Service Manual
Chassis and Body
Series 114/115

Mercedes-Benz of North America Inc.

Service Manual
Chassis and Body
Series 114/115

Mercedes-Benz of North America, Inc.
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Montvale, NJ 07645

Caution

Our service manuals contain descriptions of important assembly, adjustment and inspection jobs. Special tools required in performing certain service jobs are identified in the manual and recommended for use. Any part numbers given are only used for identification and easier differentiation between individual components, and are not intended for ordering purposes.

All procedures, illustrations and specifications contained in these manuals were based on the latest information available at the time of publication. If your Mercedes-Benz model differs from the specifications contained in the manual you select, consult your authorized Mercedes-Benz dealer.

Remember, the proper performance of services is essential for both the safety of the mechanic and the efficient operation of the vehicle. The procedures in these manuals are described in such a manner that the service may be performed safely and accurately.

However, it is always assumed that the reader is familiar with basic automotive repair procedures and Mercedes-Benz vehicles.

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Introduction

This Service Manual is the product of existing technical publications. Special care has been taken to provide accurate information on removal, disassembly, assembly, inspection, installation, and adjusting procedures, backed with the technical data necessary to do the job.

The material in this manual is divided according to the Mercedes-Benz Component Group System as outlined on the GROUP INDEX page. This page will quickly direct the reader to the Major Component Group. Each Major Component Group begins with a JOB INDEX listing all jobs within that group.

Mercedes-Benz of North America, Inc. recommends that repairs to, and maintenance of, Mercedes-Benz automobiles be performed only by Mercedes-Benz **trained personnel** at authorized Mercedes-Benz dealerships.

The information contained in this special publication is ordinarily issued by Mercedes-Benz of North America, Inc., in conjunction with supplementary service literature and special tools supplied only to its authorized dealers. The repair and maintenance procedures outlined herein are procedures to be used by **trained Mercedes-Benz service and dealership personnel.** Supplementary service literature will not be provided with this publication, but may be contained in reprints of this Service Manual.

Please note that this manual has been compiled from various sources, some of which cover models other than the subject of this book. Always refer to the engine and vehicle identification table for model and component information.

The information contained in this manual was accurate to the best of our knowledge at the time the manual was approved for publication. However, the right is reserved to make production, design and specification changes at any time, without notice and without obligation to give notice. Any such changes will not be contained in this manual.

Mercedes-Benz of North America, Inc. assumes no liability for any damage to person or property caused by the utilization of this publication to effect maintenance or repair work on Mercedes-Benz automobiles.

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Complete Service Manual coverage for Mercedes-Benz vehicles requires two individual manuals:

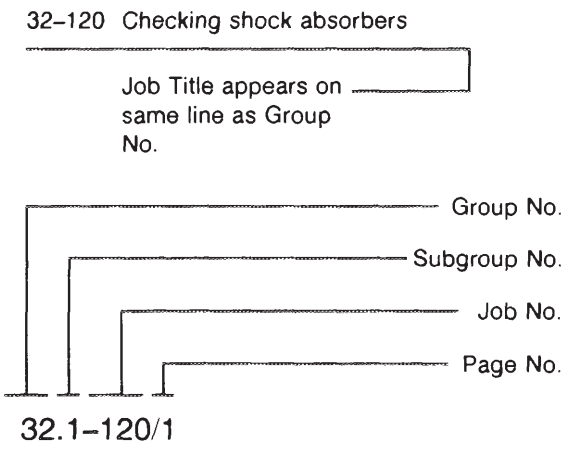
Service Manual, Engine
Service Manual, Chassis and body

Throughout these manuals, the vehicles are identified by their chassis and engine numbers. These numbers are made up of the first six digits of the respective serial number. For the actual location of chassis and engine numbers, see page 00–015/1. In case where the repair instructions apply to all versions, only the first three digits of the respective number are referenced.

For example, chassis 115 applies to all 115 models. However, chassis 115.114 would only apply to model 300 D.

Location of specific repair instructions

First locate the Group No. in the Group Index. Individual groups are separated by an easily visible dividing page, which is followed by the job index page. Then check the job index for the exact job required. The first page of a typical job description looks like this:

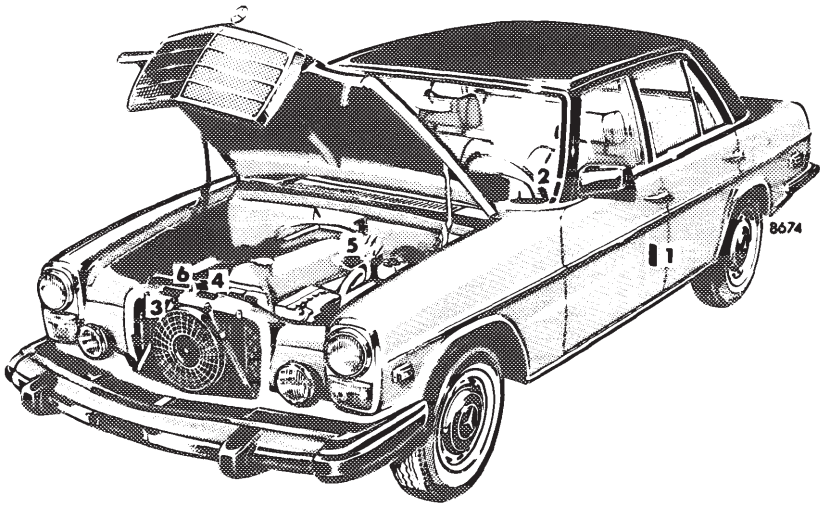


Technical data, tightening torques and tools are listed at the beginning of each job.

All dimensions are in metric units, unless otherwise indicated. Any part numbers given are only used for identification and easier differentiation between individual components, and are not intended for ordering purposes.

This manual applies to the following passenger cars, starting model year 1968:

Model	USA Model Year		Chassis Type	Engine Type
	From	To		
220 D	1968	1973	115.110	615.912
240 D	1974	1976	115.117	616.916
300 D	1975	1976	115.114	617.910
220	1968	1973	115.010	115.920
230	1974	1976	115.017	115.951
230	1968	1969	114.015	180.954
250	1968	1970	114.010	114.920
250	1971	1972	114.011	130.923
250 C	1970	1972	114.023	130.923
280	1973	1976	114.060	110.921
280 C	1973	1976	114.073	110.921



1 Certification Tag (left door pillar)
2 Identification Tag (left windshield post)
3 Chassis No.
4 Engine No.
5 Body No. and Paintwork No.
6 Emission Control Tag
(Model year 1970 and later only)

B. Model 114, 115 standard version

Model	Front spring Part no.	Shock absorber front Designation Part no.	Rear spring Part no.	Shock absorber or strut rear Designation Part no.
Standard suspension (vehicles **without** level control on rear axle)				
114.010 114.011 114.015 114.02 115.010 115.015 115.017 115.110 115.115 115.117	115 321 29 04 114 321 05 04[1]) 115 321 09 04[5])	Bilstein 115 323 10 00 F & S 115 323 13 00[3]) 115 323 17 00[3]) 115 323 20 00[4]) 115 323 25 00[8]) Boge 115 323 23 00	115 324 21 04[2]) 114 324 05 04[3])	Bilstein 115 326 14 00[2]) 115 326 21 00[3]) F & S 115 326 17 00[2]) 115 326 19 00[3]) 115 326 25 00[4]) 115 326 29 00[8]) Boge 115 326 28 00
114.06 114.07	114 321 05 04 114 321 09 04[1]) 115 321 32 04[5])		114 324 05 04	
115.114			115 324 34 04 (115 320 00 20)[6])	
Standard suspension (vehicles **with** level control on rear axle)				
114.010 114.011 114.015 114.02 115.010 115.015 115.017 115.110 115.115 115.117	115 321 29 04 114 321 05 04[1])	Bilstein 115 323 10 00 F & S 115 323 13 00[2]) 115 323 17 00[3]) 115 323 20 00[4]) 115 323 25 00[8]) Boge 115 323 23 00	114 324 02 04	114 320 06 13[2]) 114 320 12 13[3]) 123 320 10 13[7])
114.06 114.07	114 321 05 04 114 321 09 04[1])			
115.114			115 324 37 04 (115 320 02 20)[6])	

During installation of springs, pay attention to tables "Adjustment of springs".

[1]) Valid for vehicles with additional special equipment (refer to "Adjustment of front springs").
[2]) 1st version.
[3]) 2nd version.
[4]) 3rd version.
[5]) Valid for (USA) 1974.
[6]) Spare parts scope of delivery with rubber hose slipped onto lower coil runout.
[7]) 4th version with 24 mm piston rod dia. (install in the event of repairs).
[8]) Shock absorber with separating piston.

Model	Front spring Part no.	Shock absorber front Designation Part no.	Rear spring Part no.	Shock absorber or strut rear Designation Part no.
Special version: Suspension for special sedans with increased permissible rear axle load of 1160 kg, e.g. police radio cars (vehicles **with** level control on rear axle)				
114.010 114.011 114.015 115.010 115.015 115.017 115.110 115.115 115.117	115 321 30 04 114 321 06 04[1]	Bilstein 115 323 11 00 F & S 115 323 14 00[2] 115 323 18 00[3] 115 323 21 00[4] 115 323 26 00[6]	115 324 22 04	114 320 07 13[2] 114 320 14 13[3] 123 320 05 13[4] 123 320 11 13[5]
114.06 115.114	114 321 06 04 114 321 07 04[1]		115 324 36 04	
Special version: Suspension for station wagons (vehicles **with** level control on rear axle)				
114.007 115.102 115.107	115 321 30 04 114 321 06 04[1]	Bilstein 115 323 11 00 F & S 115 323 14 00[2] 115 323 18 00[3] 115 323 21 00[4] 115 323 26 00[6]	115 324 29 04	114 320 07 13[2] 114 320 14 13[3] 123 320 05 13[4] 123 320 11 13[5]
115.002	115 321 30 04			
Special version: Suspension for ambulance with normal wheel base 2750 mm (vehicles **without** level control on rear axle)				
114.005 115.100 115.105	115 321 30 04 114 321 06 04[1]	Bilstein 115 323 11 00 F & S 115 323 14 00[2] 115 323 18 00[3] 115 323 21 00[4] 115 323 26 00[6]	115 324 29 04	Bilstein 115 326 15 00 F & S 115 326 18 00[2] 115 326 20 00[3] 115 326 26 00[4] 115 326 30 00[6]
115.000 115.005	115 321 30 04			
Special version: Suspension for ambulances with normal wheel base 2750 mm (vehicles **with** level control on rear axle)				
114.005 115.100 115.105	115 321 30 04 114 321 06 04[1]	Bilstein 115 323 11 00 F & S 115 323 14 00[2] 115 323 18 00[3] 115 323 21 00[4] 115 323 26 00[6]	115 324 22 04	114 320 07 13[2] 114 320 14 13[3] 123 320 05 13[4] 123 320 11 13[5]
115.000 115.005	115 321 30 04			
Special version: Suspension for ambulances with longer wheel base 3400 mm (vehicles **with** level control on rear axle)				
114.008 115.103 115.108	114 321 07 04	Bilstein 115 323 11 00 F & S 115 323 14 00[2] 115 323 18 00[3] 115 323 21 00[4] 115 323 26 00[6]	115 324 29 04	114 320 07 13[2] 114 320 14 13[3] 123 320 05 13[4] 123 320 11 13[5]

During installation of springs, pay attention to tables "Adjustment of springs".

[1]) Valid for vehicles with additional special equipment (refer to "Adjustment of front springs").
[2]) 1st version.
[3]) 2nd version.
[4]) 3rd version.
[5]) 4th version with 24 mm piston rod dia. (install in the event of repairs).
[6]) Shock absorber with separating piston.

Data

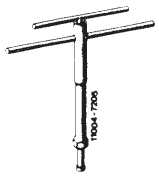
Upper shock absorber suspension

Part	Part No.	Height	Length	OD	Rubber hardness °Shore
Rubber rings top and bottom	180 326 01 68	19	–	40	57 ± 5
Protective tube[1])	115 323 04 38	4	240	–	–

[1]) Only for gas pressure shock absorbers with separating piston.

Tightening torques	Nm
Hex. nuts of lower shock absorber suspension	25
Hex. nuts of upper shock absorber suspension	tighten up to end of thread

Special tool

Socket wrench 5 mm for fastening shock absorber		107 589 00 09 00

Note

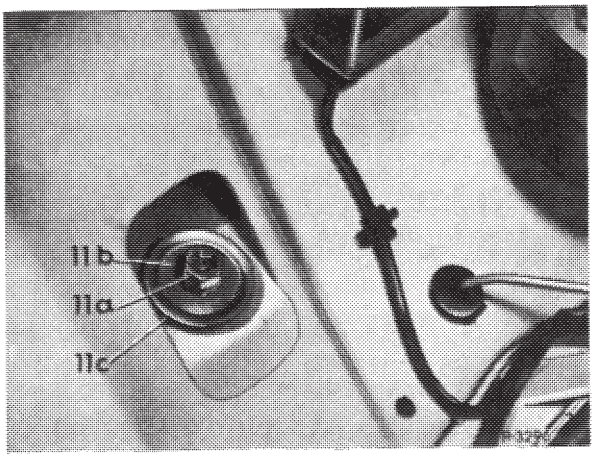
The front shock absorbers also serve as a deflection stop for the front wheels. For this reason, detach shock absorber suspension only when the vehicle is resting on its wheels or when the lower control arm is supported.

A safety stop is provided between the upper control arm and the front axle carrier.

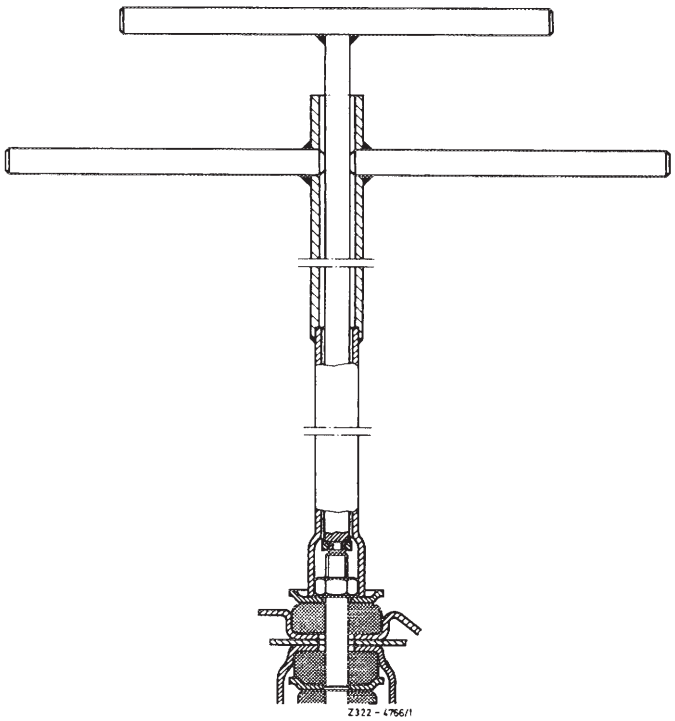
In the event of repairs and independent of make, the shock absorbers can be **individually** exchanged. Only shock absorber versions identified by color code, e.g. 1 lengthwise line red or 1 crosswise line red, must be in agreement.

Removal

1 Loosen hex. nuts (11a) at upper shock absorber suspension, remove cup (11b) and rubber ring (11c).

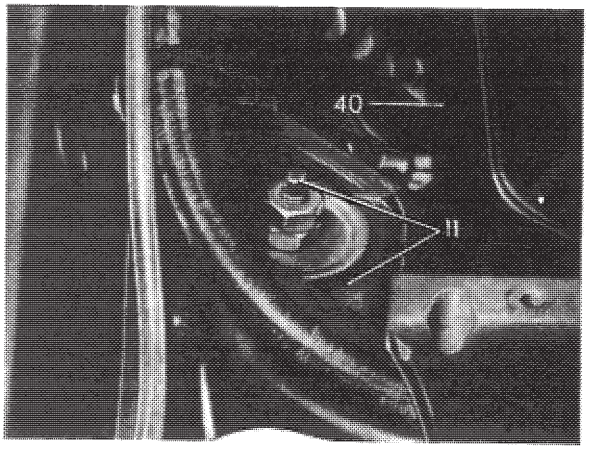


Attention!
When removing gas pressure shock absorbers with separating piston or with piston rod mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may become loose. The gas pressure would then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).



Wrench for fastening shock absorber

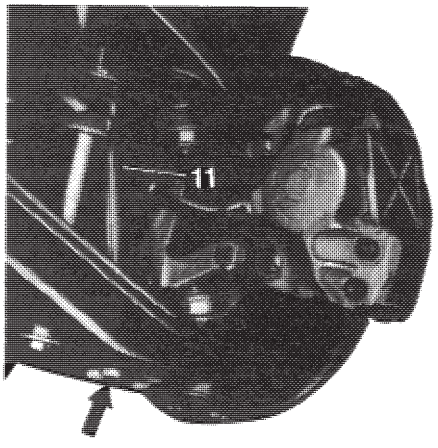
Note: When removing the righthand front shock absorber on model 107, unscrew coolant expansion tank first.



11 Upper shock absorber suspension
40 Coolant expansion tank

2 Loosen lower shock absorber suspension. For this purpose, unscrew hex. nuts (arrow) on lower control arm.

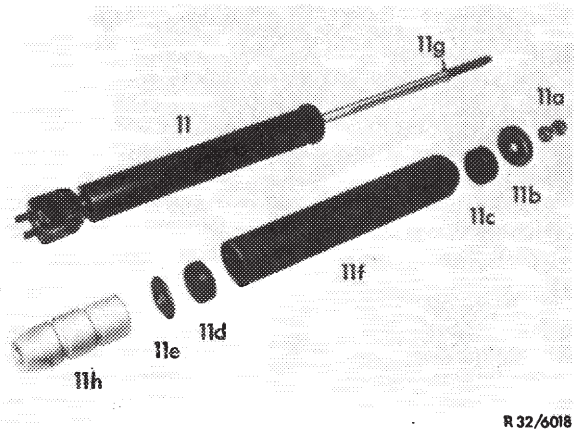
3 Press-in shock absorber piston rod and remove shock absorber.



133-5609/2

4 Remove suspension parts:

a) On shock absorber with separating piston: Pull off protective tube (11f), remove lower rubber ring (11d), lower disk (11e) and supplementary rubber spring (buffer stop) (11h).

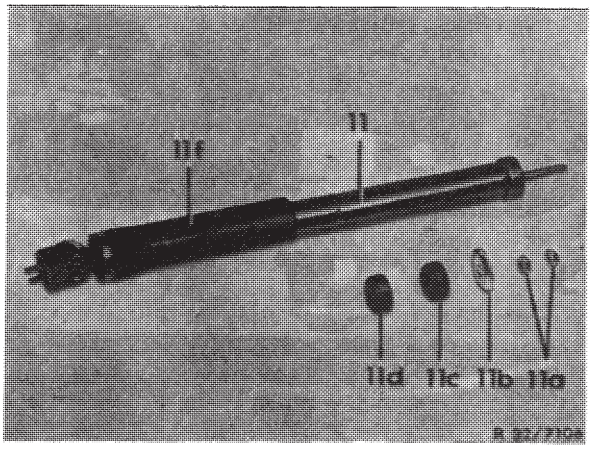


Bilstein shock absorber with separating piston starting November 1980 F & S

b) On shock absorbers without separating piston: Remove lower rubber ring.

Note: The additional rubber rings (buffer stops, 11h) are inside the protective tube on piston rod.

On shock absorbers with separating piston they are located between the housing and the upper suspension, on shock absorbers without separating piston between housing and lower suspension.



F & S shock absorber without separating piston Boge shock absorber

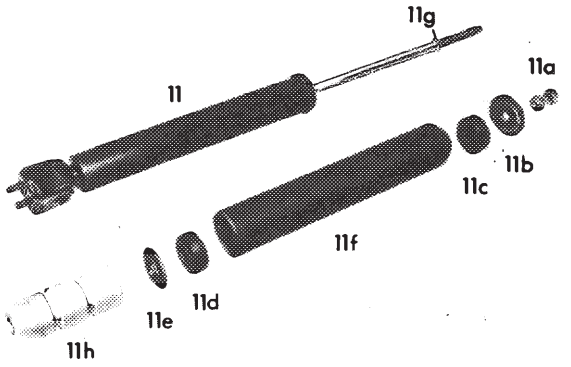
Installation

5 Check suspension components, clean lower control arm on supporting surface of fastening bracket of lower shock absorber suspension.

Note: The fastening bracket of the lower shock absorber suspension must be tightly seated in rubber mount, which should not be turnable within the suspension eye.

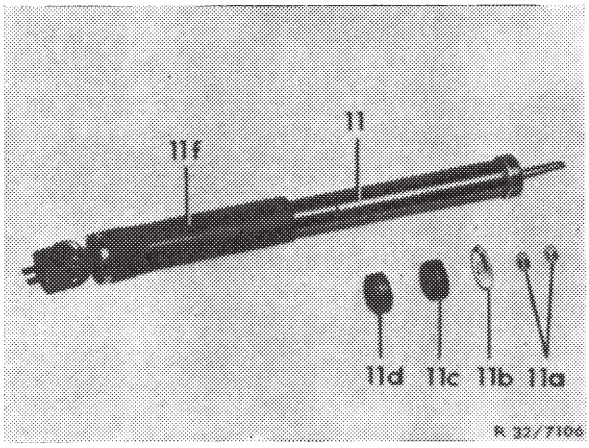
6 Slip suspension members on piston rod (on shock absorbers with separating piston: 11h,11e, 11d and 11f; on shock absorbers without separating piston 11d).

Attention!
On shock absorbers with separating piston do not mix up lower disk (11e) and upper disk (11b), since other wise the disk may slip over locking ring (11g) while driving.



Bilstein shock absorber
with separating piston
starting November 1980 F & S

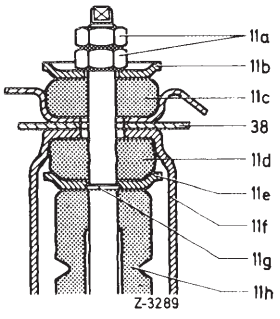
Starting 1975 an additional lower disk is inserted on upper version on shock absorbers without separating piston, while the version installed up to now requires no lower disk.



F & S
Boge
shock absorber without separating piston

7 Insert shock absorber into lower control arm and introduce shock absorber into front end.

8 Mount upper and lower suspension.

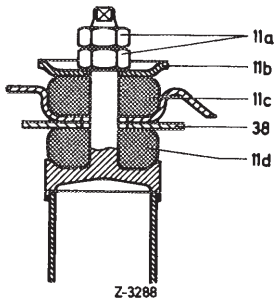


Upper suspension
Bilstein shock absorber
starting January 1980 F & S

11a	Hex. nuts	11f	Protective tube
11b	Upper disk	11g	Locking ring
11c	Rubber ring top	11h	Supplementary rubber spring (buffler stop)
11d	Rubber ring bottom		
11e	Lower disk	38	Front end

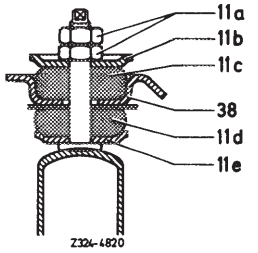
Upper suspension
F & S shock absorber
version up to 1974

11a Hex. nuts
11b Upper disk
11c Rubber ring top
38 Front end



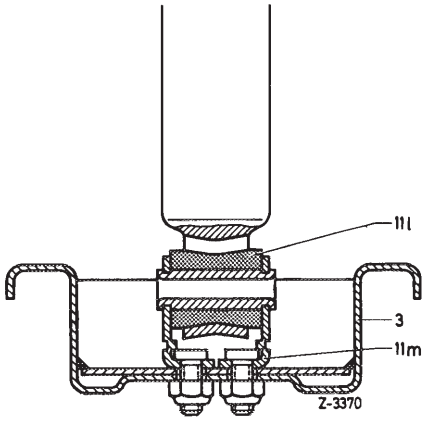
Upper suspension
F & S
Boge shock absorber
version starting 1975 up to October 1980

11a Hex. nuts
11b Upper disk
11c Rubber ring top
11d Rubber ring bottom
11e Lower disk
38 Front end



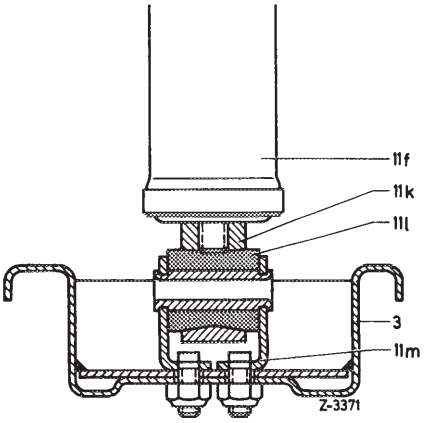
Lower suspension
Bilstein shock absorber
starting November 1980 F & S

3 Lower control arm
11 l Rubber mount
11m Fastening clip



Lower suspension
F & S
Boge shock absorber
version up to October 1980

3 Lower control arm
11 f Protektive tube
11 k Suspension eye
11 l Rubber mount
11m Fastening clip



Upper shock absorber suspension

		Part no.	Height	OD	Rubber hardness °Shore
Rubber ring	upper	115 326 16 68	19	40	60 ± 5
	lower	115 326 17 68	25		
Initial tension of rubber rings		approx. 11.5 mm (limited by threads on piston rod or housing)			

Tightening torque	Nm
Hex. screws or nuts on lower shock absorber suspension	45
Hex. nuts on upper shock absorber suspension	tighten up to end of thread

Special tools

Hexagon ratchet wrench 17 mm	 11004-8042	000 589 32 16 00
Retaining wrench 5 mm	 11004-8983	116 589 04 09 00

Note

The rear shock absorbers simultaneously serve as a deflection stop for the rear wheels. For this reason, loosen shock absorber suspension only when the vehicle rests on its wheels or when the semitrailing arm is supported.

If the shock absorber must be removed because of rumbling noises or premature leaking of piston rod seal, the alignment of the suspension points inside vehicle must be checked and if necessary corrected.

In the event of repairs and independent of make, the shock absorbers can be **individually** rxchanged. Shock absorber versions identified by color code, e.g. 1 lengthwise line whiter or 1 crosswise line white, must be in agreement.

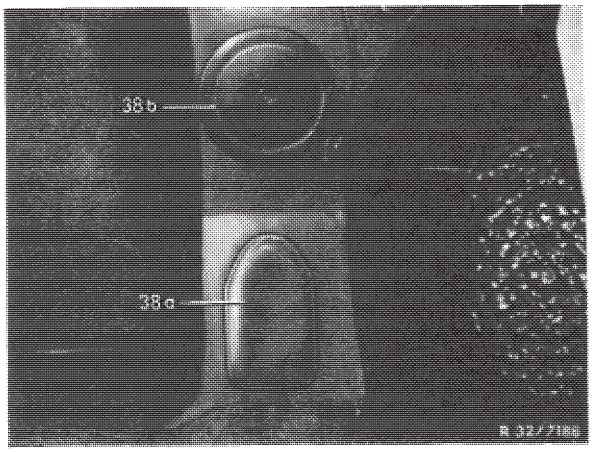
Attention!
Ehen removing gas pressure shock absorbers with separating piston or with piston mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may become loose. The gas pressure would then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).

Removal – Upper suspension

Model 107.02

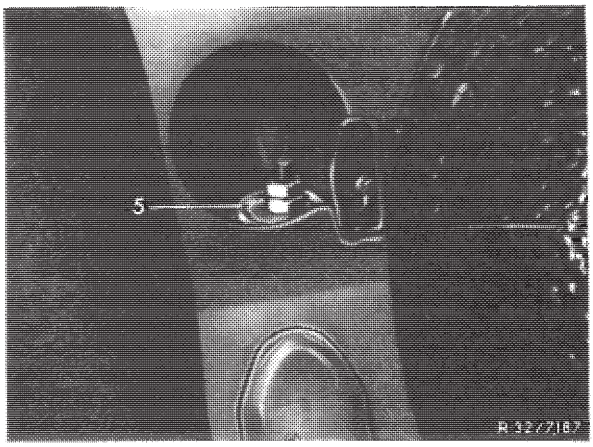
1 Remove rear seat and backrest.

2 Remove cover plate.



38a Cover plate for spring strut connection
38b Cover plate for shock absorber suspension

3 Unscrew hex. nuts on upper suspension (5) and remove rubber ring.

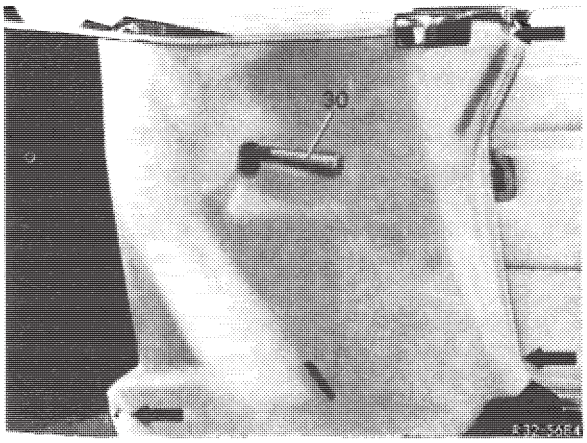


Model 107.04

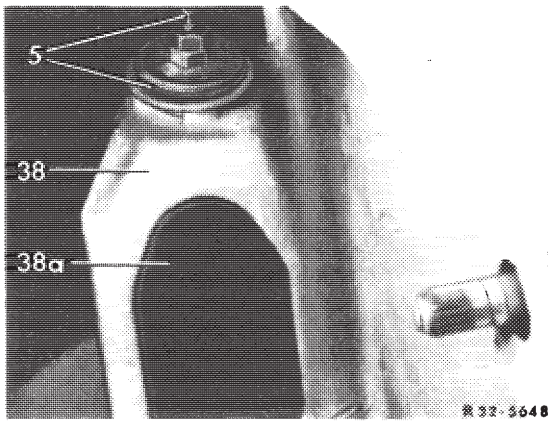
4 On vehicles with coupe top, remove top and open cover flap.

5 Remove rear seat, unscrew backrest and remove.

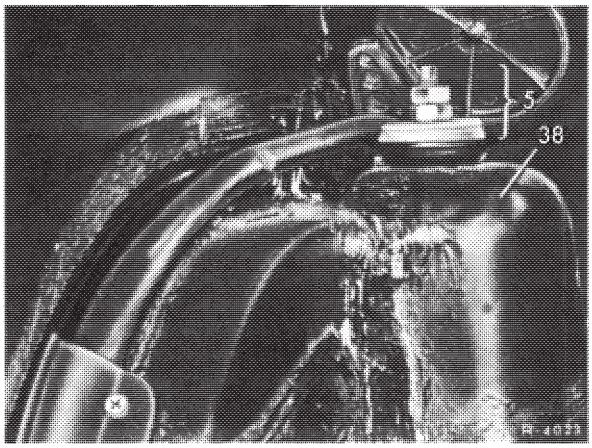
6 Remove cover flap locking lever (30) and unscrew lining (refer to arrow).

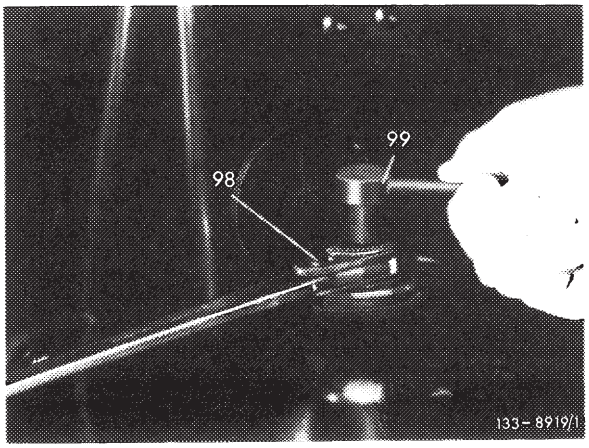


7 Unscrew hex. nuts on upper suspension (5) and remove rubber ring.



8 Unscrew hex. nuts on upper suspension from direction of trunk, remove disk and rubber ring.

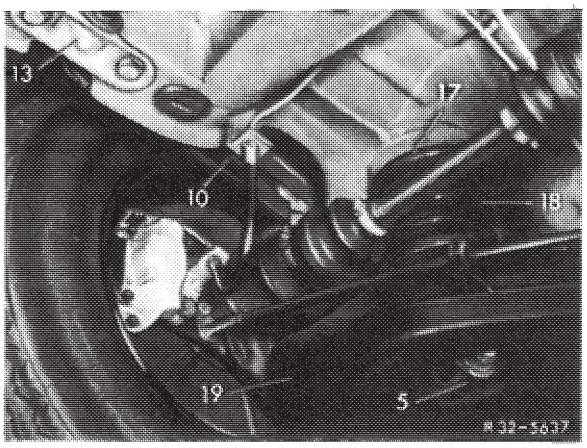




98 Hex ratchet wrench 99 Retaining wrench

Removal – Lower suspension

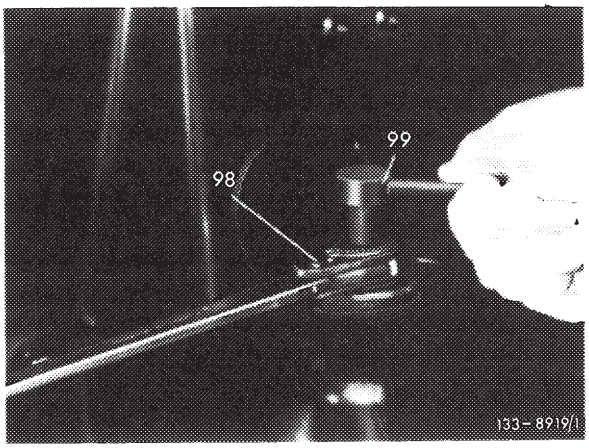
9 Unscrew hex. screws or nuts (vehicles with diagonal swing axles and starting torque compensation) of lower suspension on semitrailing arm and remove shock absorber in downward direction.



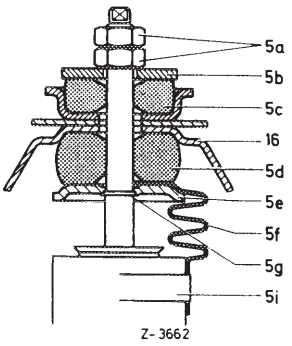
Installation

10 Check suspension members. Fastening clip of lower shock absorber suspension shoulds be firmly seated in rubber mount, rubber mount should not be rotable in suspension eye.

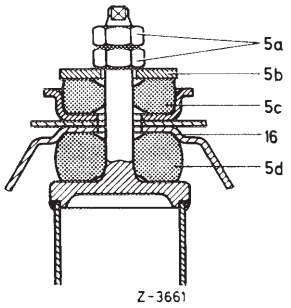
11 Insert shock absorber and mount upper suspension, making sure that the parts are correctly seated. Tighten the lower of the two hex. nuts to end of thread, then counterlock with the upper nut.



Note: The dust protection (5f) is installed only on vehicles for countries with poor road conditions.

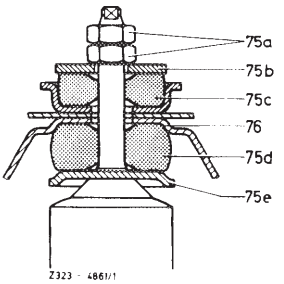


Bilstein
shock absorber
starting November 1980 F & S



Upper suspension
F & S shock absorber
(version up to 1974)

5a	Hex nut	5f	Dust protection
5b	Washer	5g	Locking ring
5c	Upper rubber ring	5i	Clamping strap
5d	Lower rubber ring	16	Dome on frame floor
5e	Cup		



Upper suspension
F & S
Boge shock absorber
(version starting 1975 up to October 1981)

75a	Hex nuts	75e	Cup
75b	Washer	76	Dome on frame floor
75c	Upper rubber ring		
75d	Lower rubber ring		

12 Mount lower suspension to semitrailing arm. If vehicle is resting on its own wheels, jack vehicle up at the rear until semitrailing arm is at level of fastening bracket on shock absorber.

13 On vehicles of 107 model series install linings, backrest and rear seat, as well as coupe top, if applicable.

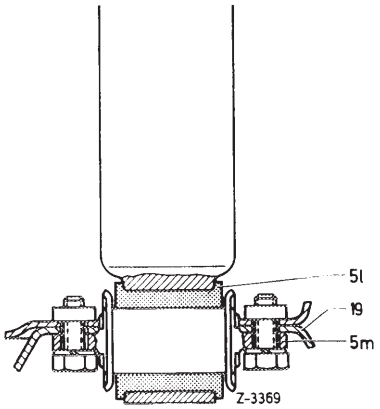
Note: On lower shock absorber suspension, two hex. bolts are screwed into semitrailing control arm of the diagonal swing axle.

On diagonal swing axle with starting torque compensation, two special bolts are inserted into the semitrailing control arm from above and retained by a pressed-on retaining disc.

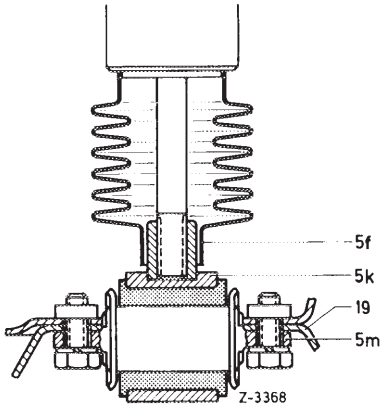
If required: Renew special bolts on lower shock absorber suspension in semitrailing control arm. With shock absorber removed, knock bolts out from below using a suitable punch.

Lower suspension on diagonal swing axle

5f Dust protection
5k Suspension eye
5l Rubber mount
5m Fastening bracket
19 Semitrailing arm



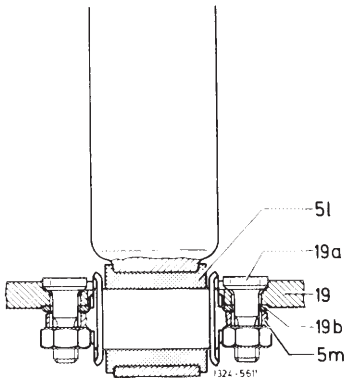
Bilstein
shock absorber
starting November 1980
F & S



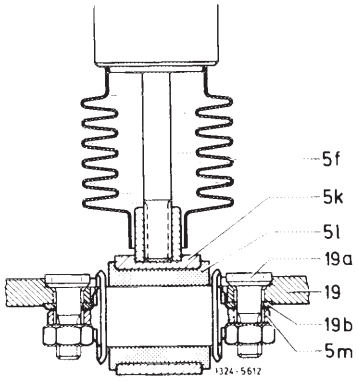
F & S
shock absorber
Boge shock absorber
up to October 1980

Lower suspension on diagonal swing axle **with** starting torque compensation

5f Dust protection
5k Suspension eye
5l Rubber mount
5m Fastening bracket
19 Semitrailing control arm
19a Special bolt
19b Retaining disc

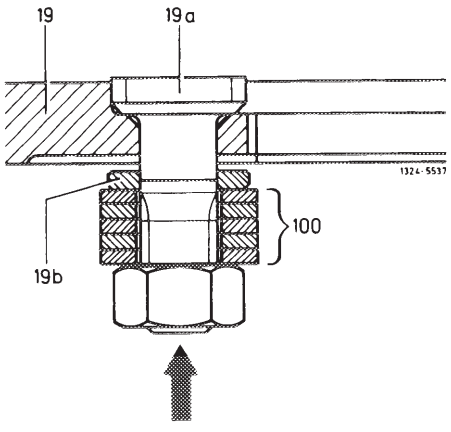


Bilstein
shock absorber
starting November 1980
F & S



F & S
shock absorber
Boge shock absorber
up to October 1980

After inserting new special bolts into bores in semi-trailing control arm, press retaining discs on shank of special bolts. Add approx. 5 washers with an ID of 10.5 mm to the retaining disc and press the retaining disc down on to the shank of the special bolt.



19 Semitrailing control arm
19a Special bolt
19b Retaining disc.

100 Washers ID 10.5

Test values for shock absorbers

Designation	Part no.	Color code (on housing for front shock absorber, on lower suspension eye for rear shock absorber)	Adjustment in N at 100/min and 50 mm stroke for new or exchange shock absorber		Check of oil reserve in shock absorber	
					Piston rod exposure „a" [3]	
					Adjustments for new shock absorbers	Max. perm. values
			Extension	Compression	mm	mm
Front shock absorbers						
Gas pressure shock absorber **with** separating piston[4]						
Bilstein	107 323 00 00 [1]	4 lengthwise lines, green	1050	520	8 ± 2	38
	107 323 01 00 [2]	4 lengthwise lines, green	1080	550		
	115 323 10 00 [6]	1 lengthwise line, red	760	400		
	115 323 11 00	2 lengthwise lines, red	1020	390		
F & S	107 323 04 00	4 crosswise lines, green	1080	550		
	115 323 25 00 [3]	1 crosswise line, red	760	400		
	115 323 26 00 [3]	2 crosswise lines, red	1020	390		
Gas pressure shock absorber **without** separating piston[5]						
F & S	107 323 02 00 [1]	4 crosswise lines, green	1180	600	22 ± 2	0
	107 323 03 00 [2]	4 crosswise lines, green	1100	670		
	115 323 13 00 [1]	1 crosswise line, red	900	440		
	115 323 14 00 [1]	2 crosswise lines, red	1050	490		
	115 323 17 00 [2]	1 crosswise line, red	870	490		
	115 323 20 00 [3]					
	115 323 18 00 [2]	2 crosswise lines, red	1150	500		
	115 323 21 00 [3]					
Boge	115 323 23 00	1 slanted line, red	770	390	14 ± 2	0

[1] 1st version
[2] 2nd version
[3] 3rd version
[4] After exceeding max. exposed piston rod value the shock absorber is losing in effect.
[5] After falling below max. exposed piston rod value the shock absorber loses in effect.
[6] Standard version model 107.026.

Test values for shock absorbers

Designation	Part no.	Color code (on housing for front shock absorber, on lower suspension eye for rear shock absorber)	Adjustment in N at 100/min and 50 mm stroke for new or exchange shock absorber		Check of oil reserve in shock absorber	
					Piston rod exposure „a" [3]	
					Adjustments for new shock absorbers	Max. perm. values
			Extension	Compression	mm	mm

Rear shock absorbers

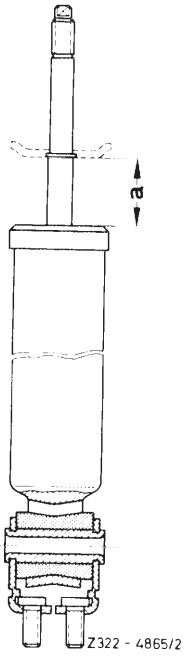
Gas pressure shock absorber **with** separating piston[4]

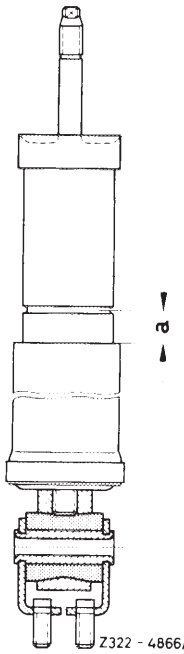
Bilstein	107 326 00 00	4 lengthwise lines, green	1800	1050	0 + 2	32
	115 326 14 00 [1]	1 lengthwise line, red	1780	1000		
	115 326 15 00	2 lengthwise lines, red	2450	1100		
	115 326 21 00 [2]	1 lengthwise line, red	1760	1120		
	116 326 02 00	1 lengthwise line, green	2350	1070		
	123 326 06 00 [4]	1 lengthwise line, white	1800	1050		
F & S	115 326 29 00	1 crosswise line, red	1760	1120		
	115 326 30 00	2 crosswise lines, red	2700	1200		
	123 326 16 00 [6]	1 crosswise line, white	1800	1050		
	126 326 09 00	1 crosswise line, blue	2370	980		

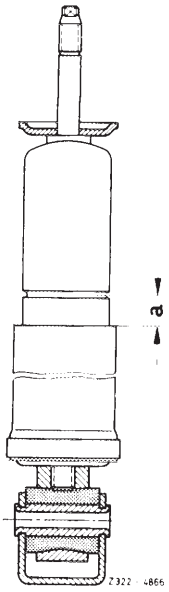
Gas pressure shock absorber **without** separating piston[5]

F & S	115 326 17 00 [1]	1 crosswise line, red	1760	1020	105 ± 2	82
	115 326 18 00 [1]	2 crosswise lines, red	2700	1160		
	115 326 19 00 [2]	1 crosswise line, red	1720	1200		
	115 326 25 00 [3]					
	115 326 20 00 [2]	2 crosswise lines, red	2450	1220		
	115 326 26 00 [3]					
	116 326 04 00 [1]	1 crosswise line, green	2300	1100		
	116 326 08 00 [2]	1 crosswise line, green	2500	1150		
	116 326 10 00 [3]	1 crosswise line, green	2450	1180		
Boge	115 326 28 00	1 slanted line, red	1780	1100	147 ± 2	137

[1] 1st version
[2] 2nd version
[3] 3rd version
[4] After exceeding max. exposed piston rod value the shock absorber is losing in effect.
[5] After falling below max. exposed piston rod value the shock absorber loses in effect.
[6] Standard version model 107.026.







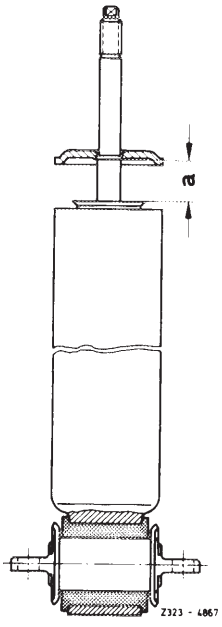
Front shock absorbers

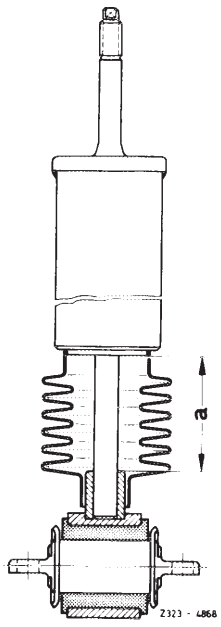
a Length of exposed piston rod

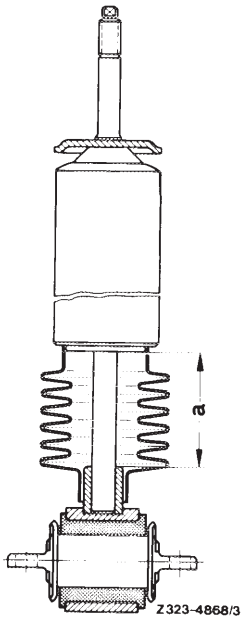
Bilstein
F & S (starting 11.1980)
with separating piston

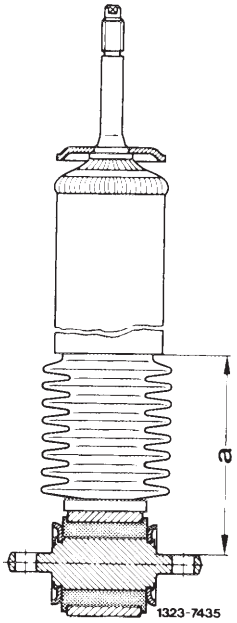
F & S
(version up to 1974)
without separating piston

F & S
(version starting
1975 up to
10.1980)









Rear shock absorbers

a Length of exposed piston rod

Bilstein
F & S (starting
11.1980) with
separating piston

F & S
(version up to
1974) without
separating piston

F & S
(version starting
1975 up to
10.1980)

Boge

Note

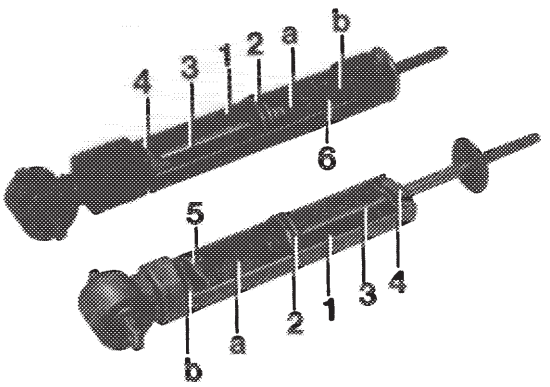
When testing and evaluating gas pressure shock absorbers, a fundamental difference between two designs must be made. Difference refers to expansion and to the separation of oil and gas chamber.

Gas pressure shock absorber with separating piston between oil and gas chamber (Bilstein, F & S starting November 1980).

Installation position of shock absorber with **piston rod in upward direction.**

Gas pressure shock absorber without separating piston between oil and gas chamber (F & S up to October 1980 and Boge).

Installation position of shock absorber with **piston rod in downward direction.**



132-16306

1 Cylinder
2 Operating piston with spring washers
3 Piston rod
4 Closing package with piston rod seal and piston rod guide
5 Separating pistons
6 Baffle plate
a Oil chamber
b Gas chamber

Oil reserve in shock absorber

The oil reserve in the shock absorber is determined by the length of exposed piston rod „a".

The temperature of the shock absorber should be approx. 20 °C when the oil reserve is measured.

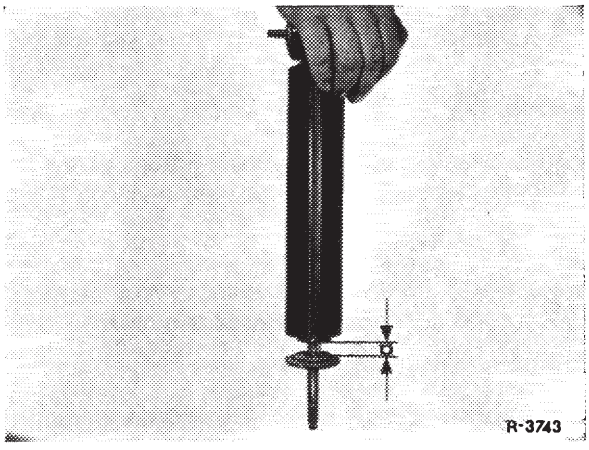
In the event of an oil loss, the length of the exposed piston rod increases on shock absorber with separating piston; the length decreases on shock absorbers without separating piston.

If the permissible length are exceeded or not met, replace shock absorber because it has lost its effectiveness.

Shock absorber with separating piston

Push-in piston rod up to stop of operating piston on separating piston. Now measure exposed length "a".

a Length of exposed piston rod

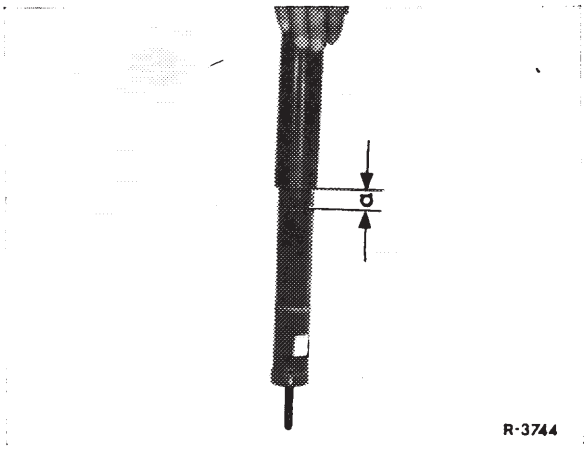


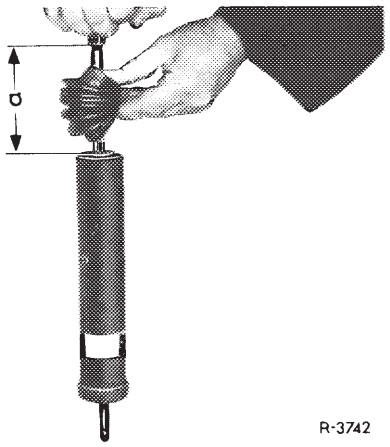
Shock absorber without separating piston

Compress shock absorber – with piston rod in upward direction – until a clearly noticeable, additional resistance begins, that is until the piston makes contact with oil column. Now measure length of exposed piston "a".

Note: When checking oil reserve in shock absorbers without separating piston, any occurring **intermediate noises are without significance.**

a Length of exposed piston rod

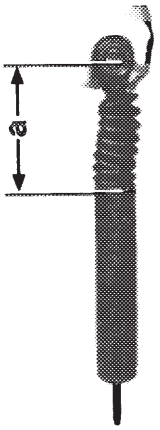




R-3742

Rear shock absorber
F & S up to October 1980

a Length of exposed piston rod



132-16306

Rear shock absorber
Boge

a Length of exposed piston rod

Sight test

Check piston rod carefully for surface damage.

Check piston rod for bends. A bent piston rod is recognized by binding when inserted into guide bushing.

Note: For lubricating guide bushing outside piston rod seal, the piston rod is designed to provide a slight oil film.

The alignment of the suspension points is important for the correct function of the piston rod seal. In the event of leaks on piston rod seal, be sure to check whether alignment of suspension points is in order.

Rumbling and knocking noises

Check upper suspension for correct assembly, lower suspension for tight seat of fastening bracket and rubber mount in housing eye.

Determine oil reserve. If oil loss is very high, shock absorbers with separating piston show a tendency toward knocking, since during deflection the piston rod may knock against separating piston. On rear mounted shock absorbers, check alignment of upper suspension point on frame floor to lower suspension point on semitrailing arm (32–126).

A loose operating piston may be responsible for the knocking.
To check, push piston rod inwards in installation position of shock absorber, release and push-in again. If the operating piston is loose, a change between pushing and pulling will be noticed by a knocking noise.

Hissing noises

Shock absorbers with separating piston have a tendency toward hissing noises if the separating piston is leaking, since gas will enter oil system and will cause foaming. Such shock absorbers may actually still be fully operational, but should nevertheless be replaced.

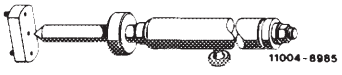
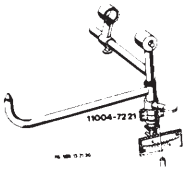
Attention!
Shock absorbers with separating piston without an absolutely solid separation of oil and gas chamber can be checked for noises etc. in installation position, that is, with piston rod in downward direction. If the noise test has been preceded by testing the oil reserve (with piston rod pointing in upward direction) or if the shock absorber has been in storage with piston rod pointing in upward direction, the oil is mixed with gas.

Noises can be evaluated only after pushing the piston rod several times inwards.

Test values for alignment of shock absorbers at front axle

Control arm position (for checking in design position)	Permissible deviation of alignment
+ 25 ± 5 mm	5 mm

Special tools

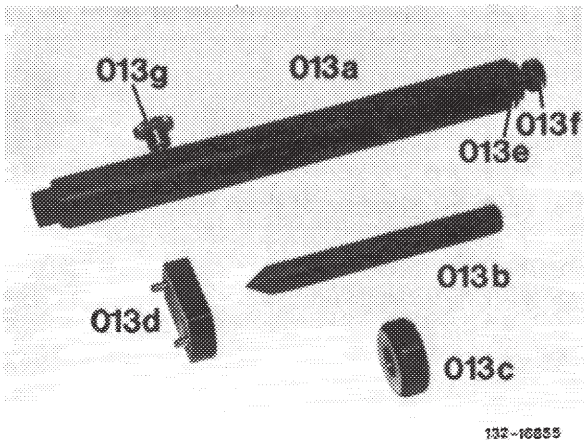
Testing and adjusting spindle for alignment of front and rear shock absorbers		123 589 05 21 00
Measuring instrument for control arm position of front axle		**123 589 03 21 00**

Note

Excessive deviations in alignment of shock absorber suspension points may lead to increased wear in shock absorber and subsequent rumbling noises and leaks of piston rod seal. In extreme cases, the driving comfort may be impaired (hardening of suspension by increased friction).

A checkup and, if required, a correction of the shock absorber alignment should therefore be performed following pertinent adjustment and reconditioning jobs of respective frame members at front end. The shock absorbers will be checked for alignment with the axle installed in design position of the vehicle and in relation to camber and caster set to nominal values.

Attention!
When removing gas pressure shock absorbers with separating piston or piston rod located on top of jacked up vehicle with axle half relieved, make sure that the piston rod is not rotating along while loosening upper suspension. Since in this condition the deflection stop in shock absorber rests against operating piston, the fastening of operating piston to piston rod may become loose. The gas pressure would then result in a sudden extension of piston rod and the oil in shock absorber would flow out (danger).



013 Testing and adjusting tool
013a Adjusting bolt
013b Testing and adjusting pin
013c Test sleeve
013d Test plate
013e Washer
013 Hex nut
013g Tightening screw

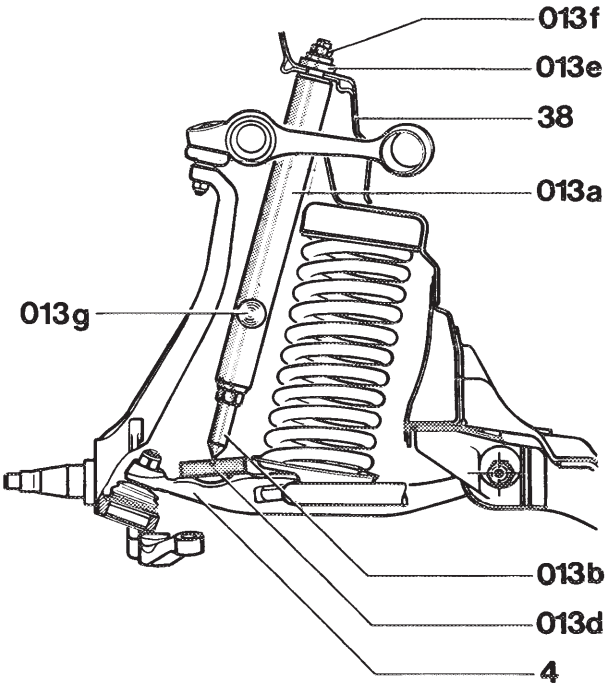
Test procedure

Note: Camber and caster of front wheels should be set to nominal values.

1 Jack-up vehicle at the front, remove front wheels.

2 Remove front shock absorbers (32–100).

3 Fasten testing and straightening tool on upper fastening point of shock absorber, while holding testing and adjusting bolt (013b) in raised condition by means of clamping screw (013g). Insert test plate (013d) at lower control arm.

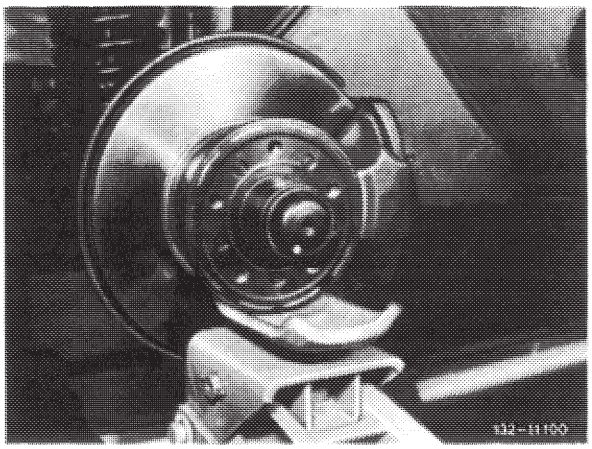


4 Lower control arm
013 Testing and adjusting tool
013a Adjusting bolt
013b Testing and adjusting bolt
013d Test plate
013e Washer
013f Hex nut
013g Clamping screw
38 Front end

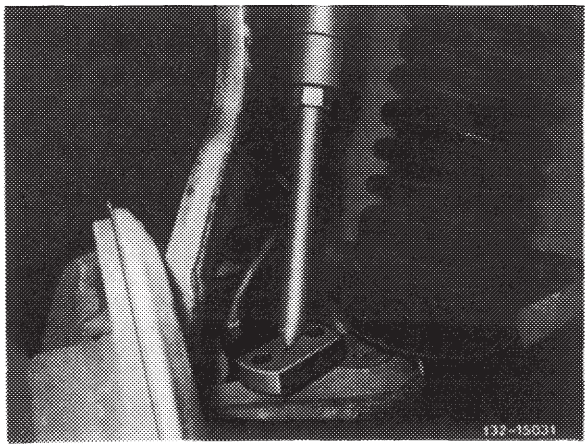
4 Insert spring tensioner (32–200 or 32–205) for front spring and tension spring until control arm is relieved.

5 Simultaneously, lift front axle half with workshop vehicle jack at front wheel hub until the specified control arm position is attained.

Attention!
The body should not lift from supporting jacks!



6 Check alignment with testing and adjusting pin (013b) and correct, if required. If pin points toward the center of test plate, a 0 mm deviation is indicated.

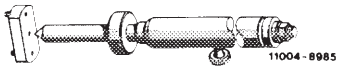
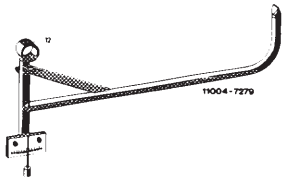
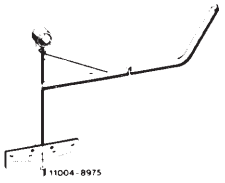


Test values for alignment of shock absorbers at rear axle

Model		Semitrailing arm position (for checking in design position)	Permissible deviation of alignment
107.022 107.023 107.024[1]	107.044[1] 114 115	+ 16 ± 5 mm	5 mm
107.042 107.043		+ 6 ± 5 mm	
107.024 107.026		+ 108 ± 5 mm	
107.044		+ 97 ± 5 mm	

[1] Only vehicles in (AUS) (S) (USA) and (J) version with standard diagonal swing axle without starting torque compensation.

Special tools

Checking and straightening tool for alignment of front and rear shock absorbers		123 589 05 21 00
Measuring instrument for semi-trailing arm position of rear axle (standard diagonal swing axle)		107 589 02 23 00
Measuring instrument for semi-trailing arm position of rear axle (diagonal swing axle with starting torque compensation)		116 589 16 21 00

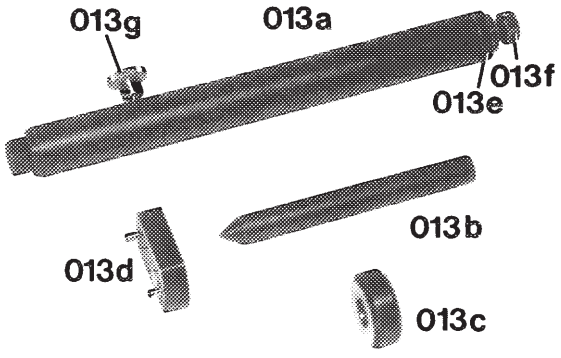
Note

Excessive deviations in alignment of shock absorber suspension points may lead to increased wear in shock absorber and subsequent rumbling noises and leaks of piston rod seal. In extreme cases, the driving comfort may be impaired (hardening of suspension by increased friction).

A checkup and, if required, a correction of the shock absorber alignment should therefore be performed following pertinent adjustment and reconditioning jobs of respective frame members at rear end. The shock absorbers will be checked for alignment with the axle installed in design position of vehicle.

The testing and adjusting tool 107 589 00 21 00 valid up to now for checking alignment of shock absorbers on rear axle, has been replaced by the testing and adjusting tool 123 589 05 21 00, used for front and rear axle of models 116 and 123.

Attention!
When removing gas pressure shock absorbers with separating piston or with piston rod mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).



013 Testing and adjusting tool
013a Adjusting bolt
013b Testing and adjusting pin
013c Test sleeve
013d Test plate
013e Washer
013f Hex nut
013g Tightening screw

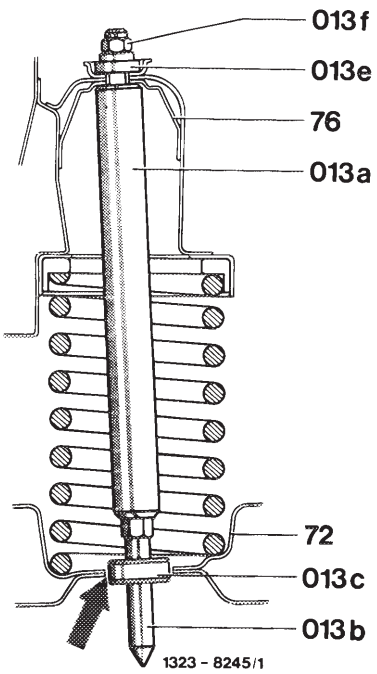
Test procedure

1 Remove rear shock absorbers or spring struts (32–110 or 32–610).

2 Load vehicle rear end in this condition until specified semitrailing arm position is attained.

3 Attach testing and adjusting tool to shock absorber dome of frame floor.

4 Check alignment with the sleeve (013c). Uniform clearance all-around in relation to semitrailing arm (refer to arrow) indicates 0 mm deviation. For corrections, remove test sleeve and use testing and adjusting pin.

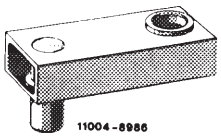
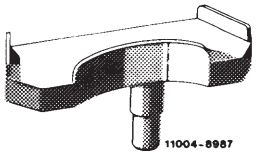


013	Testing and adjusting tool
013a	Adjusting bolt
013b	Testing and adjusting pin
013c	Test sleeve
013e	Washer
013f	Hex nut
72	Semitrailing arm
76	Mandrel on frame floor

32–200 Removal and installation of front spring

Tightening torques	Nm	(kpm)
Hex nuts of cam bolts to lower control bearing	120	(12)
Hex nuts of lower shock absorber suspension	25	(2.5)

Special tools

Intermediate angle piece for pitlift	 11004-8986	115 589 02 63 00
Cradle for intermediate angle piece	 11004-8987	115 589 03 63 00

Note

Let down lower control arm for removing front spring. Use special cradle placed on pitlift for support. If the special cradle is not available or if the front axle has already been removed completely with springs, use spring tensioner BE 15 838 of assembly stand BE 15 798 for tensioning springs.

Spindle 107 589 03 31 10 of spring tensioner 107 589 03 31 00 may be used.

The front shock absorbers are serving simultaneously as a defelction stop for the front wheels. For this reason, loosen shock absorber suspension only when the vehicle is on its wheels or when the lower control arm is supported.

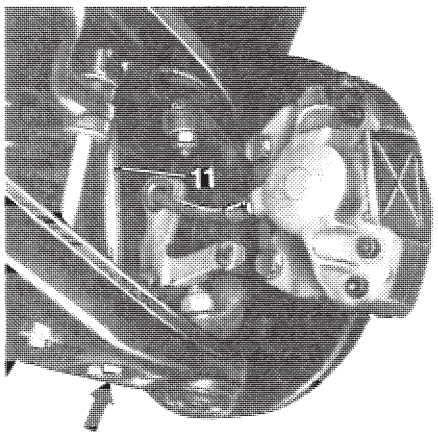
There is a safety stop between the upper control arm and the front axle carrier.

Attention!
When removing gas pressure shock absorbers with separating piston or with piston rod mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may become loose. The gas pressure would then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).

Removal

1 Loosen lower shock absorber suspension (arrow) and connecting linkage of torsion bar.

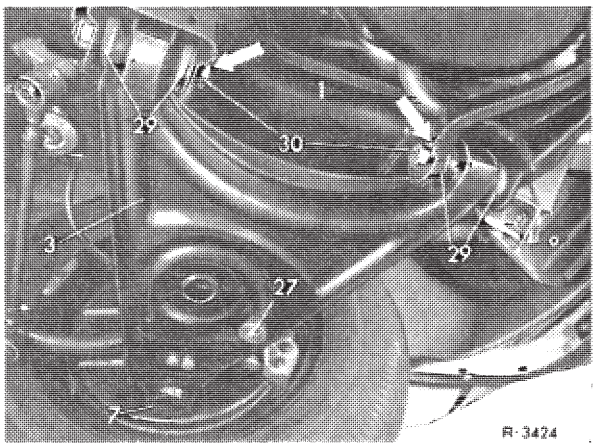
2 Lift vehicle at the front and rear, remove front wheel.



27 Torsion bar connecting linkage

133-5609/2

3 Mark position of cam bolt (30) in relation to front axle carrier on bearing of lower control arm (refer to arrows) and loosen hex nuts.



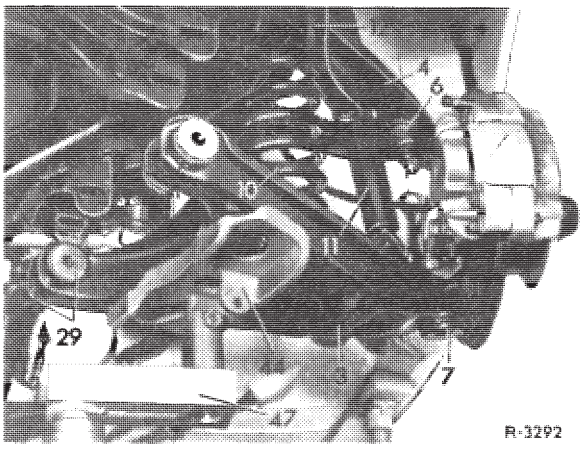
27 Torsion bar connecting linkage
29 Rubber mount

4 Support lower control arm with pitlift, attached intermediate angle piece (47) and cradle (44). Knock out cam bolt (30) and carefully lower pitlift.

Make sure that the cam bolts are not mixed up!

Note: The cradle (44) has two supporting points for the receiving bolt. The illustration shows the use of the device on left end of vehicle, change bolt around for right end.

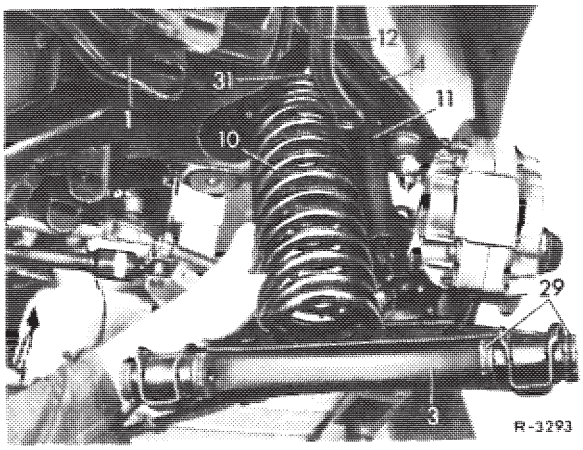
When using the intermediate angle piece (47), in combination with a pitlift, **secure pitlift against lateral tilting.**



3 Lower control arm
7 Supporting joint
10 Front spring
11 Front shock absorber
12 Torsion bar
29 Rubber mount

5 Remove cradle (44), swivel control arm forward and remove front spring with rubber ring (31).

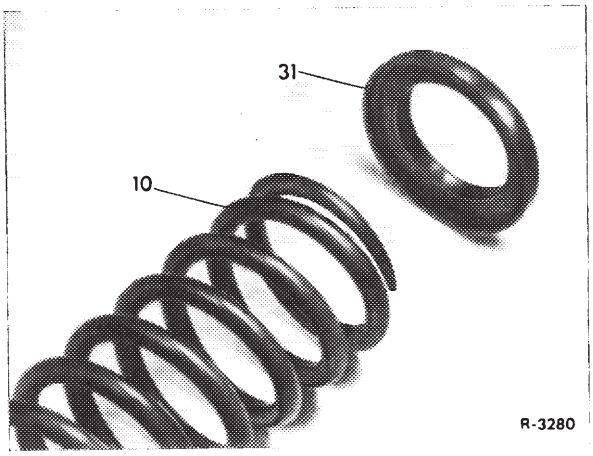
Clean control arm in range of supporting face of front spring, as well as on lower shock absorber fastening point.



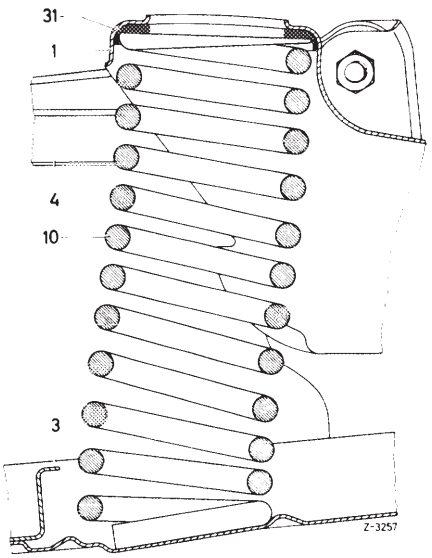
1 Front axle carrier
3 Lower control arm
4 Upper control arm
10 Front springs

Installation

6 Insert front spring with ground end up and with rubber mount (31) attached.

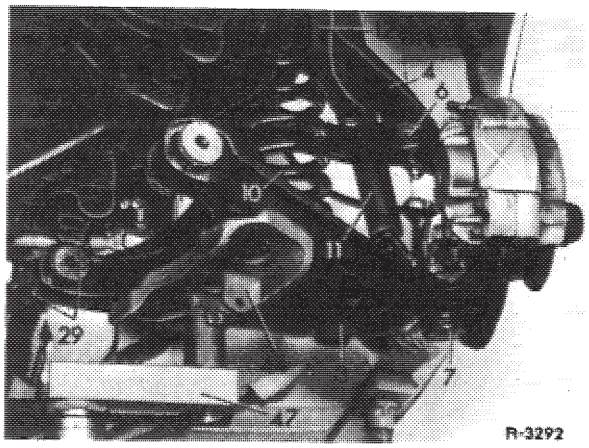


7 Swivel lower control arm into its installation position, while turning front spring in such a manner that the lower coil end is in alignment with the identation in control arm.



1 Front axle carrier
3 Lower control arm
4 Upper control arm
10 Front spring
31 Rubber mount for front spring

8 Carefully raise lower control arm with pitlift while making sure that the rubber mounts (29) are not damaged by the eyes on the front axle carrier.



3 Lower control arm
4 Upper control arm
6 Guide joint
7 Supporting joint
10 Front spring
11 Front shock absorber
12 Torsion bar
29 Rubber mount
44 Cradle
47 Intermediate angle piece

9 Mount cam bolts of control arm bearings while observing markings made during removal.

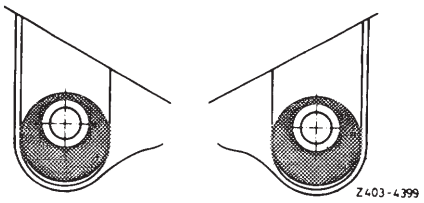
If the position of the cam has not been marked, mount cam bolt in basic position.

Note: Tighten hex nuts of cam bolts only when vehicles is on its wheels ready for driving.

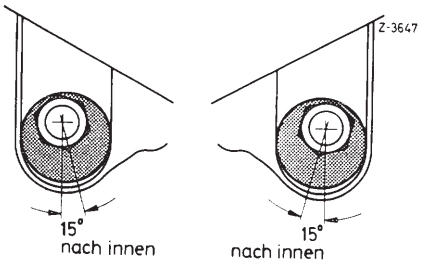
Basic adjustment of cam bolts for camber and caster on lower control arm bearings

Rear cam bolt (camber adjustment)

Model 107

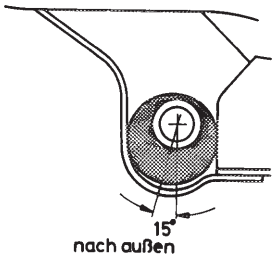


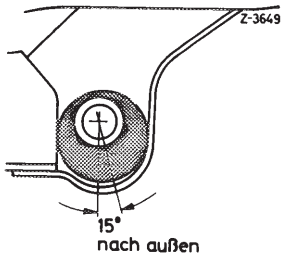
Models 114, 115
(15° inwards)



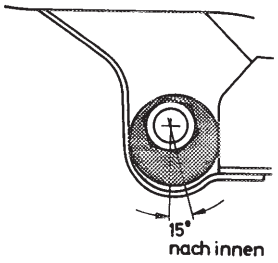
Front cam bolt (caster adjustment)

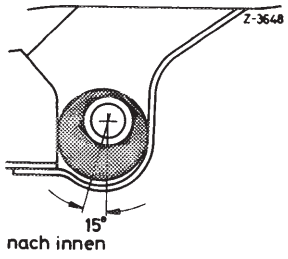
Models 107, 114, 115 with power steering (15° outwards)





Model 114, 115 with mechanical steering (15° inwards)





10 Mount torsion bar connecting linkage (32–300).

11 Attach shock absorber suspension to lower control arm.

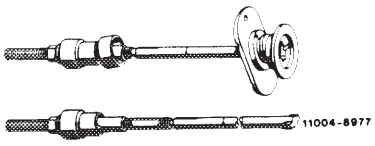
12 Mount front wheels, lower vehicle.

13 Check vehicle level on front axle (40–300).

14 Check adjustment of front wheels and make corrections, if required (40–320).

15 Check adjustment of headlights.

Special tool

Spring tensioner for front spring	 11004-8977	107 589 03 31 00
Socket 24 mm, 1/2" square, 450 mm long for spring tensioner	 11004-8982	116 589 01 09 00

Note

The front shock absorbers simultaneously serve as deflection stop for the front wheels. For this reason, only disconnect the shock absorber suspension if the vehicle is standing on its own wheels or the control arm is supported.

There is a safety stop between the upper control arm and the front axle carrier.

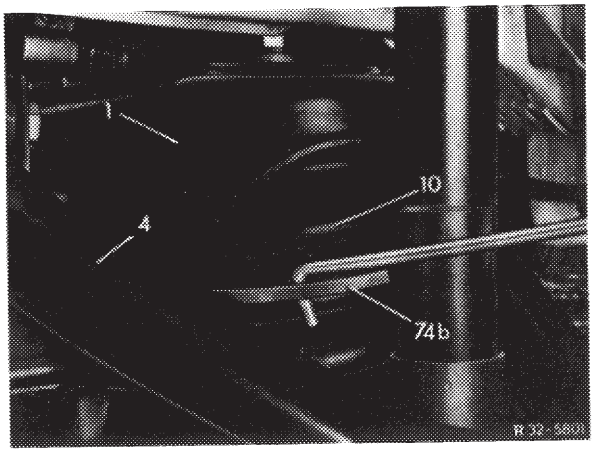
Attention!
When removing gas pressure shock absorbers with separating piston or with piston rod mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may become loose. The gas pressure would then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).

Removal

1 Disconnect upper shock absorber suspension (32–100).

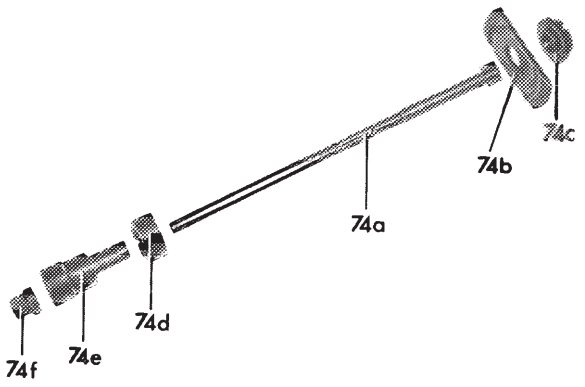
2 Lift vehicle, remove rim.

3 Insert thrust plate (74b) of spring tensioner into front spring and mount upper thrust piece (74c).



1 Front axle carrier
4 Upper control arm
10 Front spring
74b Thrust plate

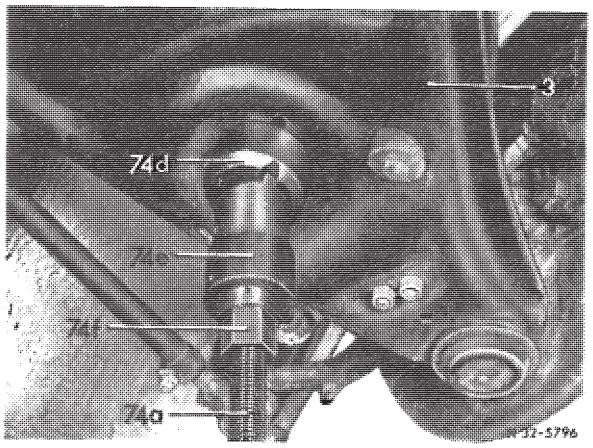
4 Insert clamping screw into upper thrust piece through lower control arm.



74a Tensioning screw
74b Thrust plate
74c Upper thrust piece
74d Lower thrust piece
74e Guide bushing
74f Collar nut

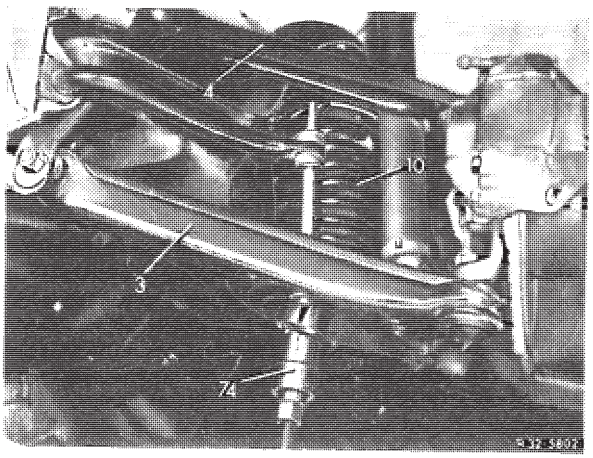
R32-5799

Slide on lower thrust piece (74d) and guide bushing (74e).



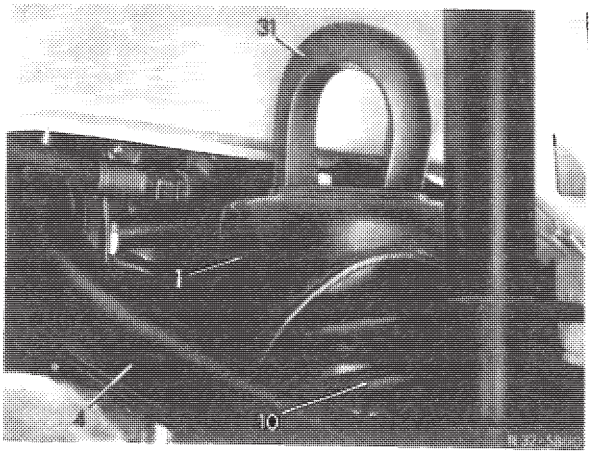
3 Lower control arm
74a Tensioning screw
74d Lower thrust piece
74e Guide bushing
74f Collar nut

5 Tension front spring.



3 Lower control arm
4 Upper control arm
10 Front spring
74 Tensioning device for front spring

6 Remove rubber mount in upward direction through opening in front axle carrier.

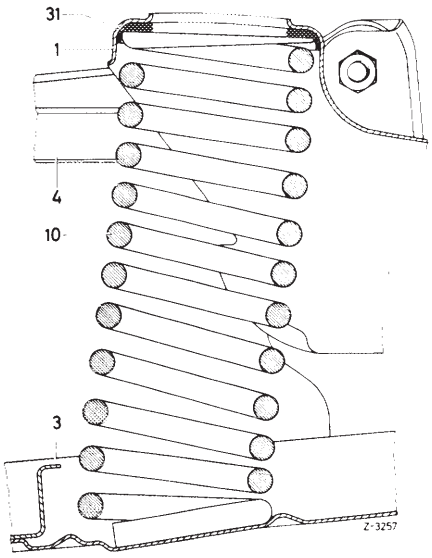


1 Front axle carrier
4 Upper control arm
10 Front spring
31 Rubber mount for front spring

Installation

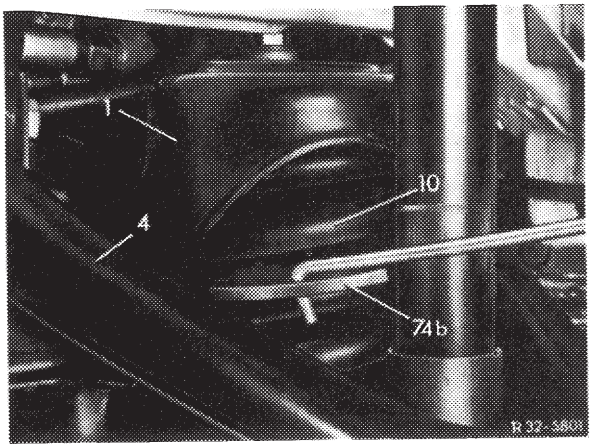
7 Apply lubricating fluid „Naphtalen" (part no. 000 989 04 60), if unavailable , soapy water, to the outside of the new rubber mount.

