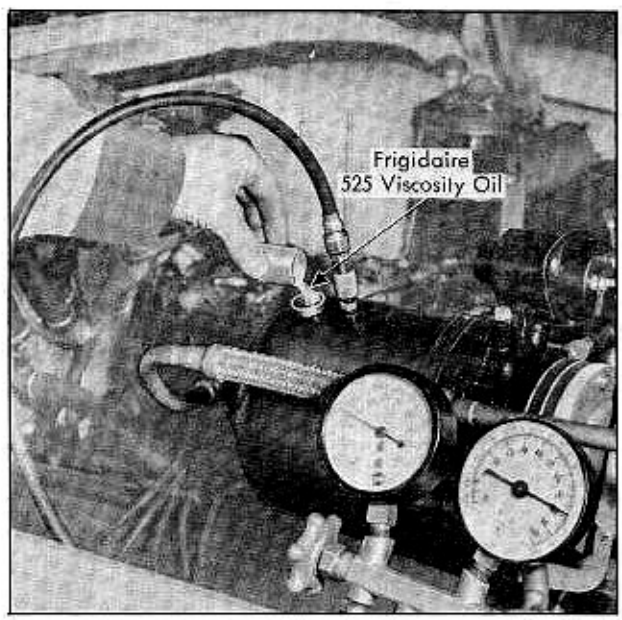


Fig. 16A-14 Adding Oil to Compressor

# AIR CONDITIONER

7. Purge air from compressor by depressing valve stem in high pressure gage connection of compressor.

8. Recheck oil level as indicated in Step 4 of Note 8a above. Open low pressure shut-off valve. Fig. 16A-13.

9. If oil is still below minimum level, continue to add four ounces at a time until satisfactory level is reached by following the steps outlined above.

10. When proper level is reached, make certain both high and low pressure shut-off valves are completely open, then replace protective caps over valve stems.

11. Replace flare nuts on both the oil test fitting and high pressure gage fitting connections.

12. Leak test all connections which have been disturbed. Fig. 16A-15.

**c. Adding Oil—Major Loss**

If a major loss of oil has occured, such as compressor shaft seal leak, line breakage, etc., add oil as outlined below after repairs have been made:

1. Close both high and low pressure hand shut-off valves at the compressor.

2. Depress Schrader core on the high pressure gage connection of the compressor. Purge pressure until only a slight audible hiss can be heard. Repeat if necessary to be sure pressure is at a minimum.

3. Remove valve flange mounting screw, and remove hand shut-off valves from bore of compressor. Fig. 16A-16.

4. Remove compressor as described in Note 10a and b.

5. Remove high pressure relief valve and gasket.

6. Invert compressor and drain oil into a clean container.

NOTE: Examine the condition of the oil to determine whether or not it is contaminated with any foreign material, such as metal chips, water, sludge, etc. This oil should be discarded and new oil used. If an excessive amount of water is found, install a new liquid dehydrator filter in the high pressure liquid line.

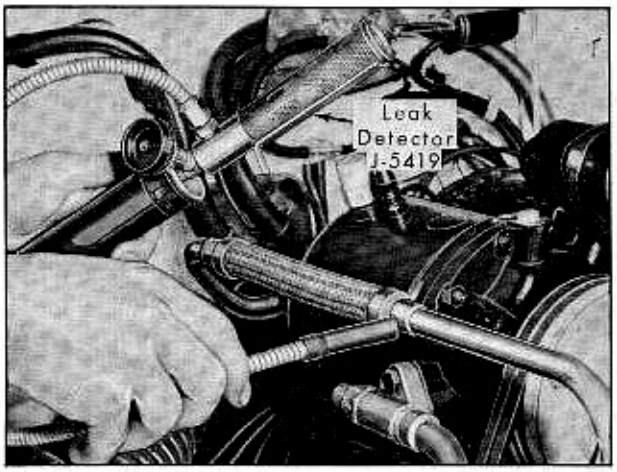


Fig. 16A-15 Testing for Leaks

7. Pour sixteen ounces of 525 viscosity Frigidaire oil from a graduated bottle into the high pressure relief valve opening in the compressor. Fig. 16A-14.

8. Install high pressure relief valve using a new copper gasket.

9. Install compressor as described in Note 13a.

10. Open high pressure hand shut-off valve and, by depressing the valve stem in the high pressure gage connection, purge the air from the compressor.

11. Open low pressure hand shut-off valve. Fig. 16A-13.

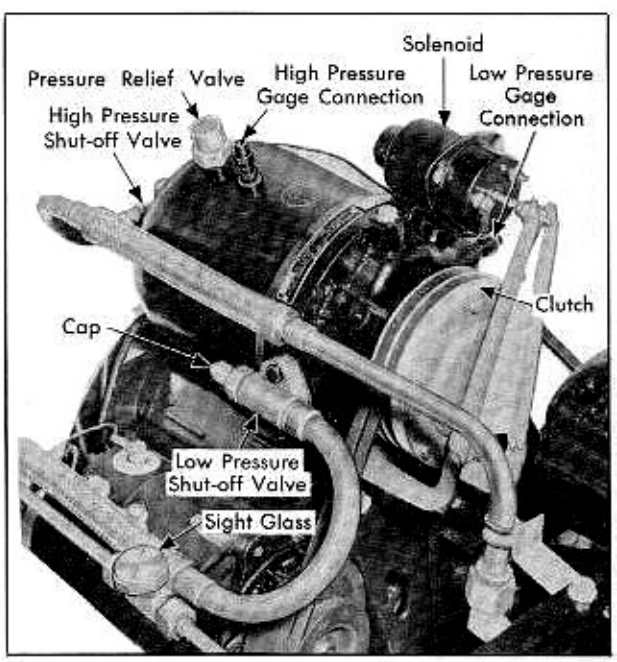


Fig. 16A-16 Compressor Fittings

12. Leak test all connections which have been disturbed or repaired.

## (9) Purging Air or Excess Refrigerant From the System

Air or excess refrigerant in the system results in high operating pressure with only partial cooling. No matter where or how air enters, it will always end up in the condenser. Air displaces refrigerant vapor in the condenser and takes up valuable condensing space. The following procedure explains how to remove air or excess refrigerant from the system.

1. Connect gage set to the gage connections on the compressor. Fig. 16A-7.

2. With the compressor not operating, open the high pressure valve on the gage set slightly and allow the vapor and air mixture to exhaust SLOWLY through the center connections of the gage set to the atmosphere, then close valve.

NOTE: One method of determining whether all of the air which was trapped in the condenser has been exhausted is by placing a small flame (cigar lighter or match) at the point of discharge - Freon vapor will put out the flame - air will cause the flame to move but will not put it out.

3. Operate the engine and compressor at 1300 RPM for about five minutes. This will tend to concentrate any air or excessive refrigerant in the condenser.

CAUTION: Do not allow the high pressure to exceed 275 pounds.

4. Observe gage readings. If they are excessively high, open high pressure valve on gage set slowly and allow vapor to exhaust at center connection on gage set, until proper operating pressures are obtained, as indicated below.

| Ambient Temp. (Temp. of surrounding Air) | Low Pressure Pounds/ Square Inch | High Pressure Pounds/ Square Inch |
|---|---|---|
| 65°F | 1-8 | 100-110 |
| 70°F | 2-11 | 105-125 |
| 75°F | 4-13 | 115-140 |
| 80°F | 6-16 | 125-155 |
| 85°F | 8-18 | 135-175 |
| 90°F | 10-21 | 140-190 |
| 95°F | 12-23 | 150-205 |
| 100°F | 14-26 | 155-220 |

NOTE: Use of an electric fan (12 inch minimum) in front of the car grille may be necessary to direct a flow of air over the condenser. This will eliminate excessive engine temperatures and provide more accurate pressure readings.

5. Disconnect the gage set, replace the flare nuts, and tighten all fittings.

## (10) Compressor Removal

Since there are several reasons for removing a compressor from the car, each of which requires a somewhat different service procedure, this note is divided into two major subnotes which cover the removal procedures for each condition.

### a. To Perform Engine Disassembly Operations and/or Shaft Seal Replacement

1. Remove shut-off valve caps from ends of both the low and high pressure lines where they are connected to the compressor. Fig. 16A-16.

2. Using a 1/4 inch key, Tool No. J-5427, close both hand shut-off valves tightly by turning clockwise. This removes the compressor from the system.

CAUTION: Do not operate compressor with shut-off valves closed. REMOVE IGNITION KEY.

3. Loosen two high pressure valve fitting to compressor attaching screws about seven turns. Tap fitting to free it from the "O" ring flange opening. The valve fitting should come back firmly against heads of screws. This permits the automatic shut-off valve in the compressor to close quickly, preventing an excessive escape of Freon from the compressor.

NOTE: A momentary release of vapor should be expected as the fitting leaves its bore in the compressor. If vapor continues to escape, the spring loaded automatic valve in the compressor is not seating properly. If this is the case, purge the Freon vapor pressure by depressing the Schrader core in the high pressure gage connection until a low audible hiss is heard. Any air in the compressor must be forced out when the unit is reinstalled as explained in the installation procedure, Note 13a, Step 10.

4. Remove screws and fitting from compressor.

5. Repeat operations 3 and 4 on low pressure line fitting.

6. Cover the low and high pressure openings in both the compressor and pressure line fittings with masking tape to keep out dirt.

7. Disconnect clutch solenoid wires.

8. Loosen generator belt adjusting bracket and link and move generator in toward engine to release tension on belts. Disconnect clutch actuating lever at solenoid by loosening lower bracket mounting screws and sliding lever away from solenoid. Remove belts from pulley.

9. Remove compressor rear mounting nut, lock washer and cap screw.

10. Remove compressor front mounting nuts, lock washers, and carefully remove compressor.

**b. To Replace A Damaged Compressor**

This includes compressors which have been internally damaged as indicated by seizing, extreme vibration, noises, etc. Also included are those compressors which are externally damaged, as indicated by cracks resulting in refrigerant and oil leakage. Replacement of compressor is necessary.

NOTE: A compressor may seize up (stall) temporarily due to excessively high operating pressure-temperature conditions (sometimes resulting in shaft seal leakage). When pressure-temperature conditions are brought down to normal, the stalling difficulty in many cases will be eliminated. These compressors should not be replaced.

1. Remove compressor from car as described in Note 10a.

2. Remove pulley-clutch assembly from damaged compressor and install on replacement compressor as described in Note 11.

## (11) Precautions, Disassembly, Assembly, and Adjustment of Compressor Pulley and Clutch

**a. Precautions**

1. Use only a clean, dry cloth to wipe off clutch parts. Do not use any type of solvent. This is a dry type clutch.

2. Do not clean the pulley bearing with any type of solvent as it will wash the grease out of the bearing. Shaft ball bearings are supplied with the correct lubricant or grease when assembled by the manufacturer and require no other lubricant at any time.

3. Prevent finger marks, dirt, grease, oil, or any type of foreign matter from coming in contact with ball bearings, frictional and mating surfaces of the clutch plates.

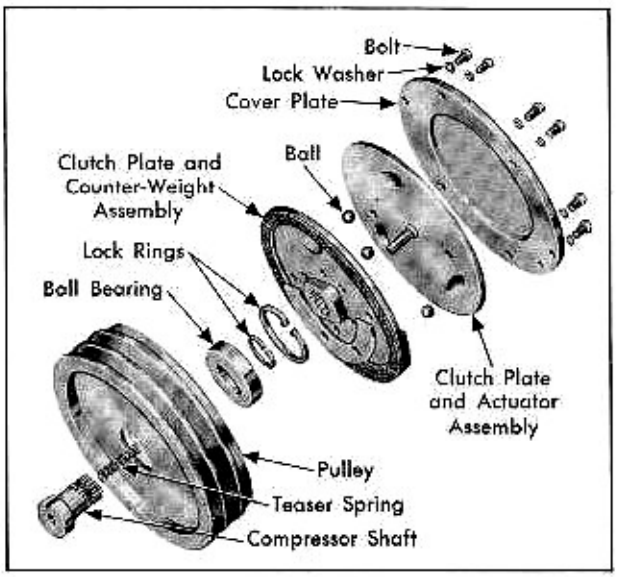


Fig. 16A-17 Clutch Assembly - Disassembled

4. It is important that no attempt is made to dress off the frictional lining material on clutch plates as this will result in improper operation.

**b. Disassembly**

1. If necessary, remove compressor from car as described in Note 10a and b - may be disassembled on car.

2. Disconnect and remove clutch actuating arm at compressor and solenoid.

3. Remove the clutch cover plate screws and remove plate.

4. Pull out two clutch plates, being careful not to lose the three actuating steel balls. Fig. 16A-17.

5. Using Truarc Pliers, No. J-4880, remove the snap ring retaining the pulley housing on the shaft. Fig. 16A-18.

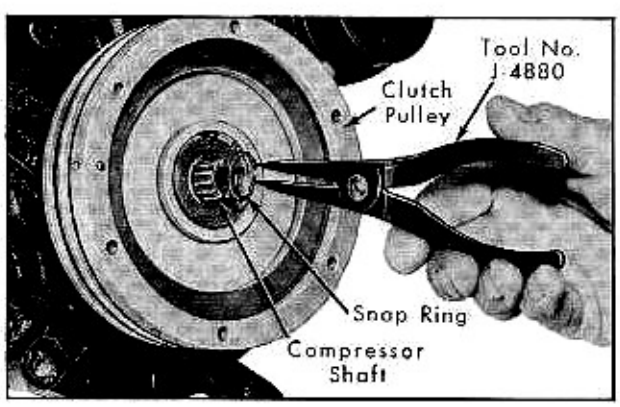


Fig. 16A-18 Removing Pulley Snap Ring

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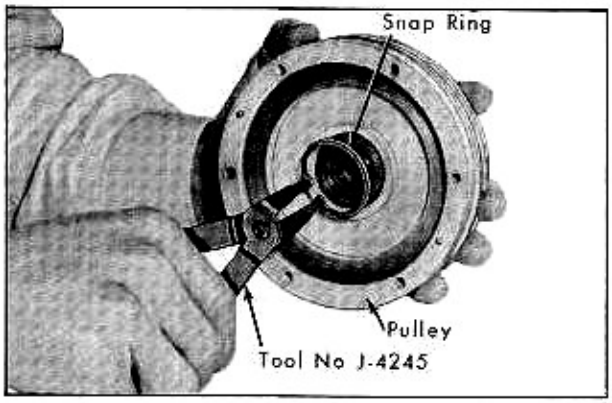


Fig. 16A-19 Removing Pulley Bearing Snap Ring

6. Remove pulley from compressor shaft.

7. If pulley housing bearing requires replacement, remove tru-arc snap ring, using Tool No. J-4245. Fig. 16A-19.

8. Remove bearing from pulley housing. Fig. 16A-20.

**c. Assembly**

1. Clean all clutch parts observing the precautions listed above.

2. Using a socket or short length of pipe, carefully press new bearing into pulley hub (at the outer race) and install snap ring using Tool No. J-4245. This ring should be installed with bevelled side out.

3. Install pulley and bearing assembly in position on shaft.

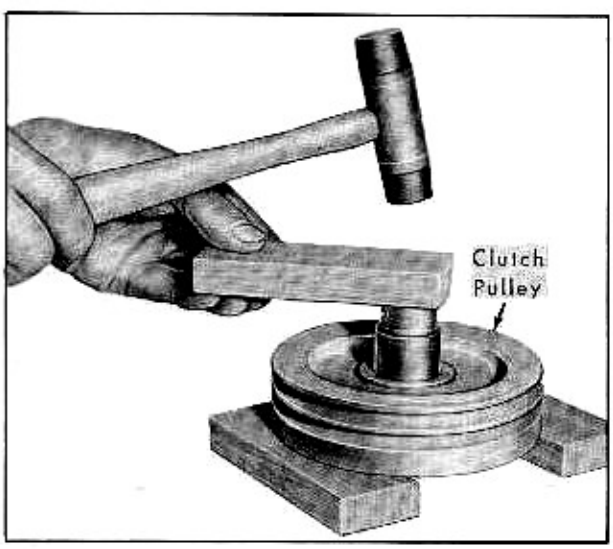


Fig. 16A-20 Removing Pulley Bearing

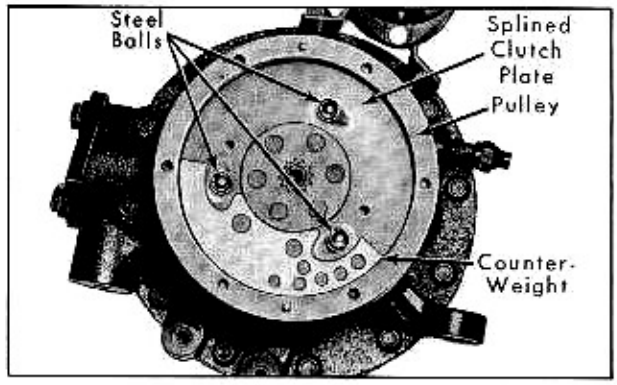


Fig. 16A-21 Splined Clutch Plate – Installed

4. Install pulley housing snap ring on compressor shaft, using Tool No. J-4880. Fig. 16A-18. This ring should be installed with the concave side out.

