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# FAILURE DIAGNOSIS RADIAL AND AXIAL JOINTS



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# GENERAL INFORMATION

## Ball joints

The history of radial and axial joints dates back to 1922 – the year which also saw the foundation of the RUVILLE company. It was then Fritz Faudi invented and patented the ball joint. At the time, the high-maintenance components still required regular lubricating by means of a grease nipple. In the early 1960s, maintenance-free radial joints prevailed over radial plain bearings with bronze friction bushings.

Radial and axial joints are subjected to extreme stress in everyday operation. To guarantee long service life and high reliability state-of-the-art suspension components must meet the most stringent design and production demands.

Notwithstanding part quality, suspension components must be examined with utmost care during car service and maintenance. Attention to detail and thorough inspection of the steering and suspension systems are fundamental aspects of professional chassis maintenance and repair. Because if one part fails, the load applied on the remaining system components multiplies, which will inevitably lead to premature part failure.





# FREQUENT DEFECTS

## Potential damage

- Defective dust boot
- Eroded ball socket
- Extracted ball joints
- Rusty joints

## Cause

- Wear limits have been exceeded
- External impact
- Insufficient lubrication
- Contamination by dirt or moisture
- High mechanical stress
- Incorrect wheel/tyre combination





### Effect

- Excessive joint play
- Unresponsive steering
- Loss of tracking stability
- Cluttering noise
- Extraction or fracture of the ball head:

#### **Risk of accident!**

- Damage to other vehicle components
- Abnormal tyre wear
- Heavy steering

### Remedy

- Adherence to the specified servicing intervals
- Immediate replacement of defective components
- Correct removal and installation in accordance with the manufacturer's specifications
- CAUTION: It is imperative to perform an axle alignment!





## DIAGNOSIS

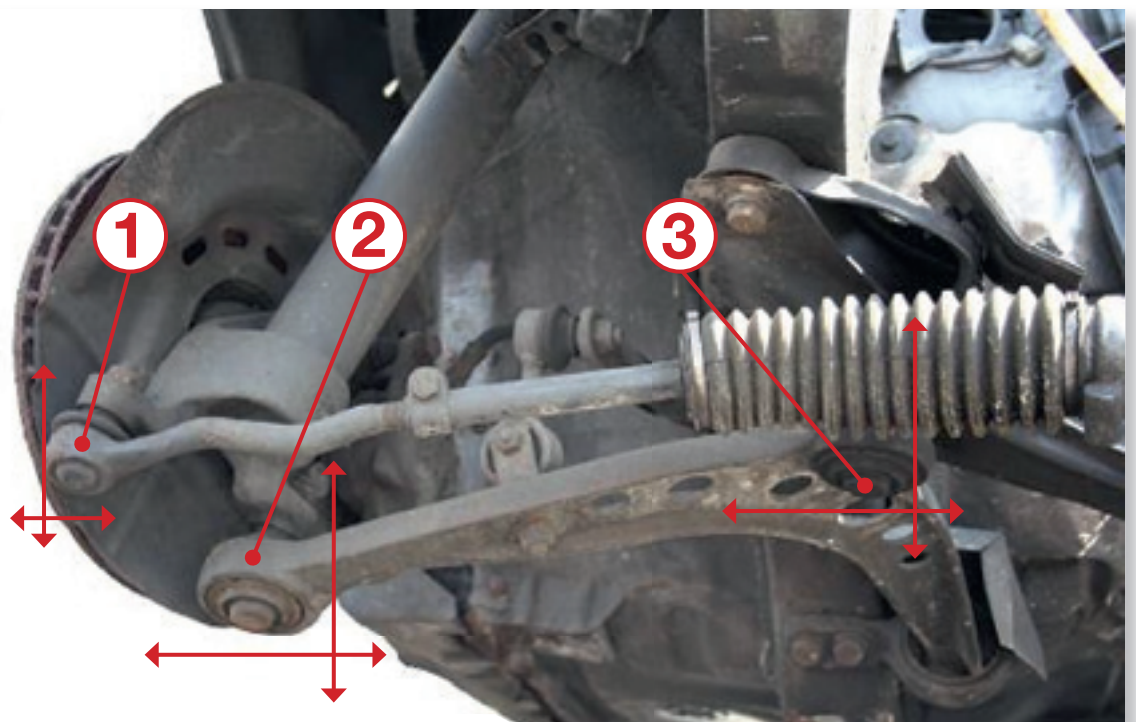
Worn out axial and radial joints typically manifest themselves through loud noise emissions, whereas the slow degradation in driveability often goes unnoticed by the driver. As trouble-free operation of the suspension can be ensured only if all system components function properly, it is absolutely vital to troubleshoot damage at an early stage. To avoid costly subsequent repairs always adhere to the specified maintenance intervals.

For reliable damage evaluation it is recommended to seek the support of a second mechanic with one mechanic moving the suspension components manually while the other feels for undesirable axial or radial joint clearance. Use a joint clearance tester, if available.

