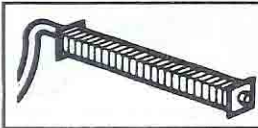


HEATING AND AIR CONDITIONING



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HEATING AND AIR CONDITIONING

HEATING SYSTEM



GENERAL

A blend-air type heating system is used for all CJ and Scrambler vehicles.

The blend-air method of heating utilizes a constant coolant flow system that allows engine coolant to flow continuously through the heater core.

The temperature of the heated air entering the passenger compartment is controlled by regulating the quantity of air that flows through the heater core air passages and blending it with a controlled amount of cool, fresh air that bypasses the heater core.

HEATER AND DEFROSTER OPERATION

The heater is an extension of the engine cooling system and depends on normal engine operating temperature and airflow through the cowl fresh air intake to heat the interior of the vehicle.

During heater operation, close the fresh air vent.

The air control knob operates a door in the fresh air intake duct, which allows air to enter the heater housing.

When the knob is pushed in, no air will enter the heater. As the knob is pulled out to the first position (HEAT), the door opens, allowing airflow to the heater.

The air control knob (1) must be pulled to the HEAT position to operate the heater.

The temperature control knob (2) operates the blend air door in the heater housing.

At the full OUT position, all the air is directed through the heater core, providing maximum heat flow.

At the full IN position, all the air is directed around the heater core, providing unheated fresh air.

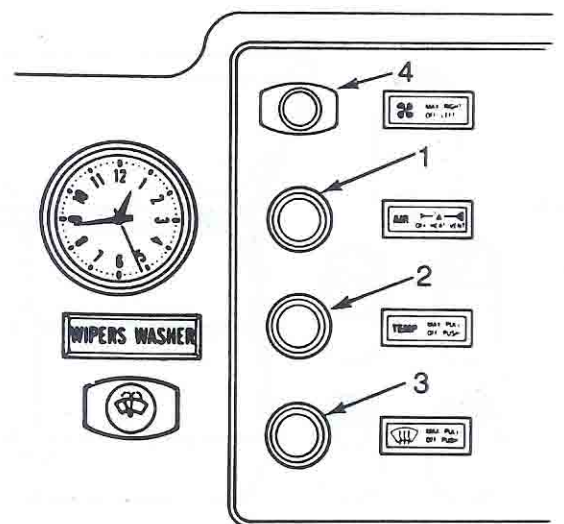
Any in-between position of the control allows a blend of cool, fresh outside air and heated air.

The defrost control knob (3) must be pushed in for the blended air to enter through the floor heat duct.

When the defrost control knob is pulled out completely, all airflow will be directed through the defroster duct and onto the windshield.

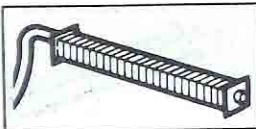
Any in-between position of the defrost control divides the airflow between the defroster duct and the floor heat duct.

If additional airflow is required, the blower motor control (4) should be turned to one of the three available speeds.



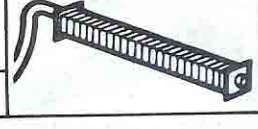
SEE I.S. NOTES

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HEATING AND AIR CONDITIONING

HEATING SYSTEM



FRESH AIR VENTILATION

The fresh air ventilating system directs outside air through the air inlet to a door in the left end of the air inlet to provide air to the driver's side and also through a door on the right side of the heater to provide air to the passenger side.

These doors are cable and linkage controlled.

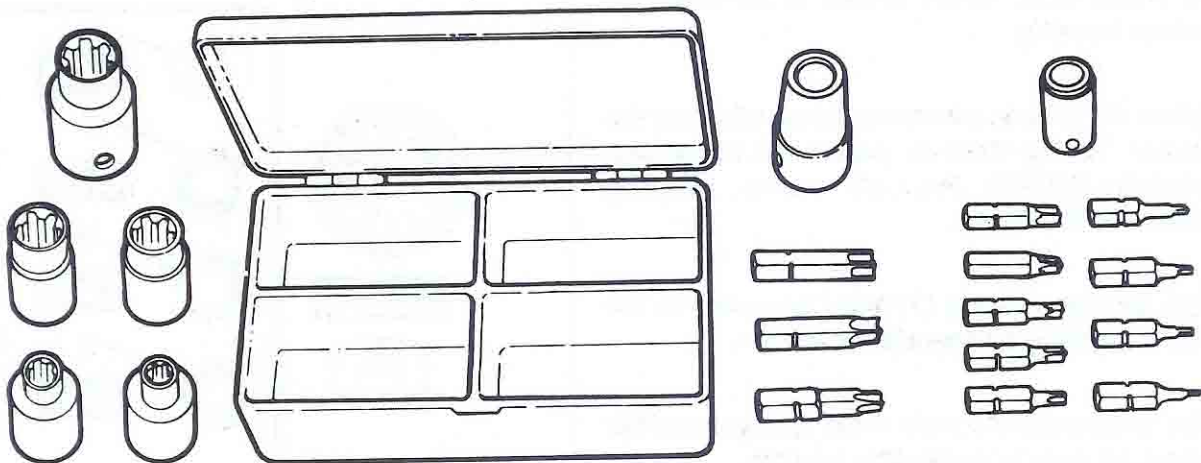
When the air control knob is pulled all the way out to the vent position, the driver's vent door is opened by linkage on the air inlet and the passenger vent door is opened by a cable that is attached to the linkage on the air inlet.

When the air control is pushed in, no air will enter the vehicle.

SPECIAL TOOLS

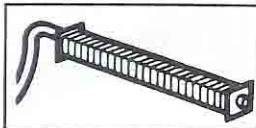
Tool Ref.	Description	Required	Recommended
J-25359-C	Torx Bit and Socket Set		■

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HEATING AND AIR CONDITIONING

HEATING SYSTEM

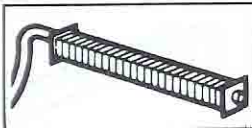


Service Diagnosis

Condition	Possible Cause	Correction
BLOWER MOTOR WILL NOT TURN AT ANY SPEED	<ul style="list-style-type: none"> (1) Blown fuse (2) Loose connection (3) Defective ground (4) Faulty switch (5) Faulty motor (6) Faulty resistor 	<ul style="list-style-type: none"> (1) Replace fuse (2) Inspect and tighten (3) Clean and tighten (4) Replace switch (5) Replace motor (6) Replace resistor
BLOWER MOTOR TURNS AT ONE SPEED ONLY	<ul style="list-style-type: none"> (1) Faulty switch (2) Faulty resistor 	<ul style="list-style-type: none"> (1) Replace switch (2) Replace resistor
BLOWER MOTOR TURNS BUT DOES NOT CIRCULATE AIR	<ul style="list-style-type: none"> (1) Intake blocked (2) Fan not secured to the motor shaft 	<ul style="list-style-type: none"> (1) Clean intake (2) Tighten securely
HEATER WILL NOT HEAT	<ul style="list-style-type: none"> (1) Coolant does not reach proper temperature (2) Heater core blocked internally (3) Heater core air-bound (4) Blend-air door not in proper position 	<ul style="list-style-type: none"> (1) Check and replace thermostat if necessary (2) Flush or replace core if necessary (3) Purge air from core (4) Adjust cable
HEATER WILL NOT DEFROST	<ul style="list-style-type: none"> (1) Control cable adjustment incorrect (2) Defroster hose damaged 	<ul style="list-style-type: none"> (1) Adjust control cable (2) Replace defroster hose

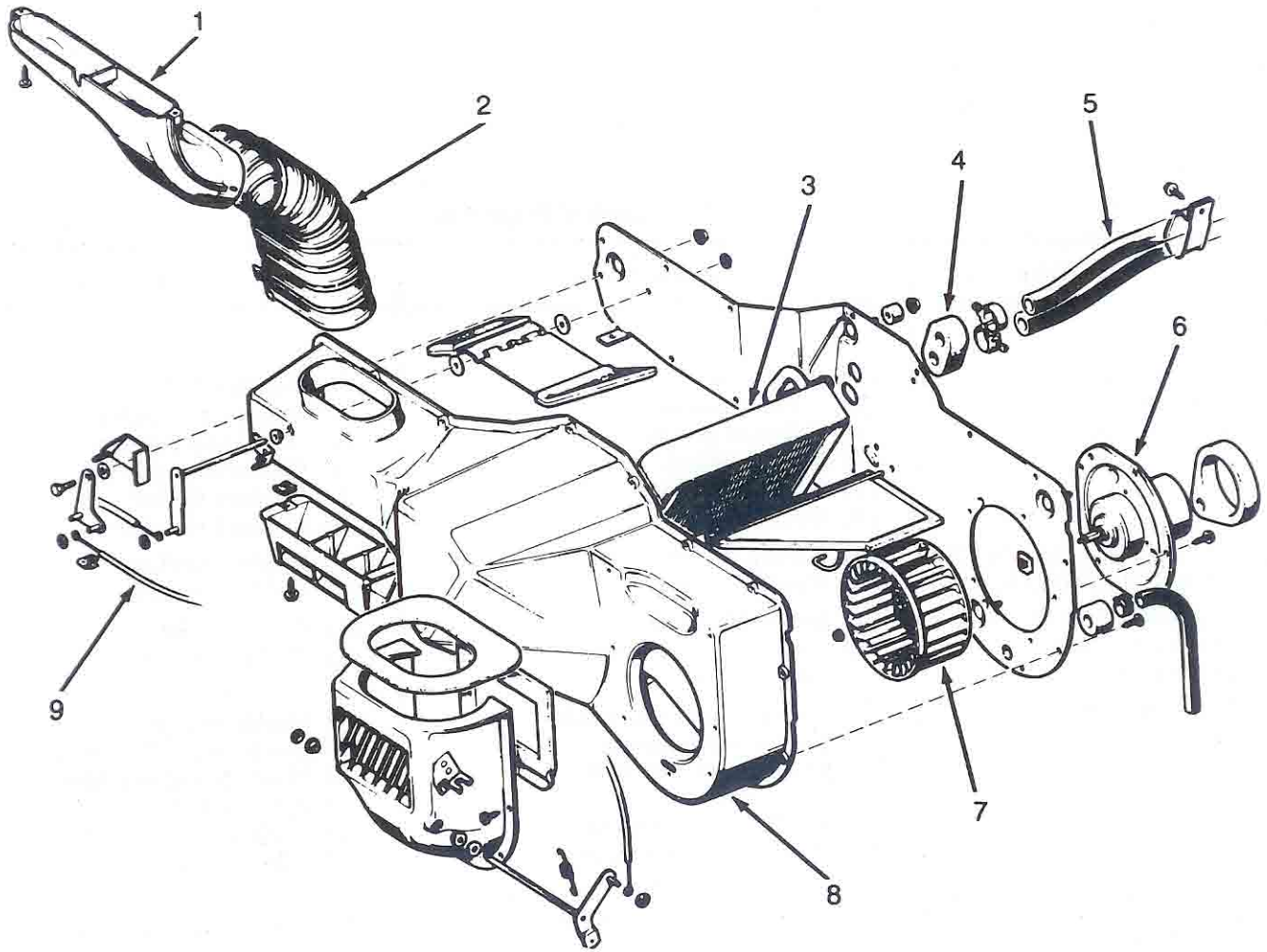
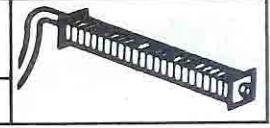
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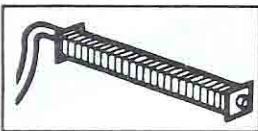
HEATING SYSTEM



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|---------------------|-------------------|
| 1. Defroster Nozzle | 6. Blower Motor |
| 2. Defroster Duct | 7. Fan |
| 3. Heater Core | 8. Heater Housing |
| 4. Seal | 9. Cable |
| 5. Hose | |

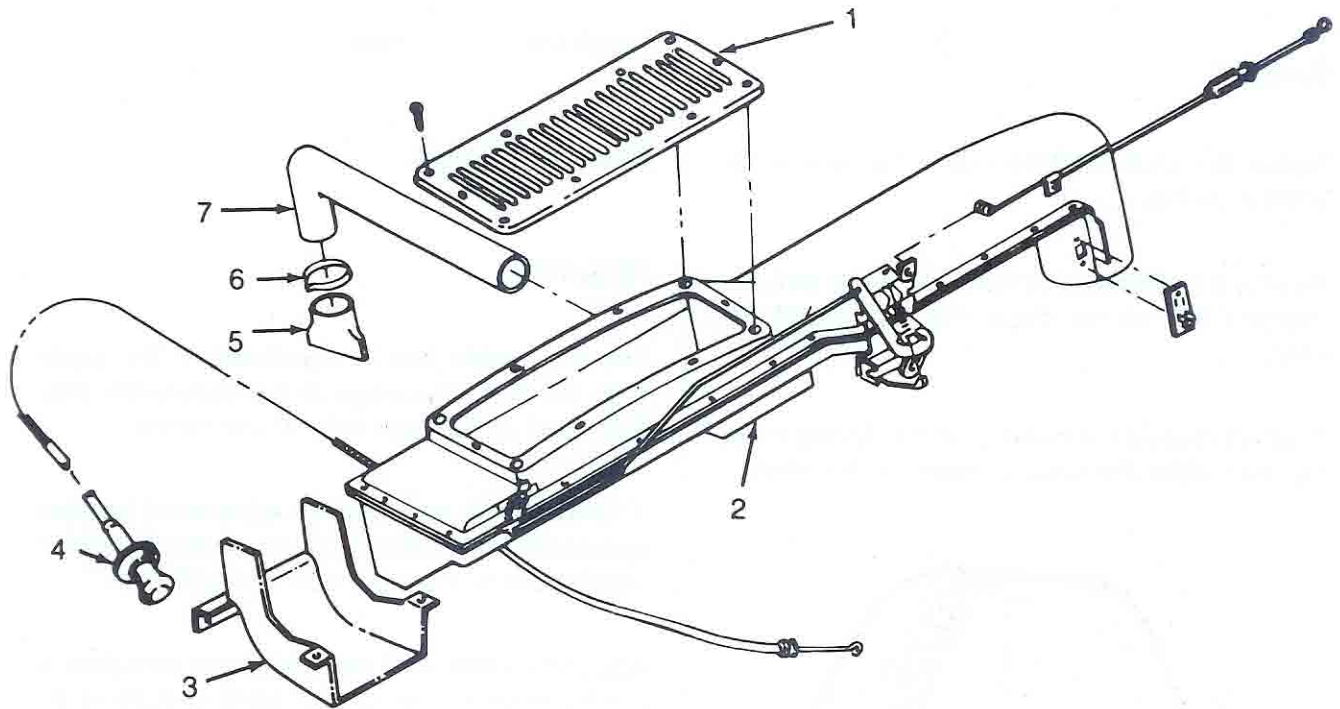
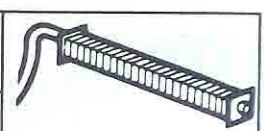
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HEATING AND AIR CONDITIONING

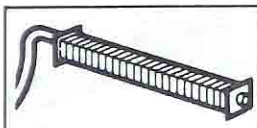
HEATING SYSTEM



- 1. Cover Panel
- 2. Fresh Air Intake Duct
- 3. Fresh Air Vent
- 4. Duct Control
- 5. Cap
- 6. Hose Clamp
- 7. Drainage Hose

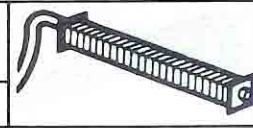
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HEATING AND AIR CONDITIONING

HEATING SYSTEM



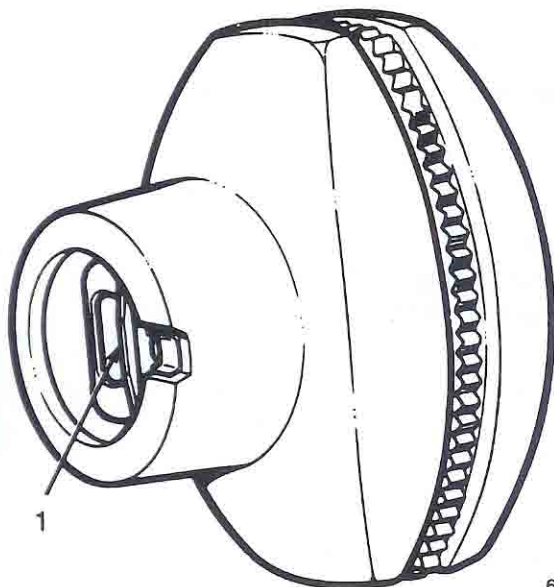
FAN CONTROL SWITCH

Removal

Rotate the knob until the slot in the neck of the knob is visible.

