

Steering: Vehicle pulls to left or right

Topic number	LI40.20-P-067947
Version	1
Function group	40.20 Chassis measurement
Date	03-27-2018
Validity	Model series 463 up to production 04/2018 (with code XZ2/XZ3/XZ4/XZ5/XZ6/XZ7)
Reason for change	
Reason for block	

Complaint:

The customer complains that the vehicle pulls increasing to the right or left (without accelerating or braking). The vehicle can be kept in the lane by holding the steering wheel or through slight steering corrections.

Note: For further steering complaints the document GI46.00-P-064393 should also be referred to.

Cause:

The complaint could be caused by the following:

- Physical reasons cause the vehicle to follow the incline of the roadway
- Wheels are not optimally balanced
- Toe adjustment on front axle
- Position of rear axle offset relative to front axle
- Aftermarket accessory components installed (wide base tires, spacer rings,....)

Remedy:

Check following points before a test drive:

Check the suspension for modifications that are not approved by Mercedes-Benz. If the suspension has been modified (larger wheels, wide base tires, wheel spacers, lowered suspension etc.), the suspension must be restored to the series production configuration and the complaint reassessed before any further measures are performed. Modifications to the suspension can have negative effects on the steering torque and the handling characteristics. Larger and wider wheels and/or wheel spacers, in particular, are frequently the reason. Repair work on the suspension or steering system are not productive here. The tire pressure and condition should also be checked, and corrected if necessary.

Measure 1:

Perform test drive in presence of customer.

A section of road that is approx. 100 meters in length should be chosen here that is as flat as possible and that does not incline to one side. To rule out the influence of any roadway inclination as far as possible, the road should be driven on at approx. 50km/h in both directions on the same side of the roadway.

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a) If the vehicle then follows - depending on the direction of travel - the roadway inclination (1x left/1x right), then the vehicle does not have a technical problem. In this case, the vehicle follows the incline of the roadway due to physical laws.

b) If the vehicle drags in both directions of travel in one direction only (e.g. 2x to right), then proceed with measure 2.

Measure 2:

Perform wheel alignment check. While doing so, re-adjust steering wheel position/straight ahead running and toe on front axle, if necessary.

Check installation position/inclination of rear axle relative to front axle. The inclination to the front axle should not exceed a value of $0^\circ \pm 1^\circ$. If the value is outside of the tolerance, then the rear axle is to be brought into the correct position using shims (see parts information). Install the shims on the rear axle trailing arm as shown in Figure 1.

Notes on wheel alignment check:

- The wheel alignment check must be performed with universal adapters. The Mercedes-Benz rapid clamping system may not be used (refer also to relevant TIPS document in Group 40.20).
- Any rim run out must be compensated for using the universal adapters
- Only the toe and the straight-ahead position of the wheels on the front axle can be adjusted. If the values measure for camber, caster and wheel offset are slightly outside the tolerance, they can be ignored if there are no visible signs of damage on the suspension.

Measure 3:

This test/measure may only be performed on steering gears manufactured by HEMA (see attachment "HEMA identification plate"):

Measure the steering forces at the pitman arm. If the forces to the left and to the right differ by more than 50%, the steering gear must be replaced (see below: Work instructions "Replace steering gear").

Check steering forces on pitman arm:

1. Detach the drag link from the pitman arm at one end.
2. Then measure the force required to move the pitman arm to the left and right (with the engine running!). A commercially available spring balance, spring force meter, luggage scale or similar must be used for this; the scale should extend from 0 to 400 N (0 to 40 kg). The force measurement must be performed at a right angle to the pitman arm, uniformly and at the same height and also performed at the same speed to the left and right.
3. Difference between left and right: The greater force must be no more than 50% higher than the lower force. To work out the difference, multiply the lower force by the factor 1.5 and compare the result with the higher force.

Examples:

- Force for moving the pitman arm to the left: 300 N (30 kg)
- Force for moving the pitman arm to the right: 200 N (20 kg)
- Calculation: $200 \text{ N (20 kg)} \times 1.5 = 300 \text{ N (30 kg)}$
- Result: Replace steering gear (see below: Work instructions for "Replace steering gear").

- Force for moving the pitman arm to the left: 240 N (24 kg)
- Force for moving the pitman arm to the right: 150 N (15 kg)
- Calculation: $150 \text{ N (15 kg)} \times 1.5 = 225 \text{ N (22.5 kg)} < 240 \text{ N (24 kg)}$
- Result: Replace steering gear (see below: Work instructions for "Replace steering gear").

