AMERICAN AIR—AIR CONDITIONING

GENERAL INFORMATION

INTRODUCTION

American Air air conditioning units are designed specifically to fit AMC cars and Jeep vehicles and are the only factory-approved units available for aftermarket installation.

Each American Air unit consists of a basic air conditioning kit and an engine adapter kit. Some models also require different cooling system components and an instrument cluster bezel adapter kit or a condenser mounting bracket kit or both, depending on year, model, and engine type.

NOTE: *Kit and cooling system component applications are outlined in the Accessories/Special Equipment Catalog. In addition, the various kits and components must be ordered separately and according to year, model, and engine.*

The basic air conditioning kit includes the evaporator, compressor, condenser, receiver/dryer, and all of the hoses and fittings needed for a complete installation. The engine adapter kit includes the mounting brackets, crankshaft pulley, and all of the braces and fasteners needed to install the underhood components included in the basic kit.

The basic air conditioning kit is available in two models, the Custom and the Universal. On Custom models, the evaporator housing is designed to fit the instrument panel contour. Some models are accented with simulated woodgrain trim to complement the vehicle interior. On Universal models, the compact evaporator housing is designed for center mounting under the instrument panel. Refer to Figures 1 through 8 for typical Custom and Universal installations.

Basic Custom model kits are available for all 1975-79 AMC cars and Jeep vehicles. Basic Universal model kits are available for 1975-77 Gremlin, Hornet, and Matador models and for 1975-76 Cherokee, Wagoneer, and Truck models only.

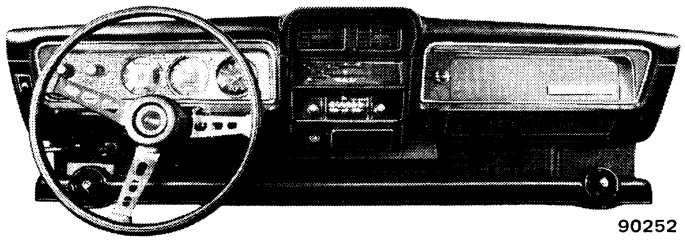


Fig. 1 1975-77 Gremlin-Hornet-AMX Custom Installation

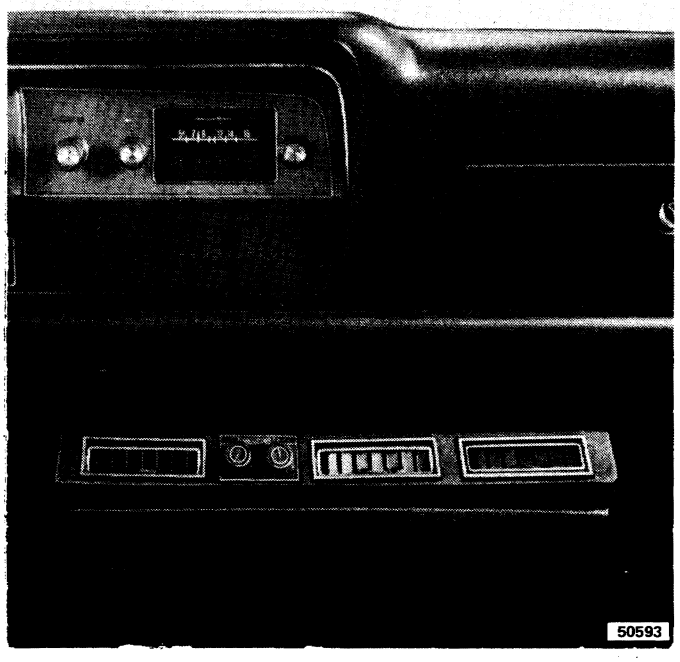


Fig. 2 1975-78 Matador Custom Installation

Fig. 3 1975-77 Gremlin-Hornet-AMX Universal Installation

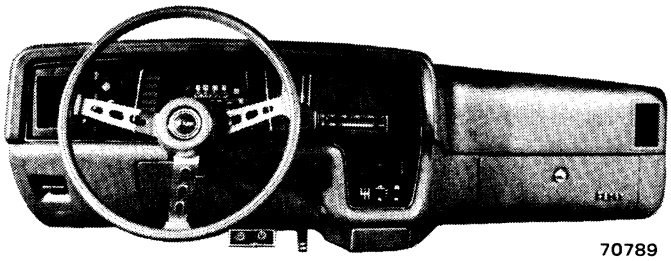


Fig. 4 1975-79 Pacer Custom Installation

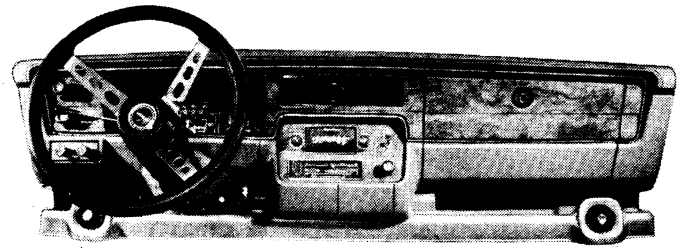


Fig. 5 1978-79 Gremlin-Spirit-Concord-AMX Custom Installation

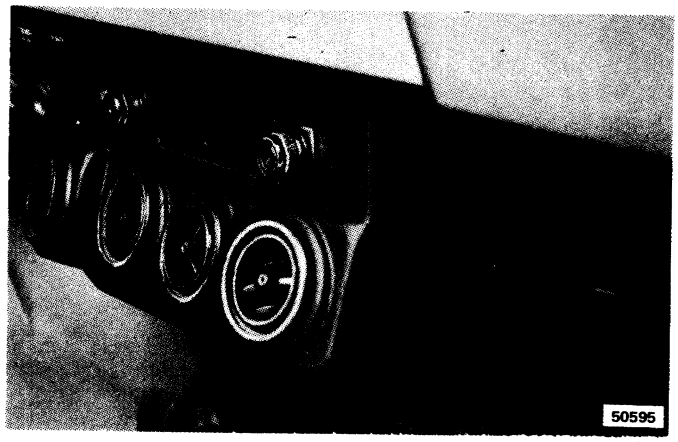


Fig. 6 1975 Jeep CJ Custom Installation

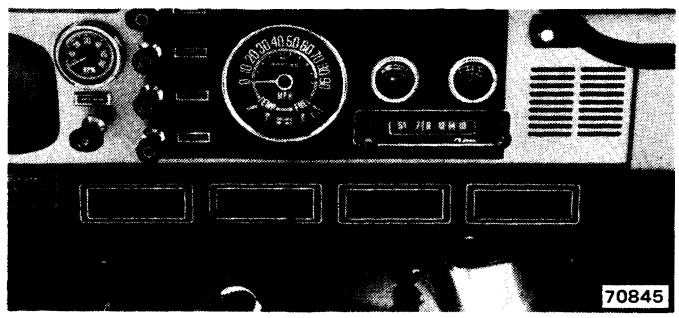


Fig. 7 1976-79 Jeep CJ Custom Installation

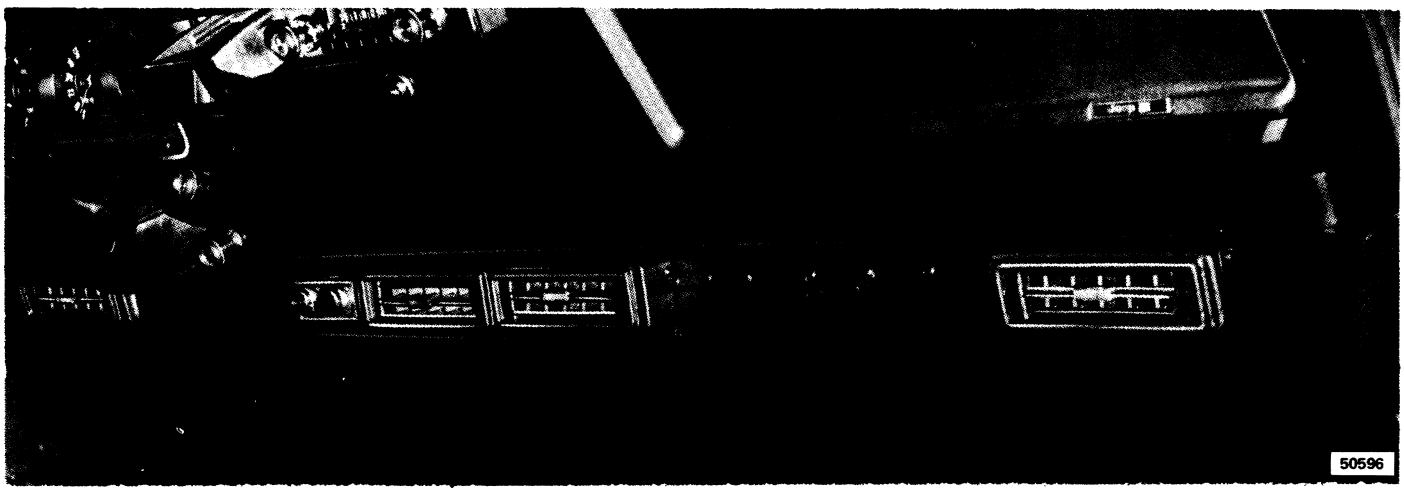


Fig. 8 Jeep Cherokee-Wagoneer-Truck Custom Installation

SYSTEM CONTROLS

Each air conditioning kit has a twin-knob control panel. The **air control knob** actuates a three-speed blower switch for increasing or decreasing air flow volume. This switch must be turned to the On position to operate the air conditioning. The **thermostat control knob** actuates the thermostat which determines cooling air temperature.

AIRFLOW

American Air air conditioning kits operate on a "closed system" principle in that air is not drawn from outside the vehicle; all air is recirculated within the vehicle. Cooled air travels from the blower motor, through the evaporator core and directly out of the evaporator case louver outlets. Two flex hoses in conjunction with adjustable louver outlets in the evaporator and instrument panel are used to direct airflow.

SYSTEM COMPONENTS

Evaporator

The evaporator acts as both air cooler and dehumidifier. When refrigerant enters the evaporator core, it begins to boil. The heated air passing over the evaporator transfers its heat to the boiling refrigerant. As the air cools, moisture in the air condenses on the evaporator core and is drained off as water.

Compressor

The compressor is a two-cylinder, belt driven pump used to circulate and increase pressure of system refrigerant.

Magnetic Clutch

The magnetic clutch consists of a stationary electromagnetic coil and rotating clutch pulley and plate assembly. The pulley drives the compressor crankshaft when the coil is energized. When the coil is de-energized, the clutch pulley freewheels and the compressor is inoperative.

Condenser

The condenser is mounted in front of the radiator to allow air flow over the condenser cooling fins which receive and dissipate heat from the refrigerant. As refrigerant passes through the condenser, it liquifies (condenses).

Receiver/Dryer

The receiver/dryer is a reservoir used to store the precise amount of refrigerant required by the system. This unit must have a capacity sufficient to provide a steady flow of refrigerant to the expansion valve. A sight glass, located at the upper end of the receiver/dryer, is provided as a means of making visual checks of system refrigerant level.

Expansion Valve

The thermostatic expansion valve, located at the inlet side of the evaporator, meters refrigerant to the evaporator. If too much refrigerant is metered, a flooding condition occurs and the unit will not cool. In addition, if too little refrigerant is metered, the system is starved and will not cool.

The metering action of the expansion valve is controlled by a temperature sensing bulb mounted on the outlet (suction) line of the evaporator.

SYSTEM OPERATION

As the compressor increases pressure on the system refrigerant, the pressure exerted also heats the refrigerant causing a temperature rise (fig. 9). The heated refrigerant is then pumped into the condenser where it is cooled by transfering heat to air flowing over the condenser fins. As the refrigerant cools, it condenses into a liquid. The liquified refrigerant, which is still under high pressure, passes into the receiver/dryer which acts as the system reservoir. When the high pressure liquid refrigerant leaves the receiver/dryer, it flows into the expansion valve. The expansion valve meters refrigerant into the evaporator where a low pressure is maintained by the suction side of the compressor.

When refrigerant enters the evaporator, it begins to boil immediately as a result of absorbing heat from air passing over the evaporator core. After the air transfers its heat to the refrigerant in the evaporator, it is now in a cooled state and ready for transfer into the passenger compartment.

As a result of the rapid heating and boiling in the evaporator, the refrigerant becomes vaporized once again. The vaporized refrigerant is then drawn back to the compressor to repeat the cycle.