5. With the compressor in an upright position, install the counter-weight clutch plate on splined shaft, frictional lining towards compressor. To do this, it will be necessary to position the one blind spline of the shaft with the open spline of the inner clutch plate hub. This is necessary since the inner clutch plate will only fit on the shaft in one position. Fig. 16A-21.

6. Place the three steel balls in the tear drop depressions of the counterweight plate.

7. Insert teaser spring in bore of compressor shaft. Fig. 16A-22.

8. With friction lining outward, place actuator

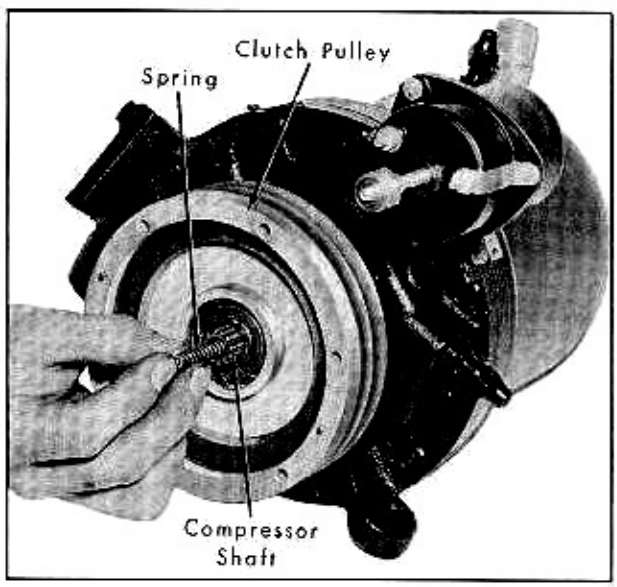


Fig. 16A-22 Installing Teaser Spring

plate on top of steel balls, making certain balls are located in the tear drop depression of both plates. Plates and steel balls can be installed as an assembly if compressor is not removed.

9. Install the clutch cover plate, being sure that the two small holes in the cover plate line up with the two locating dowel pins in the pulley.

10. Install cover plate to pulley lock washers and screws. Tighten to 12-14 foot pounds.

NOTE: Make sure all lock washers are in place to assure proper balance.

11. Install clutch actuating arm bracket to the compressor.

12. Install compressor on the car as described in Note 13a.

### d. Clutch Adjustment

1. Energize the solenoid by placing the toggle switch on the control panel in the "On" position (ignition on, engine off). Make certain solenoid is energized. If necessary connect a jumper wire from the solenoid to the battery.

2. Using a feeler gage, check the clearance between the clutch actuating pin and the lever arm. This clearance should be .015" to .020". Adjust to .018". Fig. 16A-23.

3. If adjustment is not correct, loosen lock nut at the solenoid plunger and turn the adjusting nut to secure proper clearance. Tighten lock nut.

### e. Checking Clutch Operation

With the engine idling, turn the air conditioning switch "On" and "Off" a number of times to burnish the clutch plates until the clutch properly engages.

NOTE: Proper engagement can be observed by watching the actuating pin to be sure it turns in relationship to the pulley when the clutch is engaged. Pin should rotate at pulley speed.

## (12) Replacing Compressor Seal

1. Remove compressor as described in Note 10a.

2. Relieve pressure in compressor through two gage connections to two to five pounds or until a low audible hiss is evident.

3. Remove clutch and pulley assembly from compressor as described in Note 11.

4. Remove seal retaining plate and bellows seal. Fig. 16A-24.

5. Remove nitralloy ring from shaft using Tool No. J-5425. Fig. 16A-25.

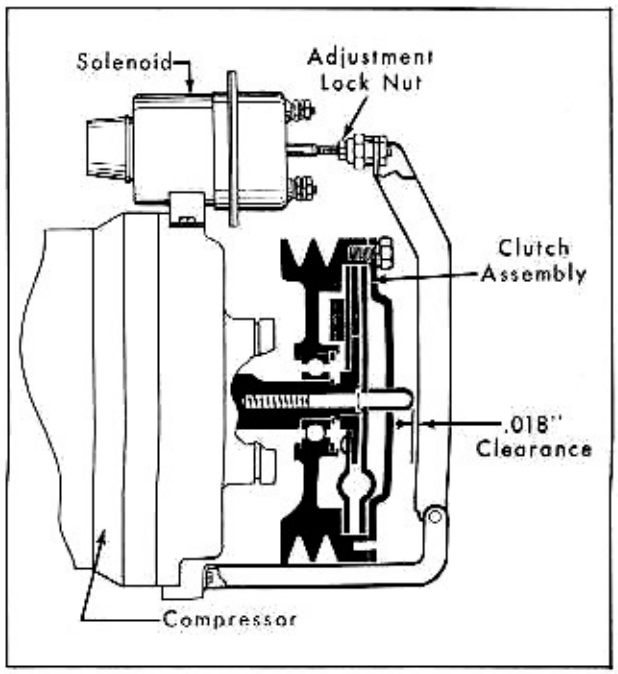


Fig. 16A-23 Clutch Adjustment

6. Make certain shaft is polished and free of paint, corrosion, nicks, burrs, tooling marks, etc. This care is necessary to avoid excessive wear and failure of new seal.

7. Flush seal cavity with Frigidaire oil.

8. Wet a cleaning tissue with a good grade of lighter fluid and allow tissue to dry. Remove any trace of oil or lint. The shaft and shoulder, also, must be clean and dry.

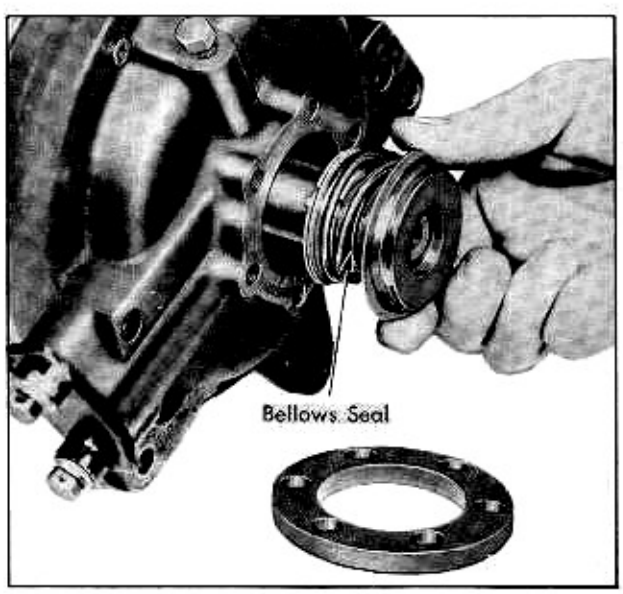


Fig. 16A-24 Removing Bellows Seal

# AIR CONDITIONER

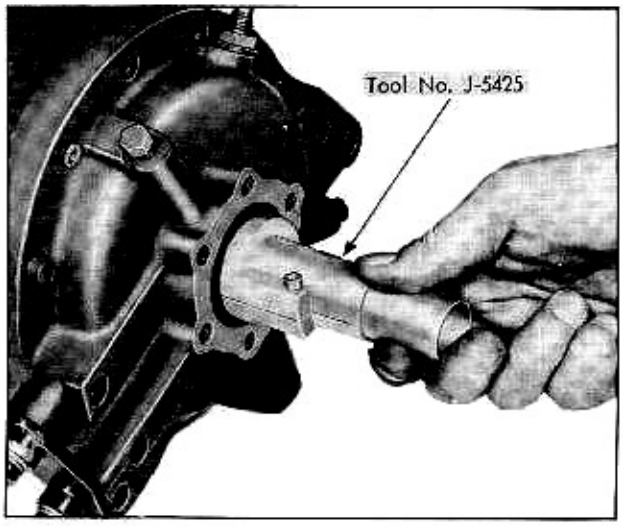


Fig. 16A-25 Removing Nitralloy Ring

9. Insert nitralloy ring in Seal Centering Tool No. J-5425 so that synthetic rubber is visible.

NOTE: Extreme care must be taken not to handle the surfaces of the nitralloy ring with the fingers. Fig. 16A-26.

10. Apply lighter fluid to another cleaning tissue and, using wetted tissue, wipe entire rubber surface, including inner diameter and radius of seal, until all the protective oil coating is removed and the rubber is completely clean and dry. The purpose of cleaning the shaft and neoprene surface of this seal is to obtain maximum driving friction.

11. Install nitralloy ring on the shaft, making certain the neoprene rests evenly and firmly against the shaft shoulder. Fig. 16A-27.

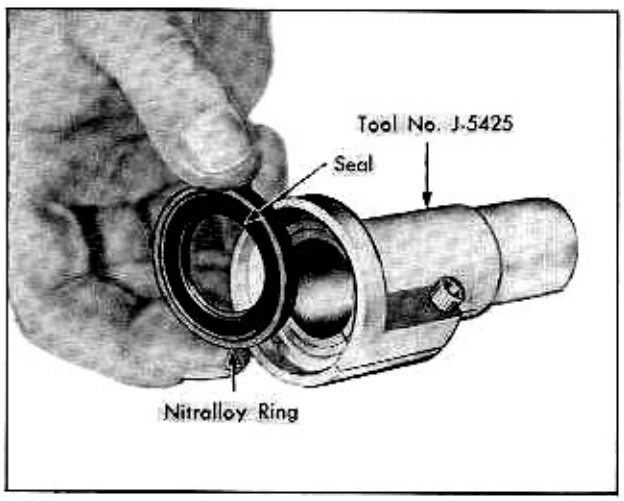


Fig. 16A-26 Installing Ring in Centering Tool

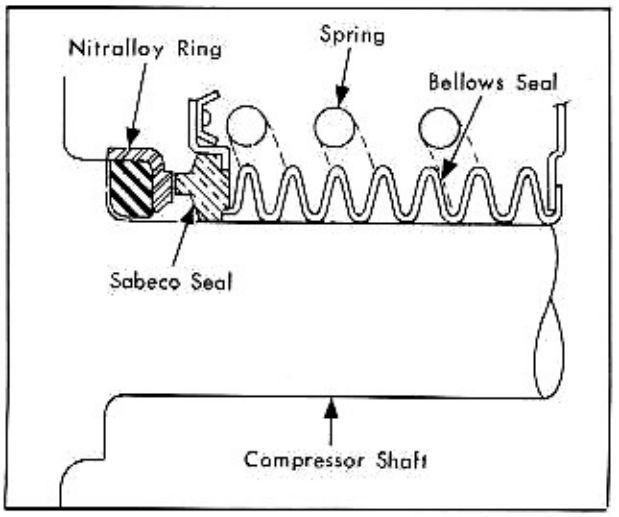


Fig. 16A-27 Location of Nitralloy Ring on Compressor Shaft

NOTE: This can be done by reversing the tool so that the small tubular end is pressed firmly by hand against the inner ring of synthetic rubber. This will assure a better contact between the radius of the seal and the shaft shoulder.

12. Apply clean Frigidaire oil to the nitralloy ring, seat, bronze seal that contacts the nitralloy ring, and the first three turns of the bellows seals.

13. Using the special seal centering tool, install the new bellows seal and gasket. Install retainer plate and screws. Screws should be tightened alternately to insure even pressure against the seat. Do not remove the centering tool until all screws are tightened. If a major loss of oil has occurred, add oil as described in Note 8c. Fig. 16A-28.

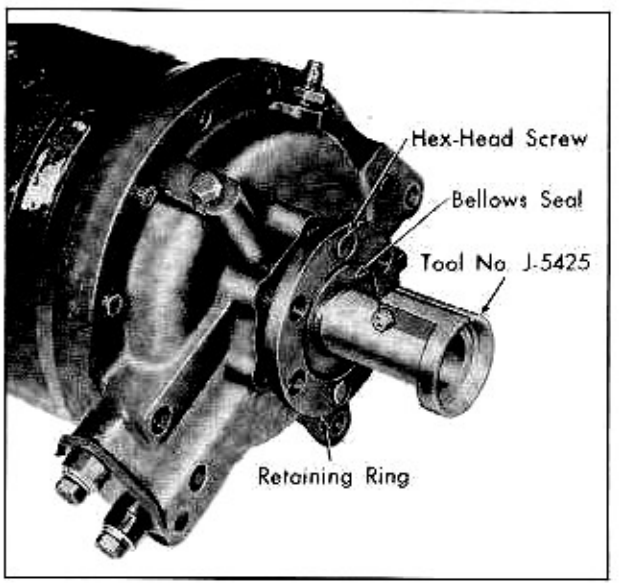


Fig. 16A-28 Installing Bellows Seal

## (13) Installing Compressor

### a. After Engine Operations Are Performed and/or Compressor Seal Replacement

1. Place compressor in position on front and rear mounting brackets.

2. Install rear mounting screw, lock washer and nut.

3. Install front mounting washers and nuts. Tighten 25 to 30 ft. lbs. torque.

4. Place belts on pulley and adjust tension at generator. Tighten adjusting bracket screw.

5. Connect clutch actuating lever to solenoid plunger and tighten lower bracket screws. Check lever adjustment as described in Note 11d. Fig. 16A-23.

6. Install new "O" rings and flange gaskets on high and low pressure line valve fittings. Apply a slight amount of Frigidaire oil to "O" rings before installing fittings into bores.

7. Insert high and low pressure line fittings into their bores in compressor. Use care to be sure that "O" ring seals are not damaged.

8. Insert screws in fittings and tighten evenly.

9. Using the 1/4" key, Tool No. J-5427, open both the high and low pressure line valves all the way (counter-clockwise).

NOTE: These valves open against a seal type seat and, therefore, must be turned open all the way against stop to prevent leaks.

10. If either automatic valve in the compressor leaked after the line fittings were removed, it will be necessary to depress the valve stem in the high pressure gage fitting 5 seconds to force out any air in the compressor.

11. Test for leaks at all connections on the compressor.

12. If leaks are indicated in above test, connection must be removed and "O" rings and gaskets replaced.

CAUTION: It is very important that all leaks be repaired. Under no circumstances should the compressor be run when a leak exists, as a complete loss of refrigerant would damage the compressor.

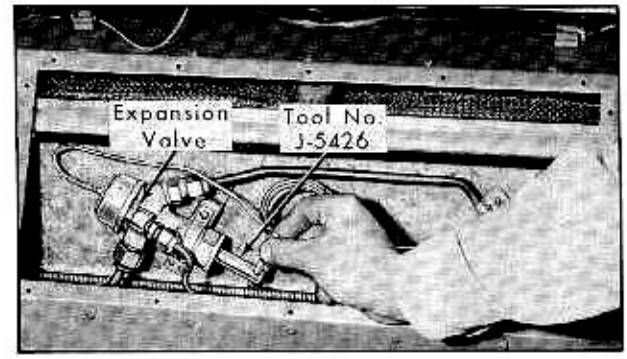


Fig. 16A-29 Adjusting Expansion Valve

### b. After Shaft Seal Is Replaced

1. Assemble and install clutch on compressor shaft as described in Note 11c.

2. Install compressor as described in Note 13a.

3. Purge the air from the compressor by depressing the valve stem in the high pressure gage connection for a few seconds.

4. Start the engine and allow it to operate for several minutes, then repeat purging operation as explained in Step 3 above. This will remove the air that entered during the seal replacement.

## (14) Adjusting the Expansion Valve

If the expansion valve is out of adjustment (ineffective cooling by either starving the cooling coil of refrigerant, or by flooding the cooling coil with refrigerant) proceed as follows:

1. Remove the access plate located centrally on the evaporator housing in the trunk compartment.

2. Using a 1" socket, while supporting the mating parts (to prevent distortion), remove the cap nut from the expansion valve.

3. Using a 3/16" valve key, Tool No. J-5426, on the adjusting stem of the expansion valve, first CLOSE the valve completely then, OPEN (counter-clockwise) 5 complete turns. Fig. 16A-29.

