Service Training



Self Study Program 890103 The 2011 Touareg



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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. Page intentionally left blank

The second generation Touareg has been redesigned to combine technical innovations, high comfort, sporty performance, a stylish design, outstanding quality and unrestricted off-road capabilities. All around, the Touareg continues its performance-luxury legacy.

With the new front end style, low ride height, and a multitude of aerodynamic details, the Touareg has improved both in driving dynamics and aerodynamics.

All of the new Touareg's components have been reviewed and/or redesigned for reduced fuel consumption and improved exhaust emissions.

- The vehicle weight of the base model has been reduced by approximately 440 lb (200kg) while increasing torsional rigidity.
- A new 8-speed automatic transmission is standard for all engines.

The new Touareg is a stylish, dynamic and authentic off-road vehicle.



2011 Touareg

This graphic displays some standard and optional equipment for the 2011 Touareg.

Electromechanical Parking Brake

Instrument Cluster with 7" Display

Bi-xenon Headlights with LED Daytime Running Lamps

Dynamic Light Assist



Panoramic Sliding Roof, Optional



8-Speed Automatic Transmission

Adjustable Front Head Restraints

Weight Reduction

One of the development requirements of the new Touareg was to significantly reduce the weight. The use of aluminium in the running gear components and hot-formed, high-strength and corrosion resistant steels for the body helped to lower the vehicle weight. Some of the weight reduction areas are listed below.



Driving Off-Road

The 2011 Touareg retains its excellent off-road capability. The following vehicle capabilities are based on a vehicle with standard equipment, a 3.6L V6 FSI engine and 235/65 R17 E50 tires plus a driver. (The weight of the driver is estimated at 165 lb (75kg)).



S449_380

S449_085

Maximum Grade - 31°



Maximum Lateral Inclination - 35°



S449_091 Ground Clearance when Stationary - 8.5 in (205mm)



Entry/Exit Angle - 25°

S449_081



Fording Depth - 19.7 in (500mm)

Breakover Angle - 20°

Technical Data

Exterior Dimensions and Weights

These specifications are for a 2011 Touareg without a driver, equipped with the 3.6L V6 FSI engine.



Exterior Dimensions

	2011 Touareg	2003 Touareg			
Length	189 in (4795 mm)	187 in (4754 mm)			
Width	76.3 in (1940 mm)	75.9 in (1928 mm)			
Height	68.2 in (1732 mm)	68 in (1726 mm)			
Wheelbase	113.9 in (2893 mm)	112.4 in (2855 mm)			
Front Track	64.9 in (1650 mm)	65 in (1653 mm)			
Rear Track	65.7 in (1670 mm)	65.5 in (1665 mm)			

Weights and Capacities

	2011 Touareg	2003 Touareg		
Gross Vehicle Weight	6125 lb (2860 kg) to 7413 lb (2910 kg)	6493 lb (2945 kg)		
Curb Weight	4711 lb (2137 kg) to 5135 lb (2329 kg)	4941 lb (2241 kg)		
Towing Capacity	7716 lb (3500 kg)	7716 lb (3500 kg)		
Max Roof Cargo	220 lb (100kg)	220 lb (100kg)		
Tank Capacity	26.4 gal (100 l)	26.4 gal (100 l)		
Drag Coeffient	.36 cd	.38 cd		

Interior Dimensions





Interior Dimensions and Volumes

	2011 Touareg	2003 Touareg
Interior Length	71.6 in (1819 mm)	70 in (1777 mm)
Luggage Compartment Volume	32.1 cu ft (910 l)	31 cu ft (880 l)
Luggage Compartment Volume with Rear Seat Folded	70.9 cu ft (2008 l)	71 cu ft (2010 l)
Knee Space - 2nd Row of Seats	3.1 in (81 mm)	1.4 in (36 mm)

	2011 Touareg	2003 Touareg
Front Headrooom	39.6 in (1006 mm)	38.7 in (983 mm)
Rear Headroom	38.9 in (989 mm)	38.3 in (973 mm)
Width and Shoulder Height, Front	59.8 in (1520 mm)	57.7 in (1465 mm)
Elbow Width, Front	70 in (1549 mm)	59.2 in (1504 mm)

Body Structure

The body of the 2011 Touareg is completely new. The primary objective when designing the new body was to increase stiffness while reducing weight.