Insert a small bladed screwdriver in the slot and depress the spring metal clip (1) toward the knob.

This will relieve the tension on the spring metal clip and allow the knob to slide off the shaft.



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NOTES

Remove the retaining nut and trim ring.

Remove the switch from the instrument panel and disconnect the wires.

Installation

Connect the wires and position the switch in the instrument panel.

Install the trim ring and retaining nut.

Install the control knob.

CONTROL CABLES

Adjustment

The only cable that is adjustable is the cable from the air inlet linkage to the passenger side vent door at the right side of the heater.

This cable has a turnbuckle adjustment located approximately 15.24 cm (6 in) above the cable attachment to the right side of the heater.

Adjust this cable until the passenger vent door is closed when the air control knob is pushed in.

NOTE: If the cable is adjusted beyond the closed door position, it will cause a bind in the linkage and may prevent the driver's side vent door from closing.

Replacement

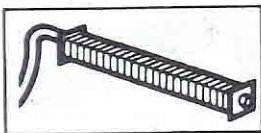
Disconnect the cable from the door and housing.

NOTE: The control cables are retained on the backside of the instrument panel by plastic tabs. To disengage the cables from the instrument panel, press the plastic tabs together and pull out the cable.

Remove the cable from the instrument panel.

Remove the cable-to-damper door.

Route the replacement cable through the hole in the instrument panel.



HEATING AND AIR CONDITIONING

HEATING SYSTEM



Connect the cable to the door and housing.

Install the cable on the damper door.

Check the operation.

HEATER CORE

The heater core housing must be removed to gain access to the heater core.

Removal

WARNING: Do not loosen the radiator draincock when the cooling system is hot and pressurized because serious burns from hot coolant can result.

Drain approximately 1.9 liters (2 qts) of coolant from the radiator. Drain the coolant into a clean container.

Disconnect the heater hoses.

Disconnect the damper door control cables.

Disconnect the blower motor wire.

Disconnect the defroster duct.

Remove the nuts from the heater core housing studs in the engine compartment.

Remove the heater core housing assembly by tilting it down to disengage it from the air inlet duct and pulling it to the rear of the vehicle.

Remove the heater core from the housing.

Installation

Install the heater core in the housing.

Position the heater core housing and install the attaching nuts.

NOTE: Ensure that the seals around the core pipes and blower motor are in position before attaching the heater core housing to the dash panel. Do not over-tighten the heater-to-dash panel nuts because this can cause distortion of the heater assembly. Tighten until two threads are visible beyond the nut.

Connect the defroster duct.

Connect the blower motor wire.

Connect and adjust the damper door control cables.

Connect the heater hoses.

Refill the cooling system.

Check the heater operation.

BLOWER MOTOR

The heater core housing must be removed before the blower motor can be removed.

Removal

Remove the heater core housing. Refer to the removal procedure.

Remove the blower motor-to-heater housing attaching screws and remove the blower motor.

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HEATING AND AIR CONDITIONING

HEATING SYSTEM



Installation

Position the blower motor in the heater core housing assembly and install the attaching screws.

Install the heater core housing. Refer to the installation procedure.

Check the blower motor and heater control operation.

DEFROSTER DUCT

Removal

Disconnect the battery negative cable.

WARNING: Do not loosen the radiator drain-cock when the cooling system is hot and pressurized because serious burns from hot coolant can result.

Drain approximately 1.9 liters (2 qts) of coolant from the radiator. Drain the coolant into a clean container.

Remove the heater hoses.

Remove the screw attaching the heater housing to the bracket.

Remove the nuts attaching the heater housing to the dash panel from within the engine compartment.

Disconnect the speedometer cable.

Remove the glove box.

Tilt the heater core housing back, pull it to the rear and lower it.

Disconnect the heater control cables.

Remove the fresh air cover panel from the cowl.

Remove the fresh air intake duct assembly.

Lower the windshield.

Remove the screws from the defroster duct and remove the defroster duct and tube.

Installation

Position the defroster duct and install the attaching screws and tube.

Raise the windshield and secure it.

Install the fresh air intake duct assembly.

Install the fresh air cover panel on the cowl.

Install the heater control cables.

Position the heater core housing on the dash panel.

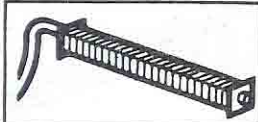
Install the nuts attaching the housing to the dash panel.

Install the glove box.

Install the speedometer cable.

Install the screw attaching the heater core housing to the bracket.

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HEATING AND AIR CONDITIONING

HEATING SYSTEM



Connect the heater hoses.

Refill the radiator.

Connect the battery negative cable.

FRESH AIR INTAKE DUCT

Removal

Disconnect the battery negative cable.

WARNING: Do not loosen the radiator draincock when the cooling system is hot and pressurized because serious burns from hot coolant can result.

Drain approximately 1.9 liters (2 qts) of coolant from the radiator. Drain the coolant into a clean container.

Remove the heater hoses.

Remove the screw attaching the heater core housing to the bracket.

Remove the nuts attaching the housing to the dash panel from within the engine compartment.

Disconnect the speedometer cable.

Remove the glove box.

Tilt the heater core housing back and pull to the rear of the lower housing.

Disconnect the heater control cables.

Remove the fresh air cover panel from the cowl.

Remove the fresh air intake duct assembly.

Installation

Position the defroster duct and install the attaching screws and tube.

Raise the windshield and secure it.

Install the fresh air intake duct assembly.

Install the fresh air cover panel on the cowl.

Install the heater control cables.

Position the heater core housing on the dash panel.

Install the nuts attaching the housing to the dash panel.

Install the glove box.

Install the speedometer cable.

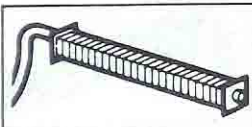
Install the screw attaching the heater core housing to the bracket.

Connect the heater hoses.

Refill the radiator.

Connect the battery negative cable.

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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



GENERAL

A factory installed air conditioner system is not available for CJ and Scrambler vehicles equipped with a four-cylinder engine.

All information in this section is in reference to vehicles equipped with a six-cylinder engine.

When driving at normal highway speeds, the CJ and Scrambler air conditioner system will operate at maximum efficiency.

When encountering stop-and-go congested driving conditions, a slight reduction in cooling efficiency generally will be experienced.

It is recommended that an intermediate temperature and the high fan position be used for average city driving and that an intermediate temperature and medium fan position be used for highway driving.

When driving at a relatively high speed for an extended period of time, the evaporator may possibly frost over, resulting in a temporary loss of cooling.

Should this occur, simply turn the TEMP knob (1) to OFF and allow the blower to operate for a few minutes to defrost the evaporator.

Then turn the TEMP knob to a position that is not as cold as the position where the frosting occurred.

To maintain maximum cooling efficiency, periodically remove bugs and other foreign matter from the condenser and radiator fins. Do not install a bug screen or other screen material in front of the condenser and radiator.

Liquid deposits under a vehicle, at a location below the evaporator housing, is frost condensation draining from the system and is normal.

The engine temperature gauge pointer will indicate a slightly higher than normal temperature when the air conditioner system is operating. However, should excessive overheating occur:

- check the condition of all coolant hoses
- check the radiator for rust or scaling conditions
- ensure that the condenser is free of bugs and other foreign matter

The air conditioner can also be used for fast, efficient defogging of windows during cool, damp weather.

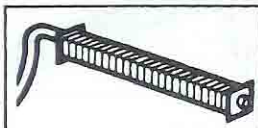
The condenser is mounted ahead of the radiator and the remaining components are in the engine compartment.

The compressor is a rotary, five-cylinder, belt-driven pump. An electromagnetic clutch couples the compressor to the drive pulley.

The drive pulley freewheels when the compressor is not in use.

The START position in the ignition switch automatically disconnects all accessories, including the A/C system, to reduce battery load and provide easier starting.

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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



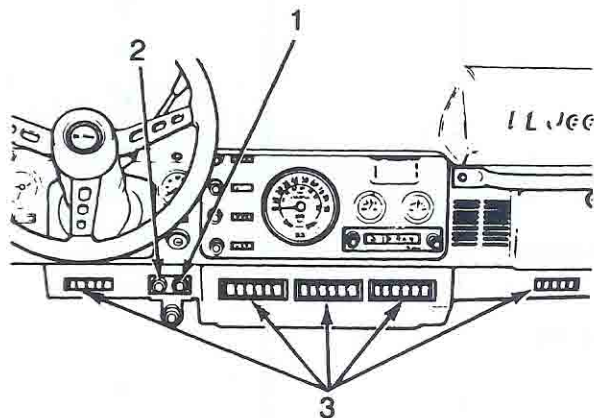
OPERATION

General

For fast, maximum efficiency, purge the vehicle of hot air by driving the equivalent of two or three city blocks.

During this time, place the TEMP control (1) in the MAX position and the FAN control (2) in the HI position. This permits the evaporator to precool in hot weather.

Adjust the air outlets to obtain the desired airflow distribution by moving the louver levers (3) left, right, up or down.



1. Temperature Control Knob
2. Fan Control Knob
3. Adjustable Air Outlet Louvers

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Airflow can be adjusted for quick delivery to a specific spot or for gentle diffusion of air throughout the vehicle.

When the interior of the vehicle has cooled to the desired temperature, the FAN knob may be set to obtain the desired volume of air from the air outlets.

The TEMP knob may be rotated to vary the temperature. It may be necessary to experiment with the TEMP knob to determine the positions best suited to various driving conditions.

Generally, an intermediate temperature and high fan speed is comfortable for city driving, and a lower fan speed is comfortable for open road driving.

Operate the engine well above idle speed for more efficient cooling when the vehicle is not in motion.

System Operation

The compressor increases the pressure and temperature of the system refrigerant.

The heated refrigerant vapor then moves to the condenser where it cools by transferring heat to the air passing over the condenser fins.

As the refrigerant cools in the condenser, it condenses into a liquid.

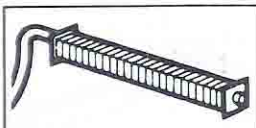
The highly pressurized liquid refrigerant then moves to the receiver/drier.

The receiver/drier is a reservoir that furnishes refrigerant to the expansion valve at all times.

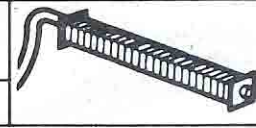
From the receiver/drier, the high-pressure liquid refrigerant moves to the expansion valve.

The expansion valve meters refrigerant into the evaporator where a low pressure is maintained by the inlet (suction) side of the compressor.

As the refrigerant enters the evaporator, it immediately begins to boil by absorbing heat from the air passing over the evaporator core.



HEATING AND AIR CONDITIONING



AIR CONDITIONER SYSTEM

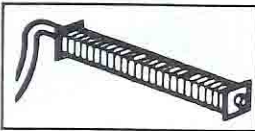
Having given up its heat to boil the refrigerant, the cooled air passes into the passenger compartment of the vehicle.

From the evaporator, the vaporized refrigerant moves back to the compressor to repeat the cycle.

SPECIAL TOOLS

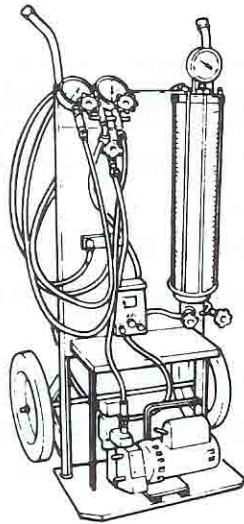
Tool Ref.	Description	Required	Recommended
J-6084	Halide Torch Leak Detector		■
J-23500-01	Portable Service Station		■
J-25359-C	Torx Bit and Socket Wrench Set		■
J-23575	Pressure Gauge and Manifold Assembly		■
J-5453	Goggles		■
J-6105	1/4-inch Ratchet		■
J-6272-02	Multi-Refrigerant Can Opener		■
J-26933	Electronic Leak Detector		■
J-29642-10	Service Valve Alignment Tool	■	
J-29642-11	Service Valve Removal and Installation Tool	■	
J-29642	Sankyo Air Conditioner Service Kit	■	
J-25498	Adapter		■
J-25499	Adapter		■

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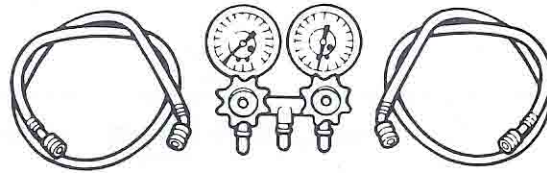


HEATING AND AIR CONDITIONING

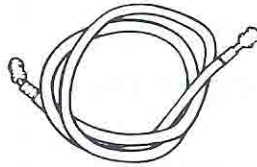
AIR CONDITIONER SYSTEM



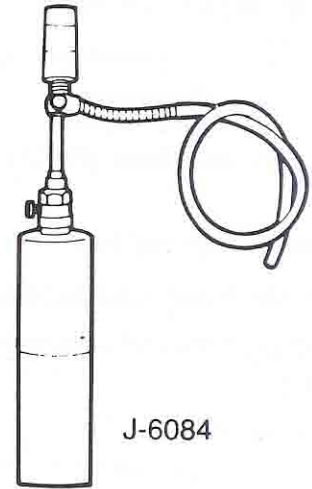
J-23500-01



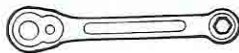
J-23575



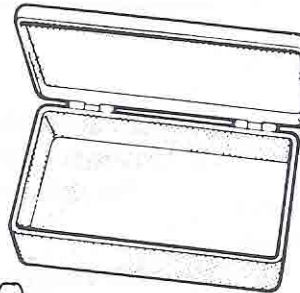
J-29642-10



J-6084



J-6105



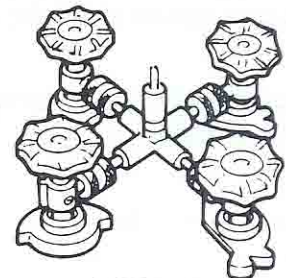
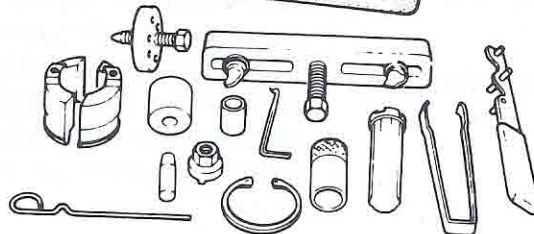
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J-5453



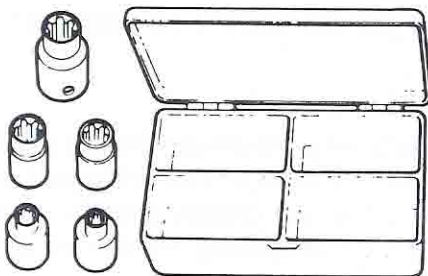
J-25498



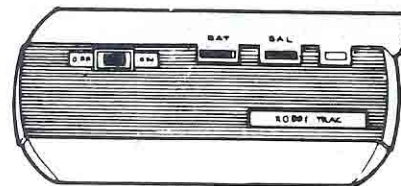
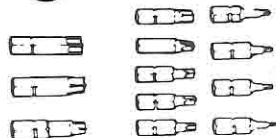
J-6272-02



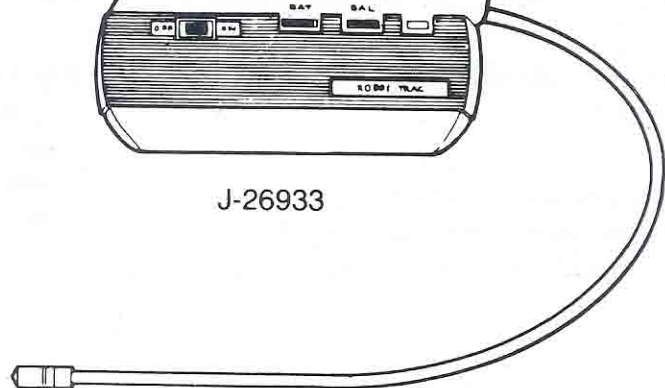
J-25499



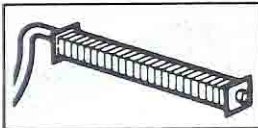
J-25359-C



J-26933

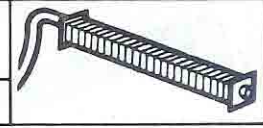


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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



TORQUE SPECIFICATIONS

Component	Service Set-To Torque	Service Recheck Torque
A/C Service Valve (Rototype)	20 N·m (15 ft-lbs) (Wet Torque)	17-24 N·m (13-17 ft-lbs)
Clutch Retaining Nut	37 N·m (27 ft-lbs)	34-39 N·m (25-30 ft-lbs)
Cylinder Head Cap Screws	33 N·m (24 ft-lbs)	30-34 N·m (22-25 ft-lbs)
Discharge/Inlet (Suction) Hose Fitting	27 N·m (20 ft-lbs)	24-30 N·m (18-22 ft-lbs)
Oil Filler Plug	10 N·m (7 ft-lbs)	8-12 N·m (6-9 ft-lbs)

REFRIGERANT SAFETY PRECAUTIONS

The refrigerant used for automotive air conditioner systems is dichlorodifluoromethane, commonly known as Refrigerant-12 or R-12.

It is transparent and colorless in both the liquid and vapor state.

Because it has a boiling point of 29.8°C (21.7°F) below zero at atmospheric pressure, it vaporizes at all ambient temperatures and pressures.

The vapor is heavier than air, nonflammable and nonexplosive. It is nonpoisonous except when in direct contact with open flame, and is noncorrosive except when combined with water.

Observe the following precautions when involved with R-12.

- R-12 evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts

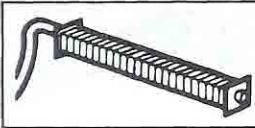
- for this reason, extreme care must be taken to prevent any liquid refrigerant from contacting the skin and especially the eyes

WARNING: Always wear safety goggles when servicing the refrigeration part of the air conditioner system. Keep a bottle of sterile mineral oil and a weak solution of boric acid handy when servicing the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out. (R-12 is rapidly absorbed by oil). Next, wash the eyes with a weak solution of boric acid. Call a doctor immediately, even if irritation has ceased after the first aid treatment.

WARNING: Do not heat R-12 above 51.7°C (125°F).

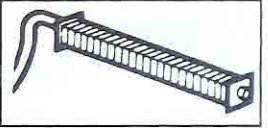
- in most instances, moderate heat is required to bring the pressure of the refrigerant in its container above the pressure of the system when charging or adding refrigerant to the system

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- a bucket or large pan of warm water not exceeding 51.7°C (125°F) is all the heat required for this purpose
- do not heat the refrigerant container with a blow torch or any other means that would raise the refrigerant temperature above the maximum allowable temperature
- do not weld, steam clean or heat the system components or refrigerant hoses

CAUTION: Keep the R-12 container upright when charging the system to remove the vapor rather than the liquid.

- when charging the refrigeration system, keep the supply tank or cans in an upright position
- if the refrigerant container is on its side or upside down, liquid refrigerant will enter the system and damage the compressor

WARNING: Always work in a well-ventilated area.

- always maintain good ventilation in the working area
- discharge the refrigerant into the service bay exhaust system or outside the building
- large quantities of refrigerant vapor in a small, poorly ventilated room can displace the air and cause suffocation
- although R-12 vapor is normally nonpoisonous, it can be changed into a very poisonous gas if allowed to come in contact with an open flame

- do not discharge large quantities of refrigerant in an area having an open flame
- a poisonous gas is produced when using a halide torch leak detector
- avoid inhaling the fumes from a leak detector

CAUTION: Do not allow liquid refrigerant to touch bright metal.

- refrigerant will tarnish bright metal and chrome surfaces
- avoid splashing refrigerant on any surface
- refrigerant in combination with moisture is very corrosive and can cause extensive damage to all metal surfaces

SERVICE VALVES

The discharge and inlet (suction) service valves are mounted directly on the compressor head.

The valves are used for diagnosis, charging, discharging and evacuating the system, and for isolating the system during component removal and installation.

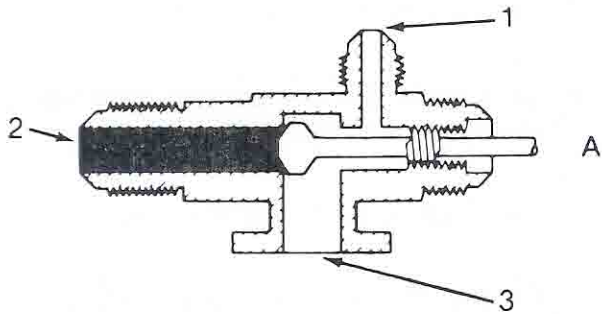
The service valves are three-position valves. In the normal operating position, the valve stem (A) is turned counterclockwise to the back-seated (full-out) position.

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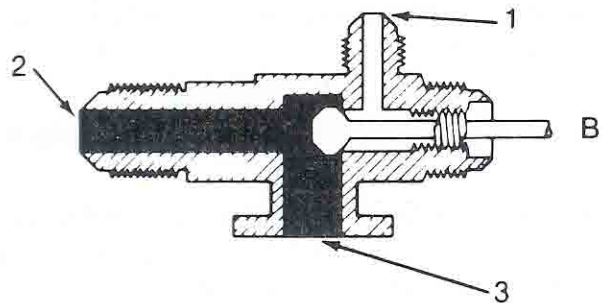


HEATING AND AIR CONDITIONING

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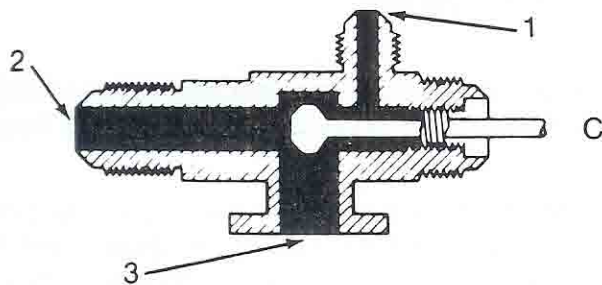
When the valve stem (B) is turned clockwise to the front-seated (full-in) position, the the compressor is isolated from the system. This position is used for removing the compressor or for checking the compressor oil level.



When the valve stem (C) is mid-positioned, the gauge port is open. This position is used for charging, discharging, evacuating and checking the system pressure.

Discharge Service Valve Adapters

When it is necessary to connect a service hose to the discharge service valve, one of the adapters listed in the chart is required.



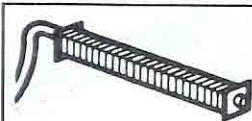
Discharge Service Valve Adapters

MANUFACTURER	PART NUMBER		
	Straight	Right Angle	Flex
Kent Moore	J-25498	J-25499	—
K-D Tools	KD-2409	—	—
Draf Tools	AC 354	—	AC 355

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1. To Service Port
2. To Hose
3. To Compressor



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PRESSURE GAUGE AND MANIFOLD ASSEMBLY

Connecting a Pressure Gauge and Manifold Assembly

Remove the protective caps from the service valves.

Close both hand valves on the gauge and manifold assembly.

Connect the compound gauge hose to the compressor inlet (suction) service valve (low-side).

Connect the high pressure gauge hose to the discharge service valve (high-side).

Turn both of the service valve stems to mid-position. The gauges will indicate the high and low side pressures respectively.

Purge any air from the high side test hose by opening the high side hand valve on the manifold for three to five seconds (the center connection on the manifold must be open).

Purge any air from the low side test hose by opening the low side hand valve on the manifold for three to five seconds (the center connection on the manifold must be open).

The system may be operated with the gauge manifold assembly connected in the manner described above. The gauges will indicate the respective operating pressures.

SYSTEM PRESSURE CHECK

The pressures developed on the high side and the low side of the compressor indicate whether or not the system is operating properly.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulley, belts or fan. Do not wear loose clothing.

Attach the pressure gauge and the manifold assembly.

Close both hand valves on the gauge and manifold assembly.

Turn both service valve stems to mid-position.

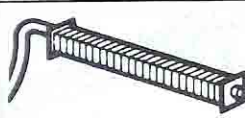
Operate the air conditioner system with the engine at 1500 rpm and the controls set for full cooling.

Insert a thermometer into the discharge air outlet and observe the air temperature. The temperature should be approximately 7.1°C (45°F) or less.

Observe the high and low side pressures.

If pressures are abnormal, refer to the Pressure and Performance Diagnosis Charts.

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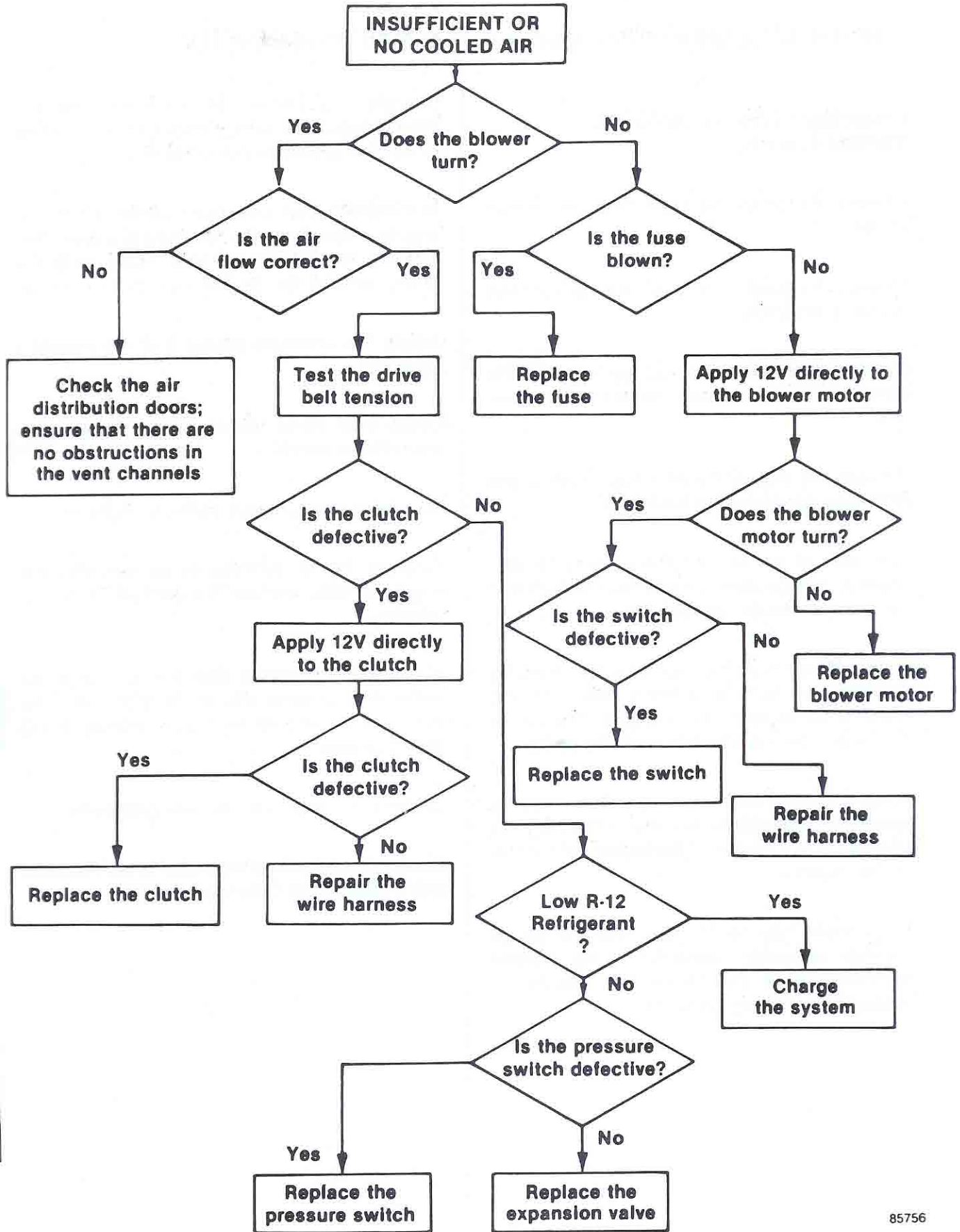


HEATING AND AIR CONDITIONING

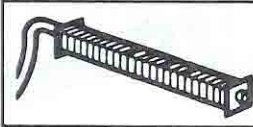


AIR CONDITIONER SYSTEM

A/C SYSTEM DIAGNOSIS



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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



Pressure Diagnosis

Condition	Possible Cause	Correction
LOW SIDE LOW – HIGH SIDE LOW	<ul style="list-style-type: none"> (1) System refrigerant is low. (2) Expansion valve is restricted. 	<ul style="list-style-type: none"> (1) Evacuate, leak test and charge the system. (2) Replace the expansion valve.
LOW SIDE HIGH – HIGH SIDE LOW	<ul style="list-style-type: none"> (1) Internal leak in the compressor – worn. (2) Cylinder head gasket is leaking. (3) Expansion valve is defective. (4) Drive belt slipping. 	<ul style="list-style-type: none"> (1) Remove the compressor cylinder head and inspect the compressor. Replace the valve plate assembly if necessary. If the compressor pistons, rings or cylinders are excessively worn or scored replace the compressor. (2) Install a replacement cylinder head gasket. (3) Replace the expansion valve. (4) Adjust the belt tension.
LOW SIDE HIGH – HIGH SIDE HIGH	<ul style="list-style-type: none"> (1) Condenser fins obstructed. (2) Air in the system. (3) Expansion valve is defective. (4) Loose or worn fan belts. 	<ul style="list-style-type: none"> (1) Clean the condenser fins. (2) Evacuate, leak test and charge the system. (3) Replace the expansion valve. (4) Adjust or replace the belts as necessary.
LOW SIDE LOW – HIGH SIDE HIGH	<ul style="list-style-type: none"> (1) Expansion valve is defective. (2) Restriction in the refrigerant hose. (3) Restriction in the receiver/drier. (4) Restriction in the condenser. 	<ul style="list-style-type: none"> (1) Replace the expansion valve. (2) Check the hose for kinks – replace if necessary. (3) Replace the receiver/drier. (4) Replace the condenser.
LOW SIDE AND HIGH SIDE NORMAL (INADEQUATE COOLING)	<ul style="list-style-type: none"> (1) Air in the system. (2) Moisture in the system. 	<ul style="list-style-type: none"> (1) Evacuate, leak test and charge the system. (2) Evacuate, leak test and charge the system.

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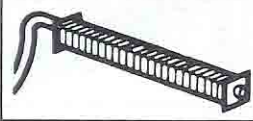


AIR CONDITIONER SYSTEM

Performance Diagnosis

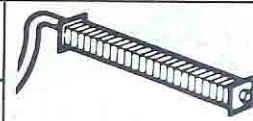
Condition	Possible Cause	Correction
COMPRESSOR NOISE	<ul style="list-style-type: none"> (1) Broken valves. (2) Overcharged. (3) Incorrect oil level. (4) Piston slap. (5) Broken rings. (6) Drive belt pulley bolts are loose. 	<ul style="list-style-type: none"> (1) Replace the valve plate. (2) Discharge, evacuate and install the correct charge. (3) Isolate the compressor and check the oil level. Correct as necessary. (4) Replace the compressor. (5) Replace the compressor. (6) Tighten with the correct torque specification.
EXCESSIVE VIBRATION	<ul style="list-style-type: none"> (1) Incorrect belt tension. (2) Clutch loose. (3) Overcharged. (4) Pulley is misaligned. 	<ul style="list-style-type: none"> (1) Adjust the belt tension. (2) Tighten the clutch. (3) Discharge, evacuate and install the correct charge. (4) Align the pulley.
CONDENSATION DRIPPING IN THE PASSENGER COMPARTMENT	<ul style="list-style-type: none"> (1) Drain hose plugged or improperly positioned. (2) Insulation removed or improperly installed. 	<ul style="list-style-type: none"> (1) Clean the drain hose and check for proper installation. (2) Replace the insulation on the expansion valve and hoses.
FROZEN EVAPORATOR COIL	<ul style="list-style-type: none"> (1) Faulty thermostat. (2) Thermostat capillary tube improperly installed. (3) Thermostat not adjusted properly. 	<ul style="list-style-type: none"> (1) Replace the thermostat. (2) Install the capillary tube correctly. (3) Adjust the thermostat.

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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



SYSTEM DISCHARGE

The refrigerant should be discharged from the system before replacing any component in the system except the compressor.

Connect the pressure gauge and manifold assembly to the service valves.

Turn both the manifold hand valves to the maximum counterclockwise (open) position.

CAUTION: Do not allow the refrigerant to rapidly discharge because the oil in the compressor and system will be forced out with it.

Open both of the service valves slightly (from back-seated position) and allow the refrigerant to discharge slowly from the system.

SYSTEM EVACUATION

A system with the refrigerant discharged during repair, or one that is excessively low on refrigerant, must be evacuated with a vacuum pump before replacement refrigerant is installed.

The reason for evacuating a system is to remove air and moisture that may have entered the system.

As the vacuum pump lowers the pressure of a closed air conditioner system, the boiling point of the moisture in the system will also be lowered.

When evacuating a system, it is necessary to lower the boiling point of the moisture in the system to a point lower than the ambient (surrounding) temperature to ensure that all the moisture is vaporized.

With an ambient temperature of 23.9°C (75°F) and a vacuum of 99 kPa (29.5 in. Hg), water will boil at a temperature of approximately 12°C (54°F) and complete vaporization of all moisture in the system is assured.

At elevations higher than sea level, it will not be possible to obtain a vacuum gauge indication of 99 kPa (29.5 in. Hg) on the low side.

For each 300 meters (1000 ft) increase in altitude, the vacuum gauge must be corrected by 3.37 kPa (1 in. Hg) to compensate for the change in atmospheric pressure.

For example, at an of altitude of 300 meters (1000 ft), a vacuum gauge indication of 96 kPa (28.5 in. Hg) will be equivalent to a gauge indication of 99 kPa (29.5 in. Hg) at sea level.

When this vacuum level is attained, a minimum of 30 minutes should be allowed to evacuate the system and ensure complete moisture removal.

Evacuation With J-26695 Vacuum Pump

The J-26695 Vacuum Pump and motor is a self-contained unit equipped with a carrying handle and stand. The unit must be kept upright at all times to prevent oil from spilling.

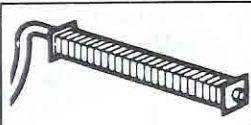
Connect Pressure Gauge and Manifold Assembly Tool J-23575 to the compressor.

Discharge the system.

Connect the center service hose to the vacuum pump inlet fitting.

Turn both manifold hand valves to the wide open position.

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Start the vacuum pump; note the gauge indications.

Operate the pump for a minimum of 30 minutes after attaining the lowest vacuum indication.

Test the system for leaks:

- close both of the manifold hand valves
- turn off the vacuum pump and note the gauge indication
- the gauge pointer should remain stationary at the vacuum level that was indicated when the pump was stopped
- if the gauge pointer returns to zero rapidly, partially charge the system and locate the leak with a leak detector
- repair the leak and repeat the evacuation procedure

If the gauge pointer remains stationary and vacuum is maintained for three to five minutes, resume the evacuation and continue for a minimum of 30 minutes.

Close both the manifold hand valves and stop the vacuum pump.

Disconnect the center service hose from the vacuum pump. The system is now ready for charging.

Evacuation With J-23500-01 Portable Air Conditioner Service Station

A J-23500-01 Portable Air Conditioner Service Station is a completely portable station equipped with a vacuum pump, metering-

charging cylinder, refrigerant supply, gauges, hoses and hand control valves.

The control switch for the vacuum pump is mounted on the front of the charging station. It should be in the OFF position before inserting the plug into the power source.

CAUTION: Ensure that the system is completely depressurized before evacuating. With the system pressurized, refrigerant may enter the vacuum pump and damage it.

Close all the hand valves.

Connect the red charging hose (1) to the discharge service valve port on the compressor.

Connect the blue charging hose (2) to the inlet (suction) service valve port on the compressor.

Discharge the system and leave the inlet (suction) and discharge service valves in the mid-position.

Connect the vacuum pump hose to the vacuum pump inlet.

Open the low pressure hand control valve and high pressure hand control valves on the charging station.

Start the vacuum pump (3) and open the vacuum control valve; note the gauge indication.

Operate the pump for a minimum of 30 minutes after attaining the lowest vacuum level.

Fill the charging cylinder (4) while the system is evacuating.

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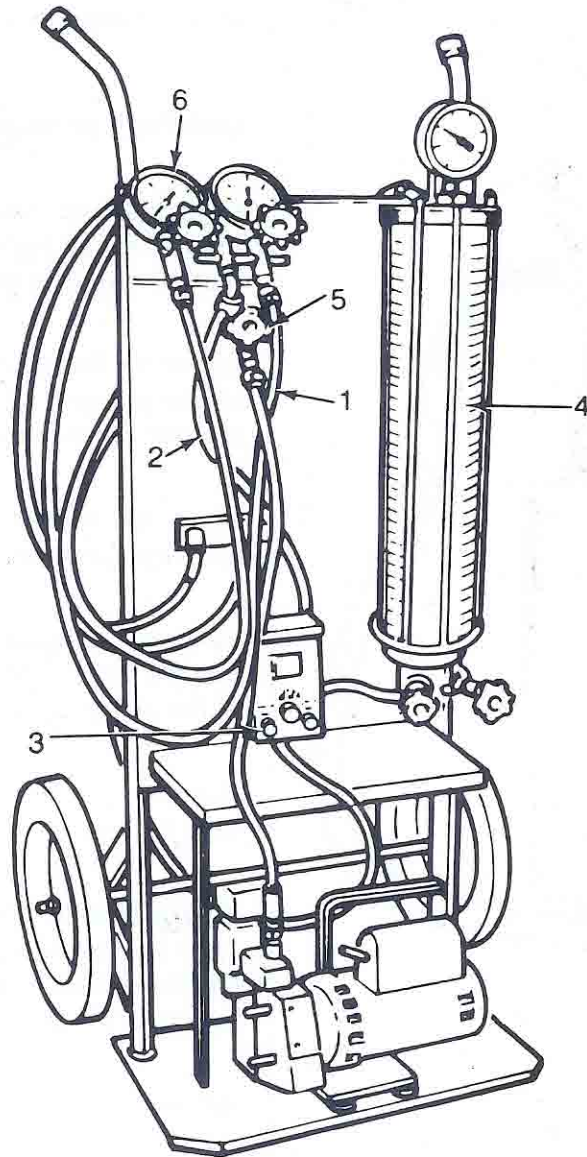


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AIR CONDITIONER SYSTEM

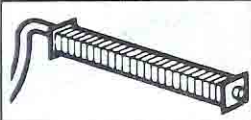


Close the vacuum control valve (5) and stop the vacuum pump. Observe the blue gauge (6) to determine if a leak exists. If a leak does not exist, the system is now ready for charging.



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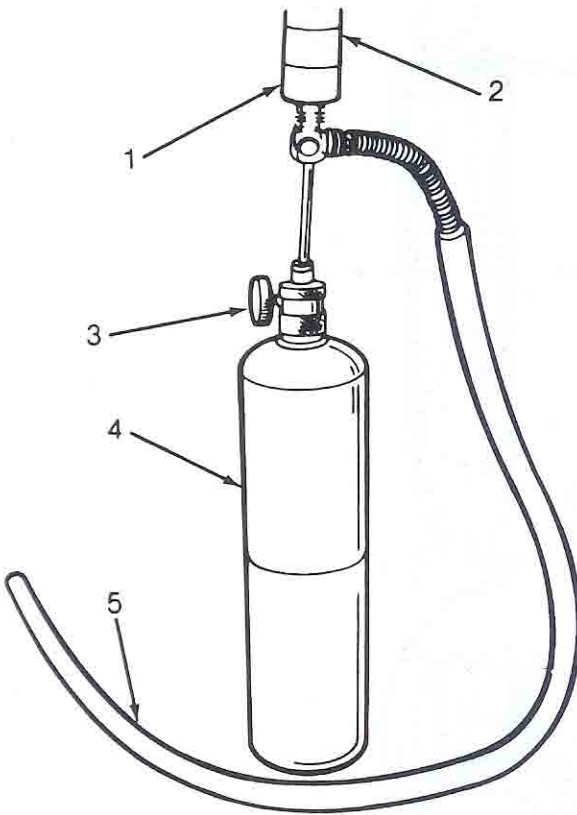
AIR CONDITIONER SYSTEM



LEAK TESTS

Halide Torch Leak Detection

External leaks can be detected and isolated with Halide Torch Tool J-6084.



1. Reactor Plate
2. Stove
3. Gas Control Knob
4. Gas Cylinder
5. Search Hose

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The torch burns propane fuel and is equipped with a search hose.

When air is drawn into the hose by the torch, it contacts a heated copper reactor ring in the torch.

If refrigerant is present in the air, the normally light blue flame will change to green or a purplish-blue color.

Leak Test Procedure

Open the torch valve and ignite the torch. Adjust the flame just high enough to heat the copper reactor ring to a cherry red color.

Lower the flame until it is about 6.4 mm (1/4 in) above or even with the copper reactor ring. A smaller flame is more sensitive to refrigerant.

Move the search hose slowly under all connections, joints and seals.

Because refrigerant is heavier than air, leaks may be more readily detected on the lower side of the areas being tested.

Watch for a flame color change. This will indicate the area of a leak.

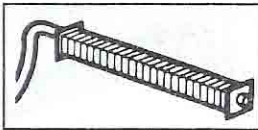
WARNING: When R-12 refrigerant contacts an open flame, phosgene gas is produced. Never inhale the vapor emitted from the Halide Torch because it is poisonous.

Repair the leak(s) as required.

Evacuate the system after all the leaks are corrected.

Charge the system.

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Electronic Leak Detection

External leaks can also be detected and isolated with Electronic Leak Detector Tool J-26933.

This leak detector is an electronic instrument designed to detect R-12 refrigerant leaks as small as one-half ounce per year.

The 45.7-cm (18-in) flexible probe provides accessibility to otherwise inaccessible areas.

Follow the manufacturer's calibration instructions (included with the unit) to prepare the electronic leak detector for proper operation.

NOTE: The Electronic Leak Detector Tool J-26933 will not expose the user to phosgene gas vapor or fumes.

Leak Test Procedure

Remove the flexible probe from its case.

Activate the tester OFF/ON switch.

Place the flexible probe tip near the leak port and adjust the BAT thumbwheel a few teeth until the light illuminates and then goes out when the tip is removed from the leak port.

Move the flexible probe slowly under all suspected leaks from connections, joints and seals.

Because R-12 refrigerant is heavier than air, leaks may be detected more readily on the lower side of areas being checked.

When a leak is detected, its presence will be indicated by the illuminated white indicator light.

NOTE: If the probe tip is held too long near the leak, the white indicator light will go out.

Repair the leaks, as required.

Evacuate the system after all the leaks are corrected.

Charge the system.

FLUSHING

Procedure

Install the compressor (if removed) and connect the service valves and hoses.

NOTE: The system must be in a discharged state.

Close all control valves of Portable Air Conditioning Service Station J-23500-01 and connect red high pressure hose to the compressor discharge service valve.

WARNING: Wear goggles to protect the eyes.

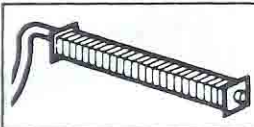
Open the refrigerant drum valve.

Bleed the charging cylinder with the valve located on the back of the control panel directly above the cylinder.

When 0.9 kg (2 lbs) of refrigerant is in the charging cylinder, close the bleed valve.

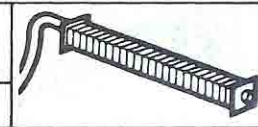
Close the refrigerant drum valve.

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Disconnect the receiver/drier from the condenser.

Place a shop towel on the condenser outlet to absorb the oil that will be forced from the system.

Center the compressor discharge valve.

Fully open the high pressure valve on the control panel and allow the liquid refrigerant to flow through the condenser.

WARNING: Always maintain good ventilation in the working area. Always discharge the refrigerant into the service bay exhaust system or outside the building. Large quantities of refrigerant vapor in a small, poorly ventilated area can displace the air and cause suffocation.

When the charging cylinder is empty, close the high pressure valve on the control panel.

Check the compressor oil level.

A replacement receiver/drier should be installed and the system evacuated before charging.

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SYSTEM CHARGE

Charge Capacity

The recommended charge is 0.9 kg (2 lbs) of R-12 refrigerant.

NOTE: Replacement of a hose, receiver/drier, condenser, expansion valve or evaporator core requires the addition of 28 grams (one ounce) of AMC Compressor Oil (8132400), or equivalent, to the system.

Charging With Multi-Refrigerant Can Opener Tool J-6272-02

The following charging procedure is based on the use of Pressure Gauge and Manifold Assembly J-23575 and Multi-Refrigerant Can Opener J-6272-02.

WARNING: Wear goggles to protect your eyes.

Connect Pressure Gauge and Manifold Assembly J-23575 and evacuate the system. Keep both the service valves in mid-position.

Close both gauge hand valves.

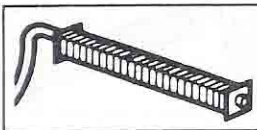
Disconnect the service hose from the vacuum pump and connect it to the center of Multi-Refrigerant Can Opener J-6272-02. Close the four petcock valves on the dispenser.

Attach the necessary number of refrigerant cans to the opener. Refer to Charge Capacity for the proper weight of the refrigerant necessary to fully charge the system.

Open one petcock valve. Loosen the center service hose at the pressure gauge and manifold assembly to allow the refrigerant to purge air from the hose. Tighten the service hose connection and close the petcock valve.

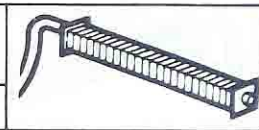
Open the suction gauge hand valve and one petcock valve. Do not open the discharge (high pressure) gauge hand valve.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.



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Start the engine and place the air conditioner control levers in the maximum cooling positions. The compressor will operate and help charge the inlet (suction) side of the system.

NOTE: The refrigerant cans may be placed upright in warm water with a maximum temperature of 51.7°C (125°F) to speed up the charging process.

When the first refrigerant can is empty, open another petcock valve to continue charging the system.

Continue charging until the specified amount of refrigerant is in the system.

The frost line on the refrigerant can will indicate what portion of the refrigerant in the can has entered the system.

This may be used as a guide when a system requires a fraction of a full can.

NOTE: If an accurate scale is available, weigh the refrigerant cans before and during the charging procedure to ensure that the correct amount of refrigerant is being used.

When the system is fully charged, close the suction gauge hand valve and all the petcock valves.

Operate the system five to ten minutes to allow it to normalize and to determine if the system will cycle properly.

Charging With Portable Air Conditioner Service Station J-23500-01

NOTE: Fill the charging cylinder.

Ensure that the refrigerant drum is inverted and the valve is open.

Open the right hand valve at the base of the charging cylinder and fill with the required amount of refrigerant to charge the system.

Liquid refrigerant will be observed rising in the charging cylinder sight glass.

Slightly open the valve at the top of the cylinder when the pressure in the charging cylinder equals the pressure in the supply tank.

This relieves the head pressure and allows the refrigerant to continue filling the cylinder.

Observe the pressure gauge at the top of the cylinder and rotate the plastic shroud until the pressure heading column corresponds with the gauge pressure in line with the sight glass.

NOTE: If the pressure gauge at the top of the cylinder indicates, for example, 483 kPa (70 psi), locate the column with the pressure heading of 483 (70) and rotate the shroud so the 483 (70) column aligns with the sight glass.

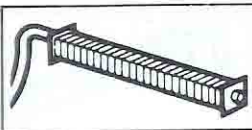
When the refrigerant reaches the correct level in the sight glass, close both the right hand valve at the base of the cylinder and the refrigerant drum valve.

Ensure that the top cylinder valve is fully closed.

NOTE: If bubbles appear in the sight glass, tilt the charging station back momentarily.

Connect the heating element cord to the power pack heating element receptacle and turn the heater switch ON.

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Allow the refrigerant to heat (building up pressure proportionately) for about 10 minutes while the vacuum pump is operating.

WARNING: Wear goggles to protect your eyes.

Discharge and evacuate the system.

Close the low pressure valve on the charging station, fully open the left hand refrigerant control valve at the base of the cylinder and the high pressure valve on the charging station.

Allow the required charge of refrigerant to enter the high side of the system.

When a full charge has entered the system, close the refrigerant control valve and the high pressure valve on the charging station.

CAUTION: Do not permit the liquid level to drop below zero on the cylinder sight glass.

Close the manifold gauges after completion of the charging operation and check the high and low side pressures.

Check the system operation.

CAUTION: Observe the gauges with the high and low pressure valves on the charging station closed. The low pressure gauge could be damaged if both the high and low pressure valves of the manifold are opened. The high pressure developed in the discharge side (high side) of the compressor would peg the low pressure gauge pointer and damage the gauge.

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

Upon completion of the operational check, back-seat the inlet (suction) and discharge service valves to their normal operating position by turning them fully counterclockwise.

Disconnect the high and low pressure charging hoses from the compressor with care.

A small amount of refrigerant remaining in the hoses will escape.

Position the charging hoses on the charging station hose holder to keep air and dirt out of them.

Open the valve at the top of the cylinder to remove the remaining refrigerant.

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

Replace the quick seal caps on the compressor service valves when service is completed.

CONTROL PANEL

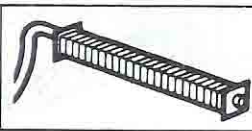
Fan Switch

The fan switch may be serviced by removing the access plate located on the lower evaporator core housing below the control panel.

TEMPERATURE CONTROL THERMOSTAT

To service the temperature control thermostat, the evaporator core housing must be disassembled.

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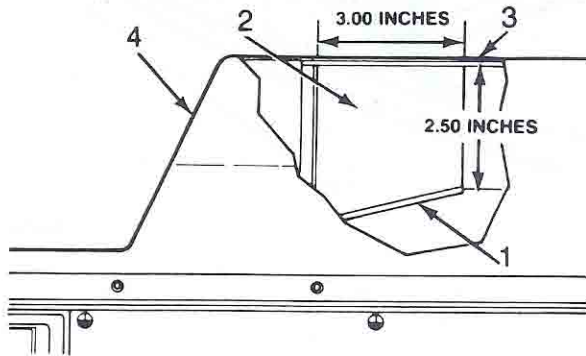
HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



When installing a replacement temperature control thermostat, insert the capillary tube (1) into the evaporator coil (2) a minimum of 5 cm (2 in).

CAUTION: Handle the tube with care to avoid bends or kinks that could cause the thermostat to malfunction.



1. Capillary Tube – Insert into Coil a Minimum of 5.1 cm (2 in)
2. Evaporator Coil
3. Insulation
4. Upper Part of Case

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CONDENSER

Removal

Discharge the refrigerant from the system. Refer to the discharge procedure.

NOTE: Discharge the system slowly to prevent loss of compressor oil.

WARNING: Do not loosen the radiator draincock when the cooling system is hot and pressurized because serious burns from hot coolant can result.

Drain the radiator. Drain the coolant into a clean container.

Remove the fan shroud and radiator.

Disconnect the pressure pipe fitting from the condenser.

Remove the condenser attaching screws and tilt the bottom of the condenser toward the engine.

NOTE: Plug all the open connections to prevent entry of dirt and moisture.

From the underside of the vehicle, disconnect the receiver/drier-to-evaporator hose fitting from the receiver/drier.

Remove the condenser and receiver/drier as an assembly.

Remove the receiver/drier from the condenser, if necessary.

Installation

If removed, attach the receiver/drier to the condenser.

Place the condenser in position and connect the receiver/drier-to-evaporator hose fitting to the receiver/drier.

Install the condenser attaching screws.

Connect the pressure pipe fitting to the condenser.

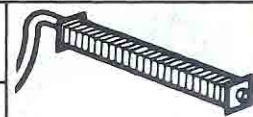
Install the radiator and fan shroud.

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HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



Fill the cooling system.

Evacuate, charge and leak test the system.
Refer to the procedures.

SIGHT GLASS

A sight glass (1) is located in the receiver/drier-to-evaporator hose at the receiver/drier end.

The sight glass provides a visual check of the system refrigerant level.

A continuous stream of bubbles will appear in the sight glass if the system is not properly charged.

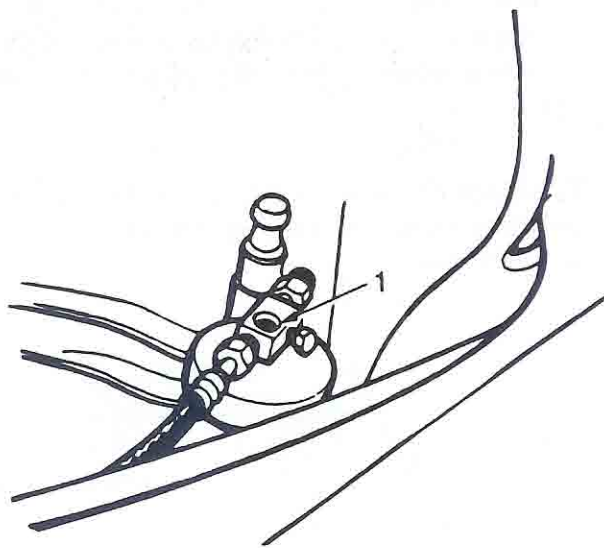
Properly charged and completely discharged systems will appear similar in the sight glass because of the lack of bubbles.

To distinguish between the two situations, cycle the compressor clutch off and on with the engine operating at 1500 rpm.

During the time the clutch is off, bubbles will appear if there is refrigerant in the system and will disappear when the clutch is on.

If no bubbles appear when the clutch is cycled off, there is no refrigerant in the system because some bubbles would appear if the system was fully charged.

If the system is discharged, it will be necessary to perform a leak test, repair as required, evacuate and charge the system.



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RECEIVER/DRIER

Removal

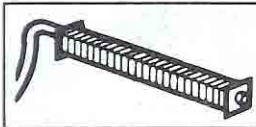
Discharge the refrigerant from the system according to the discharge procedure.

NOTE: Discharge the system slowly to prevent loss of compressor oil.

Disconnect the evaporator and condenser hose fittings from the receiver/drier.

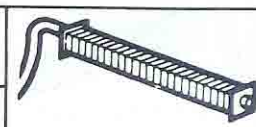
Remove the attaching screws from the bracket and remove the receiver/drier.

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AIR CONDITIONER SYSTEM



Installation

Attach the receiver/drier to the bracket.

Connect the evaporator and condenser hose fittings to the receiver/drier.

Evacuate, charge and leak test the system. Refer to the procedures.

EVAPORATOR HOUSING

Removal

NOTE: It is not necessary to discharge the system to service the blower motor. The evaporator housing may be lowered from the instrument panel to gain access to the blower motor attaching screws.

Discharge the system. Refer to the procedure.

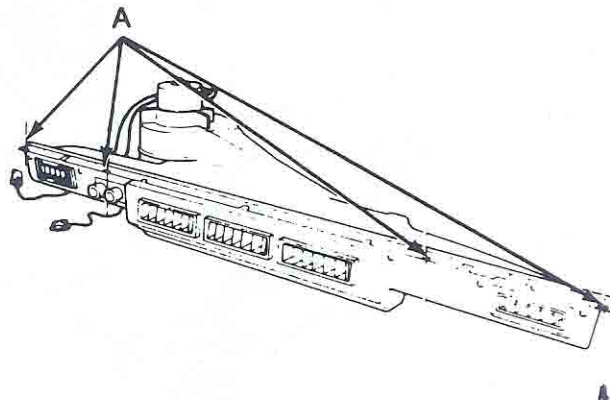
NOTE: Discharge the system slowly to prevent loss of compressor oil.

Disconnect the inlet (suction) hose fitting from the compressor.

Disconnect the receiver/drier-to-evaporator hose fitting.

Remove the hose clamps and dash grommet retaining screws.

Remove the evaporator housing-to-instrument panel attaching screws (A) and the evaporator housing-to-mounting bracket screw.



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Lower the evaporator housing and pull the hoses and grommet through the opening.

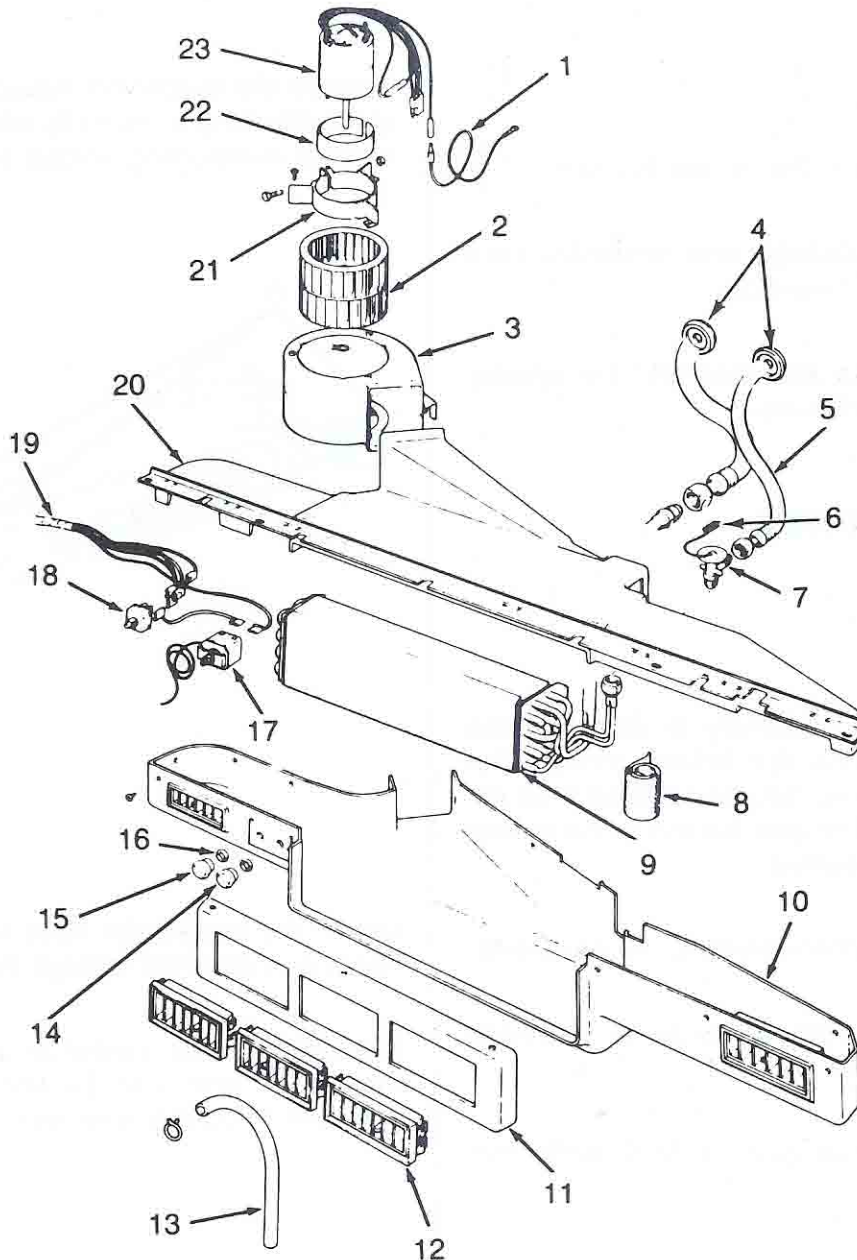
The blower motor, blower motor housing, and evaporator core can be serviced after the evaporator housing is removed.

