Active Rear Axle Steering on the Road to Success

- The 100,000th AKC system (Active Kinematics Control) rolls off the line just four years after starting production of active rear axle steering.
- Production milestone strengthens ZF's leadership in steerable rear axles, an increasingly common feature in passenger cars worldwide.
- AKC is an example of ZF's forward-looking, intelligent mechanical systems. It is also the trigger for change Lebring, a former axle assembly plant which has now become one of ZF's high-tech sites.

Friedrichshafen/Lebring (Austria). With Active Kinematics Control (AKC), ZF has become a market leader for active rear axle steering (RAS) in passenger cars and is constantly expanding its offering. The company has now produced more than 100,000 units – just four years after starting volume production of its AKC system for two exclusive sports car models. Seven premium vehicle manufacturers meanwhile enjoy the benefits of this ZF chassis innovation in volume production. The technology helps electric or conventional passenger cars become significantly safer, more dynamic, maneuverable and comfortable. Automated and autonomous driving are deemed to be considerable growth drivers for ZF's AKC system in future.

"Our production milestone of 100,000 AKC systems is a huge success in four different respects," says Dr. Holger Klein, Executive Vice President of the Car Chassis Technology Division at ZF. "First of all, it illustrates that our innovation allows almost any vehicle to benefit relatively easily from active rear axle steering. Secondly, ZF cements its position as market leader and technology leader in this product segment. Thirdly, every AKC unit installed depicts the forward-looking potential of intelligent mechanical systems in the automotive industry. And last but not least, this milestone highlights the exemplary transformation of the ZF production location in Lebring." The site, which is located near to Graz,
quickly transformed from an axle assembly plant to a hub for high-
tech mechatronics. It is currently the company's only AKC
production site and has allowed for the creation of a number of
new jobs.

**Two concepts for different axle designs**
The 100,000 AKC systems produced to date include 60,000 central
actuator systems and 40,000 dual-actuator systems. The latter
always have two actuators, one on each rear wheel. This version
celebrated its premiere in series production in 2013 in the Porsche
911 Turbo and 911 GT3 models. The Ferrari GTC4Lusso also
carries the dual-actuator version. Other vehicles, such as the recent
Porsche Panamera, feature the AKC version with a single, larger
actuator, which is located in the middle of the rear axle. This
system also helps steer the rear of SUVs like the Audi Q7 and
sedans like the Cadillac CT6 and the BMW 7 Series. So the AKC
system still has a way to go before reaching the limits of its
application spectrum. In the near future, the ZF system should find
its place in many more models with a growing number of
manufacturers including pick-up trucks and compact cars. AKC
can be combined with every type of drive system – from
conventional internal combustion engines to hybrids and all-
electric systems.

**Agile and stable**
The general operating principle remains the same: When driving
slowly through narrow streets, AKC steers contrary to the front
wheels' steering angle and generates a higher yaw rate for the
vehicle. This can reduce the turning radius by up to ten percent, so
a passenger car becomes substantially easier to maneuver. At
higher speeds, i.e. about 60 km/h and above, as well as during
obstacle-avoidance maneuvers for example, the system steers the
rear wheels in the same direction as the front wheels which
improves directional stability and driving dynamics.
Ready for the car of tomorrow
The steady growth in demand for AKC from OEMs is also based on the fact that the active rear track adjustment serves all current and upcoming megatrends in the automotive industry: It greatly improves safety, especially in critical driving situations and when braking. Additionally, it is highly efficient "by wire" as well as based on the "power on demand" principle. Furthermore, AKC supports automated driving and the necessary system redundancy, as it can even partially steer a vehicle without turning the front wheels. Consequently, ZF has set high sales expectations for this product. "In 2014, the first full production year, approximately 12,000 AKC systems left our production lines and over 100,000 units have been produced to date. In the coming years, we plan to increase production volumes to more than 250,000 units per year," says Peter Buckermann, Head of the Mechatronic Systems Product Line.

Captions:
1) Prime example of intelligent mechanical systems: ZF's active toe control kinematics AKC makes rear axles on passenger cars part of the steering system and serves all current and future megatrends in the automotive industry.
2) The AKC principle: The ZF system provides various responses depending on the road speed – to improve a car's safety, comfort, maneuverability and driving dynamics.
3) High-tech mechatronic manufacturing: AKC production at the ZF plant in Lebring which has assumed engineering functions.

Images: ZF
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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company has a global workforce of around 137,000 with approximately 230 locations in some 40 countries. In 2016, ZF achieved sales of approximately €35 billion (preliminary figures). ZF annually invests about five percent of its sales in research & development – ensuring continued success through the design and engineering of innovative technologies. ZF is one of the largest automotive suppliers worldwide.

ZF allows vehicles to see, think and act. With its technologies, the company is striving for Vision Zero – a world of mobility without accidents or emissions. With its broad portfolio, ZF is advancing mobility and services in the automobile, truck and industrial technology sectors.

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