

Climate Control (12.00)

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Climate Control (12.00)

Body Ventilation (12.01)

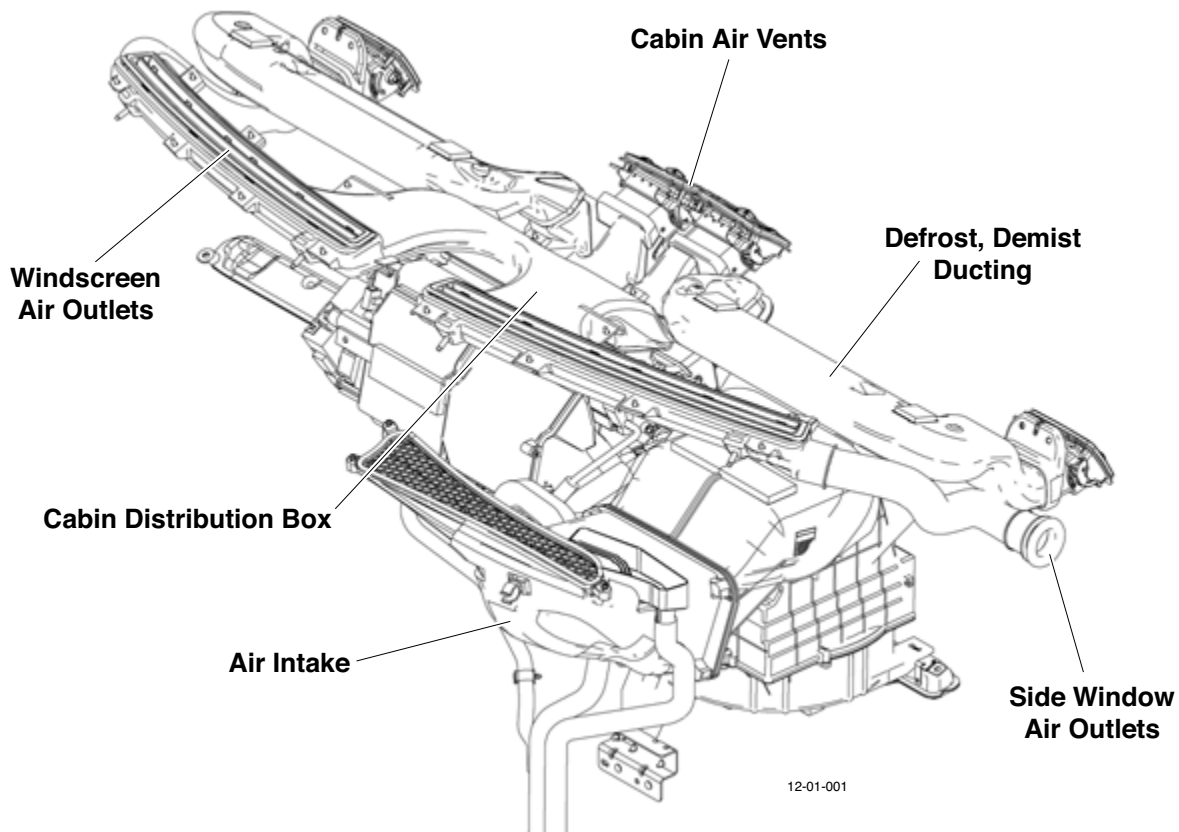
Air Intake & Distribution System

Outside air enters the plenum via inlets at the base of the windscreen.

Fresh mode - Air is drawn in through the plenum and into the blower unit. From the blower unit air enters the A/C unit where it is cooled and dehumidified as it passes through the evaporator. It is then 'reheated' to the selected temperature as it passes through the heater matrix,.

Air flows from the cabin into the boot via air vent grilles and through apertures in the rear parcel shelf. The air is exhausted from the vehicle through extraction vent assemblies (incorporating one way flaps) in the lower part of the rear bumpers, concealed by the bumper trim.

Recirculation mode - The air in the passenger compartment is drawn into the A/C system via the recirculation air inlets on the blower unit.



The A/C unit is linked and sealed to the defrost / demisting and cabin air ducting assemblies. The A/C unit incorporates two actuator operated flaps which regulate airflow to the selected air flow mode and temperature blend.

The centre vent duct incorporates a baffle plate which balances the volume of airflow of the centre and end of dash vents.

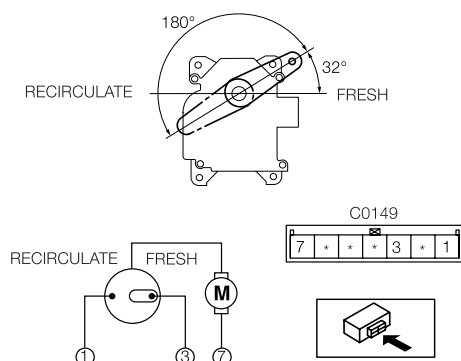
Air Intake Actuator

Inspection

1. Connect the battery positive voltage to Intake Actuator terminal 1 (or 3), and ground to terminal 3 (or 1).
2. Verify that the Air Intake Actuator operates as shown.

If the operation condition is not normal, replace the Air Intake Actuator.

Terminal (C0149)		Air Intake Actuator Operation
1	3	
Ground	B+	Fresh > Recirculate
B+	Ground	Recirculate > Fresh



Air Mix Actuator

Inspection

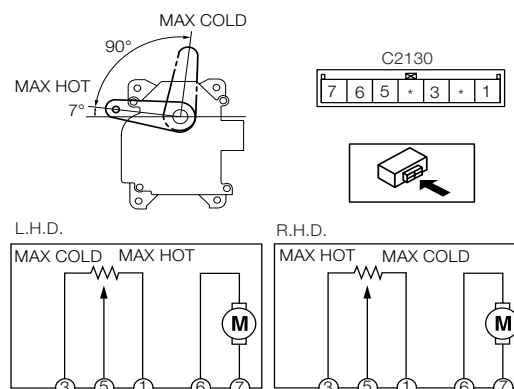
1. Connect the battery positive voltage to Air Mix Actuator terminal 6 (or 7), and ground to terminal 7 (or 6). Verify that the Air Mix Actuator operates as shown.

If the operation condition is not normal, replace the Air Mix Actuator.

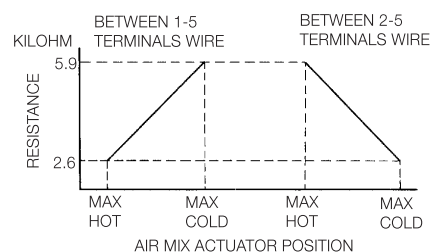
Terminal (C2130)		Air Intake Actuator Operation
1	3	
B+	Ground	Cold - Hot (LHD) Hot - Cold (RHD)
Ground	B+	Hot - Cold (LHD) Cold - Hot (RHD)

2. Check that the resistance between terminals 3 and 5, and 1 and 5 matches the Air Mix Actuator operation as shown in the graph below.

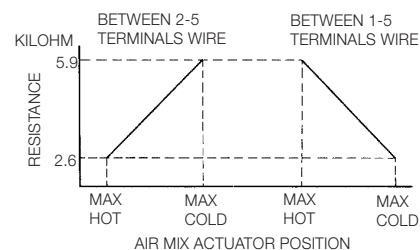
If the operation condition and resistance are not normal, replace the Air Mix Actuator.



LHD



RHD





Airflow Mode Actuator

Inspection

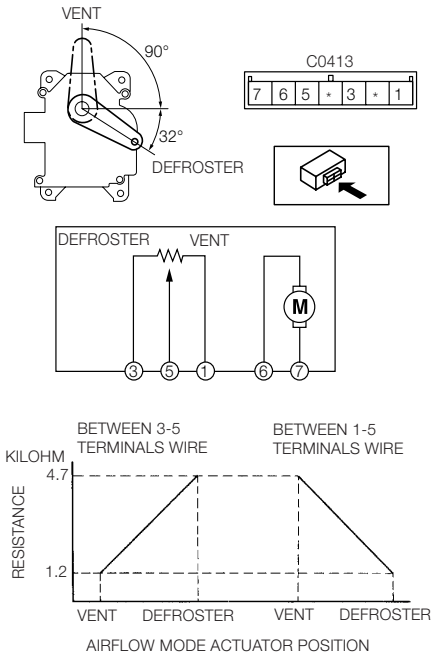
1. Connect the battery positive voltage to the Airflow Mode Actuator terminal 6 (or 7), and ground to terminal 7 (or 6). Verify that the Airflow Mode Actuator operates as shown.

If the operation condition is not normal, replace the Airflow Mode Actuator.

Terminal		Airflow Mode Actuator operation
6	7	
B+	Ground	Defroster - Vent
Ground	B+	Vent - Defroster

2. Verify that the resistance between terminals 1 and 5, and 3 and 5 matches the Airflow Mode Actuator operation as shown in the graph below.

If the operation condition and resistance are not normal, replace the Airflow Mode Actuator.



Maintenance

RH/LH Centre Facia Ventilator Outlet-Renew

Repair Operation Time (ROT)		
Item		Code
Centre Facia Ventilator Outlet-Renew	RH	12.01.CE
Centre Facia Ventilator Outlet-Renew	LH	12.01.CD

Removal

1. Remove instrument panel bezel assembly (see Workshop Manual procedure 01.12.AV Bezel Assembly - Instrument Panel - Renew).
2. Remove screws (x3) securing LH centre vent outlet to IP, release vent from aperture.

Installation

1. Install LH centre vent outlet in IP aperture and secure with screws (x3).
2. Install instrument panel bezel assembly (see Workshop Manual procedure 01.12.AV Bezel Assembly - Instrument Panel - Renew).

LH Facia Ventilator Outlet-Renew

Repair Operation Time (ROT)		
Item		Code
Facia Ventilator Outlet-Renew	LH	12.01.CF

Removal

1. Release/remove instrument cluster hood panel (6 clips).
2. Release/remove driver's upper outer panel assembly (4 clips).
3. Remove screws (x3) securing LH vent outlet to IP, release vent from aperture.

Installation

1. Install LH vent outlet in IP aperture and secure with screws (x3).
2. Install driver's upper outer panel assembly and secure in clips (x4).
3. Install instrument cluster hood and secure in clips (x6).

RH Facia Ventilator Outlet-Renew

Repair Operation Time (ROT)		
Item		Code
Facia Ventilator Outlet-Renew	RH	12.01.CG

Removal

1. Remove airbag panel and door assembly (see Workshop Manual procedure 01.12.AJ Panel & Door Assembly - Air Bag - Renew).
2. Remove passenger's upper outer panel assembly (2 clips & 2 screws)
3. Remove vent unit (3 screws), push out of aperture

Installation

1. Install vent outlet, push into aperture and secure with screws (x3)
2. Install passenger's upper outer panel assembly
3. Install airbag panel and door assembly (see Workshop Manual procedure 01.12.AV Bezel Assembly - Instrument Panel - Renew).



Climate Control (12.00)

Heater System (12.02)

Maintenance

RHD/LHD Heater Unit (Including ECU)-Renew

Repair Operation Time (ROT)		
Item		Code
Heater Unit (Including ECU)-Renew	RHD	12.03.AF
Heater Unit (Including ECU)-Renew	LHD	12.03.AD

Removal

1. Remove IP unit from vehicle (see Workshop Manual procedure 01.12.AB Facia Assembly LHD Remove for Access & Refit).
2. Disconnect multiplugs (x6) from heater unit.
3. Remove nuts (x2) and bolt (x1) securing heater unit to IP unit.
4. Disconnect tube from 'In car' temperature sensor unit and remove heater unit from IP.

Installation

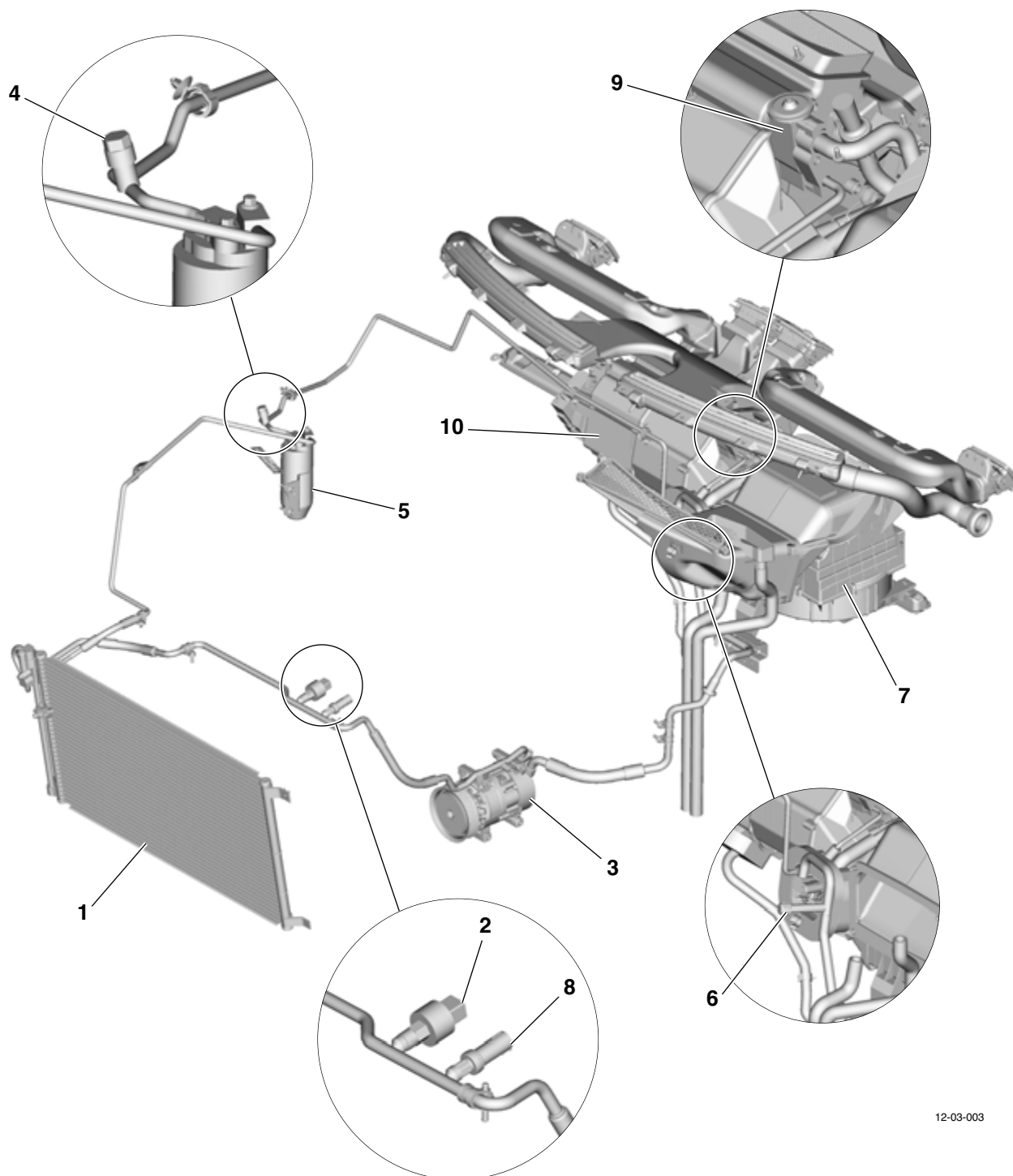
1. Connect tube to 'In car' temperature sensor, install heater unit in position on IP.
2. Position heater unit in IP. Install and torque tighten bolt and nuts (x2).
3. Connect multiplugs (x6) to heater unit.
4. Install IP unit in vehicle (see Workshop Manual procedure 01.12.AB Facia Assembly LHD Remove for Access & Refit).



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Air Conditioning (A/C) System (12.03)



12-03-003

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Item

- | | |
|--------------------------|-------------------------|
| 1. Condenser | 6. Low-side charge. |
| 2. Trinary switch | 7. Blower Unit. |
| 3. Compressor assembly | 8. Switch, A/C Cut-Off. |
| 4. High-side charge port | 9. Expansion valve. |
| 5. Receiver drier. | 10. A/C Unit. |

Major Components

Compressor

- Engine mounted, driven by the accessory drive belt
- Variable displacement type
- High-pressure relief valve, to avoid system over-pressure
- ECU controlled clutch energised via a relay

Receiver drier

- Vertically mounted on the right-hand side of the engine bay
- The high-side charge port is installed to the high side entry pipe to the receiver drier

Condenser

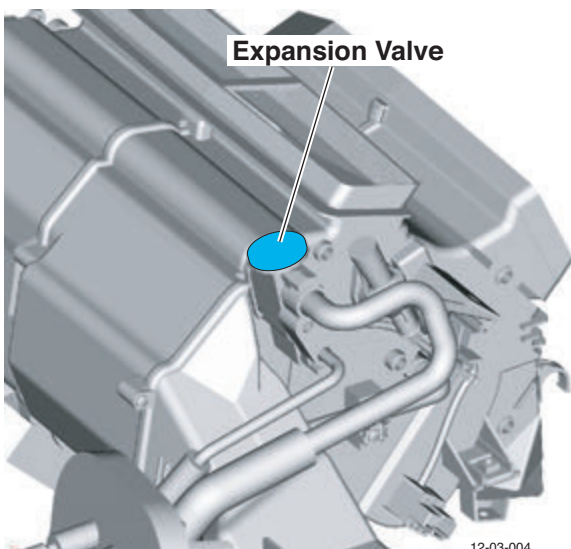
- Multi-pass fin-over-tube type, mounted in front of the engine cooling pack and directly to the radiator

Trinary switch

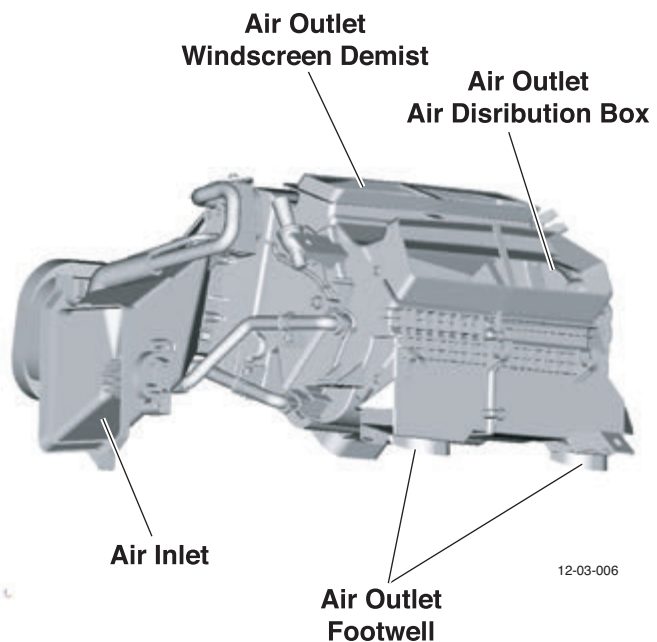
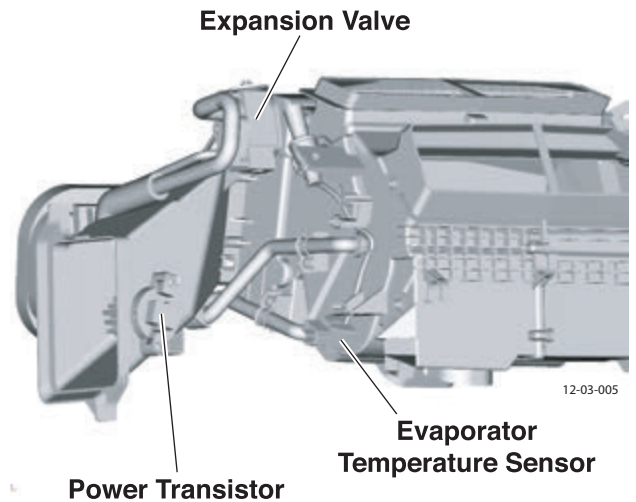
Located in the compressor discharge pipe

- Provides a signal, via the A/C module, to the PCM, to disengage the compressor clutch should the refrigerant pressure be less than 2 bar or greater than 30 bar
- Provides a hard-wired signal to the PCM, to switch the cooling fans to HIGH speed at 22 bar rising pressure and to LOW speed at 17,5 bar falling pressure
- Provides a hard-wired signal to the PCM, to switch the radiator cooling fans to LOW speed at 12 bar rising pressure and to switch the fans OFF at 8 bar falling pressure

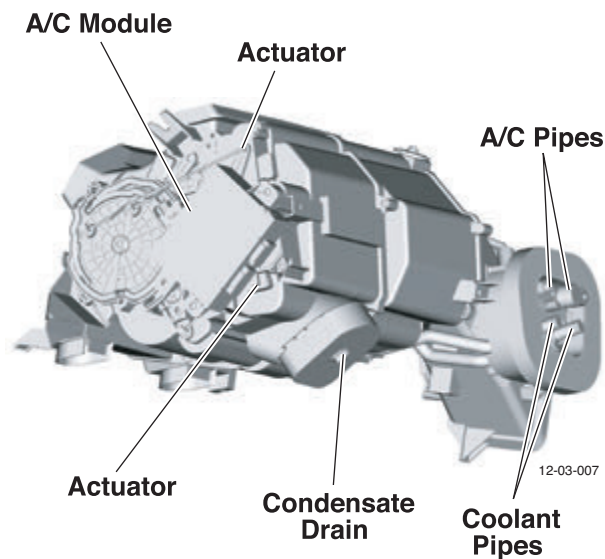
Expansion Valve



A/C Unit



The expansion valve is located on the outside of the A/C unit and comprises of a diaphragm, connected by a capillary tube to a temperature sensing bulb, which regulates the valve according to temperature variations at the evaporator outlet pipe. This component is **not** serviceable.



The A/C unit houses the evaporator, heater matrix and air flow flaps.

The unit also incorporates two servo motor operated air distribution flaps.

1. Regulates airflow to the cabin vents.
2. Regulates airflow to the defrost / demist air ducting.

When the cabin air flap is open, air is ducted to the cabin via face and foot level air vents.

Condensate (water) which forms on the evaporator fins is drained out of the unit case through a drain hose, located at underneath / rear of the evaporator.

Refrigerant System Handling Refrigerant

If accidental A/C system discharge occurs, ventilate work area before resuming service.

Warning

Do not allow refrigerant to leak near a fire or any kind of heat. A poisonous gas may be generated if refrigerant gas contacts fire or heat such as from cigarettes and heaters. When carrying out any operation that can cause refrigerant leakage, extinguish or remove the above mentioned heat sources and maintain adequate ventilation.

Warning

Handling liquid refrigerant is dangerous. A drop of refrigerant on the skin can result in localized frostbite. When handling refrigerant, wear gloves and safety goggles. If refrigerant splashes into the eyes, immediately wash them with clean water and consult a doctor.

Storing Refrigerant

Warning

The refrigerant container is highly pressurized. If it is subjected to high heat, it could explode, scattering metal fragments and liquid refrigerant that can seriously injure personnel. Store refrigerant at temperatures below 40 °C (104 °F).

Handling Insufficient Refrigerant Level

Caution

If an insufficient refrigerant level is detected while troubleshooting, do not charge (add) the refrigerant. Because an accurate amount of refrigerant cannot be determined from the pressure indicated on the recovery / recycling / recharging unit, never charge the refrigerant.

Caution

If there is too much or too little refrigerant from the refilling, there may be secondary problems such as damage to the refrigerant cycle parts, or a decrease of cooling performance. Therefore, if it is determined that the refrigerant level is insufficient, completely remove refrigerant from the refrigerant cycle and refill with refrigerant to the specified amount.

Handling Compressor Oil

Caution

Use only ND8 compressor oil for this vehicle. Using a PAG oil other than DENSO OIL8 compressor oil will damage the A/C compressor.

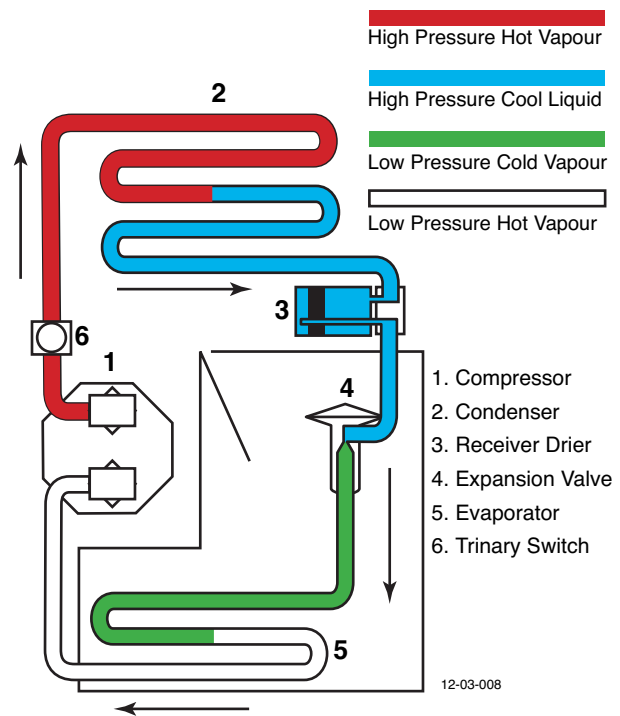
Caution

Do not spill the ND8 compressor oil on the vehicle. A drop of compressor oil on the vehicle surface can damage the paint work. If oil gets on the vehicle, wipe it off immediately.

Caution

ND8 compressor oil has a high moisture absorption efficiency. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Ensure caps are installed immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.

Refrigeration Cycle



Operation

1. The Compressor (1) draws low pressure, low temperature, refrigerant vapour from the evaporator (5) and compresses it, raising the refrigerant pressure and temperature.
2. This high pressure, hot, refrigerant vapour enters the condenser (2), where it is cooled by the flow of ambient air and changes state into a cooler, high pressure liquid.
3. From the condenser, the liquid passes into the receiver drier (3) which has three functions:
 - Removes moisture from the refrigerant using a desiccant
 - Filters the refrigerant to remove system contaminants
 - Stores the refrigerant to cope with varying system refrigerant demands
4. The filtered liquid refrigerant, still at high pressure, then enters the expansion valve (4). Here it passes through a controlled orifice and emerges as an atomised liquid spray. This has the effect of reducing the refrigerant pressure and temperature. The cold refrigerant spray now flows into the evaporator (5).
5. As refrigerant passes through the evaporator core, it cools the incoming airflow. Heat is absorbed by the refrigerant, during this process and it once again changes state, from an atomised cool liquid into a vapour. The refrigerant vapour then returns to the compressor for the cycle to be repeated.

An automatic safety valve is incorporated in the compressor, which will open if the system pressure rises above 41 bar. The valve will reseal when the pressure drops below 27,6 bar. When the safety valve is open, the compressor will 'free

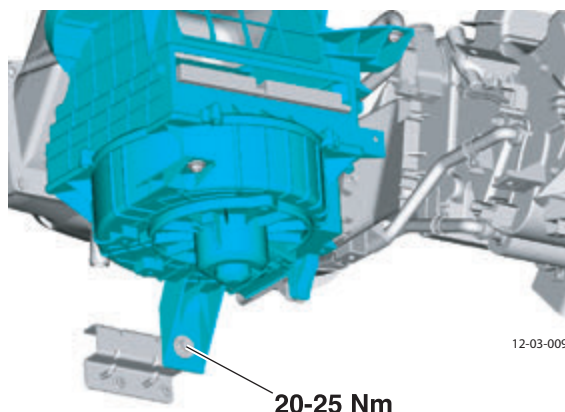
wheel' and the excess pressure will be dissipated through the expansion valve. When the pressure drops below 27.6 bar, the safety valve will close again and the compressor will be operative.

The terms 'high' and 'low' pressure (or side) refer to the pressure differential between the compressor and expansion valve ports. This differential is critical to system fault diagnosis and efficiency checks.

The high side starts at the compressor and includes the trinary switch, condenser, receiver drier and expansion valve.

The low side starts at the expansion valve outlet and includes the evaporator and all connections back to the compressor.

The trinary switch (6) monitors system pressure between the compressor and condenser. If the pressure rises above 30 bar or falls below 2 bar the compressor clutch is de-energised to prevent damage to system components.



Specifications

Refrigerant and Lubricant

Refrigerant R-134a

Compressor Lubricant ND8

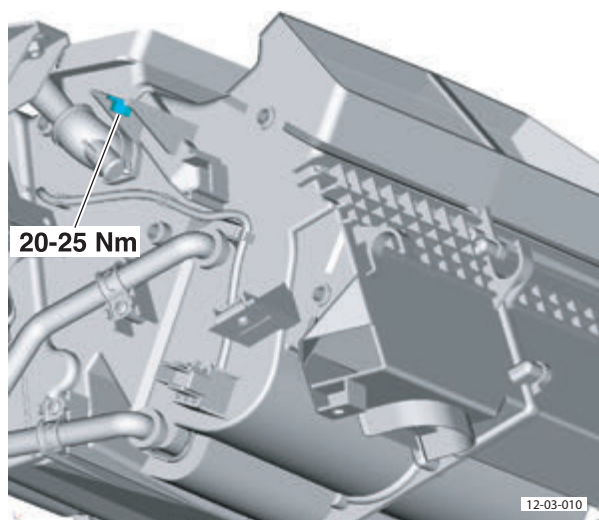
Capacities

Refrigerant charge Weight 750g (26.5oz.)

Compressor Lubricant Sealed volume (approx. quantity) 150 cc (pre-charged)

Torque Figures

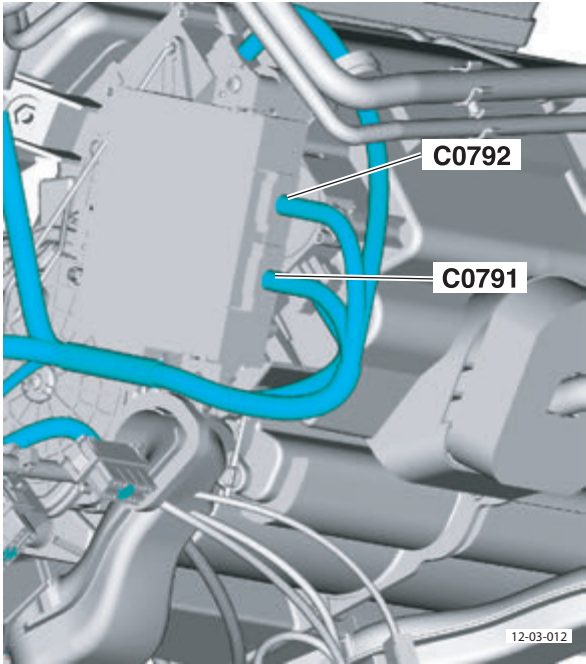
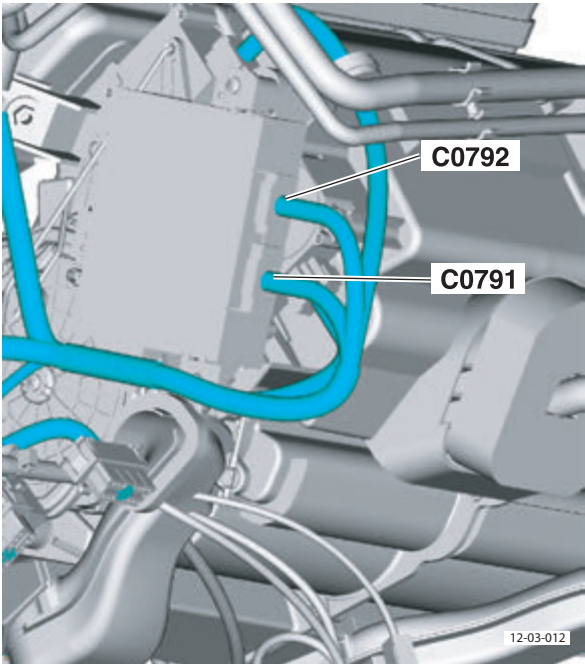
Torque Figures		
Description	Nm.	
AC unit Mounting	20-25	15-18.5
Compressor Mounting	23-27	17-20
Trinary switch		
A/C pipes to condenser	8-10	6-7.5





Diagnostics

Electrical Connectors



A/C Module (C0792)	
Pin	Specification
1	V Battery (from CCM)
2	V Ignition (from comfort relay) Recirculation acutuator
3	Blank
4	Air flow mode actuator (input)
5	Solar sensor (input)
6	Ambient Temperature sensor
7	Engine coolant temperature (input)
8	Ref. voltage - Solar sensor (output) Ref. voltage - Temperature actuator (output) Ref. voltage - Air flow mode actuator (output)
9	Blank
10	Blank
11	Blank
12	Temperature actuator (input)
13	Evaporation sensor (input)
14	In-vehicle temperature sensor (input)
15	Ground
16	Sensor ground (In-vehicle, Evaporator, Air flow mode actuator, Temperature mode actuator)

A/C Module (C0791)	
Pin	Specification
1	Air flow mode actuator (output)
2	Temperature actuator (output)
3	Blank
4	Blank
5	Blank
6	A/C On (A/C pressure sensor)
7	Blank
8	Recirculation actuator (output)
9	Blank
10	Blank
11	Temperature level (RHD)
12	Blower speed regulator (Output)
13	Air flow mode actuator (output)
14	Temperature actuator (output)
15	Blank
16	Output
17	HAVAC ECU (input)
18	Blank
19	Blower relay (engine bay fusebox)
20	Recirculation actuator (output)
21	Blank
22	blank
23	Temperature level (LHD)
24	Blower speed regulator input)

DTC Inspection

Using WDS

1. Connect the WDS to the **body** diagnostic socket (Refer to 'Appendix & Glossary', page 20-1-2).
2. Select 'Air-Con' from the menu.
3. Read the fault codes from the WDS screen.

Single Fault Codes

Code	Description	Possible Cause
02	Solar radiation sensor system inspection Present fault.	1. Solar radiation sensor fault. 2. Open or short circuit in the wiring harness between the A/C module and the solar radiation sensor.
Code	Description	Possible Cause
06	Cabin temperature sensor system inspection.	1. Cabin temperature sensor fault 2. Open or short circuit in wiring harness between A/C module and cabin temperature sensor
Code	Description	Possible Cause
07	Cabin temperature sensor system inspection.	1. Cabin temperature sensor fault 2. Open or short circuit in wiring harness between A/C module and cabin temperature sensor
Code	Description	Possible Cause
10	Evaporator temperature sensor system inspection	1. Evaporator temperature sensor fault 2. Open or short circuit in the wiring harness between the A/C module and the evaporator temperature sensor
Code	Description	Possible Cause
12	Ambient temperature sensor system inspection	1. Ambient temperature sensor fault 2. Open or short circuit in the wiring harness between the A/C module and the ambient temperature sensor
Code	Description	Possible Cause
14	ECT sensor system inspection	1. ECT fault 2. A/C module fault 3. PCM fault 4. Open or short circuit in the wiring harnesses between the A/C module, the ECT sensor, and the PCM
Code	Description	Possible Cause
18	Air mix actuator (potentiometer) system inspection	1. Air mix actuator fault 2. Open circuit in the wiring harness between the A/C module and the air mix actuator 3. Short circuit in the wiring harness between the A/C module (C0792-12) and the air mix actuator (terminal 5)
Code	Description	Possible Cause
21	Airflow mode actuator (potentiometer) system inspection	1. Airflow mode actuator fault 2. Open circuit in wiring harness between A/C module and airflow mode actuator 3. Short circuit in wiring harness between A/C module (C0792-4) and airflow mode actuator (terminal 5)
Code	Description	Possible Cause
11	Evaporator temperature sensor system inspection.	1. Evaporator temperature sensor fault 2. Open or short circuit in wiring harness between A/C module and evaporator temperature sensor



Code	Description	Possible Cause
13	Ambient temperature sensor system inspection.	1. Ambient temperature sensor fault 2. Open or short circuit in the wiring harness between the A/C module and the ambient temperature sensor
Code	Description	Possible Cause
15	ECT sensor system inspection. Past fault.	1. ECT fault 2. Open or short circuit in the wiring harness between the A/C module and the ECT sensor
Code	Description	Possible Cause
19	Air mix actuator (potentiometer) system inspection. Past fault.	1. Air mix actuator fault 2. Open circuit in the wiring harness between the A/C module and the air mix actuator 3. Short circuit in the wiring harness between the A/C module (C0792-12) and air mix actuator (C2130-5)
Code	Description	Possible Cause
22	Airflow mode actuator (potentiometer) system inspection. Past fault.	1. Airflow mode actuator fault 2. Open circuit in wiring harness between A/C module and airflow mode actuator 3. Short circuit in the wiring harness between the A/C module (C0792-4) and the air mix actuator (C2130-5)
Code	Description	Possible Cause
58	Air mix actuator (motor lock) system inspection Past fault.	1. Air mix actuator fault 2. A/C unit (air mix link and air mix crank) fault 3. Open or short circuit in the wiring harness between the A/C module and the air mix actuator
Code	Description	Possible Cause
59	Airflow mode actuator (motor lock) system inspection. Past fault.	1. Airflow mode actuator fault 2. A/C unit (airflow mode link and airflow mode crank) fault 3. Open or short circuit in the wiring harness between the A/C module and the airflow mode actuator

Multiple Fault Codes

Code	Description	Possible Cause
06 / 10 / 12 / 18 / 21	A/C module (+5 V power supply or sensor ground) system inspection.	1. Open circuit in wiring harnesses between A/C module and each temperature sensor, air mix actuator, or airflow mode actuator
Code	Description	Possible Cause
02 / 18 / 21	A/C module (5 V power supply) system inspection.	1. Open or short circuit in the wiring harnesses between the A/C module and solar radiation sensor, air mix actuator, or airflow mode actuator
Code	Description	Possible Cause
07 / 11 / 13 / 19 / 22	A/C module (5 V power supply or sensor ground) system inspection.	1. Open circuit in the wiring harnesses between the A/C module and each temperature sensor, air mix actuator, or airflow mode actuator
Code	Description	Possible Cause
19 / 22	A/C module (5 V power supply) system inspection.	• Open or short circuit in wiring harnesses between the A/C module and the solar radiation sensor, air mix actuator, or airflow mode actuator

Maintenance

Assessment of the A/C system operating efficiency and fault classification may be achieved by using the facilities on a Recovery / Recycling / Recharging unit.

Follow the manufacturer's instructions implicitly and observe all safety considerations.

Connections

Only use hoses with connectors which are dedicated to HFC 134a charge ports.

Warning

Under no circumstances should connections be made with the A/C system in operation or valves open. Should valves be open and a vacuum pump or refrigerant container attached, an explosion could occur as a result of high pressure refrigerant being forced back into the vacuum pump or container.

