Steering technology – Dynamic all-wheel steering

Reduced rotation: dynamic steering

Dynamic steering varies its degree of implementation up to 100 percent, depending on driving speed, steering angle, and the mode selected in the Audi drive select dynamic handling system. The central component is the superimposition gearing in the steering column.

It conveys the driver's steering commands just as directly as in a vehicle with a conventional steering column. There is also a direct mechanical link to the actual steering gear on the front axle and the associated feedback to the forces on the wheels. When the superimposition gearing is controlled by the electric motor, it increases or decreases the steering angle, which constantly adjusts the steering ratio according to the given driving situation. That improves steering comfort and tracking behavior in accordance with speed and driving situation. At low driving speeds – in city traffic and while maneuvering – dynamic steering operates very directly; all it takes is two full turns to go from end stop to end stop. The power steering boost is also high, which makes parking and maneuvering easier. On country roads, the directness of the steering response and electric assistance are progressively reduced. Indirect gear ratios and low power assist are used to smooth out unsteady steering movements and enable straight tracking at fast expressway speeds.

Four the win: all-wheel steering

With the Q7, Audi introduced all-wheel steering in 2014 and, in doing so, set a new standard with respect to agility. The system can adjust the steering angles on the front and rear axles independently of one another. It uses the electro-mechanical power steering in the front and rear axle steering with an electric spindle drive and two tie rods in the back. The signal to turn is electrically transmitted to the steering linkage and actuators in the rear of the car via a drive-by-wire system. At low speeds, the back wheels turn up to five degrees in the opposite direction of the front wheels. That reduces the turning radius by about one meter (*3.28 feet*) and is particularly beneficial when maneuvering and parking.

Starting at speeds of about 60 km/h (*37.28 mph*), however, the rear wheels follow the movement of the front wheels. Turning up to two degrees in the same direction makes driving behavior at highway and expressway speeds calmer overall and increases stability in swerving situations. Additionally, the all-wheel steering helps make Audi's luxury-class SUVs among the most agile models in their segment.

Top combination: Dynamic All-wheel Steering
An advance in all-wheel steering, the Dynamic All-wheel Steering that is optional in the Audi A6, A7, and A8, is standard equipment in the S81. It is currently the top technology among Audi's steering systems and combines dynamic steering on the front axle with rear-axle steering. With that system, Audi is exploring the limits of what is physically possible. The system offers significant benefits, specifically in the threshold range. It combines direct, sporty steering response with masterful driving stability or, in brief: manageability with extremely high precision. The overall steering ratio changes within a range from 9.5 to 17.0 – direct at low speeds and stable at high speeds.

05/2021