

Climate Control System - General Information -

General Specification

Type	Description
Heating, ventilation and air conditioning unit: <ul style="list-style-type: none"> • Front unit - Manual version • Front unit Automatic Temperature Control (ATC) version • Rear unit • 	<ul style="list-style-type: none"> • Centrally mounted with offset (handed) blower unit • Dual zone with side to side temperature control • Located behind right hand rear quarter panel. Includes heater, evaporator, in-line TVX, blower motor and drain tube. Air intake is 100% recirculation.
Compressor	Clutchless, belt driven from engine with electronically controlled outputs.

Climate Control System - General Information - Climate Control System

Diagnosis and Testing

Principle of Operation

For a detailed description of the Climate Control System, refer to the relevant Description and Operation section in the workshop manual. REFER to:

[Air Distribution and Filtering](#) (412-01 Air Distribution and Filtering, Description and Operation),
[Heating and Ventilation](#) (412-02A Heating and Ventilation, Description and Operation),
[Auxiliary Heater](#) (412-02B Auxiliary Heating, Description and Operation),
[Auxiliary Climate Control](#) (412-03C Auxiliary Climate Control, Description and Operation),
[Control Components](#) (412-04 Control Components, Description and Operation).

Inspection and Verification



WARNING: Servicing must be carried out by personnel familiar with both vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.



CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.



NOTE: Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern
2. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> • Coolant level • Hose(s) • Coolant pump • Control flap(s) • Duct(s) • Vent(s) • Cabin air filter • Drive belt • Air conditioning compressor • Thermostatic expansion valve • Evaporator • Receiver drier • Air conditioning condenser • Refrigerant pipes • Auxiliary drive belt • Fuel fired booster heater • Fuel fired booster heater fuel pump • Fuel fired booster heater fuel pipes 	<ul style="list-style-type: none"> • Fuse(s) • Wiring harness • Electrical connectors • Blower • Air conditioning compressor • Electric cooling fan • Automatic Temperature Control Module (ATCM) • Refrigerant pressure sensor

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index
5. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMS which may be valid for the specific customer complaint and carry out the recommendations as required

Distribution motor self-test

The motor and flap operation can be checked using the on-board distribution motor self-test function.

The self-test can be initiated by pressing and holding the **ECON** and **RECIRC** buttons while turning the ignition switch to the **ON** position.

The control module will then compare the current motor position with the values stored in the module and will indicate an error by flashing the **ECON** LED (light emitting diode).

If there are no errors, the LED will go out and the system will function normally.

To confirm that there are no errors, turn the ignition switch to the **OFF** position, then back to the **ON** position.

Observe the operation of the **programmed defrost** LED.

If there are errors present, the **programmed defrost** LED will flash and the system will attempt to calibrate itself.

Symptom Chart

Symptom	Possible Causes	Action
No climate control function, flashing LED at start-up	<ul style="list-style-type: none"> The system is in calibration mode 	<ul style="list-style-type: none"> Check the motors and levers at the heating and ventilation assembly for damage/foreign objects jamming the movement of the flaps. For additional information on the self-calibration process, see the distribution motor self-test above
Air conditioning performance poor or inoperative	<ul style="list-style-type: none"> Refrigerant undercharged Refrigerant overcharged Thermostatic expansion valve faulty Receiver drier restricted Water in refrigerant 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
Air conditioning operates briefly and then switches off	<ul style="list-style-type: none"> Electric cooling fan inoperative Air conditioning condenser airflow obstructed 	<ul style="list-style-type: none"> Test the operation of the electric cooling fan Check the air conditioning condenser for external obstructions

Pinpoint Tests

PINPOINT TEST A : PRELIMINARY TESTS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: PRELIMINARY TEST 1	
NOTES:	
	This test is performed with the engine not running.
	Normal pressure for a correctly charged and switched off system is approximately 4.5 bar on both gauges (system equalised).
	1 Close the valves on the air conditioning station
	2 Connect the air conditioning station to the vehicle charging ports
	3 Check the pressure values
	Is a pressure registered on both gauges?
	Yes GO to Pinpoint Test B .
	No GO to Pinpoint Test D .

PINPOINT TEST B : FUNCTIONALITY TESTS	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: FUNCTIONALITY TEST 1	
NOTES:	
	Normal pressures for a correctly charged and working system are 1.0 bar to 2.0 bar (low) and 11.0 bar to 15.0 bar (high).
	Normal temperature (measured at the center air vent) for a correctly charged and working system is -7°C to -2°C when ambient temperature is 20°C.
	1 Close the valves on the air conditioning station
	2 Connect the air conditioning station to the vehicle charging ports
	3 Open all doors and the tailgate
	4 Start the engine
	5 Set the temperature to the lowest setting (all zones)
	6 Set the fan speed to maximum

	7 Set the recirculate switch to off
	8 Insert a temperature probe into the centre air vent
	9 Raise engine speed to 1500rpm and maintain this speed for 5 minutes
	10 Check the temperature value
	11 Check the pressure values
	Are the pressure readings stable and in the green 'normal' region of the gauge? Yes Air conditioning system operating normally No Air conditioning system fault present. GO to Pinpoint Test C.

PINPOINT TEST C : GAUGE TESTS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
C1: GAUGE TEST 1	
	NOTE: This test is performed with the engine running and the air conditioning set to on.
	1 Check the pressure values
	Did the gauges register a change in pressure when the air conditioning was switched on? Yes GO to C2. No Using the manufacturer approved diagnostic system, check the Automatic Temperature Control Module (ATCM) for related DTCs and refer to the relevant DTC index
C2: GAUGE TEST 2	
	NOTE: This test is performed with the engine running and the air conditioning set to on.
	1 Check the pressure values
	Are the pressure gauge readings fluctuating? Yes Moisture present in the air conditioning system. Recover the refrigerant. Install a new receiver drier. Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B. No GO to C3.
C3: GAUGE TEST 3	
NOTES:	
	This test is performed with the engine running and the air conditioning set to on.
	Normal pressures for a correctly charged and working system are 1.0 bar to 2.0 bar (low) and 11.0 bar to 15.0 bar (high).
	1 Check the pressure values
	Are the pressure gauge readings too low? Yes GO to C4. No GO to C6.
C4: GAUGE TEST 4	
	NOTE: This test is performed with the engine not running.
	1 Stop the engine
	2 Using the manufacturer approved refrigerant leak detector, check for a refrigerant leak
	Was a refrigerant leak detected? Yes Refer to the relevant section of the workshop manual and recover the refrigerant. Repair as necessary. Evacuate and recharge the air conditioning system. GO to Pinpoint Test B. No GO to C5.
C5: GAUGE TEST 5	
	NOTE: This test is performed with the engine not running.
	1 Refer to the relevant section of the workshop manual and recover the refrigerant
	Was the weight of the recovered refrigerant less than specified for the air conditioning system? Yes Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B. No Install a new receiver drier. Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B.
C6: GAUGE TEST 6	

NOTES:



This test is performed with the engine running and the air conditioning set to on.



Normal pressures for a correctly charged and working system are 1.0 bar to 2.0 bar (low) and 11.0 bar to 15.0 bar (high).

	1 Check the pressure values Are the pressure gauge readings too high? Yes GO to C7. No Test inconclusive. GO to Pinpoint Test B.
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C7: GAUGE TEST 7



NOTE: This test is performed with the engine **not** running.

	1 Stop the engine 2 Refer to the relevant section of the workshop manual and recover the refrigerant
	Was the weight of the recovered refrigerant more than specified for the air conditioning system? Yes Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B. No Install a new thermal expansion valve. Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B.

PINPOINT TEST D : NITROGEN LEAK TESTS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
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D1: NITROGEN LEAK TEST



CAUTION: When charging the system with nitrogen, the pressure should be regulated to 7.0 bar.



NOTE: This test is performed with the engine **not** running.

	1 Charge the air conditioning system with nitrogen 2 Isolate the nitrogen supply 3 Monitor the pressure gauge and check for leaks
	Has the source of the leak been identified? Yes Rectify the leak as necessary. Install a new receiver drier. Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B. No Refer to the relevant section of the workshop manual and evacuate and recharge the air conditioning system. GO to Pinpoint Test B.

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Automatic Temperature Control Module \(ATC\)](#) (100-00 General Information, Description and Operation).

Climate Control System - General Information - Air Conditioning (A/C) System Recovery, Evacuation and Charging

General Procedures



WARNING: Servicing must be carried out by personnel familiar with both vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.



NOTE: The receiver drier need only be changed under the following circumstances: There is dirt in the refrigerant circuit (eg. compressor seizure); the system is leaking and refrigerant has been lost to atmosphere; refrigerant circuit has been open more than 24 hours due to repair.



1. **Refrigerant recovery:** Remove the dust covers from the high and low pressure connections.

2. Connect the high and low pressure lines to the appropriate connections.
3. Open the valves on the connections.
4. Turn the valves on the station to the correct positions.
5. Turn the process switch to the correct position.
6. Turn the main switch to 'ON'.

7.  **WARNING:** Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerants high enough for safe use in the air conditioning system. Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SEA J1991. Other equipment may not recycle refrigerant to the required level of purity. R143a Refrigerant Recover Recycling Recharging station must not be used with any other type of refrigerant. Refrigerant R134a from domestic and commercial sources must not be used in motor vehicles air conditioning systems.

Allow the system to recover the refrigerant from the system.

8. Close the valves on the refrigerant station.
9. Turn the main switch 'OFF'.
10. Close the valves on the connections.
11. Disconnect the high and low pressure connections.
12. Install the dust covers to the connectors.
13. Open the tap at the rear of the station to drain the refrigerant oil.
14. Measure and record the quantity of refrigerant oil recovered from the system.

15. Close the tap at the rear of the station.
16. **Evacuation:** Remove the dust covers from the high and low pressure connections.
17. Connect the high and low pressure lines to the appropriate connections.
18. Open the valves on the connections.
19. Turn the valves on the station to the correct positions.
20. Turn the process switch to the correct position.
21. Turn the main switch to 'ON'.
22. Allow the station to evacuate the A/C system.



23. **CAUTION:** The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted

Recharging: Close the valves on the refrigerant station.

24. Close the valve on the oil charger.
25. Disconnect the yellow line from the refrigerant station.
26. Remove the cover from the oil charger.
27. Pour the correct quantity of refrigerant oil into the oil charger.
28. Install the cover to the oil charger.
29. Connect the yellow line to the refrigerant station.
30. Open the valve on the oil charger.
31. Move the pointer on the refrigerant gauge to mark the position of the refrigerant drop.
32. Slowly open the correct valve on the refrigerant to allow the vacuum to pull the refrigerant into the system.
33. Close the valve on the refrigerant station when the correct amount of refrigerant has been drawn into the air conditioning system.
34. Turn the main switch 'OFF'.
35. Close the valves on the connections.
36. Disconnect the high and low pressure connections.

Climate Control System - General Information - Air Conditioning (A/C) Compressor Commissioning

General Procedures

Activation



CAUTION: Failure to follow this instruction may result in damage to the component.

1. Set the ignition to the on position, make sure the air conditioning (A/C) is in the off position.
2. Start the engine and allow to run for a minimum of 5 minutes.
3. Set the heater controls to 22°C, with the fan speed set to 75%.
4. Switch on the A/C system.
5. Open all air vents in the dashboard.
6. Run the A/C system for a minimum of 5 minutes, while the engine is still at idle speed.
7. Once this is achieved the compressor is stabilized, with the oil being distributed evenly throughout the system.

This section contains no data