# Volkswagen — Audi
# OBD-II Readiness Code Charts

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# Safety Information

For your safety and the safety of others, read, understand and follow all safety messages and instructions in this manual, on the test equipment and in the tool manual.

Your diagnostic tool is intended for use by properly trained, skilled professional automotive technicians. The safety messages presented below and throughout this manual are reminders to the operator to exercise extreme care when using a test instrument.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, we cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the responsibility of the automotive technician to be knowledgeable of the system being tested. It is essential to use proper service methods and test procedures and to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, or vehicle or equipment being tested.

It is assumed the operator has a thorough understanding of vehicle systems before using a diagnostic tool. Understanding of these system principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using a diagnostic tool**,** always refer to and follow safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested. Use equipment only as described in this manual.

## Safety Conventions

Safety messages in this manual contain a signal word with an icon. The signal word indicates the level of the hazard in a situation. Signal words used in this manual are in a color coded field along with a universal warning triangle as shown below.

**DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.

**WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

**⚠ CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to bystanders.

Safety messages contain three different type styles:

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard. An example is shown below.

**⚠ WARNING**

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with the engine running.**

*A moving vehicle can cause injury.*

When an icon for the specific hazard is not available. In these instances, the safety message is proceeded by the signal word. An example is shown below.

**⚠ WARNING**

The engine compartment contains electrical connections and hot or moving parts.

- **Keep yourself, test leads, clothing, and other objects clear of electrical connections and hot or moving parts.**
- **Do not wear watches, rings, or loose clothing when working in an engine compartment.**
- **Do not place tools or equipment on fenders or other places in the engine compartment.**
- **Barriers are recommended to help identify danger zones in test area.**

*Contact with electrical connections and hot moving parts can cause injury.*

# Important Safety Instructions

**For a complete list of safety messages, refer to the Safety Chapter in the user manual for the diagnostic tool associated with this software product.**

# Table of Contents

# Chapter 1: Introduction

## OBD-II Overview

On-Board Diagnostics, starting with the OBD-I system, verifies the normal operation of sensors and actuators by measuring voltage drop at the component. This technique for confirmation of operation is known as a component monitor. This method can be used to determine short circuits to positive, short circuits to ground, and open circuits.

OBD-II systems, the next generation, monitor inputs and outputs (sensors and actuators) in the same manner as OBD-I systems, but add comprehensive new processes that include:

- Plausibility of signals and components of emissions-related functions.
- Monitors on functions not completely monitored previously.
- Monitors on systems not monitored previously.

Monitors, as used in this context, can take one of two forms:

- **Component monitors**—The engine control module (ECM) looks at the operation of individual parts of the system.
- **System monitors**—The ECM operates a component (or multiple components) to verify system operation.

## OBD-II Drive Cycle

The OBD-II Drive Cycle (see page 3) can be used to drive the vehicle in a prescribed manner which will run and set both component and emission system monitors, which are called readiness monitors.

Examples of readiness monitors include:

- Exhaust gas recirculation (EGR)
- Secondary air injection (AIR)
- Evaporative emission (EVAP)
- Misfires
- Fuel delivery
- Oxygen sensor (O2S)
- Catalytic converter (CAT)

Each monitor requires specific operating conditions or enabling criteria to be met before a test is initiated. In most cases, the monitors should run and set during normal vehicle operation. However, due to different driving habits, enabling criteria may not always be met for every monitor.

**NOTE:**
The OBD-II Drive Cycle can be time-consuming and may not be practical in many urban environments.

### OBD-II Drive Cycle Stages

The OBD-II Drive Cycle is an eight-stage course, as illustrated in the chart on page 3. An explanation of each step is provided below.

**Stage 1: Cold Start**—The ECM determines the presence of a cold start by comparing the engine coolant temperature to the ambient air temperature during startup. The engine is considered cold when:

- Engine coolant temperature is below 122°F (50°C).
- Engine coolant and intake air temperatures are within 11°F (6°C) of each other at startup.

**NOTE:**
Do not leave the key on prior to the cold start or the oxygen sensor (O2S) heater monitor may not run.

During this period, the O2S heater, misfire, AIR, fuel system, and EVAP monitors run.

**Stage 2: Idle 2½ Minutes**—Turn the air conditioning (A/C) and headlights on to help the misfire monitor—the additional electrical loads help even out combustion pulses. During this period, the O2S heater, AIR, EVAP, misfire, and possibly fuel system (if operating in closed loop) monitors run.

**Stage 3: Accelerate**—Prior to accelerating, turn off the A/C and headlights (if possible). Open the throttle halfway until you reach 55 MPH (89 KPH). During acceleration, the misfire, fuel system, and EVAP monitors run.

**Stage 4: Steady State Cruise**—During this portion of the cycle, the O2S, AIR, EGR, EVAP, misfire, and fuel system monitors run.

**Stage 5: Decelerate**—Gradually coast down without applying the brakes. Also, on manual transmission vehicles, remain in high gear and do not press the clutch. During this period, the EGR, EVAP, and fuel system monitors run.

**Stage 6: Accelerate**—Apply ¾ throttle until reaching 60 MPH (97 KPH). During acceleration, the misfire, fuel system, and EVAP monitors run.

**Stage 7: Steady State Cruise**—During this period, the CAT, O2S, AIR, EGR, EVAP, misfire, and fuel system monitors run.

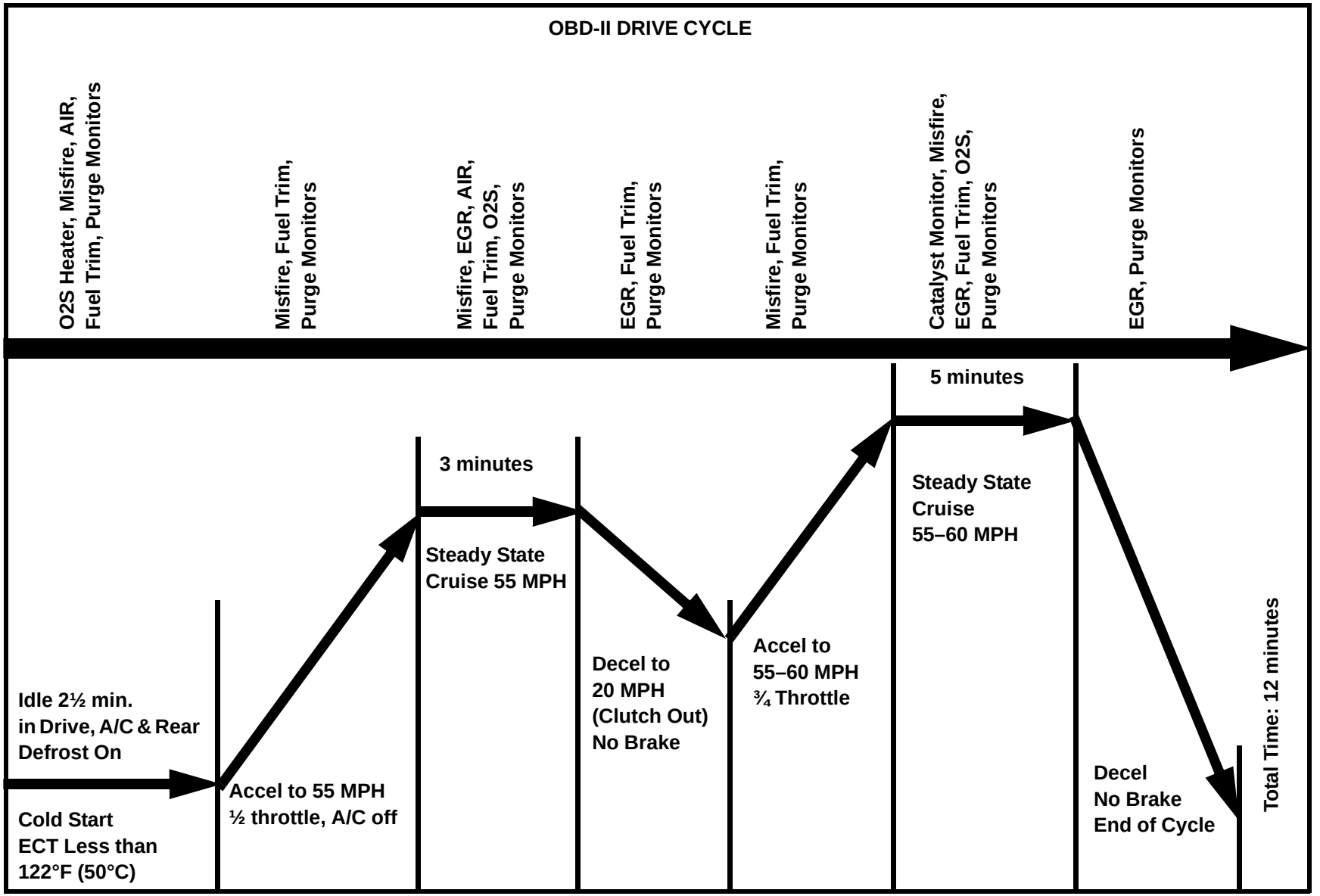
**NOTE:**
If the CAT is marginal and the battery was disconnected prior to the Drive Cycle, it may take up to five separate Drive Cycles in order to determine the state of the CAT.

**Stage 8: Decelerate**—Gradually coast down without applying the brakes. Also, on manual transmission vehicles, remain in high gear and do not press the clutch. During this portion of the Drive Cycle, the EGR, EVAP, and fuel system monitors run.

# VW/Audi OBD-II Readiness Codes

VW and Audi documentation refers to “Setting Readiness Codes,” which means running and completing the OBD-II Readiness Monitors (all monitors that have run and passed are indicated by a “Ready” status). The VW/Audi Readiness charts are designed to instruct the technician to use the scan tool to run one or more of the eight Readiness Monitors (Codes) as listed in Table 1-1, “Readiness code digit chart,” on page 4. The scan tool has the capability to command the ECM to run readiness code diagnostic tests in a special operational mode called “Basic Settings.” If these tests run successfully, all eight Readiness Monitors (Codes) will be set to “Ready” or “0”. In most cases, these charts will eliminate the need to drive the OBD-II drive cycle because these tests are designed to run with the vehicle stationary.

The other alternative is driving the OBD-II Drive Cycle (page 3) or generic road test (page 14) which will also set the readiness monitors but is not always practical, requiring very exact operating conditions for each monitor to run. Readiness code status is now part of some state emission programs. The vehicle will fail if any of these monitors have not passed. In addition, repair work can be validated if readiness code tests are run successfully.


OBD-II DRIVE CYCLE
O2S Heater, Misfire, AIR, Fuel Trim, Purge Monitors
Misfire, Fuel Trim, Purge Monitors
Misfire, EGR, AIR, Fuel Trim, O2S, Purge Monitors
EGR, Fuel Trim, Purge Monitors
Misfire, Fuel Trim, Purge Monitors
Catalyst Monitor, Misfire, EGR, Fuel Trim, O2S, Purge Monitors
EGR, Purge Monitors
5 minutes
3 minutes
Steady State Cruise 55 MPH
Steady State Cruise 55–60 MPH
Idle 2½ min. in Drive, A/C & Rear Defrost On
Cold Start ECT Less than 122°F (50°C)
Accel to 55 MPH ½ throttle, A/C off
Decel to 20 MPH (Clutch Out) No Brake
Accel to 55–60 MPH ¾ Throttle
Decel No Brake End of Cycle
Total Time: 12 minutes

## *Table 1-1. Readiness code digit chart*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Diagnostic Function |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0 | Catalytic converter |
| | | | | | | 0 | | Catalytic converter heating (no diagnostic yet, always “0”) |
| | | | | | 0 | | | EVAP canister system (tank ventilation system) |
| | | | | 0 | | | | Secondary air injection (AIR) system |
| | | | 0 | | | | | A/C system (no diagnostic yet, always “0”) |
| | | 0 | | | | | | Oxygen sensor |
| | 0 | | | | | | | Oxygen sensor heating |
| 0 | | | | | | | | EGR (not available, always “0”) |
| An OK readiness status is represented by a “0”. A Not OK status is represented by a “1”. | | | | | | | | |

**Note the following regarding VW/Audi readiness codes:**

- Table 1-1 does not apply to diesel engines. See “Diesel Engines” on page 62.
- Any readiness code test listed in the charts contained in this manual that does not pass indicates that there is a problem and will require further diagnosis.
- The status for each of the eight readiness codes, 0 or 1, indicates whether a particular emission system or function passed all the related diagnostic tests as listed in the chart.
- Be aware that multiple diagnostic tests (multiple chart steps) may need to run and pass for a particular monitor to complete and set to ready (0). Also note, certain tests may require previous step tests to have run successfully before the next test can run.
- The eight emission systems or functions are the same OBD-II readiness monitors viewed by a generic OBD-II scan tool.

**Readiness codes can be useful for the following reasons:**

- During an emission test, the readiness code can be used to confirm a system function and is now used by emission inspection programs to determine a pass or fail status.
- Related monitor repair work can be verified if the readiness code sets to an OK (Ready) status.

# Viewing Readiness Codes

The following sections explain how to view readiness codes on gasoline or diesel engines with the Snap-on® scan tool.

## Viewing Gas Engine Readiness Codes

You can view readiness codes on gasoline engines either through Functional Tests or through Expert Mode.

**To view readiness codes through Functional Tests:**

1. Identify the vehicle to the scan tool and connect the scan tool to the appropriate diagnostic connector as you would for normal scan tool diagnostics (described in the *Volkswagen/Audi Vehicle Communication Software Manual*).
2. Navigate to the system selection screen, then select **01-Engine Management**.
3. Navigate through the informational and warning screens until the Main Menu displays.
4. From the Main Menu, select **Functional Tests**.
5. From the Functional Tests menu, select **Readiness Code**.
6. Select to continue when the confirmation screen displays.

   The Readiness Code menu displays.
7. Select **15-Check Readiness Code Setting** from the menu.

**To view readiness codes through Expert Mode:**

1. Enter Expert Mode as described in the *Volkswagen/Audi Vehicle Communication Software Manual*.
2. Navigate to the system selection screen, then select **01-Engine Management Master**.

   An instructional screen displays, followed by a series of warning and informational screens.
3. Follow the on-screen instructions and select to continue until the Expert Mode menu displays.
4. From the Expert Mode menu, select **08-Read Measuring Value Block**.

   The Select measuring Value Block screen displays.
5. Select Measuring Value Block **086**.

   Readiness codes display.

## Viewing Diesel Engine Readiness Codes

For 1996 and newer 1Z and AHU diesel engines, you must use the generic OBD-II testing mode in the Snap-on® Domestic or Asian Imports Vehicle Communication Software to view readiness codes. For 1998–2003 ALH diesels, use the following procedure.

**To view readiness codes on 1998–2003 ALH diesel engines:**

1. With engine idling, select **Expert Mode > 01-Engine Management Master > 08-Read Measuring Value Block**.
2. Select Measuring Value Block **017**.

   Channel 2 should read x000xxxx and Channel 4 should read 0xxxxxxx if readiness codes set (“x” digits are ignored).
3. If Channels 2 and 4 do not read as specified, perform the readiness setting road test on page 62 for 1998–2001 models, or on page 63 for 2002–03 models.
4. Navigate back to the Expert Mode menu, then select **06-Stop Communication** before exiting the Expert Mode menu.

# Preparing to Set Readiness Codes

The following sections contain tips and example procedures that provide general information to get you acquainted with using the readiness code charts following this chapter. See “Appendix B: Frequently Asked Questions” on page 105 for more information.

## Important Tips for Reading Readiness Charts

Note the following when using the readiness code charts contained in this book.

- Check for stored diagnostic trouble codes (DTCs). Any codes set will prevent readiness code completion. Repair all DTCs or other known malfunctions before attempting to set readiness codes.
- Make sure the correct engine ID code has been verified on the engine to ensure that the correct readiness chart and procedure is selected. All engine codes are stamped on the engine block or on the cylinder head with the first three letters being the designation (i.e., ABA, AAA). Some can be found on timing belt cover label on a sticker in the owner’s maintenance manual, or on a sticker in the spare tire compartment. There are often different engine codes for the same model and engine. See the *Volkswagen/Audi Vehicle Communication Software Manual* for engine ID code locations.
- *Do not* assume that the scan tool ID and engine code are correct if the scan tool communicates. The scan tool does not use the ID to establish communication—the units are automatically identified.
- Sometimes a readiness monitor will already be set when following the steps in a procedure. If Channel 4 reads “OK”, continue on to the next step.
- Some 2002–03 VW/Audi models use a different procedure (Audi AVK and AMB and VW AWM, BDF, and BDP) and the screen prompts are different. Once in the test, scrolling to the next display without exiting is not possible. Also, a readiness test will not automatically start after entering the display group, the **Y** button will need to be pressed to start test (changes the screen message from “OFF” to “ON” in the Current State field. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information).

## Readiness Code Setting Requirements

Make sure to fulfil the following requirements before starting readiness code setting procedures:

- With the engine off and ignition off, remove the fuel tank filler cap to release pressure. This will help the Fuel Tank Leak Test run more quickly.
- Warm up the engine to normal operating temperature.

**NOTE:**
The VW ABA (1996–99 2.0L Golf, Jetta, GTI and Cabriolet) requires a cold engine to set the EVAP monitor. In this case, set this monitor first, then warm up the engine to set the others.

- Turn off all electrical accessories (A/C, rear window defroster, etc.).
- Make sure battery voltage is at least 12V and that the charging system is working properly.
- We recommend keeping the engine hood closed to maintain proper engine temperature. Both Audi and Volkswagen V8 engines may overheat if the hood is open while setting readiness codes.

# Setting Readiness Codes: Sample Procedures

The sample procedures that follow illustrate how to use the charts in this manual.

## Sample Procedure 1: VW Engine ID Code AWW

The following example procedure shows how to check readiness codes on a 2001 Volkswagen Jetta 1.8L, engine ID code AWW using Table 3-24, “Engine Code AWW: 2000–03 Jetta & Golf 1.8L,” on page 51.

**NOTE:**
This procedure can be used for all engine ID codes except Audi AVK and AMB, and VW AWM, BDF, and BDP. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for a procedure that can be used with these engines.

**To check readiness codes on a VW with engine ID code AWW:**

1. **Check DTC Memory.**

   From the readiness code menu, select **02-Check DTC Memory**.

   If no codes are present, a “No codes” screen displays and you may go on to Step 3.

   If codes are present, a codes list screen displays and you must go on to the next step.

2. **Clear DTC Memory.**
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **05-Check DTC Memory**.

      An instructional screen displays.
   c. Make sure the key is on with the engine off, then select to continue and clear codes.

      When codes are cleared, the “No Codes Present” message displays.

**NOTE:**
For reference, you may now select 15-Check Readiness Code Setting to view the monitor status. Whenever codes are cleared, all readiness code monitors are reset to “Not Completed”, indicated by a “1”. Any zeros that did not change to ones indicate monitors not installed on this vehicle. Refer Table 1-1 on page 4 to see which monitors are not installed on the vehicle based on the readiness code digits shown in the monitor status.

3. **Throttle Body Adaptation Test**.
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **04-Basic Settings**.

      The Select Measuring Value Block screen displays.
   c. Select **Measuring Value Block 060**.

      A Basic Setting Value Block screen displays.

      The Current State “Off” should change to “On” when the test starts, indicated by Channel 4 reading “Running”.

      The adaptation takes only a few seconds. The other channels are reading the throttle valve angle sensors and will change as the throttle is actuated by the ECM. Do not touch the throttle pedal or turn off the key during the adaptation.

      If the adaptation is successful, Channel 4 changes from “Running” to “OK”.

      If it is not successful, it will require further investigation. See the *Volkswagen/Audi Vehicle Communication User Manual* for more information about the electronic throttle.

4. **Temperature Check.** Instead of Basic Settings, this is a non-intrusive reading of value block 08.
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **08-Read Measuring Value Block**.

      The Select Measuring Value Block screen displays.
   c. Select **Measuring Value Block 004**.

      A Read Measuring Value Block screen displays.

d. Check that the Channel 4 reading matches the specification in the chart.

e. Navigate back to the Select Measuring Value Block screen.

5. **Fuel Tank Leak Test**. This test checks the EVAP and fuel tank leak detection systems. The engine must be at idle for this test to run.

   a. Select **Measuring Value Block 071**.

      A Read Measuring Value Block screen displays.

   b. The test starts.

      Channel 3 reads “Check” or “Measur.End” as test is running.

      Channel 4 changes to “Syst.OK” if this monitor runs successfully.

6. **Closed Loop Fuel Control Test.** This test monitors the ability of the engine management system to maintain fuel control to a desired air/fuel ratio.

   a. Select **Measuring Value Block 107**.

      A Read Measuring Value Block screen displays.

   b. The test starts.

      Channel 4 should change to “Run” or “Test Run” when the test starts, providing the previous test was successful and engine conditions are correct (at idle and fully warmed up).

      Channel 4 reads “Syst.OK” if the monitor runs successfully.

7. **EVAP System Diagnosis Test.**

   a. Select **Measuring Value Block 070**.

      A Read Measuring Value Block screen displays.

   b. The test starts.

      Channel 4 reads “EVAP OK” if the monitor runs successfully.

8. **After CAT Oxygen Sensor Test.** This test validates that the after CAT O2S is active.

   a. Select **Measuring Value Block 036**.

      A Read Measuring Value Block screen displays.

   b. The test starts, providing the vehicle is at idle and the previous steps were successful.

      Channel 2 reads “B1-S2 OK” if the monitor runs successfully.

9. **Camshaft Timing Test.** This test makes sure that variable camshaft control is working properly. The engine speed must be 1800–2200 RPM for this test to run.

   a. Select **Measuring Value Block 094**.

      A Read Measuring Value Block screen displays.

   b. The test starts when Channel 2 reads “On”.

      Channel 4 reads “Syst.OK” if the monitor runs successfully.

10. **Knock Sensor Test.** The engine speed must be 1800–2200 RPM for this test to run.

    a. Select **Measuring Value Block 028**.

       A Read Measuring Value Block screen displays.

    b. The test starts.

       Channel 4 changes to “Syst.OK” if this monitor runs successfully.

11. **After CAT Oxygen Sensor Aging Test.** This test validates that the after CAT O2S is active. The engine speed must be 1800–2200 RPM for this test to run.

    a. Select **Measuring Value Block 043**.

       A Read Measuring Value Block screen displays.

       Channel 2 is CAT temperature, which usually must read at least 572°F (300°C) before the test will run.

    b. The test starts when Channel 4 reads “Test Run”.

       Channel 4 reads “B1-S2 OK” if the monitor runs successfully.

12. **Closed Loop Fuel Control Check.** This test validates that the system is achieving closed loop fuel control

    a. Select **Measuring Value Block 030**.

       A Read Measuring Value Block screen displays.

b. Closed Loop is achieved if the last two digits in Channel 1 both read “1” (ignore any other channel information).

13. **Before CAT Oxygen Sensor Response Time Test.** The engine speed must be 1800–2200 RPM for this test to run.
    a. Select **Measuring Value Block 034**.
       A Read Measuring Value Block screen displays.
    b. The test starts.

    The channel specifications from Table 3-24 on page 51 must be met for this test to run. Channel 4 changes to “B1-S1 OK” if this monitor runs successfully.

14. **Oxygen Sensor CAT Control Dwell Time Test.** This test checks the relationship of the before CAT and after CAT O2S. The after CAT O2S control has the authority to override the before CAT O2S control. This allows the after CAT O2S control to take over, preventing possible CAT damage in case the before CAT O2S performance deteriorates to the point of jeopardizing the CAT. The after CAT O2S can also adjust to slight changes in the mixture if it detects displacement of the before CAT voltage curve. It takes control by holding the before CAT O2S control at its higher or lower point for a specific time (dwell time). If this time is in the positive range (e.g., 50 ms), then the mixture is shifted to the rich direction. If the time is negative (e.g., -50 ms), then the mixture is shifted to the lean direction. The engine speed must be at idle for this test to run.

**NOTE:**
If the value is above +200 ms, then there is a possible leaking exhaust system.

    a. Select **Measuring Value Block 037**.
       A Read Measuring Value Block screen displays.
    b. The test starts.

    Channel 4 changes to “Syst.OK” if this monitor runs successfully.

15. **Catalytic Converter Test.** The engine speed must be 1800–2200 RPM for this test to run.
    a. Select **Measuring Value Block 046**.
       A Read Measuring Value Block screen displays.
    b. The test starts. Channel 4 should change from “Test Off” to “Test On” or “Test Run” when test starts.

**NOTE:**
Channel 3 specification: The ECM compares the voltage(s) of the before CAT O2S to the voltage(s) of the after CAT O2S. The result is the amplitude ratio between the two sensors and indicates the CAT test result in either percent or amplitude ratio. A good CAT amplitude ratio range is 0.00–0.32.

    c. Channel 4 should change to “CAT B1 OK” if the monitor runs successfully.

16. **Secondary Air System Test.** The engine speed must be at idle for this test to run.

**NOTE:**
The Secondary Air Pump will turn on during this test.

    a. Select **Measuring Value Block 077**.
       A Read Measuring Value Block screen displays.
    b. The test starts.

    Channel 4 changes to “Syst.OK” if this monitor runs successfully.

17. **Misfire Activity Check.** This check validates that misfire monitoring is active. The engine speed must be at idle for this test to run.
    a. Navigate to the Readiness Code or Expert Mode menu.
    b. Select **08-Read Measuring Value Block**.
       A Read Measuring Value Block screen displays.
    c. Select **Measuring Value Block 014**.
       The test starts.
       Channel 4 reads “Activated” or “Prepared” if this monitor runs successfully.

18. **Readiness Code Setting Check**.
    a. Select **Measuring Value Block 086**.

       A Check Readiness Code Setting screen displays.

    b. All readiness code monitors are set when all eight readiness code digits are “0”.

## Sample Procedure 2: VW Engine ID Code AWM

The following procedure shows how to check readiness codes on a 2001–03 VW, engine ID code AWM using Table 3-19, “Engine Code AWM: 2001–03 Passat 1.8L 4-cylinder,” on page 45.

**NOTE:**
This procedure can only be used for engine ID codes Audi AVK and AMB, and VW AWM, BDF, and BDP. See “Sample Procedure 1: VW Engine ID Code AWW” on page 7 for a procedure that can be used with all other engine ID codes.

**To check readiness codes on an VW with engine ID code AWM:**

1. From the readiness code menu, select **02-Check DTC Memory**.

   If no codes are present, a “No codes” screen displays and you may go on to Step 3.

   If codes are present, a codes list screen displays and you must go on to the next step.

2. **Clear DTC Memory.**
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **05-Clear DTC Memory**.

      When codes are cleared, a “No codes Present” message displays.

   c. Navigate back to the Readiness Code or Expert Mode menu.

**NOTE:**
For reference, you may now select 15-Check Readiness Code Setting to view the monitors screen. Whenever codes are cleared, all readiness code monitors are reset to “Not Completed”, indicated here by a “1”. Any zeros that did not change to ones indicate monitors not installed on this vehicle. Refer Table 1-1 on page 4 to see which monitors are not installed on the vehicle based on the readiness code digits.

3. **Throttle Body Adaptation Test.** This step is the adaptation procedure for the ECM to learn new settings for the Drive-by-Wire electronic throttle. Note that this test is done with the key on, engine off and it is recommended to perform this on a cold engine if possible.
   a. Select **04-Basic Settings**.

      The Select Measuring Value Block screen displays.

      You are now ready to start the adaptation test. Note that this adaptation procedure is part of the readiness chart because if the adaptation is not correct, it may set a DTC and or prevent a readiness code monitor from running.

   b. Select **Measuring Value Block 060**.

      A Basic Setting Value Block screen displays.

      Current State should change from “Off” to “On” when the test starts to run, and the Channel 4 should read “Running”.

      The adaptation takes only a few seconds. The other channels are reading the throttle valve angle sensors and will change as the throttle is actuated by the ECM. Do not touch the throttle pedal or turn off the key during the adaptation.

      If adaptation is successful, Channel 4 changes from “Running” to “OK”.

      If it is not successful, it will require further investigation. See the *Volkswagen/Audi Vehicle Communication User Manual* for more information about the electronic throttle.

4. **Kickdown Adaptation Test.** This test adapts the throttle position for learning the transmission kickdown (passing gear).
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **04-Basic Setting**.
      The Select Measuring Value Block screen displays.
   c. Select **Measuring Value Block 063**.
      Channel 4 reads “KickDownActivate” when the test is running.
   d. Press accelerator pedal all the way to the floor, past the point where you feel the switch for the kickdown.
      The message in Channel 4 changes to “Running”.
   e. Hold the pedal down to the floor for 3 seconds.
   f. When Channel 4 reads “OK”, release the pedal, the kickdown adaptation is successful.
      If Channel 4 reads “Not OK”, further diagnosis is necessary.
5. **Measurement Block 001 Test.** This test validates that specific parameters are being met.
   a. Navigate back to the Readiness Code or Expert Mode menu.
   b. Select **04-Basic Setting**.
      The Select Measuring Value Block screen displays.
   c. Select **Measuring Value Block 001**.
      Channel 4 reads “11111111” if the monitor runs successfully.
6. **Closed Loop Fuel Control Test.** This test monitors the ability of the engine management system to maintain fuel control to obtain a desired air/fuel ratio.
   Do not return to the Readiness Code or Expert Mode menu before initiating this test.
   a. From the Select Measuring Value Block screen, select value block **107**.
   b. Channel 4 reads “11111111” if the monitor runs successfully.
7. **EVAP System Diagnosis Test.**
   Do not return to the Readiness Code or Expert Mode menu before initiating this test.
   a. From the Select Measuring Value Block screen, select value block **070**.
   b. Channel 4 reads “EVAP OK” if the monitor runs successfully.
8. **Knock Sensor Test.** The engine speed must be 1800–2200 RPM for this test to run.
   Do not return to the Readiness Code or Expert Mode menu before initiating this test.
   a. From the Select Measuring Value Block screen, select value block **028**.
   b. Channel 4 reads “Syst.OK” if the monitor runs successfully.
9. **Before CAT Oxygen Sensor Response Time Test.** The engine speed must be 1800–2200 RPM for this test to run.
   Do not return to the Readiness Code or Expert Mode menu before initiating this test.
   a. From the Select Measuring Value Block screen, select value block **034**.
      The test starts if conditions are met. The channel specifications from Table 3-24 on page 51 must be met for this test to run.
   b. Channel 4 changes to “B1-S1 OK” if the monitor runs successfully.
10. **Before CAT Oxygen Sensor Test.** This test validates that the before CAT O2S is active.
    Do not return to the Readiness Code or Expert Mode menu before initiating this test.
    a. From the Select Measuring Value Block screen, select value block **036**.
       The test starts, providing the vehicle is at idle and the previous steps were successful.
    b. Channel 2 reads “B1-S2 OK” if the monitor runs successfully.

11. **Oxygen Sensor Test.** This test checks the relationship of the before CAT and after CAT O2S. The after CAT O2S control has the authority to override the before CAT O2S control. This allows the after CAT O2S control to take over, preventing possible CAT damage in case the before CAT O2S performance deteriorates to the point of jeopardizing the CAT. The after CAT O2S can also adjust to slight changes in the mixture if it detects displacement of the before CAT voltage curve. It takes control by holding the before CAT O2S control at its higher or lower point for a specific time (dwell time). If this time is in the positive range, then the mixture is shifted to the rich direction. If the time is negative, then the mixture is shifted to the lean direction. The engine must be at idle for this test to run.

**NOTE:**
If the value is above +200 ms, then there is a possible leaking exhaust system.

Do not return to the Readiness Code or Expert Mode menu before initiating this test.

a. From the Select Measuring Value Block screen, select value block **037**.
b. Channel 4 reads “Syst.OK” if the monitor runs successfully.

12. **Before CAT Oxygen Sensor Aging Test.** This is a test of adequate response time for the before CAT O2S. This test is performed with the engine running (do not shut engine off unless the instructions specifically state that a test is performed with the engine off).
    a. Navigate back to the Readiness Code or Expert Mode menu.
    b. Select **04-Basic Setting**.
       The Select Measuring Value Block screen displays.
    c. Select **Measuring Value Block 043**.
    d. Activate the test.
       Channel 4 changes to read “Test On”.
    e. Press the brake and throttle pedals to the floor.
       Engine RPM will automatically go to 2200 RPM.
       If the O2S response time is OK, Channel 4 changes to read “B1-S1 OK” within a short time, usually 30 seconds to 1 minute.

**NOTE:**
The value in Channel 2 is calculated CAT temperature and the value in Channel 3 is a calculated value for O2S response time (the higher the number, the better the response time).

13. **Catalytic Converter Test.** This test checks the fuel tank ventilation valve for operation and leakage.
    a. Navigate back to the Readiness Code or Expert Mode menu.
    b. Select **04-Basic Setting**.
       The Select Measuring Value Block screen displays.
    c. Select **Measuring Value Block 043**.
    d. To activate, press the brake and throttle pedals to the floor.
       The test begins when Channel 4 changes to read “Test On”.
    e. Channel 4 changes to read “CATB2 OK” if this monitor runs successfully.
       If the test finishes with “Not OK”, then further diagnosis of the catalytic converter is necessary.

**NOTE:**
Snap the throttle swiftly to 4000 RPM at the end of the test to be able to continue to the next test.

14. **Camshaft Timing Test.** This test makes sure that variable camshaft control is working properly. The engine speed must be 1800–2200 RPM for this test to run.
    Do not return to the Readiness Code or Expert Mode menu before initiating this test.
    a. From the Select Measuring Value Block screen, select value block **094**.
       The test starts when Channel 2 reads “On”.
    b. Channel 4 reads “Syst.OK” if the monitor runs successfully.

15. **Fuel Tank Leak Test**. This test checks the EVAP and fuel tank leak detection systems. The engine must be at idle for this test to run.

    Do not return to the Readiness Code or Expert Mode menu before initiating this test.

    a. From the Select Measuring Value Block screen, select value block **071**.

       Channel 3 reads “Check”, or “Measur.End” while the test runs.

    b. Channel 4 reads “Syst.OK” if the monitor runs successfully.

16. **Secondary Air System Test.** This test checks the secondary air injection system.

    a. Navigate back to the Readiness Code or Expert Mode menu.

    b. Select **04-Basic Setting**.

       The Select Measuring Value Block screen displays.

    c. Select **Measuring Value Block 077**.

    d. Snap the throttle twice to at least 4000 RPM to start the test.

       The test starts when Channel 4 changes to read “Test On”.

    e. Channel 4 reads “Syst.OK” if the monitor runs successfully.

       If test finishes with “Not OK”, then further diagnosis of the air injection system is needed.

**NOTE:**
You should hear the secondary air pump run for several seconds during the test

17. **Misfire Activity Check.** This test is non-intrusive (performed in 08 not 04) and validates that misfire monitoring is active or “On”. The engine speed must be at idle for this test to run.

    a. Navigate back to the Readiness Code or Expert Mode menu.

    b. Select **04-Basic Setting**.

       The Select Measuring Value Block screen displays.

    c. Select **Measuring Value Block 014**.

       Channel 4 reads “Activated” or “Prepared” if this monitor runs successfully.

18. **Oxygen Sensor Heater Test.** This tests the before and after CAT O2S heaters as well as the heater control circuitry. This test turns the heaters on, and then monitors the heater resistance, which must be less than 0.02 kohm, as specified for Channel 3 in the chart.

    a. Navigate back to the Readiness Code or Expert Mode menu.

    b. Select **04-Basic Setting**.

       The Select Measuring Value Block screen displays.

    c. Select **Measuring Value Block 041**.

       If the Channel 3 reading falls within the specification, move on to the next test. If not, the oxygen sensor heater or circuit must be checked.

19. **Readiness Code Setting Check.**

    a. Navigate back to the Readiness Code or Expert Mode menu.

    b. Select **04-Basic Setting**.

       The Select Measuring Value Block screen displays.

    c. Select **Measuring Value Block 086**.

       If all eight readiness code digits are “0”, then all readiness code monitors are set.

# Chapter 2: Generic Road Tests

This chapter contains generic road tests for Volkswagen and Audi that can be used to set readiness codes. The roads tests that follow are expansions of the OBD-II Drive Cycle described on page 1, but are manufacturer-specific.

These generic road tests may be used in the following manner:

- As an alternative procedure to setting problem readiness monitors.
- For specific 2003 models that currently have no readiness chart.
- In combination with the charts. After repairs, a road test performed according to the following procedures could be done first. The chart can then be used to set any remaining un-set monitors.

**NOTE:**
Be aware that these road tests are time-consuming. Always use the charts first, if available. In a rare instance where a monitor test will not run using the scan tool and charts, the road test procedure will help.
At the time of this printing, there were no charts available for some 2002–03 engines.

## Volkswagen Generic Road Test

Make sure that the following test requirements are met before starting the Volkswagen generic road test:

- The respective fuses of the Motronic fuel injection and ignition system must be OK.
- Battery voltage must be at least 12V.
- All electrical accessories (lights, rear window defroster, etc.) must be switched off.
- A/C must be switched off.
- Ground connections to the engine and the chassis must be OK.
- There must not be any diagnostic trouble codes (DTCs) stored in ECM memory.