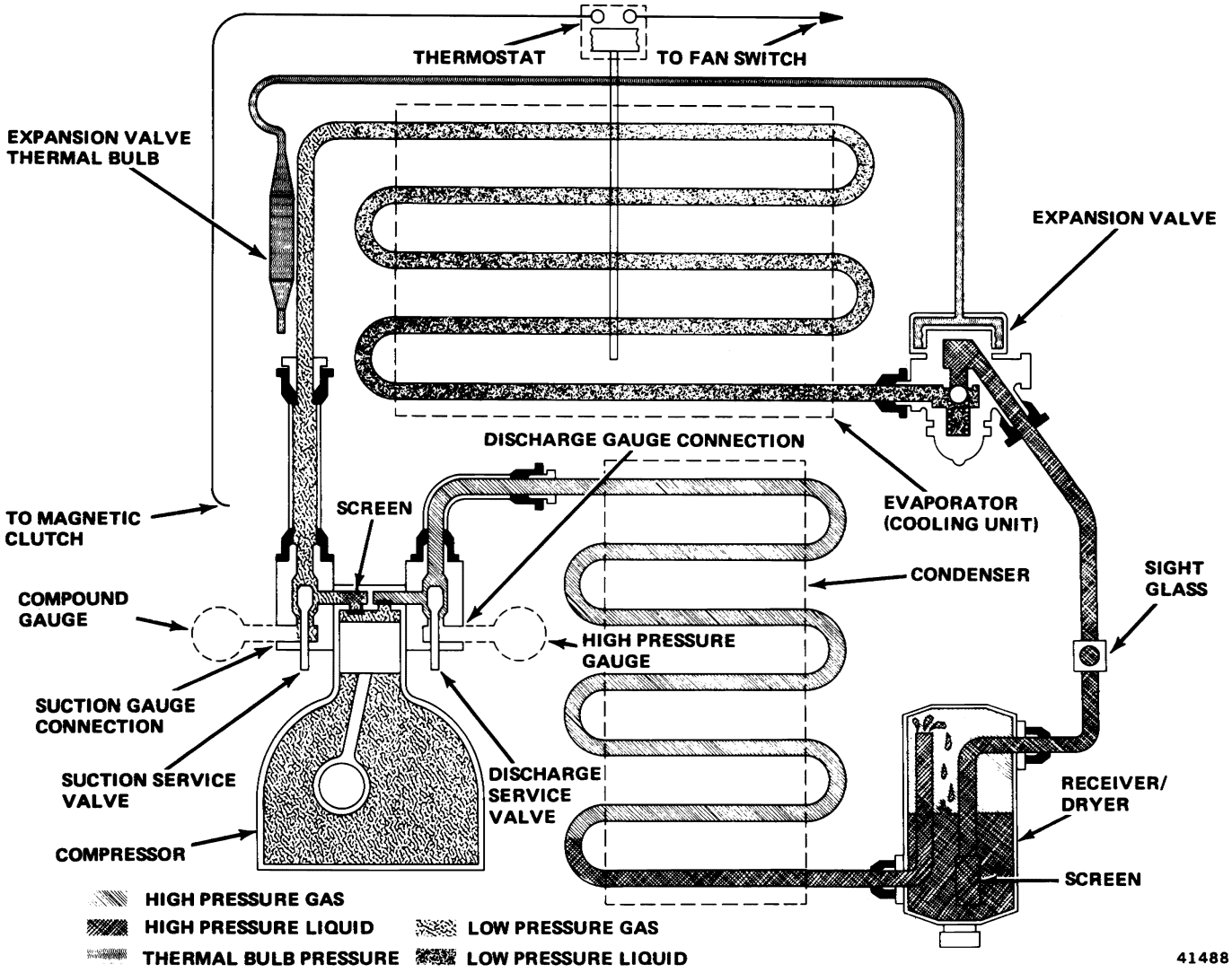


Fig. 9 Refrigeration Cycle

NOTES

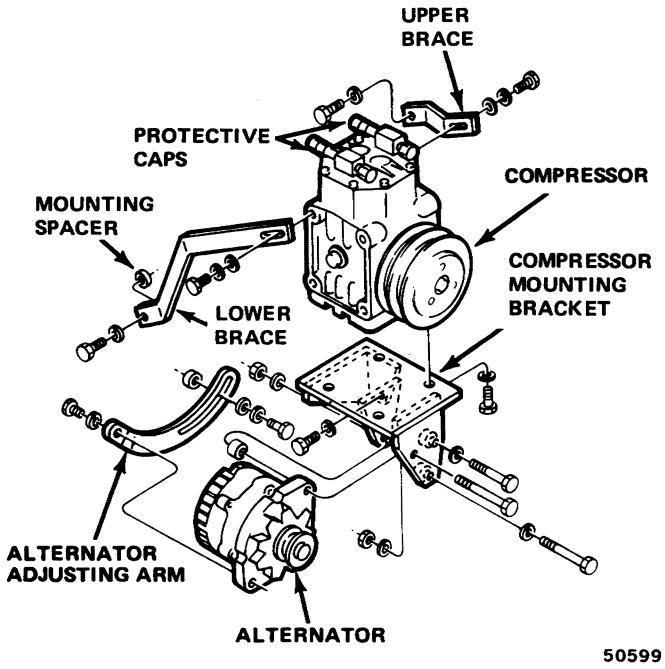


Fig. 11 Compressor Mounting—
1975-79 Six-Cylinder Engine except Pacer

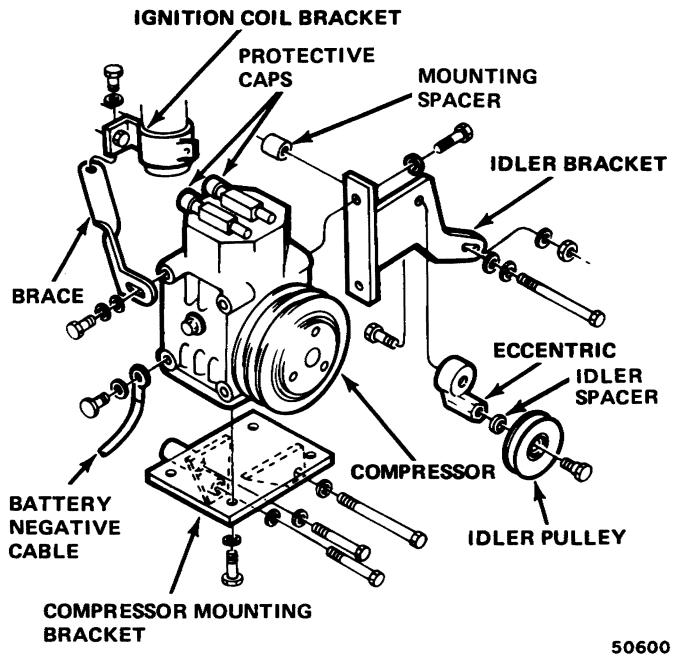


Fig. 13 Compressor Mounting—1975 Eight-Cylinder Engine

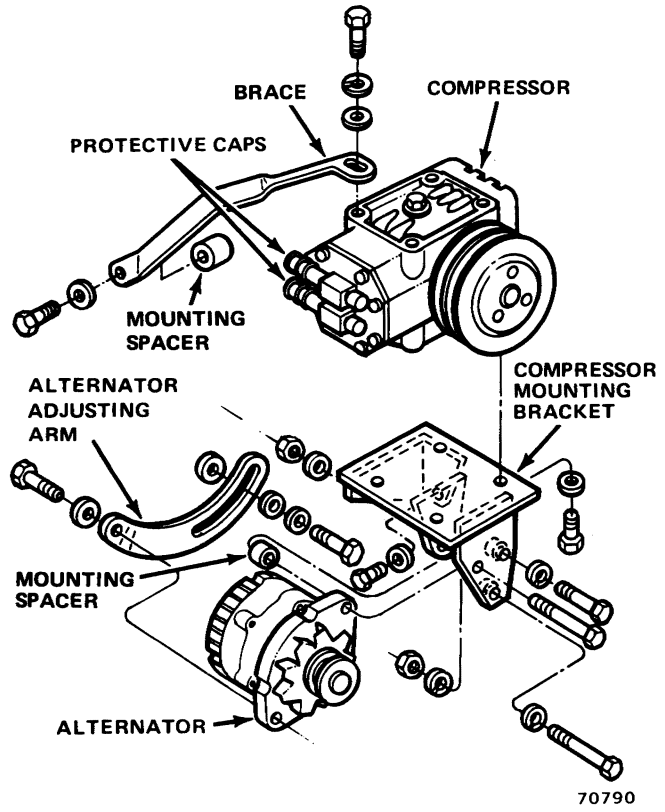


Fig. 12 Compressor Mounting—1975-79 Pacer Six-Cylinder Engine

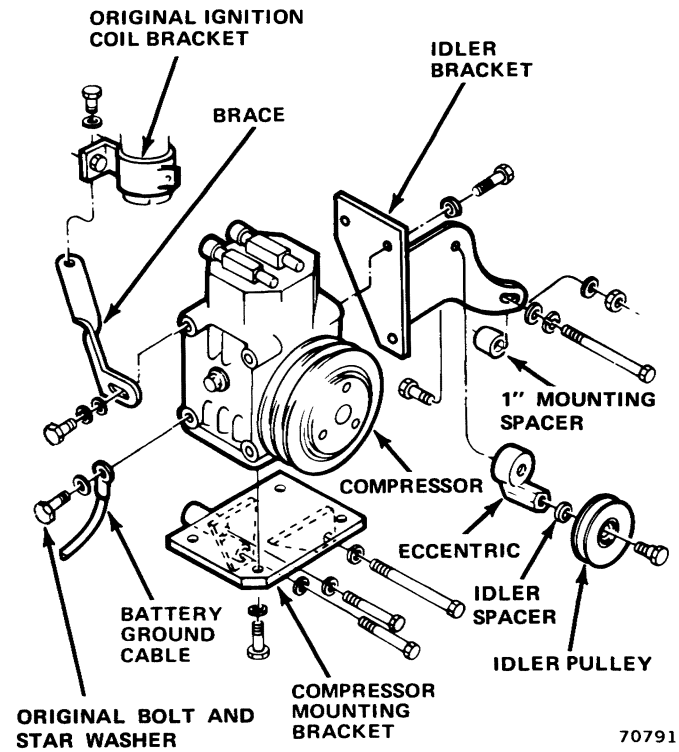


Fig. 14 Compressor Mounting—1976-79 Eight-Cylinder Engine

Compressor Belt Tension

The belt tension adjustment specifications for new and used (in-service) compressor drive belts are different. New belts require a higher initial tension adjustment to compensate for tension loss that occurs during the first few minutes of operation.

Used (in-service) belts should be adjusted to 105 to 130 pounds (467 to 578 N) tension on eight-cylinder engines and 90 to 115 pounds (400 to 512 N) tension on four- and six-cylinder engines.

New belts should be adjusted to 125 to 155 pounds (556 to 689 N) initial tension on all engines.

Compressor drive belt tension is adjusted at the idler pulley mounting bracket.

NOTE: *New belt tension specifications apply only to service replacement belts. Once a new belt has been adjusted and operated, it is considered a used belt and should be set to used-belt specifications thereafter.*

Compressor drive belts are made of Dacron. A unique characteristic of this type of belt concerns its reaction to heat. When subjected to heat, Dacron belts tend to increase in tension rather than stretch. With Dacron belts, normal tension loss after initial operation is due to belt wear-in which allows the belt to ride deeper in the pulley V-groove.

If a belt is operated with less than specified tension, slippage can occur causing the belt contact surfaces to become glazed. A glazed belt will lose some of its load carrying capability and may slip even after being adjusted to specified tension.

Belt vibration, particularly on six-cylinder engines, is usually the result of improper tension. When excessive belt vibration or flutter occurs, adjust belt tension to specifications only. Do not attempt to cure vibration by using a higher than specified tension. Excessive tension will only increase stress on the idler assembly and will not eliminate vibration.

Isolating the Compressor

On compressors equipped with service valves, it is not necessary to discharge the system for compressor removal. The compressor can be isolated from the system eliminating the need for recharging after completing compressor service operations. The isolation procedure is as follows:

NOTE: *The compressor isolation procedure applies to units equipped with service valves only. If the compressor is equipped with Schrader valves, the system must be discharged before removing the compressor.*

(1) Connect Pressure Gauge and Manifold Assembly J-23575.
(2) Close both manifold pressure gauge hand valves.
(3) Mid-position both compressor service valves.
(4) Start engine and operate air conditioning unit.
(5) Turn suction service valve slowly clockwise toward front-seated position and observe suction pressure.
(6) When suction pressure is reduced to zero, stop engine and compressor and quickly complete front-seating of suction service valve.
(7) Front-seat discharge service valve.
(8) Loosen oil check plug slowly to release any internal pressure in compressor.
(9) Compressor is now isolated from remainder of system and service valves can now be removed from compressor if necessary.

Compressor Removal—Eight-Cylinder Engine

NOTE: *Refer to Figures 13 and 14 for parts nomenclature and assembly sequence.*

(1) If compressor is equipped with service valves, isolate compressor. If compressor is equipped with Schrader valves, discharge system.
(2) Disconnect refrigerant lines and install protective caps over valve fittings.
(3) Loosen and remove belts from compressor pulley.
(4) Disconnect magnetic clutch wire.
(5) Remove compressor mounting bracket brace(s).
(6) Remove alternator.
(7) Remove idler bracket from compressor mounting bracket.
(8) Disconnect battery negative cable.
(9) Remove compressor and mounting bracket as assembly.
(10) Remove mounting bracket from compressor.

Compressor Installation—Eight-Cylinder Engine

(1) Install mounting bracket on compressor.
(2) Install compressor on engine.
(3) Install compressor mounting bracket braces. Connect upper brace to ignition coil bracket.
(4) Install idler bracket.
(5) Install alternator.
(6) Install and adjust compressor drive belt to specified tension.
(7) Connect battery negative cable.
(8) Remove protective caps from valve fittings and connect refrigerant lines to fittings.
(9) Connect magnetic clutch wire.
(10) Purge air from compressor and open service valves, if equipped. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

Compressor Removal—Six-Cylinder Engine

NOTE: *Refer to Figures 11 and 12 for parts nomenclature and assembly sequence.*

GENERAL SERVICE PROCEDURES

GENERAL

The following service procedures apply to all American Air air conditioning systems installed in AMC cars and Jeep vehicles.

REFRIGERANT SAFETY PRECAUTIONS

The refrigerant used in American Air systems is dichlorodifluoromethane, commonly refered to as Refrigerant 12 or R-12. It is transparent and colorless in either a liquid or vapor (gaseous) state. Because R-12 has a boiling point of 21.7°F below zero (-29.8°C) at atmospheric pressure, it will vaporize at normal temperatures and pressures. In a vapor state, R-12 is heavier than air, nonflammable, and nonexplosive. It is nonpoisonous—except when in direct contact with an open flame and is noncorrosive—except when combined with water.

WARNING: *The following precautions MUST be observed when handling refrigerant R-12:*

- Always wear safety goggles when servicing any part of the system containing refrigerant. R-12 evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts. For this reason, extreme care must be taken to prevent refrigerant from contacting the eyes or skin, especially the eyes.
- When working on the system, always have a bottle of sterile mineral oil and a bottle containing a **weak** solution of boric acid and water nearby. R-12 is rapidly absorbed by mineral oil, which can be washed out with the boric acid solution. If refrigerant should get into the eyes, flush the eyes immediately with mineral oil; then wash them out with the boric acid solution. Repeat this procedure as necessary then see a doctor immediately even though irritation may have ceased after first aid treatment.
- When recharging or adding refrigerant to the system, never heat refrigerant R-12 above 125°F. In many instances, moderate heat is required to raise refrigerant pressure (in its container) above system pressure in order to add refrigerant to the system. The only acceptable method for this purpose is to place the lower portion of the refrigerant container in a bucket or large pan containing hot water not over 125°F. Never heat a refrigerant container using an open flame and never use any other heating method that would raise refrigerant temperature above 125°F. In addition, never weld or steam clean on or near system components or refrigerant lines.
- Always keep refrigerant containers or supply tanks in an upright position when charging the system. Refrigerant must enter the system as a vapor only. If the refrigerant container is placed on its side or upside down, refrigerant will enter the system in liquid form and damage the compresssor.
- Always work in a well-ventilated area and always discharge refrigerant into the service bay exhaust system or outside the building. Large accumulations of refrigerant vapor in a small, poorly ventilated room can displace the air and cause suffocation.

- Although refrigerant vapor is normally non-poisonous, it can be changed into a very poisonous gas if allowed to come in contact with an open flame. Never discharge large quantities of refrigerant in an area having an open flame. In addition, a poisonous gas is produced when using the halide torch leak detector. Avoid breathing the fumes from the detector during use.

- Do not allow liquid refrigerant to contact bright metal or chrome surfaces as refrigerant will tarnish these surfaces. Avoid splashing refrigerant on any surface. Refrigerant, when combined with moisture (water), becomes a very corrosive solution that can damage metal surfaces severely.

COMPRESSOR SERVICE

The compressor is a belt-driven, two-cylinder reciprocating pump used to circulate and increase pressure of the system refrigerant. The compressor is mounted on brackets attached to the engine and driven by a belt operated by the crankshaft pulley and compressor magnetic clutch pulley.

On four-cylinder engines, the compressor is mounted on the drivers of the engine block with a mounting bracket and two braces (fig. 10). On six-cylinder engines, the compressor is mounted on the passenger side of the engine block with a mounting bracket and two braces (figs. 11 and 12). On eight-cylinder engines, the compressor is mounted on the top, passenger side of the engine with a mounting bracket and brace(s) (figs. 13 and 14).

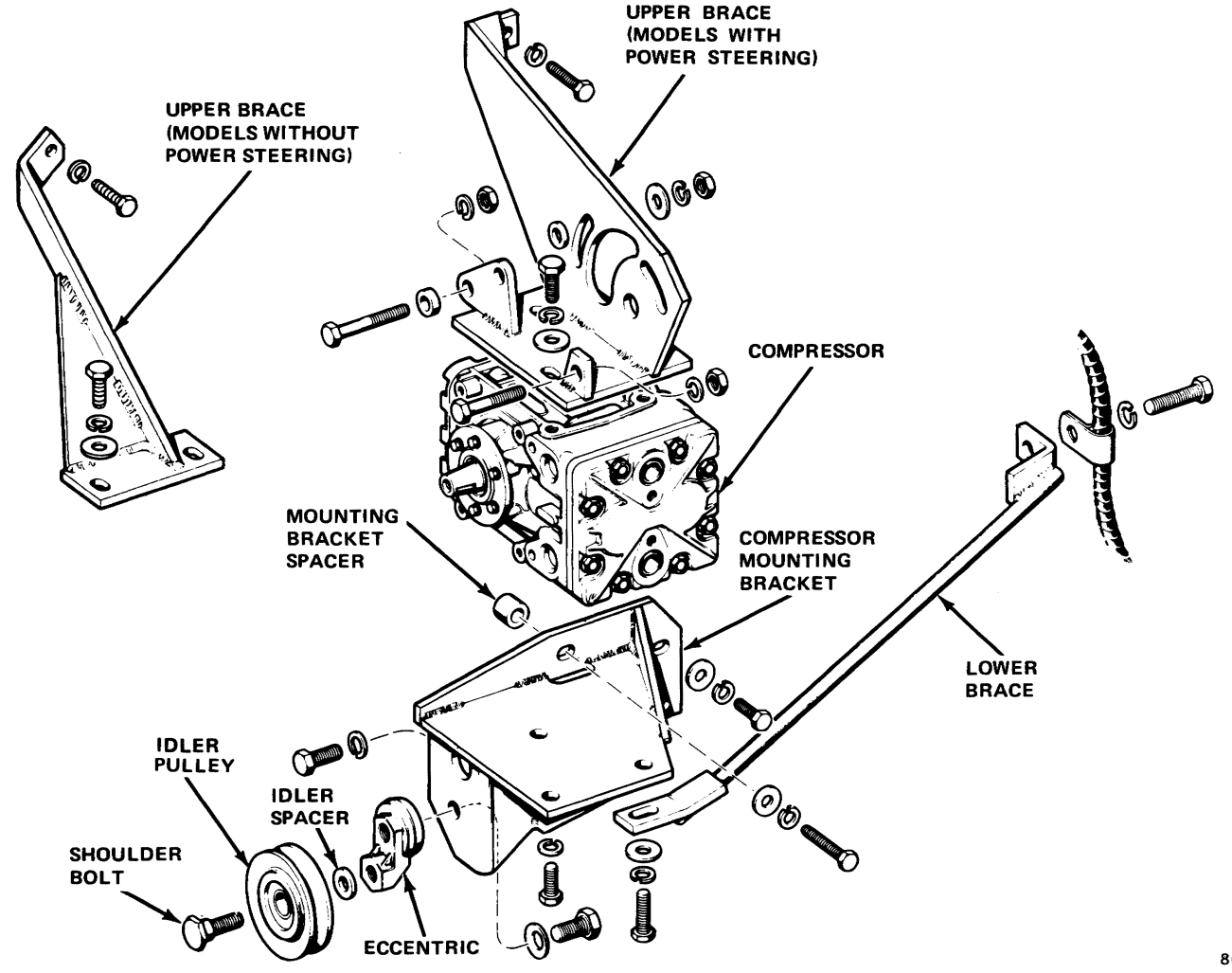


Fig. 10 Compressor Mounting—Four-Cylinder Engine

(1) If compressor is equipped with service valves, isolate compressor. If compressor is equipped with Schrader valves, discharge system.

(2) Disconnect refrigerant lines and install protective caps over valve fittings.

(3) Loosen and remove compressor belt from pulley.

(4) Disconnect magnetic clutch wire.

(5) Remove alternator belt adjusting bolt and remove alternator belt.

(6) Remove alternator upper mounting bolt.

(7) Remove alternator lower mounting bolt and move alternator aside.

(8) Remove battery negative cable and compressor mounting bracket braces.

(9) Remove compressor and mounting bracket as assembly.

(10) Remove mounting bracket from compressor.

Compressor Installation—Six-Cylinder Engine

(1) Install mounting bracket on compressor.

(2) Position assembled compressor and mounting bracket on engine.

(3) Install mounting bracket braces.

(4) Connect battery negative cable.

(5) Install alternator and alternator lower mounting bolt.

(6) Install alternator upper mounting bolt.

(7) Install alternator belt and adjusting bolt and adjust belt to specified tension.

(8) Install compressor drive belt and adjust to specified tension.

(9) Remove protective caps from valve fittings and connect refrigerant lines to fittings.

(10) Connect magnetic clutch wire.

(11) Purge compressor of air and open service valves if equipped. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

Compressor Removal—Four-Cylinder Engine

NOTE: *Refer to Figure 10 for parts nomenclature and assembly sequence.*

(1) If compressor is equipped with service valves, isolate compressor. If compressor is equipped with Schrader valves, discharge system.

(2) Disconnect refrigerant lines and install protective caps over valve fittings.

(3) Loosen power steering pump and remove drive belt.

(4) Remove power steering pump.

(5) Remove power steering pump bracket and move bracket aside.

(6) Loosen idler pulley eccentric and remove compressor drive belt.

