



# SERVICE BULLETIN

SB1220

<b>ADDRESSEES</b>	: Owners and operators of coaches listed under 'Application'
<b>COACH/BUS MODEL</b>	: C2045, T2100 Series
<b>BULLETIN TYPE</b>	: Service Information
<b>SECTION/CHAPTER</b>	: Section 2 – Cooling system Chapter 2.34 Traction engine – Cooling system
<b>DATE</b>	: May 13, 2008
<b>SUBJECT</b>	: <b>Cooling and heating system service – New coolant replacement procedures</b>
<b>TERMS &amp; CONDITIONS</b>	: No claims will be accepted with reference to this Bulletin.

## APPLICATION:

The service information subject of this Bulletin is applicable to following units:

Model	Engine	VIN
C2045	Cummins	46068 →
	Detroit Diesel	46692 →
	Caterpillar	47200 →

Model	Engine	VIN T2140	VIN T2145
T2100	Cummins	40148 →	44313 →
	Detroit Diesel	40611 →	44633 →
	Caterpillar	N/A	44801 →

## DESCRIPTION:

1. As from the above-mentioned units, the passenger compartment heating system is controlled by a electronic control unit (ECU) that is linked to the multiplex system.
2. With the introduction of the new technology some of the components previously installed to ensure system performance have been replaced by technically more advanced equipment. As a result the procedures to drain and fill the cooling and heating systems required a revision.
3. This Service Bulletin has been released to inform owners and operators of these new procedures.  
They complement the service information already present in the Maintenance Manual and should be filed as per instructions in the Information Handling section at the end of this Bulletin.

*Continued on next page.*

## **PRODUCTS:**

- For cleaning/flushing agent specifications, refer to the “Engine Operations Manual” that comes with the coach.
- For engine specific coolant specifications, refer to the Maintenance Manual, chapter 2.34 “Coolant for Cummins/Detroit Diesel/Caterpillar engine”.
- Refer also to the Maintenance Manual, chapter 1.1 “Fluids and lubricants”.

**CAUTION: The use of antifreeze with “organic” corrosion inhibitors (so-called Organic Acid Technology or OAT) is not allowed.  
This type of antifreeze affects the gaskets and the blue silicone hoses.**

- For inhibitor specifications, refer to the Maintenance Manual, chapter 2.34 “Coolant for Cummins/Detroit Diesel/Caterpillar engine”.
- Contents of the cooling/heating system: approximately 43.5 US gallon (165 l).
- Waste disposal: discard old products according to applicable environmental regulations.

## **PROCEDURE:**

### **To drain and fill the engine cooling and heating systems**

*NOTE: If you do not have the expertise to perform present procedure, do not hesitate to go to your nearest ABC Customer Care & Parts Source service center.*

*NOTE: If assistance is required, call ABC Technical Support at 877-427-7278.*

#### **1. Cooling/heating system service intervals:**

Refer to the Maintenance Manual, chapter 1.1 “Maintenance schedule”.

#### **2. General:**

This job should be executed by a technician experienced in cooling system service.

#### **3. Special tools, equipment or services:**

- Refer to the Maintenance Manual, chapter 2.34 “Special tools – cooling system”.
- When draining the system also provide a clean and empty 55 us gallon coolant drum to catch/recover the coolant.

#### **4. Preparations:**

- Park the coach on a level-surfaced service pit with the front wheels straight.  
If portable post lifts are going to be used, lower the suspension first.  
Apply the parking brake and shut down the engine.
- Switch off all systems and turn off the battery master switch.
- When not working in the driver’s area, put a “DO NOT OPERATE” tag on the instrument panel.
- Read the entire procedure before beginning to work.
- Before filling and bleeding the engine cooling system and the heating system, first read and make sure to understand the procedure in attachment 5 to this Bulletin: “To troubleshoot using multifunctional display.”

**CAUTION:** When working in the engine compartment, turn the starter motor inhibitor switch to “starter motor disabled” for the steps, which do not require engine operation.

Observe safe shop practices at all times.

**4. To drain the engine cooling system:**

Refer to the “To drain engine cooling circuit” procedure that has been attached to this Bulletin.

**5. To fill and bleed the engine cooling system:**

Refer to the “To fill and bleed engine cooling circuit” procedure that has been attached to this Bulletin.

**6. To drain the engine cooling system and the heating system:**

Refer to the “To drain engine cooling and heating circuit” procedure that has been attached to this Bulletin.

