

CLIMATIZER, DEFROSTER AND AIR CONDITIONER

The Climatizer is a fresh-air heating and ventilating system. Fresh air taken in at the shroud ventilator in the right fender passes through an air duct and blower and then through the Climatizer heating core. The air is discharged underneath the front seat and distributed uniformly throughout the car interior (See Fig. 1). The large volume of fresh air, heated as required, also prevents frosting of the car windows except under extreme conditions, when it is supplemented by the windshield defroster.

The defroster, which includes a heating booster, forces heated air through flexible tubes and built-in air outlets to remove the condensation and frost from the windshield. An individual outlet is provided for each half of the windshield. Fig. 2 illustrates the defroster motor and blower with the heating coil at the air intake.

The defroster and Climatizer blower motors are controlled by individual switches on the instrument panel. The flow of water to both units is controlled by a single thermostatically operated valve which is mounted on the dash just below the package compartment. This automatic valve is set to maintain the desired air temperature by moving the control handle which is mounted just below the instrument board on the left side.



FIG. 1

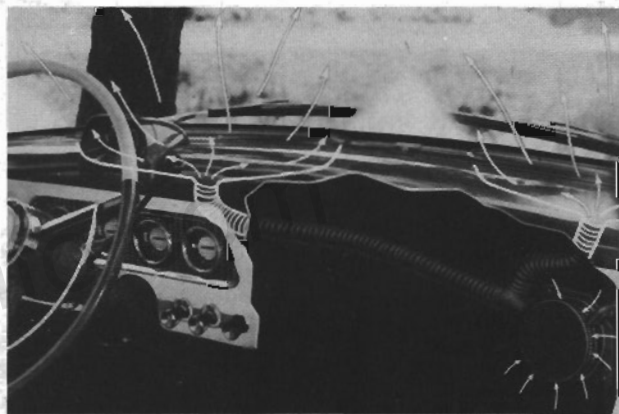


FIG. 2

CLIMATIZER

CORE

Removal and Installation—All Models

Drain the cooling system, loosen the hose clamps, and remove the hoses from the core. Remove the front seat cushion. Remove the six core mounting screws and lift the air deflector and the core out of the core housing.

Place the core in the core housing, making sure the core grommets at the inlet and outlet pipes are properly positioned, install the air deflector, and install the core retaining screws. Lay a bead of sealing compound between the core flange and the housing. Connect the hoses to the core. Fill the cooling system and check the core and connections for leaks. Install the front seat cushion.

CORE HOUSING

Removal and Installation—All Models

Remove the core as outlined under Climatizer Core—Removal and Installation. Remove the screw from the clip which holds the core hoses together just in front of the housing, and leave the clip on the hoses. Remove the screw which holds the blower-to-housing tube on the housing. Remove the housing-to-floor screws, remove the blower tube, and then lift the housing out of the floor pan opening.

Lay a bead of sealing compound around the floor opening. Insert the heater core housing in the tube and press the housing down into position. The sealer should squeeze out all around the edge of the heater core housing mounting flange. NOTE. — Proper sealing

around the opening is most important. A few minutes spent in sealing will prevent serious owner inconvenience. Install the housing-to-floor pan screws. Install the blower-to-housing tube retaining screw. Install the core hose clip at the floor pan and then install the core as outlined in Core—Removal and Installation.

MOTOR AND BLOWER ASSEMBLY

Removal and Installation—All Models

Disconnect the motor wire at the connector at the dash flange. Remove the clip from around the loom on the dash panel flange and pull the loom and wire down through the hood hinge spring opening behind the hood hinge. Loosen the air hose clamps at the blower inlet and outlet and remove the outlet hose from the blower. Leave the inlet hose clamp tight on the blower housing. Remove the blower mounting bracket retaining bolt and nuts which secure it to the

right front fender apron on the underside of the fender. Remove the assembly with the short air hose attached to the blower.

