MP4-23 KONI FSD DAMPER

WORDS MARK SKEWIS PHOTOS GIBSON/LAT

NEW DAMPING TECHNOLOGY from Vodafone McLaren Mercedes Official Supplier Koni is helping to define new standards not only on the racetrack but also for normal motorists.

In road cars, Koni's FSD (Frequency Selective Damping) system helps to solve the conflict between the differing damper requirements of providing good handling and a comfortable ride. In broad terms, stiff dampers are advantageous when cornering, while soft dampers offer better cushioning over bumpy surfaces. Up until recently, the only way to enjoy the best of both worlds was to employ complex computercontrolled ride control. To avoid the complexity, expense and, crucially, weight penalty

associated with such systems, FSD uses valving inside the damper itself

to vary the damping characteristics. No additional cables, sensors, or any other devices are needed.

"We designed a system that uses a valve to control an oil flow parallel to the one going through the piston rod," explains Altorf. "This parallel flow is closed by the FSD feature, giving a rise in damping force almost linear to the time that the piston is moving in one direction. "This means that when the

damper is moving slowly, such as during cornering, the damper forces are high. But when the damper is moving fast, for

example over potholes, the damper forces are low." FSD was introduced on the Mercedes-Benz SLR McLaren. Such was its success that it was trialled and then adopted for the team's grand prix cars. Of course, on the circuit, the emphasis is entirely on finetuning handling.

Main: the simple forms of Koni's FSD dampers conceal intricate valving and dual oil flows

Right: the rear damper is mounted on top of the car's gearbox, between the rear wheels (top), the front damper is mounted next to the pedals; detail shots of the damper (below)



"Our goal is to provide damping that is soft enough to maximise grip when the car is running over kerbs or other bumps, while also offering a very stiff setup on the straights and through fast, smooth corners," continues Altorf. "This keeps the car's attitude consistent, which provides a better platform for the aerodynamics package. To apply high damping forces over the bumps would entail a loss of grip." While FSD is a new development in Formula 1, Koni's involvement in the sport is not. This year marks

the company's 50th season. During

that time, its products have helped

win 13 world titles - and its regular

dampers have benefited from the

world's toughest proving ground.

TECHNICAL SPEC.

WEIGHT: 450g LENGTH: 200-250mm DIA. (MAIN CHAMBER): 35mm



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If you think that's just marketing speak, think again. Vodafone McLaren Mercedes' development programme has contributed directly to advances in the build quality and packaging of FSD dampers there's no space to accommodate large dampers on a grand prix car, so smaller units were developed and the FSD concept honed to cope with small volume fluid flows. "It is always easier to design a damper that uses a lot of fluid flow because if you misplace a small percentage through leakage, you still have enough left with which to generate force," says Mark Williams, chief vehicle development engineer for Vodafone McLaren Mercedes. "But in Formula 1 you don't have



much space. You are displacing so little fluid that any loss through leakage is significant.

"Together with Koni, we tuned the FSD damper's flow paths where they go, the restrictions, the bypasses and the charging system – to deal with low volumes of fluid flow." The result of that labour is a more efficient product both for road and racetrack.

"The Vodafone McLaren Mercedes Formula 1 programme has really benefited our development work," reveals Altorf. "But it also acts as the perfect advertisement, if you like, to help influence the drivers of standard road cars. After all, if the FSD damper is good enough for Lewis and Heikki..."