**7. To clean and flush the engine cooling system and the heating system:**

*NOTE: Cleaning and flushing should be performed only if the coolant is contaminated.*

*NOTE: Any time the coolant is contaminated both the engine cooling circuit and the coach heating circuit should be cleaned and flushed.*

*NOTE: Ensure that the process listed in the “Engine Operations Manual” is followed.*

*NOTE: During cleaning, respectively water flushing, check that liquid is flowing through the heating circuit.*

- 1) Refer to the “Engine Operations Manual” that comes with the coach.
- 2) Follow the fill and bleed procedure “To fill and bleed the engine cooling system and the heating system” for the cleaning agent fill, and the final water flush procedure provided that:
  - Cleaning solution, respectively tap water is used instead of coolant.
  - For step 10 of the procedure, reference is made to the time specified in the “Engine Operations Manual”
  - Steps 15, 18 and 19 are omitted.
- 3) Shut down the engine and drain the systems referring to “To drain the engine cooling system and the heating system”.

**8. To fill and bleed the engine cooling system and the heating system:**

- 1) Refer to the “To fill and bleed engine cooling and interior heating circuit” procedure that has been attached to this Bulletin.
- 2) Warning decal VH 11109825 has been included with this Bulletin.  
Install it as shown in Figure 1, overleaf.

*Procedure complete.*



# WARNING

REFER TO THE MAINTENANCE MANUAL OR SERVICE BULLETIN SB1220 FOR PROPER COOLING SYSTEM DRAIN, FLUSH AND FILL PROCEDURES. THIS INFORMATION IS ALSO AVAILABLE BY CALLING ABC TECHNICAL SUPPORT AT (877) 427-7278 OR VISITING [WWW.ABC-COMPANIES.COM/BULLETINS.ASP](http://WWW.ABC-COMPANIES.COM/BULLETINS.ASP).

Specimen - Part # VH 11109825 - Actual size: 3-3/8" x 5-5/16" (86 x 135 mm)

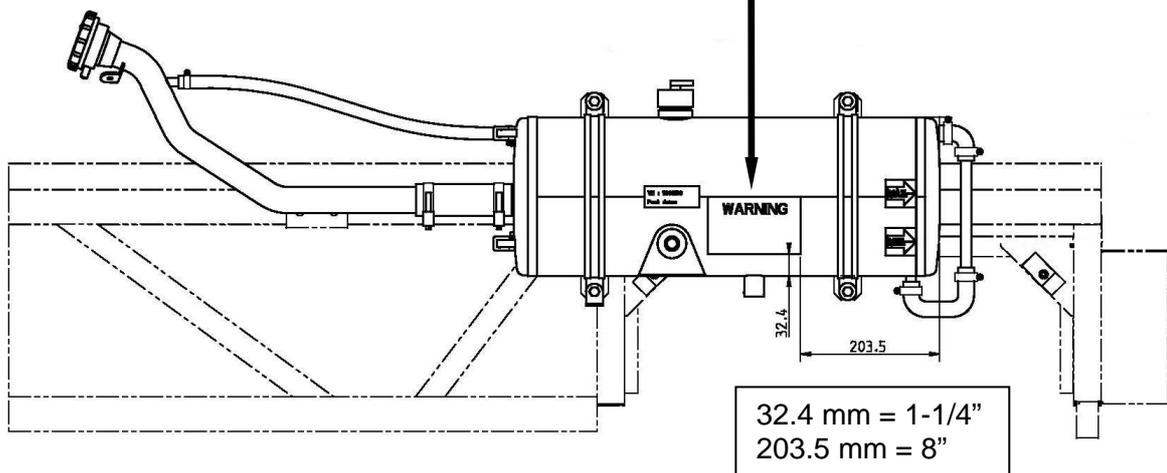


Figure 1

## **ATTACHMENTS:**

“To drain engine cooling circuit”

“To fill and bleed engine cooling circuit”

“To drain engine cooling and heating circuit”

“To fill and bleed engine cooling and interior heating circuit”

“To troubleshoot using multifunctional display”

Drain, flush and fill warning decal.

## **DISCLAIMER:**

The procedures contained herein are not exclusive. Van Hool cannot possibly know, evaluate, or advise the transportation industry of all conceivable ways in which a procedure may be undertaken or of the possible consequences of each such procedure. Other procedures may be as good, or better, depending upon the particular circumstances involved.