(7) Disconnect magnetic clutch wire.

(8) Remove compressor from mounting bracket.

(9) Remove compressor mounting bracket.

Compressor Installation—Four-Cylinder Engine

(1) Install compressor mounting bracket on engine.

(2) Install compressor on mounting bracket.

(3) Connect magnetic clutch wire.

(4) Install compressor drive belt and adjust belt tension.

(5) Install power steering pump bracket on compressor bracket.

(6) Install power steering pump.

(7) Install power steering pump drive belt and adjust belt tension.

(8) Remove protective caps from valve fittings and connect refrigerant lines to fittings.

(9) Purge compressor of air and open service valves. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

Compressor Front Seal Replacement

The compressor front seal assembly is shown in Figure 15. The front seal is serviced in kit form only. All kit components must be used especially when a leak has been detected at the seal assembly.

NOTE: *A small amount of oil around the front seal is normal and does not indicate a seal leak. Because all seal parts are dipped in oil at time of assembly, normal operating pressures may force surplus oil past the seal lip.*

(1) If compressor is equipped with service valves, isolate compressor. If compressor is equipped with Schrader valves, discharge system.

(2) Remove compressor drive belt.

(3) Remove magnetic clutch and woodruff key from compressor shaft.

(4) Remove seal plate capscrews and washers.

(5) Remove seal plate by carefully prying it loose from compressor.

(6) Remove seal assembly by prying behind seal spring holder (fig. 15).

(7) Lubricate replacement seal assembly components with clean refrigeration oil.

(8) Install replacement seal assembly on compressor shaft.

NOTE: *If the carbon ring is loose (not firmly seated in friction ring and spring holder), do not install the carbon ring at this time. Also, be sure that the neoprene friction ring is facing outward (toward compressor shaft nut) after seal installation.*

(9) Slide seal assembly back and forth on compressor shaft several times to seat neoprene friction ring.

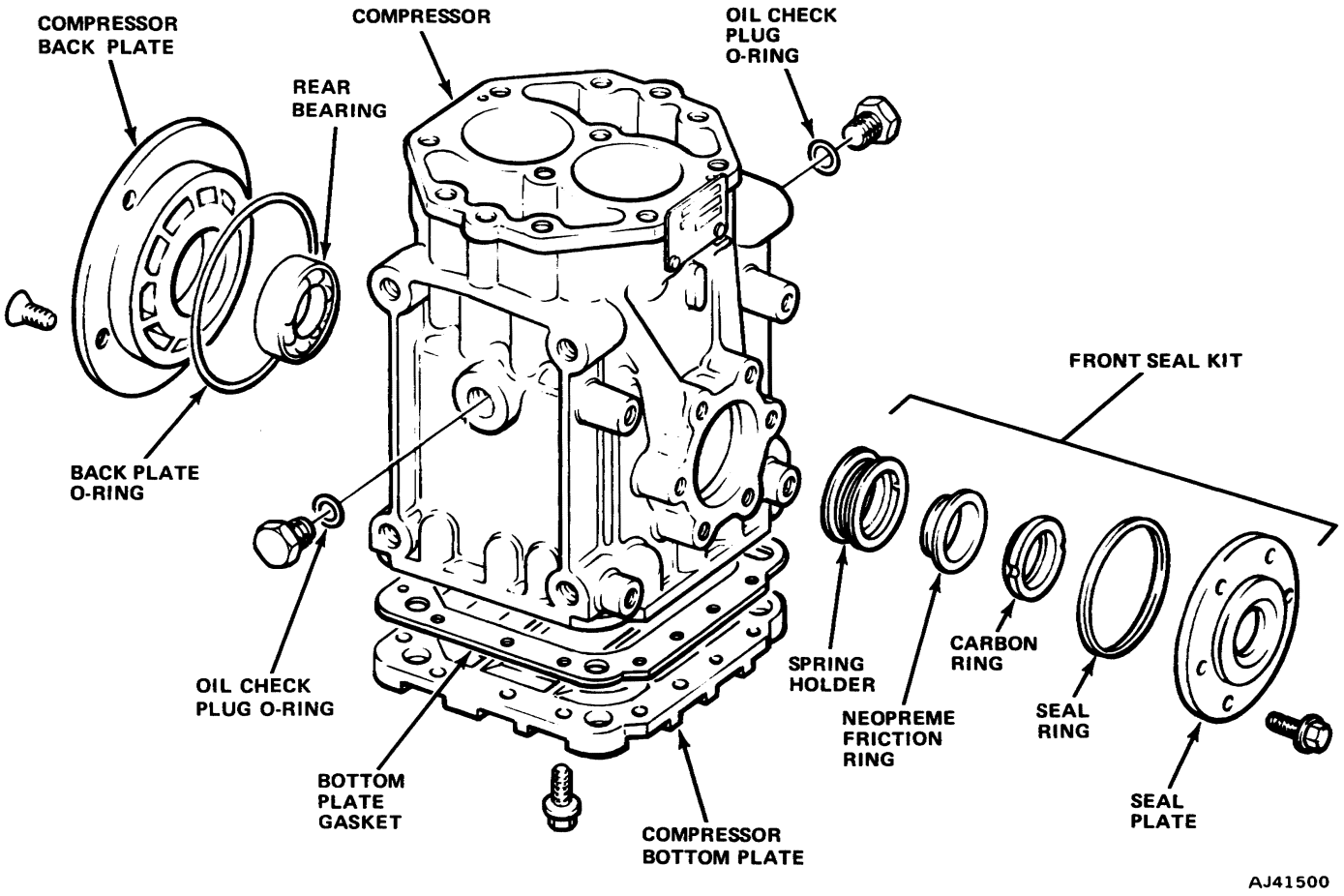


Fig. 15 Compressor Seal Components and Gaskets

(10) Push seal assembly inward until spring holder contacts bearing race. Be sure friction ring remains seated in spring holder.

(11) Install carbon ring if not installed previously. Be sure notched side of carbon ring faces outward when installed (fig. 15).

(12) Coat mating surfaces of compressor and seal plate with film of refrigeration oil.

(13) Install seal ring in seal plate ring groove.

(14) Install seal plate.

(15) Install seal plate capscrews but do not tighten completely at this time. Finger-tighten screws only.

(16) Center seal plate on compressor shaft by tapping plate lightly.

(17) Tighten seal plate capscrews in diagonal pattern to 90 inch-pounds (10 N•m) torque.

(18) Turn compressor shaft by hand (using clutch mounting bolt) to seat front seal.

(19) Install magnetic clutch and woodruff key.

(20) Install compressor drive belt.

(21) Purge compressor of air and open service valves, if equipped. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test—and recharge as necessary.

Compressor Backplate O-Ring Seal Replacement

(1) Discharge system.

(2) Remove compressor.

(3) Remove backplate attaching screws (fig. 15) using Torx Bit Tool J-25359-02.

(4) Remove backplate by carefully prying it loose from compressor. Keep backplate parallel to bearing surface during removal.

(5) Remove O-ring seal from backplate.

(6) Clean backplate and apply light film of refrigeration oil to O-ring seal surface.

(7) Position O-ring seal on backplate and install backplate over rear bearing and into compressor.

(8) Install backplate attaching screws. Tighten screws in diagonal pattern to 13 foot-pounds (17.6 N•m) torque using Torx Bit Tool J-25359-02.

(9) Install compressor.

(10) Purge air from compressor.

(11) Evacuate and charge system—perform leak—test and recharge system if necessary.

Compressor Head, Valve Plate, and Gasket Replacement

NOTE: *On six-cylinder models that have the compressor mounted in an upright position, compressor removal is not necessary for head, valve plate, or gasket replacement. However, compressor removal will be required for all other models.*

(1) If compressor is equipped with Schrader valves, discharge system. If compressor is equipped with service valves, isolate compressor.

(2) Remove compressor, if required.

(3) Remove service or Schrader valves from compressor head.

NOTE: *The valve ports have identifying letter codes cast into the head (D for discharge and S for suction).*

(4) Remove compressor head attaching screws.

(5) Remove head and valve plate by tapping under valve plate ears, which are short half-round projections on valve plate (fig. 16).

(6) Separate compressor head from valve plate by tapping valve plate ears while holding compressor head.

(7) Remove all gasket material from head, valve plate, and compressor body sealing surfaces. Do not score or nick these surfaces.

(8) Coat sealing surfaces with light film of refrigeration oil.

(9) Install replacement valve plate cylinder gasket on compressor body. Be sure gasket is positioned on locating dowel pins.

(10) Install valve plate on compressor. Be sure plate is positioned on locating dowel pins so that discharge valve is at top. Refer to Figure 16 for assembly sequence.

(11) Install replacement head gasket. Be sure gasket is positioned on locating dowel pins.

(12) Install compressor head.

(13) Install and tighten compressor head attaching screws to 15 foot-pounds (20 N•m) torque and in sequence outlined in Figure 17 only.

(14) Coat service valve ports with light film of refrigeration oil and install replacement service or Schrader valve gaskets.

(15) Install service or Schrader valves.

(16) If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

(17) Install compressor, if removed.

(18) Purge compressor of air and open service valves, if equipped.

(19) Evacuate and charge system, perform leak test, and recharge system if necessary.

Bottom Plate Gasket Replacement

(1) If compressor is equipped with Schrader valves, discharge system. If compressor is equipped with service valves, isolate compressor.

(2) Remove compressor.

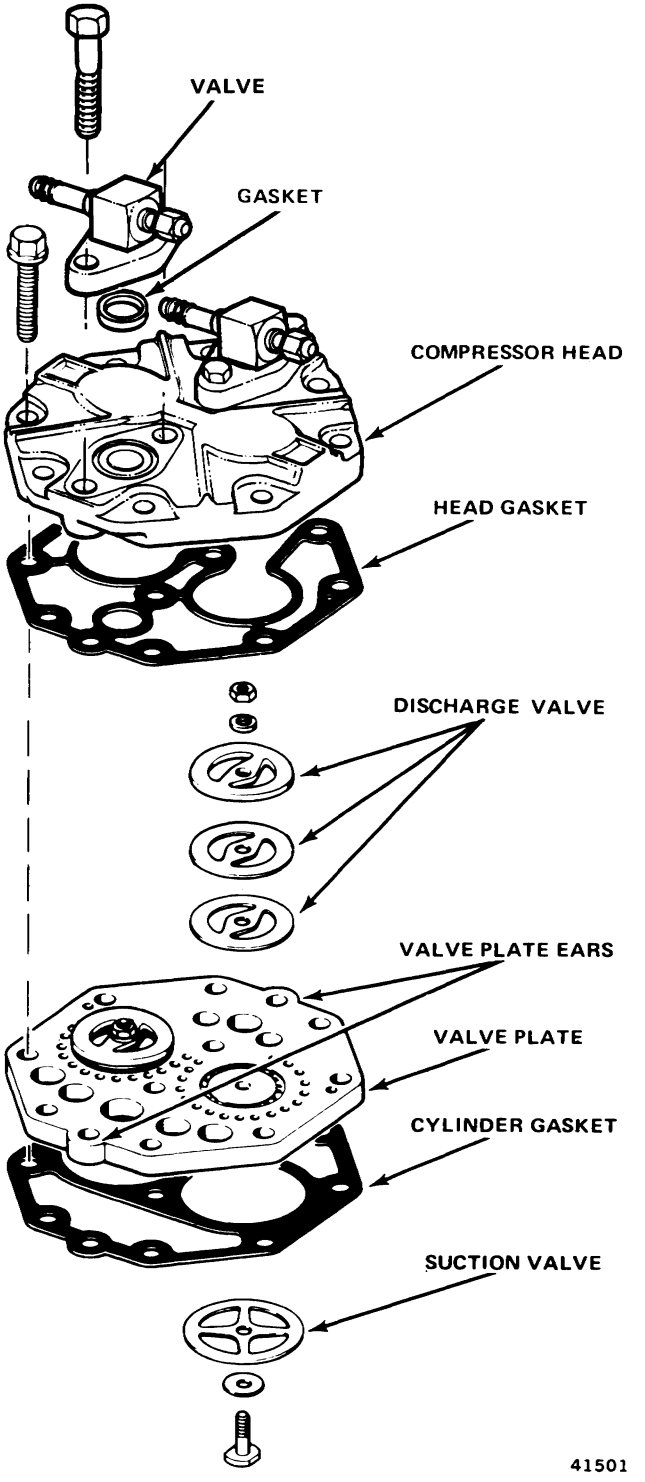


Fig. 16 Compressor Head and Valve Plate Assembly

(3) Remove bottom plate attaching screws and carefully remove bottom plate (fig. 15).

(4) Remove all gasket material from bottom plate and compressor sealing surfaces. Do not score or nick these surfaces.

(5) Coat sealing surfaces with light film of refrigeration oil.

(6) Install replacement bottom plate gasket and install bottom plate (fig. 15).

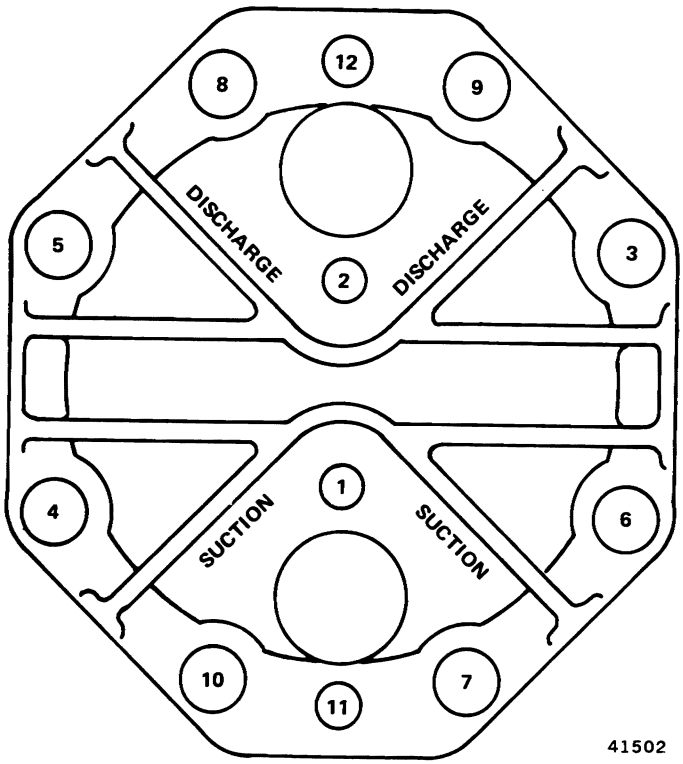


Fig. 17 Compressor Head Attaching Screw Tightening Sequence

(7) Install and tighten bottom plate attaching screws to 150 inch-pounds (17 N•m) torque.

(8) Install compressor.

(9) If compressor is equipped with service valves, purge compressor of air and open service valves. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

Checking Compressor Oil Level

At initial fill, 7 ounces (198 g) of 280 to 300 Seybolt refrigeration oil is placed in the compressor crankcase. Approved oils are Sun Oil Sunisco 5, Texaco Capella E, or equivalent. In normal operation, a small amount of this oil will always be circulating with the refrigerant in the system. Unless a system leak develops, the system oil level will remain the same.

CAUTION: *The compressor oil level must be checked whenever the system has been discharged for service part replacement and especially after a rapid loss of refrigerant has occurred.*

Check the compressor oil level with the compressor in operating position and only after vehicle interior air has been cooled to desired temperature. Operating the system stabilizes oil entrained in the system and provides an accurate oil level reading. The oil check plugs are located on either side of the compressor crankcase (fig. 15).

When installing a replacement compressor, check the oil level in the old compressor before removing it. The oil level in the new unit must be the same as the level in the old.

(1) If compressor is equipped with service valves, isolate compressor. If compressor is equipped with Schrader valves, discharge system.

(2) Loosen crankcase oil check plug slowly to release any internal pressure in compressor. Remove check plug only after all pressure is relieved.

(3) Fabricate oil dipstick rod as shown in Figure 18.

(4) Hold dipstick as vertical as possible and insert dipstick in check plug opening. Oil level should be within specifications indicated in Figure 18.

(5) Add clean refrigerant oil if necessary.

CAUTION: *Refrigeration oil absorbs moisture rapidily. Keep the refrigerant container capped until ready to use and recap immediately after use.*

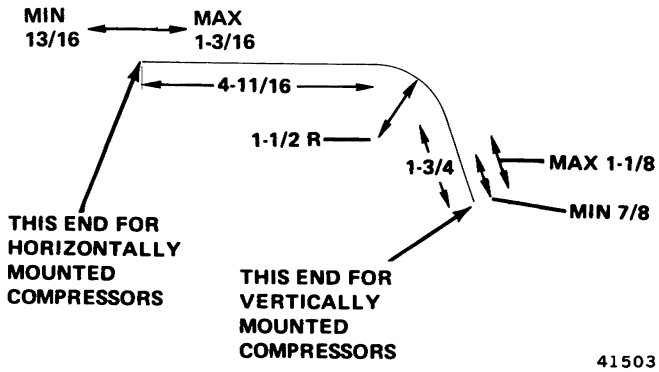


Fig. 18 Oil Dipstick Dimensions (In Inches)

(6) Install oil plug O-ring. Be sure O-ring is not twisted.

NOTE: *Oil plug leaks are usually due to a damaged, dirty, or improperly installed O-ring.*

(7) Install and tighten oil plug to 4 foot-pounds (5 N•m) torque.

(8) If compressor is equipped wth service valves, purge compressor of air and open valves. If compressor is equipped with Schrader valves, evacuate system—charge system—perform leak test and recharge as necessary.

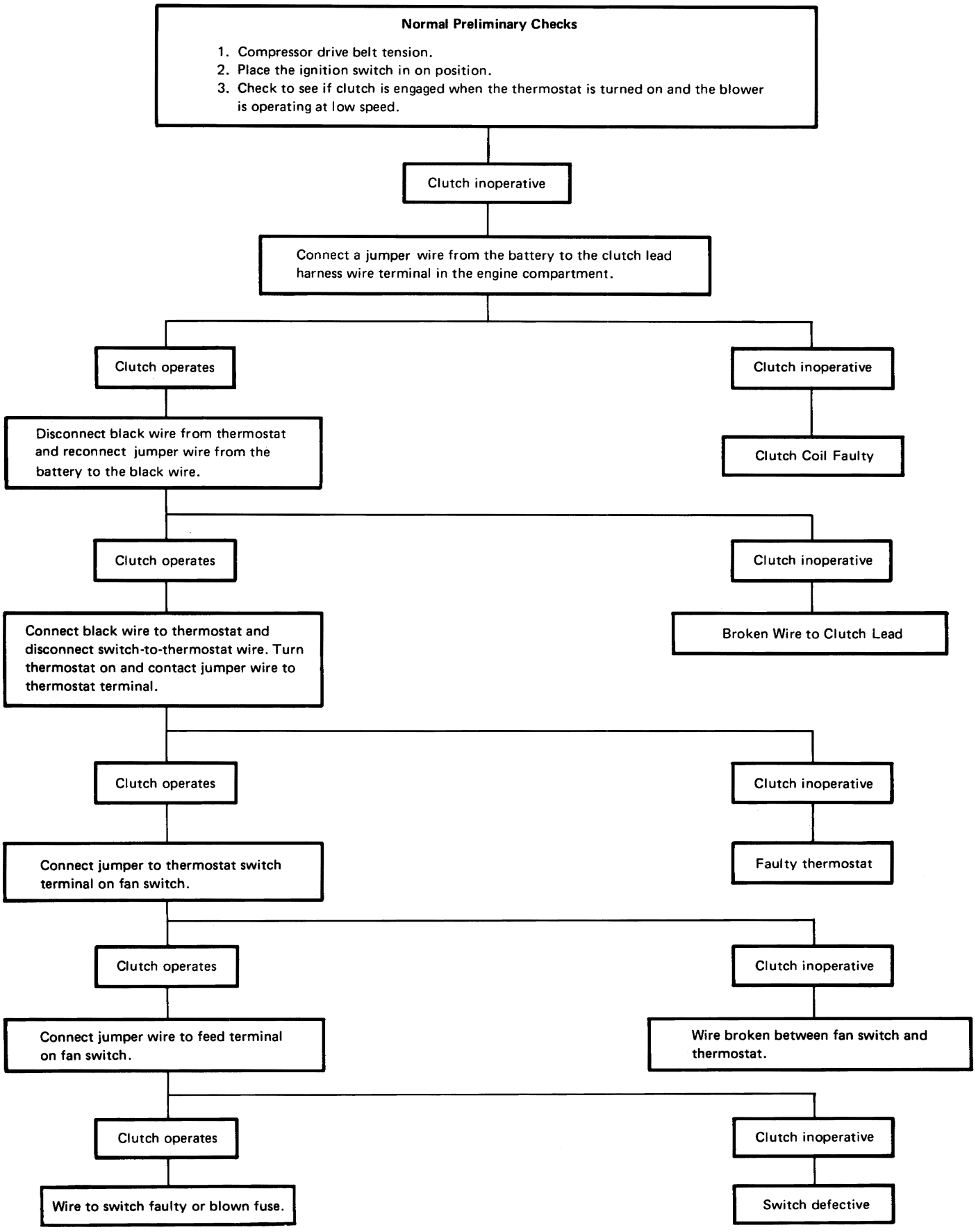
MAGNETIC CLUTCH

The magnetic clutch consists of a stationary electromagnetic coil and a rotating pulley and plate assembly.

The electromagnetic coil is mounted on four bosses on the compressor. The pulley and plate assembly is mounted on the compressor shaft. When the air conditioner is not operating, the pulley freewheels on the clutch hub bearing. When the clutch is energized, the plate is magnetically engaged with the pulley and turns the compressor crankshaft.

Do not attempt to replace the bearing, pulley or clutch plate separately. These components are serviced as a complete assembly only. Only the coil is serviced as a separate assembly.

Magnetic Clutch Diagnosis



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Electrical Diagnosis

Refer to the Magnetic Clutch Diagnosis chart when diagnosing magnetic clutch electrical malfunctions.

Magnetic Clutch Noise Diagnosis

Spin the clutch pulley by hand. Interference between the field and the rotor assembly must not occur. The clutch coil must be mounted properly using only the special screws that position the field coil on the compressor.

A worn pulley bearing will produce a roughness that can be felt when spinning the pulley. Do not attempt to replace the bearing separately if it exhibits roughness. Replace the bearing and pulley as an assembly only.

A replacement clutch may generate a squeal-type noise when engaged initially. However, this noise will stop after a few cycles of operation.

Magnetic Clutch Removal

(1) Remove compressor belt.

(2) Remove bolt and washer attaching clutch to compressor shaft. Energize clutch or use spanner wrench to hold clutch while removing bolt and washer.

(3) Install 5/8—11 bolt in threaded center of clutch plate.

(4) Remove clutch by tightening bolt and pulling clutch from compressor shaft.

CAUTION: *Do not pry against the clutch to remove it.*

(5) Remove magnetic coil attaching screws.

(6) Disconnect coil wire and remove coil.

Magnetic Clutch Installation

(1) Install magnetic coil. Attach coil using four special screws provided with replacement unit only. These screws must be used in order to position coil on compressor properly.

(2) Tighten screws to 7 foot-pounds (9 N•m) torque.

(3) Install woodruff key in compressor shaft.

(4) Align clutch with woodruff key and install clutch on shaft.

(5) Connect clutch coil wire.

(6) Install clutch-to-compressor shaft attaching bolt and washer. Tighten bolt to 20 foot-pounds (27 N•m) torque. Energize clutch coil or use spanner wrench to hold clutch while tightening bolt.

(7) Install compressor belt and adjust belt tension to specifications.

SERVICE VALVES

The compressor discharge and suction valves are mounted on the compressor head. They are used for diagnosis, charging, discharging, system evacuation and component removal (fig. 19).

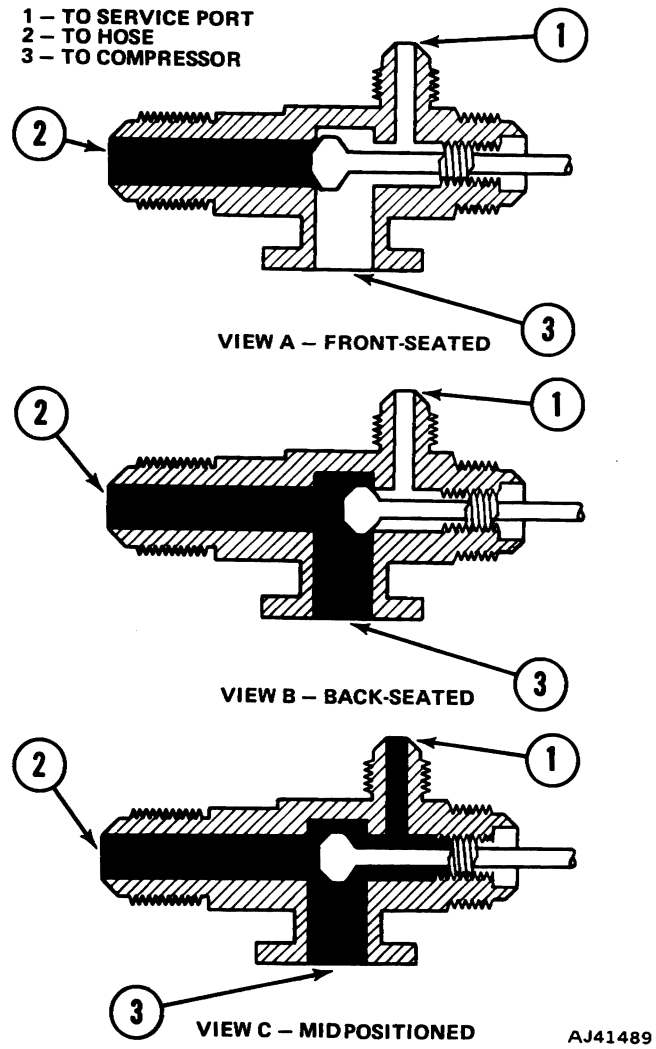

Fig. 19 Schrader and Service Valve Cross Sections

One of two types of compressor service valves is used; the service valve or the Schrader valve. The service valve contains a three-position, internally mounted valve stem that allows the valve to be front or back-seated, or midpositioned. With this type of valve, the compressor can be isolated from the system and serviced without having to discharge the system. The Schrader valve does not have any type of internal valving and requires that the system be discharged before performing compressor service operations.

SIGHT GLASS

A sight glass, located at the center of the receiver/dryer, is provided as a means of checking system refrigerant levels visually (fig. 20).

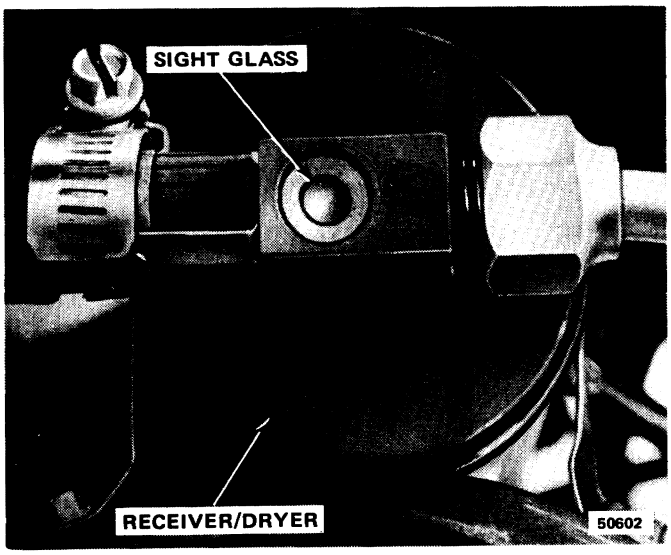

Fig. 20 Sight Glass

If the system is low in refrigerant, a continuous stream of bubbles will appear in the sight glass. However, if the system is fully charged or fully discharged, bubbles will not appear in the sight glass. To distinguish between a fully charged or discharged situation, cycle the magnetic clutch off and on with the engine operating at 1500 rpm. If the system contains refrigerant, bubbles will appear when the clutch is off and will disappear shortly after the clutch is turned on. If bubbles do not appear when the clutch is cycled off-on, the system is completely discharged (as bubbles would appear in a fully charged system). If the system is discharged, it will be necessary to leak test, repair, evacuate, and recharge the system.

PRESSURE GAUGE AND MANIFOLD ASSEMBLY

The Pressure Gauge and Manifold Assembly Tool J-23575 (fig. 21) is the most important tool used in servicing the air conditioning system. The assembly is used to determine system high and low side pressures, refrigerant charge level, and for system diagnosis. It is designed to provide simultaneous high and low side pressure readings because these pressures must be compared to check system operation.

Low Side Gauge

The low side gauge is a compound gauge that provides both pressure and vacuum readings. It is used to check pressure and vacuum at the suction side of the air conditioning system.

The low side gauge is calibrated from 0 to 150 pounds pressure (0 to 1034 kPa) and from 0 to 30 inches (0 to 101 kPa) vacuum.

High Side Gauge

The high side gauge is used to check pressure at the discharge side of the air conditioning system.

Manifold

The low and high side gauges are connected to the air conditioning system through the manifold (fig. 21). The manifold has two gauge fittings and three hose connections (fig. 21).

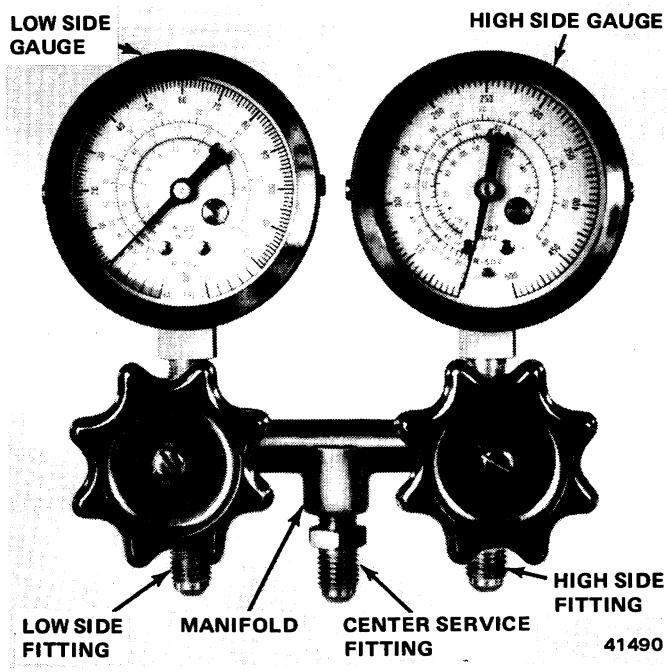

Fig. 21 Pressure Gauge and Manifold Assembly J-23575

The gauges are connected to the manifold gauge fittings. The low side hose is connected to the manifold fitting directly below the low side gauge. The high side hose and fitting are connected to the manifold directly below the high side gauge. The center (service) fitting and hose of the manifold is used for charging, discharging, and evacuating the system.

Both the high and low sides of the manifold have manual shutoff valves. The hand valves open or close the respective gauge connections to the center service connection, or to each other. The manifold is constructed so that pressure is indicated on the gauges regardless of hand valve position.

Pressure Gauge and Manifold Assembly Connections

(1) Remove protective caps from compressor service valve gauge ports.

(2) Close both hand valves on gauge manifold.

(3) Connect low side gauge hose to suction service valve gauge port.

(4) Connect high pressure gauge hose to discharge service valve gauge port.

(5) If compressor is equipped with service valves, set both valves at mid or cracked position. Gauges will register high and low side pressures respectively.

(6) Purge air from high side hose by opening high side hand valve on manifold for 3 to 5 seconds. Be sure center connector on manifold is also open.

(7) Purge air from low side hose by opening low side hand valve on manifold for 3 to 5 seconds. Be sure center connector on manifold is also open.

NOTE: *The air conditioning system may be operated with the gauge manifold assembly connected as outlined. The gauges will not interfere with system function and will simply register operating pressures.*

CHECKING SYSTEM PRESSURES

After installing the manifold and gauge assembly, the gauge pressures developed at the compressor high and low sides will indicate if the system is, or is not, operating correctly.

(1) Attach pressure gauge and manifold asembly. Refer to Pressure Gauge and Manifold Assembly Connections.

(2) Close both hand valves on gauge and manifold assembly.

(3) Operate air conditioning system with engine running at 1500 rpm and air conditioning controls set for maximum cooling.

(4) Insert thermometer into discharge air outlet and note air temperature.

(5) Observe and compare high and low side pressures with those shown in Normal Operating Temperatures and Pressures Chart. If pressures are abnormal, refer to Pressure Diagnosis Chart in Service Diagnosis paragraph of this section.

SYSTEM DISCHARGING

Refrigerant must be discharged from the system before replacing or servicing any component except a compressor equipped with service valves. If the compressor is equipped with Schrader valves, the complete system must be discharged before servicing the compressor.

Normal Operating Temperatures and Pressures Chart

Engine Speed (RPM)	Ambient Temperature (°F)	Average Discharge Air Temperature (°F)	Head Pressure (PSI)	Suction Pressure (PSI)
1500	60	45	110	9
1500	70	45	135	10
1500	80	46	170	11
1500	90	47	190	12
1500	100	48	220	14
1500	110	48	275	18

WARNING: *Always wear safety goggles when discharging the system and release refrigerant very slowly. In addition, never discharge refrigerant in an enclosed area or in the presence of an open flame. Discharge refrigerant into the shop exhaust system or outside the shop only.*

(1) Connect pressure gauge and manifold assembly to compressor discharge service valves (fig. 22).

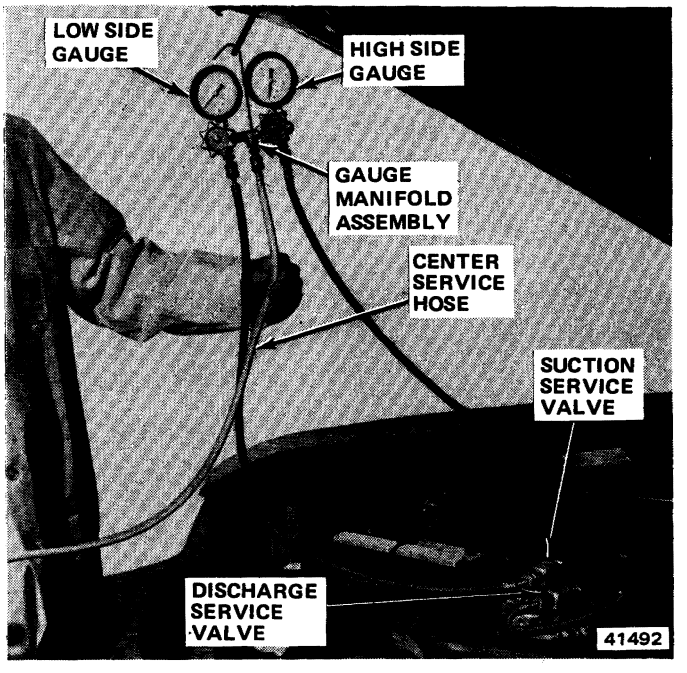

Fig. 22 Pressure Gauge and Manifold Connections for System Discharging

(2) Open both manifold hand valves and allow refrigerant to discharge **slowly**.

CAUTION: *Do not allow refrigerant to discharge rapidily as the compressor oil will be drawn out along with the refrigerant.*

SYSTEM EVACUATION

If the air conditioning system has been discharged or is excessively low on refrigerant, it must be completely evacuated using a vacuum pump before recharging. The system must be evacuated to remove trapped air and more important, any moisture that may have entered or collected in the system.

Moisture in any quantity is extremely harmful to the air conditioning system. It can collect and freeze in the thermostatic expansion valve orifice blocking refrigerant flow and preventing system cooling. Moisture will also react with R-12 to form hydrochloric acid which will corrode metal parts in the system. Corrosion particles can also break loose and block small passages and orifices in the system.

Air and moisture are removed from the air conditioning system by creating a vacuum throughout the system. A motor-driven vacuum pump is used for this purpose.

A vacuum is necessary to decrease system pressure and lower the boiling temperature of moisture enough to vaporize it. When vaporized, moisture is easily drawn off along with trapped air by the pump-generated vacuum.

Water boils at 212°F (100°C) and an atmospheric pressure of 14.7 psi (101 kPa) at sea level. As pump vacuum decreases pressure in the air conditioning system, the boiling point of moisture in the system is also lowered. To evacuate the system, it is necessary to lower the boiling point of system moisture to a point lower than ambient temperature. This will ensure the boiling off of all system moisture. When a vacuum of 29.5 inches Hg (99 kPa) is generated in the system, water will boil at approximately 72°F (22°C). At an ambient temperature of 72°F (22°C), a complete boiling off of all system moisture will occur at this vacuum level.

At altitudes above sea level, it will not be possible to obtain a vacuum reading of 29.5 inches Hg (99 kPa) on the low side gauge. For each 1,000 feet of altitude, the vacuum gauge must be corrected by 1-inch Hg (3.3 kPa) to compensate for changes in atmospheric pressure. For example, at 1,000 feet above sea level, a gauge reading of 28.5 inches Hg (96 kPa) will be the same as a gauge reading of 29.5 inches Hg (99 kPa) at sea level. When a gauge reading of 28.5 inches Hg (96 kPa) is reached, a minimum of 30 minutes is required to evacuate the system completely.

Evacuation Procedure Using Vacuum Pump J-26695

NOTE: *Vacuum pump J-26695 is a self-contained unit consisting of the vacuum pump, electrically operated pump motor, all necessary hoses and connections, and integral carrying handle and stand. The pump and motor must be kept upright at all times to prevent lubricating oil from spilling out of the unit.*

(1) Connect Pressure Gauge and Manifold Assembly J-23575.

(2) Discharge system.

(3) Connect center service hose to inlet fitting of vacuum pump J-26695 (fig. 23).

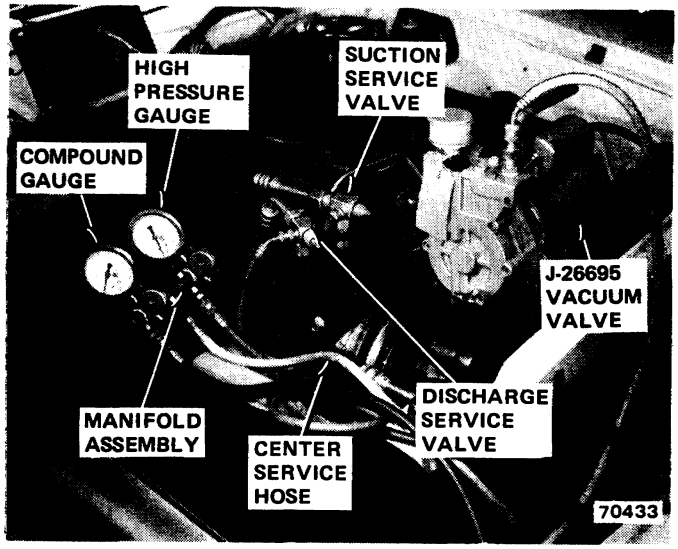

Fig. 23 Evacuating System With Vacuum Pump J-26695

(4) Open both manifold hand valves completely.

(5) Start vacuum pump motor and note vacuum reading on compound (low side) gauge.

(6) When lowest vacuum reading is reached, operate pump a *minimum* of 30 additional minutes to evacuate system completely.

(7) Test system for leaks. Close both manifold shutoff valves. Turn off vacuum pump motor and note compound gauge reading. Gauge needle must remain stationary at point where pump was stopped.

(8) If gauge needle returns to zero rapidly, there is a system leak. Install partial charge in system and locate leak using leak detector. Repair leak and repeat evacuation procedure.

(9) If gauge needle remains stationary and vacuum is maintained for 3 to 5 minutes, resume evacuation for minimum of 30 minutes.

(10) Close both manifold hand valves and stop vacuum pump.

(11) Disconnect center service hose from vacuum pump. System is now ready for charging.

Evacuation Procedure Using Air Conditioning Service Station J-23500-01.

The J-23500-01 Air Conditioning Service Station (fig. 24) is a completely portable unit equipped with vacuum pump, metering-charging cylinder, refrigerant supply, gauges, hoses, and hand control valves.

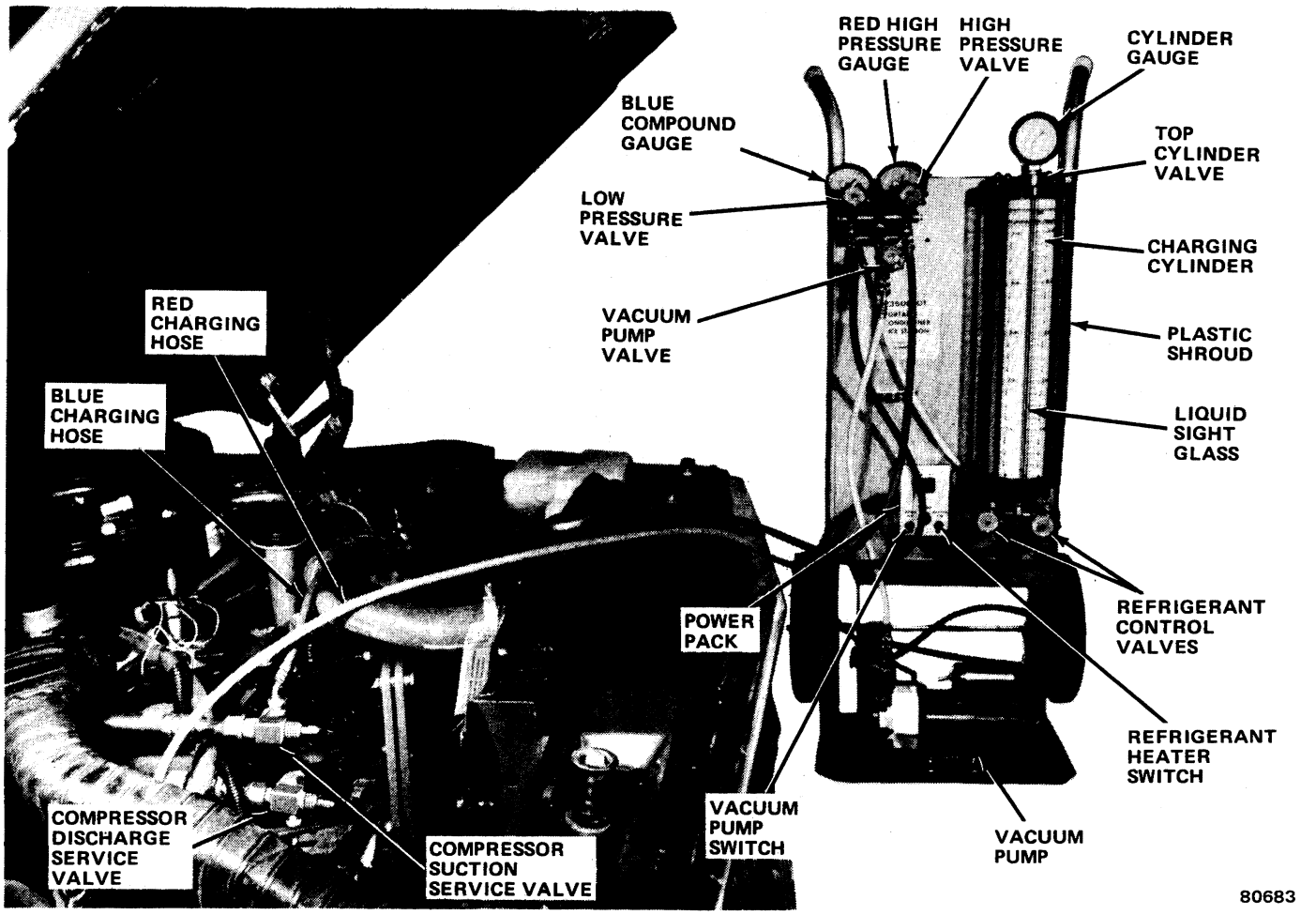

Fig. 24 Portable Air Conditioning Service Station J-23500-01

The vacuum pump control switch is located at the front of the charging station. This switch must be in the OFF position before connecting the pump motor to an electrical source.

There are four hand control valves on the service station control panel face. The valves are numbered and identified as follows: low pressure control (1), high pressure control (2), vacuum control (3), and R-12 control (4).

CAUTION: *When the station is not in use, keep all control valves in the Off position to prevent entry of dirt and moisture.*

(1) Close all hand control valves.

(2) Connect red charging hose to compressor discharge service valve port.

(3) Connect blue charging hose to compressor suction service valve port.

(4) Discharge system slowly. If compressor is equipped with service valves, leave valves in mid or cracked position.

(5) Connect vacuum pump hose to vacuum pump inlet.

(6) Open low pressure hand control valve (1) and high pressure hand control valve (2) on charging station.

(7) Start vacuum pump. Open vacuum control valve (3). Note compound (low side) gauge reading.

(8) Operate pump a *minimum of 30 minutes* after reaching lowest vacuum reading on gauge.

(9) Fill charging cylinder of portable service station. Refer to Filling Charging Cylinder.

(10) Close vacuum hand control valve (3) and stop vacuum pump.

(11) Note compound gauge reading. If gauge reading remains steady, system is ready for charging.

(12) If gauge needle drops to zero rapidly, system leak exists. Install partial charge, leak test system, repair as necessary and repeat evacuation procedure.

CHECKING FOR LEAKS

Whenever the air conditioning system requires more than 1/2 pound (0.23 kg) of refrigerant after a season of operation, a serious leak is indicated which must be located and repaired.

Most refrigerant leaks occur at hose connections that have loosened due to engine/vehicle vibration. If the hose fittings are still serviceable, this type of leak is corrected simply by retightening the loose connection.

Some refrigerant leaks occur on very warm days only and during peak traffic hours where extended periods of stop and go driving are encountered. This type of leak most often occurs at the compressor shaft seal or service valve gasket.

The air conditioning system must contain an adequate quantity of refrigerant to be properly leak tested. If the system is completely discharged, evacuate the system and add 1/2 pound (0.23 kg) of refrigerant for test purposes.

External leaks are detected and located using Electronic Leak Detector J-26933 (fig. 25) or Halide Torch Leak Detector J-6084 (fig. 26).

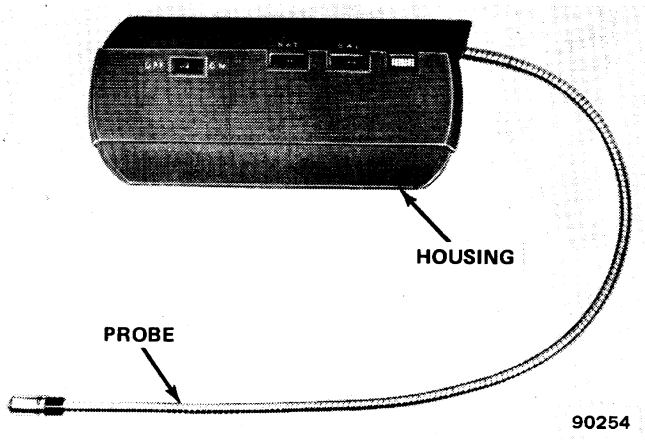

Fig. 25 Electronic Leak Detector J-26933

The electronic leak detector will measure leaks as small as 1/2 ounce (14 g) per year. It has a long, flexible probe that simplifies access to all points of the system.

NOTE: *Because the electronic leak detector does not require a flame to locate refrigerant leaks, it will not expose the user to Phosgene gas vapors or fumes.*

The halide torch leak detector burns propane fuel and is equipped with a search hose. When air is drawn into the search hose by the torch flame, the presence of refrigerant gas in the air will cause a change in the normal light blue color of the torch flame. A small refrigerant leak will change the torch flame color to yellow. A large refrigerant leak will change it to green or a purple-blue color.

WARNING: *When refrigerant R-12 is exposed to an open flame, a toxic gas (Phosgene) is produced. Never breathe fumes produced by the halide torch as they may be poisonous.*

Leak Test Procedure Using Electronic Leak Detector J-26933

(1) Unwind flexible probe from leak detector case.
(2) Turn leak detector Off/On switch to On position.

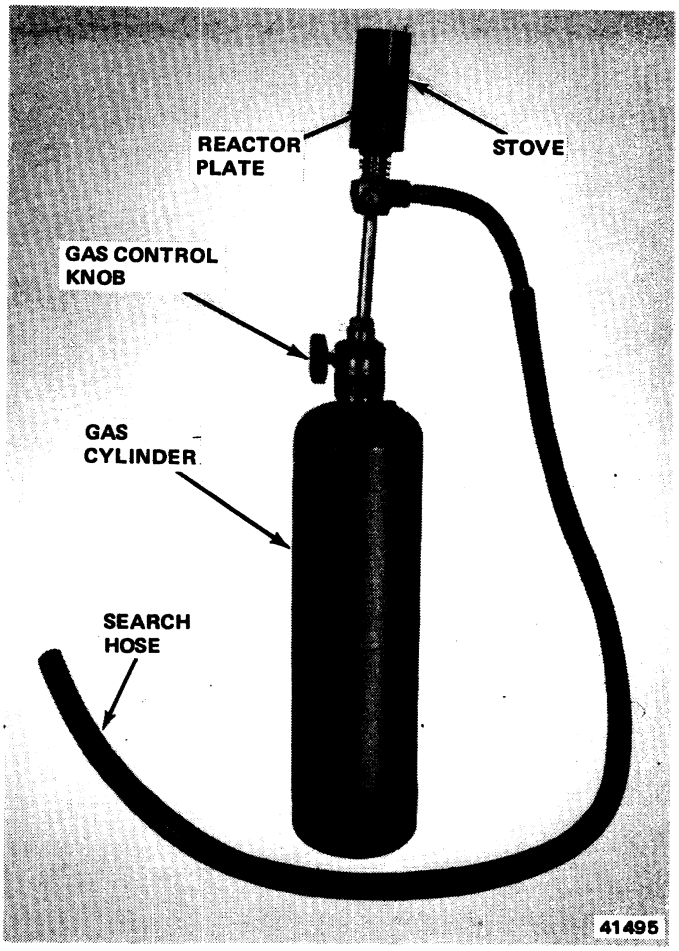

Fig. 26 Halide Torch Leak Detector J-6084

(3) Calibrate leak detector as follows: Place flexible probe tip near leak port in case. Adjust BAT thumbwheel until light goes on and goes out when probe tip is moved away from leak port. Leak detector is now ready for use.

(4) Move flexible probe slowly **under** all connections, joints and seals. Since R-12 refrigerant is heavier than air, leaks are detected more readily on lower side of areas being checked.

(5) When a leak is found, white signal light on detector will illuminate.

NOTE: *If the probe tip is held on the leak area for too long a time, the white signal light will go out.*

(6) Repair leaks as necessary and perform leak test again.
(7) Evacuate system.
(8) Charge system.

Leak Test Procedure Using Halide Torch J-6084

(1) Open torch valve and light torch.
(2) Adjust torch flame just high enough to heat copper reactor ring to cherry red color.

(3) Reduce flame until approximately 1/4 inch (6 mm) above or level with copper reactor ring.

NOTE: *Do not adjust the torch flame any higher than the specified 1/4 inch (6 mm). A smaller flame is more sensitive to refrigerant.*

(4) Move search hose slowly **under** all connections, joints, and seals. Since refrigerant is heavier than air, leaks are more readily detected on lower side of areas being checked.

(5) As search hose is moved, watch for color change of torch flame indicating leak area.

WARNING: *A toxic gas (Phosgene) is produced when refrigerant R-12 is exposed to an open flame. Never breathe the vapors or fumes from the halide torch as they may be poisonous.*

(6) Repair leaks as necessary and perform leak test again.

(7) Evacuate system.

(8) Charge system.

SYSTEM CHARGING

Before adding a full charge to the system, check the compressor oil level, perform a leak test, repair leaks if necessary, and evacuate the system.

NOTE: *The refrigerant charge capacity for all American Air systems is 28 to 32 ounces (79 to 91 g) or approximately two cans of refrigerant.*

Charging Procedure with Multi-Refrigerant Can Dispenser J-627202

The following charging procedure is based on the use of Pressure Gauge and Manifold Assembly J-23575, and Multi-Refrigerant Can Dispenser J-6272-02 (fig. 27).

WARNING: *Always wear goggles to protect the eyes when working with refrigerant R-12.*

(1) Connect Pressure Gauge and Manifold Assembly J-23575 to compressor service valve ports.

(2) Discharge system.

(3) Evacuate system.

(4) Close both manifold gauge hand valves.

(5) Close all four petcock valves on multi-refrigerant can dispenser.

(6) Disconnect manifold center service hose from vacuum pump and reconnect hose to center fitting of Multi-Refrigerant Can Dispenser J-6272-02.

(7) Attach required number of refrigerant cans to dispenser.