To check for ball joint damage (positions 1-3 in the picture) the mechanic simulates possible movements of the component in question, i.e. its movability in horizontal and vertical direction.

Loose joints can be identified by visual inspection, but more reliably by touching.

Use slip joint pliers or a tyre lever to offset components from one another. Proceed with utmost caution so as not to damage the rubber boots.

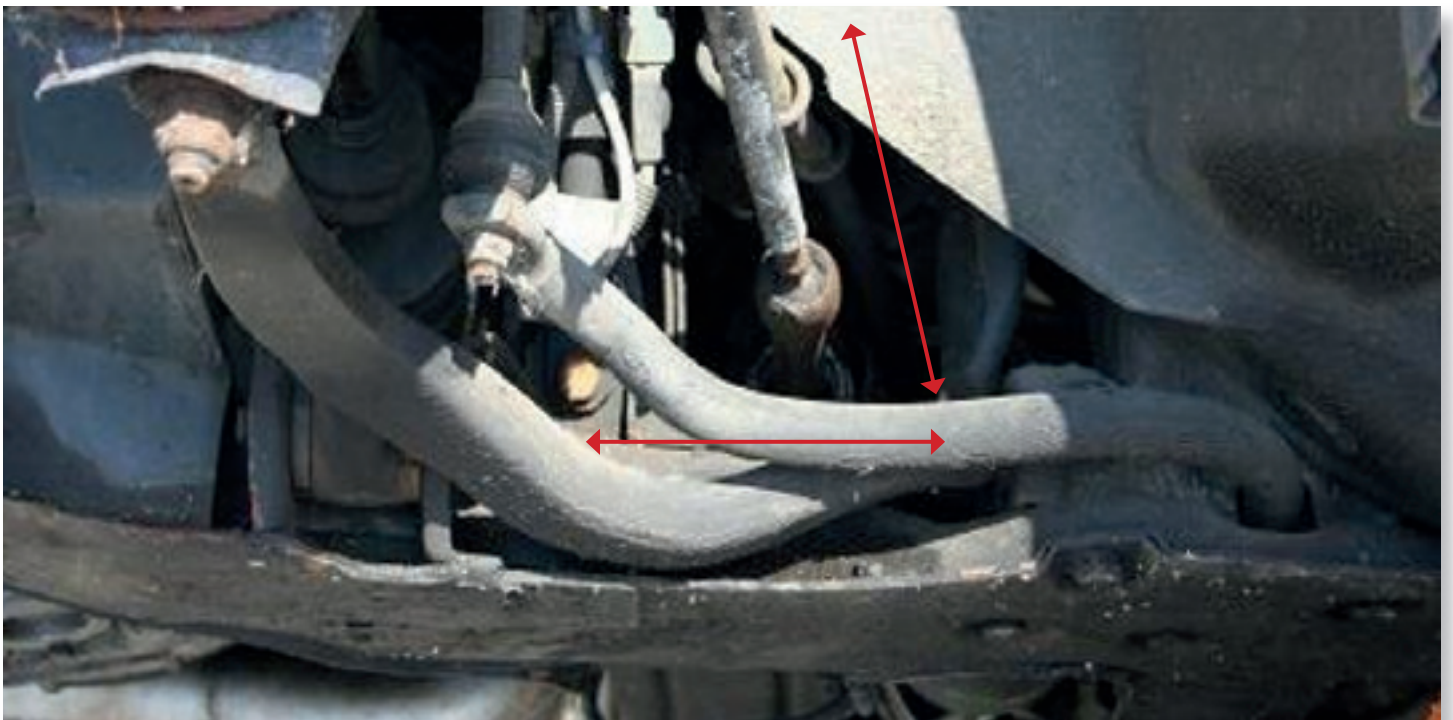


On rack-and-pinion steering systems the tie rod is firmly bolted to the steering gear by its inner end.

Flexible connection between the steering gear and tie rod is ensured by means of an axial joint which is subjected to highest stress, as both compression and tensile loads are applied. This means that ball head and socket must match precisely.

If excessive clearance is observed on one of the components forming the steering trapeze, immediate detailed inspection is imperative as these components are critical for vehicle safety. This cannot be emphasized strongly enough.

To locate a defective axial joint and pinpoint the cause it may be necessary to remove the steering joint bellows as this is the only way to rule out the risk of replacing a fully functional steering gear.





# FITTING INSTRUCTIONS

## HOW TO REPLACE SUPPORT JOINTS USING THE EXAMPLE OF A MERCEDES W 124 MODEL

### Removal

Ball joints have for-life grease filling which makes them maintenance-free.

Place the control arm in installation position in the tool and press downward to drive out the support joint. Make sure there is sufficient space for the used part in the lower area of the press.

When using a hydraulic press or extracting tool proceed with great caution as these tools generate very high pressure.