The red sections in the image represent hardened steel sections. Although they have been used in other Volkswagen models, this is the first time they are being used in the Touareg.

- Upper A-pillar
- Parts of the roof side member
- Inner B-pillar
- Rear seat cross member
- Roof cross member for vehicles without panoramic sliding roof

Vehicle with Panoramic Sliding Roof



S449_039

The roof cut-out for the panoramic sliding roof has a bonded reinforcement frame consisting of tailored blanks. This provides strength for the passenger compartment in the event of a side impact.

Fenders



The fenders are steel and are secured in different locations than the previous Touareg. The design and different securing positions are important for pedestrian protection.

Doors

The internal components of the doors are pre-assembled on a plastic assembly carrier. This carrier is installed as a single component during door assembly. The front assembly carriers are bolted in place. The rear carriers are secured using a plastic clip that is rotated 90° to lock the assembly in place.

The exterior mirrors are bolted to the outer door skin.



S449_098

Panoramic Sliding Roof

The panoramic sliding roof is made up of two glass panels. The front panel can be moved to a vent position or opened. The rear panel is firmly bolted in place. Efficient heat-insulating glass is used for both glass panels.

The panoramic sunroof also includes an electrically adjustable sunshade. The operation of this sunshade is controlled by a switch in the sunroof controls. The wind deflector is extended and retracted mechanically when the panoramic sunroof opens and closes.



S449_139

Tailgate

The rear tailgate of the Touareg is opened and closed electrically. The system consists of the following components:

- Radio remote control key fob
- Rear Lid Remote Release Button E233 in the driver's door
- Release Button in Rear Lid Handle E234
- Spindle drive on each side
- Power latching system in the lock
- Rear Lid Lock Button in Luggage Compartment E406
- Sensor strips
- Rear lid control module

The tailgate can be opened and closed from the driver's seat, using E234, E406, or the radio remote control. Sensor strips are installed in the side areas of the tailgate for pinch protection after the tailgate is almost closed.



S449_007

Programming the Opening Angle

The tailgate opening angle can be set to different heights to accommodate shorter or taller people. To set the height, manually move the tailgate to the desired height. Press and hold the button on the tailgate for more than three seconds. The new height position is stored. The hazard flashers flash once and an audible sound is heard. The tailgate cannot be programmed between 0° to 20° degrees from its closed position.

Pinch Protection

For safety, there are two pinch protection systems on the tailgate. The first is the force detection system of the motor and the second consists of two pressure-sensitive strips.

Excessive Force Detection System

The purpose of this system is to determine if an obstacle is present when the tailgate is closing or opening. The tailgate control system monitors the motor spindle drive speed and compares it to a mapped value. Deviations between the mapped and actual speed are evaluated by an algorithm.

If sluggishness is detected, the speed is readjusted. If the tailgate stops, the tailgate stops and reverses by approximately 10°. If the tailgate is stopped during opening, the rear lid stops.

Pinch Protection Strips

The pinch protection strips are located at the sides of the tailgate to detect an obstacle during the final stages of closing.

The electrical resistance of the strips change due to pressure. This resistance is monitored while the tailgate is being closed. An obstacle is detected if the resistance falls below a specific value. If the resistance drops too far, it moves back and opens by approximately 10°. The pinch protection strips are not monitored while the tailgate is opening.

If a protection strip is defective, the rear lid can only be operated using the Release Button in Rear Lid Handle E234 and the Button to Close Rear Lid Lock Button in Luggage Compartment E406. The radio remote control and the Rear Lid Remote Release Button E233 in the driver's door are deactivated.

Emergency Operation Function

If the Hall sensor in the drive motor fails, the tailgate can continue to be moved electrically. However, the motors are actuated with a modified opening model. If both Hall sensors fail, the tailgate cannot be actuated electrically. The tailgate still opens and closes manually, but with slightly increased force.

Spindle Drive

Design and Function

The spindle drive is used to raise and lower the tailgate. It consists of a spindle actuator with electric motor and gear, a coil spring for force support, a brake element and the wrap spring brake, for securely holding in each opening position. The electric motor drives the spindle via a two-stage planetary gear. The spindle moves the outer tube via the spindle nut.