8 Insert rubber mount into opening in front of axle carrier and place mount on front spring. If the spring is in contact with the front axle carrier, centralize by means of a suitable tool.



9 Allow front spring to expand slowly, taking care that the rubber mount is seated correctly on front spring and in front axle carrier.

10 Remove spring tensioner and pull thrust plate out of front spring using a suitable hook.



1 Front axle carrier
4 Upper control arm
10 Front spring
74b Thrust plate

11 Mount rim, lower vehicle and mount upper shock absorber suspension (32–100).

12 Check vehicle level on front axle (40–300).

13 Check headlight adjustment.

B. Models 114, 115 standard version

Adjustment of front springs (association front springs -- rubber mounts)

Model	Front spring Part no.	Height of spring rubber mounts according to vehicle equipment (slide roof, power steering, automatic transmission, air-conditioning) and color code of spring									
		Special equipment									
		None		1		2		3 or air conditioning system		1–3 and air condition-ing system	
		Color code of spring									
		blue	red	blue	red	blue	red	blue	red	blue	red
Standard suspension											
114.010 114.011 114.021 114.023 115.115	115 321 29 04	18	23	–	–	–	–	–	–	–	–
	114 321 05 04	–	–	8	13	13	18	13	18	23	–
114.015	115 321 29 04	13	18	18	23	–	–	–	–	–	–
	114 321 05 04	–	–	–	–	8	13	13	18	18	23
114.022 115.110 115.117	115 321 29 04	18	23	–	–	–	–	–	–	–	–
	114 321 05 04	–	–	8	13	13	18	18	23	23	–
114.060[1]) 114.073	114 321 05 04	13	18	13	18	18	23	–	–	–	–
	114 321 09 04	–	–	–	–	–	–	8	13	13	18
114.062[1]) 114.072	114 321 05 04	13	18	18	23	18	23	–	–	–	–
	114 321 09 04	–	–	–	–	–	–	8	13	13	18
115.010 115.015 115.017	115 321 29 04	13	18	13	18	18	23	18	23	–	–
	114 321 05 04	–	–	–	–	–	–	–	–	13	18
115.114	114 321 05 04	18	23	18	23	–	–	–	–	–	–
	114 321 09 04	–	–	–	–	8	13	13	18	18	23

[1]) On righthand drive vehicles install a rubber mount on righthand side of vehicle higher by 5 mm than indicated in table.

Adjustment of front springs (association front springs — rubber mounts)

Model	Front spring Part no.	Height of spring rubber mounts according to vehicle equipment (slide roof, power steering, automatic transmission, air-conditioning and color code of spring									
		Special equipment									
		None		1		2		3 or air conditioning system		1–3 and air conditioning system	
		Color code of spring									
		blue	red	blue	red	blue	red	blue	red	blue	red
Special version: Harder suspension for poor road conditions											
114.010 114.011 114.021 114.023 115 115	115 321 30 04	13	18	18	23	18	23	–	–	–	–
	114 321 06 04	–	–	–	–	–	–	8	13	13	18
114.015	115 321 30 04	13	18	13	18	18	23	18	23	–	–
	114 321 06 04	–	–	–	–	–	–	–	–	8	13
114.022 115.110 115 117	115 321 30 04	13	18	18	23	–	–	–	–	–	–
	114 321 06 04	–	–	–	–	8	13	8	13	13	18
114.060[1] 114.073	114 321 06 04	8	13	8	13	13	18	13	18	–	–
	114 321 07 04	–	–	–	–	–	–	–	–	8	13
114.062[1] 114.072	114 321 06 04	8	13	8	13	13	18	18	23	–	–
	114 321 07 04	–	–	–	–	–	–	–	–	8	13
115.010 115.015 115.017	115 321 30 04	8	13	8	13	13	18	13	18	–	–
	114 321 06 04	–	–	–	–	–	–	–	–	8	13
115.114	114 321 06 04	13	18	13	18	18	23	–	–	–	–
	114 321 07 04	–	–	–	–	–	–	8	13	13	18
Special version: Suspension for special sedans with higher permissible rear axle load of 1160 kg, e.g. police radio cars											
114.010 114.011 114.015 115 110 115 115 115.117	115 321 30 04	13	18	13	18	18	23	18	23	–	–
	114 321 06 04	–	–	–	–	8	13	8	13	–	–
114.06	114 321 06 04	13	18	18	23	18	23	18	23	–	–
115.010 115 015 115.017	115 321 30 04	8	13	8	13	13	18	13	18	–	–
115.114	114 321 06 04	13	18	13	18	18	23	18	23	–	–
	114 321 07 04	–	–	–	–	–	–	8	13	–	–

[1]) On righthand drive vehicles install a rubber mount on righthand side of vehicle higher by 5 mm than indicated in table.

Adjustment of front springs (association front springs – rubber mounts)

Model	Front spring Part no.	Height of spring rubber mounts according to vehicle equipment (slide roof, power steering, automatic transmission, air-conditioning) and color code of spring									
		Special equipment									
		None		1		2		3 or air conditioning system		1–3 and air condition-system	
		Color code of spring									
		blue	red	blue	red	blue	red	blue	red	blue	red
Special version: Springs for special sedans with longer wheel base 3400 mm											
114.017	114 321 06 04	18	23	–	–	–	–	–	–	–	–
	114 321 07 04	–	–	8	13	8	13	13	18	18	23
115.112 115.119	114 321 07 04	8	13	8	13	13	18	18	23	23	–
Special version: Suspension for special sedans with longer wheel base 3400 mm											
114.005 114.007	115 321 30 04	13	18	13	18	18	23	18	23	–	–
115.100 115.105	115 321 30 04	18	23	18	23	–	–	–	–	–	–
	114 321 06 04	–	–	–	–	8	13	–	–	–	–
115.102 115.107	115 321 30 04	13	18	18	23	–	–	–	–	–	–
	114 321 06 04	–	–	–	–	8	13	8	13	–	–
115.000 115.005	115 321 30 04	8	13	13	18	13	18	–	–	–	–
115 002	115 321 30 04	8	13	8	13	13	18	13	18	–	–
Special version: Springs for ambulances with longer wheel base 3400 mm											
114.008	114 321 07 04	8	13	8	13	13	18	–	–	–	–
115.103 115 108	114 321 07 04	8	13	13	18	13	18	–	–	–	–

C. Model 107, 114, 115 national versions

Adjustment of front springs (association front springs – rubber mounts)

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring Color code of spring blue	red
(AUS) 1981			
107.045	114 321 05 04	13	18
(AUS) 1982			
107.045	114 321 05 04	18	23
(J) 1981			
107.025	114 321 05 04	13	18
107.045	114 321 05 04	8	13
(J) 1982			
107.045	114 321 05 04	13	18

Adjustment of front springs (USA) 1974

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring Power steering **and** automatic transmission **and** air conditioning system Color code of spring blue	red	Power steering **and** automatic transmission **and** air conditioning system **and** sliding roof **or** supplementary heater blue	red	Power steering **and** automatic transmission **and** air conditioning system **and** sliding roof **and** supplementary heater blue	red
107.024	114 321 07 04	8	13	8	13	13	18
107.044	114 321 06 04	18	23	–	–	–	–

Adjustment of front springs

(USA)

1974 to end of series

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring									
		Power steering		Power steering **and** automatic transmission **or** sliding roof		Power steering **and** automatic transmission **and** sliding roof **or** air conditioning system		Power steering **and** automatic transmission **or** sliding roof **and** air conditioning system		Power steering **and** automatic transmission **and** sliding roof **and** air conditioning system	
		Color code of spring									
		blue	red	blue	red	blue	red	blue	red	blue	red
114.060	115 321 32 04	–	–	–	–	–	–	8	13	13	18
114.073											
115.114										8	13
115.117	114 321 05 04	18	23	18	23	–	–	–	–	–	–
	114 321 09 04	–	–	–	–	8	13	13	18	13	18
115.017	114 321 05 04	–	–	13	18	18	23	–	–	–	–
	114 321 09 04	–	–	–	–	–	–	8	13	8	13

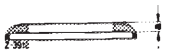
Adjustment of front springs (USA) 1981/1982

Model	Front spring Part No.	Height of spring rubber mounts depending on vehicle equipment (sliding roof) and color code of spring			
		No special equipment		One special equipment	
		Color code of spring			
		blue	red	blue	red
Vehicles **with** automatic climate control					
107.025	114 321 09 04	8	13	8	13
107.045	114 321 05 04	18	23	–	–

Rubber mounts for front springs

1st version

Model 114, 115

Height „a" mm	Part no.	
8	115 321 32 84	
13	115 321 33 84	
18	115 321 34 84	
23	115 321 35 84	

2nd version

Model 107[1]), 114, 115

Height „a" mm	Part no.	
8	115 321 48 84	
13	115 321 49 84	
18	115 321 50 84	
23	115 321 51 84	

[1]) Not for model 107.026

3rd version [1])

Model 107.026 standard
Model 107.022/023/024, 107.04, 114, 115 for repairs

Height „a" mm	Number of naps (n)	Part no.	
8	1	107 321 02 84	
13	2	107 321 03 84	
18	3	107 321 04 84	
23	4	107 321 05 84	

[1]) Version with threads for accurate location on spring and with naps for identifying the various heights.

C. Model 107, 114, 115 national versions

Adjustment of front springs (association front springs – rubber mounts)

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring Color code of spring blue	red
(AUS) 1981			
107.045	114 321 05 04	13	18
(AUS) 1982			
107.045	114 321 05 04	18	23
(J) 1981			
107.025	114 321 05 04	13	18
107.045	114 321 05 04	8	13
(J) 1982			
107.045	114 321 05 04	13	18

Adjustment of front springs (USA) 1974

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring Power steering **and** automatic transmission **and** air conditioning system Color code of spring blue	red	Power steering **and** automatic transmission **and** air conditioning system **and** sliding roof **or** supplementary heater blue	red	Power steering **and** automatic transmission **and** air conditioning system **and** sliding roof **and** supplementary heater blue	red
107.024	114 321 07 04	8	13	8	13	13	18
107.044	114 321 06 04	18	23	–	–	–	–

Adjustment of front springs

(USA)

1974 to end of series

Model	Part No.	Height of spring rubber mounts depending on vehicle equipment and color code of spring									
		Power steering		Power steering **and** automatic transmission **or** sliding roof		Power steering **and** automatic transmission **and** sliding roof **or** air conditioning system		Power steering **and** automatic transmission **or** sliding roof **and** air conditioning system		Power steering **and** automatic transmission **and** sliding roof **and** air conditioning system	
		Color code of spring									
		blue	red	blue	red	blue	red	blue	red	blue	red
114.060	115 321 32 04	–	–	–	–	–	–	8	13	13	18
114.073											
115.114										8	13
115.117	114 321 05 04	18	23	18	23	–	–	–	–	–	–
	114 321 09 04	–	–	–	–	8	13	13	18	13	18
115.017	114 321 05 04	–	–	13	18	18	23	–	–	–	–
	114 321 09 04	–	–	–	–	–	–	8	13	8	13

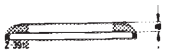
Adjustment of front springs (USA) 1981/1982

Model	Front spring Part No.	Height of spring rubber mounts depending on vehicle equipment (sliding roof) and color code of spring			
		No special equipment		One special equipment	
		Color code of spring			
		blue	red	blue	red
Vehicles **with** automatic climate control					
107.025	114 321 09 04	8	13	8	13
107.045	114 321 05 04	18	23	–	–

Rubber mounts for front springs

1st version

Model 114, 115

Height „a" mm	Part no.	
8	115 321 32 84	
13	115 321 33 84	
18	115 321 34 84	
23	115 321 35 84	

2nd version

Model 107[1]), 114, 115

Height „a" mm	Part no.	
8	115 321 48 84	
13	115 321 49 84	
18	115 321 50 84	
23	115 321 51 84	

[1]) Not for model 107.026

3rd version [1])

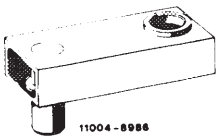
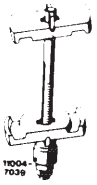
Model 107.026 standard
Model 107.022/023/024, 107.04, 114, 115 for repairs

Height „a" mm	Number of naps (n)	Part no.	
8	1	107 321 02 84	
13	2	107 321 03 84	
18	3	107 321 04 84	
23	4	107 321 05 84	

[1]) Version with threads for accurate location on spring and with naps for identifying the various heights.

Tightening torque	Nm	(kpm)
Hex. bolts or nuts of lower shock absorber suspension	45	(4.5)
Hex. nuts of upper shock absorber suspension	tighten up to runout of threads	

Special tools

Intermediate angle piece for pitlift		115 589 02 63 00
Spring tensioner for rear spring		115 589 00 31 00
Socket 24 mm 1/2" square 450 mm long for spring tensioner		116 589 01 09 00

Note

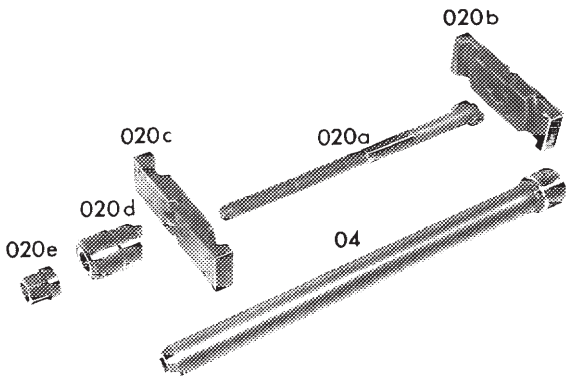
The rear shock absorbers simultaneously serve as deflection stops for the rear wheels. For this reason, only detach shock absorber suspension if the vehicle is standing on its own wheels or if the semitrailing arm is supported. There is a safety stop between the semitrailing arm and the rear axle carrier.

Attention!
When removing gas pressure shock absorbers with separating piston or with piston rod mounted at top, with vehicle jacked up and axle half relieved, make sure that the piston rod is not turning along when loosening upper suspension. Since in this condition the resilience stop in shock absorber rests against operating piston, the attachment of operating piston to piston rod may become loose. The gas pressure would then suddenly extend piston rod and the oil in shock absorber would flow out (risk of an accident).

Removal

1 Remove rear shock absorber or spring strut (32–110 or 32–610). Make sure that the upper shock absorber suspension is released **first.**

2 Lift vehicle at the rear.



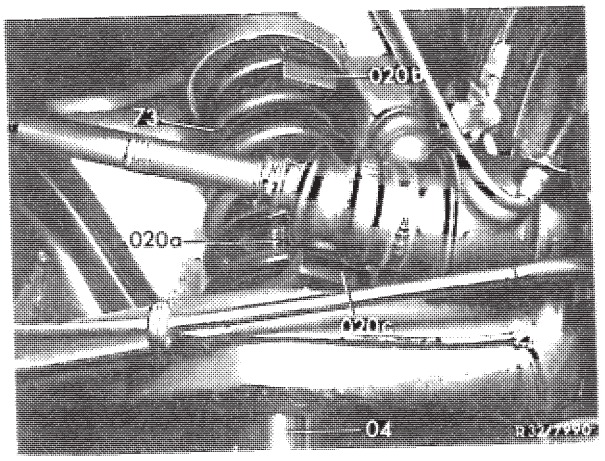
B 32/7926

Spring tensioner for rear springs

04 Socket
020a Tensioning screw
020b Upper tensioning plate
020c Lower plate
020d Guide sleeve
020e Hex nut

3 Insert tensioning plates of spring tensioner into rear spring in parallel with each other to the extent that 5 coils are included.

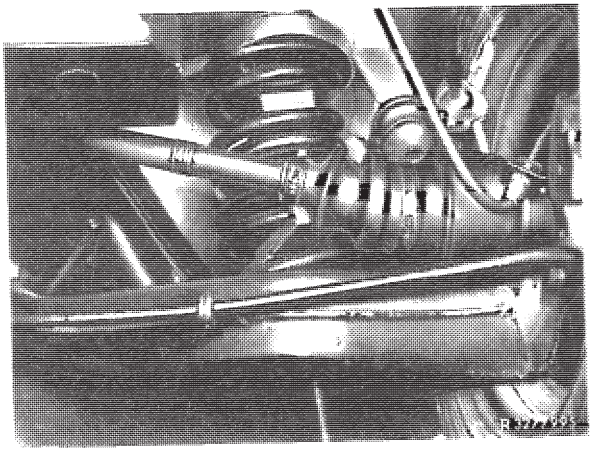
4 Insert tensioning screw through opening in semi trailing arm.



04 Socket
73 Rear spring
020a Tensioning screw
020b Upper tensioning plate
020c Lower tensioning plate

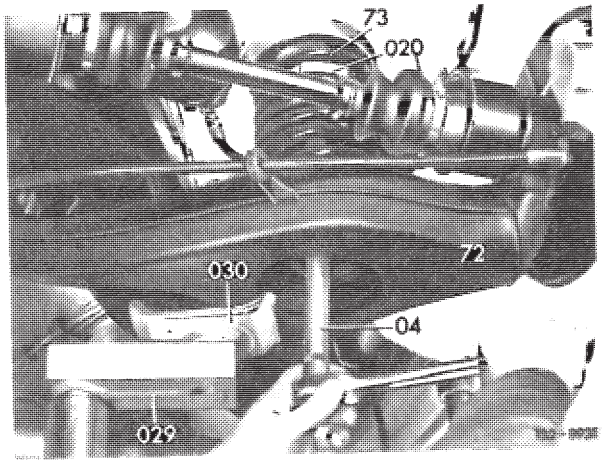
Attention!
The webs on tensioning screw and guide sleeve must be correctly seated in grooves of lower and upper tensioning plates.

5 Tension rear spring.



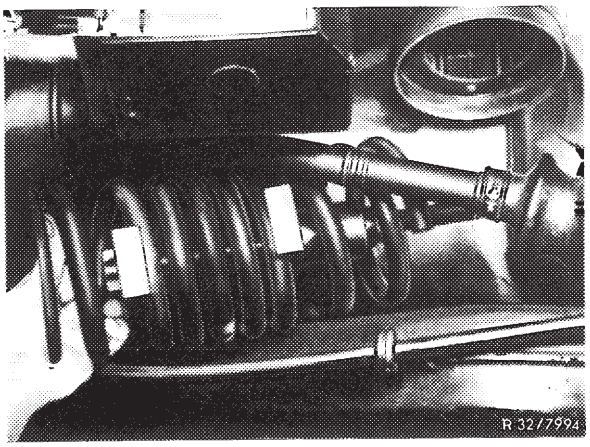
6 Using a pit hoist and the intermediate angle bracket lift control arm approximately to a horizontal position after fitting the clamping plates and the tensioning screw, then compress the rear spring and lower pit hoist carefully until the safety stop of semitrailing arm rests against rear axle carrier.

Pit hoist must be guarded against lateral tilting.

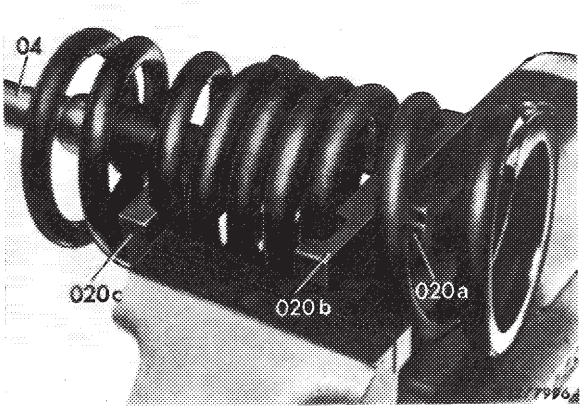


72 Semitrailing arm
73 Rear spring
04 Socket
020 Spring tensioner
029 Intermediate angle bracket
030 Lift or jack cradle

7 Remove rear spring with rubber mount.



8 Insert upper tensioning plate and allow spring to expand.



04 Socket
020a Tensioning screw
020b Upper tensioning plate
020c Lower tensioning plate

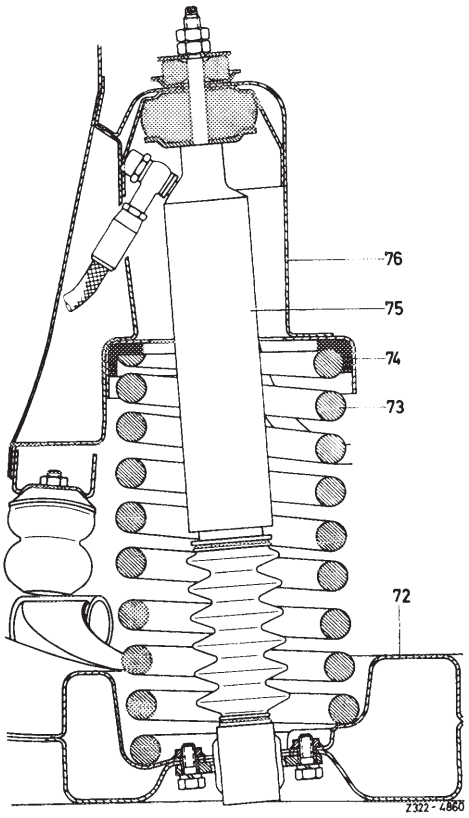
Installation

9 Tension 5 coils of rear spring.

10 Place rubber mount on rear spring so that the coil end rests on impression of semitrailing arm.

11 Allow spring to expand, taking care that the rubber mount on the frame floor and the coil end on the semitrailing arm are correctly positioned.

12 When using a pit hoist, lift semitrailing arm before allowing spring to expand, then release spring and carefully lower pit hoist.



72 Semitrailing arm
73 Rear spring
74 Rubber mount
75 Shock absorber or spring strut
76 Dome on frame floor

13 Install rear shock absorber or spring strut (32–110 or 32–610). Be sure to attach lower suspension to semitrailing arm first.

14 Lower vehicle.

15 Check position of semitrailing arm on rear axle (40–300).

16 Check headlight adjustment.

B. Model 114, 115 standard version

Adjustment of rear springs (association rear springs — rubber mounts)

Model	Vehicles **without** level control			Vehicles **with** level control		
	Rear spring Part no.	Height of spring-rubber mounts according to color code of spring		Rear spring Part no.	Height of spring-rubber mounts according to color code of spring	
		blue	red		blue	red
Standard suspension						
114.010 114.011 114.015 114.02 115.010 115.015 115.017 115.110 115.115 115.117[4])	107 324 21 04[1]) 114 324 05 04	9.5	14	114 324 02 04	9.5	14
114.06[4]) 114.07[4])	114 324 05 04	9.5[2])	14[2])	114 324 02 04	14[3])	19[3])
115.114[4])	115 320 00 20[5])			115 320 02 20[5])	9.5	14
Special version: Harder rear spring for subsequent installation (without torsion bar on rear axle)						
114.010 114.011 114.015 114.02 114.06 114.07 115.010 115.015 115.017 115.110 115.115 115.117	115 324 22 04	14	19	–	–	–
115.114	115 320 01 20[5])	9.5	14			
Special version: Harder suspension for poor road conditions (higher vehicle level)						
114.010 114.011 114.015 114.02 115.010 115.015 115.017 115.110 115.115 115.117	115 324 22 04	14	19	115 324 27 04	9.5	14
114.06 114.07[3])					14	19
115.114	115 320 01 20[5])	9.5	14	115 320 03 20[5])	9.5	14

Footnotes 1 - 5 refer to end of table.

Model	Vehicles **without** level control			Vehicles **with** level control		
	Rear spring Part no.	Height of spring-rubber mounts according to color code of spring		Rear spring Part no.	Height of spring-rubber mounts according to color code of spring	
		blue	red		blue	red
Special version: Springs for sedans with longer wheel base 3400 mm (higher vehicle level)						
114.017 115.112 115.119	–	–	–	115 324 22 04	14	19
Special version: Suspension for sedans with higher permissible rear axle load, e.g. police radio cars (higher vehicle level)[6]						
114.010 114.011 114.015 114.06 115.010 115.015 115.017 115.110 115.115 115.117	115 324 29 04	9.5	14	115 324 22 04	9.5	14
115.114				115 320 01 20[5]		
Special version: Springs for station wagons						
114.007 115.102 115.002 115.107	–	–	–	115 324 29 04	14	19
Special version: Springs for ambulances with normal wheel base 2750 mm (higher vehicle level)[6]						
114.005 115.110 115.000 115.105 115.005	115 324 29 04	14	19	115 324 22 04	14	19
Special version: Springs for ambulances with longer wheel base 3400 mm (higher vehicle level)						
114.008 115.108 115.103	–	–	–	114 324 22 04	14	19

[1] 1st version up to September 1972.
[2] On righthand steering vehicles at righthand vehicle end install rubber mount 5 mm higher than stated in table.
[3] On righthand steering vehicles at lefthand vehicle end install rubber mount 5 mm lower than stated in table.
[4] On USA vehicles starting model year 1975 the rear springs are provided with rubber mounts 5 mm higher.
[5] Spare parts scope of delivery with rubber hose slipped on at lower coil runout.
[6] On vehicles without level control and with rear springs 115 324 29 04, **no** torsion bar is installed on rear axle.

General information about springs

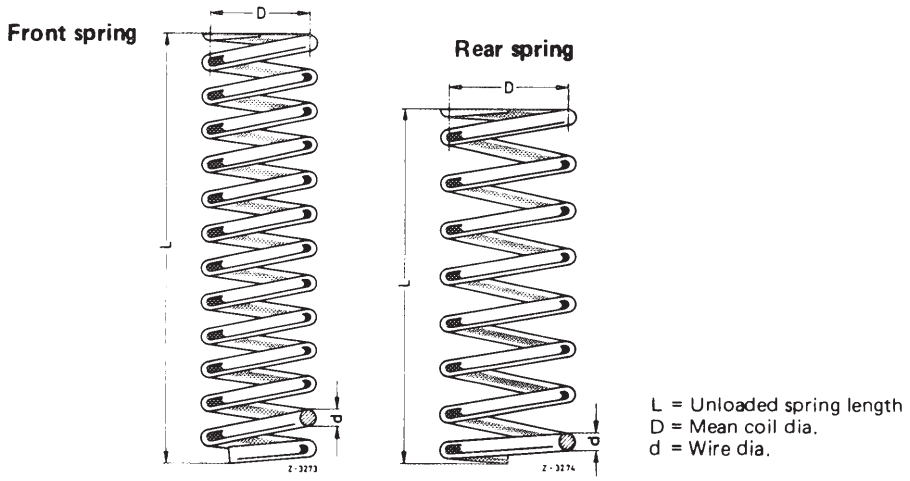
Manufactured springs are subject to tolerances. To provide uniform installation conditions on vehicle, the tolerances showing up during production of the springs are compensated with regard to spring length or installation height. To identify the various spring lengths, the springs are marked with paint at the final, lower end of coil. (Color marks in center of spring are inspection marks of manufacturer, they are of no significance with regard to length of spring). The part number and the DB company symbol are punched into each spring at end of final coil.

a) Front springs

On front springs the different spring lengths (installation heights) are identified by the following colors:
Model 107 114 115 red = short spring blue = long spring
The various installation heights of the springs and the different axle loads resulting for the individual vehicle models and versions are compensated by the installation of rubber mounts of varying height (refer to tables „Adjustment of front springs").

b) Rear springs

Model 107 114 115
The color code on rear springs is the same as on front springs, therefore
red = short spring blue = long spring
The various installation heights and rear axle loads are compensated by rubber mounts of varying height for the rear springs (refer to table „Adjustment of rear springs").



Part no.	Spring travel per 1000 N load	Wire dia. „d"	Unloaded spring length „L"
Front springs			
114 321 05 04	21.2	15.3	445.5
114 321 06 04	16.4	16.1	424.5
114 321 07 04	16.4	16.3	437.5
114 321 09 04	21.2	15.4	459.5
115 321 29 04	21.2	15.3	431.5
115 321 30 04	16.4	16.1	411.5
115 321 32 04	18.55	15.9	453.8

Rear springs

107 324 03 04	19.5	15.9	369
114 324 02 04	23.3	15.1	355
114 324 05 04	19.5	16	365
115 324 21 04	19.5	15.9	361
115 324 22 04	15.9	16.9	350
115 324 27 04	19.5	15.9	353
115 324 29 04	12.35	17.8	344
115 324 34 04	18.8	15.2	369
115 324 36 04	15.5	16	357
115 324 37 04	22.2	14.25	366
115 324 38 04	18.7	15.1	361

Data

Torsion bar			Rubber mount of torsion bar bearing	
Model	Part no.	Diameter	Part no.	Bore dia.
107	107 323 01 65	25	114 323 05 85	23.5–0.5
114 115	115 323 16 65[1]) 107 323 01 65[2])			

[1]) 1st version (up to February 1972). [2]) 2nd version (starting March 1972).

Torsion bar connecting linkage on front axle

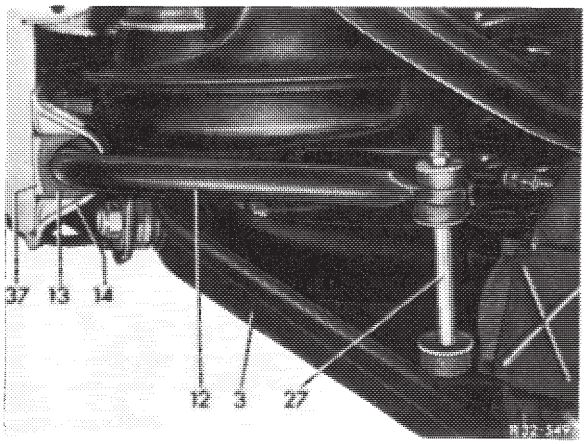
Rubber buffer		Spacing tube	Hex bolt	
Part no.	Height	Length	Length	Length without threads
115 323 02 44	20	100	210	178–1.5

Tightening torque	Nm	(kpm)
Hex bolts of torsion bar bearing	20–25	(2–2.5)

Removal

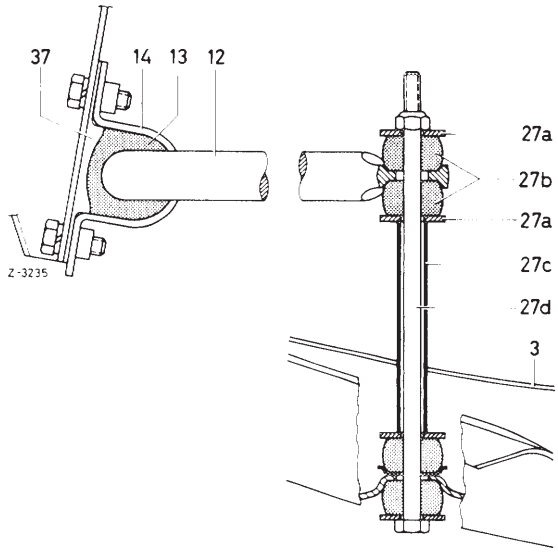
1 Loosen connecting linkage (27) at left and right on lower control arm.

2 Unscrew holding clamp (14) of torsion bar bearing left and right and remove torsion bar (12).



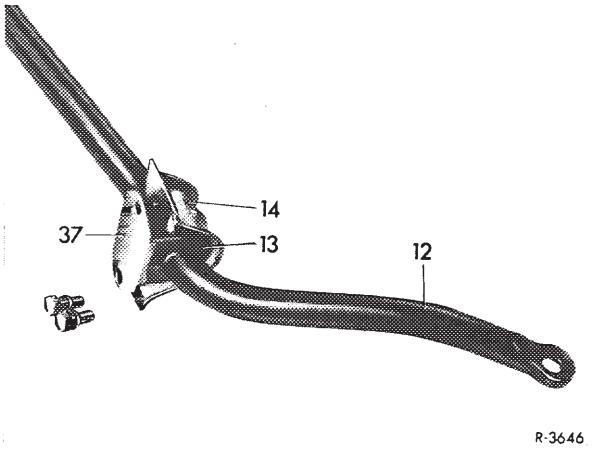
3 Lower control arm
12 Torsion bar
13 Rubber mount for torsion bar
14 Holding clamp
27 Torsion bar connecting linkage
37 Locking plate

3 Check rubber mount of torsion bar bearing and rubber rings of connecting linkage.



3 Lower control arm
12 Torsion bar
13 Rubber mount
14 Holding bracket
27 Connecting linkage
27a Washer
27b Rubber ring
27c Spacing tube
27d Hex bolt
37 Locking plate

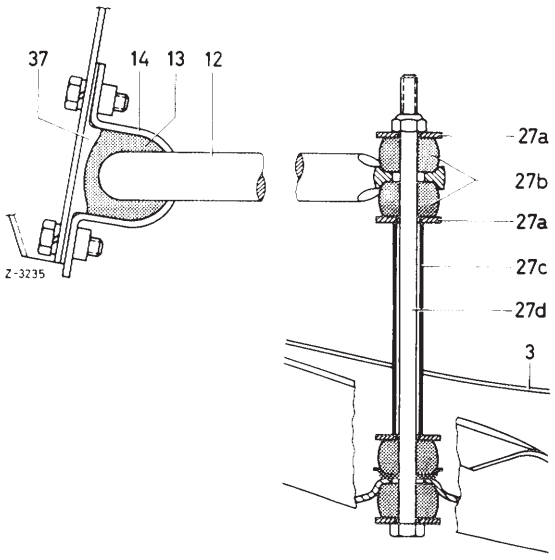
4 Slide rubber mount on torsion bar with parting slot toward front, fit locking plate (37) and attach torsion bar bearing to frame floor. Align torsion bar prior to tightening hex bolts.



12 Torsion bar
13 Rubber mount
14 Holding bracket
37 Locking plate

Note: Insufficiently tightened hex bolts of the holding bracket may result in knocking noises when driving on winding roads.

5 Attach torsion bar connecting linkage left and right to lower control arm. Tighten hex nut up to end of thread.



3 Lower control arm
12 Torsion bar
13 Rubber mount
14 Holding bracket
27 Connecting linkage
27a Washer
27b Rubber ring
27c Spacing tube
27d Hex bolt
37 Locking plate

Data

Model	Torsion bar		Rubber mount of torsion bar bearing	
	Part no.	Diameter	Part no.	Bore dia.
107.022 107.023 107.024[3]) 107.025 107.042 107.043 107.044[3])	107 326 20 65[1])	19	107 326 14 81	17.5–0.5
	107 326 23 65[2])	18	116 326 08 81	16.5–0.5
114, 115	114 326 10 65	16	115 326 05 81	14.5–0.5

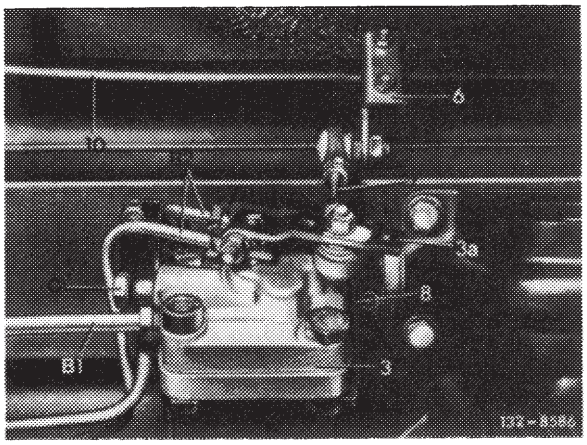
[1]) 1st version [2]) 2nd version [3]) (AUS) (J) (USA) only

Tightening torques	Nm	(kpm)
Hex bolts of torsion bar bearing	70	(7)
Ball joints of torsion bar connecting rods	45	(4.5)

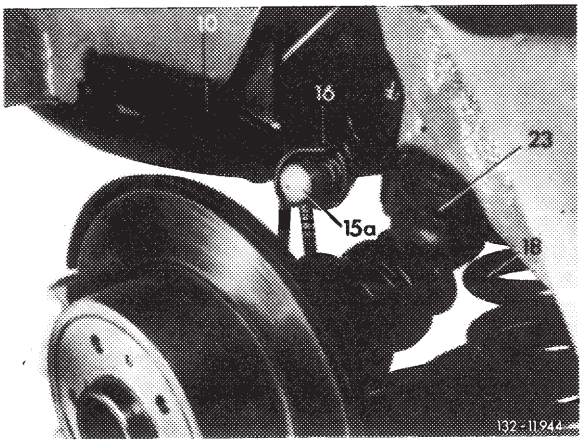
Removal

1 Lift vehicle at the rear.

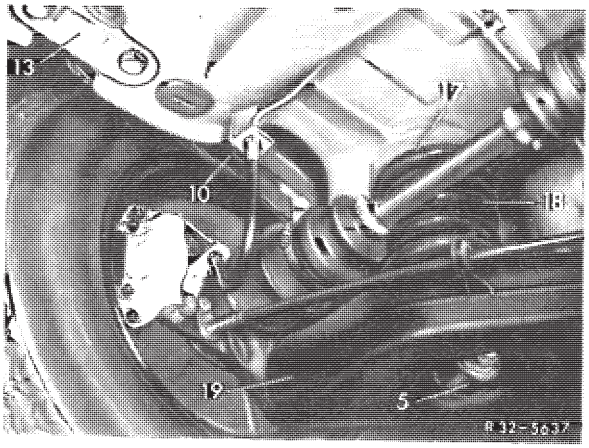
2 On vehicles with level control, separate connecting rod (7) for level control (3) from lever (6) on torsion bar.



3 Disconnect connecting rod (15) at left and right on torsion bar.

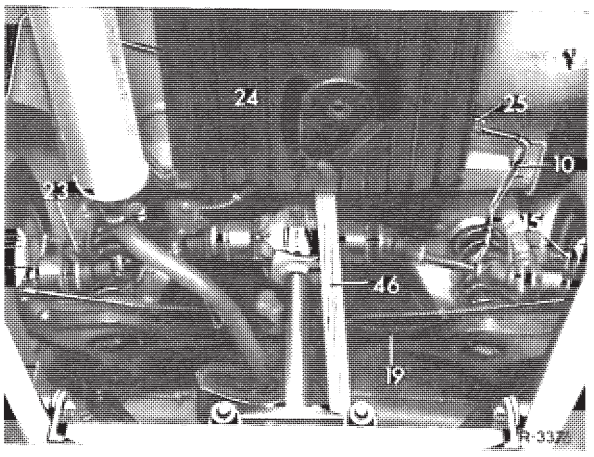


4 Unscrew holding bracket (13) of torsion bar bearing left and right.



5 On models 114, 115 disconnect venting lines on fuel tank. Unscrew fastening clamp of fuel feed and return line on frame floor in front of fuel tank.

Loosen fuel tank at front attachment, lower slightly and support by means of a suitable strut (46).



10 Torsion bar
15 Connecting rod
24 Fuel tank
25 Venting lines for fuel tank
46 Strut

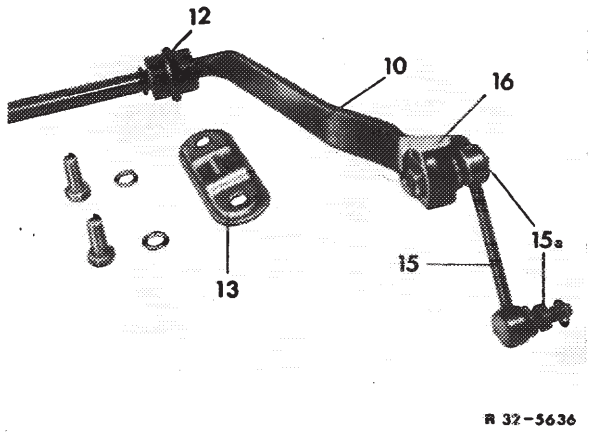
6 Loosen rubber rings of rear exhaust mounting bracket, slightly lower exhaust line and support.

7 Remove torsion bar downwards on model 107 and toward lefthand side of vehicle on model 114, 115.

Installation

8 Check rubber mounts (12) of torsion bar bearing and connecting rods (15).

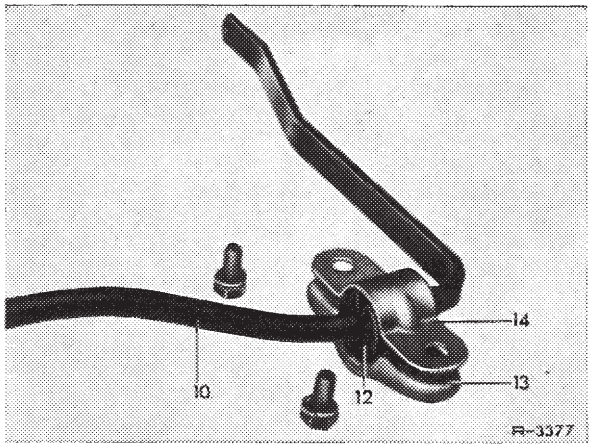
9 If required, mount lever for operating level control on torsion bar (32–660).



Model 107

10 Torsion bar
12 Rubber mount
13 Holding bracket
15 Connecting rod
15a Ball joints of connecting rod with spring washers
16 Deflection plate

10 Insert torsion bar. Push rubber mount on to torsion bar with separating slot on top. On models 114, 115 mount upper holding bracket.

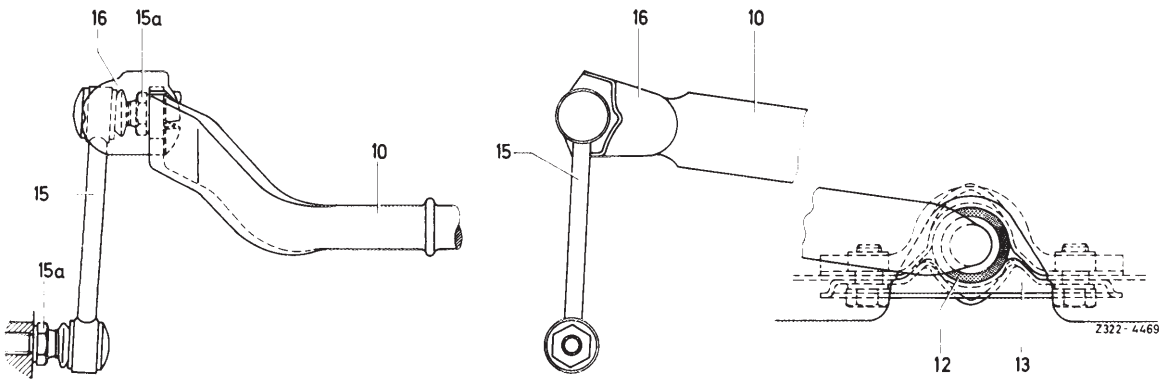


Models 114, 115

10 Torsion bar
12 Rubber mount
13 Lower holding bracket
14 Upper holding bracket

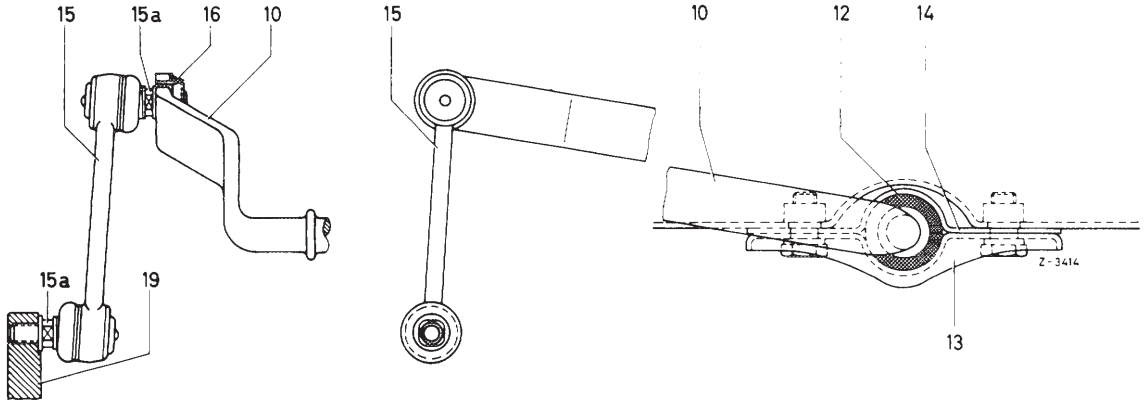
11 Mount torsion bar bearing on frame floor.

12 Attach connecting rods at right and left of torsion bar. If required, renew deflection plates.



Model 107

10 Torsion bar
12 Rubber mount
13 Holding bracket
15 Connecting rod
15a Ball joints of connecting rod with spring washers
16 Deflection plate



Models 114, 115

10 Torsion bar
12 Rubber mount
13 Lower holding bracket
14 Upper holding bracket
15 Connecting rod
15a Ball pin with spring washer
16 Deflection plate
19 Semitrailing arm

13 On models 114, 115 connect vent lines (25) to fuel tank. Attach fastening clamp for fuel feed and return line to frame floor in front of fuel tank. Screw-on fuel tank.

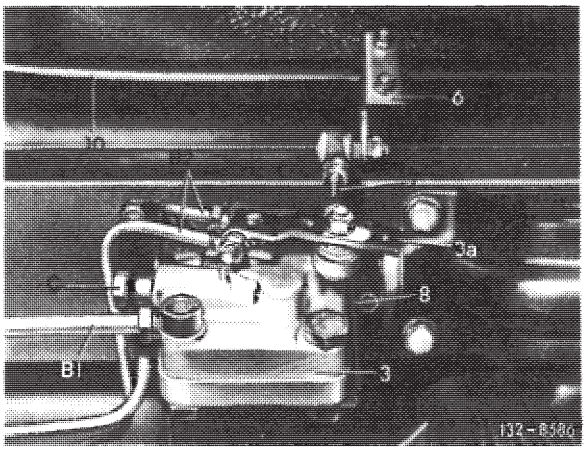
14 Mount rear axle pipe.

15 Lower vehicle.

16 Additionally on vehicles with level control:

a) Attach connecting rod (7) to lever (6) on torsion bar.

b) Check vehicle level and correct, if required (40–310).



Test values of spring struts

Part no.	Color code on joint of lower suspension	Test values in N at 100/min and 50 mm stroke	
		Values for new spring struts Pull	Push
1st version with rubber mount			
107 320 00 13	4 diagonal stripes green	2000	800
114 320 06 13	1 diagonal stripe red	2100	760
114 320 07 13	2 diagonal stripes red	2500	980
116 320 29 13	2 diagonal stripes green	3100	1150
116 320 30 13	1 diagonal stripe green	2200	860
2nd version with ball joint [1]			
114 320 12 13	1 stripe red	2050	710
114 320 14 13	2 stripes red	2650	970
116 320 31 13	1 stripe green	2250	790
116 320 32 13	2 stripes green	3250	1150
116 320 45 13[2) 3)]	3 stripes green	2400	820
116 320 46 13[2)]	4 stripes green	3050	1180
123 320 04 13	1 stripe white	1750	700
123 320 05 13	2 stripes white	2700	1030
123 320 07 13[2)]	3 stripes white	2350	970
123 320 08 13[2)]	4 stripes white	2700	1030
123 320 10 13[2)]	1 stripe white	1650	740
123 320 11 13[2)]	4 stripes white	2700	1030

[1)] Installed starting May 1974.
[2)] Version with 24 mm piston rod dia. starting July 1979.
[3)] At start of series model 126 approx. 100 vehicles were provided with spring struts part no. 126 320 06 13. The damping force adjustment of spring struts corresponds to version part no. 116 320 45 13.

Permissible oil consumption

for 10 000 km	max. 0.4 l

Carefully check piston rod for surface damage.

Check piston rod for distortion. A distorted piston rod will be noticed during stroke by binding in guide bushing.

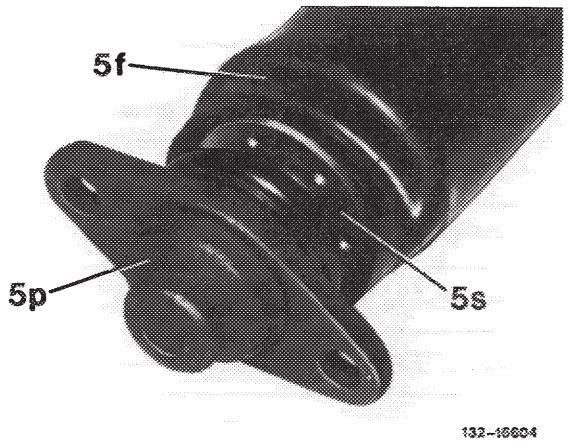
Note: For lubrication of guide bushing located outside piston rod seal, design provides an oil film on piston rod.

The oil film and thereby the oil outlet provided is somewhat thicker than for shock absorbers. Oil deposits inside dust guard are therefore normal.

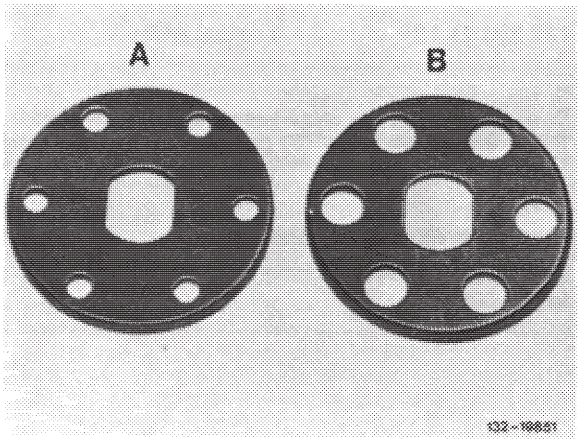
A major leak is indicated when with the vehicle stopped a number of drops will appear underneath spring strut and oil consumption of level control system is above permissible value.

Alignment of suspension points is important for correct function of piston rod seal. Be sure to check piston rod seal in the event of leaks to see whether alignment of suspension points is in order (32–126).

Note: On spring struts of T-sedans, check bores on disc (5s) for contamination.



If a disc of the 1st version (A) is installed, exchange disc for 2nd version (B) with larger bores (8 mm dia.) (32–612).



Rattling noises

Check upper suspension for correct assembly, lower suspension for tight seat of fastening clip and rubber mount in housing eye or ball joint for absence of play.

Check alignment of upper suspension point on frame floor in relation to lower suspension point on semi-trailing arm (refer to "check alignment of rear shock absorbers" – steel suspension 32–126).

Attention!
If the alignment of the suspension parts has not been in order, replace spring struts only if they have already been running for an extended period at a heavily deviating alignment or if they have been clearly leaking.

Tightening Torques	Nm
Hex. bolts for rubber mountings of suspension on frame floor	45
Hex. nuts of lower shock absorber suspension	20
Hex. bolts of front engine mounting	35
Hex. nuts of track rod joints	35
Self-locking hex. head screw for fastening rpm sensor to steering knuckle	8

Special tools	
Carrying stirrup for engine	107 589 02 61 00
Puller for track rod ball joints	124 589 01 33 00

Notes

The jobs described below apply when the individual parts are subsequently controlled or the front axle is repaired. In such a case, the shock absorber, the torsion bar and the front springs are already removed on vehicle.

But if the vehicle will be placed on the frame straightening bench, for example, as the result of repairs following an accident in which the front axle has not been damaged, remove front axle **complete** with front springs, shock absorbers and torsion bar.

The front shock absorbers are serving simultaneously as a deflection stop for the front wheels. Therefore loosen shock absorber suspension only when the vehicle is on its wheels or when the lower control arm is supported.

There is a safety stop between the upper control arm and the front axle carrier.

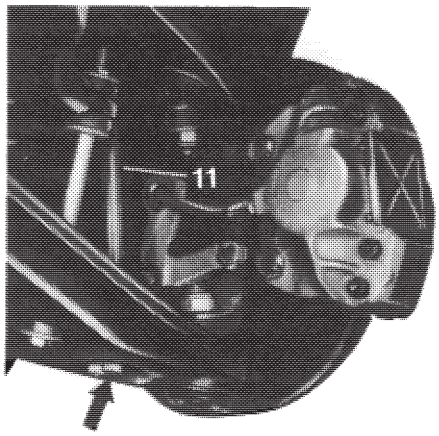
Remove self-locking screws and nuts on principle!

Removal

1 Loosen lower shock absorber suspension (arrow).

2 Jack-up vehicle at front and rear and place on supporting stands of similar height. Remove front wheels.

3 Remove front shock absorbers (11) (32–100).



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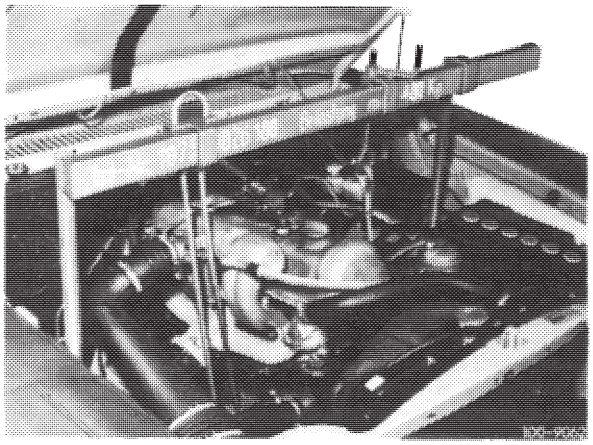
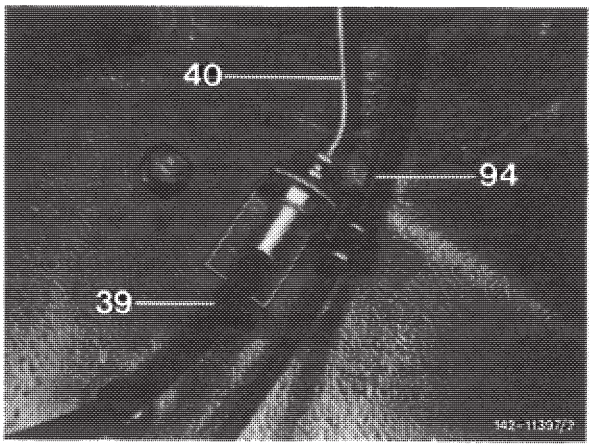
4 Connect carrying stirrup to engine.

5 Loosen hex. bolts of front engine mounting right and left.



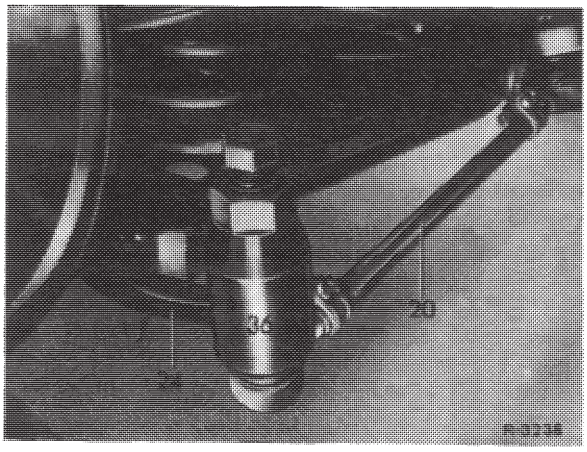
6 Separate brake lines and brake hoses from each other. Close connections with rubber plugs.



142-1137/2

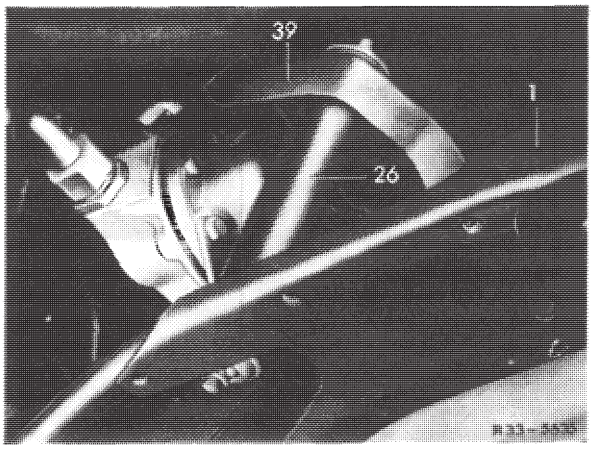
7 Remove track rods left and right from steering knuckle arm (46–530).

8 Remove front torsion bar (32–300).

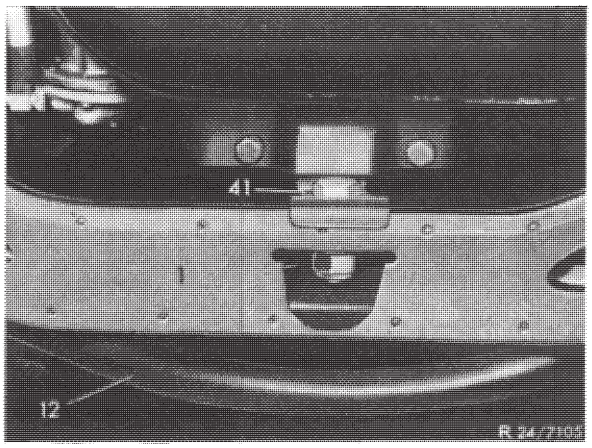


20 Track rod
24 Steering knuckle arm
36 Remover

9 On vehicles with engines 110, 115, 130, 180 and 615, 616, 617 detach engine shock absorber suspension from front axle carrier.



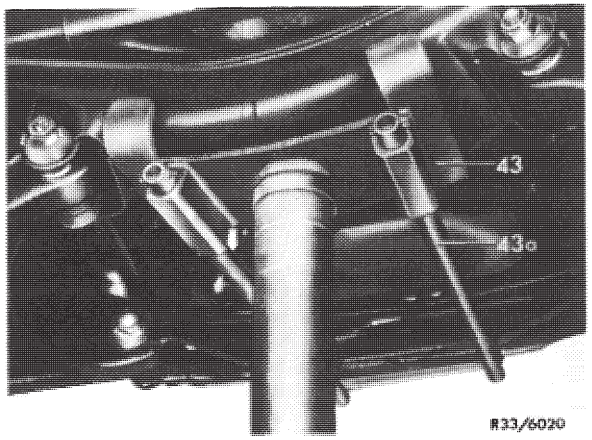
10 On vehicles with engines, 115, and 615, 616, detach engine movement limiter from front axle carrier.

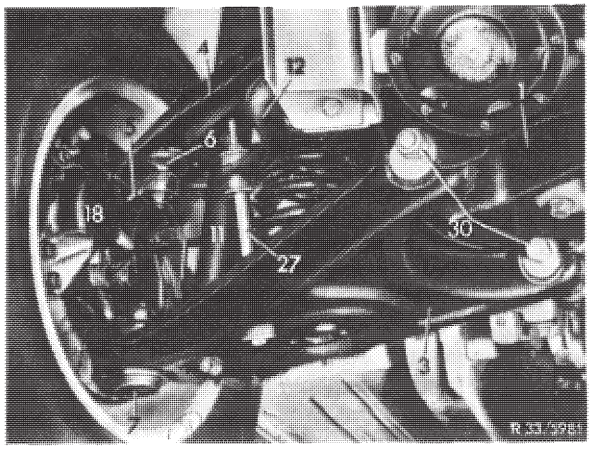


1 Front axle carrier
12 Torsion bar
41 Engine movement limiter

11 Remove front springs (32–200), attach lower control arms again temporarily to front axle carrier.

12 Support front axle carrier with pit lift and cradle (43) with supplementary member (43a).

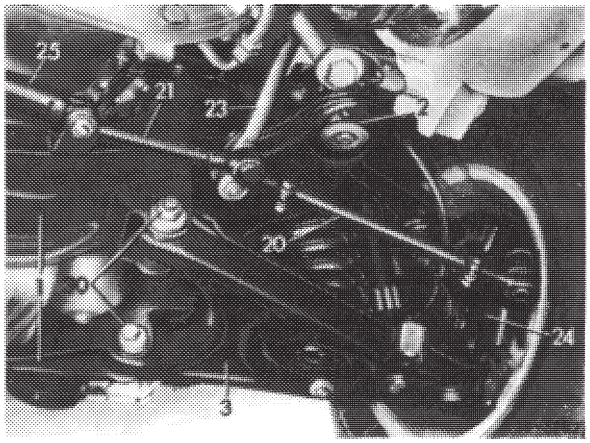




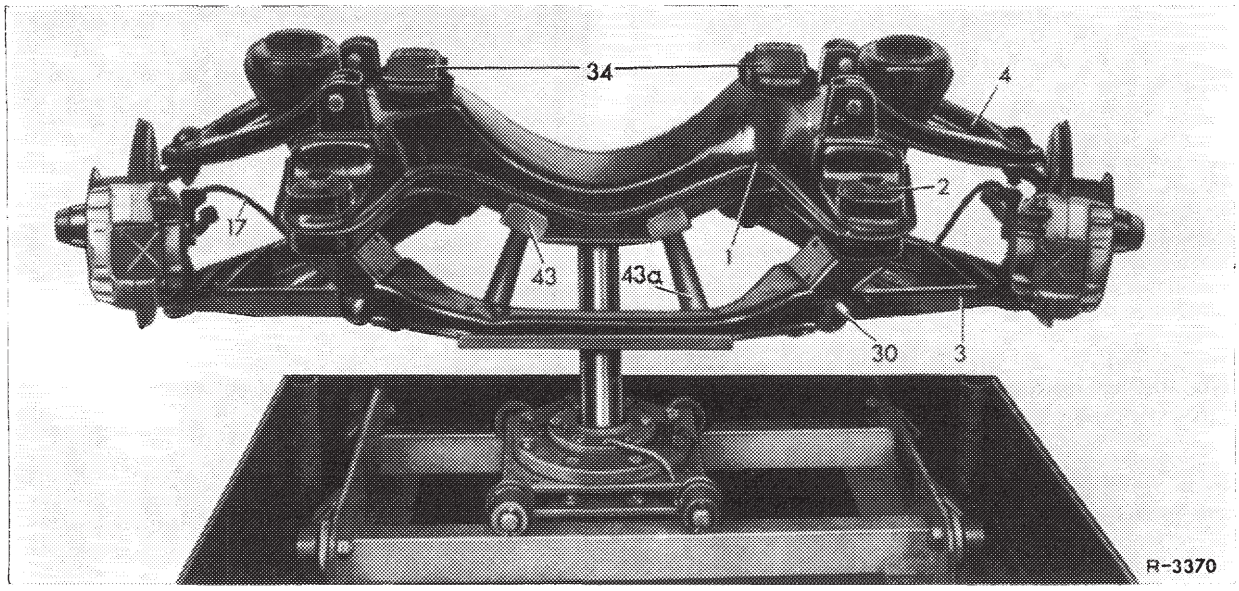
Front axle seen from the front

1 Front axle carrier
3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
11 Front shock absorber
12 Torsion bar
27 Torsion bar connecting linkage
30 Eccentric bolts

13 Loosen hex. bolts of four rubber mounts (2) for attaching front axle carrier to frame floor.



14 Lower pit lift and remove front axle.



1 Front axle carrier
2 Rubber mount
3 Lower control arm
4 Upper control arm
17 Brake hose
30 Cam bolt
34 Rubber mount of front engine mounting
43 Cradle
43a Supplementary member for removal and installation of front axle

Installation

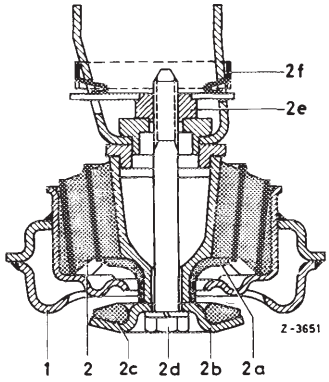
15 Check rubber mount of front engine mounting.

16 Check condition of rubber mount for suspending front axle and for tight seat in front axle carrier (33–110).

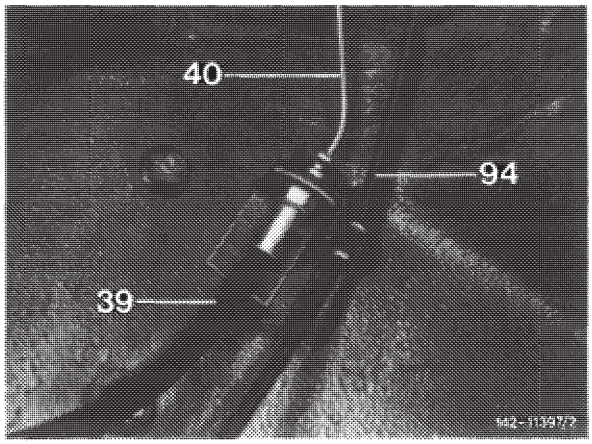
17 Introduce front axle and attach to frame floor.

18 Remove engine carrying stirrup. Install the hex. bolts for the engine suspension.

1 Front axle carrier
2 Rubber mount
2a Stop buffer for deflection
2b Stop plate
2c Stop buffer for deflection
2d Hex. bolt
2e Fastening nut
2f Holder for fastening nut



19 Connect brake hoses.



20 Install front springs (32–200).

Attention!
Tighten hex. nuts of eccentric bolt for lower control arms **only, if the vehicle is resting on its wheels ready for driving.**

21 Install front shock absorber (32–100).

22 Mount track rod joints.

23 Install torsion bar (32–300).

24 On vehicles with engines 110, 115, 130, 180 and 615, 616, 617, attach engine shock absorber to front axle carrier.

25 On vehicles with engine 115 and 615, 616, mount engine movement limiter to front axle carrier and adjust.

26 Bleed brake system (42–010).

27 Mount front wheels, lower vehicle.

28 Check vehicle level at front axle.

29 Check wheel adjustment at front axle and correct, if necessary (40–320).

30 Check adjustment of headlights.

33–110 Removal, installation and inspection of rubber mounts for front axle suspension (front axle installed)

Tightening torques	Nm
Hex. bolts for rubber mounts of suspension on frame floor	45
Hex. nuts of lower shock absorber suspension	20
Hex. bolts of front engine mounting	35
Hex. nuts of track rod joints	35
Self-locking hex. head screw for fastening rpm sensor to steering knuckle	8

Special tools

Carrying stirrup for engine	107 589 02 61 00
Puller for track rod ball joints	124 589 01 33 00

Note

The front shock absorbers are simultaneously serving as a deflection stop for the front wheels. Therefore loosen shock absorber suspension only when the vehicle is on its wheels or when the lower control arm is supported.

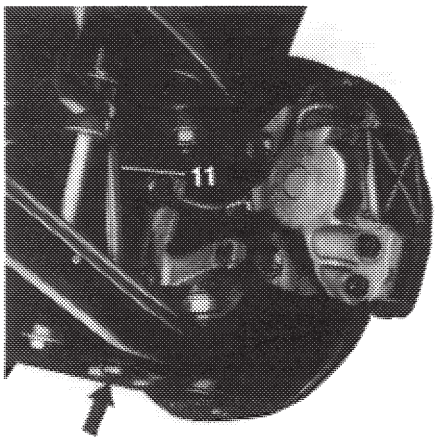
There is a safety stop between the upper control arm and the front axle carrier.

Renew self-locking screws and nuts on principle!

Removal

1 Remove both front shock absorbers (11) (32–100).

2 Jack-up vehicle at the front and rear while making sure that all the four supporting stands are set to the same height. Remove front wheels.



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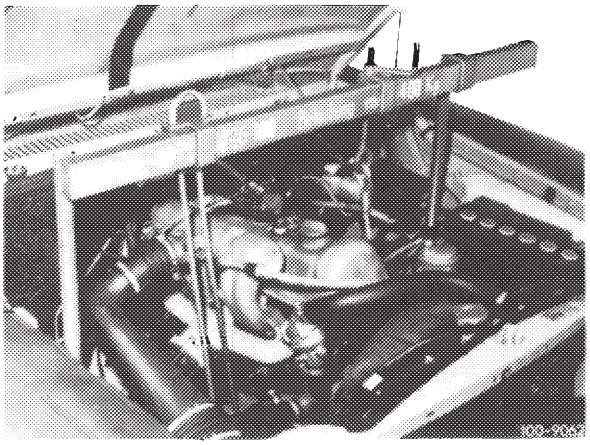
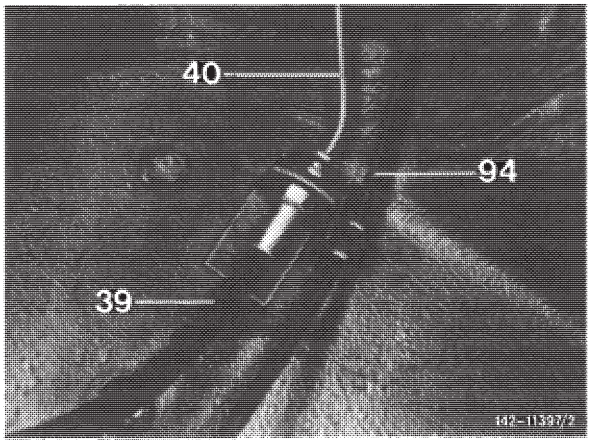
3 Attach engine carrying stirrup.

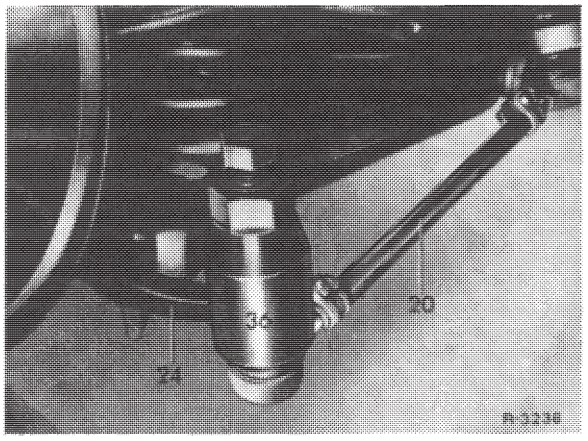
4 Remove right and left hexagonal bolts from front engine suspension.



5 Separate brake line and brake hose from each other. Block the connection with rubber plugs.

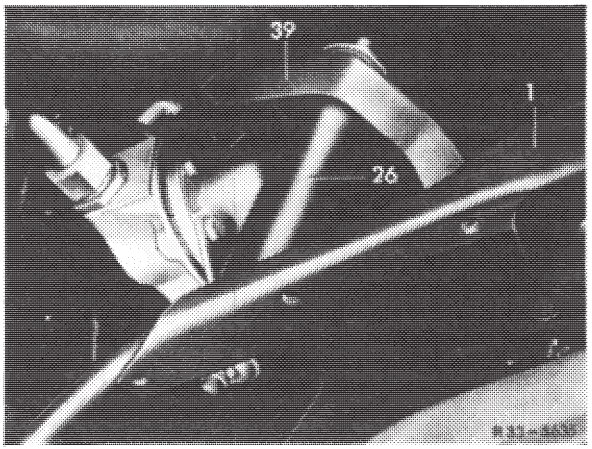


6 Remove tie rods from both steering knuckle arms.



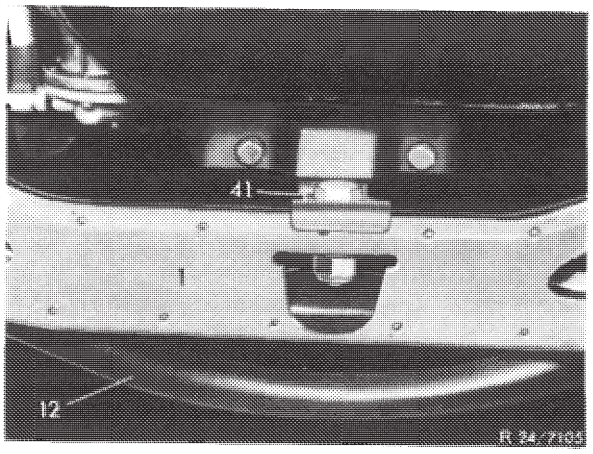
20 Tie rod
24 Steering knuckle arm
36 Remover

7 On vehicles with engines 110, 115, 130, 180 and 615, 616, 617, detach engine shock absorber from front axle carrier.



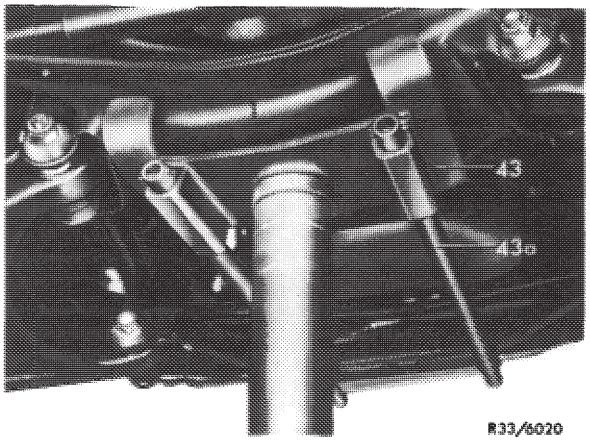
1 Front axle carrier
26 Engine shock absorber
39 Holder for engine shock absorber

8 On vehicles with engines 115, 615 and 616, detach engine movement limiter from front axle carrier.

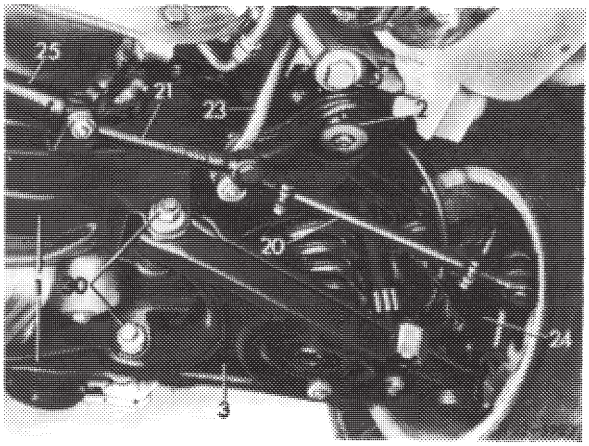


1 Front axle carrier
12 Torsion bar
41 Engine movement limiter

9 Support the front axle carrier with a pit lift and mounting (43) with supplementary part (43a).

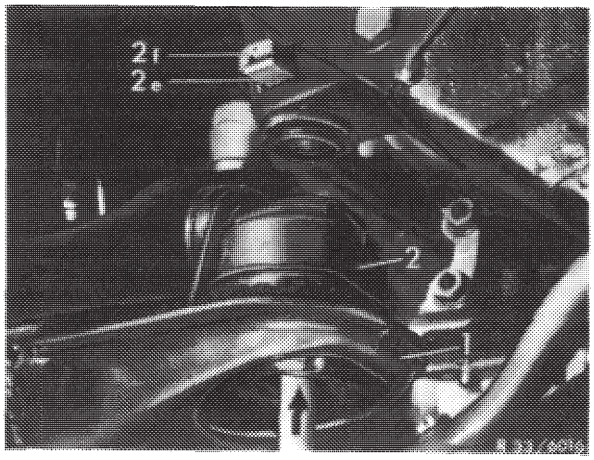


10 Loosen hex. head screws (2) of the four rubber mounts for front axle suspension on frame floor.

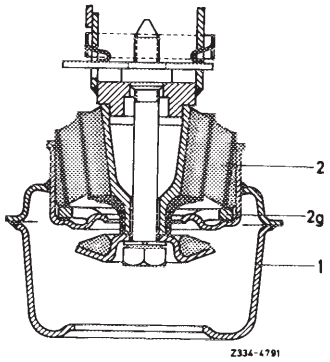


1 Front axle carrier
2 Rubber mount
3 Lower control arm
20 Tie rod
21 Drag link
23 Steering intermediate arm
24 Steering knuckle arm
25 Steering shock absorber
26 Eccentric bolts

11 Lower pit lift approx. 50 mm and knock the rubber mounts (2) out of their seats in the front axle carrier from below (see arrow).



Note: On vehicles with longer wheelbase 3400 mm, models 114.008, 114.017, 115.103, 115.108, 115.112 and 115.119 there are washers (2g) between the front axle carrier and the rubber mount.



1 Front axle carrier
2 Rubber mount for front axle suspension
2g Washers
for front rubber mounts 2 mm thick
for rear rubber mounts 4 mm thick

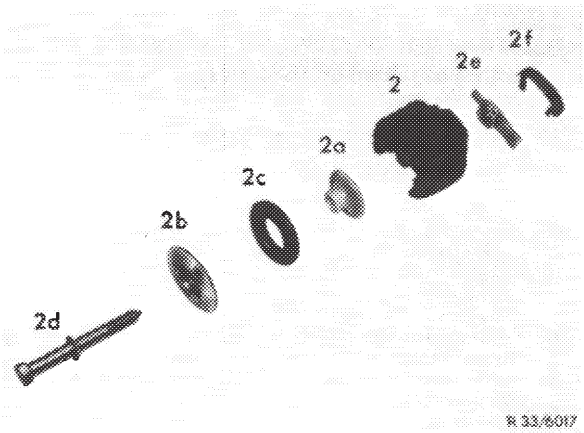
Checking the rubber mounts

12 Check that inner sleeve fits tightly in rubber mantle.

13 Check for cracks and damage on buffer stops for spring compression and rebound.

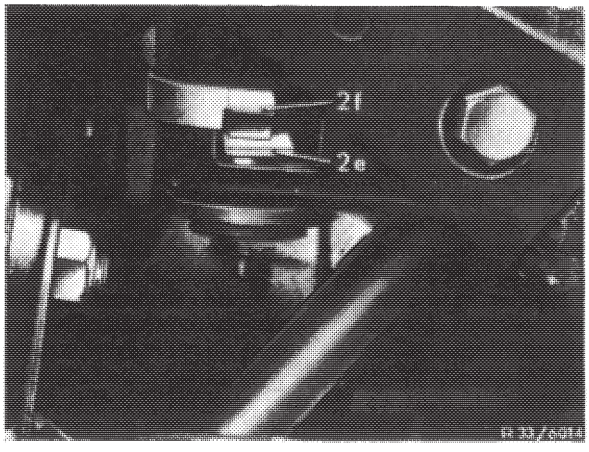
Installation

14 Push the buffer stop for spring compression (2a) onto the rubber mounts (2).



2 Rubber mount
2a Buffer stop for spring compression
2b Stop plate
2c Buffer stop for spring rebound
2d Hex. bolt with spring washer
2e Fastening nut
2f Holder for fastening nut

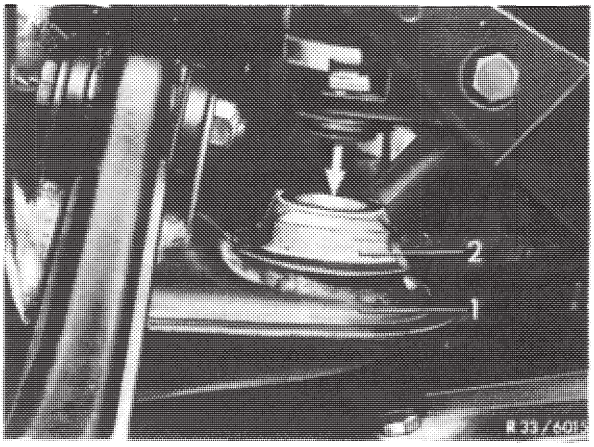
Note: For assembly of fastening nuts (2f) insert holder (2e) (if available).



2e Fastening nut
2f Holder for fastening nut

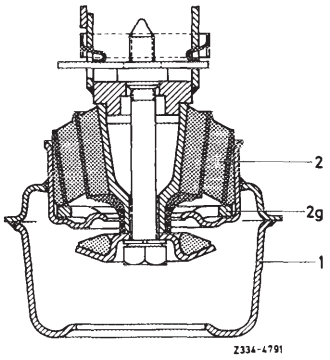
15 Apply lubricant "Naphtalen" (Part No. 000 989 14 60) to the rubber mount circumference.
On no account use oil or grease!

16 Press the rubber mounts into their seats in the front axle carrier.



1 Front axle carrier
2 Rubber mount

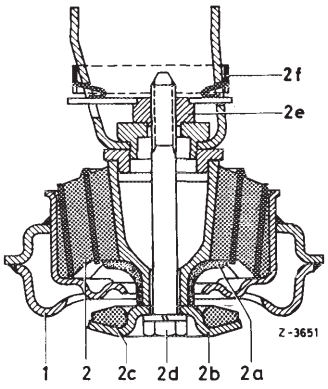
Attention!
On vehicles with longer wheelbase 3400 mm, models 114.008, 114.017, 115.103, 115.108, 115.112 and 115.119, do not forget the washers (2g).



1 Front axle carrier
2 Rubber mount for front axle suspension
2g Washers
for front rubber mounts 2 mm thick
for rear rubber mounts 4 mm thick

17 Lift the front axle carrier with the pit lift, taking care that the rubber mount inner sleeve is correctly positioned on the frame.

18 Mount the front axle carrier on the frame floor with the hex. bolts.



1 Front axle carrier
2 Rubber mount
2a Buffer stop for spring compression
2b Stop plate
2c Buffer stop for spring rebound
2d Hex. bolt with spring washer
2e Fastening nut
2f Holder for fastening nut

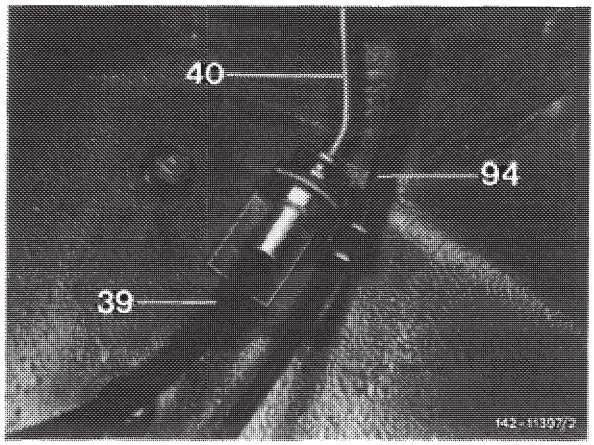
19 Remove engine carrying stirrup. Install hex. bolts for engine suspension.

20 On vehicles with engines 115, 130, 180 and 615, 616, 617 mount engine shock absorber suspension on front axle carrier.

21 On vehicles with engines M 115 and 615, 616 mount the engine movement limiter on the front axle carrier.

22 Install the tie rod joints.

23 Connect brake hoses.

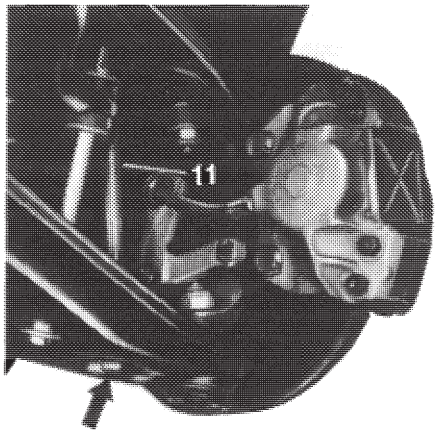


24 Screw lower shock absorber suspensions right and left to lower control arms (arrow).

25 Lower vehicle.

26 Bleed brake system (42–010).

27 Check headlight adjustment.



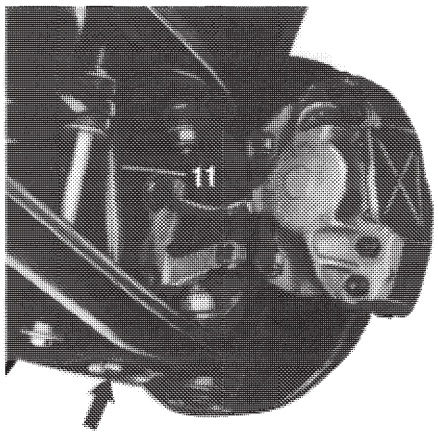
Tightening torques	Nm
Hex. nuts of track rod ball joint	35
Hex. bolts of upper control arm bearing	60
Hex. nuts of cam bolts for lower control arms	120
Hex. nuts of lower shock absorber suspension	20
Self-locking hex. head screw for fastening rpm sensor to steering knuckle	8

Special tool	
Puller for track rod ball joints	124 589 01 33 00

Note

The front shock absorbers are serving simultaneously as a deflection stop for the front wheels. Therefore loosen shock absorber suspension only when the vehicle is on its wheels or when the lower control arm is supported.

Renew self-locking screws and nuts on principle!



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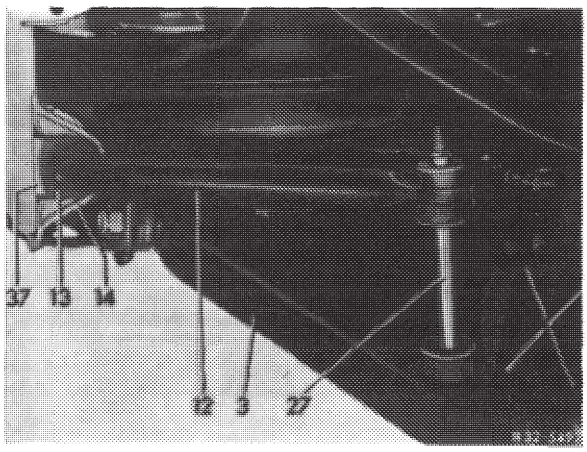
Removal

1 Loosen lower shock absorber suspension (arrow).

2 Jack-up vehicle at the front, remove front wheel.

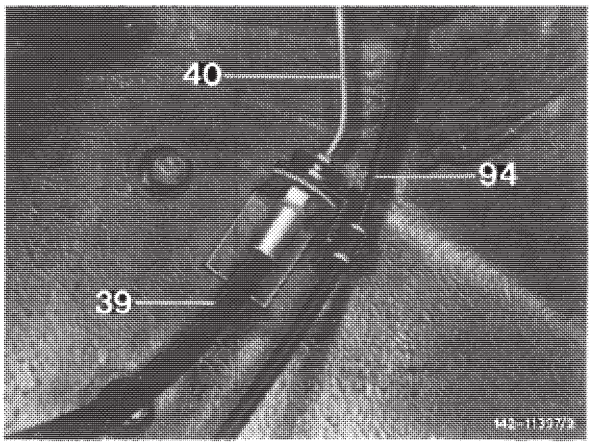
3 Loosen connecting linkage (27) of torsion bar.

4 Remove front spring (32–200).

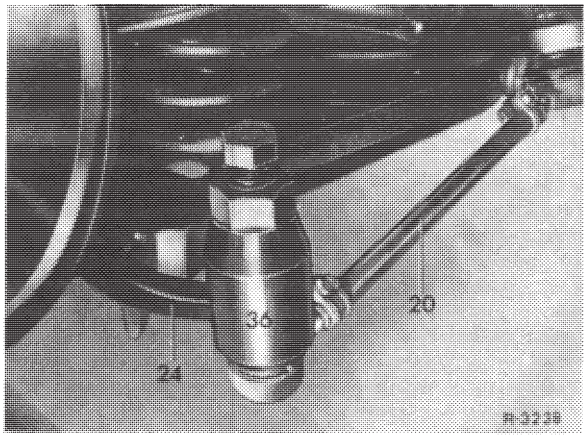


3 Lower control arm
12 Torsion bar
13 Rubber mount for torsion bar
14 Holder for rubber mount
27 Torsion bar connecting linkage
37 Safety plate for rubber mount

5 Separate brake line and brake hose from each other. Close connections with rubber plugs.

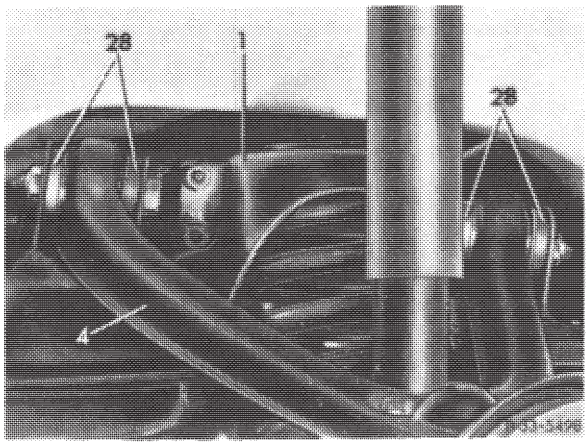


6 Remove track rod from steering knuckle arm.



20 Track rod
24 Steering knuckle arm
36 Remover

7 Loosen both hex. bolts of upper control arm bearing.



1 Front axle carrier
4 Upper control arm
28 Rubber slide bearing

8 Attach upper control arm to front axle carrier, making sure that the sealing lips of the rubber slide bearings are not damaged.

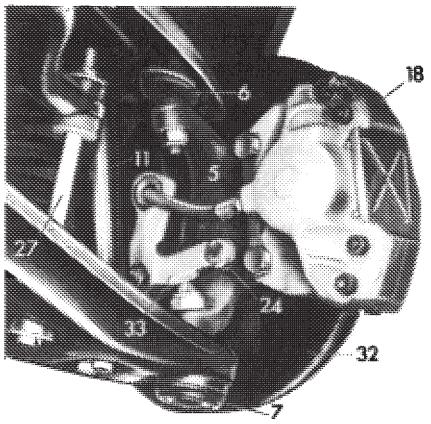
The front bolt of the two hex. bolts is **always** mounted **from the rear forward, the rear bolt from the front rearward.**

9 Install front spring (32–200).

Attention!
Tighten hex. nut of eccentric bolt for lower control arms **only if the vehicle is resting on its wheels** ready for driving.

10 Mount torsion bar connecting linkage (27) and shock absorber (11) to lower control arm.

11 Mount track rod on steering knuckle arm (24).



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12 Connect brake hose to brake line.

13 Bleed braking system (42–010).

14 Check front axle wheel adjustment and correct, if required (40–320).

Data

Wheel bearing end play	0.01–0.02 mm

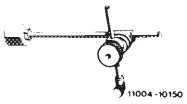
Lubricant

Quantity	Into wheel cap: Grease quantity approx. 20 g (about up to edge of bead)
Series fillup:	Anti-friction bearing grease (refer to Specifications for service products sheet 265)
Repair fillup:	High-temperature anti-friction bearing grease (refer to Specifications for service products sheet 265.1)[1])

[1]) Available in 150 gr. screw cans, part no. 000 989 49 51.

Tightening torque	Nm
Hex. socket screw of clamping nut	20

Special tools

Remover and installer for wheel cap		116 589 22 33 00
Holder for dial gauge to adjust wheel bearing end play		363 589 02 21 00

Conventional tool

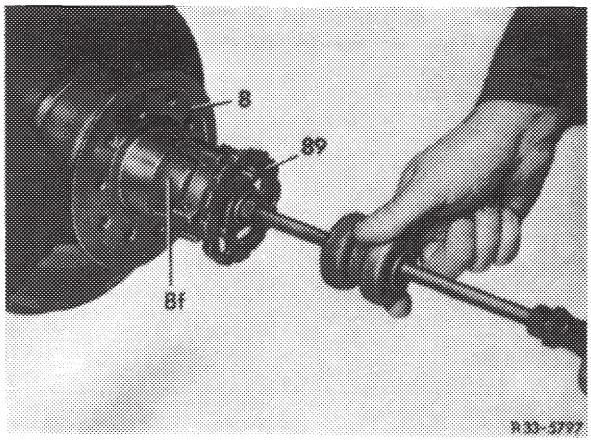
Dial gauge A 1 DIN 878	e.g. made by Mahr, D–7300 Esslingen order No. 311 000

Note

In the event of repairs, from now on use exclusively high-temperature anti-friction bearing grease for front wheel hubs. Generally renew complete grease charge of front wheel hub, since a mixture of anti-friction bearing grease or multi-grade grease must be absolutely prevented. If, in exceptional cases, high-temperature anti-friction bearing grease is not available, multi-grade grease (refer to Specifications for service products, page 267) may be used.

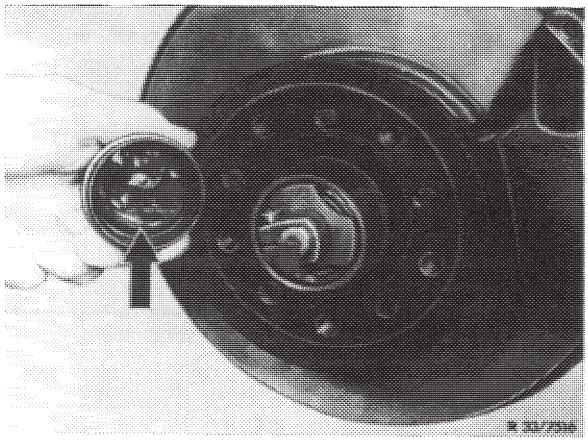
1 Jack up vehicle, remove front wheel.

2 Pull off wheel cap (8f) with tool (89).

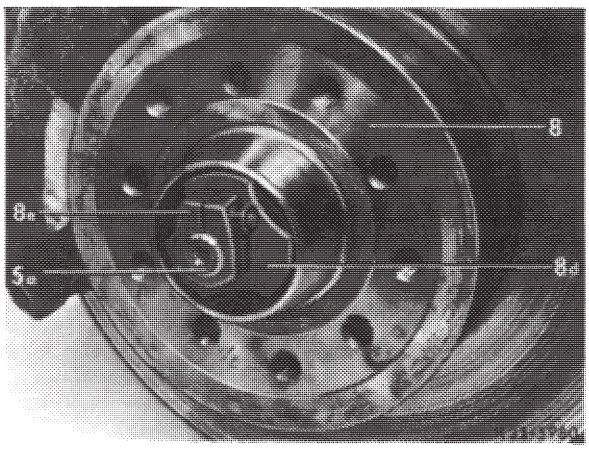


3 Remove contact spring for radio suppressor.

4 Push brake pads away from brake disc (42–160).

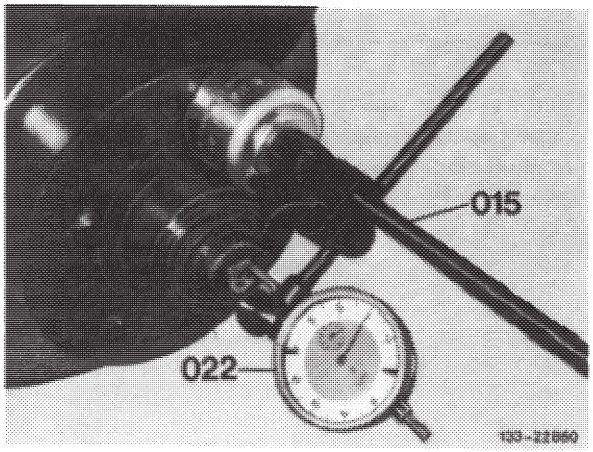


5 Loosen hex. socket screw of clamping nut (8e), then tighten clamping nut while simultaneously rotating hub (8) so that the hub can be rotated with an effort, only. Then screw clamping nut back again for approx. 1/3 turn and loosen tension by a blow against kingpin (5a) with a plastic hammer.



6 Place tester (015) on front wheel hub and set dial gauge (022) to approx. 2 mm preload.

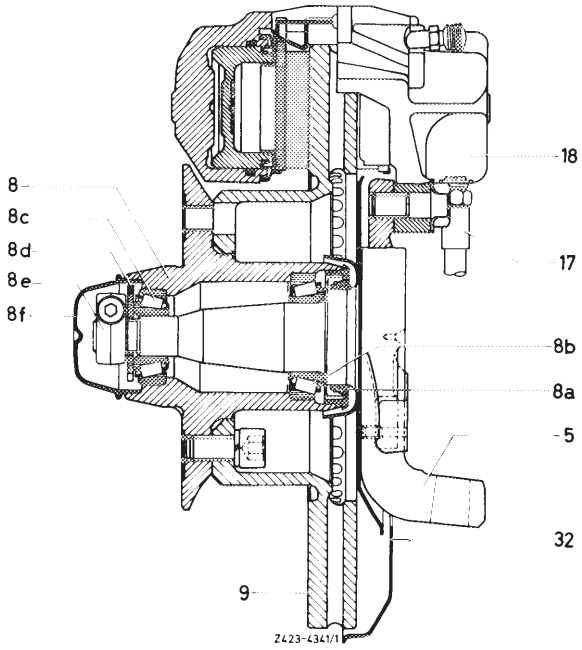
Note: For measuring wheel bearing play, the formerly valid tester (015), part no. 116 589 12 21 00 may also be used.



7 Check end play of wheel hub by pulling and pushing energetically on flange.

Rotate wheel hub several times each time prior to measuring.

Attention!
Do not rotate wheel hub while measuring.
Each rotary movement of wheel hub is indicated on dial gauge, so that accurate reading of actual end play would be impossible.



Front wheel hub

5	Steering knuckle	8e	Clamping nut
8	Wheel hub	8f	Wheel cap
8a	Radial sealing ring	9	Brake disc
8b	Tapered roller bearing inside	17	Brake hose
8c	Tapered roller bearing outside	18	Fixed caliper
8d	Washer	32	Cover plate

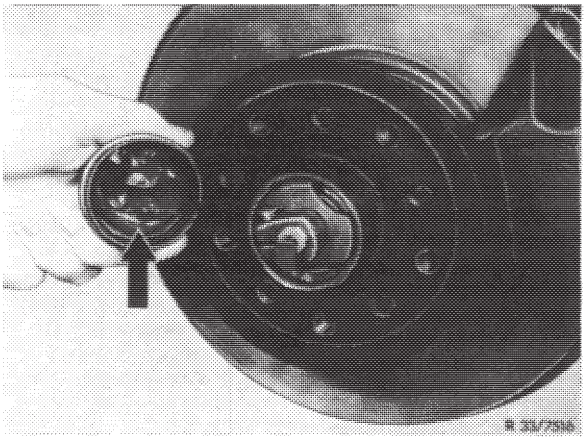
8 Tighten hex. socket screw of clamping nut and check end play once again.

Note: With wheel bearing end play correctly adjusted, the washer located between the outer tapered roller bearing and the clamping nut should just barely permit turning by means of finger. Always adjust wheel bearing end play with dial gauge.

9 Complete additional checkup by turning washer between inner race of outer tapered roller bearing and clamping nut.

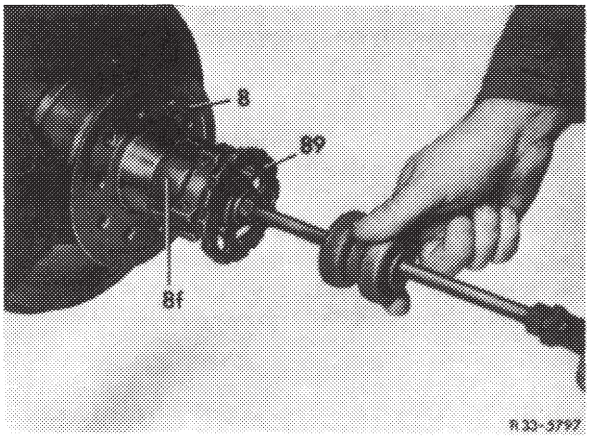
10 Insert contact spring for radio suppressor.

11 Fill wheel hub with specified grease up to approx. edge of bead.



12 Press-on wheel cap with installer (89).

13 Mount front wheel, lower vehicle.



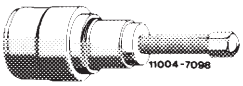
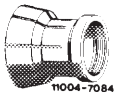
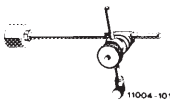
Lubricant

Quantity	Into wheel cap: Grease quantity approx. 20 g (about up to edge of bead)
Series fillup:	Anti-friction bearing grease (refer to Specifications for service products sheet 265)
Repair fillup:	High-temperature anti-friction bearing grease (refer to Specifications for service products sheet 265.1)[1])

[1]) Available in 150 gr. screw cans, part no. 000 989 49 51.

Tightening torques	Nm
Hex. bolts for brake caliper	115
Hex. socket screw of clamping nut	20

Special tools

Remover and installer for wheel cap		 11004-7127	116 589 22 33 00
Impact puller for front wheel hub		 11004-7110	201 589 10 33 00
Puller for tapered roller bearing inner race	basic tool	 11004-7098	001 589 36 33 00
	collet	 11004-7084	000 589 01 34 00
Holder for dial gauge to adjust wheel bearing end play		 11004-10150	363 589 02 21 00

Conventional tool

Dial gauge A 1 DIN 878	e.g. made by Mahr, D–7300 Esslingen order No. 311 000

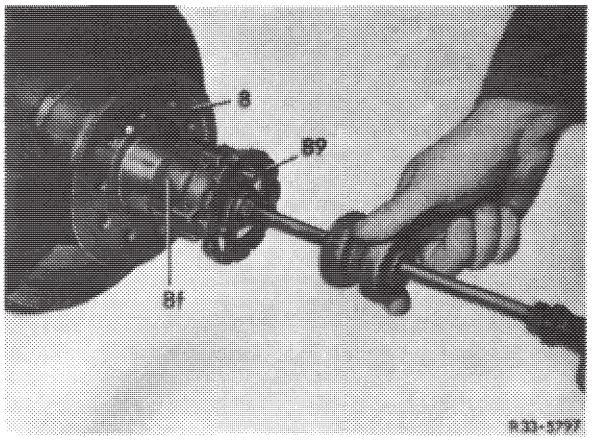
Note

In the event of repairs, from now on use exclusively high-temperature anti-friction bearing grease for front wheel hubs. Generally renew complete grease charge of front wheel hub, since a mixture of anti-friction bearing grease or multi-grade grease must be absolutely prevented. If, in exceptional cases, high-temperature anti-friction bearing grease is not available, multi-grade grease (refer to Specifications for service products, page 267) may be used.

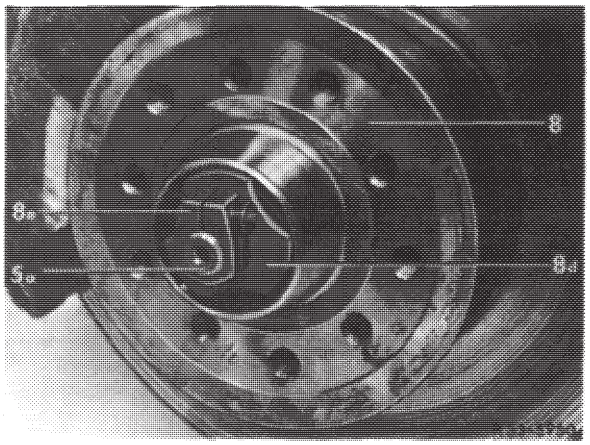
Removal

1 Remove fixed caliper (42–100).

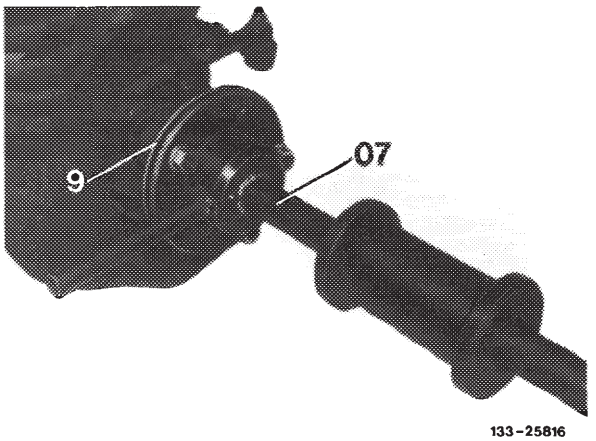
2 Pull wheel cap from front wheel hub with pertinent tool (89).



3 Remove contact spring for radio suppressor. Loosen hex. socket screw of clamping nut (8e) on kingpin, unscrew clamping nut and remove washer (8d).



4 Pull off front wheel hub with impact puller if required.



133-25816

5 Additional jobs if tapered roller bearing inner race is stuck on steering knuckle:

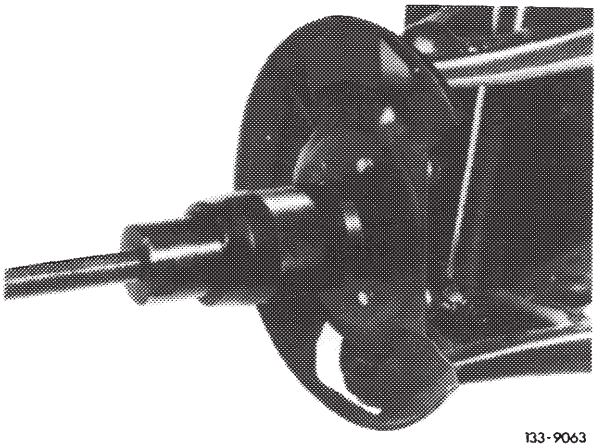
a) Pull tapered roller bearing inner race from steering knuckle.

b) Remove radial seal from steering knuckle.

6 Check kingpin (33–410).

7 Check front wheel hub, tapered roller bearing and radial sealing ring (33–320).

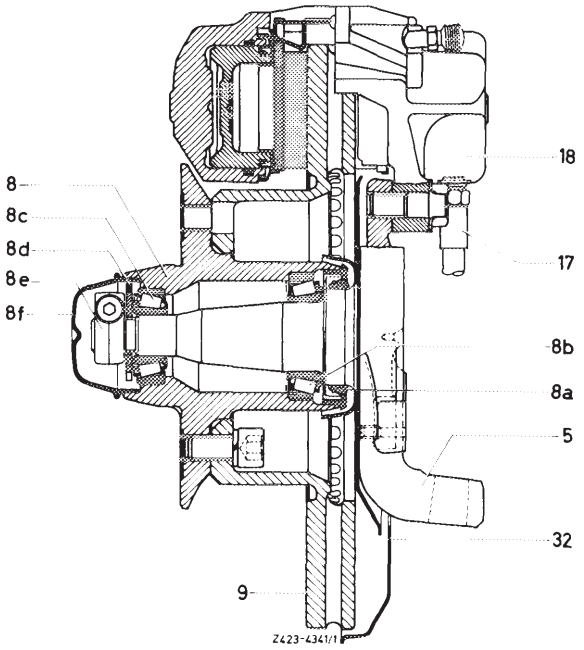
8 Check brake disc (42–220).



133-9063

Installation

9 If required, install tapered roller bearing inner race of inside tapered roller bearing and radial sealing ring in front wheel hub (33–320).



Front wheel hub

5	Steering knuckle	8e	Clamping nut
8	Wheel hub	8f	Wheel cap
8a	*Radial sealing ring*	9	Brake disc
8b	Tapered roller bearing inside	17	Brake hose
8c	Tapered roller bearing outside	18	Fixed caliper
8d	Washer	32	Cover plate

10 Coat running surface for radial sealing ring on kingpin thinly with grease.

11 Push wheel hub on kingpin, insert inner race with roller cage of outside tapered roller bearing. Mount washer and fit clamping nut.

12 Adjust wheel bearing end play (33–300).

13 Fasten fixed caliper with new locking plate or self-locking hex. head fitted screws to steering knuckle (42–100).

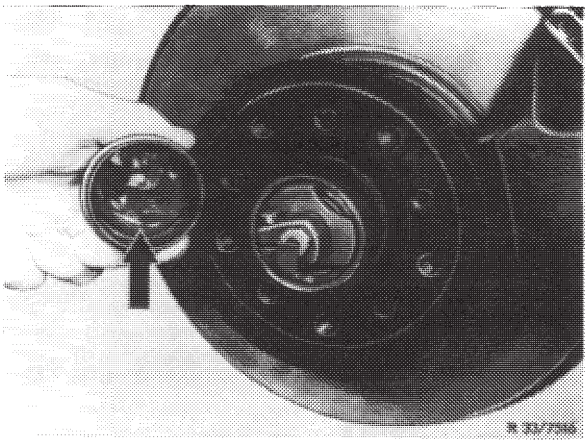
Attention!
Do not twist brake hose and do not expose to tensile stress!

14 Insert contact spring for radio suppressor.

15 Fill wheel cap with specified anti-friction bearing grease.

16 Attach wheel cap with pertinent tool.

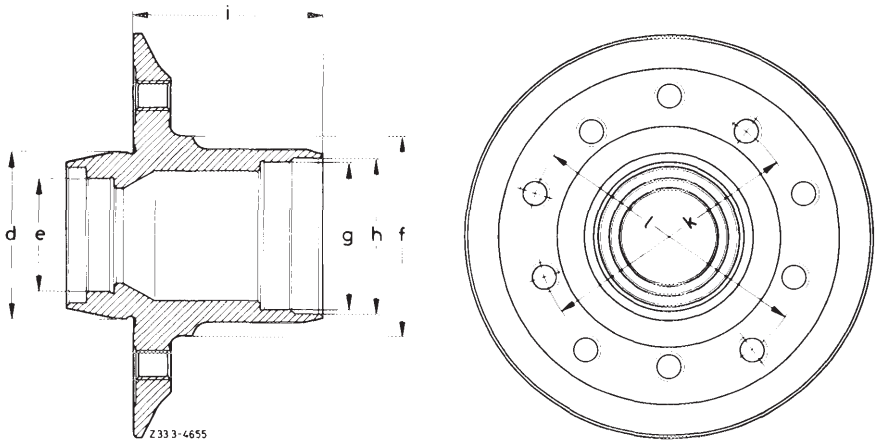
17 Mount front wheel, lower vehicle.



Data

Front wheel hub — Model	114, 115 1st version[1])[3])	114, 115 2nd version[2])[3])
Bolthole circle dia. "k" for attachment of brake disc	88.5	104
Bolthole circle dia. "l" for attachment of disc wheel	112	
Flange distance "i"	73	75
Fitting "f" for brake disc	69.50 / 69.47	79.97 / 80.00
Permissible lateral play at the flange	0.03	
Permissible vertical play at the disc wheel centre "d"	0.05	
Fitting "h" for radial sealing ring	62^{H8}	

[1]) Standard equipment on models 114, 115 until June 1971.
[2]) For models 114, 115 standard equipment from July 1971. Replacement for 1st version.
[3]) Front wheel hubs with the same flange distance on the left and right should be installed on one and the same vehicle if possible.



Front wheel hub
1st and 2nd version

Designation	Identification	Part no.	Remarks
Tapered roller bearings[1])			
Inner tapered roller bearing "g"	LM 670 48/10	000 981 58 05	–
Outer tapered roller bearing "e"	LM 119 49/10	000 981 59 05	
Radial sealing ring			
For front wheel hub	46 x 62 x 10/8	005 997 50 46	Radial sealing ring with sealing lip and additional dust lip. During assembly, fill space between sealing lip and dust lip with specified grease.

[1]) The bearing inner races are mounted on wheel spindle at a sliding fit or a light force fit. In the event of repairs, a radial play of 0.03 mm on inner bearing and of 0.025 mm on outer bearing between bearing inner race and wheel spindle is still permitted. If the play is larger, there is a possibility to eliminate this play during assembly by applying "Omnifit Type 80 red M or H" with activator (combination pack part no. 002 989 69 71) or Loctite 640 (part no. 002 989 20 71). For details, refer to respective instructions.

[2]) Special version of tapered roller bearings. In the event of repairs, pay attention to part no.

Lubricant

Quantity	Total capacity	approx. 70 g	Suitably, weigh full capacity prior to starting assembly of front wheel hub.
	In hub with bearing	approx. 50 g	Fill roller cages or tapered roller bearings well with grease. Also provide grease for roller faces.
	In wheel cap	approx. 20 g	Fill approx. up to edge of bead.
Series fillup:	Anti-friction bearing grease (refer to Specifications for service products page 265)		
Series fillup:	High-temperature anti-friction bearing grease (refer to Specifications for service products page 265.1)[1])		

[1]) Available in 150 gr. screw cans, part no. 000 989 49 51.

Special tools

Fixture for pressing on the outer bearing races and the radial sealing ring	201 589 01 43 00
Puller for outer bearing race of inner tapered roller bearing	201 589 00 33 00
Removal punch for outer bearing race of outer tapered roller bearing	116 589 04 15 00
Holder for dial gauge to adjust wheel bearing end play	363 589 02 21 00

Conventional Tools

Dial gauge A 1 DIN 878	e.g. Messrs. Mahr, D-7300 Esslingen order No. 311 000

Note

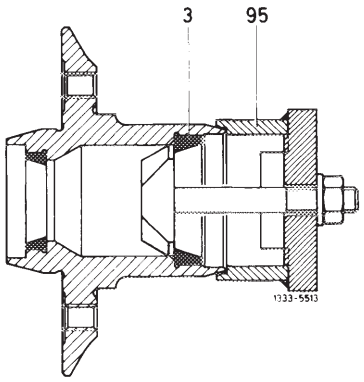
In the event of repairs, from now on use exclusively high-temperature anti-friction bearing grease for front wheel hubs. Generally renew complete grease charge of front wheel hub, since a mixture of anti-friction bearing grease or multi-grade grease must be absolutely prevented. If, in exceptional cases, high-temperature anti-friction bearing grease is not available, multi-grade grease (refer to Specifications for service products, page 267) may be used.

Disassembly

1 Remove inner race and roller cage of outer tapered roller bearing from the hub.

2 Remove radial sealing ring and take inner race and roller cage of inner tapered roller bearing out of the hub.

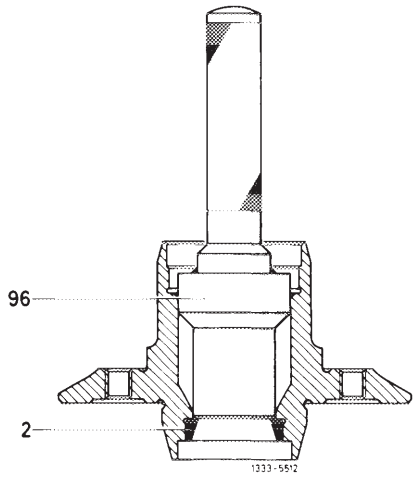
3 Remove the outer race of the inner tapered roller bearing using the puller.



3 Outer race of inner tapered roller bearing
95 Puller

4 Push the outer race of the outer tapered roller bearing out of the hub using the removal punch.

5 Separate front wheel hub from the brake disc (42–220).



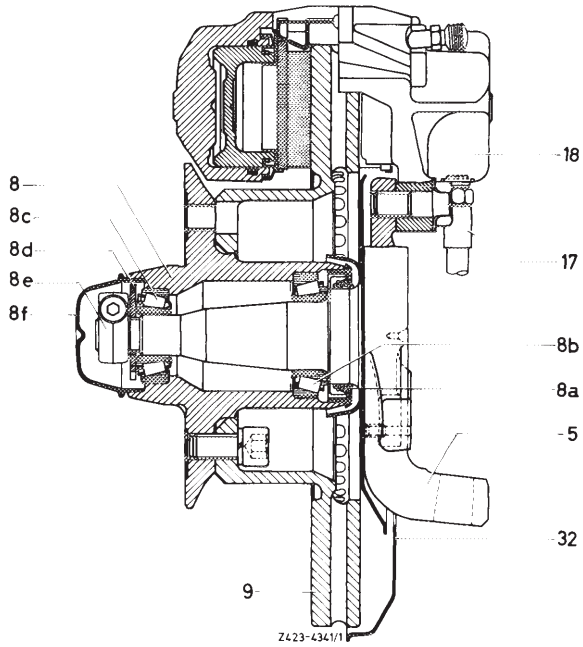
2 Outer race of outer tapered roller bearing
96 Removal punch

6 Check flange of front wheel hub for runout (see data).

7 Check the threaded holes for the wheel mounting.

8 Check tapered roller bearings and bearing seats in the hub.

9 Check and if necessary replace the disc (8d) which is ground on both sides.



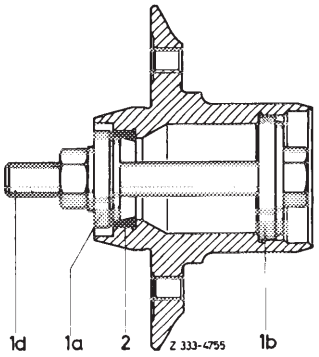
Front wheel hub

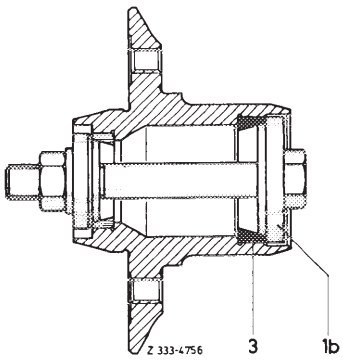
5 Steering knuckle
8 Wheel hub
8a Radial sealing ring
8b Tapered roller bearing, outside
8c Tapered roller bearing, inside
8d Disc
8e Clamping nut
8f Hub grease cap
9 Brake disc
17 Brake hose
18 Fixed caliper
32 Cover plate

Assembly

10 Using the special tool, press the outer races of the tapered roller bearings into the front wheel hub individually.

1a Pressure plate for outer race of outer tapered roller bearing
1b Pressure plate for outer race of inner tapered roller bearing
1d Bolt with washer and hex. nut
2 Outer race for outer tapered roller bearing



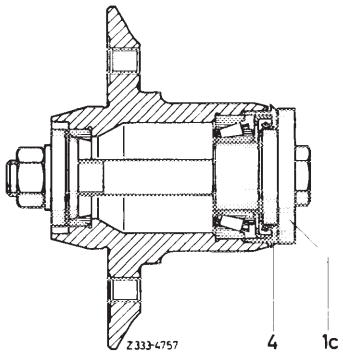


1b Pressure plate for outer race of inner tapered roller bearing
3 Outer race of inner tapered roller bearing

11 Fill hub cap with specified grease approx. up to edge of bead.

12 Fill roller cage of inner tapered roller bearing well with grease, insert inner race with roller cage into the hub and apply grease to the roller faces.

13 Fill the radial sealing ring with grease between the sealing lip and the dust lip, then press in using special tool.



1c Pressure plate for radial sealing ring
4 Radial sealing ring

14 Fill the front wheel hub with the remaining grease.

Note: If too much grease is used, the filling action causes the grease to overheat and it can loose its lubricating properties. The amount of grease must however not be too small, otherwise the tapered roller bearings might not be properly lubricated.

15 Install the brake disc (42–220).

16 Check the condition of the running surface for the radial sealing ring on the steering knuckle.

Tightening torques	Nm
Hex. bolts of steering knuckle arm	80
Hex. nut of guide joint	60
Hex. nut of supporting joint	80
Self-locking hex. screw for fastening rpm sensor to steering knuckle	8

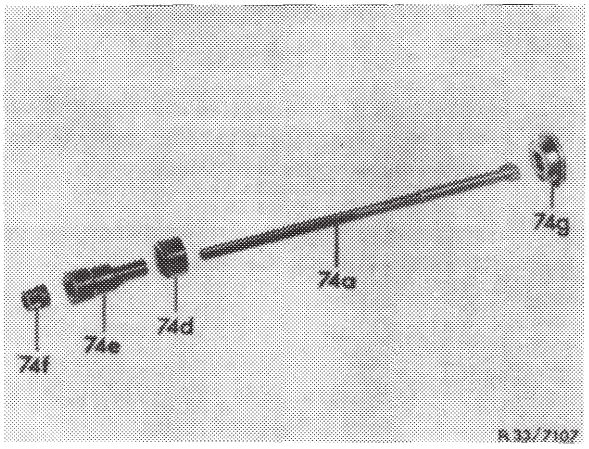
Special tools

Spring tensioner for front spring	107 589 03 31 00
Remover for supporting and guide joint	115 589 02 33 00
Socket wrench insert 24 mm, 1/2" square drive for spring tensioner	116 589 01 09 00

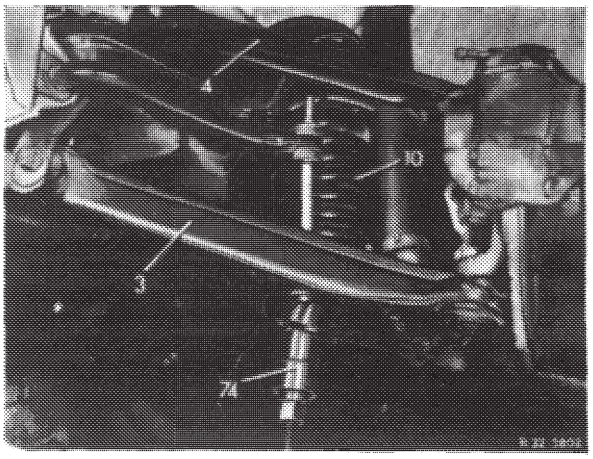
Notes

When the work is done above the pit, do not mount supports for jacking-up the vehicle as usual on frame floor, but outside under lower control arms. The front shock absorbers should remain installed.

If, for example when working on the lifting platform, the lower control arm cannot be supported, secure by inserting spring tensioner (74).



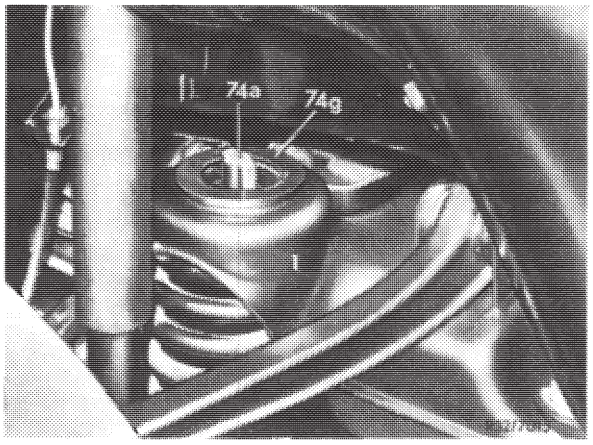
74a Tensioning bolt
74d Lower thrust piece
74e Guide bushing
74f Collar nut
74g Upper thrust piece



3 Lower control arm
4 Upper control arm
10 Front spring
74 Spring tensioner

For this purpose, place the additional plate of spring tensioner against spring dome of front axle carrier. In such a case, the shock absorber can also be removed.

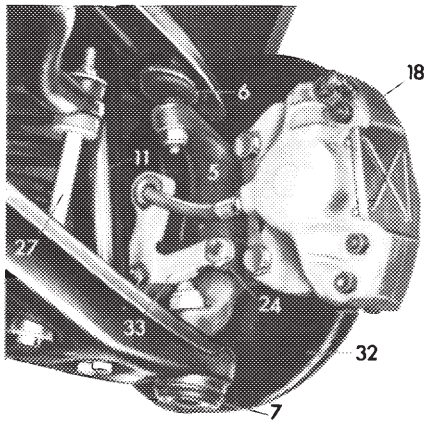
Never loosen the hex. nuts of the guide joint and the supporting joint with the shock absorber removed without inserting the spring tensioner.



1 Front axle carrier
74a Tensioning bolt
74g Clamp plate

Removal

1 Unscrew steering knuckle arm from steering knuckle.

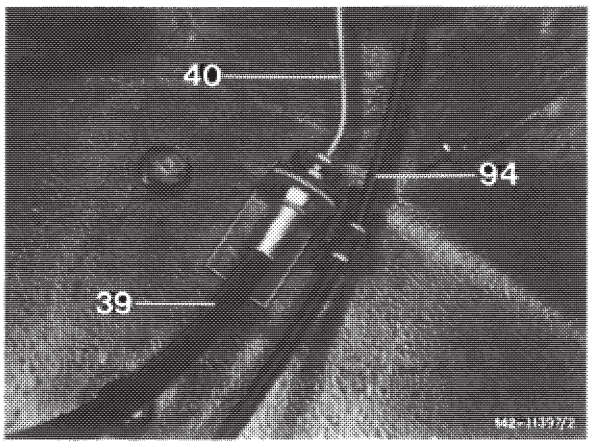


R 32-5609

5 Steering knuckle
6 Guide joint
7 Supporting joint
11 Front shock absorber
18 Fixed caliper
24 Steering knuckle arm
27 Torsion bar connecting linkage
32 Cover plate
33 Holder for brake hose

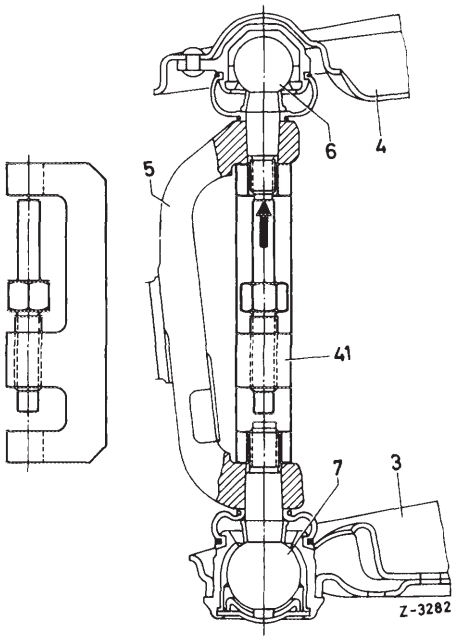
2 Separate brake line and brake hose from each other. Close connections with rubber plugs.

3 Remove fixed caliper (42–100).



4 Unscrew hex. nut on supporting joint (7) and on guide joint (6).

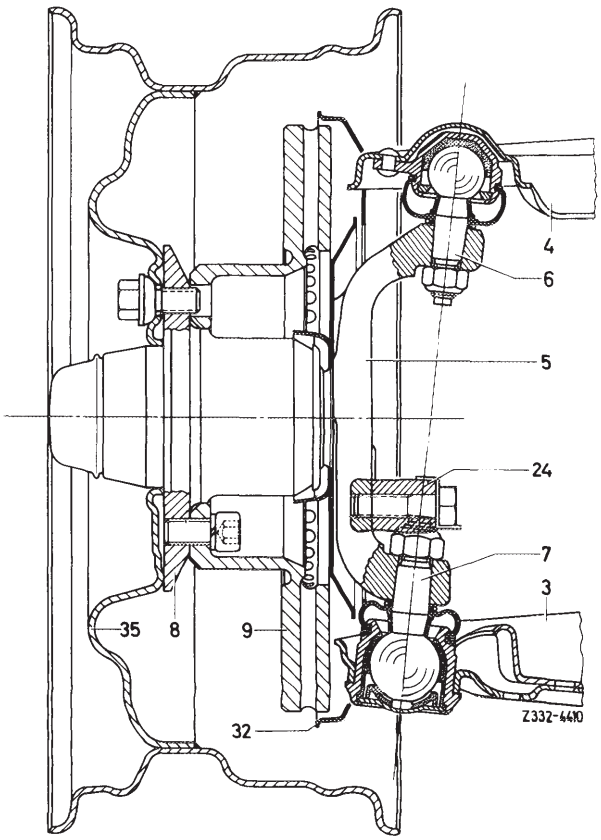
5 Remove supporting joint and guide joint with remover (41) from steering knuckle. Remove steering knuckle.



3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
41 Remover

Installation

6 Attach upper and lower control arm to steering knuckle. Make sure that the seats of the ball pins for the supporting and guide joint are kept free of grease.

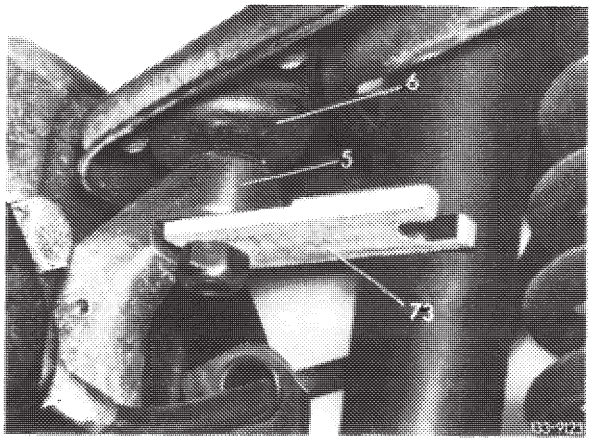


Steering knuckle bearings

3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
8 Front wheel hub
9 Brake disc
24 Steering knuckle arm
32 Cover plate
35 Disc wheel

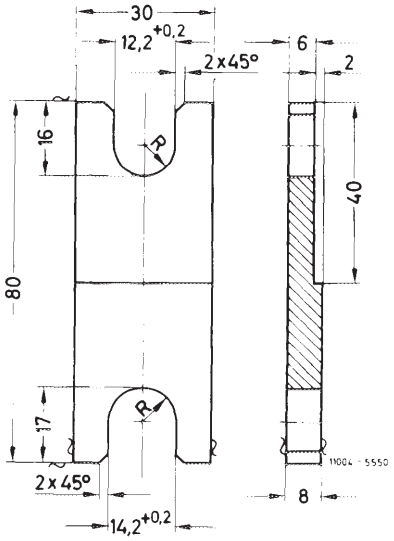
7 If the ball pin on the guide or supporting joint keeps turning when the hex. nut is being tightened, insert a spacing piece and pull the ball pin head into the steering knuckle by tightening the hex. nut.

Then loosen hex. nut, remove spacing piece and tighten hex. nut to the prescribed torque.



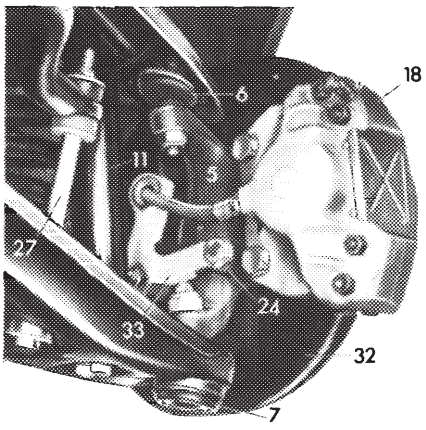
5 Steering knuckle
6 Guide joint
73 Spacing piece

The spacing piece can be self-made.



8 Install fixed caliper (18) (42–100).

9 Install steering knuckle arm using new holder for brake hose.



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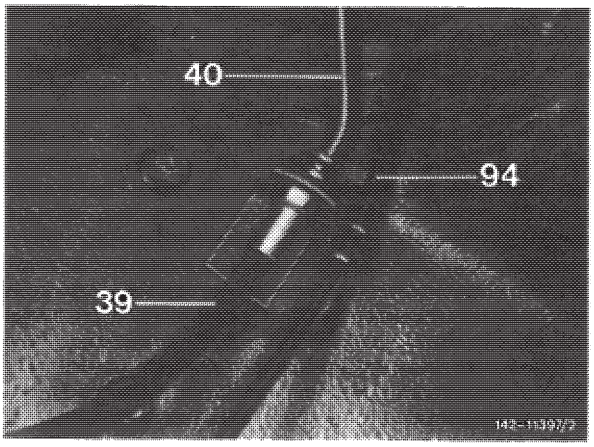
10 Connect brake line and brake hose to each other.



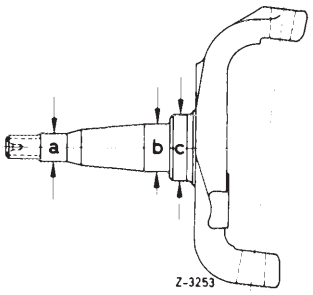
11 Bleed braking system (42–010).

12 Check wheel adjustment on front axle and correct, if required (40–320).

13 Check headlight adjustment.

Steering knuckle

Permissible runout of steering knuckle spindle on bearing seats		0.05
Min. steering knuckle spindle dia. in case of repair	Bearing seat "a"	19.04
	Bearing seat "b"	31.74
Min. dia. in case of repair of running surface "c" for radial sealing ring [1]		44.4



[1]) During factory assembly the steering knuckle spindle is provided with a return flow spiral on the running surface of the radial sealing ring. If the running surface requires re-machining in case of repair, the return flow spiral need not be provided again.

Conventional tools

Measuring stand	e.g. Messrs. Bosch, Stuttgart-Feuerbach Order No. 0 601 980 001
Dial gauge A 1 DIN 878	e.g. Messrs. Mahr, D-7300 Esslingen Order No. 311 000

Checking

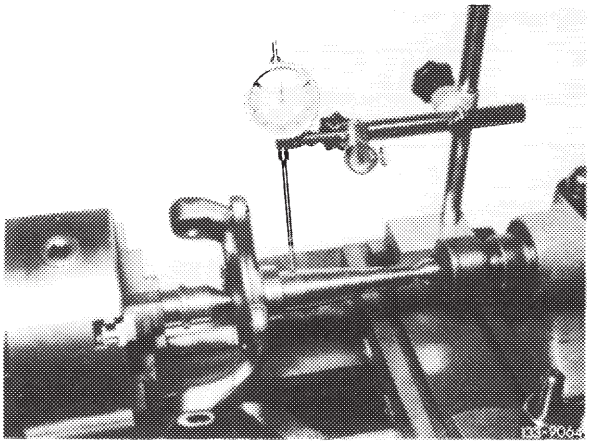
a) **Steering knuckle spindle**
(Steering knuckle installed)

1 Check the running surface for the radial sealing ring and the bearing seats on the steering knuckle spindle.

2 If necessary, re-machine the running surface, removing the steering knuckle from the vehicle. In this case the return flow spiral need not be provided again.

b) **Steering knuckle**
(Steering knuckle removed)

3 Take the steering knuckle up at the two centres between the ends and check runout of bearing seats.



Data

Model	Part no.	Code no.	Version	Remarks
114.000, 114.01, 114.02 115 1st version	115 332 22 20	522	left	Install steering knuckle arms in sets only
	115 332 23 20	523	right	
114.06, 114.07 114.00, 114.01, 114.02 115 2nd version	115 332 24 20	524	left	
	115 332 25 20	525	right	
107	107 332 02 20	0702	left	
	107 332 03 20	0703	right	

Tightening torques	Nm
Hex. head screws for fastening steering knuckle arm to steering knuckle	80
Hex. nut for fastening track rod to steering knuckle arm	35

Special tool

Puller for ball joint of track rod on steering knuckle arm	 11004-7226	186 589 10 33 00

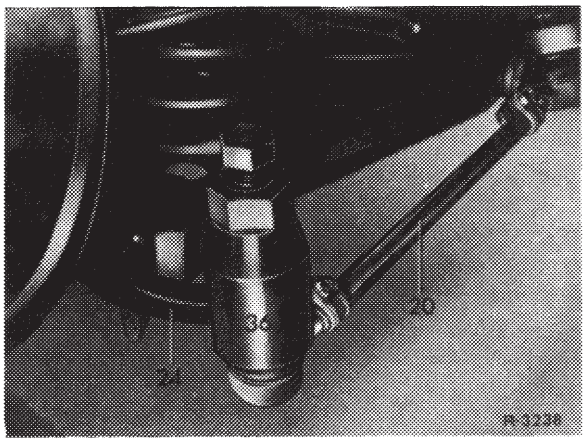
Conventional tool

Open double box end wrench 9 x 11	e.g. Hazet, D-5630 Remscheid Order no. 612

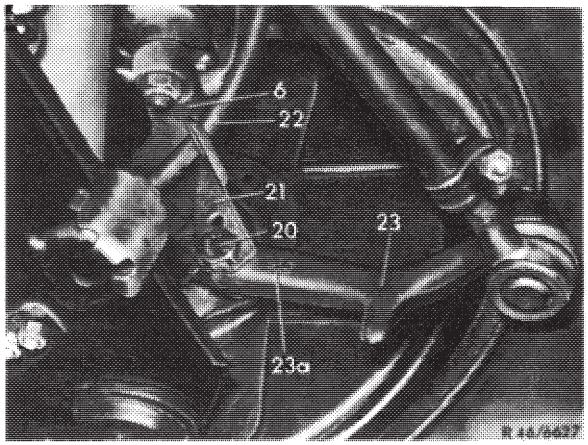
Removal

1 Uncotter castle nut of track rod and unscrew castle nut.

2 Force ball joint of track rod from steering knuckle arm with puller.

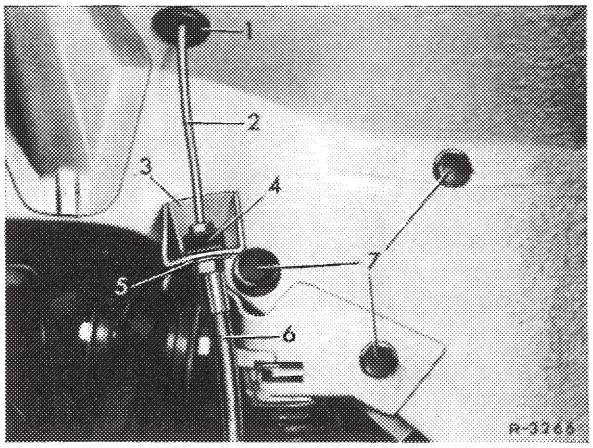


3 Unbend locking plate (21), unscrew hex. head screws (20) and remove steering knuckle arm (23).



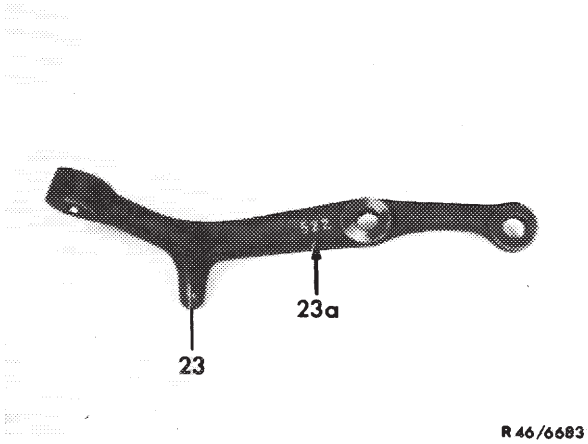
4 Loosen brake hose (6) on holder (3) from brake line (2) and take out of locking plate (5).

For loosening and tightening brake lines, use **conventional double box end wrench only.**



Checking

The steering knuckle arm cannot be checked with conventional shop equipment. **When in doubt,** particularly following an accident, install **new steering knuckle arms.** Pay attention to correct code number (23a) of steering knuckle arm.



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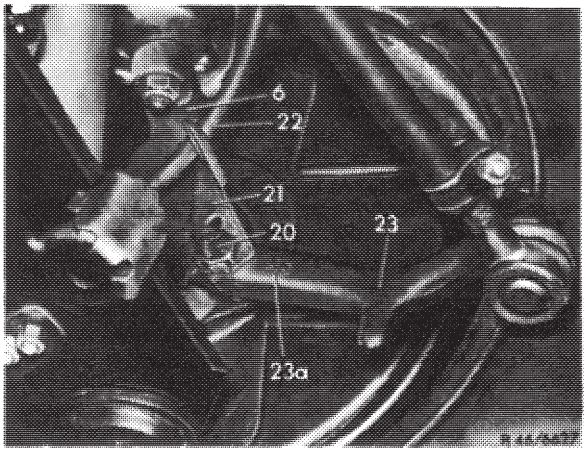
Installation

6 Fasten steering knuckle arm to steering knuckle (6) using a new holder (21). Tighten hex. head screws (20) to specified torque of 80 Nm and secure.

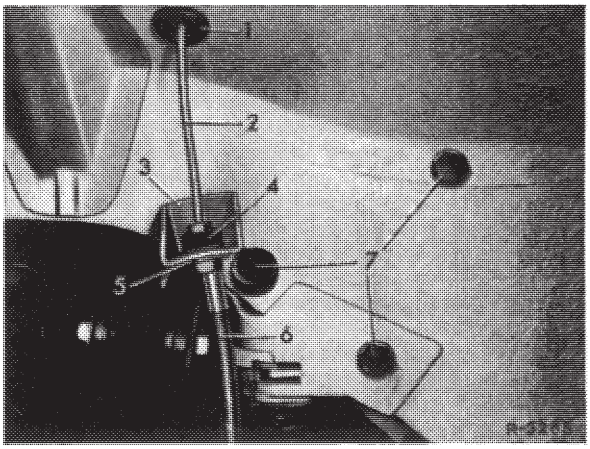
Note: On models 114.06 and 114.07 install only steering knuckle arms of second version with code number 524 or 525.

Also install only arms of one version into one and the same vehicle.

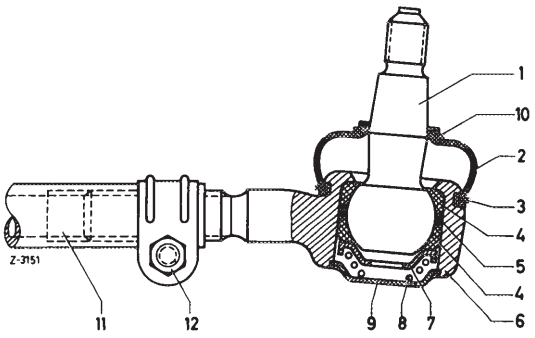


7 Guide brake hose (22) through bore in holder (21).

8 Fasten brake hose (6) to brake line (2). Make sure that the brake hose is inserted into locking plate in holder (3) in such a manner that it cannot wipe anywhere.



9 Check rubber sleeve (2) on ball pin of track rod. If rubber sleeve is damaged, renew ball joint (46–540). Fasten track rod to steering knuckle arm. Tightening torque of castle nut 35 Nm reference value. Cotter castle nut.



10 Bleed brake system (42–010).

11 Check wheel adjustment values on front axle (40–320).

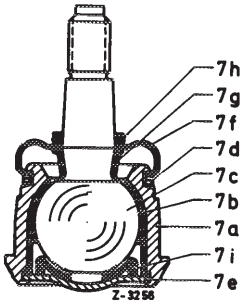
Notes

The supporting joint (bottom) and the guide joint (top) of the steering knuckle bearing are ball joints seated in plastic ball shells.

The housing of supporting joint is pressed into lower control arm, while the guide joint is connected to upper control arm by means of three round head rivets.

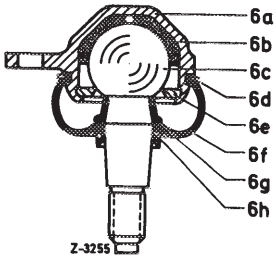
Supporting joint

7a Housing
7b Ball socket
7c Ball pin 35 mm dia.
7d Circlip
7e Washer
7f Boot
7g Support ring
7h Clamping ring
7i Lower ball socket



Guide joint

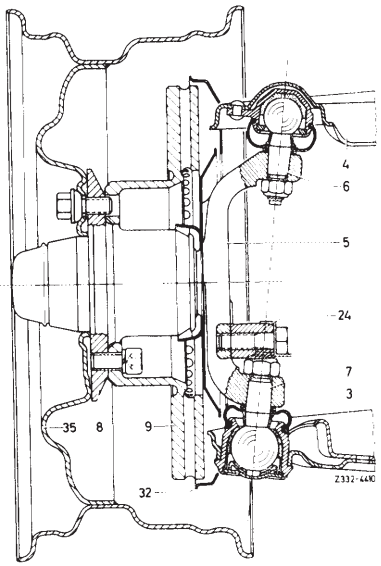
6a Housing
6b Ball socket
6c Ball pin 27 mm dia.
6d Circlip
6e Washer
6f Boot
6g Support ring
6h Clamping ring



The ball joints require no maintenance, i.e. they are filled with lubricant for life. On such a maintenance-free joint, sealing against the entry of dirt and sand is of vital importance for the service life. For this reason it is necessary to check the ball joints from time to time. If the boot is leaking, dirt is bound to enter during operation and will cause premature wear of the ball joint. A rubber boot which has been damaged during assembly, for example, must be replaced at once. A ball joint which has already been in operation with a leaking boot must always be replaced or the relevant control arm must be exchanged for another.

On a defective guide joint replace complete upper control arm on principle, since subsequent rivetting or screwing-on of joint is not possible.

In order to check the ball pins for distortion during accident repairs, see 33–560 or 33–570, "Checking upper and lower control arm".



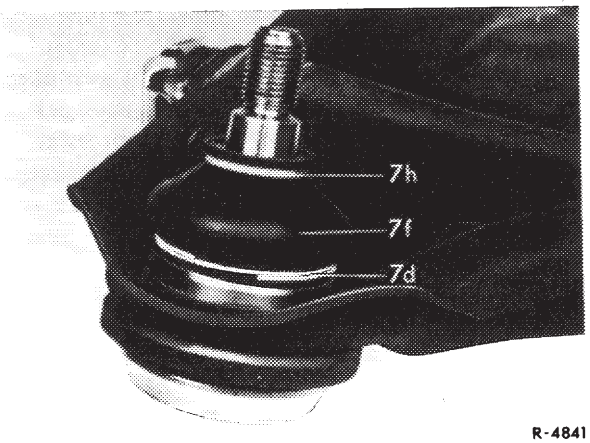
3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
8 Front wheel hub
9 Brake disc
24 Steering knuckle arm
32 Cover plate
35 Disc wheel

Checking

1 Push an approx. 150 mm long tube over the ball pin. If the joint is in good order, the ball pin can be moved back and forth smoothly without sticking. If there is too much free play, only jerky movement or a grinding noise, the joint or the control arm must be replaced.

2 Check supporting joint for tight seating in lower control arm, and connection of guide joint in upper control arm.

3 Check rubber boots (6f and 7f) for cracks and damage, check circlips (6d and 7d) and tension rings (6h and 7h) for correct seating.



Supporting joint

7d Circlip
7f Boot
7h Tension ring

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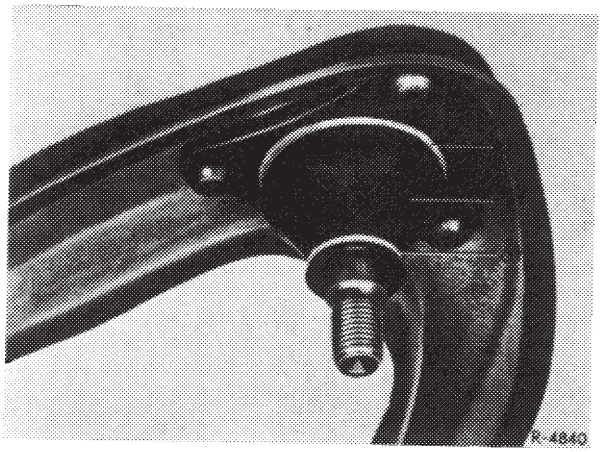


Guide joint

6d Circlip
6f Boot
6h Tension ring

Lubricants

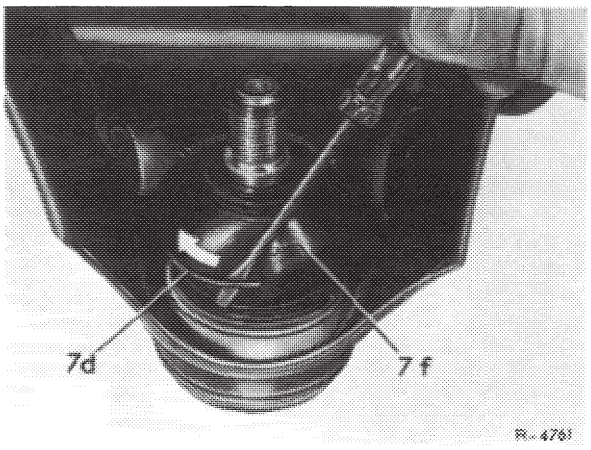
	Amount of grease	Type of grease
Supporting joint	approx. 10 cm^3 (9 gr)	Longterm grease, see "Specifications for service products", page 266.2
Guide joint	approx. 8 cm^3 (7 gr)	

Notes

Replace damaged boots only during assembly jobs. **Never replace damaged or leaking boots on joints already in use.** In such a case, be sure to replace the joint or the pertinent control arm.

Removal

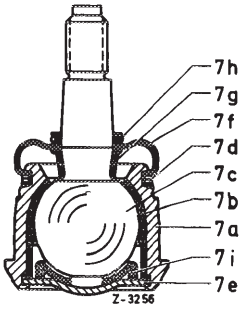
1 Lift circlip at one end with a screw driver and remove in direction of arrow.



7d Circlip
7f Boot

Supporting joint

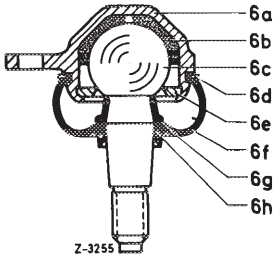
7a Housing
7b Ball shell
7c Ball pin
7d Circlip
7e Washer
7f Boot
7g Supporting ring
7h Clamping ring
7i Lower ball socket



2 Remove used grease from ball joint.

Guide joint

6a Housing
6b Ball socket
6c Ball pin
6d Circlip
6e Washer
6f Boot
6g Supporting ring
6h Clamping ring



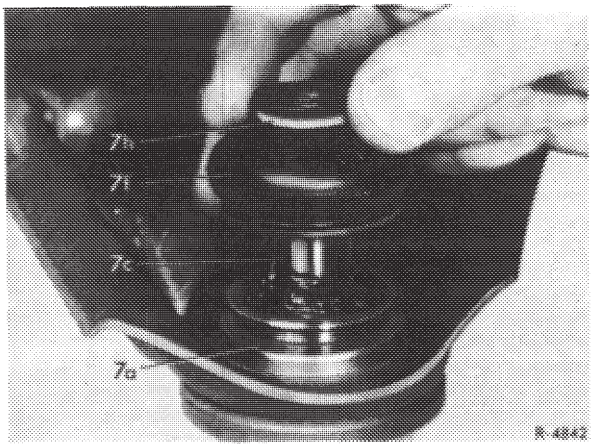
Installation

3 Fill space between housing and ball pin with fresh grease.

4 Place ball pin in vertical position and mount new boot with clamping ring inserted.

Supporting joint

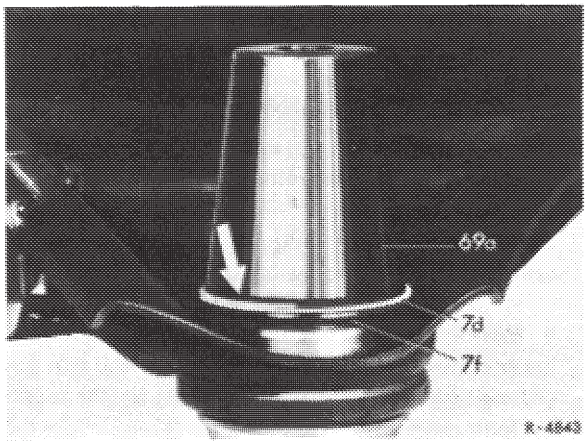
7a Housing
7c Ball pin
7f Boot
7h Clamping ring



5 Slide circlip (7d) on suitable assembly boot (69a) in such a manner that the cylindrical portion of the boot (refer to arrow) is attained.

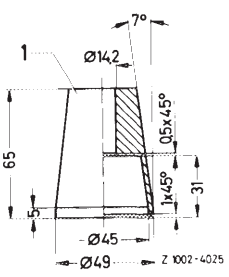
6 Place assembly boot on supporting or guide joint in such a manner that the groove for the seat of the circlip on sleeve remains just free. Then slide circlip on sleeve of joint.

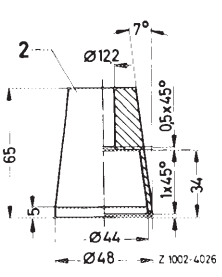
7 Check seat of installed sleeve.



Self-made assembly sleeves

1 Assembly sleeve for supporting joint
2 Assembly sleeve for guide joint





Supporting joint for repair

Part No.	Supporting joint		max. permissible dia. of bore for supporting joint in control arm
	Housing dia.	Marking compared with standard joint	
115 333 11 27	$\frac{48.45}{48.30}$ [1]	White housing cover	48.0

[1] Diameter of standard joint $\frac{48.05}{47.90}$ mm.

Special tools

Removal and installation tool for supporting joint	107 589 01 43 00

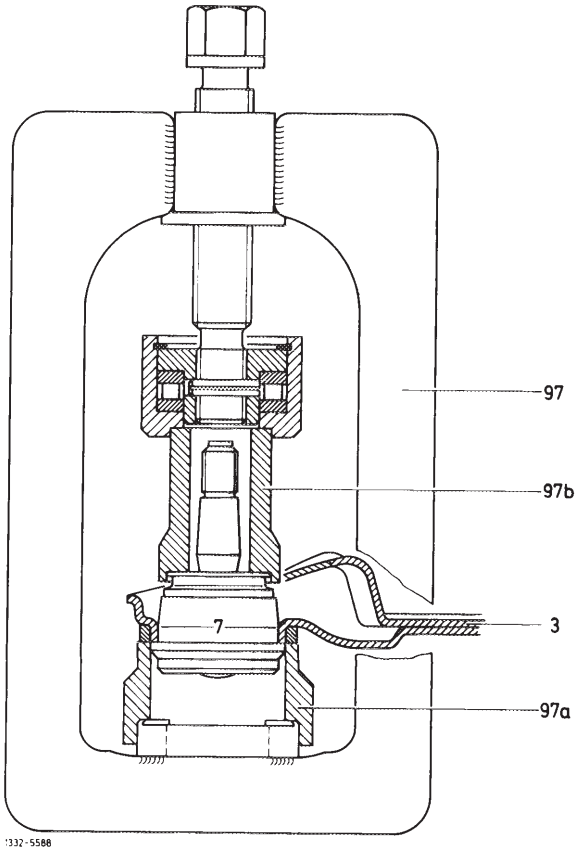
Removal

1 Remove steering knuckle (33–400).

2 Take off supporting joint boot (33–430).

3 Press supporting joint out of the control arm using the removal and installation tool.

4 Measure the bore for the supporting joint in the lower control arm. It must not exceed 48.0 mm across or longitudinally, otherwise a tight fit for the supporting joint cannot be guaranteed.

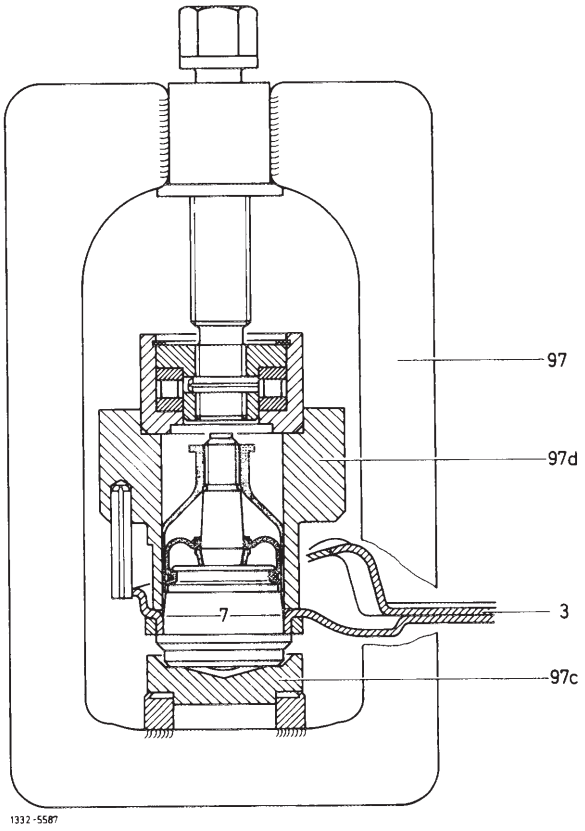


3 Lower control arm
7 Supporting joint
97 Removal and installation tool
97a Lower control arm support
97b Thrust piece for pressing out

Installation

5 Press the supporting joint into lower control arm using installation tool. Take care that pressure is applied vertically and no tilting takes place.

6 Install steering knuckle (33–400).



3 Lower control arm
7 Supporting joint
97 Removal and installation tool
97c Lower control arm support
97d Thrust piece for pressing in

Tightening torques	Nm
Hex. nut for supporting joint	80
Hex. nut for guide joint	60
Hex. bolts of upper control arm bearing	60
Hex. bolts for steering knuckle arm	80
Self-locking hex. head screw for fastening rpm sensor to steering knuckle	8

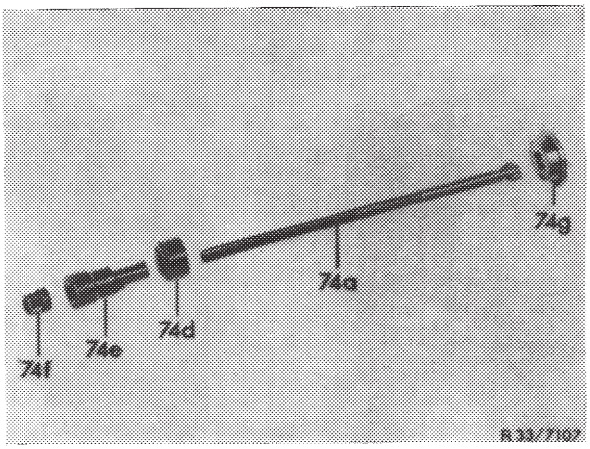
Special tools

Spring tensioner for front spring	107 589 03 31 00
Remover for supporting and guide joint	115 589 02 33 00
Socket wrench insert 24 mm, 1/2" square drive for spring tensioner	116 589 01 09 00

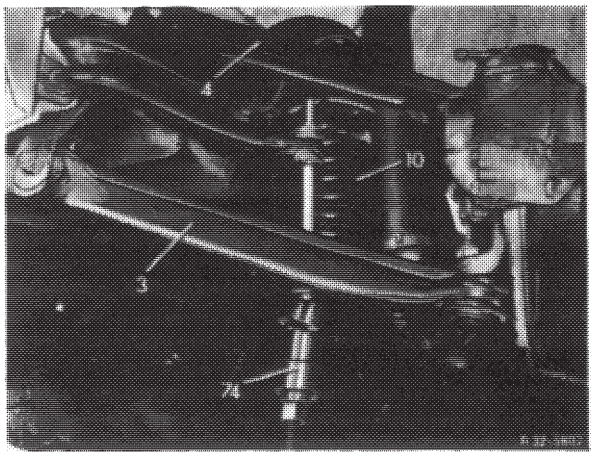
Notes

When the work is done above the pit, do not mount supports for jacking-up the vehicle as usual on frame floor, but outside under lower control arms. The front shock absorbers should remain installed.

If, for example when working on the lifting platform, the lower control arm cannot be supported, secure by inserting spring tensioner (74).



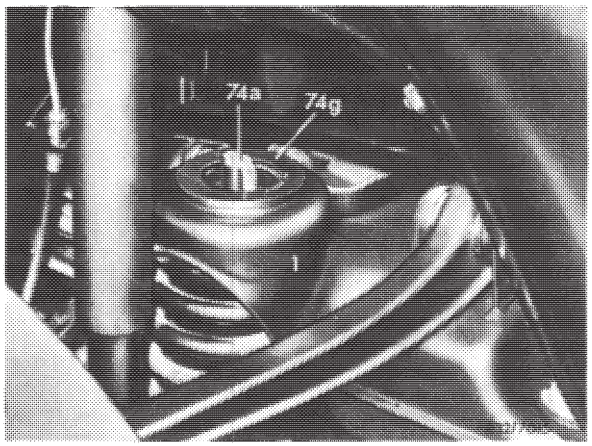
74a Tensioning bolt
74d Lower thrust piece
74e Guide bushing
74f Collar nut
74g Clamp plate



3 Lower control arm
4 Upper control arm
10 Front spring
74 Spring tensioner

For this purpose, place the additional plate of spring tensioner against spring dome of front axle carrier. In such a case, the shock absorber can also be removed.

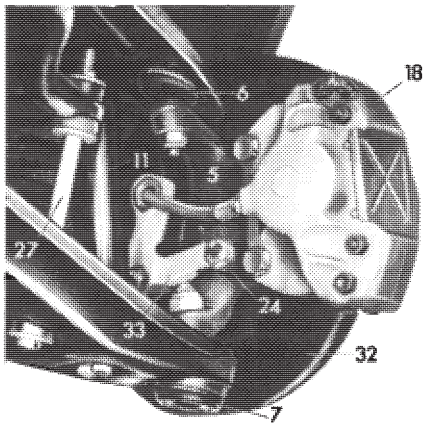
Never loosen the hex. nuts of the guide joint and the supporting joint with the shock absorber removed without inserting the spring tensioner.



1 Front axle carrier
74a Tensioning bolt
74g Clamping plate

Removal

1 Unscrew steering knuckle arm from steering knuckle.



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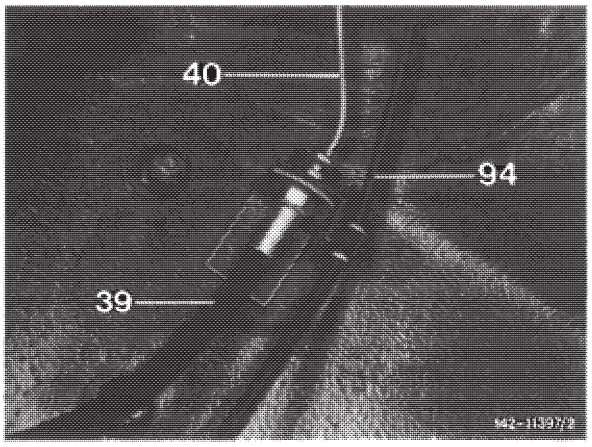
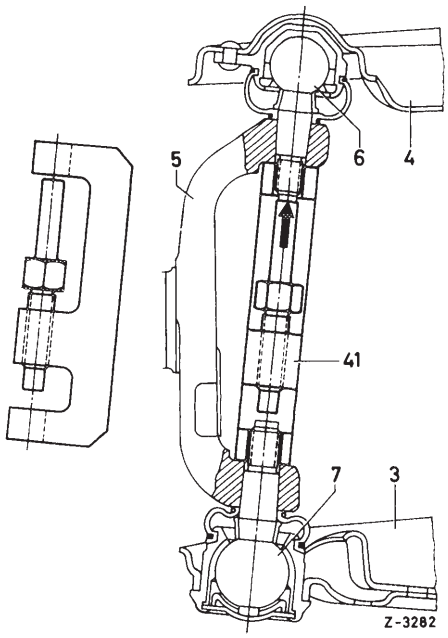
5 Steering knuckle
6 Guide joint
7 Supporting joint
11 Front shock absorber
24 Steering knuckle arm
27 Torsion bar connecting linkage
32 Cover plate for front wheel brake
33 Holder for brake hose

2 Separate brake line (40) and brake hose (39) from each other, close connections with rubber plugs.



3 Unscrew hex. nut on guide joint (6) and on supporting joint (7). Remove guide joint from steering knuckle with remover (41).

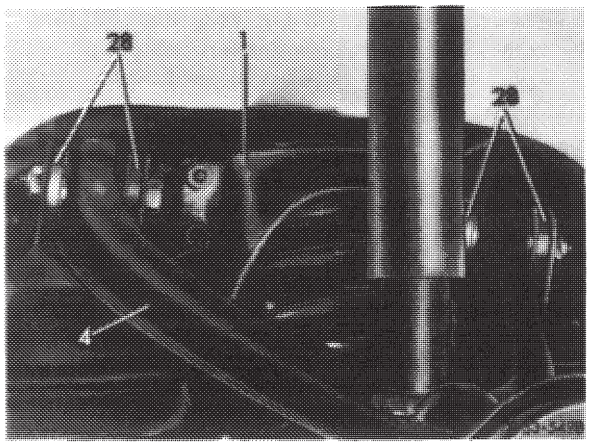


3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
41 Remover

4 Unscrew both hex. nuts of the upper control arm mounting and remove control arm.

Installation

5 Attach upper control arm to front axle carrier. During insertion, make sure that the sealing lips of the rubber slide bearings are not damaged.



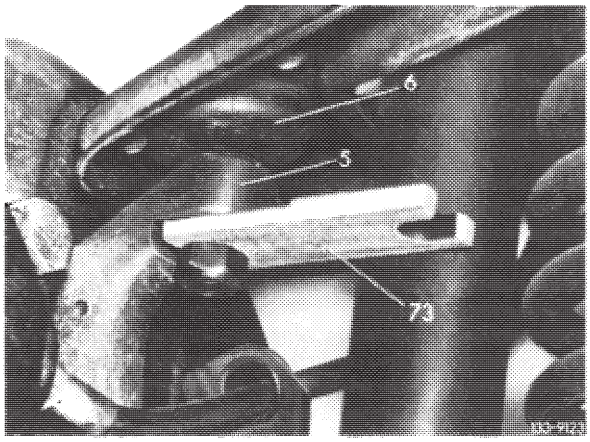
1 Front axle carrier
4 Upper control arm
28 Rubber slide bearing

Caution! Mount **the front bolt** of the two hex. bolts always **from the rear in forward direction, the rear bolt from the front in rearward direction.**

6 Attach guide and supporting joint to steering knuckle. Make sure that the seats of the ball pins for the guide and supporting joint are free of grease.

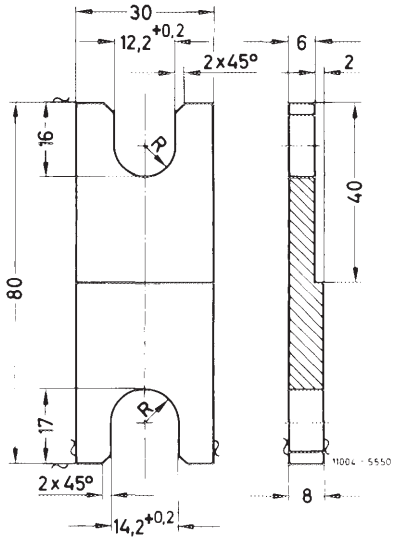
7 If the ball pin on the guide or supporting joint keeps turning when the hex. nut is being tightened, insert a spacing piece and pull the ball pin cone into the steering knuckle by tightening the hex. nut.

Then loosen hex. nut, remove spacing piece and tighten nex. nut to the prescribed torque.

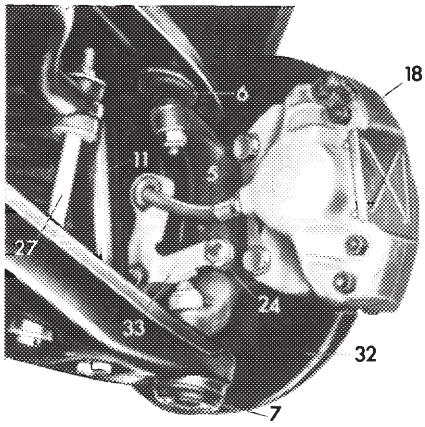


5 Steering knuckle
6 Guide joint
73 Spacing piece

The spacing piece can be self-made.



