

Service Training



Reference Guide 810103

Volkswagen Airbag and Safety Systems Reference Guide



Volkswagen Group of America, Inc.
Volkswagen Academy
Printed in U.S.A.
Printed 11/2011

Course Number 810103

©2011 Volkswagen Group of America, Inc.

All rights reserved. All information contained in this manual is based on the latest information available at the time of printing and is subject to the copyright and other intellectual property rights of Volkswagen Group of America, Inc., its affiliated companies and its licensors. All rights are reserved to make changes at any time without notice. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, nor may these materials be modified or reposted to other sites without the prior expressed written permission of the publisher.

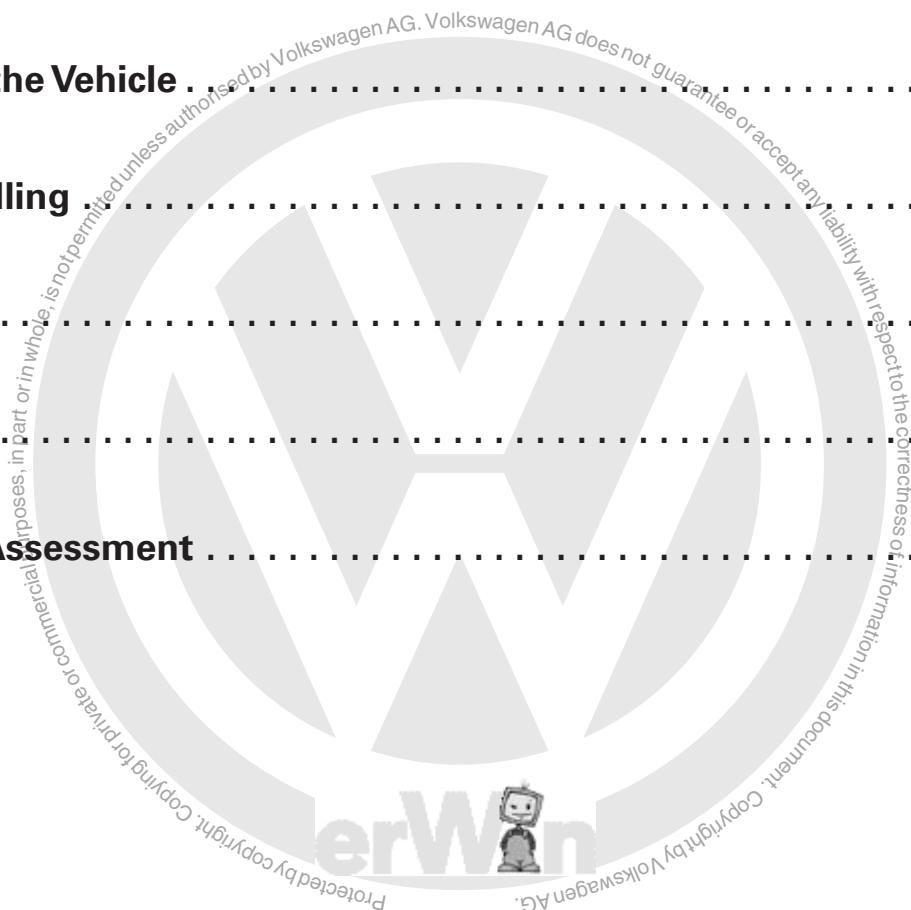
All requests for permission to copy and redistribute information should be referred to Volkswagen Group of America, Inc.

Always check Technical Bulletins and the latest electronic repair information for information that may supersede any information included in this booklet.

Trademarks: All brand names and product names used in this manual are trade names, service marks, trademarks, or registered trademarks; and are the property of their respective owners.

Contents

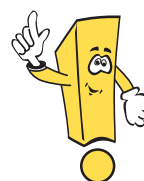
Introduction	1
Airbag and Pyrotechnic Systems	3
Working on the Vehicle	9
Special Handling	12
Special Tools	16
Repair Steps	18
Knowledge Assessment	21



This Self-Study Program provides information regarding the design and function of new models.
This Self-Study Program is not a Repair Manual.

This information will not be updated.
For maintenance and repair procedures, always refer to the latest electronic service information.

Note



Important!