Wrap Spring Brake

Design and Function

Because the holding torque of the spindle drive is not strong enough to hold the open rear lid in position, the drive has an internal brake element.

The brake element is designed as a wrap spring brake. If the springs are tensioned by rotating the drive or output levers, the spring diameter gets smaller. This reduces the friction torque that the spring transfers to the outer housing. As soon as the rotational movement stops, the springs relax and expand to apply friction to the outer housing. The movement is stopped.



Xenon Headlights



Daylight Driving Lights



S449_189

The LED daytime running lamp bulbs illuminate whenever the vehicle is running and the parking brake is disengaged.

Side Light



S449_191

The LED side light bulbs and the side light bulb illuminate when the side light is actuated.

Turn Signal



S449_142

The turn signal bulb flashes when the turn signal is actuated.

Main Beam



S449_193

The main beam bulb, the side light bulb and the LED side light bulbs illuminate when the main beam is actuated.

High Beam



S449_195

When high beam is switched on, the high beam bulb and the side light bulb illuminate.

Taillamps

The taillamps have split rear lights. One section is located in the side panel and the other section in the tailgate. Rear running lamps are also in the rear bumper.

The bulbs for the inner light can be replaced without removing the housing. The housing must be removed to access the bulbs. It is secured using a central bolt.



S449_138

Foglamps



The fog light with cornering light is located in the front spoiler.

The fog light bulb is changed via a flap in the wheel housing liner.

S449_140

Body

Interior Equipment

Front Seats

Eight-way and 12-way power seats are available on the Touareg. Heated front seats are standard. Heated rear seats are optional.





Backrest Lateral Support Adjustment

Adjustments are made with a combination of a pneumatic drive and a mechanical adjustment facility.

Head Restraints

The head restraints on the seats are longitudinally and height adjustable. Operation is carried out with a central button for both adjustment directions.

Rear Seat System

The rear seat system is split and can be moved 6.3 in (160 mm) longitudinally. The backrests can be locked in three inclination positions. An electric backrest release function is optional.



Electric Backrest Release Function

Operation is carried out via buttons in the right luggage compartment trim.



Luggage Compartment

The rear seat system can be longitudinally moved 6.3 in (160 mm). As a result, the size of the interior and cargo areas can change significantly. The load compartment width has been increased by 7.5 to 53 inches (190 to 1350 mm), which allows up to four golf bags to be loaded easily. Depending on the position of the rear seat bench, the luggage compartment volume ranges from 20.5 to 23.3 cu ft (580 to 660 liters), increasing to 58 cu ft (1642 liters) when the rear seat bench is folded down.

Variable Load Floor

The variable load floor is the flat load surface that allows bulky objects to be loaded more easily. Items such as an umbrella, flashlight or even a folding shovel can be stored under the luggage compartment floor. The floor can be removed and inserted upside-down when dirty items need to be carried. Its lower side is coated for soiled cargo.



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Safety Equipment

The new Touareg is equipped with two front, side and curtain airbags.

Crash Sensors

Early crash sensors are located under the headlights. They detect frontal crash conditions before the impact has been transferred to the chassis.



Curtain Airbags

Curtain airbags are located in the side rails above the headliner. During a side impact collision, they deploy and drop down to cover teh side window areas.

Front Airbags

The vehicle is equipped with driver and passenger front airbags.

Occupant Protection

S449_005

Side Crash Sensors

Pressure sensors for detecting a side crash are located in the front doors.

Lateral acceleration sensors for detecting a side crash are located near the rear wheel housings.

Seat Belt Tensioners

All outboard seats have pyrotechnic seat belt tensioners. When deployed, they lessen slack in the seat belt to hold the occupant more securely.

3.6L V6 FSI Engine

The 3.6L engine is mounted longitudinally. This engine is similar in design to the previous 3.6L engine used in the Touareg.