8 Install steering knuckle arm using new holder for brake hose.



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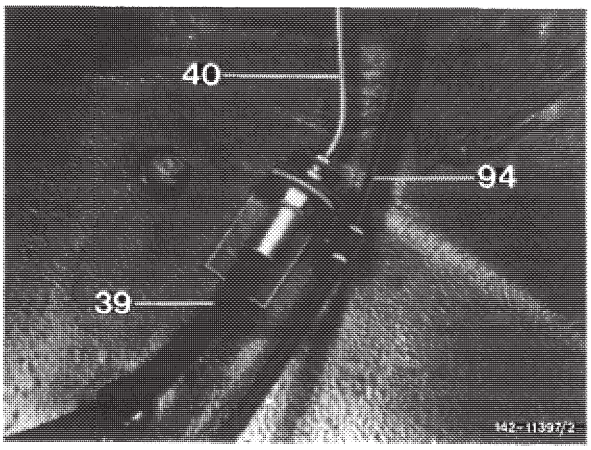
9 Connect brake line and brake hose to each other.

10 Bleed braking system (42–010).

11 Check wheel adjusting values on front axle (40–320).

12 Check headlight adjustment.



Tightening torques	Nm
Hex. nut for guide joint	60
Hex. nut for supporting joint	80
Hex. bolts for steering knuckle arm	80
Hex. nuts of cam bolts for lower control arm bearing	120
Hex. nut of lower shock absorber suspension	20

Special tools

Remover for supporting and guide joint	115 589 02 33 00

Note

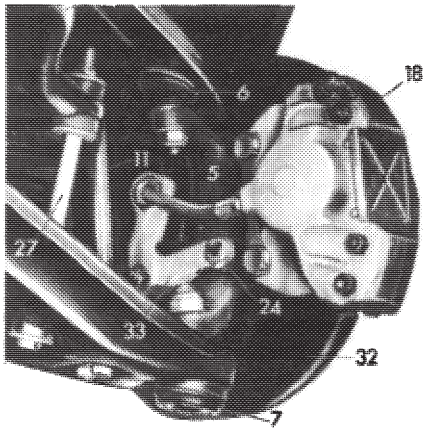
The front shock absorbers are serving simultaneously as deflection stop for the front wheels. Therefore loosen shock absorber suspension only when the vehicle is on its wheels or when the lower control arm is supported. There is a safety stop between the upper control arm and the front axle carrier.

Removal

1 Loosen lower shock absorber suspension.

2 Jack-up vehicle, remove front wheel.

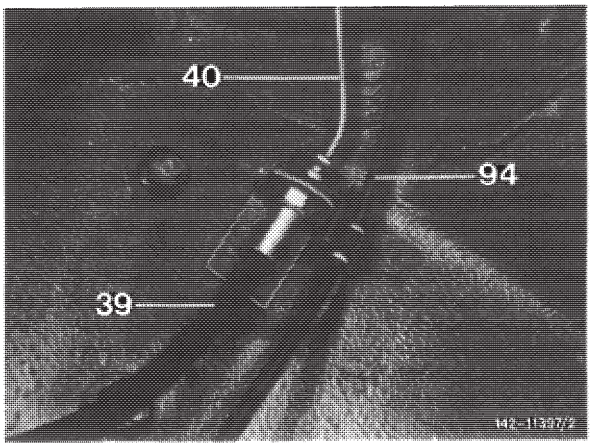
3 Unscrew steering knuckle arm from steering knuckle.



R 32-5609

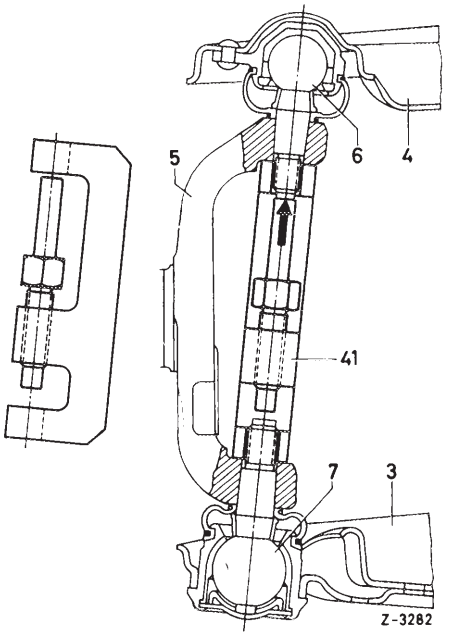
5 Steering knuckle
6 Guide joint
7 Supporting joint
11 Front shock absorber
18 Fixed caliper
24 Steering knuckle arm
27 Torsion bar connection linkage
32 Cover plate for front wheel brake
33 Holder for brake hose

4 Separate brake line (40) and brake hose (39) from each other. Close connections with rubber plugs.



5 Remove front spring (32–200).

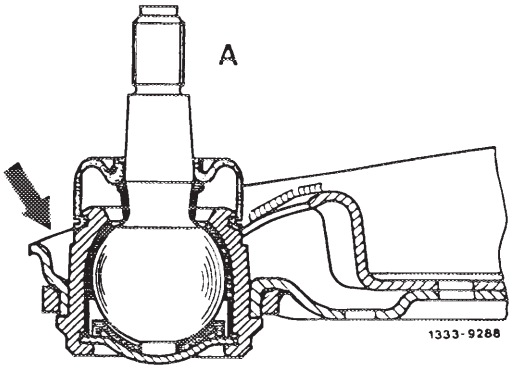
6 Unscrew hex. nuts on supporting and guide joint. Remove supporting joint from steering knuckle with pertinent fixture, remove lower control arm.



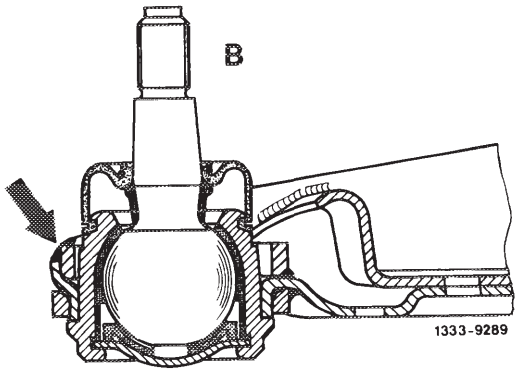
3 Lower control arm
4 Upper control arm
5 Steering knuckle
6 Guide joint
7 Supporting joint
11 Remover

Installation

Note: Starting March 1980 the lower control arms in range of supporting joint were reinforced by a welded-in ring (arrows). These changed control arms may also be used instead of the version installed up to now.



1st version up to February 1980
A Lower control arm

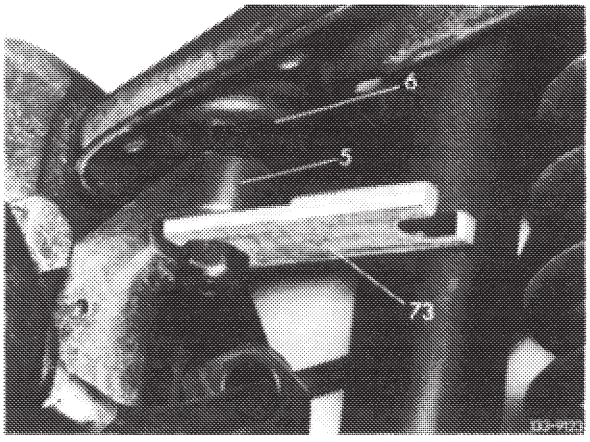


2nd version starting March 1980
B Lower control arm

7 Attach supporting and guide joint with new, self-locking hex. nuts to steering knuckle. Make sure that the seats of the ball pins for the supporting and guide joint are free of grease.

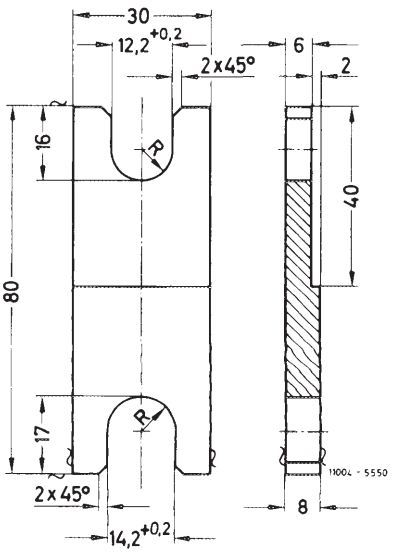
8 If the ball pin on the guide or supporting joint keeps turning when the hex. nut is being tightened, insert a spacing piece and pull the ball pin cone into the steering knuckle by tightening the hex. nut.

Then loosen hex. nut, remove spacing piece and tighten hex. nut to the prescribed torque.



5 Steering knuckle
6 Guide joint
73 Spacing piece

The spacing piece can be self-made.

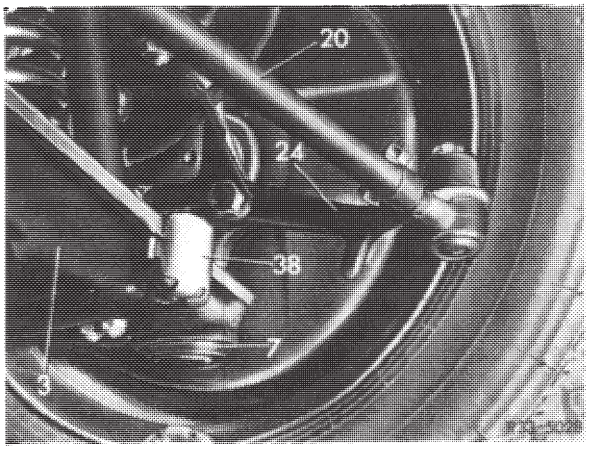


9 Install front spring (32–200).

10 Attach the lower shock absorber suspension to the control arm.

Attention!
Only tighten the hex. nuts of the eccentric bolt for the lower control arm **if the vehicle is in driving condition and standing on its own wheels.**

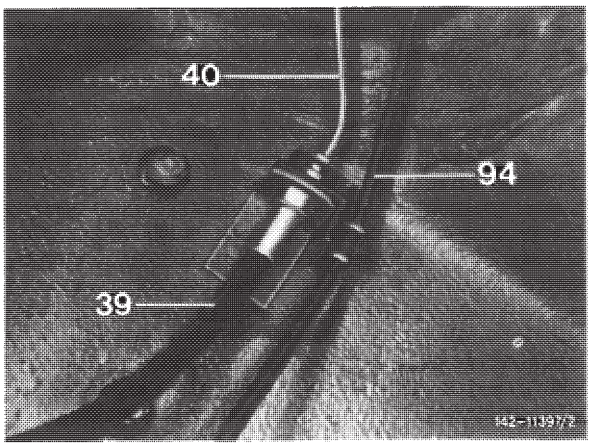
11 Install steering knuckle arm using new holder for brake hose (46–095).



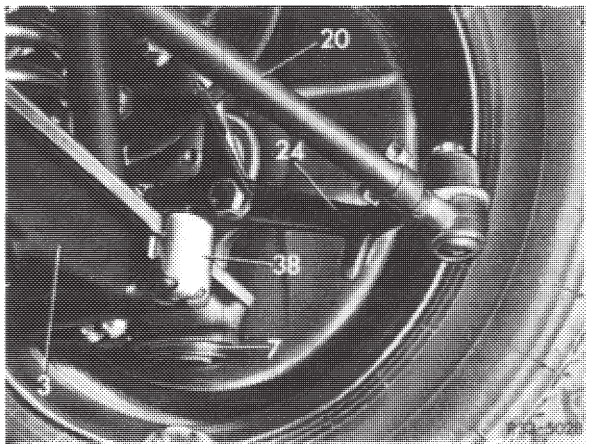
3 Lower control arm
7 Supporting joint
20 Track rod
24 Steering knuckle arm
38 Protective cap

12 Connect brake pipe and break hose to each other.

13 Bleed braking system (42–010).



14 Check protective cap (38) for steering lock on lower control arm (3). Mount new protective cap, if required.



15 Check control arm position of front axle.

16 Check wheel adjusting values on front axle (40–320).

17 Check headlight adjustment.

33–520 Checking and repairing lower control arm bearing

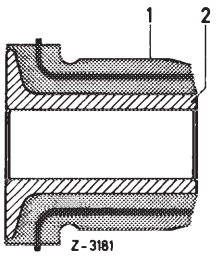
Data

Rubber jacket OD	Length	Rubber hardness ° Shore
34 ± 0.2	38 ± 0.1	60 ± 3

Checkup

1 Check rubber bearings for tight seat in lower control arm.

2 Check inner bushing for tight connection to rubber jacket.

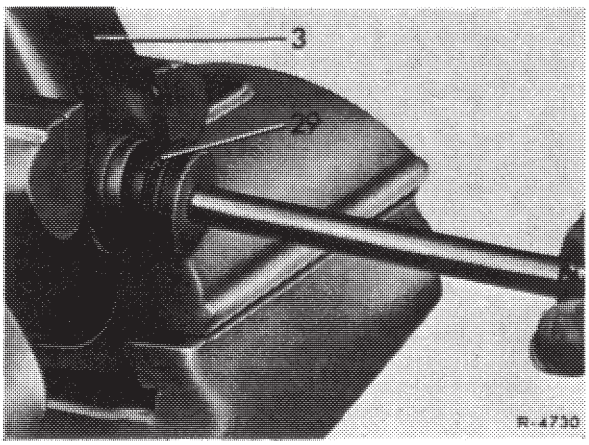


Rubber bearing (torsion bearing) for lower control arm
1 Rubber jacket
2 Bushing

Repairs

3 Loosen outer rubber bearing by moving back and forth in lower control arm and remove.

4 Knock out inner rubber bearing.



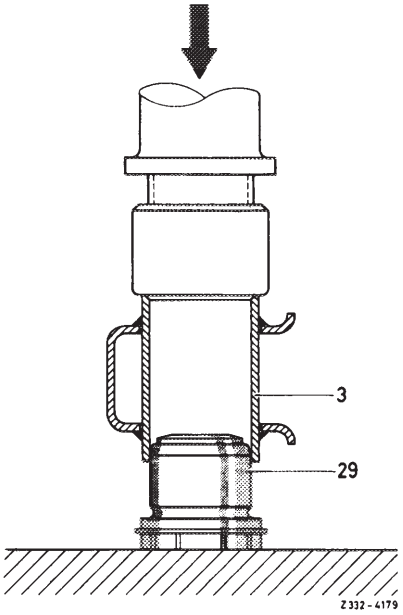
3 Lower control arm
29 Rubber bearing

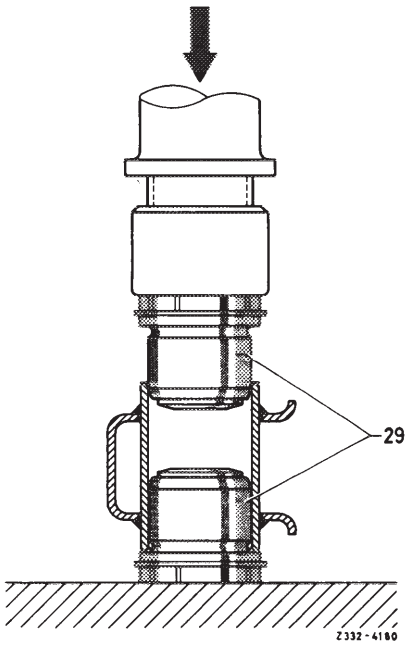
Caution!
Clean bearing tubes inside well prior to pressing in rubber bearing and rub with emery cloth, if required. Coat rubber bearing on circumference as well as the pertinent bearing pipe inside with slide fluid "Naphtalen" (MB Part No. 000 989 04 60).

Never use oil or grease!

5 Press rubber bearing into lower control arm making sure that the bearings are pushed vertically and are not canting.

Press in each bearing individually, not both together.





3 Lower control arm
29 Rubber bearing

Rubber Slide Bearings

Rubber jacket OD	Radial play between outer bushing (2b) and inner bushing (3) in pressed-in condition	Length	Lubrication
34–0.2	free of play	28.5 ± 0.1	maintenance-free [1] [2]

[1] The outer bushing (2b) and the washer (2a) are provided with DU dry bearing material and vulcanized inside rubber jacket (1).
[2] Provide new rubber slide bearings prior to installation on slide surfaces with special grease "Calypsol AE" or "Kenlube M 62".

Checkup

1 Pull out inner bushing of rubber slide bearing.

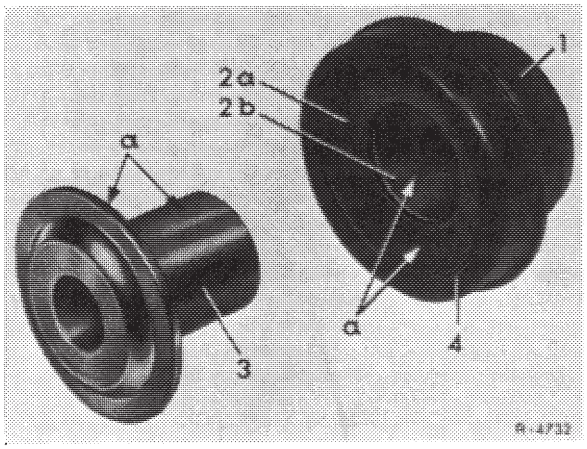
2 When judging a rubber slide bearing observe the following:

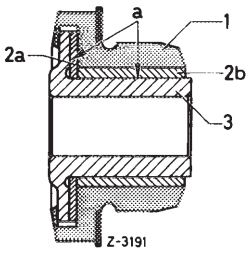
a) The bearing collar should not be damaged and should still be rigidly connected to the cylindrical portion: the rubber jacket (1) should have no cracks on transition to flange.

b) The grey DU running surface of the outer bushing and washer (2a) at face of flange may not be worn.

c) The inner bushing (3) of the bearing should not show any score marks on slide surfaces "a". A blueish discoloration inside on collar is of no significance.

d) The sealing lip for the inner bushing (3) on rubber jacket should not be damaged.





Rubber slide bearing (DU bearing) for upper control arm

a Slide surfaces
1 Rubber jacket
2a Washer
2b Outer bushing
3 Inner bushing
4 Sealing lip

Repairs

3 Knock or force rubber slide bearing out of control arm.

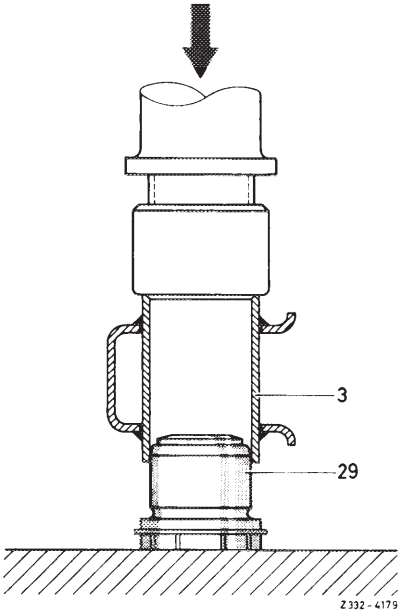
Caution!
Prior to pressing in the rubber slide bearings, clean bearing pipes inside well and rub with emery cloth, if required. Coat rubber jacket of slide bearings as well as the pertinent bearing tube inside with slide fluid "Naphtalen" (MB Part No. 000 989 04 60).

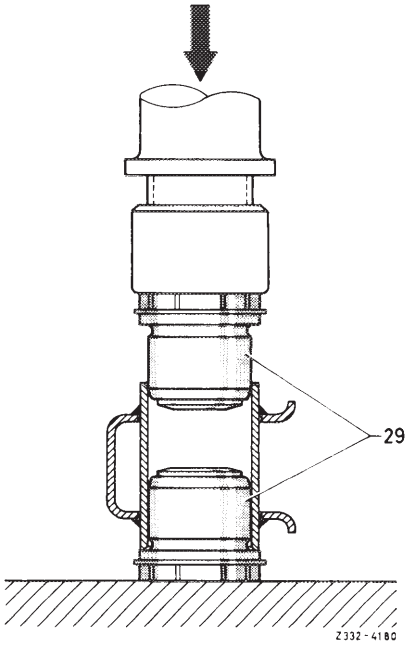
Never use oil or grease!

4 Press rubber slide bearing into upper control arm, making sure that the insertion proceeds vertically without canting.

Press-in each bearing individually, not both together.

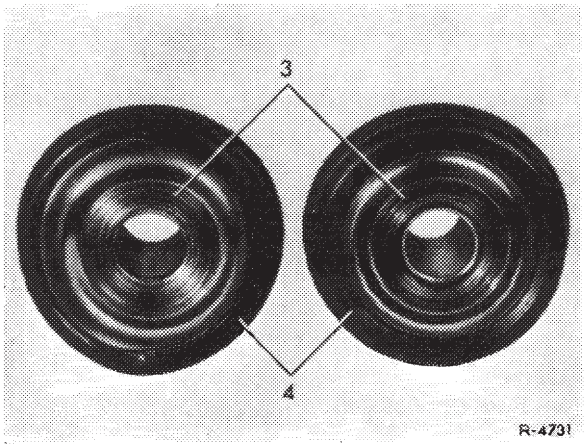
5 Provide slide surfaces "a" of rubber slide bearings with specified lubricant. For this purpose, always pull out inner bushing.





3 Control arm
29 Rubber slide bearing

6 Watch out for correct seat of sealing lip (4) after inserting inner bushing (3).



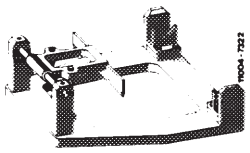
3 Inner bushings
4 Sealing lips

Arrangement left: wrong
Arrangement right: right

Data

Permissible offset of upper control arm	1.5
Permissible distortion of upper control arm (along vehicle longitudinal axis on guide joint)	2
Permissible distortion of ball pin for guide joint	0.5

Special tools

Tool for checking upper control arm		115 589 11 23 00
Mounting for guide joint (concentricity test)		107 589 02 31 00

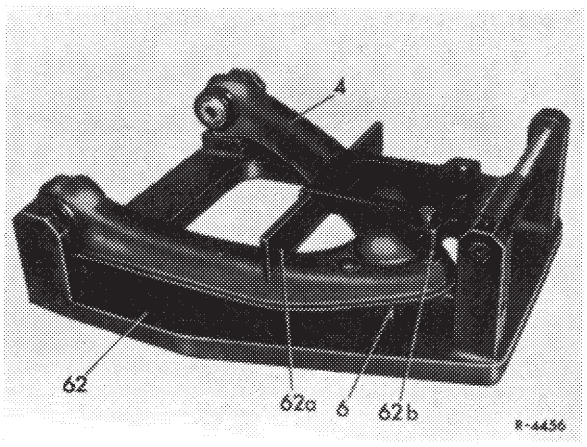
Conventional tools

Measuring stand	e.g. made by Bosch, D-7000 Stgt.-Feuerbach order No. 0 601 980 001
Dial gauge A 1 DIN 878	e.g. made by Mahr, D-7300 Esslingen order No. 810

1 Place complete control arm with rubber slide bearings into fixture (62) to check for distortion and offset.

2 Check offset with straightedge (62a).

3 Measure distortion on guide joint with wedge-shaped bolt (62b).

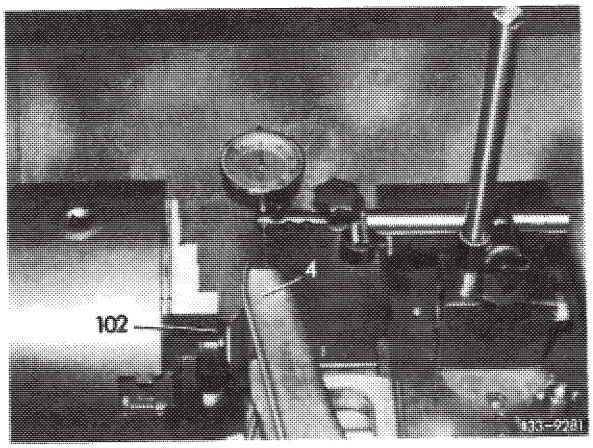


4 Upper control arm
6 Guide joint
62 Fixture
62a Straightedge for checking offset
62b Wedge-shaped bolt for checking distortion

4 Clamp mounting for guide joint in a lathe chuck to check ball pin for distortion.

5 Introduce ball pin into mounting device (102) and press on.

6 Position dial gauge with 1 mm preload against upper control arm and determine distortion of ball pin at approx. 25/min.



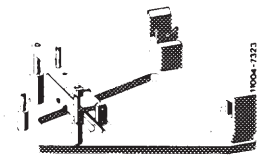
33–570 Checking lower control arm

Data

Permissible offset of lower control arm	1.5
Permissible bending of lower control arm (measured along the longitudinal vehicle axle)	1.5[1])
Permissible bending of ball pin for supporting joint	0.5

[1]) Bending value is within permissible limits when checking bolt can be inserted.

Special tools

Device for checking lower control arm		115 589 12 23 00
Mounting ring for supporting joint		107 589 01 31 00

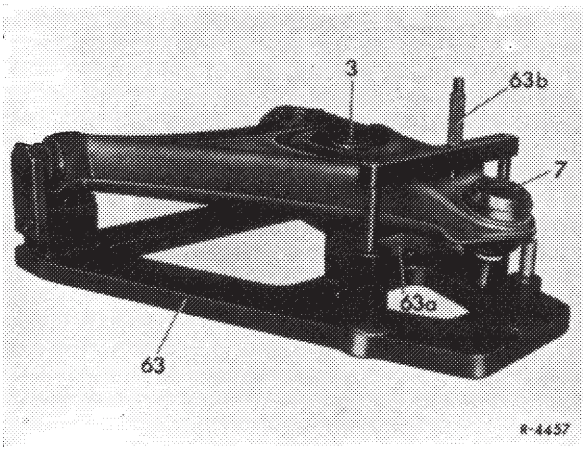
Conventional tools

Measuring stand	e.g. Messrs. Bosch, D-7000 Stgt.-Feuerbach Order No. 0 601 980 001
Dial gauge A 1 DIN 878	e.g. Messrs. Mahr, D-7300 Esslingen Order No. 810 St

1 To check for bending and offset, place the complete control arm with rubber mounts in the special device (63).

2 Check offset with rule (63a).

3 Insert checking bolt (63b). If the bolt cannot be inserted, the permissible bending amount has been exceeded.

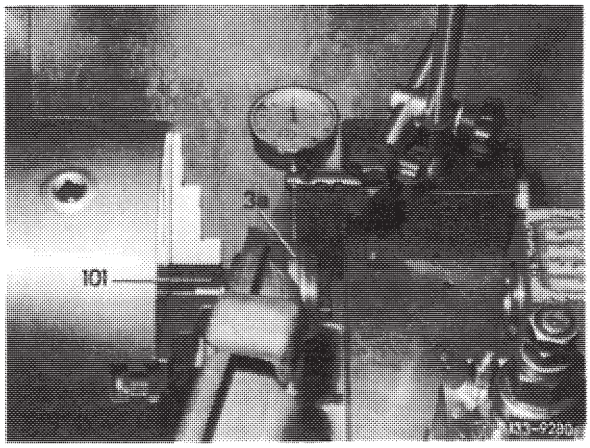


3 Lower control arm
7 Supporting joint
63 Special device
63a Rule for checking offset
63b Bolt for checking bending

4 To check the ball pin for bending, insert receiving ring (101) into the chuck of a lathe.

5 Insert ball pin into receiving ring and press in.

6 Attach dial gauge to the reinforcing ring (3a) of the control arm with 1 mm pretension and measure bending of the ball pin at approx. 25/min.



Special tool

Telescopic measuring bar 415–925 mm	124 589 01 19 00

Commercially available tool

Height measuring device	e.g. Stiefelmayer, D–7300 Esslingen order No. 030 102

Note

The set of measuring components permits checking the front axle carrier either on inspection device for axle carriers or on measuring table.

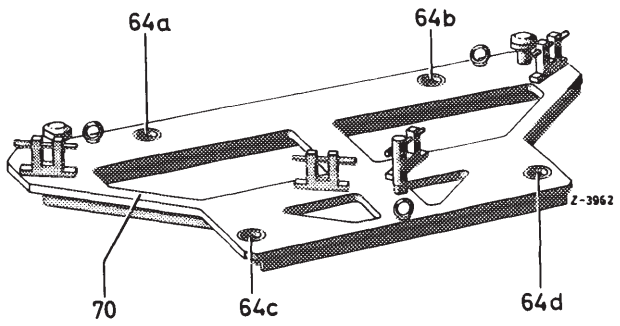
To check the front axle carrier for distortion on receiving points of front axle suspension the measuring components can also be placed on Celette frame straightening bench.

Preparations for measuring

1 Place measuring components into provided holes of inspection device for axle carriers or on a normal measuring table.

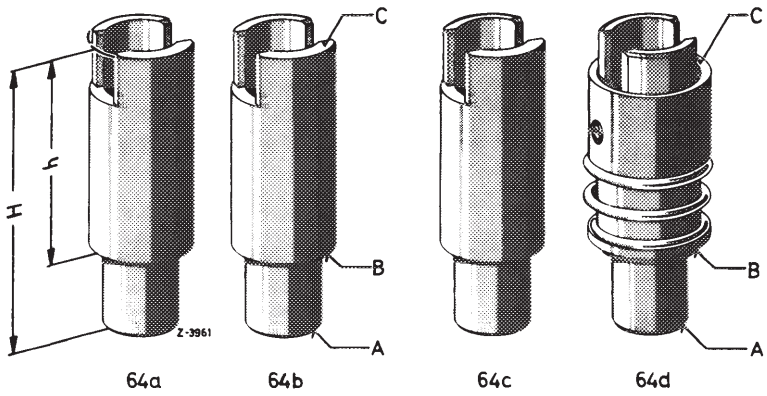
2 Knock rubber bearings for suspension of front axle to frame floor from cups in front axle carrier.

3 Introduce measuring rods (65a) for lower control arm bearing brackets into bearing brackets up to stop.



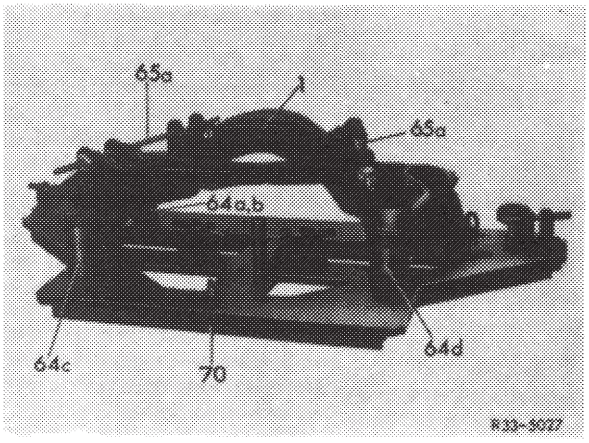
64a, b Receiving points for rear bearing; distance 760 mm
64c, d Receiving points for front bearing; distance 684 mm
70 Inspection device for axle carrier

A Receiving point for checkup on measuring table
B Receiving point for checkup on inspection device for axle carriers
C Upper receiving point
h Reference height of measuring component in inspection device for axle carriers
H Reference height of measuring component on measuring table
64a, b Measuring component (rigid) for rear bearing h = 146 mm, H = 198 mm
64c Measuring component (rigid) for front bearing h = 150 mm, H = 202 mm
64d Measuring component (adjustable) for front bearing



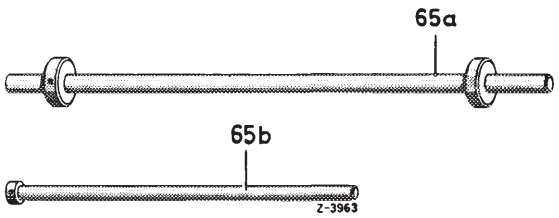
4 Place front axle carrier on measuring components with the bottom up.

Note: The measuring components carry the designations "front" („vorn") and "rear" („hinten").



1 Front axle carrier
64a, b Measuring components for rear bearing
64c Measuring component for front bearing
64d Measuring component for front bearing (adjustable)
65a Measuring rods for lower control arm bearing
70 Inspection device for axle carrier

Note: The measuring rods are provided with one fixed locating ring each. The measuring rods (65a) for the lower control arm bearing brackets are additionally provided with one movable locating ring each.



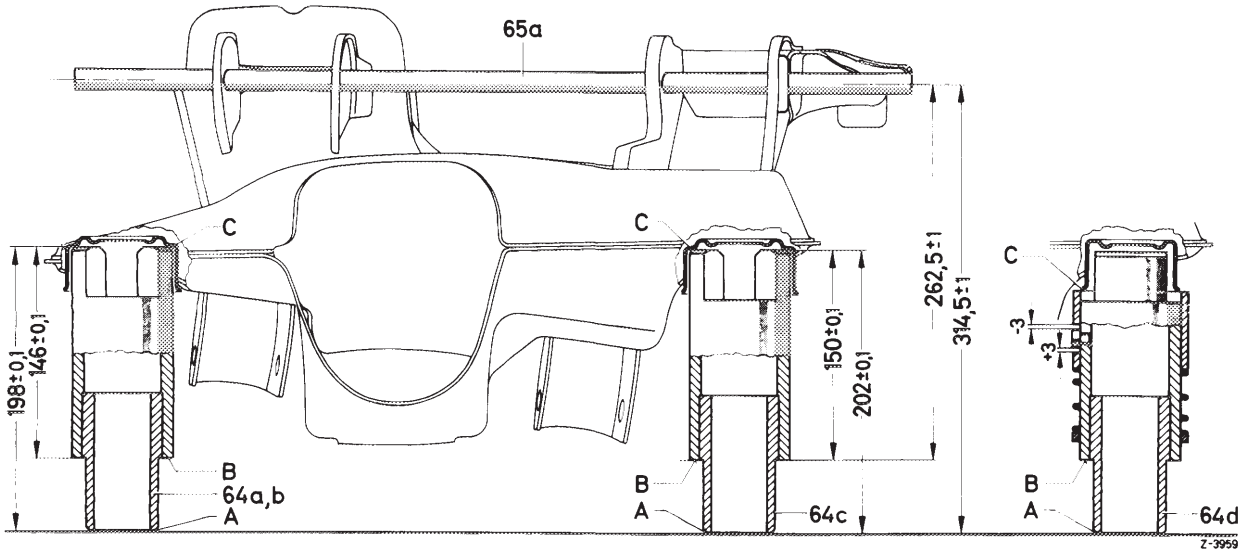
65a Measuring rod for lower control arm bearing brackets
65b Measuring rod for upper control arm bearing brackets

Checkup for distorsion

5 The inspection points to check for distortion are the cups for the rubber bearings of the front axle carrier suspension on frame floor. The permissible dimension is included in the adjusting possibilities of the measuring component (64d) starting from the nominal dimension in upward or downward direction.

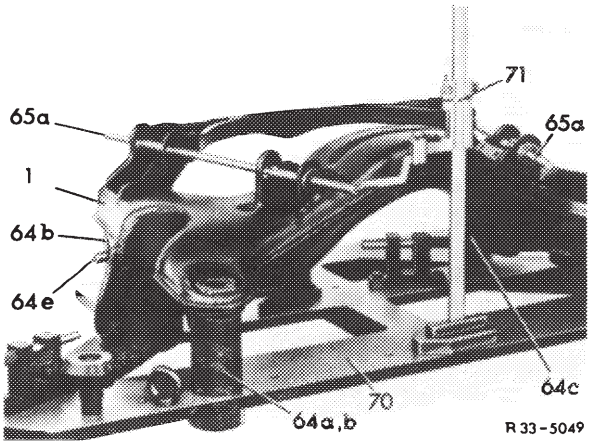
Note: During the checkup for distortion the front axle carrier should rest against the rigid components (64a, b and c) at the top, while the sleeve of the adjustable component (64d) is placed against the bottom edge of the cup. The nominal dimension is attained when the pin is laterally in the bolt in the center of the hole in sleeve.

6 A checkup of the height between the inspection device or measuring table and the bearing brackets for the lower control arms serves as an additional checkup for distortion.



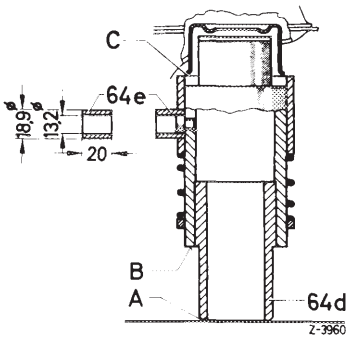
A Receiving point for checkup on measuring table
B Receiving point for checkup on inspection device for axle carrier
C Upper receiving point
64a, b Measuring component (rigid) for rear bearing reference height 198 or 146 mm
64c Measuring component (rigid) for front bearing reference height 202 or 150 mm
64d Measuring component (adjustable) for front bearing
65a Measuring rod for lower control arm bearing brackets

Measurements are made in each case by means of a vertical tracer up to center of measuring rod. During these measurements the front and rear bearing cup on the side of the front axle carrier to be measured should rest against the measuring component.



1 Front axle carrier
64a, b Measuring components for rear bearing
64c Measuring components for front bearing (rigid)
64 Measuring components for front bearing (adjustable)
64e Locating sleeve
65a Measuring rods lower control arm bearing
70 Inspection device for axle carrier
71 Vertical tracer

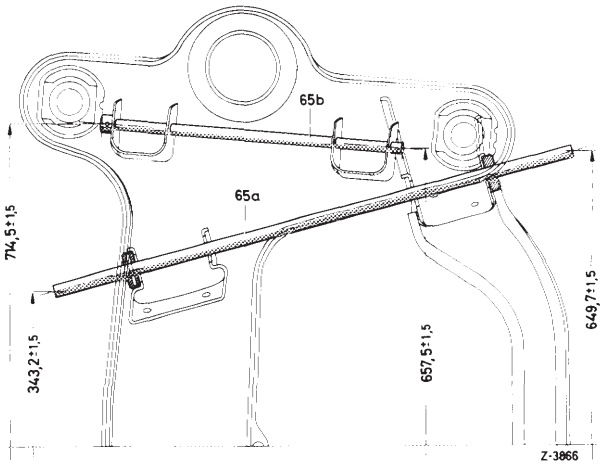
Note: The adjustable measuring component (64d) is fixed at the nominal height by means of the locating sleeve (64e). The locating sleeve must be selfmade according to dimensions in the figure.



64d Adjustable measuring component
64e Locating sleeve

Checkup of bends

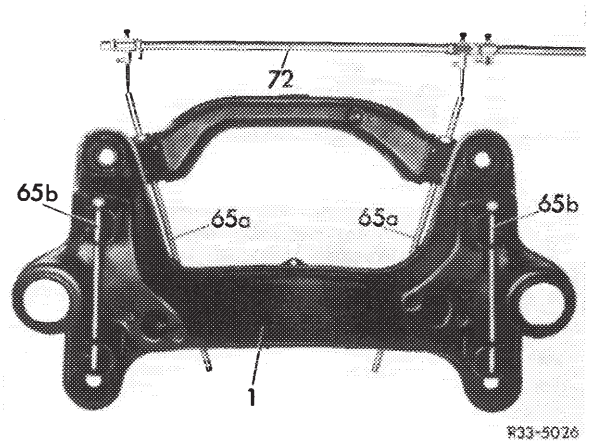
7 Bends are checked in transverse direction with reference to the distances of the upper and lower control arm bearing brackets by means of the measuring rods (65a and b).

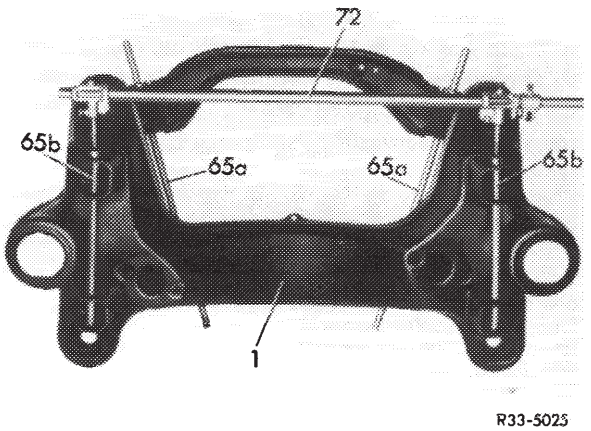


65a Measuring rods for lower control arm bearing brackets
65b Measuring rods for upper control arm bearing brackets

8 The measurements are made with a suitable beam compass. The center bores of the measuring rods serve as measuring points.

Note: The beam compass (72) shown in the figure is a conventional compass of 1,500 mm measuring length, fine adjustment with vernier and round measuring tips.





1 Front axle carrier
65a Measuring rods for lower control arm bearing
65b Measuring rods for upper control arm bearing
72 Beam compass

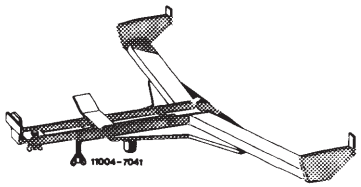
A. Models 114, 115

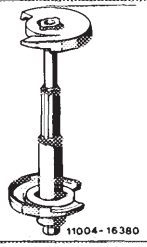
Oil type and capacities

Hypoid gear oil SAE 90	refer to specifications for service products page 235
Models with cast iron rear axle end cover	1.15 litre
Models with aluminum rear axle end cover	1.0 litre

Tightening torques		Nm
Hex socket necked down bolt for attaching rear rubber bearing to rear axle end cover (rubber bearing 1st version)		140
Hex. socket or hex. head bolts for attaching rear rubber bearing on rear axle end cover (rubber bearing 2nd version)		120
Hex bolts for attaching rear rubber bearing to frame floor		25
Hex bolts, self-locking for attaching rear rubber bearing to frame floor		30
Hex bolts for attaching front rubber bearings to frame floor		120
Hex bolts for attaching supporting plate to frame floor		40
Clamping nut of propeller shaft (2-piece)		30–40
Clamping nut of propeller shaft (3-piece)	front	30–40
	rear	200

Special tools

Vehicle jack top for removal and installation of complete rear axle		116 589 10 61 00
Torque wrench 25–130 Nm with plug-in ratchet 1/2" square		001 589 66 21 00
Torque wrench 40–200 Nm with plug-in ratchet 1/2" square		001 589 67 21 00

Open end wrench 46 mm for torque wrench for clamping nut of propeller shaft	 11004-9974	126 589 00 01 00
Spring tensioner for rear spring	 11004-16380	124 589 06 31 00

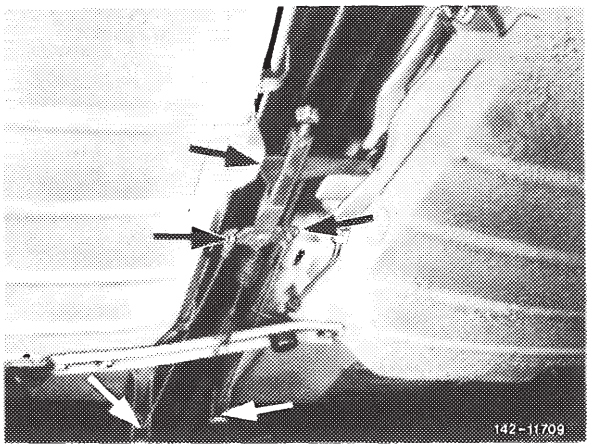
Note

Remove rear axle only with wheels removed first to avoid damage to rear axle shaft during transportation of complete units.

Removal

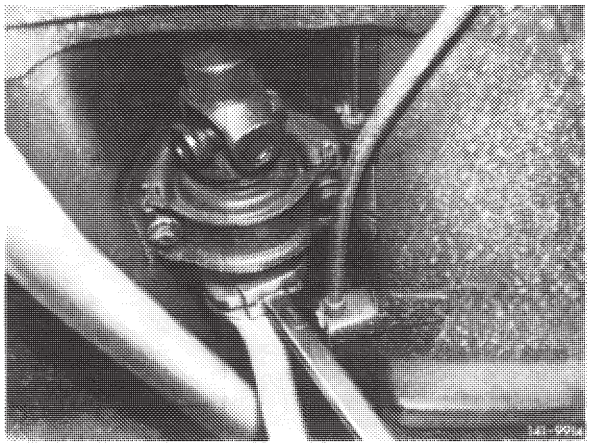
1 Remove exhaust system (49–100).

2 Disconnect cable controls of parking brake on frame floor and on compensating lever.



3 Loosen clamping nut of propeller shaft, and hex bolts of propeller shaft intermediate bearing on frame floor.

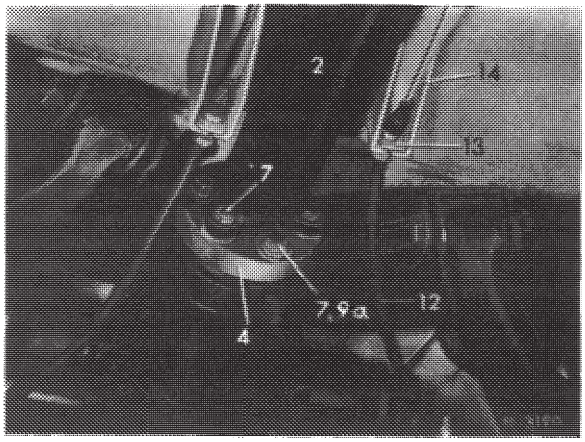
Note: On 3-piece propeller shaft loosen front clamping nut only.



4 Unflange propeller shaft (2) at the rear and push out of centering in forward direction.

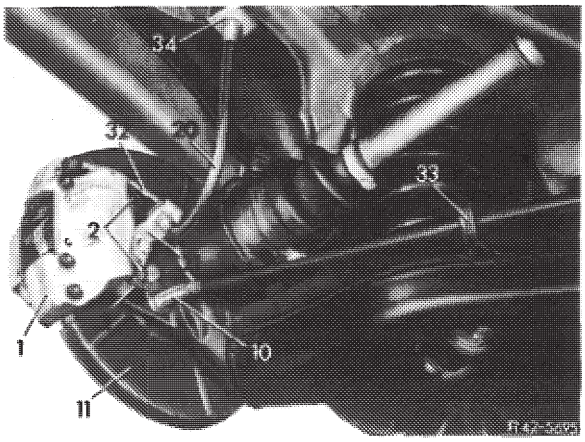
5 Remove shock absorber or struts (32–110 or 32–610).

6 Remove rear springs (32–230).

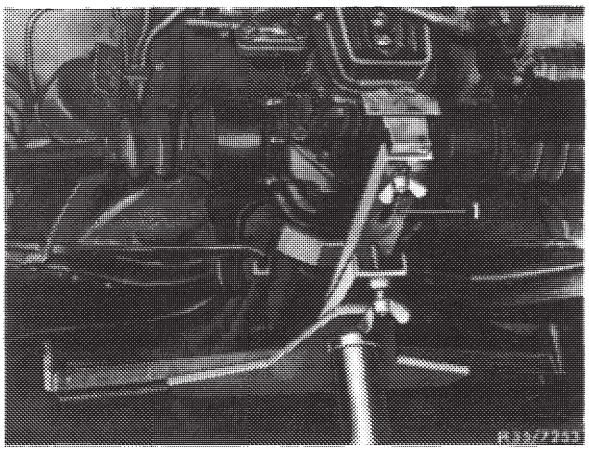


7 Loosen connecting rod for torsion bar on semi-trailing arm (32–310).

8 Unscrew both brake hoses (20) on brackets of frame side members and close brake lines against penetration of dirt (42–228).

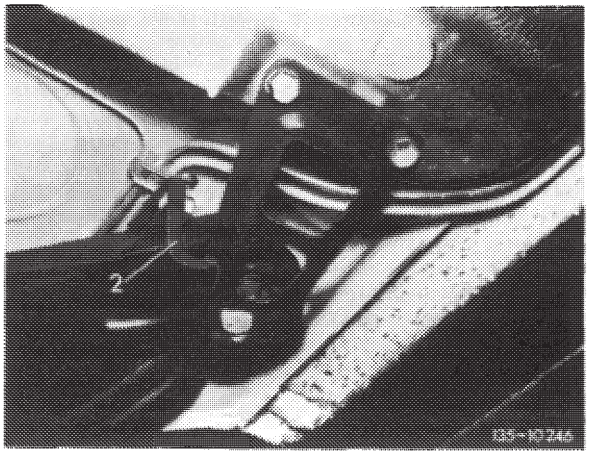


9 Slip vehicle jack top (1) with a vehicle jack or pit lift under rear axle and lift up to stop against rear axle carrier.



10 Loosen stop limitation (2) on rear axle carrier and remove (model 115.114 only).

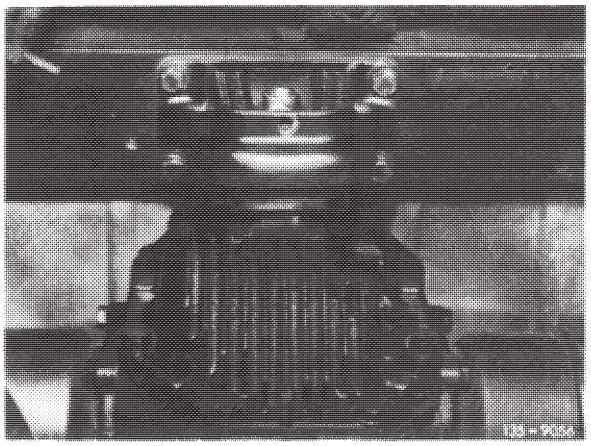
11 Loosen hex bolts of supporting plates and remove.



12 Unscrew rear rubber bearing from frame floor.

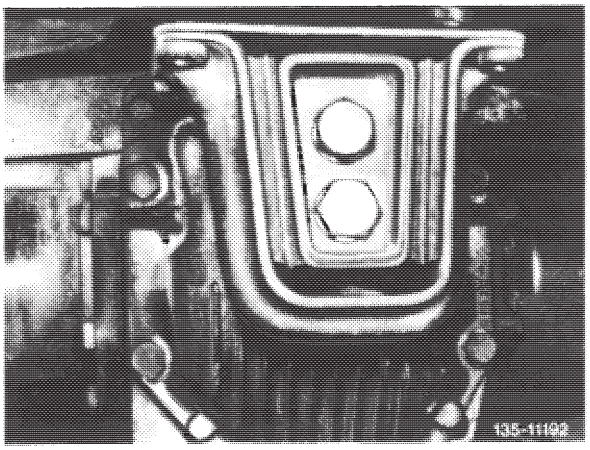
13 Carefully lower rear axle.

Attention!
When lowering and transporting rear axle do not damage cover plates of brake discs.



14 Unscrew rear rubber bearing from rear axle end cover.

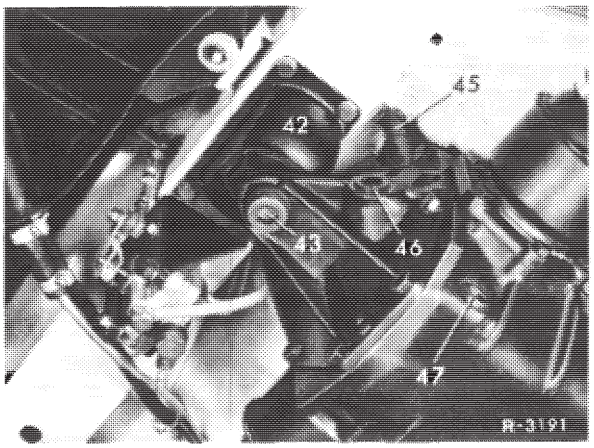
15 Check front and rear rubber bearing and renew, if required.



Installation

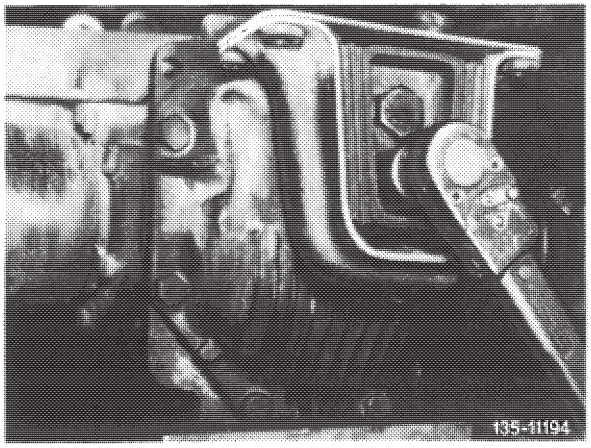
16 Attach rear rubber bearing (42) of 1st version to frame floor. Tightening torque of hex bolts 25 Nm.

Attention!
The rubber bearing is asymetrically designed. To guarantee installation free of tensions, install rubber bearing only with narrow end in driving direction.



1st version

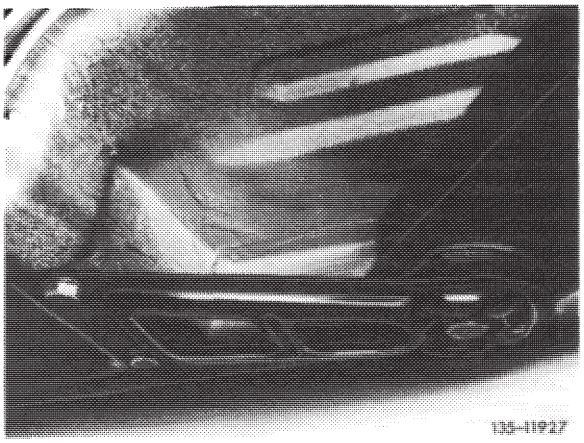
17 Attach rear rubber bearing of 2nd version to rear axle end cover, tighten hex socket bolts or hex bolts to 120 Nm.



2nd version

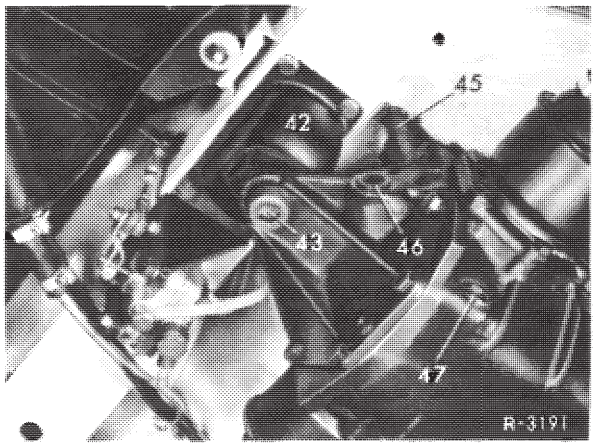
18 Lift rear axle with vehicle jack top and insert front rubber mounting into guides on frame floor.

19 Mount supporting plates of rubber bearing to frame floor. Tighten hex bolts of rubber bearing to 120 Nm and hex bolts of supporting plates to 40 Nm.



20 Attach rear rubber bearing of 1st version to rear axle end cover. Tighten hex socket necked down bolt (43) to 140 Nm.

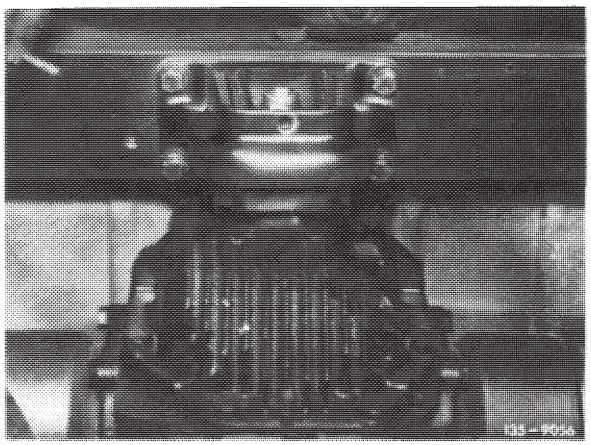
Note: Always replace hex socket necked down screw following one-time use.



1st version

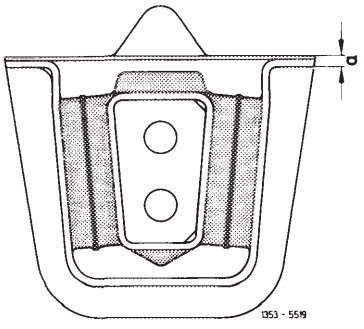
21 Mount rear rubber bearing of 2nd version with hex bolts, snap rings and washers or new self-locking hex bolts to frame floor. Tightening torque of hex bolts 25 Nm, of self-locking hex bolts 30 Nm.

Attention!
Use self-locking hex bolts with plastic coating (micro-encapsulated) only once.

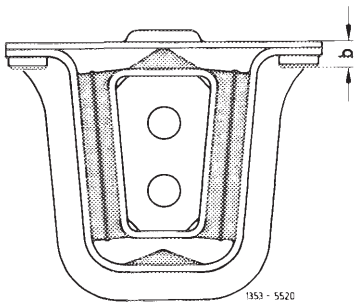


2nd version

22 For rubber bearing **without** washers (dimension "a" 5 mm) on fastening eyes, use hex bolt with snap rings and washers.



23 For rubber bearing **with** washers (dimension "b" 12 mm) on fastening bolts, use self locking hex bolts.



24 Remove vehicle jack top.

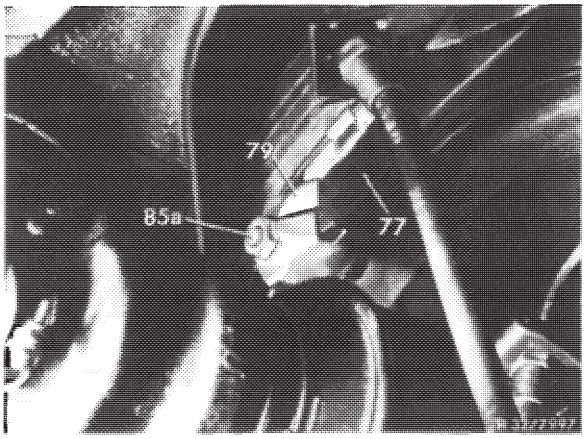
25 Flange-on propeller shaft.

26 Install rear springs (32–230).

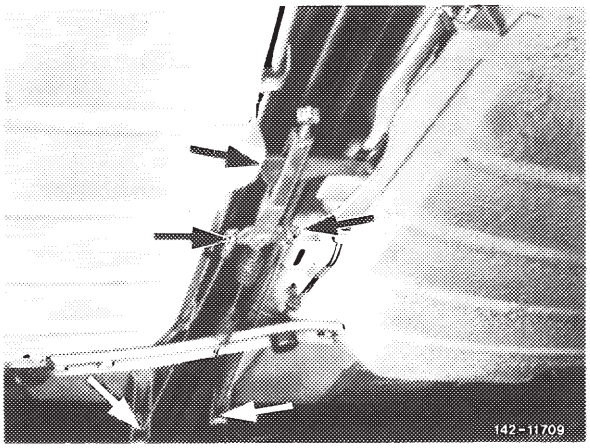
27 Install shock absorbers or struts (32–110 or 32–610).

28 Attach torsion bar linkage (85a) (32–310).

29 Connect both brake hoses and bleed brake system (42–010).

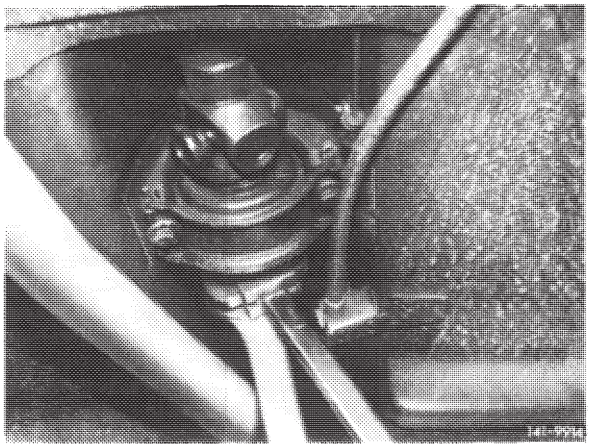


30 Attach cable controls of parking brake and adjust (42–525).



31 Tighten clamping nut on propeller shaft to 30–40 Nm.

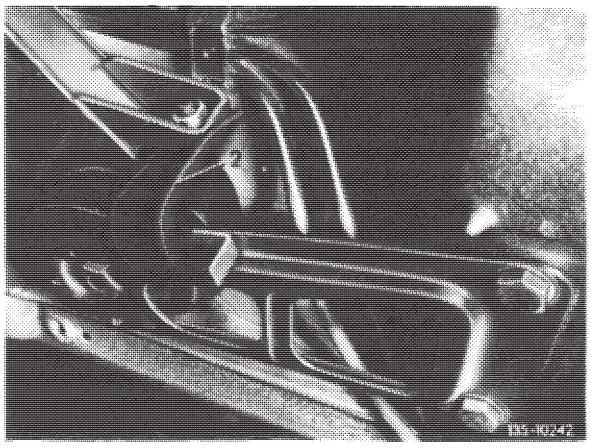
32 Tighten propeller shaft intermediate bearing.



33 Mount stop limitation (2) at front on rear axle (model 115.114 only).

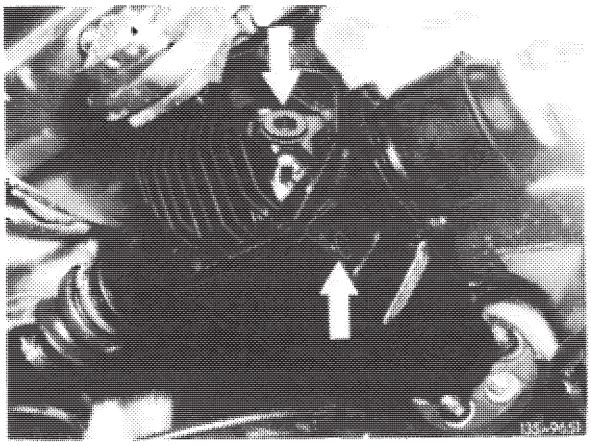
Attention!
Clearance between rubber buffer of stop limitation and supporting plate should be 2—3 mm with vehicle ready for driving. To adjust, make sheet metal angle piece with the following dimensions:

Thickness 2.5 mm, length 60 mm, height 20 mm, width 10 mm.



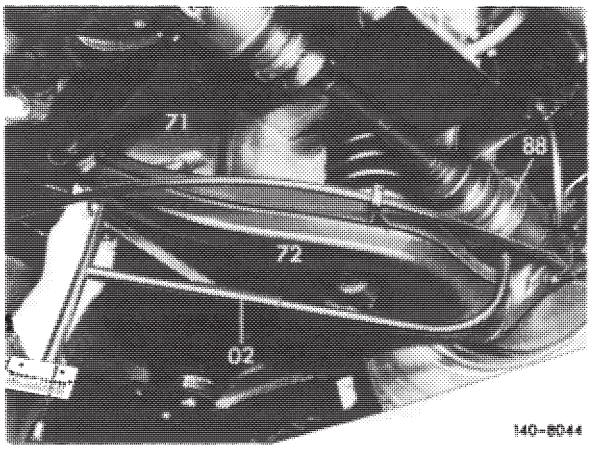
34 Install exhaust system (49—100).

35 Check oil level in rear axle and add oil up to level of filler bore, if required.



36 Check vehicle level at rear axle (40—300 or 310).

37 Check headlight adjustment (82—250).



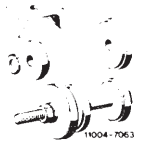
A. Model 107, 114, 115, 116, 123

Rear axle installed

Adjusting dimension of limit stop (on models 115.114 and 123 with engine 102, 115, 616 and 617 only)	
Clearance between rubber buffer and supporting plate	2–3 mm

Slide fluid for pressing-in rubber bearings	
Slide fluid (Naphtolen H or slide paste Fahr)	000 989 08 60

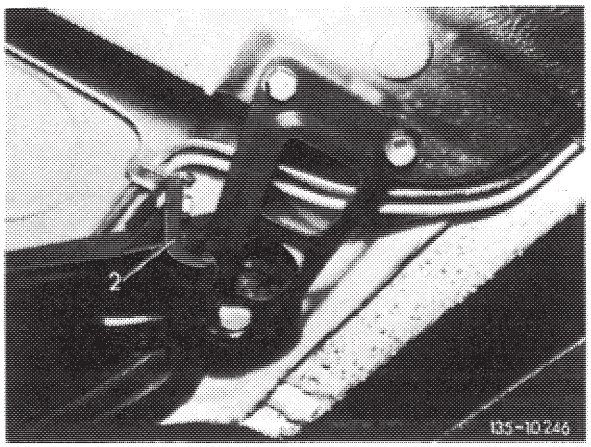
Tightening torques	Nm
Hex bolt for attaching front rubber bearing to frame floor	120
Hex screws for attaching supporting plate to frame floor	40
Hex bolt for attaching stop limitation (models 115.114 and 123 with engine 102, 115, 616 and 617 only)	40

Special tool		
Installer for installing rubber bearing in rear axle carrier		116 589 11 61 00

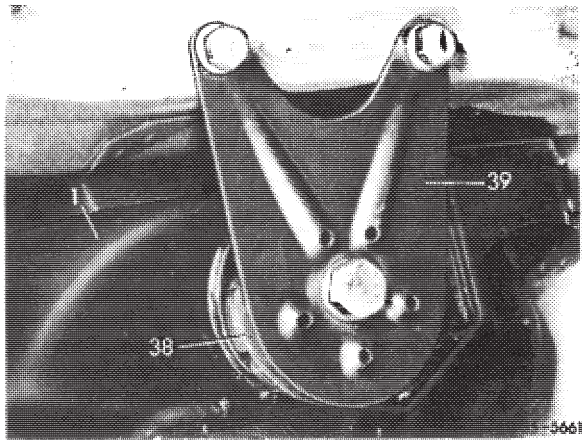
Removal

1 Support rear axle carrier at respective end.

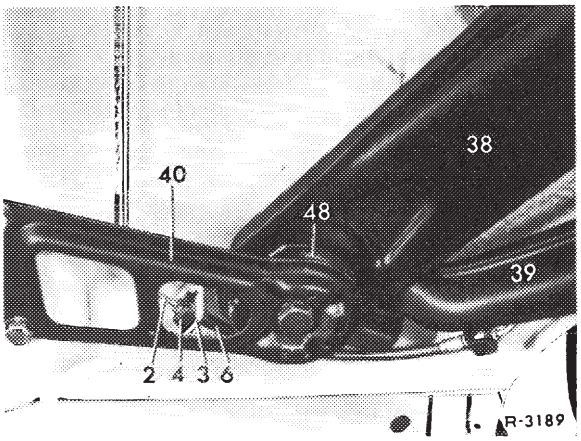
2 Loosen stop limit (2) on rear axle carrier and remove (only on model 115.114 and on models 123 with engine 617, with engine 616 starting March 1978, with engine 115 starting September 1979 and with engine 102).



3 Unscrew supporting plate (39) from frame floor.

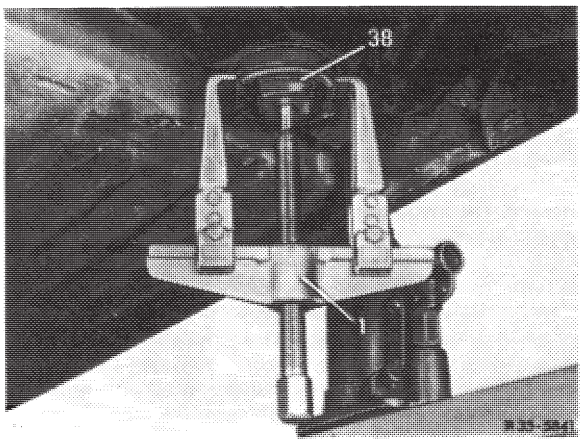


4 Loosen brake hose on holder (3) and close against penetration of dirt (models 114 and 115 of 1st version only).

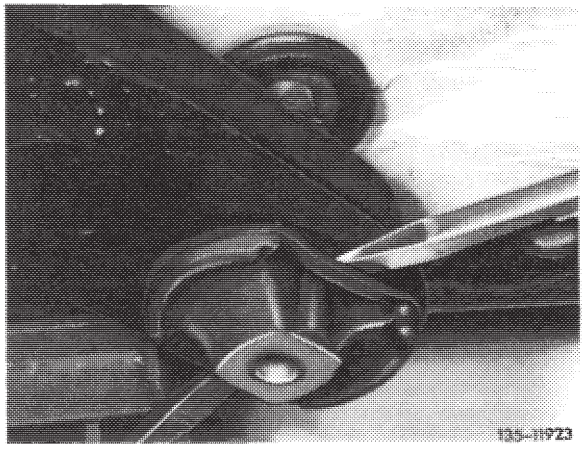


5 Insert a mandrel of 10 mm dia. and approx. 160 mm length into bore of rubber bearing and pull rubber bearing out of rear axle carrier by means of a puller.

On model 123, push rubber bearing out of rear axle carrier by means of a suitable tool until a two-arm puller can be applied.



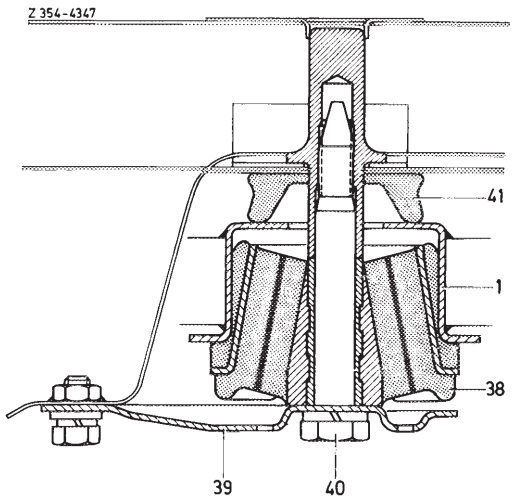
Models 107, 114, 115, 116



Model 123

6 Check rubber bearing (38) and stop rubber (41) on frame floor and renew, if required.

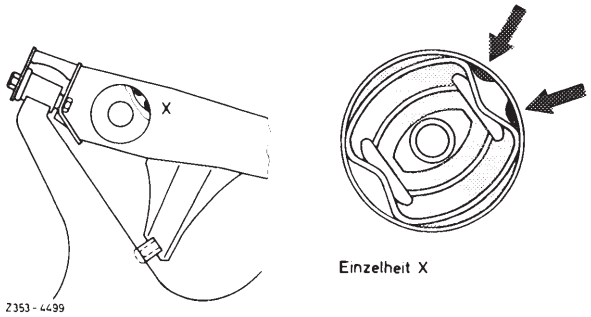
Attention!
Renew compressed rubber bearing on principle.



Installation

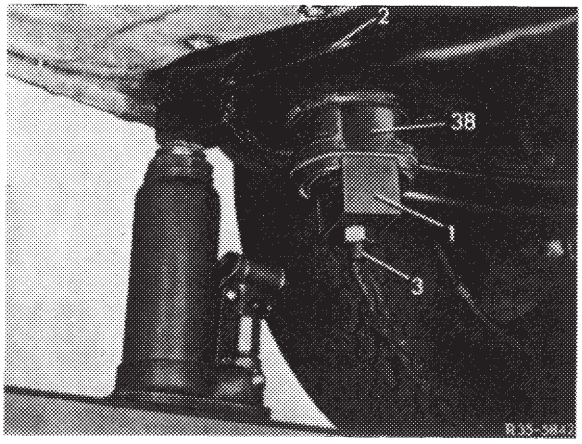
Attention!
During installation pay special attention to position of rubber bearing.

On model 107.04 this position is marked by means of two lugs in cup. The two lugs should rest in a recess of rubber bearing.

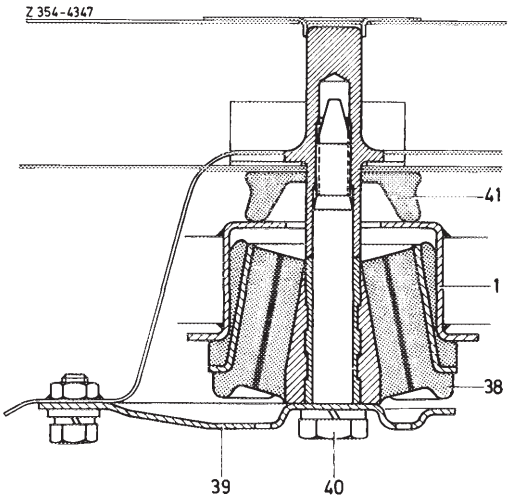


7 Rub rubber bearing with slide fluid and pull into rear axle carrier.

Note: When the vehicle is jacked up, the respective rear wheel must be additionally lifted, so that the rear axle carrier can move far enough downwards for positioning tool.



8 Attach rubber stop (41) (on models 115.114 and 123 with engine 617, with engine 616 starting March 1978, with engine 115 starting September 1979 and with engine 102, which are provided with an adjustable stop limit, no rubber stop is installed). Lift rear axle carrier and mount supporting plate. Tighten hex. screws on supporting plate to 40 Nm and on rubber bearing to 120 Nm.

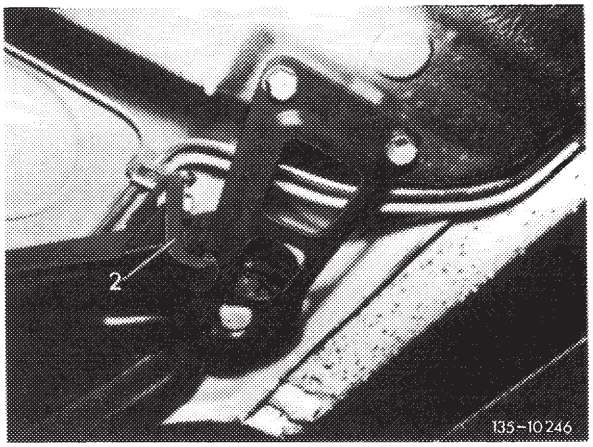


9 Connect brake hose and bleed brake system (42–010, required only for 1st version of models 114 and 115).

Adjustment of stop limit on models 115.114 and 123 with engine 617, with engine 616 starting March 1978, as well as with engine 115 starting September 1979 and with engine 102.

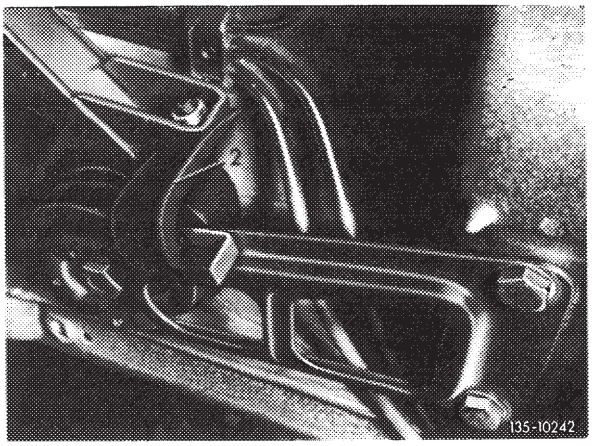
10 Loosely mount stop limitation (2) at front to rear axle carrier.

Attention!
Clearance between rubber buffer of stop limitation and supporting plate should be 2–3 mm with vehicle ready for driving.



11 Insert sheet metal angle piece between rubber buffer and supporting plate.

Note: Make sheet metal angle piece (2.5 mm thick) yourself according to the following dimensions: 60 mm long, 20 mm high, 10 mm wide.



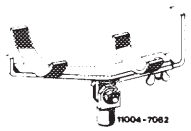
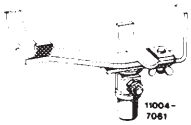
12 Push stop limitation lightly upwards and tighten hex bolt to 40 Nm.

13 Remove sheet metal angle piece.

35–050 Removal and installation of rear rubber bearing of rear axle suspension

Tightening torques	Nm
Hex socket necked-down bolt for attaching rear rubber bearing to rear axle end cover (rubber bearing 1st version)	140
Hex. socket or hex. head screws for attaching rear rubber bearing to rear axle end cover (rubber bearing 2nd version)	120
Hex bolts for attaching rear rubber bearing to frame floor	25
Hex bolts, self-locking for attaching rear rubber bearing to frame floor	30

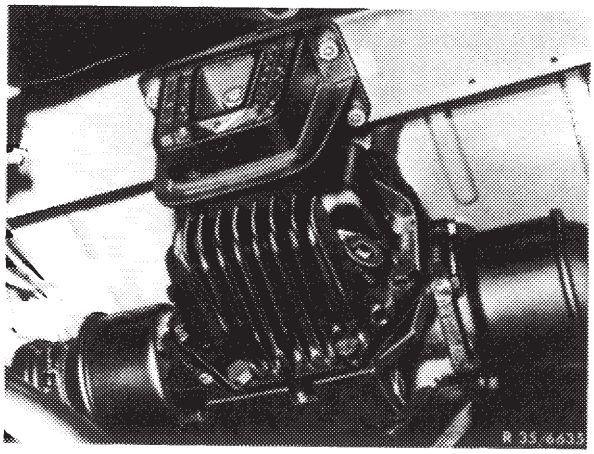
Special tools

Vehicle jack top for removal and installation of rear axle center piece	(large center piece)[1]		116 589 02 63 00
Vehicle jack top for removal and installation of rear axle center piece	(small center piece)[1]		115 589 35 63 00

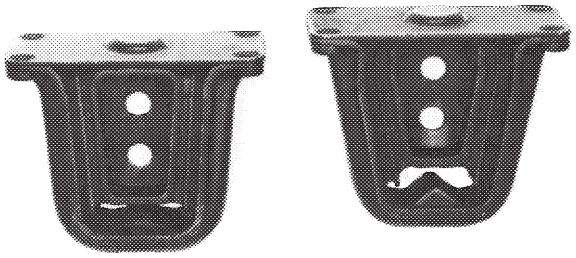
[1] refer to installation survey rear axle center piece 35–500

Note:

During 1971 and 1972, the small and the large rear axle center piece for models 107, 114, 115 and 116 were occasionally provided with a rear axle end cover with large bulge.



For this rear axle end cover, only the rubber bearing of the former version (1) applies. The rubber bearing (2) installed uniformly since the middle of 1978 cannot be used for reasons of available space.

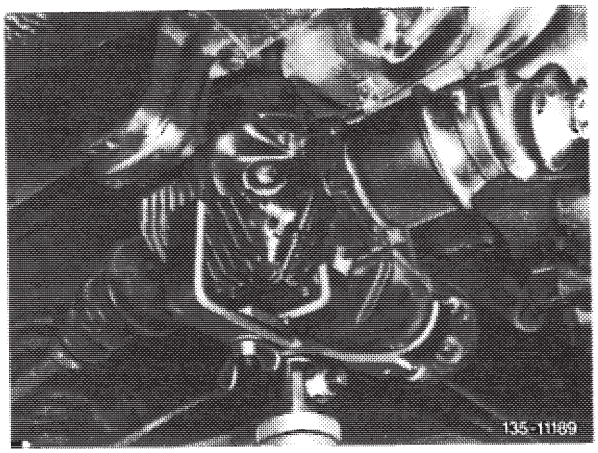


1 2

135-10855

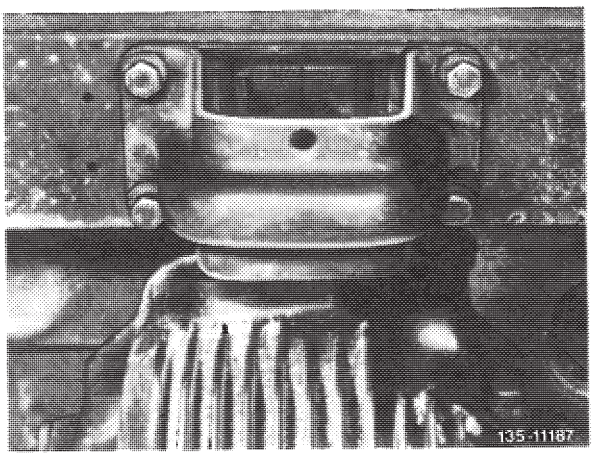
Removal

1 Support rear axle housing on vehicle jack top and raise slightly.



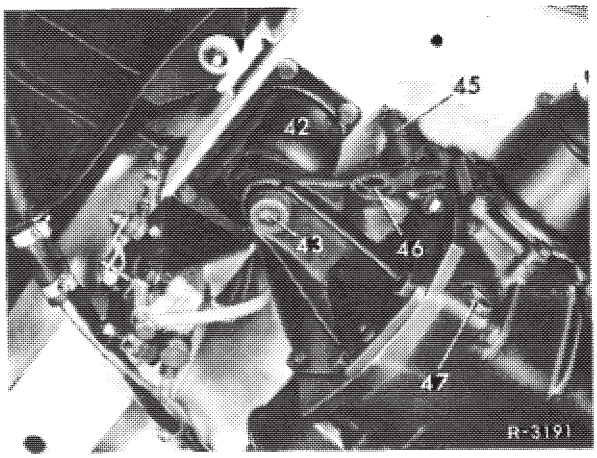
2 Unscrew hex bolts or locking bolts on frame floor and slightly lower rear axle.

On models 115.114 and 123 with engine 617, with engine 616 starting March 1978, with engine 115 starting September 1979 and with engine 102, additionally loosen front stop limit from rear axle carrier (35–040).



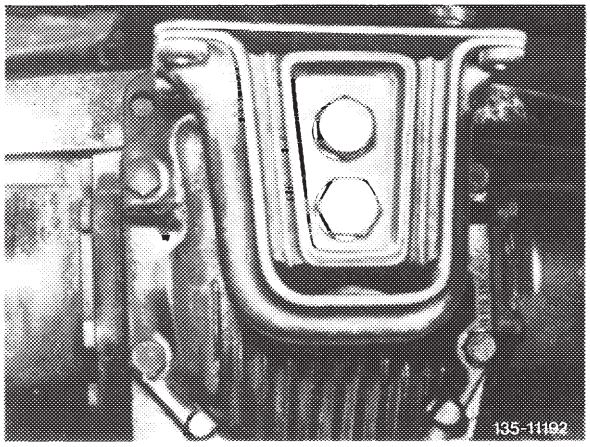
1st version on models 107 and 106
2nd version on models 114 and 115

3 Unscrew hex. socket necked-down screw (43) and remove together with rubber bearing.

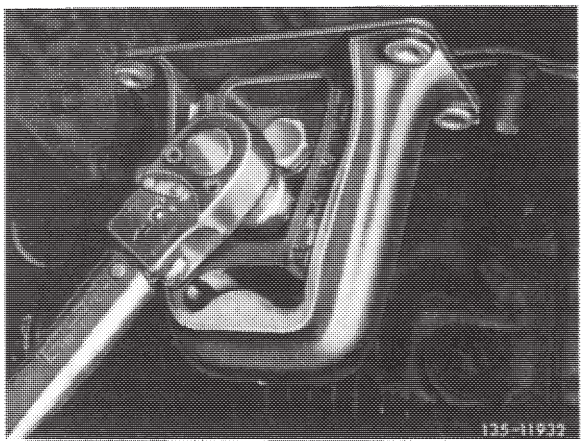


1st version on models 114 and 115

4 Unscrew rubber mounting from rear axle end cover and remove.



1st version on models 107 and 116
2nd version on models 114 and 115

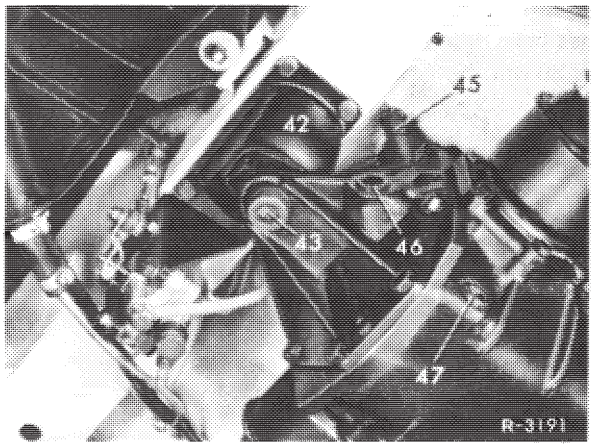


1st version on models 123 and 126
2nd version on models 107 and 116
Repair version on models 114 and 115

Installation

5 Attach rubber bearing (42) of 1st version to frame floor. Tightening torque of hex bolts 25 Nm (2.5 kpm).

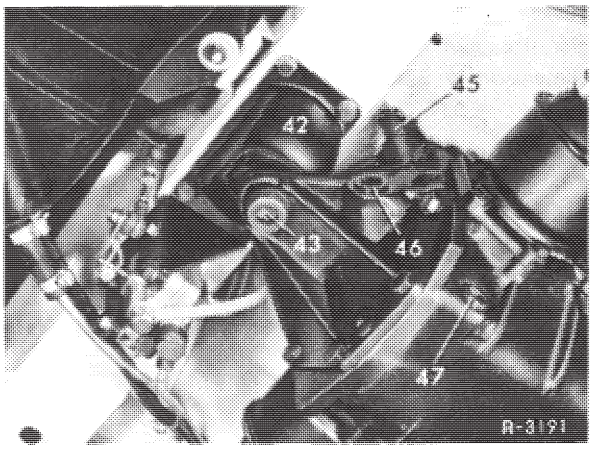
Attention!
Rubber bearing is asymetrically designed. To guarantee installation free of tensions, install rubber bearing with narrow end in driving direction.