Page intentionally left blank

Introduction to Volkswagen Airbag and Safety Systems

After completing this course you will be able to:

- Recognize that occupant safety is integrated throughout the vehicle, and practice caution when performing repairs
- Identify the conditions that cause the airbag to deploy
- Handle airbags and pyrotechnic seat belts according to safety rules and precautions
- Recognize the special tools used with airbag and safety systems
- Recognize the special procedural steps for performing a repair involving an airbag

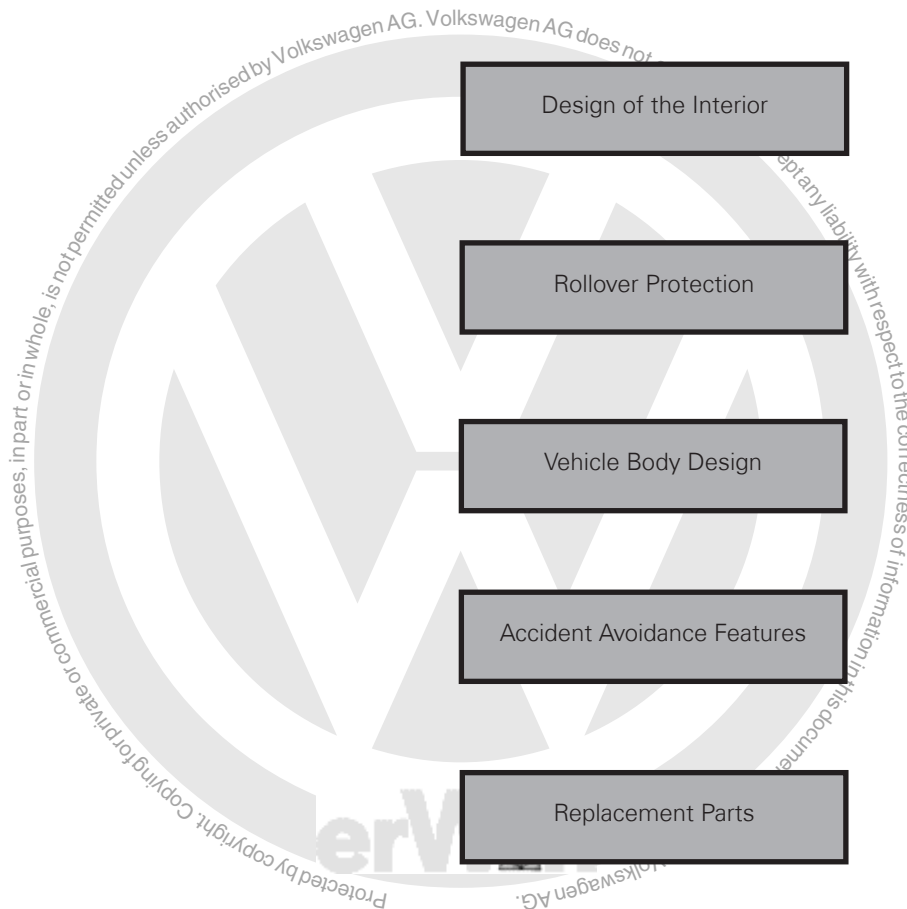


Introduction

Safety Related Components

When it comes to safety, airbags and seatbelts aren't the only components involved. Safety is integrated throughout Volkswagen vehicles.

- Instrument panels are made with materials to reduce the risk of injury in a crash, such as soft textures and padding
- Steering columns and the lower portions of instrument panels are designed to absorb energy and control the position of occupants during a crash
- Door panels have special designs, materials, and crush elements that help reduce the chance of injury to the occupant
- Seat cushions and head restraints are also engineered to position occupants and reduce injuries

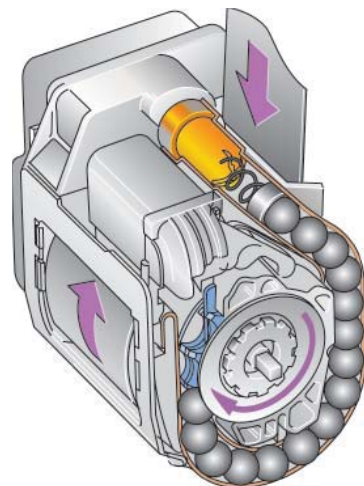


Airbag and Pyrotechnic Systems

Volkswagen has always been innovative with its occupant safety systems. It began offering seat belts in the early 1960's.

Today's Volkswagen safety systems are much more advanced, including driver and passenger front airbags, side airbags, side curtain airbags and pyrotechnic safety belts.

As you proceed through this guide, you will learn about how these systems work, and the things you need to know to work safely with these components.



Airbag and Pyrotechnic Systems

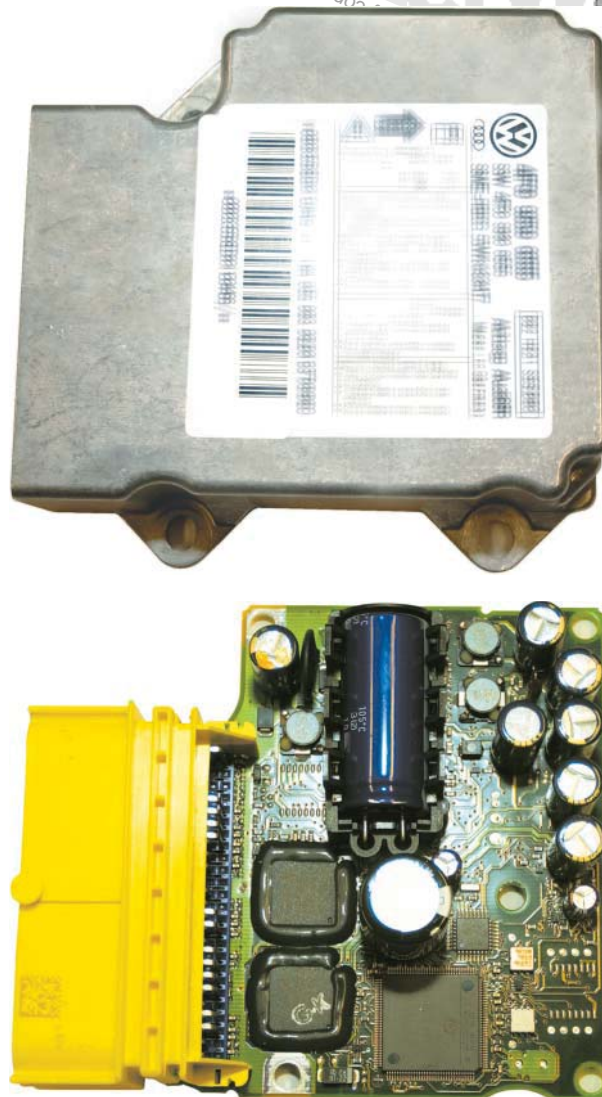
ACM Inputs

Airbag and pyrotechnic devices deploy only in certain instances.

The deployment of an airbag or pyrotechnic device depends on the vehicle deceleration, acceleration or pressure change caused by the crash and registered by the Airbag Control Module (ACM).

If the measured value is below the reference value programmed into the ACM, the airbags or pyrotechnic devices will not be deployed.

Vehicle damage or lack of vehicle damage is not necessarily an indication of whether or not the airbag or a pyrotechnic device should or should not have been deployed.



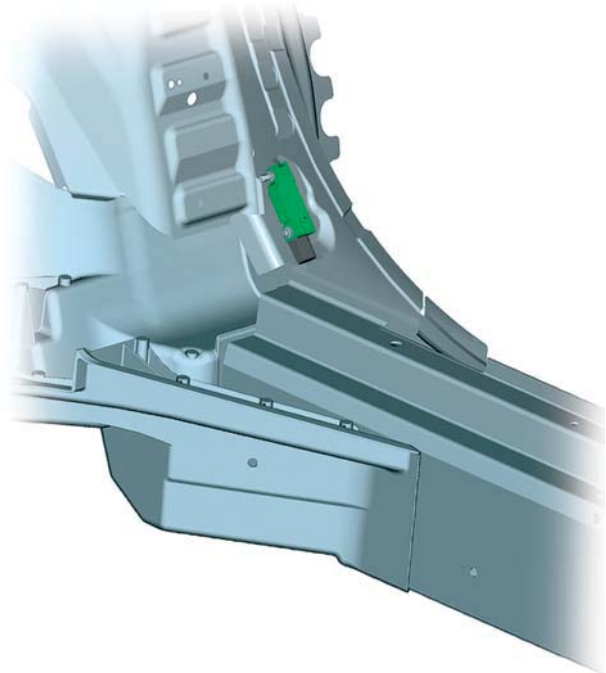
Airbag and Pyrotechnic Systems

What happens in a Crash

There are sensors located in the vehicle that detect a change in velocity in a crash, and send that information to the ACM.

The ACM receives the sensor information and determines what type of crash it is.

The ACM sends a signal to pre-tension the seat belts and then deploys the airbags that are needed for that situation.



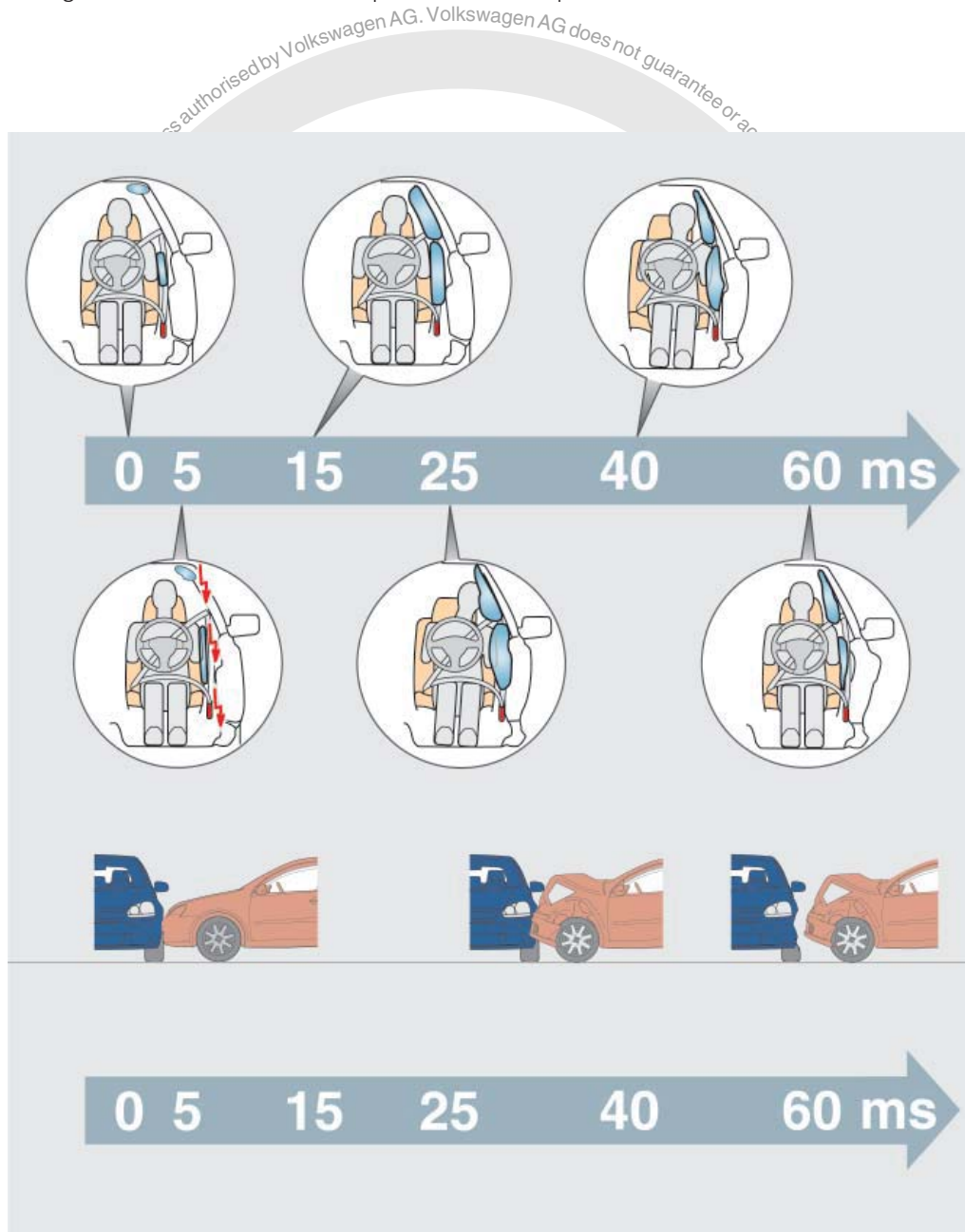
Airbag and Pyrotechnic Systems

Front Crash Sequence

The time that passes between a braking vehicle going into a crash and the deployment of the airbags is very short.

For example, a vehicle going 35 mph into a rigid wall has about 150 milliseconds to complete the activation of all the safety features. That is about as long as it takes you to blink your eyes.

The driver doesn't have any time to react. This is why it is called a "passive" restraint system. The ACM, seatbelts, and airbags function on their own to protect the occupants.



Airbag and Pyrotechnic Systems

Passive Occupant Detection System

Now that you know about how a vehicle will activate an airbag, let's look at how it knows when to turn it off.

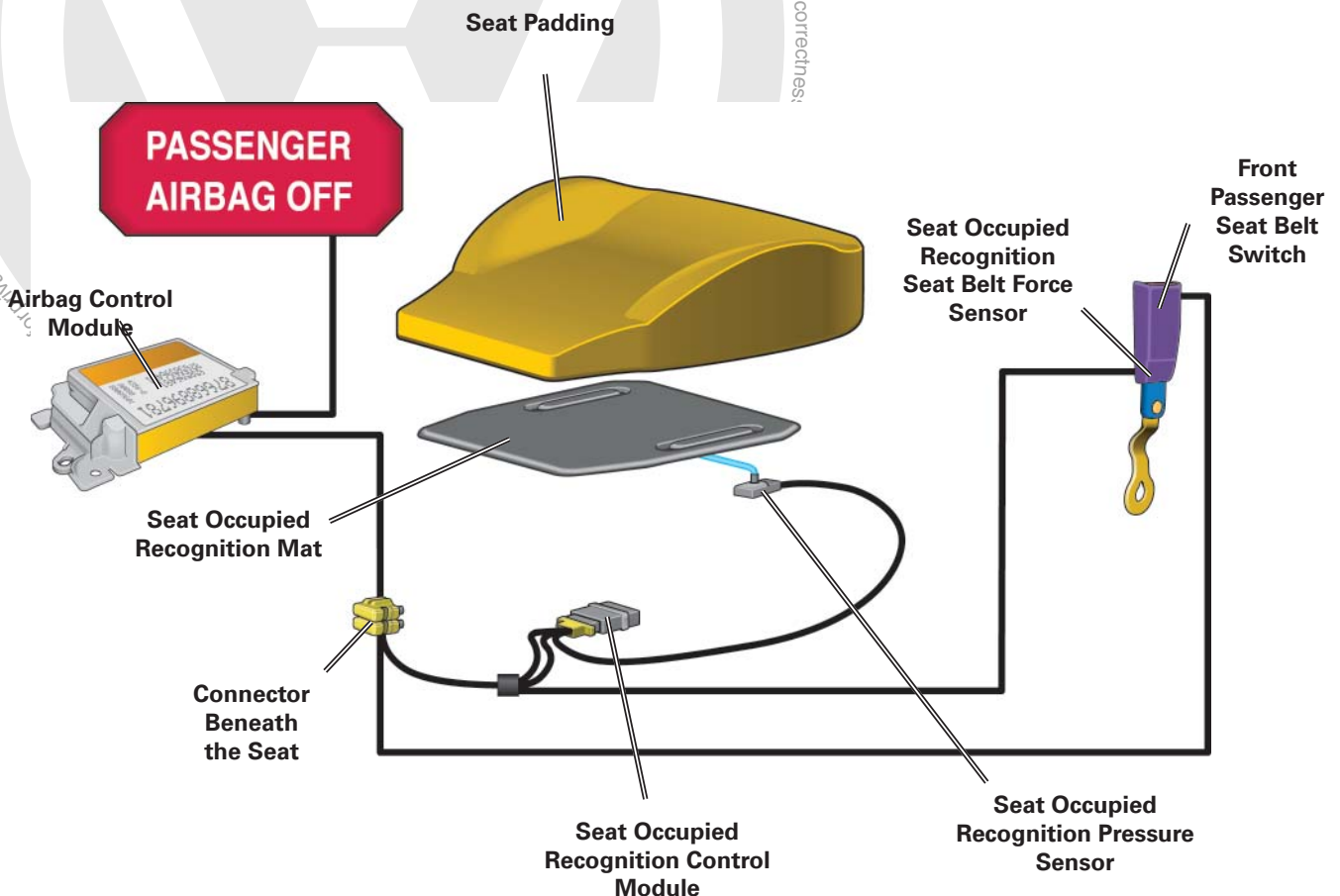
It is a requirement that the front passenger airbag be turned off for an infant in a child seat.