Technical Features

- Oil level/oil temperature sensor with ultrasonic measurement
- Innovative thermal management in the engine with variable water pump



Technical Data

Туре	VR Engine
Displacement	219 cu in (3597 cm ³)
Bore	3.5 in (89 mm)
Stroke	3.8 in (96.4 mm)
Valves Per Cylinder	4
Compression Ratio	11.4:1
Maximum Output	280 hp (206kW) at 6200
	rpm
Maximum Torque	265 lb/ft (360Nm) at
	3000 - 4000 rpm
Engine Management	BOSCH MED 17.1.6
Fuel	Premium
Exhaust Gas Treatment	Three-way catalytic
	converter with Lambda control
Emissions Standard	ULEV II



Engines

3.0L V6 TDI Engine

This is the same engine that was used in the previous Touareg.

Technical Features

- Common rail fuel injection system with piezo injectors
- Low-temperature exhaust gas recirculation
- Volume flow-controlled oil pump
- Oil level/oil temperature sensor with ultrasonic measurement principle
- Diesel particulate filter with selective reduction catalyst



Technical Data

Туре	6 Cylinder V-Engine
Displacement	181.1 cu in (2967 cm ³)
Bore	3.6 in (91.4 mm)
Stroke	3.27 in (83 mm)
Valves Per Cylinder	4
Compression Ratio	16.8:1
Maximum Output	225 hp (165 kW) from
	4000 - 4400 rpm
Maximum Torque	406 lb/ft (550Nm) from
	2000 - 2250 rpm
Engine Management	BOSCH EDC 17
Fuel	Ultra-low sulfur diesel
Exhaust Gas Treatment	Exhaust gas recirculation, oxidizing catalytic converter, diesel particulate filter
Emissions Standard	Tier 2 BIN5, ULEV II



3.0LV6TSI Engine with Supercharging (Hybrid)

The 3.0LTSI engine has a supercharger to increase power. This engine is only used in the Touareg Hybrid.



Technical Features

- Six-cylinder V engine with Roots supercharger
- Volumetric flow-controlled oil pump
- Intake manifold flaps
- Secondary air system to comply with exhaust emissions legislation
- Belt-driven supercharger
- Charge air coolers for intake air
- Intake only variable valve timing
- Oil level/oil temperature sensor with ultrasonic measurement principle
- Oil gauge in the infotainment system
- Innovative Thermal Management (ITM)
- The following components are driven electrically:
 - Vacuum pump for the brake servo (in addition to the mechanical vacuum pump)
 - Power steering pump
 - Air conditioning compressor

Technical Data

Туре	6-Cylinder V Engine
Displacement	182.8 cu in (2995 cm ³)
Bore	3.33 in (84.5 mm)
Stroke	3.5 in (89 mm)
Valves per Cylinder	4
Compression Ratio	10.5:1
Maximum Output	333 hp (245 kW) from
	5500 - 6500 rpm
Maximum Torque	325 lb/ft (440 Nm) from
	3000 - 5250 rpm
Engine Management	BOSCH MED 17.1.6
Fuel	Premium
Exhaust Gas Treatment	Cylinder bank-selective Lambda control with a broadband probe before catalytic converter per cylinder bank, two ceramic catalytic converters with Lambda probe after the catalytic converter
Emissions Standard	ULEV II

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Output, Combustion Engine

In kick-down, the drive output of the combustion engine and the electric motor are added in the output curve to give a maximum output of 375 hp (279 kW). This means that the output curve is increased by the amount of the electric motor driving power, 46 hp (34 kW). This occurs over almost the entire speed range.

More importantly, the full torque of the electric motor is available immediately.

Electric Hybrid Drive

The 2001 Touareg will be available as a hybrid vehicle, using a traditional combustion engine and an electric motor. The vehicle was not designed as a hybrid from the ground up, and retains its sportiness and off-road characteristics.

During vehicle development, focus was placed on technician safety when handling the high-voltage technology. Numerous shut-off functions and back-up facilities in the hybrid system prevent dangerous situations for workshop employees.



The basic design of the hybrid system allows either the engine or the electric motor, or both, to drive the vehicle. This is what is called a parallel hybrid design. The following capabilities are retained from the previous model:

- Off-road capability
- Trailering capability
- High-power
- Occupant comfort.

Overview of the Drivetrain



The drivetrain on the Touareg Hybrid consists of:

- The 3.0L supercharged TSI engine
- A clutch that engages/disengages the engine from the rest of the drivetrain
- The electric motor
- The 8-speed automatic transmission 0C8 from Aisin
- The transfer case with Torsen differential
- The drive shafts

The engine, clutch, electric motor and the automatic transmission are configured inline on a common shaft. This allowed for weight savings despite additional components.