**NOTE:**
Make sure to accelerate the vehicle uniformly, not at WOT.

**To perform the Volkswagen generic road test:**

1. Drive the vehicle until engine operating temperature (EOT) is at least 176°F (80°C).
2. Turn the engine off and let the vehicle cool until EOT is at least 41 to 95°F (5 to 35°C).
3. Drive the vehicle for 10 minutes in the highest gear or in the highest driving mode on a level surface at a constant speed in the range of 40 to 50 MPH (65 to 80 KPH) at an engine speed of 2000 to 2500 RPM.
4. After 10 minutes, downshift to an engine speed of 2800 to 3500 RPM.
5. Drive in deceleration mode at an engine speed of about 1800 RPM.
6. Park the vehicle and let the engine run at idle for 3 minutes.
   The gas pedal *must not* be operated during this time.
7. Drive the vehicle for 10 minutes in the highest gear or in the highest driving mode on a level surface at a constant speed in the range of 40 to 50 MPH (65 to 80 KPH) at an engine speed of 2000 to 2500 RPM.
8. Park the vehicle and let the engine run at idle for 3 minutes.
   The gas pedal *must not* be operated during this time.
9. Read readiness codes (see “Viewing Readiness Codes” on page 5 for a detailed procedure).

10. If all digits in the 8-digit number block read 0, then you are finished. If one of the digits is a 1, continue to the next step.
11. Drive the vehicle for 10 minutes in the highest gear or in the highest driving mode on a level surface at a constant speed in the range of 40 to 50 MPH (65 to 80 KPH) at an engine speed of 2000 to 2500 RPM.
12. Park the vehicle and let the engine run at idle for 3 minutes.

    The gas pedal *must not* be operated during this time.
13. Read readiness codes again.
14. If either the Secondary Air Injection system (position #5) or the EVAP canister system (position #6) read 1 instead of 0, repeat the complete procedure from the beginning.

# Audi Generic Road Test

Make sure that the following test requirements are met before starting the Audi generic road test:

- The respective fuses of the Motronic fuel injection and ignition system must be OK.
- Battery voltage must be at least 12V.
- All electrical accessories (lights, rear window defroster, etc.) must be switched off.
- A/C must be switched off.
- Ground connections to the engine and the chassis must be OK.
- There must not be any diagnostic trouble codes (DTCs) stored in ECM memory.
- Throttle valve angle should be 10 to 20%.

**To perform the Audi generic road test:**

1. If the engine is warm, let the vehicle cool until EOT is 50 to 122°F (10 to 50°C).
2. Start the engine and let it run at idle for at least 15 minutes.
3. Drive the vehicle for 15 minutes in the highest gear or in the highest driving mode on a level surface at a constant speed of about 56 MPH (90 KPH) at an engine speed of 1800 to 2200 RPM.
4. Read readiness codes (see “Viewing Readiness Codes” on page 5 for a detailed procedure).

# Chapter 3: Volkswagen Readiness Code Charts

## Gasoline Engines

***Table 3-1. Engine Code AAA: 1996–2000 Golf, Jetta, GTI & Passat 2.8L (sheet 1 of 2)***

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | | | | ADP I.O or ADP OK |
| 4. | START ENGINE COLD | | | | | |
| 5. EVAP System Diagnosis Test | COOL ENGINE IDLE | 04/153 | 41 to 194°F (5 to 90°C) | 41 to 113°F (5 to 45°C) | | xxxxx100 |
| 6. | WARM UP AT 2500 RPM | 08/103 | | More than 104°F (40°C) | | xxxxxxx0 |
| 7. Secondary Air System Test (if installed) | IDLE | 04/160 | More than 104°F (40°C) | | | xx11x100 |
| 8. Warm-up | 2200–3300 RPM until temperatures are attained | 08/103 | | More than 140°F (60°C) | More than 680°F (360°C) | xxxxxxx0 |
| 9. Oxygen Sensor Aging Test | IDLE after 5 seconds | 04/131 Do Not Exit | | | | xxxx100 |
| 10. Fuel Trim Part Throttle Adaptation Test | ROAD TEST (avoid overrun):<br>1) Momentarily full throttle from 4600 RPM.<br>2) ½ throttle acceleration from 30 MPH. | 04/125 Do Not Exit | | | | x1x1xxx0 |
| 11. Fuel Trim Idle Adaptation Test | IDLE 30 seconds | 04/125 Do Not Exit | | | | xxxxx100 |
| 12. Oxygen Sensor Aging Test | • Vehicle stationary<br>• All accessories off<br>• 2200–2800 RPM for 20 seconds | 04/130 Do Not Exit | | 0 to 2.8 seconds | 4, 6, or 10 | xxxxx100 |
| 13. Catalytic Converter Test | 2700–3300 RPM for 120 seconds | 04/136 Do Not Exit | | Min. 680°F (360°C) | Less than 0.3 | xxxxx100 |

*Table 3-1. Engine Code AAA: 1996–2000 Golf, Jetta, GTI & Passat 2.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 14. EVAP System Diagnosis Test | • Vehicle stationary<br>• Do not load engine<br>• Idle for 30 seconds | 04/150 | | | | xxxxx100 |
| 15. Readiness Code Setting Check | | Exit, Select 15 | 00000000 | | | |
| NOTE: If Channel 1 reads 00000000, then the vehicle has passed and you are finished. If it does NOT read 00000000, then proceed with the following steps. | | | | | | |
| 16. Knock Sensor Test | 2500 RPM, check in 15 seconds | 04/145 | | | | |
| 17. Before CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/115 | | | | |
| 18. After CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/116 | | | | |
| 19. Before CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/120 | | | | |
| 20. Oxygen Sensor Heater Test | 2200–2800 RPM | 04/121 | | | | |
| 21. Throttle Body Adaptation Test | IDLE | 04/140, 141, 142 | | | | |

*Table 3-2. Engine Code ABA: 1996–99 Golf, Jetta, GTI & Cabriolet 2.0L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | | | | ADP I.O or ADP OK |
| 4. | START ENGINE COLD | | | | | |
| 5. Fuel Tank Leak Test | COOL ENGINE IDLE | 04/153 | 41 to 194°F (5 to 90°C) | 41 to 113°F (5 to 45°C) | | xxxxx100 |
| 6. | WARM UP TO 2500 RPM | 08/103 | | More than 104°F (40°C) | | xxxxxxx0 |
| 7. Secondary Air System Test (if installed) | IDLE | 04/160 | More than 104°F (40°C) | | | xx11x100 |
| 8. Warm-up | 2200–3300 RPM until temperatures are attained | 08/103 | | More than 140°F (60°C) | More than 680°F (360°C) | xxxxxxx0 |
| 9. Oxygen Sensor Aging Test | IDLE after 5 seconds | 04/131 Do Not Exit | | | | xxxx100 |
| 10. Fuel Trim Part Throttle Adaptation Test | ROAD TEST (avoid overrun):<br>1) Momentarily full throttle from 4600 RPM.<br>2) ½ throttle acceleration from 30 MPH in 2nd gear, 2500–3500 RPM, no deceleration. | 04/125 Do Not Exit | | | | x1x1xxx0 |
| 11. Fuel Trim Idle Adaptation Test | IDLE 30 seconds | 04/125 Do Not Exit | | | | xxxxx100 |
| 12. Oxygen Sensor Aging | • Vehicle stationary<br>• 2200–2800 RPM for 20 seconds | 04/130 Do Not Exit | | 0 to 2.8 seconds | 4, 6, or 10 | xxxxx100 |
| 13. Catalytic Converter Test | 2700–3300 for 120 seconds | 04/136 Do Not Exit | | Min. 680°F (360°C) | Less than 0.3 | xxxxx100 |
| 14. EVAP System Diagnosis Test | • Vehicle stationary<br>• Do not load engine<br>• Idle for 30 seconds | 04/150 | | | | xxxxx100 |

*Table 3-2. Engine Code ABA: 1996–99 Golf, Jetta, GTI & Cabriolet 2.0L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 15. Readiness Code Setting Check | | Exit, Select 15 | 00000000 | | | |
| NOTE: If Channel 1 reads 00000000, then the vehicle has passed and you are finished. If it does NOT read 00000000, then proceed with the following steps. | | | | | | |
| 16. Knock Sensor Test | 2500 RPM, check in 15 seconds | 04/145 | | | | |
| 17. Before CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/115 | | | | |
| 18. After CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/116 | | | | |
| 19. Before CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/120 | | | | |
| 20. Oxygen Sensor Heater Test | 2200–2800 RPM | 04/121 | | | | |
| 21. Throttle Body Adaptation Test (if applicable) | IDLE<br>NOTE: This test has no exact specifications. The diagnostic test runs in the background during the check. | 04/140 | | | | |
| 22. Throttle Valve Actuator Test | IDLE<br>NOTE: This test has no exact specifications. The diagnostic test runs in the background during the check. | 04/141, 142 | | | | |

*Table 3-3. Engine Code ABA: 2000–01 Cabriolet 2.0L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | IDLE | 04/060 | | | Idling speed | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | | | 41 to 194°F (5 to 90°C) | Max. 140°F (60°C) |
| 5. Fuel Tank Leak Test | Idle for 30 seconds and check specifications | 04/071 | | | | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | | | | TVV OK |
| 7. Secondary Air System Test | IDLE | 04/077 | | | | SYST.OK |
| 8. Oxygen Sensor Aging Test | A. 2200–2800 RPM | 08/034 | | More than 666°F (352°C) | | |
| | B. 2200–2800 RPM | 08/030 Do Not Exit | | 111 | | |
| | C. 2200–2800 RPM | 04/034 | | | | B1 P1 OK |
| 9. Catalytic Converter Test | 2800–3200 RPM | 04/046 | | More than 666°F (352°C) | Less than 0.55 | CAT B1 OK |

*Table 3-4. Engine Code AEB: 1998–99 Passat 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/086 | 11100101/ 01100101 | 11111101 | 00011111 | 00000000 |
| 4. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 0 to 25° | 0 to 25° | IDLE | ADP.OK |
| 5. Before and After CAT Oxygen Sensor Heater Check | 1800–2200 RPM | 08/030 | 111 | 111 | | |
| 6. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800 to 2200 RPM | 0.8 to 2.0 ms | 0.0 to 3.3 s | B1-S1 OK |
| 7. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 0.0 to 1.0 | 0 to 2 | 58.6 s | CAT B1 OK NOTE: May take up to 1 min. before test runs (Test ON). |
| 8. EVAP System Diagnosis Test | IDLE | 04/070 | | -5.4 to +9.4% | | |
| 9. Fuel Tank Leak Test | IDLE | 04/071 | | | | |
| 10. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 3-5. Engine Code AEB: 2000 Passat 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 9 | ADP.OK |
| 4. Kickdown Adaptation Test | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP.OK |
| 5. Closed Loop Fuel Control Test | IDLE | 04/107 | 800 to 900 RPM | -8% to +8% | | SYST.OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | | | Check END | |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | 0 to 2.0 kohm | Htg..bC ON | 0 to 2.0 kohm | Htg..bC ON |
| 9. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.5 to 0.095V | B1-S2 OK | | |
| 10. Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 1.0 s | B1-S1 OK |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -150 ms to +150 ms | SYST.OK |
| 12. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 13. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 752°F (400°C) | 0.0 to 0.29 | CATB1 OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | 4 to 10 g/s | SYST.OK |
| 15. Readiness Code Setting Check | IDLE | 08/086 | 00000000 | | | |

*Table 3-6. Engine Code AEG: 1998–2001 Golf, GTI, Jetta & New Beetle 2.0L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | | | IDLE | ADP.OK |
| 4. Secondary Air System Test | IDLE | 04/077 | Engine Temp 43 to 156°F (6 to 69°C) | | | SYST.OK |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | | | | EVAP OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | | ABORT | CHECK END | SYST.OK |
| 7. After CAT Oxygen Sensor Aging Test | 2200–2800 RPM | 04/034 | 2200–2800 RPM | More than 666°F (352°C) | Max. 2.20 s | B1-S1 OK |
| 8. Catalytic Converter Test | 2800–3200 RPM | 04/046 | 2800–3200 RPM | More than 666°F (352°C) | Max. 0.55 | CAT B1 OK |
| 9. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-7. Engine Code AES: 1997 Eurovan 2.8L VR6 (sheet 1 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Closed Loop Fuel Control Check | • Engine at normal operating temp.<br>• Run engine at 3000–3500 RPM.<br>• Check specs after 60 seconds. | 08/103 | 1.4 to 2.4 ms (Engine Load Range) | More than 104°F (40°C) ECT | More than 680°F (360°C) (Exh. temp.) | xx1xxx00 |
| 4. Secondary Air System Test | IDLE<br>Check after 20 seconds. | 04/160<br>Do Not Exit | More than 140°F (60°C) ECT | 0.7% (O2 Control w/Secondary Air Valve Open) | 25% (O2 Control w/ Secondary Air Injection On) | xx11x100 |
| 5. Closed Loop Fuel Control Test | 2200–3300 RPM<br>Check specs after 120 seconds | 04/103<br>Do Not Exit | 1.4 to 2.4 ms (Engine Load Range) | More than 140°F (60°C) ECT | More than 680°F (360°C) (Exh. temp.) | xx1xxx00 |
| 6. After CAT Oxygen Sensor Aging Test | IDLE<br>30 seconds | 04/131<br>Do Not Exit | 650–750 RPM | 0 to 1V (O2V after CAT) | -1200 to +1200 ms (Sensor Aging time value) | xx11xx00 |
| 7. Fuel Trim Part Throttle Adaptation Test | ROAD TEST:<br>Drive in 2nd gear (manual & auto) 2500–4000 RPM. Check specs during road test. Continue road testing until specs are obtained. Avoid extended deceleration periods which may prevent diagnostic from running. | 04/125<br>Do Not Exit | 2500–3500 RPM | -10 to +10% (O2 adaptation under partial load) | -12 to +12.4% (O2 adaptation at idle) | 01x1x100 |
| 8. EGR Test | ROAD TEST:<br>Drive in 2nd gear (manual & auto) 2000–3500 RPM for a minimum of 20 seconds. Check specs during road test. | 04/155<br>Do Not Exit | 2000–3500 RPM | More than 122°F (50°C) (EGR Temp. at idle) | Approx. 122°F (50°C) (Temp. difference between idle & partial load) | 1111x100 |

*Table 3-7. Engine Code AES: 1997 Eurovan 2.8L VR6 (sheet 2 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 9. Fuel Trim Idle Adaptation Test | • Engine coolant more than 140°F (60°C) (08/001).<br>• Intake manifold temp. more than 176°F (80°C) (08/003).<br>• Run engine at idle & check specs after 30 seconds. | 04/125<br>Do Not Exit | 650–750 RPM | -23 to +23%<br>(O2 adaptation under partial load) | -12 to +12.4%<br>(O2 adaptation at idle) | 01x1x100 |
| 10. Before CAT Oxygen Sensor Aging Test | 2500–3500 RPM for 20 seconds, then check specs. | 04/130<br>Do Not Exit | 2500–3500 RPM | 0 to 2 seconds<br>(Period duration of O2 control before CAT) | 10<br>(O2S periods recognized) | 111x100 |
| 11. Catalytic Converter Test | 2500–3500 RPM for 20 seconds, then check specs. | 04/136<br>Do Not Exit | 2500–3500 RPM | More than 680°F (360°C) | 0.15 max.<br>(Idle speed control deviations during test) | 1111x100 |
| 12. Fuel Tank Leak Test | • Coolant fan not on.<br>• Idle 30 seconds, then check specs. (Do not load engine or it will abort test.) | 04/150<br>Do Not Exit | 0 to 100%<br>(Fuel tank vent valve minimum opening) | -7 to -23 or 7 to 23<br>(O2 control deviations during test) | 0.39 g/s max.<br>(Idle speed control deviations during test) | 1110x100 |
| 13. Readiness Code Setting Check | If all Readiness Codes are not set (all zeros), continue with Step 13. | 15 | | | | |
| 14. Vehicle Speed Sensor Test | ROAD TEST:<br>Drive in 2nd or 3rd gear (manual & auto) 3500 RPM for 5 seconds, then release accelerator for 3 seconds (driving speed must still be at 12 MPH minimum and have been decelerating for 2 seconds minimum). | 04/180<br>Do Not Exit | 5 to 10 seconds<br>3500 RPM min. | More than 176°F (80°C) | 16 to 31 MPH<br>(25 to 50 KPH) | x111x100 |

*Table 3-7. Engine Code AES: 1997 Eurovan 2.8L VR6 (sheet 3 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 15. Knock Sensor Test, Bank 1 | 3200 RPM minimum. Check specs after 15 seconds. | 04/145 Do Not Exit | 3200 RPM min. | 7 max. (Amplification factor for knock sensor signal) | 0 (Open circuit in wiring counter) | xxxx1100 |
| 16. Knock Sensor Test, Bank 2 | 3200 RPM minimum. Check specs after 15 seconds. | 04/146 Do Not Exit | 3200 RPM min. | 7 max. (Amplification factor for knock sensor signal) | 0 (Open circuit in wiring counter) | xxxx1100 |
| 17. Before CAT Oxygen Sensor Test | 2200–2800 RPM | 04/115 Do Not Exit | More than 140°F (60°C) (Engine Coolant Temp.) | Approx. 680°F 360°C (Exh. Gas Temp.) | 0 to 1V (O2S before CAT voltage fluctuating) | 1011x100 |
| 18. After CAT Oxygen Sensor Test | 2200–2800 RPM for 15 seconds, then check specs. | 04/116 Do Not Exit | 0 to 1200 ms (O2 after CAT switching time delay) | 680°F (360°C) (Exh. Gas Temp.) | More than 0.6V (O2S V after CAT) | 1011x100 |
| 19. Before CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/120 Do Not Exit | More than 680°F (360°C) (Exh. Gas Temp.) | 120 seconds (Time between O2S heating & start of test) | 4.5 to 15.6 ohm (O2S before CAT Heater resistance) | 1111x100 |
| 20. After CAT Oxygen Sensor Heater Test | 2200–2800 RPM | 04/121 Do Not Exit | More than 680°F (360°C) (Exh. Gas Temp.) | 120 seconds (Time between O2S heating & start of test) | 4.5 to 15.6 ohm (O2S before CAT Heater resistance) | |
| 21. Idle Air Valve Test | IDLE:<br>NOTE: This test has no exact specs. The diagnostic test runs in the background during the check. | 04/140 | | | | |

*Table 3-7. Engine Code AES: 1997 Eurovan 2.8L VR6 (sheet 4 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 22. Throttle Valve Actuator Test | IDLE:<br>NOTE: This test has no exact specs. The diagnostic test runs in the background during the check. | 04/141,142 | | | | |
| 23. Readiness Code Setting Check | | Exit, Select 15 | 00000000 | | | |

*Table 3-8. Engine Code AES: 1998–99 Eurovan 2.8L VR6 (sheet 1 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• Intake air temperature less than 194°F (90°C).<br>• Coolant temperature less than 203°F (95°C).<br>• Throttle valve angle less than 50°F (10°C). | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | 4.000 to 5.000V | 3.000 to 4.000V | IDLE Operating Mode | ADP OK |
| 4. Throttle Position Specification Check | Key On, Engine Off—Check throttle position switch spec. Slowly go to WOT and watch angle display. | 08/003 | 0 RPM | | Less than 80 to 87° | Approx. Ambient Temp. |
| 5. Throttle Position Specification Check | IDLE | 08/003 | 650–750 RPM | | Less than 0 to 5° | Approx. Ambient Temp. |
| 6. EVAP System Diagnosis Test | IDLE | 04/153 Do Not Exit | 140 to 203°F (60 to 95°C) | 41 to 201°F (5 to 94°C) | 10.1 or 19.1 s | 11110100 or 11111000 |
| 7. Closed Loop Fuel Control Test | ROAD TEST:<br>Drive in 2nd gear between 2500 and 4000 RPM. Continue test drive until Channel 4 reads as indicated. | 04/103 | | Min. 140°F (60°C) | Approx. 680°F (360°C) | xx1xxxx0 |
| 8. Fuel Trim Part Throttle Adaptation Test | ROAD TEST:<br>Drive in 3rd gear (manual & auto) 2400–2600 RPM for a minimum of 22 seconds until Channel 4 reads as indicated. | 04/125 Do Not Exit | 2400–2600 RPM | -10 to +10% (O2S Adaptation at Part Load) | -12.4 to +12.4% (O2S Adaptation at Idle) | x111xx00 |
| NOTE: For most of these monitors, the 4th channel does not read ADP OK. Instead, if monitors have run OK, 0 & 1 digits will match exactly as in chart. | | | | | | |

*Table 3-8. Engine Code AES: 1998–99 Eurovan 2.8L VR6 (sheet 2 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 9. Vehicle Speed Sensor Test | ROAD TEST:<br>1) Drive in 2nd or 3rd gear (manual & auto) keeping above 3500 RPM for a minimum of 5 seconds.<br>2) Release accelerator pedal for 3 seconds (after 3 seconds, the driving speed must still be at least 10 MPH in engine deceleration for a minimum of 2 seconds until Channel 4 reads as indicated. | 04/180 | At least 3500 RPM for 5 to 10 seconds | At least 176°F (80°C) (Coolant Temp.) | 20 to 50 KPH (Vehicle Speed) | x111x100 |
| 10. Fuel Trim Part Throttle Adaptation Test | End Road Test.<br>IDLE | 04/125<br>Do Not Exit | 650–750 RPM | -10 to +10% (O2S Adaptation at Part Load) | -12.4 to +12.4% (O2S Adaptation at Idle) | x1x1x100 |
| 11. EGR Test | IDLE | 04/155<br>Do Not Exit | 650–750 RPM | -10 to +10% (O2S Adaptation at Part Load) | -12.4 to +12.4% (O2S Adaptation at Idle) | x1x1x100 |
| 12. Secondary Air System Test | IDLE for 20 seconds then check specs. | 04/160<br>Do Not Exit | At least 140°F (60°C) (Coolant Temp.) | 0.7% (Secondary Air Valve Open) | 25% (Secondary Air Pump Running) | 1x11x100 |
| 13. Fuel Tank Leak Test | IDLE for 20 seconds, then check specs. (Do not load engine or test will abort). | 04/150<br>Do Not Exit | 0 to 100% (Opening Degrees) | Min. -6.3 to +6.3% 0.36 g/s (O2S Control) | Min. -6.3 to +6.3% 0.36 g/s (Idling Control) | 1110x100 |
| 14. After CAT Oxygen Sensor Aging Test | IDLE for 30 seconds, then check specs. | 04/131<br>Do Not Exit | 650–750 RPM | 0.01 to 1.00 V (O2S after CAT) | -1200 to +1200 ms (O2S aging) | xx11x100 |
| 15. Before CAT Oxygen Sensor Aging Test | Increase to 2500–3500 RPM. Check specs after 120 seconds. | 04/130<br>Do Not Exit | 3000–3500 RPM | 0 to 2 s (seconds) | 10 (Period Counter) | 111x100 |
| 16. Catalytic Converter Test | Increase to 2500–3500 RPM. Check specs after 120 seconds. | 04/136 | 3000–3500 RPM | Min. 680°F (360°C) (Exh. Gas Temp.) | max. 0.15 (Amplitude Ratio) | 1111x100 |
| NOTE: For most of these monitors, the 4th channel does not read ADP OK. Instead, if monitors have run OK, 0 & 1 digits will match exactly as in chart. | | | | | | |

*Table 3-8. Engine Code AES: 1998–99 Eurovan 2.8L VR6 (sheet 3 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 17. After CAT Oxygen Sensor Test | Increase engine speed until Exh. temp is 680°F (360°C) minimum. Then check specs at idle. | 04/116 Do Not Exit | 0 to 1200 ms (switching time delay of O2 after CAT) | Min. 680°F (360°C) (Exh. Gas Temp.) | min. 0.6 V (O2S voltage after CAT) | 1011x100 |
| 18. Before CAT Oxygen Sensor Test | (Same as step 17) | 04/115 Do Not Exit | Min. 140°F (60°C) (Coolant temp.) | Approx. 680°F (360°C) (Exh. Gas Temp.) | Fluctuating voltage (O2S Voltage before CAT) | 1011x100 |
| 19. Before CAT Oxygen Sensor Heater Test | (Same as step 17) | 04/120 | Min. 680°F (360°C) (Exh. Gas Temp.) | 120 seconds (Time between O2S heating & start of test) | 4.5 to 15.6 ohm (O2S before CAT Heater resistance) | 1111x100 |
| 20. After CAT Oxygen Sensor Heater Test | (Same as step 17) | 04/121 | Min. 680°F (360°C) (Exh. Gas Temp.) | 120 seconds (Time between O2S heating & start of test) | 4.5 to 15.6 ohm (O2S before CAT heater resistance) | 1111x100 |
| 21. Knock Sensor Test, Bank 1 | Increase to at least 3000 RPM. Check specs after 1 min. | 04/145 | min. 3000 RPM | max. 7 (Amplification factor for knock sensor signal) | 0 (Open Circuit in wiring counter) | xxxx x100 |
| 22. Knock Sensor Test, Bank 2 | Increase to at least 3000 RPM. Check specs after 1 min. | 04/146 | | | | |
| 23. Readiness Code Setting Check | Exit out and check readiness codes to view completed monitors. | Exit, Select 15 | 00000000 | | | |
| NOTE: For most of these monitors, the 4th channel does not read ADP OK. Instead, if monitors have run OK, 0 & 1 digits will match exactly as in chart. | | | | | | |

*Table 3-9. Engine Code AFP: 2000–02 Golf, GTI & Jetta 2.8 VR6*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | Counter counts to 9 | ADP.OK |
| 4. Oxygen Sensor Aging Test | Engine on, brake pedal pressed | 04/034 | 1350–1450 RPM | | | B1-S1 OK |
| 5. Catalytic Converter Test | Engine on, brake pedal pressed | 04/046 | 1350–1450 RPM | 752 to 1202°F (400 to 650°C) | | CAT B1 OK |
| 6. Secondary Air System Test | IDLE | 04/077 | 650–8500 RPM | | CHECK END | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | | | Max. 2.20 s | EVAP OK |
| 8. Fuel Tank Leak Test | IDLE | 04/071 | Reed op | | Max. 0.55 | SYST.OK |
| 9. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |
| NOTE: Brake pedal MUST be pressed for ECM-controlled idle increase. | | | | | | |

*Table 3-10. Engine Code AHA: 1998–99 Passat 2.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/086 | 01101101 | 11111111 | 00111111 | 00011111 |
| 4. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | 3.255 to 4.745V | 0.902 to 4.863V | IDLE | ADP.OK |
| 5. Before and After CAT Oxygen Sensor Readiness Check | 2000–2500 RPM | 08/030 | 111 (See note below) | 111 | 111 | 111 |
| 6. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | 0.8 to 2.5 ms | 0.00 to 2.1 s | B1-S1 OK |
| 7. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/035 | 1800–2200 RPM | 0.8 to 2.5 ms | 0.00 to 2.1 s | |
| 8. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 0.00 to 0.28 | 0 to 2 | 58.6 s | CAT B1 OK |
| 9. Catalytic Converter Test | 1800–2200 RPM | 04/047 | 0.00 to 0.2 | 0 to 2 | 58.6 s | |
| 10. EVAP System Diagnosis Test | IDLE | 04/070 | -% | -5.5 to +6.3% | max. 0.2 g/s | EVAP OK |
| 11. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | CHECK END | SYST.OK |
| 12. Secondary Air System Test | IDLE | 04/077 | | | | |
| 13. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

Note for Step 5: ACTIVE = 1, NONACTIVE = 2; 111: 1st digit = O2 Control Active, 2nd digit = HO2S Operational, 3rd digit = OH2S Heater ON (3rd digit toggles ON/OFF with engine warm.

*Table 3-11. Engine Code AHA: 2000 Passat 2.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 18% | 80 to 90% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP.OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 630–820 RPM | -10 to +10 | -10 to +10 | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/04 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.aC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | |
| 11. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/034 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/035 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 12 to 26% | 0 to 1V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B1-S2 OK |

*Table 3-11. Engine Code AHA: 2000 Passat 2.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.50<br>Man 0 to 0.55 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.50<br>Man 0 to 0.55 | CAT B2 OK |
| 19. Secondary Air System Test | IDLE | 04/077 | 630–820 RPM | 0 to 5 g/s | -80 to +20% | SYST.OK |
| 20. Secondary Air System Test | IDLE | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086<br>or Exit, Select 15 | 00000000 | | | |

*Table 3-12. Engine Code APH: 1999–2001 New Beetle 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | Counter counts up to 8 or 9 during adaptation | ADP OK |
| 4. Before CAT Oxygen Sensor Aging Test, Bank 1 | IDLE | 04/034 | IDLE | Catalyst temp must be More than 662°F (350°C) | | |
| 5. Catalytic Converter Test | 2280–2760 RPM | 04/046 | 2280–2760 RPM | More than 752°F (400°C) | Man Trans Less than 0.33; A/T Less than 0.40 | CAT B1 OK |
| 6. Secondary Air System Test | IDLE | 04/077 | 820–860 RPM | | | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | | | | TBV OK or SYST.OK |
| 8. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 9. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-13. Engine Code ATQ: 2000–03 Passat 2.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 18% | 80 to 90% | 0 to 8 | APD OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 630–820 RPM | -10 to +10 | -10 to +10 | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/04 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.aC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | |
| 11. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/034 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/035 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 12 to 26% | 0 to 1V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B1-S2 OK |

*Table 3-13. Engine Code ATQ: 2000–03 Passat 2.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.58<br>Man 0 to 0.62 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.58<br>Man 0 to 0.62 | CAT B2 OK |
| 19. Secondary Air System Test | IDLE | 04/077 | 630–820 RPM | 0 to 5 g/s | -80 to +20% | SYST.OK |
| 20. Secondary Air System Test | IDLE | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086<br>or Exit, Select 15 | 00000000 | | | |

*Table 3-14. Engine Code ATW: 1999 Passat 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | |
| 5. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 1.0 s | B1-S1 OK |
| 6. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.5 to 0.95V | B1-S2 OK | | |
| 7. Oxygen Sensor Test | IDLE | 04/037 | 15 to 30% | 0.1 to 0.9V | -150 to +150 ms | SYST.OK |
| 8. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 9. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.4 | CAT B1 OK |
| 10. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | -7 to +7% | | EVAP OK |
| 11. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 12. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 140 to 212°F (60 to 100°C) | 4 to 10 g/s | |
| 13. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 3-15. Engine Code ATW: 2000–01 Passat 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 9 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | |
| 5. Closed Loop Fuel Control Test | IDLE | 04/107 | 800–900 RPM | -8 to +8% | | SYST.OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | Closed/Open | | CHECK END | |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 8. Heated Oxygen Sensor | 1800–2200 RPM | 04/041 | 0 to 2.0 kohm | Htg..bC ON | 0 to 2.0 kohm | Htg..bC ON |
| 9. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.5 to 0.95V | B1-S2 OK | | |
| 10. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 1.0 s | B1-S1 OK |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -150 to +150 ms | SYST.OK |
| 12. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 13. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 752°F (400°C) | 0.0 to 0.29 | CAT B1 OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | 4 to 10 g/s | SYST.OK |
| 15. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 3-16. Engine Code AUG: 2001 Passat 1.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 79 to 94% | 79 to 94% | KICKDOWN | |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 6. Before CAT Oxygen Sensor Response Time Test | 2300–2800 RPM | 04/034 | 2300–2800 RPM | More than 662°F (350°C) | 0.5 to 2.5 | B1-S1 OK |
| 7. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.1 to 0.9V | B1-S2 OK | | |
| 8. Oxygen Sensor Test | IDLE | 04/037 | 13 to 45% | 0.1 to 0.9V | Less than 0.02 | SYST.OK |
| 9. After CAT Oxygen Sensor Aging Test | 2300–2800 RPM | 04/043 | 2300–2800 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 10. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 11. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | More than -20% | |
| 12. Catalytic Converter Test | 2300–2500 RPM | 04/046 | 2300–2500 RPM | 1022 to 1292°F (550 to 700°C) | More than 2.5 | CAT B1 OK |
| 13. Closed Loop Fuel Control Test | IDLE | 04/107 | 800–900 RPM | -8 to +8% | | SYST.OK |
| 14. Camshaft Timing Test | More than 1080 RPM | 04/094 | More than 1080 RPM | CS - ctr. ON | SYST.OK | |
| 15. Misfire Activity Check | IDLE | 08/014 | 740–920 RPM | 13 to 45% | 0 | activated |

*Table 3-16. Engine Code AUG: 2001 Passat 1.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. Oxygen Sensor Heater Check | IDLE | 08/041 | | Htg..bC ON | Less than 2.0 kohm | Htg..aC ON |
| 17. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 3-17. Engine Code AVH: 2001–03 New Golf, New Jetta & New Beetle 2.0L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | 8 | ADAP. OK |
| 4. Fuel Tank Leak Test | IDLE | 04/202 | | | | xx0xx1x0 |
| 5. Knock Sensor Check | ROAD TEST: More than 3000 RPM | 08/203 | | | | xxxxx100 |
| 6. Vehicle Speed Check | ROAD TEST: More than 3000 RPM | 08/204 | | | | xxxxx100 |
| 7. Before CAT Oxygen Sensor Heater Check | Depress brake pedal and hold, press accelerator to full throttle. | 08/205 | | | | xxxxx100 |
| 8. Before CAT Oxygen Sensor Aging Test | (Same as step 7) | 04/212 | | | | xxxxx100 |
| 9. Fuel Trim Part Throttle Adaptation Test | (Same as step 7) | 04/216 | | | | xxxxx100 |
| 10. Mass Airflow Sensor Test | (Same as step 7) | 04/218 | | | | 00000x00 |
| 11. After CAT Oxygen Sensor Heater Test | (Same as step 7) | 04/219 | | | 392 to 1112°F (200 to 600°C) | xxxxx100 |
| 12. After CAT Oxygen Sensor Test | (Same as step 7) | 04/221 | | | 392 to 1112°F (200 to 600°C) | 000xx100 |
| 13. After CAT Oxygen Sensor Test | (Same as step 7) | 04/224 | | | | xxxxx100 |
| 14. Catalytic Converter | (Same as step 7) | 04/226 | | | 842 to 1364°F (450 to 740°C) | xxxxx100 |
| 15. Fuel Trim Idle Adaptation Test | IDLE | 04/216 | | | | xxxx1100 |
| 16. EVAP System Diagnosis Test | IDLE | 04/228 | | | | xxxxx100 |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-17. Engine Code AVH: 2001–03 New Golf, New Jetta & New Beetle 2.0L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 17. Secondary Air System Test | IDLE | 04/229 | | | | xxxxx100 |
| 18. Fuel Trim Idle Adaptation Test | IDLE | 04/231 | | | | xxxxx100 |
| 19. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-18. Engine Code AWD: 2000–01 Golf, GTI, Jetta & New Beetle 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Temperature Check | 1800–2500 RPM | 08/004 | 1800–2500 RPM | | | |
| 4. Closed Loop Fuel Control Check | 1800–2500 RPM | 08/030 | - - - - - - 11 | | | |
| 5. Closed Loop Fuel Control Test | IDLE | 04/107 | 640–840 RPM | -23 to +23% | | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 10% | | More than 30% | EVAP OK |
| 7. After CAT Oxygen Sensor Test | IDLE | 04/036 | Less than 0.4 V or More than 0.5 V | B1-S2 OK | | |
| 8. After CAT Oxygen Sensor Aging Test | 1800–2500 RPM | 04/043 | 1800–2500 RPM | More than 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 9. Camshaft Timing Test | 1800–2500 RPM | 04/094 | 1800–2500 RPM | CS-ctr.1 ON/OFF | SYST.OK | |
| 10. Knock Sensor Test | 1800–2500 RPM | 04/028 | 1800–2500 RPM | 12–25% | More than 104°F (40°C) | SYST.OK |
| 11. Before CAT Oxygen Sensor Response Time Test | 1800–2500 RPM | 04/034 | 1800–2500 RPM | More than 662°F (350°C) | More than 0.5 | B1-S1 OK |
| 12. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -1200 to +1200 ms | SYST.OK |
| 13. Catalytic Converter Test | 1800–2500 RPM | 04/046 | 1800–2500 RPM | More than 752°F (400°C) | 0.0 to 0.32 | CAT B1 OK |
| 14. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 15. Secondary Air System Test | IDLE | 04/077 | | 5 to 12 g/s | More than -45% | |
| 16. Misfire Activity Check | IDLE | 08/014 | 640–820 RPM | 12 to 30% | 0 | activated |
| 17. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 3-19. Engine Code AWM: 2001–03 Passat 1.8L 4-cylinder (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• Emergency brake engaged<br>• Manual transmission in neutral/Automatic transmission in "P" or "N"<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 79 to 94% | 79 to 94% | KICKDOWN | |
| 5. Measurement Block 001 Test | WARM UP | 04/001 | 700–6600 RPM | 176 to 230°F (80 to 110°C) | -10 to +10 | 11111111 |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 700–860 RPM | -8% to +8% | | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | -7% or +7% | | TBV OK |
| 8. Knock Sensor Test | Depress brake pedal and hold, press accelerator to full throttle. | 04/028 | preset RPM | More than 13% | More than 176°F (80°C) | SYST.OK |
| 9. Before CAT Oxygen Sensor Response Time Test | (Same as step 8) | 04/034 | preset RPM | More than 662°F (350°C) | 0.5 to 2.5 | B1-P1 OK |
| 10. Before CAT Oxygen Sensor Test | IDLE | 04/036 | 0.1 to 0.9V | B1-P2 OK | | |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 13 to 45% | 0.1 to 0.9V | -0.02 to +0.02 | SYST.OK |
| 12. Before CAT Oxygen Sensor Aging Test | (Same as step 8) | 04/043 | preset RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-P2 OK |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See "Sample Procedure 2: VW Engine ID Code AWM" on page 10 for more information. | | | | | | |

*Table 3-19. Engine Code AWM: 2001–03 Passat 1.8L 4-cylinder (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 13. Catalytic Converter Test | (Same as step 8) | 04/046 | preset RPM | 550–700°C | More than 2.0 | CAT B1 OK |
| 14. Camshaft Timing Test | (Same as step 8) | 04/094 | preset RPM | CS-ctr. ON | SYST.OK | |
| 15. Fuel Tank Leak Test | IDLE | 04/071 | | | Check END | SYST.OK |
| 16. Secondary Air System Test | IDLE | 04/077 | 700–860 RPM | 1 to 10 g/s | -50% to +30% | |
| 17. Misfire Activity Check | IDLE | 04/014 | 700–860 RPM | 13 to 45% | Less than 5 | activated |
| 18. Oxygen Sensor Heater Test | IDLE | 04/041 | | Htg. before CAT. ON/OFF (fluctuates) | Less than 0.02 kohm | Htg. after CAT. ON |
| 19. Readiness Code Setting Check | IDLE | 08/086 | 00000000 | | | |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

*Table 3-20. Engine Code AWP: 2001–02 New Beetle*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 88% | 89 to 11% | 0 to 8 | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | 700–810 RPM | 12 to 15V | 140 to 176°F (60 to 80°C) | Max. 140°F (60°C) |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | CHECK END | SYST.OK |
| 6. Oxygen Sensor Control and Heater Check | IDLE | 08/030 | x11 | xxx | | |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 700–810 RPM | -10% to +10% | | SYST.OK |
| 8. Before CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | Min. 662°F (350°C) | 0.5 to 1.99 | B1-S1 OK |
| 9. After CAT Oxygen Sensor Test | 1800–2200 RPM | 04/036 | 0.1 to 0.4V or 0.5 to 0.9V | B1-S2 OK | | |
| 10. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | Min 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 11. Oxygen Sensor Test | 1800–2200 RPM | 04/037 | 12 to 30% | 0.1 to 0.9V | -0.02 to +0.02 | SYST.OK |
| 12. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | Min. 820°F (440°C) | 0.0 to 0.2 | CAT B1 OK |
| 13. EVAP System Diagnosis Test | IDLE | 04/070 | 0.0 to 10.0% | -7% to +7% | Min. 50% | EVAP OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 700–810 RPM | 5.0 to 12.0 g/s | Min. 30% | SYST.OK |
| 15. Misfire Activity Check | IDLE | 08/014 | 640–820 RPM | 12 to 30% | 0 | ACTIVATED |
| 16. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-21. Engine Code AWP: 2003 New Beetle*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 93% | 97 to 3% | 0 to 8 | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | 640–860 RPM | 12 to 15V | 140 to 176°F (60 to 80°C) | Max. 176°F (80°C) |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | CHECK END | SYST.OK |
| 6. Oxygen Sensor Control and Heater Check | IDLE | 08/030 | x11 | xxx | | |
| 7. EVAP System Diagnosis Test | IDLE | 04/170 | 0 to 100% | -7% to +7% | Min. 30% | EVAP.OK |
| 8. Before CAT Oxygen Sensor Aging Test | Press and hold the gas and brake pedals to the floor until Channel 1 reads 1800–2200 RPM. | 04/034 | 1800–2200 RPM | Min. 662°F (350°C) | 0.5 to 2.5 s | B1-S1 OK |
| 9. Secondary Air System Test | IDLE | 04/077 | 640–860 RPM | 5.0 to 12.0 g/s | -45 to 100% | SYST.OK |
| 10. Oxygen Sensor Test | 1800–2200 RPM | 04/037 | 12 to 30% | 0.1 to 0.9V | -0.02 to 0.02 | |
| 11. After CAT Oxygen Sensor Aging Test | (Same as step 8) | 04/043 | 1800–2200 RPM | Min 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 12. After CAT Oxygen Sensor Test | 1800–2200 RPM | 04/036 | 0.1 to 0.4V or 0.5 to 0.9V | B1-S2 OK | | |
| 13. Catalytic Converter Test | (Same as step 8) | 04/046 | 1800–2200 RPM | Min. 820°F (440°C) | 0.0 to 0.32 | CAT B1 OK |
| 14. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-22. Engine Code AWV: 2000–02 New Beetle 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | Counter counts up to 8 or 9 during adaptation | ADP OK |
| 4. Before CAT Oxygen Sensor Aging Test, Bank 1 | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | O2V 0.00 to 1.00 | |
| 5. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 824°F (440°C) | Less than 0.32 | CAT B1 OK |
| 6. Secondary Air System Test | IDLE | 04/077 | 640–820 RPM | 5 to 12 g/s Air Mass for Secondary Air | More than -45% Relative coolant temp | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | | | | TBV OK or SYST.OK |
| 8. Fuel Tank Leak Test | IDLE | 04/071 | Reed Closed | | CHECK END | SYST.OK |
| 9. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-23. Engine Code AWV: 2003 New Beetle 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 88% | 89 to 11% | 0 to 8 | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | 700–810 RPM | 12.0 to 15.0V | 140 to 176°F (60 to 80°C) | Max. 140°F (60°C) |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | More than 824°F (440°C) Catalyst Temp | CHECK END | SYST. OK |
| 6. Oxygen Sensor Control and Heater Check | IDLE | 08/030 | x11 | xxx | | |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 700–810 RPM | -10 to +10% | | SYST. OK |
| 8. Before CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | Min. 662°F (350°C) | 0.5 to 1.99 | B1-S1 OK |
| 9. After CAT Oxygen Sensor Test | 1800–2200 RPM | 04/036 | 0.1 to 0.4V or 0.5 to 0.9V | B1-S2 OK | | |
| 10. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | Min. 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 11. Oxygen Sensor Test | 1800–2200 RPM | 04/037 | 12 to 30% | 0.1 to 0.9V | -0.02 to +0.02 | SYST. OK |
| 12. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | Min. 440°C | 0.0 to 0.20 | CAT B1 OK |
| 13. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 10% | -7 to +7% | Min. 50% | EVAP OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 700–810 RPM | 5.0 to 12.0 g/s | Min. 30% | SYST. OK |
| 15. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-24. Engine Code AWW: 2000–03 Jetta & Golf 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 93% | 97 to 3% | 0 to 8 | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | 640–820 RPM | 8.0 to 15.0V | 140 to 176°F (60 to 80°C) | Max. 176°F (80°C) |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | Check END | SYST.OK |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 640–820 RPM | -23% to +23% | | |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 10% | -7% to +7% | Min. 30% | EVAP OK |
| 8. After CAT Oxygen Sensor Test | 1800–2200 RPM | 04/036 | 0.1 to 0.4 V or 0.5 to 0.9 V | B1-S2 OK | | |
| Steps 9 and 10 are optional if the test vehicle is equipped with variable camshaft control and knock sensors. | | | | | | |
| 9. Camshaft Timing Test | 1800–2200 RPM | 04/094 | 1800–2200 RPM | | SYST.OK | |
| 10. Knock Sensor Test | 1800–2200 RPM | 04/028 | 1800–2200 RPM | 12 to 25% | More than 104°F (40°C) | SYST.OK |
| 11. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | Min. 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 12. Oxygen Sensor Check | 1800–2200 RPM | 08/030 | x11 | xxx | | |
| 13. Oxygen Sensor Aging Before CAT | 1800–2200 RPM | 04/034 | 1800–2200 RPM | Min. 662°F (350°C) | 0.5 to 2.5 s | B1-S1 OK |
| 14. Oxygen Sensor CAT Control Dwell Time Test | 1800–2200 RPM | 04/037 | 12 to 30% | 0.1 to 0.9 V | -0.02 to +0.02 | SYST.OK |
| 15. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | Min. 824°F (440°C) | 0.0 to 0.32 | CAT B1 OK |
| 16. Secondary Air System Test | IDLE | 04/077 | 640–820 RPM | 5.0 to 12.0 g/s | -45% to +100% | SYST.OK |
| 17. Misfire Activity Check | IDLE | 08/014 | 640–820 RPM | 12 to 30% | 0 | ACTIVATED |
| 18. Readiness Code Setting Check | Key On, Engine Off | Exit, Select 15 | 00000000 | | | |

*Table 3-25. Engine Code AXK: 2001–03 Eurovan 2.8L VR6 (sheet 1 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—<br>When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | | | KICKDOWN | |
| 5. Fuel Tank Leak Test | IDLE:<br>Specification: xxxxx100 is indicated in Display Field 4 | 04/202 | NOTE: During this work step, the diagnostic pump can start repeated diagnostic procedures until specified value is obtained, depending on how much fuel is in the fuel tank. If a diagnostic time of 3 minutes is exceeded, there may be a leak. (Check DTC entry.) | | | xxxxx100<br>NOTE: May take up to 30 seconds. |
| 6. Knock Control Test | ROAD TEST:<br>1) Accelerate in 1st gear until approx. 3000 RPM is reached.<br>2) Run briefly at approx. 3000 RPM until Channel 4 reads as indicated. | 04/203 | | | | xxxxx100 |
| 7. Vehicle Speed Test | ROAD TEST:<br>1) Accelerate until a speed of more than 3000 RPM is reached.<br>2) Abruptly close throttle valve. | 04/204 | NOTE: Decceleration indication must be obtained once for approx. 3 seconds performed in 1st gear. | | | xxxxx100 |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-25. Engine Code AXK: 2001–03 Eurovan 2.8L VR6 (sheet 2 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 8. Before CAT Oxygen Sensor Heater Test | IDLE:<br>1) Depress brake pedal and hold, press accelerator to full throttle. Engine speed raised to approx. 2300 RPM by the ECM.<br>2) Let engine run at increased RPM (about 40 seconds) until Channel 4 reads as indicated. | 04/205<br>Do Not Exit | | | | xxxxx100 |
| 9. Intake Camshaft to Crankshaft Position Test | (Same as step 8) | 04/208 | | | | xxxxx100 |
| 10. Exhaust Camshaft to Crankshaft Position Test | (Same as step 8) | 04/209 | | | | xxxxx100 |
| 11. Intake Camshaft Adjustment Test | (Same as step 8) | 04/210 | | | | xxxxx100 |
| 12. Exhaust Camshaft Adjustment Test | (Same as step 8) | 04/211 | | | | xxxxx100 |
| 13. Before CAT Oxygen Sensor Aging Test | (Same as step 8) | 04/212 | NOTE: If monitor does not set, check 08/046 to view CAT temperature. Raise CAT temp. to at least 662°F (350°C) via an engine speed of approx. 3500 RPM and repeat this step. | | | xxxxx100 |
| 14. Fuel Trim Part Throttle Adaptation Test | IDLE<br>1) Depress brake pedal and hold, press accelerator to full throttle. Engine speed raised to approx. 2300 RPM by the ECM.<br>2) Let engine run at increased RPM (about 75 seconds) until Channel 4 reads as indicated. | 04/216 | | | | xxxxx100 |
| 15. Mass Airflow Sensor Test | (Same as step 14) | 04/218<br>Do Not Exit | NOTE: This procedure may last approx. 4 minutes. | | | xxxxx100 |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-25. Engine Code AXK: 2001–03 Eurovan 2.8L VR6 (sheet 3 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Heater Test | (Same as step 14) | 04/220 | | | | xxxxx100 |
| 17. After CAT Oxygen Sensor Test | IDLE<br>1) Depress brake pedal and hold, press accelerator to full throttle. Engine speed raised to approx. 2300 RPM by the ECM.<br>2) Let engine run at increased RPM (about 30 seconds) until Channel 4 reads as indicated. | 04/222<br>Do Not Exit | | | | xxxxx100 |
| 18. After CAT Oxygen Sensor Aging Test | IDLE<br>1) Depress brake pedal and hold, press accelerator to full throttle. Engine speed raised to approx. 2300 RPM by the ECM.<br>2) Let engine run at increased RPM (about 15 seconds) until Channel 4 reads as indicated. | 04/225<br>Do Not Exit | | | | xxxxx100 |
| 19. Catalytic Converter Test<br>NOTE: After this work step, the ECM returns to the condition “IDLE” | IDLE:<br>1) Depress brake pedal and hold, press accelerator to full throttle. Engine speed raised to approx. 2300 RPM by the ECM.<br>2) Let engine run at increased RPM (about 60 seconds) until Channel 4 reads as indicated.<br>3) Release the accelerator and brake pedal, then let engine run at IDLE. | 04/227<br>Do Not Exit | | | | xxxxx100 |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-25. Engine Code AXK: 2001–03 Eurovan 2.8L VR6 (sheet 4 of 4)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 20. Fuel Tank Leak Test | IDLE:<br>Approx. 30 seconds until Channel 4 reads as indicated. | 04/216<br>Do Not Exit | | | | xxxxx100 |
| 21. EVAP System Diagnosis Test | (Same as step 20) | 04/229<br>Do Not Exit | | | | xxxxx100 |
| 22. Secondary Air System Test | (Same as step 20) | 04/231 | | | | xxxxx100 |
| 23. Readiness Code Setting Check | Exit out and check Readiness Code to view completed monitors | Exit, Select 15 | 00000000 | | | |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-26. Engine Code AZG: 2001–03 New Golf, New Jetta & New Beetle 2.0L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | 8 | ADP.OK |
| 4. Fuel Tank Leak Test | IDLE | 04/202 | | | | xx0xx1x0 |
| 5. Knock Sensor Check | ROAD TEST: More than 3000 RPM | 08/203 | | | | xxxxx100 |
| 6. Vehicle Speed Check | ROAD TEST: More than 3000 RPM | 08/204 | | | | |
| 7. Before CAT Oxygen Sensor Heater Check | Depress brake pedal and hold, press accelerator to full throttle. | 08/205 | | | | |
| 8. Before CAT Oxygen Sensor Aging Test | (Same as step 7) | 04/212 | | | | |
| 9. Fuel Trim Part Throttle Adaptation Test | (Same as step 7) | 04/216 | | | | |
| 10. Mass Airflow Sensor Test | (Same as step 7) | 04/218 | | | | 00000x00 |
| 11. After CAT Oxygen Sensor Heater Test | (Same as step 7) | 04/219 | | | 392 to 1112°F (200 to 600°C) | xxxxx100 |
| 12. After CAT Oxygen Sensor Test | (Same as step 7) | 04/221 | | | 392 to 1112°F (200 to 600°C) | 000xx100 |
| 13. After CAT Oxygen Sensor Test | (Same as step 7) | 04/224 | | | | xxxxx100 |
| 14. Catalytic Converter Test | (Same as step 7) | 04/226 | | | 842 to 1364°F (450 to 740°C) | |
| 15. Fuel Trim Idle Adaptation Test | IDLE | 04/216 | | | | xxxx1100 |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-26. Engine Code AZG: 2001–03 New Golf, New Jetta & New Beetle 2.0L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. EVAP System Diagnosis Test | IDLE | 04/228 | | | | xxxxx100 |
| 17. Secondary Air System Test | IDLE | 04/229 | | | | |
| 18. Fuel Trim Idle Adaptation Test | IDLE | 04/231 | | | | |
| 19. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |
| NOTE: Brake pedal must remain pressed and held during test in order for test to run and complete with ECM controlled RPM. | | | | | | |

*Table 3-27. Engine Code BDF: 2001–02 Golf, GTI & Jetta 2.8L VR6*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 93% | 97 to 3% | 8 | ADP.OK |
| 4. Temperature Check | IDLE | 08/004 | 640–720 RPM | 11.5 to 15.0V | 185 to 230°F (85 to 110°C) | Less than 176°F (80°C) |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed open | | Check END | SYST.OK |
| 6. Oxygen Sensor Check | IDLE | 08/030 | 111 | xxx | | |
| 7. Before CAT Oxygen Sensor Aging Test | Depress brake pedal and hold, press accelerator to full throttle. | 04/034 | 2300 RPM | More than 380°C | 1.0 to 2.5 | B1-P1 OK |
| 8. Fuel Trim Part Throttle Adaptation Test | (Same as step 7) | 04/216 | | | | xxxxx100 |
| 9. Oxygen Sensor Check | IDLE | 08/030 | xxx | 111 | | |
| 10. After CAT Oxygen Sensor Aging Test | (Same as step 7) | 04/043 | 2300 RPM | More than 716°F (380°C) | 0.1 to 0.9V | B1 P2 OK |
| 11. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.1 to 0.9V | B1 P2 OK | | |
| 12. Catalytic Converter Test | (Same as step 7) | 04/046 | 2300 RPM | More than 716°F (380°C) | 0.00 to 0.99 | CAT B1 OK |
| 13. Fuel Tank Leak Test | IDLE | 04/216 | | | | xxxx1100 |
| 14. EVAP System Diagnosis Test | IDLE | 04/070 | | | | TBV OK |
| 15. Secondary Air System Test | IDLE | 04/077 | 640–720 RPM | | | SYST. OK |
| 16. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

*Table 3-28. Engine Code BDF: 2003 Golf & Jetta 2.8L VR6*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | | | 0 to 8 | ADP.OK |
| 4. EVAP System Diagnosis Test | IDLE | 04/202 | | | | xxxxx100 |
| Enter 04/212 depress gas pedal to full throttle and hold until the test is done, then release the gas pedal and continue to the next step. This test may take several minutes. | | | | | | |
| 5. Before CAT Oxygen Sensor Aging Test | IDLE | 04/212 | | | | xxxxx100 |
| With your foot on the brake, enter 04/227 and depress gas pedal to full throttle and hold until the test is done, then release the gas pedal and continue to the next step. This test may take several minutes. | | | | | | |
| 6. Catalytic Converter Test | IDLE | 04/227 | | | | xxxxx100 |
| Remove your foot from the brake. | | | | | | |
| 7. EVAP System Diagnosis Test | IDLE | 04/229 | | | | xxxxx100 |
| 8. Secondary Air System Test | IDLE | 04/231 | | | | xxxxx100 |
| 9. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |

*Table 3-29. Engine Code BDP: 2002–03 Passat W8 (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 16% | 82 to 97% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | | | KICKDOWN | |
| 5. Fuel Tank Leak Test | IDLE | 04/202 | | | | xxxxx100 |
| 6. Before CAT Oxygen Sensor Heater Test, Bank 1 | Depress brake pedal and hold, press accelerator to full throttle. | 04/205 | | | | xxxxx100 |
| 7. Before CAT Oxygen Sensor Heater Test, Bank 2 | (Same as step 6) | 04/206 | | | | xxxxx100 |
| 8. Before CAT Oxygen Sensor Aging Test, Bank 1 | (Same as step 6) | 04/215 | | | More than 1 | xxxxx100 |
| 9. Before CAT Oxygen Sensor Aging Test, Bank 1 | (Same as step 6) | 04/216 | | | More than 1 | xxxxx100 |
| 10. Fuel Trim Part Throttle Adaptation Test, Bank 1 | (Same as step 6) | 04/219 | | | | xxxxx100 |
| 11. Fuel Trim Part Throttle Adaptation Test, Bank 2 | (Same as step 6) | 04/220 | | | | xxxxx100 |
| 12. Mass Airflow Sensor Test | (Same as step 6) | 04/221 | | | | xxxxx100 |
| 13. After CAT Oxygen Sensor Heater Test, Bank 1 | (Same as step 6) | 04/222 | | | 392 to 1202°F (200 to 650°C) | xxxxx100 |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

*Table 3-29. Engine Code BDP: 2002–03 Passat W8 (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 14. After CAT Oxygen Sensor Heater Test, Bank 2 | (Same as step 6) | 04/223 | | | 200 to 650°C | xxxxx100 |
| 15. After CAT Oxygen Sensor Test | (Same as step 6) | 04/226 | | | | xxxxx100 |
| 16. After CAT Oxygen Sensor Aging Test, Bank 1 | (Same as step 6) | 04/227 | | | | xxxxx100 |
| 17. After CAT Oxygen Sensor Aging Test, Bank 2 | (Same as step 6) | 04/228 | | | | xxxxx100 |
| 18. Catalytic Converter Test, Bank 1 | (Same as step 6) | 04/229 | | | | xxxxx100 |
| 19. Catalytic Converter Test, Bank 2 | (Same as step 6) | 04/230 | | | | xxxxx100 |
| 20. Fuel Trim Idle Adaptation Test, Bank 1 | IDLE | 04/219 | | | | xxxxx100 |
| 21. Fuel Trim Idle Adaptation Test, Bank 2 | IDLE | 04/220 | | | | xxxxx100 |
| 22. EVAP System Diagnosis Test | IDLE | 04/231 | | | | xxxxx100 |
| 23. Secondary Air System Test, Bank 1 | IDLE | 04/232 | | | | xxxxx100 |
| 24. Secondary Air System Test, Bank 2 | IDLE | 04/233 | | | | xxxxx100 |
| 25. Fuel Trim Idle Adaptation Test, Bank 1 | IDLE | 04/234 | | | | xxxxx100 |
| 26. Fuel Trim Idle Adaptation Test, Bank 2 | IDLE | 04/235 | | | | xxxxx100 |
| 27. Readiness Code Setting Check | IDLE | Exit, Select 15 | 00000000 | | | |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

# Diesel Engines

***Table 3-30. Engine Code 1Z (1996–97): Diesel Engine***

| Test Conditions | |
|---|---|
| 1. | Warm up engine until coolant temperature is 77°F (25°C) minimum. |
| 2. | Turn the engine off, wait 10 seconds, then restart the engine. |
| 3. | Increase engine speed to 2200 RPM. |
| 4. | Release the accelerator and allow the engine to idle (about 900 RPM). |
| 5. | Stop the engine and wait 10 seconds. |
| 6. | Start the engine and increase engine speed to 2200 RPM. |
| 7. | Release the accelerator and allow the engine to idle (about 900 RPM). |
| 8. | Check if readiness codes are set or completed using generic OBD-II testing mode. |

***Table 3-31. Engine Codes 1Z (1998), AHU (1998–99) and ALH (1998–2001): Diesel Engines***

| Test Conditions | |
|---|---|
| 1. | Start the engine and increase the speed to 2200 RPM, release throttle and allow engine to return to idle (900 RPM), stop the engine, and waiting approximately 10 seconds, then repeat. |
| 2. | Exit and select 15 to check Readiness Code settings. If settings are not OK, continue with the next steps. |
| 3. | Start the engine and let it idle for 35 seconds minimum. |
| 4. | Test drive vehicle and maintain 2000 RPM in 3rd gear (manual transmissions) or 2nd gear (automatic transmissions) for 5 seconds minimum. |
| 5. | Accelerate from an engine speed of 2200 RPM to WOT in 2nd or 3rd gear for 8 seconds. |
| 6. | Park the vehicle, switch off the engine, and wait approximately 10 seconds. Repeat steps 3–6 and check for readiness code settings with generic OBD-II testing mode using Snap-on® Domestic or Asian Imports Vehicle Communication Software.<br>NOTE: For ALH, you can check readiness codes with the procedure on page 5. |

***Table 3-32. Engine Code ALH (2002–03): Diesel Engine***

| Test Conditions |
|---|
| 1. Switch the ignition on and wait 5 seconds. |
| 2. Start the engine and let it idle for 45 seconds. |
| 3. Perform the following road test:<br>– In 3rd gear, accelerate with the gas pedal fully depressed, accelerating from 31 MPH (50 KPH) to 75 MPH (120 KPH).<br>– Drive on a level surface for two minutes in 4th gear, maintaining a constant engine speed between 1700 and 1900 RPM. |
| 4. Park the vehicle and switch the ignition off. |
| 5. Wait 15 seconds, then switch the ignition switch back on. |
| 6. Wait 5 seconds, then start the engine and let it run at idle for 45 seconds. |
| 7. Repeat the road test in step 3. |
| 8. Park the vehicle but do not shut the engine off—let it idle for three minutes without touching the gas pedal. |
| 9. Check readiness codes with the procedure for diesel engines on page 5. |

# Chapter 4: Audi Readiness Code Charts

## Gasoline Engines

***Table 4-1. Engine Code ABZ: 1997–99 A8/S8 4.2L***

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/036 | 01100101 | 11111101 | 00010111 | 00010111 |
| 4. Before CAT Oxygen Sensor Check, Banks 1 & 2 | IDLE | 08/026 | -0.170 to 0.900V | -0.170 to 0.900V | B1-S1 ON | B1-S1 ON |
| 5. Before CAT Oxygen Sensor Response Time Test, Bank 1 | 1800–2200 RPM | 04/029 | 1800–2200 RPM | Min. 572°F (300°C) | 0.5 to 2.5 s | B1-S1 OK |
| 6. Before CAT Oxygen Sensor Response Time Test, Bank 2 | 1800–2200 RPM | 04/030 | 1800–2200 RPM | Min. 572°F (300°C) | 0.5 to 2.5 s | B2-S1 OK |
| 7. Catalytic Converter Test, Bank 1 | 1800–2200 RPM | 04/031 | 1800–2200 RPM | Min. 572°F (300°C) | 0.00 to 0.30 | CAT B1 OK |
| 8. Catalytic Converter Test, Bank 2 | 1800–2200 RPM | 04/032 | 1800–2200 RPM | Min. 572°F (300°C) | 0.00 to 0.30 | CAT B2 OK |
| 9. EVAP System Diagnosis Test | IDLE | 04/033 | | -5.5 to +6.3% | Max. 0.2 g/s | EVAP OK |
| 10. Fuel Tank Leak Test | IDLE | 04/034 | | | CHECK END | SYST.OK |
| 11. Readiness Code Setting Check | IDLE | 08/036 or Exit, Select 15 | 00000000 | | | |

*Table 4-2. Engine Code AEB: 1997–99 A4 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/086 | 11100101/ 01100101 | 11111101 | 00011111 | 00000000 |
| 4. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 0 to 25° | 0 to 25° | IDLE | ADP.OK |
| 5. Before and After CAT Oxygen Sensor Heater Check | 1800–2200 RPM | 08/030 | 111 | 111 | | |
| 6. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | 0.8 to 2.0 ms | 0.0 to 3.3 s | B1-S1 OK |
| 7. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 0.0 to 1.0 | 0 to 2 | 58.6 s | CAT B1 OK NOTE: May take up to 1 min. before test runs (Test ON). |
| 8. EVAP System Diagnosis Test | IDLE | 04/070 | | -5.4 to 9.4% | | |
| 9. Fuel Tank Leak Test | IDLE | 04/071 | | | | |
| 10. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-3. Engine Code AEB: 2000 A4 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 9 | ADP.OK |
| 4. Kickdown Adaptation Test | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | |
| 5. Closed Loop Fuel Control Test | IDLE | 04/107 | 800–900 RPM | -8% to +8% | | SYST.OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | | | Check END | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | 0 to 2.0 kohm | Htg..bC ON | 0 to 2.0 kohm | Htg..bC ON |
| 9. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.5 to 0.095V | B1-S2 OK | | |
| 10. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 1.0 s | B1-S1 OK |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -150 ms to +150 ms | SYST.OK |
| 12. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 13. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 752°F (400°C) | 0.0 to 0.29 | CATB1 OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | 4 to 10 g/s | SYST.OK |
| 15. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-4. Engine Code AEW: 1997–99 A8/S8 3.7L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/036 | 01100101 | 11111101 | 00010111 | 00010111 |
| 4. Before CAT Oxygen Sensor Check, Banks 1 & 2 | IDLE | 08/026 | -0.170 to 0.900V | -0.170 to 0.900V | B1-S1 ON | B1-S1 ON |
| 5. Before CAT Oxygen Sensor Response Time Test, Bank 1 | 1800–2200 RPM | 04/029 | 1800–2200 RPM | Min. 572°F (300°C) | 0.5 to 2.5 s | B1-S1 OK |
| 6. Before CAT Oxygen Sensor Response Time Test, Bank 2 | 1800–2200 RPM | 04/030 | 1800–2200 RPM | Min. 572°F (300°C) | 0.5 to 2.5 s | B2-S1 OK |
| 7. Catalytic Converter Test, Bank 1 | 1800–2200 RPM | 04/031 | 1800–2200 RPM | Min. 572°F (300°C) | 0.00 to 0.30 | CAT B1 OK |
| 8. Catalytic Converter Test, Bank 2 | 1800–2200 RPM | 04/032 | 1800–2200 RPM | Min. 572°F (300°C) | 0.00 to 0.30 | CAT B2 OK |
| 9. EVAP System Diagnosis Test | IDLE | 04/033 | | -5.5 to +6.3% | Max. 0.2 g/s | EVAP OK |
| 10. Fuel Tank Leak Test | IDLE | 04/034 | | | CHECK END | SYST.OK |
| 11. Readiness Code Setting Check | IDLE | 08/036 or Exit, Select 15 | 00000000 | | | |

***Table 4-5. Engine Code AFC: 1996–98 A4/S4, A6/S6, and Cabriolet***

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/029* | 111_11_1 | 000_00_0 | 0 | 0 |
| 4. Warm up engine, Temperature Check | IDLE | 08/001 | More than 158°F (70°C) | | | |
| 5. A mixed city and highway drive is required. The necessary driving conditions for the test drive are listed below:<br>Speed: 50–62 MPH for 1½–5 minutes<br>RPM: 1800–2700 RPM. Manual Transmissions in 4th or 5th gear, Automatics in “D”rive.<br>Drive Profile: At specified speed (50–62 MPH), implement a short deceleration phase (5–8 s), then resume steady MPH/RPM.<br>Drive Time: Approximately 1.5–5 minutes, as long as necessary. | | | | | | |
| 6. Readiness Code Setting Check | IDLE | 08/029 or Exit, Select 15 | 000_00_0 | | | |

* If display field 1 in display group 029 reads “1” instead of “0”, and/or a malfunction relating to the exhaust system is stored in the DTC memory, you must use display group 017 for a selective diagnosis. Since exhaust gas recirculation is switched off during Basic Setting (04), diagnosis of the EGR throughput is evaluated only in Read Measuring Value Block (08). The diagnosis is only considered OK when the EGR temperature is greater than 122°F (50°C) during reading time. Diagnosis of the EGR flow is active when the following conditions are met: coolant temperature is greater than 46°F (8°C); vehicle is in constant drive with an engine speed of 2000–3000 RPM; engine load is 30–60%.

*Table 4-6. Engine Code AHA: 1997–99 A4/S4/A6/S6 2.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 08/086 | 01101101 | 11111111 | 00111111 | 00011111 |
| 4. Throttle Body Adaptation Test | Key On, Engine Off | 04/098 | 3.255 to 4.745V | 0.902 to 4.863V | IDLE | ADP.OK |
| 5. Before and After CAT Oxygen Sensor Heater Check | 2000–2500 RPM | 08/030 | 111* | 111 | 111 | 111 |
| 6. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | 0.8 to 2.5 ms | 0.00 to 2.1 s | B1-S1 OK |
| 7. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/035 | 1800–2200 RPM | 0.8 to 2.5 ms | 0.00 to 2.1 s | B1-S1 OK |
| 8. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 0.00 to 0.28 | 0 to 2 | 58.6 s | CAT B1 OK |
| 9. Catalytic Converter Test | 1800–2200 RPM | 04/047 | 0.00 to 0.2 | 0 to 2 | 58.6 s | CAT B1 OK |
| 10. EVAP System Diagnosis Test | IDLE | 04/070 | | -5.5 to +6.3% | Max. 0.2 g/s | EVAP OK |
| 11. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | CHECK END | SYST.OK |
| 12. Secondary Air System Test | IDLE | 04/077 | | | | SYST.OK |
| 13. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

* ACTIVE = 1, NONACTIVE = 2; 111: 1st digit = O2 Control Active, 2nd digit = HO2S Operational, 3rd digit = OH2S Heater ON (3rd digit toggles ON/OFF with engine warm.

*Table 4-7. Engine Code AKB: 2000 A8 4.2L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 92% | 2 to 47% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | SYST.OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 650–730 RPM | -10 to +10% | -10 to +10% | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.bC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B1-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.0 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/035 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.0 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 13.5 to 22.5% | 0.1 to 0.01V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 650–730 RPM | More than 446°F (230°C) | 0 to 1V | B1-S2 OK |

*Table 4-7. Engine Code AKB: 2000 A8 4.2L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 650–730 RPM | More than 446°F (230°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1900–2400 RPM | More than 662°F (350°C) | 0 to 0.25 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1900–2400 RPM | More than 662°F (350°C) | 0 to 0.25 | CAT B2 OK |
| 19. Secondary Air System Test | 1800–2400 RPM | 04/077 | 1800–2400 RPM | More than 13 g/s | -70 to +30% | SYST.OK |
| 20. Secondary Air System Test | 1800–2400 RPM | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-8. Engine Code AMB: 2002–03 A4 and Cabrio 1.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• Emergency brake engaged<br>• Manual transmission in Neutral, automatic transmission in Park/Neutral position (PNP)<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0–8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—<br>When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 79 to 94% | 79 to 94% | KICKDOWN | |
| 5. Measurement Block 001 Test | IDLE<br>Warm up engine | 04/001 | 700–6600 RPM | 176 to 230°F (80 to 110°C) | -10 to +10 | 11111111 |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 700–860 RPM | -8% to +8% | | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | -7% or +7% | -30 to +100% | EVAP OK |
| 8. Knock Sensor Test | Engine on<br>Press gas pedal and brake pedal simultaneously | 04/028 | 2300 RPM | More than 13% | More than 176°F (80°C) | SYST. OK |
| 9. Before CAT Oxygen Sensor Response Time Test | (Same as step 8) | 04/034 | 2300 RPM | More than 662°F (350°C) | 0.5 to 2.5 | B1-S1 OK |
| 10. After CAT Oxygen Sensor Test | (Same as step 8) | 04/036 | 0.1 to 0.9V | B1-S2 OK | | |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 13 to 45% | 0.1 to 0.9V | -0.02 to +0.02 | SYST. OK |
| 12. Oxygen Sensor Heater Test | IDLE | 04/041 | | Htg. After CAT ON | Less than 0.02 | Htg. After CAT ON |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See "Sample Procedure 2: VW Engine ID Code AWM" on page 10 for more information. | | | | | | |

*Table 4-8. Engine Code AMB: 2002–03 A4 and Cabrio 1.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 13. After CAT Oxygen Sensor Aging Test | (Same as step 8) | 04/043 | 2300 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 14. Catalytic Converter Test | (Same as step 8) | 04/046 | 2000 RPM | 1022 to 1292°F (550 to 700°C) | More than 2.0 | CAT B1 OK |
| 15. Camshaft Timing Test | (Same as step 8) | 04/094 | 1200 RPM | CS—ctr. ON | SYST. OK | |
| 16. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST. OK |
| 17. Secondary Air System Test | IDLE | 04/077 | 700 to 860 RPM | 1 to 10 g/s | -50 to +30% | |
| 18. Misfire Activity Check | IDLE | 04/014 | 700 to 860 RPM | 13 to 45% | Less than 5 | PREPARED |
| 19. Readiness Code Setting Check | IDLE | 04/086 or Exit, Select 15 | 00000000 | | | |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

*Table 4-9. Engine Code AMU: 2001–02 TT 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Readiness Code Setting Check | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP OK |
| 4. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 10% | 0 to 30% | | EVAP OK |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 700–820 RPM | -23 to +23% | | SYST.OK |
| 7. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | Less than 2 kohm | Htg.bC ON | Less than 2 kohm | Htg.bC ON |
| 8. After CAT Oxygen Sensor Test | IDLE | 04/036 | Less than 0.4V or More than 0.5V | B1-S2 OK | | |
| 9. Secondary Air System Test | 1800–2200 RPM | 04/077 | 1800–2200 RPM | 5 to 12 g/s | 2 to 5 g/s | SYST.OK |
| 10. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 3.3 s | B1-S1 OK |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -1200 to +1200 ms | SYST.OK |
| 12. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 752°F (400°C) | 0.1 to 0.9V | B1-S2 OK |
| 13. Catalytic Converter Test | 1800–2200 RPM | 04/046<br>04/047 | 1800–2200 RPM | More than 752°F (400°C) | | CAT B1 OK |
| 14. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-10. Engine Code APB: 2001–02 A6 2.7L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 20% | 80 to 97% | 0 to 8 | APD OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | | 78 to 94% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 640–920 RPM | -18 to +18 | -18 to +18 | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/04 | 0 to 0.5 kohm | Htg.bC ON | 0 to 0.5 kohm | Htg.aC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B2-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | 1520–2280 RPM | 04/034 | 1520–2280 RPM | More than 500°F (260°C) | 0.4 to 1.0 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | 1520–2280 RPM | 04/035 | 1520–2280 RPM | More than 500°F (260°C) | 0.4 to 1.0 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 0 to 30% | 0 to 1V | -150 to +150 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | 0 to 30% | 0 to 1V | -150 to +150 ms | SYST.OK |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 700–3000 U/min | More than 662°F (350°C) | 0 to 1V | B1-S2 OK |

*Table 4-10. Engine Code APB: 2001–02 A6 2.7L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. Oxygen Sensor Aging After CAT | IDLE | 04/044 | 700–3000 U/min | More than 662°F (350°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2280 RPM | 04/046 | 1800–2280 RPM | More than 599°F (315°C) | 0 to 0.80 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2280 RPM | 04/047 | 1800–2280 RPM | More than 599°F (315°C) | 0 to 0.80 | CAT B2 OK |
| 19. Secondary Air System Test (Auto Trans Only) | IDLE | 04/077 | 640–920 RPM | 0 to 5 g/s | -40 to +10% | SYST.OK |
| 20. Secondary Air System Test (Auto Trans Only) | IDLE | 04/078 | 640–920 RPM | 0 to 5 g/s | -40 to +10% | SYST.OK |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-11. Engine Code ART: 2000 A6 4.2L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 92% | 2 to 47% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | SYST.OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 650–730 RPM | -10 to +10% | -10 to +10% | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.bC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B1-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.0 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/035 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.0 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 13.5 to 22.5% | 0.1 to 0.01V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 650–730 RPM | More than 446°F (230°C) | 0 to 1V | B1-S2 OK |

*Table 4-11. Engine Code ART: 2000 A6 4.2L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 650–730 RPM | More than 446°F (230°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1900–2400 RPM | More than 662°F (350°C) | 0 to 0.25 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1900–2400 RPM | More than 662°F (350°C) | 0 to 0.25 | CAT B2 OK |
| 19. Secondary Air System Test | 1800–2400 RPM | 04/077 | 1800–2400 RPM | More than 13 g/s | -70 to +30% | SYST.OK |
| 20. Secondary Air System Test | 1800–2400 RPM | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-12. Engine Code ATC: 2000–01 TT 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in “Readiness Code Setting Requirements” on page 6):<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP.OK |
| 4. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST. OK |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 10% | | 0 to 30% | EVAP OK |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 640–920 RPM | -23 to +23% | | SYST. OK |
| 7. Camshaft Timing Test | 1800–2200 RPM | 04/094 | 1800–2200 RPM | CS-ctr.1 ON/OFF | SYST. OK | |
| 8. Knock Sensors Test | 1800–2200 RPM | 04/028 | 1800–2200 RPM | 12 to 25% | More than 104°F | SYST. OK |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | Less than 2 kohm | Htg.bC ON | Less than 2 kohm | Htg.aC ON |
| 10. Before CAT Oxygen Sensor Test | IDLE | 04/036 | Less than 0.4V or More than 0.5V | B1-S2 OK | | |
| 11. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 207s | B1-S1 OK |
| 12. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9V | -1200ms to +1200ms | SYST. OK |
| 13. Before CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 640–820 RPM | 5–12 g/s | More than -45% | SYST. OK |
| 15. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 752°F (400°C) | 0.0 to 0.35 | CAT B1 OK |
| 16. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-13. Engine Code ATQ: 2000–01 A4/S4; A6/S6 2.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 18% | 80 to 90% | 0 to 8 | APD OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 630–820 RPM | -10 to +10 | -10 to +10 | SYST.OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/04 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.aC ON |
| 9. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | Htg.aC ON |
| 11. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/034 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | 1000–2400 RPM | 04/035 | 1000–2400 RPM | More than 716°F (380°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 12 to 26% | 0 to 1V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B1-S2 OK |

*Table 4-13. Engine Code ATQ: 2000–01 A4/S4; A6/S6 2.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 1800–2400 RPM | More than 716°F (380°C) | 0 to 1V | B2-S2 OK |
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.58<br>Man 0 to 0.62 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1800–2400 RPM | More than 788°F (420°C) | Auto 0 to 0.58<br>Man 0 to 0.62 | CAT B2 OK |
| 19. Secondary Air System Test | IDLE | 04/077 | 630–820 RPM | 0–5 g/s | -80 to +20% | SYST.OK |
| 20. Secondary Air System Test | IDLE | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086<br>or Exit, Select 15 | 00000000 | | | |

*Table 4-14. Engine Code ATW: 2000 A4 1.8L*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 9 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP.OK |
| 5. Closed Loop Fuel Control Test | IDLE | 04/107 | 800–900 RPM | -8 to +8% | | SYST.OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | Closed/Open | | CHECK END | SYST.OK |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 8. Oxygen Sensor Heater Test | 1800–2200 RPM | 04/041 | 0 to 2.0 kohm | Htg..bC ON | 0 to 2.0 kohm | Htg..bC ON |
| 9. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.5 to 0.95V | B1-S2 OK | | |
| 10. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | 0 to 1.0 s | B1-S1 OK |
| 11. Oxygen Sensor Test | IDLE | 04/037 | 12 to 30% | 0.1 to 0.9 V | -150 to +150 ms | SYST.OK |
| 12. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 662°F (350°C) | 0.1 to 0.9 V | B1-S2 OK |
| 13. Catalytic Converter Test | 1800–2200 RPM | 04/046 | 1800–2200 RPM | More than 752°F (400°C) | 0.0 to 0.29 | CAT B1 OK |
| 14. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | 4 to 10 g/s | SYST.OK |
| 15. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-15. Engine Code AUX: 2001–03 A8 4.2L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 92% | 2 to 47% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | SYST.OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 650–730 RPM | -10 to +10% | -10 to +10% | SYST.OK |
| 8. Oxygen Sensor Test | 1800–2200 RPM | 04/041 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.bC ON |
| 9. Oxygen Sensor Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B1-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/035 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 13.5 to 22.5% | 0.1 to 0.01 V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. Oxygen Sensor Aging After CAT | IDLE | 04/043 | 650–730 RPM | More than 250°C | 0 to 1V | B1-S2 OK |
| 16. Oxygen Sensor Aging After CAT | IDLE | 04/044 | 650–730 RPM | More than 250°C | 0 to 1V | B2-S2 OK |

*Table 4-15. Engine Code AUX: 2001–03 A8 4.2L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1900–2400 RPM | 752 to 1004°F (400 to 540°C) | 0 to 0.25 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1900–2400 RPM | 752 to 1004°F (400 to 540°C) | 0 to 0.25 | CAT B2 OK |
| 19. Secondary Air System Test | 1800–2400 RPM | 04/077 | 1900–2400 RPM | More than 13 g/s | -70 to +30% | SYST.OK |
| 20. Secondary Air System Test | 1800–2400 RPM | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-16. Engine Code AVK: 2002–03 A4/A6 3.0L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6:<br>• Emergency brake engaged<br>• Manual transmission in Neutral, automatic transmission in PNP<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 18% | 80 to 90% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans Only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 97% | 4 to 94% | KICKDOWN | ADP.OK |
| 5. Measurement Block 001 Test | IDLE:<br>Warm up engine | 04/001 | 630 to 6800 RPM | 176 to 234°F (80 to 112°C) | -10 to +10 | -10 to +10 |
| 6. Before CAT Oxygen Sensor Response Time Test, Bank 1 | Engine on<br>Press gas pedal and brake pedal simultaneously | 04/034 | Preset Values | | | B1-S1 OK |
| 7. Before CAT Oxygen Sensor Response Time Test, Bank 2 | (Same as step 6) | 04/035 | Preset Values | | | B2-S1 OK |
| 8. After CAT Oxygen Sensor Test | (Same as step 6) | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B2-S2 OK |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See "Sample Procedure 2: VW Engine ID Code AWM" on page 10 for more information. | | | | | | |

*Table 4-16. Engine Code AVK: 2002–03 A4/A6 3.0L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 9. After CAT Oxygen Sensor Test, Bank 1<br>* Check software level to determine the correct procedure! | ECM software up to 0003: IDLE<br>ECM software 004 and above: Engine on<br>Press gas pedal and brake pedal simultaneously | 04/037 | 7 to 100% | 0 to 1V | -0.05 to +0.05 | SYST. OK |
| 10. After CAT Oxygen Sensor Test, Bank 2 | (Same as step 6) | 04/038 | | | | |
| 11. After CAT Oxygen Sensor Test | | 04/039 | 1 to 190 g/s | 0 to 1V | 0 to 1V | SYST. OK |
| 12. After CAT Oxygen Sensor Aging Test, Bank 1 | (Same as step 6) | 04/043 | Preset Values | | 0 to 1V | B1-S2 OK |
| 13. After CAT Oxygen Sensor Aging Test, Bank 2 | (Same as step 6) | 04/044 | Preset Values | | 0 to 1V | B2-S2 OK |
| 14. Catalytic Converter Test, Bank 1 | (Same as step 6) | 04/46 | Preset Values | More than 932°F (500°C) | 0 to 0.99 | CAT B1 OK |
| 15. Catalytic Converter Test, Bank 2 | (Same as step 6) | 04/047 | Preset Values | More than 932°F (500°C) | 0 to 0.99 | CAT B2 OK |
| 16. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 17. Fuel Tank Leak Test | IDLE | 04/071 | | | | SYST. OK |
| 18. Secondary Air System Test, Bank 1 | • Rev to 4000 RPM 2 times before test.<br>• Press gas pedal and brake pedal simultaneously. | 04/077 | Preset Values | 0 to 190 g/s | | SYST. OK |
| 19. Secondary Air System Test, Bank 2 | (Same as step 18) | 04/078 | Preset Values | 0 to 190 g/s | | SYST. OK |
| 20. Readiness Code Setting Checks | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |
| NOTE: For all steps except check and clear memory, you must press **N** to exit the test, then re-enter and press **Y** to begin the test. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10 for more information. | | | | | | |

*Table 4-17. Engine Code AWM: 2001 A4 1.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 79 to 94% | 79 to 94% | KICKDOWN | |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 6. Before CAT Oxygen Sensor Response Time Test | 2300–2800 RPM | 04/034 | 2300–2800 RPM | More than 662°F (350°C) | 0.5 to 2.5 | B1-S1 OK |
| 7. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0.1 to 0.9V | B1-S2 OK | | |
| 8. Oxygen Sensor Test | IDLE | 04/037 | 13 to 45% | 0.1 to 0.9V | Less than 0.02 | SYST.OK |
| 9. After CAT Oxygen Sensor Aging Test | 2300–2800 RPM | 04/043 | 2300–2800 RPM | More than 662°F (350°C) | 0.1 to 0.9V | B1-S2 OK |
| 10. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST. OK |
| 11. Secondary Air System Test | IDLE | 04/077 | 740–920 RPM | 2 to 5 g/s | More than -20% | |
| 12. Catalytic Converter Test | 2300–2500 RPM | 04/046 | 2300–2500 RPM | 1022 to 1292°F (550 to 700°C) | More than 2.5 | CAT B1 OK |
| 13. Closed Loop Fuel Control Test | IDLE | 04/107 | 800–900 RPM | -8 to +8% | | SYST. OK |
| 14. Camshaft Timing Test | More than 1080 RPM | 04/094 | More than 1080 RPM | CS - ctr. ON | SYST.OK | |
| 15. Misfire Activity Check | IDLE | 08/014 | 740–920 RPM | 13 to 45% | 0 | activated |

*Table 4-17. Engine Code AWM: 2001 A4 1.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 16. Oxygen Sensor Heater Check | IDLE | 08/041 | | Htg..bC ON | Less than 2.0 kohm | Htg..aC ON |
| 17. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-18. Engine Code AWN: 2001–03 A6 4.2L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 92% | 2 to 47% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | SYST.OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 650–730 RPM | -10 to +10% | -10 to +10% | SYST.OK |
| 8. Oxygen Sensor Test | 1800–2200 RPM | 04/041 | 0–0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.bC ON |
| 9. Oxygen Sensor Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B1-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/035 | 650–730 RPM | More than 392°F (200°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 13.5 to 22.5% | 0.1 to 0.01V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. After CAT Oxygen Sensor Aging Test | IDLE | 04/043 | 650–730 RPM | More than 482°F (250°C) | 0 to 1V | B1-S2 OK |
| 16. After CAT Oxygen Sensor Aging Test | IDLE | 04/044 | 650–730 RPM | More than 482°F (250°C) | 0 to 1V | B2-S2 OK |

*Table 4-18. Engine Code AWN: 2001–03 A6 4.2L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1900–2400 RPM | 752 to 1004°F (400 to 540°C) | 0 to 0.25 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1900–2400 RPM | 752 to 1004°F (400 to 540°C) | 0 to 0.25 | CAT B2 OK |
| 19. Secondary Air System Test | 1800–2400 RPM | 04/077 | 1900–2400 RPM | More than 13 g/s | -70 to +30% | SYST.OK |
| 20. Secondary Air System Test | 1800–2400 RPM | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-19. Engine Code AWP: 2001–02 TT 1.8L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 93% | 97 to 3% | 8 | ADP OK |
| 4. Oxygen Sensor Test | 1800–2200 RPM | 04/030 | 111 | 110 | | |
| 5. Before CAT Oxygen Sensor Aging Test, Bank 1 | 2000 RPM | 04/034 | 2000 RPM | More than 662°F (350°C) | More than 0.5 | B1 P1 OK |
| 6. After CAT Oxygen Sensor Test, Bank 1 | 2000 RPM | 04/036 | 0.1 to 0.95V | B1 S2 OK | | |
| 7. Oxygen Sensor Test, Bank 1 | 2000 RPM | 04/037 | 12 to 30% | 0.1 to 0.95V | -0.02 to +0.02 | SYST.OK |
| 8. After CAT Oxygen Sensor Aging Test, Bank 1 | 2000 RPM | 04/043 | 2000 RPM | More than 572°F (300°C) | 0.1 to 0.95V | B1 P2 OK |
| 9. Catalytic Converter Test | Front Wheel Drive: 2000 RPM<br>All Wheel Drive: 2400 RPM<br>NOTE: This test takes about 60 seconds. | 04/046 | Front Wheel Drive: 2000 RPM<br>All Wheel Drive: 2400 RPM | Front Wheel Drive: more than 440°C<br>All Wheel Drive: more than 752°F (400°C) | 0 to 3.2 | CAT B1 OK |
| 10. EVAP System Diagnosis Test | IDLE<br>NOTE: If the test does not start or the display jumps from “TEST ON” to “TEST OFF”, briefly press the throttle pedal. | 04/070 | 0 to 99% | Less than -7% or More than +7% | | TBV OK |
| 11. Fuel Tank Leak Test | IDLE<br>NOTE: This test takes about 90 seconds.<br>NOTE: If you perform this function more than once, open the tank filler cap after each test to release pressure. | 04/071 | Reed Open | | Measurement END | SYST.OK |

*Table 4-19. Engine Code AWP: 2001–02 TT 1.8L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 12. Secondary Air System Test | Quickly press throttle pedal to the floor and release, revving the engine to at least 2500 RPM.<br>NOTE: This test takes about 60 seconds. | 04/077 | 700–820 RPM | 5 to 12 g/s | More than -45% | SYST.OK |
| 13. Readiness Code Setting Check | IDLE | 08/086<br>or Exit, Select 15 | 00000000 | | | |

*Table 4-20. Engine Code AWP & BEA: 2003 TT (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 8 to 60% | 60 to 94% | 0 to 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 75 to 100% | 75 to 100% | KICKDOWN | |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | Reed cl. | | CHECK END | SYST. OK |
| 6. Closed Loop Fuel Control Test | IDLE | 04/107 | 640 to 860 RPM | -23 to +23% | | |
| 7. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | Less than or equal to -7% or More than or equal to +7% | 0 to 30% | EVAP OK |
| 8. Camshaft Timing Test | 2200–2800 RPM | 04/094 | 2200–2600 RPM | Cs-ctr.1 ON/OFF | SYST. OK | |
| 9. Knock Sensors Test | 2200–2800 RPM | 04/028 | 2200–2600 RPM | 12 to 25% | More than 104°F (40°C) | SYST. OK |
| 10. Before CAT Oxygen Sensor Response Time Test | 1800–2200 RPM | 04/034 | 1800–2200 RPM | More than 662°F (350°C) | More than 0.5 | B1-S1 OK |
| 11. Secondary Air System Test | IDLE | 04/077 | 640–840 RPM | Less than 12 g/s | More than -45% | SYST. OK |
| 12. Oxygen Sensor Test | 1800–2200 RPM | 04/037 | 12 to 30% | 0.1 to 0.9V | -0.02 to +0.02 | SYST. OK |
| 13. After CAT Oxygen Sensor Aging Test | 1800–2200 RPM | 04/043 | 1800–2200 RPM | More than 572°F (300°C) | 0.1 to 0.9V | B1-S2 OK |
| 14. After CAT Oxygen Sensor Test | 1800–2200 RPM | 04/036 | More than 0.4V or Less than 0.5V | B1-S2 OK | | |

*Table 4-20. Engine Code AWP & BEA: 2003 TT (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 15. Catalytic Converter Test | 1800–2200 RPM | 04/046 | F: 1800–2200 RPM<br>Q: 2200–2800 RPM | F: More than 824°F (440°C)<br>Q: More than 842°F (450°C) | 0.0 to 0.32 | CAT B1 OK |
| 16. Readiness Code Setting Check | IDLE | 08/086 | 00000000 | | | |

*Table 4-21. Engine Code AYS: 2001–03 S8 4.2L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP OK |
| 4. Kickdown Adaptation Test | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 12 to 92% | 2 to 47% | KICKDOWN | ADP OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST.OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | SYST.OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 650–730 RPM | -10 to +10% | -10 to +10% | SYST.OK |
| 8. Oxygen Sensor Test | 1800–2200 RPM | 04/041 | 0 to 0.9 kohm | Htg.bC ON | 0 to 0.9 kohm | Htg.bC ON |
| 9. Oxygen Sensor Test | 1800–2200 RPM | 04/042 | | | | |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B1-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034 | 760–840 RPM | More than 482°F (250°C) | 0.1 to 1.8 s | B1-S1 OK |
| 12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/035 | 760–840 RPM | More than 482°F (250°C) | 0.1 to 1.8 s | B2-S1 OK |
| 13. Oxygen Sensor Test | IDLE | 04/037 | 13.5 to 24% | 0.1 to 0.01V | -800 to +800 ms | SYST.OK |
| 14. Oxygen Sensor Test | IDLE | 04/038 | | | | |
| 15. Oxygen Sensor Aging After CAT | 1800–2400 RPM | 04/043 | 1800–2400 RPM | More than 482°F (250°C) | 0 to 1V | B1-S2 OK |
| 16. Oxygen Sensor Aging After CAT | 1800–2400 RPM | 04/044 | 1800–2400 RPM | More than 482°F (250°C) | 0 to 1V | B2-S2 OK |