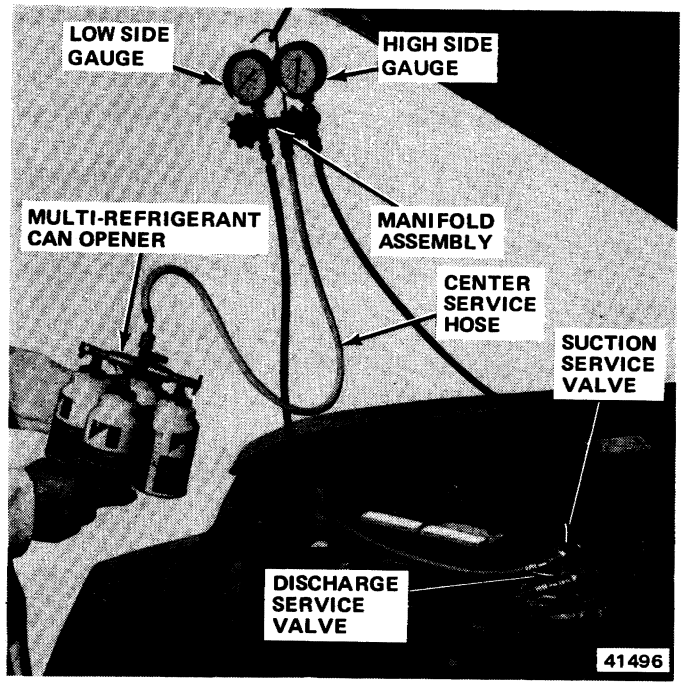

Fig. 27 Charging the System Using Multi-Refrigerant Can Dispenser J-6272-02

(8) Purge air from center service hose as follows: Open one petcock valve on dispenser. Loosen center service hose at manifold fitting. Allow refrigerant to purge air from line. Tighten service hose connection and close petcock valve.

(9) Open low side gauge (suction side) shutoff valve and one petcock valve on dispenser. Do not open high side (discharge) gauge shutoff valve.

(10) Start engine.

(11) Place air conditioning controls in maximum cooling position to operate compressor circulate refrigerant gas into suction side of system.

NOTE: *The refrigerant cans may be placed in an upright position in water heated to no more than 125°F (52°C) to speed up the charging process.*

(12) When first refrigerant can is empty, open another petcock valve on dispenser and continue charging system.

(13) Continue charging until 28 to 32 ounces (79 to 91 g), or approximately two cans of refrigerant have been added to system. Frost line on refrigerant can will indicate how much refrigerant in can has entered system. Frost line can also be used as a guide when system requires fractional portion of full can only.

NOTE: *If an accurate scale is available, weigh the refrigerant cans before and during the charging procedure to be sure the correct amount of refrigerant is added.*

(14) When system if fully charged, close suction (compound) gauge hand valve and all dispenser petcock valves.

(15) Operate air conditioning system 5 to 10 minutes to allow system to normalize and to determine if system will cycle properly. Refer to Checking System Pressures.

(16) After operational check, back-seat service valves to normal position by turning valve stems fully counterclockwise. If compressor is equipped with Schrader valves, system is opened automatically when suction and/or discharge service line is installed. System is then controlled by manifold hand valves.

(17) Purge refrigerant trapped in manifold assembly and hoses by loosening hoses and allowing refrigerant to discharge slowly.

(18) Remove pressure gauge and manifold assembly and install dust caps on compressor service valve fittings.

Filling Charging Cylinder of Portable Air Conditioner Service Station J-23500-01

(1) Be certain refrigerant drum is inverted and valve is open.

(2) Open right-hand valve at base of charging cylinder and fill with required amount of refrigerant (refer to Charging System). Liquid refrigerant will be observed rising in charging cylinder sight glass.

(3) Crack (open) valve at top of cylinder when pressure in charging cylinder equals pressure in supply tank. Opening valve relieves head pressure allowing refrigerant to continue filling cylinder.

(4) Observe pressure gauge at top of cylinder. Rotate plastic shroud until pressure heading column corresponds with gauge pressure and column is aligned with sight glass.

NOTE: *As an example, suppose the pressure gauge at the top of the cylinder registers 70 psi (483 kPa). First, locate the column with a pressure heading of "70"; then, rotate the shroud until the "70" column is aligned with the sight glass.*

(5) When refrigerant reaches desired level in sight glass, close right-hand valve at base of cylinder and refrigerant drum valve. Be sure top cylinder valve is fully closed.

NOTE: *If bubbling occurs in sight glass, tilt charging station backward momentarily.*

(6) Connect heating element cord to heating element receptacle of power pack and turn heater switch to On position. Allow refrigerant to warm (increasing pressure proportionately) for about 10 minutes while vacuum pump is operating.

Charging Procedure Using Portable Air Conditioner Service Station J-23500-01

(1) Fill charging cylinder if necessary. Refer to Filling Charging Cylinder of Portable Air Conditioner Service Station.

WARNING: *Wear goggles to protect eyes.*

(2) Discharge and evacuate system as described above.

(3) Close low pressure valve on charging station, fully open left hand refrigerant control valve at base of cylinder and high pressure valve on charging station, and allow required charge of refrigerant to enter high side of system. When full charge has entered system, close refrigerant control valve and high pressure valve on charging station.

CAUTION: *Do not permit liquid level to drop below 0 (zero) on cylinder sight glass.*

(4) Close manifold gauges after completion of charging, and check high and low pressures and system operation.

(5) Read gauges with high and low pressure valves on charging station closed. The low pressure gauge could be damaged if both high and low pressure valves of manifold are opened. The high pressure developed in discharge side (high side) of compressor would peg indicator needle of low pressure gauge and damage gauge.

(6) Close all valves on charging station and close refrigerant drum valve when operations are completed.

(7) If compressor is equipped with service valves, back-seat valves to normal operating position by turning them fully counterclockwise.

(8) Disconnect high and low pressure charging hoses from compressor with care. (A small amount of refrigerant remaining in hoses will escape.) Replace charging hoses on hose holder on charging station to keep air and dirt out of hoses.

(9) Open valve at top of cylinder to remove remaining refrigerant.

NOTE: *The charging cylinder is not designed to store refrigerant.*

(10) Operate system 10 to 15 minutes to allow system to normalize and determine if system cycles properly.

SERVICE DIAGNOSIS

Performance and pressure diagnosis procedures pertain to all AMC and Jeep models.

NOTE: *When conditions indicate no cooling or insufficient cooling, be sure all gauges are connected properly before proceeding with diagnostic procedures.*

Performance Diagnosis

Condition	Possible Cause	Correction
COMPRESSOR NOT WORKING	(1) Broken drive belt.	(1) Replace belt.
	(2) Broken clutch wire	(2) Repair wire.
	(3) Broken compressor piston.	(3) Replace compressor.
	(4) Bad thermostat switch.	(4) Replace thermostat.
	(5) Bad clutch coil.	(5) Replace clutch coil.
ENGINE OVER-HEATING	(1) Fan belt slipping.	(1) Tighten belt.
	(2) Engine out of time.	(2) Tune engine.
	(3) Leaky radiator cap.	(3) Replace cap.
	(4) Radiator coolant level low.	(4) Fill radiator.
	(5) Clogged condenser coil fins.	(5) Clean fins.
	(6) Engine cooling system clogged.	(6) Flush radiator and engine block.
	(7) Not enough air passing over radiator fins.	(7) Install heavy duty cooling.
EVAPORATOR NOT COOLING	(1) Frozen coil, switch set too high.	(1) Defrost coil by turning thermostat down.
	(2) Faulty clutch.	(2) Check clutch wire and thermostat.
	(3) Drive belt slipping.	(3) Tighten belt.
	(4) Hot air leaks into car.	(4) Close heater vents or air vents.
	(5) Plugged receiver/dryer.	(5) Replace receiver/dryer.
	(6) Capillary tube broken.	(6) Replace expansion valve.
	(7) Undercharged system.	(7) Add refrigerant.
	(8) High head pressure.	(8) See "HIGH HEAD PRESSURE."
	(9) Low suction pressure.	(9) See "LOW SUCTION PRESSURE."

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Performance Diagnosis (Continued)

Condition	Possible Cause	Correction
EVAPORATOR NOT COOLING (Continued)	(10) High suction pressure.	(10) See "HIGH SUCTION PRESSURE."
	(11) Frozen expansion valve.	(11) Evacuate system and replace receiver/dryer.
	(12) Defective expansion valve.	(12) Replace valve.
FROZEN EVAPORATOR COIL	(1) Faulty thermostat.	(1) Replace thermostat.
	(2) Thermostat not set properly.	(2) Set to driving conditions.
	(3) Insufficient evaporator air.	(3) Turn switch to higher setting.
BELT TROUBLE	(1) Pulleys not aligned.	(1) Align pulleys.
	(2) Belt too tight or too loose.	(2) Adjust correctly.
	(3) Wrong belt.	(3) Replace belt.
	(4) Overcharged system or excessive head pressure.	(4) Discharge some refrigerant. See "HIGH PRESSURE."
	(5) Bad bearing in idler pulley.	(5) Replace bearing.
EXCESSIVE VIBRATION OF COMPRESSOR AND MOUNTING BRACKET	(1) Head pressure too high.	(1) See "HIGH HEAD PRESSURE."
	(2) Loose or broken bracket bolts.	(2) Replace or tighten bolts.
	(3) No lock washers on bolts.	(3) Install lock washers on bolts.
	(4) Crankshaft pulley loose.	(4) Tighten pulley bolts.
	(5) Clutch not tight on compressor.	(5) Tighten bolts.
	(6) Overcharged system.	(6) Remove some refrigerant.
	(7) Worn or frozen bearings in idler pulley.	(7) Replace bearings.
	(8) Loose or defective belt.	(8) Tighten or replace belt.

50588B

Performance Diagnosis (Continued)

Condition	Possible Cause	Correction
NOISY CLUTCH	(1) Coil improperly installed.	(1) Center clutch and coil.
	(2) Loose compressor shaft pulley.	(2) Tighten bolt.
	(3) Compressor shaft key alignment poor.	(3) Align key with clutch.
CLUTCH DOES NOT WORK	(1) Fuse blown.	(1) Replace if defective.
	(2) Broken or loose wires to clutch.	(2) Replace or repair wire.
	(3) Short in clutch coil.	(3) Replace coil.
	(4) Voltage at clutch.	(4) Check connections and insulation on wires.
	(5) Thermostat inoperative.	(5) Replace if defective.
	(6) Blower switch on in all positions.	(6) Replace if inner brass race is burned.
	(7) Defective compressor (frozen).	(7) Replace compressor.
BLOWER DOES NOT WORK	(1) Fuse blown.	(1) Replace fuse.
	(2) Broken or loose connections.	(2) Repair connection.
	(3) Control switch inoperable.	(3) Replace if defective.
	(4) Fan motor locked or dragging.	(4) Align motor and adjust blower clearance.
	(5) Voltage at motor.	(5) Check wires and replace motor if defective.
	(6) Ground wire.	(6) Correct problem.
BLOWER RUNS TOO SLOWLY	(1) Loose wires or shorts.	(1) Correct problem.
	(2) Binding blower shaft.	(2) Align motor and blower shaft.

50588C

Performance Diagnosis (Continued)

Condition	Possible Cause	Correction
BLOWER RUNS TOO SLOWLY (Continued)	(3) Burned out resistors in control switch.	(3) Replace control switch.
	(4) Allen setscrew on blower wheel loose.	(4) Tighten setscrew.
LEAKING COMPRESSOR SEAL OR GASKETS	(1) Faulty compressor seal (use a leak detector to check this).	(1) Replace seal or gasket. Inspect and correct refrigerant charge. Inspect and correct compressor oil level. Inspect and replace receiver/ dryer if moisture is present.
LEAKING HOSES OR FITTINGS	(1) Hose to close to exhaust manifold.	(1) Move hoses.
	(2) No grommets in firewall (hose cut).	(2) Install grommets and replace hose.
	(3) Hose or fitting flare seats damaged.	(3) Replace hose or fittings.
	(4) Hose to fitting connection leaking.	(4) Replace hose.

50588

Pressure Diagnosis

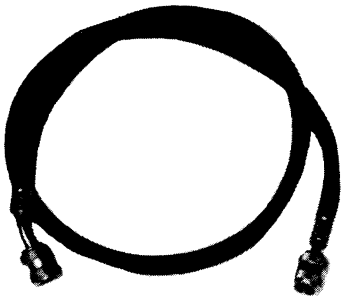
Condition	Possible Cause	Correction
LOW HEAD PRESSURE	(1) Leak in system.	(1) Repair leak.
	(2) Defective expansion valve.	(2) Replace valve.
	(3) Suction valve closed.	(3) Open valve.
	(4) Undercharged system.	(4) Add refrigerant.
	(5) Plugged receiver/dryer.	(5) Replace receiver/ dryer.
	(6) Compressor suction valve leaking.	(6) Replace valve.
	(7) Bad reed valves in compressor.	(7) Replace reed valve.

50589A

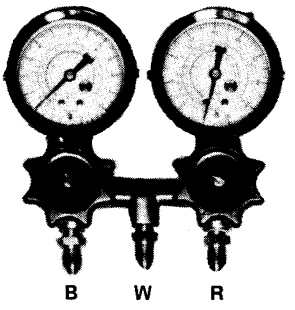
Pressure Diagnosis (Continued)

Condition	Possible Cause	Correction
HIGH HEAD PRESSURE	(1) Air in system.	(1) Recharge system.
	(2) Clogged condenser.	(2) Clean condenser.
	(3) Discharge valve closed.	(3) Open valve.
	(4) Overcharged system.	(4) Remove some refrigerant.
	(5) Insufficient airflow over condenser.	(5) Install heavy duty cooling fan.
	(6) Loose fan belt.	(6) Tighten fan belt.
	(7) Condenser not centered on fan or too close to radiator.	(7) Align fan or adjust distance from radiator.
LOW SUCTION PRESSURE	(1) Undercharged system.	(1) Add refrigerant.
	(2) Worn compressor piston.	(2) Replace compressor.
	(3) Compressor head gasket leaking.	(3) Replace head gasket.
	(4) Kinked or flattened hoses.	(4) Replace hose.
	(5) Compressor suction valve leaking.	(5) Change valve plate.
	(6) Moisture in system.	(6) Replace receiver/ dryer.
	(7) Foreign material in expansion valve screen.	(7) Replace receiver/ dryer.
HIGH SUCTION PRESSURE	(1) Loosen expansion valve bulb.	(1) Tighten bulb clamp.
	(2) Overcharged system.	(2) Remove some refrigerant.
	(3) Expansion valve stuck open.	(3) Replace valve.
	(4) Compressor reed valves inoperable.	(4) Replace valves in compressor.
	(5) Leaking compressor head gasket.	(5) Replace head gasket.

Air Conditioning Tools

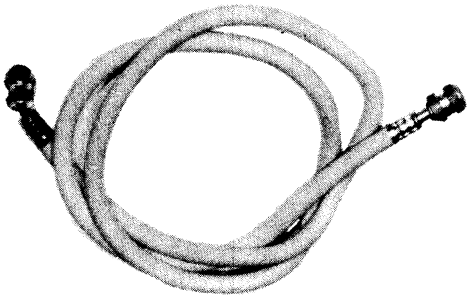


BLUE



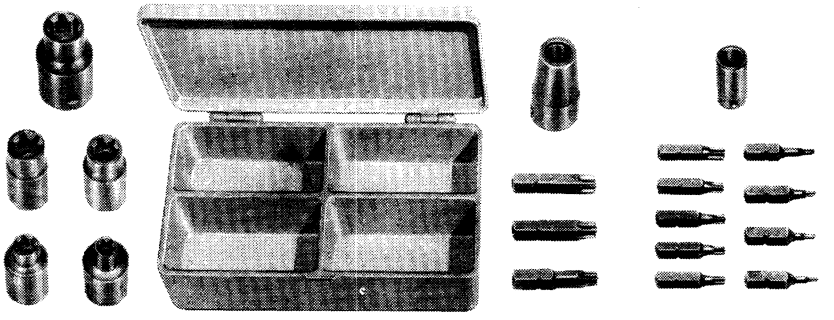
B W R

RED

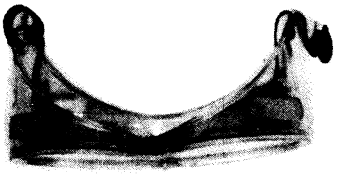


WHITE

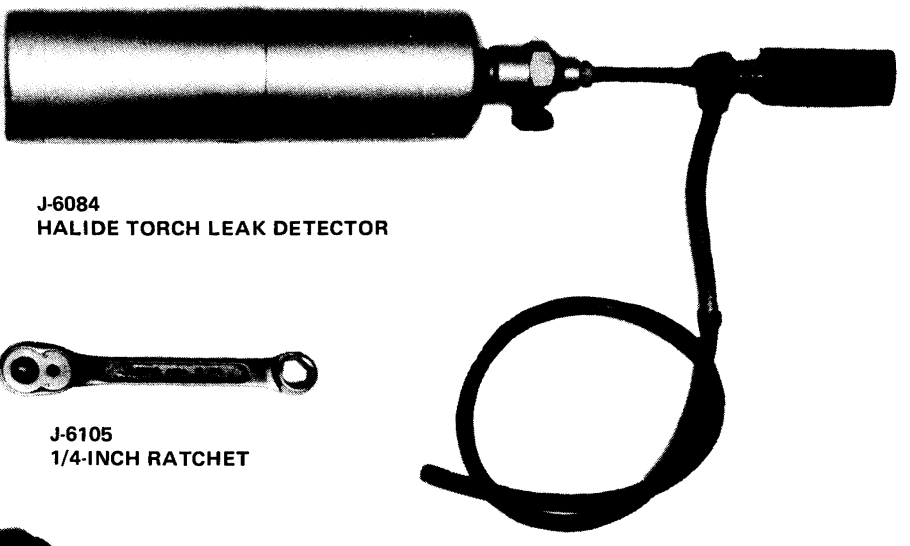
J-23575 PRESSURE GAUGE
AND MANIFOLD ASSEMBLY