The air conditioning compressor is not driven by a belt for the hybrid vehicle. Instead, it is driven by a separate electric motor that is supplied with power from the high voltage system.



Further information on the hybrid system is in SSP 890203 "The Touareg Hybrid".

Oil Gauge in the Infotainment System

The Touareg will no longer have a dipstick to measure the oil. Instead, an oil gauge can be viewed in the infotainment system. The customer is only provided with warnings regarding the oil level via the instrument cluster.



Display range: A =Oil level OK, do not replenish oil B =Oil level too low, replenish oil urgently (approx. 1 l) C =Oil can be replenished (approx. 0.5 l) D =Overfilling warning, urgently reduce oil

To measure the oil level:

- The vehicle must be horizontal.
- The oil temperature must be between 140 and 248° F (60 to 120° C).
- After stopping the engine, wait briefly and allow the oil to flow back into the oil pan.
- Turn on the ignition, press the "CAR" infotainment button, press the "Service" function button.

The oil pressure/oil level display in the dash panel insert is maintained as follows:

		Possible Cause	Remedy
٩٢.	Illuminates	Engine oil level too low	Turn off engine. Check oil level.
N	Illuminates	Problem with the engine oil pressure	Drive to a dealership under the maximum engine speed indicated in the dash panel insert.
ч.	Flashes	Engine oil pressure too low	STOP! Do not continue driving! Turn off engine. Check oil level. Do not continue driving if the warning lamp flashes, even if the oil level is OK. Seek professional help.
۰.	Flashes	Engine oil system malfunction	Visit a dealership. Have the engine oil sensor checked.

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Transfer Case

The 2011 Touareg has a Torsen center differential to distribute power between the front and rear axles. The power distribution is 40:60 (front axle:rear axle).

4MOTION

All 2011 Touareg vehicles are equipped with the Torsen transfer case. This self-locking center differential provides permanent four-wheel drive.

The Torsen differential operates purely mechanically and reacts without delay to changes in driving situations.

Its compact design, low weight and lifetime oil fill mean that the transfer box is maintenance-free and reliable.



8-Speed Automatic Transmission 0C8

Every 2011 Touareg will have this 8-speed automatic transmission. This transmission is based on the previous 09D transmission.

The eight forward gears (smaller gear ratio steps) have enabled the consumption and emissions values to be reduced compared with the 09D automatic transmission. The eight forward speeds are made possible by the Lepelletier gear set concept.

The 0C8 automatic transmission is also designed for use with the hybrid drive.





For more information, refer to SSP 850103, The 8-speed Automatic Transmission 0C8.

Transmission

Developer/ Manufacturer	AISIN AW CO. LTD Japan					
Designation	Automatic transmission 0C8					
Transmission Features	 Electrohydraulically controlled 8-speed planetary transmission with a simple primary planetary gear set and a Ravigneaux planetary gear set Torque converter with slip-controlled torque converter lock-up clutch Designed for longitudinal installation in combination with a transfer case 					
Control System	 Hydraulic control unit (valve body) in the oil sump with external electronic control module Dynamic Shift Program DSP with separate sports program in "position S" and "Tiptronic" mode for manual gear changes Special feature: Starting off in 2nd gear is possible in Tiptronic mode 					
Torque	Depending on version, up to 737 lb/ft (1000 Nm)					
Service	For fluid maintenance and intervals, see ElsaWeb					
Weight	Depending on adaptation of the transmission to the engine, between 200 and 240 lb (91 and 108 kg)					
Speed	Depending on engine, the top speed can be achieved in 6th, 7th or 8th gear					

Torque Converter



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Overview

Thanks to its running gear, the 2011 Touareg offers outstanding off-road qualities. However, it also provides maximum ride comfort on paved roads. The running gear has the following characteristics:

- Very good vibration and wheel and tire comfort
- Low rolling resistance
- Agile performance
- High stability
- Very good off-road capabilities