1st version on models 114 and 115

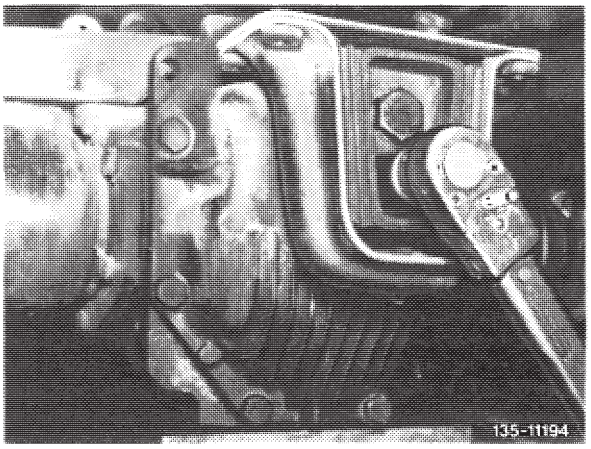
6 Lift rear axle and tighten hex socket necked-down screw (43) to 140 Nm.

Note: Always replace hex. socket necked-down expanding screw (43) after using screw once.

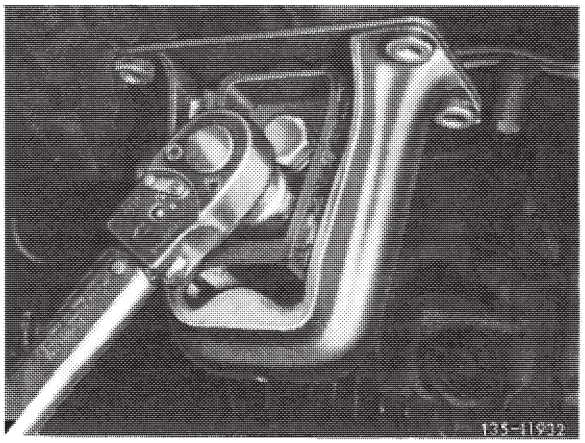


1st version on models 114 and 115

7 Attach rubber bearing to rear axle end cover. Tighten hex. screws to 120 Nm.



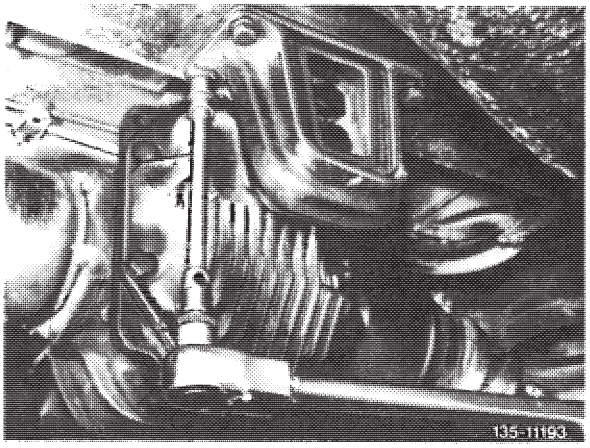
1st version on models 107 and 116
2nd version on models 114 and 115



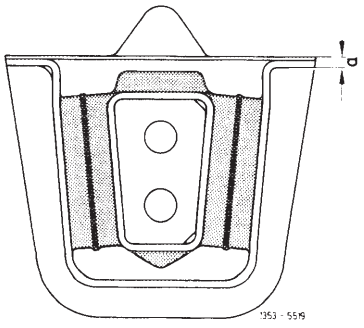
1st version on models 123 and 126
2nd version on models 107 and 116
Repair version on models 114 and 115

8 Lift rear axle and tighten hex bolts or self-locking hex bolts of rubber bearing to frame floor at 25 Nm or 30 Nm.

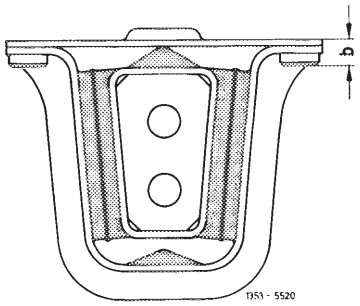
Attention!
Self-locking hex. screws with plastic coating (micro-encapsulated) or holders with all-metal lock nut on model 126 may be used **only** once.



9 On rubber bearings **without** washers on fastening eyes, use hex bolts with washers and snap rings only (dimension a = 5 mm).

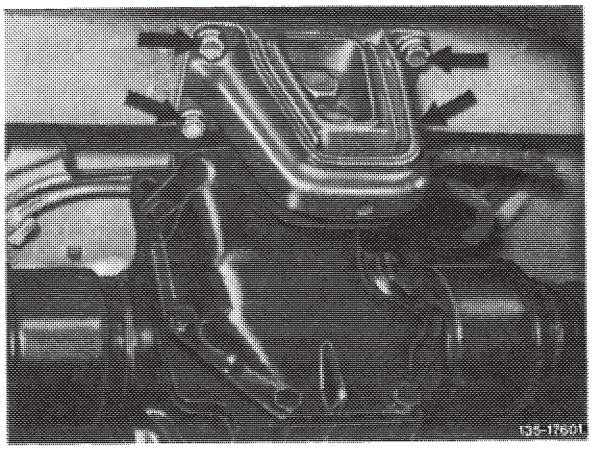


10 On rubber bearings **with** washers on fastening eyes use self-locking hex. bolts only (dimension b = 12 mm).

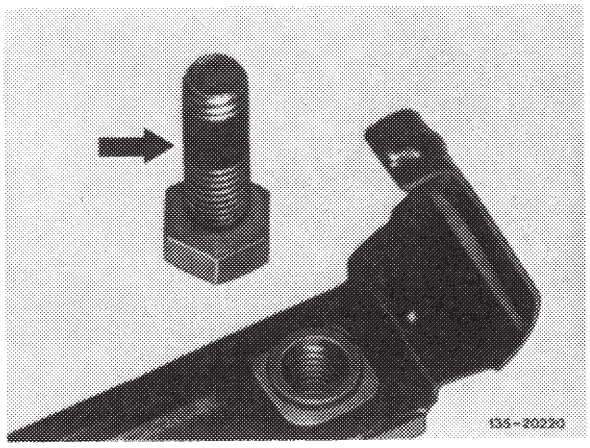


Model 126

11a Lift rear axle center piece up to frame floor and fasten rubber bearing to frame floor. Tightening torque of self-locking hex. bolts 1st version or hex. bolts 2nd version 30 Nm.



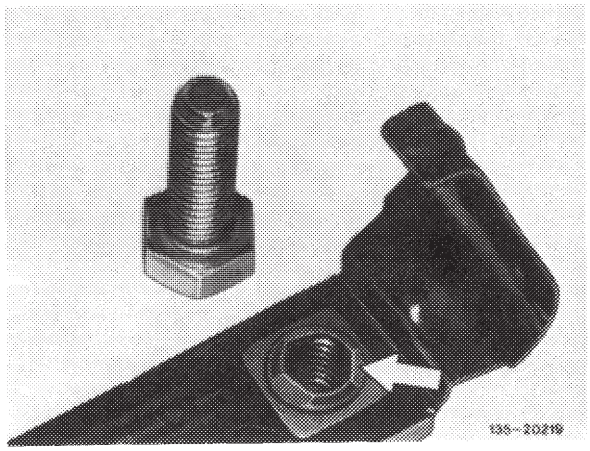
11b In the event of repairs, replace 1st version by 2nd version.



1st version

Self-locking hex. bolts (arrow) and holder with nut without lock

Attention!
Be sure to replace holder of 2nd version after one-time use.

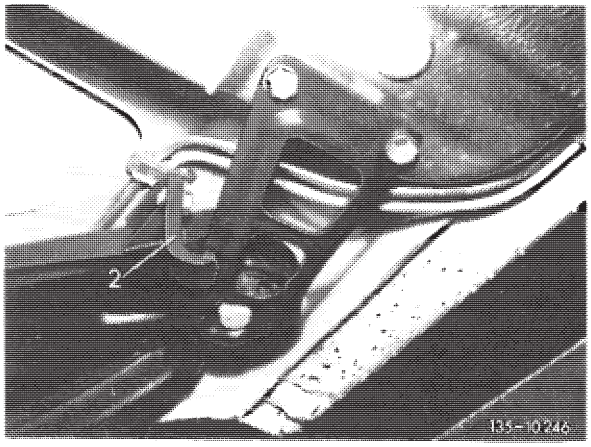


2nd version

Hex. bolts without lock and holder with self-locking nuts (arrow)

12 Lower pit lift or vehicle jack and remove top.

13 On models 115.114 and 123 with engine 617, with engine 616 starting March 1978, with engine 115 starting September 1979 and with engine 102, mount stop limit (2) and adjust (35–040).

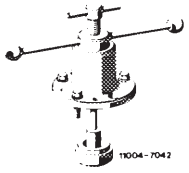
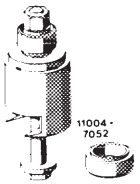


Slide fluid for pressing-in rubber bearings

Slide fluid (Naphtolene H or slide paste Fahr)	000 989 08 60

Tightening torques		Nm
Hex nut for attaching semi-trailing arm to rear axle carrier		120
Hex bolt for attaching rear axle shaft to rear axle shaft flange	1st version (M 12)	95
	2nd and 3rd version (M 8)	30

Special tools

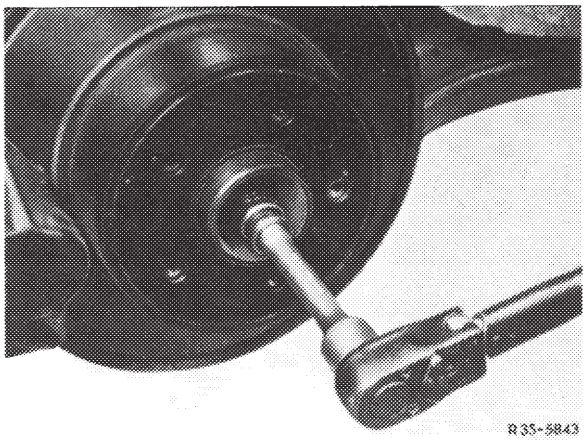
Assembly device for removal and installation of rear axle shaft on rear axle shaft flange		116 589 24 61 00
Remover and installer for rubber bearing on semi-trailing arm		116 589 13 43 00

Removal

1 Completely remove rear axle together with rear axle carrier (35–010).

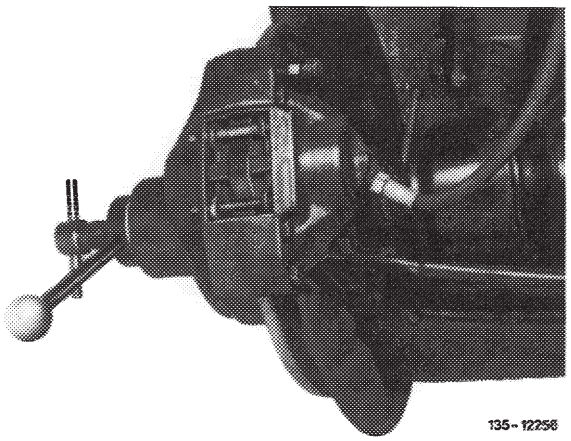
2 Lower semi-trailing arm down to deflection stop.

3 Loosen hex. screw (M 12) of 1st version or hex. screw (M 8) with spacing sleeve and tensioning washer of 2nd and 3rd version for attaching rear axle shaft to rear axle shaft flange and remove.



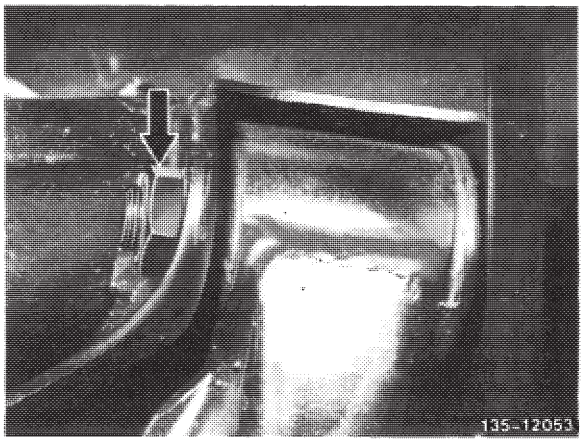
4 If required, push rear axle shaft out of rear axle shaft flange by means of assembly fixture.

Attention!
When removing assembly tool, be sure to hold rear axle shaft in place. Do not drop rear axle shaft, so that housing for synchromesh joint will not be damaged or start leaking.



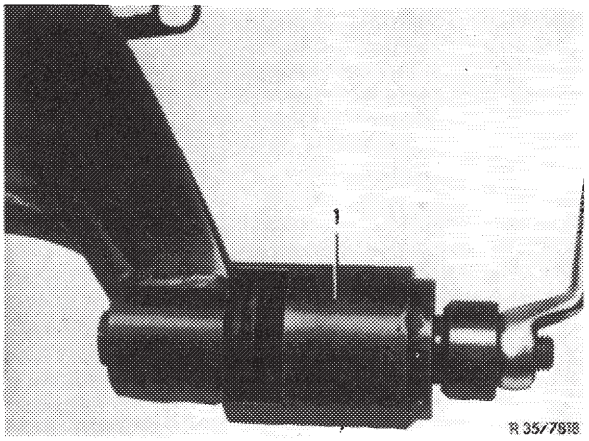
5 Loosen hex nut for attaching semi-trailing arm. Pull out hex bolts and remove semi-trailing arm.

Attention!
During removal and transportation of semi-trailing arm, do not damage cover plate of brake disc.

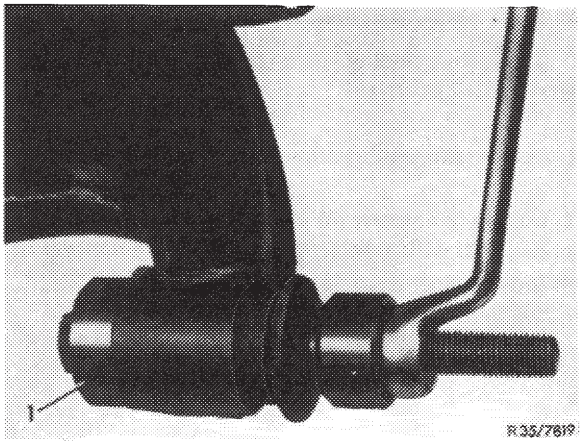


Replacing rubber bearing

6 Pull rubber bearing out of semi-trailing arm.



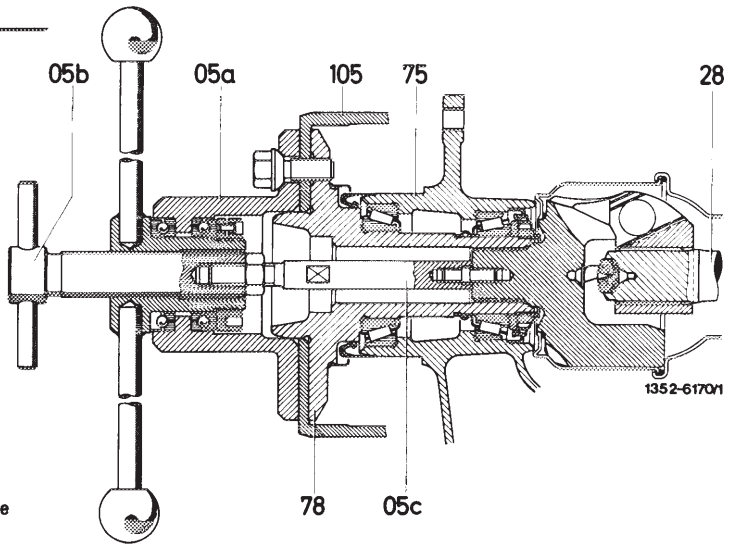
7 Coat new rubber bearing with sliding fluid and pull-in by means of installer (1) from outside in-ward direction up to stop on eye of semi-trailing arm.



Installation

8 Insert semi-trailing arm into rear axle carrier. Insert hex bolts and screw-on hex nuts together with snap rings, but do not yet tighten.

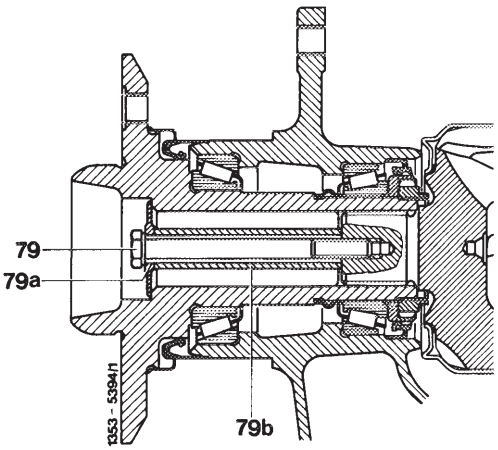
9 If required, pull rear axle shaft with assembly fixture untio rear axle shaft flange.



05a-05c Assembly fixture
28 Rear axle shaft
75 Semi-trailing arm
78 Rear axle shaft flange
105 Brake disc

10 Tighten hex. screw for attaching rear axle shaft to rear axle shaft flange on 1st version (M 12) to 95 Nm. On 2nd and 3rd version, mount hex. screw (M 8) together with tensioning washer and spacing sleeve and tighten to 30 Nm.

Attention!
Replace tensioning washer after one-time use. Provide tensioning washer (79a) with oil in range of screw head.

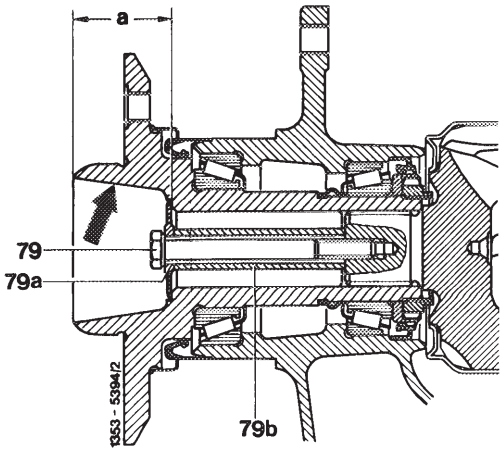


2nd version

79 Hex. screw M8 x 90
79a Tensioning washer
79b Spacing sleeve (72.5 mm long)

Note: Starting September 1979 the inside contour (arrow) of rear axle shaft flange has been modified and the contact surface of the tensioning washer has been moved inwards by an additional 5 mm. To guarantee the correct association of hex. screw and spacing sleeve, measure distance "a" on rear axle shaft flange from face to contact surface of tensioning washer by means of a depth gauge and take the length for the spacer sleeve and hex. screw from table.

Be sure to avoid wrong combinations!



3rd version

79 Hex. screw M8 x 85

79a Tensioning washer
79b Spacing sleeve (67.5 mm long)
a = 37 mm

2nd rear axle shaft flange version

a = 32 mm

Pertinent hex. screw = M 8x85
Pertinent spacing sleeve = 72.5 mm

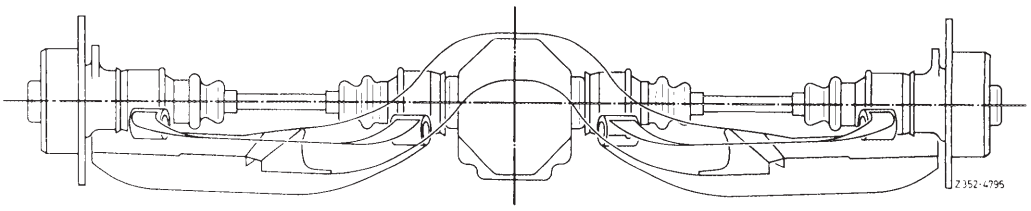
3rd rear axle shaft version

a = 37 mm

Pertinent hex. screw = M 8x85
Pertinent spacing sleeve = 67.5 mm

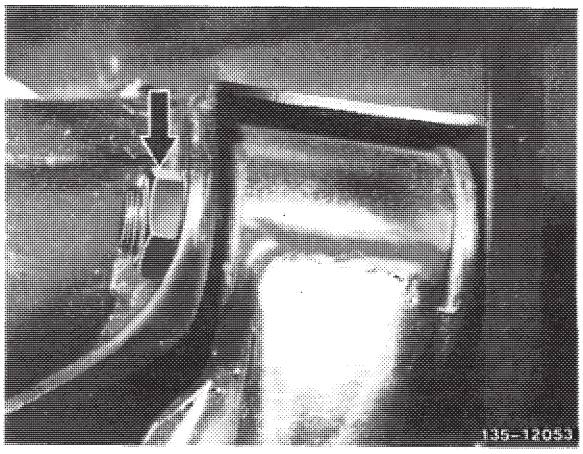
As an additional external identification characteristic, the shorter hex. screw is provided with a recess on hex. head, on the shorter spacing sleeve the surface is bright, on the former sleeve it is phosphatized (bonderized).

11 Raise or lower semi-trailing arm until rear axle shafts are horizontal.



12 Tighten hex nuts for fastening semi-trailing arm to 120 Nm (12 kpm).

13 Completely install rear axle (35–010).



Rear wheel bearings

End play of rear axle shaft flange		0.04–0.06

Rear axle shaft flange

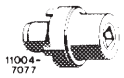
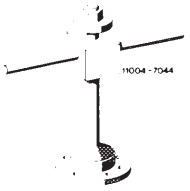
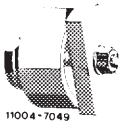
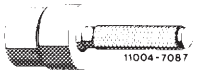
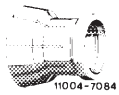
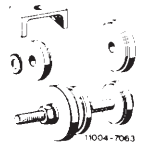
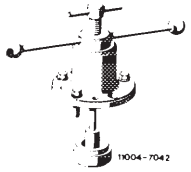
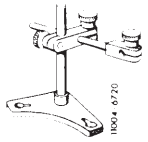
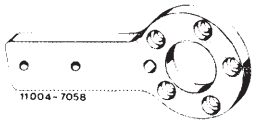
Permissible vertical runout on concentric alignment in installed condition		0.12
Permissible lateral runout in installed condition		0.12
Thickness of flange		9.5–10.0
Permissible vertical runout on bearing seats and on running surfaces for radial sealing rings		0.03
Permissible vertical runout on concentric alignment		0.02
Fit (dia.) for brake disc		67.00 / 66.97
Dia. of bearing seats	outside	46.028 / 46.017
	inside	41.013 / 41.002
Dia of running surface for outer radial sealing ring		72.00 / 71.81
Twist on running surface for outer radial sealing ring	lefthand flange	righthand twist
	righthand flange	lefthand twist
	Length of twist on circumference of running surface	20
Wideness of spacing sleeve		11.8–12.0

Lubricant

Lubricant for rear wheel bearing		**Multi-purpose grease** refer to specifications for service products page 267
Quantity each side		50 g

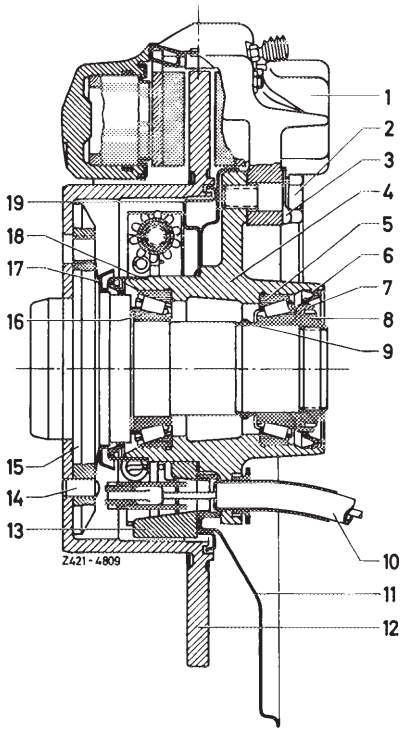
Tightening torque		Nm
Hex bolt for attaching rear axle shaft to rear axle shaft flange	1st version (M 12)	95
	2nd version (M 8)	30

Special tools

Socket for slot nut rear axle shaft flange		115 589 02 07 00
Impact puller for rear axle shaft flange		116 589 23 33 00
Puller for tapered roller bearing outer race		115 589 00 33 00
Remover for tapered roller bearing outer race		115 589 02 43 00
Puller for tapered roller bearing inner races (basic tool)		001 589 36 33 00
Collet for puller 001 589 36 33 00 for tapered roller bearing inner race		000 589 02 34 00
Installer for tapered roller bearing outer races and radial sealing rings on semi-trailing arm		116 589 11 61 00
Assembly tool for rear wheel bearing		116 589 24 61 00
Dial gauge holder		136 589 04 21 00
Assembly plate for rear axle shaft flange		136 589 05 31 00
Installer for tapered roller bearing race on rear axle shaft flange		116 589 09 15 00

Note

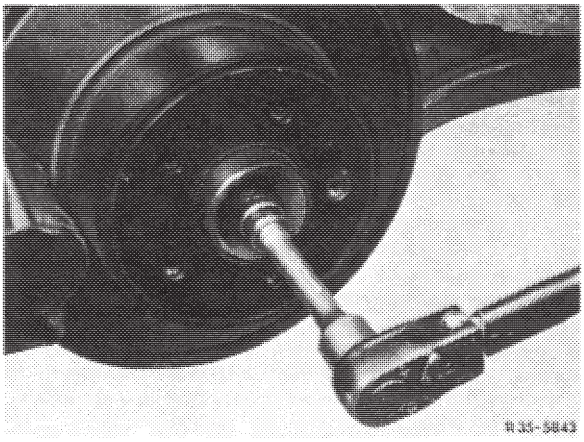
Jobs on bearing of rear axle shaft flange can also be completed with the rear axle installed.



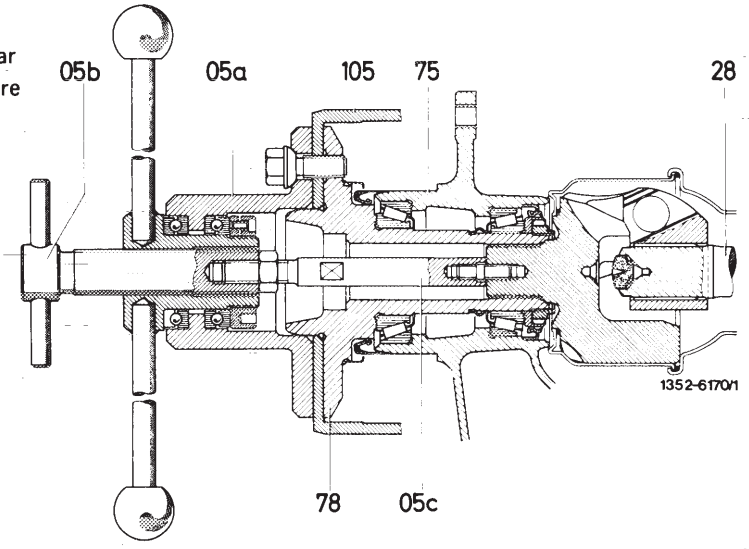
1 Caliper
2 Hex bolt (self-locking 2nd version only)
3 Locking plate (1st version only)
4 Wheel carrier
5 Inner tapered roller bearing
6 Inner radial sealing ring
7 Sealing ring (thrust washer)
8 Slot nut
9 Spacing sleeve
10 Cable control
11 Cover plate
12 Brake disc
13 Brake carrier
14 Cyl. pin
15 Rear axle shaft flange
16 Outer tapered roller bearing
17 Protective ring
18 Outer radial sealing ring
19 Cover ring

Removal

1 Unscrew hex bolt for attaching rear axle shaft to rear axle shaft flange and remove together with spacing sleeve and tensioning washer.



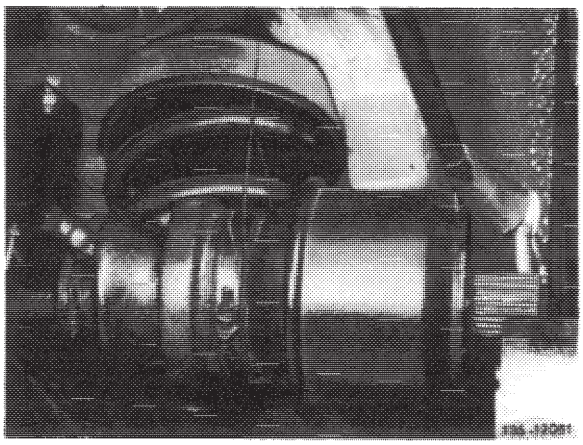
2 If required, push rear axle shaft (28) out of rear axle shaft flange (78) by means of assembly fixture (05).



3 Remove assembly tool.

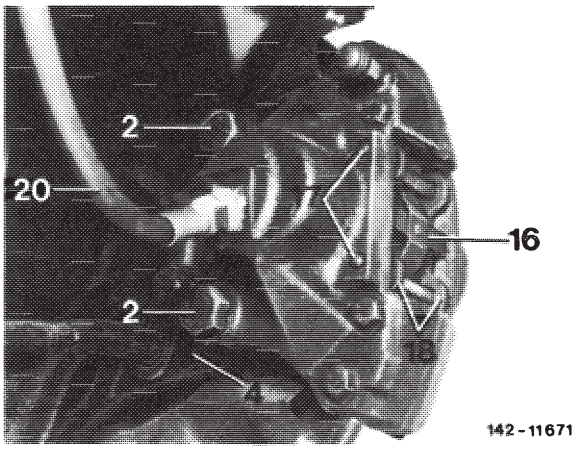
Attention!
When removing assembly tool, do not bend rear axle shaft too much and do not drop shaft.

With rear axle in place, rear axle shaft is best tied with a wire to torsion bar or rear spring, to continue working without obstruction.

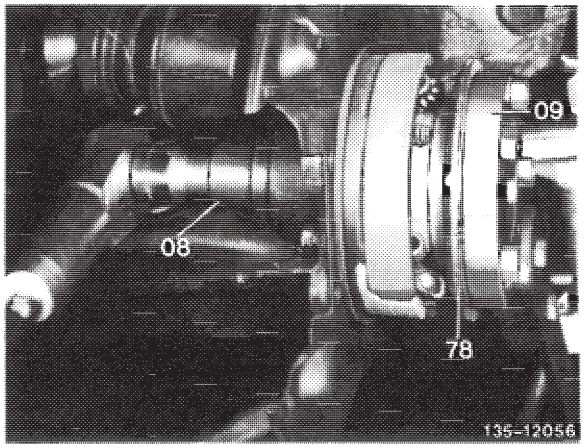


4 Remove caliper and brake disc (42–228).

5 Remove brake shoes of parking brake, if required (42–530).

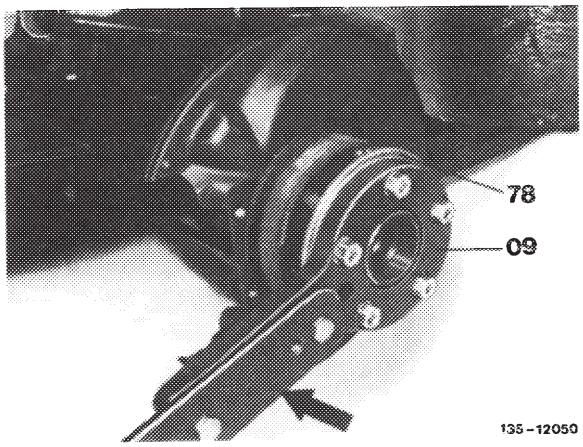


6 Unlock slot nut on rear axle shaft flange. Attach assembly (09) with extension (self-made) to rear axle shaft flange (78), loosen slot nut with slot nut wrench (08) and remove.

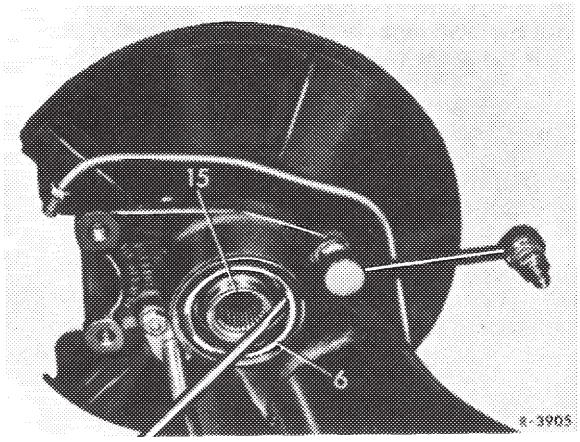


7 With the rear axle installed, the rear axle shaft flange (78) or the assembly plate (09) can be supported with an extension (arrow) as shown in illustration.

Note: For loosening slot nut with semi-trailing arm removed, clamp assembly plate (09) on shaft into vise.

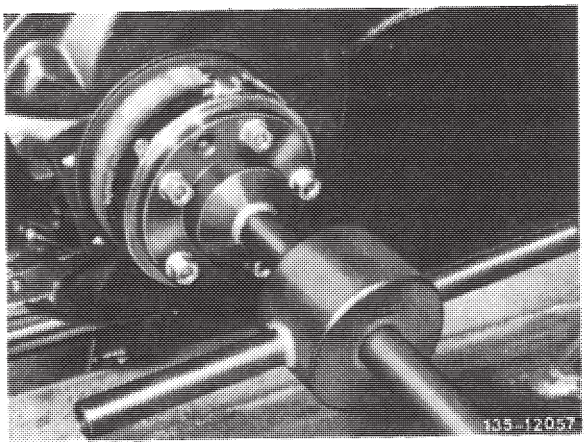


8 Remove sealing race and inner radial sealing ring (6) from wheel carrier by means of a screw driver.

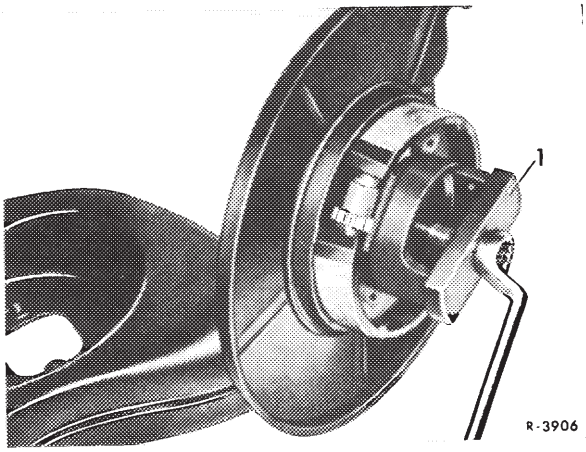


9 Knock rear axle shaft flange out of wheel carrier by means of impact puller and remove bearing inner race together with spacing sleeve.

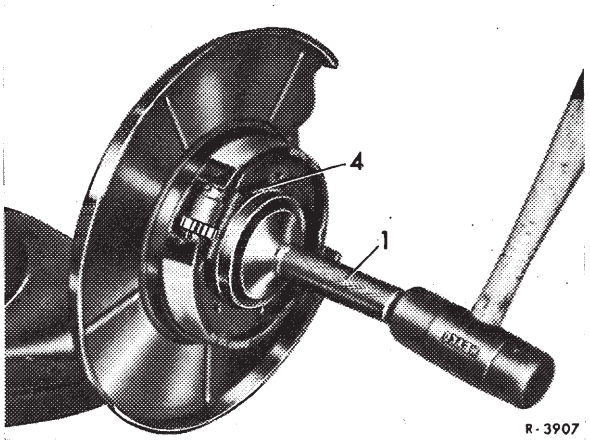
10 Remove outer radial sealing ring from wheel carrier.



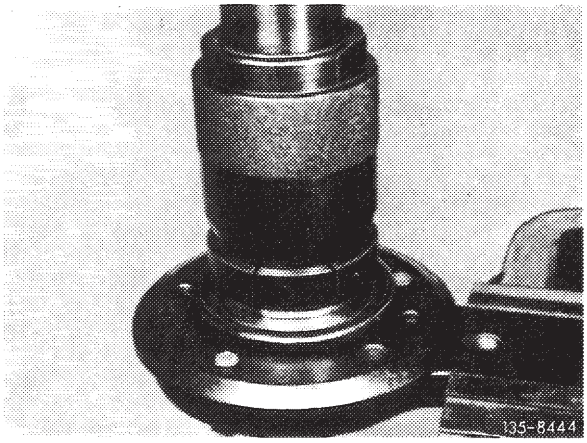
11 Pull bearing outer race of outer tapered roller bearing out of wheel carrier by means of puller (1).



12 Knock bearing outer race of inner tapered roller bearing out of wheel carrier (4) by means of removing mandrel (1).

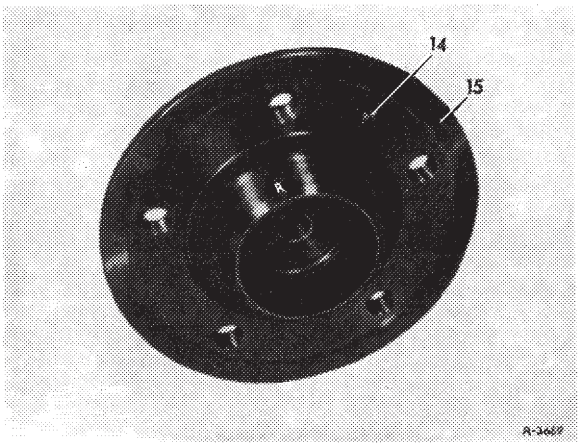


13 Clamp assembly plate with rear axle shaft flange into vise. Pull outer bearing inner race from rear axle shaft flange by means of puller.

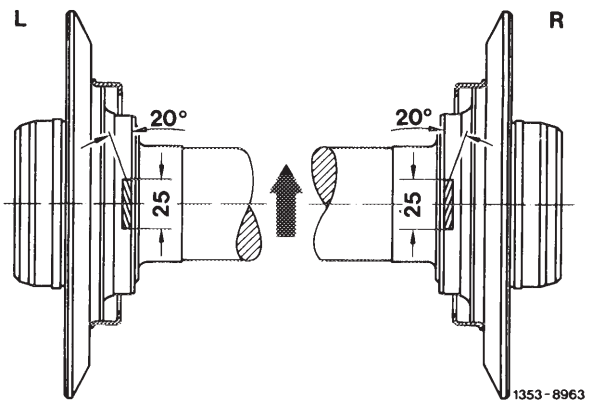


14 Check all parts for re-use. Pay special attention to running surfaces for radial sealing rings on rear axle shaft flange and on sealing ring. Replace worn parts. Check rear axle shaft flange for vertical and lateral runout.

Note: The rear axle shaft flanges are provided with an oil return spiral on running surface for outer radial sealing ring, which differs for lefthand and righthand side. For identification, the chamfer for concentric alignment is provided with a punched-in "R" for right-hand side and a punched-in "L" for lefthand side.



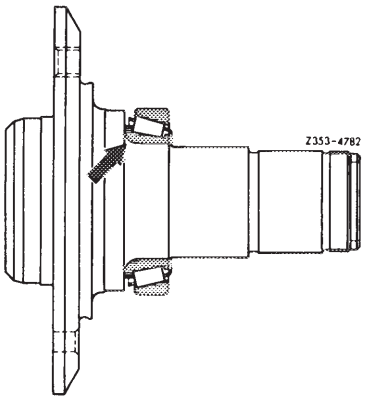
15 If required, refinish oil return spiral with emery cloth (grain 180) at an angle of approx. 20° for a length of 25 mm.



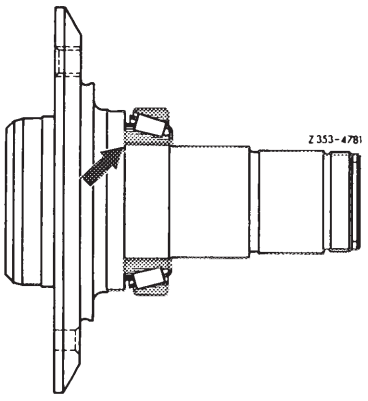
L = Lefthand rear axle shaft flange
R = Righthand rear axle shaft flange

Installation

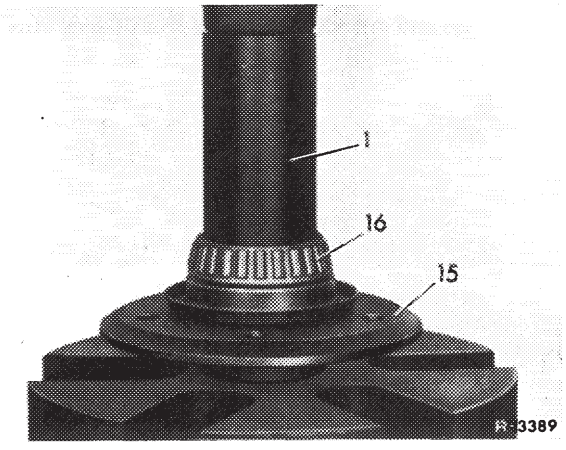
16 On rear axle shaft flange of present version use tapered roller bearing with large fillet (arrow) **only**.



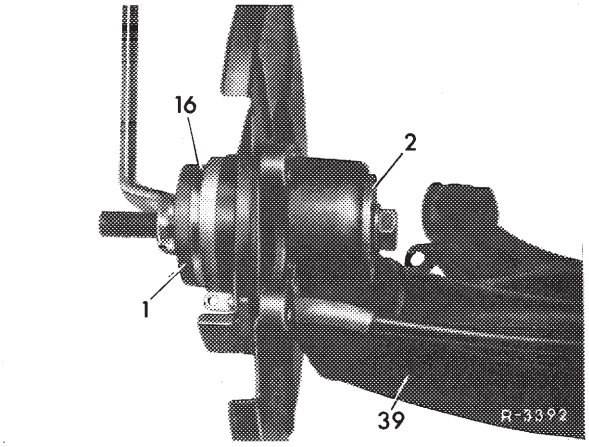
17 For rear axle shaft flange of version used up to now a tapered roller bearing with larger radius may also be used.



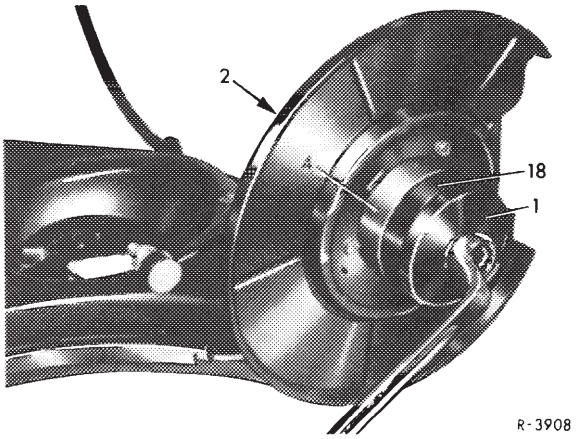
18 Press bearing ring of outer tapered roller bearing (16) on rear axle shaft flange (15) with a matching tube (1)



19 Install both bearing outer races into wheel carrier by means of installer (1 and 2).

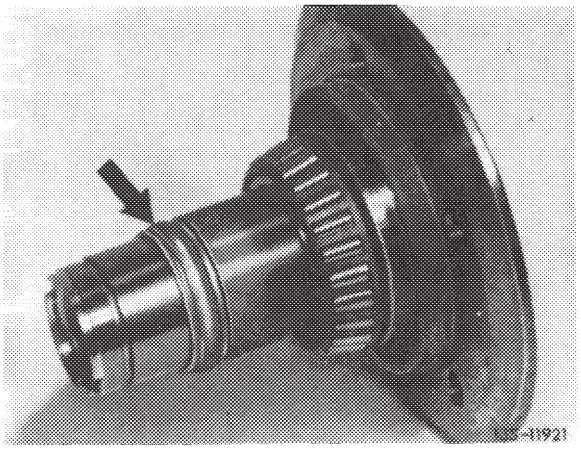


20 Coat seat for outer radial sealing ring on wheel carrier (4) with sealing compound and carefully mount new radial sealing ring (18) by means of puller (1 and 2) so that ring rests against chamfer of wheel carrier.



21 Coat or fill both tapered roller bearing inner races and cavity between both bearing outer races in wheel carrier with multi-purpose grease.

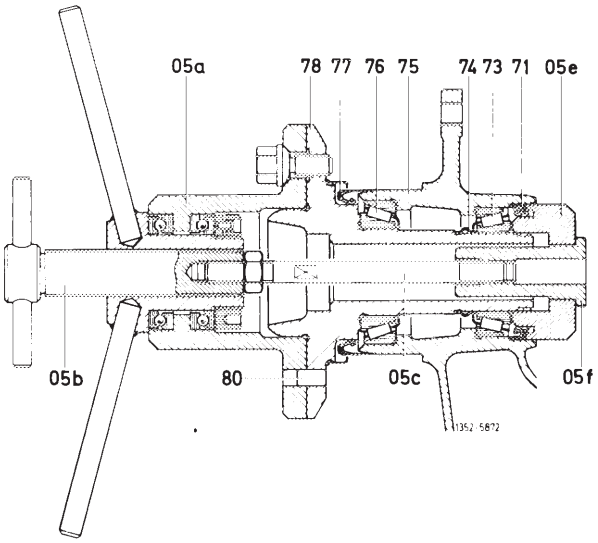
22 Mount new spacing sleeve (arrow) on rear axle shaft flange and introduce rear axle shaft flange into wheel carrier.



23 Place bearing inner race for inner tapered roller bearing (73) on rear axle shaft flange.

24 Fill new radial sealing ring between the two sealing lips with multi-purpose grease. Coat radial sealing ring with sheet metal jacket at OD with sealing compound. Mount radial sealing ring with partially rubberized jacket in dry condition. Press bearing inner race and radial sealing ring on or in by means of assembly tool (05a–05f).

25 Mount sealing ring and screw-on a new slot nut.

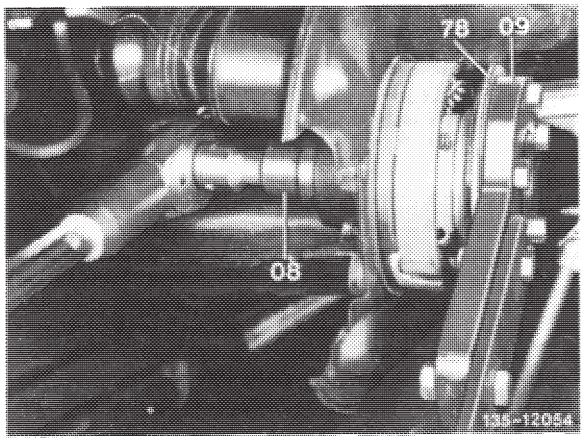


05a–05f Assembly tool
71 Radial sealing ring
73 Tapered roller bearing, inner
74 Spacing sleeve
75 Semi-trailing arm
76 Tapered roller bearing, outer
77 Radial sealing ring
78 Rear axle shaft flange
80 Fitted notched pin

Adjustment

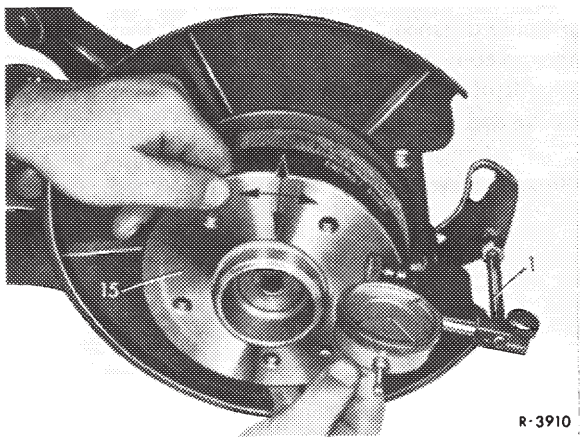
26 Attach assembly plates to rear axle shaft flange.

27 Keep tightening slot nut with slot nut wrench (08) until a slight end play can still be noticed. Attach dial gauge holder to wheel carrier.



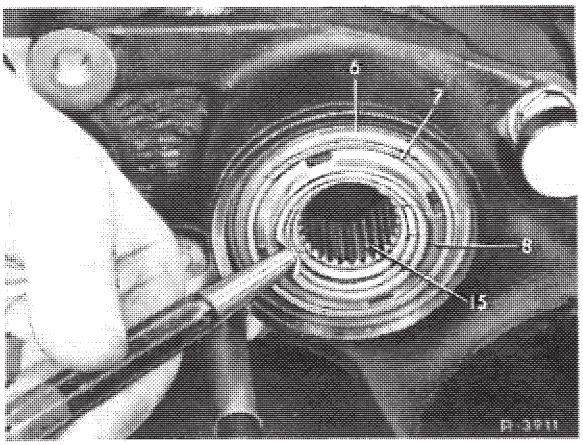
28 Check end play of rear axle shaft flange while moving rear axle flange back and forth and simultaneously turning to the right and left (end play 0.04–0.06 mm).

Attention!
If there is no more end play because the slot nut has been tightened too much, do not make corrections by releasing slot nut but always install a new spacing sleeve and set up end play once again.



29 Lock slot nut (8) by bending at two points into respective slots on rear axle shaft flange (15).

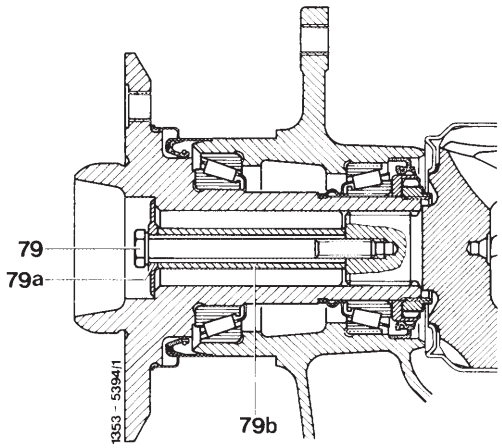
30 Pull rear axle shaft into rear axle shaft flange.



31 Tighten hex bolt for attaching rear axle shaft to rear axle shaft flange of 1st version (M 12) to 95 Nm.

On 2nd version, mount hex bolt (79; M 8) with tensioning washer (79 a) and spacing sleeve (79 b) and tighten to 30 Nm.

Attention!
Replace tensioning washer (79a) after one-time use.
Provide tensioning washer (79a) in range of screw head with oil (2nd and 3rd version).

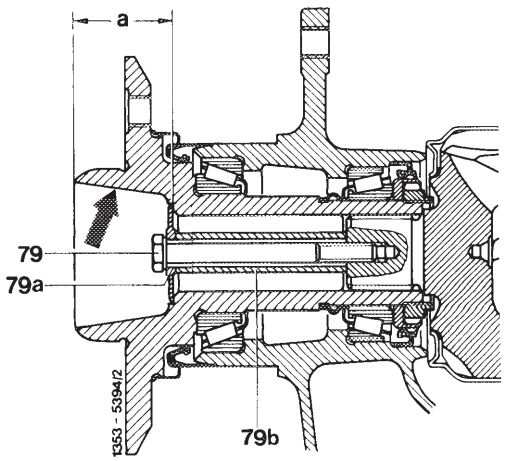


2nd version

79 Hex. screw M 8 x 90
79a Tensioning washer
79b Spacing sleeve (72.5 mm long)

Note: Starting September 1979 the inside contour (arrow) of rear axle shaft flange has been modified and the contact surface of the tensioning washer has been moved inwards by an additional 5 mm. To guarantee the correct association of hex. screw and spacing sleeve, measure distance "a" on rear axle shaft flange from face to contact surface of tensioning washer by means of a depth gauge and take the length for the spacer sleeve and hex. screw from table.

Be sure to avoid wrong combinations!



3rd version

79 Hex. screw M 8 x 85
79a Tensioning washer
79b Spacing sleeve (67.5 mm long)
a = 37 mm

2nd rear axle shaft flange version

a = 32 mm

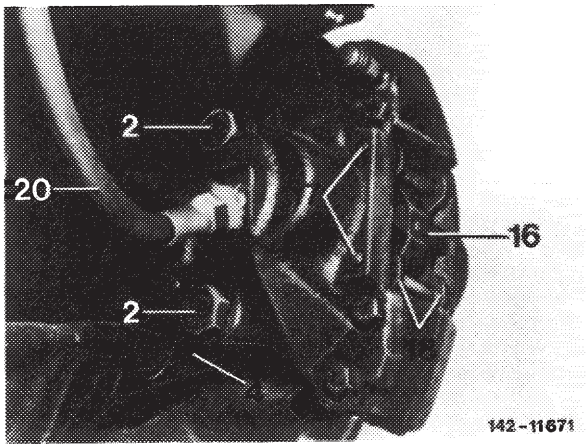
Pertinent hex. screw = M 8x90
Pertinent spacing sleeve = 72.5 mm

3rd rear axle shaft version

a = 37 mm

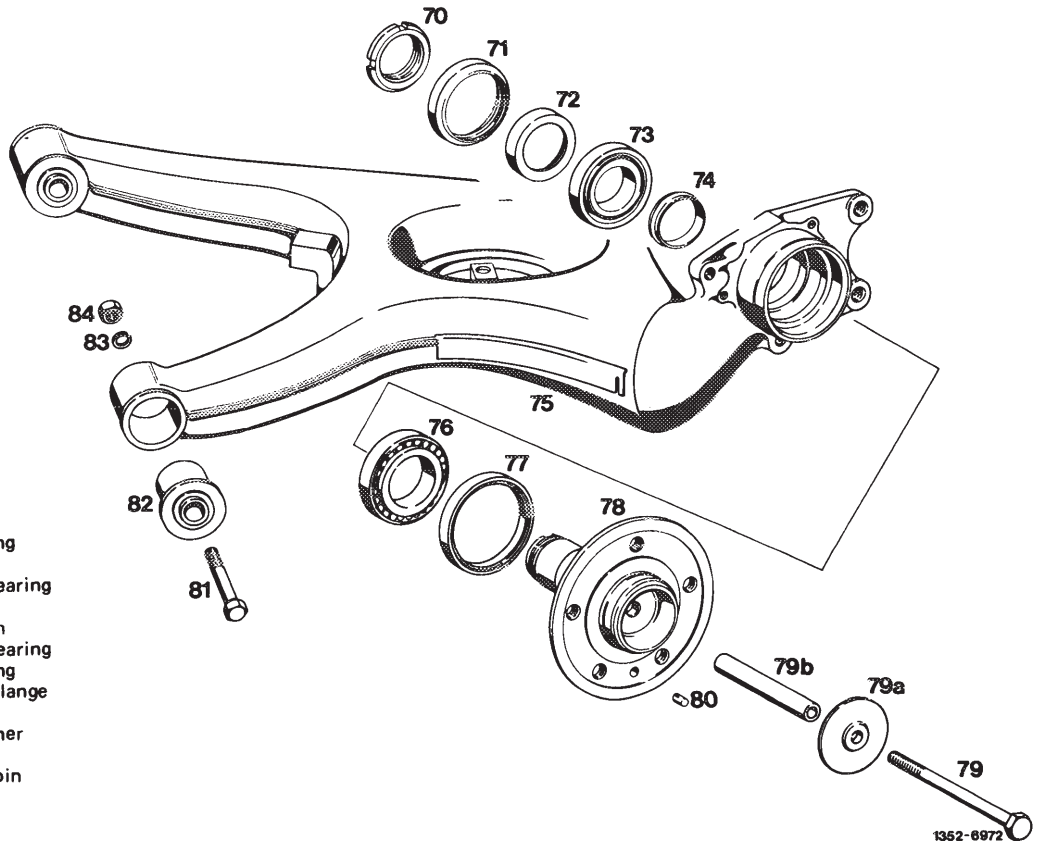
Pertinent hex. screw = M 8x85
Pertinent spacing sleeve = 67.5 mm

As an additional external identification characteristic, the shorter hex. screw is provided with a recess on hex. head, on the shorter spacing sleeve the surface is bright, on the former sleeve it is phosphatized (bonderized).



32 Install brake shoes of parking brake, if removed (42–530).

33 Mount brake disc and vent brake system, if required (42–010 and 42–228).



70 Slot nut
71 Radial sealing ring
72 Thrust washer
73 Tapered roller bearing
74 Spacing sleeve
75 Semi-trailing arm
76 Tapered roller bearing
77 Radial sealing ring
78 Rear axle shaft flange
79 Hex bolt
79a Tensioning washer
79b Spacing sleeve
80 Fitted notched pin
81 Hex bolt
82 Rubber bearing
83 Snap ring
84 Hex nut

Adjusting dimensions for inspection

Distance "d" of control mounts for front bearing of rear axle carrier		Model 107.02, 114, 115	1025 ± 0.3 mm
		Model 107.04	820 ± 0.3 mm
		Model 116	1214 ± 0.3 mm
		Model 123	1190 ± 0.3 mm
		Model 126	1192 ± 0.7 mm
Distance "e" from measuring table	To upper edge of rear axle carrier center at front end	Model 107.02, 114, 115	303 ± 0.5 mm
		Model 116, 126	299 ± 0.5 mm
		Model 123	314 ± 0.5 mm
	To lower edge of rear axle carrier center at rear end of rear axle without drive members[1])	Model 107.04	361 ± 0.5 mm
	To center of drive pinion pin of rear axle with drive members	Model 107.042	269 ± 0.5 mm
		Model 107.043/044/045/046	255 ± 0.5 mm
Distance "f" from measuring table to rear axle shaft flange at upper edge for wheel fit		Model 107.02, 114, 115	293.5 ± 0.5 mm
		Model 107.04	318 ± 0.5 mm
		Model 116, 126	282.5 ± 0.5 mm
		Model 123	287.5 ± 0.5 mm

[1]) The measuring point refers to height of 12.5 mm bore.

Test values

Rear axle shaft flange	Lateral runout		0 to 0.12 mm	
Camber (+) or (−)	Model 107.02 114, 115 1st version 123 1st version		$-0^{\circ}\ 45' \pm 30'$	
	Model 107.042 1st version 107.043/044		$-1^{\circ}\ 20' \pm 30'$	
	Model 107.042 2nd version 107.045/046		$-1^{\circ}\ 30' \pm 30'$	
	Model 116, 126 107.02 2nd version 123 2nd version		$-1^{\circ}\ \pm 30'$	
Toe-in (+) or toe-out (−) (measuring points for toe-in per wheel (VSR1), reference points for toe-in total (VSG1)[1])	Model 107.043/044, 114, 115, 116 107.02/042 and 123 1st version	per wheel	+ 0.5	$^{+1.0}_{-0.5}$ mm
		total	+ 1.0	$^{+2.0}_{-1.0}$ mm
	Model 107.045/046 107.02/042 and 123 2nd version[2]) 126	per wheel	+ 1.5	$^{+0.5}_{-1.0}$ mm
		total	+ 3.0	$^{+1.0}_{-2.0}$ mm

1) Measurement difference between front and rear in reference to 14" rim diameter (measuring points for toe-in per wheel (VSR1) and/or reference points for total toe-in (VSG1) at a distance of 185 mm from wheel center). The values correspond to those toe-in values resulting during running gear measurement.

The doubled measuring values resulting from the additional control measurement of the total toe-in (VSG2) (measuring points 370 mm from wheel center) must be halved for comparison with the total toe-in values (VSG1).

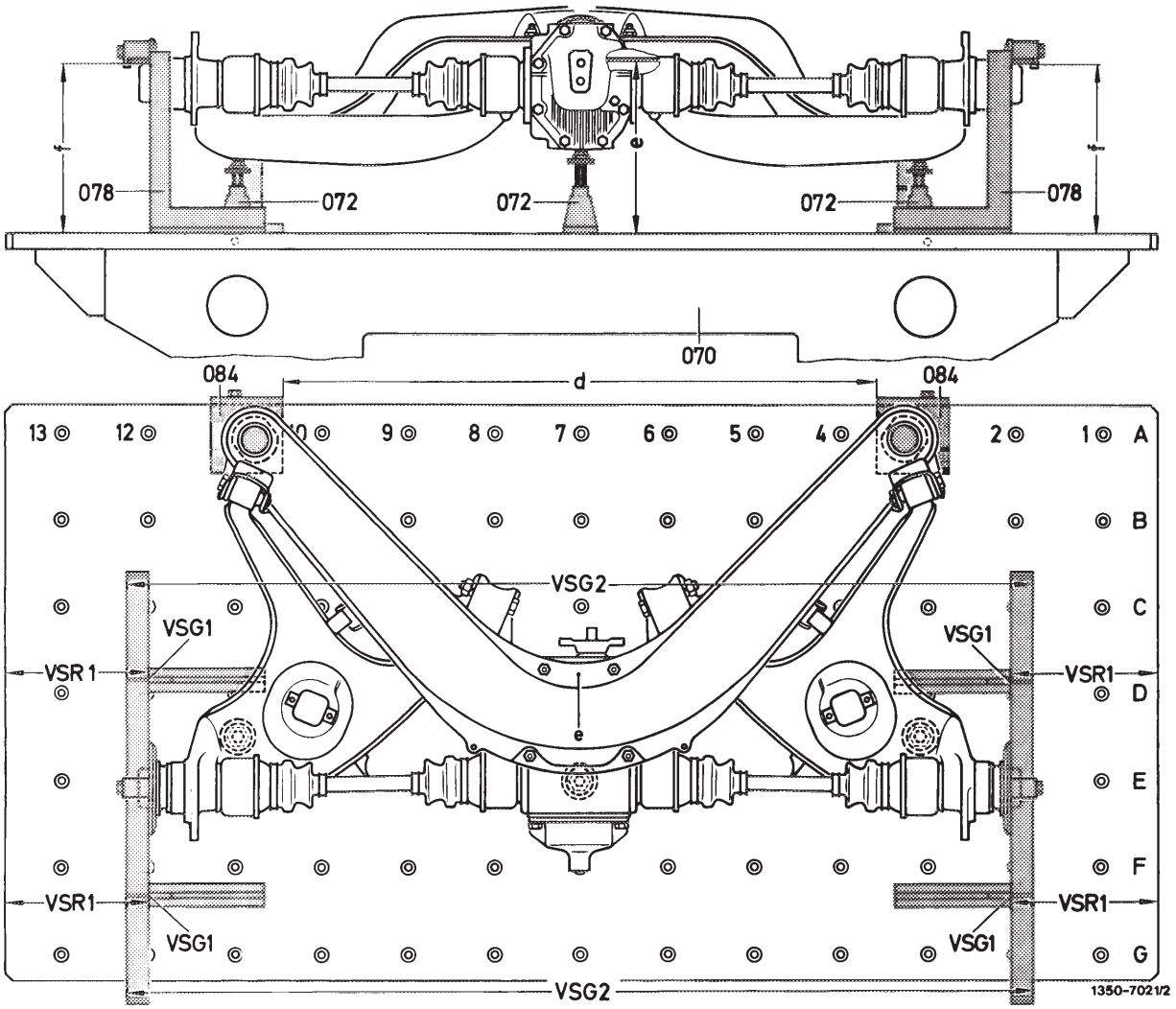
When comparing the toe-in measurement values obtained during running gear measurement with an axle measuring device in curb condition and measurement on the test bench in design position it must be noted that the values obtained during curb condition measurement can be 0.5 mm greater per wheel due to the higher semi-trailing arm position.

2) Identification characteristics on rear axle carrier 2nd version:
On model 123 additional bore of 10 mm dia. on the righthand, inner bearing bracket for connection of semitrailer.
On model 107.042 starting March 1980 and model 107.045/046 starting begin of production provided with spring bracket at outside with a recess.

Comparison table for toe-in millimeters/degrees

Toe-in (VSR1 or VSG1 when checking rear axle on measuring table[1])	corresponds to toe-in on axle measuring instrument	Toe-in (VSR1 or VSG1) when checking rear axle on measuring table[1])	corresponds to toe-in on axle measuring instrument
0.5 mm	$0^{\circ}\ 4'\ 30''$	5.5 mm	$0^{\circ}\ 49'\ 30''$
1.0 mm	$0^{\circ}\ 9'$	6.0 mm	$0^{\circ}\ 54'$
1.5 mm	$0^{\circ}\ 13'\ 30''$	6.5 mm	$0^{\circ}\ 58'\ 30''$
2.0 mm	$0^{\circ}\ 18'$	7.0 mm	$1^{\circ}\ 03'$
2.5 mm	$0^{\circ}\ 22'\ 30''$	7.5 mm	$1^{\circ}\ 07'\ 30''$
3.0 mm	$0^{\circ}\ 27'$	8.0 mm	$1^{\circ}\ 12'$
3.5 mm	$0^{\circ}\ 31'\ 30''$	8.5 mm	$1^{\circ}\ 16'\ 30''$
4.0 mm	$0^{\circ}\ 36'$	9.0 mm	$1^{\circ}\ 21'$
4.5 mm	$0^{\circ}\ 40'\ 30''$	9.5 mm	$1^{\circ}\ 25'\ 30''$
5.0 mm	$0^{\circ}\ 45'$	10.0 mm	$1^{\circ}\ 30'$

1) Measuring values with reference to 14" rim dia. (distance 185 mm from wheel center).



d Adjusting dimension of control mounts for front bearings
e Height adjusting dimension for rear axle carrier center
f Height adjusting dimension to rear axle shaft flange on upper edge for wheel fit
VSR1 Measuring points for toe-in per wheel (with reference to 14" rim dia at a distance of 185 mm from wheel center)
VSG1 Reference points for toe-in total (with reference to 14" rim dia at a distance of 185 mm from wheel center)
VSG2 Measuring points for additional control measurement of toe-in total (with reference to double 14" rim dia at a distance of 370 mm from wheel center)

070 Measuring table
072 Jack
078 Try square
084 Control mounts

Semi-trailing arm position in design position

(For comparison, inspection on measuring table and chassis measurement)

Model	Diagonal swing axle	Diagonal swing axle with starting torque compensation
107.022 to August 1980	+ 16 mm	108 mm
107.023, 107.024, 107.026		
107.022 starting September 1980	+ 19 mm	–
107.025[1])	+ 14 mm	–
107.042 up to February 1980	+ 6 mm	–
107.043, 044, 045, 046	+ 6 mm	97 mm
107.042 starting March 1980	+ 11 mm	–
107.045 (USA)		
114, 115	+ 16 mm	–
116	+ 12 mm	105 mm
123	+ 21 mm	–
126	+ 12 mm	106 mm

1) (USA) + 19 mm.

Data Sheet for Rear Axle Wheel Location

Checking on Test Bench of Vehicles Involved in and Suspected of being Involved in an Accident

Mercedes-Benz service

Branch/Agency | Customer

Measurement carried out: Date/Name | Day | Rep.-Order No.

Registration Number | Initial Registration | Model | Chassis No. | Speedometer reading: km/mi.

Received from | Received time | Received by | Engine No. | Non-binding delivery date

Testing the diagonal swing axle
Models 107, 114, 115, 116, 123, 126

					Measurement data prior to axle repair	Measurement data following axle repair	Remarks
Wheel suspension, complete	Rear axle shaft flange Lateral runout	mm	left				
			right				
	Camber (+) or (−)	degrees	left				
			right				
	Toe-in (+) or toe-out (−) (measuring points for toe-in per wheel (VSR1), reference points for total toe-in (VSG1) [1] [2] [3]	mm	left				
			right				
			total				
Semitrailing arm	Distance (b) between bearings measured across inner side	mm	left				
			right				
	Camber (+) or (−)	degrees	left				
			right				
	Toe-in (+) or toe-out (−) (measuring points for toe-in per wheel (VSR1) [1]	mm	left				
			right				
Rear axle carrier	Distance (c) between front mounts	mm					
	Camber deviation (STA) and toe-in deviation (SPA) on the outer bearing brackets for hinging the semitrailing arms [4]	mm	left	STA			
				SPA			
			right	STA			
				SPA			

[1] Measurement difference between front and rear in reference to 14" rim diameter (measuring points for toe-in per wheel (VSR1) and/or reference points for total toe-in (VSG1) at a distance of 185 mm from wheel center). The values correspond to those toe-in values resulting during running gear measurement.

[2] The doubled measuring values resulting from the additional control measurement of the total toe-in (VSG2) (measuring points 370 mm from wheel center) must be halved for comparison with the total toe-in values (VSG1).

[3] When comparing the toe-in measurement values obtained during running gear measurement with an axle measuring device in curb condition and measurement on the test bench in design position it must be noted that the values obtained during curb condition measurement can be 0.5 mm greater per wheel due to the higher semitrailing arm position.

[4] Measurement via light slit between the check support pin and the bore in the bearing bracket of the rear axle carrier. Even circumferential gap of light in the bore = 0 mm deviation. Pin contact in the bore = 1 mm deviation.

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35.1–410/4 F3

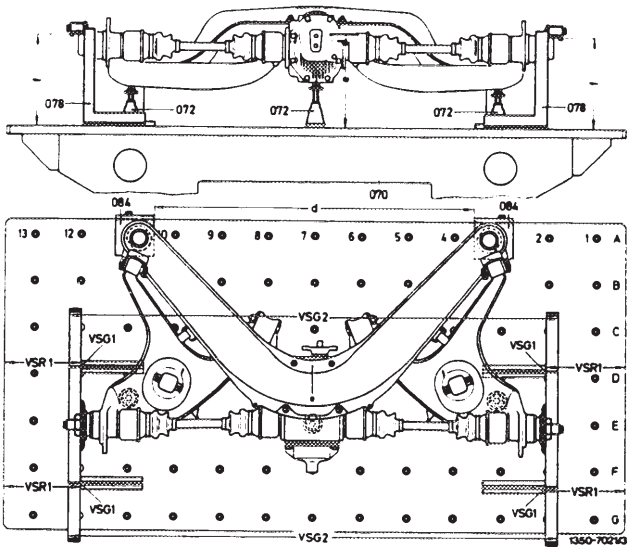
Testing Wheel Suspension, Complete

- d Adjustment dimension of the check supports for the front mounts of the rear axle carrier
- e Height adjusting dimension to center of rear axle carrier
- f Height adjusting dimension for rear axle shaft flange measured at upper edge of wheel centering collar

VSR1 Measuring points for toe-in per wheel (in reference to 14" rim diameter at a distance of 185 mm from wheel center).

VSG1 Reference points for total toe-in (in reference to 14" rim diameter at a distance of 185 mm from wheel center).

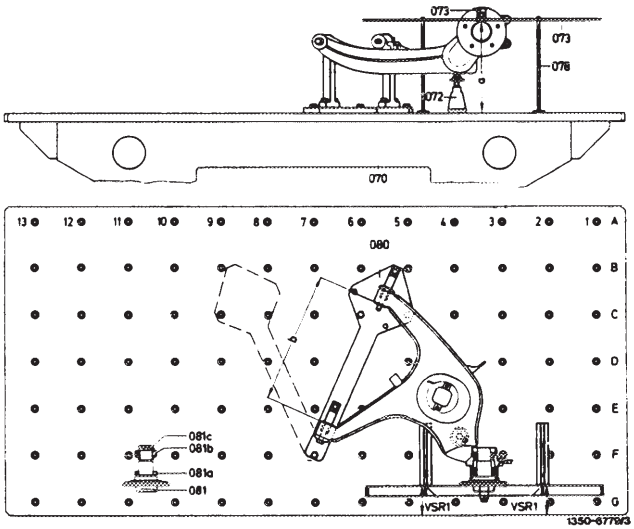
VSG2 Measuring points for additional control measurement of the total toe-in (in reference to the doubled 14" rim diameter at a distance of 370 mm from wheel center).



Testing Semitrailing Arm

- a Height adjusting dimension for rear axle shaft flange measured at upper edge of wheel centering collar
- b Distance between bearings measured across inner side (control dimension)

VSR1 Measuring points for toe-in per wheel (in reference to 14" rim diameter at a distance of 185 mm from wheel center).

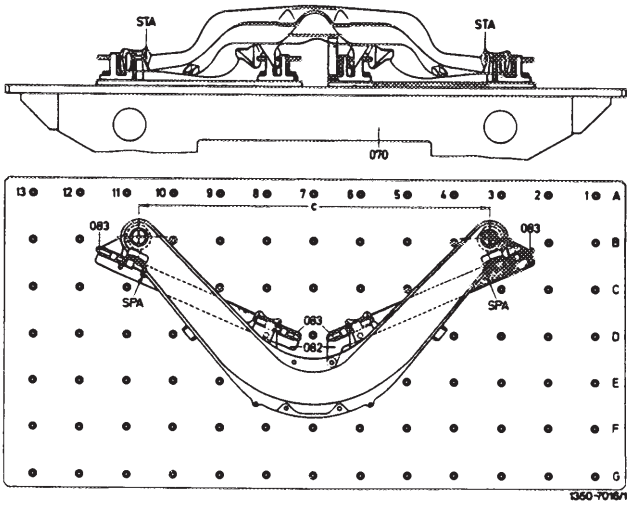


Testing Rear Axle Carrier

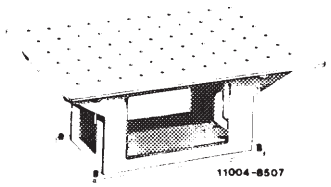
- c Distance between front mounts (control dimension)

STA Measuring points for camber deviation

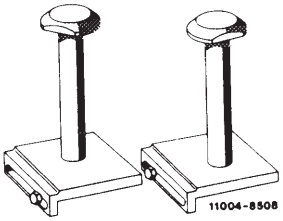
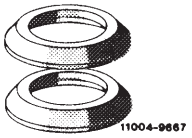
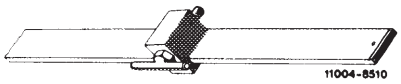
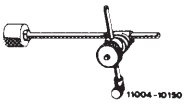
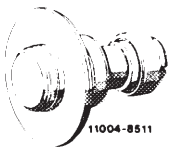
SPA Measuring points for toe-in deviation



Required equipment

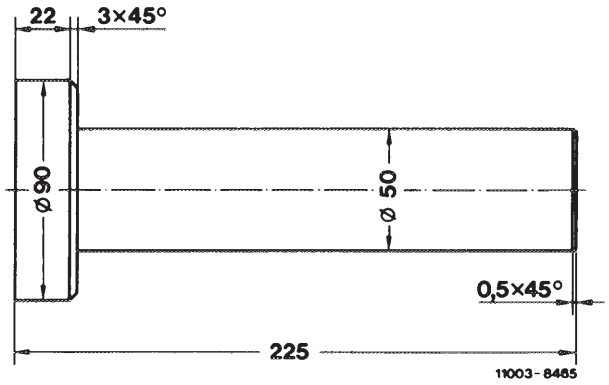
Measuring table with coordinate bore holes 13 mm dia F7, spacing 150 mm	 11004-8507	BE 03600 1522 E 0145

Special tools

Control mounts for complete directional stability system	 11004-8508	116 589 13 23 00
Intermediate rings for control mounts for complete wheel location model 126	 11004-9667	126 589 00 63 00
Jack, adjustable from 100 to 160 mm (required 3 each)	 11004-8509	116 589 08 31 00
Straightedge (750 mm long) with holder (required 2 each)	 11004-8510	116 589 12 31 00
Magnetic holder for dial gauge	 11004-10150	363 589 02 21 00
Measuring flange for semi-trailing arm and coupled semi-trailing arm without wheel bearing	 11004-8511	116 589 31 21 00

Self-made tool

Measuring base for
magnetic holder
Material: steel



Conventional tools

Dial gauge A 1 DIN 878	e.g. made by Mahr D-7300 Esslingen Order no. 810
Extension 50 mm for dial gauge	e.g. made Mahr D-7300 Esslingen Order no. 902
Try square 300 x 200 mm (required 2 each)	e.g. made by Stiefelmayer D-7300 Esslingen Order no. 151 AR
Height measuring and tracing tool size III	e.g. made by Stiefelmayer D-7300 Esslingen Order no. 5 V
Bell-type mount for angle measuring tool	e.g. made by Beissbarth D-8000 Munich Order no. P1/96
Angle measuring tool	e.g. made by Beissbarth D-8000 Munich Order no. P 10/05

Notes

Measuring of complete directional stability system will be of advantage if chassis measurements cannot be made on a vehicle following an accident with e.g. heavy front axle or front end damage or also if chassis measurements provide no clear-cut diagnosis of rear axle. If such measurements are within the specified tolerances, additional checkups of the individual semi-trailing arms and rear axle carriers are not required.

A checkup of the complete directional stability system is not required if a visual checkup is already showing deformations on rear axle carrier or on a semi-trailing arm. In such a case, check the individual components whenever required.

Measuring of complete directional stability system is principally the same for all axles of the respective models; only the different adjusting dimensions must be taken into account when making preparations for measuring.

For measuring the directional stability system and its various components a measuring table of 2000 x 1000 mm will be required. The measuring table has coordinate bore holes of 13 mm dia F7 spaced 150 mm apart for locating the control mounts. The coordinate bore holes are identified in longitudinal direction with the numbers 1 to 13 and in transverse direction with the letters A to G.

The principle of checking the complete directional stability system and the semi-trailing arms is about the same as for chassis measurements. The optical rectangular established around the vehicle for chassis measurements is replaced by the measuring table for the mechanical measurement of the directional stability system and its components.

The mesuring values before and following axle reconditioning must be recorded in "Data sheet for directional stability of rear axle".

For checking on measuring table, the components of the directional stability system are located on measuring table in such a manner that the position of the semi-trailing arms corresponds to the design position, i.e. to a medium vehicle load. When comparing the measuring values between the checkup on the measuring table and the chassis measurements with vehicle ready for driving, refer to table "Semi-trailing arm position in design position".

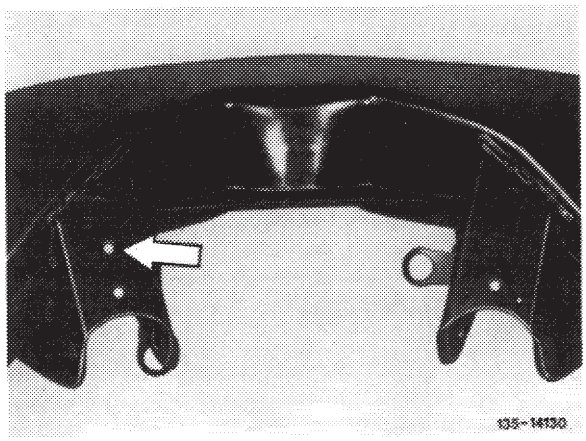
The checkup of the complete directional stability system of rear axle comprises:

a) Checking rear axle shaft flanges for lateral runout
b) Rear axle camber
c) Toe-in per wheel (VSR1), total toe-in (VSG 1 and VSG 2)

On rear axle carrier for model 123, starting April 1977, a change has been made on bearing brackets for connection of semi-trailing arms. Compared with the 1st version, the camber of the complete directional stability system has been changed in minus direction by approx. 0° 15' and the toe-in in plus direction by approx. 1.0 mm per wheel.

Identification starting January 1978 for rear axle carrier of 2nd version:

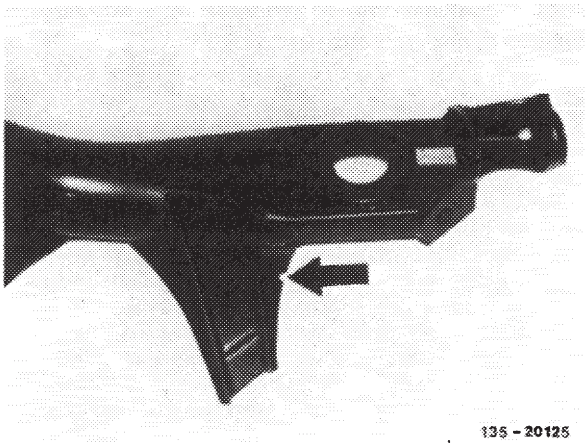
Additional bore of 10 mm dia at right-hand, inner bearing for connection of semi-trailing arm (arrow).



Series production of rear axle carrier 2nd version on model 123

Model	–	Starting chassis end no.	Model		Starting chassis end no.
Sedans	123.020	038 541	Sedans long	123.028	022 886
	123.023	048 372		123.129	033 764
	123.026	022 886		123.132	042 755
	123.030	016 635			
	123.033	024 625	T sedans	123.083	000 001
	123.120	053 863		123.086	000 001
	123.123	033 764		123.093	000 001
	123.126	022 239		123.183	000 001
	123.130	043 755		123.190	000 001
Coupes	123.043	000 001	Special vehicles	123.000	048 372
	123.050	000 001	(bodies made by	123.003	022 886
	123.053	000 001	others)	123.007	000 001
	123.150	000 001		123.102	033 764
				123.103	033 764
				123.105	043 755

On rear axle carrier for model 107.022 starting September 1980 and 107.042 starting March 1980, the bearing brackets for swivelling semi-trailing arm has been modified. As a result, compared with 1st version, the complete wheel location resulted in a change of toe-in in plus direction by approx. 1.0 mm per wheel.



Identifying characteristics starting March or September 1980 for rear axle carrier of 2nd version:

Additional bore of 10 mm dia. on righthand, inner bearing bracket for swivelling semi-trailing arm on model 107.022 and on model 107.042 provided with a recess on both resilient stops on outer side (arrow).

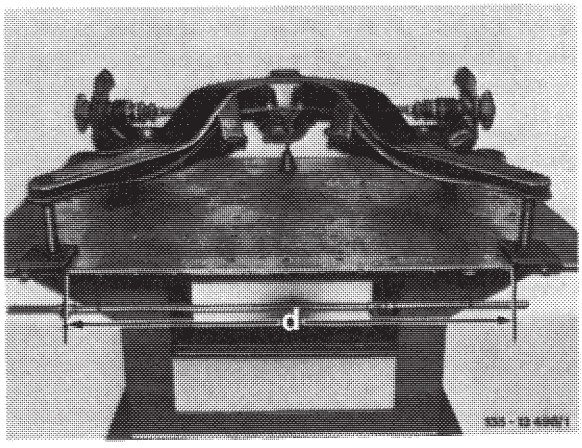
Beginn of series production of rear axle carrier 2nd version on model 107.022 and 107.042, no chassis end number has been recorded.

Preparation for checkup

1 Remove brake caliper and brake disc (42–228).

2 Force both rubber mounts of front rear axle bearings out of rear axle carrier (35–040).

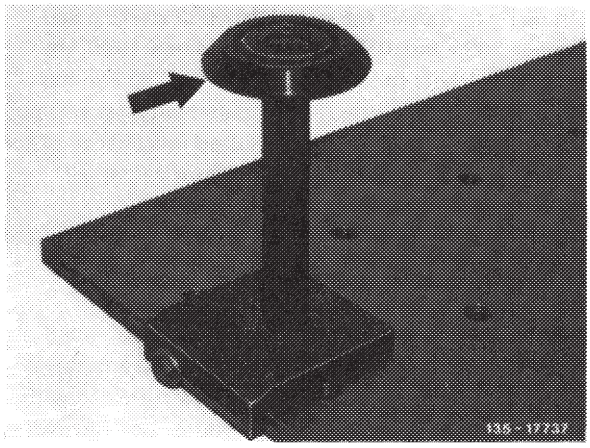
3 Set distance "d" of control mounts on measuring table and attach control mounts.



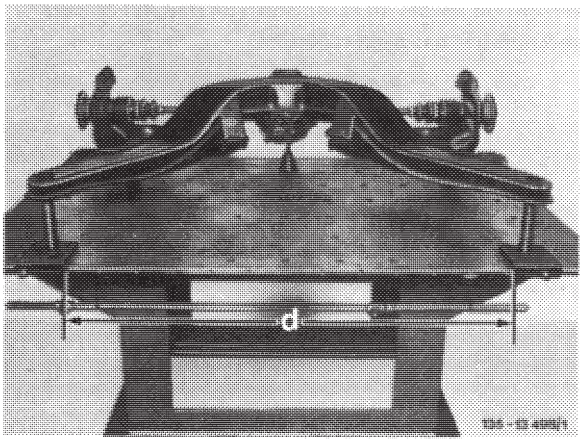
Adjusting dimensions

Model 107.02, 114, 115	1025 ± 0.3 mm
Model 107.04	820 ± 0.3 mm
Model 116	1214 ± 0.3 mm
Model 123	1190 ± 0.3 mm
Model 126	1192 ± 0.7 mm

4 On model 126, include additional intermediate rings on control mounts (arrow).



5 Place directional stability assembly on control mounts and support rear axle center housing or rear axle carrier center as well as both semi-trailing arms by means of jacks.



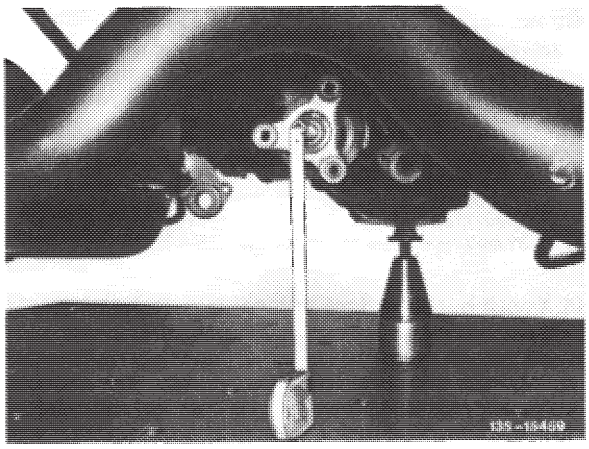
6 Distance "e" on models 107.02, 114, 115, 116, 123 and 126 on rear axle with or without drive members, adjust rear axle carrier at front end (arrow) by means of a height measuring instrument from measuring table to upper edge of rear axle carrier center. For this purpose, change height of jack accordingly.

Adjusting dimensions

Model 107.02, 114, 115	303 ± 0.5 mm
Model 116, 126	299 ± 0.5 mm
Model 123	314 ± 0.5 mm

Note: The adjusting dimension refers to surface of upper shell of rear axle carrier. Pay attention to weld seam in measuring range, if applicable.

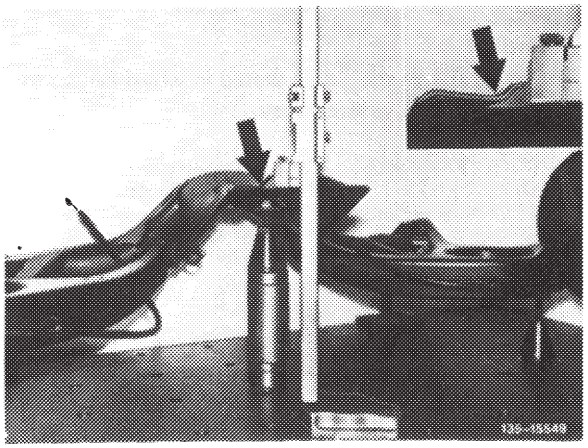
7 Adjust distance "e" on model 107.04 on one rear axle **with** drive members by means of a precision measuring tape or height measuring tool from measuring table to center of pin on drive pinion. For this purpose, change height of jack accordingly.



Adjusting dimensions

Model 107.042	269 ± 0.5 mm
Model 107.043/044 107.045/046	255 ± 0.5 mm

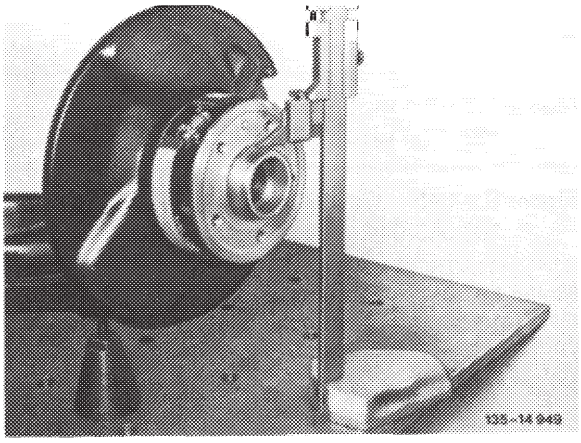
8 Adjust distance "e" on model 107.04 on one rear axle **without** drive members with a height measuring tool from measuring table to bottom edge of rear axle carrier at rear end in center to height of 12.5 mm bore (arrow). For this purpose, change height of jack accordingly.



Adjusting dimension

Model 107.04	361 ± 0.5 mm

9 Adjust distance "f" with a height measuring tool from measuring table of upper edge of wheel fit on rear axle shaft flange left and right. For this purpose, change height of jack accordingly.



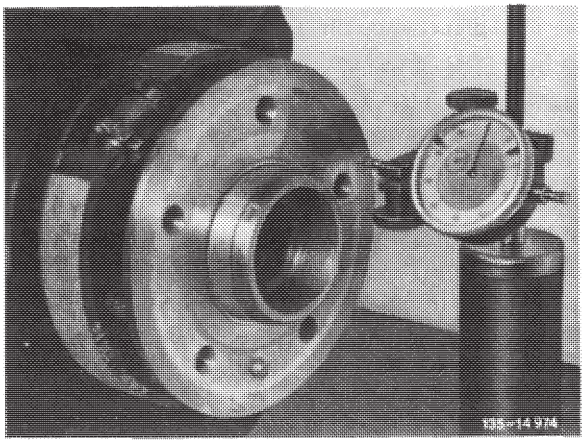
Adjusting dimensions

Model 107.02, 114, 115	293.5 ± 0.5 mm
Model 107.04	318 ± 0.5 mm
Model 116, 126	282.5 ± 0.5 mm
Model 123	287.5 ± 0.5 mm

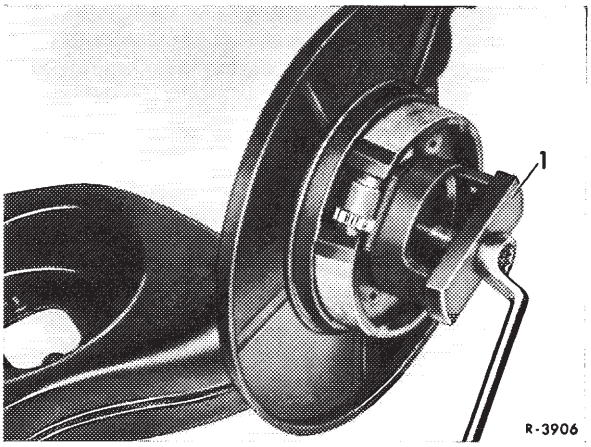
Checkup

Rear axle shaft flange

10 Check rear axle shaft flange at left and right for lateral runout. For this purpose, use dial gauge with magnetic holder and self-made measuring base.



Attention!
If lateral runout of rear axle shaft flange is above permissible tolerance range, insert measuring flange for additional checkups.



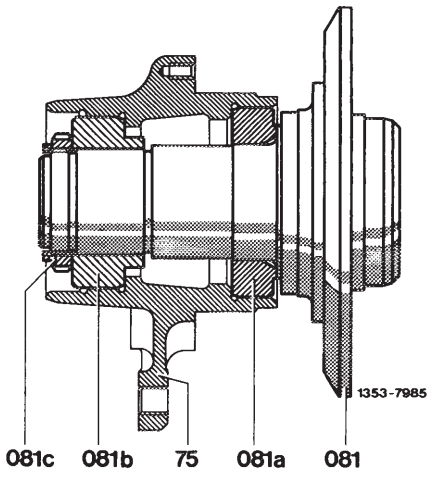
Mount measuring flange:

a) Remove rear axle shaft flange (35–130).

b) Knock-out outer race of inner tapered roller bearing, pull off outer race of outer tapered roller bearing by means of pertinent device.

c) Introduce measuring flange with outer spacing ring. Mount inner spacing ring with small diameter facing flange end and slightly tighten slot nut.

Attention!
Measuring flange should be seated in wheel carrier of semi-trailing arm without play.



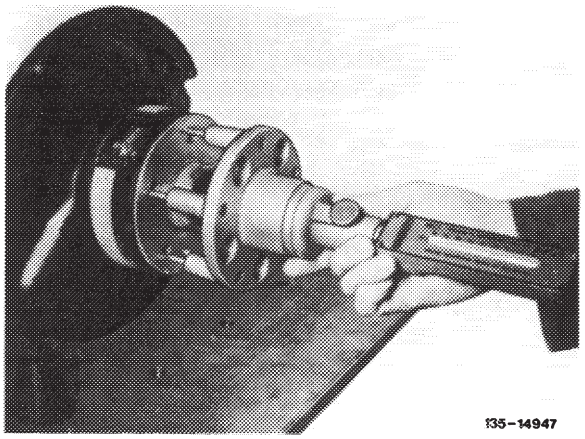
75 Semi-trailing arm
081 Measuring flange
081a Outer spacer ring (pressed-on)
081b Inner spacer ring
081c Slot nut

Rear wheel camber

11 Measure rear wheel camber left and right, using angle measuring instrument with bell-type mount for this purpose.

Test values

Model 107.02, 114, 115 123 1st version	-0^{o} 45' ± 30'
Model 107.042 1st version 107.043/044	-1^{o} 20' ± 30'
Model 107.042 2nd version 107.045/046	-1^{o} 30' ± 30'
Model 116, 126 123 2nd version	-1^{o} ± 30'



Note:
a) Steel plate semi-trailing arm

If the camber is higher than the permissible tolerance range, the fault may be a distortion of the semi-trailing arm itself or of the bearing brackets on rear axle carrier. However, experience has shown that on steel plate semi-trailing arms a distortion is mainly characterised by a misalignment (deviation) in direction of track.

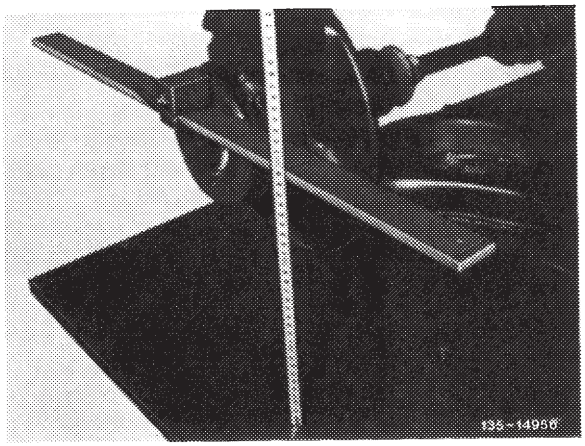
b) Light alloy coupled semi-trailing arm

If the camber is higher than the permissible tolerance range, the fault may be a distortion of the separate wheel carrier or of the bearing brackets of rear axle carrier, or a distortion of both components. The cast light alloy coupled semi-trailing arm itself will not yield both in direction of camber and track. **If the wheel carrier is only slightly distorted in direction of camber, continued use of semi-trailing arm in combination with a new wheel carrier is permitted. In the event of major distortions of wheel carrier (camber misalignment more than 1^{o}), the semi-trailing arm should be replaced for safety reasons to eliminate any risk of incipient cracks.**

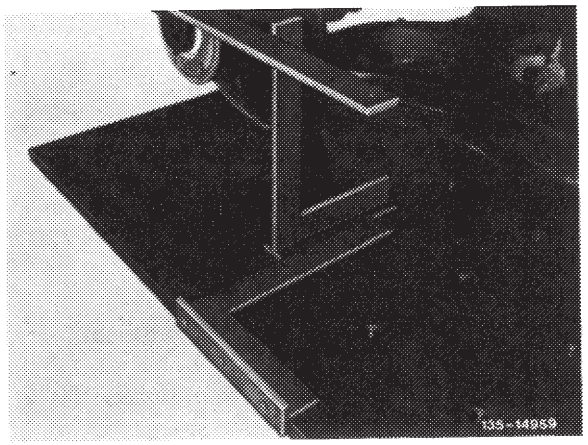
Toe-in per wheel (VSR 1) and total toe-in (VSG1)

Note: A straightedge on rear axle shaft flange serves for measuring toe-in. Measuring points for toe-in per wheel (VSR1) are the inside marks applied 185 mm from wheel center with reference to 14" rim dia. The measuring values thereby correspond to values of chassis measurements at respective position of semi-trailing arms (also refer to comparison table for toe-in values in millimeters and degrees). The outer marks on straightedge at a distance of 370 mm from wheel center are serving for an additional reference measurement of total toe-in (VSG2). For technical reasons the double toe-in is measured, so that the value **must be halved** for comparison with toe-in values (VSG1) with reference to 14" rim dia.

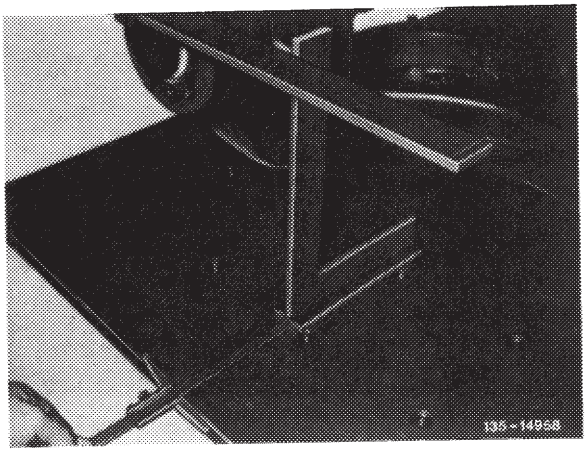
12 Attach straightedge with holder to rear axle shaft flange while paying attention to the two markings for wheel center. Set straightedge into horizontal position by measuring and compensating vertical distance of straightedge in relation to measuring table both at front and rear.



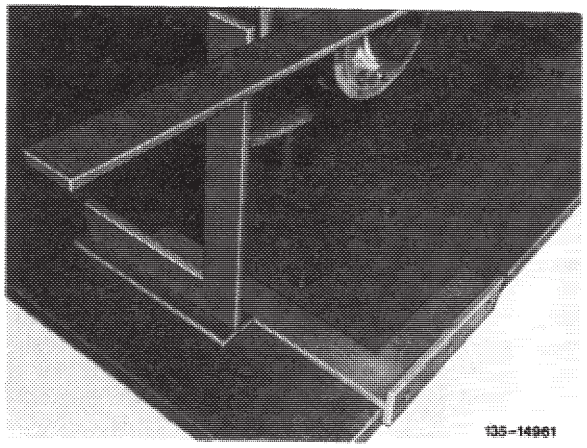
13 Position try square at front against inner mark of straightedge, using a second try square for this purpose.



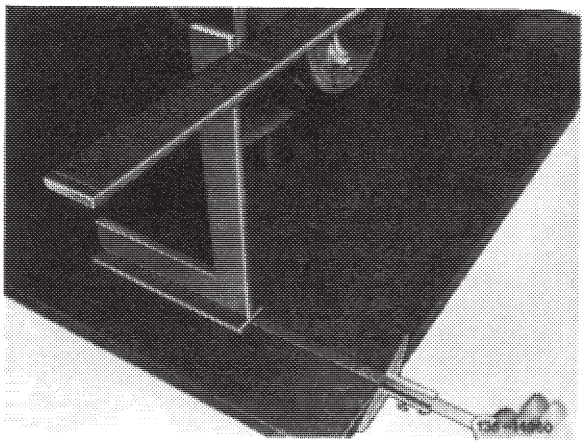
14 Measure front distance from edge of measuring table to try square or to straightedge by means of depth gauge and write down value.



15 Place try square at the rear against inner mark of straightedge using a second try square for this purpose.



16 Measure rear distance from edge of measuring table to try square or to straightedge with depth gauge and write down value.



17 To find toe-in per wheel (VSR1) determine difference between values measured at the front and rear and enter into data sheet. The sum of measurements at left and right provide the total toe-in (VSG1).

Attention!
Make sure whether there is toe-in (+) in toe-out (—)!

Test values	Toe-in per wheel (VSR1)	
Model 114, 115, 116 107, 123 1st version	+ 0,5	+ 1,0 — 0,5 mm
Model 107, 123 2nd version 126	+ 1,5	± 1,0 mm

Test values	Total toe-in (VSG1)	
Model 114, 115, 116 107, 123 1st version	+ 1,0	+ 2,0 — 1,0 mm
Model 107, 123 2nd version 126	+ 3,0	± 1,5 mm

Example: Model 123 2nd version
Toe-in per wheel (VSR1)

Left-hand wheel:

Front value	=	162.5 mm
Rear value	=	161.0 mm
results in difference or toe-in	=	+ 1.5 mm

Right-hand wheel:

Front value	=	157.0 mm
Rear value	=	150.5 mm
results in difference or toe-in	=	+ 6.5 mm

Total toe-in (VSG1)

Toe-in left-hand wheel	=	+ 1.5 mm
Toe-in right-hand wheel	=	+ 6.5 mm
results in Total toe-in	=	+ 8.0 mm

Note: The example shows a toe-in for lefthand wheel which is in order, while the righthand wheel is subject to a distortion of semi-trailing arm or rear axle carrier, which resulted in a larger toe-in. For additional evaluation, the righthand semi-trailing arm and the rear axle carrier must be additionally checked. Experience has shown that with larger deviations of toe-in (more than 6 mm per wheel), both the steel plate semi-trailing arm as well as the respective bearing brackets of the rear axle carrier are no longer in order.

On the other hand, with a cast light alloy coupled semi-trailing arm, which is not yielding both in direction of camber and track, a misalignment (deviation) of toe-in is mainly having an influence on bearing brackets of rear axle carrier. A distortion of wheel carrier may also be included (refer to section "Rear wheel camber", as well as to 35–420 "Checking semi-trailing arms").

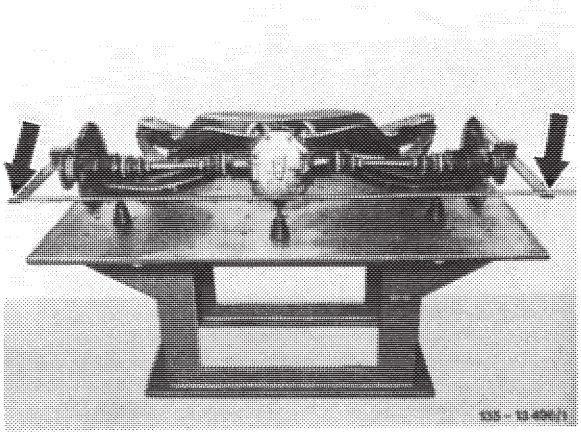
Since a light alloy coupled semi-trailing arm is subject to a risk of incipient cracks, replace for safety reasons, if

a) the wheel carrier is distorted in direction of track. Check during individual checkup of semi-trailing arm (35–420).

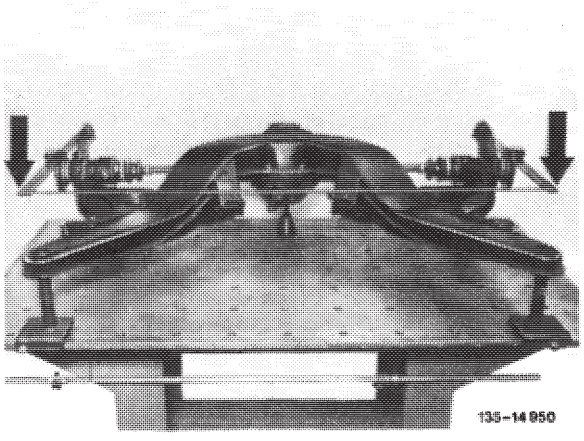
b) the rear axle carrier shows major distortions on bearing brackets (deviations in direction of track or camber more than 5 mm). Check during individual checkup of rear axle carrier (35–430).

Total-toe-in (VSG2)
(Additional reference measurement)

18 Measure at outer marks of straightedge the distance at the rear from left to right by means of a precision measuring tape and write down value.



19 Measure distance at front from left to right at outer marks of straightedges and also write down value.



20 To determine total toe-in (VSG2) determine difference between values measured at front and rear, making sure whether it is toe-in (+) or toe-out (—).

Half the measuring value is the value of the total toe-in (VSG1) with reference to rim dia.

Example:

Rear value	= 1587 mm
Front value	= 1571 mm
results in difference	
or total toe-in (VSG2)	= + 16 mm
corresponding to	
total toe-in (VSG1)	= + 8 mm

Adjusting dimensions for checkup

Distance "a" from measuring table to rear axle shaft flange on upper edge for wheel fit	293.5 ± 0.5 mm

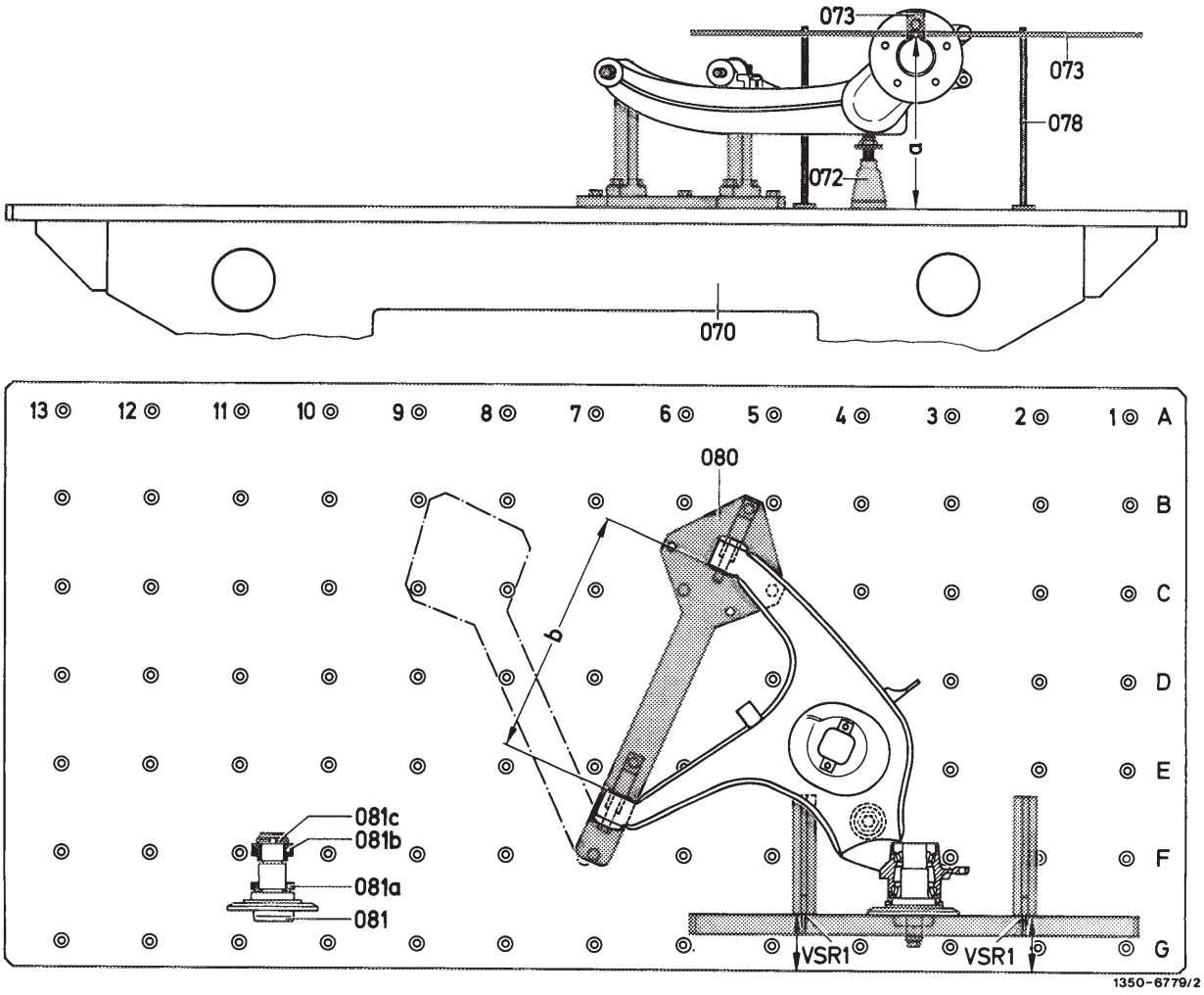
Test values[1])

Distance "b" of inner bearing eyes	414 ± 2 mm
Rear axle shaft flange lateral runout	0 to 0.12 mm
Camber (+) or (—)	0° ± 20′
Toe-in (+) or toe-out (—) Measuring points for toe-in per wheel (VSR1)[2])	$0\ ^{+\ 1.0\ mm^{3})}_{-0.5\ mm}$

[1]) The checkup for steel plate semi-trailing arms of the standard diagonal swing axle and for light alloy coupled semi-trailing arms of diagonal swing axle with starting torque compensation is the same.

[2]) Difference dimension front to rear, with reference to 14" rim dia (measuring points for toe-in per wheel (VSR1) at a distance of 185 mm from wheel center).

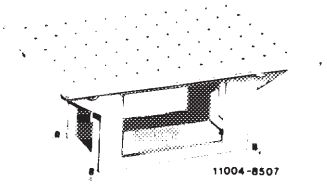
[3]) On both semi-trailing arms of one axle the entire misalignment (deviation) of toe-in (left-hand and right-hand semi-trailing arm together) in plus direction should not exceed 1.5 mm, in minus direction 1.0 mm. However, these maximum dimensions are permitted only if the tolerances for total toe-in (VSG1) on complete axle are not exceeded.



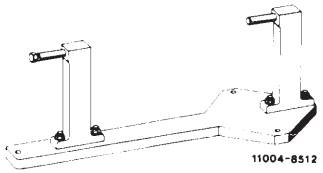
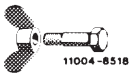
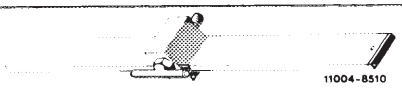
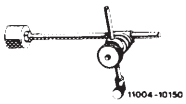
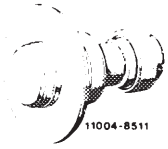
a Height adjusting dimension for rear axle shaft flange at upper edge for wheel fit
b Distance of inner bearing eyes (reference dimension)
VSR1 Measuring points for toe-in per wheel (with reference to 14" rim dia at a distance of 185 mm from wheel center).

070 Measuring table
072 Jack
073 Straightedge
078 Try square
080 Control mount
081 Measuring flange
081a Outer spacer ring
081b Inner spacer ring
081c Slot nut

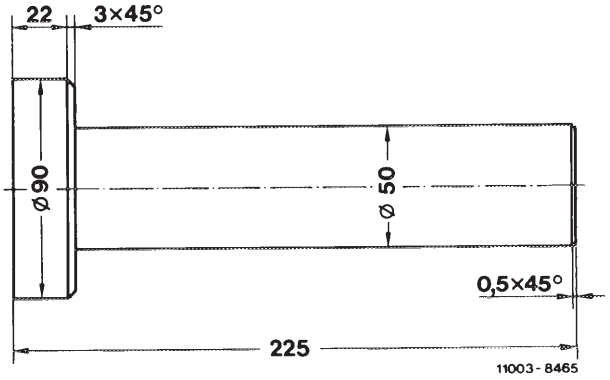
Required equipment

Measuring table with coordinate bore holes 13 mm dia F 7, spacing 150 mm	 11004-8507	BE 03600 1522 E 0145

Special tools

Control mount for semi-trailing arms and coupled semi-trailing arms	 11004-8512	116 589 15 23 00
Fitted screw with wing nut for locating control mount on measuring table (required 4 each)	 11004-8518	116 589 19 63 00
Jack, adjustable from 100 to 160 mm	 11004-8509	116 589 08 31 00
Straightedge (750 mm long) with holder	 11004-8510	116 589 12 31 00
Magnetic holder for dial gauge	 11004-10150	363 589 02 21 00
Measuring flange for semi-trailing arm and coupled semi-trailing arm without wheel bearing	 11004-8511	116 589 31 21 00

Self-made tool

Measuring base for magnetic holder Material: steel	

Conventional tools

Dial gauge A 1 DIN 878	e.g. made by Mahr D-7300 Esslingen Order no. 810
Extension 50 mm for dial gauge	e.g. made by Mahr D-7300 Esslingen Order no. 902
Try square 300 x 200 mm (required 2 each)	e.g. made by Stiefelmayer D-7300 Esslingen Order no. 151 AR
Height measurement and tracing tool size III	e.g. made by Stiefelmayer D-7300 Esslingen Order no. 5 V
Bell-type mount for angle measuring tool	e.g. made by Beissbarth D-8000 Munich Order no. P1/96
Angle measuring tool	e.g. made by Beissbarth D-8000 Munich Order no. P 10/05

Notes

Checking of semi-trailing arm as an individual component is in principle and in job sequence the same as for complete directional stability assembly. A semi-trailing arm with wheel bearing as well as a semi-trailing arm without wheel bearing can be checked in combination with a measuring flange instead of the rear axle shaft flange.

For measuring the directional stability system and its various components a measuring table of 2000 x 1000 mm will be required. The measuring table has coordinate bore holes of 13 mm dia F7 spaced 150 mm apart for locating the control mounts. The coordinate bore holes are identified in longitudinal direction with the numbers 1 to 13 and in transverse direction with the letters A to G.

The measuring values before and following axle reconditioning must be recorded in "Data sheet for directional stability of rear axle" (35–410).

The control mount for steel plate semi-trailing arms as well as for light alloy coupled semi-trailing arms for left and right is mounted on measuring table in such a manner that the nominal values for camber and toe-in are each resulting in a 0 value. If applicable, the misalignment (deviations) of camber and toe-in are each measured in plus or minus direction.

Checkup of semi-trailing arm comprises:

a) Checking rear axle shaft flange for lateral runout
b) Rear axle camber
c) Toe-in

Preparations for checkup

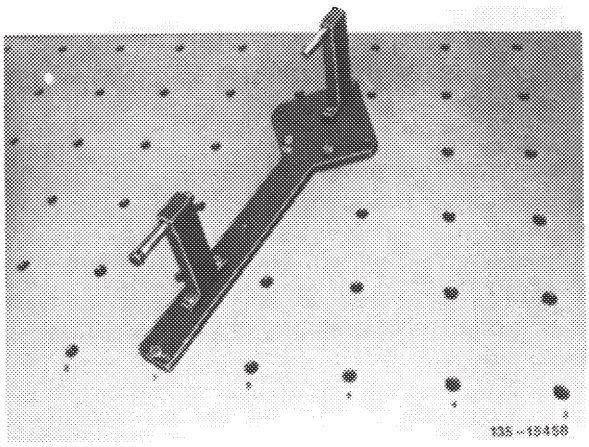
1 Remove brake caliper and brake disc from semi-trailing arm (42–228).

2 Attach control mount with fitted screws and wing nuts to measuring table.

Associated coordinate bore holes:

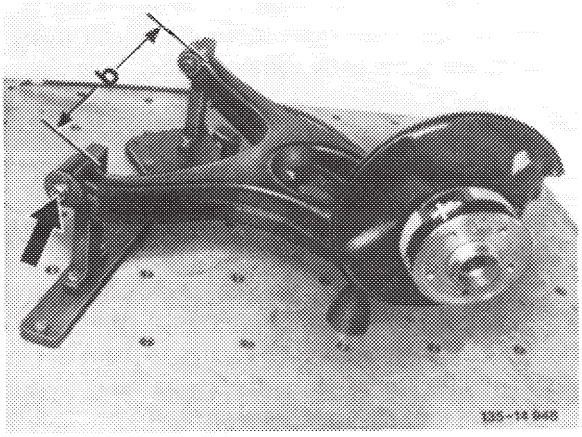
For left-hand semi-trailing arm F 7 and C6,

for right-hand semi-trailing arm F 7 and C8.



3 Place semi-trailing arm on both pins of control mount and attach with hex screw (arrow) to outer bearing. Support semi-trailing arm outside by means of jack.

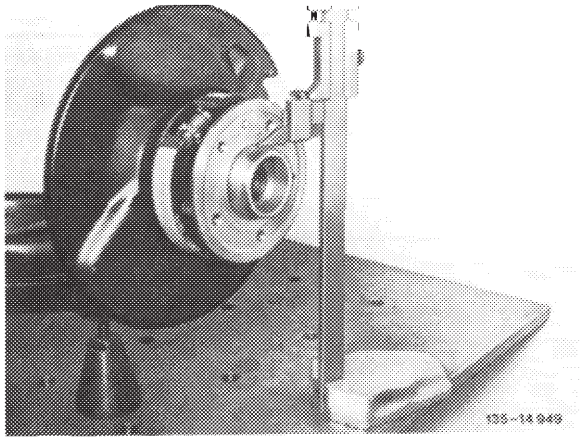
Note: If the semi-trailing arm cannot be introduced easily into pins of control mount, measure distance "b" of inner edges of bearings in relation to each other by means of a precision measuring tape.



Reference dimension

Steel plate and light alloy coupled semi-trailing arm	414 ± 2 mm

4 Set distance "a" by means of a height measuring instrument from measuring table to rear axle shaft flange at upper edge for wheel fit. For this purpose, change height of jack accordingly.

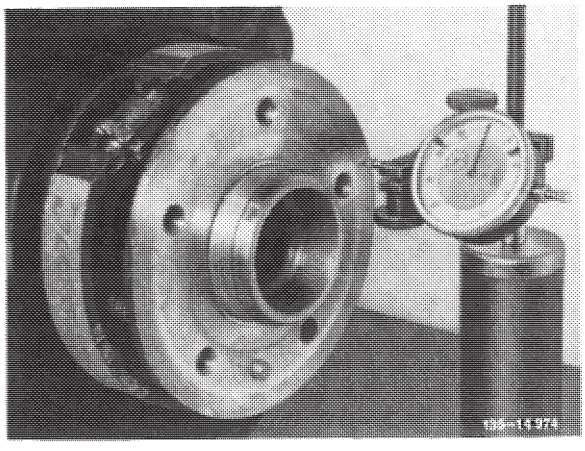


Adjusting dimension

Model 107, 114, 115 116, 123, 126	293.5 ± 0.5 mm

Checkup

5 Check rear axle shaft flange for lateral runout. For this purpose, use dial gauge with magnetic holder and self-made measuring base.



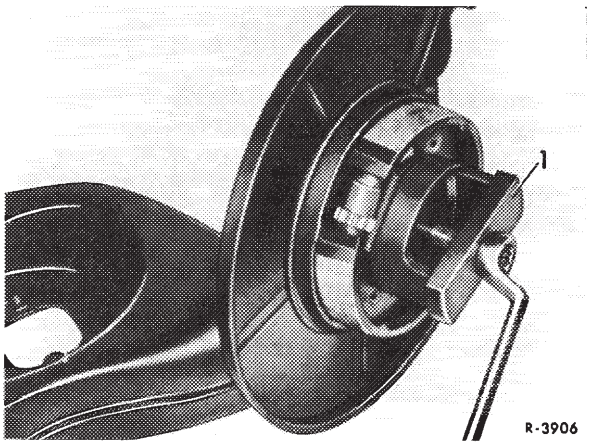
Check value

Model 107, 114, 115 116, 123, 126	0 to 0.12 mm

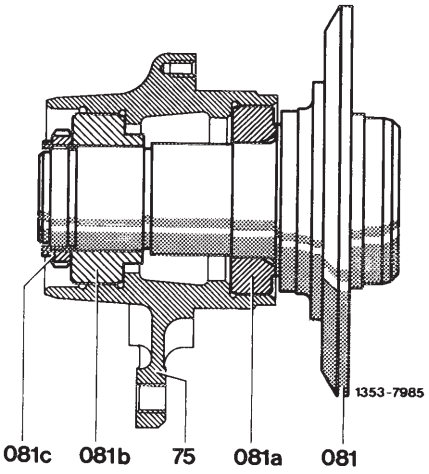
Attention!
If the lateral runout of the rear axle shaft flange is beyond permissible tolerance range, insert measuring flange for additional checkups.

Mount measuring flange:
a) Remove rear axle shaft flange (35–130).

b) Knock-out outer race of inner tapered roller bearing by means of locking-out mandrel. Pull-off outer race of outer tapered roller bearing by means of respective tool.



c) Introduce measuring flange with outer spacer ring. Mount inner spacer ring with small diameter facing flange end and slightly tighten slot nut.



75	Semi-trailing arm
081	Measuring flange
081a	Outer spacing ring (pressed-on)
081b	Inner spacing ring
081c	Slot nut

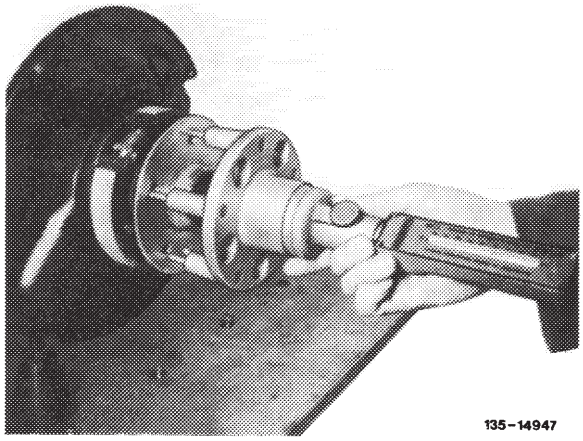
Attention!
The measuring flange should be seated in wheel carrier of semi-trailing arm without play.

Rear wheel camber

6 Measure rear wheel camber. For this purpose, use angle measuring instrument and bell-type mount.

Check value

Model 107, 114, 115 116, 123, 126	0° ± 15'



Note:

a) Steel plate semi-trailing arm

If the camber is higher than the permissible tolerance range, the fault may be a distortion of the semi-trailing arm itself or of the bearing brackets on rear axle carrier. However, experience has shown that on steel plate semi-trailing arms a distortion is mainly characterised by a misalignment (deviation) in direction of track.

b) Light alloy coupled semi-trailing arm

If the camber is higher than the permissible tolerance range, the fault may be a distortion of the separate wheel carrier.

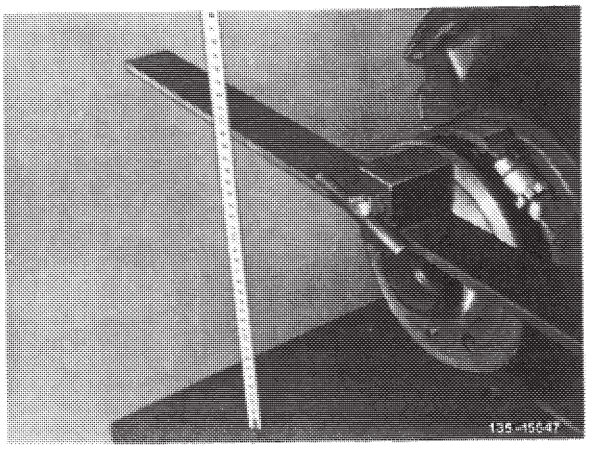
The cast light alloy coupled semi-trailing arm itself will not yield both in direction of camber and track. **If the wheel carrier is only slightly distorted in direction of camber, continued use of semi-trailing arm in combination with a new wheel carrier is permitted. In the event of major distortions of wheel carrier (camber misalignment more than 1^{o}), the semi-trailing arm should be replaced for safety reasons to eliminate any risk of incipient cracks.**

Toe-in per wheel (VSR1)

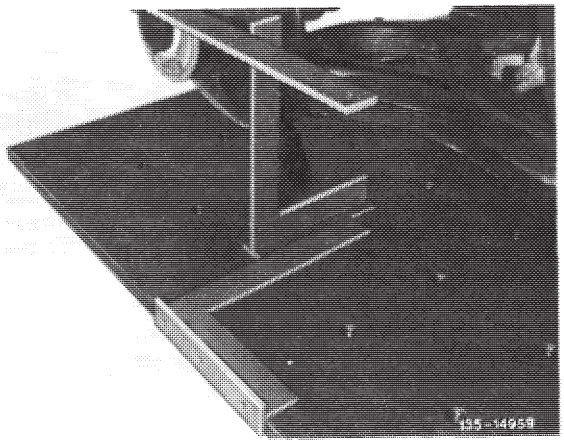
Note: A straightedge on rear axle shaft flange or measuring flange serves for measuring toe-in. Measuring points for toe-in per wheel (VSR1) are the inside marks applied 185 mm from wheel center with reference to 14" rim dia. The measuring values thereby correspond to values of chassis measurements at respective position of semi-trailing arms (also refer to comparison table for toe-in values in millimeters and degrees, section 35–410 "Complete checkup of rear axle directional stability").

The outer markings (measuring points VSR2) on straightedge at a distance of 370 mm from wheel center can be used for additional reference measurements, if in doubt. The resulting double toe-in values are then halved in relation to values with reference to 14" rim dia.

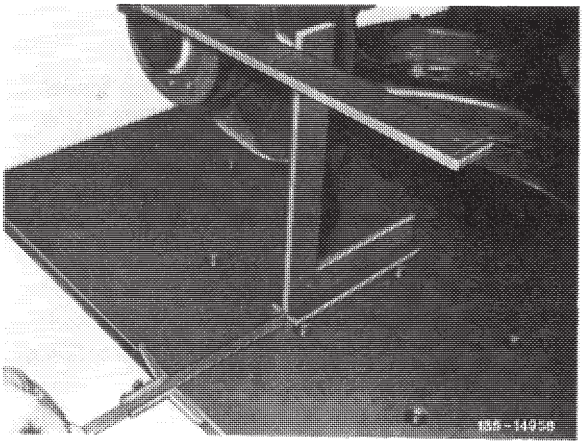
7 Attach straightedge with holder to rear axle shaft flange while paying attention to the two markings for wheel center. Set straightedge into horizontal position by measuring and compensating vertical distance of straightedge in relation to measuring table both at front and rear.



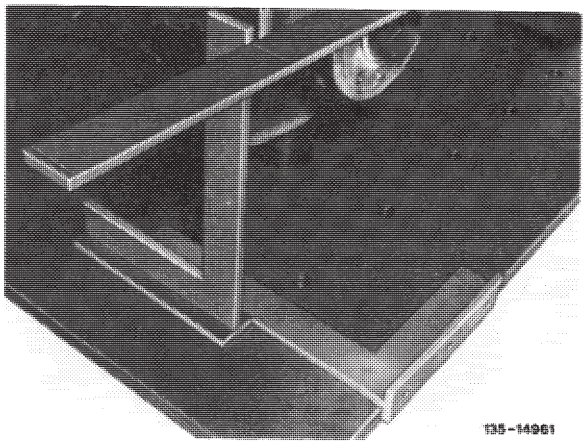
8 Position try square at front against inner mark of straightedge, using a second try square for this purpose.



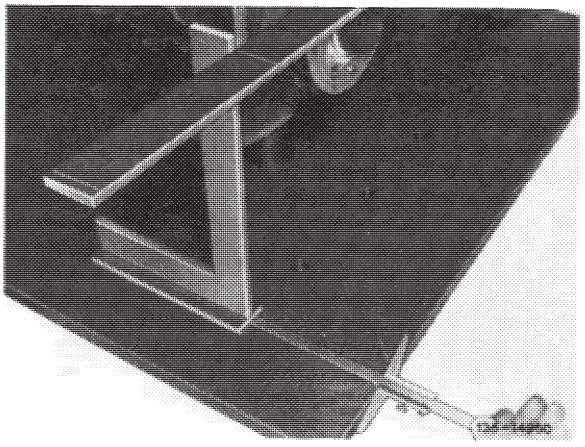
9 Measure front distance from edge of measuring table to try square or to straightedge by means of depth gauge and write down value.



10 Place try square at the rear against inner mark of straightedge using a second try square for this purpose.



11 Measure rear distance from edge of measuring table to try square or to straightedge with depth gauge and write down value.



12 To find toe-in per wheel (VSR1) determine difference between values measured at the front and rear and enter into data sheet.

Check value

Model 107, 114, 115 116, 123, 126	$0\ ^{+\ 1.0}_{-\ 0.5}$ mm

Example: Model 123
Toe-in per wheel (VSR1)

Left-hand wheel:	
Front value	= 62.5 mm
Rear value	= 62.3 mm
results in difference toe-in	= + 0.2 mm
Right-hand wheel:	
Front value	= 64.4 mm
Rear value	= 61.9 mm
results in difference toe-in	= + 2.5 mm

Attention!
In the event of a deviation from nominal value check whether it is toe-in (+) or toe-out (—). On both semi-trailing arms of one axle the entire misalignment (deviation) of toe-in (left-hand and right-hand semi-trailing arm together) in plus direction should not exceed 1.5 mm, and 1.0 mm in minus direction. When checking complete directional stability assembly, the toe-in value should also be within permissible tolerance (35—410).

Note: The example (steel plate semi-trailing arm on model 123) shows on left-hand semi-trailing arm a toe-in which is in order, while the right-hand semi-trailing arm has a non-permissible toe-in misalignment (deviation) caused by distortion.

If the light alloy coupled semi-trailing arm shows a misalignment (deviation) of toe-in, it is an indication that the separate wheel carrier is distorted (also refer to section "Rear wheel camber").

The cast light alloy coupled semi-trailing arm itself is not yielding both in direction of camber and caster.

If the wheel carrier is distorted in direction of track, replace coupled semi-trailing arm for safety reasons due to risk of incipient cracks!

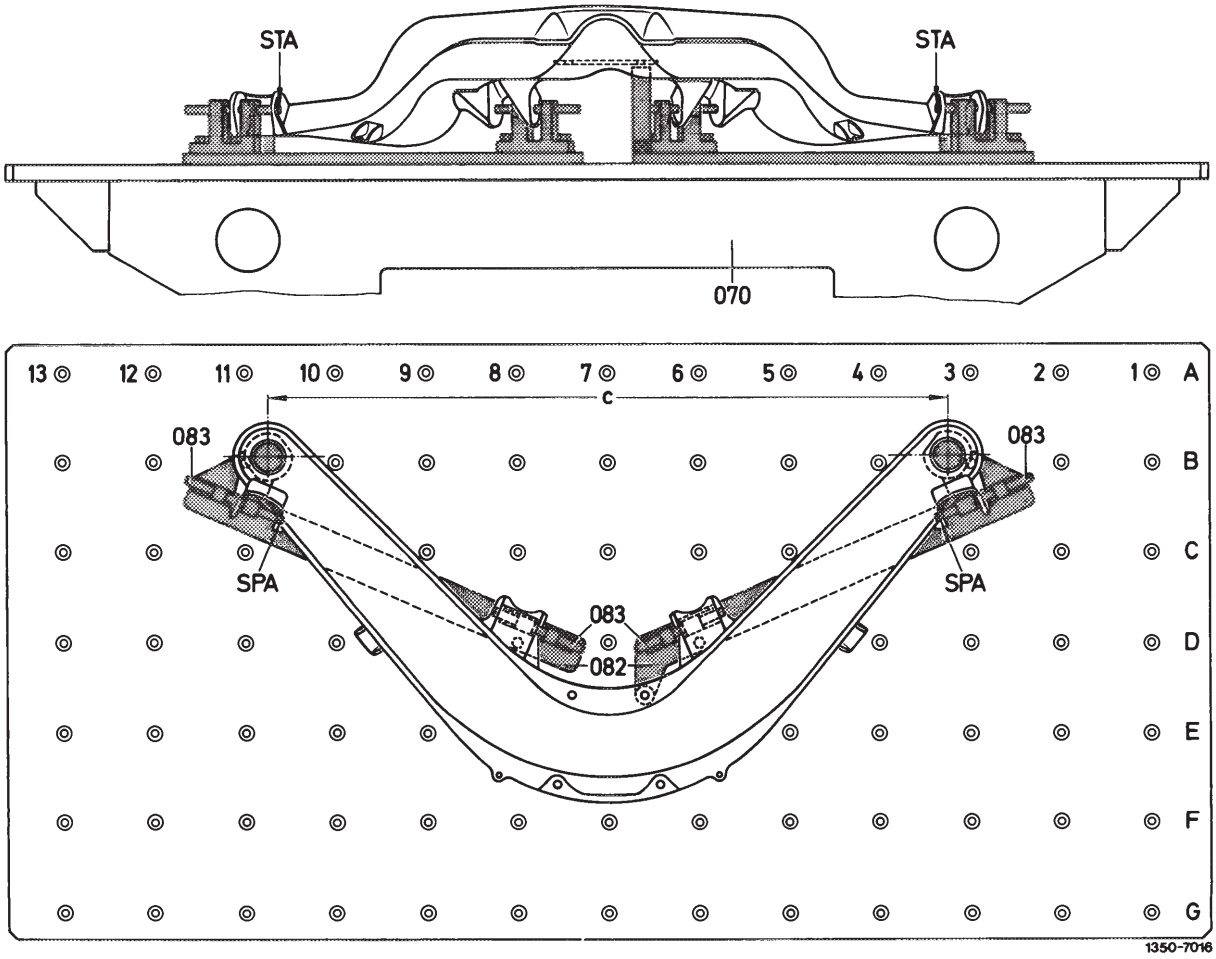
Check values

Distance "c" of front bearings	Model 107.02, 114, 115	1125 ± 2 mm
	Model 107.04	920 ± 2 mm
	Model 116	1314 ± 2 mm
	Model 123, 126	1290 ± 2 mm
Deviation on outer bearing brackets for connection to semi-trailing arms[1])	Camber misalignment (STA)	0 to 1.0 mm
	Track misalignment (SPA)	0 to 0.5 mm[2])

[1]) Measuring by means of light gap between plug pin of control mount and bore in bearing bracket of rear axle carrier. All-around uniform light gap in bore = 0 mm misalignment. Close fit of plug pin in bore = 1 mm misalignment.

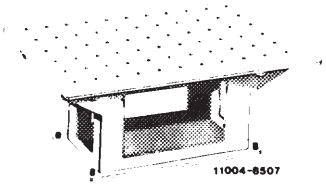
[2]) On model 123 the control mounts are designed for the second version of the rear axle carrier (identification: additional bore in right-hand inner bearing bracket for connection to semi-trailing arm). When checking a rear axle carrier of the first version, note that the plug pin in minus track direction rests against edge of bore already at a deviation of approx. 0.5 mm, and in plus camber direction already at a deviation of approx. 0.2 mm.

On model 107 the control mounts are designed for the 1st version of the rear axle carrier **(without identification).** When checking a rear axle carrier of the 2nd version (identification: On model 107.02 an additional bore in righthand inner bearing bracket for swivelling semi-trailing arm, while on model 107.04 both resilient stops are provided with a recess on outer side). When checking a rear axle carrier of the 2nd version, note that here the plug pin in minus track direction should rest against edge of bore already at a deviation of approx. 0.5 mm, and in plus camber direction already at a deviation of approx. 0.2 mm.

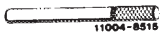
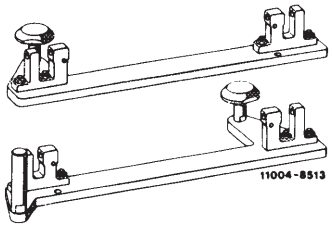
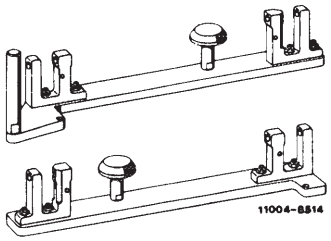
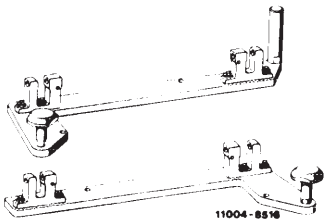
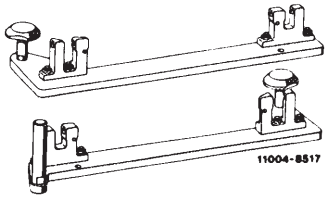
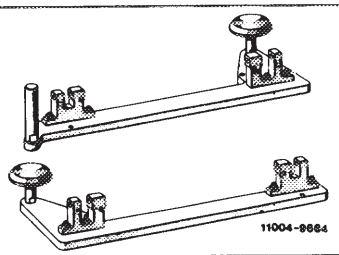
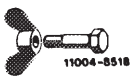


c Distance of front bearings (reference dimension)
STA Measuring points for camber misalignment on outer bearing brackets for connection to semi-trailing arms
SPA Measuring points for track misalignment on outer bearing brackets for connection to semi-trailing arms
070 Measuring table
082 Control mounts
083 Plug pins

Required equipment

Measuring table with coordinate bore holes 13 mm dia F7, spacings 150 mm	 11004-8507	BE 03600 1522 E 0145

Special tools

Plug pin for control mounts (required 4 each)	 11004-8515	116 589 16 15 00
Model 107.02, 114, 115 Control mounts for rear axle carrier	 11004-8513	115 589 32 23 00
Model 107.04 Control mounts for rear axle carrier	 11004-8514	107 589 07 23 00
Model 116 Control mounts for rear axle carrier	 11004-8516	116 589 14 23 00
Model 123 Control mounts for rear axle carrier	 11004-8517	123 589 03 23 00
Model 126 Control mounts for rear axle carrier	 11004-8664	126 589 00 23 00
Fitted screw with wing nut for locating control mounts (required 4 each)	 11004-8518	116 589 19 63 00

Note

For measuring the directional stability system and its various components a measuring table of 2000 x 1000 mm will be required. The measuring table has coordinate bore holes of 13 mm dia F7 spaced 150 mm apart for locating the control mounts. The coordinate bore holes are identified in longitudinal direction with the numbers 1 to 13 and in transverse direction with the letters A to G.

The control mounts for the individual rear axle carriers are different and are marked in relation to respective model.

Model 107.02, 114, 115
Model 107.04
Model 116
Model 123
Model 126

The checkup itself is the same for all rear axle carriers.

The rubber mounts of the front rear axle carrier bearings must be removed for checkup.

The measuring values before and following axle reconditioning must be recorded in "Data sheet for directional stability of rear axle" (35–410).

Checkup of rear axle carrier comprises:

a) Distance of front bearings

b) Contact surfaces of front bearings

c) Location of outer bearing brackets in relation to semi-trailing arm connection in direction of camber and track with inner bearing brackets in fixed position

On rear axle carrier for model 123, starting April 1977, on model 107.022, starting September 1980, and on model 107.042, starting March 1980, a change has been made on bearing brackets for connection of semi-trailing arms. Compared with the 1st version, the camber to the complete direction of stability system has been changed in minus direction by approx. 0^{o} 15' and the toe-in in plus direction by approx. 1.0 mm per wheel. (Also refer to section 35-410 Complete inspection of rear axle directional stability).

On model 123, the control mounts are designed for 2nd version, and on model 107 for 1st version of the rear axle carrier.

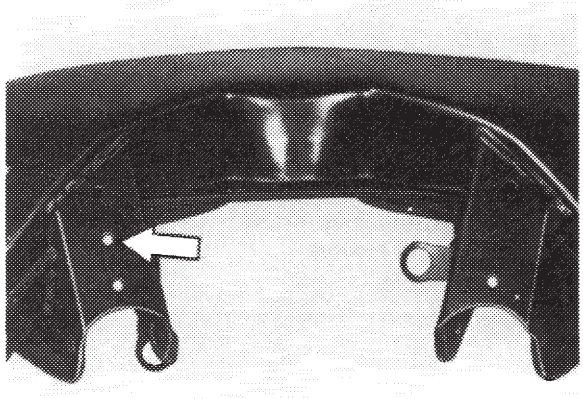
Identification (starting January 1978 or starting September 1980) for rear axle carrier of 2nd version:

Additional bore of 10 mm dia. on righthand, inner bearing bracket for connection of semi-trailing arm (arrow).

When checking rear axle carrier 1st version on model 123 and on model 107.02 2nd version, note the following:

In plus camber direction the plug pin rests already against edge of bore at a deviation of approx. 0.2 mm.

In minus track direction the plug pin rests against edge of bore at a deviation of approx. 0.5 mm.

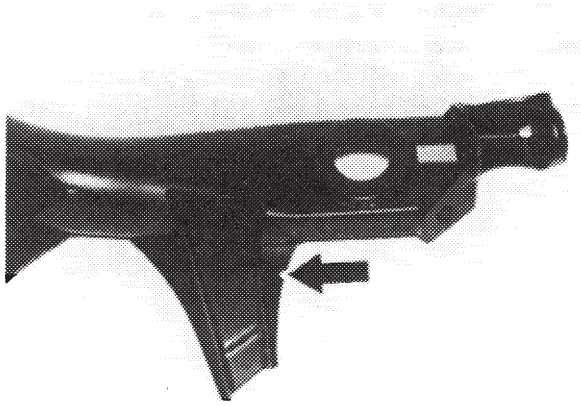


Model 107,02 and 123

135-14130

Identification characteristic (starting March 1980) for rear axle carrier of 2nd version:

Additional recess on both resilient stops on outer sides for model 107.04 (arrow).



Model 107.04

135 - 20125

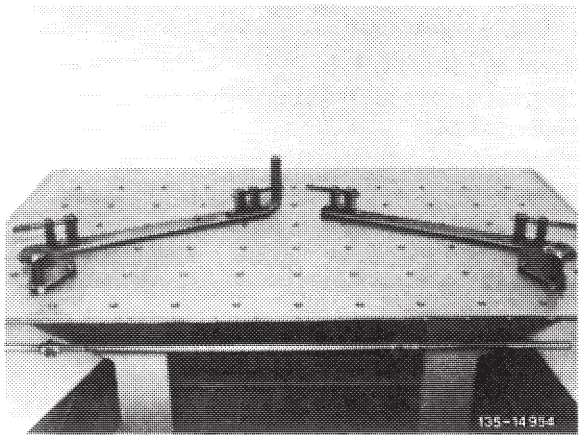
When checking rear axle carrier 2nd version, note the following:

In plus camber direction, at a deviation of approx. 0.2 mm, the plug pin rests already against edge of bore.

In minus track direction, at a deviation of approx. 0.5 mm, the plug pin rests already against edge of bore.

Checkup

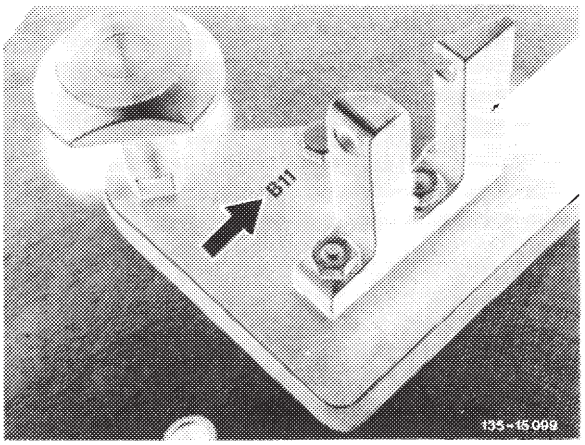
1 Attach both control mounts on measuring table with fitted screws and wing nuts, while making sure that the coordinate bore holes are always in agreement.



135-14954

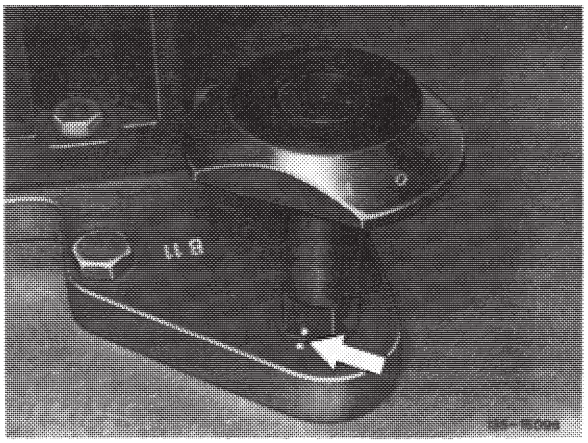
Associated coordinate bore holes for control mounts

Model	Right-hand inner	Right-hand outer	Left-hand inner	Left-hand outer
107.02 114, 115	D6	B3	D8	B11
107.04	D6	B3	B8	B11
116	D5	B3	D9	B11
123, 126	D6	B3	D8	B11

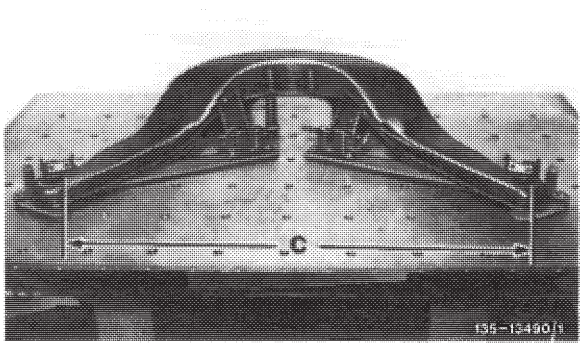


135-15099

2 Check position of mounting bracket for front bearings of rear axle carrier in realtion to base plate of control mount left and right. In correct position the two punched in check points (arrow) are properly aligned.



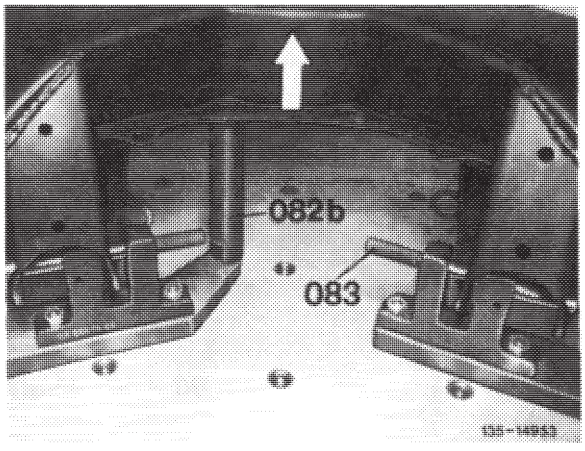
3 Place rear axle carrier on control mounts. If rear axle carrier cannot be introduced or only when applying force against the two cups of the front bearings, measure distance "c" of front bearing with precision measuring tape. Suitably place precision measuring tape on one side against inner edge of bore and on other side against outer edge.



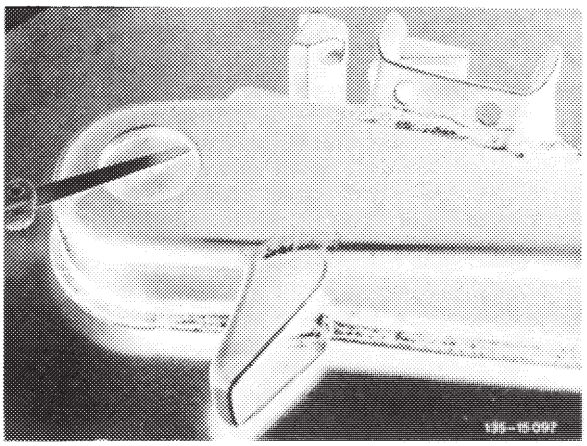
Distance "c" of front bearings

Model 107.02, 114, 115	1125 ± 2 mm
Model 107.04	920 ± 2 mm
Model 116	1314 ± 2 mm
Model 123, 126	1290 ± 2 mm

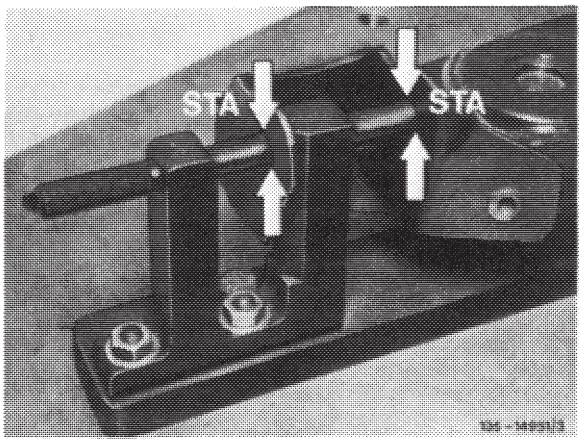
4 Slightly lift rear axle carrier in center and insert a slip gauge 1 mm thick (082b) at mounting pin. Insert plug pins (083) at both bearing brackets of inner bearings of semi-trailing arms. If the plug pins cannot be inserted at inner bearing with the slip gauge inserted and pulled out (tolerance range), the rear axle carrier is so far beyond permissible tolerance that no other test will be required.



5 To check front bearings of rear axle carrier, check difference in height of contact surfaces for control mount left and right with a slip gauge.



6 Check position of outer bearing brackets in relation to semi-trailing arm connection in direction of camber and track, slip-in both plug pins (083) and measure light gap in bore of bearing brackets.



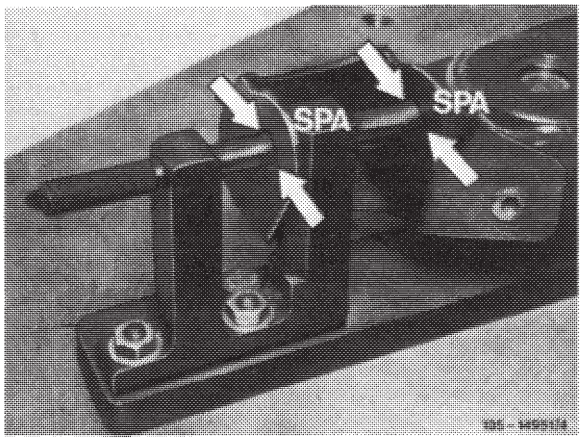
Checkup in camber direction

Uniform light gap = deviation 0 mm
Well fitting pin = deviation 1 mm

STA = camber misalignment in plus and minus direction
SPA = track deviation in plus and minus direction

Check values

Chamber deviation (STA)	0 to 1.0 mm
Track deviation (SPA)	0 to 0.5 mm



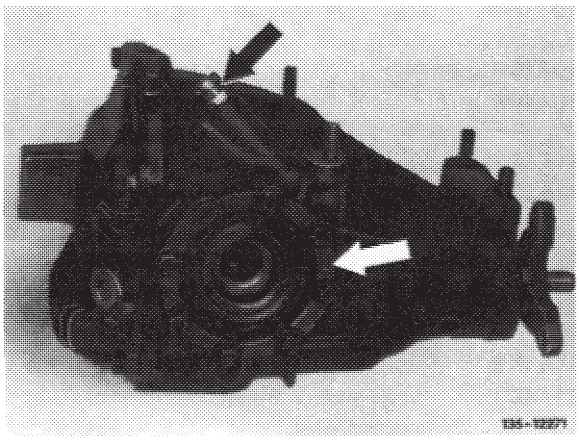
Checkup in track direction

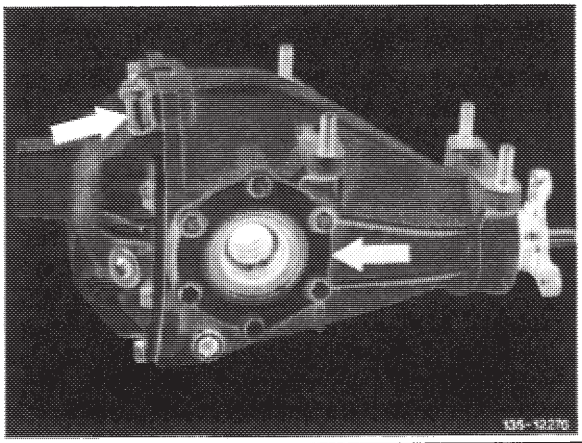
Note

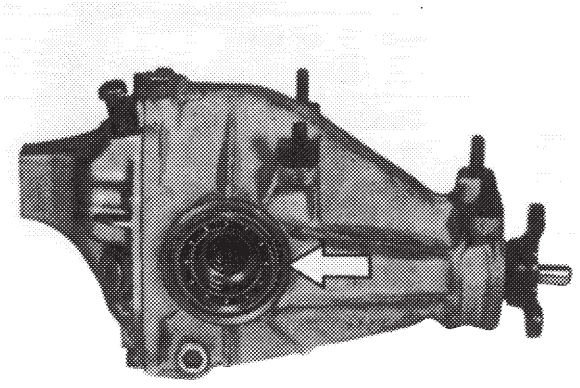
Diagonal swing axles are provided with two rear axle center pieces of different size, which also differ by the lay-out of the breather and the fastening method of the two lateral bearing caps. Another small center piece without lateral bearing caps has been added as from start of series of model 126.02 (January 1980).

Differentiating characteristics

Model	Rear axle center piece
107.023/024 107.025/026 107.043/044 107.045/046 116.028 116.029 116.03 126.03 126.04	**Large center piece** The breather is located at the right on rear axle housing. On models 126.03/04 the breather is located at the **left** on rear axle housing starting October 1981 to November 1982. The two lateral bearing caps are each fastened with 8 screws. The hole circle dia. of the universal joint flange on models 107.023/043 and 107.025/045, 125.032/033 up to September 1980, 116.028/029 amounts to **90 mm** on models 107.024/026/044/046 and 107.025/045, 126.032/033 starting October 1980, 116.03, 126.036/037 amounts to **110 mm**.
107.022 107.042 114 115 116.020 116.024 116.025 116.120 123	**Small center piece with lateral bearing caps** The breather is located on end cover. The two lateral bearing caps are each fastened by means of 6 screws. Models 107.022/042 and 123 are provided with this center piece as standard equipment up to January 1981.
123 126.02	**Small center piece without lateral caps** The diameter of the radial sealing rings is larger and is provided with an alternate spiral thread. Models 107.022/042 and 123 are provided with this center piece as standard equipment starting February 1981.







135–19646

Installation survey

Model	Vehicle version	Version	Ratio	Number of teeth
107.022 107.042[3])	Standard	1. up to February 1980	3.69	48:13
		2. starting March 1980	3.58	43:12
	with manual 5-speed transmission[1] (HK)		3.92	47:12
107.023 107.043	Standard		3.46	45:13
107.024 107.044	Standard	1. up to December 1973	3.07	46:15
		2. starting January 1974	3.06	52:17
107.025 107.045	Standard		3.27	49:15
	(USA) (J)		2.47	47:19
107.026 107.046	Standard		2.72	49:18
114.00 114.017	Standard	1. up to November 1969	4.08	49:12
		2. starting December 1969	3.92	47:12
114.010	Standard	1. up to November 1969	3.92	47:12
		2. starting December 1969	3.69	48:13
114.015 [1] 114.021 114.022	with 15" wheels with manual 5-speed transmission (AUS)	1. up to November 1969	4.08	49:18
		2. starting December 1969	3.92	47:12
114.011 114.023 114.06 [1] [2] 114.07	Standard		3.69	48:13
	with 15" wheels with manual 5-speed transmissions (HK) (USA) (ZA)		3.92	47:12
115.000 115.002 115.102	Standard		4.08	49:12
115.005	Standard		3.92	47:12
115.010 115.015	Standard	1. up to November 1969	4.08	49:12
		2. starting December 1969	3.92	47:12
	with 15" wheels (HK) (ZA)		4.08	49:12
115.017 115.117	Standard		3.69	48:13
	with 15" wheels (HK) (USA) (ZA)		3.92	47:12

[1] Manual 5-speed transmission no longer available starting July 1976.

[2] (ZA) is provided with standard version starting July 1976.

[3] Manual 5-speed transmission starting September 1981 standard with ratio 1:3.58.

A. Model 114, 115

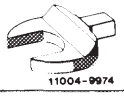
Oil type and capacities

Hypoid gear oil SAE 90	refer to specifiactions for service products page 235
Rear axle center piece with cast iron rear axle end cover	1.15 litres
Rear axle center piece with aluminum rear axle end cover	1.0 litre

Tightening torques		Nm
Hex socket necked down bolt for attaching rear rubber bearing to rear axle end cover (rubber bearing 1st version)		140
Hex socket bolts or hex bolts for attaching rear rubber bearing to rear axle end cover (rubber bearing 2nd version)		120
Hex bolts for attaching rear rubber bearing to frame floor		25
Hex bolts, self-locking, for attaching rear rubber bearing to frame floor		30
Hex bolt for attaching rear axle shaft to rear axle shaft flange	1st version M 12	95
	2nd version M 8	30
Threaded bushing in rear axle shaft for reduction from M 12 to M 8 (repair version)		30
Self locking nuts for attaching rear axle center piece to rear axle carrier		100
Lock nut of propeller shaft (2-piece)		30–40
Lock nut of propeller shaft (3-piece)	front	30–40
	rear	200
Studs on rear axle housing		50

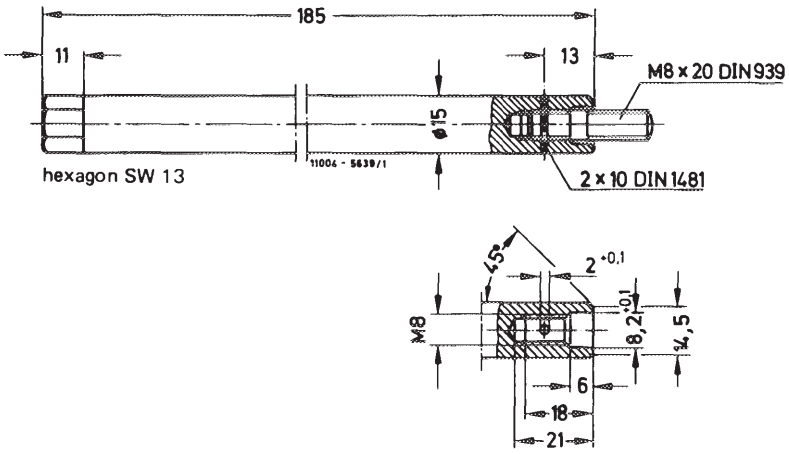
Special tools

Torque wrench with plug-in ratchet 1/2" square	25–130 Nm		001 589 66 21 00
	40–200 Nm		001 589 67 21 00

Open end wrench 46 mm for torque wrench handle for lock nut of propeller shaft		126 589 00 01 00
Assembly tool for removal and installation of rear axle on rear axle shaft flange		201 589 00 61 00

Self-made tool

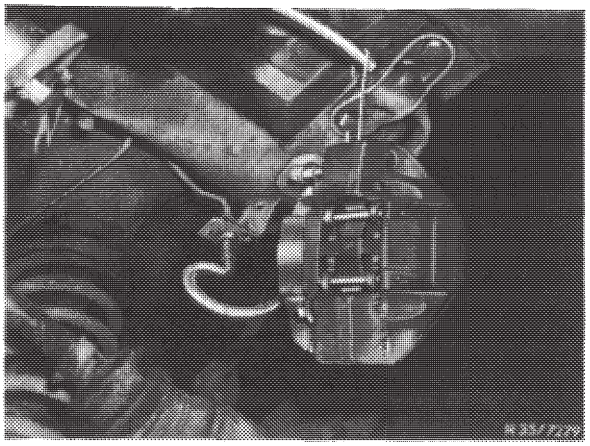
Tool for screwing threaded bushing into rear axle shaft



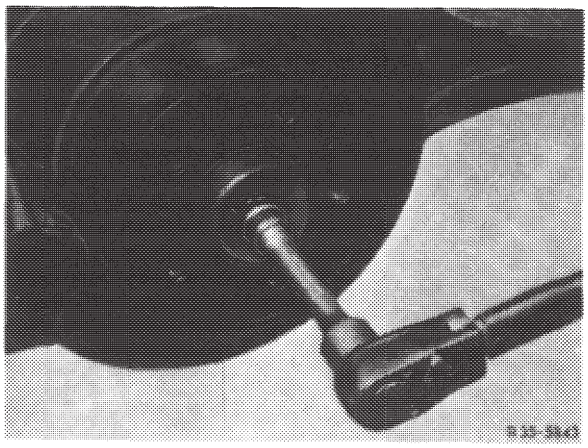
Removal

1 Drain oil from rear axle

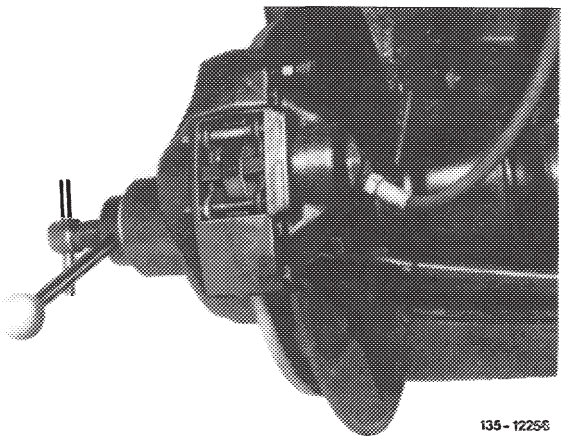
2 Unscrew caliper at the right and suspend by means of a hook.



3 Loosen hex bolt (M 12) on both sides of 1st version or hex bolt (M 8) with spacing sleeve and clamping disc of 2nd version for attaching rear axle shaft to rear axle shaft flange and remove.

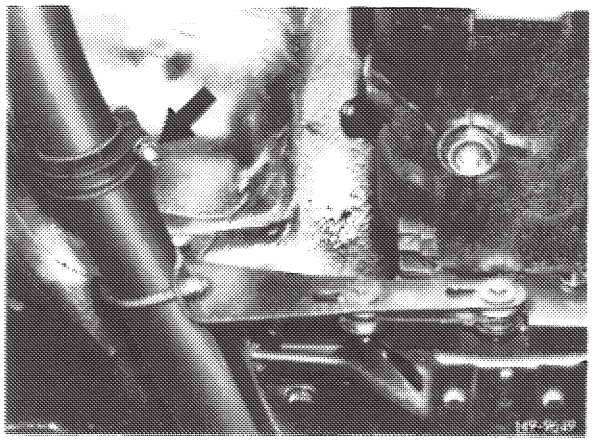


4 If required, force rear axle shaft out of rear axle shaft flange by means of assembly fixture.



Attention!
When removing assembly tool be sure to hold rear axle shaft in place. Do not let rear axle shaft drop down, since this would damage the housing of the synchromesh joint and make it leak. If the rear axle shaft cannot be removed in spite of being fully telescoped, loosen rubber bearing from frame floor and rear center piece from rear axle carrier. Lower center piece and swivel to one side. Then remove rear axle shaft from rear axle shaft flange.

Do not release shock absorbers, since they are required for holding axle.

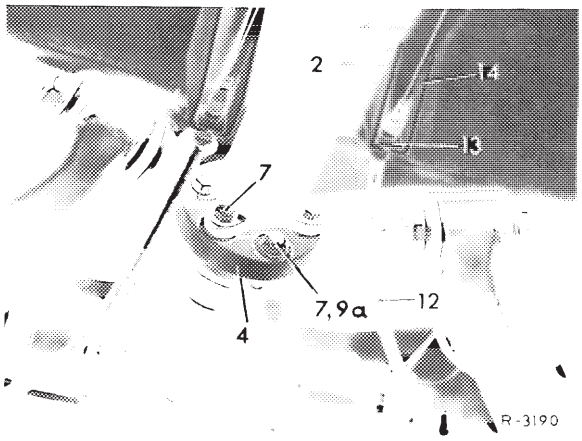


5 If required, remove exhaust system starting at plug connection.

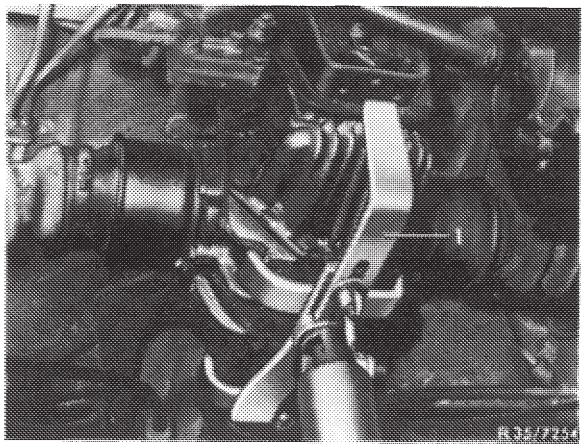
6 Loosen lock nut and propeller shaft intermediate bearing on frame floor.

Note: On three-piece propeller shaft, loosen only front lock nut or both propeller shaft intermediate bearings on frame floor.

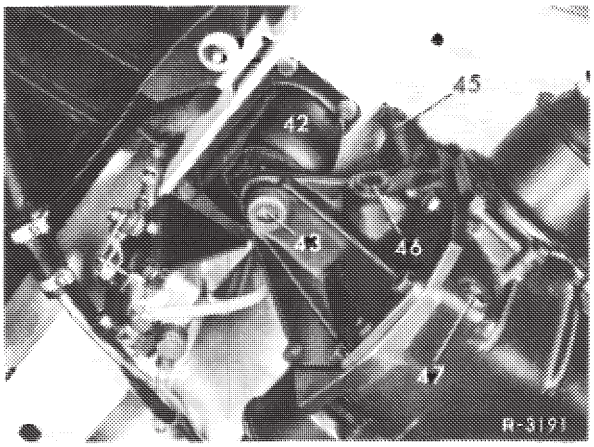
7 Unflange propeller shaft on rear axle and slide forward out of concentric alignments.



8 Support rear axle housing with a vehicle jack or with pitlift and vehicle jack top.

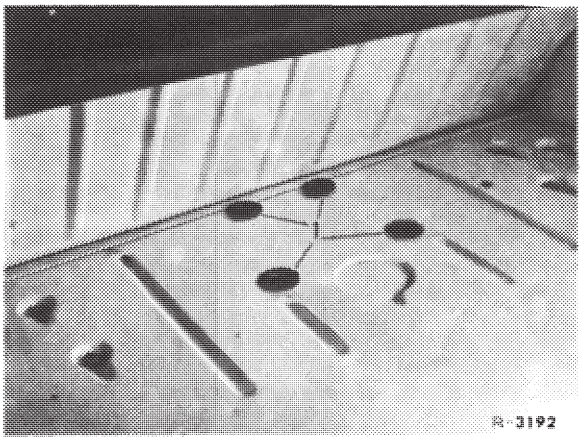


9 On 1st version, unscrew hex socket necked-down bolt (43) for rubber bearing on rear axle end cover. On 2nd version, unscrew hex bolts for attaching rubber mounting to frame floor.