Recovery

Caution

Do not attempt to adapt this unit for R-12 as an A/C system failure will result. Recovery / Recycle / Recharging equipment has special connections to avoid cross contamination with R-12 systems.

The A/C unit's overfill limitation mechanism has been calibrated specifically for use with the 50 lb. (23 Kg) refillable refrigerant tank.

Run the A/C system for a few minutes before starting the recovery procedure as this will enable more refrigerant to be recovered. Turn the A/C system off before starting the procedure.

Ensure the A/C system has pressure in it before beginning the recovery process; if there is no system pressure there is no refrigerant to recover.

Ensure that the oil drain valve is closed.

Read manufacture's instructions and warnings before completing any recovery / evacuating and charging operations.

Caution

The Recovery / Recycling / Recharging unit relies on a weighing mechanism to weight the quantity of oil removed. Ensure that the Recovery / Recycle / Recharging unit is not disturbed during the recovery procedure.

1. Connect an R-134a Recovery / Recycling / Recharging unit to the vehicle A/C system.
2. Follow the Recovery / Recycling / Recharging unit manufacturer's instructions to evacuate the A/C system.

Compressor oil may be drawn out during this process, take note of the quantity recovered so that it may be replaced.

Evacuation

The removal of unwanted air and moisture, is critical to the correct operation of the A/C system. Moisture in the system can be highly destructive and may cause internal blockages due to freezing; water suspended in the lubricating oil will damage the compressor. Once the A/C system has been dismantled, or the refrigerant charge recovered, all traces of moisture must be removed before charging.

It is recommended that initially only the high-side valve be opened at the start of the procedure. After a short time a small depression should be seen on the low-side, at which point the low-side valve may be opened and the evacuation process completed. If a vacuum is not registered on the low-side, it may indicate that the expansion valve is permanently closed or that the system is blocked. This simple check may save time and effort when the system is recharged.

Read manufacture's instructions and warnings before completing any Recovery / Recycling / Recharging operation.

1. Connect an R-134a Recovery / Recycling / Recharging unit to the vehicle A/C system.
2. Follow the Recovery / Recycling / Recharging unit manufacturer's instructions to evacuate the A/C system.

Charging

Caution

Do not exceed the specification when charging the A/C system with refrigerant. Doing so will decrease the efficiency of the A/C unit or damage the refrigeration cycle parts.

Caution

Always start the charging of refrigerant from the high-pressure side. If charging starts from the low-pressure side, vanes of the A/C compressor will not be released and abnormal noise may result.

Read manufacture's instructions and warnings before completing any Recovery / Recycling / Recharging operation.

1. Connect an R-134a Recovery / Recycling / Recharging unit to the vehicle A/C system.
2. Follow the Recovery / Recycling / Recharging unit manufacturer's instructions to charge the A/C system.

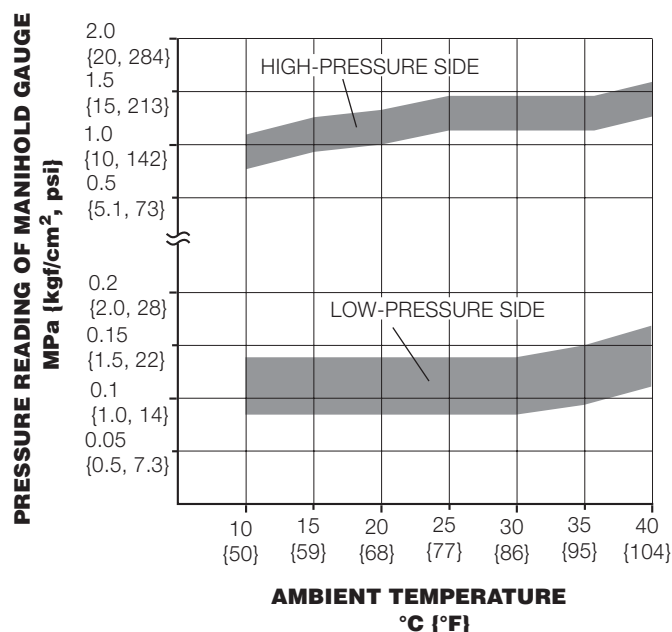


A/C System Testing

It is recommended that a free standing air mover is placed in front of the condenser / cooling system.

Pressure Check

1. Connect the Recovery / Recycling / Recharging unit.
2. Start the engine. Allow to warm up then run at a constant 1,500 rpm.
3. Set the following A/C controls:
 - Air Circulation to 'Recirculate'
 - Temperature to 'Max' Cold
 - Air Flow to 'Vent'
4. Close all the vehicle doors and windows.
5. Measure the ambient temperature and high / low pressure side reading of Recovery / Recycling / Recharging unit gauges.
6. Verify that the intersection of the pressure reading of the Recovery / Recycling / Recharging unit gauges and the ambient temperature is in the shaded zone.



If there is any fault, inspect the refrigerant system according to the troubleshooting chart.

Performance Test

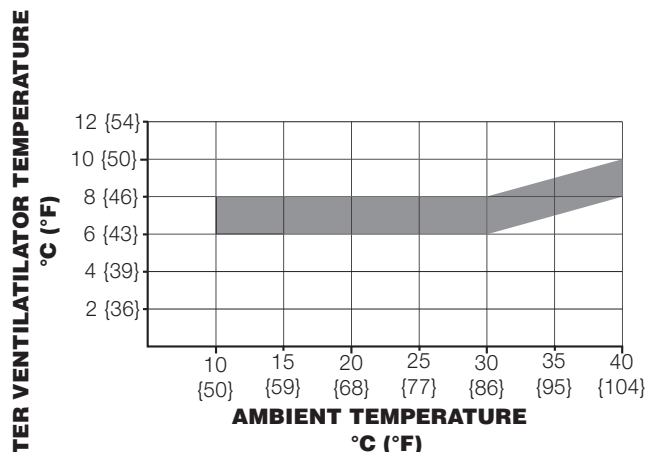
1. Check the refrigerant pressure.
2. Place a dry-bulb thermometer in the driver-side center ventilator outlet.
3. Start the engine. Allow to warm up then run at a constant 1,500 rpm.
4. Set the A/C unit fan speed to 'Max Hi'.
5. Turn the A/C system on.
6. Set the following A/C controls:
 - Air Circulation to 'Recirculate'
 - Temperature to 'Max' Cold
 - Air Flow to 'Vent'

7. Close all the doors and windows.
8. Wait until the A/C output temperature stabilizes.

Stabilized condition.

The A/C compressor repeatedly turns on and off at regular intervals.

9. After the blower air is stabilized, read the dry-bulb thermometer.
10. Verify the ambient temperature.
11. Verify the temperature is in the shaded zone.



If there is any fault, inspect the refrigerant system according to the troubleshooting chart.

Vacuum Check

1. Stop the vacuum pump, note the high and low pressure side readings of the Recovery / Recycling / Recharging unit gauges and wait for 5 min.
2. Check the high and low pressure side readings of the Recovery / Recycling / Recharging unit gauges.
 - 1 If the readings have changed, inspect for leaks and go to Evacuation (Refer to 'Evacuation', page 12-3-9).
 - 2 If the readings have not changed, go to Charging (Refer to 'Charging', page 12-3-9).

Leaks

Faults associated with low refrigerant charge weight and low pressure may be caused by leakage. Leaks traced to mechanical connections may be caused by torque relaxation or joint face contamination. Evidence of oil around such areas is an indicator of leakage.

Leak Detection

Fluorescent Tracer Dye - A fluorescent tracer dye is incorporated into the refrigeration system and can be checked for non-apparent leaks by scanning with a high intensity ultraviolet lamp. The location of leaks can be pinpointed by the bright yellow glow of the tracer dye.

Caution

Observe ALL safety precautions associated with ultraviolet equipment.

