

Chapter 18

Ventilation System

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Description

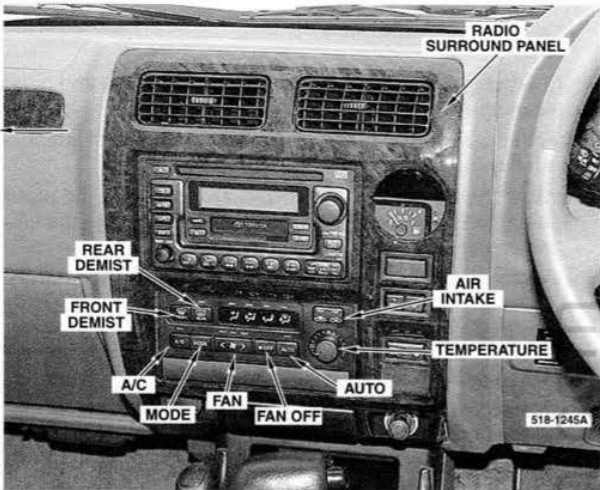
The ventilation controls on models without climate control, use three rotary controls to direct air through the vehicle at the most comfortable temperature.

The ventilation controls also incorporate the air conditioning and rear window demister switches. The airflow control directs air to the floor, dashboard or windscreen outlets as required. The bi-level positions direct air simultaneously to either the floor and dashboard outlets or the face and floor outlets.

The air intake control directs air from outside the vehicle or recirculates the air within the cabin. The recirculate position is advantageous in dusty conditions or to heat/cool the vehicle interior rapidly.

The temperature selector operates two cables. One is connected to the heater valve, located in the engine compartment and the other controls a door in the heater unit. When the selector lever is in the full cold position, the heater valve is closed and coolant is prevented from flowing through the heater core. The door in the heater unit prevents air passing over the heater core.

As the temperature selector is moved to the warm position, the valve opens allowing coolant to flow through the heater core. At



Ventilation controls. Models with climate control.

the same time the door in the heater unit opens allowing engine coolant to pass over the heater core.

The temperature of the heater core is relevant to the temperature of the engine coolant and therefore maximum heating is only available when the engine is at normal operating temperature.

The fan switch is used to control the fan speed and also switches the fan On and Off.

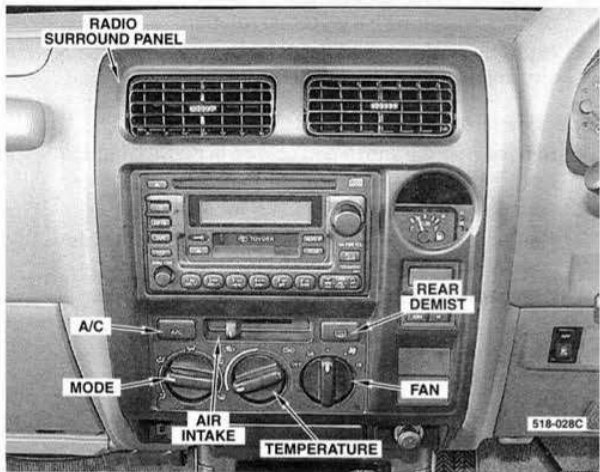
Air conditioned models use identical controls with the addition of an air conditioning switch. The fan switch must be set at 1 or above for the air conditioning to operate.

VX and Grande models are equipped with an electronic climate control system which can automatically control the vehicles interior environment regardless of ambient conditions.

A climate control ECU is used to control the position of the air intake servo motor and the air flow control servo motor and heater flap control servo motor. The climate control ECU receives information from the solar sensor located at the top of the dashboard, the ambient air temperature sensor located behind the front bumper and the cabin temperature sensor, located behind the driver side lower dash panel.

The climate control ECU is combined with the controls. The system has a self diagnosis capability, however, due to the complex nature of the system it is recommended that an authorised dealer be consulted should a fault develop that cannot be fixed using the information in this chapter.

Due to enviromental concerns, it is recommended, that any work requiring disconnection of the refrigerant lines be referred to an authorised dealer or an air conditioning specialist.

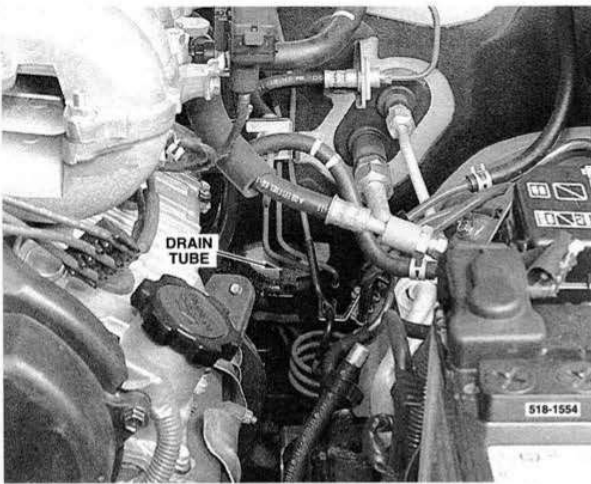


Ventilation controls. Models without climate control.

Routine Maintenance

The ventilation system requires little maintenance other than the following operations, most of which are applicable to the air conditioning system.