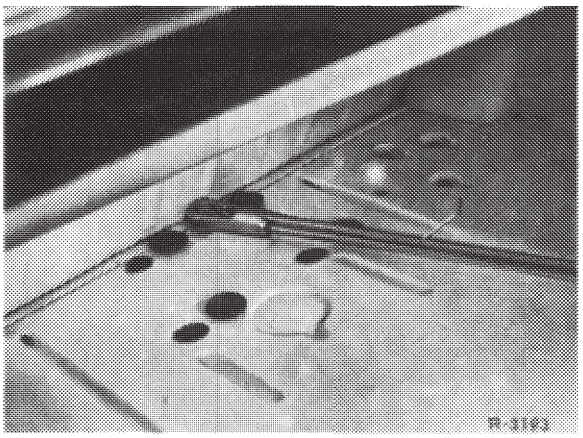


Rear rubber mounting of 1st version

10 Fold back rubber mat in trunk and remove rubber plugs (1).

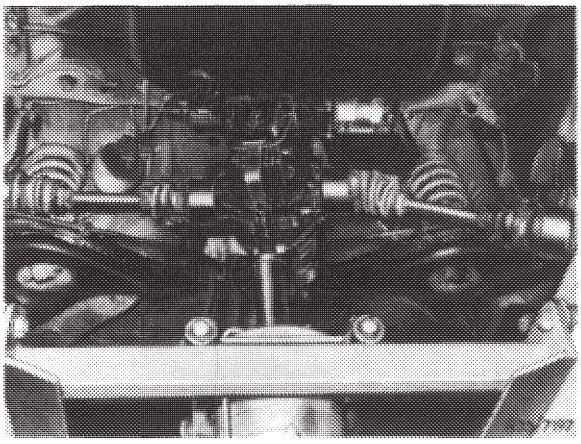


11 Unscrew rear axle center piece from rear axle carrier.



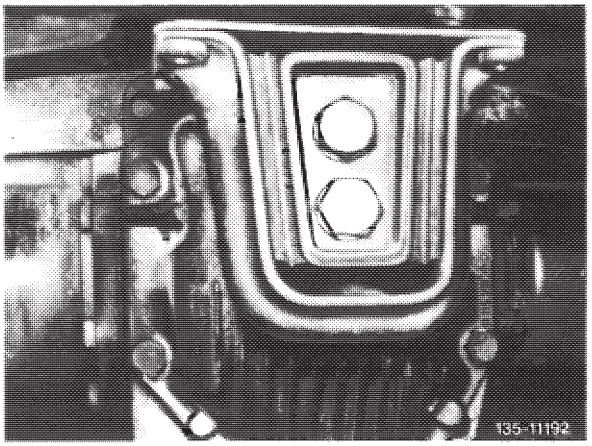
12 Lower rear axle center piece and remove together with rear axle shaft.

Attention!
When transporting rear axle center piece with rear axle shafts make sure, that the **rear axle shafts are not falling down**, since this would result in damage and leaks to the housings of the toothed inner synchromesh joints.



13 Unscrew rubber bearing (1st version) on frame floor and rubber bearing (2nd version) from rear axle center piece.

14 Check rubber bearings and renew, if required.

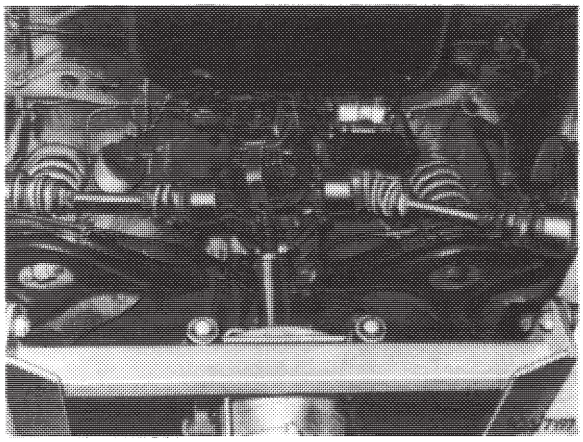


Rear rubber bearing of 2nd version

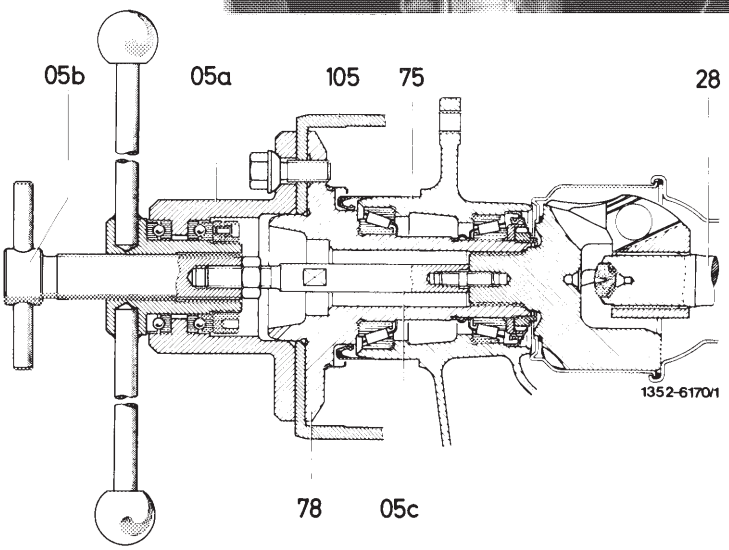
Installation

15 Tighten rubber bearing of 1st version on frame floor to 25 Nm and rubber bearing of 2nd version on rear axle center piece to 120 Nm.

16 Place rear axle center piece with rear axle shafts on vehicle jack top and move into installation position.

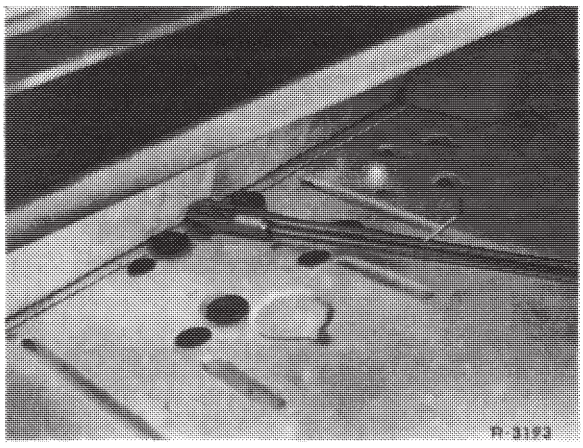


17 Introduce rear axle shafts into rear axle shaft flange by means of assembly fixture. Remove assembly fixture.

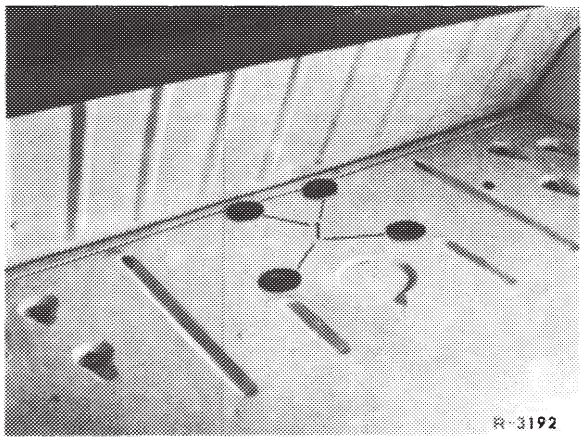


18 Lift rear axle center piece and attach to rear axle carrier. Tighten self-locking nuts to 100 Nm.

Attention!
Renew self-locking hex. nuts on principle.



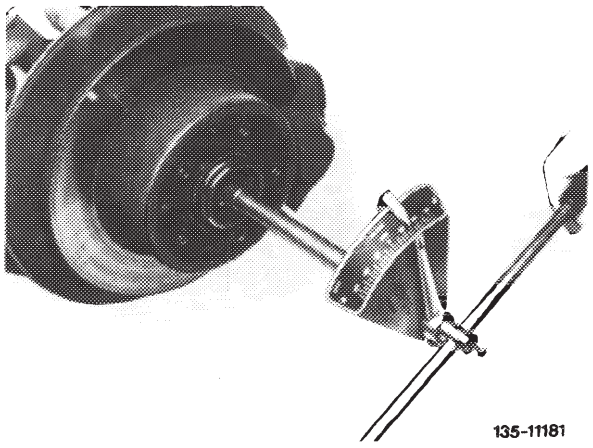
19 Close through-holes with rubber plug (1) and put back rubber mat.



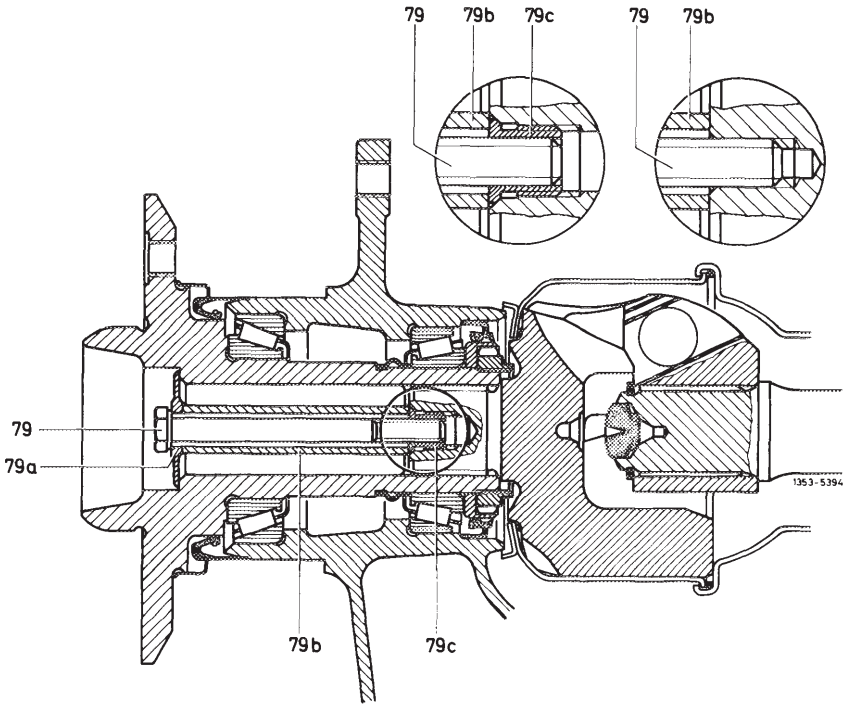
20 Rear axle shafts to rear axle shaft flange. Tighten hex. screw M 12 on 1st version to 95 Nm.

On 2nd version, mount hex. screw M 8 with clamping disc and spacing sleeve and tighten to 30 Nm.

Attention!
Remove clamping disc after onetime use. Lubricate clamping disc in range of screw head.



Note: In the event of clicking noises, exchange hex. screw M 12 with thick washer for hex. screw M 8 (79) with pertinent spacing sleeve (79b) and clamping disc (79a). To reduce threads, screw a threaded bushing (79c) into rear axle shaft by means of self-made tool. (Detail at left). Tightening torque of threaded bushing 30 Nm.

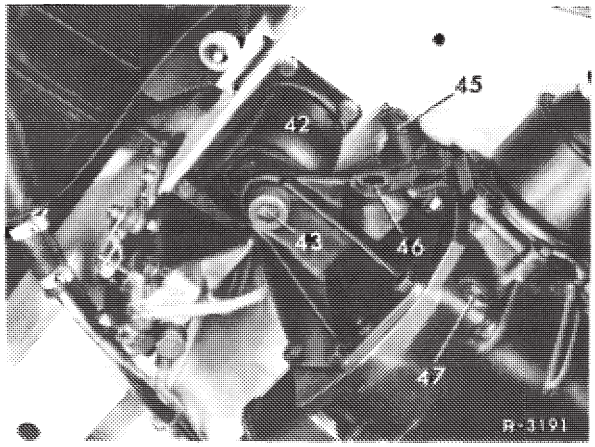


79 Hex bolt
79a Clamping disc
79b Spacing sleeve
79c Threaded bushing

Detail left:
repair solution

Detail right:
standard version

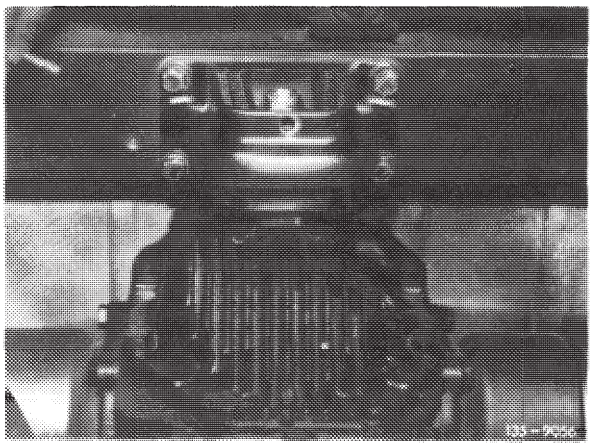
21 On rubber bearing of 1st version, lift rear axle center piece up to rubber bearing (42) and tighten hex socket necked-down bolt (43) to 140 Nm.



Rear rubber bearing of 1st version

22 On rubber bearing of 2nd version, lift rear axle center piece up to frame floor and attach rubber bearing to frame floor. Tightening torque of hex. screws 25 Nm. Tightening torque of self-locking hex. screws 30 Nm.

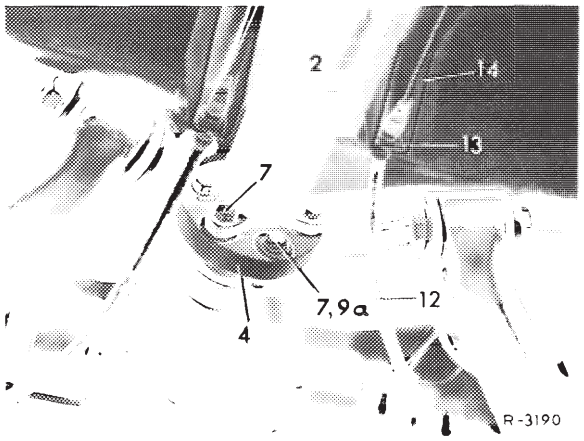
Attention!
Use self-locking hex. screws only once.



Rear rubber bearing of 2nd version

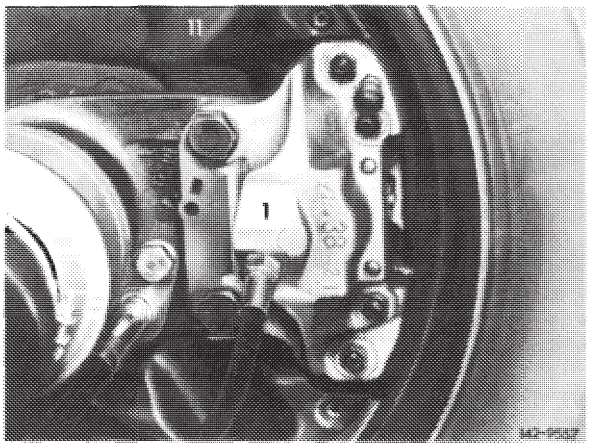
23 Mount propeller shaft (2) to universal flange of drive pinion.

24 Attach propeller shaft intermediate bearing, but do not yet tighten.



25 Mount caliper with new locking plate or locking bolts and tighten to 90 Nm.

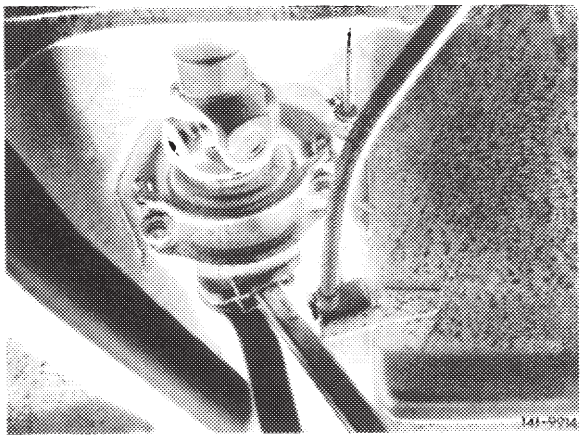
26 Fill oil into rear axle up to level of filler hole.



27 Tighten clamping nut on propeller shaft to 30–40 Nm.

28 Tighten propeller shaft intermediate bearing.

29 Install exhaust system.

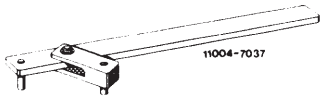
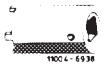
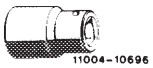
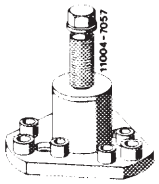


35–530 Replacement of radial sealing ring on drive pinion

Rear axle center piece installed.

Tightening torques			Nm
Lock nut of propeller shaft	2-piece		30–40
	3-piece	front	30–40
		rear	200

Special tools

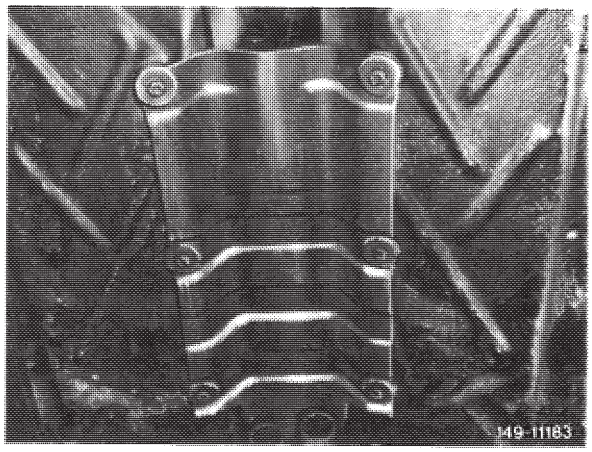
Holding wrench for universal flange		116 589 10 07 00
Socket 3/4" square for slot nut on universal flange		115 589 01 07 00
Socket 30 mm double hex. 3/4" square for double hex. collar nut on universal flange		126 589 02 09 00
Thrust piece for radial seal (component of remover and installer for drive pinion)		116 589 12 61 03
Torque measuring tool for friction torque of rear axle drive 30–600 Ncm		001 589 49 21 00
Connection 3/4" square head to 1/2" square socket		100 589 02 59 00
Puller for universal flange		116 589 19 33 00

Removal

Models 107, 116, 126

1 Remove exhaust system (49–100).

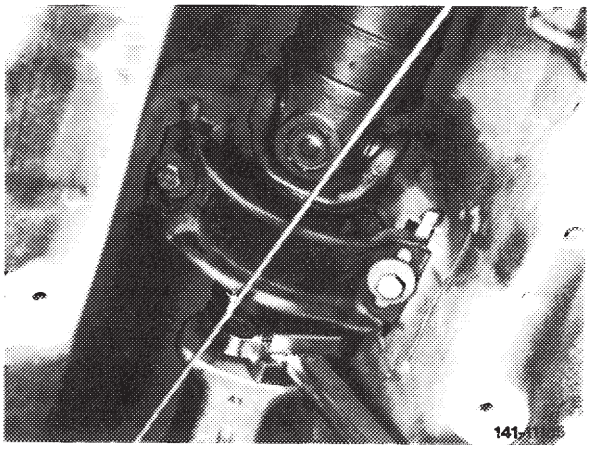
2 Unscrew shielding plate.



All models

3 Loosen clamping nut and unscrew propeller shaft intermediate bearing on frame floor.

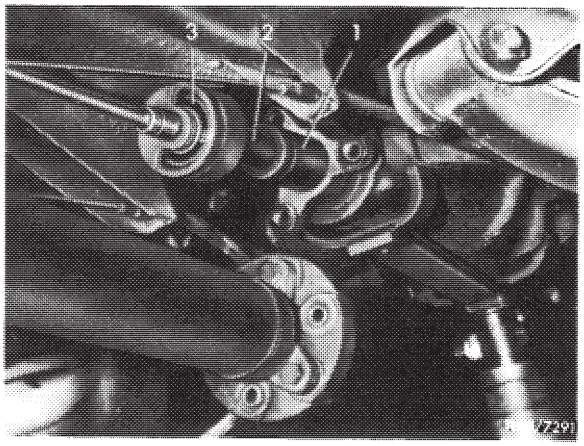
Note: On 3-piece propeller shaft loosen front lock nut only.



4 Unflange propeller shaft from rear axle and push forward out of concentric alignment.

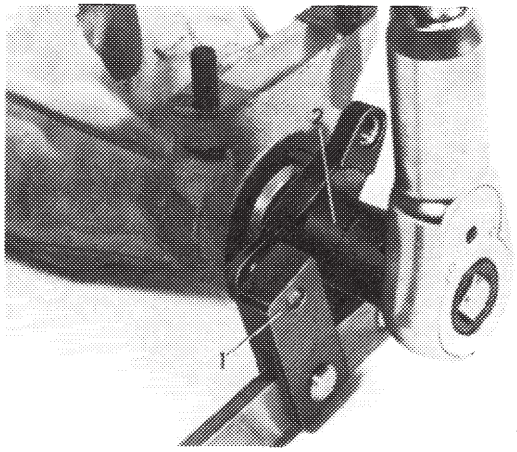
5 Measure friction torque of complete rear axle drive and write down.

Attention!
When measuring friction torque, make sure that the rear axle shafts are approximately horizontal and that neither the brake pads on brake discs nor the brake shoes of the parking brake are wiping against drum.

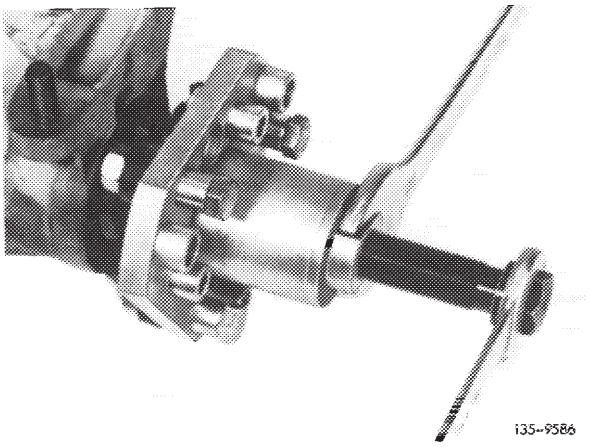


6 Plug holding wrench on universal flange and loosen slot nut or double hex. collar nut with slot nut socket or double hex. socket.

Note: Do not unlock on slot nut or double hex. collar nut with crush nut (since January 1974 or November 1981), but simply turn loose.

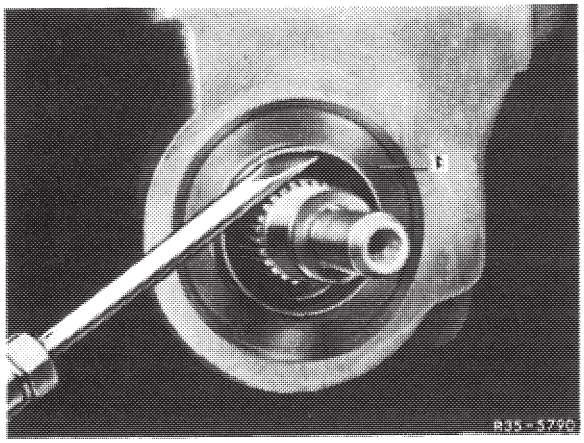


7 Pull universal flange from drive pinion, using puller, if required.

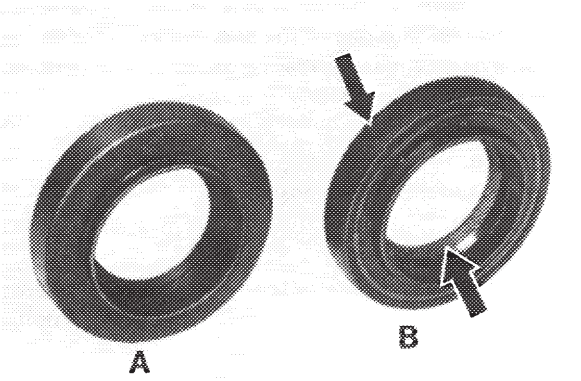


8 Force radial sealing ring out of rear axle housing by means of a screwdriver.

9 Check running surface for radial sealing ring on universal flange. Replace universal flange, if running surface is worn.



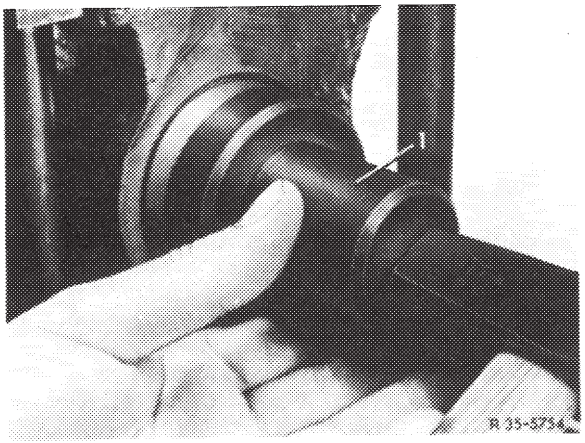
Note: Starting November 1979, only radial sealing rings with oil return feed thread and rubber-coated sheet-metal jacket will be available (B, arrows). This change eliminates the ground thread on universal flange.



A Radial sealing ring without ground thread (1st version)
B Radial sealing ring with righthand thread and rubber-coated sheet-metal jacket (2nd version)

Installation

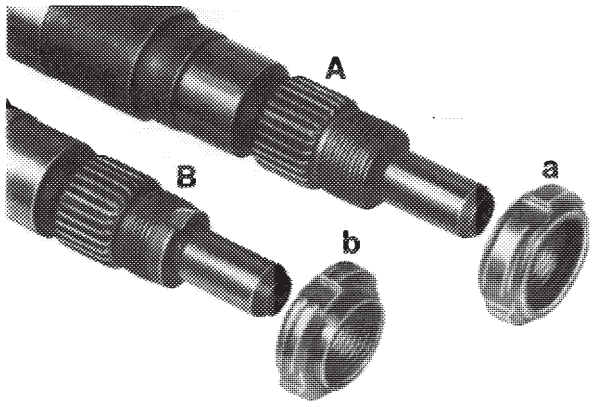
10 Coat radial sealing ring with rubber-coated sheet-metal jacket on OD with rubber sliding compound "naphtalene H or hypoid gear oil" and knock-in up to stop in rear axle housing by means of thrust piece (1).



11 Plug-on joint flange and carefully tighten with a new slot nut until measured or recorded friction torque has been attained. Tightening torque of slot nut should amount to at least 180 Nm. If this minimum tightening torque is not attained, replace elastic spacing sleeve.

Attention!
On drive pinion of 1st version without **groove** on threads (A) mount **self-locking slot nut** (polystop slot nut, a) **only.**

On drive pinion of 2nd version **with groove (B) optionally use a crush slot nut (b) with a groove on circumference, or a double hex. collar nut (c).** Other installation combinations are not permitted.



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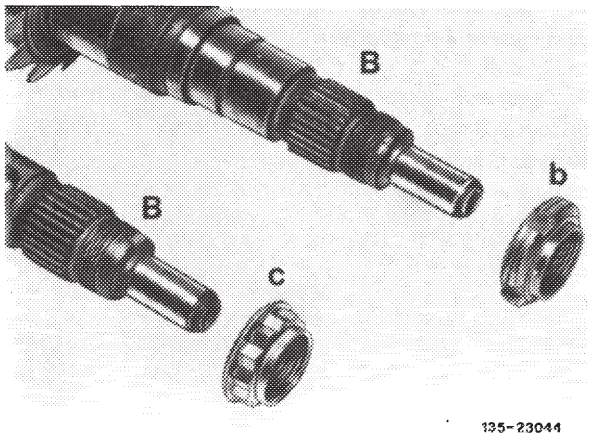
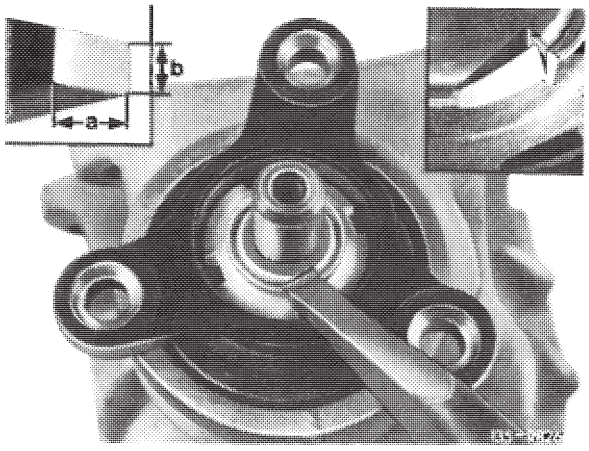


135-23044

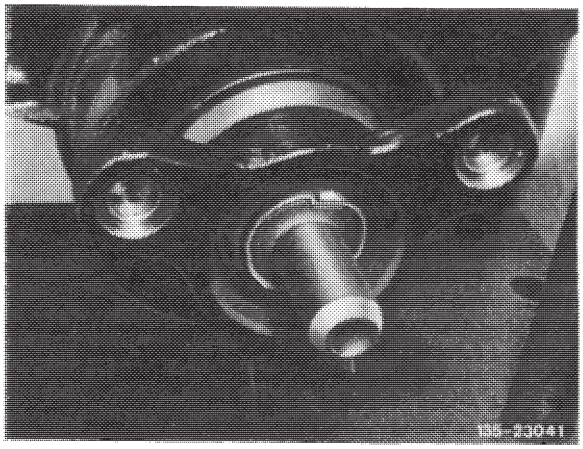
12 Peen crush slot nut or double hex. collar nut with a peening tool into one of the two grooves of drive pinion in such a manner that no gap shows up between groove and locking tab.

Attention!
Blows should not be too heavy.

Dimensions for peening tool: "a" = approx. 8 mm
"b" = approx. 4 mm



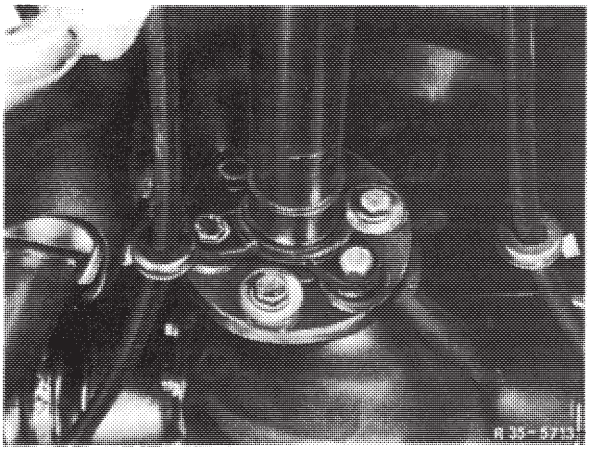
Crush slot nut


Double hex. collar nut

13 Attach propeller shaft to flange.

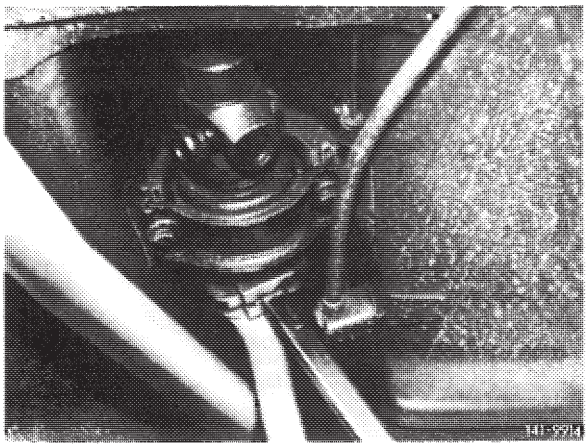
14 Attach propeller shaft intermediate bearing but do not yet tighten.

15 Fill rear axle housing with oil up to level of filler hole.



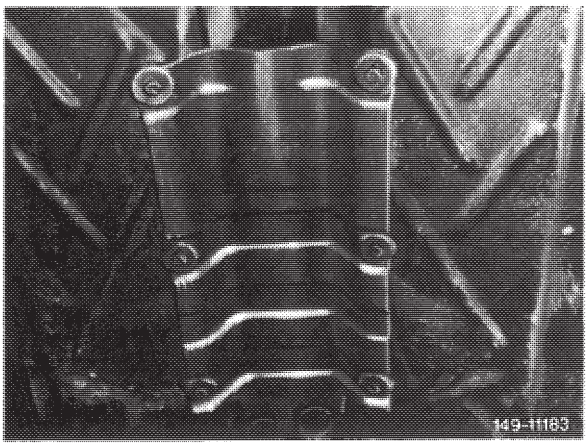
16 Tighten lock nut on propeller shaft to 30–40 Nm.

17 Tighten propeller shaft intermediate bearing.

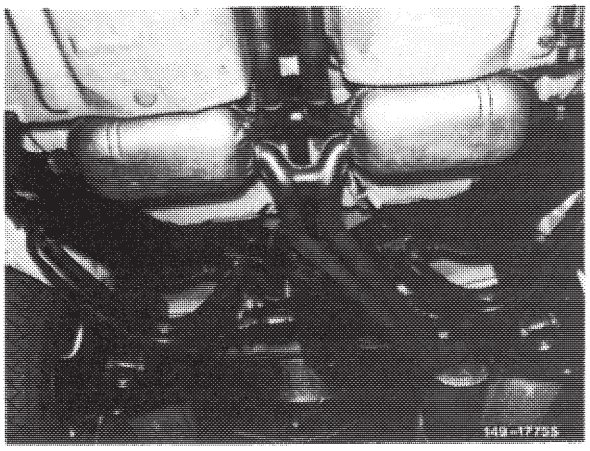


Models 107, 116, 126

18 Mount shielding plate.



19 Install exhaust system (49–100).

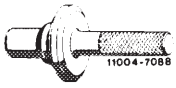
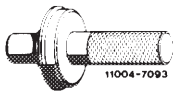
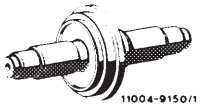
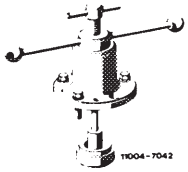


35–540 Replacement of radial sealing ring of rear axle shaft

Rear axle center piece installed.

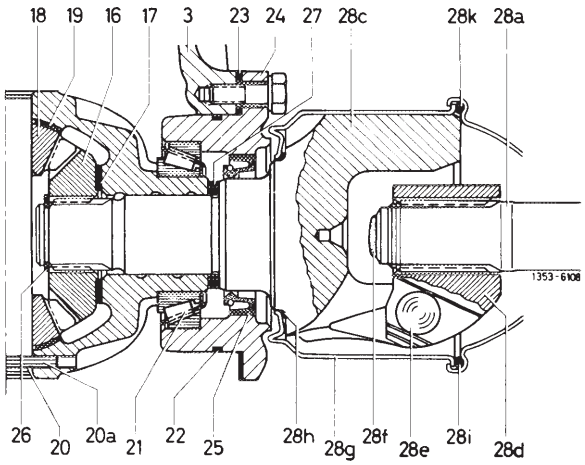
Tightening torques		Nm
Hex socket necked-down bolt for attaching rear rubber bearing to rear axle end cover (rubber bearing 1st version)		140
Hex socket bolts or hex bolts for attaching rear rubber bearing to rear axle end cover (rubber bearing 2nd version)		120
Hex bolts for attaching rear rubber bearing to frame floor		25
Hex bolts, self-locking, for attaching rear rubber bearing to frame floor		30
Hex bolts for attaching rear axle end cover		45
Hex bolt for attaching rear axle shaft to rear axle shaft flange	1st version M 12	95
	2nd and 3rd version M 8	30

Special tools

Installer for radial sealing ring with 65 mm OD	 11004-7088	116 589 05 43 00
Installer for radial sealing ring with 81 mm OD	 11004-7093	116 589 10 15 00
Installer for radial sealing ring for rear axle center piece without lateral bearing cap	 11004-9150/1	126 589 00 15 00
Assembly tool for removal and installation of rear axle shaft on rear axle shaft flange	 11004-7042	116 589 24 61 00

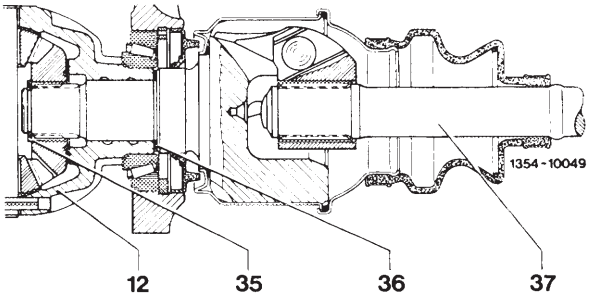
Layout of rear axle center piece with lateral bearing caps

3 Rear axle housing
16 Side gear
17 Thrust washer
18 Differential pinion
19 Ball washer
20 Differential bolt
20a Clamping sleeve
21 Tapered roller bearing
22 Sealing ring
23 Compensating washer
24 Bearing cap
25 Radial sealing ring
26 Locking ring
27 Spacing ring
28a Rear axle shaft
28c Inner spider
28d Spider joint hub
28e Ball
28f Stop buffer
28g Protective sleeve
28h Sealing ring
28i Stop sleeve
28k Sealing ring



Layout of rear axle center piece without lateral bearing caps

12 Differential housing
35 Locking ring
36 Spacing ring
37 Rear axle shaft



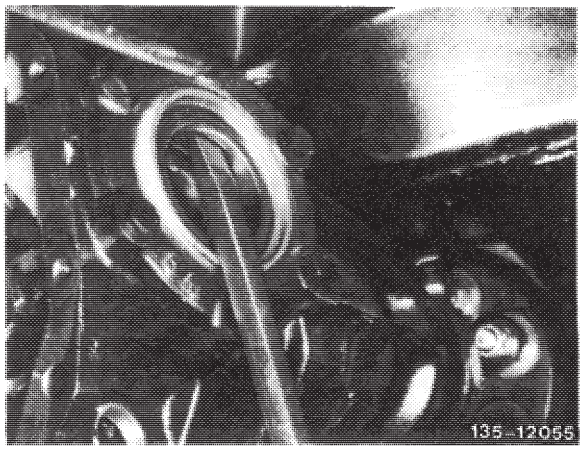
Note

Thoroughly clean rear axle housing in range of bearing cap, so that no dirt can enter rear axle housing.

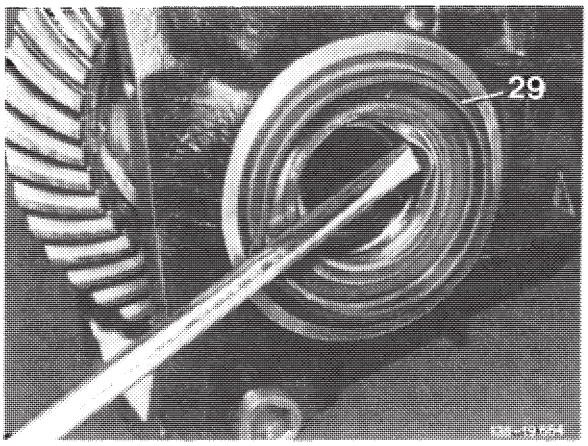
Removal

1 Completely remove rear axle shaft at respective end (35–620).

2 Force radial sealing ring out of bearing cap by means of a screwdriver.



Rear axle center piece with lateral bearing caps

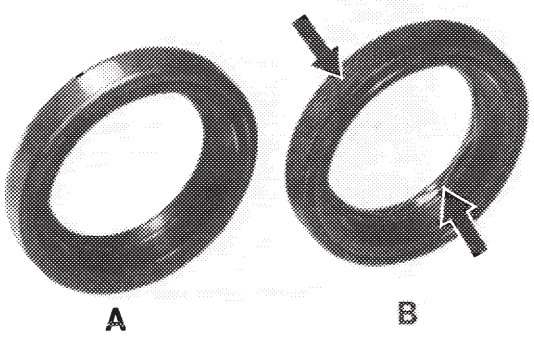


Rear axle center piece
without lateral bearing cap

29 Radial sealing ring

3 Check running surface for radial sealing ring on inner spider and renew rear axle shaft, if required.

Note: Starting November 1979 only radial sealing rings with alternate thread for oil return together with rubber-coated sheet-metal jacket will be available (B, arrows). They can be used at the left and right. This will eliminate ground thread on rear axle shafts.



135-17049

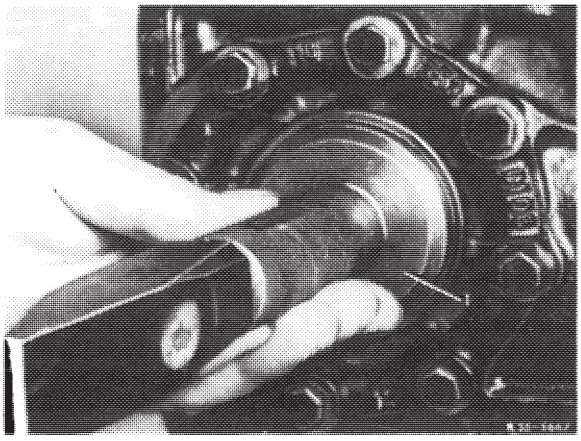
A = Radial sealing ring without thread (1st version)
B = Radial sealing ring with alternate thread and rubber-coated sheet-metal jacket (2nd version)

Installation

Rear axle center piece with lateral bearing caps

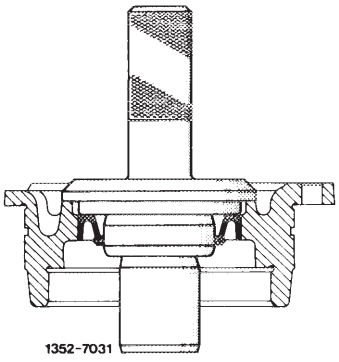
4 Knock-in radial sealing ring with 65 mm OD by means of installer, until installer is flush with bearing cap.

Note: Coat radial sealing ring togehter with rubber-coated sheet-metal jacket on OD with rubber sliding compound "napthalene H or hypoid gear oil".



Attention!
On vehicles with large rear axle center piece there are 2 versions of bearing caps for radial sealing rings with 65 mm dia.

On 1st version, push radial sealing ring inwards until punch rests against lug for dirt labyrinth of bearing cap.

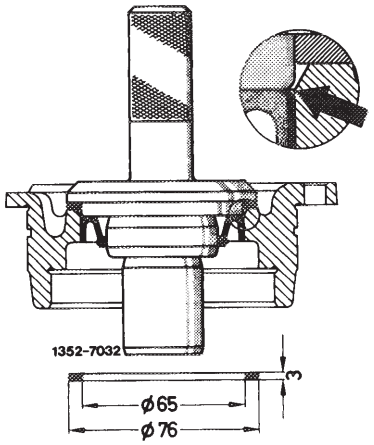


1352-7031

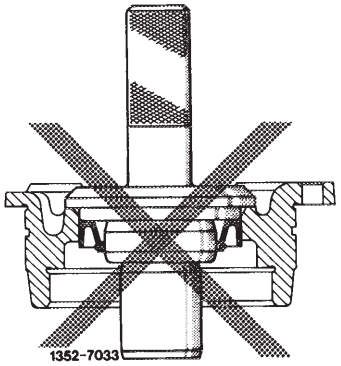
Radial sealing ring correctly inserted

On 2nd version, push radial sealing ring inward until punch is flush with lower edge of chamfer (lug for dirt labyrinth is made shorter) of bearing cap.

To avoid excessive pressure, use spacing ring made according to drawing.



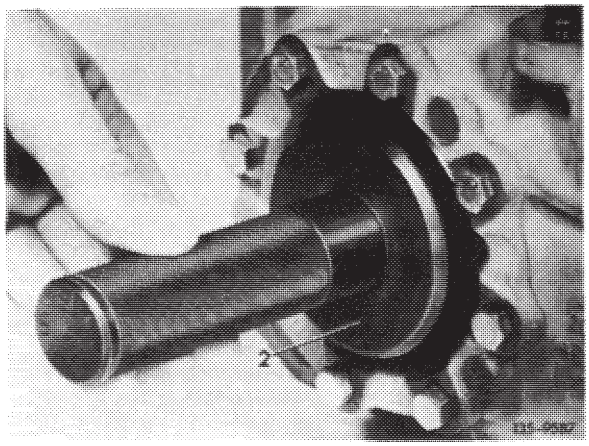
Radial sealing ring correctly inserted!



Radial sealing ring wrongly inserted!

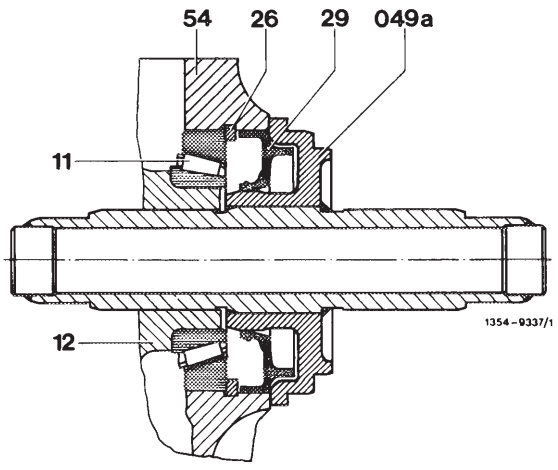
5 Press radial sealing ring of 81 mm OD into bearing cap until installer rests against cap.

Note: Coat radial sealing ring together with rubber-coated sheet-metal jacket on OD with rubber sliding compound "naphtalene or hypoid gear oil".



Rear axle center piece without lateral bearing caps

6 Coat radial sealing ring at OD with rubber sliding compound "naphtalene H or hypoid gear oil" and knock-in by means of installer, until installer (49a) rests against rear axle housing (54).

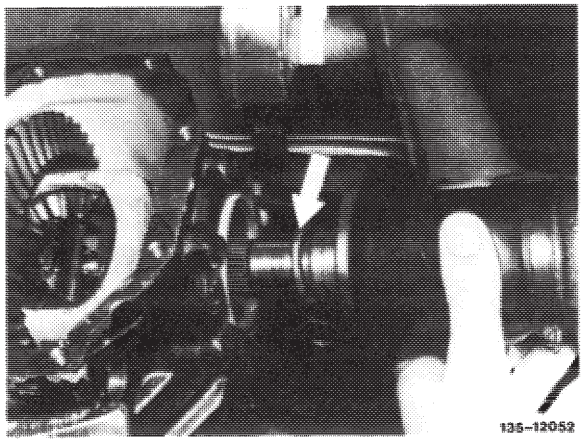


11 Tapered roller bearing
12 Transmission housing
26 Locking ring
29 Radial sealing ring
049a Installer
54 Rear axle housing

7 Install rear axle shaft complete with spacing ring. For this purpose, use a new locking ring between spider and side gear (35–620).

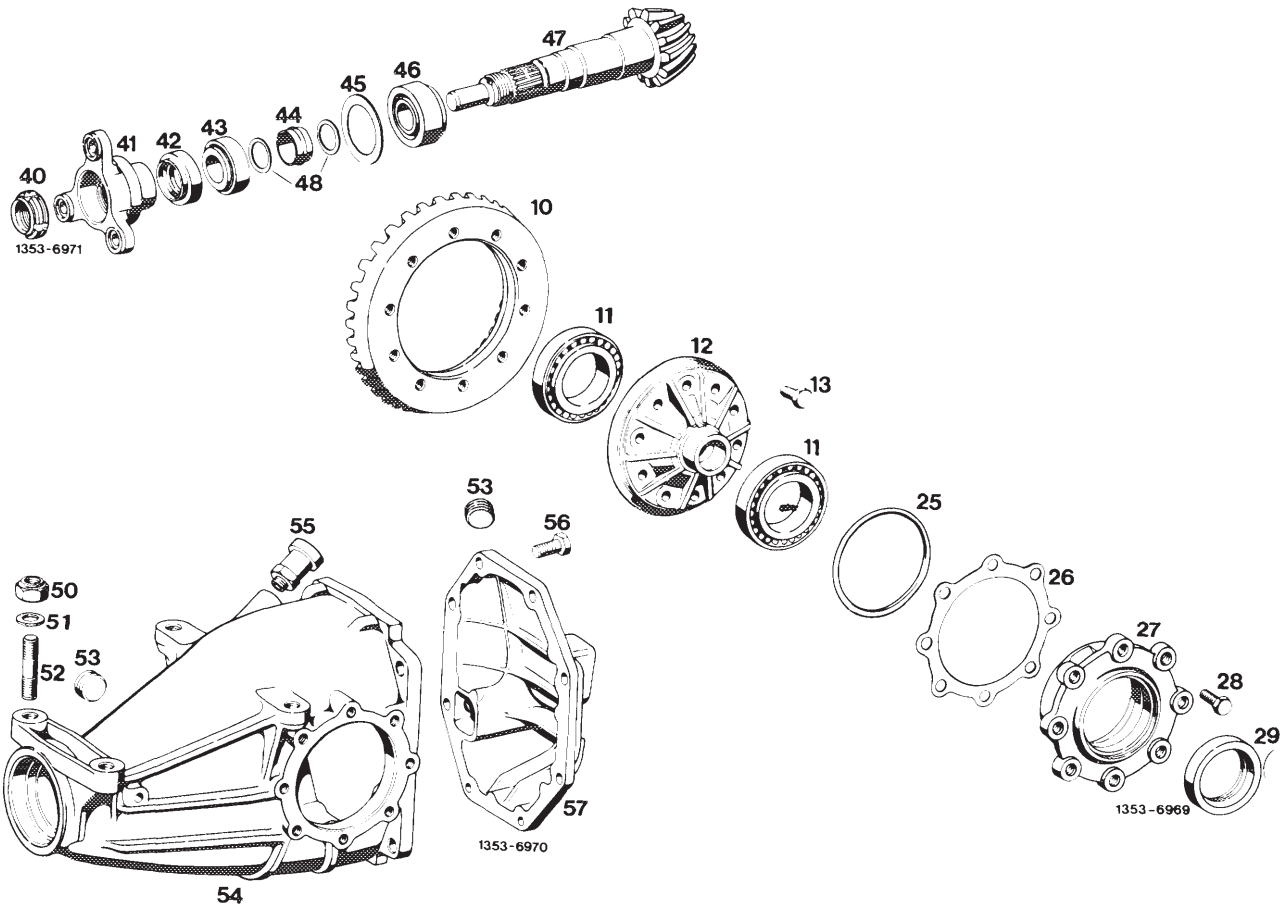
8 Check end play between inner spider and differential housing.

There should be no noticeable end play; the locking ring should just barely turn in groove. If required, install thicker or thinner spacing ring.



9 Fill rear axle housing with oil up to level of filler hole.

A. Rear axle center piece with lateral bearing caps



10	Ring gear	Check for damage and wear For assembly, heat to 60–70 °C
11	Tapered roller bearing (differential)	Check for damage and wear
12	Differential housing	Check for damage
13	Hex. head screw normal or self-locking	Renew, pay attention to tightening torque and lenght, refer to table
25	Sealing ring	Renew
26	Compensating washer	
27	Bearing cap	Check for damage
28	Hex. head screw	Tightening torque 20 Nm
29	Radial sealing ring	Renew
40	Slot nut or double hex. collar nut	Renew, secure by peening collar
41	Universal flange	Check, renew, if vertical runout exceeds 0.06 mm after resetting several times
42	Radial sealing ring	Renew
43	Small tapered roller bearing (drive pinion)	Check for damage and wear
44	Spacing sleeve	Renew

45	Compensating washer	
46	Large tapered roller bearing (drive pinion)	Check for damage and wear
47	Drive pinion	Pay attention to mating no., check for damage and wear. Refer to note: A item 28
48	Washer	Renew
50	Self-locking nut	Renew, tightening torque 100 Nm
51	Washer	
52	Stud	Check for damage, tightening torque 50 Nm
53	Closing plug	
54	Rear axle housing	Check for damage
55	Breather	Renew
56	Hex. screw	Tightening torque 45 Nm
57	End cover	Check for damage, clean parting surface and coat with sealing compound

Oil types and capacities

Standard differential	Hypoid gear oil SAE 90 refer to specifications for service products page 235	
Differential with restricted slip (positive traction) (name plate on rear axle housing)	Special Hypoid gear oil refer to specifications for service products page 235.3	
Capacity	large center piece[1)]	1.3 litres
	small center piece[1)]	1.0 litre[2)]

[1)] Refer to installation survey rear axle center piece 35–500
[2)] On models 114 and 115 with rear rubber bearing of rear axle 1st version (cast iron end cover) the oil capacity amounts to 1.15 liter.

Gear wheel (rotor) for rpm sensor on vehicles with ABS

Part number	Ratio	Number of teeth
123 353 01 85	4.08	23
123 353 02 85	3.92	24
123 353 03 85	3.69	26
123 353 04 85	3.58/3.54	27
123 353 05 85	3.46	28
126 353 00 85	3.27	29
126 353 01 85	3.06/3.07	31
126 353 03 85	2.82	34
126 353 04 85	2.72	35
126 353 06 85	2.47	39
126 353 05 85	2.24	43

Compensating washers for adjusting backlash and spread

Thickness	large center piece[1)]	0,9 to 1.4
	small center piece[1)]	0.6 to 1.9
Steps		0.05 to 0.05

Note: If required, grind one compensating washer to required thickness.

Adjusting values of gear assembly

Backlash of gear assembly		0.08–0.14 mm
Adjustment of tapered roller bearings for differential: Tapered roller bearings are provided with the required preload by widening (spreading) rear axle housing by	large center piece[1]	0.15–0.20 mm
	small center piece[1]	0.10–0.15 mm
Permissible tolerance of adjusting dimension "A" of drive pinion		+ 0.01 −0.02
Adjustment of tapered roller bearing of drive pinion by measuring friction torque when rotating drive pinion with friction torque wrench[2]	new tapered roller bearing	120–140 Ncm
	used tapered roller bearing	50–100 Ncm

[1] Refer to installation survey rear axle center piece 35–500.
[2] For correct adjustment of tapered roller bearings tighten slot nut or double hex. collar nur on universal flange until the specified friction torque is attained when rotating drive pinion. For checking friction torque when rotating drive pinion, the differential with ring gear should not be installed.

Compensating washers for adjusting drive pinion

Thickness	large center piece	1.5 to 2.4
	small center piece	1.5 to 1.8
Steps		0.05 to 0.05

Note: If required, grind one compensating washer to required thickness.

Fastening screws for ring gear

Center piece version	Flange thickness of differential housing	Length of hex. screws		Part number
Large	10	22		116 990 02 01
	8	20	standard	126 990 01 01
			self-locking	126 990 07 01
Small	10	20		128 990 00 01
	8	18	standard	123 990 16 01 (replaced)
			self-locking	123 990 30 01

Universal flange on drive pinion

Dia. of running surface for radial sealing ring on universal flange	when new	$\frac{40.00}{39.84}$
	minimum dia. for repairs[1]	39.6
Running surface of universal flange		without thread
Permissible vertical runout of sealing surface of universal flange		0.06

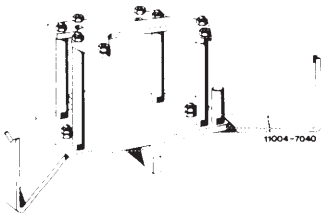
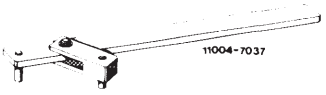
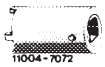
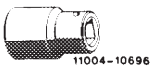
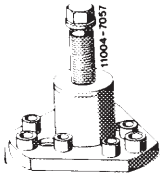
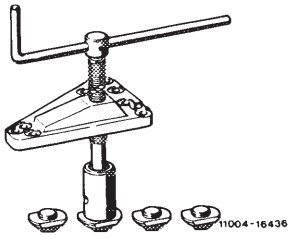
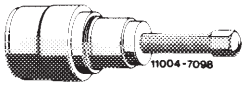
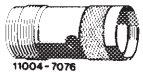
[1] Refinish running surface for seal in an emergency only.

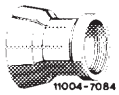
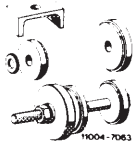
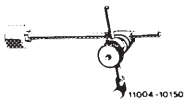
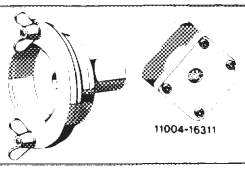
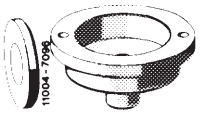
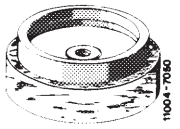
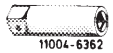
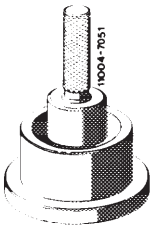
Compensating washer between inner synchromesh joint and differential housing

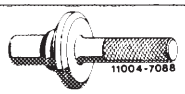
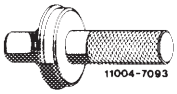
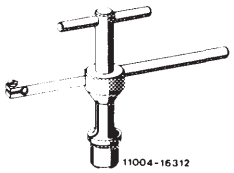
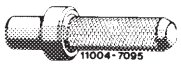
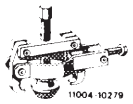
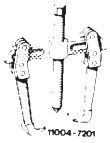
Spacing ring	Thickness	from 2.6 to 3.4
	Steps	from 0.1 to 0.1

Tightening torques			Nm
Hex. screws for fastening rear axle end cover to rear axle housing			45
Fastening screws for ring gear	Small center piece	standard	80
		self-locking	100
	Large center piece	standard	120
		self-locking	140
Studs in rear axle housing			50
Hex. screws for bearing caps on rear axle housing			20

Special tool

Assembly stand for rear axle center piece	 11004-7040	116 589 00 59 00
Holding wrench for universal flange	 11004-7037	116 589 10 07 00
Slot nut socket 3/4" square for slot nut on universal flange	 11004-7072	115 589 01 07 00
Socket 30 mm double hex. 3/4" square for double hex. collar nut on universal flange	 11004-10696	126 589 02 09 00
Puller for universal flange on drive pinion	 11004-7057	116 589 19 33 00
Installer and remover for pinion	 11004-16436	201 589 02 43 00
Puller for tapered roller bearing inner races (basic tool)	 11004-7098	001 589 36 33 00
Extension for puller 001 589 36 33 00	 11004-7076	000 589 35 34-00
Thrust piece for radial sealing ring on drive pinion	 11004-16310	124 589 02 15 00

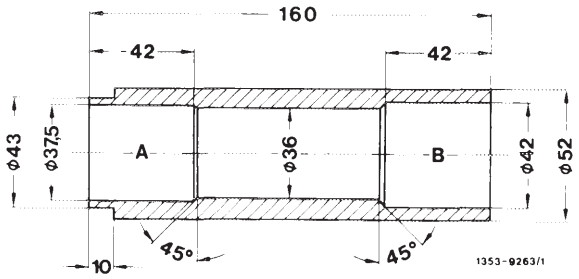
Collet for puller 001 589 36 33 00 for tapered roller bearing inner race	small center piece		000 589 33 34 00
	large center piece		000 589 34 34 00
Installer for tapered roller bearing outer races			116 589 11 61 00
Measuring plate for pinion height with bearing			601 589 00 23 00
Dial gauge holder for measuring plate 601 589 00 23 00			363 589 02 21 00
Measuring device for pinion bearing height in rear axle housing	small center piece		123 589 01 21 00
	large center piece		116 589 01 21 00
Measuring device for pinion bearing			116 589 07 21 00
Dial gauge holder			111 589 08 23 00
Adjusting gauge for adjusting pinion			115 589 05 21 00
Torque measuring tool 30–600 Ncm 1/2" square			001 589 49 21 00
Connection 3/4" square head to 1/2" square socket			100 589 02 59 00
Removing tool for removing tapered roller bearing outer race and radial sealing ring from bearing cap	small center piece		115 589 00 35 00

Removing tool for removing tapered roller bearing outer race from bearing cap	large center piece		116 589 00 35 00
Installing mandrel for radial sealing ring with 65 mm OD			116 589 05 43 00
Installing mandrel for radial sealing ring with 81 mm OD			116 589 10 15 00
Measuring bracket for measuring inclination			126 589 08 21 00
Backlash gauge			201 589 03 21 00
Assembly mandrel for inner race of tapered roller bearing			115 589 04 61 00
Puller for tapered roller bearing			123 589 08 33 00
Puller for pulling gear wheel on drive pinion of vehicles with ABS			000 589 88 33 00

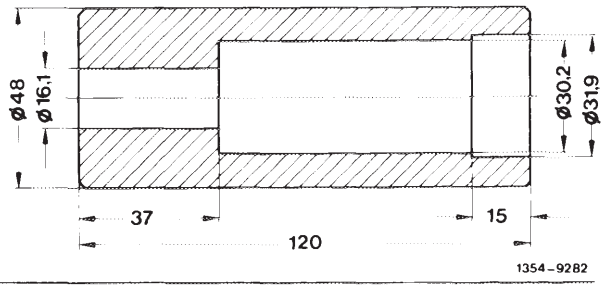
Conventional tools

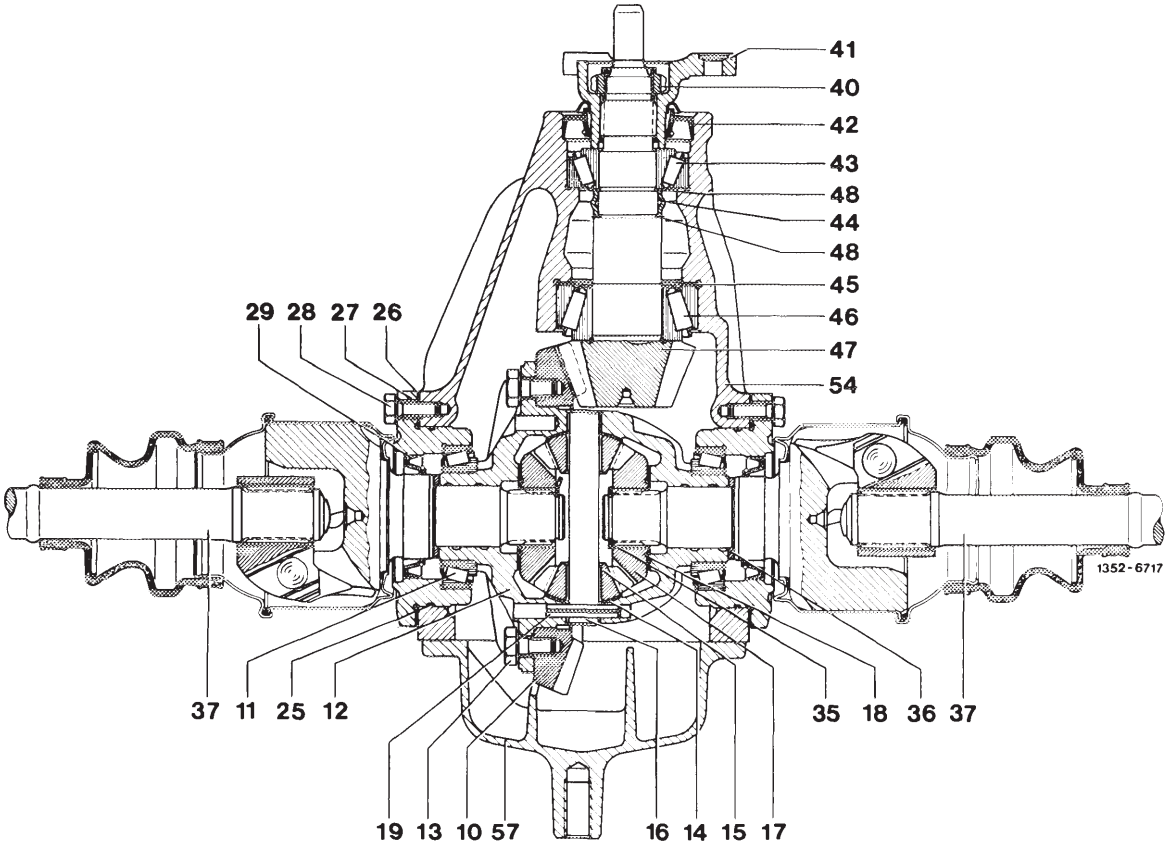
Two-arm puller	e.g. made by Nexus, D-5630 Remscheid order no. 100 size 2

Self-made tools

Installing sleeve for tapered roller bearing on drive pinion A = Small drive pinion B = Large drive pinion	

Installing sleeve for gear wheel on drive pinion of vehicles with ABS





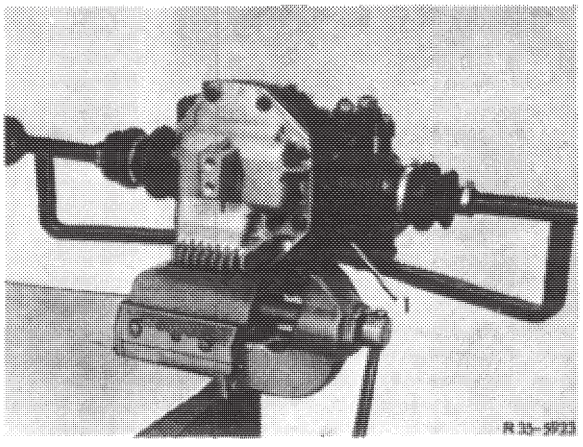
10 Ring gear
11 Tapered roller bearing
12 Differential housing
13 Hex bolt
14 Ball washer
15 Differential pinion
16 Differential pinion shaft
17 Side gear
18 Thrust washer
19 Clamping sleeve
25 Sealing ring
26 Compensating washer
27 Bearing cap
28 Hex bolt
29 Radial sealing ring
35 Locking ring
36 Compensating washer
37 Rear axle shaft complete
40 Crush collar nut or double hex. collar nut
41 Universal flange
42 Radial sealing ring
43 Small tapered roller bearing
44 Spacing sleeve
45 Compensating washer
46 Large tapered roller bearing
47 Drive pinion
48 Thrust washer
54 Rear axle housing
57 Rear axle end cover

Disassembly

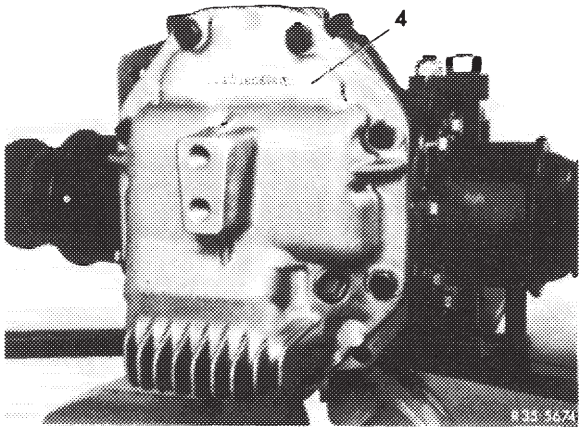
Removing differential together with ring gear

1 Remove rear axle center piece with rear axle shafts (35–520).

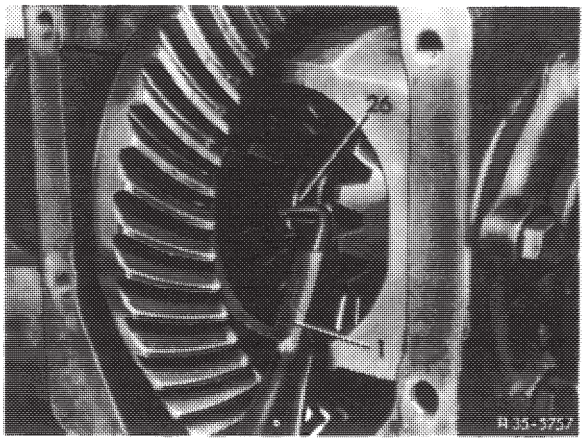
2 Clamp rear axle center piece with rear axle shafts on assembly stand (1) and support rear axle shafts. Drain oil from rear axle housing.



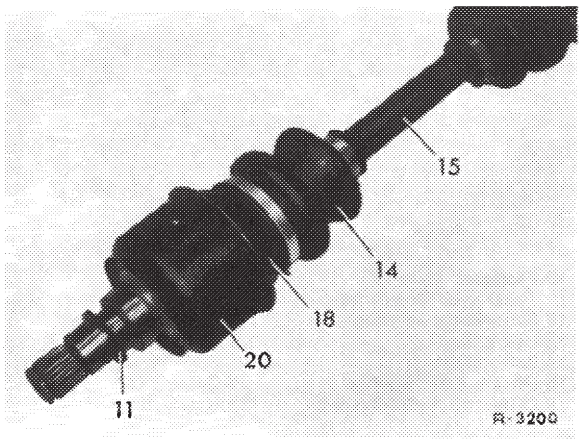
3 Unscrew end cover (4) from rear axle housing.



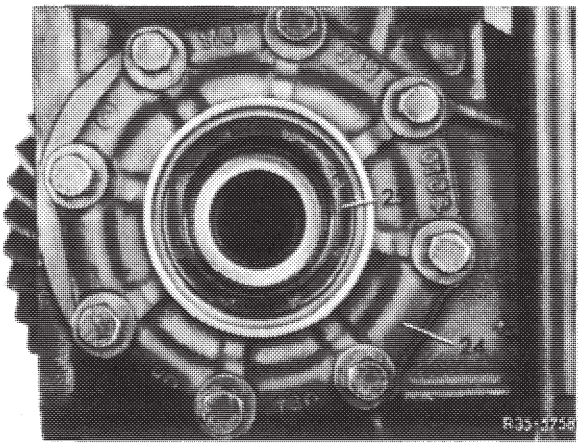
4 Pull off locking rings (26) between inner synchromesh joints and side gears by means of pliers (1) or a hook and remove from housing.



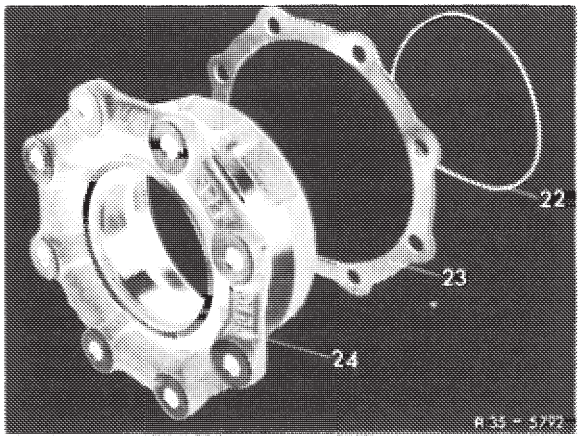
5 Pull rear axle shafts out of side gears and remove together with spacing rings (11).



6 Remove lateral bearing caps (24).

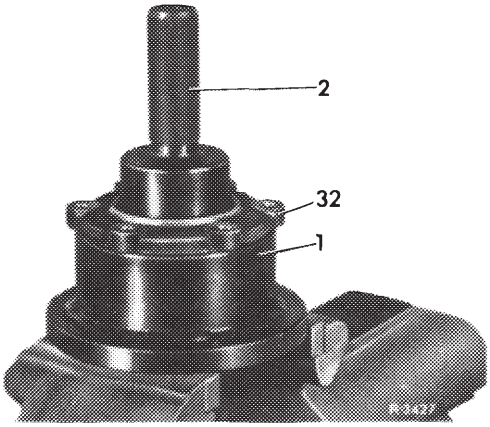


7 Pull off sealing rings (22). Remove compensating washers (23) for adjusting backlash or spread dimension (widening) and mark together with bearing caps (for lefthand and righthand side).



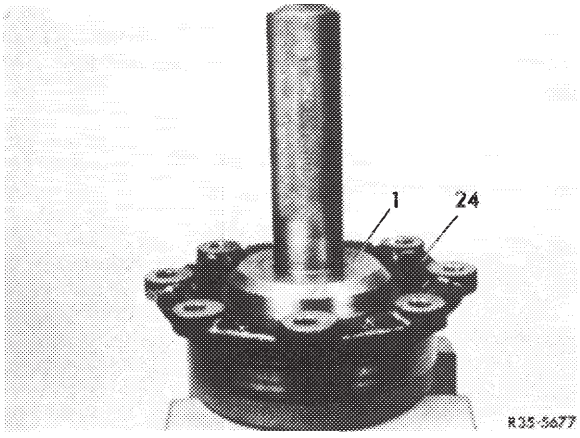
With small rear axle center piece

8 Press radial sealing ring and tapered roller bearing outer race together out of bearing cap by means of removing tool (1 and 2).

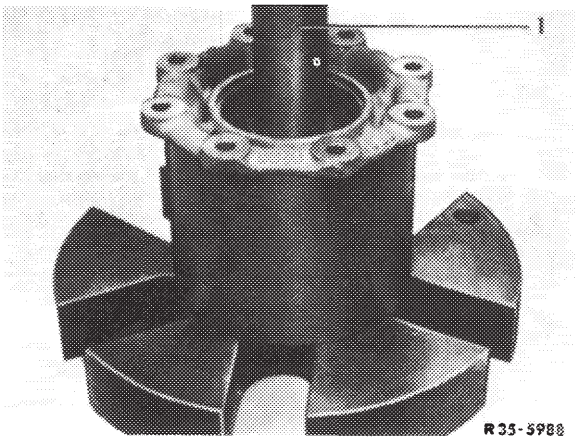


With large rear axle center piece

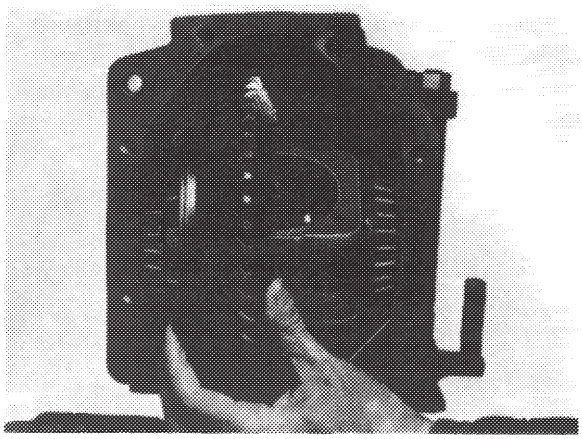
9 Force radial sealing ring out of bearing cap by means of removing tool (1).



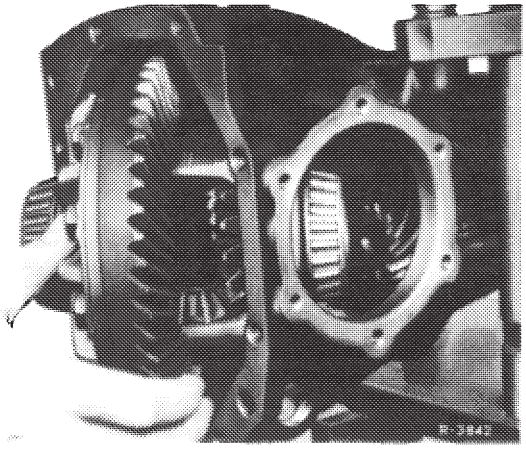
10 Force out bearing outer race by means of removing tool (1).



11 Take differential out of rear axle housing (large center piece).

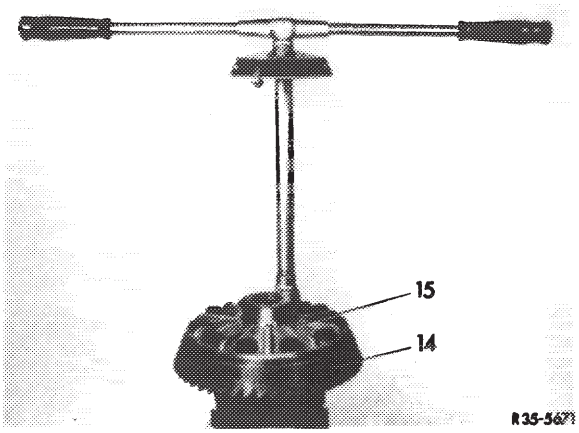


12 Move differential into position shown and take out of rear axle housing (small center piece).

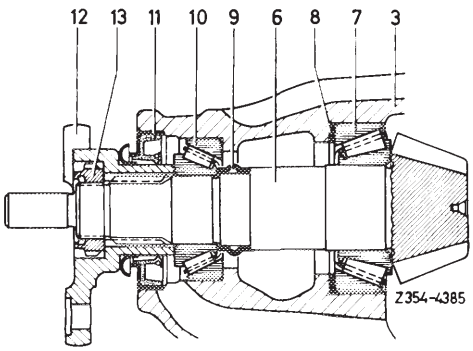


Note: If the wheel assembly is used again, mark position of ring gear in relation to differential housing, so that the ring gear is reinstalled in the same position as before.

13 Unscrew ring gear from differential housing and carefully push from housing.

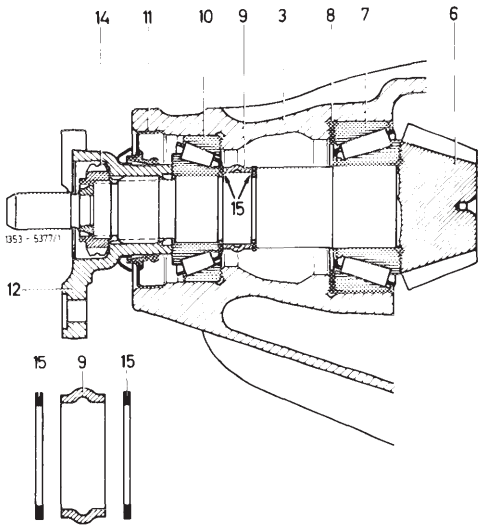


Removing and checking drive pinion



1st version

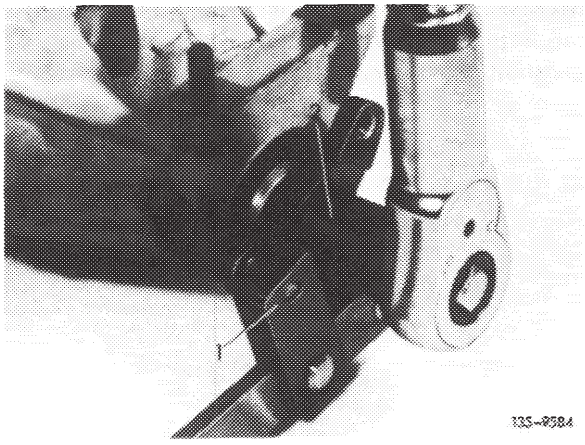
3 Rear axle housing
6 Drive pinion
7 Tapered roller bearing
8 Compensating washer
9 Spacing sleeve
10 Tapered roller bearing
11 Radial sealing ring
12 Universal flange
13 Self-locking slot nut (1st version)



2nd version

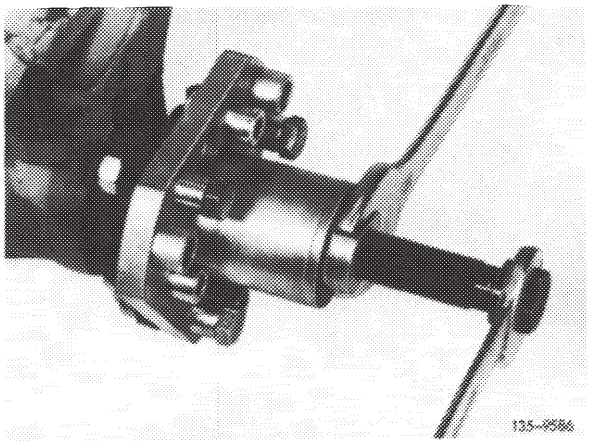
3	Rear axle housing	11	Radial sealing ring
6	Drive pinion	12	Universal flange
7	Tapered roller bearing	14	Crush slot nut (2nd version)
8	Compensating washer		or double hex. collar nut
9	Spacing sleeve		(3rd version)
10	Tapered roller bearing	15	Washer

14 Plug holding wrench (1) on universal flange and loosen self-locking or crush slot nut with slot nut wrench (2) or double hex. collar nut with double hex. socket.

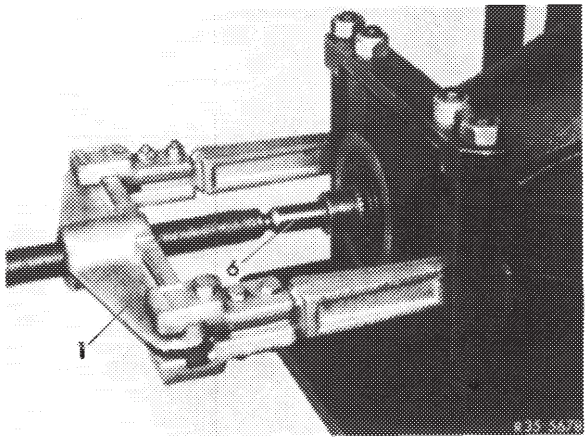


15 Mark universal flange in relation to drive pinion.

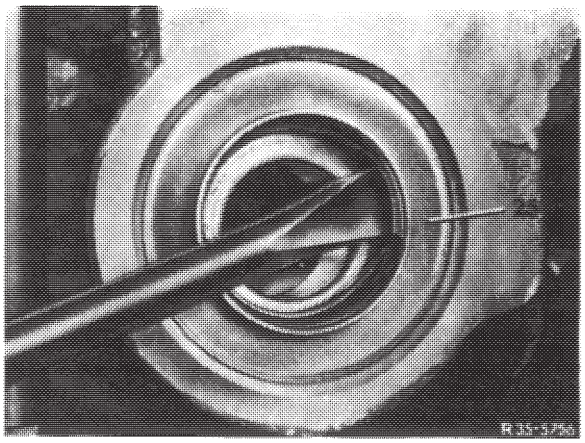
16 Pull universal flange from drive pinion with puller, if required.



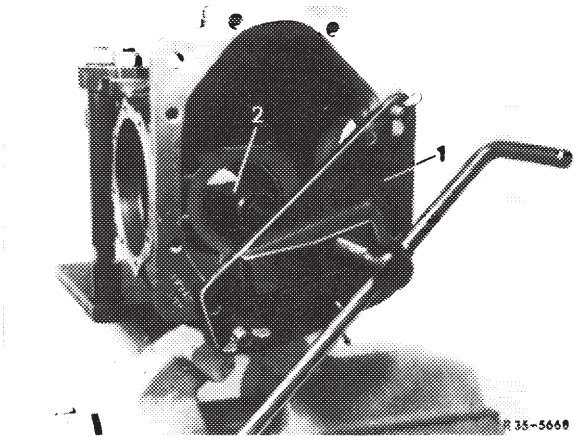
17 Force drive pinion out of rear axle housing by means of a conventional puller.



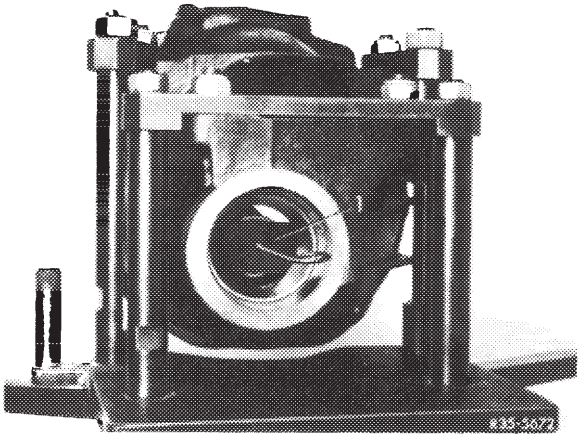
18 Force radial sealing ring (25) out of rear axle housing by means of a screwdriver and remove tapered roller bearing inner race.



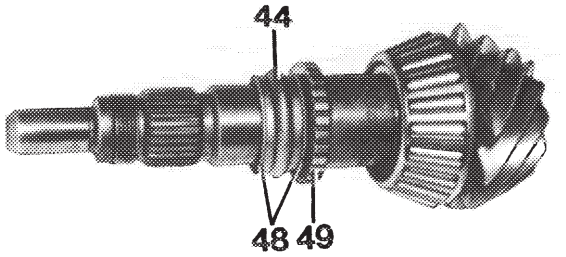
19 Screw installer and remover (1) to rear axle housing and pull inner tapered roller bearing outer race with compensating washer out of housing by means of pulling member (2).



