



HEATING AND AIR CONDITIONING

CONTENTS

	page		page
AUTOMATIC TEMPERATURE CONTROL (ATC)		MANUAL AIR CONDITIONING SYSTEM SELF-	
SELF-DIAGNOSTICS	21	DIAGNOSTICS	19
COMPONENT SERVICE PROCEDURES	7	REFRIGERANT SERVICE PROCEDURES	3
GENERAL INFORMATION	1		

GENERAL INFORMATION

INDEX

	page		page
Description and Operation	1	Side Window Demisters	2
Engine Cooling System Requirements	2	System Airflow	1

DESCRIPTION AND OPERATION

Both the heater and the heater/air conditioning systems share many of the same components. This Group will deal with both systems together when component function is common, and separately when they are not.

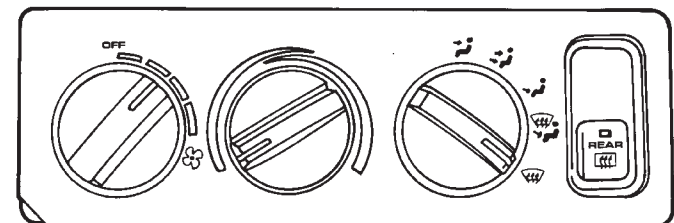
For proper operation of the instrument panel controls (Fig. 1), refer to the Owner's Manual provided with the vehicle.

All vehicles are equipped with a common A/C-heater unit housing assembly. A vehicle with a heater only system, the evaporator, expansion valve and recirculating air door are omitted.

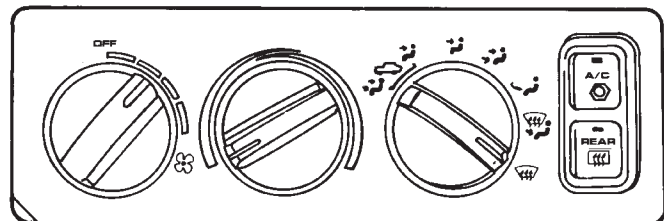
SYSTEM AIRFLOW

The system draws outside (ambient) air from the cowl opening at the base of the windshield into the plenum chamber above the A/C-heater unit housing. On air conditioned vehicles, the air passes through the evaporator. At this point air is directed either through or around the heater core by adjusting the blend-air (temperature) door via the TEMP control on the instrument panel. Air flow is then directed to either the PANEL, DEFROST, DEMISTOR or FLOOR outlets via the mode selector on the control head. Air flow velocity can be adjusted with the blower speed selector switch on the instrument panel.

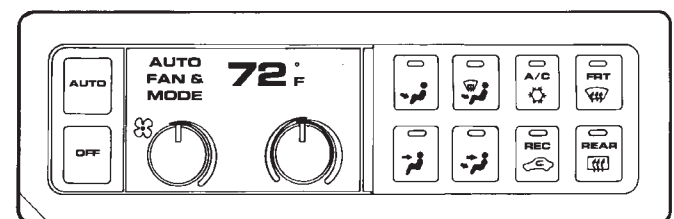
Outside air can be shut off by closing the recirculating air door. When the blower is operating this will recirculate the air that is already inside the vehicle. The recirculation door is closed when the system is set to the "OFF" position or when the system



HEATER CONTROL



MANUAL A/C CONTROL



ATC CONTROL MODULE

9324-48

Fig. 1 Heater, Manual A/C and ATC Controls

is in a recirculation setting. Recirculation is prevented/disabled when the system is in DEFROST, MIX or FLOOR mode.



Depressing the DEFROST, MIX or A/C button will engage the compressor if operating conditions are correct. This will send refrigerant through the evaporator, thus removing heat and humidity from the air before it is directed through or around the heater core. If DEFROST, MIX or HEAT is selected the system will default to outside air.

SIDE WINDOW DEMISTERS

The side window demisters direct air from the heater assembly to the side windows when the mode selector is on FLOOR, DEFROST, MIX OR BI-LEVEL setting. The outlets are located on the top outboard corners of the doors.

ENGINE COOLING SYSTEM REQUIREMENTS

To maintain the performance level of the heating/air-conditioning system, the engine cooling system must be prepared as shown in this manual.

The use of a bug screen is not recommended. Any obstructions in front of the radiator or condenser can reduce the performance of the A/C and/or engine cooling system.

WARNING: DO NOT OPEN COOLING SYSTEM WHEN HOT AS PERSONAL INJURY OR DAMAGE TO VEHICLE MAY RESULT.

The engine cooling system is designed to develop internal pressure of 97 to 123 kPa (14 to 18 psi). Wait 15 minutes (after the engine is shut off), or until safe temperature and pressure is attained, before opening cooling system. Refer to Group 7, Cooling System. Coolant temperature can be checked using the DRB II scan tool.

The use of aluminum cylinder heads, intake manifolds, heater cores, and radiators, requires special corrosion protection. Use only Mopar antifreeze or ethylene-glycol based antifreeze containing Alugard 340-2. This additive is necessary for best cooling system protection. To obtain the maximum life of the cooling system, mixing distilled water with ethylene-glycol type coolant is recommended.

CAUTION: Do not add additional inhibitors, anti-rust products, or soluble oil (sold as "water pump lubricants"). These products may not be compatible with the radiator coolant.

Refer to Group 7, Cooling System for cooling system procedures.



REFRIGERANT SERVICE PROCEDURES

INDEX

	page		page
R-134A Refrigerant	3	System Leak Checking	4
System Charge Level—Check or Fill	4	Thermocouple Probe	3

R-134a REFRIGERANT

This vehicle uses a new type of refrigerant called R-134a. It is a non-toxic, non-flammable, clear colorless liquified gas.

R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. Even small amounts of R-12 in a R-134a system will cause compressor failure, lubricant sludging or poor A/C performance. **Never add R-12 to a system designed to use R-134a. System failure will occur.**

Both high pressure and low pressure service ports used to service the air conditioning system are located on the compressor manifold (Fig. 1). New service port couplers have been developed to ensure that the system is not accidentally filled with the wrong refrigerant (R-12).

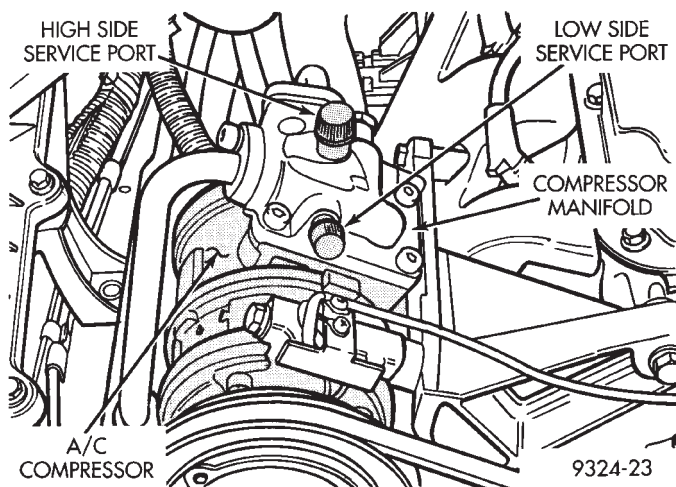


Fig. 1 Service Port Location

R-134a refrigerant requires a special type of compressor lubricant. When adding lubricant to the system, use only Chrysler approved lubricant. See underhood label indicating refrigerant charge and lubricant type (Fig. 2).

Due to the different characteristics of R-134a, it requires all new service procedures.

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING



Fig. 2 Underhood Label (Typical)

SAE REQUIREMENTS TO DISCHARGE R-134A SYSTEMS. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

The use of R-134a will have a positive environmental impact due to it's zero ozone depletion and low global warming impact.

THERMOCOUPLE PROBE

To diagnose the LH A/C system, a temperature probe is required to measure liquid line temperature. The clamp-on type K probe shown in this manual is available through the Chrysler Professional Service Equipment (PSE) program. This probe is compatible with temperature-measuring instruments that accept Type K Thermocouples and have a miniature connector input. Other temperature probes are available through after market sources. All specifications and illustrations in this manual will reflect the use of the probe made available through Professional Service Equipment program.

In order to use the temperature probe, a digital thermometer will be required. If a digital thermometer is not available, a adapter is available through the Professional Service Equipment program. It can convert any standard digital multi-meter into a thermometer. This adapter is designed to accept any standard K-type thermocouple.

If a digital multi-meter is not available, it to can be ordered through Professional Service Equipment program.



SYSTEM LEAK CHECKING

WARNING: R-134A SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134A HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

If the A/C system is not cooling properly, determine if the refrigerant system is fully charged with R-134a. This is accomplished by performing a system Charge Level-Check or Fill. If while performing this test A/C original discharge pressure is less than 207 kPa (30 p.s.i.) proceed to Empty Refrigerant System Leak Test. If discharge pressure is greater than 207 kPa (30 p.s.i.) proceed to low refrigerant level leak test. If the refrigerant system is empty or low in refrigerant charge, a leak at any line fitting or component seal is likely. A review of the fittings, lines and components for oily residue is a indication of the leak location. To detect a leak in the refrigerant system, perform one of the following procedures as indicated by the symptoms.

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134A SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

EMPTY REFRIGERANT SYSTEM LEAK TEST

(1) Evacuate the refrigerant system to the lowest degree of vacuum possible (approx. 28 in Hg.). Determine if the system holds a vacuum for 15 minutes. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed with this procedure.

(2) Prepare a .284 Kg. (10 oz.) refrigerant charge to be injected into the system.

(3) Connect and dispense .284 Kg. (10 ozs.) of refrigerant into the evacuated refrigerant system.

(4) Proceed to step two of Low Refrigerant Level Leak Test.

LOW REFRIGERANT LEVEL LEAK TEST

(1) Determine if there is any (R-134a) refrigerant in the system. Use the DRB II scan tool partial charge test or pressure gauge liquid line temperature partial charge check. See system charge level check or fill for procedure.

(2) Position the vehicle in a wind free work area. This will aid in detecting small leaks.

(3) Bring the refrigerant system up to operating temperature and pressure. This is done by allowing the engine to run for five minutes with the system set to the following:

- Transaxle in Park
- Engine Idling at 700 rpm
- A/C Controls Set in 100 percent outside air
- Full Cool
- High Blower
- A/C in the "ON"
- Vehicle Windows Open.

CAUTION: A leak detector designed for R-12 refrigerant will not detect leaks in a R-134a refrigerant system.

(4) Shut off the vehicle and wait 2 to 7 minutes. Then use an Electronic Leak Detector that is designed to detect R-134a type refrigerant and search for leaks. Fittings, lines, or components that appear to be oily usually indicates a refrigerant leak. To inspect the evaporator core for leaks, insert the leak detector probe into the recirculating air door opening or a heat duct.

(5) If a thorough leak check has been completed without indication of a leak, proceed to "System Charge Level-Check or Fill".

SYSTEM CHARGE LEVEL—CHECK OR FILL

The procedure below should be used to check and/or fill the refrigerant charge in the air conditioning system.