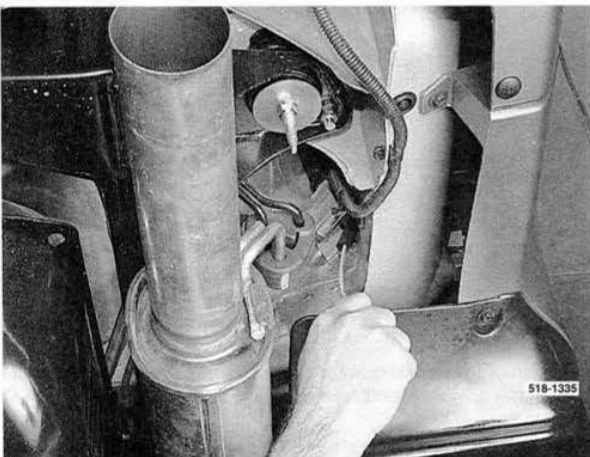
- 1 Regularly check all the coolant hoses and connections for leakage including the heater hoses as described in Cooling System (chapter 5).
- 2 If the system is not cooling sufficiently, have the system recharged by an authorised dealer or an air conditioning specialist. It is considered normal for the system to require periodic regassing.
- 3 Inspect the air conditioner pipes and hoses for leaks, deterioration and alignment. Evidence of oil leakage is an indication of a refrigerant leak. Repair or renew as necessary.



Location of the evaporator drain tube.

- 4 Inspect the evaporator drain tube for blockage. Clean as necessary.

To prevent problems with the evaporator drain tube blocking, vehicles parked in leafy areas should have the plenum cover removed and the plenum cleaned of leaves and debris from time to time. For the removal procedure of



Cleaning the evaporator drain tube on models with a rear air conditioning unit. A cable tie is an ideal tool.

the plenum cover, refer to the Wiper Motor and Linkage heading in Body Electrical (chapter 16).

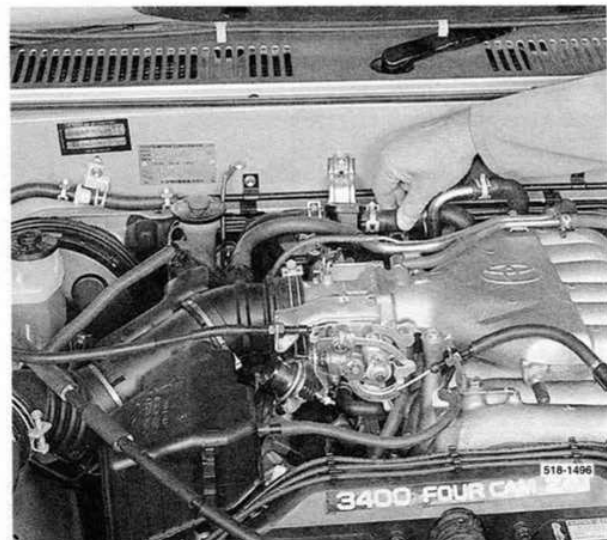
- 5 Inspect the condenser exterior surfaces for blockage. Clean as necessary.
- 6 Check the drive belt for deterioration. Refer to Engine (chapter 4) for the correct procedure.
- 7 Operate the air conditioning system once a week for a minimum of five minutes to keep the compressor seals lubricated.

Heating and Air Conditioning Trouble Shooting

NO HEATED AIR INSIDE VEHICLE

- 1 Faulty engine thermostat: Renew the thermostat as described in Cooling System (chapter 5).
- 2 Temperature selector inoperative: Check that the heater control cable is connected and correctly adjusted.
- 3 Heater valve remaining closed: Check the operation of the valve.
- 4 Lack of coolant in the engine: Check the coolant level.
- 5 Blocked heater hoses or heater core: Remove the blockage or renew the hoses or core as necessary.
- 6 Air flow doors inoperative: Check for loose or broken cables, blown fuse, electrical problems, leaks or sticking/binding door flap.

i Ensure that the engine is reaching normal operating temperature. If in doubt, check the operation of the thermostat as described under the Thermostat heading in Cooling System (chapter 5). When the engine is at normal operating temperature and the heater is switched on, both heater hoses should feel warm/hot. If the heater core is blocked, one hose will feel hot and the other hose will be noticeably cooler.

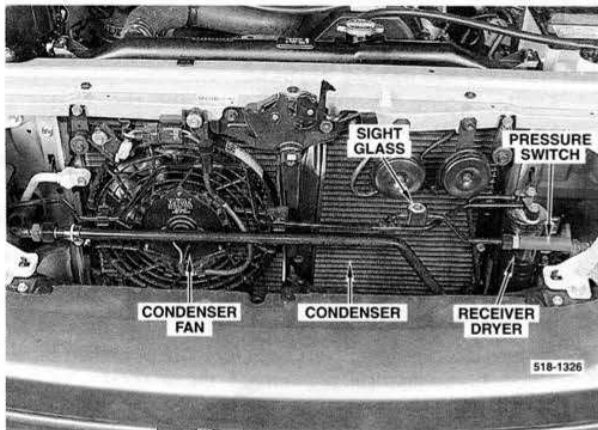


Checking for coolant flow through the heater core. When the engine is at normal operating temperature and the heater is switched on, both heater hoses should feel warm/hot.

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NO COOLED AIR INSIDE VEHICLE

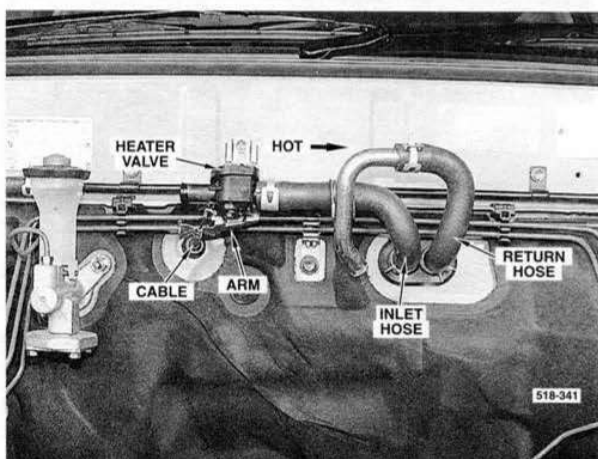
- 1 Air conditioning drive belt slipping: Check and if necessary, renew the drive belt as described in Engine (chapter 4).
- 2 Insufficient refrigerant: Refer to the Air Conditioning heading and if necessary, have an authorised dealer or an air conditioning specialist check the refrigerant charge.
- 3 A/C or Gauge fuse blown: Check the fuse and renew as necessary.
- 4 Compressor inoperative: With the engine running, switch the air conditioning On and check that the compressor clutch engages with an audible click. If not, check for power at the compressor before having the compressor repaired by a specialist.



Air conditioning components located in front of the radiator.

i If the pressure switch is functioning correctly, the compressor will not engage if the refrigerant charge is low. If the air conditioning system is suspect, it is recommended that the vehicle be taken to an authorised dealer or an air conditioning specialist for testing and repair.

- 5 Heater system allowing warm air to mix with cooled air: Check that the heater control cable is connected and correctly adjusted.



When the temperature selector inside the vehicle is set at cold the heater valve must arm must be fully toward the rear of the vehicle.



With the heater control set to hot the arm on the heater valve is fully forward. The arm is positioned toward the firewall when the heater control is set to cold.

- 6 Heater valve remains open: Check the operation of the heater valve.

VENTILATION CONTROLS INOPERATIVE**Without Climate Control**

- 1 Control cable disconnected or broken: Check the control cables.
- 2 Controls or actuator link faulty: Renew components as necessary.

With Climate Control

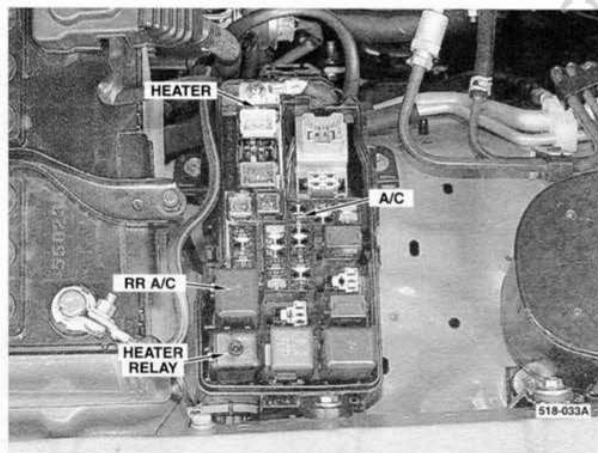
- 1 Controls illuminate but do not work: Check the wiring, switches and electric motors.
- 2 Controls do not illuminate: Check illumination circuit power supplies.



Use the wiring diagrams at the rear of Body Electrical (chapter 16), to assist in tracing faults within the climate control system.

FAN MOTOR INOPERATIVE

- 1 Heater fusible link blown: Renew the fusible link.
- 2 Gauge fuse blown: Renew the fuse.
- 3 Faulty heater relay: Check and renew the relay as necessary.
- 4 Faulty fan motor: Check and renew the motor as necessary.
- 5 Faulty fan motor earth circuit (models without climate control): Check and rectify the earth circuit.
- 6 Faulty fan motor resistor: Renew the resistor as necessary.
- 7 Faulty fan switch: Renew the fan speed switch, on models without climate control or the fan speed control assembly, on models with climate control.



Location of the heater relay, air conditioning and heater fuses in the engine compartment fuse and relay box.

FAN MOTOR OPERATES ON HIGH SPEED ONLY

- 1 Faulty fan motor resistor (models without climate control): Renew the fan motor resistor.

- 2 Faulty fan speed switch: Renew the fan switch, on models without climate control or the climate control ECU and control assembly on models with climate control.

i On models with climate control, occasionally faults within the climate control ECU and control assembly cannot be accurately tested, even with the manufacturers dedicated test equipment. Where it is suggested in the text to renew the climate control ECU and control assembly, a substitute component can often be obtained through an engine management component remanufacturer. Often, these companies have loan units to enable the technician to substitute a known good component with theirs to see if the fault is then rectified. It is recommended that this avenue be explored before purchasing new components. These products can often be obtained through local spare parts and accessory stores.

- 3 Faulty fan speed control assembly (models with climate control): Renew the fan speed controller.

WATER LEAKING INTO INTERIOR OF VEHICLE WHEN A/C OPERATING

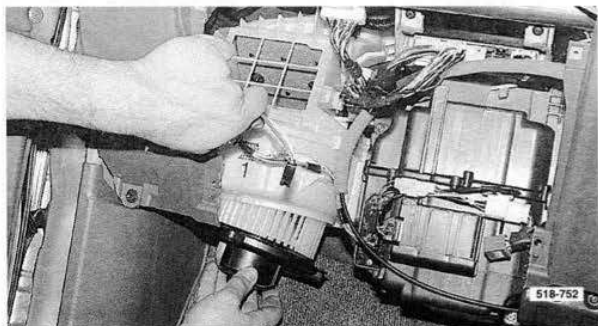
- 1 Evaporator drain tube blocked: Raise the front of the vehicle and support it on chassis stands. Carefully clean the drain tube, located on the left hand side of the firewall or, on models with a rear cooling unit, behind the right hand rear wheel.
- 2 Heater unit case cracked or damaged: Check heater unit case.
- 3 Heater core leaking: Pressure check the vehicle cooling system as described in Cooling (chapter 5), and if the heater core is leaking replace the core as described under the Heater Unit heading later in this chapter.

i To prevent problems with the evaporator drain tube blocking, vehicles parked in leafy areas should have the plenum cover removed and the plenum cleaned of leaves and debris from time to time. For the removal procedure of the plenum cover, refer to the heading Wiper Motor and Linkage in Body Electrical (chapter 16).

Fan Motor and Resistor

TO REMOVE AND INSTALL FRONT FAN MOTOR

- 1 Working in the passenger compartment, remove the screw and bolt retaining the glove compartment and withdraw the compartment from the dashboard.



Removing the fan motor from the air intake housing.

- 2 Disconnect the wiring connector from the fan motor.
- 3 Remove the retaining bolts and withdraw the fan motor from beneath the air box.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Tighten the retaining bolts securely.
- 2 Ensure that the fan motor wiring is securely connected.

TO REMOVE AND INSTALL REAR COOLER FAN MOTOR

To remove the rear cooler fan motor, it is necessary to remove the entire unit. Therefore it is necessary to take the vehicle to an authorised dealer or a licensed air conditioning specialist to have the refrigerant gas evacuated from the system.

- 1 Remove the right hand side third seat. Refer to Body (chapter 17).
- 2 Remove the covers from each end of the seat hinge. Remove the bolts and remove the hinge from the vehicle.
- 3 Remove the screws and then remove the tailgate scuff plate from the vehicle.
- 4 Prise loose and remove the rear quarter trim panel.
- 5 Disconnect the ducting from the rear pillar.
- 6 Working beneath the vehicle, disconnect the refrigerant pipes. Discard the O rings, and seal the ends of the pipes to prevent the entry of dirt and moisture.
- 7 Disconnect the wiring connectors and remove the retaining bolts. Withdraw the unit from the vehicle.
- 8 Remove the retaining screws and withdraw the fan motor.

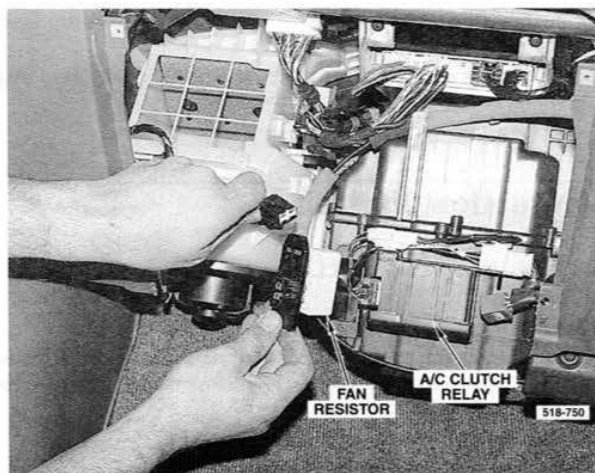
Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the fan motor to the unit ensuring that the screws are tightened securely.
- 2 Install the unit to the vehicle. Tighten the retaining bolts securely.
- 3 Install new O rings, coated with the appropriate refrigerant oil, to the refrigerant pipes and tighten the pipes securely.



Some refrigerant oils are carcinogenic and have to be handled with extreme care.

- 4 Ensure that the wiring connectors are securely connected.



Removing the fan resistor.

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- 5 Install the ducting and the rear quarter trim panel.
- 6 Install the third seat hinge, tighten the retaining bolts securely and install the covers.
- 7 Install the third seat.
- 8 Have the system filled with refrigerant gas and checked for leaks by an authorised dealer or licensed air conditioning specialist.

TO REMOVE AND INSTALL FRONT FAN RESISTOR

- 1 Working in the passenger compartment, remove the screw and bolt retaining the glove compartment and withdraw the compartment from the dashboard.
- 2 Disconnect the resistor wiring connector.
- 3 Remove the retaining screws and withdraw the resistor.

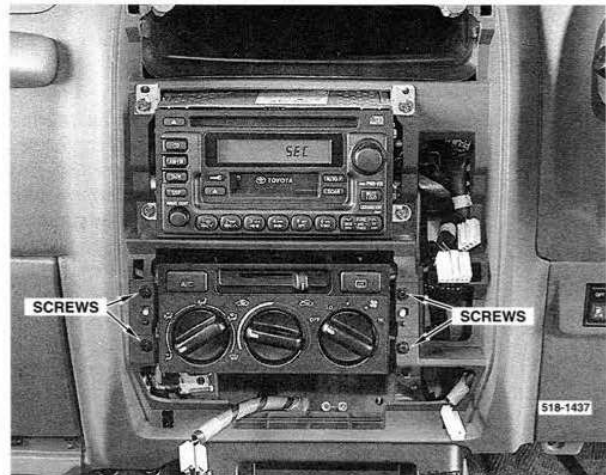
Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.

TO REMOVE AND INSTALL REAR AIR CONDITIONING FAN RESISTOR

On early models, the rear air conditioning fan resistor is located on the left side in the lower evaporator case facing the front of the vehicle. On late models, the rear air conditioning fan resistor is located on the right side in the pillar duct. To access the resistor, the duct needs to be removed from the vehicle.

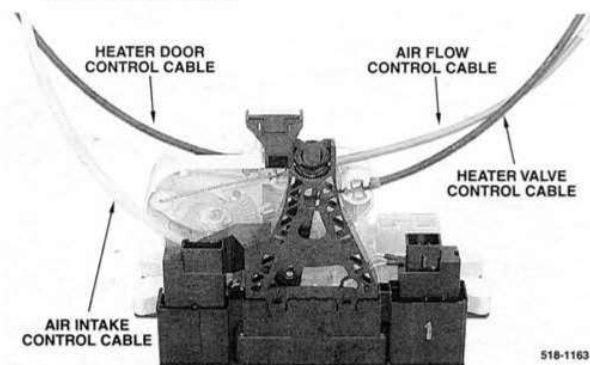
- 1 Remove the right hand side third seat. Refer to Body (chapter 17).
- 2 Remove the covers from each end of the seat hinge. Remove the bolts and remove the hinge from the vehicle.
- 3 Remove the screws and then remove the tailgate scuff plate from the vehicle.
- 4 Prise loose and remove the rear quarter trim panel.
- 5 On early models, disconnect the fan motor resistor wiring connector. Remove the retaining screws and remove the fan motor resistor.
- 6 On late models proceed as follows:
 - a Prise the trim panel from beneath and behind the rear side window.
 - b Remove the scrivet and manoeuvre the duct partially from the evaporator housing
 - c Disconnect the wiring connector and remove the duct from the vehicle.
 - d Remove the retaining screws and withdraw the resistor from the duct.

Installation is a reversal of the removal procedure, ensuring that the wiring connector is securely connected.



Location of the ventilation control assembly retaining screws.

- b Remove the screws retaining the fuel door and bonnet release levers. Push the levers toward the front of the vehicle and manoeuvre the levers from the panel.
- c Gently pull the bottom of the panel back to release the clips from the dashboard. Partly lower the panel and disconnect the fuel select switch and the rheostat. Place the panel clear of the work area.
- 3 Remove the radio surround panel. Refer to Body (chapter 17).
- 4 Working in the engine compartment, disconnect the control cable from the heater valve. Refer to Cooling System (chapter 5).
- 5 Disconnect the air flow control cable from the right hand side of the air intake housing.
- 6 Disconnect the air intake control cable from the air intake housing. Slide the outer cable from the clips retaining it to the crash bar.
- 7 Remove the cover located below the dashboard and adjacent to the left of the centre console.
- 8 Remove the clip from the outer cable and disconnect the inner heater door control cable from the left hand lower side of the heater unit.
- 9 Remove the screws retaining the ventilation controls to the dashboard. Partially withdraw the controls and disconnect the wiring connectors. Remove the panel with the cables from the dashboard.



Control cables viewed from the top of the assembly.

Ventilation Controls

TO REMOVE AND INSTALL

Models Without Climate Control

- 1 Working in the passenger compartment, remove the screw and bolt retaining the glove compartment and withdraw the compartment from the dashboard.
- 2 Remove the lower dash panel as follows:
 - a Remove the screw and bolt retaining the panel to the dashboard.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Ensure that the control cables are correctly routed and not kinked.
- 2 Connect the wiring connectors to the ventilation controls and install the surround panel to the dashboard.
- 3 Connect each inner cable to the appropriate lever on the heater unit, air intake housing and heater valve and then install the outer cable retaining clip. Ensure that the outer cables where necessary are installed to their retaining clips.
- 4 Adjust the control cables as described later in this chapter.
- 5 Install the glove compartment and lower dash panel. Refer to Body (chapter 17), if necessary.

Models With Climate Control

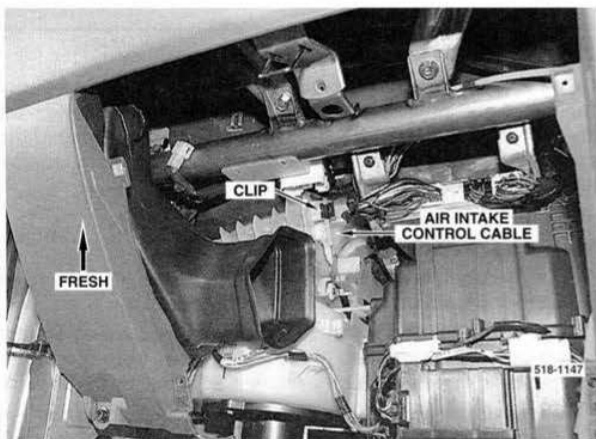
- 1 Remove the radio surround panel. Refer to Body Electrical (chapter 16).
- 2 Remove the screws retaining the ventilation controls to the dashboard. Partially withdraw the controls and disconnect the wiring connectors.

Installation is a reversal of the removal procedure ensuring that the wiring connectors are securely connected.

TO ADJUST CONTROL CABLES

Air Intake Control Cable

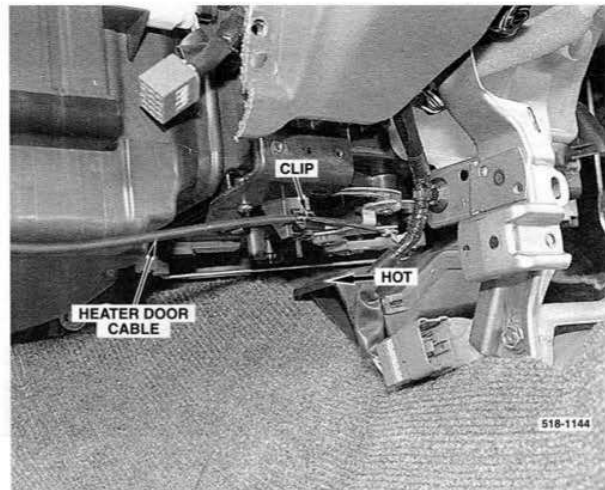
- 1 Working in the passenger compartment, remove the screw and bolt retaining the glove compartment and withdraw the compartment from the dashboard.
- 2 Remove the clip retaining the outer control cable.
- 3 Move the air intake selector to the fresh position.
- 4 Hold the air intake housing lever to the fresh position with the inner control cable end attached to the lever and install the retaining clip to the outer cable.



Location of the air intake control cable.

Heater Door Control Cable

- 1 Remove the retaining bolts and remove the cover located below the dashboard and adjacent to the left of the centre console.
- 2 Remove the clip retaining the outer control cable.
- 3 Move the temperature selector to the hot position.

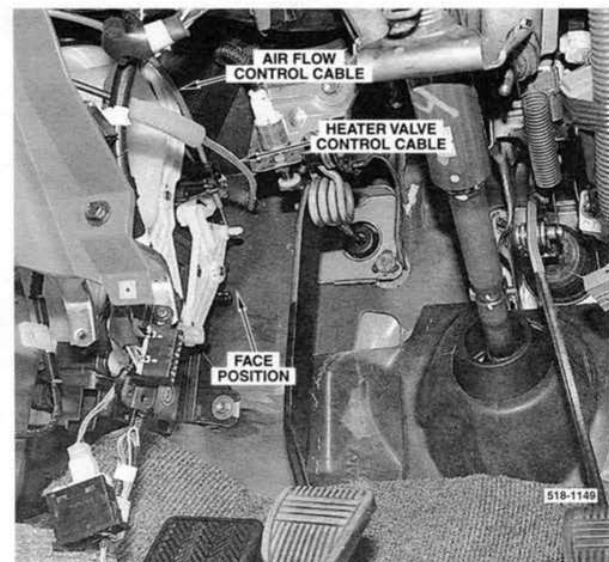


Location of the heater door control cable.