4. Install access plate.

## (15) Replacing the Expansion Valve

1. Purge the system as described in Note 5. (have the replacement valve within reach for immediate installation).

2. Remove the access plate from the evaporator housing.

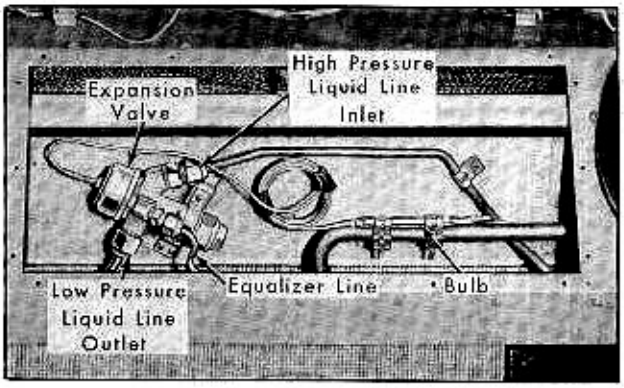


Fig. 16A-30 Expansion Valve Connections

3. Disconnect the power element bulb from the low pressure line. Fig. 16A-30.

4. Remove the equalizing, low pressure and high pressure line flares in that order at the valve.

5. Remove the expansion valve clamp.

6. Remove the valve assembly with power element bulb.

7. Install the new valve by connecting the lines, and clamp the power element of the new valve to the TOP or SIDE of the LOW PRESSURE LINE.

NOTE: Under no circumstances should the smaller high pressure liquid line contact the bulb.

8. Open gage and Freon drum valves and bring system up to drum pressure for checking leaks.

9. Leak test the three expansion valve connections carefully for leaks.

10. Evacuate the system as previously described in Note 6a and b.

11. Add refrigerant as previously described in Note 7b.

12. Replace access plate. Check operation of system.

## (16) Replacing Blower Motor

1. Disconnect the electrical lead to the blower motor.

2. Remove flat rubber pad at rear of motor housing, six screws, and motor assembly from motor housing.

3. Remove the fan and mounting plate from the motor and install it on the new motor. Make certain that the fan is in the corresponding position on the new shaft.

4. Install the new motor and its assembly in reverse order of removal.

## (17) Replacing the Cooling Coil

1. Purge the system as previously described in Note 5.

2. Remove spare tire and disconnect all of the air ducts from the evaporator.

3. Disconnect blower motor leads.

4. Remove access panel and disconnect the refrigerant line connections at the evaporator unit housing.

5. Remove the evaporator unit mounting nuts and bolts and remove unit from the luggage compartment.

6. Remove the panels from the unit housing, including blower assemblies.

7. Disconnect and remove the expansion valve as described in Note 14, and install it on the new cooling coil.

8. Remove the cooling coil, and install the new one. Installation is reverse of removal procedure.

9. Evacuate the system. Note 6b.

10. Add refrigerant to the system. Note 7b.

11. Test for leaks.

## (18) Removal and Installation of Filters

Two filters are located on top of the evaporator housing in the return air stream. Air inside the car is filtered before passing across the cooling coil and then back into the interior of the car. The air filter must be cleaned regularly during those months in which the air conditioner is in operation. This should be done every two months or 2000 miles, or more frequently in those areas of the country which are extremely dusty. To remove the filters for cleaning or replacement purposes, proceed as follows:

1. Remove access panel on the evaporator housing in the trunk compartment.

2. Remove one filter at a time through opening in evaporator housing. Fig. 16A-31.

3. The filter may be cleaned in solvent or by washing in a soapy solution made with household detergent. After filter is cleaned, it should be rinsed and dried with compressed air. Then apply (spray) a light coating of an SAE 30 detergent-free, non-odorous, engine oil or RP filter coat to the entire filter surface.

4. To install filter, reverse above procedure.

## (19) Replacing the Dehydrator-Filter

The purpose of the dehydrator-filter is to absorb moisture and to trap foreign matter (dirt, solder, filings, etc.) that may not have been removed during the installation or during service operations. When the filter becomes saturated with moisture or clogged with foreign matter, replacement is necessary. No service should be performed on the dehydrator-filter. To replace the filter, proceed as follows:

1. Purge the system as described in Note 5.

2. Raise the car and disconnect the flare fittings at the dehydrator, located along the right frame side bar in the high pressure liquid line.

NOTE: Do not uncap the new dehydrator until it is in position for installing as it will quickly absorb moisture from the air and decrease its efficiency in the system.

3. Remove mounting clamp and dehydrator filter.

4. Install the new dehydrator, making certain refrigerant flow through it will be in the direction of the arrow on the label or the letters "IN" stamped on inlet fitting. Flow is towards the rear of the car.

5. Before evacuating the system, apply sufficient drum pressure to the system to obtain a good leak test of the dehydrator connections.

6. Evacuate the system as described in Note 6b.

7. Add refrigerant as described in Note 7c.

8. Check performance of system, then remove the evacuating and charging equipment. Be sure all shut-off valves in the system are fully open.

## (20) Replacing the Sight Glass

The sight glass provides a quick and sure way of determining whether or not the refrigerant charge in the system is sufficient. It is so designed that a shortage of refrigerant in the receiver and liquid line will be indicated by the appearance of bubbles or foam beneath the glass. A screw-on metal cap protects the glass. Whenever replacement of the sight glass is required, proceed as follows:

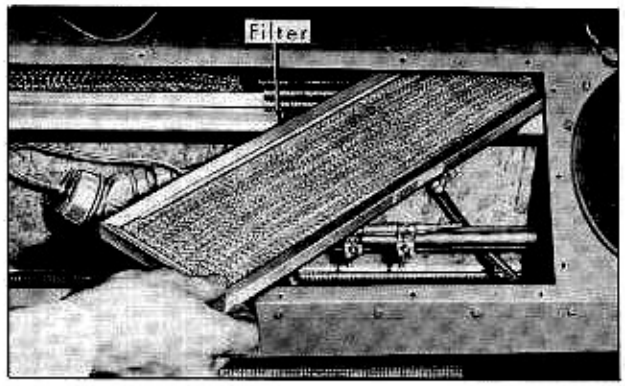


Fig. 16A-31 Removing Filter

1. Purge the system as outlined in Note 5. Have replacement sight glass within reach for immediate installation.

2. Disconnect the flare fittings at the sight glass and remove sight glass.

3. Install the new sight glass.

4. Before evacuating the system, apply sufficient drum pressure to the system to obtain a good leak test.

5. Evacuate the system as described in Note 6b.

6. Add refrigerant as described in Note 7b.

## (21) Replacing the Condenser

1. Purge the complete system down to 5 lbs. maximum as described in Note 5.

2. Remove the hood lock plate support and baffle.

3. Disconnect the high pressure line (flared connection at the condenser inlet).

4. Disconnect the condenser outlet lines at the flared connection alongside the condenser and at the inlet elbow on the receiver.

5. Remove the condenser mounting screws and the condenser.

6. Install new condenser by reversing the procedure for removal.

# AIR CONDITIONER

7. Evacuate the entire system as previously described and completely recharge it with refrigerant. Notes 6b and 7b.

8. Test for leaks.

## (22) Replacing the Receiver

1. Purge the system as described in Note 5.

2. Disconnect the high pressure inlet line flare at the receiver.

3. Disconnect the high pressure outlet line from the receiver.

4. Remove the receiver mounting nuts, washers, and receiver.

5. Install the new receiver by reversing the procedure for removal. Inlet line must be connected to "IN" fitting of receiver.

6. Evacuate the entire system and recharge with refrigerant. Note 6b and 7b. Test for leaks.

## AIR CONDITIONER SERVICE DIAGNOSIS

| CONDITION | CAUSE | CORRECTION |
|---|---|---|
| **A. POOR COOLING** | | |
| Blowers not operating | 20 Amp. fuse blown | Check for short, Replace fuse |
| | A/C Switch in "off" position | Instruct owner |
| | A/C Switch inoperative | Replace switch |
| | Blower rheostats inoperative | Replace rheostats |
| | Wire broken or loose connections | Inspect connections and wires |
| | Blower motor defective | Repair or replace motor |
| | Blower motor rotates in wrong direction | Replace motor |
| Restricted air flow | Filter(s) in evaporator clogged with dirt and/or other foreign material | Remove and clean filters |
| | Outside air scoops restricted | Clean out scoops |
| | Roof ducts restricted | Remove restriction |
| | Air flow under rear seat restricted | Remove restriction |
| | Condenser clogged or restricted. | Remove obstruction |
| Incorrect quantity of refrigerant in system | Not enough refrigerant | Check for leaks - add partial charge - Note 7c |
| | Too much refrigerant | Bleed off excess refrigerant - Note 9 |
| Refrigerant flow to cooling coil incorrect | Expansion valve improperly adjusted | Check adjustment - Note 14. Replace if necessary |
| | Power element does not contact pressure line properly | Position element correctly and tighten securely. |
| | Restriction on liquid line between receiver and cooling coil | Replace line or receiver tank |
| | Power element discharged | Replace expansion valve. |

## AIR CONDITIONER SERVICE DIAGNOSIS (Cont'd)

| CONDITION | CAUSE | CORRECTION |
|---|---|---|
| Refrigerant not condensing properly | Air flow through condenser restricted<br>High engine operating temperatures<br>Air or excess refrigerant in system<br>Restriction in high pressure and condenser | Clean foreign material out of core<br>Check cooling system<br>Bleed off air or excess refrigerant<br>Replace line |
| Clutch does not engage | Defective solenoid<br>Clutch plate lining worn or saturated with fluid causing slippage<br>Toggle Switch defective<br>Adjustment of clutch lever arm incorrect<br>Spring in bore of compressor shaft broken | Replace solenoid<br>Replace plates<br>Replace switch<br>Adjust properly - Note 11d<br>Replace spring |
| Electrical | Toggle Switch not "on"<br>Loose connections or broken wires between electrical units<br>20 Amp. fuse blown | Instruct owner<br>Inspect and repair<br>Inspect for short and replace fuse |
| **B. TOO COLD** | | |
| Clutch does not disengage | Defective solenoid<br>Toggle switch inoperative<br>Clutch lever arm bent, broken or binding | Replace solenoid<br>Replace switch<br>Free-up-replace if necessary |
| Blower speed can not be reduced | Defective blower switch | Replace switch |
| **C. VIBRATION—NOISE** | | |
| Tubing | Loose<br>Chafing | Check grommets and tighten clamps<br>Reposition lines |
| Blowers | Loose on shaft<br>Striking housing<br>Foreign material<br>Motor bearings or mounts | Tighten screws<br>Align blower on shaft<br>Remove material<br>Replace motor. Tighten mounting |
| Fan Blade and Pulley | Strikes shroud<br>Pulley scrapes on water pump housing | Realign shroud<br>Grind down housing and paint |
| Compressor | Mounting brackets loose<br>Continuous internal noise | Tighten<br>Replace compressor |

## AIR CONDITIONER SERVICE DIAGNOSIS (Cont'd)

| CONDITION | CAUSE | CORRECTION |
|---|---|---|
| Air flow | Foreign material in air system<br>Small slits or openings in ducts | Remove foreign material<br>Seal all unnecessary openings, Use tape around joints in roof ducts. |
| **D. INCORRECT OPERATING PRESSURE (when checked with gage set)** | | |
| Excessive pressure in high pressure side | Air or excess refrigerant in system | Purge air or excess refrigerant from system until normal operating pressures are obtained. (See Note 9) |
| | Air flow through condenser core restricted | Clean condenser core with air or brush. DO NOT USE STEAM |
| | Kinks or restrictions in line on high pressure side | Check entire high pressure side to expansion valve for restrictions |
| | High engine temperature | Check cooling system |
| | Shut-off valve on high pressure side of compressor not fully open | Open valve all the way |
| | Insufficient air flow through cooling coil | Check for restricted air passage |
| | Incorrect expansion valve adjustment | Adjust valve. See Note 14. |
| Insufficient pressure on high pressure side | Shortage of refrigerant | Check for leaks, repair, and add refrigerant |
| | Incorrect expansion valve adjustment | Adjust expansion valve. See Note 14. |
| | Divider blocks in compressor not seating | Replace compressor |
| Excessive pressure on low pressure side | Expansion valve operation | Check power element bulb contact with suction line. See Note 14 for proper adjustment of expansion valve. |
| | Expansion valve needle stuck open or leaking | Open expansion valve several turns - Readjust valve. If trouble still exists, replace valve |
| Insufficient pressure on low pressure side | Restriction in lines | Check all lines for restrictions or kinks |
| | Shortage of refrigerant | Check for leaks, repair, and add refrigerant |
| | Expansion valve needle stuck shut | Open valve several turns - Readjust if trouble still exists. Replace valve. |
| | Expansion valve not open far enough | Adjust expansion valve. See Note 14 |

# AIR CONDITIONER

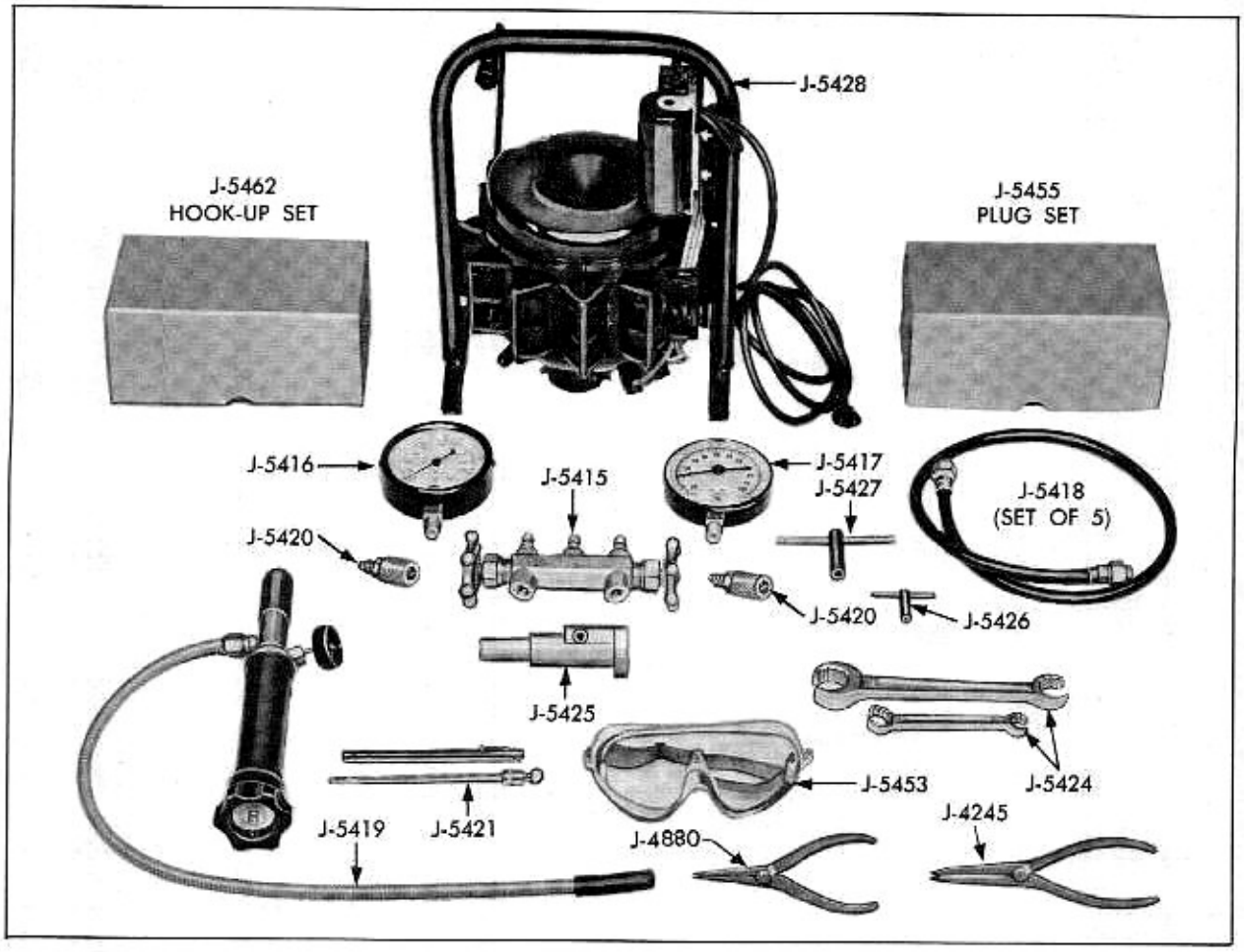


Fig. 16A-32 Cadillac Air Conditioner Tools

| Tool No. | Description | Tool No. | Description |
|---|---|---|---|
| J-5415 | Gauge Manifold | J-4880 | Tru Arc Pliers #2 |
| J-5416 | High Pressure Gauge | J-5425 | Seal Centering Tool |
| J-5417 | Low Pressure Gauge | J-5426 | 3/16" Valve Key |
| J-5418 | Gauge Charging Line (Set of 5) | J-5427 | 1/4" Liquid Valve Key |
| J-5419 | Leak Detector With Anhydrous Alcohol | J-5428 | Vacuum Pump 115v, 50-60 Cycle 1/7 HP. With Special Oil |
| J-5420 | Gauge Adapters (Set of 2) | | |
| J-5421 | Pocket Thermometer ($0^{O}$-$220^{O}$) | J-5453 | Goggles |
| J-5424 | 9/16" Tube Wrench-3/4" Tube Wrench | J-5455 | Plug Set |
| J-4245 | Tru Arc Pliers #3 | J-5462 | Gauge Hookup Set |

OTHER NOTES AND REFERENCES

# AIR CONDITIONER

OTHER NOTES AND REFERENCES

# ACCESSORIES

# AUTOMATIC HEATING SYSTEM

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## GENERAL DESCRIPTION

The Cadillac Deluxe Automatic Heating System consists of two heater units, one behind each cowl kick pad, which circulate warm air at floor level. Warm air is circulated through the front compartment by means of outlet grilles located on each cowl kick pad, and through the rear compartment of 60S and 62 series cars by ducts leading from each heater unit, through the front doors, to outlet grilles located at the rear of the front door kick pads.