Leather or Wood Steering Wheel, with Multi-Function Buttons

Lightweight Running Gear

ABS/ESP with MK25



Electromechanical Parking Brake

Tire Pressure Monitoring

Torsen Transfer Case

Electrical System

Overview

Bi-Xenon Headlights with LED Daytime Running Lamps

Instrument Cluster with either 7" Color Display (premium) or 5" Monochrome Display (base)



Dynamic Light Assist 5th Generation Immobilizer Dynaudio Sound System S449_069

Multi-Function Camera Reverse Function

Radio/Navigation System RNS 850

Air Conditioning

The new Touareg has Climatronic automatic air conditioning. The Climatronic system is an automatic heating, cooling and distribution system. All vehicles for North America will have two-zone Climatronic.



Operation



The following functions are available at the control head in the instrument panel:

- OFF switching off all HVAC functions
- AUTO automatic function
- AC ON/OFF
- Temperature regulation for the front right and left seats
- Air distribution settings for both left and right zones
- Blower intensity setting for both left and right zones

- Recirculation function
- Synchronization with the driver's climatic zone

S449_116

- Maximum defrost
- Residual heat function
- Front seat heating
- Heated rear window

Display in Radio/Navigation System RNS 850

The Climate button is used to activate the mode for the climate settings in the radio/navigation system RNS 850 display. The display is a touch screen.



Climate Settings

The following settings are available:

- Air distribution
- Steering wheel heating
- Blower speed
- AUTO, automatic temperature, blower and air distribution regulation plus climate profile setting



S449_022

S449_020

The following settings are possible under the "Extras" menu:

- Three different climate profiles "Low," "Medium" and "High"
- Activation/deactivation of automatic recirculated air

"Extras" Menu



S449_024

2-zone Climatronic



Legend

- E87 Front A/C display control head G17 Outside Air Temperature Sensor G65 High Pressure Sensor G107 Sunlight Photo Sensor G238 Air Quality Sensor G261 Left Footwell Vent Temperature Sensor G262 Right Footwell Vent Temperature Sensor G308 Evaporator Temperature Sensor G385 Left Front Upper Body Vent Temperature Sensor G386 Right Front Upper Body Vent Temperature Sensor G397 Rain/Light Recognition Sensor J255 Climatronic Control Module J519 Vehicle Electrical System Control Module J520 Vehicle Electrical System Control Module 2 J533 Data Bus Onboard Diagnostic Interface J708 Residual Heat Relay (for water pump) N82 Coolant Shutoff Valve N280 A/C Compressor Regulator Valve
- V2 Fresh Air Blower
- V107 Defroster Door Motor
- V108 Left Footwell Door Motor
- V110 Left Center Vent Motor
- V158 Left Temperature Door Motor
- V159 Right Temperature Door Motor
- V299 Left Side Vent Motor
- V425 Fresh Air/Recirculated Air/Back Pressure Door Motor Z1 Rear Window Defogger



CAN Convenience Data Bus CAN Operation and Display Data Bus CAN Data Bus line LIN Data Bus line

Coolant Circuit

A portion of the heat exchanging system in the Touareg is new and includes a refrigerant pipe that forms a "pipein-pipe system". Both high and low pressure refrigerant can be transferred in the same pipe due to its internal construction. The outside channel of the pipe sends refrigerant to the expansion valve. The inside channel of the pipe sends refrigerant back to the A/C compressor. This design increases system efficiency and contributes towards minimizing fuel consumption.

It is used for a small section of the A/C lines and is located in the center cowl area.



Heating and Air Conditioning

Control Motors



The control motors for the flap drives are all identical and can basically be used on any flap. Because these are stepper motors, their design does not require a potentiometer.

There are seven control motors on the air distribution box.

The control motors are connected in series, and are actuated via a separate LIN bus by the Climatronic control module.



Each motor has its own "address" in the Climatronic control module. The motor addresses are assigned using test plans in the VAS scan tools. When setting an address, the existing address in the motor is erased. The Climatronic control module then sends a signal for automatic addressing. The addresses are assigned to the individual control motors. Basic settings using the VAS diagnostic tester can only be carried out after addressing is performed. Resetting the addresses must be carried out each time a control motor has been replaced.

Blower Module

The 2011 Touareg is equipped with a blower module with a blower regulation motor and a blower regulation sender. This is a single unit and the components cannot be replaced separately.

