Off-Road Benefits

Off-Road ABS

As part of the Touareg's high-performance brake system, the off-road anti-lock brake system (ABS) permits the front wheels to lock momentarily. The beauty of ABS is that it allows the driver to steer the vehicle in an emergency stopping situation; by locking only the front wheels, oversteer is prevented. However, many experienced off-road specialists do not want ABS when driving off-road. They depend on their own ability to lock the front wheels in loose gravel or dirt because the shoveling effect created by the front wheels builds up a pile of gravel or dirt in front of the wheels, causing the vehicle to slow down. Therefore, off-road ABS only acts at speeds less than 18 mph (29 km/h) on the front wheels, when driving forward and in low-range gear reduction.

Engine Braking Assist

The purpose of engine braking assist (EBA) is to prevent the wheels from skidding due to compression braking of the engine if the accelerator is lifted very suddenly or a low gear is engaged. EBA reduces any wheel slip that could occur when braking to a low, non-critical value. This is especially useful on loose, off-road surfaces where skids can occur.

Hill Descent Assist

Off-road drivers know that one of the most treacherous hazards they face is traversing a steep downhill that is covered with loose rocks or dirt. With the Touareg, the driver removes his or her foot from the accelerator at a speed of less than 12 mph (20 km/h) to initiate hill descent assist (HDA). HDA uses controlled brake applications to ensure that the vehicle does not go out of control while descending. The driver can then focus on steering.

In summary, HDA intervenes:

- at speeds less than 12 mph (20 km/h)
- on slopes greater than 20%
- during forward and reverse driving
- when ESP is active

HDA intervenes, for example, when one wheel loses traction. Using the ABS pump, the brakes are applied at the wheels that have good traction. This prevents acceleration and keeps the vehicle speed constant. When the process is complete, the vehicle returns to the previous driving speed.

"There are SUVs that are as quick, handle as sharply, or are as capable off-road or as comfortable as our loaded Touareg, but precious few can match the VW in all the above…"

– *Car and Driver, March 2003*

Electronic Differential Lock (EDL)

The Touareg has four-wheel EDL. Using four-wheel EDL, a free-spinning wheel is slowed by brake application, transferring torque to a wheel with traction.

Center Differential Reduction Stage

The Touareg has a center differential as standard with an electric differential lock and a reduction stage. The reduction, or low range gear, is a 2.7:1 gear reduction. Low range helps provide the torque necessary to climb a 45-degree slope and also provides engine braking for steep declines.

ESP

ESP automatically provides the driver with an enhanced ability to maintain control of the vehicle, but it should be deactivated when driving on loose sand or gravel. ESP uses ASR which reduces engine power when wheel slip is detected. This makes the vehicle slow down and causes more difficulty getting out of the loose sand or gravel.

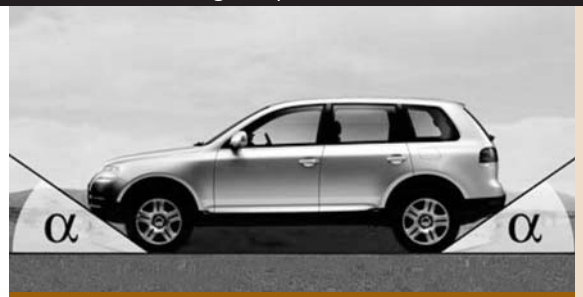
4XMOTION Four-Wheel Drive

For many years 4MOTION has been touted for its four-wheel drive system abilities. One of the advantages of its Torsen differential is that it is a completely mechanical system. But now with the Touareg, we are introducing an electronically controlled center differential. Why? To meet the specific needs of off-road drivers, a locked center differential helps provide exceptional control. The Touareg 4XMOTION system remains locked until the ABS wheel speed sensors indicate that the driver is turning. The differential then unlocks, allowing the axles to turn at different speeds. This prevents drivetrain strain and tire wear. In extreme conditions, the driver can manually lock the center differential.

The low-range gear, differential locks, and body design with high ground clearance and short front and rear overhangs allow excellent off-road capabilities.

Off-Road Driving Capabilities	Description	Benefit
 **Maximum climbing capability: 45°**	The steepest slope a vehicle can climb. The Touareg's low gear ratio reduction is the key to its outstanding climbing ability of 45 degrees.	The Touareg can climb the steepest slope it is ever likely to encounter. Think of driving in a mountainous area and seeing a sign warning of an 8 or 9 percent grade; it is an unusually steep hill. Then think of the 100 percent grade that the Touareg can climb!
 **Ground clearance maximums** **Steel suspension: 8.3" (212 mm)** **Air suspension: 11.8" (300 mm)**	The distance between the ground the vehicle is resting on and the lowest part of the sprung chassis. (Most often this is the differential case.)	High ground clearance makes the Touareg's other off-road capabilities possible.
 **Maximum lateral inclination: 35°**	The steepest slope a vehicle can drive laterally. The Touareg will comfortably function to a slope up to 35 degrees.	When driving over terrain with inclination, the Touareg remains a safe and dependable vehicle.

α = angle

Off-Road Driving Capabilities	Description	Benefit
 **Approach angle** **Steel suspension: 28°** **Air suspension: 33.2°** **Departure angle** **Steel suspension: 28°** **Air suspension: 33.2°**	Approach angle: The indication of how steep a ramp a vehicle can negotiate from a flat surface. Departure angle: The indication of how steep a ramp a vehicle can drive off.	The Touareg has great ability to climb over rocks without hitting the vehicle's body.
 **Break-over angle** **Steel suspension: 22°** **Air suspension: 27.2°**	The angle of a ramp that the vehicle can negotiate from a level surface without becoming "high-centered" — that is, hanging up on the ridge of the ramp so that either the front or rear wheels (or both) lift off the ground.	As with the approach and departure angles, the Touareg has great ability to climb over rocks without hitting the vehicle's body.
 **Fording depth** **Steel suspension: 19.7" (500 mm)** **Air suspension: 22.8" (580 mm)**	The highest level of water a vehicle can slowly drive through without the engine taking on water or water entering the vehicle.	When deep water or a river has to be negotiated, the Touareg's generous fording depth is a great advantage. With air suspension, the Touareg can slowly power through up to 23 inches of water, without any leakage into the passenger compartment due to its sealed doors, tailgate, front and rear lights, and electrical connections.

α = angle