To install the motor and blower, raise the blower to the fender apron and while aligning the mounting holes, but before the bolts are installed, slide the short inlet air hose over the end of the under-fender air duct. Install the mounting bolts through the bracket and fender apron, using shakeproof washers beneath the bolt head and also the nut. These washers help make a good electrical ground. Connect the long air hose to the blower outlet. Use clamps around all hose connections.

With the loom over the wire, thread the loom and wire up through the opening beside the hood hinge spring. Place the loom and wire behind the hood hinge and fasten with clip on top of the dash flange. Connect the motor wire from the connector.

DEFROSTER

COIL

Removal and Installation—All Models

Drain the cooling system and remove the hoses from the coil pipes. Disconnect the heater valve control cable and place to one side. Then remove the three coil cover-to-defroster blower screws (8, Fig. 3) which allows removal of the coil (5), inner and outer covers (3 and 7), and gaskets (4 and 6).

Assemble the inner and outer covers and gaskets on the coil, using a paper gasket between each cover and the coil. Insert the coil inlet and outlet pipes through the cowl, position the coil and cover assembly on the blower, and install the retaining screws. Connect the heater valve control cable to the heater valve. Connect the hoses to the coil pipes and fill the cooling system. Check the hose connections and coil for leakage.

MOTOR, BLOWER, AND COIL ASSEMBLY

Removal and Installation—All Models

Disconnect the defroster motor-to-switch wire from the connector at the dash flange. Remove the defroster air hoses and disconnect the heater valve control cable.

Drain the cooling system and remove the hoses from the coil pipes. Remove the mounting bracket stud nuts and remove the assembly from the cowl.

To install, position the assembly at the cowl with the gasket and install the stud nuts. Connect the hoses to the coil pipes, tightening the hose clamps securely. Connect the defroster motor wire to the connector. Connect the heater valve control cable and install the defroster air hoses.

Fill the cooling system and check hose connections for leakage.

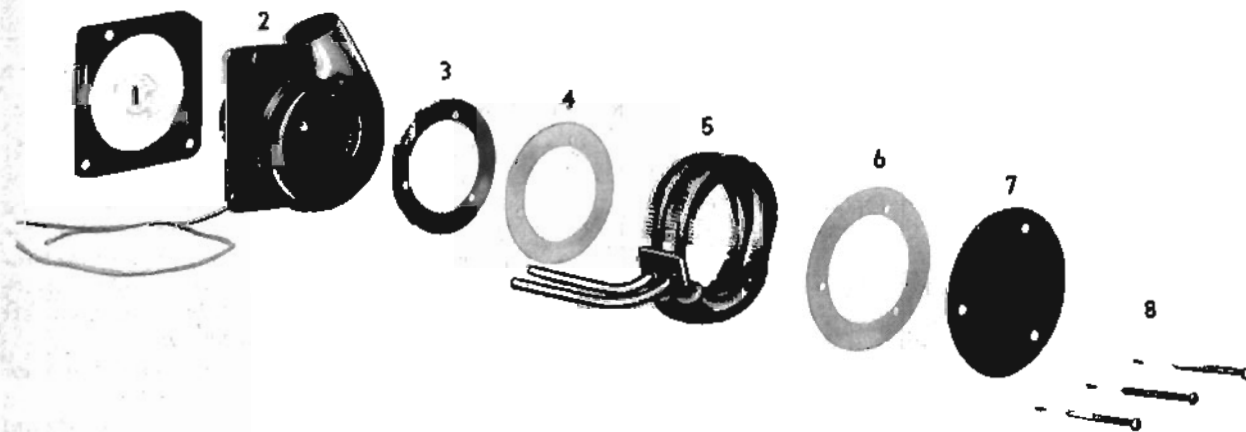


FIG. 3

1. Gasket
2. Defroster motor

3. Inner cover
4. Paper gasket

5. Coil
6. Paper gasket

7. Outer cover
8. Coil cover-to-blower screws

AUTOMATIC WATER CONTROL VALVE

The air temperature in the car is controlled by an automatic water control valve which regulates the amount of hot water permitted to circulate through the Climatizer core. The valve is set manually for the desired temperature by means of the control handle at the instrument panel. Changing the position of the control, changes the setting of the valve and results in raising or lowering the point at which the temperature will be maintained. After the interior of the car reaches the desired temperature, the control valve will automatically maintain this temperature.

The control valve maintains the temperature automatically throughout its entire range except at the maximum setting position. In this position, the valve is locked open and the Climatizer will deliver a maximum heat regardless of the temperature of the car.

At the minimum setting position the valve is fully closed and no water will flow through the heater core.

A 170° engine cooling system thermostat is installed in production in all models. A 180° thermostat may be installed if more heat is desired than can be obtained with the production thermostat.

Servicing and Installation—All Models

No attempt should be made to disassemble, repair, or adjust the control valve nut. The spring adjusting screw is carefully set by the manufacturer and should not be disturbed. If for any reason the unit does not function properly, it should be replaced.

To insure proper operation of the unit, make sure that the manual control cable is adjusted so that the roller arm can be operated through the full length of travel from the minimum setting position to the maximum setting position.

The water valve mounting screws enter from the engine compartment side of the dash. The valve must be installed so that the capillary tube extends from the top of the valve. The water hose leading from the cylinder head elbow (or the water pump manifold nipple on V-8 models) must be connected to the curved pipe of the automatic valve. On the Champion and Flighthawk models, the molded elbow end of the water hose is connected to the curved pipe of the automatic heater valve.

HOSE INSTALLATION AND LENGTHS

Hose Installation

Use only a small amount of thin gasket shellac on the hoses and fittings to facilitate their installation. In addition it is easier to slip the hoses over the fittings,

the shellac will harden quickly, sealing and strengthening the joint against leaks when the system is under pressure. Never use soap, lubricant, or any non-hardening sealer on the hose connection.

HOSE LENGTHS

	CHAMPION	FLIGHTHAWK	COMMANDER & PRESIDENT	POWERHAWK & SKYHAWK	GOLDENHAWK
15/16" OD Hose					
Defroster tee-to-heater core.....	62" (157,5 cm.)	79" (200,7 cm.)	62" (157,5 cm.)	79" (200,7 cm.)	79" (200,7 cm.)
Heater core-to-defroster tee.....	55" (129,7 cm.)	55" (129,7 cm.)	55" (129,7 cm.)	55" (129,7 cm.)	55" (129,7 cm.)
Defroster tee-to-water pump.....	28" (71,1 cm.)	28" (71,1 cm.)	24" (61,0 cm.)	24" (61,0 cm.)	37" (94 cm.)
Heater valve-to-defroster tee.....	8½" (21,6 cm.)	2½" (6,4 cm.)	8½" (21,6 cm.)	2½" (6,4 cm.)	2½" (6,4 cm.)
Cylinder head-to-heater valve (molded elbow at valve end).....	19" (48,3 cm.)	27" (68,6 cm.)			
Water pump manifold-to-heater valve.....			44" (111,8 cm.)	36" (91,4 cm.)	15" (38,1 cm.)
¾" OD Hose					
Defroster-to-tee.....	27½" (69,9 cm.)	27½" (69,9 cm.)	27½" (69,9 cm.)	27½" (69,9 cm.)	27½" (69,9 cm.)
Tee-to-defroster.....	20" (50,8 cm.)	20" (50,8 cm.)	20" (50,8 cm.)	20" (50,8 cm.)	20" (50,8 cm.)

AIR CONDITIONER

DESCRIPTION

The Studebaker Air Conditioner is a selectively controlled system that cools, cleans, dries, and circulates the air within the car. The system consists of a compressor, condenser, evaporator or cooling unit two blowers, filter, condensation drains, ducts, fittings, and hoses.

Air from inside the car is led through two openings in the rear package shelf to the refrigeration unit on the ledge of the trunk compartment. In the refrigeration unit the air passes over the evaporator where it gives up much of its heat to a gas, Freon 12, flowing through the evaporator. At the same time, humidity from the air condenses on the evaporator coils and is drained away. The cooled, dried, filtered air is then forced by either or both of the blowers back into the car through the two cold air outlets (plastic tubes) mounted on the package shelf.

CONTROL OF SYSTEM

The driver controls the system from a panel mounted beneath and at the center of the instrument panel. There are three controls on the panel. The center control regulates the amount of cooling action the conditioner is to furnish; the further out it is pulled, the cooler will be the air delivered from the outlets.

Car body temperature may also be regulated by varying the rate of circulation of the air through the evaporator where it is cooled. The two outer controls in the control panel operate two 3-point switches which regulate the speeds of two air circulation blowers; one on each end of the evaporator. The right switch controls the right blower, the left switch the left blower. The switches have "Off", "Hi", and "Lo" positions. The switches are, of course, in the "Off" position (full in) when no cooling is required. For maximum cooling, they are on "Hi" speed and for moderate cooling on "Lo" speed. Either blower may be operated separately or together in several speed combinations. The right blower may be on "Hi", the left on "Lo" or "Off", for more cooling on the right side of the car which will be required when the sun rays are entering that side. If the sun is on the left side of the car, the left blower may be on "Hi" and the right on "Lo" or "Off". The higher the blower speed, the more air will be circulated through the evaporator and the cooler will be the car.

Fresh outside air can be mixed with the recirculating air within the car at any time just by opening one of the front vent windows or (on Climatizer equipped cars) by opening the right fender vent (be sure the inner vent door is closed) to bring the air into the car through the underseat Climatizer core.

Because the air is dehumidified as it is cooled, the cooling effect of the system is increased. For example, if the outside air is 95°F. and the air inside the car is dehumidified and cooled to 80°F., it may feel to an occupant as cool as air which has not been dehumidified but cooled to 70°F.

When the car has been parked in the sun with all

windows closed, the maximum cool-down rate may be obtained and comfortable inside car air temperature reached in a minimum of time by following these instructions:

- 1—Open the two front door windows (open all 4 door windows if there are passengers in the rear seat) to evacuate the car body of hot air.
- 2—The center control should be in the full out position and the blowers turned off. (The blowers should be turned off every time the ignition is turned off and left off until the engine is started. This will reduce the battery load during cranking and allow the hot air to be evacuated before it is circulated through the evaporator.)
- 3—Start the engine and drive the car for several hundred feet in second gear of "Lo" range to obtain maximum compressor capacity, with the windows open and blower fans off to evacuate the hot inside air.
- 4—Close the windows and turn both fans on "Hi". Make the necessary adjustment on the control panel to maintain the desired temperature after the car has become comfortably cool.

In city traffic under severe operating conditions it is desirable to drive locked in direct on overdrive-equipped cars to maintain a compressor speed sufficient to assure maximum cooling. The engine should never be allowed to idle for prolonged periods of time. In bumper-to-bumper low speed traffic, it is advisable to maintain an engine speed of from 1000-1500 rpm's with the accelerator pedal when possible. This will assure better car cooling, better engine cooling, and will speed the generator to a point where it will charge.

OPERATION

The expansion valve (see Fig. 4), located at the inlet to the cooling coil or evaporator in the trunk compartment, meters the flow of Freon 12 liquid into the evaporator coil. As the Freon liquid passes through the orifice in the valve, its pressure is reduced. This reduces its boiling point to a temperature below that of the air passing over the evaporator coil and the Freon 12 boils. The automatic action of the expansion valve maintains the correct amount of Freon in the evaporator to assure its operation at maximum capacity.

In the evaporator, the Freon 12, in changing from a liquid to a gas, absorbs heat from the air forced around the coils by the system blowers. The cooled air is discharged into the car, and the moisture from the air condenses on the cooling coils and collects in the drain pan under the coil, from where two hoses drain under the car. The Freon 12 gas passes out of the evaporator and through a long flexible hose under the car to the compressor, which is mounted on the front end of the engine.

The compressor is driven by a V belt from the front of the engine crankshaft, and operates continuously when the engine is running. This assures that the seals in the compressor will not dry out, as might occur if it were allowed to stand idle for long periods of time. The compressor has two functions: (1) to pump Freon 12 through the system, and (2) to raise

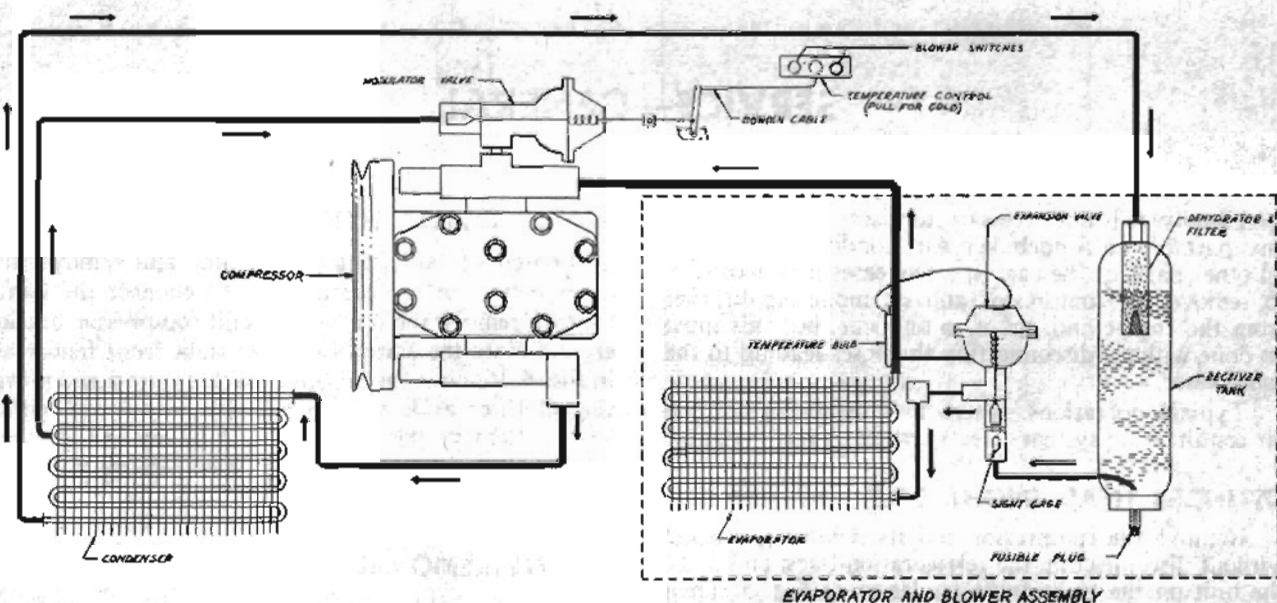


FIG. 4 SCHEMATIC DIAGRAM OF THE AIR CONDITIONER

the pressure of the Freon 12 gas received from the cooling coil, so that it will more readily condense and give up heat to the air as it passes through the condensing coil.

The condensing coil is located in front of the car radiator. In the condenser, the Freon 12, still under high pressure, changes back to a liquid. From the bottom of the evaporator, it flows back under the car through a second long flexible hose to a storage tank in the trunk compartment called the receiver.

From the receiver, the liquid is piped through a small sight glass to the expansion valve to begin a new cycle. After the air conditioning system has been in use long enough to stabilize (about 5 minutes), all of the Freon 12 passing through the sight glass should be liquid. *If bubbles appear in the glass, the system does not have a sufficient amount of Freon and should be serviced by a refrigeration mechanic.*

The system output is controlled by a modulator valve mounted on top of the compressor. This valve

allows some of the Freon 12 vapor to by-pass the evaporator, flowing from the upper part of the condenser back to the inlet of the compressor. If no cooling is required, the modulator valve is wide open, and some of the compressor output is by-passed back to the compressor inlet, so that little power is needed to run the compressor, and the remainder of the system is practically inoperative. The setting of the modulator valve can be varied by moving the hand control on the instrument panel, so that the operator can obtain as much or as little cooling as he desires, within the capacity of the system. The cycle, as described above, repeats continuously as long as the engine is operating.

A five-blade fan is used on air conditioned cars to regain the engine cooling lost due to the mounting of the condenser in front of the radiator core.

There will be occasions, especially when changing the position of the modulating valve control (center control on the control panel), when the modulating valve will buzz for a second or two. This is a normal condition.

REFRIGERANT

Under normal atmospheric pressure, Freon 12 becomes a gas at 21.7°F. below zero. Since the Freon 12 in the system is always far above this boiling point even at room temperature, *all parts of the system are always under pressure.* This is true even though the unit has not been used for some time and the engine is not running. Even after the system has been vented, small traces of Freon 12 that remain in the system may build up considerable pressure after standing.

Because of its low boiling point, liquid Freon 12 evaporates so rapidly at room temperature that it will freeze anything it contacts. *Do not disconnect*

any part of the system without first taking precautions to protect your eyes, your skin, and the car finish.

Be very careful when using paint drying lamps, ovens, steam cleaners, welding torches, etc., to avoid heating any part of the system. When Freon 12 in the confined system is heated, its pressure is increased. If sufficient heat is applied, the pressure will increase to a point where some part of the system will rupture.

Freon 12 gas, by itself and unconfined, is harmless, colorless, and odorless. It is non-explosive, non-inflammable, and non-corrosive. *However, if brought in contact with an open flame it becomes toxic.*

SERVICE—GENERAL

Usually, it is not necessary to disconnect or remove any part of the Studebaker Air Conditioner to work on other parts of the car. In a few cases it is necessary to remove the compressor and its mounting bracket from the engine and put it to one side, but this must be done without disconnecting the hoses leading to the compressor.

Typical operations, where the installation of the air conditioning system affects service or removal, are:

CYLINDER HEAD (RIGHT SIDE)

Remove the compressor and its mounting bracket without disconnecting the refrigeration lines, and place the unit on the right front fender as in Fig. 5. Then proceed to remove the cylinder head as usual.

WATER PUMP MANIFOLD

Drain the radiator. Remove the compressor and compressor mounting bracket without disconnecting the compressor hoses, and place the assembly on the right front fender as in Fig. 5. Remove both of the compressor drive belt idler pulleys and their brackets. Then remove the water pump manifold as usual.

FAN BELT

Loosen the adjusting idler pulley and remove the compressor drive belt. Loosen the power steering pump bracket and remove the pump drive belt. Then loosen the generator and remove the fan belt.

OIL FILTER

The oil filter inlet and outlet hose fittings must be aligned properly before the filter is set in position and the mounting bracket bolts are installed. The bracket mounting bolts should be installed with the heads of the bolts toward the compressor. The filter and mounting bracket must be removed to gain access to the filter inlet and outlet connections.

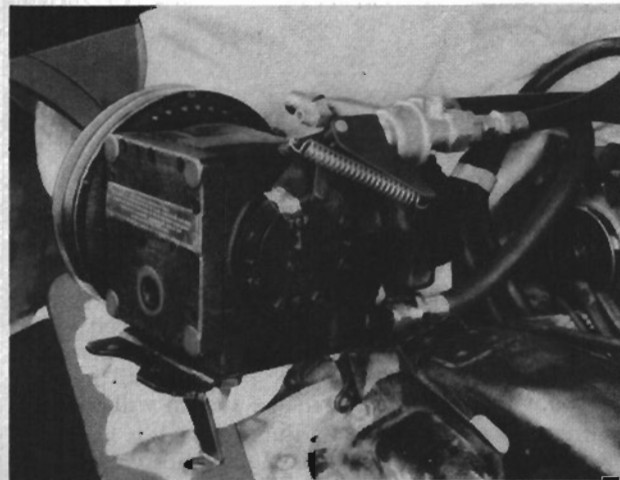


FIG. 5

WATER OUTLET FITTING OR THERMOSTAT

Loosen the adjusting idler pulley and remove the drive belt from the compressor. Disconnect the hand control, remove the compressor and compressor bracket, and place the assembly on the right front fender as in Fig. 5. Remove the oil filter bracket screws and move the oil filter aside to gain access to the water outlet screws. Remove the adjusting idler pulley bracket and remove the water outlet fitting. Then remove the thermostat.

ENGINE REMOVAL

First remove the compressor and compressor mounting bracket as an assembly, *without disconnecting the refrigerant hoses*. Move the assembly to a position on the front of the right front fender, being careful to keep the compressor crankcase lower than the compressor cylinder head, so that oil will not leak into the chamber above the piston. (See Fig. 5).

Remove the engine in the usual way.

COMPRESSOR AND BRACKET

Removal For Engine Repair

Do not disconnect the refrigerant hoses.

Drain the radiator. Loosen the idler pulley, and remove the compressor drive belt. Remove the hand control cable at the modulator valve. Remove the two cap screws which hold the compressor bracket to the water pump manifold. The lower screw, which is longer, also retains the idler pulley bracket. When the screw is removed, do not lose the spacer which fits between the brackets.

Take out the two Allen-head screws which hold the compressor mounting bracket to the water outlet fitting, and remove the cap screw at the base of the oil filler pipe. Remove the compressor and bracket with the hoses still attached, and place the assembly on the front of the right front fender as shown in Fig. 5. Keep the unit as nearly as possible in the same position as it was when mounted, so that the oil in the compressor crankcase will not run up past the compressor piston.

When installing the compressor and before putting on the belt, turn the drive pulley by hand several times to pump out any excess oil that may have collected on top of the piston. After the system is in operation, check the sight glass for bubbles.

AIR FILTER

Servicing

The air filter in the cooling coil housing in the trunk compartment should be cleaned at regular intervals.

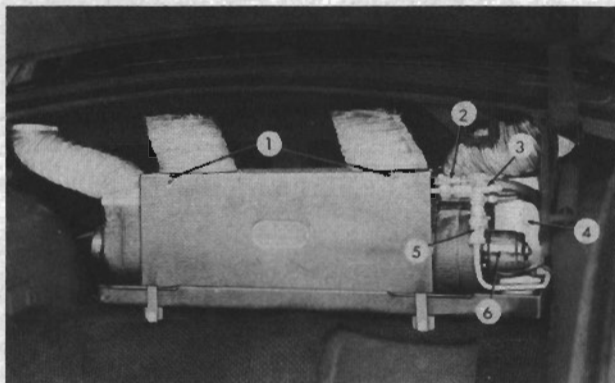


FIG. 6

1. Wing nuts
2. Evaporator outlet
3. Expansion valve

4. Receiver tank
5. Sight glass
6. Blower motor

To remove the air filter, first remove the wing nuts and washers from the studs (1, Fig. 6) near the top of the blower housing. Remove the back panel and slide the filter (Fig. 7) out of the blower housing. Wash the filter in cold, soapy water and rinse in clear water.

When reinstalling the filter, be sure it is properly positioned under the spring clips before sliding it into place.

COMPRESSOR DRIVE BELT

Adjustment

The compressor drive belt tension is controlled by the position of the left idler pulley (1, Fig. 8), which is mounted in a horizontal slot in its bracket. The idler pulley shaft is threaded into a lock nut which is retained by the idler pulley bracket. To adjust the belt, use an open-end wrench on the hexagonal part of the idler pulley shaft between the pulley and the pulley bracket. Loosen the shaft slightly, and move the pulley to loosen or tighten the belt.

The drive belt should be tightened until a force of 25 lbs. (11.5 kg.) exerted as shown in Fig. 8 will deflect the belt $\frac{1}{2}$ inch (13 cm.). (Check the tension halfway between the compressor pulley and the adjustable idler pulley. Use a spring scale held perpendicular to the belt at this point.)

Replacement

Loosen the left idler pulley shaft and slide the pulley toward the center of the car as far as it will go, to release tension on the belt. Remove the old belt and install the new belt. Adjust the belt tension as described under Compressor Drive Belt—Adjustment.

COMPRESSOR OIL LEVEL

Checking

There should be just enough oil in the crankcase of the compressor so that splash is visible in the compressor sight glass (1, Fig. 9) whenever the compressor is running.

Since the compressor crankcase forms a part of the refrigerant system, the compressor oil level should be

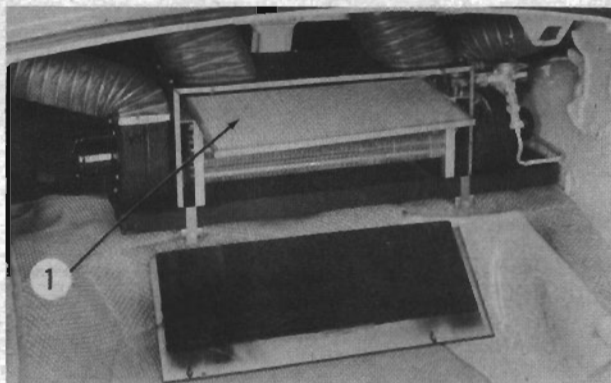


FIG. 7

1. Filter

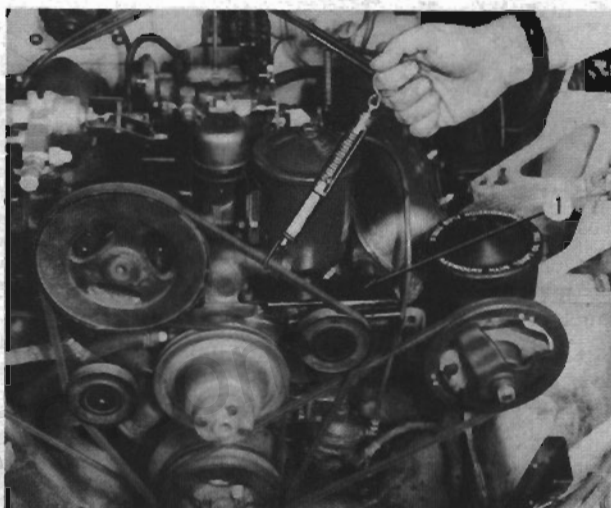


FIG. 8

1. Compressor belt idler pulley and bracket

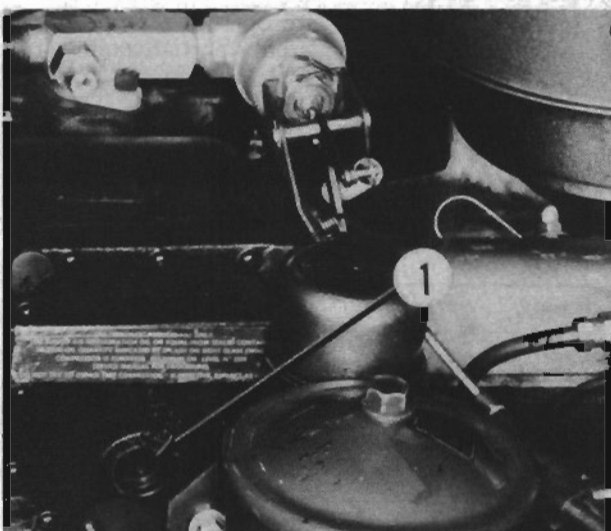


FIG. 9

1. Compressor sight glass

adjusted only by a Novi warehouse or service outlet.

If the compressor fill plug is removed by error, the entire system will have to be purged and recharged.

