

Serial Differential Gears:

Serial Differential Gears have the disadvantage during different road grip of the drive wheels that they can transfer altogether only the double torque of the wheel, which possesses the worse road grip. If a drive wheel revs up, then also the better responsible drive wheel keeps only just as to torque assigned as the more badly responsible wheel transferred can.

Differential locks cause that the better responsible drive wheel can transfer more torque. Limited Slip Differential prevent compensation completely, serial differentials with limited slip, brake compensation off (automatic differential). The lock value indicates how much torque difference between 2 driving sides (e.g. left and right drive wheel), related to the altogether transferable torque, is possible.

Automatic balance differential with multiple disk clutches (LSD)

At different number of revolutions of the drive wheels the balance wheels (bevel gears) turn and pressure with its axles the thrust rings (over in-milled ramps) against the two lamella packages. From the contact pressure, between the faster turning inner spline and the outer spline lamellas a frictional force, which a load-sensitive friction moment causes, results. This moment is led over balance housings, outer spline lamellas and inner spline lamellas to the other drive side. Here it works additionally for the drive moment of this side. The more slowly turning drive shaft has always the larger torque.

Advantages:

- up to 6 differently possibilities for acceleration and brake over the ramps, influence the check value on the Setup
- Small building area
- Low weight
- Pre load can be selected at will
- Economical manufacturing of the exchangeable thrust rings with ramps
- The lamella barrier with pressing the lamellas over thrust rings has a great many possibilities of the vote.
- This kind of differential works even if a propelled wheel does not have contact to the road.
- This barrier is feeling torque
- Check value spreading can be represented almost at will.
- The check value can be represented by 0 - 100% at will.
- Progressive and digressive characteristics are possible

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Automatic balance differential also Snails and worm gears (Torsen Differential)

The Torsen Differential consists of 2 worm gears, which are positively connected by spur wheels with one another. The check value is determined by the upward gradient of the two worm gears. During different road grip the balancing and revving of a wheel become closed by the automatic locking of the worm gears. The spur wheels of the faster turning side at the spur wheels and the worm gears of the more slowly turning side support themselves off. With driving along curves the worm gears have different numbers of revolutions. Number of revolutions balancing is made by the turning spur wheels.

Advantages:

- Small wear to snails and worm gears

Disadvantages:

- Cost-intensive manufacturing
- No optional adjustment possibility of the check value
- Large building area
- High weight
- The gate barrier functions only, if both wheels of the propelled axle with the lane are in contact.
- It is only a maximum check value spreading of 10% possible.
- Pre load is only very limited possible (and increases the wear)
- Well only the original patented Zexel Gleason gate barrier works (blocks with many AUDI models in the longitudinal differential). Copies of a modified system of company Quaife etc. function only very badly or not at all.

Automatic balance differential with steel lamellas and Silicone oil (Visco clutch)

The Visco clutch is flanged on and connected with this to the housing of the transmission. It consists arranged outer spline and inner spline lamellas and silicone liquid of housing, hub alternating. The outer spline lamellas intervene in the teeth of the housing, the inner spline in the slots of the hub. If a drive wheel begins to rev up, then the silicone liquid is cut by the lamellas, it develops a check effect between the lamellas and also between the two half axle wheels and drive wheels. With small differences in rpm the check effect is so small that a number of revolutions reconciliation can take place.

Advantage:

- Advantage of the Viscodiff is very soft using by the driver is usually not noticed.

Disadvantages:

- Large building area necessarily because of clutch housings
- High weight o Undefined check value
- No optional distortion possibility of the check value Axle not completely lock able
- The Viscodiff develops its check value over the difference number of revolutions of the two propelled wheels. That is, it must rev a wheel up clearly around one check moment to construct.
- No check value spreading possible
- No Preload possible
- The height of the check value is strongly build space dependent