On 75 series cars, the front compartment is heated by warm air circulated through each cowl kick pad, the rear compartment by two heaters located under the rear seat.

Two blower motors, one under the top rear of each front fender, accessible through the engine compartment, provide a constant flow of air to the heater for warming and distribution to the car interior. Ouside air for the heater and for summer ventilation is scooped up through an air intake located horizontally along the outside cowl top panel between the rear of the hood and the lower windshield reveal molding. Air entering the intake is directed first against a series of two baffles which force any rain in the air to drop into a drain gutter provided for this purpose. The water thus collected is routed to the ground through four large drain hoses.

A dual thermostatic valve control unit mounted centrally on the engine side of the front cowl panel regulates the flow of water to the heaters and the temperature level of the car interior.

Two levers, one on each side of the instrument cluster assembly, control the operation of both heater units, the two blower units, and on the 75 series, the two recirculating heaters under the rear seat.

The left hand lever (Heat) controls the car interior temperature, the volume of intake air to both the front and rear compartments, both blower motors, and the two underseat heaters on the 75 series.

The right hand lever controls the operation of the two blower motors, upper level ventilation and defroster operation.

The above controls are connected through the ignition switch so that the system is turned on, if the levers are depressed, when the ignition switch is in either the "on" or accessory position.

Air intakes to the lower level of the driver's compartment are located on the left and right side of the inner cowl panel. They are controlled by valves operated by push-pull type knobs located to the right and left of the steering column in the instrument panel. The air intake valves are kept closed during cold weather and are used solely during warm weather when increased ventilation is desired inside of the car

# AUTOMATIC HEATING SYSTEM

## SERVICE INFORMATION

### (1) Water Flow

The flow of water through the automatic heating system is illustrated in Fig. 16B-1. The water flows from the right and left outlet sides of the water pump to the thermostatic control valves, from the control valves to the right and left heater cores, and then to the water pump intake. On 75 series the water is routed from the thermostatic control valves to the heater core units under the rear seat, and from these units back to the right and left cowl heaters.

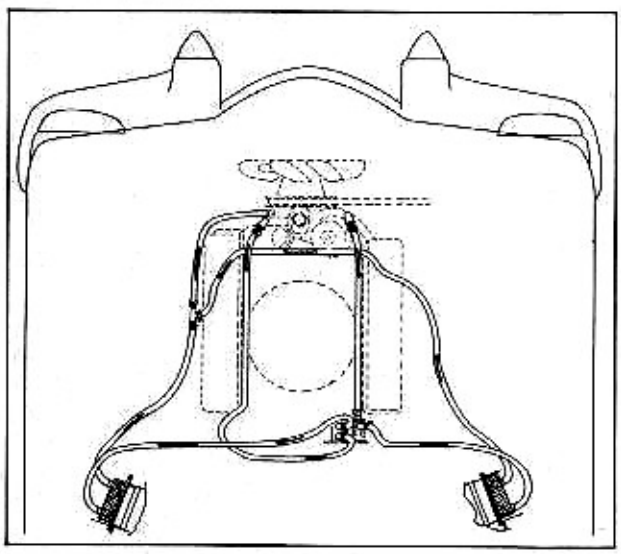

Fig. 16-B-1 Water Flow

### (2) Air Flow

The flow of air through the heater and defroster system is illustrated in Fig. 16B-2. Outside air is drawn in through the cowl air scoop.

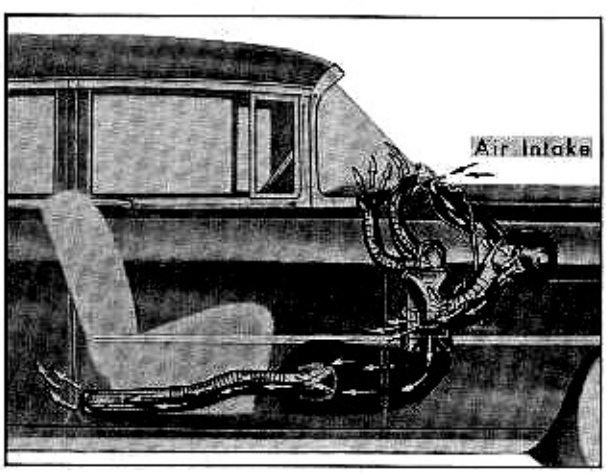


Fig. 16-B-2 Air Flow

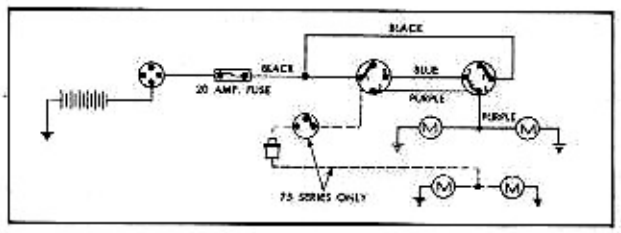


Fig. 16-B-3 Electrical Circuit

The heater lever regulates the temperature to which the car is heated by operating the thermostatic water valves. It also controls the amount of air delivered by regulating the heater air valve opening and by operating the two speed blower switch. As the lever is depressed to approximately 2/3 of its travel, a point is reached where the heater air valves are wide open. Beyond this point, the blower motors operate at "High" speed and the temperature continues to increase to the limit of the heater lever travel.

The "Defr" lever controls the air flow for upper level winter and summer ventilation and defrosting of the windshield. For upper level summer ventilation the blower motors turn "ON" when the "Defr" lever is moved from the "OFF" position. As the lever is depressed the ventilator valve in the heater unit begins to open, allowing fresh air to by-pass the heater cores, enter the defroster ducts, and over the windshield area. The upper vent valve reaches its maximum open position as the "Defr" lever is depressed to the "Vent" position; Beyond the "Vent" position the "Vent" valve begins to close and the defroster valve opens, until at the "Ice" position of the "Defr" lever the vent valve is completely closed and the defroster valve completely open.

At all times when interior temperatures are below 65°F, the thermostatic water valves permit circulation of water through the heater cores, regardless of the "Heat" lever position.

Upper level cool air is obtained during heater operation by depressing the "Defr" lever toward the "Vent" position, thus allowing a portion of the intake air to by-pass the heater cores and flow through the defroster ducts to the windshield area. With the heater lever moved from the "OFF" position, the "Defr" lever must be depressed beyond the "Vent" position to allow warm air through the defroster ducts for defrosting purposes.

### (3) Electrical Circuit

The heater electrical circuit is illustrated in Fig. 16B-3. Both blower motors are turned "ON" to "Low" speed when either the "Heat" or "Defr" levers are moved from the "OFF" position. As

# AUTOMATIC HEATING SYSTEM

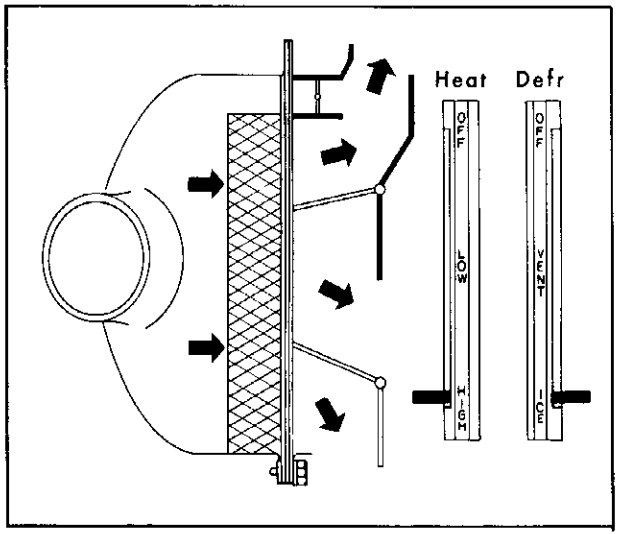


Fig. 16-B-4 Control Lever Position (Ice Removal)

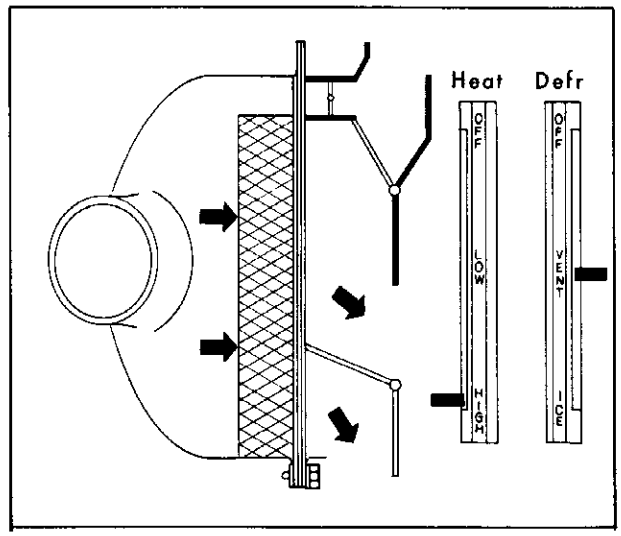


Fig. 16-B-5 Control Lever Position (Winter Ventilation)

either lever is depressed to approximately 2/3 of its travel, the blower motors operate at full speed.

In addition, the "Heat" lever automatically turns on the underseat heater motors on the 75 series as the lever is moved from the "OFF" position.

## (4) Operation of "Heat" and "Defr" Control Levers

### a. Warm-up

1. Both control levers should be left in the "OFF" position until the engine has warmed sufficiently to furnish hot water to the heater cores.

2. If it is necessary to defog before the water is warm, push the "Defr" lever down to "Ice" position.

### b. Ice Removal

1. Depress "Heat" lever to "High" position to get maximum air temperature with high blower speed.

2. Depress "Defr" lever to "Ice" position to prevent any air from bypassing the heater cores, Fig. 16B-4.

NOTE: To remove ice while the engine is still cold, leave the "Heat" lever in "OFF" position, and depress "Defr" lever all the way down to the "Ice" position.

### c. Summer Ventilation

1. "Heat and Defr" levers in "OFF" position.

2. Pull out both ventilator knobs at right and left of steering column below instrument cluster. These knobs operate the right and left fresh air intake valves on the lower inner cowl panel.

### d. Winter Ventilation

1. Upper level ventilation is possible during winter operation of the heater by depressing the "Defr" lever no further than the vent position, Fig. 16B-5. This will allow fresh, unheated air to by-pass the heater core and circulate at breath level. By depressing the lever beyond the vent position the vent valve begins to close and the defroster valve open until the "Ice" position is reached. At this point, all intake air is passing through the heater core.

### e. Summer Defogging

1. Depress "Defr" lever to vent position, Fig. 16B-6.

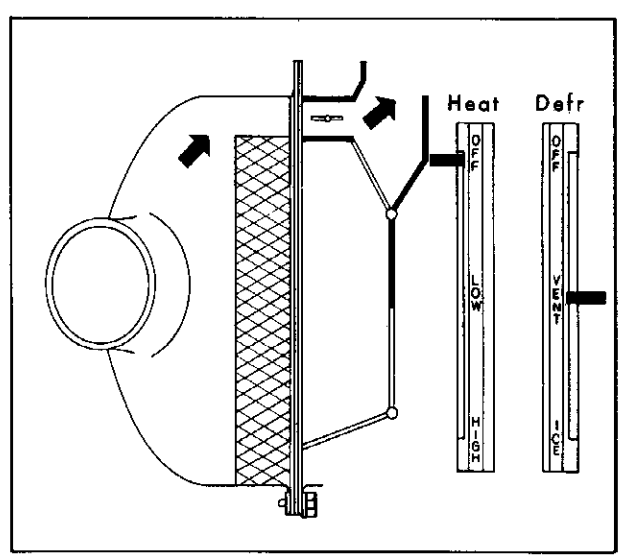


Fig. 16-B-6 Control Lever Position (Summer Defogging)

## (5) Adjustment of Control Levers

For best appearance, the "Heat" and "Defr" levers should be in alignment with each other when both levers are raised to the "OFF" position. Adjustment can be made in the following manner.

**a. "Heat" Control Lever**

1. Remove right and left heater grilles and cowl kick pads.

2. Disconnect heater control cables at both heater units and at cowl clamps.

3. Disconnect thermostatic control valve cables at valves and at cowl clamps.

4. Move control lever to "OFF" position, 1/8" from cluster casting.

5. Fully close heater air valve at both heaters.

6. Turn both thermostatic control valves to full off position.

7. Connect and tighten cables in place without interfering with the pre-set position of the control lever, heater air valves or thermostatic control valves.

NOTE: Make certain that heater and thermostatic valves close completely in "OFF" position, and that blower switch will turn off.

**b. "Defr" Control Lever**

1. Remove right and left heater grilles and cowl kick pads.

2. Disconnect "Defr" lever cables at both heater units and at cowl clamps.

3. Move control lever to full "OFF" position, and in line with "OFF" position of "HEAT" lever, (1/8" from cluster casting.)

4. Fully close defroster valves and fresh air bypass valves in both heater units.

5. Connect and tighten cables in place without interfering with the pre-set position of the heater unit valves or control lever. Check to see that air valve and blower switch will turn off.

6. Install cowl kick pads and heater grilles.

**c. Fresh Air Ventilator Knobs**

1. Disconnect ventilator control cables at both fresh air intake valves and at cowl clamps.

2. Push both fresh air vent knobs in as far as possible.

3. Fully close both fresh air intake valves.

NOTE: It is essential that a perfect air tight seal be maintained at the fresh air intake valves as cold air leaks at this point will strike the thermostatic valve capillary tubes and affect heater operation during cold weather.

4. Connect and tighten cables in place without interfering with the pre-set position of the control knobs or air valves.

## (6) Removal and Installation of Blower Motor (Left or Right)

1. Remove cowl air deflector to blower assembly air hose.

2. Remove blower assembly to heater air hose.

3. Remove blower motor feed wire connector from clip on fender and disconnect feed wire from connector.

4. Remove blower assembly to wheel housing extension brace nuts and lock washers and remove brace.

5. Remove three nuts and lock washers from upper mounting bracket of blower assembly and remove blower assembly from car.

6. Remove 5 phillips head screws, blower motor retaining plate to blower housing, and remove retaining plate, motor, and blower fan.

7. Loosen nut in blower fan hub and remove fan from motor shaft.

8. Remove motor to retaining plate attaching screws and remove motor.

9. To install, reverse above procedure.

## (7) Removal and Disassembly of Heater Unit (Left or Right)

1. Drain cooling system.

2. Raise front end of car and place on stands.

3. Disconnect water hoses from heater assembly, using a special pliers for removing the spring type hose clamps.

4. Remove heater outlet grille and cowl kick pad.

5. Disconnect hand brake lever at instrument panel when removing left heater assembly. For right heater assembly remove glove box as outlined in Section 3, Note 4.

6. Remove three heater shroud duct retaining screws.

7. Loosen trim retainer in door hinge pillar and remove heater shroud duct.

8. Disconnect two defroster hoses from defroster adapter.

9. Remove two defroster adapter to heater assembly retaining screws.

10. Remove instrument panel to cowl brace and remove defroster adapter.

11. Disconnect heater control cables from heater assembly.

12. Remove six heater to cowl attaching screws.

13. Remove retainers (rubber tubing) from the four studs located at each corner of the heater assembly.

14. Remove three heater core to valve case retaining screws.

15. Remove valve case and lift core out of air inlet case.

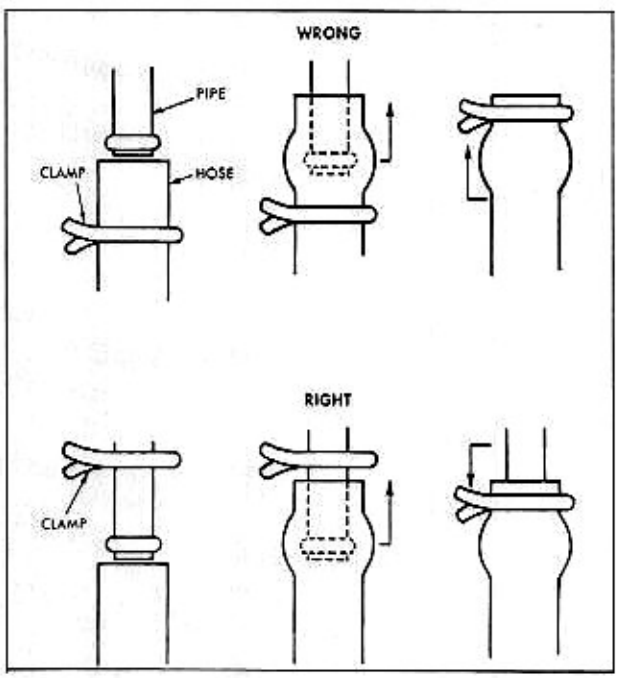


Fig. 16-B-7 Spring Type Hose Clamps

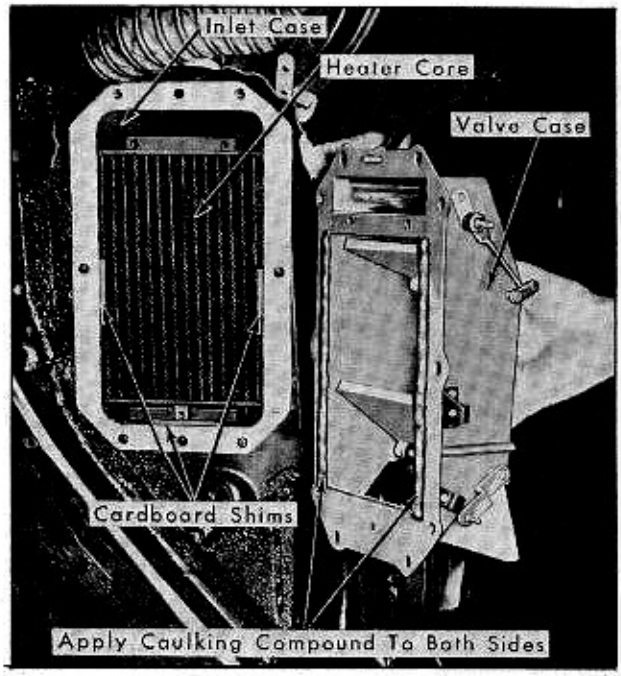


Fig. 16-B-8 Heater Core Alignment

16. Disconnect air intake duct from rear of inlet case and remove inlet case.

NOTE: When installing spring type clamps, slide the clamp over the pipe and then install hose over pipe, past enlarged portion of pipe. Using special pliers, slide clamp over hose so that it is positioned between the enlarged portion of pipe and end of hose as shown in Fig. 16B-7. NEVER PLACE THE CLAMP ON THE HOSE FIRST AND FORCE IT OVER THE ENLARGED PORTION OF THE PIPE AS THIS WOULD EXPAND THE SPRING CLAMP EXCESSIVELY, GIVING IT A SET WHICH IS TOO LARGE AND MAY CAUSE LEAKS. Special pliers, Tool No. 9A, available from the Snap-On Tools Corporation, are designed to fit the clamp properly and will not permit the clamp to be over expanded.

## (8) Installation and Assembly of Left Heater Unit

1. Place core in position in inlet case and shim in place with cardboard shims to align core to valve case screw holes. See Fig. 16B-8.

2. Place inlet case in opening in cowl side panel.

3. Apply autobody sealer along both sides of valve case to seal valve case to sides of heater core. See Fig. 16B-8.

4. Position valve case over locating studs at each corner of inlet case and install three heater core to valve case retaining screws.

5. Install six heater to cowl attaching screws.

6. Connect heater control cables to heater assembly.

NOTE: See Note 5 for adjustment of control levers.

7. Slide defroster adapter onto top of heater assembly, making sure that it is held securely by the spring clip, and install defroster adapter to heater assembly retaining screws.

8. Connect defroster hoses to defroster adapter.

9. Install heater shroud duct and heater shroud duct attaching screws.

10. Tighten trim retainer on door hinge pillar.

11. Connect handbrake lever at instrument panel if left heater assembly is being replaced or replace glove box as outlined in Section 3, Note 4, if right heater assembly is being replaced.

12. Replace cowl kick pad and heater outlet grille.

13 Connect air intake duct to heater air intake case.

14. Connect water hoses to heater core nipples, using special snap-on pliers to install spring type hose clamps.

15. Lower front end of car.

16. Refill cooling system.

## (9) Removal and Installation of Thermostatic Control Valve (Left or Right)

1. Disconnect capillary tube from clamp on cowl panel in interior of car.

2. Loosen thermostatic valve control cable clamp and slide cable out of clamp and off control arm on the valve.

3. Disconnect and plug water hoses from valve at the engine firewall, using special pliers to remove the spring type hose clamps.

4. Peel rubber insulator pad from thermostatic control valve retaining plate, using care to prevent damage to pad.

5. Remove three valve to retaining plate screws and remove thermostatic control valve. Carefully bend capillary tube to clear firewall during removal.

6. To install, reverse above procedure.

NOTE: Use 3M rubber cement to fasten the rubber insulator pad to the retaining plate when installing the thermostatic control valve assembly.

## (10) Removal and Installation of Underseat Heater Core (75 Series Only) (Left or Right)

1. Disconnect battery ground strap at battery.

2. Drain cooling system.

3. Raise rear of car and place on stands.

4. Disconnect water hoses from heater assembly, using special pliers to remove spring type hose clamps.

5. Disconnect blower motor feed wire at clip on side of heater assembly.

6. Remove two blower unit to floor pan screws, and remove heater assembly.

7. Remove friction tape and four metal screws at junction of blower unit and heater core housing.

8. Remove twelve metal screws, joining the two heater housing sections and remove core.

9. To install, reverse above procedure.

NOTE: Make sure that seal around core is properly installed to prevent air leakage past core.

## (11) Removal and Installation of Underseat Heater Motor (75 Series Only) (Left or Right)

1. Proceed as outlined in steps 1 through 7, Note 10.

2. Bend back blower housing retainer tabs and separate the upper and lower blower housings, using care not to break tabs.

3. Loosen nut in blower fan hub and remove fan from blower shaft.

4. Remove blower motor to housing retainer screws and remove motor.

5. To install, reverse above procedure.

## (12) Removal of Blower and Underseat Heater Control Switches

A blower motor control switch is mounted on

# AUTOMATIC HEATING SYSTEM

each of the two heater control levers. To replace these switches it is necessary to first remove the instrument panel cover as outlined in Section 3, Note 1. Either switch may then be easily replaced by disconnecting the terminal wires and removing the two attaching screws.

The blower motor switch for the underseat heater blower on 75 series cars is a push type switch located on the "Heat" control arm lever mounting bracket. As the "Heat" lever is depressed, the underseat heater blower motors are turned on.

The instrument panel cover must be removed to replace this switch. See Section 3, Note 1.

## HEATER DIAGNOSIS CHART

| EFFECT | CAUSE | REMEDY |
|---|---|---|
| 1. Insufficient heat | a. Failure of cooling system to warm up. | Check radiator thermostat and replace if required. |
| | b. Kinked heater hoses. | Remove kink. |
| | c. Obstructed underseat heater air outlets (75 Series) | Remove obstruction. |
| | d. Incorrect operation of controls. | Instruct operator. |
| | e. Dirt or lint in cores. | Remove lint and blow out dirt. |
| | f. Solder obstructing water flow in core. | Replace core. |
| | g. Defect in wiring circuit. | See cause and remedies 2b, 2c, 2f, 7, 8a, 8b, 14. |
| | h. Summer air vent not fully closed. | Push in air vent knob or adjust cable if required. |
| | i. Defective temperature control. | Replace unit. |
| | j. Obstructed front or rear compartment air ducts. | Remove obstruction. |
| | k. Obstruction in cowl air blister. | Remove obstruction. |
| | l. Control cables not properly secured to thermostatic valve. | Adjust control cables. |
| | m. Air leaks between heater valve case and heater core. | Seal the leaks with caulking compound. |
| 2. Inadequate fog removal. | a. Obstructions in windshield outlets. | Remove obstruction. |
| | b. Blower motor not connected. | Connect wire. |
| | c. Defective blower motor. | Replace motor. |
| | d. Defective blower motor switch. | Replace switch. |
| | e. Defroster control not pushed down far enough. | Instruct operator |
| | f. Open or shorted electrical circuit. | Check circuit and repair.. |
| | g. Defroster valve does not open fully. | Repair valve or readjust operating linkage. |

# AUTOMATIC HEATING SYSTEM

## HEATER DIAGNOSIS CHART (Cont'd)

| EFFECT | CAUSE | REMEDY |
|---|---|---|
| 3. Inadequate ice removal. | a. Thermostatic valve control unit poppet valve not opened. | Check lever adjustment. |
| | b. Defective blower motor. | Replace. |
| | c. Defect in wiring. | Repair. |
| | d. See Trouble 2a. | |
| | e. See Trouble 1. | |
| | f. See Note 4b. | |
| 4. Too warm in car. | a. Cold air leaks strike capillary tube. | Repair leaks or close air vent. |
| | b. Capillary tube touching dash. | Move tube away from dash. |
| | c. Obstruction in air duct to defroster outlets. | Check for air flow through this duct and repair if obstructed. |
| | d. Temperature unit defective. | Replace. |
| | e. Incorrect operation of controls. | Instruct operator. |
| 5. Cold Floor. | a. Air leaks. | Repair leaks or close summer ventilator. Also see Trouble 1. |
| | b. Hoses routed incorrectly. | Connect as in Fig. 16a-1. |
| 6. Blower fan will not run. | a. Blown fuse. | Replace fuse. |
| | b. Defective Motor. | Replace motor. |
| | c. Open circuit. | Repair circuit between ignition switch, blower switch, and blower motor. |
| | d. Defective Switch. | Replace Switch. |
| 7. Underseat heater fan will not run. (75 series only) | a. Open circuit. | Repair circuit between switch and underseat heater motor. |
| | b. Defective Switch. | Replace switch. |
| | c. Defective motor. | Replace motor. |
| | d. Obstruction in fan blades. | Remove obstruction. |
| 8. Control levers not aligned up and down. | a. Incorrect adjustment. | See Note 5. |
| 9. Control knobs not aligned in and out. | a. Improperly adjusted. | Adjust knobs. |
| 10. Coolant Leaks. | a. Hose leak at connections. | Replace or tighten clamps, replace hose, repair or replace nipple. |
| | b. Cores leak. | Repair if possible, otherwise replace. |
| | c. Temperature control unit leaks. | Replace. |
| 11. Blown fuses. | a. Short in electrical system. | Disconnect at ignition switch, blower switches, and blower motors, connect progressively to locate short. |

# ACCESSORIES

# RADIO

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## GENERAL DESCRIPTION

A Signal Seeking, Pre-Selector radio, equipped with an automatic signal seeking tuner and five push buttons for favorite station selection, is available for use on all 1954 Cadillac cars.

By turning the sensitivity control ring to any of four positions, the radio will automatically receive signals from the weakest to the strongest stations as the selector bar is depressed. All receivable stations may be received in this manner.

The signal seeker tuner assembly is electroncially controlled. The operator can change stations by merely depressing a selector bar on the radio. The seeking operation is a uni-directional sweep of the broadcast band from low to high frequency with a near instantaneous return of the tuner pointer.

The "favorite station selector" feature of the 1954 Cadillac radio permits a choice of five different stations, selected by the owner, to be tuned in with push buttons located on the radio dial.

A foot control switch for remote control of the signal seeking selector bar is available for installation at the owners option. When the pre-selector radio is being operated with the push buttons, it is necessary to first depress the selector bar manually before operating the radio with the foot control.

A 6" x 9" elliptical, permanent magnet speaker is mounted separately from the radio. The speaker is located to the right of the radio with the grille opening on the front of the instrument panel and extending beneath the instrument panel overhang.

An auxiliary rear speaker, standard equipment with this radio (except on Convertible Coupes), is located under the parcel shelf in back of the rear seat.

## SERVICE INFORMATION

### (1) Signal Seeking Radio Controls

#### a. Switch, Volume, and Sensitivity Control

The ring and knob control at the left of the radio dial serves a dual purpose. The knob controls the "on" and "off", and "volume." The ring controls "sensitivity." By turning the ring to any of four positions, it is possible to receive the weakest to the strongest stations.

#### b. Tone, Speaker Volume, and Antenna Control

The ring and knob control at the right of the radio dial serves three functions. The ring is the radio tone control. Turn the tone control ring to the left for bass tones and to the right for treble tones. The knob is the speaker volume and antenna control. When the knob is turned to the left, the front speaker volume is predominant. As the knob is turned clockwise, the front speaker volume gradually decreases while the rear speaker volume increases. Thus, the sound can be balanced to please both front and rear seat passengers.

Pushing in the knob will raise the antenna, and pulling it out will lower the antenna. In metropolitan

sections with strong broadcasting stations, the radio will operate with the antenna rod in the "down" position. The antenna should be raised to receive stations with weaker signals.

**c. Automatic Tuning**

To obtain accurate tuning, it is only necessary to touch the "selector" bar above the radio dial. Any particular station can be obtained by just holding the bar down until the dial pointer approaches the desired frequency and then releasing the bar.

**d. Push Button Tuning**

Once the five push buttons are set to the owners five station selections it is only necessary to push the correct button to dial the desired station.

## (2) Minor Adjustments

**a. Antenna Trimmer Adjustment**

1. Turn radio on and allow it to play for approximately ten minutes to reach normal operating temperature.

2. Extend vacuum portion of antenna, set volume control at maximum, and sensitivity control at maximum (extreme clockwise position).

3. Tune in a weak station near 1400 KC and adjust the antenna trimmer, located on the left side of radio case near the antenna lead socket, to maximum volume. Fig. 16C-1.

NOTE: If, during adjustment, the station becomes strong, tune to a weaker station and continue adjustment.

**b. Push Button Station Selection**

1. Open the door directly below the dial to gain access to the five red plastic stops.

2. Use the selector bar to tune in the desired station with the lowest frequency.

3. Slide the first plastic stop on the left so that its pointer is directly beneath the dial pointer. The first push button will now tune that station.

4. Depress the selector bar again and tune the next desired station. Align the pointer of second plastic stop with the dial indicator. Push button number two is now set.