Each carrier who uses the procedures herein must first satisfy itself thoroughly that neither the safety of its employees or agents, nor the safety or usefulness of any products, will be jeopardized by any procedure selected.

## **INFORMATION HANDLING:**

Important supplements to and modifications of the technical information not yet included in the manual, are communicated by means of Service Bulletins.

File the Service Bulletins at the back of your manual, in numerical order.

To make sure that you will be reminded of the Bulletins that have appeared in the meantime while paging the manual, mark the pages concerned by hand with the Service Bulletin number.

## To drain engine cooling circuit

### Introduction

The procedure below only describes the draining of the engine cooling circuit, which means that the isolating valves of the interior heating circuit remain closed while draining.

If both the engine cooling circuit and the heating circuit should be drained, follow the instructions under "To drain engine cooling and heating circuit" in chapter 8.10.

### Special tools

Hose coupling for drain nipple	Van Hool No. 10772040
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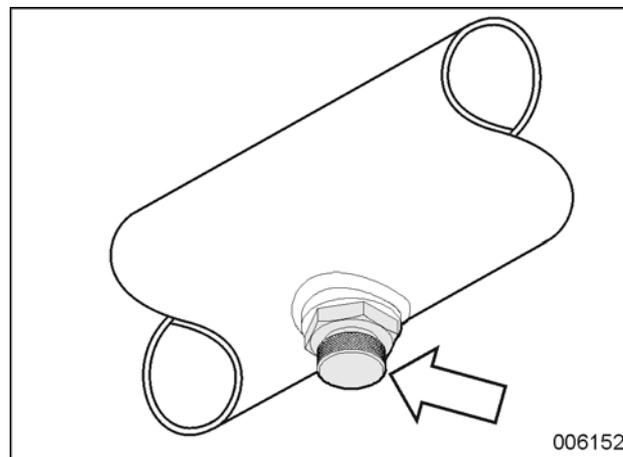
### Equipment condition

Cold engine

### Drain nipple

To simplify draining, a water pipe near the radiator has been provided with a drain nipple that can be connected with a hose.

### Figure: drain nipple in cooling circuit water pipe



### Drain hose

You can make the drain hose mentioned in the procedure yourself. It consists of a special coupling (refer to "Special tools") and a hose with an inner diameter of 3/4 inch (19 mm).

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**Procedure**

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<b>Step</b>	<b>Action</b>
<b>1</b>	Close both the interior heating circuit isolating valves (refer to "To operate interior heating circuit isolating valves" in chapter 8.10).
<b>2</b>	Unscrew the expansion tank filler cap and remove it.
<b>3</b>	Hang the end of the drain hose in a container.
<b>4</b>	Remove the protective cap from the drain nipple. Screw the drain hose onto the nipple. The engine cooling circuit is now draining.
<b>5</b>	If present, remove all the drain plugs in the cooling circuit water pipes and collect the coolant.

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## To fill and bleed engine cooling circuit

### Introduction

The procedure below only describes the filling and bleeding of the engine cooling circuit, meaning that the isolating valves of the interior heating circuit have remained closed while draining.

If both the engine cooling circuit and the heating circuit have been drained, follow the instructions under "To fill and bleed engine cooling and heating circuit" in chapter 8.10.

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### Procedure

Step	Action
1	Remove the drain hose (refer to "To drain engine cooling circuit"). Screw the protective cap on the drain nipple.
2	If present, install all the cooling circuit drain plugs.
3	Slowly pour coolant in the expansion tank until just above the yellow band of the gauge glass.
4	Observe the coolant level and top up until (after approximately a quarter of an hour) you notice that the level is not dropping anymore.
5	Start the engine and let it run at high idle (do not exceed 1 000 rpm)  Top up with coolant as the level in the expansion tank drops. If the level no longer drops, and the coolant no longer foams, the engine cooling circuit is completely bled.
6	Open the interior heating circuit isolating valves (refer to "To operate interior heating circuit isolating valves" in chapter 8.10).
7	Drive the vehicle to make the engine reach its operating temperature.
8	Stop the engine and check the coolant level as soon as the system has cooled down completely. If necessary, top up with coolant.

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## To drain engine cooling and heating circuit

### Introduction

The procedure below describes draining both the engine cooling circuit and the interior heating circuit.

If only the engine cooling circuit is to be drained, follow the instructions under "To drain engine cooling circuit" in chapter 2.34.