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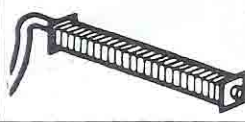
HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



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| 1. Wire | 13. Drain Tube |
| 2. Blower Fan | 14. Temperature Control Knob |
| 3. Blower Housing | 15. Fan Control Knob |
| 4. Grommet | 16. Nut |
| 5. Hose | 17. Thermostat |
| 6. Capillary Tube | 18. Switch |
| 7. Expansion Valve | 19. Harness |
| 8. Insulation | 20. Upper Housing |
| 9. Evaporator Core | 21. Bracket |
| 10. Lower Housing | 22. Insulation |
| 11. Panel | 23. Blower Motor |
| 12. Louver | |



HEATING AND AIR CONDITIONING



AIR CONDITIONER SYSTEM

Installation

Push the hoses through the grommet opening, install the grommet by pushing it toward the engine compartment and fasten it to the dash panel with the two attaching screws.

Raise the evaporator housing, install the evaporator housing-to-instrument panel attaching screws and the evaporator housing-to-mounting bracket screw.

Install the hose clamps and grommet attaching screws.

Connect the receiver/drier-to-evaporator hose fitting.

Connect the inlet (suction) hose fitting to the compressor.

Evacuate, charge and leak test the system. Refer to the procedures.

EXPANSION VALVE

Replacement

The expansion valve is preset and should not be adjusted. A defective valve requires replacement.

Discharge the system. Refer to the discharge procedure.

NOTE: Discharge the system slowly to prevent loss of compressor oil.

Remove the evaporator housing. Refer to the removal procedure.

Remove the insulation wrapped around the inlet (suction) hose fitting, expansion valve and evaporator tubing.

Mark the capillary tube location on the evaporator tubing.

Disconnect the inlet and outlet hose fittings, and remove the capillary tube clamp.

Disconnect and remove the expansion valve.

Clean the evaporator tubing to provide a positive metal-to-metal contact for the replacement expansion valve capillary tube.

Install the replacement expansion valve.

Clamp the capillary tube at the marked location on the evaporator tubing.

Connect the inlet and outlet hose fittings.

NOTE: Ensure that the capillary tube is clamped tight and has a positive metal-to-metal contact with the evaporator tubing.

Wrap the expansion valve, inlet hose fitting and capillary tube with insulation.

Install the evaporator housing. Refer to the installation procedure.

Evacuate, charge and leak test the system. Refer to the procedures.



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MAGNETIC CLUTCH

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

The electromagnetic coil is retained on the compressor with a snap ring and is slotted to maintain its position.

The pulley and plate assembly are mounted on the compressor shaft.

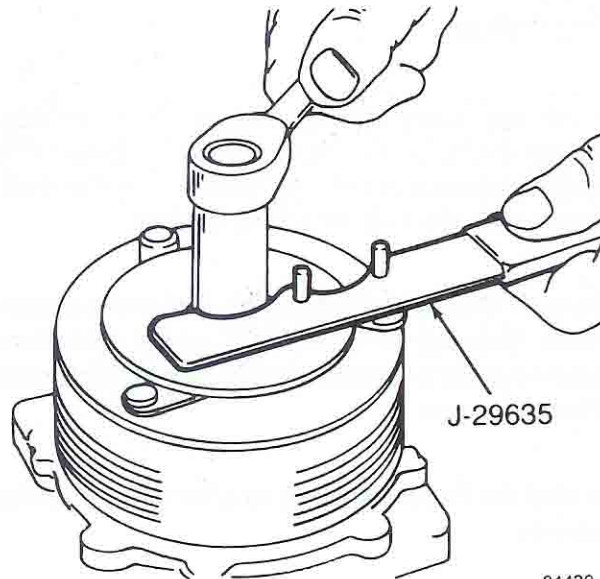
When the compressor is not in operation, the pulley freewheels on the clutch hub bearing. When the coil is energized, the plate is magnetically engaged with the pulley and turns the compressor shaft.

Noise Diagnosis

When a magnetic clutch assembly is suspected of being the source of unusual noises, follow the diagnosis sequence listed in the A/C System Troubleshooting chart.

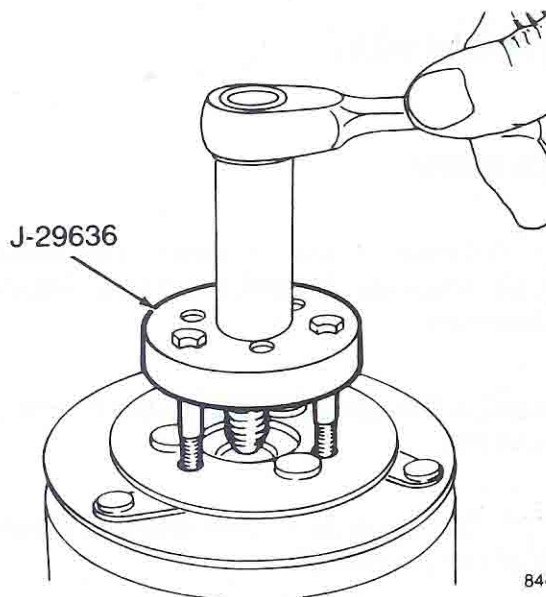
Removal

Insert two pins of Front Plate Spanner J-29635 into any two bolt holes in the front clutch plate.

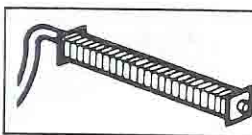


Hold the clutch plate stationary and remove the nut.

Remove the clutch plate using Clutch Plate Puller J-29636 and remove the key from the shaft.



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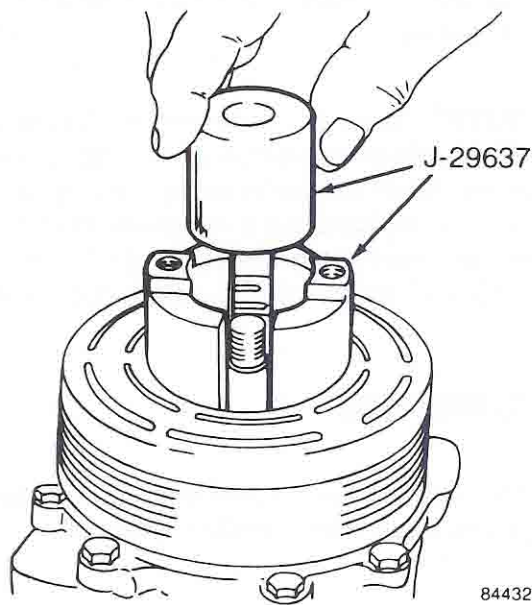
AIR CONDITIONER SYSTEM



Remove the internal bearing snap ring.

Remove the external front snap ring.

Remove the rotor pulley assembly using Rotor Pulley Puller J-29637.



Insert the lip of the jaws into the internal bearing snap ring groove.

Place the rotor puller shaft protector over the exposed compressor shaft.

Align the thumb head bolts with the puller jaws and finger-tighten.

Turn the puller center bolt clockwise to remove the rotor pulley.

Remove the electromagnetic coil wire from the clip on top of the compressor front housing.

Remove the snap ring with snap ring pliers and then remove the electromagnetic coil.

Installation

Install the electromagnetic coil.

NOTE: The coil flange protrusion must align with the hole in the front housing to prevent coil movement and correctly locate the wire.

CAUTION: Do not clamp the compressor in a vise with the jaw on the compressor body.

Support the compressor by four mounting ears on the rear of the compressor.

Align the rotor assembly squarely on the front housing hub. Use a suitable driver to drive the rotor assembly onto the shaft.

Install the internal bearing snap ring and then the external bearing snap ring.

NOTE: All snap rings have a straight edge and a beveled edge on the circumference. Position the snap rings so that the flat edge is toward the compressor and the beveled edge is outward.

Install the front plate assembly using the original clutch shims on the compressor shaft.

Install the compressor shaft key.

Align the front plate keyway with the compressor shaft key and use Clutch Face Installer J-29641 to tap the front plate onto the shaft until it contacts the clutch shims.

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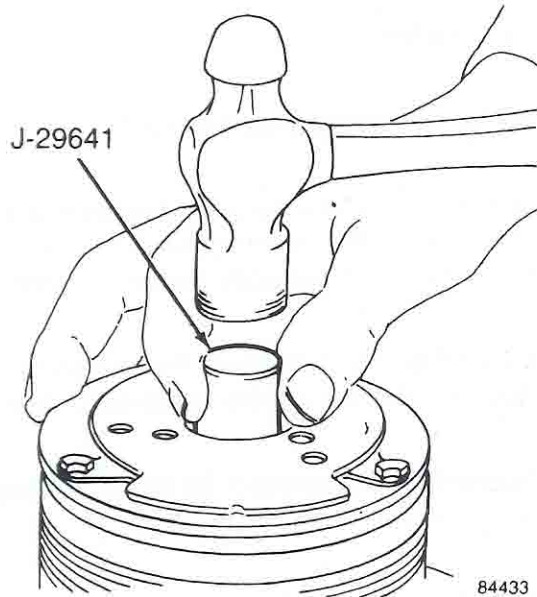


HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



NOTE: When installing the front plate, a distinct change in the sound will be heard when the front plate contacts the shims.



The air gap should consistently be 0.41-0.79 mm (0.016-0.031 in).

If the air gap varies, pry up lightly at minimum variations and tap down at maximum variations.

If the air gap is not as specified, remove the hex nut and front plate and add or subtract shims as necessary.

NOTE: The air gap is determined by the spacer shims. When assembling existing or replacement clutch components try the original shims first. When installing a replacement clutch on a replacement compressor, use a 1.02-, 0.51- and 0.13-mm (0.040-, 0.020- and 0.005-in) shim.

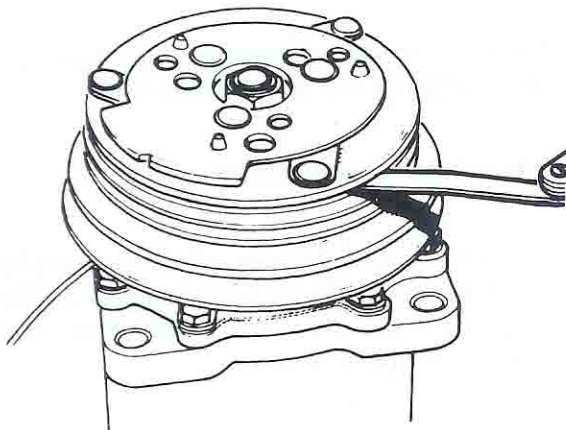
COMPRESSOR

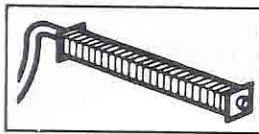
The compressor used with all six-cylinder engines is a five-cylinder rotary unit.

Install the hex nut and tighten with 37 N·m (27 ft-lbs) torque.

Check the air gap around the perimeter of the clutch plate and pulley with a feeler gauge.

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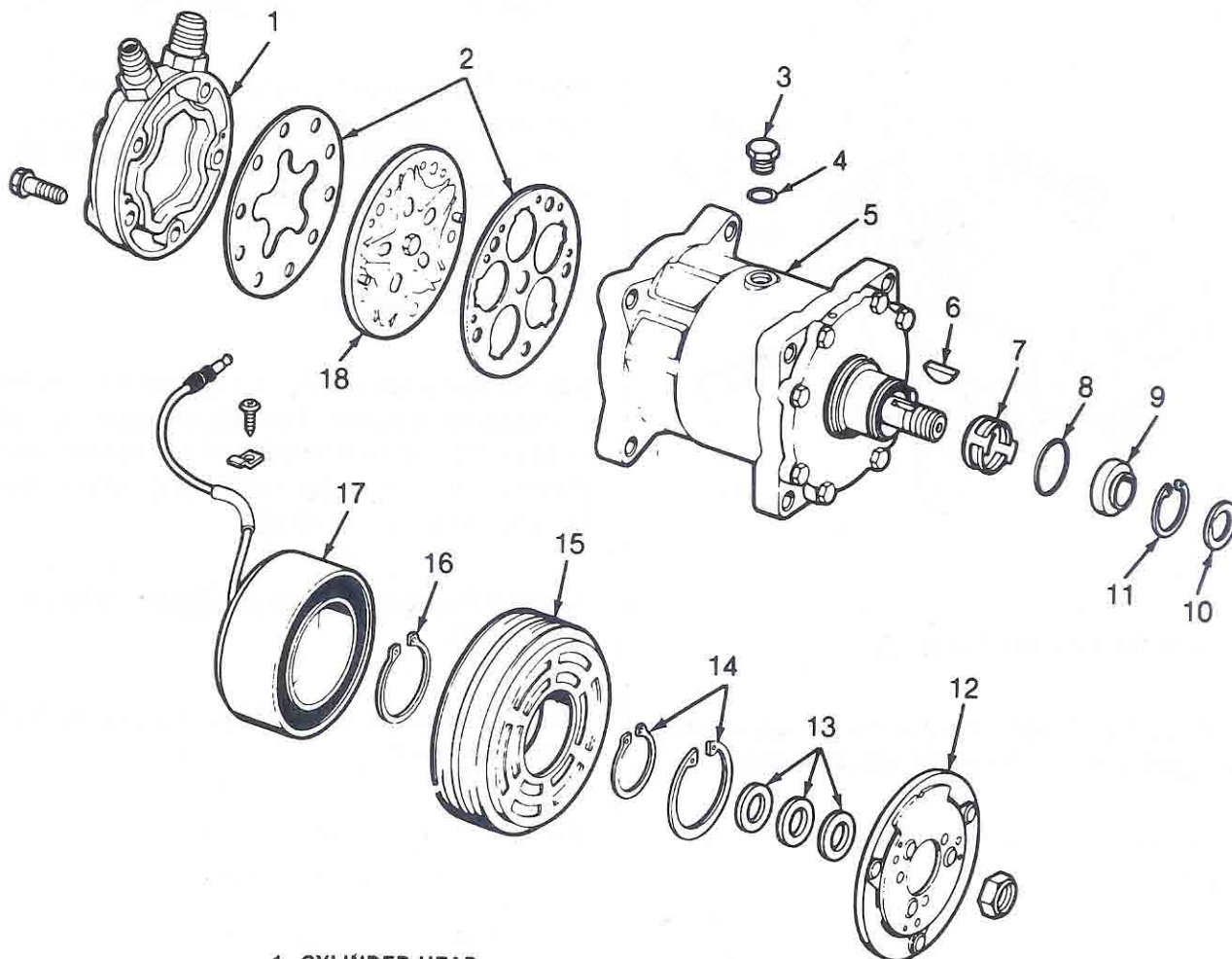


HEATING AND AIR CONDITIONING

AIR CONDITIONER SYSTEM



Components and Mounting

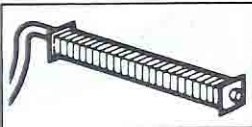


- 1. CYLINDER HEAD
- 2. GASKETS
- 3. OIL FILL PLUG
- 4. O-RING
- 5. COMPRESSOR HOUSING
- 6. KEY
- 7. SHAFT SEAL
- 8. O-RING
- 9. SHAFT SEAL SEAT

- 10. FELT RING
- 11. SNAP RING
- 12. FRONT PLATE
- 13. SHIMS
- 14. SNAP RING
- 15. ROTOR PULLEY
- 16. SNAP RING
- 17. CLUTCH ASSEMBLY
- 18. VALVE PLATE

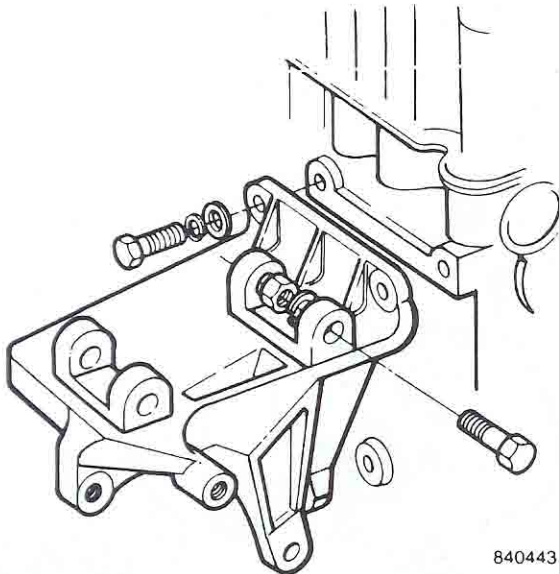
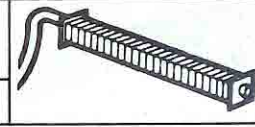
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HEATING AND AIR CONDITIONING

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Service Valve Leak Diagnosis

The compressor should be at operating temperature to achieve an accurate test.