5. Repeat above procedure with remaining three buttons.

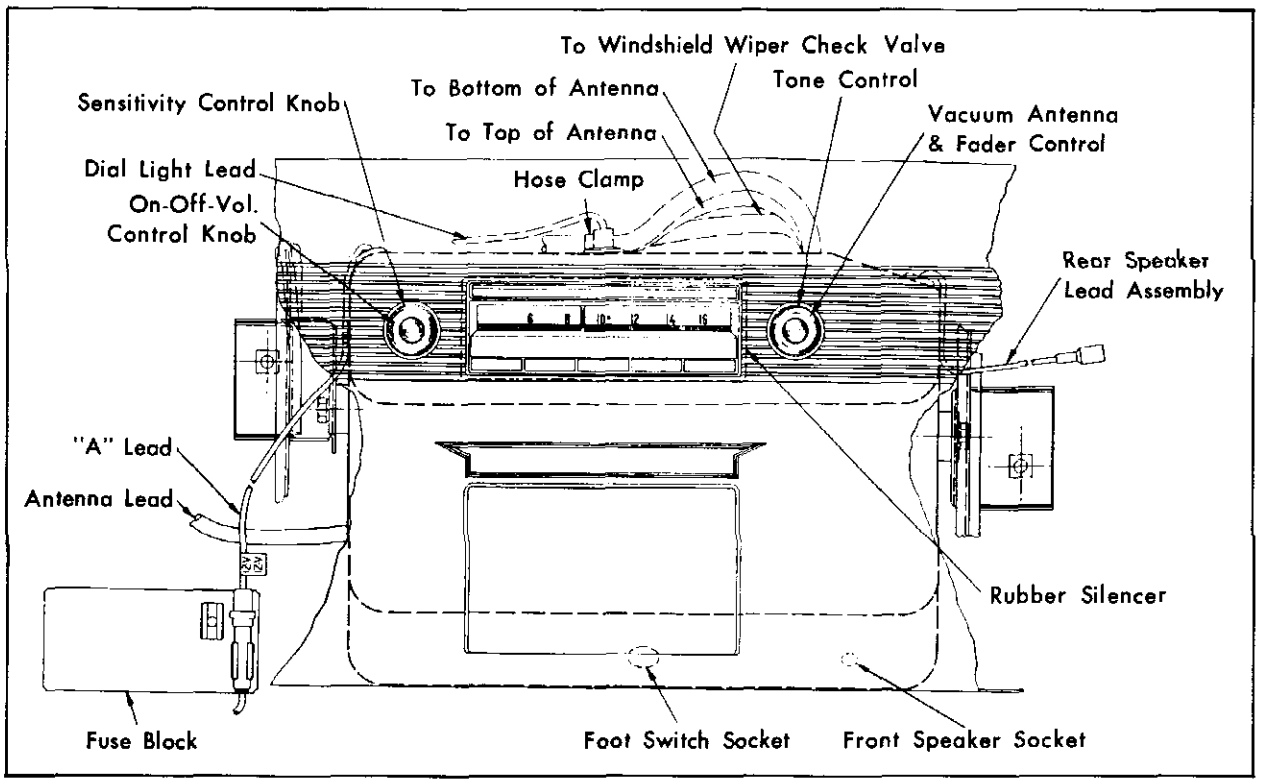


Fig. 16-C-1 Radio Assembly

## (3) Minor Repair Procedures

Many of the troubles which affect the satisfactory operation of the radio may be corrected without removing the set from the car. Check the condition and, with the aid of the diagnosis chart, Page 16-C-39, perform the operation or operations necessary to correct the trouble. If these minor repairs do not correct the condition, the radio should be removed from the car and repaired by an authorized radio service station.

**a. Fuse**

Turn radio on and check to see if the radio pilot light will light. If fuse is open or blown, replace with one of the correct amperage. This is generally caused by the vibrator points sticking. Replace fuse and jar radio when the radio switch is turned on. If fuse does not blow, leave set on a few minutes to remove any corrosion that may be formed on vibrator points. Turn radio off and on several times. Continued operation indicates the vibrator points are free and should give continuous service.

**b. Vibrator**

Turn the radio on and listen for any unusual buzz or hum. A slight buzz is permissible, but if it is loud, irregular in tone, or intermittent as compared with a known good vibrator, replace with a new one. Defective vibrators may cause a noisy, weak, dead, intermittent, or poor toned radio.

**c. Antenna**

Use a test antenna and lead-in, plugged into the set, with the test antenna held outside the car. If the radio works satisfactorily with this test assembly the antenna should be checked for a short or ground and the lead-in should be checked for continuity. Test the antenna mast to ground while wiggling the antenna. If a ground is indicated in test, disassemble the antenna and check for defective insulators or presence of water or moisture in the cylinder. Test the antenna lead-in for continuity (test may be made on a volt-ohm meter or on some tube testers) at both tips of lead-in, which should give a reading on tester. Test of continuity from antenna end of lead-in tip to ground. This test should give no reading on the tester. If lead-in tests show a ground or open circuit replace the lead-in.

The conditions mentioned above will cause a weak or intermittent signal in the radio set and will cause the signal seeker in the radio to sweep back and forth across the dial continually, trying to pick up a station. The signal seeker will also sweep back and forth across the dial when the tuning bar is depressed while the car is in an unusually weak signal area such as in a building or under a viaduct. Do not remove the set to correct this condition until all previous checks on the antenna have been made with the car in a fair signal area.

**d. Tubes**

Check tubes by disconnecting antenna, turning volume on full, and tapping each tube with eraser end of a pencil. Noisy or intermittent tubes will give a cracking noise in the speaker. Replace all tubes that are found defective in this test. Check all tubes on tester and replace those that are not up to specifications. When replacing tubes be sure the correct tube is used.

**e. Antenna Trimmer**

If antenna is not peaked, it will cause the set to have weak reception. This operation should always be performed when the new car is delivered, or after any repair work is completed. See Note 2a.

**f. Worn or Defective Parts**

Static in the radio may be due to worn static collectors in the wheels, defective distributor rotor suppressor, or generator condenser. Static due to defective wheel static collectors will be noticed only when the car is in motion, while static due to a defective distributor suppressor will be timed with the ignition. Static due to the defective generator condenser is higher in frequency and tone.

## (4) Removal of Radio

1. Disconnect antenna lead plug from left side of radio.

2. Disconnect rear speaker wire from connector at top of glove box.

3. Disconnect front speaker wire at right side of radio.

4. Disconnect ignition lead (black) wire at fuse connector.

5. Remove antenna control knob, spring, and tone control ring from right shaft. Following same procedure, remove volume control knob and sensitivity ring from left shaft.

6. Remove hex nut control escutcheon marked "tone". Following same procedure, remove hex nut escutcheon marked "sensitivity".

7. Remove mounting screws and washers from mounting bracket to the receiver.

8. Remove radio from under instrument panel. Disconnect dial light feed wire (brown) at connector.

9. Disconnect three vacuum antenna hoses from clip and nipples on top of radio.

10. Remove dial light from top of radio chassis.

## (5) Installation of Radio

1. Install dial light in top of radio chassis.

2. Connect the vacuum antenna hoses to the nipples on the top of the radio and install under clip provided.

3. Install dial light feed wire (brown) at connector.

4. Install radio with the control bushings extending through instrument panel.

5. Assemble control escutcheon, marked "tone", and a hex nut loosely on the right control bushing. Following same procedure, assemble escutcheon marked "sensitivity" on left control bushing.

NOTE: The control escutcheons have locating pins on the back side which must fit in the matching holes in the instrument panel.

6. Assemble washers and screws loosely through the positioning bracket to receiver. Pull the radio case firmly toward the instrument panel and tighten positioning screws.

7. Tighten control escutcheon hex nuts.

8. Assemble the tone control ring, spring, and control knob on the right shaft. Assemble the sensitivity control ring, wave washer, and control knob on left shaft.

9. Connect the lead (black) wire to the accessory terminal of the ignition switch.

10. Connect rear speaker wire at left side of radio.

11. Connect front speaker wire at right side of radio.

12. Insert antenna lead-in wire at left side of radio.

13. Check operation of the radio.

## (6) Replacement of Front Speaker

1. Remove radio, as outlined in Note 4, to provide access to front speaker attaching screws.

2. Remove attaching screws at top and bottom of speaker on left side.

3. Remove upper attaching screw and clip through clock access hole in top interior of glove box.

4. Remove speaker assembly.

5. To install, reverse above procedure.

## (7) Replacement of Push Button Tuning Tabs

1. Remove radio as outlined in Note 4.

2. Remove radio dial escutcheon plate.

3. Remove control bushing spacer nuts.

4. Slide the tabs off either end of circuit board until defective tab has been removed.

5. Replace tabs in sequence indicated in Fig. 16C-2.

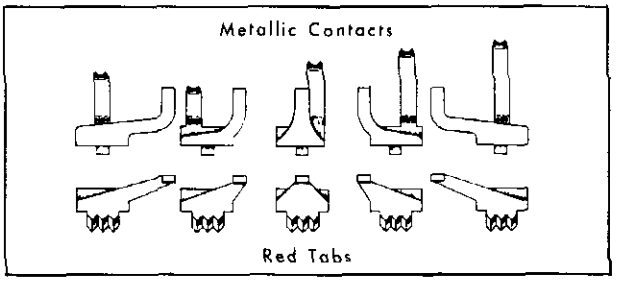


Fig. 16-C-2 Tuning Tab Sequence

To replace, hold the tab with its correct metallic contact together with a pair of long nose pliers and slide the tab on the end of the circuit board. Be careful not to bend the flexible contact out of shape.

6. Install control bushing spacer nuts and radio dial escutcheon plate.

7. Install radio as outlined in Note 5.

## (8) Radio Noise Suppressors

### a. Static Collectors

Static collectors are located on all four wheels of 1954 Cadillac cars. Their purpose is to discharge static electricity, which is generated while the car is in motion, back into the chassis of the automobile.

# RADIO

An inoperative or inefficient static collector may cause a crackling noise in the radio when the car is in motion. This noise will stop when the brakes are applied or the car is brought to a stop.

Location, and possible reasons for inoperative static collectors are as follows:

**Front Wheels**

Front wheel static collectors consist of helical coil copper inserts installed between the steering knuckle and the front hub grease cap. The areas against which they are grounded must be free of grease or oil to assure proper operation. Also, care must be taken when installing the front wheel to bend the steering knuckle nut cotter key around the shaft, rather than over the end of the shaft, to prevent the static collector from catching on the cotter key end and breaking.

**Rear Wheels**

Rear wheel static collectors are an integral part of the rear brake oil drain shield. Their only service failure would be due to poor contact caused by oil leakage past the rear axle shaft oil seal.

**b. Ignition Suppressors**

Various types of ignition suppressors are used on 1954 Cadillac cars. In general, they all serve the same purpose, to eliminate spark noise from interfering with radio reception. Failure of any of these parts to function properly is accompanied by a "popping" noise. The noise increases as the engine is speeded up, varying with engine speed. If this interference is present, the suppressors should be checked in the following order:

**Engine Ground Straps**

Two ground straps, one from each cylinder head to cowl, should be checked for breaks and proper ground contact.

**Hood Ground Clips**

There are two hood ground clips located on the left fender near the vacuum antenna. Check for proper ground contact or replace if missing.

**Coil Condenser**

Mounted on outside of coil. Replace if necessary.

**Distributor Rotor Suppressor**

Built into distributor rotor. Replace rotor if necessary.

**c. Generator—Regulator Condenser**

A condenser mounted on the outside of the generator prevents generator - regulator operation from interfering with radio reception. A crackling noise, beginning at the time the regulator begins to control generator output, is an indication of condenser trouble. The noise does not occur at engine idle. To correct the condition, replace the condenser.

## DIAGNOSIS OF MINOR RADIO TROUBLES

| TROUBLE | CAUSE | REMEDY |
|---|---|---|
| Dead | Blown Fuse. | Check fuse. See Note 3a. |
| | Dead vibrator | Check vibrators. See Note 3b. |
| | Antenna open or shorted. | Check antenna. See Note 3c. |
| | Dead tube. | Check tubes. See Note 3d. |
| | Poor ground | Check all ground connections. |
| | Power supply to radio open. | Check connections at switch. |
| Weak | Antenna not extended. | Extend antenna. |
| | Station too weak. | Inform owner. |
| | Antenna trimmer not adjusted. | Adjust trimmer. See Note 3e. |
| | Antenna open, shorted. | Test antenna. See Note 3c. |
| | Weak tube. | Test tubes. See Note 3d. |
| | Worn vibrator. | Replace vibrator. See Note 3b. |
| | Low battery. | Charge battery. |
| | Poor ground. | Check ground connections. |
| | Poor antenna connection. | Push leads firmly together. |
| Noisy | Antenna not extended. | Extend antenna. |
| | Local interference. | Explain to owner. |
| | Station signal weak. | Explain to owner |

## DIAGNOSIS OF MINOR RADIO TROUBLES (Cont'd)

| TROUBLE | CAUSE | REMEDY |
|---|---|---|
| Noisy (Cont'd) | Antenna open, shorted. | Check antenna. See Note 3c. |
| | Noisy tube. | Check tubes. See Note 3d. |
| | Noisy vibrator. | Replace vibrator. See Note 3f. |
| | Static noise. | Identify type of noise. Replace. |
| | Spark noise. | Check distributor rotor. See Note 3f. |
| | Generator noise. | Check generator condenser. See Note 4f. |
| | Installation defects. | Check installation. |
| Intermittent | Loose antenna connection. | Check connections. |
| | Intermittent tube. | Check tubes. See Note 3d. |
| | Intermittent vibrator. | Replace vibrator. See Note 3b. |
| Poor Tone. | Defective tube. | Check tubes. See Note 3d. |
| | Worn vibrator. | Replace vibrator. See Note 3b. |
| | Low battery. | Charge battery. |

OTHER NOTES AND REFERENCES

# ACCESSORIES

# VACUUM ANTENNA

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## GENERAL DESCRIPTION

The radio antenna on 1954 series Cadillac cars is the piston and rod type, vacuum operated from the interior of the car through the tone and speaker control knob on the face of the radio. Pushing the speaker control knob in will raise the antenna, pulling it out will lower the antenna.

Vacuum is supplied to the antenna by a hose running from the vacuum check valve, mounted below the windshield wiper motor on the engine side of the cowl, to the control valve in the radio. From there, vacuum lines run to the base and the top of the antenna cylinder to raise or lower the antenna.

The antenna lead-in to the radio is in two sections to facilitate removal of the antenna assembly. The lead-in is separated by a plug-in connector at the rear of the left front fender dust shield. The short lead-in to the antenna is removed with the antenna assembly. Care should be taken to see that this connection is tight. Heavy ignition noise and a weak signal will be noticed if the connection is loose.

The antenna rod is removed without the necessity of disassembling the antenna assembly. The rod is screwed into the piston assembly which has four "dogs" on its bottom that slide into four recesses in the lower plug. This prevents the piston from revolving while the rod is being unscrewed.

## SERVICE INFORMATION

### (1) Removal and Installation of Vacuum Antenna

1. Separate lead-in cable at plug-in connector at rear of left front fender dust shield.

2. Raise antenna rod slightly by hand and lower it back into position slowly while rotating it until the "dogs" in the bottom of the piston can be felt to lock into position in the recessed grooves provided in the bottom plug, Fig. 16D-1.

The antenna rod may then be unscrewed from the piston and removed from the assembly.

NOTE: When using pliers to loosen or tighten the antenna rod, be sure to protect the chrome surface of the rod with a piece of leather or cloth.

3. Remove dome nut, insulator, and pad from top of antenna.

4. Disconnect both upper and lower vacuum hoses from vacuum cylinder.

5. Remove screw, lock washer, and flat washer holding lower end of antenna to support on front fender.

6. Remove antenna assembly.

7. To install antenna, reverse steps 1 through 6.

### (2) Disassembly of Vacuum Antenna

1. Remove lower vacuum elbow.

2. Remove two screws holding shield cup to bottom of antenna and remove cup and shield cup to plug washers.

3. Remove drain plug and piston through bottom of cylinder.

4. Remove two screws holding antenna lead-in plug retainer to upper part of cylinder and disconnect lead-in wire.

5. Remove cylinder to head retaining screw and remove head assembly from top of cylinder, using a puller as shown in Fig. 16D-2. No attempts should be made to remove the lower seal retainer from the upper end of the vacuum cylinder; nor should the capacity coupler be removed from the head assembly

NOTE: An antenna head puller, made to the

# VACUUM ANTENNA

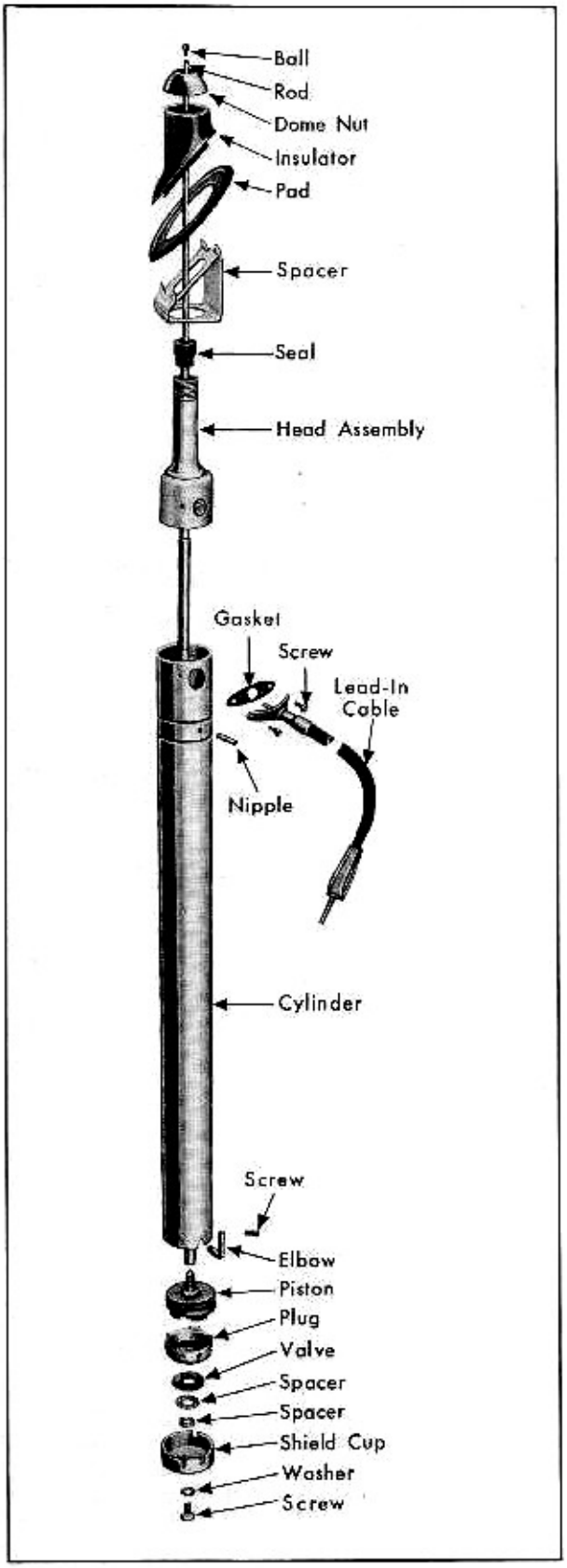


Fig. 16-D-1 Antenna Disassembled

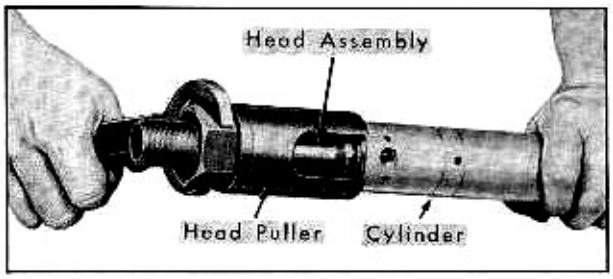


Fig. 16-D-2 Removing Antenna Head

dimensions specified in Fig. 16D-3, is applicable to all 1947 through 1954 vacuum antennas.