- 4 Hold the heater door lever to the hot position with the inner control cable end attached to the lever and install the retaining clip to the outer cable.

Air Flow Control Cable

- 1 Remove the lower dash panel and air duct. Refer to Body (chapter 17), if necessary.
- 2 Remove the outer control cable from the retaining clip.
- 3 Move the air flow selector to the face level position.
- 4 Hold the air flow control lever to the face level position with the inner control cable end attached to the lever and install the outer cable to the retaining clip.

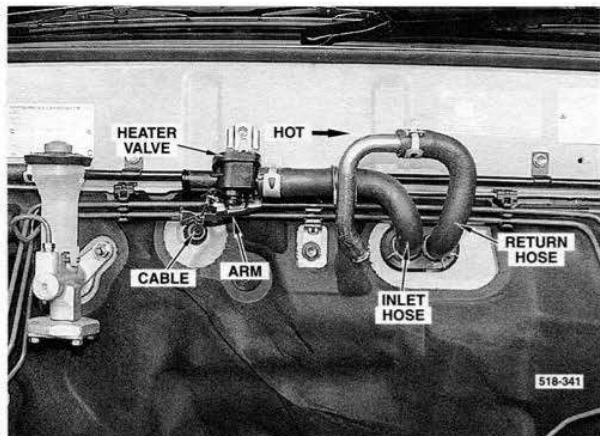


Location of the heater valve and air flow control cables.

Heater Valve Control Cable

- 1 In the engine compartment, remove the retaining clip from the outer control cable.

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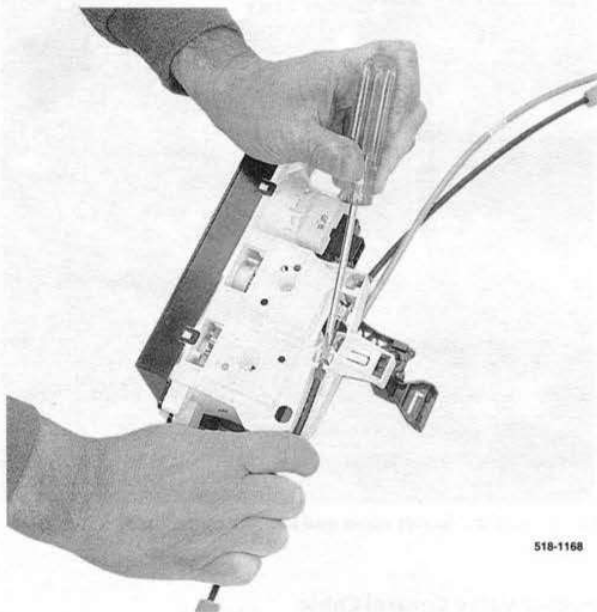
Location of the heater control cable.

- 2 Set the temperature selector to hot and on models with climate control, switch the ignition On.
- 3 Hold the heater valve control lever to the hot position with the inner control cable end attached to the lever and install the retaining clip to the outer cable.

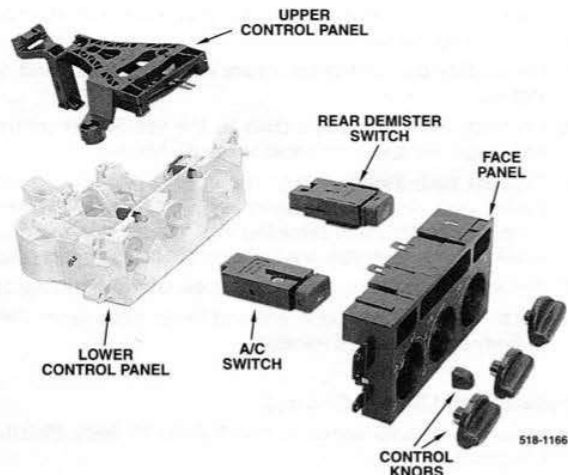
TO DISMANTLE

Models Without Climate Control

- 1 Remove the ventilation control panel as previously described.
- 2 Using a screwdriver spread the locking tabs to release the heater door control cable. Manoeuvre the control cable from the panel.
- 3 Lever the control knobs from the shafts and the lever.
- 4 Using a small screwdriver, release the locking tabs and remove the face panel.



To release the outer cable, spread the locking tabs and withdraw the cable from the assembly.



Ventilation control assembly dismantled.

- 5 Using a small screwdriver to release the locking tabs, split the control panel.
- 6 Remove the remainder of the control cables.
- 7 Release the locking tabs to remove the switches from the rear of the face panel.

Assembly is a reversal of the dismantling procedure with attention to the following points:

- 1 Carefully inspect all components and renew as necessary.
- 2 Install the control cables and then assemble the two halves of the control panel.
- 3 Install the switches to the face panel before installing the facepanel to the control assembly.
- 4 Install the knobs to the rotary switches and the intake control lever.