The air conditioning system in this vehicle holds 0.794 Kg. (28 oz. or 1.75 lbs.) of R-134a refrigerant.

This procedure can be performed two different ways:

- With a DRB II scan tool and a thermocouple. Use the DRB II scan tool diagnostic topic: "Partial Charge Test".
- Using a manifold gauge set, a thermocouple and the Charge Determination Graph. It is recommended to use the gages or reclaim/recycle equipment.

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134A SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.



WARNING: R-134A SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134A HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

(1) Establish your preferred method of measuring compressor discharge pressure. Use a manifold gauge set (Fig. 3) or a DRB II scan tool (Refer to 1993 LH Body Diagnostic Manual).

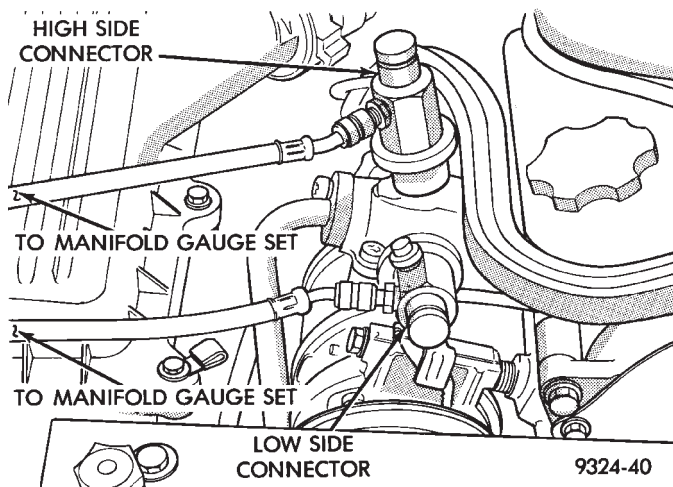


Fig. 3 Manifold Gauge Hook-up

(2) Attach a clamp-on thermocouple (P.S.E. 66-324-0014 or 80PK-1A) or equivalent to the liquid line (Fig. 4). It must be placed as close to the condenser outlet as possible to observe liquid line temperature. Refer to "Thermocouple Probe" in this section for more information on probe.

(3) The vehicle must be in the following modes:

- Transaxle in Park
- Engine Idling at 700 rpm
- A/C Controls Set to Outside Air
- Panel Mode
- Full Cool
- High Blower
- A/C Button in the "ON" Position
- Vehicle Windows Open.
- Recirc Button Turned OFF on ATC Equipped Vehicles

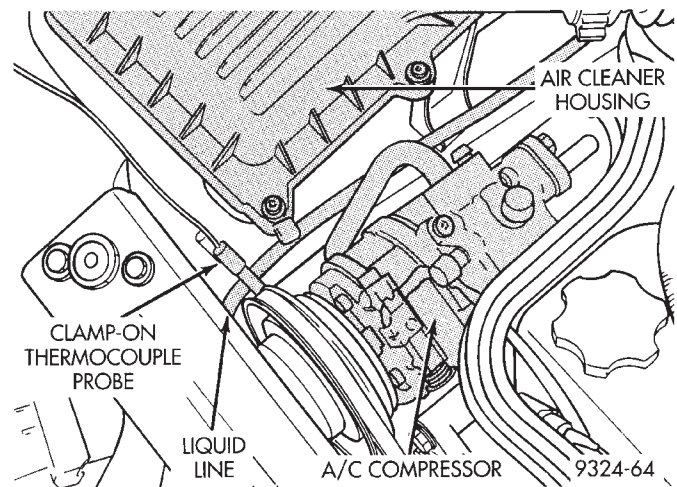


Fig. 4 Thermocouple Attachment Point

(4) Operate system for a couple of minutes to allow the system to stabilize.

(5) Set system pressure to about 1793 kPa (260 psi) by placing a piece of cardboard over part of the front side of the condenser. This will maintain a constant pressure and stop the cooling fans from alternating between high and low speeds.

(6) Observe Discharge pressure and Liquid line temperature. Using the Charge Determination Graph determine where the system is currently operating (Fig. 5). If the system is in the **undercharged** region, ADD 0.057 Kg. (2 oz.) to the system and recheck readings. If the system is in the **overcharged** region, RECLAIM 0.057 Kg. (2 oz.) from the system and recheck readings. Continue this process until the system readings are in the proper charge area on the Charge Determination Chart.

The same procedure can be found on the DRB II scan tool, "LH Climate Control", "System Test", "Partial Charge". The DRB II scan tool procedure does not require the Charge Determination Graph. The correct liquid line temperature range is calculated by the DRB II scan tool automatically.

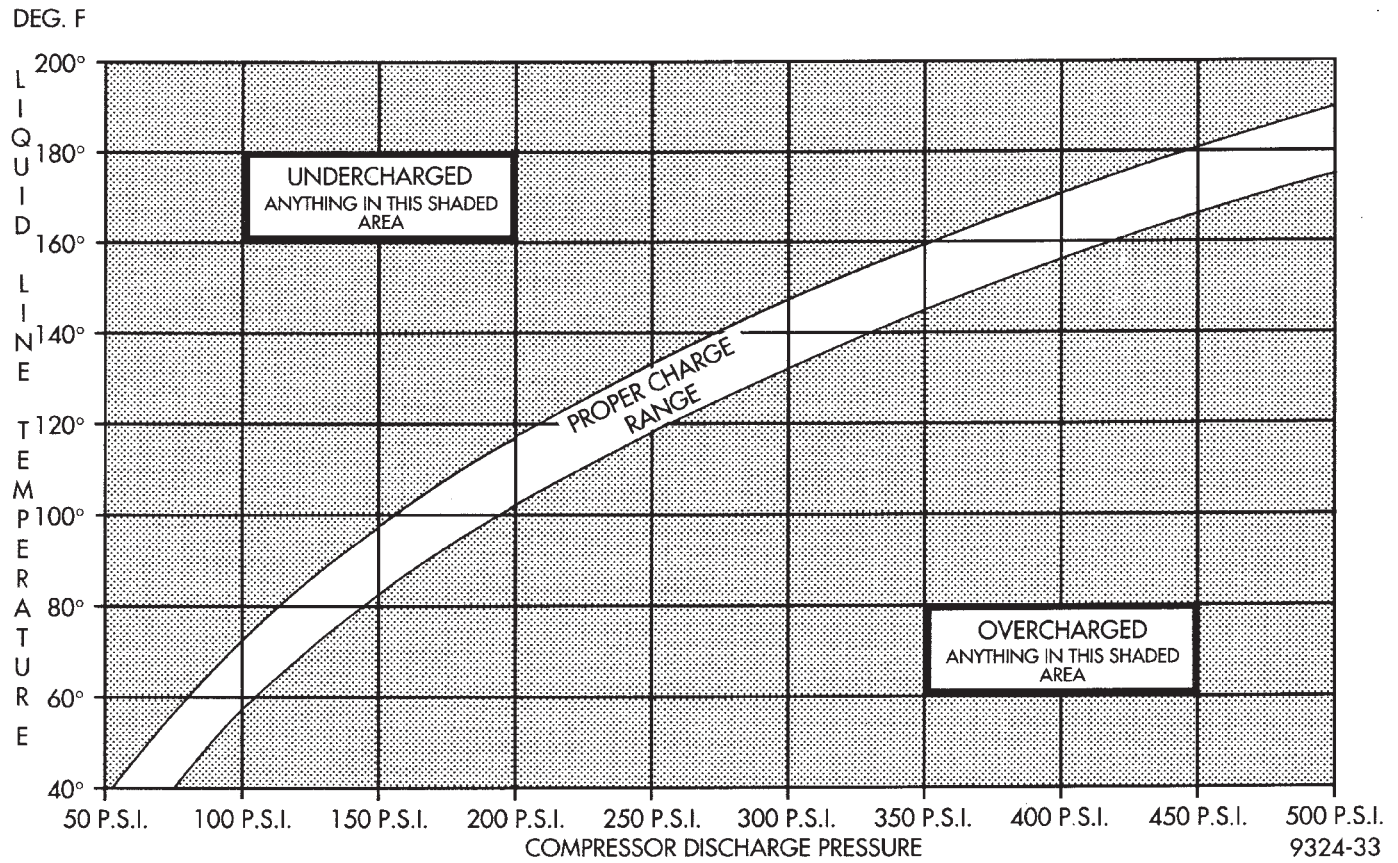


Fig. 5 Charge Determination Graph



COMPONENT SERVICE PROCEDURES

INDEX

	page		page
A/C Pressure Transducer	7	Compressor High-Pressure Relief Valve	13
A/C Refrigerant Lines	14	Condenser	13
Actuators	7	Control Head	14
Ambient Temperature Sensor	8	Evaporator	15
ATC In-Car Temperature Sensor	8	Evaporator Probe	15
Blower Motor	10	Expansion Valve	15
Blower Power Module	9	Heater Core	18
Blower Resistor	9	Heater—A/C Housing	16
Compressor	10	Receiver/Drier	18
Compressor Clutch/Coil Assembly	11	Sun Sensor	18

A/C PRESSURE TRANSDUCER

The A/C pressure transducer is screwed onto a valve on the discharge line near the condenser. The pressure transducer functions as the refrigerant system pressure sensor. It supports the condenser/radiator fans and compressor functions.

O-ring replacement is required whenever the pressure transducer is serviced. Be sure to use the o-ring specified for this vehicle.

REMOVAL AND INSTALLATION

(1) Disconnect the wire harness connector from the A/C pressure transducer.

CAUTION: A slight release of pressure trapped in the fitting may be experienced. It is not necessary to discharge the refrigerant system.

(2) Remove the transducer with a counter-clockwise rotation using a 3/4" open-end wrench.

To install the pressure transducer, reverse the removal procedure. Tighten pressure transducer to 6 N•m (50 in. lbs.).

ACTUATORS**RECIRCULATION DOOR ACTUATOR**

The recirculation door actuator is located on the right side of the heater housing (Fig. 1).

The recirculation door actuator is an electric motor. It mechanically positions the recirculation door in either the open or closed position. Actuation of the motor will occur when drive signals are supplied to the actuator from the manual A/C or heater control heads or ATC system. The recirculation door actuator does not have a feedback signal. The outside air/recirc door actuator is not serviceable and must be replaced if found to be defective.

REMOVE AND INSTALL

(1) Disconnect battery.

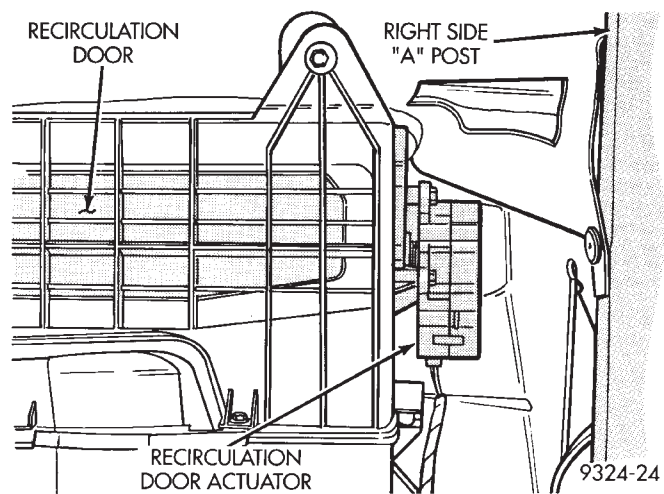


Fig. 1 Recirculation Door Actuator

(2) Remove floor console or instrument panel center lower cover.

(3) Remove lower instrument panel assembly.

(4) Remove body controller at right side of instrument panel.

(5) Remove actuator retaining screws. Pull actuator straight off recirculation door shaft. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.

(6) Disconnect electrical connection.

(7) To install reverse removal procedure.

MODE DOOR ACTUATOR

The mode door actuator is an electric motor. It mechanically positions the A/C unit panel/bi-level door and the floor/defrost door. Actuation of the motor will occur when drive signals are supplied to the actuator from the A/C Manual Control Head or the ATC system. This actuator also contains a feedback strip which allows the computer control to know the exact



position of the mode door at all times. The mode door actuator is not serviceable and must be replaced if found to be defective.

The mode door actuator is located on the lower left side of the heater housing (Fig. 2)

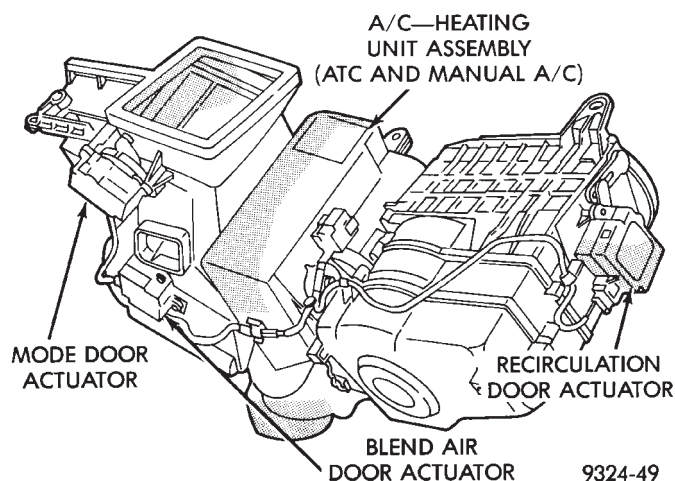


Fig. 2 Mode Door Actuator Location

REMOVE AND INSTALL

- (1) Remove left and right underpanel silencer/ducts.
 - (2) Remove floor console.
 - (3) Remove center floor heat adaptor duct.
 - (4) Remove rear seat heat forward adaptor duct.
 - (5) Loosen center support bracket and pry rearward to gain access to the actuator.
 - (6) Remove actuator retaining screws. Then pull actuator straight down. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.
 - (7) Remove electrical connection on actuator.
- To install, reverse removal procedure.

TEMPERATURE DOOR ACTUATOR

The blend-air (temperature) door actuator is an electric motor which mechanically positions the temperature door. Actuation of the motor will occur when drive signals are supplied to the actuator from the Manual A/C Control Head, Heater only or the ATC system. A feedback strip in the actuator allows the computer control to know the exact position of the temperature door at all times. The blend-air door actuator is not serviceable and must be replaced if found to be defective.

The temperature door actuator is located at the bottom of the heater housing at the center tunnel.

REMOVE AND INSTALL

- (1) Remove left and right underpanel silencer/ducts.
- (2) Remove two screws from actuator which are accessible from the right side of center stack.

- (3) Remove one screw from actuator on left side.

- (4) Pull actuator straight down from shaft and disconnect electrical connection. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.

To install, reverse removal procedure.

AMBIENT TEMPERATURE SENSOR

The ambient air temperature sensor is located on the inside of the left front bumper beam. This sensor will inform the ATC system of the ambient temperature outside the vehicle. This sensor is used by the ATC system to adjust blower speed, temperature offsets, evaporator temperatures and mode control.

The ambient sensor is not serviceable and must be replaced if found to be defective.

If this sensor fails the ATC system will use the battery temperature information as a back up.

TEST

To test Ambient Temperature Sensor refer to 1993 LH Body Diagnostic Manual.

REMOVAL AND INSTALLATION

- (1) Remove sensor mounting screw.
 - (2) Disconnect sensor wiring connector.
- To install, reverse removal procedure.

ATC IN-CAR TEMPERATURE SENSOR

The ATC system uses various sensors which return electrical signals to the body controller. The In-Car Temperature Sensor is used on ATC equipped vehicles only. It is located behind the name plate on the right side of the instrument panel.

The In-Car Temperature Sensor is part of a motorized aspirator assembly that is mounted in the instrument panel. A small fan (in the sensor) draws air through an intake on the instrument panel (behind name plate). This air flows over a thermistor which measures interior vehicle temperatures. The ATC system then makes adjustments to maintain the optimum passenger compartment comfort.

The In-Car sensor will automatically turn on when a vehicle door is opened. If the door is left open, the In-Car Sensor will automatically turn off within approximately 5 minutes. If the door is then closed, but there is no ignition start, the In-Car Sensor will automatically turn off after approximately 2 minutes. After the vehicle has been driven, the In-Car Sensor will turn off immediately when the ignition is turned off. The aspirator motor in the In-Car Sensor operates whenever the ignition switch is "ON" (even when the ATC system OFF button is pushed).

If the In-Car sensor is open or shorted on this system, the digital display will turn off and the system defaults to manual operation. Refer to Owner's Manual for system operating instructions.



The In-Car Temperature Sensor assembly is not serviceable and must be replaced if found to be defective.

TEST

(1) Perform air flow test.

(a) Turn ignition to the ON position and push the OFF button to stop the ATC system airflow. This will make it easier to observe paper in the next step.

(b) Place a small piece of tissue paper in front of the sensor opening. If the tissue sticks to the opening, the In-Car sensor is aspirating properly.

(2) Check if the electrical connection and connector are good per 1993 LH Body Diagnostic Manual.

(3) Check presence and condition of two foam seals that are absolutely necessary for proper sensor operation.

(a) Seal on the inside surface of the trim bezel directly behind the nameplate.

(b) Seal (strip) located directly to the right of the right center duct opening.

REMOVAL AND INSTALLATION

(1) Remove right side instrument panel trim end cap (Fig. 3).

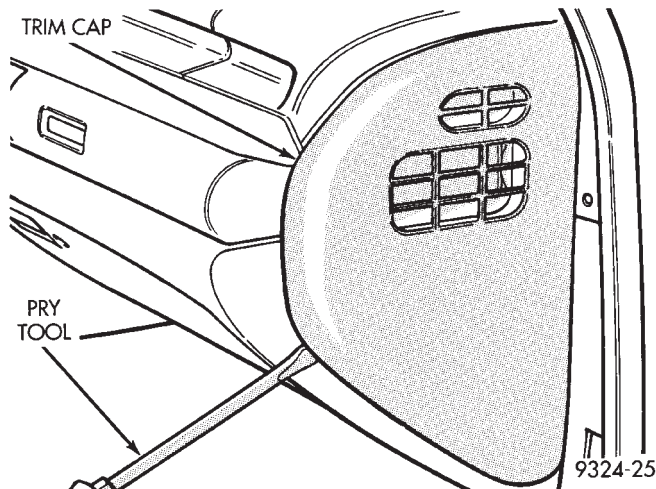


Fig. 3 Trim Cap Removal

(2) Remove right trim bezel from instrument panel (Fig. 4). It is held in place by friction and a screw.

(3) Remove sensor retaining screws.

(4) Pull out sensor from instrument panel and disconnect wiring.

To install, reverse removal procedure.

BLOWER POWER MODULE

The blower motor power module is only used in vehicles equipped with Automatic Temperature Control (ATC). It is located on the lower right side of the heater housing.

The power module receives pulse width modulated signals from the Body Control Module. The power

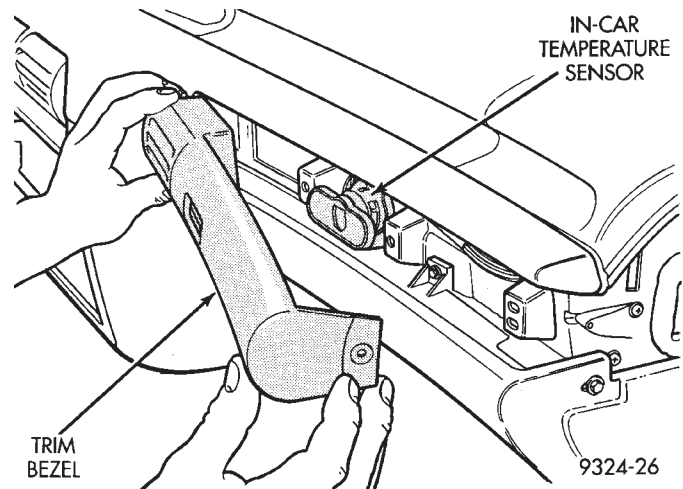


Fig. 4 Trim Bezel Removal

module varies voltage to the blower motor for different blower speeds based on the ATC software. There are 14 speeds and a blower off signal.

REMOVAL AND INSTALLATION

(1) Remove lower right under panel access cover silence duct.

(2) Disconnect wiring connector on blower motor module.

(3) Remove blower motor module retaining screws.

(4) Pull blower motor module out of heater housing (Fig. 5).

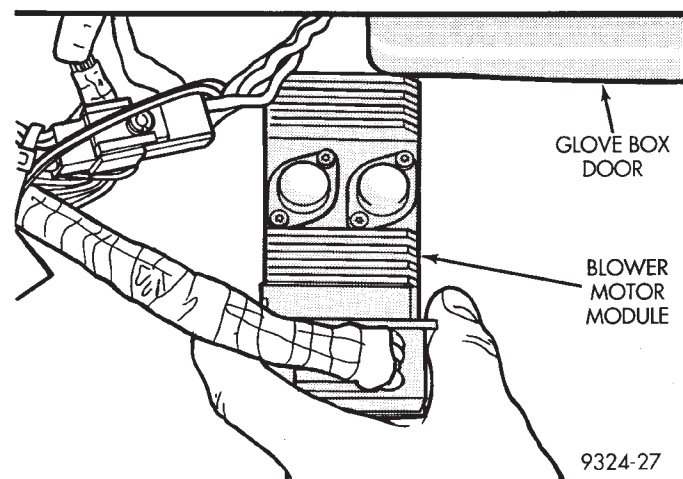


Fig. 5 Blower Motor Module Removal

To install, reverse removal procedure.

BLOWER RESISTOR

Vehicles with heater only or manual air conditioning (Non-ATC) systems will have a blower motor resistor. The resistor is located on the lower right side of the heater housing.

REMOVAL AND INSTALLATION

(1) Remove lower right underpanel silencer/duct.



(2) Disconnect wiring connectors on blower motor resistor.

(3) Remove blower motor resistor retaining screws.

(4) Pull blower motor resistor out of heater housing.

To install, reverse removal procedure.