## (3) Assembly of Vacuum Antenna

1. Coat outside of head assembly sparingly with Glyptol sealer and press head into top of vacuum cylinder until the three screw holes line up.

CAUTION: Do not damage insulator at top of head assembly.

2. Connect antenna lead-in plug to antenna head and install lead-in retainer screws. Install cylinder to head retaining screw.

3. Lubricate rubber cups on piston assembly sparingly with vaseline and guide lips of rubber cups into cylinder with a feeler gage to prevent damage to the piston.

4. Coat outer edge of bottom drain plug sparingly with Glyptol sealer and press plug in bottom of vacuum cylinder until screw holes line up.

5. Place large, thin copper washer and small steel washer in position on bottom of drain plug and then position shield cup over bottom of cylinder and install the two retaining screws.

6. Install lower vacuum elbow.

## (4) Maintenance and Repair Procedures

Many antenna troubles can be prevented by cleaning the antenna rod on all cars at periodic intervals. This is easily performed during a lubrication period, or when a car is being washed, by wiping the rod with a soft cloth. It is essential that the rod be kept clean at all times to prevent dirt from damaging the seals as the rod is raised and lowered.

### a. Moisture in Cylinder

Weak receiption or fading is often caused by moisture in the antenna cylinder due to condensation

# VACUUM ANTENNA

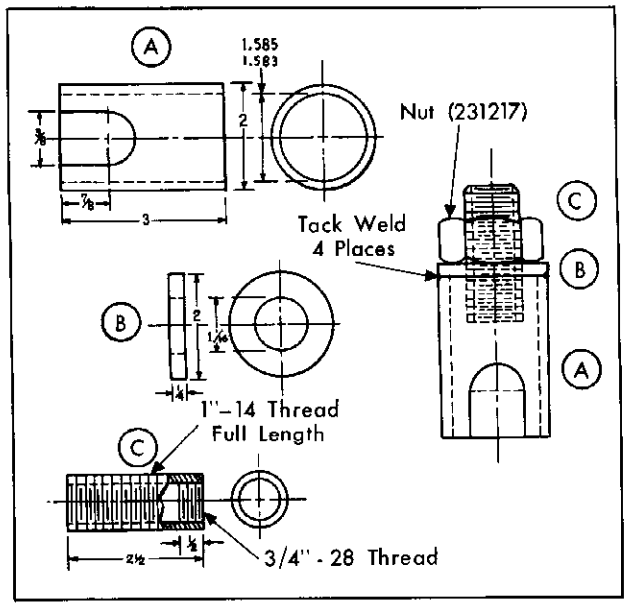


Fig. 16-D-3 Antenna Head Pulley

or leakage through the seals. Leakage is most apt to occur while the antenna is being operated with the rod wet and dirty. The presence of water can usually be determined by pulling the antenna rod up quickly by hand and noting if any moisture has been forced out of the cylinder where the rod passes through the upper insulator.

If trouble has been traced to moisture in the cylinder, the antenna must be removed, disassembled and thoroughly cleaned. All moisture can be removed by blowing it out with compressed air, then pushing a clean, dry cloth through the cylinder. Before assembling the antenna, check the drain holes in the bottom plug to be sure they are not obstructed.

NOTE: Cover bottom drain holes with masking tape before undercoating car.

**b. Antenna Will Not Raise or Lower**

Inability of the antenna rod to raise or lower is usually due to a defective antenna rod piston, vacuum hose leak, or a bent antenna rod. No attempt should be made to correct this condition by adding oil to the cylinder. If a check of the three possible causes listed above fails to correct the condition, disassemble the antenna and replace any defective parts.

**c. Antenna Will Raise But Will Not Lower**

Examine the neoprene drain valve washer on the bottom of the drain plug for excessive stiffness. The drain valve serves a dual purpose, permitting water to drain from the cylinder and preventing the entrance of dirt and road dust to the cylinder. This valve should be replaced if there is any question as to its serviceability.

OTHER NOTES AND REFERENCES

# ACCESSORIES

# AUTRONIC EYE

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## GENERAL DESCRIPTION

The Autronic Eye is an electronic device that automatically switches the headlamps between the upper and lower beams in response to light from an approaching car. This device, which is optional equipment available as a factory installed accessory, consists of four separate units. The function and operation of each is described briefly in the following paragraphs.

The Phototube Unit, mounted on the top left side of the instrument panel, is an optical device equipped with a lens which picks up light from an approaching car and focuses it through a filter and mask to a phototube. This phototube converts the light into an electrical signal which is conducted, by a cable, to the Amplifier unit.

The Amplifier Unit is mounted under the hood on the left front fender dust shield and supplies voltage to both the phototube and the power relay.

In response to a signal from the phototube unit, the amplifier unit operates the power relay to lower the headlamp beams.

The Power Relay is mounted under the hood near the amplifier unit and switches the headlamps between the upper and lower beams. It is a heavy duty relay with special alloy contacts and is operated by the amplifier unit.

An Auxiliary Foot Control Switch is mounted on the toe board along side the standard foot dimmer switch and acts as an over-control switch, when pressed down and held, to provide an upper beam, regardless of light on the phototube unit.

The headlamps are controlled automatically in only one position of the standard foot dimmer switch.

The other position of the standard foot dimmer switch provides the lower beam only.

The auxiliary foot switch functions only in the "automatic" position of the standard foot dimmer switch. When pressed down and held, it provides the upper beam regardless of light on the phototube unit. This arrangement permits signaling if desired and provides a simple test for the "automatic" position of the standard foot dimmer switch.

In the "automatic" position of the standard foot dimmer switch, the autronic eye provides complete automatic switching of the headlamp beams. When a car approaches, the light from its headlamps strikes the phototube unit which causes the Autronic Eye to switch the headlamps to the lower beam. At this time, if the driver of the approaching car had on the upper beam, he would normally switch to the lower beam; thus, greatly reducing the amount of light falling on the phototube unit. The Autronic Eye is designed to maintain its vehicle headlamps on a lower beam even with this reduction in light. When light is removed from the phototube unit, the Automatic Headlamp Control returns the headlamps to the upper beam.

If the approaching vehicle fails to switch to its lower beam, the auxiliary foot switch may be operated to provide an upper beam for signaling purposes. Street lights and extraneous lights encountered in the city are sufficient to cause the Automatic Headlamp Control to maintain the vehicle headlamps on the lower beam.

At times, it may be desired to operate the standard foot dimmer switch to the "lower beam" position, when following a vehicle, to avoid glaring its driver through the rear window.

The Autronic Eye is disconnected from its vehicle headlamps in the "lower beam" position of the standard foot dimmer switch; however, the Autronic Eye is not turned off.

It continues to function as long as the headlamps are turned on, and is ready at all times to provide automatic control whenever the standard foot dimmer switch is returned to the "automatic" position.

# AUTRONIC EYE

## SERVICE INFORMATION

### (1) Preliminary Checks Before Adjustment

The Automatic Headlamp Control device should hold its adjustment over a long period of time. There may be occasions, of course, when the adjustment of the device is questioned. Like any other electrical unit, loose or incorrect wire connections, or even a misunderstanding of the operation of the device, may lead one to believe that an adjustment is necessary. The following troubles may be reported:

Headlamps switch to the lower beam when an approaching car is too far away. Headlamps switch to the lower beam when approaching car is too close or will not switch to the lower beam at all.

Headlamps will not return to the upper beam when no car or other lights are ahead.

Headlamps return to the upper beam, after being depressed by the upper beam of an approaching car when the approaching car switches to the lower beam.

Headlamps switch back and forth rapidly between upper and lower beam.

While the above complaints may be corrected by simple aiming and sensitivity adjustments in most cases, a few preliminary tests should be made to indicate if the difficulty is more serious than can be corrected by simple adjustment. Check as described below:

1. Pull light switch knob to full "On" position. With car in lighted area, lights should remain on the lower beam, regardless of the position of the standard dimmer switch.

2. Depress auxiliary foot switch. The lights should change to the upper beam, if the standard dimmer switch is in the automatic position. If not, trip the dimmer switch and again depress the auxiliary switch. The lights should now change to the upper beam and back to the lower beam when the auxiliary switch is released.

If lights do not operate as described in steps 1 and 2, refer to Notes 4 and 5.

3. Cover the phototube unit lens with palm of the hand. The headlamps should switch to the upper beam and back to the lower beam when the hand is removed, if the standard foot switch is in the "automatic" position. If beam does not raise and lower as explained above, see Notes 4 and 5.

NOTE: If the headlamps operate as outlined in the above tests, the unit should operate correctly with the proper aiming and sensitivity adjustment. If the Autronic Eye cannot be serviced immediately, the lights can be quickly converted to manual foot dimmer switch operation, in most cases, by disconnecting the blue feed wire to the amplifier from the multiple plug inside the amplifier.

### (2) Phototube Unit Aiming Procedure

NOTE: Due to normal settling of front and rear springs, it is recommended that the aiming procedure, outlined below, should be made with the 2,000 mile inspection.

1. The phototube unit aiming should be done with car unloaded, trunk empty, except for spare tire, gas tank at least half full, and with tires at correct pressure.

2. Locate car on a level floor (level within 1/4" fore and aft of car).

3. Rock car to normalize springs.

4. Adjust dial on aiming device to the number stamped on the name plate on bottom side of phototube unit. Fig. 16E-1.

5. Position aiming device on top of phototube unit, using care to center it on the raised ridge, and then move it to the rear until it contacts the lens.

6. Adjust phototube unit aiming screw until bubble is centered in the level. Fig. 16E-2.

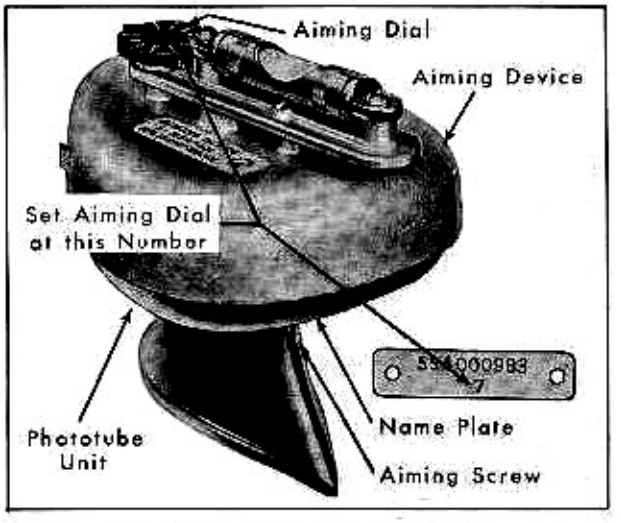


Fig. 16-E-1 Setting Leveling Device

NOTE: It is very important that the phototube unit is accurately aimed. If it is aimed too low,

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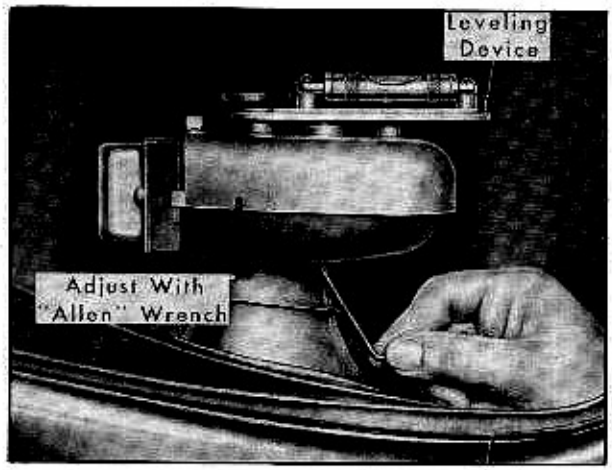


Fig. 16-E-2 Leveling Adjustment

back reflections from the headlamps of the car on which the Autronic Eye is installed will hold the lamps on the lower beam. Also, the unit must be aimed as low as possible to provide the maximum tolerance for car loading.

## (3) Sensitivity Adjustments

### a. "DIM" Sensitivity Adjustment

CAUTION: The Autronic Eye develops 1000 volts -- headlamps must be turned off before removing cover from phototube unit.

1. Remove two oval head screws from bottom of the phototube unit.

2. Lift off cover, remove lens and replace lens with test lamp. Fig. 16E-3.

3. Replace cover and screws.


Fig. 16-E-3 Sensitivity Adjustment

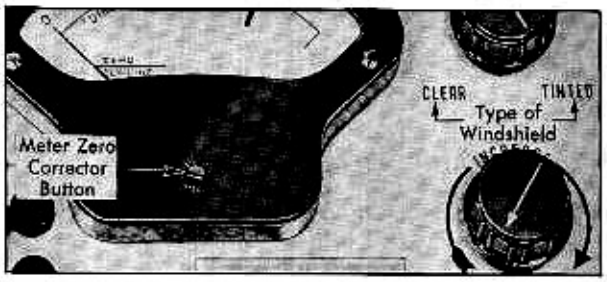


Fig. 16-E-4 Meter Zeroing Button

4. Turn headlamps "ON" and wait at least four minutes for amplifier to stabilize. Set standard foot dimmer switch to "Automatic" position. (Upper beam will then be on.)

5. Turn zero corrector on face of meter until meter pointer is on zero set line. Fig. 16E-4.

6. Turn the intensity rheostat all the way counter-clockwise. Fig. 16E-5.

7. Turn the selector switch to the "DIM" position.

NOTE: Be sure to use correct "DIM" position for clear or tinted windshields.

8. Insert the connector into the cigar lighter receptacle. (Sun Tester only.)

9. Check car battery voltage. If less than 12 volts, operate engine at fast idle when making sensitivity adjustment.

10. Turn intensity rheostat clockwise slowly just to the point where the headlamps switch to the lower beam. The meter pointer should fall within the "DIM" sensitivity adjustment line. Fig. 16E-5.