- Force for moving the pitman arm to the left: 250 N (25 kg)
- Force for moving the pitman arm to the right: 170 N (17 kg)
- Calculation: $170 \text{ N (17 kg)} \times 1.5 = 255 \text{ N (25.5 kg)} > 250 \text{ N (25 kg)}$
- Result: Do not replace steering gear.

Work instructions "Replace steering gear"

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Note: The work instructions described in WIS differ from those described below and will be updated.

1. Remove steering gear including pitman arm (included in package). Note: The marking on the steering shaft of the new steering gear is not valid. The new steering gear and the steering wheel must be in the straight-ahead position when installing
2. Install new steering gear (including pitman arm) on frame and connect hydraulic connections
3. Attach drag link to pitman arm
4. Set the front wheels straight (same track on left and right)
5. Straighten steering wheel
6. Connect steering shaft to steering gear (the steering wheel and front wheels must be straight!)
7. Bleed steering gear (after filling with power steering fluid):
 - Start engine and switch off again.
 - Raise vehicle at the front (load off front wheels) and turn steering wheel to full left and right lock at least 5 times with engine off.
 - Then lower vehicle (load on front wheels) and turn steering wheel to full left and right lock at least 10 times with engine running until the system is free of air.
 - Check oil level and correct, if necessary
8. Adjust hydraulic steering limiter.
 - Adjust the hydraulic steering stops such that they take effect immediately before the mechanical end stops
9. Check power steering system
 - With the engine running, turn the steering wheel to full left lock and reverse the vehicle a short distance (sometimes the steering wheel can then be turned slightly more)
 - Stop vehicle and engage the forward gear, keeping the steering wheel at full lock
 - Drive off and countersteer
 - If the servo assistance starts too late, the steering stops must be adjusted again
 - Perform the same procedure with the steering wheel turned to the right.

Attachments

File	Description
Korrektur Schrägstand Hinterachse.jpg	Figure 1
Typschild.JPG	HEMA identification plate

Symptoms

Chassis/suspension / Suspension characteristic / Goes off track when driving through ruts
Chassis/suspension / Suspension characteristic / Pulls to the right
Chassis/suspension / Steering system / Function / Reset
Chassis/suspension / Suspension characteristic / Pulls to the left

Parts

Part number	ES1	ES2	Designation	Quantity	Note	EPC
N 000988 025023			Shim	1	Install shim as per Figure 1	X
A 463 460 69 00			Power steering system - LHD	1		X
A 463 460 70 00			Power steering system - RHD	1		X

Operation numbers/damage codes

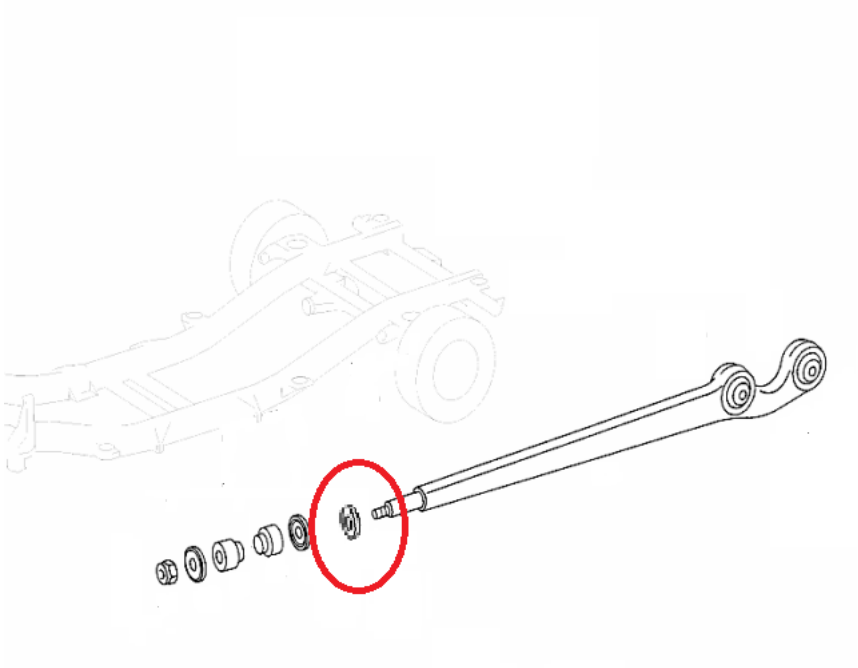
Op. no.	Operation text	Time	Damage code	Note
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XENTRY TIPS

46-3400	REMOVE/INSTALL POWER STEERING			
40-6505	MEASURE VEHICLE			
46-3230	ADJUST STEERING SHAFT OF POWER STEERING			

Attachments

Korrektur Schrägstand
Hinterachse.jpg:



XENTRY TIPS

Typschild.JPG:

