Electronically controlled multi-plate clutch

Electronically controlled multi-plate clutch in S1

Like all Audi S models the Audi S1 and the S1 Sportback (7.0 / 7.1 liters of fuel per 100 kilometers [33.60 / 33.13 US mpg]; 162 / 166 grams of CO_2 per kilometer [260.71 / 267.15 g/mile]) come with permanent all-wheel drive – another USP in this segment. Weight distribution constraints mean the hydraulic multi-plate clutch is mounted on the rear axle (axle load distribution: front 60 percent, rear 40 percent). Depending on the driving situation, the electronically controlled clutch distributes the drive torque between the axles. If one of the axles starts to slip, the torque is instantly redirected to the other axle. The management of the multi-plate clutch is decidedly dynamic. It allows controlled drifts on a road surface with a low coefficient of friction in sport mode or with deactivated ESC.

Status: 3/2014

Electronically controlled multi-plate clutch in TT

The quattro permanent all-wheel drive system (optional feature on the TT 2.0 TFSI, and standard on the TTS) is a unique feature of the compact Audi sports car. The key innovation is an advanced electro-hydraulic multi-plate clutch, as well as new all-wheel drive software developed specifically for the TT.

The weight-optimized design and eliminating the accumulator enabled a weight reduction of 1.5 kilograms (3.31 lb) compared to the previous component. The clutch sits at the end of the propeller shaft in front of the rear axle – an installation position that benefits axle load distribution. For a required torque from the wheel software, the electric axial piston pump builds hydraulic pressure up to 38 bar. The friction plates are pressed together and this action sends driving torque continuously to the rear axle.

Audi has completely redesigned electronic control of the torque distribution and tailored specifically it to the TT. This is the first time the all-wheel drive system has been integrated into the Audi drive select dynamic driving system. As the new control philosophy includes more driving dynamics relevant sensor sizes than beforehand, the driver has the ideal torque distribution to all four wheels in every situation. This means that the traction control system can already send driving torque to the rear axle when the driver turns the steering wheel during sporty driving. As soon as the driver steps on the gas, the driving torque pushes the Coupé seamlessly into the bend, without any initial

understeering. For load changes, torque distribution allows targeted turning of the TT into the bend, ensuring a sporty driving feel. For drifts, it offers maximum control and reliability – when exiting a bend the front axle straightens out the Coupé.

When developing the new all-wheel drive software, one particular area of focus was enhancing the performance level. The precise determination of driving conditions, road characteristics and driver type means that torque distribution can be calculated for optimal performance and set via the all-wheel drive system. Because the software always knows the exact all–wheel requirements, in efficiency mode, even temporary cutoff is possible . However due to sensitive monitoring of driving conditions, the all-wheel drive is activated on a predictive basis; this process occurs even before the torque is required again at all four wheels. This measure allows emissions to be reduced even further by up to 1.5 g CO_2 per km (2.41 g/mile).

Status: 3/2014