### Special tools

Hose coupling for drain nipple	Van Hool No. 10772040
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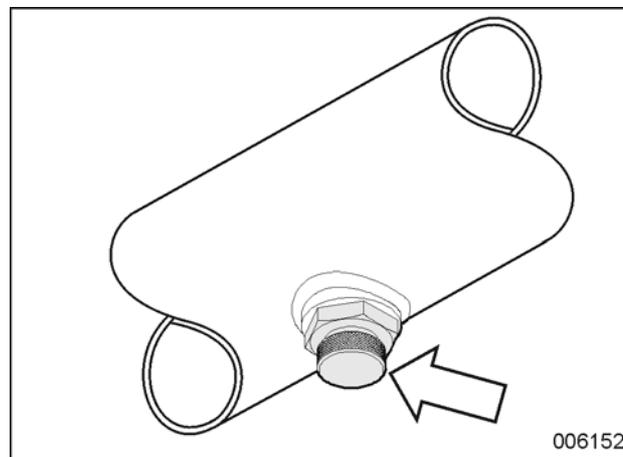
### Equipment condition

- Cold engine
- Isolating valves of interior heating circuit open (refer to "To operate interior heating circuit isolating valves" in chapter 8.10).

### Drain nipple

To simplify draining, a water pipe near the radiator has been provided with a drain nipple that can be connected with a hose.

### Figure: drain nipple in cooling circuit water pipe



### Drain hose

You can make the drain hose mentioned in the procedure yourself. It consists of a special coupling (refer to "Special tools") and a hose with an inner diameter of 3/4 inch (19 mm).

### Procedure

*NOTE: Depending on the way in which the water pipes have been installed, it may be necessary to undo some of the water hoses in order to completely drain the heating circuit. Collect the coolant.*

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<b>Step</b>	<b>Action</b>
1	Unscrew the expansion tank filler cap and remove it.
2	Hang the end of the drain hose in a container.
3	Remove the protective cap from the drain nipple. Screw the drain hose onto the nipple. Coolant now runs out of the drain hose.
4	If present, remove the drain plugs in the engine cooling circuit water pipes and collect the coolant.
5	Drain the roof heaters.  To this end, loosen the screw of the upper hose clamp at each roof heater and prize the hose until you hear that air is being aspirated. Tighten the hose clamp again to the prescribed torque if no more coolant runs out of the drain hose.
6	Drain the convectors.  To this end, open the bleed screws of the convectors until no more coolant runs out of the drain hose.
7	Drain the driver's cab climate control unit.  To this end, open the bleed screw of the driver's cab climate control unit until no more coolant runs out of the drain hose.

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## To fill and bleed engine cooling and interior heating circuit

### Introduction

The procedure below describes filling and bleeding both the engine cooling circuit and the interior heating circuit. If only filling and bleeding of the engine cooling circuit is required, follow the instructions under "To fill and bleed engine cooling circuit" in chapter 2.34.

### To operate climate-control devices

While carrying out the procedure, use the climate control test program (refer to chapter 8.2, under "Passenger compartment control system: to trouble-shoot using the multifunctional display") to:

- switch the water circulation pump on or off;
- open or close the metering valve in the hot-water supply to the roof heating;
- open or close the metering valve in the hot-water supply to the floor heating;
- make the roof-heater fans turn.



### WARNING!

**Asphyxiation hazard. When carrying out works in a confined space, connect engine and coolant heater exhaust to an appropriate exhaust fumes evacuating system.**

### Procedure

Step	Action
1	Remove the drain hose (refer to "To drain engine cooling circuit"). Screw the protective cap on the drain nipple.
2	If present, install all the cooling circuit drain plugs.
3	Slowly pour coolant in the expansion tank until just above the yellow band of the gauge glass.
4	Observe the coolant level and top up until (after approximately a quarter of an hour) you notice that the level is not dropping anymore.
5	Switch the vehicle ignition on and use the climate control test program to open the hot-water supply metering valves to the passenger compartment.