J-25359-02 TORX BIT AND SOCKET SET

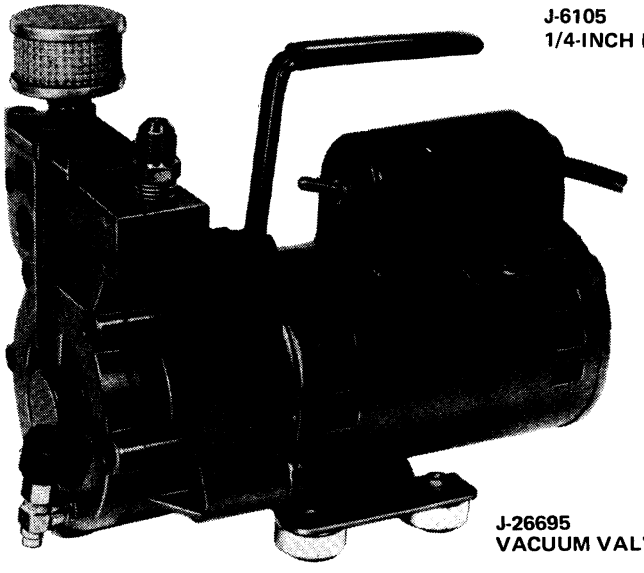


J-5453
GOGGLES

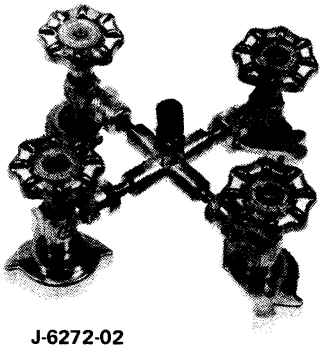


J-6084
HALIDE TORCH LEAK DETECTOR

J-6105
1/4-INCH RATCHET



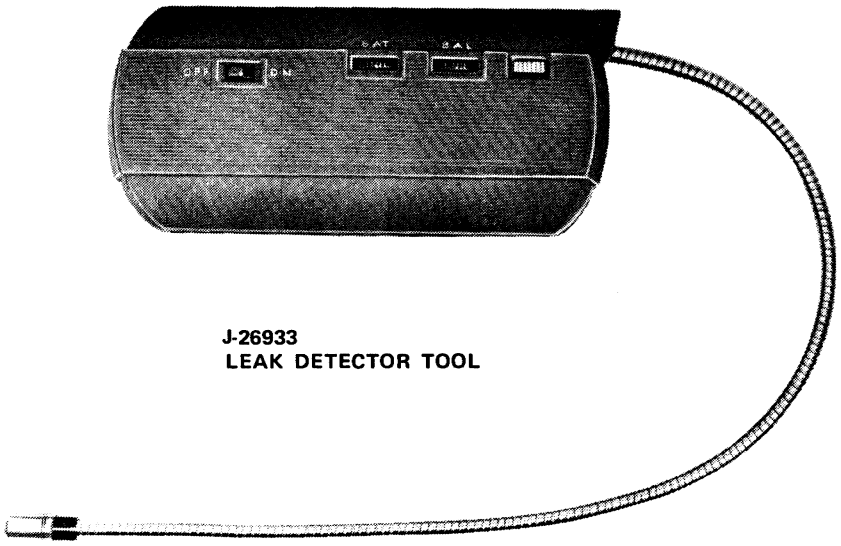
J-26695
VACUUM VALVE



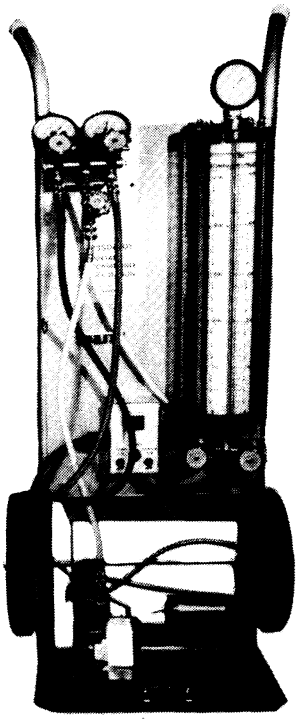
J-6272-02
NO. 4 MULTI-REFRIGERANT
CAN OPENER

42866A

Air Conditioning Tools (Continued)



J-26933
LEAK DETECTOR TOOL



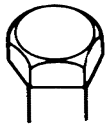
J-23500-01
PORTABLE SERVICE STATION

42866B

STANDARD TORQUE SPECIFICATIONS AND CAPSCREW MARKINGS

Refer to the Standard Torque Specifications and Capscrew Markings chart when installing or servicing American-Air air conditioners and a torque valve is not specified. Note that torque specifications in the chart are based on the use of clean and dry threads. Reduce torque by 10 percent when threads are lubricated with oil and by 20 percent if new, plated-type screws are used.

Standard Torque Specifcations and Capscrew Markings

CAPSCREW HEAD MARKINGS	CAPSCREW BODY SIZE Inches – Thread	SAE GRADE 1 or 2 (Used Infrequently)		SAE GRADE 5 (Used Frequently)		SAE GRADE 6 or 7 (Used at Times)		SAE GRADE 8 (Used Frequently)	
		Torque		Torque		Torque		Torque	
		Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm
Manufacturer's marks may vary. Three-line markings on heads shown below, for example, indicate SAE Grade 5.   SAE 1 or 2  SAE 5  SAE 6 or 7  SAE 8	1/4-20	5	6.7791	8	10.8465	10	13.5582	12	16.2698
	-28	6	8.1349	10	13.5582			14	18.9815
	5/16-18	11	14.9140	17	23.0489	19	25.7605	24	32.5396
	-24	13	17.6256	19	25.7605			27	36.6071
	3/8-16	18	24.4047	31	42.0304	34	46.0978	44	59.6560
	-24	20	27.1164	35	47.4536			49	66.4351
	7/16-14	28	37.9629	49	66.4351	55	74.5700	70	94.9073
	-20	30	40.6745	55	74.5700			78	105.7538
	1/2-13	39	52.8769	75	101.6863	85	115.2445	105	142.3609
	-20	41	55.5885	85	115.2445			120	162.6960
	9/16-12	51	69.1467	110	149.1380	120	162.6960	155	210.1490
	-18	55	74.5700	120	162.6960			170	230.4860
	5/8-11	83	112.5329	150	203.3700	167	226.4186	210	284.7180
	-18	95	128.8027	170	230.4860			240	325.3920
	3/4-10	105	142.3609	270	366.0660	280	379.6240	375	508.4250
	-16	115	155.9170	295	399.9610			420	569.4360
	7/8- 9	160	216.9280	395	535.5410	440	596.5520	605	820.2590
	-14	175	237.2650	435	589.7730			675	915.1650
	1- 8	235	318.6130	590	799.9220	660	894.8280	910	1233.7780
	-14	250	338.9500	660	894.8280			990	1342.2420

70090

COMPONENT REMOVAL/INSTALLATION PROCEDURES—JEEP VEHICLES

NOTE: *Compressor and magnetic clutch removal and installation procedures are outlined in the General Service Procedures section.*

CONDENSER

CJ—Cherokee-Wagoneer-Truck

Removal

(1) Discharge system.
(2) Drain coolant and remove radiator.
(3) Disconnect compressor discharge-to-condenser hose.
(4) Disconnect receiver/dryer-to-condenser line.

NOTE: *Plug all open connectors to prevent dirt and moisture from entering system components.*

(5) Remove condenser.

Installation

(1) Install condenser (figs. 127, 128 and 129).

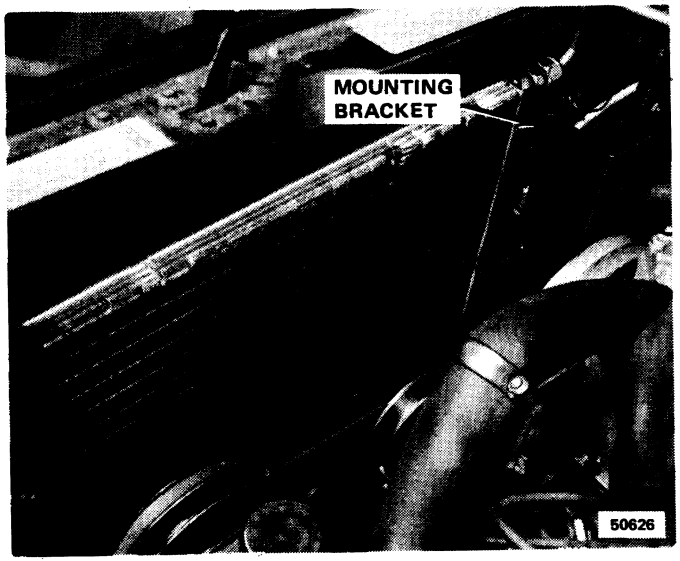


Fig. 127 Condenser Installation—1975 CJ Models

(2) Connect receiver/dryer-to-condenser line at disconnect coupling.
(3) Connect compressor discharge-to-condenser hose.
(4) Install radiator and refill with previously drained coolant.
(5) Leak test, evacuate, and charge system.

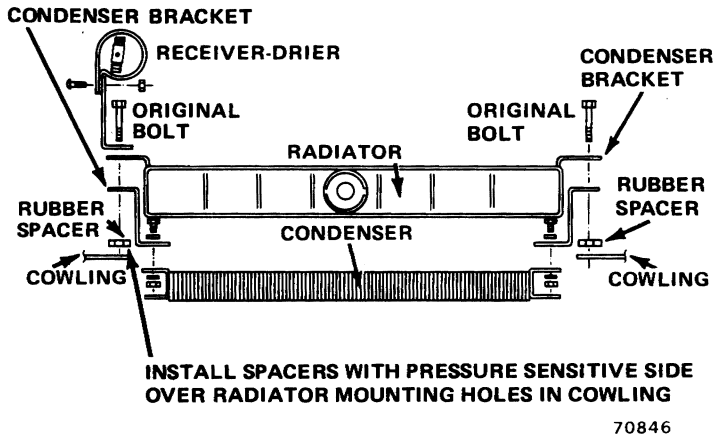


Fig. 128 Condenser Installation—1976-79 CJ Models

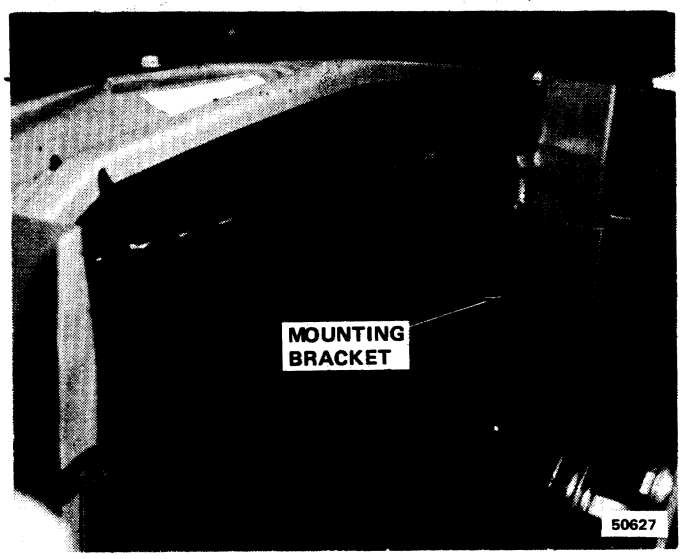


Fig. 129 Condenser Installation—1975-79 Cherokee-Wagoneer-Truck

RECEIVER/DRYER

CJ-Cherokee-Wagoneer-Truck

The receiver/dryer is installed on the driver-side splash apron and is attached by a strap-type mounting bracket. The receiver/dryer inlet is connected to the condenser line and the outlet is connected to the evaporator discharge hose (fig. 124).

Removal

(1) Discharge system.
(2) Disconnect evaporator and condenser lines from receiver/dryer.
(3) Remove mounting bracket attaching screws and remove receiver/dryer.

Installation

(1) Position receiver/dryer on splash apron panel and install mounting bracket and attaching screws.
(2) Connect evaporator and condenser lines.
(3) Leak test, evacuate, and charge system.

EVAPORATOR ASSEMBLY

1975 CJ Models

Removal

(1) Discharge system.
(2) Disconnect blower switch wires. Disconnect magnetic clutch wire.
(3) Remove screws attaching evaporator to instrument panel.
(4) Remove dash panel brace from dash panel.
(5) Remove insulating tape and disconnect suction and discharge hoses at evaporator.
(6) Remove evaporator assembly.

Installation

(1) Connect suction and discharge hoses to evaporator and install insulating tape.
(2) Attach evaporator to instrument panel.
(3) Install dash panel brace.
(4) Connect blower switch wires. Connect magnetic clutch wire.
(5) Leak test, evacuate, and charge system.

1976-79 CJ-Models

Removal

(1) Discharge system.
(2) Disconnect blower switch wires. Disconnect magnetic clutch wire.
(3) Remove screws attaching evaporator to instrument panel.
(4) Remove insulating tape and disconnect suction and discharge hoses at evaporator.
(5) Disconnect drain hose and remove evaporator assembly.

Installation

(1) Connect suction, discharge and drain hoses to evaporator. Wrap all exposed portion of refrigerant hose fittings with insulating tape.
(2) Attach evaporator to instrument panel.
(3) Insert drain hose in floorpan hole.
(4) Connect blower switch wires. Connect magnetic clutch wire.
(5) Leak test, evacuate, and charge system.

1975-1979 Cherokee-Wagoneer-Truck

Removal

(1) Discharge system.
(2) Disconnect blower switch wires. Disconnect clutch wire.
(3) Remove screws attaching evaporator housing brace to lower cowl trim panel.
(4) Remove screws attaching evaporator assembly to instrument panel.
(5) Remove insulating tape and disconnect suction and discharge hoses from evaporator.
(6) Remove drain hose from evaporator.
(7) Remove evaporator.

Installation

(1) Attach suction and discharge hoses to evaporator and install insulating tape.
(2) Connect blower switch wires. Connect clutch wire.
(3) Attach evaporator assembly to instrument panel.
(4) Install screws attaching evaporator housing brace to lower cowl trim panel.
(5) Install drain hose.
(6) Leak test, evacuate, and charge system.

EVAPORATOR COMPONENTS—1975 CJ-MODELS

NOTE: *Discharge the system before performing service procedures that require removal of the evaporator assembly. After installing evaporator assembly, leak test, evacuate, and charge the system.*

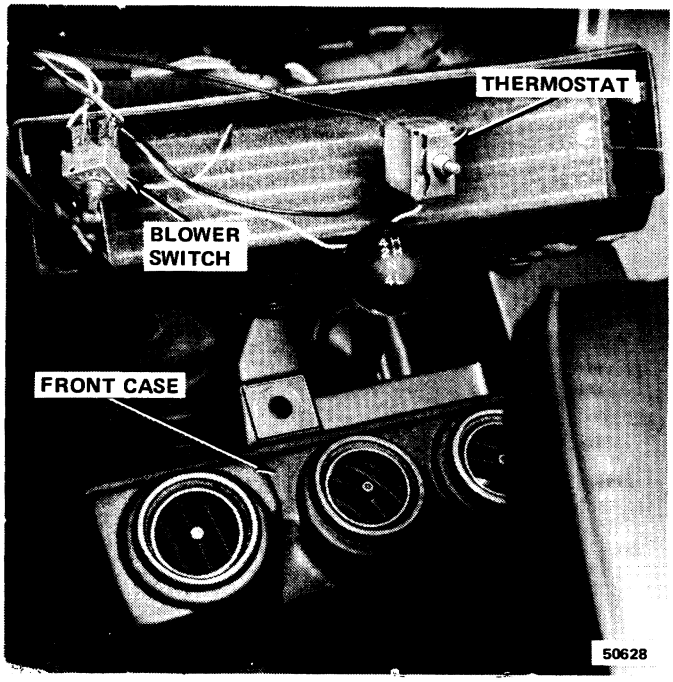


Fig. 130 Blower Switch and Thermostat Removal—1975 CJ Models

Blower Switch—1975 CJ Models

Removal

(1) Remove knob and locknut from blower switch.
(2) Remove left louver assembly to gain access to blower switch.
(3) Remove blower switch and disconnect wires from switch (fig. 130).

Installation

(1) Connect wires to blower switch and install switch.
(2) Install locknut and knob on blower switch.
(3) Install left louver assembly in evaporator housing.

Thermostat—1975 CJ Models

Removal

(1) Remove knob and locknut from thermostat switch.
(2) Remove evaporator attaching screws and move evaporator away from instrument panel.
(3) Remove screws from evaporator case halves and separate case halves.
(4) Remove top case half to gain access to thermostat and capillary tube.
(5) Remove capillary tube from evaporator. Disconnect thermostat wires and remove thermostat (fig. 130).

Installation

(1) Install thermostat in bottom case, connect wires, and insert capillary tube into evaporator coil.
(2) Install locknut and thermostat switch knob.
(3) Install screws attaching top and bottom evaporator case halves.
(4) Position evaporator assembly on instrument panel and install attaching screws.

EVAPORATOR COMPONENTS—1976-79 CJ-Models

NOTE: *Discharge the system before performing service procedures that require removal of the evaporator assembly. Leak test, evacuate, and charge the system after installing the evaporator assembly.*

Blower Switch

Removal

(1) Remove driver-side louver assembly from evaporator case.
(2) Remove knob and locknut from blower switch (fig. 131).
(3) Remove switch from housing and disconnect wires at rear of switch.

Installation

(1) Connect wires to blower switch and position switch in evaporator case.
(2) Install locknut and switch knob.

Thermostat

Removal

(1) Disconnect evaporator assembly from instrument panel and lower to vehicle floor.
(2) Remove evaporator housing screws and separate case halves.
(3) Remove knob and locknut from thermostat (fig. 112).

