

## Diagnostic Instructions

As in all microprocessor systems, communications must be provided to monitor system operation and to allow diagnosis of any concerns that may develop in the system. System monitoring for the driver's use is provided through the instrument panel-mounted message center indicator (10D898). Diagnosis communication for the service technician is provided through the data link connector (14489) in the engine compartment and the Rotunda New Generation Star (NGS) Tester 007-00500 or Super Star II Tester 007-0041B or equivalent.

The message center indicator is accessed in two different ways. If the "SYSTEM CHECK" button is pushed, one of the following three messages will be displayed:

- AIR SUSPENSION SYSTEM OK
- AIR RIDE SWITCH OFF
- CHECK AIR RIDE

Additionally during ignition power up, one of the latter two messages will be displayed if the suspension system is either not turned on, or detects concerns. In either case, the message is displayed for a short period of time, depending on how many other messages need to be communicated to the driver.

When the CHECK AIR RIDE message is displayed in the message center indicator, the system error that has been detected by the control module (5A919) is stored in the control module memory. This diagnostic trouble code will be retained for the next 80 ignition switch cycles. If there is no repeat of the same error during these 80 ignition switch cycles, the control module will erase the DTC.

Because of this self-erasing memory, a customer may have had a concern "just a few days ago" that is not retrieved from memory when Function Test 211, "RETRIEVE ALL MEMORY CODES," is executed. This must be kept in mind if you must tell customer that no current concern has been found.

When the control module detects a concern, the air suspension system is disabled for the current ignition cycle. If the condition causing the concern clears up during the current ignition switch cycle, the system will not reactivate.

For example, if the customer has severely overloaded the luggage compartment, the system will not be able to trim the vehicle without exceeding the compressor run time. This will generate a DTC 98 that disables the suspension system. If the customer then drives the vehicle and unloads the luggage compartment without turning the ignition switch OFF, the system will not adjust for the new load. The customer will experience poor ride quality and the vehicle will not adjust trim for either high speed or low speed travel.

**The data link connector** (DLC) is located in the engine compartment on the front side of the RH front shock absorber tower. This data link connector allows communications between the control module and either the Rotunda New Generation Star (NGS) Tester 007-00500 or Super Star II Tester 007-0041B or equivalent.

The Symptom Chart may be used to help locate the service conditions if the listed symptoms are observed. Whether or not the listed symptoms are observed always:

1. Retrieve all diagnostic trouble codes stored in the control module memory by executing Function Test 211.
2. Run the [Auto Test](#) program to determine what diagnostic trouble codes are currently being sensed by the control module.

3. If the stored DTCs are different from the current DTCs, always service the current DTCs first.
4. If more than one diagnostic trouble code is displayed in either the memory or the current DTCs list, service in the following order:
  - 1st: Electrical Faults, DTC 25, DTCs 50 through 95.
  - 2nd: Electro-Pneumatic Faults, DTC 98 and DTC 99.
  - 3rd: Courtesy Lamp Switches, DTC 29; Shock Absorber Electronic Steering Sensor, DTC 45.

Refer to [Diagnostic Trouble Code](#) chart to determine correct Pinpoint Test to begin Diagnostics.

Refer to the [Symptom Chart](#) to gain additional insight before you begin service.

Remember that similar DTCs often indicate a condition with a shared (common) portion of the circuit. For example, if both DTC 50 and DTC 55 are received, the condition may likely lie in the common ground. Examine the ground Circuit 432 (BK/PK), shared by the LH and RH front air suspension height sensors (5359) for continuity between the two air suspension height sensors and between the air suspension height sensors and the control module.

Please remember that a diagnostic trouble code may indicate several faults. The DTCs are to assist in system diagnosis and are not to be considered as definitive.

Always perform Pinpoint Tests corresponding to the DTC to determine where the fault lies and to properly service the fault.

### **Drive Cycle Diagnostics**

This part of the diagnostics will light the CHECK SUSPENSION warning indicator in the message center if a malfunction is detected in the system while driving the vehicle. Up to 32 diagnostic trouble codes (DTC) will remain stored in memory for up to one hour after the ignition switch is turned to OFF. The air suspension service switch in the luggage compartment must remain ON during this time. The DTCs should be written down at this time. If the vehicle has not been driven in over an hour or the air suspension service switch has been turned OFF, the vehicle must be driven with the air suspension switch ON to try to duplicate the condition.

### **Auto Test Diagnostics**

#### **Using New Generation Star**

1. Open hood. Locate data link connector on RH front shock tower. Install battery charger to power vehicle during testing.
2. Open luggage compartment door.
3. Connect Rotunda New Generation Star (NGS) 007-00500 or equivalent to data link connector. Select air suspension auto test for Mark VIII from the NGS menu.
4. Make sure both doors are closed.
5. Turn air suspension service switch to OFF then to ON.

6. Turn ignition switch from OFF to RUN.
7. Press NGS trigger button to begin Self-Test.
8.  **CAUTION: Do not lean on vehicle or open doors while DTC 10 is displayed. This will introduce false errors into the test results.**

DTC 10 is displayed while Auto Test is running. Any faults discovered by Auto Test will halt the test and be displayed on the NGS.

9. When DTC 12 is displayed:

Open driver door.  
Turn steering wheel a minimum of 1/4 turn in both directions.  
Exit vehicle and close driver door.  
Open then close passenger door.

Press NGS trigger to continue test.

10. Read displayed DTCs. DTC 11 means that vehicle has passed Auto Test. Other DTCs retrieved indicate faults that must be serviced. Refer to [Diagnostic Trouble Code Chart](#) for Pinpoint Tests to service DTCs.
11. If vehicle passes Auto Test, exit diagnostics by removing NGS from data link connector and turning ignition switch OFF.

### Using Super Star II

1. Open hood.

Locate data link connector on the front of the RH front shock tower.  
Install battery charger to power vehicle during testing.

2. Open luggage compartment door.

Locate air suspension service switch.  
Make certain air suspension switch is ON.

3. Set-up Rotunda Super Star II Tester 007-0041-B or equivalent.

MODE switch to FAST  
SELECTOR switch to EEC/MCU  
POWER switch to ON  
HOLD/TEST push button in HOLD position, UP

4. Turn ignition switch to OFF then to RUN.
5. Make sure front doors (20124) on vehicle are closed.
6. Connect Super Star II Tester to data link connector.
7. Press HOLD/TEST button and latch in TEST (DOWN) position.

8.  **CAUTION: Do not lean on vehicle or open doors while DTC 10 is displayed. This will introduce false errors into the test.**

DTC 10 will be displayed while Auto Test is running. Any faults discovered by the Auto Test will halt the test and will be displayed on the Super Star II Tester.

9. When DTC 12 is displayed:

Open driver door.  
Turn steering wheel a minimum of 1/4 turn in both directions.  
Close driver door.  
Open and close passenger front door.

10. Unlatch HOLD/TEST button.
11. Press HOLD/TEST button and read displayed DTCs.
12. DTC 11 indicates that the vehicle has passed the Auto Test. Other DTCs indicate faults to be serviced.
13. Unlatch HOLD/TEST button and use the MEM FWD and MEM REV buttons to view all DTCs stored during the Auto Test. Refer to [Diagnostic Trouble Code Chart](#) for Pinpoint Tests for DTCs.
14. If vehicle passes Auto Test, exit diagnostics by removing Star Tester from data link connector, turning PWR OFF and turning ignition switch OFF. Disconnect battery charger unless you are entering Function Test.

## Functional Tests

### Using New Generation Star

1. Open hood. Locate data link connector on the RH front shock tower. Install battery charger to power vehicle during testing.
2. Open luggage compartment door. Locate air suspension service switch and make certain switch is OFF.
3. Connect new generation star to data link connector. Select functional test from the NGS menu.
4. Make sure both doors are closed.
5. Turn ignition switch to RUN.
6. Perform Function Test 211 and record DTCs displayed.
7. Perform Function Test 228 to clear control module memory.
8. Scroll to desired functional test DTC. Refer to [Function Test Index](#).
9. **NOTE: Compressor may shut OFF if it runs for more than 10 minutes. If compressor shuts OFF, exit test and turn ignition OFF for at least 10 minutes.**

Press NGS trigger button to begin desired test.

10. Press NGS trigger button to end test.
11. Scroll to next desired function test.

### Using Super Star II

1. Open hood:

Locate data link connector on the front of the RH front shock tower.  
Install battery charger to power vehicle during testing.

2. Open luggage compartment door:

Locate air suspension service switch.  
Make certain air suspension switch is OFF.

3. Set-up Super Star II Tester:

MODE switch to FAST  
SELECTOR switch to EEC/MCU  
POWER switch to ON  
HOLD/TEST push button in HOLD (UP) position

4. Turn ignition switch to OFF, then to RUN position.
5. Both front doors on vehicle closed.
6. Connect Super Star II Tester to data link connector. Turn Tester on.
7. Press HOLD/TEST button and latch in TEST (DOWN) position.
8. Diagnostic Trouble Codes for the various Function Tests will be displayed one after the other. To select and run a Function Test: When the desired code number appears, release the HOLD/TEST button and press the HOLD/TEST button. Function Test will then be selected and started.
9. **NOTE: Compressor may shut OFF if it runs for more than 2 minutes. If compressor shuts OFF, exit test and turn ignition switch OFF for at least 10 minutes.**

Unlatch HOLD/TEST button to end selected test. Relatch the HOLD/TEST button to re-enter the DTC display function.