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Step	Action
6	<p>From the dashboard, set the temperature of the driver's cab heating to maximum.</p> <p>The driver's cab heating metering valve is now open.</p>
7	<p>Through the climate control test program, switch on the heating circuit circulating pump. Top up with coolant as the level in the expansion tank drops.</p> <p>Proceed with the next step when the circulation pump has run steadily for approximately 5 minutes, without gargling or hissing.</p>
8	<p>Through the climate control test program, close the hot-water supply metering valves to the passenger compartment and switch off the heating circuit circulating pump.</p>
9	<p>From the dashboard, set the temperature of the driver's cab heating to minimum.</p> <p>The driver's cab heating metering valve is now closed.</p>
10	<p>Start engine and let it run approximately 5 minutes at high idle (do not exceed 1 000 rpm). Top up with coolant as the level in the expansion tank drops.</p>
11	<p>Through the climate control test program, switch on the heating circuit circulating pump.</p>
12	<p>Bleed each heating circuit separately, see further on in the text.</p>
13	<p>Make sure all the metering valves in the hot-water supply to the heating circuits are open.</p>
14	<p>Check the coolant level in the expansion tank and screw the filler cap on the expansion tank.</p>
15	<p>Drive the vehicle to make the engine reach its working temperature.</p>
16	<p>Check heat delivery of all heating devices. In case of a heater, make the fan(s) turn to this end.</p>
17	<p>If a device delivers less heat than normal, repeat step 12, but now only for the relevant heating circuit.</p>
18	<p>Leave the climate control test program and close the service menu.</p>
19	<p>Stop the engine and check the coolant level as soon as the system has cooled down completely. If necessary, top up with coolant.</p>

**To bleed the heating circuits separately**

The table below gives a detailed description of step 12 of "Procedure", see above.

Step	Action
1	<p>Open the metering valve in the hot-water supply to the floor heating. Top up with coolant as the level in the expansion tank drops.</p> <p>The circuit is completely bled when the circulation pump has run steadily for approximately 5 minutes, without gargling or hissing.</p>
2	<p>Close the metering valve in the hot-water supply to the floor heating.</p>
3	<p>From the dashboard, set the temperature of the driver's cab heating to maximum. The metering valve in the hot-water supply to the driver's cab heating then opens. Top up with coolant as the level in the expansion tank drops.</p> <p>The circuit is completely bled when the circulation pump has run steadily for approximately 5 minutes, without gargling or hissing.</p>
4	<p>From the dashboard, set the temperature of the driver's cab heating to minimum. The metering valve in the hot-water supply to the driver's cab heating then closes.</p>
5	<p>Open the metering valve in the hot-water supply to the roof heating. Top up with coolant as the level in the expansion tank drops.</p> <p>The circuit is completely bled when the circulation pump has run steadily for approximately 5 minutes, without gargling or hissing.</p>

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## Passenger compartment control system: to troubleshoot using the multifunctional display

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### Introduction

To simplify the troubleshooting process, the multiplex system of the vehicle has been provided with a climate control test program.

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### Equipment condition

Battery isolating switch on

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### To operate the multifunctional display

For more information on how to scroll through menus and to select functions in the service menu of the multifunctional display, see chapter 11.1, under "To operate the multifunctional display".

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### "Running engine" simulation

Some components of the climate control system can only operate if the engine is running. A "running engine" simulation program allows you to activate these components without the engine actually running. To activate this program, see under "Passenger compartment control system: to activate the "running engine" simulation" in the present chapter.

*NOTE: It is not recommended to use the climate control system fans during the "running engine" simulation, unless there good reasons for doing so. This will avoid putting a load on the batteries and draining them.*