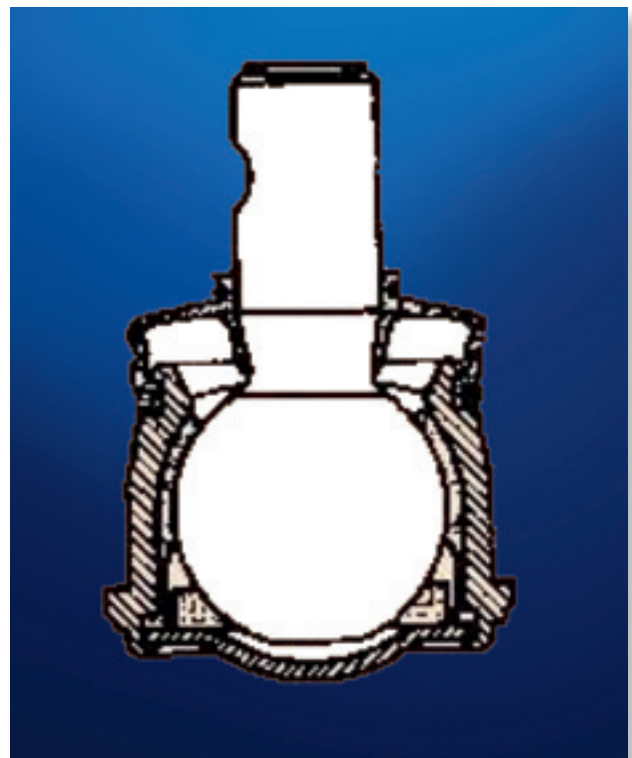
To remove support joints use a mechanical extracting tool or a customary hydraulic press with attachments.

During all kinds of maintenance work special attention should be paid to the protective boot. If it is defective the joint is constantly exposed to moisture and dirt which will result in increased wear and premature component failure.

#### Important note

**Risk of accident!**

**Adhere to the maintenance and manufacturer's specifications at all times!**



## Installation

To install the new support joint place the control arm against its installation position in the tool.

To ensure trouble-free operation align the marks on the control arm with the marks on the support joint.

When the correct installation position is ensured use a clamping pad to press the support joint in the control arm.

Be careful not to damage the rubber boot.

It is imperative to inspect the rubber boot for possible damage after the support joint has been pressed in.

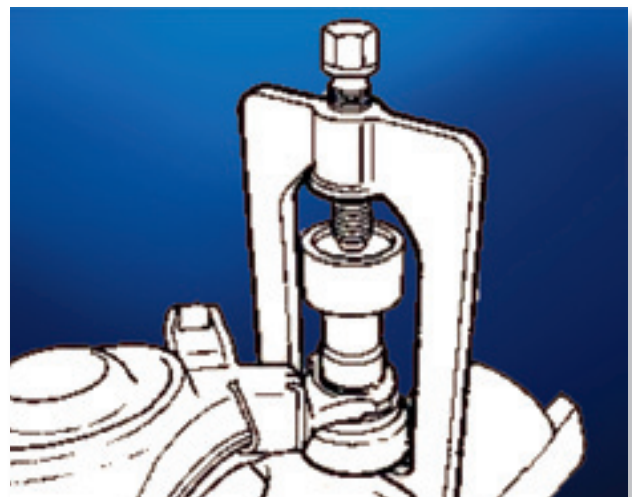
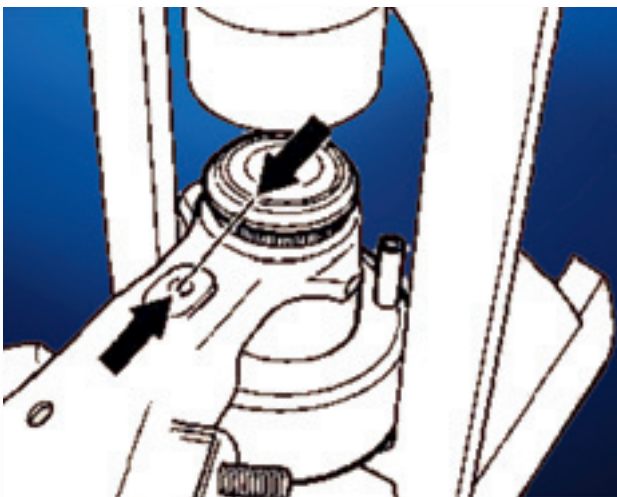
When mounting the control arm it is essential to tighten the control arm bushing bolts only when loaded.

Refer to the Control Arm Bushings brochure.

### Important note

**Risk of accident!**

**Adhere to the maintenance and manufacturer's specifications at all times!**





## DAMAGE PATTERNS

Porous or torn rubber boots on tie rod ends and axle joints allow moisture and dirt to enter the joints which causes increased wear of all components.



Lost snap rings can also allow contaminants to penetrate into the ball head. The result: excessive ball head clearance will destroy the ball socket within shortest time.

**CAUTION.**  
**INCREASED RISK OF ACCIDENT!**