Automatic Refrigerant Leak Detector - (various manufacturers) Hand-held, portable, battery operated leak detector. Place in and around A/C system to detect refrigerant leaks.

System Pressure Fault Classification

If erratic or unusual gauge movements occur, check the equipment against known Recovery / Recycling / Recharging unit gauges.

This table should be used in conjunction with the graphical representations of 'High side' pressure / ambient temperature and 'Low side' pressure / evaporator temperature.

Low side gauge reading	High side gauge reading	Fault	Cause
Normal	Normal	Discharge air initially cool then warms up	Moisture in system
Normal to low	Normal	As above	As above
Low	Low	Discharge air slightly cool	Refrigerant charge low
Low	Low	Discharge air warm	Refrigerant charge very low
Low	Low	Discharge air slightly cool or frost build up at expansion valve	Expansion valve stuck closed
Low	Low	Discharge air slightly cool, sweating or frost after point of restriction	Restriction in High side of system
High	Low	Compressor noisy	Defective compressor reed valve
High	High	Discharge air warm and high side pipes hot	Refrigerant charge high or inefficient condenser cooling due to air flow blockage or engine cooling fans not working
High	High	Discharge air warm Sweating or frost at evaporator	Expansion valve stuck open



Maintenance

Condenser-Renew

Repair Operation Time (ROT)	
Item	Code
Condenser-Renew	12.03.BB

Removal

1. Recover refrigerant gas from A/C system (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).
2. Remove front grille (see Workshop Manual procedure 01.08.AA Grille - Radiator - Renew).
3. Remove bolts (x4) that secure PAS fluid cooler to bonnet latch cross member and position fluid cooler aside.
4. Remove bolts (x6) that secure bonnet latch cross member to body and position aside.
5. Remove bolts (x2) that secure condenser pipe connections.
6. Plug pipes and block connections.
7. Remove and discard 'O' rings (x2) from pipe connections.
8. Remove bolts (x2) that secure condenser to radiator and remove condenser.

Installation

1. Install condenser to radiator and install and torque tighten bolts (x2).
2. Clean pipe connections and remove plugs.
3. Install new 'O' rings to pipe connections.
4. Connect pipes to condenser and install and torque tighten bolts (x2).
5. Install bonnet latch cross member and install and torque tighten bolts (x6).
6. Position PAS fluid cooler to cross member and install and torque tighten bolts (x4).
7. Install front grille (see Workshop Manual procedure 01.08.AA Grille - Radiator - Renew).
8. Refrigerant gas re-charge A/C system (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).

Liquid Receiver Drier-Renew

Repair Operation Time (ROT)	
Item	Code
Liquid Receiver Drier-Renew	12.03.DB

Removal

1. Refrigerant gas recovery A/C system (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).

2. Remove bolts (x2) that secure pipes to receiver drier and remove and discard 'O' rings (x2) from pipe connections. Plug pipe connections (see Fig. 1).



Fig. 1

3. Release harness clip from receiver drier mounting bracket.
4. Remove bolts (x2) that secure receiver drier then remove receiver drier (see Fig. 2).



Fig. 2

Installation

1. Install receiver drier and install and torque tighten bolts (x2).
2. Install harness clip in receiver drier bracket.
3. Lubricate and install new 'O' rings on pipe connections.
4. Install pipes in receiver drier and install and torque tighten bolts (x2).
5. Refrigerant gas re-charge A/C system (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).

Lower Evaporator Outlet Tube Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Lower Evaporator Outlet Tube Assembly-Renew	12.03.GC

Removal

1. Recover A/C refrigerant (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).
2. Raise vehicle on ramp.
3. Remove road wheel/s.
4. Remove wheel arch liner (see Workshop Manual procedure 01.02.FB Wheel Arch Liner - Front - LH - Renew).
5. Remove pipe from compressor (bolts x1).
6. Remove bolts (x2) from pipe support P-clips.
7. Disconnect lower pipe from upper pipe using special tool (412-038 black) and remove lower pipe.
8. Mark relative position of P-clips (x2) and remove from pipe.

Installation

1. Install P-clips (x2) to pipe in same position as from old pipe.
2. Install new o-rings to upper pipe.
3. Install pipe and connect to upper pipe.
4. Install bolts (x2) to pipe support P-clips.
5. Install pipe to compressor (bolts x2).
6. Install wheel arch liner (see Workshop Manual procedure 01.02.FB Wheel Arch Liner - Front - LH - Renew).
7. Install road wheel/s.
8. Lower vehicle on ramp.
9. Recharge A/C refrigerant (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).

Upper Evaporator Outlet Tube Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Upper Evaporator Outlet Tube Assembly-Renew	12.03.GF

Removal

1. Recover/Recharge refrigerant (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).
2. Remove wiper linkage (see Workshop Manual procedure 01.16.BA Linkage Assembly - Wiper - Renew).
3. Remove bolt (x1) from pipe support P-clip.
4. Remove pipe support clip to body (RHS).
5. Remove pipe to evaporator connection (bolt x1).

6. Disconnect upper pipe from lower pipe using special tool (412-038 black) and remove upper pipe.
7. Mark relative position of P-clip then remove clip from pipe.

Installation

1. Install P-clip to pipe in same position as old pipe.
2. Install pipe and connect to lower pipe.
3. Install pipe to evaporator connection (bolt x1).
4. Install pipe support clip to body (RHS).
5. Install bolt (x1) to pipe support P-clip.
6. Install wiper linkage (see Workshop Manual procedure 01.16.BA Linkage Assembly - Wiper - Renew).
7. Recover/recharge refrigerant (see Workshop Manual procedure 12.03.FA Tank - Receiver Drier - Renew).

Blower Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Blower Assembly-Renew	12.03.AB

Removal

1. Remove IP assembly (see Workshop Manual procedure 01.12.AB Facia Assembly - LHD - Remove for Access and Refit).
2. Disconnect multiplugs (x2) from blower motor.
3. Release harness clip from blower motor.
4. Remove nuts (x3) securing blower motor assembly to IP.
5. Remove bolt and nuts (x2) securing heater unit to IP.
6. Release and remove blower motor assembly from heater unit.

Installation

1. Install blower motor assembly to heater unit.
2. Align blower motor assembly and heater unit onto studs.
3. Install and torque tighten bolt and nuts (x5) securing heater and blower assemblies to IP.
4. Install harness clip in blower motor assembly.
5. Connect multiplugs (x2) to blower motor.
6. Install IP assembly (see Workshop Manual procedure 01.12.AB Facia Assembly - LHD - Remove for Access and Refit).

Blower Motor-Renew

Repair Operation Time (ROT)	
Item	Code
Blower Motor-Renew	12.03.BA

Removal

1. Power passenger seat fully rearwards.
2. Battery isolation switch 'OFF'.
3. Disconnect multiplug from blower motor.
4. Remove screws (x3), remove blower motor assembly.

Installation

1. Install blower motor, install and tighten screws (x3).



2. Connect multiplug to blower motor.
3. Battery isolation switch 'ON'.
4. Power passenger seat to original position.

Pollen Filter-Renew

Repair Operation Time (ROT)	
Item	Code
Pollen Filter-Renew	12.03.EF

Removal

1. Remove Glove box shield (see Workshop Manual procedure 01.12.AP Shield - Glovebox - Renew).
2. Remove pollen filter cover.
3. Remove pollen filters.

Installation

1. Install pollen filters.
2. Install pollen filter cover.
3. Install Glove box shield (see Workshop Manual procedure 01.12.AP Shield - Glovebox - Renew).

Compressor to Condenser Tube Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Compressor to Condenser Tube Assembly-Renew	12.03.GA

Removal

1. Remove PAS pump (see Workshop Manual procedure 03.05.AA Pump - Power Steering - Renew).
2. Remove condenser (see Workshop Manual procedure 12.03.BB Air Con - Condenser - Renew).
3. Disconnect breather pipe quickfits (x2) from air cleaner duct.
4. Remove throttle body duct for access (clips x3).
5. Disconnect sensor multiplugs (x2).
6. Remove (bolts x2) pipe support P-clips and pipe.
7. Mark relative position of p-clips (x2), remove from pipe.

Installation

1. Install p-clips (x2) to pipe in same position as from old pipe.
2. Install pipe and (bolts x2) pipe support P-clips.
3. Connect sensor multiplugs (x2).
4. Install throttle body duct.
5. Connect breather pipe quickfits (x2) to air cleaner duct.
6. Install condenser (see Workshop Manual procedure 12.03.BB Air Con - Condenser - Renew).
7. Install PAS pump (see Workshop Manual procedure 03.05.AA Pump - Power Steering - Renew).

Condenser to Receiver Drier Tube Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Condenser to Receiver Drier Tube Assembly-Renew	12.03.GB

Removal

1. Remove condenser (see Workshop Manual procedure 12.03.BB Air Con - Condenser - Renew).
2. Remove pipe from clip (support to body).
3. Remove bolt, pipe support to body.
4. Remove pipe from receiver drier and vehicle.

Installation

1. Install pipe to vehicle and receiver drier.
2. Install bolt, pipe support to body.
3. Install pipe to clip (support to body).
4. Install condenser (see Workshop Manual procedure 12.03.BB Air Con - Condenser - Renew).

Receiver Drier to Evaporator Tube Assembly-Renew

Repair Operation Time (ROT)	
Item	Code
Receiver Drier to Evaporator Tube Assembly-Renew	12.03.GD

Removal

1. Recover refrigerant (see Workshop Manual procedure 12.03.FA Refrigerant Gas - Recover/Recharge - Renew).
2. Remove pipe from clip (support to body).
3. Remove bolt, pipe to evaporator.
4. Remove nuts (x2) W/W reservoir filler neck to body (move aside).
5. Remove nut (x1) and bolt (x1) fuse box to body (move aside).
6. Remove pipe from receiver drier and vehicle.

Installation

1. Install pipe to vehicle and receiver drier.
2. Install and torque tighten bolt, pipe to evaporator.
3. Install nut (x1) and bolt (x1) fuse box to body.
4. Install nuts (x2) W/W reservoir filler neck to body.
5. Install pipe to clip (support to body).
6. Recharge refrigerant. (see Workshop Manual procedure 12.03.FA Refrigerant Gas - Recover/Recharge - Renew).

Troubleshooting

The areas for inspection (steps) are given according to various circuit malfunctions. Use the following chart to verify the symptoms of the trouble in order to diagnose the appropriate area.

Symptom(1)	Description	Possible Cause
Insufficient air (or no air) blown from vents.	Problem with each vent / duct or both. Airflow mode does not change.	• Fault in Airflow Mode Actuator • Fault in 'Vent' mode system • Fault in 'Heat' mode system • Fault in 'Defroster' mode system

Symptom (2)	Description	Possible Cause
Amount of air blown from vents does not change.	Fault in blower system.	• Blower motor fault • Blower unit fault • Power transistor system fault • Climate control unit fault

Shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Symptom (4)	Description	Possible Cause
Air intake mode does not change.	Air intake mode does not change when switching REC FRESH mode.	• Air Intake Actuator fault • Air intake door fault

Shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Symptom (5)	Description	Possible Cause
No temperature control with A/C Module.	Temperature does not change with operating temperature control dial	• Air Mix Actuator (5 V signal) system fault • A/C Module (potentiometer GND signal) system fault • Air Mix Actuator (potentiometer input signal) system fault • Air Mix Actuator (potentiometer GND signal, motor drive signal) system fault • Air Mix Actuator system fault • A/C unit air mix door fault

Shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Symptom (6)	Description	Possible Cause
Windshield fogged.	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT DEF modes • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT DEF modes	• A/C Module (B+ signal) system fault • Air intake actuator fault • A/C Module (RECIRCULATE, FRESH signal) system fault • Fault in blower unit air intake doors

Shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.



Symptom (7)	Description	Possible Cause
Air from vents not cold enough.	Magnetic clutch operates but A/C system malfunctions.	• Drive belt fault • Fault in blower unit or condenser • Fault in Receiver / Drier or expansion valve (valve closes too much) • Fault in refrigerant lines • A/C compressor system fault, insufficient compressor oil • Over filling of compressor oil, fault in expansion valve or A/C unit air mix link system
Symptom (8)	Description	Possible Cause
No cool air.	Magnetic clutch does not operate.	• Fault in PCM A/C cut control system • Fault in A/C Module • Fault in refrigerant pressure switch • Fault in PCM (A/C signal) • Fault in PCM (IG1 signal) • Fault in A/C compressor • Fault in A/C relay • Fault in Evaporator Temperature Sensor
<i>Shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.</i>		
Symptom (9)	Description	Possible Cause
Noise while operating A/C system.	Noise from magnetic clutch, A/C compressor, hose or refrigerant line.	• Magnetic clutch operation noise • A/C compressor slippage noise • Hose or refrigerant line interference noise

Climate Control (12.00)

Climate Subsystem (12.04)**Maintenance****Solar Load Sensor-Renew**

Repair Operation Time (ROT)	
Item	Code
Solar Load Sensor-Renew	12.04.AA

Removal

1. Remove IP unit from vehicle (see Workshop Manual procedure 01.12.AB Facia Assembly - LHD - Remove for Access & Refit).
2. Disconnect multiplug from solar sensor and remove sensor from IP unit.

Installation

1. Install solar sensor, install multiplug.
2. Install IP unit into vehicle (see Workshop Manual procedure 01.12.AB Facia Assembly - LHD - Remove for Access & Refit).

In-car Temperature Sensor-Renew

Repair Operation Time (ROT)	
Item	Code
In-car Temperature Sensor-Renew	12.04.AD

Removal

1. Release and remove driver's side lower instrument panel, clips (x7), disconnect air temperature pipe. Remove driver's lower panel assembly.
2. Disconnect multiplug, remove temperature sensor.

Installation

1. Install temperature sensor, connect multiplug.
2. Install driver's lower panel assembly.

Ambient Air Temperature Sensor-Renew

Repair Operation Time (ROT)	
Item	Code
Ambient Air Temperature Sensor-Renew	12.04.AC

Removal

1. Remove radiator grille (see Workshop Manual procedure 01.08.AA Grille - Radiator - Renew).
2. Release ambient air temperature sensor from body.
3. Disconnect multiplug, remove ambient air temperature sensor.

Installation

1. Position ambient air temperature sensor, connect multiplug, install sensor in body.
2. Install radiator grille (see Workshop Manual procedure 01.08.AA Grille - Radiator - Renew).

A/C Re-circulation Switch-Renew

Repair Operation Time (ROT)	
Item	Code
A/C Re-circulation Switch-Renew	15.01.CM

Removal

1. Remove centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access and Refit).
2. Depress clips and remove A/C re-circulation switch from centre stack.

Installation

1. Install A/C re-circulation switch and secure with clips.
2. Install centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access and Refit).

A/C Request Switch-Renew

Repair Operation Time (ROT)	
Item	Code
A/C Request Switch-Renew	15.01.CN

Removal

1. Remove centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access and Refit).
2. Depress clips and remove A/C request switch from centre stack.

Installation

1. Install A/C request switch and secure with clips.
2. Install centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access and Refit).

HVAC Control Module-Renew

Repair Operation Time (ROT)	
Item	Code
HVAC Control Module-Renew	15.01.CP

Removal

1. Remove centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access & Refit).
2. Rotate HVAC control knobs to vertical position, remove screws (x8) securing HVAC control unit and multiplugs (x2); (lever HVAC unit from rear to remove control knobs).

Installation

1. Install HVAC unit, secure with screws (x8), fit control knobs (x3) and connect multiplugs (x2).
2. Refit centre stack assembly (see Workshop Manual procedure 15.01.CB Centre Stack Assembly - Remove for Access & Refit).