BLOWER MOTOR

The blower motor is located on the right side of the heater housing. The blower motor the blower motor wheel must be replaced as an assembly.

REMOVAL AND INSTALLATION

(1) Disconnect battery.

(2) Remove lower right under panel silencer duct.

(3) Remove blower motor housing cover.

(4) Remove blower motor retaining screws.

(5) Lower blower motor from of housing.

To install, reverse removal procedure.

COMPRESSOR

The compressor used on this vehicle is a Nippon-denso 10PA17-R134a. This compressor uses an aluminum swash plate, teflon coated pistons and aluminum sleeved cylinder walls. One-way check valves are used to regulate refrigerant flow through the compressor.

CAUTION: A 10PA17 R-12 compressor looks identical to a 10PA17-R134a and will bolt up to this vehicle. It is extremely important that a R-134a compressor is identified prior to using compressor in question. Check tag located on compressor for model number.

Excessive noise that occurs when the air-conditioning is being used may be caused by:

- Loose Bolts
- Mounting Brackets
- Loose Compressor Clutch
- Excessive High Refrigerant Operating Pressure

Verify the following before compressor repair is performed:

- (a) Compressor drive belt condition
- (b) Proper refrigerant charge
- (c) Thermal expansion valve (TXV) operating correctly
- (d) Head pressure is normal

LUBRICANT LEVEL

It is important to have the correct amount of lubricant in the A/C system to ensure proper lubrication of the compressor. Too little lubricant will result in damage to the compressor. Too much lubricant will reduce the cooling capacity of the system and consequently result in higher discharge air temperatures.

The lubricant used in the compressor is polyalkylene glycol PAG lubricant. Only refrigerant lubricant

approved for use with R-134a should be used to service the system. Do not use any other lubricant. The lubricant container should be kept tightly capped until it is ready for use, and then tightly capped after use to prevent contamination from dirt and moisture. Refrigerant lubricant will quickly absorb any moisture it comes in contact with.

It is not necessary to check or add lubricant unless it has been lost. This may be due to a ruptured line, shaft seal leakage, leakage from the evaporator, condenser leak, filter drier or loss of refrigerant due to a collision. Lubricant loss at a the leak point will be evident by the presence of a wet, shiny surface around the leak.

REFRIGERANT LUBRICANT LEVEL CHECK

When the A/C system is originally assembled, all of the components (except the compressor) are lubricant free. After the system has been charged with (R-134a) refrigerant and operated, the lubricant in the compressor is dispersed through the lines and components. The evaporator, condenser, and filter-drier will retain a significant amount of lubricant. (Refer to the Refrigerant Lubricant Capacities chart). When a component is replaced, the specified amount of lubricant must be added. When the compressor is replaced, the amount of lubricant that is retained in the rest of the system must be drained from the replacement compressor. When a refrigerant line or component has ruptured and has released an unknown amount of lubricant, the compressor should be removed and drained through the suction port. The filter-drier must be replaced along with the ruptured part. The lubricant capacity of the system, minus the amount of lubricant remaining in the components, equals the amount of lubricant to be added. The lubricant should be added through the suction port of the compressor.

LUBRICANT CAPACITIES CHART

A/C COMPONENT REFRIGERANT OIL CAPACITIES		
COMPONENT NAME	ml	oz
Total Air Conditioning System	140 ml	4.75 oz
Condenser	30 ml	1.00 oz
Evaporator	59 ml	2.00 oz
Receiver/Drier	30 ml	1.00 oz
Line Blown	44 ml	1.50 oz

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VERIFY REFRIGERANT LUBRICANT LEVEL

(1) Discharge refrigerant system using a recycling/reclaiming equipment if charge is present.

(2) Disconnect refrigerant lines from A/C compressor. Cap the open lines to prevent moisture from entering system.



- (3) Remove compressor from vehicle.
- (4) From suction port on top of compressor, drain lubricant from compressor.
- (5) Add system capacity minus the capacity of components that have not been replaced. Refer to the Lubricant Capacity Chart. Add lubricant through the suction port on compressor. This is not to exceed 133 ml (4.5 oz.) in total.
- (6) Install compressor and connect refrigerant lines. Then evacuate and charge refrigerant system.
- (7) Most reclaim/recycling equipment will measure the lubricant being removed. This is the amount of lubricant to be added back to the system. If a new compressor is being installed, drain lubricant from old compressor, measure the amount drained and discard old lubricant. Drain the lubricant from the new compressor into a clean container. Return the amount of lubricant measured from the old compressor, plus the amount reclaimed from the system back into the new compressor.

REMOVAL AND INSTALLATION

The A/C compressor may be unbolted and repositioned without discharging the refrigerant system. Discharging is not necessary if removing the compressor clutch/coil assembly, engine, cylinder head, or generator.

WARNING: REFRIGERANT PRESSURES REMAIN HIGH EVEN THOUGH THE ENGINE MAY BE TURNED OFF. DO NOT TWIST OR KINK THE REFRIGERANT LINES WHEN REMOVING A FULLY CHARGED COMPRESSOR. SAFETY GLASSES MUST BE WORN.

- (1) Disconnect Negative battery cable.
- (2) Loosen and remove drive belts (refer to Group 7, Cooling System) and disconnect compressor clutch wire lead.
- (3) Remove refrigerant from the A/C system (with a refrigerant recovery machine) if the compressor is being replaced.
- (4) Remove refrigerant lines from compressor and disconnect electrical connector (if necessary).
- (5) If system is left open place plug/cap over open lines.
- (6) Remove compressor attaching bolt.
- (7) Remove compressor. If refrigerant lines were not removed, lift compressor/clutch assembly and tie it to a suitable component.

To install, reverse the removal procedure.

COMPRESSOR CLUTCH/COIL ASSEMBLY

REMOVAL

Compressor assembly must be removed from mounting. Although, refrigerant discharge is not necessary.

- (1) Remove the compressor shaft bolt (Fig. 1). A band type oil filter removal tool can be placed around the clutch plate to aid in bolt removal.

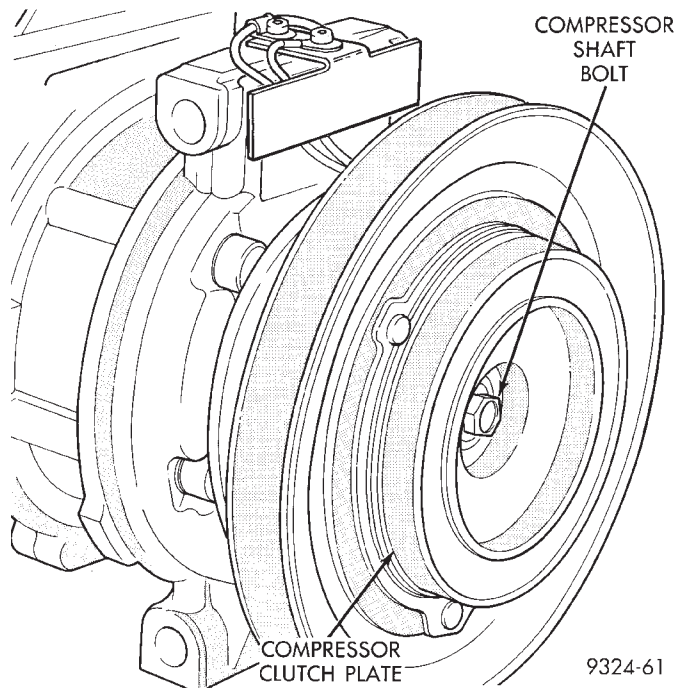


Fig. 1 Compressor Shaft Bolt and Clutch Plate

- (2) Tap the clutch plate with a plastic hammer and remove clutch plate and shim(s) (Fig. 2).

CAUTION: Do not use screwdrivers between the clutch plate assembly and pulley to remove front plate as this may damage the front plate assembly.

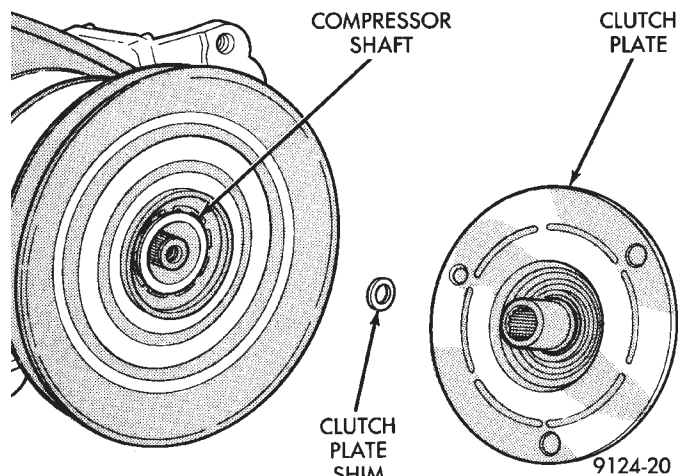


Fig. 2 Clutch Plate and Shim(s)

- (3) Remove pulley retaining snap ring with Snap Ring Pliers (C-4574), and slide pulley assembly off of compressor (Fig. 3).
- (4) Remove coil wire bracket/ground clip screw and wire harness.

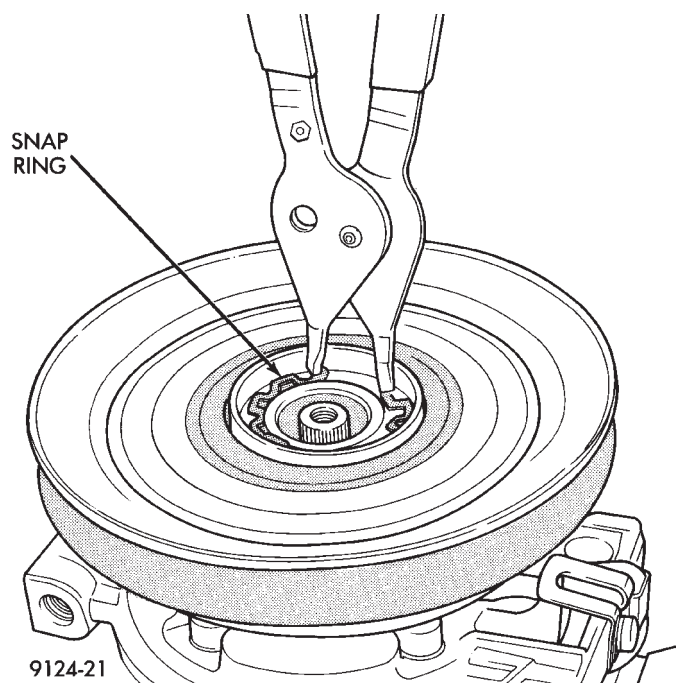


Fig. 3 Removing Pulley Snap Ring

(5) Remove snap ring retaining field coil onto compressor housing (Fig. 4). Slide field coil off of compressor housing.

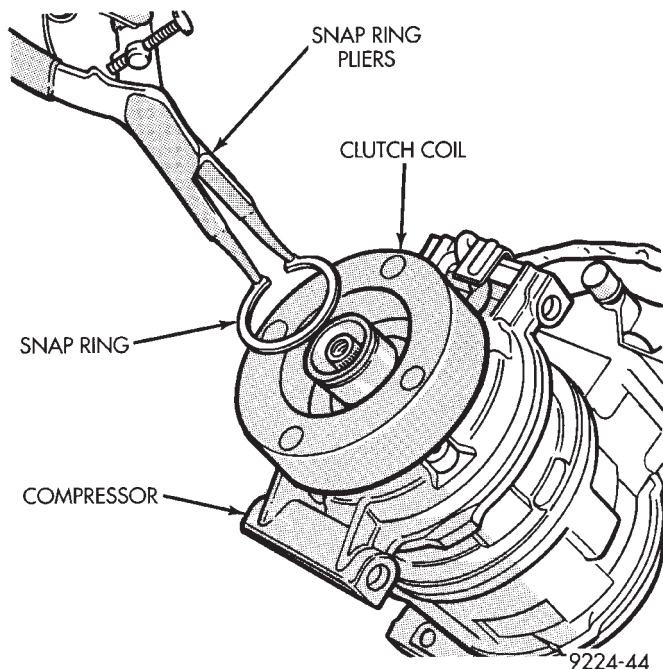


Fig. 4 Clutch Coil Snap Ring

(6) Examine frictional faces of the clutch pulley and front plate for wear. The pulley and front plate should be replaced if there is excessive wear or scoring. If the friction surfaces are oily, inspect the shaft nose area of the compressor for oil and remove the felt from the front cover. If the compressor felt is saturated with oil, the shaft seal is leaking and will have to be replaced.

(7) Check bearing for roughness or excessive leakage of grease. Replace bearing as required.

INSTALLATION

(1) Align pin in back of field coil with hole in compressor end housing, and position field coil into place. Make sure that lead wires are properly routed, and fasten the coil wire bracket/ground retaining screw.

(2) Install field coil retaining snap ring with Snap Ring Pliers (C-4574). The bevel side of the snap ring must be outward. Also both eyelets must be to the right or left of the pin on the compressor. Press snap ring to make sure it is properly seated in the groove.

CAUTION: If snap ring is not fully seated it will vibrate out, resulting in a clutch failure and severe damage to the front face of the compressor.

CAUTION: Do not mar the pulley frictional surface.

(3) Install pulley assembly to compressor. If necessary, tap gently with a block of wood on the friction surface (Fig. 5).

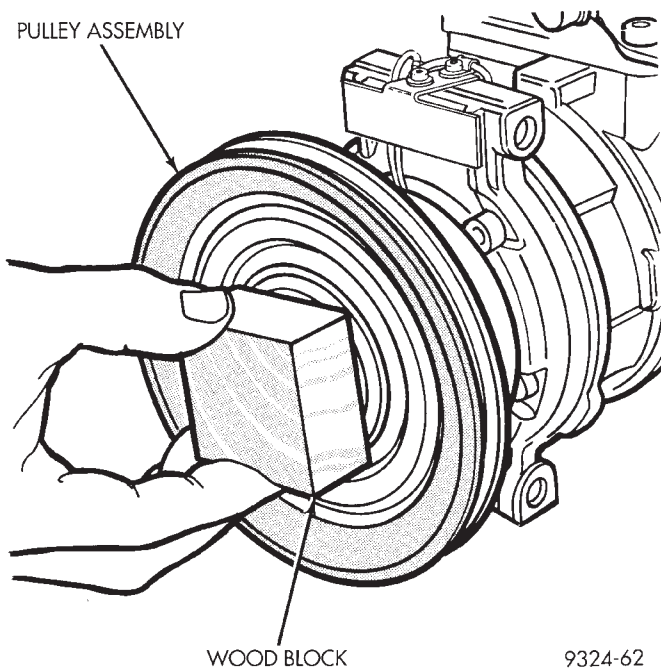


Fig. 5 Installing Pulley Assembly

(4) Install pulley assembly retaining snap ring (bevel side outward) with Snap Ring Pliers (C-4574). Press the snap ring to make sure it is properly seated in the groove.

(5) If the original front plate assembly and pulley assembly are to be reused, the old shim(s) can be used. If not, place a trial stack of shims, 2.54 mm (0.10 in.) thick, on the shaft against the shoulder.

(6) Install front plate assembly onto shaft.



(7) If installing a new front plate and/or pulley assembly, the gap between front plate and pulley face must be checked. Use the following procedure:

(a) Attach a dial indicator to front plate so that movement of the plate can be measured.

(b) With the dial indicator zeroed on the front plate, energize the clutch and record the amount of movement.

(c) The readings should be 0.35 mm to 0.65 mm (0.014 to 0.026 in.). If proper reading is not obtained, add or subtract shims until desired reading is obtained.

(8) Install compressor shaft bolt. Tighten to 17.5 ± 2 N•m (155 ± 20 in. lbs.).

Shims may compress after tightening shaft nut. Check air gap in four or more places to verify if air gap is still correct. Spin pulley for final check.

CLUTCH BREAK-IN

After new clutch installation, cycle the A/C clutch 20 times (5 sec. on and 5 sec. off). During this procedure, set the system to the A/C mode, engine rpm at 1500-2000, and high blower speed. This procedure (burnishing) will seat the opposing friction surfaces and provide a higher clutch torque capability.

COMPRESSOR HIGH-PRESSURE RELIEF VALVE

The high pressure relief valve is located on the A/C compressor manifold (Fig. 1).

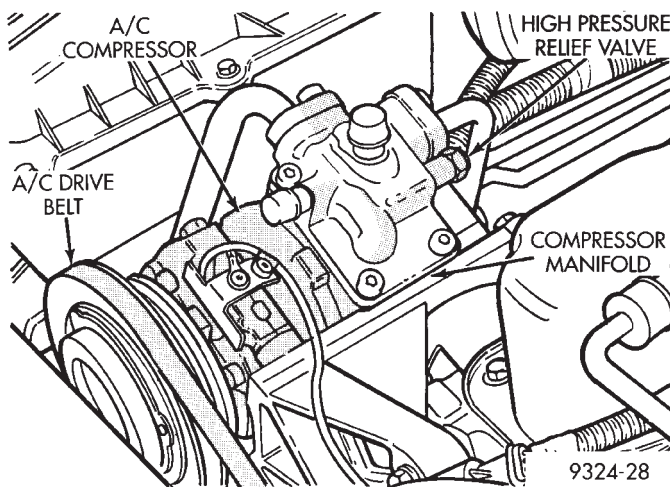


Fig. 1 High Pressure Relief Valve Location

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134A SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

WARNING: R-134A SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134A HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

REMOVAL AND INSTALLATION

(1) Remove refrigerant from A/C system using a refrigerant recovery machine.

(2) Rotate the high pressure relief valve counter-clockwise and separate relief valve from the vehicle.

To install, reverse the preceding operation using a new O-ring seal. Evacuate and charge the refrigerant system.

CONDENSER

The condenser is located between the radiator and the front bumper. The condenser can be serviced without having to drain the cooling system or remove the radiator.

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REMOVAL AND INSTALLATION

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Disconnect and cap A/C lines at the condenser.

(3) Remove condenser mounting bolts and unscrew 3/4 inch nut at receiver/drier.

(4) Remove screw from condenser inlet tube bracket and spread bracket open. The receiver/drier comes out separate from the condenser.

CAUTION: Avoid bending or breaking condenser inlet tube when lifting condenser from the vehicle.



- (5) Lift condenser from vehicle.
To install, reverse the removal procedure.

CONTROL HEAD

The control head is located below the radio. Regardless of the type of heater or A/C system the car is equipped with, the control head removal and installation procedures are the same.

REMOVAL AND INSTALLATION

- (1) Place the ignition key in the OFF position before removing control head.
- (2) Remove trim bezel.
- (3) Remove control head retaining screws.
- (4) Pull control head out of instrument panel. Then disconnect the two connectors on the rear of control head.

To install, reverse removal procedure.

A/C REFRIGERANT LINES

The air conditioning lines used on this vehicle are made from reinforced rubber with a nylon liner on the inner walls. The ends of the A/C lines are made from light-weight aluminum and use brazeless fittings or quick connects.

The A/C lines use special connectors called "quick connects". There are four quick connects in the system. Two are located at the condenser and the other two are located at the expansion valve. Each quick connector has a clip installed on it.

CAUTION: Never attempt to remove a clip or disconnect a quick connect without reclaiming all refrigerant from the air conditioning system. The system must be empty.

All quick connects use two O-rings to seal the connection. The O-rings are made from a special type of rubber that is not affected by R-134a refrigerant. O-ring replacement is required whenever lines are removed and installed. Use only O-rings specified for this vehicle. Failure to use the correct type of O-ring will cause the connection to leak within a short period of time.

When it is necessary to open the refrigeration system, have everything needed to service the system ready. The system should not be left open any longer than necessary. Cap or plug all lines and fittings as soon as they are opened. This will prevent the entrance of dirt and moisture into the system. All new lines and components should be capped or sealed until they are ready to be used.

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TEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

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LIQUID LINE

REMOVAL AND INSTALLATION

- (1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
- (2) Remove engine air inlet tube.
- (3) Remove A/C quick connect clips at all locations.
- (4) Disconnect quick connectors on expansion valve. Remove suction line from expansion valve and swing out of the way of the liquid line. Use special tool 7193 to disconnect quick connector.

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

- (5) Disconnect liquid line from the receiver/drier. It may be necessary to disconnect radiator upper crossmember and A/C discharge line quick connect.

CAUTION: Cap all lines that are not being replaced and cap all condenser tubes.

- (6) Remove the liquid line from the vehicle.
To install, reverse the removal procedure.

DISCHARGE LINE

REMOVAL AND INSTALLATION

- (1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
- (2) Disconnect A/C pressure transducer wire harness.
- (3) Remove quick connect clip and disconnect quick connect at condenser using special tool.

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

- (4) Disconnect line at A/C compressor using a 6 mm allen wrench.
To install, reverse the removal procedure.



SUCTION LINE

REMOVAL AND INSTALLATION

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Remove quick connect clip and disconnect quick connect at expansion valve end.

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

(3) Disconnect line at compressor end using a 6 mm allen wrench.

(4) Remove line by pulling rear end of line up out of vehicle with compressor end following through the tie-rod area.

To install, reverse the removal procedure.

EVAPORATOR

The heater housing must be removed from the vehicle when replacing the evaporator.

REMOVAL AND INSTALLATION

(1) Disconnect battery.

CAUTION: The refrigerant must be removed from the system before removing Heater-A/C housing. Use a refrigerant recovery machine.

(2) Remove heater housing from vehicle. Refer to Heater-A/C Housing Removal and Installation in this section for procedure.

(3) Remove recirculation door actuator.

(4) Remove recirculation Door and housing.

(5) Remove upper housing retaining screws.

(6) Remove upper half of heater housing.

(7) Lift evaporator out of lower housing.

(8) Transfer expansion valve onto new evaporator. Always use a new gasket when transferring expansion valve. Also transfer evaporator sensor. Place the evaporator sensor in the same location as on the previous evaporator.

To install, reverse removal procedure.

EVAPORATOR PROBE

The evaporator probe is a temperature sensing element located at the coldest point on the face of the evaporator. Output from the probe is sampled either by the engine controller (manual A/C) or the body controller (ATC). It is used to switch the clutch OFF before evaporator freeze-up occurs. On manual A/C systems, the clutch is switched OFF when the probe temperature reaches 1.1°C. (34°F.). It is allowed to switch ON when the probe temperature reaches 2.8°C. (37°F.). The ON/OFF settings for the ATC system are variable.

The evaporator probe is located on the lower right side of the heater housing.

REMOVAL

(1) Disconnect battery.

(2) Remove right under panel silencer.

(3) Disconnect wiring connector for evaporator probe.

(4) At center of heater housing, locate evaporator probe access plate. Twist the access plate counter clockwise one-quarter turn and remove plate.

(5) Pull probe out of evaporator core. This plate must be pushed inside the A/C unit and orientated in such a way that the plate can be removed.

INSTALLATION

(1) Install new probe into the evaporator. **The new probe must not go into the same hole (in the evaporator core) that the old probe was removed.** The evaporator is manufactured with three holes for probe insertion. Insert the probe in the uppermost hole.

(2) Install evaporator probe access panel.

(3) Connect probe wiring harness.

(4) Reconnect battery.

EXPANSION VALVE

The expansion valve is located on the engine side of the dash panel, near the right shock tower.

The expansion valve can fail in three different positions (open, closed or restricted).

In a Open Position: this will result in a noisy compressor or no cooling. The cause can be a broken spring, broken ball or excessive moisture in the A/C system. If the spring or ball are found to be defective, replace the expansion valve. If excessive moisture is found in the A/C system, recycle the refrigerant.

In a Closed Position: There will be low suction pressure and no cooling. This may be caused by a failed power dome or excessive moisture in the A/C system. If the power dome on the expansion valve is found to be defective replace the expansion valve. If excessive moisture is found recycle the refrigerant.

A Restricted Orifice: There will be low suction pressure and no cooling. This may be caused by debris in the refrigerant system. If debris is believed to be the cause, recycle the refrigerant and replace the expansion valve and receiver/drier.

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REMOVAL AND INSTALLATION

- (1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
- (2) Remove engine air inlet tube and the air distribution duct on vehicles equipped with 3.5 liter engine.
- (3) Disconnect A/C lines from expansion valve. Use special tool 7193 to disconnect quick connector on expansion valve.
- (4) Remove two retaining bolts from expansion valve.
- (5) Remove expansion valve.
- (6) Remove expansion valve gasket.

CAUTION: Always install a new gasket when replacing expansion valve.

To install, reverse removal procedure. Tighten new expansion valve to proper torque specification.

HEATER—A/C HOUSING

REMOVAL AND INSTALLATION

- (1) Disconnect battery. This must be done to prevent accidental air bag deployment.

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- (2) Using an A/C recovery unit, remove all R-134a refrigerant from the A/C system.

- (3) Remove air cleaner hose and air distribution duct from the engine.

- (4) Drain the engine cooling system.

- (5) Disconnect heater hoses at the dash panel. Plug the heater core inlet and outlet tubes to prevent anti-freeze from spilling on the vehicle interior during removal. If an appropriate plug cannot be found pull back carpet and use caution when removing unit. Keep the heater tubes elevated to prevent spillage of coolant.

- (6) Remove both A/C lines from expansion valve. Use special tool 7193 to disconnect quick connectors on A/C lines. Refer to A/C line removal in this section for complete procedure. After removing lines cap the expansion valve openings and the A/C hose openings. This will prevent any dirt or moisture from entering the refrigerant system during servicing.

CAUTION: The lubricant used in this air conditioning system absorbs moisture readily (similar to brake fluid). Do not leave any portion of the system open for extended periods of time.

- (7) Remove the three retaining nuts from the studs. These studs project through the dash panel into the engine compartment.

- (8) Remove right and left instrument panel end caps. These caps are held in place by a series of clips.

- (9) Remove right and left interior door post kick panel.

- (10) Remove right side bezel from instrument panel (Fig. 1).

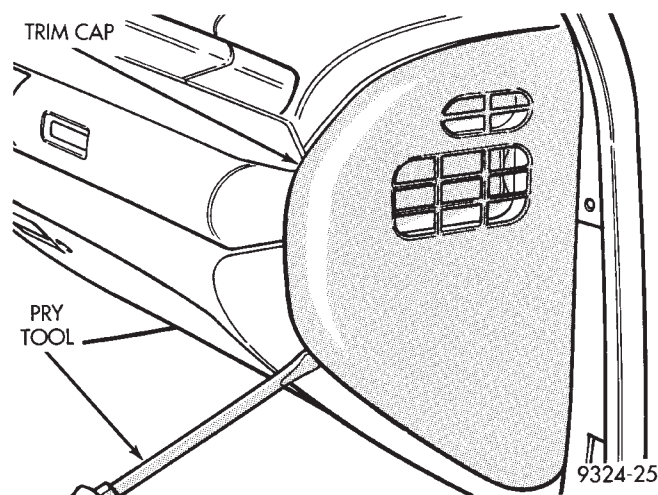


Fig. 1 Right Side Bezel Removal

- (11) Remove the radio center bezel which is held in place by six clips. This can be done by carefully prying the bezel from the instrument panel.

- (12) Remove the radio and heater A/C control head from the panel and place in a safe area to prevent scratches to component faces.



(13) Remove the center instrument panel bezel (Fig. 2). This bezel is held in place by four clips. It can be removed by carefully prying it from the instrument panel.

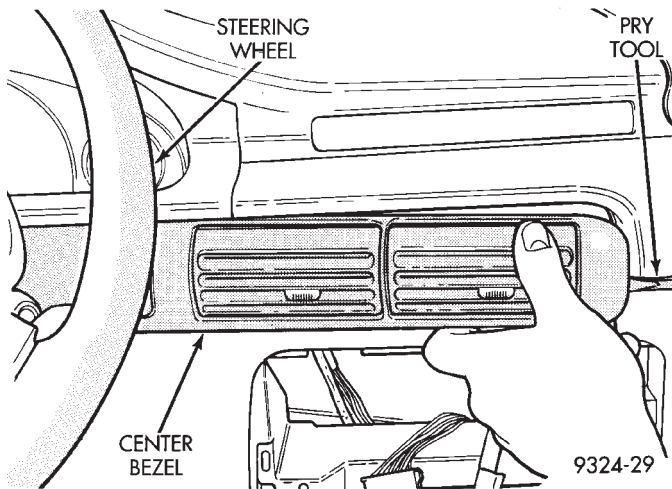


Fig. 2 Center Bezel Removal

(14) Remove center console from vehicle (if equipped).

(15) If the vehicle is equipped with a right side air bag, the glove box must be lowered. The glove box assembly can be lowered by pressing in on the sides of the glove box. This will release the glove box and allow access to air bag mounting screws. There are four screws located behind the glove box. Remove these screws and then close the glove box.

(16) Remove lower bolster retaining screws.

(17) Carefully lower the bolster and disconnect the trunk release and glove box light wiring. Then remove the lower bolster from the vehicle.

(18) Remove the instrument panel top cover (Fig. 3). It is held in place by retainer clips at both ends of the cover. To remove carefully pry upward at one end of the cover until the clip is disengaged. Proceed to the opposite side and gradually pry the rear edge of the top cover along the entire width of the panel.

(19) Remove right and left windshield "A" pillar trim covers.

(20) Remove five bolts that hold instrument panel to the cowl. These bolts are located at the base of the windshield.

(21) Disconnect the DRB II scan tool connector from brace.

(22) Remove instrument panel ground strap. This strap is located on the lower left side of the center console.

(23) Remove left knee blocker support bracket. This will allow access to the 60 way wiring connector.

(24) Remove under column duct and left floor duct.

(25) Disconnect 60 way wiring connector. Then disconnect all related wiring connectors.

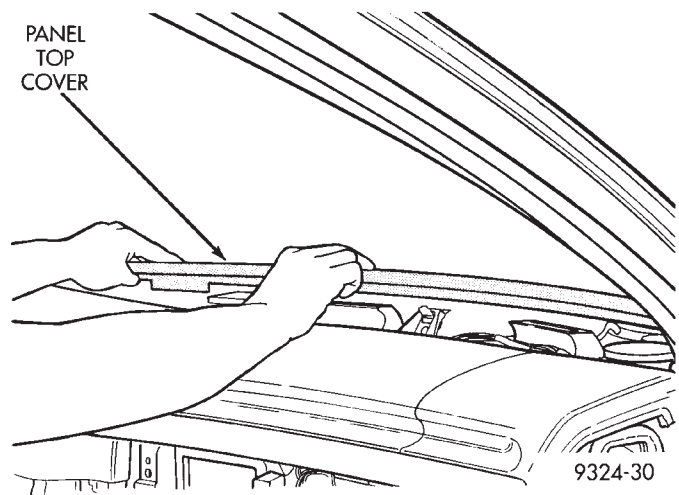


Fig. 3 Panel Top Cover

(26) Disconnect fuse panel wiring connectors.

(27) Disconnect the brake light switch connector.

(28) Remove steering column covers from steering column.

(29) Remove steering column retaining bolts and allow the steering column to lower to the floor. Do not completely remove the column from the vehicle.

(30) Remove wiring from the steering column.

(31) Remove air bag connectors.

(32) Remove right side floor air duct.

(33) Disconnect 10 way connector, blower module connector and blower motor connector from the heater/Air Conditioning assembly.

(34) Remove body controller from vehicle.

(35) Disconnect right side connector and antenna connector.

(36) Remove right and left side upper instrument panel mounting screws located in door jam.

(37) Remove upper instrument panel from the vehicle. The upper instrument panel will be removed with all harnesses and gauges still in the panel. It is recommended that two people handle the upper panel while removing.

(38) Remove air duct for rear heater vents. It is held in place by a bracket/push pin near the rear of the duct.

(39) Remove the air bag module and brace from the vehicle.

(40) Remove three attaching bolts which holds the heater housing to the dash panel.

(41) Carefully roll the heater housing out of the vehicle.

(42) After removing the heater housing, remove the drain tube from the heater housing. The drain tube should be installed from underneath the vehicle after the heater housing is reinstalled into the vehicle.

To install heater housing, reverse removal procedure.



HEATER CORE

The heater housing must be removed from the vehicle to service the heater core.

REMOVAL

- (1) Disconnect battery.
- (2) Remove heater housing from vehicle. Refer to Heater-A/C Housing Removal and Installation in this section for procedure.
- (3) With the heater housing out of the vehicle, pull back heater core retaining clips. Then pull the heater core out of the heater housing.

INSTALLATION

- (1) Push new heater core into the heater housing.
- (2) Place retaining brackets over heater core and fasten with screws provided with new heater core (Fig. 4).

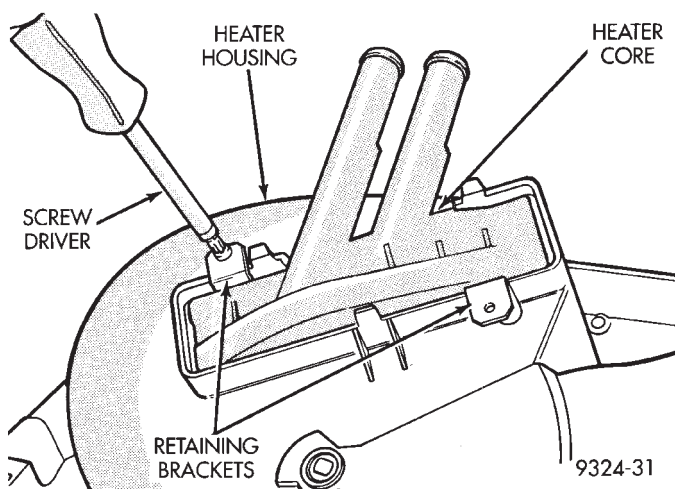


Fig. 4 Heater Core Retaining Bracket

- (3) Reinstall heater housing into vehicle.
- (4) Reconnect battery.

RECEIVER/DRIER

The receiver/drier is a receiver for reserve refrigerant. It also has a desiccant bag and a filter which is used to absorb moisture and filter the refrigerant as it passes through the receiver/drier.

The receiver/drier is located left of the A/C condenser. The A/C refrigerant must be removed from the system before removing the receiver/drier. Always use a refrigerant recovery machine.

It is recommended that if an A/C system was left open for an extended period of time that the receiver/drier be replaced.

REMOVAL AND INSTALLATION

- (1) Remove refrigerant from A/C system using a refrigerant recovery machine.
- (2) Remove condenser bolt from module.
- (3) Remove receiver/drier nut from condenser.
- (4) Remove receiver/drier quick connect clip and disconnect quick connect (liquid line to receiver/drier).
- (5) Remove drier from vehicle.
- (6) Cap liquid line and condenser threaded fitting while system is open to prevent moisture from entering system.

To install, reverse removal procedure.

CAUTION: When installing new receiver/drier do not leave open to atmosphere for a long period of time. Receiver/drier contains moisture absorbing materials which will absorb moisture in the atmosphere.

SUN SENSOR

The sun sensor is only used on vehicles equipped with Automatic Temperature Control (ATC). The sensor is mounted on the top of the instrument panel below the instrument panel top cover. This is not a thermistor type sensor but rather a photo diode. For this reason the sun sensor responds to sun light intensity rather than temperature. It is used to aid in determining proper mode door position, temperature door position and blower speed.

The sun sensor is not serviceable and must be replaced if found to be defective.

TEST

The sun sensor is located so that the sun hits the sensor in the same way that it hits the driver and the passenger. It is important that the area in front of the sensor be unobstructed. Check that the following items are not in the way of the sun sensor.

- Caps or papers which might cover the sensor.
- Windshield wipers that are adjusted too high.
- Stickers on the windshield that are directly in front of the sensor.
- Top cover which is not properly installed.

Refer to the 1993 LH Body Diagnostic Manual for electrical test procedure.

REMOVAL AND INSTALLATION

- (1) Remove instrument top cover.
- (2) Remove Sun Sensor mounting screws.
- (3) Lift sensor out of instrument panel and disconnect wiring.

CAUTION: The sun sensor must protrude approximately 1/4 inch above the instrument panel top cover. This will ensure proper operation.

To install, reverse removal procedure.



MANUAL AIR CONDITIONING SYSTEM SELF-DIAGNOSTICS

GENERAL INFORMATION

The system uses three rotary knobs to control the heater/air conditioning system (Fig. 1).

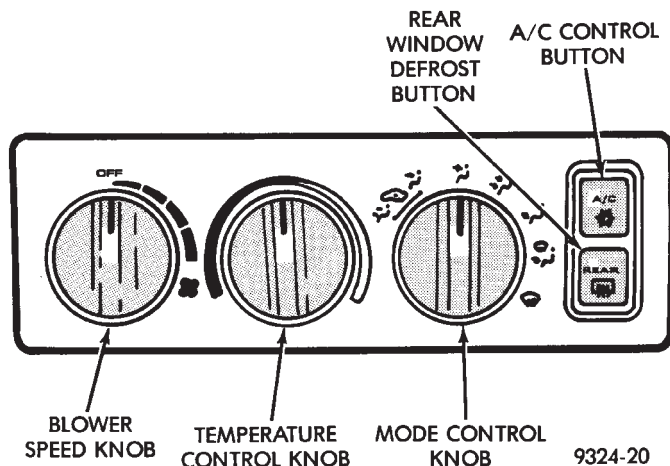


Fig. 1 Control Knobs

The left knob is used to control the blower speed. It has four speeds and a off position. When the blower motor is in the off position the entire system is shut off. The recirculation door will be closed to stop all air flow into the vehicle.

The center knob controls the temperature of the system air. In the far left position is cold and as it is turned clockwise the air coming from the system becomes warmer.

The right knob controls the different modes available to the user. There are seven different modes available to the operator. They are as follows:

- Defrost
- Mix Mode (air flows between defroster and floor)
- Floor Mode
- Bi-Level (air flows between panel outlets and floor)
- Panel
- Recirculate Panel
- Recirculate Bi-Level

VEHICLE SELF DIAGNOSTIC TESTS

The manual air conditioning system (Non-ATC Systems) have built in self diagnostics. Use the following procedures to access and test the system. All diagnostic trouble codes will be displayed through the rear window defogger switch LED light.

In order to perform any tests, the control head must be placed in its diagnostic mode. To access the diagnostic mode perform the following steps:

(1) Start the engine and allow it to run during the entire test. The vehicle must not be moving during this test.

(2) The left knob (Blower control) must be placed to any speed setting. Do not place the knob to the off position.

(3) The center knob (Temp knob) must be placed in the full cool position.

(4) The right knob (Mode control) must be placed in the defrost mode.

(5) The A/C button on the control head can be in the on or off position.

(6) Press the rear window defogger switch and hold for three to five seconds. The rear window defogger switch light will begin to flash. Release the button when the light begins to flash.

The system is now in the diagnostic mode. The following steps must be used to diagnose the system.

To abort the diagnostic mode, turn the blower switch to the off position or push the A/C or rear window defogger button once. The diagnostic mode can also be aborted by changing either the temperature selector or mode selector settings.

(7) When the diagnostic mode is first entered, the rear window defogger switch will flash for approximately 30 seconds. During this time the actuators are being calibrated and checked. If calibration is successful the light will go out. If the rear window defogger switch light has gone out skip to step 10 of this procedure. If the light remained on continue with this test.

(8) If there is a unsuccessful calibration, the rear window defogger switch light will remain on. This indicates that a problem is present in an actuator or there is an internal control head problem.

(9) To determine where the problem in the system is:

- Move the mode actuator knob to the mix position. If the rear window defogger switch light remains on this indicates that there is an internal problem with the control head and it requires replacement. If the light goes out the control head electronics are good.
- Move the mode actuator knob to the floor position. If the rear window defogger switch light remains on this indicates that the blend door actuator wiring or HVAC blend (Temp) door has a problem. If the rear window defogger switch light goes off in this position indicates that the blend door actuator and circuits are good.
- Move the mode actuator knob to the Bi-Level position. If the rear window defogger switch light remains on this indicates that the mode actuator and/or circuit has a problem. If the rear window defogger switch light goes off in this position indicates that the mode actuator, HVAC mode door and circuits are good.

The recirculation actuator can be checked after completing the following control knob test.



CAUTION: Step 10 (mode actuator knob test) and step 11 (temperature knob test) can not be performed if test in step 8 (unsuccessful calibration) occurs. One must fix problem of step 8 before testing mode and temperature knob operation.

(10) To check the mode actuator knob perform the following:

- Run Calibration diagnostics.
- Place the mode actuator knob in the mix mode. The rear window defogger switch light should flash twice and then pause. It should continue this two flash sequence. This indicates that the mix mode has no problems.
- Place the mode actuator knob in the floor mode. The rear window defogger switch light should flash three times and then pause. It should continue this three flash sequence. This indicates that the floor mode has no problems.
- Place the mode actuator knob in the Bi-Level mode. The rear window defogger switch light should flash four times and then pause. It should continue this four flash sequence. This indicates that the Bi-Level mode has no problems.
- Place the mode actuator knob in the Panel mode. The rear window defogger switch light should flash five times and then pause. It should continue this five flash sequence. This indicates that the Panel mode has no problems.

- Place the mode actuator knob in the Recirculate Panel mode. The rear window defogger switch light should flash six times and then pause. It should continue this six flash sequence. This indicates that the Recirculate Panel mode has no problems.

- Place the mode actuator knob in the Recirculate Bi-Level mode. The rear window defogger switch light should flash seven times and then pause. It should continue this seven flash sequence. This indicates that the Recirculate Bi-Level mode has no problems.

(11) To check the temperature control knob perform the following:

- Place the mode actuator knob in the defrost position.
- Slowly turn the temperature control knob clockwise while observing the rear window defogger switch light. As you turn the knob clockwise the rear window defogger switch light should begin flashing. It will continue to flash faster as the knob is turned. Once the knob reaches full heat the rear window defogger switch light will go out.
- Switch the mode actuator knob between panel and recirculate panel and observe the recirculation door for movement. If the door moves correctly the recirculation door actuator and circuits are good.

To exit the diagnostic mode either turn off the blower or push the A/C or rear window defogger button once.



AUTOMATIC TEMPERATURE CONTROL (ATC) SELF-DIAGNOSTICS

GENERAL INFORMATION

The ATC system allows the operator to manually control the passenger compartment environment. The control head, located in the instrument panel is used to control the desired temperature, air flow direction and blower speed (Fig. 1). The operator may also select an AUTO mode. The system will automatically select the blower speed, temperature and air flow direction. Refer to the Owner's Manual for proper operation.

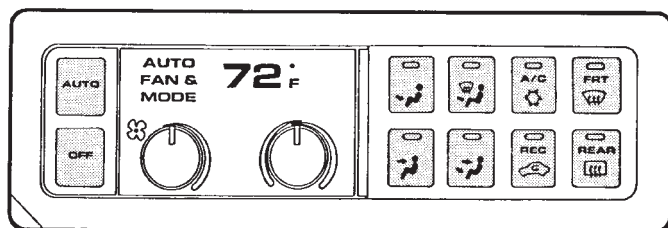


Fig. 1 ATC Control Head

VEHICLE SELF DIAGNOSTIC TESTS

The ATC system can be diagnosed two ways. The DRB II scan tool can be used or the vehicle's own control head display may be used. If the DRB II scan tool is to be used, refer to the 1993 LH Body Diagnostic Manual.

The control head can only be placed into the diagnostic mode while the engine is running and the vehicle is not moving. Set the control to a 75°F. setting (so there is no confusion with 23-36 Diagnostic Trouble Codes).