NOTE: *Observe the position and depth of the capillary tube in the evaporator for assembly reference.*

(4) Pull capillary tube from evaporator. Disconnect thermostat wires and remove thermostat from evaporator bottom case half.

Installation

(1) Connect thermostat wires and install capillary tube in evaporator coils (fig. 131).
(2) Install thermostat switch and install locknut and knob.
(3) Install screws attaching top and bottom case halves.

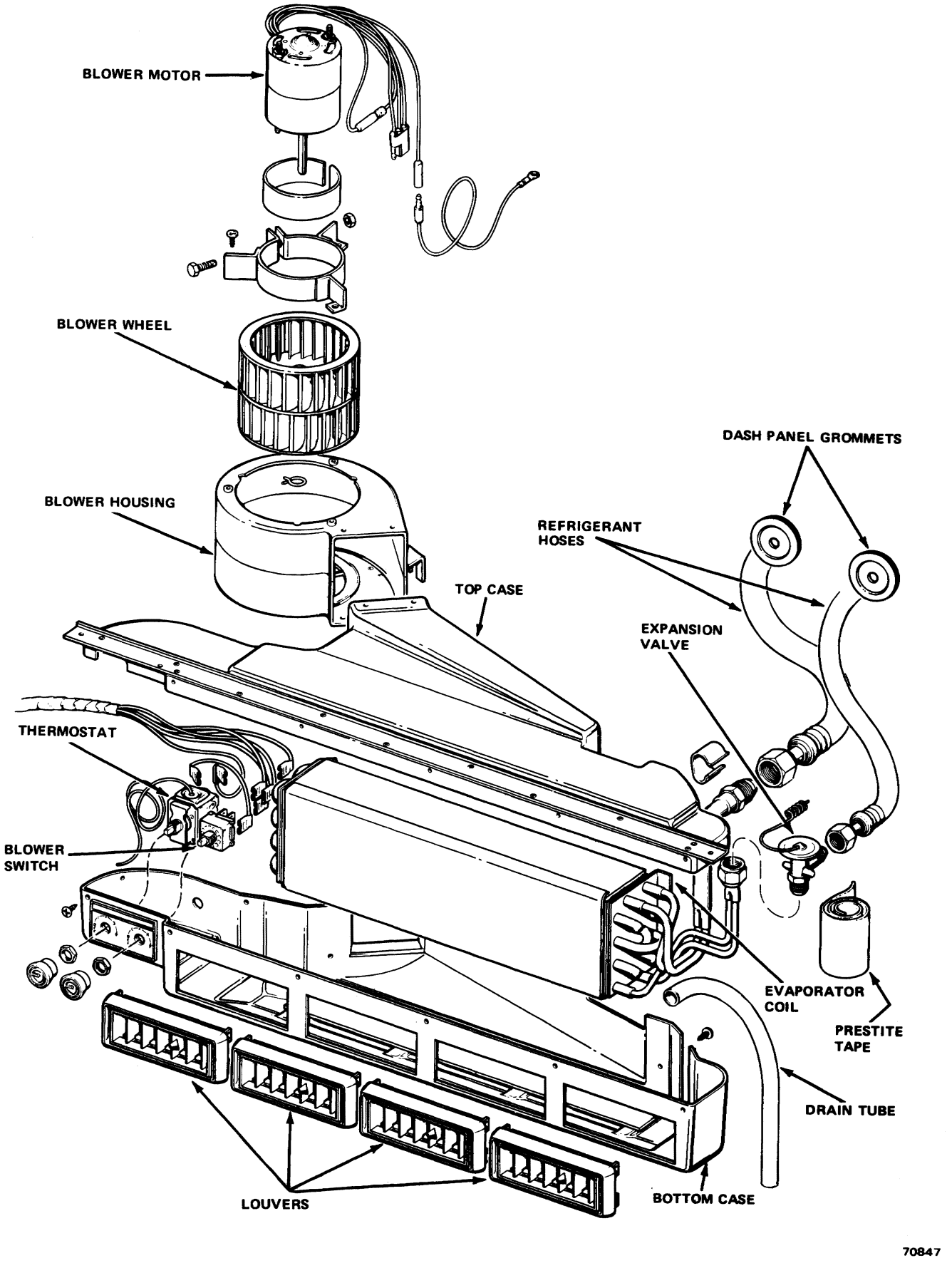


Fig. 131 Evaporator Disassembly—1976-79 CJ Models

(4) Install evaporator assembly on instrument panel.

Blower Motor

Removal

(1) Remove evaporator from vehicle and place on work bench.
(2) Remove screws attaching blower motor to blower housing and remove blower motor, bracket, and wheel (fig. 131).
(3) Remove blower motor bracket from motor.
(4) Remove locking spring retaining blower wheel on blower motor shaft and remove wheel.

Installation

(1) Install blower wheel on blower motor shaft and install locking spring (fig. 131).
(2) Install blower motor bracket on blower motor.
(3) Install blower motor and wheel in blower housing.
(4) Connect blower motor wire harness to motor.
(5) Install evaporator.

Blower Wheel

Removal

(1) Remove evaporator and place on work bench.
(2) Remove screws attaching blower motor to housing and remove blower motor, bracket and wheel (fig. 131).
(3) Remove locking spring retaining blower wheel on motor shaft and remove blower wheel.

Installation

(1) Install blower wheel on motor shaft and install locking spring (fig. 131).
(2) Install blower motor, bracket and wheel in housing.
(3) Install evaporator.

Expansion Valve

Removal

(1) Remove evaporator and place on work bench.
(2) Remove insulating tape from expansion valve (fig. 112).
(3) Remove clamp and expansion valve.

Installation

(1) Install expansion valve and clamp. Wrap entire valve with insulating tape (fig. 131).

NOTE: *The capillary tube clamp must be tightened securely.*

(2) Install evaporator.

Evaporator Coil

Removal

(1) Remove evaporator and place on work bench.
(2) Remove screws attaching top and bottom case halves and separate cases (fig. 131).
(3) Remove expansion valve clamp and evaporator coil from bottom case half.

Installation

(1) Install evaporator coil, expansion valve and clamp in bottom case (fig. 131). Wrap entire expansion valve with insulating tape.

NOTE: *The capillary tube clamp must be tightened securely.*

(2) Install screws attaching top and bottom case halves.
(3) Install evaporator.

Top and Bottom Case Halves

Removal

(1) Remove evaporator and place on work bench.
(2) Remove screws attaching top case to bottom case and separate case halves (fig. 131).
(3) Remove evaporator coil and expansion valve from bottom case half.

Installation

(1) Install evaporator coil and expansion valve in bottom case half.
(2) Install screws attaching top and bottom case halves.
(3) Install evaporator.

Louvers

Removal

(1) Remove evaporator and place on work bench.
(2) Remove screws attaching top and bottom case halves. Separate case halves.
(3) Remove louvers using small screwdriver.

Installation

(1) Install replacement louvers by snapping louver into position.
(2) Install screws attaching top and bottom case halves.
(3) Install evaporator.

EVAPORATOR COMPONENTS—1975-79 CHEROKEE-WAGONEER-TRUCK

NOTE: *Discharge the system before performing service procedures that require removal of the evaporator assembly. Leak test, evacuate, and charge the system after installing the evaporator assembly.*

Blower Switch

Removal

(1) Remove evaporator-to-instrument panel attaching screws and move evaporator assembly away from instrument panel.

(2) Remove passenger-side louver from housing (fig. 132).

(3) Remove blower switch knob and locknut.

(4) Remove switch and disconnect blower switch wires.

Installation

(1) Connect wires to switch and install blower switch (fig. 132).

(2) Install locknut and switch knob.

(3) Install passenger-side louver in housing.

(4) Position evaporator on instrument panel and install evaporator attaching screws.

Thermostat

Removal

(1) Remove evaporator-to-instrument panel attaching screws and move evaporator away from instrument panel.

(2) Remove driver-side extension duct (fig. 132).

(3) Remove thermostat knob and locknut.

(4) Remove screws attaching evaporator adapter bracket and front case to top and bottom case halves.

(5) Separate top and bottom case halves.

NOTE: *Observe the position and depth of the capillary tube in the evaporator for assembly reference.*

(6) Disconnect thermostat switch wires. Remove capillary tube from evaporator and remove thermostat.

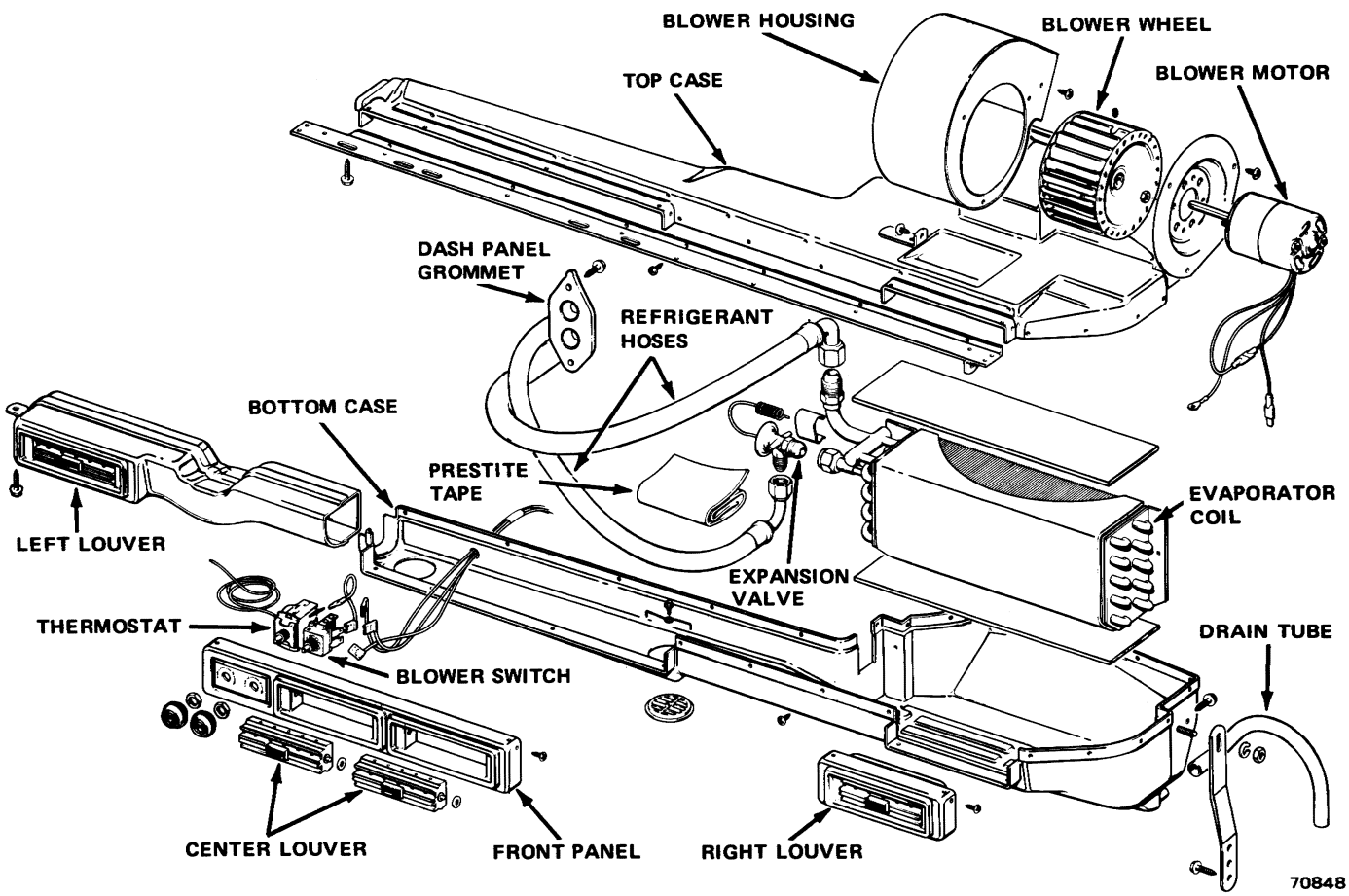


Fig. 132 Evaporator Disassembly—Cherokee-Wagoneer-Truck

Installation

(1) Install thermostat (fig. 132). Connect wires to thermostat and insert capillary tube into evaporator coil.

(2) Install thermostat in control panel. Install thermostat locknut and knob.

(3) Install screws attaching evaporator adapter bracket and front case to top and bottom case halves.

(4) Install drivers-side louver housing.

(5) Position evaporator on instrument panel and install evaporator attaching screws.

Blower Housing

Removal

(1) Remove evaporator and place on work bench.

(2) Disconnect blower motor wire (fig. 132).

(3) Remove screws attaching blower housing to top case and remove blower housing.

(4) Remove screws attaching blower motor mounting plate and remove blower motor and wheel.

Installation

(1) Install blower motor and wheel to mounting plate. Install screws attaching blower motor mounting plate to housing (fig. 132).

(2) Position blower housing in top case and install attaching screws.

(3) Connect blower motor wire.

(4) Install evaporator.

Blower Wheel

Removal

(1) Remove evaporator and place on work bench.

(2) Disconnect blower motor wire (fig. 132).

(3) Remove screws attaching blower motor mounting plate. Remove blower motor and wheel.

(4) Loosen screw retaining blower wheel on blower motor shaft and remove blower wheel.

Installation

(1) Install blower wheel on motor shaft and install retaining screw (fig. 132).

(2) Install blower wheel and motor in mounting plate. Install screws attaching blower motor mounting plate to blower housing.

(3) Connect blower motor wire.

(4) Install blower housing in top case.

(5) Install evaporator.

Blower Motor

Removal

(1) Remove evaporator and place on work bench.

(2) Remove screws attaching blower housing to top case and remove blower housing.

(3) Disconnect blower motor wire (fig. 132).

(4) Remove screws attaching blower motor mounting plate. Remove blower motor and wheel.

(5) Remove screw retaining blower wheel to blower motor shaft. Remove blower wheel from blower motor.

(6) Remove blower motor mounting plate from blower motor.

Installation

(1) Install blower motor mounting plate on blower motor.

(2) Install blower motor wheel on motor shaft and install retaining screw (fig. 132).

(3) Install blower motor and wheel in mounting plate. Install screws attaching blower motor mounting plate to blower housing.

(4) Connect blower motor wire.

(5) Install blower housing in top case.

(6) Install evaporator.

Evaporator Coil

Removal

(1) Remove evaporator and place on work bench.

(2) Remove driver-side extension duct.

(3) Remove screws attaching evaporator adapter bracket and front case to top and bottom case halves (fig. 132).

(4) Remove screws attaching bottom case to top case and separate case halves.

(5) Remove capillary tube from evaporator coils.

(6) Remove evaporator coil from bottom case.

(7) Remove insulating tape from expansion valve.

(8) Remove expansion valve and clamp from bottom case.

Installation

(1) Install evaporator coil in bottom case (fig. 132).

(2) Install expansion valve and clamp in bottom case. Wrap entire valve assembly with insulating tape.

NOTE: *The capillary tube clamp must be tightened securely.*

(3) Assembly top and bottom case halves and install attaching screws.

(4) Install front case and evaporator mounting bracket on top and bottom cases.

(5) Install driver-side extension duct.

(6) Install evaporator.

Expansion Valve

Removal

(1) Remove evaporator and place on work bench.
(2) Remove screws attaching evaporator adapter bracket and front case to top and bottom case halves. Remove bracket and front case.
(3) Remove screws attaching top and bottom case halves and separate case halves.
(4) Remove insulating tape from expansion valve and remove valve and clamp from evaporator coil (fig. 132).

Installation

(1) Install expansion valve and clamp (fig. 132). Wrap entire expansion valve with insulating tape.

NOTE: *The capillary tube clamp must be tightened securely.*

(2) Assemble top and bottom case halves and install attaching screws.
(3) Install front case and adapter bracket on top and bottom case halves.
(4) Install evaporator.

Top and Bottom Case

Removal

(1) Remove evaporator and place on work bench.
(2) Remove driver-side extension duct.
(3) Remove screws attaching evaporator adapter bracket and front case and remove bracket and case (fig. 132).
(4) Remove screws attaching blower motor housing to top case, disconnect blower motor wire and remove housing.
(5) Remove screws attaching bottom case to top case and separate cases.
(6) Remove insulating tape from expansion valve.
(7) Remove evaporator coil and expansion valve and clamp from bottom case.
(8) Remove screws attaching passenger-side louver frame to bottom case and remove louver frame.

Installation

(1) Install evaporator coil, expansion valve and clamp in bottom case (fig. 132).
(2) Wrap entire expansion valve with insulating tape.
(3) Install passenger-side louver frame.
(4) Assembly top and bottom case halves and install attaching screws.
(5) Install blower motor housing in top case and connect blower motor wire.
(6) Install front case and evaporator adapter bracket on top and bottom case halves.
(7) Install driver-side extension duct.
(8) Install evaporator.

Front Case

Removal

(1) Remove evaporator-to-instrument panel attaching screws and move evaporator away from instrument panel.
(2) Remove driver-side extension duct from evaporator assembly.
(3) Remove evaporator adapter bracket from case (fig. 132).
(4) Remove blower switch and thermostat knobs ,locknuts. Remove switch and thermostat.
(5) Disconnect wires from switch and thermostat.
(6) Remove front case and louvers from bottom case.

Installation

(1) Install front case and louvers in bottom case (fig. 132).
(2) Install front case on top and bottom cases.
(3) Connect wires to switch and thermostat.
(4) Install blower switch and thermostat in case.
(5) Install switch locknuts and knobs.
(6) Install evaporator adapter bracket.
(7) Install driver-side extension duct.
(8) Position evaporator on instrument panel and install evaporator attaching screws.

Louvers

Replacement

(1) Remove louver by pulling louver housing away from front case.
(2) Install louver by snapping louver housing into front case.

A

B

C

D

E

E (Cont'd)

G

J

K

L

M

O

P

R

S

S (Cont'd)

T

U

V