Install Pressure Gauge and Manifold Assembly J-23575.

Front-seat the inlet (suction) and discharge service valves by turning them clockwise.

Discharge the refrigerant remaining in the compressor by opening the inlet (suction) service valve slowly.

Open the low pressure gauge hand valve and close the high pressure gauge hand valve.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.

Start the engine and operate the compressor. Pressure will build up rapidly. Stop the engine/compressor at 1 035-1 380 kPa (150-200 psi).

NOTE: The pressure should be maintained if the discharge valve is operating properly. A loss of pressure indicates a leaking compressor discharge valve or head gasket.

Compressor Isolation

It is not necessary to discharge the system for compressor removal. The compressor can be isolated from the remainder of the system and eliminate the need for recharging when performing compressor service.

Connect Pressure Gauge and Manifold Assembly J-23575.

Close both gauge hand valves and mid-position both service valves.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.

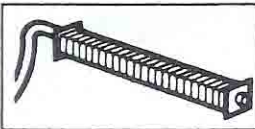
Start the engine and operate the air conditioner system.

Turn the inlet (suction) service valve slowly clockwise toward the front-seated position.

When the pressure is reduced to zero or less, stop the engine and compressor and quickly finish front-seating the inlet (suction) service valve.

Front-seat the discharge service valve.

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Loosen the oil level check plug slowly to release any internal pressure in the compressor.

The compressor is now isolated from the remainder of system.

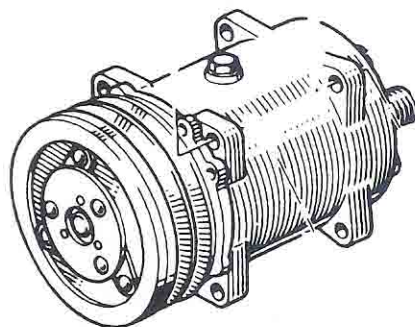
The service valves can be removed from the compressor.

When installing or removing service valves from a compressor, Tool J-29642-11 must be used to loosen or tighten the connecting fitting.

Compressor Removal

Disconnect the battery negative cable.

Isolate the compressor according to the isolation procedure previously described.



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Remove the discharge and inlet (suction) hoses from the compressor. Plug or tape all the hose fitting openings.

Remove the drive belt(s) by loosening the idler pulley (or alternator for engines equipped with a serpentine drive).

Remove the bolts and remove the compressor from the mounting bracket.

NOTE: If the compressor is being replaced, remove the magnetic clutch.

Compressor Installation

NOTE: If a replacement compressor is being installed: check the oil, add oil if necessary and install the magnetic clutch on the compressor.

Install the compressor on the mounting bracket.

Install the drive belt(s).

Tighten the drive belt(s) to the specified tension. Refer to Chapter B – Engines.

Remove all tape or plugs from the hoses and connect the discharge and inlet (suction) hoses.

Connect the battery negative cable.

Evacuate, charge and test the system for leaks.

If equipped, reset the clock to the correct time.

Front Seal Replacement

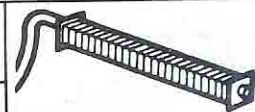
Remove the compressor. Refer to the removal procedure.

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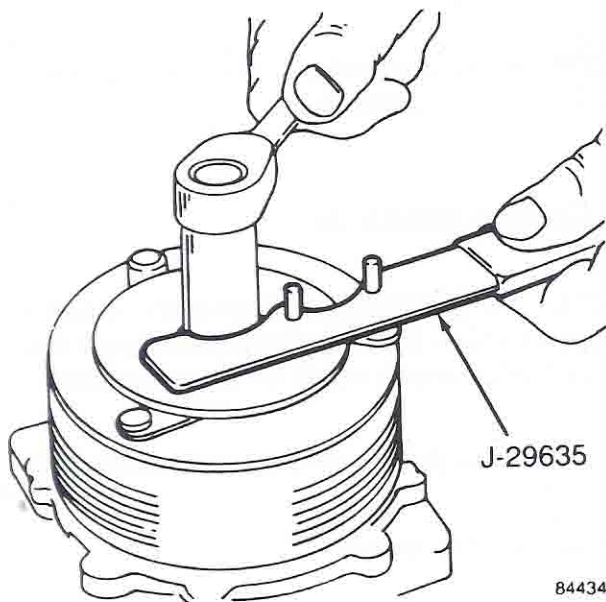


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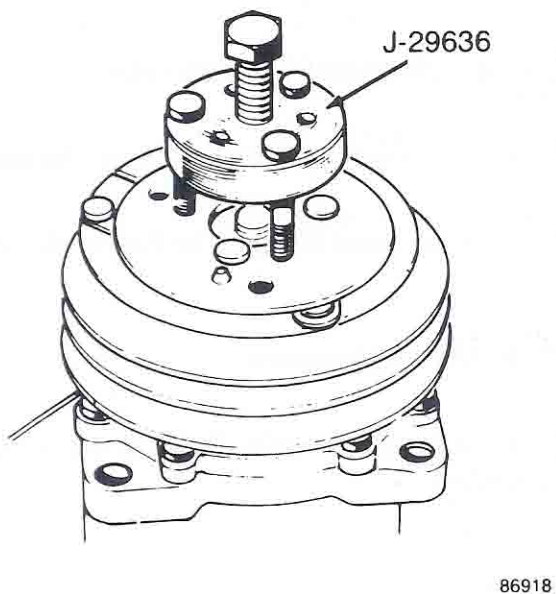


Insert two pins of Front Plate Spanner J-29635 into any two bolt holes in the clutch front plate. Hold the clutch plate stationary and remove the nut.



Remove the clutch plate using Puller J-29636 and remove the key from the shaft.

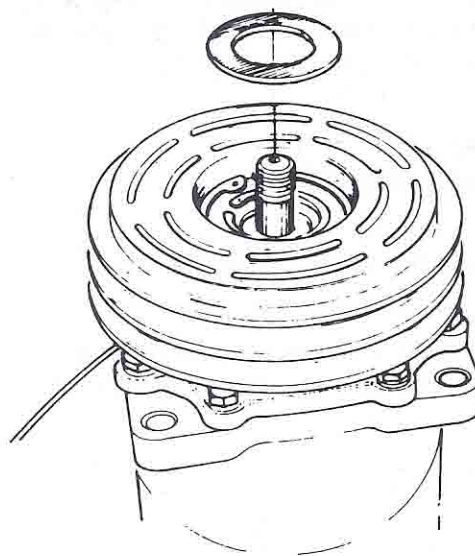
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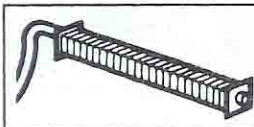


Insert snap ring pliers into the two holes in the felt ring metal retainer and lift out the felt ring.

Remove the clutch shims. Use O-Ring Hook J-9553-01 and a small screwdriver to prevent the shim from binding on the shaft.

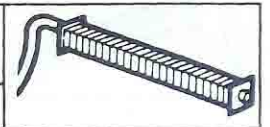
Remove the shaft seal seat retaining snap ring with pliers.



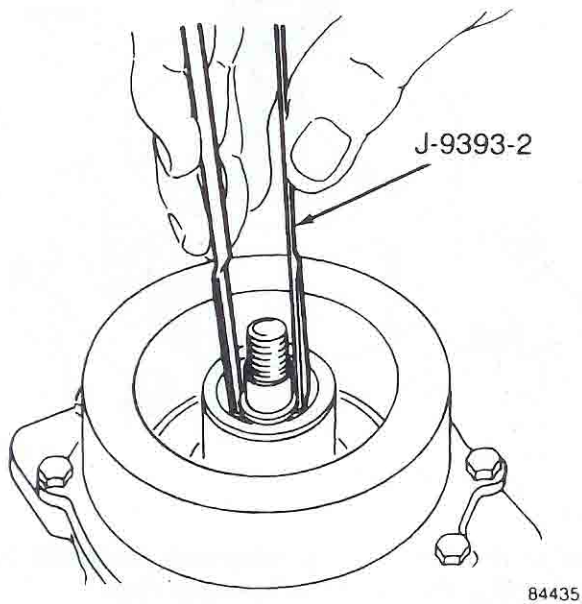


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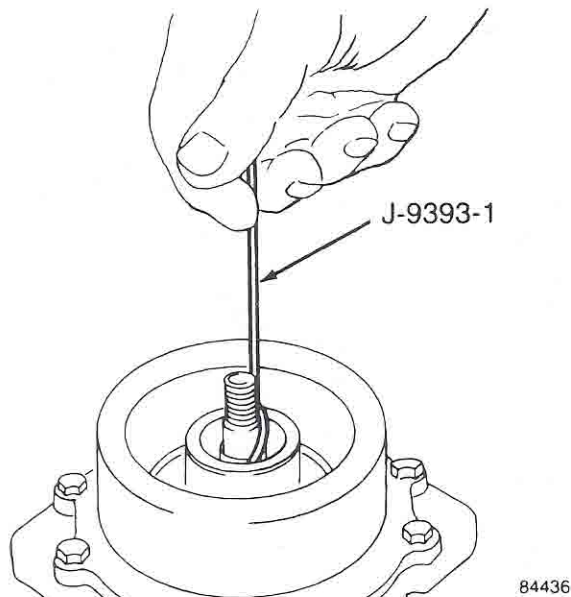


Remove the shaft seal seat using Seal Retainer Tongs J-9393-2.

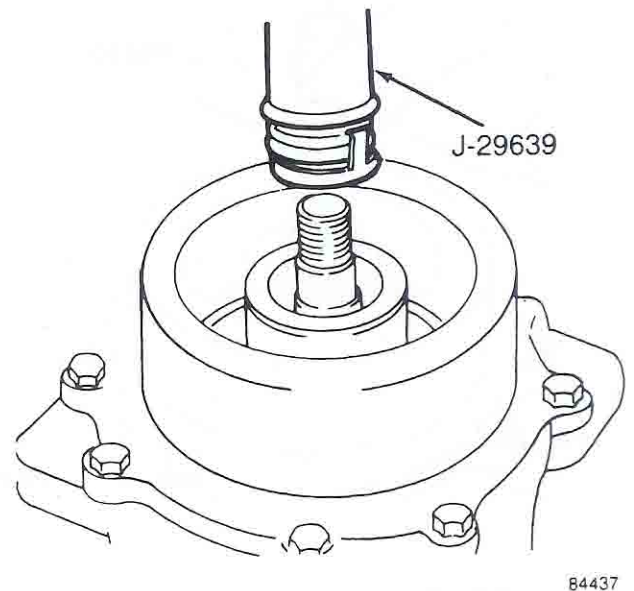


CAUTION: When removing the shaft seal O-ring, do not scratch the O-ring groove with the O-ring hook.

Use O-Ring Hook J-9553-01 to remove the shaft seal O-ring.



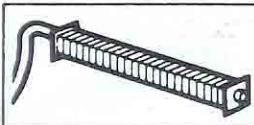
Insert Seal Installation and Removal Tool J-29639 into the seal bore. Press down against the seal spring. Twist the tool until it engages in the slots in the seal cage. Lift the seal out.



Clean the seal cavity thoroughly with a lint-free or synthetic cloth and clean compressor oil. Then blow out with clean dry air.

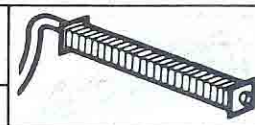
NOTE: Ensure that all foreign material is removed from the seal bore prior to seal installation.

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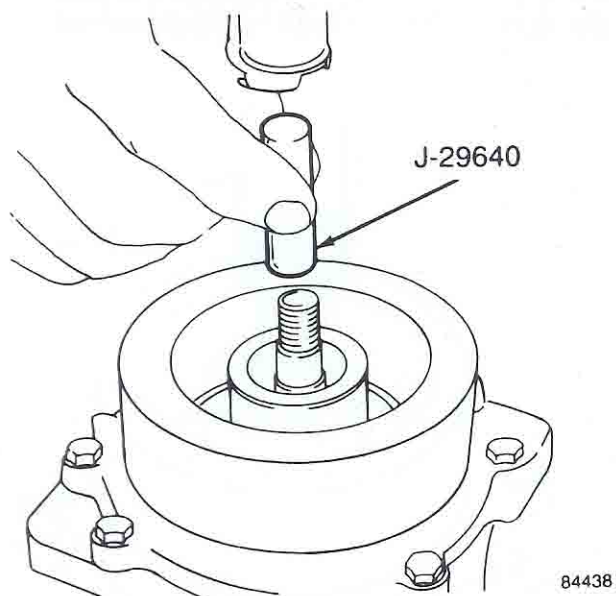


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Insert Seal Sleeve Protector J-29640 over the compressor shaft.

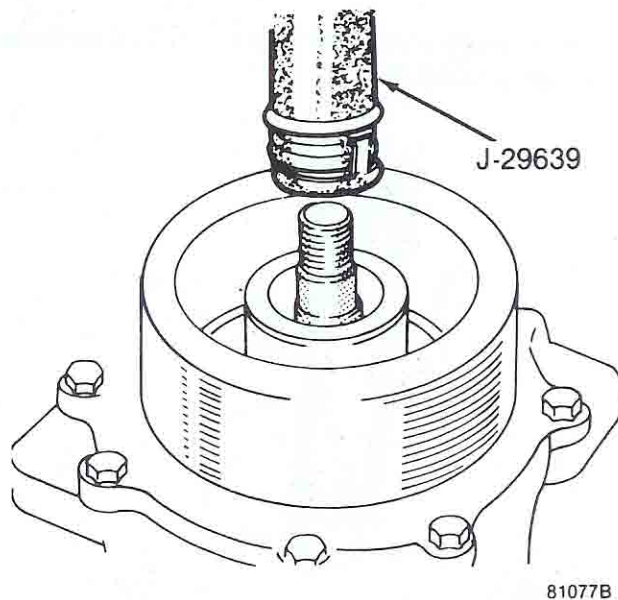


CAUTION: Do not touch the replacement seal lapping surfaces.

Dip the mating surfaces of the seal lapping surfaces in clean compressor oil.

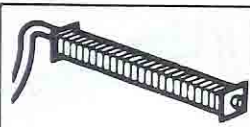
Engage the slots of Seal Removal and Installation Tool J-29639 in the slots in the seal cage and insert the seal assembly firmly into place in the compressor seal cavity.

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Twist the tool in the opposite direction to disengage the tool from the seal cage.

CAUTION: When installing the shaft seal O-ring, do not scratch the O-ring groove with the O-ring hook.