In most Volkswagen vehicles, there is a mat under the seat cushion that sends fluid through a transfer hose to a sensor. (The 2011 Jetta and 2012 Passat introduced an electromagnetic system).

The sensor converts the pressure into an electrical signal that is sent to the Seat Occupied Recognition Control Module.

Also, the seat belt buckle measures tension on the seat belt and sends that information to the Seat Occupied Recognition Control Module.

The control module uses those signals to determine the weight of the occupant and sends a signal to the ACM about whether or not to deploy the passenger airbag.



Airbag and Pyrotechnic Systems

Precautions

There are certain precautions that you should always take when working on an airbag system.

Refer to the repair manual for the latest warnings and cautions as well as other important information on airbags and pyrotechnic devices.

Empty pockets of pencils, pens, cigarettes, and other items that could fall out.

Disconnect the battery ground (GND) strap before working on the airbag or pyrotechnic seat belts.

Wear O.S.H.A approved safety goggles with a minimum ANSI rating of ANSI Z87_1_1968 and ANSI Z87_1_1989. Flying material released during an inadvertent deployment can damage eyesight or cause blindness.

Electrostatically discharge yourself before handling an airbag or pyrotechnic safety belt. Do this by touching a suitable metal part, such as a door jam striker pin or ground point.

Working on the Vehicle

When Working on Vehicles

There are quite a few things a Technician needs to know when working on vehicles with Airbags and pyrotechnic seatbelts.

Never open or attempt to repair an airbag module or pyrotechnic safety belts.

Do not install airbag components or pyrotechnic safety belts that have been dropped or show signs of damage.

Never use a (nine volt) battery saver. Using a battery battery saver can cause an airbag or safety belt pretensioner to deploy.

Never use a digital volt ohmeter or self powered test light when working on an airbag or pyrotechnic safety belt system.

Using the wrong diagnostic tools can cause and airbag or safety belt pretensioner to deploy.

Use only approved Volkswagen diagnostic tools on airbag and pyrotechnic safety belt systems.

Working on the Vehicle

Never use impact tools to remove or install pyrotechnic safety belts.

Do not hammer in the area of pyrotechnic safety belts, the airbag control module or crash sensors.

See ElsaWeb for the location of sensors that trigger safety belts and airbags.

Do not use grease, cleaning solutions, solvents or similar substances on safety belts or airbag covers.

Do not apply stickers or badges to airbag covers.

Do not use salvage parts when repairing a safety belt or airbag system.

Never turn the ignition to the ON position while reaching through the steering wheel spokes. The airbag could deploy and cause serious injury.

Working on the Vehicle

Do not disable any safety systems on the vehicle

Always wash your hands and face with mild soap and water after working on a vehicle in which the airbags and other pyrotechnic devices have been deployed, especially before eating.

Also:

Do not let the particles and dust released from an airbag or pyrotechnic safety belt get into your eyes or into any cuts or scratches. If contact does occur, flush eyes with water and wash exposed skin with soap and water.

Special Handling

On the following pages you will learn some of the special handling rules to follow for airbags and pyrotechnic seatbelts

All airbags and pyrotechnic safety belts of a vehicle scheduled to be scrapped must be deployed using Airbag Deployment Device J-44210

Always read the instruction booklet and view the supplemental video for Airbag Deployment Device J-44210 and heed all warnings before using the device.

Undeployed airbags and pyrotechnic safety belts are considered hazardous material. When disposing of an undeployed airbag or pyrotechnic safety belt that is either defective or expired, use the appropriate repair information and Airbag Deployment Device J-44210.

Never deploy airbags or pyrotechnic safety belts in the vehicle.

If airbag or pyrotechnic safety belt cannot be safely deployed or removed from the vehicle, contact the Volkswagen Dealer Technician's Helpline (877) 299-0505.

Make sure your dealer complies with federal, state and local regulations for explosive substances.

Deployed airbags and pyrotechnic safety belts can be disposed of as normal scrap.

Special Handling

Shipment of active, undeployed airbag gas generators and pyrotechnic safety belt retractors must be in accordance with the regulations published in the latest edition of the Code of Federal Regulations #49 (49 CFR)

Shipment must be initiated and received by certified individuals. The penalties for noncompliance are severe. Civil penalties range from \$250 to \$27,500 per violation, per day. Criminal penalties, for willfully violating the regulations, range from \$250,000 for individuals and \$500,000 for corporations



Special Handling

Special Procedures

Now that you have learned about safe handling, let's proceed to learn about the special procedures to follow for airbags or pyrotechnic seatbelt systems.



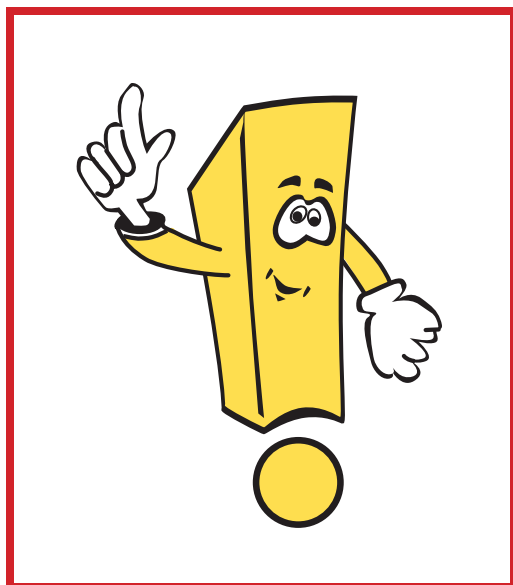
If airbags and pyrotechnic safety belts did not deploy, it's not necessary to replace and component unless the MIL indicates a malfunction



Register replacement of any airbag components with the Volkswagen Group of America, LLC. Refer to ElsaWeb for the latest registration procedures.



Report any triggered airbag incident, as soon as possible, to the Product Liaison Office and the Volkswagen Group of America. The report should include: VIN, mileage, approximate estimated cost of repair, description of accident and location of vehicle.

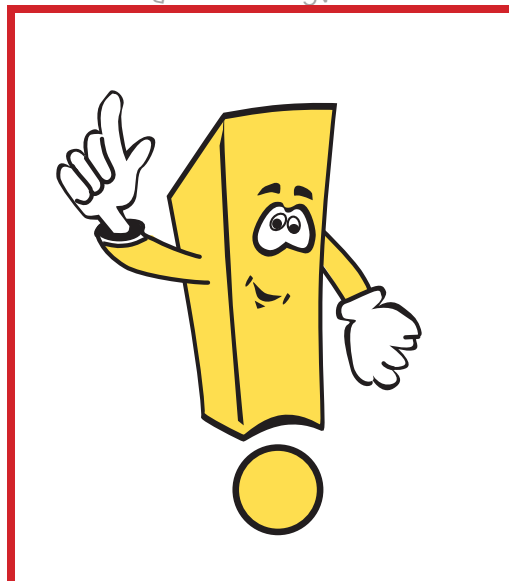




Refer to the latest repair information in ElsaWeb to determine which components have to be replaced in the event of airbag and pyrotechnic safety belt deployment.



Inspect pyrotechnic safety belts even if the airbag(s) did not deploy.



Special Tools

Airbag Deployment Device J-44210

State and federal law requires airbags and seat belt tensioners to be deployed before being discarded.

The J-44210 Deployment Fixtures assists certified technicians on the deployment of Volkswagen driver, passenger, side-impact airbags and seatbelt tensioners for the purpose of disposal.

The fixture functions as a platform to which airbags and tensioners can be attached for deployment. It incorporates a plastic tank that must be filled with water prior to use. It also includes the necessary bolts and brackets to properly attach the airbag/tensioners.

The instructions supplement the service procedures for airbag modules published by Volkswagen. It is important that the technician is familiar with these procedures.



VAS 5056

The VAS 5056 simulates the resistance of the airbag. It can also simulate a short circuit when the button on the tester is pushed. The tester comes with adapter harnesses to fit all airbag and pyrotechnic safety belt igniter connectors.

For example, for the DTC Passenger's side airbag igniter 1-N131-Too High, a technician can connect the VAS 5056 to the igniter wiring harness and monitor the value blocks on the VAS 5051 or 5052. When the technician pushes the button on the tester, the value block should change from Too High to Too Low. If this happens the technician has verified the wiring harness to the airbag is not the cause of the DTC.



Repair Steps

When you do a repair that involves an airbag, you need to follow special procedures.

Define the Problem

Make sure you have all the information you need

Verify and Analyze

Observe the vehicle's condition. Note special equipment. Do not disturb or make any adjustments, such as moving the seats.

Locate the Problem

Use VAS Scan Tool retrieve DTCs

Repair the Problem

Always follow repair manual cautions and warnings.

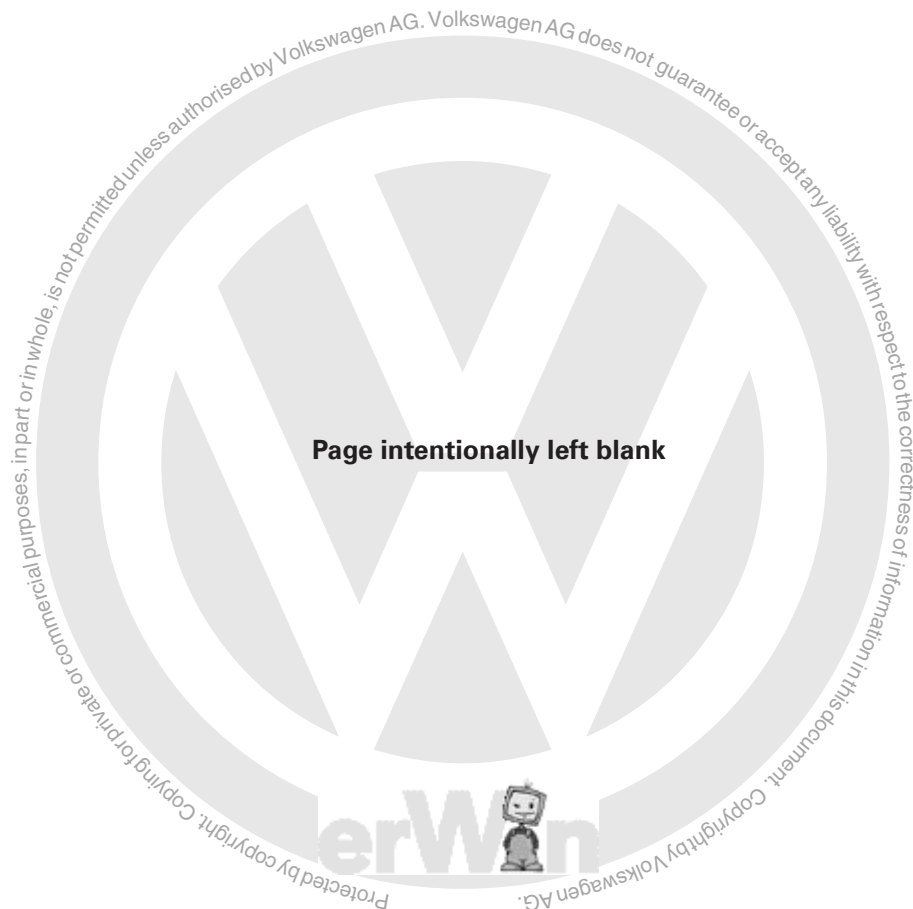
Do not erase DTCs until after the repair.

Conduct a Quality Check

Inspect and make sure all trim has been replaced correctly.

Page intentionally left blank





Knowledge Assessment

An on-line Knowledge Assessment (exam) is available for this Self-Study Program.

The Knowledge Assessment may or may not be required for Certification.

You can find this Knowledge Assessment at:

www.vwwebsource.com

For Assistance, please call:

Volkswagen Academy



Certification Program Headquarters

1-877-791-4838

(8:00 a.m. to 8:00 p.m. EST)

Or, E-mail:

concierge@volkswagenacademy.com



erWin
Protected by copyright. Copying for private use is prohibited. Document Copyright by Volkswagen AG.

Volkswagen Group of America
2200 Ferdinand Porsche Drive
Herndon, VA 20171
November 2011



Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Volkswagen retailer or other qualified shop. We especially urge you to consult an authorized Volkswagen retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Volkswagen.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Volkswagen is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Volkswagen retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.
- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

Cautions & Warnings

- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly; do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Volkswagen specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.
- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Volkswagen Service technicians should test, disassemble or service the airbag system.

Cautions & Warnings

- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Volkswagen Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.