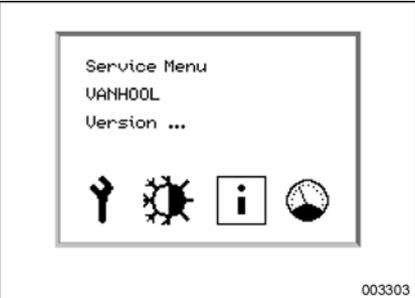
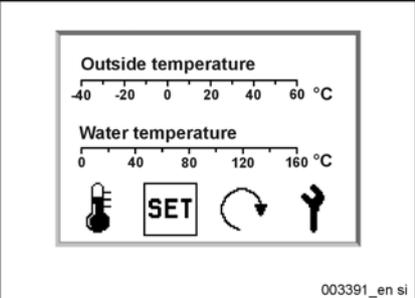
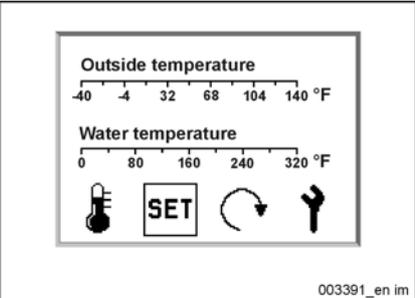
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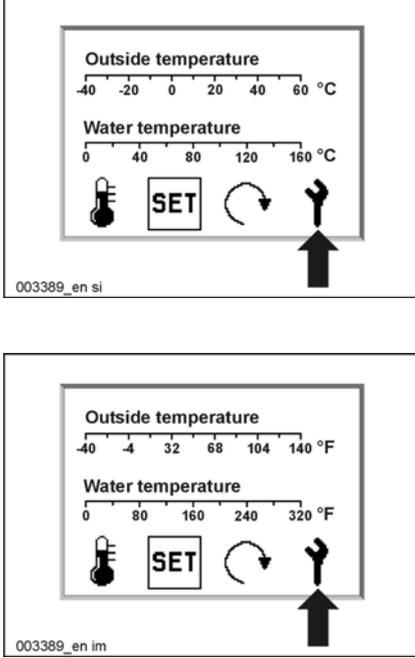
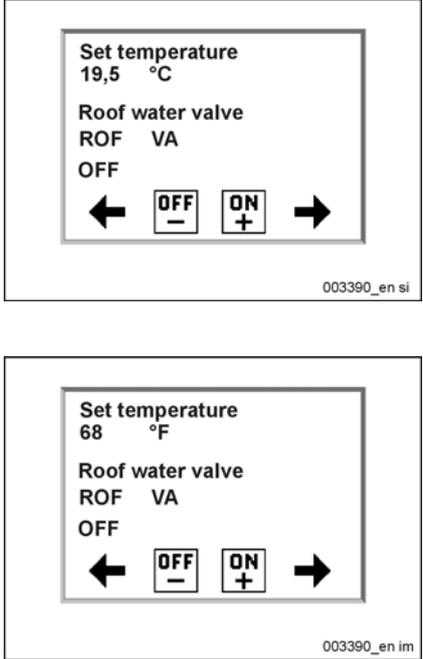
### To check equipment operation

You can use the test program to activate equipment yourself to determine how it responds to control signals.

*NOTE: If you use the "running engine" simulation to activate the electromagnetic clutch of the climate-control compressor, do so only for a short time while an assistant checks that the clutch responds. If it remains activated for too long, the electromagnet will overheat.*

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Step	Action	Result
1	Press and hold the far left button under the display for longer than 5 seconds.	<p>The service menu appears on the display.</p>  <p>003303</p>
2	Press the button under the climate control symbol.	<p>The climate control menu appears on the display.</p>  <p>003388</p>  <p>003391_en si</p>  <p>003391_en im</p>

Step	Action	Result
<p>3</p>	<p>Press the button under the wrench symbol.</p> 	<p>You are now in the climate control system test program. The following will appear on the display:</p> <ul style="list-style-type: none"> <li>• set temperature;</li> <li>• equipment description;</li> <li>• equipment code;</li> <li>• equipment condition.</li> </ul> 
<p>4</p>	<p>Change the equipment status by pressing the button under "OFF" or "ON".</p>	<p>Check if the activated equipment responds to the status change.</p> <p><i>NOTE: The component will remain in the new status until you change it again or exit the service menu.</i></p>
<p>5</p>	<p>Press the button under the left or right arrow to navigate to the next or previous item of equipment.</p>	<p>See step 3.</p>
<p>6</p>	<p>Repeat steps 4 and 5 until all equipment has been checked.</p> <p><i>NOTE: See further on for the equipment sequence.</i></p>	

**Equipment  
sequence on  
the display**

Abbreviation	Component
ROF VA	Valve controlling hot water metering valve of roof heaters
CNV VA	Valve controlling hot water metering valve of floor heaters/ convectors (if fitted)
CIRC	Water circulating pump
GAS CH	CLU, COND, EVAP1 and EVAP2 (only on vehicles with interior cooling)
CLU	Climate control compressor clutch (only on vehicles with interior cooling)
COND	Condenser fans (only on vehicles with interior cooling)
EVAP1	Roof heater fans ("low" speed)
EVAP2	Roof heater fans ("medium" speed)
EVAP3	Roof heater fans ("high" speed)
RF FSH	Inside/outside air selection flap
CNV 1	Floor heater fans ("low" speed)
CNV 2	Floor heater fans ("high" speed)
CAP VA	Climate-control compressor capacity control (only on vehicles with interior cooling)

**To exit test  
program**

Momentarily press the far left button under the multifunctional display as many times as necessary to return to the service menu.

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