Heater Unit

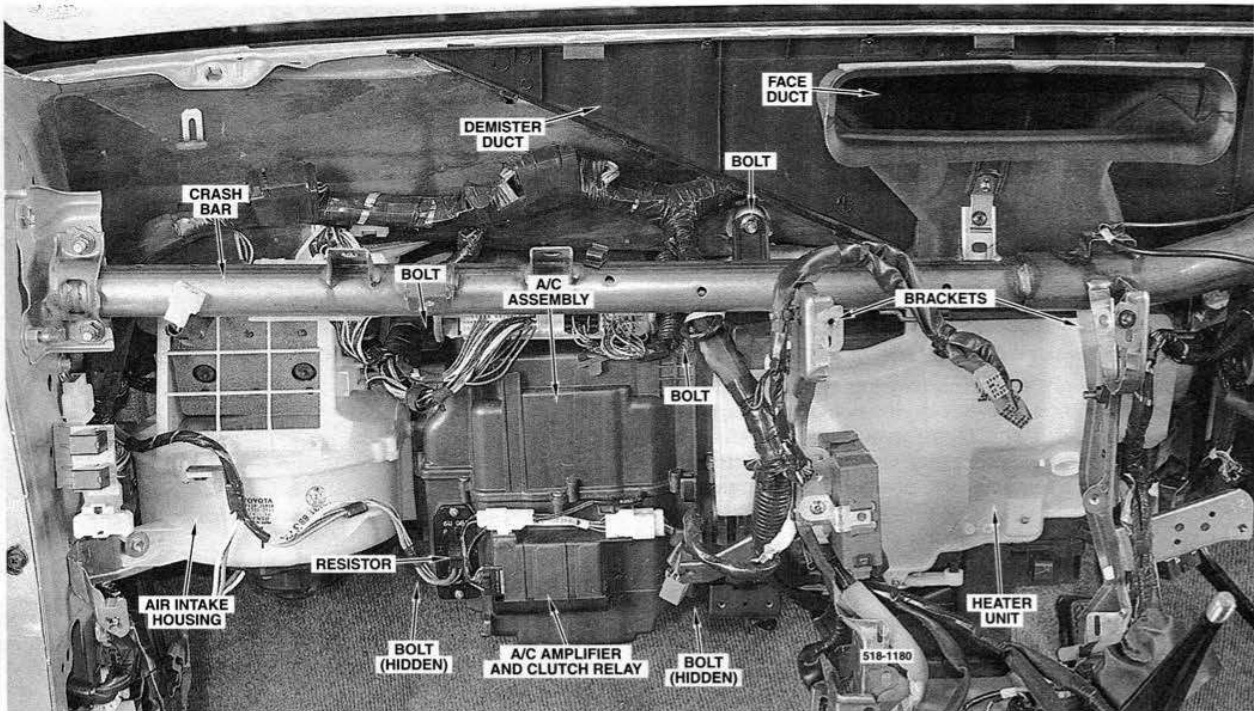
On air conditioned models, removal of the heater unit requires the disconnection of the air conditioner evaporator refrigerant lines. This will necessitate the evacuation and recharging of the system by an authorised dealer or air conditioning specialist. Refer to the Air Conditioning heading.

TO REMOVE AND INSTALL

- 1 On air conditioned models, evacuate the system. Refer to an authorised dealer or air conditioning specialist.
- 2 Drain the cooling system as described in Cooling System (chapter 5). Disconnect the coolant hoses from the heater pipes in the engine compartment adjacent to the firewall.
- 3 Remove the dashboard from the vehicle as described in Body (chapter 17). Remove the ventilation controls as previously described.
- 4 On air conditioned models, working in the engine compartment, disconnect the evaporator refrigerant lines and cover the openings to prevent entry of dirt and moisture. Discard the O rings. Remove the drain tube grommet from the firewall.



Some refrigerant oils are carcinogenic and have to be handled with extreme care.



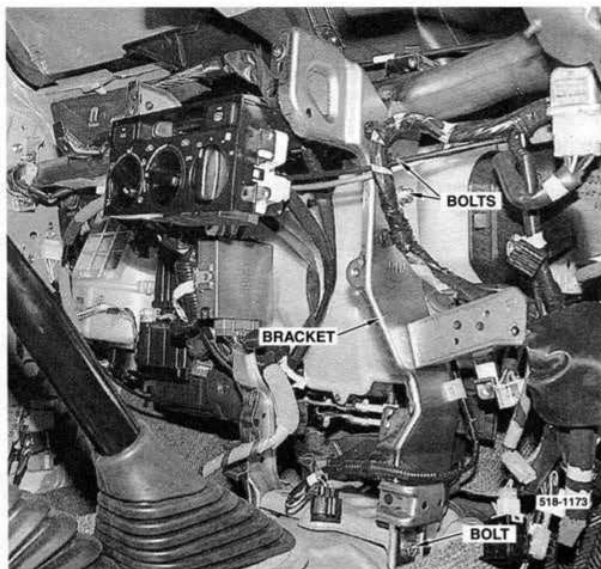
Dashboard removed showing the heater unit and air conditioning assembly.

- 5 Disconnect the wiring from the fan resistor, amplifier and where applicable the evaporator temperature sensor.
- 6 Remove the nuts retaining the air conditioning assembly to the firewall and withdraw the assembly.
- 7 Remove the nuts and bolts retaining the heater unit to the firewall.
- 8 Remove the face and demister air ducts from the heater unit.
- 9 Remove the bolts retaining the brackets between the floor and the crash bar and position the brackets clear of the work area.
- 10 Remove the crash bar retaining nuts and lift the crash bar so the heater unit can pass under the crash bar
- 11 Remove the nuts and bolts retaining the heater unit to the firewall.
- 12 Manoeuvre the heater unit back and remove the unit from the vehicle. Use care not to spill coolant on the interior of the vehicle.
- 13 If necessary, remove the screws and plates and withdraw the heater core from the top of the assembly.

Installation is a reversal of the removal procedure with attention to the following points:

- 1 Install the heater core to the heater unit and tighten the screws securely.
- 2 Install the heater unit to the firewall and tighten retaining nuts and bolts securely.
- 3 Install the air conditioning assembly ensuring that the seal between it and the heater unit is in good condition. If necessary apply a thin bead of sealant such as Permatex clear RTV. Ensure that the wiring is securely connected.
- 4 Install the dashboard as described in Body (chapter 17).
- 5 Fill the cooling system as described in Cooling System (chapter 5).