*Table 4-21. Engine Code AYS: 2001–03 S8 4.2L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 17. Catalytic Converter Test | 1800–2400 RPM | 04/046 | 1800–2400 RPM | 626 to 1076°F (330 to 580°C) | 0 to 0.45 | CAT B1 OK |
| 18. Catalytic Converter Test | 1800–2400 RPM | 04/047 | 1800–2400 RPM | 626 to 1076°F (330 to 580°C) | 0 to 0.45 | CAT B2 OK |
| 19. Secondary Air System Test | 1800–2400 RPM | 04/077 | 1800–2400 RPM | More than 13 g/s | -70 to +30% | SYST.OK |
| 20. Secondary Air System Test | 1800–2400 RPM | 04/078 | | | | |
| 21. Readiness Code Setting Check | IDLE | 08/086 or Exit, Select 15 | 00000000 | | | |

*Table 4-22. Engine Code BBD: 2002–03 S6 4.2L 8-cylinder (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in “Readiness Code Setting Requirements” on page 6):<br>• Emergency brake engaged<br>• Automatic transmission in PNP<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 10 to 20% | 80 to 90% | 0 to 8 | ADP.OK |
| 4. Misfire Activity Check | IDLE* | 04/014 | 760–840 RPM | 13.5 to 24% | 0 to 5 | ACTIVATED |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | -5.5% to +6.3% | | EVAP OK |
| 6. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK. END | SYST. OK |
| 7. Before CAT Oxygen Sensor Response Time Test, Bank 1 | IDLE | 04/034 | 760–840 RPM | More than 482°F (250°C) | 0.1 to 1.8 s | B1-S1 OK |
| 8. Before CAT Oxygen Sensor Response Time Test, Bank 2 | IDLE | 04/035 | 760–840 RPM | More than 482°F (250°C) | 0.1 to 1.8 s | B2-S1 OK |
| 9. Oxygen Sensor Test, Bank 1 | IDLE | 04/037 | 13.5 to 24% | 0.1 to 1.0V | -200 to +200 ms | SYST. OK |
| 10. Oxygen Sensor Test, Bank 2 | IDLE | 04/038 | | | | |
| 11. Oxygen Sensor Test | IDLE | 04/041 | 0 to 0.9 kohm | Htg. After CAT ON | | Htg. After CAT ON |
| 12. Before and After CAT Oxygen Sensor Test | IDLE | 04/030 | 111 | 010 or 110 | 111 | 010 or 110 |
| 13. After CAT Oxygen Sensor Aging Test, Bank 1 | 1800–2400 RPM | 04/043 | 1800–2400 RPM | ~482°F (250°C) | 0.0 to 0.1V | B1-S2 OK |
| 14. After CAT Oxygen Sensor Aging Test, Bank 2 | 1800–2400 RPM | 04/044 | 1800–2400 RPM | ~482°F (250°C) | 0.0 to 0.1V | B2-S2 OK |
| * Warm up engine if necessary. | | | | | | |

*Table 4-22. Engine Code BBD: 2002–03 S6 4.2L 8-cylinder (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 15. Catalytic Converter Test, Bank 1 | 1800–2400 RPM | 04/046 | 1800–2400 RPM | 626 to 1076°F (330 to 580°C) | 0 to 0.45 | CAT B1 OK |
| 16. Catalytic Converter Test, Bank 2 | 1800–2400 RPM | 04/047 | 1800–2400 RPM | 626 to 1076°F (330 to 580°C) | 0 to 0.45 | CAT B2 OK |
| 17. Camshaft Timing Test | More than 2000 RPM | 04/094 | More than 2000 RPM | ON | SYST. OK | SYST. OK |
| 18. Secondary Air System Test, Bank 1 | 1800–2400 RPM | 04/077 | 1800–2400 RPM | 11 to 19 g/s | -70 to +30% | |
| 19. Secondary Air System Test, Bank 2 | 1800–2400 RPM | 04/078 | | | | |
| 20. After CAT Oxygen Sensor Test | More than 2200 RPM | 04/039 | More than 12 g/s | 0.1 to 1.0V | 0.1 to 1.0V | |
| 21. Readiness Code Setting Checks | IDLE | 04/086 | 00000000 | | | |
| * Warm up engine if necessary. | | | | | | |

*Table 4-23. Engine Code BCY: 2003 A6/S6 4.2L 8-cylinder (sheet 1 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirements (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• The vehicle must be stationary.<br>• Vehicles with automatic transmission must have the selector lever set to P or N.<br>• Coolant temperature must be at least 176°F (80°C.) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 93% | 97 to 3% | 8 | ADP.OK |
| 4. Kickdown Adaptation Test | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | 79 to 94% | 79 to 94% | KICKDOWN | ADP.OK |
| 5. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 99% | | | TBV OK |
| 6. Fuel Tank Leak Test | • IDLE<br>• ECT more than 185°F (85°C)<br>• IAT less than 185°F (85°C)<br>• Fuel tank cap opened briefly to release pressure<br>• Test may take about 90 seconds | 04/071 | Reed open | | Measurement END | SYST. OK |
| 7. Oxygen Sensor Test, Bank 1 | IDLE | 04/037 | 13.5 to 22.5% | 0.000 to 1.000V | -200 to +200 ms | SYST. OK |
| 8. Oxygen Sensor Test, Bank 2 | IDLE | 04/038 | | | | |
| 9. Before CAT Oxygen Sensor Aging Test, Bank 1 | IDLE | 04/034 | 730–790 RPM | More than 482°F (250°C) | 0.2 to 0.8 s | B1-S1 OK |
| NOTE: If "OK" displays immediately after a display group is selected, the test has already been completed and you may continue to the next step. | | | | | | |

*Table 4-23. Engine Code BCY: 2003 A6/S6 4.2L 8-cylinder (sheet 2 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 10. Before CAT Oxygen Sensor Aging Test, Bank 2 | IDLE | 04/035 | 730–790 RPM | More than 482°F (250°C) | 0.2 to 0.8 s | B2-S1 OK |
| 11. After CAT Oxygen Sensor, Banks 1 & 2 | Depress gas and brake pedals simultaneously (1800 RPM) | 04/039 | | 0.100 to 0.950V | 0.100 to 0.950V | SYST. OK |
| 12. Oxygen Sensor Heater Test, Bank 1 | IDLE (Specifications can be obtained faster by increasing engine speed) | 04/041 | Less than 1 kohm | Upstream Heating ON | Less than 1 kohm | Downstream Heating ON |
| 13. Oxygen Sensor Heater Test, Bank 2 | (Same as step 12) | 04/042 | Less than 1 kohm | Upstream Heating ON | Less than 1 kohm | Downstream Heating ON |
| Note for Oxygen Sensor Heater Tests: Do not continue with testing until channels 1 and 3 display less than 0.9 kohm. | | | | | | |
| 14. After CAT Oxygen Sensor Aging Test, Bank 1 | IDLE | 04/043 | 700–790 RPM | 392 to 572°F (200 to 300°C) | 0.000 to 1.000V | B1-S2 OK |
| 15. After CAT Oxygen Sensor Aging Test, Bank 2 | IDLE | 04/044 | 700–790 RPM | 392 to 572°F (200 to 300°C) | 0.000 to 1.000V | B2-S2 OK |
| 16. Secondary Air System Test, Bank 1 | Depress gas and brake pedals simultaneously (2550 RPM) | 04/077 | 2400–2600 RPM | More than 16 g/s | -30 to +30% | SYST. OK |
| 17. Secondary Air System Test, Bank 2 | (Same as step 16) | 04/078 | 2400–2600 RPM | More than 16 g/s | -30 to +30% | SYST. OK |
| Release gas and brake pedals. | | | | | | |
| 18. Catalytic Converter Test, Bank 1 | Depress gas and brake pedals simultaneously (1800 RPM)<br>Diagnosis time = ~40 s<br>Start test when Channel 2 reads ~1004°F (540°C) | 04/046 | 700–790 RPM | 752 to 1004°F (400 to 540°C) | 0.0 to 0.073 | CAT B1 OK |
| NOTE: If “OK” displays immediately after a display group is selected, the test has already been completed and you may continue to the next step. | | | | | | |

*Table 4-23. Engine Code BCY: 2003 A6/S6 4.2L 8-cylinder (sheet 3 of 3)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 19. Catalytic Converter Test, Bank 2 | (Same as step 18) | 04/047 | 700–790 RPM | 752 to 1004°F (400 to 540°C) | 0.0 to 0.073 | CAT B2 OK |
| 20. Readiness Code Setting Checks | IDLE | 08/086 | 00000000 | | | |
| NOTE: If “OK” displays immediately after a display group is selected, the test has already been completed and you may continue to the next step. | | | | | | |

*Table 4-24. Engine Code BEL: 2003 A6 & Allroad 2.7L (sheet 1 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| Test Requirement (in addition to those listed in "Readiness Code Setting Requirements" on page 6):<br>• Coolant temperature more than 176°F (80°C) | | | | | | |
| 1. Check DTC Memory | Key On, Engine Off | 02 | | | | |
| 2. Clear DTC Memory | Key On, Engine Off | 05 | | | | |
| 3. Throttle Body Adaptation Test | Key On, Engine Off | 04/060 | 3 to 20% | 80 to 97% | 8 | ADP.OK |
| 4. Kickdown Adaptation Test (Auto Trans only) | Key On, Engine Off—When Channel 3 displays KICKDOWN, press the gas pedal to the floor until Channel 4 displays ADP.OK. | 04/063 | | 78 to 94% | KICKDOWN | ADP.OK |
| 5. Fuel Tank Leak Test | IDLE | 04/071 | | | CHECK END | SYST. OK |
| 6. EVAP System Diagnosis Test | IDLE | 04/070 | 0 to 100% | | | EVAP OK |
| 7. Closed Loop Fuel Control Test | IDLE | 04/107 | 640–920 RPM | -18 to +18% | -18 to +18% | SYST. OK |
| 8. Heated Oxygen Sensor<br>9. Heated Oxygen Sensor | IDLE* | 04/041<br>04/042 | 0 to 0.5 kohm | Htg.bC ON | 0 to 0.5 kohm | Htg.bC ON |
| 10. After CAT Oxygen Sensor Test | IDLE | 04/036 | 0 to 1V | B1-S2 OK | 0 to 1V | B2-S2 OK |
| 11. Before CAT Oxygen Sensor Response Time Test<br>12. Before CAT Oxygen Sensor Response Time Test | IDLE | 04/034<br>04/035 | 1520–2280 RPM | More than 500°F (260°C) | 0.4 to 1.0 s | B1-S1 OK<br>B2-S1 OK |
| 13. Oxygen Sensor Test<br>14. Oxygen Sensor Test | IDLE | 04/037<br>04/038 | 0 to 30% | 0 to 1V | -150 to +150 ms | SYST. OK |
| * Warm up engine if necessary. | | | | | | |

*Table 4-24. Engine Code BEL: 2003 A6 & Allroad 2.7L (sheet 2 of 2)*

| Diagnostic Test or Check | Test/Check Conditions | Test (04) or Check (08) # | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|---|---|
| 15. After CAT Oxygen Sensor Aging Test<br>16. After CAT Oxygen Sensor Aging Test | IDLE | 04/043<br>04/044 | 700–3000 U/min | More than 662°F (350°C) | 0 to 1V | B1-S2 OK<br>B2-S2 OK |
| 17. Catalytic Converter Test<br>18. Catalytic Converter Test | IDLE | 04/046<br>04/047 | 1880–2280 RPM | More than 599°F (315°C) | 0 to 0.80 | CAT B1 OK<br>CAT B2 OK |
| 19. Secondary Air System Test (Auto Trans Only)<br>20. Secondary Air System Test (Auto Trans Only) | IDLE | 04/077<br>04/078 | 640–920 RPM | 0 to 5 g/s | -40 to +10% | SYST. OK |
| 21. Readiness Code Setting Check | IDLE | 08/086 | 00000000 | | | |
| * Warm up engine if necessary. | | | | | | |

# Appendix A: Acronyms

The following acronyms are used in this manual.

| | |
|---|---|
| **A/C** | Air Conditioning |
| **AIR** | Secondary Air Injection |
| **A/T** | Automatic Transmission |
| **CAT** | Catalytic Converter |
| **DTC** | Diagnostic Trouble Code |
| **ECM** | Engine Control Module |
| **ECT** | Engine Coolant Temperature |
| **EGR** | Exhaust Gas Recirculation |
| **EOT** | Engine Operating Temperature |
| **EVAP** | Evaporative Emissions |
| **O2** | Oxygen |
| **O2S** | Oxygen Sensor |
| **OBD** | On Board Diagnostic |
| **PNP** | Park/Neutral Position |
| **WOT** | Wide Open Throttle |

# Appendix B: Frequently Asked Questions

## What is a readiness code?

A VW/Audi readiness code is the equivalent of an OBD-II readiness monitor. The diagnostic tests in the charts are designed to run one of the eight readiness monitors (codes) for specific systems or components. The scan tool has the capability to command the engine control module (ECM) to run diagnostic tests that bypass the normal readiness monitor test-enabling criteria. In most cases, these scan tool-induced monitor tests can be run with the vehicle stationary or while driving the vehicle on a short road test.

Readiness code (monitor) status is now part of some state emission programs. The vehicle will fail if these monitors have not all passed. In addition, repair work can be validated if readiness code tests are run successfully. Any tests that do not pass indicate the vehicle is not operating correctly. Technicians can use these tests as a diagnostic tool to help pinpoint problem areas.

## What needs to be done before setting readiness codes?

You must do the following before you can set readiness codes:

- **Check for stored current diagnostic trouble codes (DTCs).** Any codes set will prevent readiness code completion.
- **Repair all DTCs or other known malfunctions.**
- **Make sure the correct engine ID code has been verified on the engine to ensure the correct procedure is selected.** All engine ID codes are stamped on the engine block or on the cylinder head. Some can be found on timing belt cover label, on the sticker in owner's maintenance manual, or on the sticker in spare tire compartment. There may be multiple engine ID codes for the same model and engine.

See the "Operations" chapter of the *Volkswagen/Audi Vehicle Communication User's Manual* for specific engine ID code locations.

## How do I check readiness codes?

There are two ways to view readiness codes with the Snap-on® scan tool: through Functional Tests or through Expert Mode. See page 5 for detailed procedures.

## How do I know if the test is running or ran correctly?

For most vehicles, if the test ran successfully, the status reading in Channel 4 changes to "ADP.OK" or "SYST.OK". For some, Channel 4 displays "RUN" while the test is running or "ABORT" if the test is interrupted.

For other vehicles, there are eight digits in Channel 4 reading zeros, ones, or Xs. In the chart, usually only one or two of these digits represent the specific test in question. If the test passes, then the correct digits will change from "1" to "0". The other digits represented by X in the chart are not relevant. Always match the scan tool display with the correct channel specification in the chart.

## How do I know when to select 04-BASIC SETTINGS or 08-READ MEASURING VALUE BLOCK?

The chart indicates whether the procedure step is a Basic Settings test (04) or a check (08).

*If 08 is selected*, then no test will run. Instead, data or specifications are viewed in normal operation. *If 04 is selected*, the Basic Settings mode commands the tests to run.

## What happens if I accidently exit out of a test before it is completed?

Depending on the vehicle, re-selecting the test may be sufficient. For others, you may need to go back to the first test, as some require each test to be run in an uninterrupted sequence. For these, be sure not to

press **N** at the end of the test. Scroll in the next display group and the scan tool will read and initiate the next test. Vehicles requiring an uninterrupted sequence between specific steps are identified in the charts with a “Do Not Exit” message after the display group number.

**NOTE:**
The new procedure, starting with some 2002 VW and Audi vehicles, will not allow next step activation without exiting. See “Sample Procedure 2: VW Engine ID Code AWM” on page 10.

## Must all readiness code tests be performed sequentially?

No. Many newer vehicles will allow individual tests to be run. However, some may require previous step tests to be completed before they can run. Remember, if DTCs were cleared, all readiness codes will have a Not Ready status. For best results, complete all tests in sequence. Note that any stored code(s) may inhibit tests from running.

## Are these the same readiness monitors that I see with my generic OBD-II scan tool?

Yes. The Readiness Code Digit Chart on page 4 displays the same eight readiness monitors as viewed by a generic scan tool. The tests in the charts may have different names and the charts include additional diagnostic tests. Also, note that generic OBD-II scan tools cannot set VW/Audi OBD-II readiness codes; they only report readiness monitor status: Ready (the test passed) or Not Ready (the test has not run or did run and failed).

## What do the specifications mean in Channels 1–3?

These are either test specifications that have to be met before the test will run, or they are system or components tested during the readiness monitor test (values may be seen changing during the readiness test). The specifications have various ranges that indicate what values are within tolerance. If the test fails, refer to these specifications to identify the failure area.

Not all vehicles will have specifications in every channel. Some may read a component or system status. If a test fails, go to the corresponding display group for further diagnosis.

Also, be aware that the channel data parameter values displayed are the same in either 04 or 08. The difference is that in 08, the readings are normal operating values, and in 04 the readings may be modified during the test. Specifications refer to range values that must be met either in 04 or 08 as stated in the test procedures.

## What should I do if the test will not run?

Be sure to read the instructions because all conditions need to be correct. Also, for some tests, like O2S and Catalytic Converter, the exhaust temperature is very important. When the instructions say to maintain RPM between a certain range, be sure to follow them exactly as some vehicles will abort the test even when only slightly outside of the range. To ensure success, pre-condition the catalytic converter for a few minutes before entering the test. Also, achieving the specified RPM before entering the test may be helpful. If after careful review and several unsuccessful attempts, re-check for DTCs and perform diagnosis of that specific monitor system.

## What is the difference between 086 and function 15 for checking readiness codes?

Nothing, both are identical. The 8 digits need to be matched with Table 1-1 on page 4 for the status results of each monitor. Each digit indicates whether a specific monitor has set or completed (i.e., achieved a “Ready” status). A measuring value display for 086 or readiness code (Functional Test) menu selection 15 that reads all eight zeros indicates that all eight monitors have set or completed successfully to a “Ready” status.

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