To place the system into its diagnostic mode, press and hold the floor, mix and defrost buttons (at the same time). The ATC head display will begin to blink (Fig. 2). When the control head display begins to blink release the floor, mix and defrost buttons. Once the control head enters its diagnostic mode, the display on the control head will continue to blink until it completes its tests and calibrations. Then it will display any diagnostic trouble codes that are present in the body controller (which relate to ATC operation) on the control head display. If there are no diagnostic trouble codes the system will return to its normal operation as indicated by temperature display.

Diagnostic trouble codes related to the ATC system will appear on the display in numerical form. The diagnostic trouble codes are stored in the body controller and diagnostic trouble code numbers can range between 23 and 36. The control head can only show one diagnostic trouble code at a time. Under certain circumstances more than one diagnostic trouble code could be in the memory. To scroll through any additional diagnostic trouble codes, press the panel button.

If diagnostic trouble codes are found, refer to the 1993 LH Body Diagnostic Manual for repair procedures.

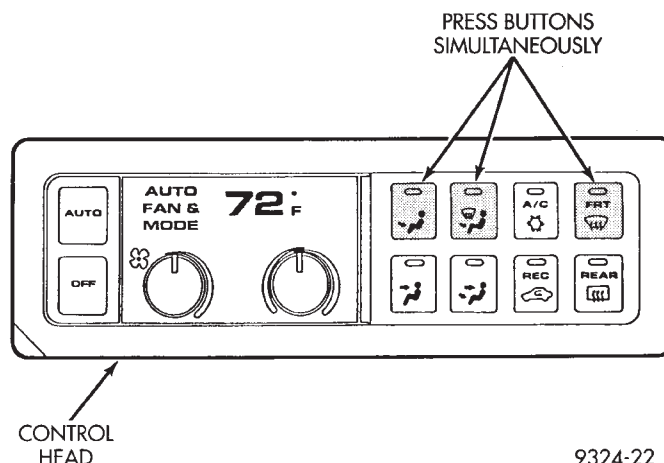


Fig. 2 Entering Self-Diagnostic Mode

The control head cannot display all diagnostic trouble codes stored within the body controller. There may be other diagnostic trouble codes in the body controller not related to the ATC system. These codes can only be found using the DRB II scan tool.

ERASING DIAGNOSTIC TROUBLE CODES

Diagnostic trouble codes can be cleared from the memory two ways:

- The DRB II scan tool
- Power to the body control module can be disconnected for ten minutes (disconnect battery).

If the DRB II scan tool is to be used, refer to the 1993 LH Body Diagnostic Manual for procedures.

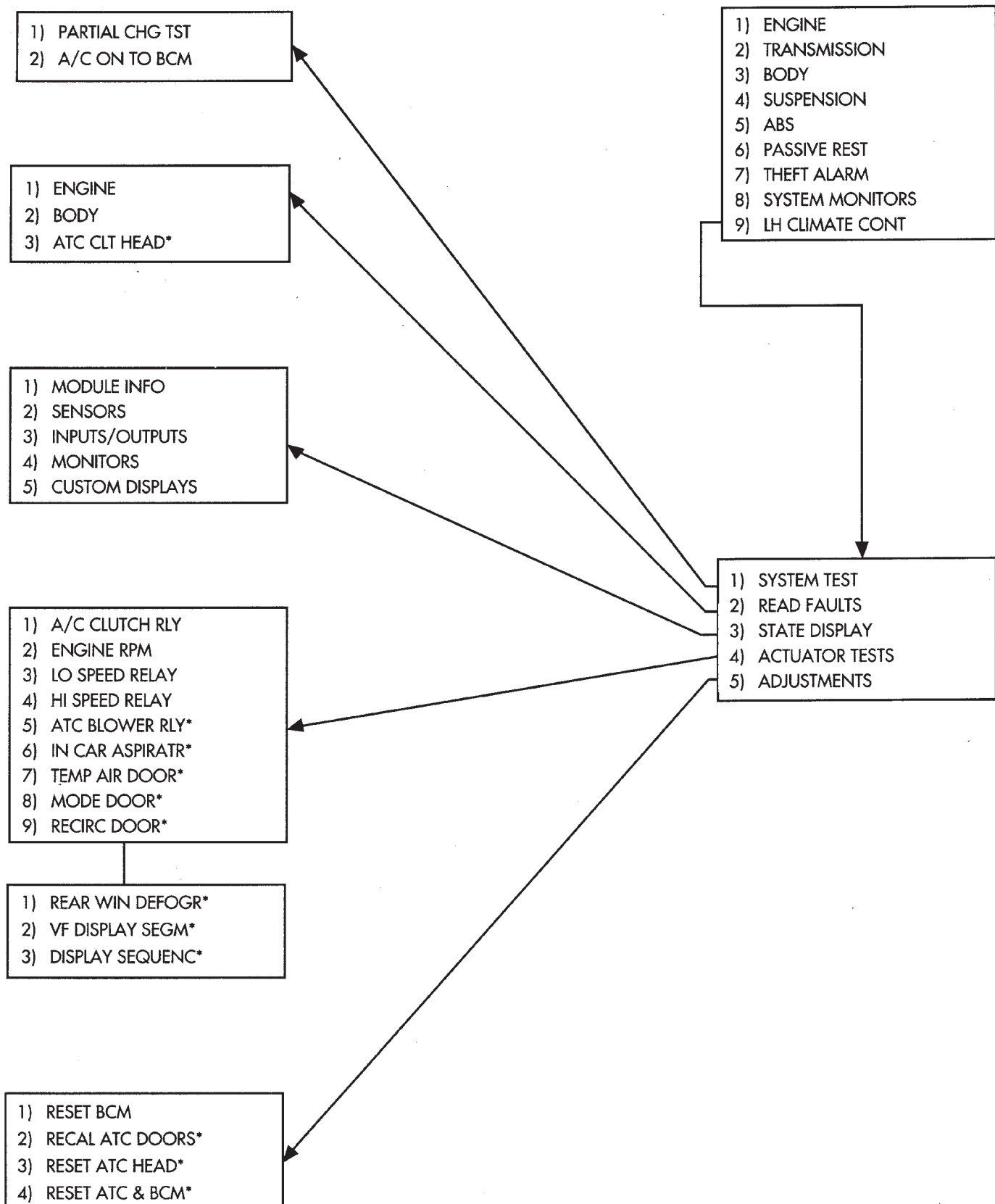
CAUTION: Fault code 26 can be created if the sensor is disconnected while it is running; this will result in the control head display disappearing. To correct, clear fault code 26 from the body controller.

DIAGNOSTIC TROUBLE CODE CHART

CODE	DESCRIPTION
23	ATC Blend Door Feedback Failure
24	ATC Mode Door Feedback Failure
25	Ambient Sensor
26	ATC In-Car Sensor
27	Sun Sensor Failure
31	ATC Recirculation Door Stall Failure
32	ATC Blend Door Stall Failure
33	ATC Mode Door Stall Failure
34	Engine Temperature Message not Received
35	Evaporator Sensor Failure
36	ATC Head Communication Failure



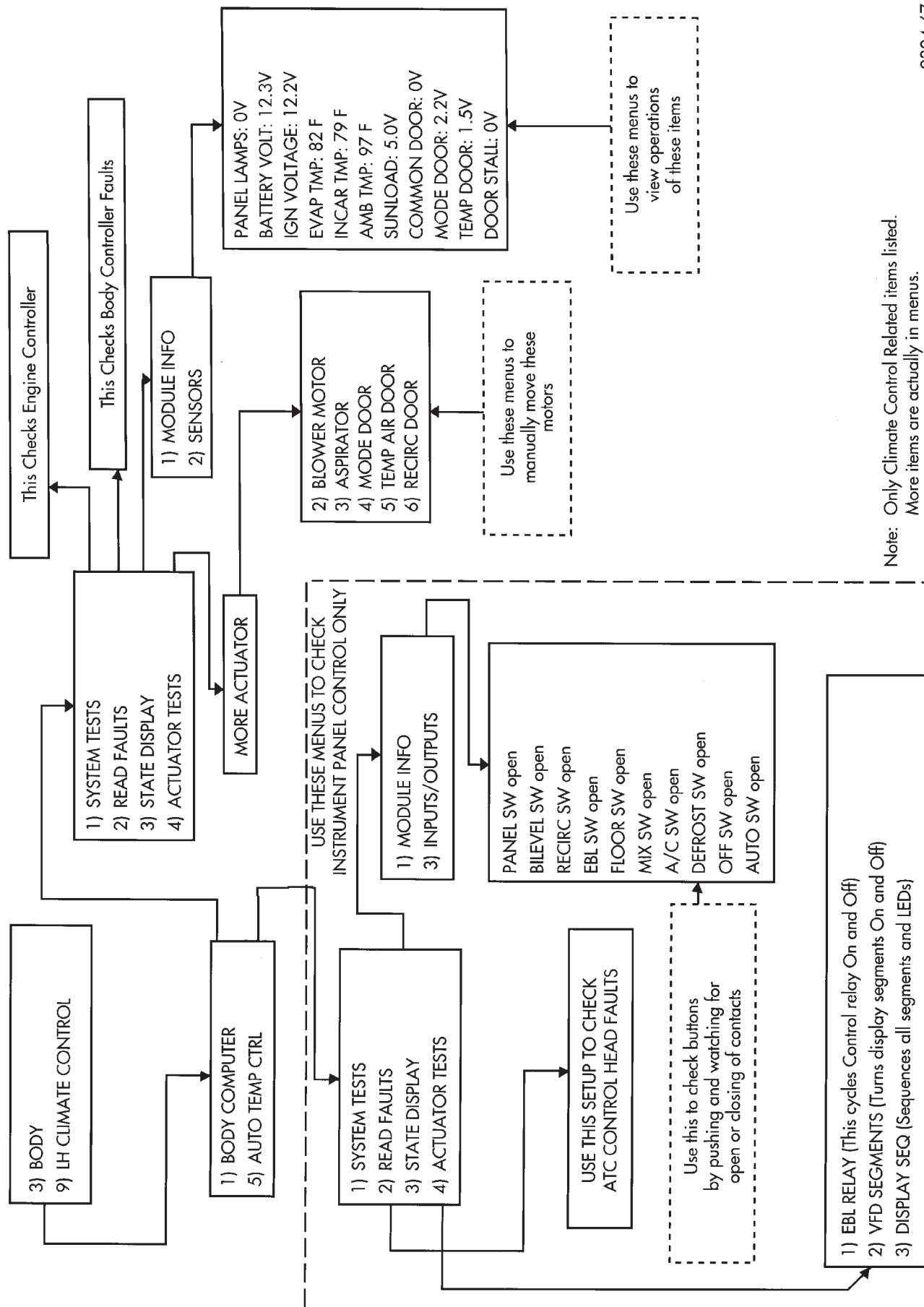
DRB II SCAN TOOL FLOW CHART—MANUAL/ATC



*ATC ONLY FUNCTIONS



DRB II SCAN TOOL MENU—BODY SECTION/CLIMATE CONTROL ITEMS





DRB II SCAN TOOL FLOW CHART—SYSTEM TESTS