- 6 Ensure that all wiring connectors are securely connected.
- 7 On models without climate control, check and adjust the control cables as described previously in this chapter.
- 8 On models with climate control, check and adjust the heater valve control cable as described previously in this chapter.
- 9 Run the engine to operating temperature and check the operation of the heater unit. Check for coolant leaks at the heater hose connections and rectify if necessary.



It is not necessary to disconnect the wiring from the brackets to place the brackets clear of the work area after the retaining bolts are removed.

Air Conditioning

 Some refrigerant oils are carcinogenic and have to be handled with extreme care.

DESCRIPTION

The air conditioning system removes heat and moisture from the air within the vehicle.

The system may be operated alone during warm weather or with the heater during colder weather. When used in conjunction with the heater, the system will provide warm, dry air which will rapidly demist the interior of the vehicle.

Basic components of the air conditioning system consist of a compressor, condenser, receiver/dryer, evaporator, expansion valve, pressure switch and pipes/hoses carrying refrigerant through the system. Various other sensors and controls are utilised to monitor temperature, pressures and engine idle speed.

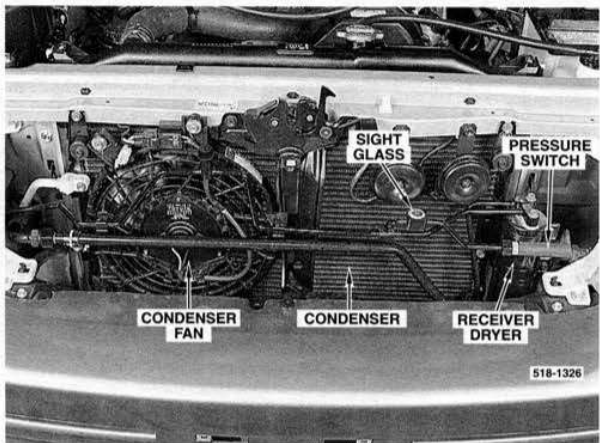
Dual air conditioning models have a second cooling unit installed in the right hand rear of the vehicle. It can be operated independent as well as simultaneously with the front unit. Shared components on the dual air conditioning system are the compressor, condenser and receiver dryer.

The refrigerant will boil at a very low temperature, therefore it must be contained under pressure. Escaping refrigerant can cause frostbite and eye damage, and will produce a poisonous gas when burnt. If the system suffers a rapid loss of refrigerant, oil from the compressor will be lost with the refrigerant. Any work requiring disconnection of the refrigerant lines must be referred to an authorised dealer or an air conditioning specialist.

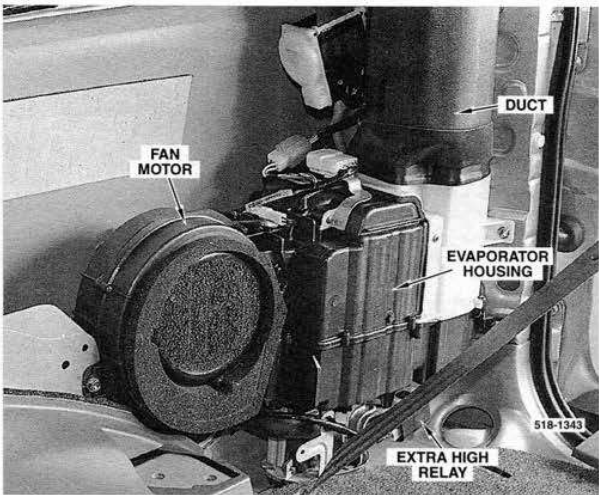
In the event of major repairs to the vehicle, such as engine removal, the compressor hoses are usually of sufficient length to allow the compressor to be removed from the engine and secured to one side of the engine compartment without disturbing any refrigerant line connections.

If the operation of the air conditioning system is in doubt, it is recommended that the vehicle be taken to an authorised dealer or air conditioning specialist.

The air conditioning system requires little maintenance and is covered under the Routine Maintenance heading at the beginning of this chapter. It is considered normal for the system to require occasional regassing.



The sight glass is located in the top of the receiver dryer.



Right rear quarter trim panel removed, showing the rear air conditioning unit.

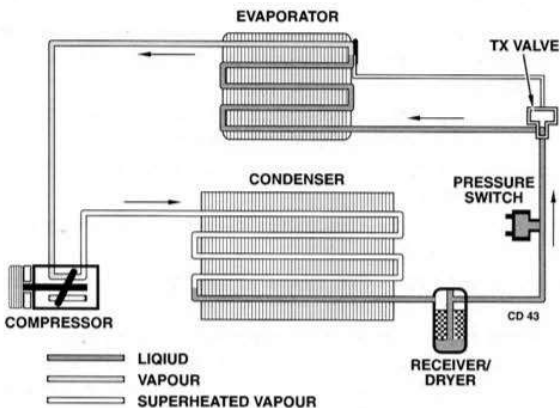
TO CHECK REFRIGERANT

The R134a refrigerant gas used in this vehicle makes checking the sight glass only a guide at best. Accurate refrigerant level checks need to be performed using proper air conditioning pressure gauges.

- 1 With the bonnet open, start the engine and operate the air conditioning. The compressor pulley clutch should be heard to engage and disengage as the air conditioning is turned on and off (cycling).
- 2 With the air conditioning on and the engine idling, the inlet line at the compressor should feel cool to slightly warm while the outlet should feel warm to slightly hot.

 To avoid burns carry out this procedure with the engine cold and use extreme caution when working near rotating pulleys, belts, fans etc.

- 3 A system that is low on gas will have less temperature difference between the inlet and outlet lines.
- 4 No temperature difference indicates a more serious problem and should be referred to an air conditioning specialist.



Basic components of the air conditioning system. Various other sensors are utilized to monitor temperature, pressure and engine speed.