10. SPKR switch must be ON while running Function Tests 212 through 219 and 223 through 225 to provide audible air suspension height sensor checks.

### FUNCTION TEST INDEX

Test Code	Description
211	Display All Diagnostic Trouble Codes In Memory

212	LH Front Pump with Audible Air Suspension Height Sensor Check
213	LH Front Vent with Audible Air Suspension Height Sensor Check
214	RH Front Pump with Audible Air Suspension Height Sensor Check
215	RH Front Vent with Audible Air Suspension Height Sensor Check
216	LH Rear Pump with Audible Air Suspension Height Sensor Check
217	LH Rear Vent with Audible Air Suspension Height Sensor Check
218	RH Rear Pump with Audible Air Suspension Height Sensor Check
219	RH Rear Vent with Audible Air Suspension Height Sensor Check
221	Compressor Run
222	Actuator Output Test (Cycles All Solenoids and EVO Power Steering Control Valve Actuator)
223	LH Front Air Suspension Height Sensor Trim Detection, Audible Output
224	RH Front Air Suspension Height Sensor Trim Detection, Audible Output
225	LH Rear Air Suspension Height Sensor Trim Detection, Audible Output
226	Vehicle Speed Sensor Detection
227	Pulse EVO Power Steering Control Valve Actuator through Duty Cycle
228	Erase All Diagnostic Trouble Codes Stored in Control Module Memory

**NOTE: Prior to testing for any of the following DTCs, service DTCs 18 for low battery voltage or 19 for high battery voltage to determine power and ground. If no fault is found, do not replace any parts, but continue with listed DTCs.**

#### DIAGNOSTIC TROUBLE CODE CHART

Code	PPT	Description	Error Handling	Display	Generated	Validation
10		Auto test in progress			A.T.	
11		Auto test passed			A.T.	
12		Perform manual tests			A.T.	
15		No faults stored in memory			A.T.	
18	A	Control Module Detects Low Battery Voltage	Disable AS and EVO until control module senses more than 13 volts for 1 second continuous		A.T.	Less than 11 volts for 1 second continuous
19	B	Control Module Detects High Battery Voltage	Disable AS and EVO until control module senses less than 17.5 volts for 1 second continuous		A.T.	More than 19 volts for 1 second continuous
20		Control Module	Disable AS	On after 1 second	D.C.	Replace control

		Memory Error 2			A.T.	module
25	C	Air Suspension Height Sensor Supply Not 5 Volts	Disable AS	On after 1 second	D.C. A.T.	
29	D	Two Door Cycles Not Detected During Test			A.T.	
35	E	EVO Power Steering Control Valve Actuator Concern	AS normal, EVO full assist		D.C. A.T.	Fault after 1 second continuous
45	J	Steering Rotation Not Detected			A.T.	
50	M	LH Front Air Suspension Height Sensor Signal Out Of Range	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
55	M	RH Front Air Suspension Height Sensor Signal Out Of Range	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
60	M	LH Rear Air Suspension Height Sensor Signal Out Of Range	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
70	H	Vent Solenoid Valve	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
75	F	Compressor Relay Control Circuit	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
80	G	LH Front Spring Solenoid Valve	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
85	G	RH Front Spring Solenoid Valve	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
90	G	LH Rear Spring Solenoid Valve	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
95	G	RH Rear Spring Solenoid Valve	Disable AS	On after 1 second	D.C. A.T.	Fault after 1 second continuous
98	N	Compressor Run Time Exceeded	Disable AS	On after ON-REST-ON cycle. 11.5 minutes	D.C. A.T.	Fault after ON-REST-ON cycle. 11.5 minutes
99	K	Unable To Detect Raising or Lowering Of One Or More Corners	Disable AS	On after either maximum vent or maximum pump time-out (90-second vent, 90-second pump)	D.C. A.T.	Fault after either max. vent or max. pump time-out (90-second vent, 90-second pump)

	L	Vehicle Speed Sensor Diagnostics				
	P	Unable to enter Auto Test				
	Q	No Codes Displayed, Auto Test Is Running	No Codes Displayed, Auto Test Is Running			

## Abbreviations Used:

DC = Drive Cycle

AT = Auto Test

AS = Air Suspension

PPT = Pinpoint Test