Sensors

The majority of the Climatronic sensors in the 2011 Touareg are the same as those used in the previous Touareg. The Humidity Sensor G355 is new.

Humidity Sensor G355

G355 is designed to prevent windshield fogging by sensing air humidity. Window fogging occurs below the dew point temperature, when there is high humidity and low temperature in the passenger compartment. Measuring the air humidity at the window is the most effective way to determine possible fogging conditions.



The humidity and the temperature at the windshield are measured using a capacitive thin-layer sensor. G355 functions in a similar way as a plate capacitor; measurement of the capacity reveals the degree of humidity.

The sensor electronics convert the measured capacity into a voltage value. The temperature of the window is measured through a separate sensor within G355, since it is attached directly to the window.

Signal Usage

The signal is transmitted to the vehicle electrical system control module via a LIN bus, and is forwarded to the Climatronic control module via the convenience CAN. The Climatronic system controls the supply of air to the windscreen so that fogging is reduced.

Effects of Failure

Without a signal from the sensor, the control module cannot calculate the point in time from which moisture settles on the windows. The automatic defrost function fails.

Hybrid Air Conditioner Compressor



Due to its connection to the high-voltage system, the electric air conditioner compressor can also be operated when the combustion engine is not operating. If the available voltage drops, the combustion engine is restarted to continue the supply of electrical power.

The air conditioner compressor in the Touareg Hybrid is supplied with 288V DC voltage. The compressor contains a DC/AC inverter, converting the direct current into alternating current to operate the asynchronous AC current motor.

The air conditioning compressor is connected to the power electronics via a $2 \times 4 \text{ mm}^2$ cable. This is also where the 30A fuse is located that protects the high-voltage system. The fuse cannot be replaced separately.

The connector is mechanically coded, and cables are orange. When the connector is removed, the pilot line in the cable is opened and the high-voltage system is disabled.



When working on the air conditioner compressor, the high-voltage system's voltage must be switched off by a Volkswagen high-voltage technician.

Heating and Air Conditioning

Technical Features

- The delivery rate of the compressor is regulated by the electric drive motor speed of the air conditioner compressor. It can be adjusted in increments of 50 rpm.
- The rotational speed range is between 0 and 8600 rpm, and is regulated via the Climatronic control module. To reduce operating noise, the rotational speed of the electronic air conditioner compressor is at a minimum when the vehicle is stationary.
- The compressor has a mean electrical power consumption of approximately 2 hp (1.5 kW); its maximum electrical power consumption is approximately 9.4 hp (7 kW).
- The heat incurred by the inverter and the motor coils is dissipated via the refrigerant return line (intake side).
- The compressor is protected against access to dangerous wires, is dust-proof and can be temporarily immersed in water (Class IP 67).



Communication

The air conditioner compressor is connected to the powertrain CAN/extended CAN, (deactivatable CAN, as the AC compressor lies in the crash area). As feedback to the air conditioner control unit, the electronic compressor transmits the following data:

- Actual rotational speed
- Current consumption (0-25A)
- Component temperature
- Status messages on internal communication, current, voltage and load monitoring.



The air conditioner compressor can only be replaced as a complete unit.

Heating and Air Conditioning

Function

The air conditioner compressor is a "scroll compressor" where compression takes place between two scroll elements. These elements are two nested spirals, one is stationary and the other is moved in circles against or near the first. This causes the spirals to form several increasingly smaller chambers within the coils. In these chambers, the material is compressed towards the center, where it can escape through a passage.





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Thermal Management System

The heat exchanger for the interior heating is also connected to the innovative thermal management system.

In the case of low ambient temperature of, for example, 0°C and a desired temperature setting of 22°C in the interior, the heating is only provided with "warm coolant" when the coolant temperature is at least 20°C. This process takes approximately 60 seconds, up to a maximum of 120 seconds. During this time, the vehicle is driven with "stationary water," which means that the water pump is not operating and no coolant is circulating. This allows the coolant to heat faster.

When the Coolant Shut-Off Valve N82 has opened, all of the heated coolant is initially used to heat the interior. Depending on the interior temperature, the heat output is gradually reduced by the Climatronic control module.



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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

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