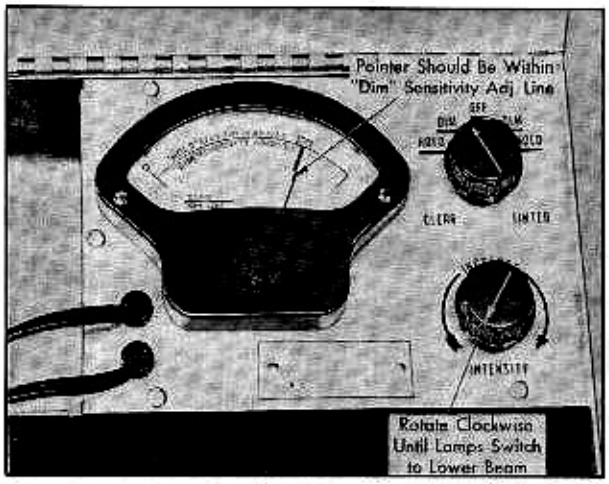


Fig. 16-E-5 Dim Sensitivity Meter

# AUTRONIC EYE

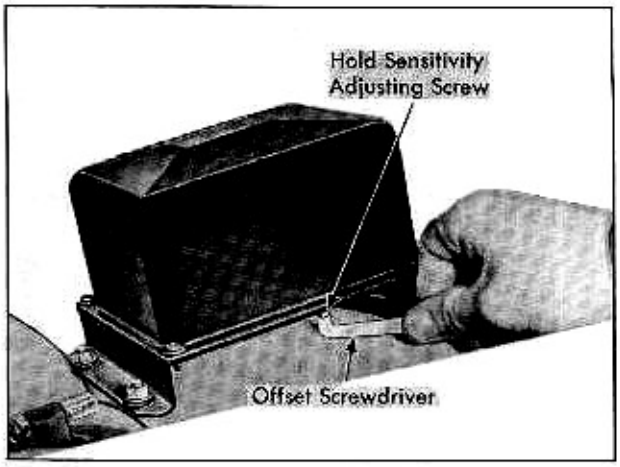


*Fig. 16-E-6 Adjust Holding Sensitivity*

11. If not, adjust intensity rheostat to the high side of the "DIM" sensitivity adjustment line.

12. Rotate phototube unit sensitivity control counterclockwise to end of adjustment, using a special 1/16" screw driver provided in tester. Fig. 16E-5. Momentarily switch selector switch to "off" position so that headlamps are on upper beam; then turn selector switch to "DIM" position.

13. Carefully and slowly turn phototube unit sensitivity control clockwise just to the point where the headlamps switch to the lower beam - DO NOT GO BEYOND THIS SETTING.

14. Turn intensity rheostat all the way counterclockwise, momentarily switch selector switch to "off" position and back to "DIM" position.

15. Turn intensity rheostat clockwise slowly just to the point where the headlamps switch to the lower beam. If "DIM" sensitivity has been adjusted correctly, the meter pointer should fall within the "DIM" sensitivity adjustment line. If not, repeat steps 11 through 15.

### b. "HOLD" Sensitivity Adjustment

"HOLD" Sensitivity adjustments may be made by adjusting the potentiometer on the bottom (outside) of the amplifier unit. Fig. 16E-6. THIS ADJUSTMENT SHOULD NOT BE MADE UNTIL "DIM" SENSITIVITY IS ADJUSTED CORRECTLY AND "HOLD" SENSITIVITY ADJUSTMENT CHECKED TO SEE IF THE METER POINTER FALLS WITHIN "HOLD" SENSITIVITY ADJUSTMENT BAR.

Checking "HOLD" Sensititivy Adjustment

1. With "DIM" sensitivity correctly adjusted, turn selector switch to "DIM" position, and turn intensity rheostat clockwise to end of adjustment to obtain a lower beam.

2. Turn the selector switch to "HOLD" position.

NOTE: Be sure to use correct "HOLD" position for clear or tinted windshield.

3. Turn intensity rheostat counterclockwise carefully and slowly just to the point where the headlamps switch to the upper beam. The meter pointer should fall within the "HOLD" sensitivity adjustment bar on meter scale. If not, adjust amplifier for "HOLD" sensitivity, as follows:

Adjust Amplifier for "HOLD" Sensitivity

1. Turn on headlamps and wait four minutes to allow amplifier to stabilize.

2. Turn the "HOLD" control on the bottom (outside) of the amplifier unit clockwise to end of adjustment. Use small offset screwdriver, Fig. 16E-6.

3. Rotate intensity rheostat clockwise to end of adjustment.

4. Turn selector switch to "DIM" position momentarily to switch headlamps to lower beam; then turn selector switch to "HOLD" position.

NOTE: Be sure to use correct "HOLD" position for clear or tinted windshields.

5. Adjust intensity rheostat until meter pointer is in center of the "HOLD" sensitivity adjustment bar on meter scale. Fig. 16E-7.

6. Turn "HOLD" control on amplifier counterclockwise slowly just to the point where the headlamps switch to the upper beam. If the headlamps do not switch to upper beam when the "HOLD"

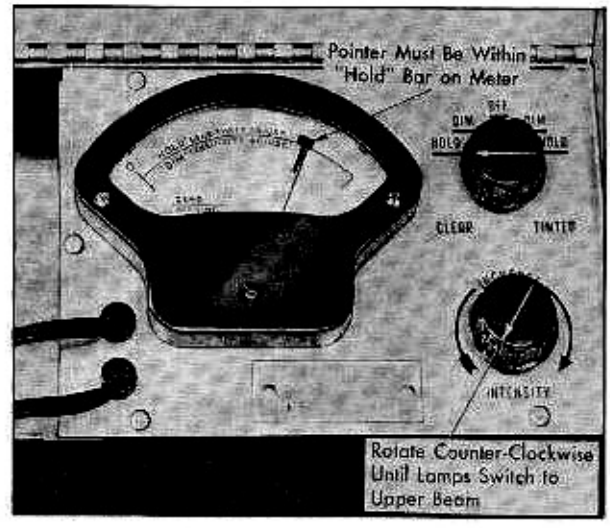


*Fig. 16-E-7 Hold Sensitivity Meter*

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control is turned completely counterclockwise, rotate intensity rheostat counterclockwise until headlamps switch to upper beam. If the meter pointer is within the "HOLD" sensitivity adjustment bar, the amplifier unit is within tolerance.

7. Again check "HOLD" sensitivity adjustment by rotating intensity rheostat clockwise to end of adjustment.

8. Turn selector switch to "DIM" position momentarily to switch headlamps to lower beam; then turn selector switch to "HOLD" position.

NOTE: Be sure to use correct "HOLD" position for clear or tinted windshields.

9. Turn intensity rheostat counterclockwise carefully and slowly just to the point where the headlamps switch to the upper beam. The meter pointer should fall within the "HOLD" sensitivity adjustment bar on meter scale, if adjustment was made correctly.

10. Turn off headlamps.

11. Disconnect Autronic Eye tester from cigar lighter.

12. Remove two oval head screws from bottom of phototube unit.

13. Lift off cover, remove test lamp and replace lens.

14. Replace cover and screws.

## (4) Minor Service Corrections (On Car)

CAUTION: Headlamps should be turned "off" before any connections are tightened, made, or broken. The battery ground strap must be disconnected before removing or tightening the phototube unit. The Autronic Eye develops 1,000 volts.

1. Check to see that all external connections are tight and properly made. Be sure to inspect plug-in connections of phototube unit under the instrument panel.

2. Turn on the headlamps and feel the amplifier for vibrator buzz. If vibrator does not buzz -

a. Be sure vibrator is firmly seated in socket.

b. Replace vibrator with new 12 volt vibrator. DO NOT USE RADIO 6 OR 12 VOLT TYPE VIBRATOR.

3. Inspect tube filaments for glowing, except the amplifier (large tube) and phototube. Check or replace one tube at a time in amplifier with known good tube. If tube is replaced, dimming sensitivity must be rechecked.

## (5) Trouble Diagnosis (Units on Car)

NOTE: The following series of tests should be made to isolate the trouble to one of the four major components of the Autronic Eye before removing any of the units from the car.

### a. Units Outside of Electronic Circuits

Disconnect blue feed wire in amplifier from multiple plug. The headlamps should switch between upper and lower beams by operating the standard foot dimmer switch. If not, trouble is in:

1. Power relay.

2. Standard foot dimmer switch.

3. Amplifier unit harness from standard dimmer switch to power relay in either the light blue or yellow wires, Fig. 16E-8.

### b. Amplifier Unit (150 volt section) Test

1. Replace blue wire and disconnect the phototube unit and auxiliary foot switch from the amplifier unit. Headlamp should be on upper beam in "automatic" position of the standard foot dimmer switch.

2. If above test is satisfactory, connect a 2 megohm resistor between black wire and natural wire in the amplifier unit harness, Fig. 16E-8.

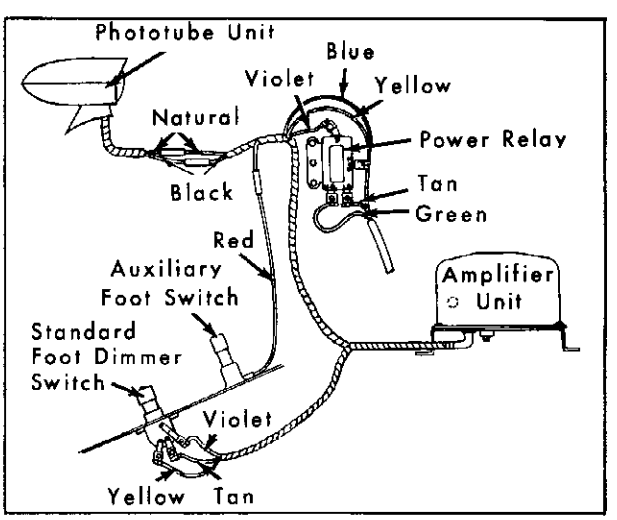


Fig. 16-E-8 Wiring Circuit

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Headlamp should remain on lower beam in both positions of the standard foot dimmer switch.

3. If headlamps remain on lower beam in Step 2, connect the red amplifier unit wire to ground (with the 2 megohm resistor connected between the black and natural wire). Headlamps should switch to upper beam in "automatic" position of standard foot dimmer switch.

NOTE: If the Autronic Eye fails in any one of the above steps, the trouble is usually in the 150 volt section of the amplifier unit.

**c. Amplifier Unit (1000 volt section) Test**

1. With phototube unit disconnected, connect a 2 megohm resistor from the black wire in amplifier unit harness to ground. With a 20,000 ohm per volt D.C. Voltmeter capable of measuring 1,000 volts, the voltage across the 2 megohm resistor should at least be 850 volts. If not, the trouble is probably in the 1,000 volt section of the amplifier.

NOTE: A high voltage control, adjusted and sealed at the factory, is provided inside the amplifier. If necessary, the seal may be broken and the control readjusted to the voltage marked inside the amplifier cover.

**d. Phototube Unit**

1. If the amplifier unit is functioning properly, connect the phototube unit to the amplifier unit. With light entering the phototube unit, the headlamps should be on lower beam in both positions of the standard foot dimmer switch. With no light entering the phototube unit, the headlamps should be on Upper Beam in one position of the standard foot dimmer switch ("automatic" position). If not, trouble is in the phototube unit.

2. If above test is correct, the auxiliary foot switch should be depressed and should cause the upper beam to be "on" in one position of the standard foot dimmer switch ("automatic" position).

NOTE: If the tests above indicate that the trouble is in either the phototube unit or the amplifier unit, they should be removed from the car and serviced.

Conversion to operation of the headlamps by the standard foot dimmer switch can be accomplished by disconnecting the wires 1, 2, and 3 from the power relay and connecting them to their respective terminals on the standard dimmer switch. If the auxiliary foot switch or power relay are defective, they should be replaced. When installing any one of the Autronic Eye Units, connections should be made in accordance with the installation wiring diagram, Fig. 16E-8.

OTHER NOTES AND REFERENCES

# AUTRONIC EYE

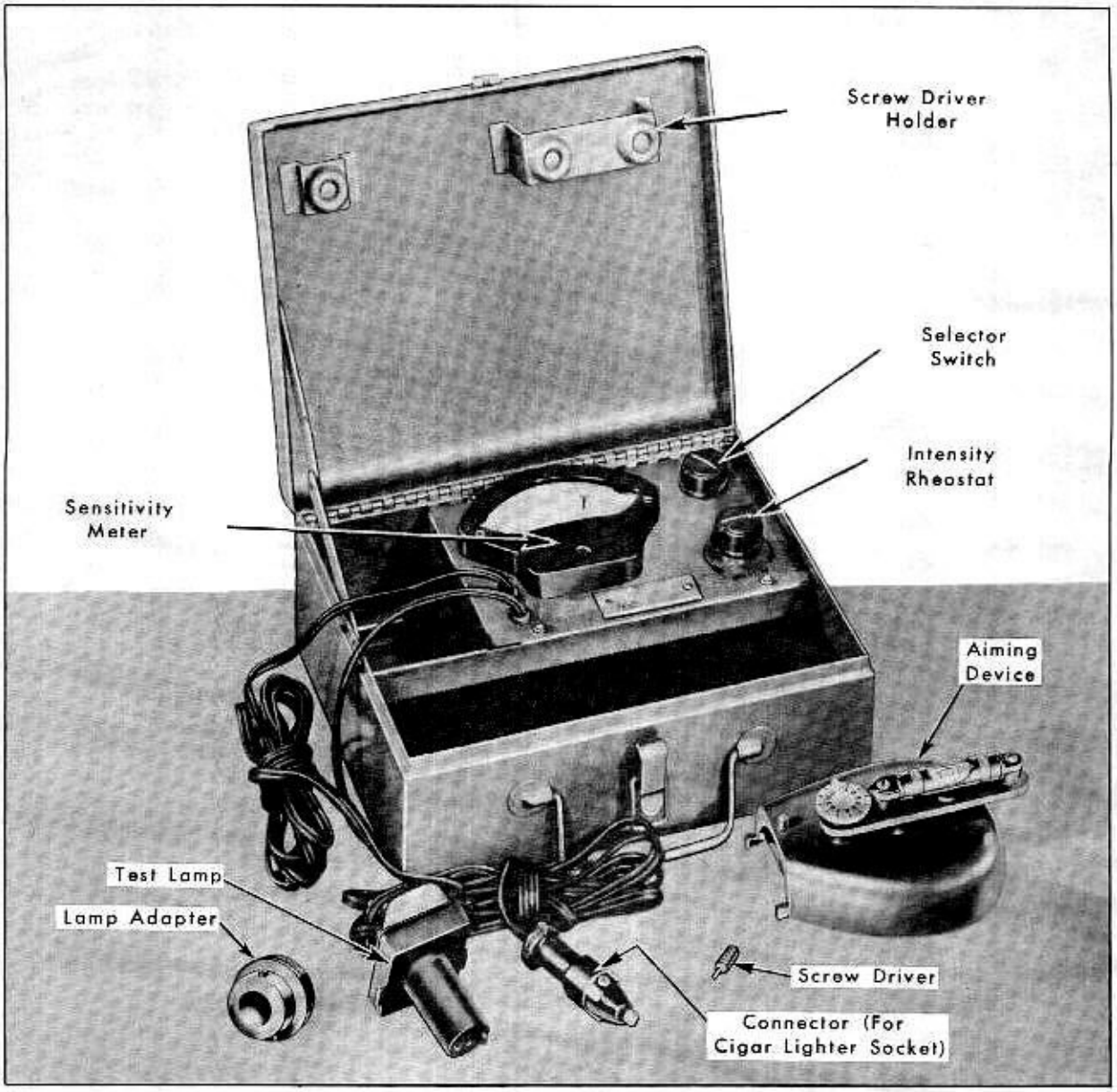


Fig. 16-E-9 Special Tools

# ACCESSORIES

# FOG LIGHTS

## GENERAL DESCRIPTION

The Fog Lamps on all 1954 Cadillac cars are mounted in the radiator grille and incorporate the turn signal lights.

The Fog Lamp switch is controlled by a "ring" mounted behind the headlamp control knob at the extreme left side of the instrument panel. The switch is part of the headlamp switch system and is designed so that either parking lights or Fog Lamp may be used when the headlamp switch is adjusted to the parking light position. This is necessary in order to comply with the existing laws governing automobile lighting in effect in some states.

## SERVICE INFORMATION

### (1) Fog Lamp Aiming Procedure

1. Place car on a level floor, 25 feet from a wall or screen. Draw on this surface, a horizontal line at the same height at the centerline of the Fog Lamps.

2. Sight through the rear window over radiator ornament and draw vertical centerline of car.

3. Measure distance between lamp centers and draw vertical lamp centers on screen.

4. Loosen aiming screw, located at back of Fog Lamp housing, and adjust lamp until top of beam is four inches below horizontal centerline of Fog Lamp and centered on its vertical centerline.

5. Tighten aiming screw.

NOTE: The above aiming specifications comply with the minimum average state requirements. Where permissible by state law, the lighting may be improved somewhat by raising beam to parallel with the road or with center of Fog Lamp beam on horizontal center of lamps on the aiming screen.