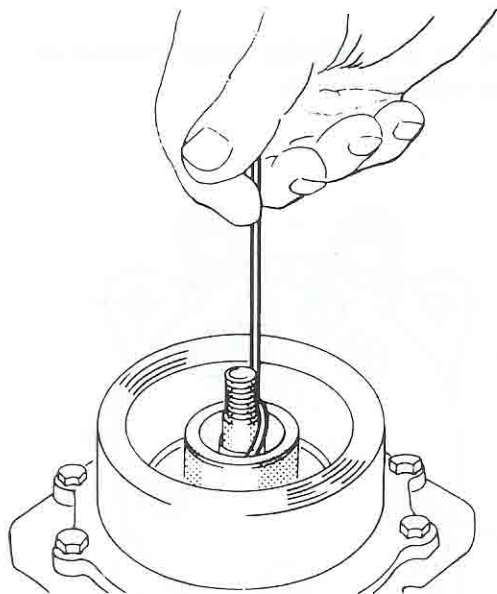


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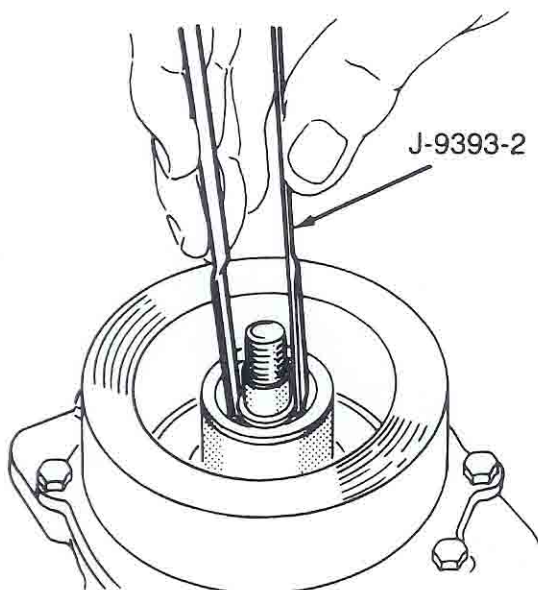


Coat the O-ring with clean compressor oil and carefully place it in the seal groove with O-Ring Hook J-9553-01.



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Coat the seal retainer with clean compressor oil and install it with Seal Retainer Tongs J-9393-2. Press the retainer lightly against the seal.



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Install the snap ring with the beveled edge out (away from the compressor).

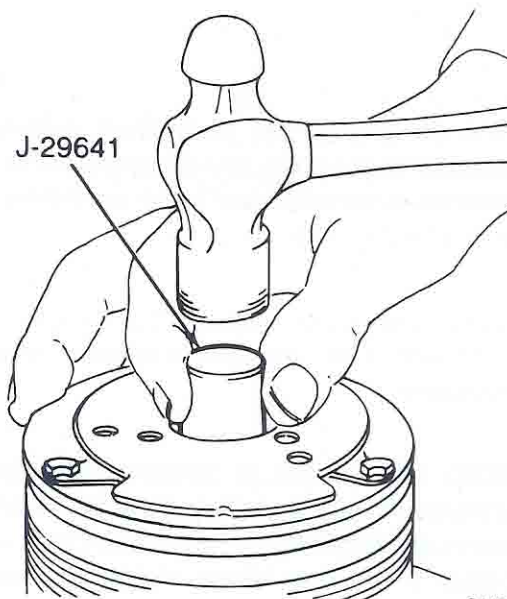
NOTE: It may be necessary to lightly tap the snap ring to seat it in its groove.

Install the clutch spacer shims.

Tap the replacement felt ring into place and install the compressor shaft key.

Align the front plate keyway with the compressor shaft key.

Use Clutch Face Installation Tool J-29641 to tap the front plate on the shaft until it contacts the clutch shims.



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Install the shaft nut and tighten with 34-41 N·m (25-30 ft-lbs) torque.

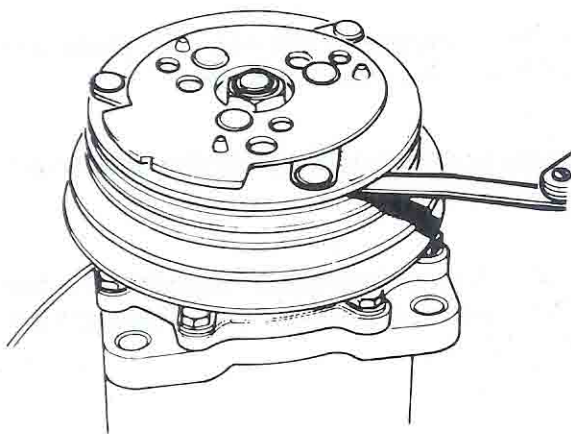
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Check the air gap around the perimeter of the plate with a feeler gauge. The air gap must be between 0.41 and 0.79 mm (0.016 and 0.031 in).



86923

If the air gap is not consistent around the perimeter of the plate, pry up lightly at the areas of minimum variation and tap down lightly at the areas of maximum variation.

If the air gap is not between 0.41 and 0.79 mm (0.016 and 0.031 in), add or subtract shims as necessary.

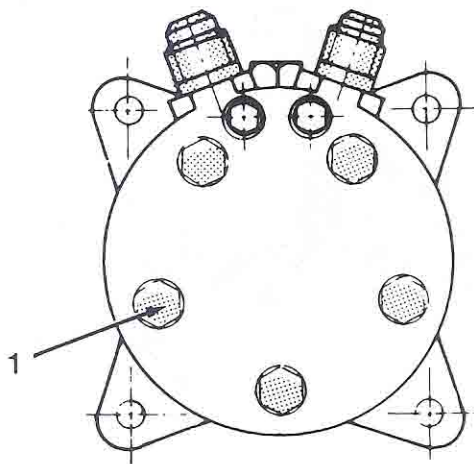
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NOTE: The air gap is controlled by the shim thickness. When installing a replacement or a previously installed clutch assembly, try the original shims first. When installing a replacement clutch on a replacement compressor (that previously did not have a clutch), use 1.02-, 0.51- and 0.13-mm (0.040-, 0.020- and 0.005-in) shims.

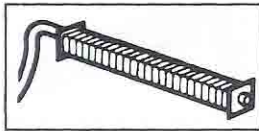
Cylinder Head, Valve Plate and Gasket

Removal

Remove all the cylinder head capscrews (1) from the cylinder head.



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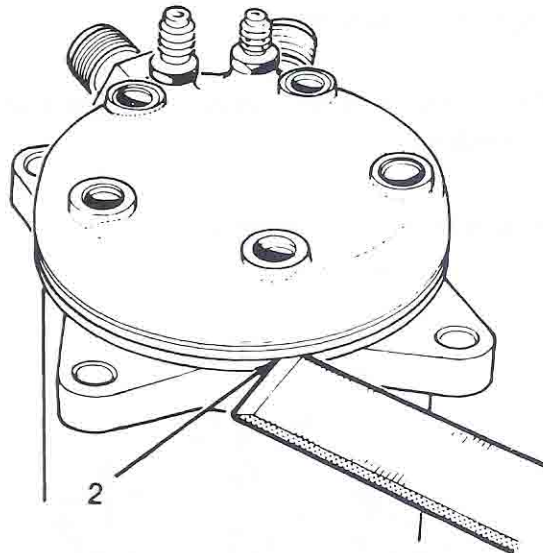


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Use a small hammer and gasket scraper (2) to tap the outer edge of the cylinder head until it is separated from the valve plate. Inspect for damage.

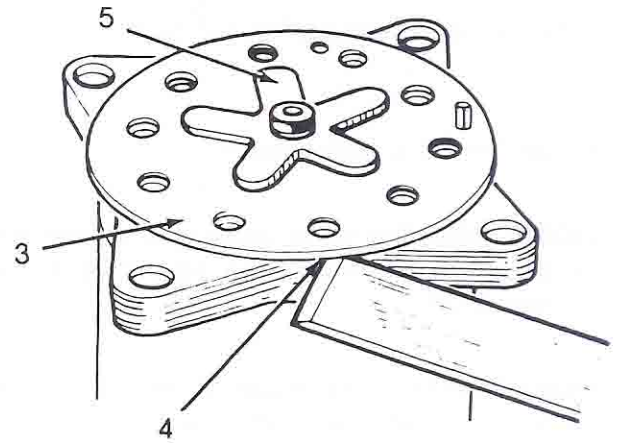


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NOTE: The cylinder head gasket normally remains with the valve plate.

Position the gasket scraper between the outside edge of the valve plate (3) and cylinder block (4) and lightly tap the valve plate until it becomes loose.

NOTE: Do not remove the valve (5) from the valve plate.



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Inspect the reed valves and the discharge retainer. Replace any damaged portion.

CAUTION: When cleaning gasket material from the cylinder head or valve plate, be careful not to damage the machined surfaces.

If the valve plate and/or the cylinder head are to be retained and installed, carefully remove the gasket material with a gasket scraper.

Inspect the cylinder head for fitting and thread damage. Replace the cylinder head if damaged.

Inspect the service ports on the back of the cylinder head. Remove the valve core with a valve core tool to inspect.

Remove the service port to inspect the O-ring; if damaged, replace the O-ring.



HEATING AND AIR CONDITIONING

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Installation

Coat the valve plate gasket with clean compressor oil.

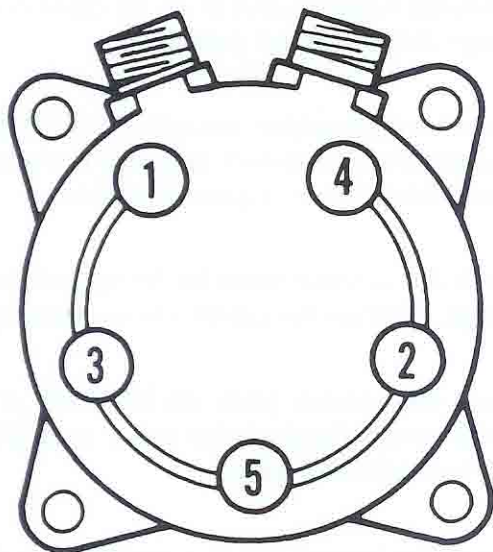
Install the valve plate gasket.

NOTE: Align the valve plate gasket with the locating pin holes and the oil orifice in the cylinder block.

Install the cylinder head with the fittings pointing up or in line with the oil filler plug.

Insert the cylinder head capscrews and tighten finger-tight.

Follow the tightening sequence and tighten the cylinder head bolts with 33 N·m (24 ft-lbs) torque.



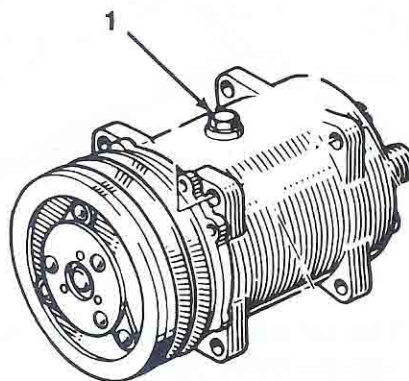
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Checking The Oil Level

When there has been an obvious loss of compressor oil or a component has been replaced (including the compressor), the oil must be checked in the compressor after the repair has been made.

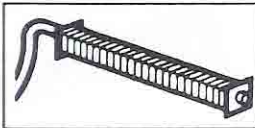
Check the oil level according to the following procedure:

- remove the oil filler plug (1)



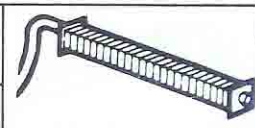
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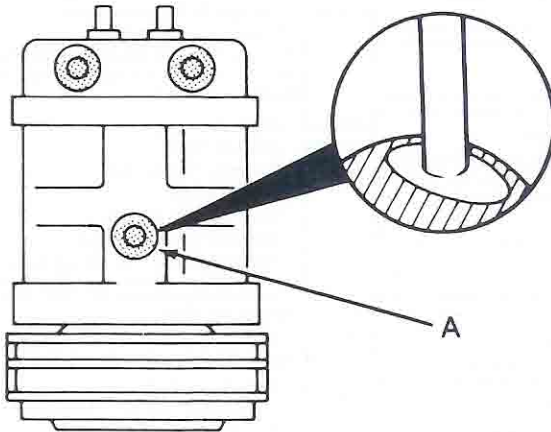


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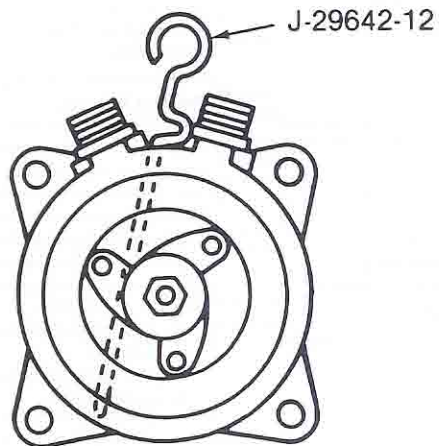


- look through the oil filler plug hole (A) and rotate the clutch front plate to position the piston connecting rod in the center of the oil filler plug hole



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- insert Dipstick J-29642-12 into the oil filler plug hole to the right of the piston connecting rod until the dipstick stop contacts the compressor housing



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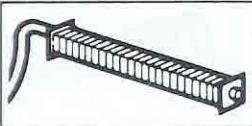
- remove the dipstick and count the number of increments covered with oil

- when properly filled, the compressor should contain between four and six increments of oil

CAUTION: The compressor rotates at very high speed. Satisfactory operation is dependent on sufficient lubrication. However, excess oil will hinder the cooling efficiency.

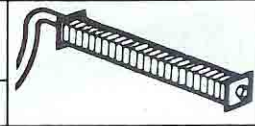
- correct the oil level as necessary

- install the oil filler plug



HEATING AND AIR CONDITIONING

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TROUBLESHOOTING CHART

During diagnosis follow the procedures in the sequence shown until a defect is found. Then perform the repair in the Cause and Remedy Section. If this repair does not fully solve the problem, proceed to the next Inspection Step.

Symptom	Problem Diagnosis and Inspection	Cause and Remedy
Lack of Cooling	Smooth Running Compressor Unusually high suction Pressure with unusually low discharge pressure	Replace or Repair Broken Head or Block Gasket Broken or Deformed Reed Valve Foreign Substance Under Reed Valve or Gasket
	Unusually low suction and discharge pressure	Replace or Repair Shaft Seal Leak Service Port Cylinder Head Leak Gasket Leak Oil Filler Plug Leak Cracked Cylinder Block Front Housing O Ring Leak
	Intermittent or Inoperative	Adjust Air Gap
	Rough Running or Intermittent or Inoperative	Replace or Repair Broken Lead Wire Clutch Coil Defect—Internal System Ground
Rough Running	Compressor Failure—Internal	

Symptom	Problem Diagnosis and Inspection	Cause and Remedy	
Unusual Noise	Clutch engaged		
		1 Check Compressor Mounting Components	
		2 Check Engine Components	
		3 Check for Intermittent or Slipping Clutch	Adjust Air Gap—Defective Coil
		4 Check for Proper Refrigerant Charge	Recharge and Recheck
		5 Check Clutch Bearing	Replace Bearing
		6 Oil Level	Restore to Proper Level
		7 Shaft Turning Smoothness Test	Compressor Failure (Internal)
Clutch disengaged "chattering"	8 Remove Valve Plate and Inspect	Replace or Repair Broken Discharge Valve Reed or Retainer Broken Suction Valve Reed Broken Gasket	
	1 Check Air Gap	Replace or Repair Adjust Air Gap Defective Clutch Pulley or Front Plate	

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