20 Force outside tapered roller bearing outer race out of rear axle housing by means of thrust member (1).



21 Remove spacing sleeve (44) together with thrust washers (48) from drive pinion.



44 Spacing sleeve
48 Thrust washers
49 Gear wheel (on vehicles with ABS only)

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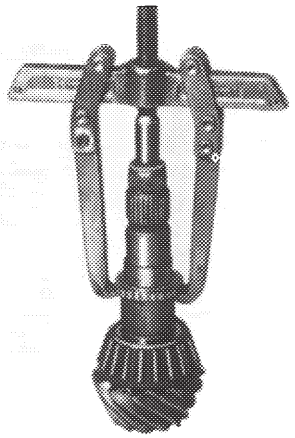
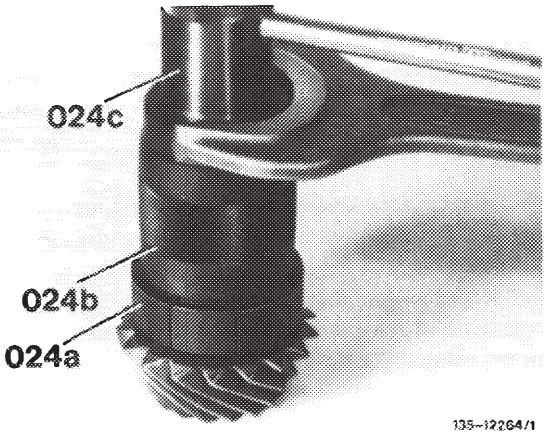
Vehicles with ABS

22 Pull gear wheel (rotor) from drive pinion by means of a conventional puller.

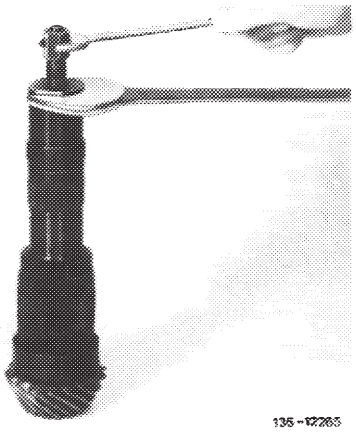


23 Assemble puller (basic unit 024) with extension (024c) and clamp (024a).

24 Slip puller with clamp (024a) over tapered roller bearing and tighten clamp by means of clamping sleeve (024b) behind rollers of tapered roller bearing.



25 Pull tapered roller bearing inner race from drive pinion by means of puller.



Checkup

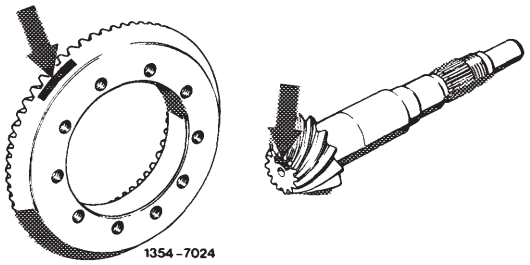
26 Check all parts for re-use. Check bearing seats on drive pinion for radial and axial runout.

27 Check running surface for radial sealing ring on universal flange. If running surfache is worn out or oil return feed thread on 1st version is damaged, replace universal flange.

28 Place universal flange on drive pinion while paying attention to mark. Check vertical runout of universal flange on running surface of radial sealing ring.

If in spite of repositioning universal flange several times the vertical runout on splining is higher than 0.06 mm, replace universal flange.

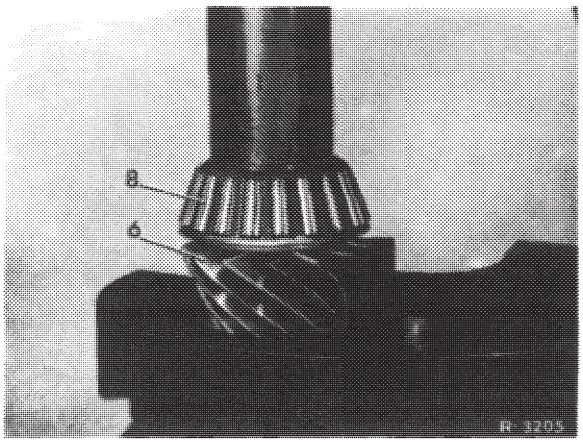
Note: Each drive pinion and ring gear belonging to one gear set is identified by means of a serial number written on both parts. In addition, the distance of the wheels in relation to each other for the respective gear set are also named on drive pinion.

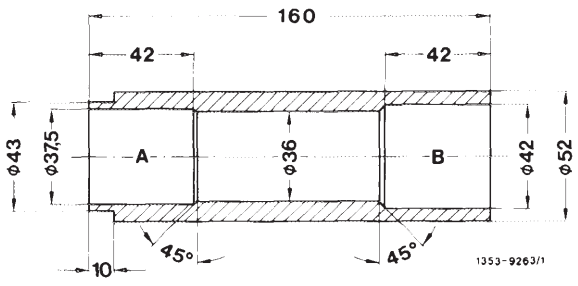


To determine the thickness of the compensating washer required for adjusting the drive pinion, a data sheet should be used. **A sample data sheet is inserted at the end of this job number.** The measuring and computing procedure of the example shown is described in detail on the following pages.

Assembly and adjustment of gear assembly

29 Press rear tapered roller bearing (8) on drive pinion (6) by means of self-made pressing-on sleeve (1). For this purpose, use side of sleeve marked with "A" or "B" according to center piece.



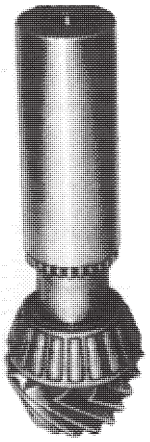


Pressing-on sleeve (self-made)

A = for vehicles with small center piece
B = for vehicles with large center piece

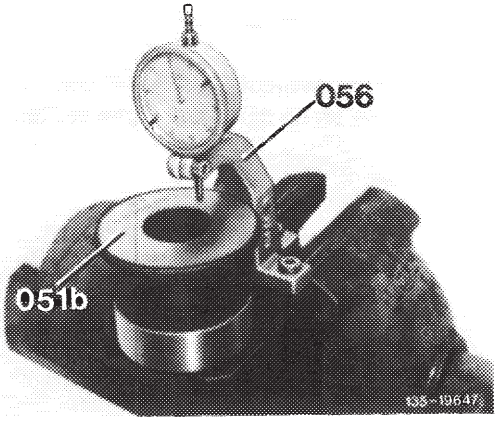
Vehicles with ABS

30 Press-on ring gear (rotor) with self-made installing sleeve.

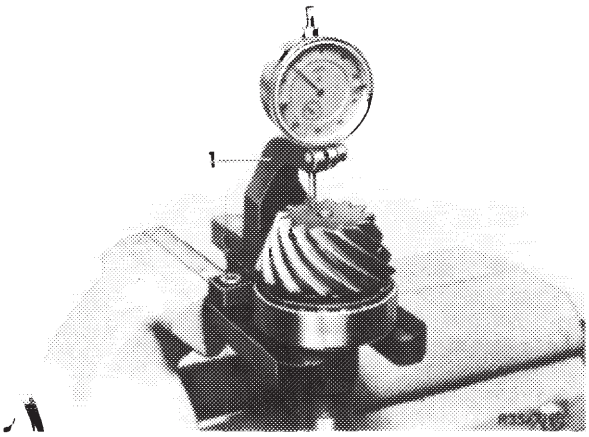


135-19640

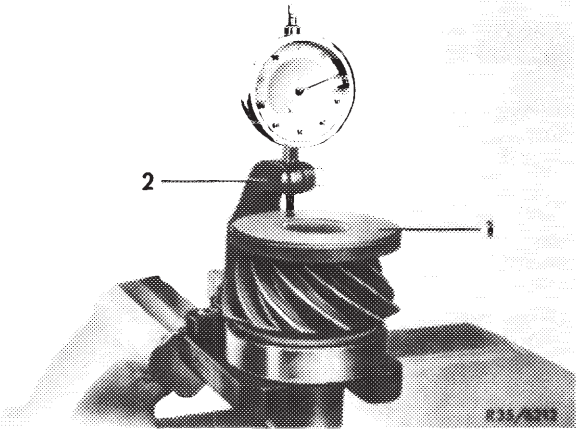
31 Set dial gauge at approx. 3 mm preload on measuring body (051b) initially to 0.



32 For small rear axle center pieces place outer bearing race on roller cage of drive pinion. Insert drive pinion into measuring device (1, 1st version) and measure drive pinion height with bearing. Record dimension which shows the difference between measuring body height "B1" and drive pinion height "B" on data sheet item 1.

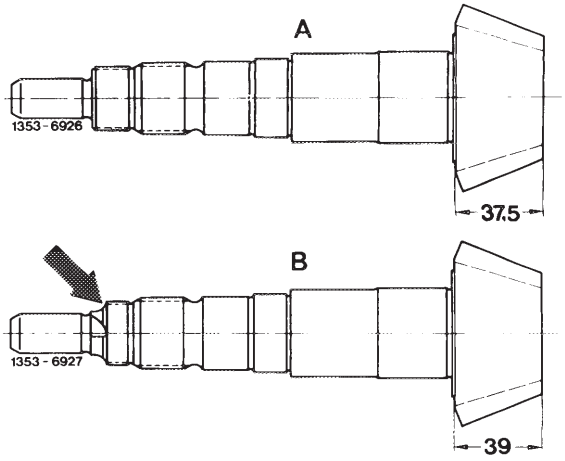


33 For large rear axle center pieces place outer bearing race on roller cage of drive pinion and attach magnetic plate (1). Place drive pinion into measuring device (2, 1st version) and measure drive pinion height with bearing and magnetic plate. Record dimension, which shows a difference between measuring body height "B1" and drive pinion height "B" on data sheet under item 1.



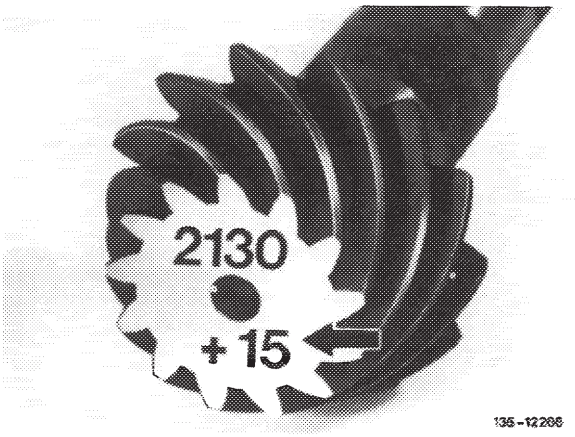
Attention!
For large rear axle center pieces drive pinions with a height of 37.5 mm and 39 mm were installed. Consequently, 1.5 mm must be entered under item 1 in data sheet for drive pinions with 39 mm height and then added.

With this change, the type of lock has been simultaneously changed from polystop (A) – to crush nut – slot nut (B, arrow).

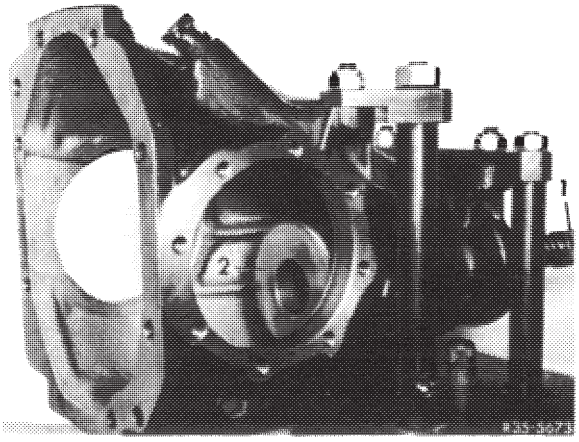


34 Enter basic deviation "a" of drive pinion (refer to arrow) (plus or minus) under item 2 in data sheet.

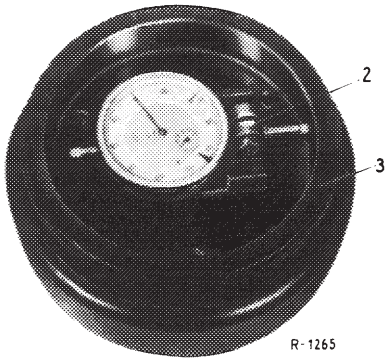
35 Add (+) or deduct (–) values of item 1 and 2 depending on prefix of value on drive pinion.



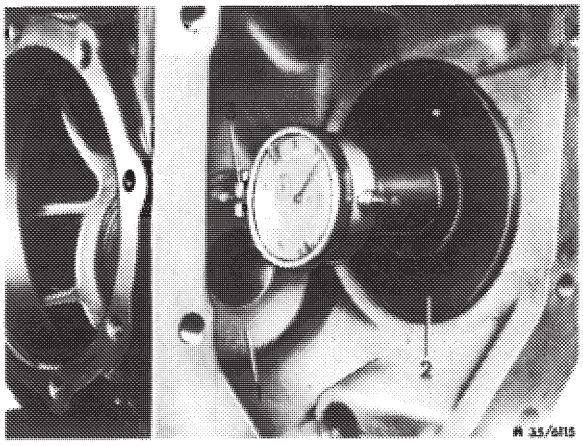
36 Insert device (1) with measuring body (2) in rear axle housing and screw-on measuring body (2).



37 Insert dial gauge with dial gauge holder (2) into adjusting gauge (3) and set dial gauge under 3 mm preload to 0.

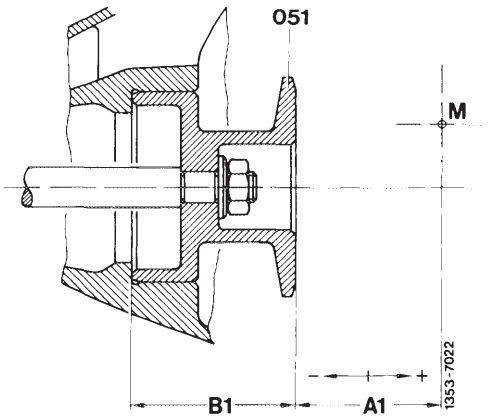


38 Insert mounting tool (2) together with dial gauge holder and dial gauge (3) into righthand bore of rear axle housing and screw down.



39 Read difference between preset gauge dimension and measuring body face and enter under item 3 in data sheet in plus or minus direction.

Note: The statement of direction plus (+) or minus (–) refers to rotation of dial gauge needle. A deviation from zero position in counterclockwise direction would be minus direction, in clockwise direction plus direction.



40 Add (+) or subtract (–) subtotal of values from item 1 and item 2, as well as from item 3. This computed value provides the thickness of the compensating washer.

Example:

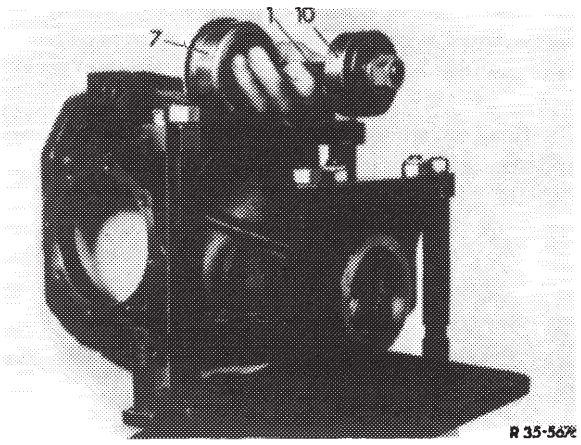
Item 1		= 1.60
Item 2		= + 0.15
		= –
Subtotal		= 1.75
Item 3	minus direction	= + 0.06
	plus direction	= –
Thickness of compensating washer "S"		= 1.81

41 Remove mounting tool and measuring body out of rear axle housing.

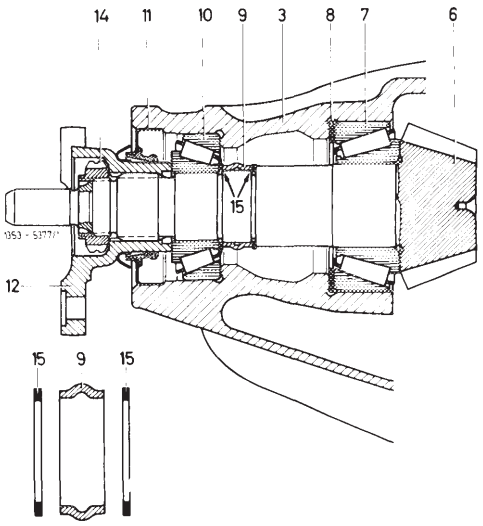
42 Insert compensating washer with computed washer thickness "S" into rear axle housing (refer to example).

Note: Use hardened compensating washers only, they are available at varying thickness. If required, grind one compensating washer as required.

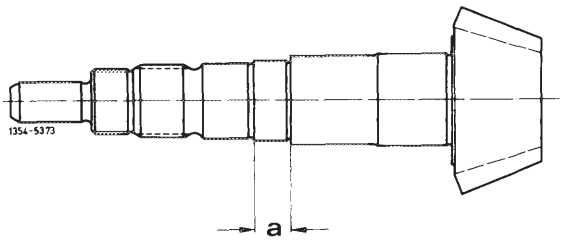
43 Insert outer races of front and rear tapered roller bearing into rear axle housing by means of installer.



44 Add on both sides of spacing sleeve (9) one washer (15) each and place on drive pinion.

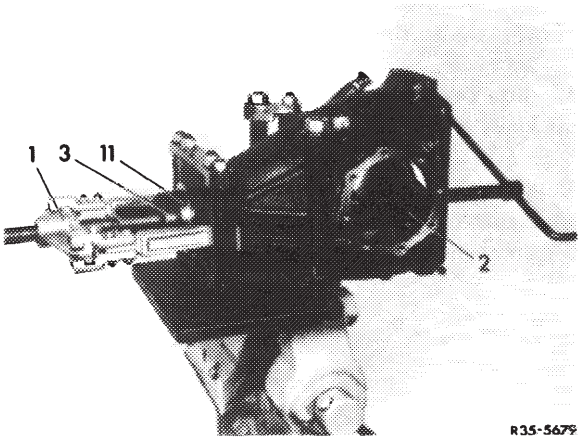


Attention!
On small rear axle center piece add washers only at drive pinion where dimension "a" amounts to **13.5 mm**.



45 Insert drive pinion into rear axle housing and support with remover and installer (2).

46 Coat radial sealing ring with sheet-metal jacket at OD with sealing compound and radial sealing ring with rubber-coated jacket with hypoid gear oil or rubber sliding compound "naphtalene H" and put on thrust piece. Insert inner race of front tapered roller bearing and press-in together with radial sealing ring (11).



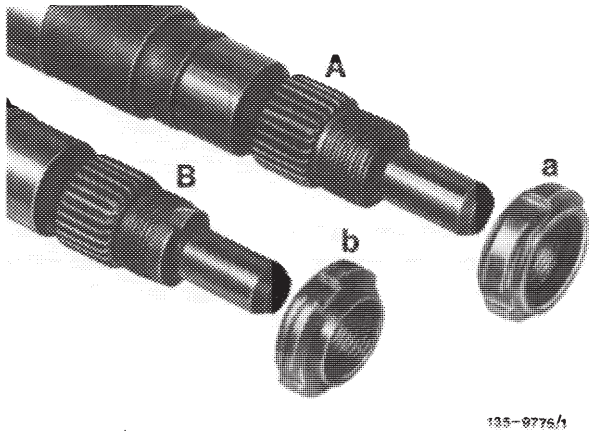
47 Coat running surface for radial sealing ring at universal flange with molybdenum disulfide paste and slip universal flange on drive pinion. Pay attention to mark which may have been applied during removal on universal flange and on drive pinion.

48 Take away remover and installer from rear axle housing.

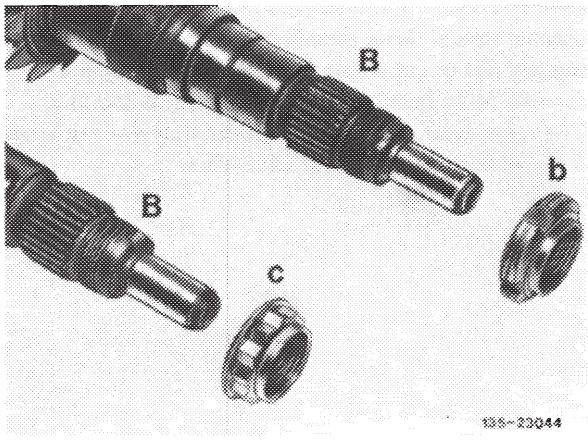
Attention!
On drive pinion of 1st version without **groove on threads (A)** mount **self-locking slot nut** (polystop slot nut, *a*) **only.**

On drive pinion of 2nd version **with nut (B) optionally use a crush slot nut (b) with a groove on circumference or a double hex. collar nut (c).** Other installation combinations are not permitted.

A = Drive pinion without groove
a = Polystop slot nut
B = Drive pinion with groove
b = Crush slot nut



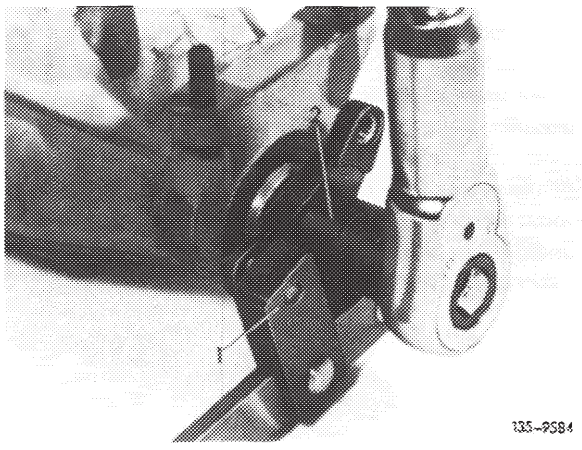
135-9776/1



135-23044

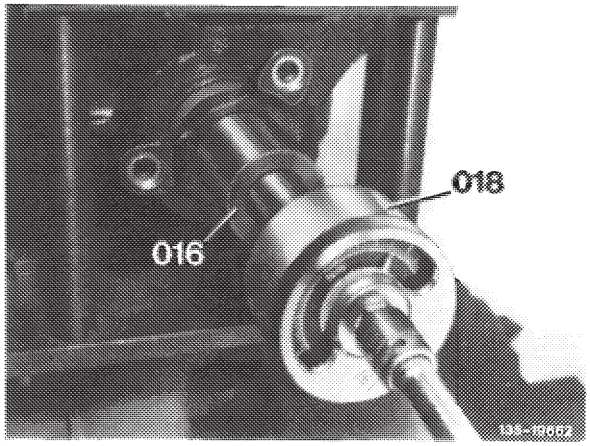
B = Drive pinion with groove
b = Crush slot nut
c = Double hex. collar nut

49 Screw-on new self-locking or crush slot nut or double hex. collar nut. Plug holding wrench on universal flange, and **carefully** tighten slot nut or double hex. collar nut until friction torque of 120–140 Ncm on new bearings and of 50–100 Ncm on used bearings is attained.


135-9584

Attention!
When tightening slot nut or double hex. collar nut, turn drive pinion several times and apply light blows against rear axle housing to make sure that the tapered rollers are settling well in races.

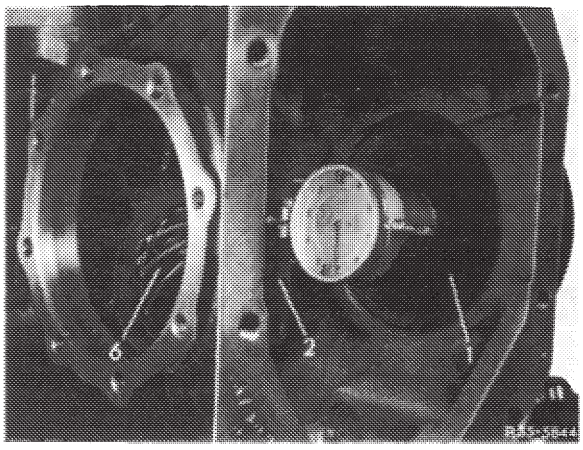
50 To check, plug torque measuring instrument (018) with connecting member on slot nut wrench (016) and rotate drive pinion.



Note: The tapered roller bearings of the drive pinion must be installed at a given preload. This preload is attained by compressing the spacing sleeve located between the bearing inner race of the front tapered roller bearing and the drive pinion when tightening the slot nut or collar nut.

If the friction torque, that is, the preload of the tapered roller bearings, is too low when rotating the drive pinion, tighten slot nut or collar nut a little more. If the specified friction torque is exceeded, remove drive pinion once again and install a **new** spacing sleeve. **Never reduce friction torque by releasing slot nut or collar nut,** since the preload of the tapered roller bearing would then become too low. The result would be play of drive pinion while driving coupled with noises in rear axle drive.

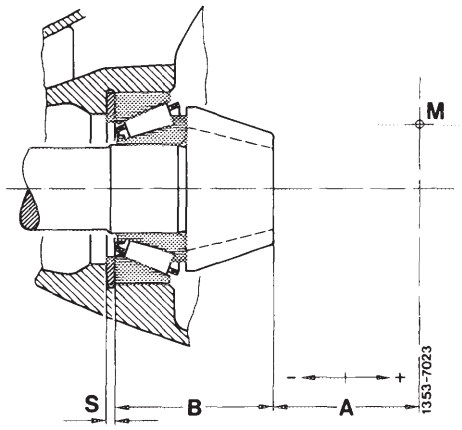
51 Install measuring tool together with dial gauge holder and dial gauge again into righthand bore of rear axle housing to check adjustment. For measuring the adjusting dimension "A" position magnetic measuring plate on face of drive pinion.



For the gears of the example shown the dial gauge should indicate a deviation of 0.15 mm from basic dimension in plus direction, the same dimension which is written on face of drive pinion.

The permissible basic deviation of adjusting dimension "A" should not exceed plus 0.01 and minus 0.02.

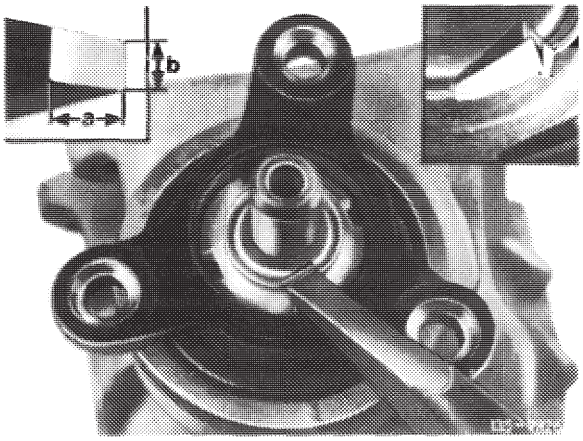
When the deviation is larger, grind removed compensating washer to required size or install a new compensating washer of pertinent thickness. Also make sure that a **new spacing sleeve** is used for the tapered roller bearings.



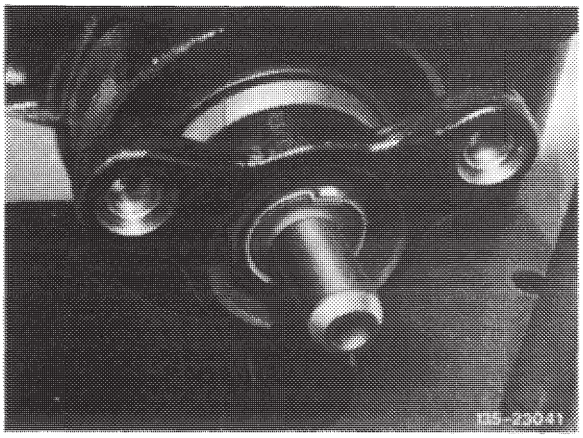
52 Remove measuring tool and dial gauge with holder from rear axle housing.

53 Peen crush slot nut or double hex. collar nut with a peening tool into one of the two grooves of drive pinion in such a manner that no gap is provided between groove and locking tab.

Attention!
Do not apply any heavy blows in axial direction.



Crush slot nut
Dimensions for peening tool
a = approx. 8 mm
b = approx. 4 mm



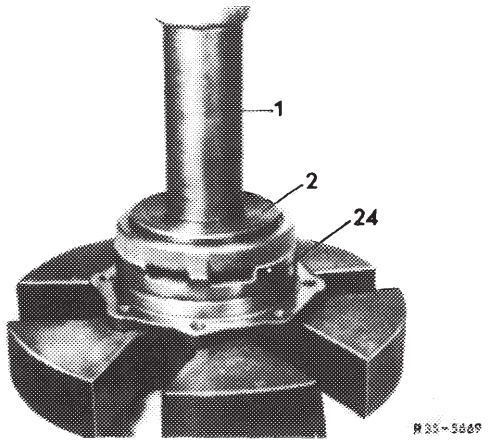
Double hex. collar nut

Press radial sealing ring and tapered roller bearing outer race into lateral bearing cap

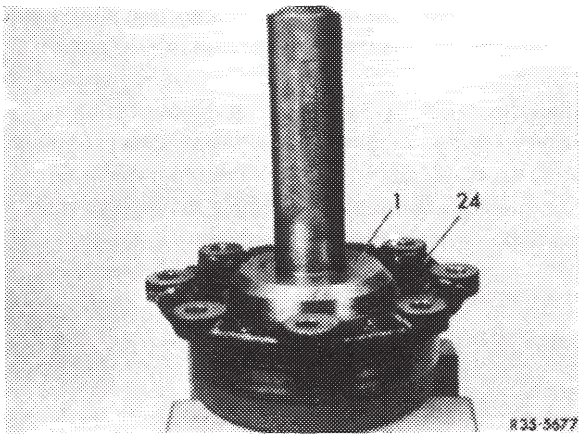
54 Press new tapered roller bearing outer race with disc from installing tool (2) and installing sleeve (1) into bearing cap (24).

In the case of rear axle center piece press in with disc of 74.8 mm dia.

In the case of large rear axle center piece press in with disc of 88 mm dia.



55 Coat new radial sealing ring with sheet-metal jacket on OD with sealing compound, radial sealing ring with rubber-coated jacket with hypoid gear oil or rubber sliding compound "naphtalene H" and press into bearing cap (24) up to stop by means of installer (1).

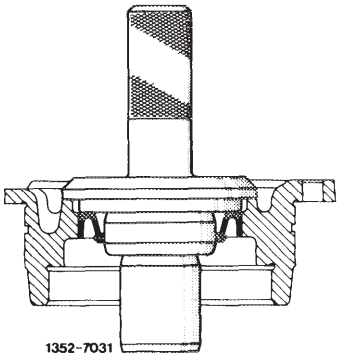


Attention!
Three bearing cap versions are available for vehicles with large rear axle center piece.

1st and 2nd version with 65 mm dia. radial sealing ring

3rd version with 81 mm dia. radial sealing ring.

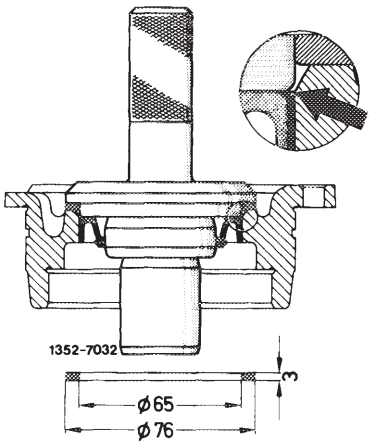
On 1st version, push radial sealing ring in until the installation mandrel rests against lug for dirt labyrinth of bearing cap.



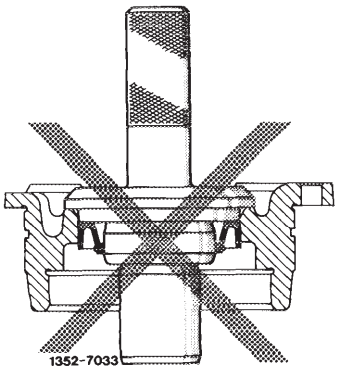
Radial sealing ring correctly inserted

On 2nd version, insert radial sealing ring until the insertion mandrel is flush with bottom edge of chamfer (lug for dirt labyrinth is shortened) of bearing cap.

To avoid overpressure against radial sealing ring, make a spacing ring according to drawing and use.



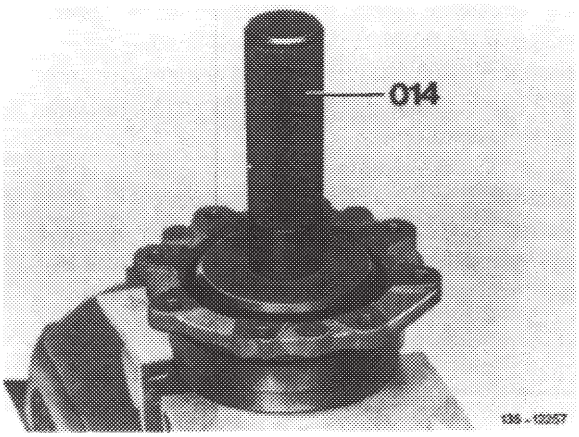
Radial sealing ring correctly inserted



On 2nd version radial sealing ring wrongly inserted

On 3rd version, press new radial sealing ring of 81 mm OD up to stop into bearing cap by means of installer (014).

Note: Coat radial sealing rings with rubber jacket with hypoid gear oil or rubber sliding compound "naphtalene H" on OD.



Adjusting backlash

Note: The backlash of the gear assembly and the required preload of the tapered roller bearings in relation to bearings of differential are adjusted by means of compensating washers between the bearing caps and the rear axle housing. Compensating washers are available at varying thickness. For assembly, reinstallation of the previously removed bearing caps and compensating washers on pertinent side will be best.

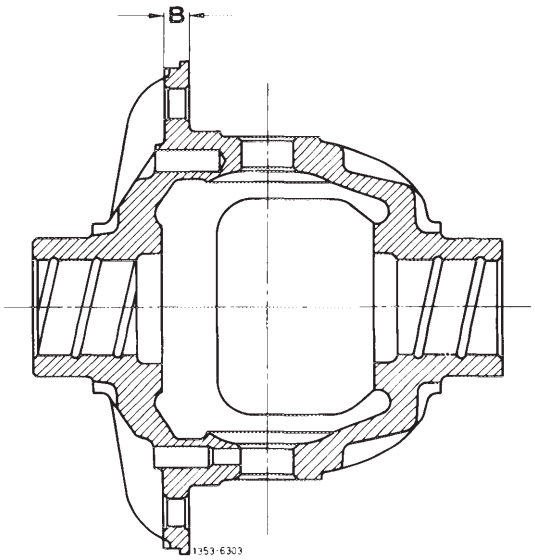
56 Disassemble and assemble differential (35–560).

57 Carefully clean bore of ring gear and seat on differential housing. Heat ring gear to approx. 70–80 °C and place on differential housing. Check markings on ring gear and differential housing, previously applied.

If the ring gear cannot be placed on differential housing, assist by means of light hammer blows (rubber hammer).

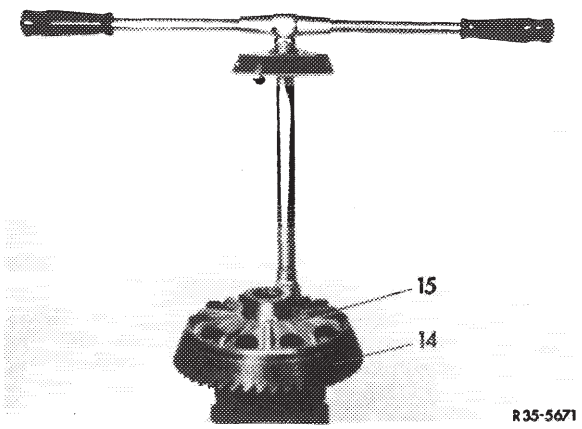
Attention!
When installing a new differential housing or when using new ring gear screws, pay attention to length of ring gear screws. On small rear axle center piece with contact flange dimension "B" **8 mm thick** use ring gear screws **18 mm long** only, and for contact flange **10 mm thick** use ring gear screws **20 mm long** only. On large rear axle center piece with contact flange dimension "B" **8 mm thick,** use ring gear screws **20 mm long** only, and for contact flange **10 mm thick** use ring gear screws **22 mm long.**

Always renew ring gear screws after one-time use on principle.

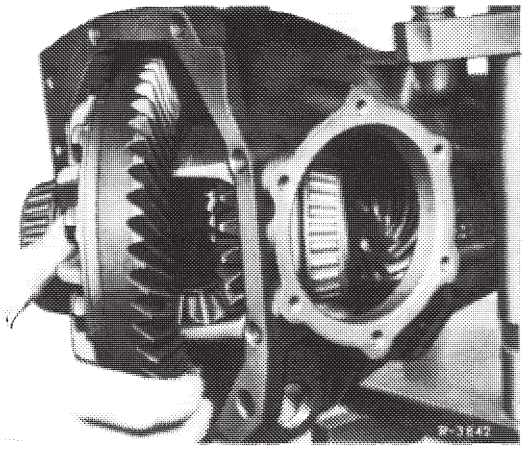


58 Crosswise tighten hex. head screws for fastening ring gear uniformly to 80 Nm, self-locking hex. head screws to 100 Nm on small center piece and 120 Nm, self-locking hex. head screws to 140 Nm on large center piece.

Attention!
Renew ring gear screws on principle after one-time use. Standard fastening screws can be replaced by self-locking hex. head screws, but not vice versa.

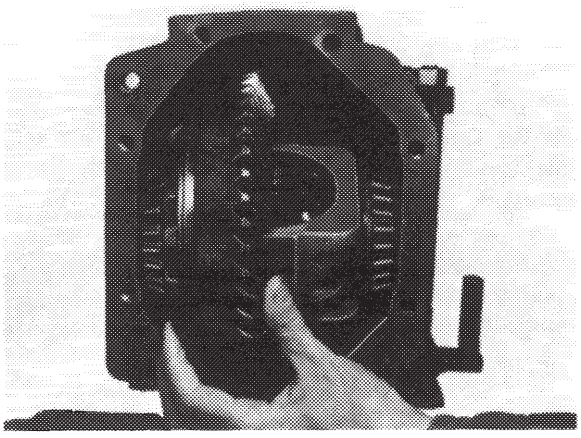


59 Insert differential with righthand side first into bore of lateral bearing cap until the differential can be introduced into the rear axle housing at the left.



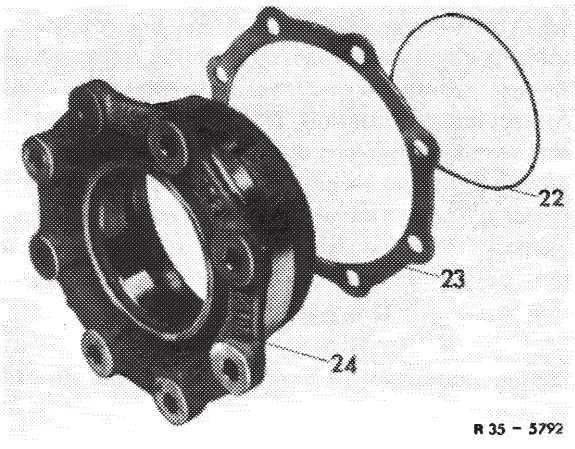
Small center piece

60 Place differential into rear axle housing.

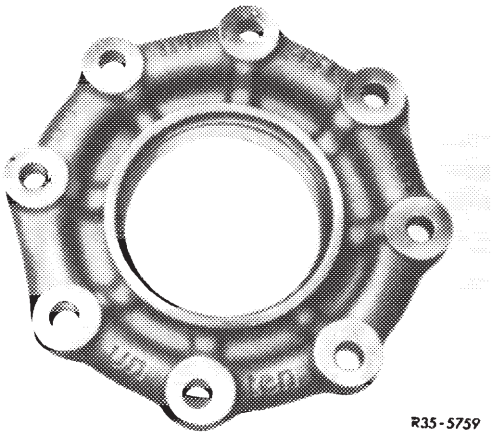


Large center piece

61 Place the previously removed compensating washers (23) on bearing cap (24) and insert new sealing rings (22) into grooves of bearing cap.

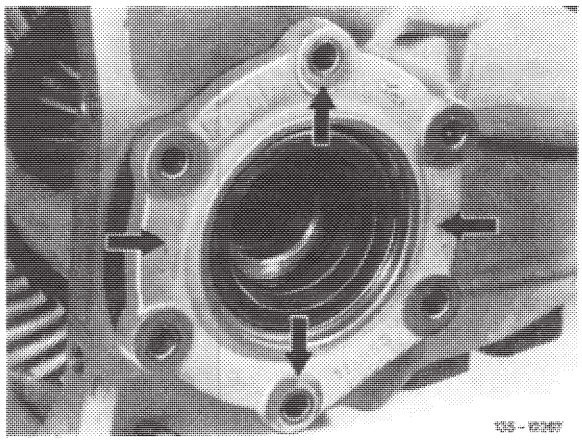


62 On 1st version only, mount both bearing caps with the designation "unten" (bottom) at the bottom. For the other versions, the position of the bearing cap is not important.

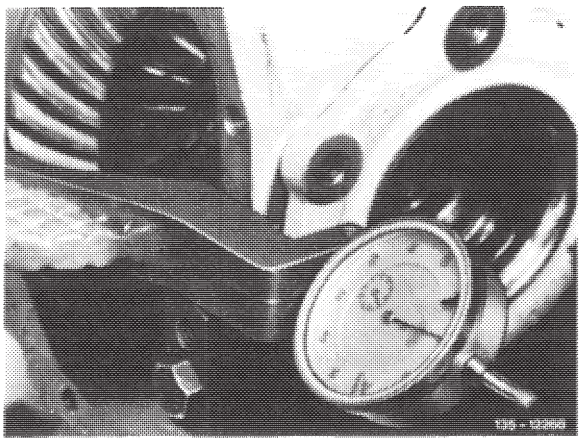


63 Slip both bearing caps with the initially mounted compensating washers into rear axle housing.

Note: If the bearing caps bind in bore of rear axle housing, settle caps by applying light hammer blows (rubber hammer) (arrows).

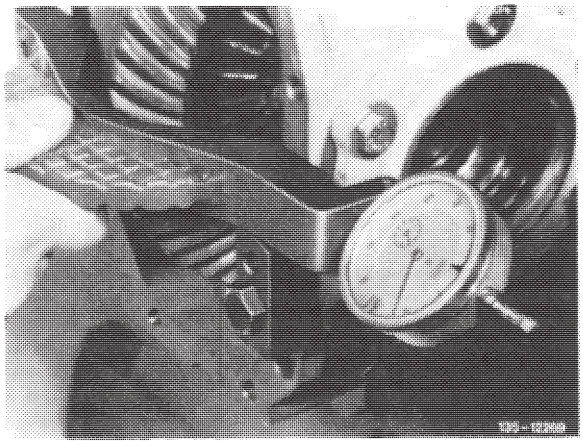


64 Screw supporting blocks for spread measuring instrument at the right and left to sealing surface of rear axle housing. Place spread measuring instrument with dial gauge on supporting blocks and set dial gauge under preload to "0".

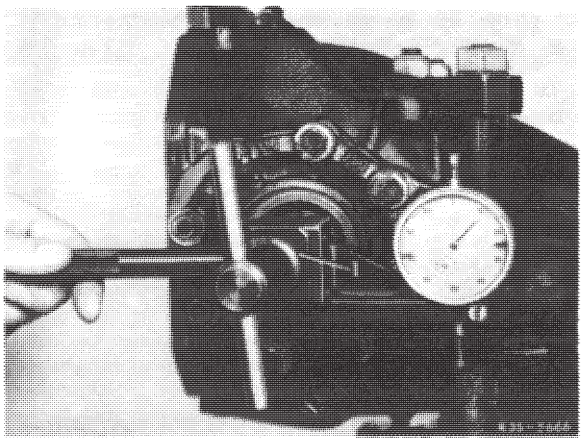


65 Screw-in all hex. screws on bearing caps and tighten crosswise to 20 Nm.

66 Place spread measuring instrument again on supporting blocks and measure spread (widening) of rear axle housing. The required spread dimension of rear axle housing and thereby the correct preload of tapered roller bearings on differential is attained as soon as the spread dimension in range of small center piece is between 0.10–0.15 mm, and on large center piece between 0.15–0.20 mm.

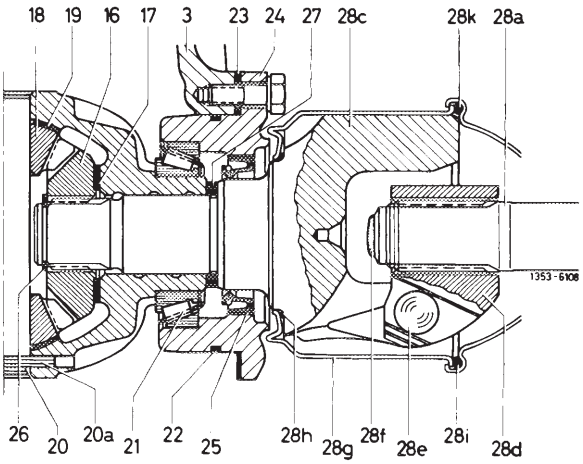


67 Insert backlash gauge into righthand bore of differential housing and clamp down.



68 Measure backlash at four points with reference to circumference of ring gear by moving dial gauge holder accordingly. The smallest play counts. **The backlash should amount to 0.08 to 0.14 mm.** Hold drive pinion in place at universal flange when measuring.

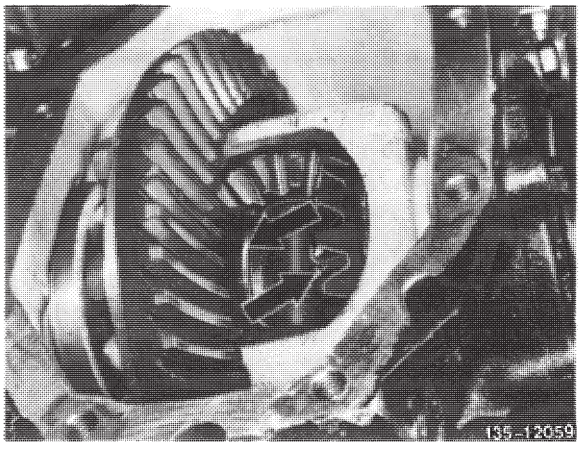
Note: The adjustment of the tapered roller bearings and the gear assembly is in order when the spread (widening) of rear axle housing and the backlash are in range of nominal values. If these values are not attained, repeat adjustments using pertinently thicker or thinner compensating washers (23).



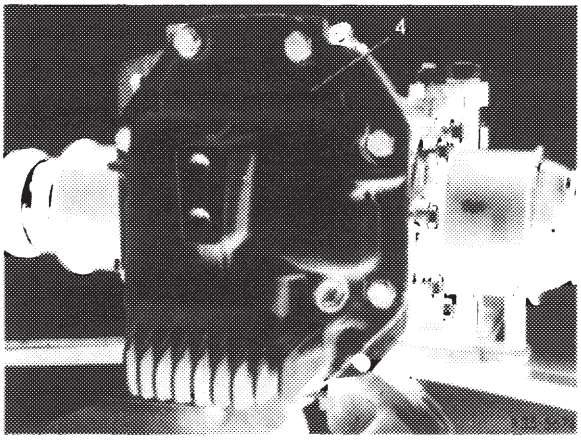
Example 1: If the backlash is in order, but the spread of the rear axle housing is insufficient, use compensating washers for both bearing caps which are each thinner by a uniform amount.

Example 2: If the spread is in order but he backlash is too high, remove compensating washers of pertinent size from the left and add at the right. If backlash is too low, proceed vice versa.

69 Install lefthand and righthand rear axle shaft with **new** locking rings (35–620).



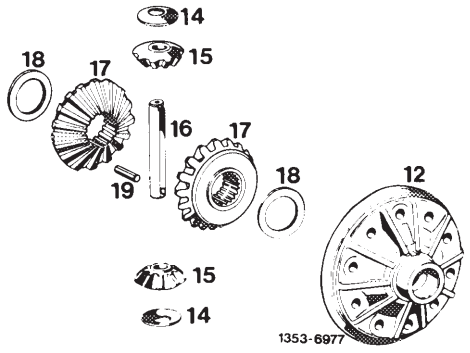
70 Clean sealing surface on end cover and rear axle housing and coat with sealing compound. Mount rear axle end cover (4). Tightening torque of hex bolts 45 Nm.



71 Fill-in hypoid gear oil up to lower edge of oil filler hole.

72 Renew breather on rear axle end cover.

A. Standard differential



12	Differential housing	Check vertical and axial runout on fitted dia. for ring gear, max. 0.02
14	Spherical washer	Renew
15	Differential	Check for damage
16	Differential pinion shaft	Check for wear
17	Differential side gear	Check for damage
18	Thrust washer	Renew, selecting thickness to obtain a friction torque of 30–90 Nm
19	Clamping sleeve	Renew

Adjustment of differential gears

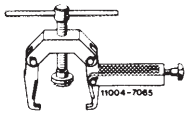
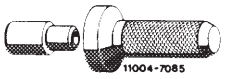
Friction torque when rotating complete differential	30–90 Nm

Differential

Permissible vertical runout of differential housing on fit for ring gear			0.02
Permissible lateral runout of differential housing on flange surface for ring gear			0.02
Thrust washer on side gear	Thickness	large center piece[1)]	1.3 to 1.7
		small center piece[1)]	1.0 to 1.7
	Steps		0.1 mm each
Clamping sleeve		large center piece[1)]	6 x 45
		small center piece[1)]	6 x 40

[1)] Refer to installation survey rear axle center piece 35–500

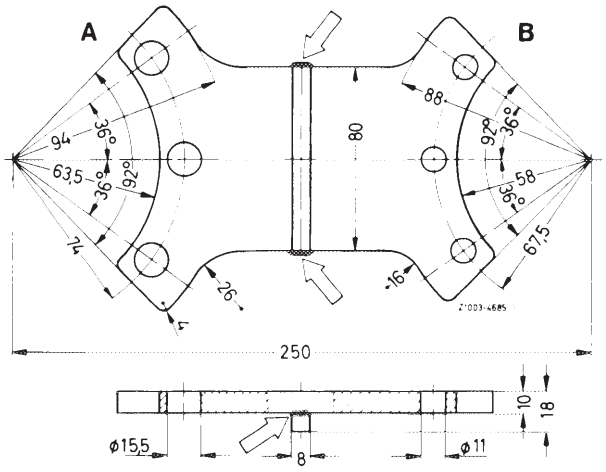
Special tools

Puller for tapered roller bearing		 11004-7085	123 589 08 33 00
Assembly mandrel (2 each) for side gears		 11004-7092	116 589 18 61 00
Assembly mandrel for differnetial gears	large center piece	 11004-11027	126 589 02 15 00
	small center piece		123 589 06 15 00
Assembly mandrel for inner race of tapered roller bearing	large center piece	 11004-7085	116 589 08 61 00
	small center piece	 11004-7095	115 589 04 61 00
Support for differential housing		 11004-9154/1	126 589 06 31 00

Self-made tool

Clamping device for differential

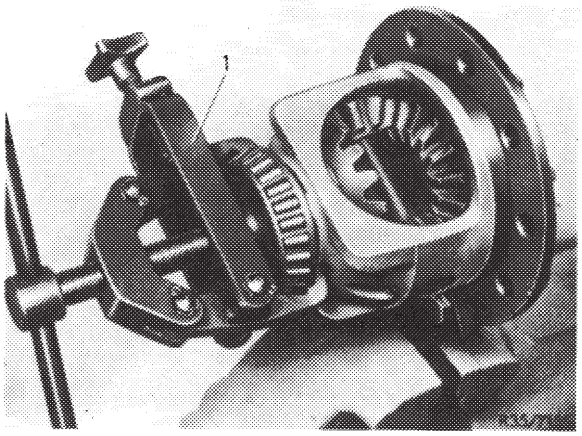
A = large rear axle center piece
B = small rear axle center piece
Arrow = intermediate web welded



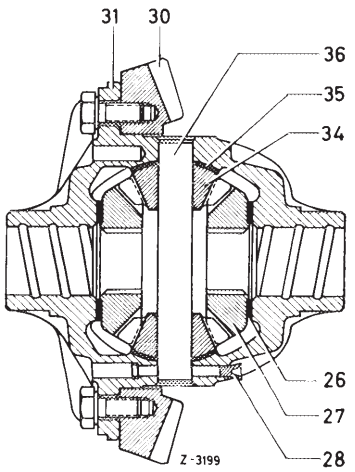
Disassembly

1 Clamp differential with self-made clamping device into vise.

2 Pull both tapered roller bearing inner races from differential housing with puller (1).



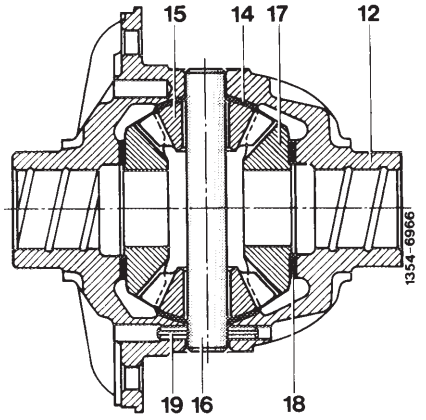
3 Knock clamping sleeve (28) for differential pinion shaft (36) out of differential housing (31) by means of a matching mandrel.



Complete differential of 1st version

26	Thrust washer	31	Differential housing
27	Side gear	34	Differential pinion
28	Clamping sleeve	35	Ball washer
30	Ring gear	36	Differential pinion shaft

4 Force out differential pinion shaft and remove differential pinions, side gears, thrust washers and ball washers.



Complete differential of 2nd version

12 Differential housing
14 Ball washer
15 Differential pinion
16 Differential pinion shaft
17 Side gear
18 Thrust washer
19 Clamping sleeve

5 Check individual parts for re-use. Renew all overheated or seized differential pinions, thrust washers and ball washers on principle.

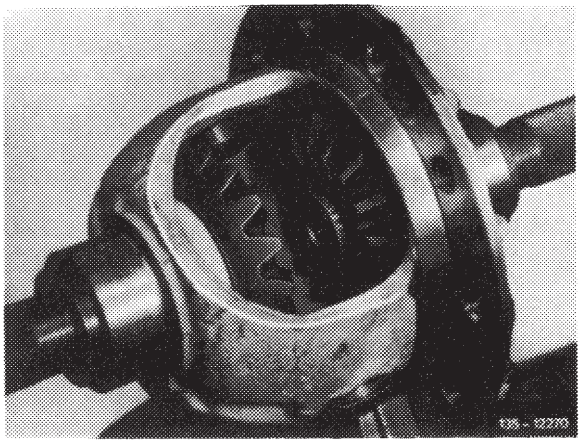
6 Check bores in differential housing. Check fit and supporting surface for ring gear for radial and axial runout.

Assembly

7 Insert both assembly mandrels into bores of differential housing.

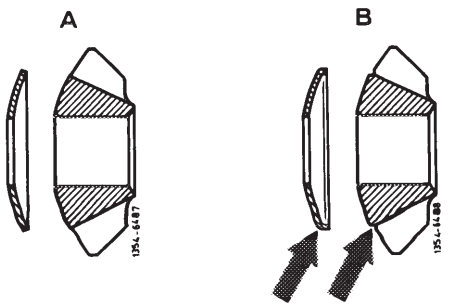
8 Place thrust washer on side gears.

9 Place both side gears with thrust washers on assembly mandrels in differential housing.

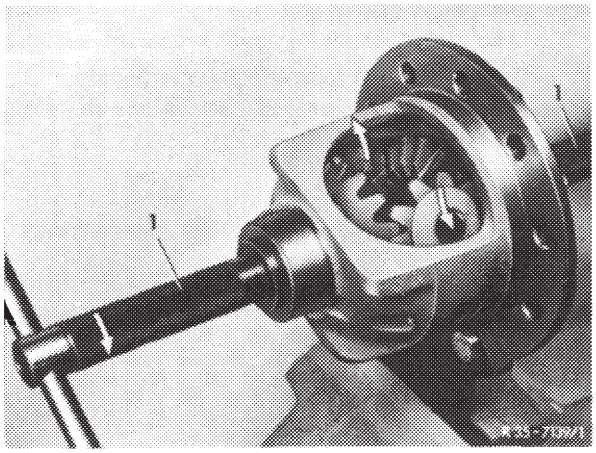


Attention!
To facilitate assembly, the ball washers of the present version (B) of the differential are provided with a collar at OD and the differential pinions with a shoulder (arrow).

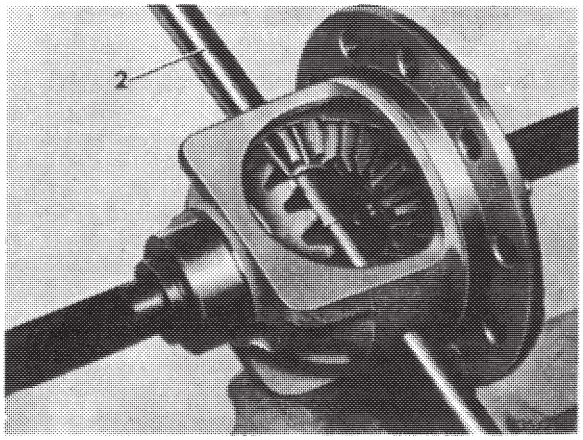
Mount differential pinions and ball washers only in the combination shown in illustration.



10 Turn both differential pinions and ball washers together into differential housing by means of assembly mandrel (1).

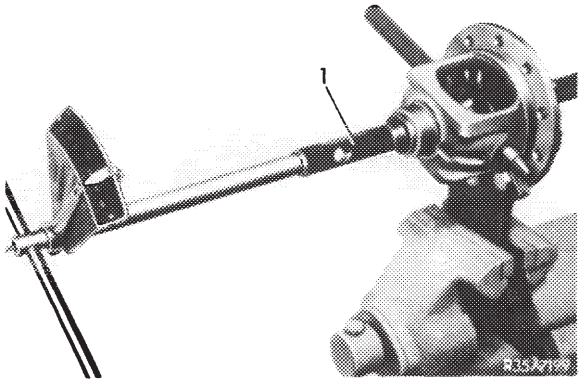


11 Slip assembly mandrel (2) instead of differential bolt into differential housing to locate differential pinions and ball washers.

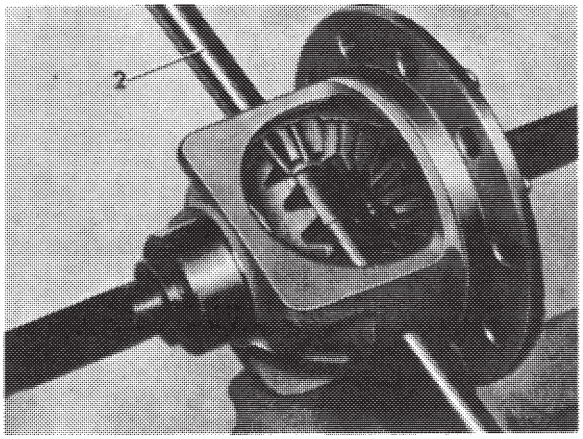


12 Check friction torque. Friction torque should amount to 30–90 Nm, at restraining points up to 100 Nm.

Note: Select thrust washers for side gears in such a manner that a given friction torque is available during assembly.



13 Knock in differential bolt while paying attention to bore for clamping sleeve.

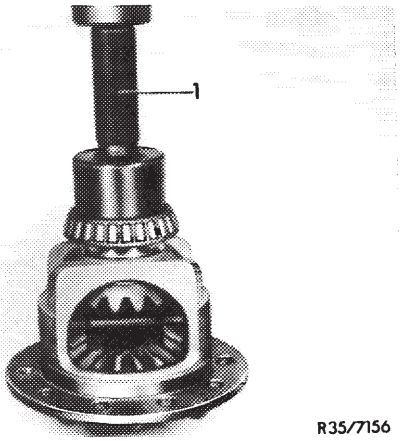


14 Knock in new clamping sleeve.

15 Press inner races of tapered roller bearings on differential housing by means of assembly mandrel (1).

Assembly mandrel for:

small	rear axle center piece:	115 589 04 61 00
large	rear axle center piece:	116 589 08 61 00



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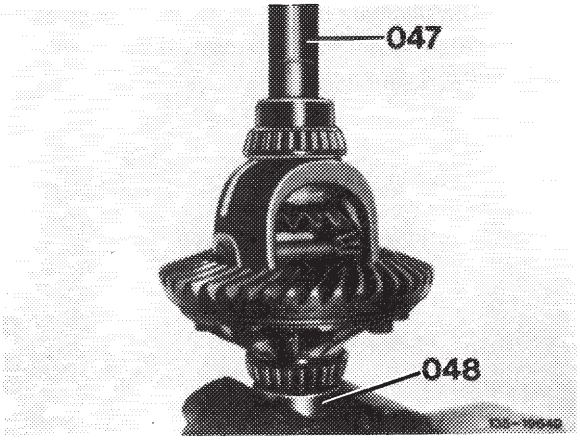
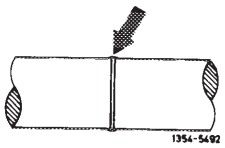
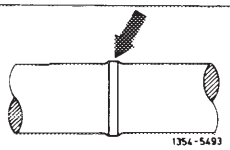
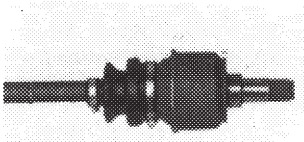
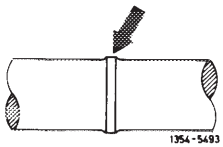
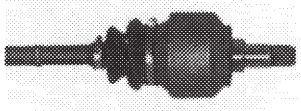
Attention!
To prevent damage to roller cage when pressing-on second inner race, use support (048) (for small rear axle center piece without lateral bearing caps only).

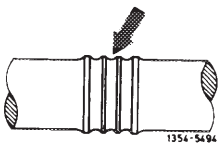
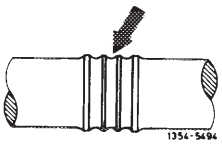
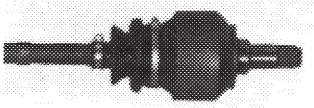
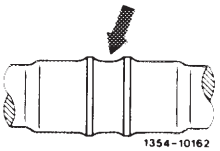
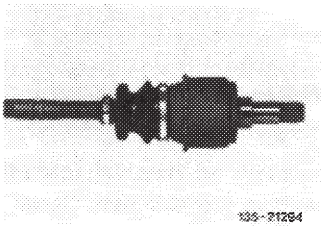
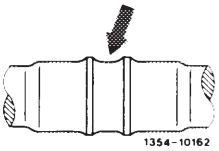
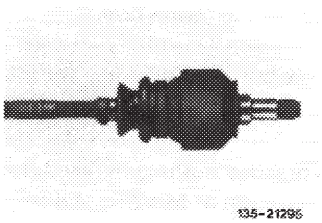


A. Model 107, 114, 115, 116, 123, 126.02/03

Installation survey

Model	Diameter of protective sleeve inside mm	outside mm	Part number	Version	Identification and differentiating characteristics of rear axle shafts
107.023 107.043 107.024 (USA) 107.044 (USA) 114.05/07	100	100	107 350 07 10 left[1])[5]) 107 350 08 10 right[1])[5])	A	
114.01 114.02 115 123.02/04 123.1	100	100	115 350 42 10 left[1])[3]) 115 350 43 10 right[1])[3]) 115 350 45 10 left[2])[3])[9]) 115 350 46 10 right[2])[3])[9])		
115.114			115 350 49 10 left[2])[4]) 115 350 50 10 right[2])[4])		
123.000 123.026/028 123.04/08 123.1/2[11])			123 350 02 10[3])[9]) left and right without oil return feed thread		
107.022/023 107.042/043 107.024 (USA) 107.044[7])[10]) (USA) 114.06/07 123.03	100	100	107 350 10 10 left[1])[6]) 107 350 11 10 right[1])[6]) 107 350 27 10 left[2])[6]) 107 350 28 10 right[2])[6])	B	
107.022/042 107.025/045 123.03/05 123.093 123.125/193			107 350 33 10[11]) left and right without oil return feed thread		
107.024 107.044[8]) (except (USA))	115	100	107 350 13 10 left[1]) 107 350 14 10 right[1]) 107 350 23 10 left[2]) 107 350 24 10 right[2])	C	
107.026 107.046			107.350 34 10[11]) left and right without oil return feed thread		

[1]) Rear axle shaft with M 12-threads on outer joint (1st version up to December 1973).
[2]) Rear axle shaft with M 8-threads on outer joint (2nd version starting January 1974).
[3]) These rear axle shafts are installed during production only. In the event of repairs, install version "B".
[4]) Up to chassis end no. 027 059 and starting chassis end no. 040 339 install only rear axle shafts with 32 mm dia.
Starting chassis end no. 027 060 up to chassis end no. 040 338 install version "B" in the event of repairs (chassis with vibration eliminator).
[5]) 1st version up to September 1972 (with yellow color code on protective sleeve).
In the event of repairs, install version "B".
[6]) 2nd version on models 107.023/024/043/044, 114.06/07 starting October 1972. In the event of repairs of series 114.01, 114.02, 115, 123.02/04/08/1 replacement for version "A"
[7]) Installed up to chassis end no. 029 598.
[8]) Starting chassis end no. 029 599 also installed on USA vehicles.
[9]) Except model 123.125.
[10]) Installed starting chassis end no. 053 399. In combination with ring-shaped weight on inner joints of rear axle shafts.
[11]) Replaces former rear axle shaft in combination with a radial sealing ring with oil return feed thread.

Model	Diameter protective sleeve inside mm	outside mm	Part number	Version	Identification and differentiating characteristics of rear axle shafts
				D	
116.02 116.032 (USA) 116.033 (USA)	100	100	116 350 09 10 left[1]) 116 350 10 10 ritht[1]) 116 350 29 10 left[2]) 116 350 30 10 right[2])		
126.02			126 350 00 10[11]) left and right without oil return feed thread		
				E	
116.032 116.033 116.036	115	100	116 350 11 10 left[1]) 11 350 12 right[1]) 116 350 25 10 left[2]) 116 350 26 10 right[2])		
126.120			126 350 01 10[11]) left and right without oil return feed thread		
				F	
126.032 125.033	100	100	126 350 02 10		
				G	
126.036 126.037	115	100	126 350 03 10		

[1]) Rear axle shaft with M 12 threads on outer joint (1st version up to December 1973).
[2]) Rear axle shaft with M 8 thread on outer joint (2nd version starting January 1974).
[11]) Replaces former rear axle shaft in combination with a radial sealing ring with oil return feed thread.

Oil types and capacities

Standard differential		Hypoid gear oil SAE 90 refer to specifications for service products page 235	
Differential with restricted slip (positive traction) (name plate on rear axle housing)		Special Hypoid gear oil refer to specifications for service products page 235.3	
Capacity	large center piece[1)]		1.3 litres
	small center piece[1)]	1st version with cast iron rear axle end cover	1.15 litres
		2nd version with aluminium rear axle end cover	1.0 litre

[1)] Refer to installation survey rear axle center piece 35–500

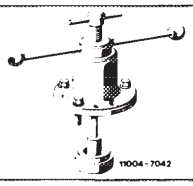
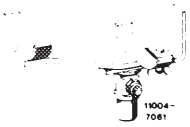
Spacing ring between inner synchromesh joint and differential housing

Assembly instructions for correct selection of spacing ring	There should be no noticeable end play between inner synchromesh joint and differential housing. However, the locking ring should still permit turning in groove.	
Spacing ring	thickness	from 0.7 to 1.50[2)]
		from 2.60 to 3.40
	depth	from 0.1 to 0.1

[2)] With rear axle center piece without lateral bearing caps

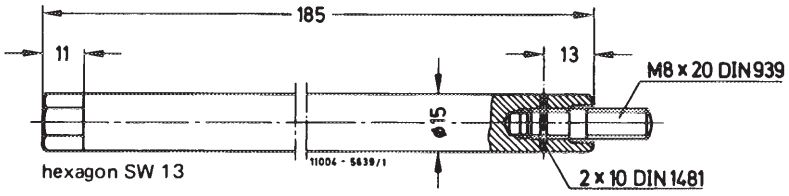
Tightening torques		Nm
Hex bolt for attaching rear axle shaft to rear axle shaft flange	1st version M 12	95
	2nd version M 8	30
Hex bolts for attaching rear axle end cover to rear axle housing		45
Hex bolts for attaching rear rubber bearing to frame floor		25
Hex bolts, self-locking, for attaching rear rubber bearing to frame floor		30
Threaded bushing in rear axle shaft for reduction of M 12 to M 8 (repair version)		30

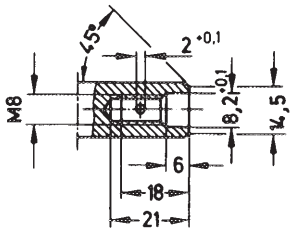
Special tools

Assembly tool for rear axle shaft			116 589 24 61 00
Vehicle jack top	large center piece		116 589 02 63 00
Vehicle jack top	small center piece		115 589 35 63 00

Self-made tool

Tool for screwing-in threaded bushing

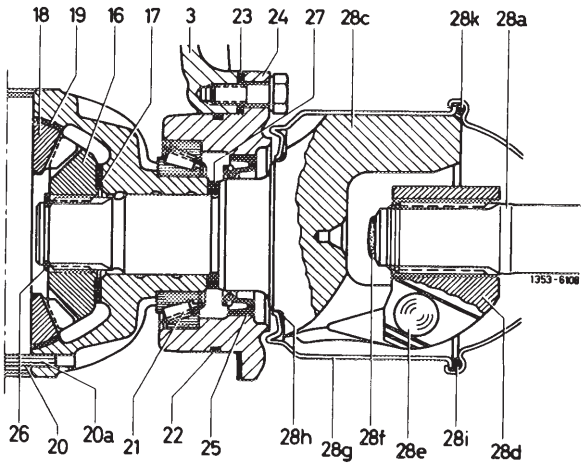




Note

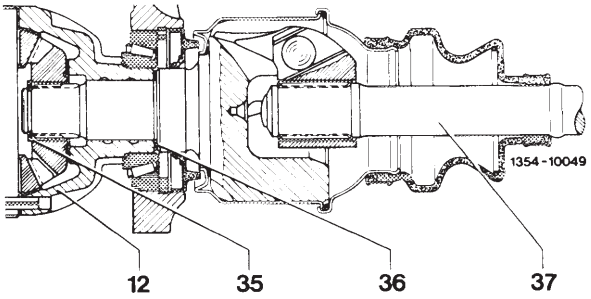
These instructions cover the removal and installation of rear axle shafts for all models. On vehicles with starting torque compensation there are small deviations which are described.

If both rear axle shafts are to be exchanged, it will be of advantage to remove the complete rear axle center piece.



Rear axle center piece with lateral bearing caps

3	Rear axle housing	26	Locking ring
16	Side gear	27	Spacing ring
17	Thrust washer	28a	Rear axle shaft
18	Differential pinion	28c	Inner spider
19	Ball washer	28d	Spider joint hub
20	Differential bolt	28e	Ball
20a	Clamping sleeve	28f	Stop buffer
21	Tapered roller bearing	28g	Protective sleeve
22	Sealing ring	28h	Sealing ring
23	Compensating washer	28i	Stop sleeve
24	Bearing cap	28k	Sealing ring
25	Radial sealing ring		



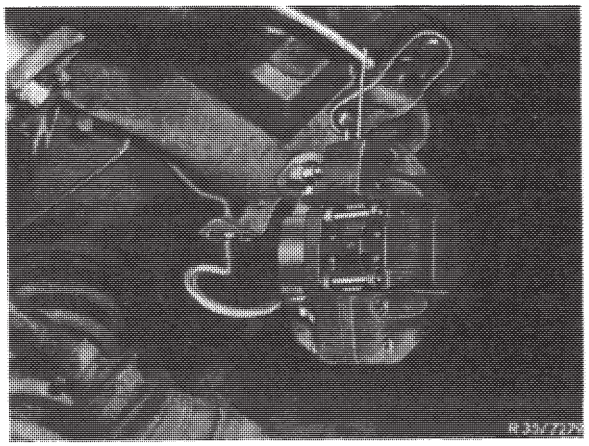
Rear axle center piece without lateral bearing caps

12 Differential housing
35 Locking ring
36 Spacing ring
37 Rear axle shaft

Removal

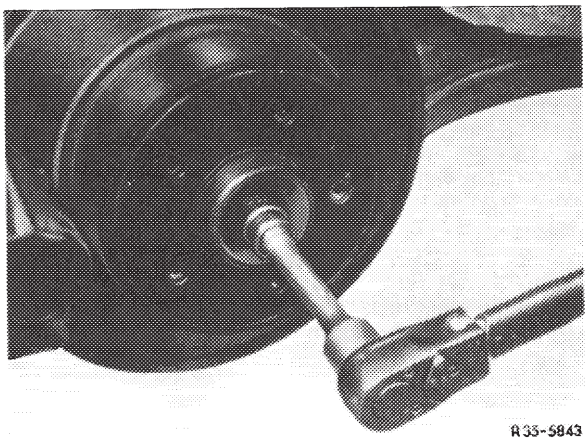
1 Drain oil from rear axle.

2 Unscrew caliper at respective end and hang up with a hook. Not required for rear axles with starting torque compensation.

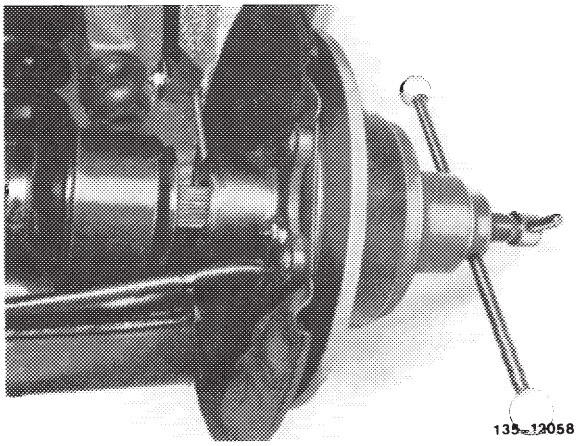


On rear axle with starting torque compensation, if required, unscrew brake hose on holder and close brake line as well as brake hose against penetration of dirt.

3 Loosen hex bolt M 12 of 1st version or hex bolt M 8 of 2nd version with spacing sleeve and clamping disc for attaching rear axle shaft to rear axle shaft flange and remove.



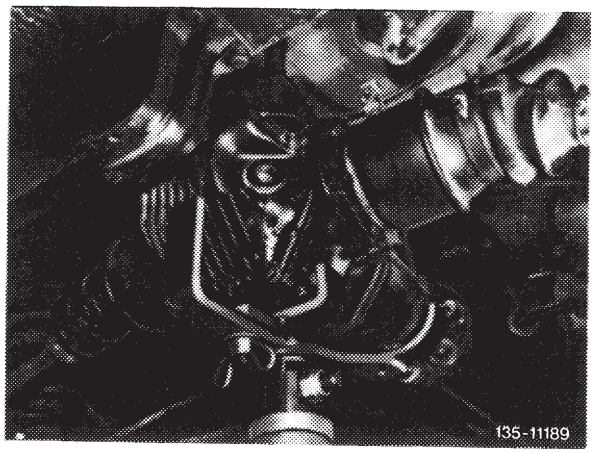
4 Force rear axle shaft out of rear axle shaft flange by means of assembly tool.



Attention!
When removing assembly tool, be sure to hold rear axle shaft in place. Do not permit rear axle shaft to drop, since this will damage the synchromesh joint and result in leaks. If on models 114 and 115 the rear axle shaft cannot be removed in spite of being completely telescoped, loosen upper shock absorber suspension and lower semitrailing arm against deflection stop.

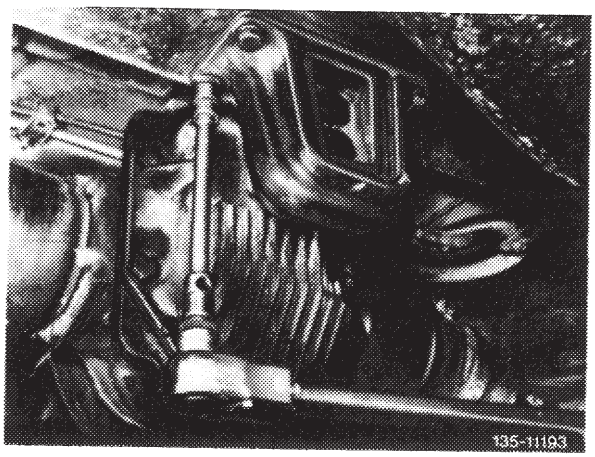
On models 107, 116, 123 and 126 loosen rear axle center piece from rear axle carrier and lower until studs are out of rear axle carrier (concerns mainly vehicles with starting torque compensation). Swivel rear axle center piece to pertinent side until rear axle shaft can be removed.

5 Support rear axle housing with pitlift or vehicle jack and respective top.



6 On 1st version of rubber bearing, unscrew hex. socket necked-down bolt for rubber bearing on rear axle end cover. (Model 114 and 115) On 2nd version, unscrew hex. bolts from rubber bearing.

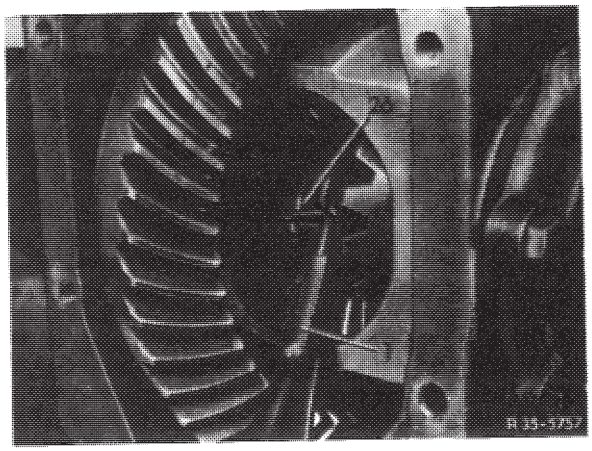
7 Clean rear axle housing. Unscrew hex. bolts for attaching cover to rear axle housing and remove cover.



Rear rubber bearing of 2nd version

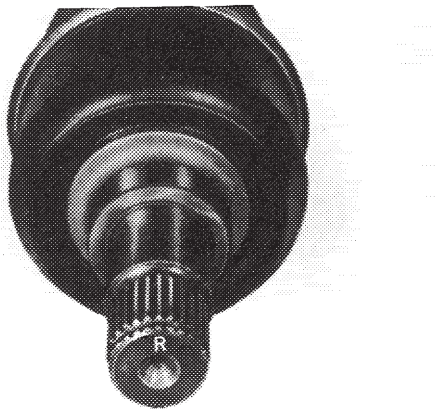
8 Pull off locking ring (26) between inner synchronesh joint and side gear by means of pliers (1) or a hook and remove from housing.

9 Pull rear axle shaft out of side gear and remove together with spacing ring.



Installation

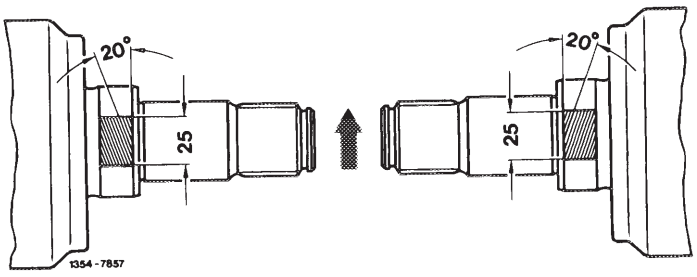
Attention!
Rear axle shafts are provided with oil return threads (twist) on running surface of radial sealing ring, which are different for left and right. For identification, the face of the inside joint is provided with an electrically written "R" for the righthand side and an "L" for the lefthand side. The oil return feed thread or the identification is in place up to September 1979 on models 107.023/024/043/044, 116.028/029/03 and up to February 1981 on models 107.022/042 and 123.



R-3594

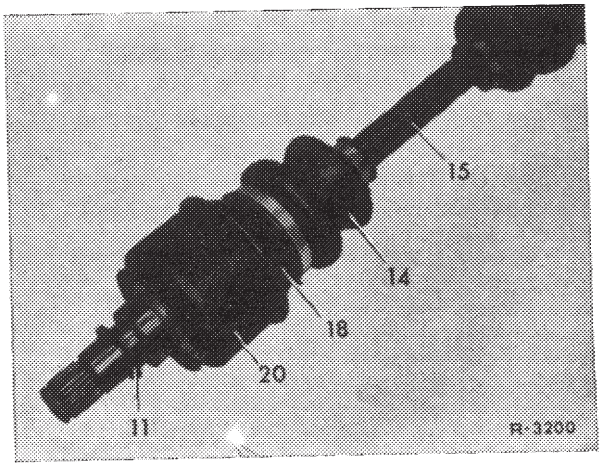
10 Refinish oil return feed thread, if required, with emery cloth (grit 180) at an angle of approx. 20° and for a length of 20–30 mm.

Note: When installing a radial sealing ring with alternating feed thread, refinishing of oil return feed thread is not necessary. If a rear axle shaft is installed without oil return feed thread, make sure that a radial sealing ring with alternate feed thread is installed.



1354-7857

11 If a new rear axle shaft is installed, place the previously removed spacing ring (11) on inner synchromesh joint.

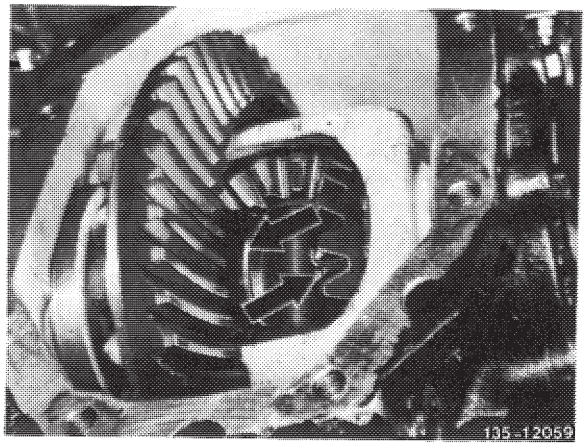


R-3200

12 Introduce complete rear axle shaft into side gear and insert new locking ring into groove of inner synchromesh joint.

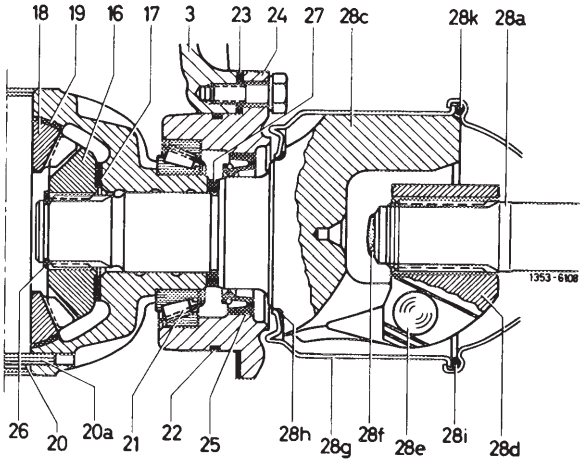
Attention!
If the rear axle shaft cannot be introduced into differential housing up to contact surface, contract both joints first. Then apply light blows with a plastic hammer against outer spider to knock rear axle shaft against contact surface of differential housing. **Do not apply hammer blows against stop sleeve.**

Do not permit rear axle shaft to drop or to bend sharply, since this will damage housing for synchromesh joint and result in leaks.

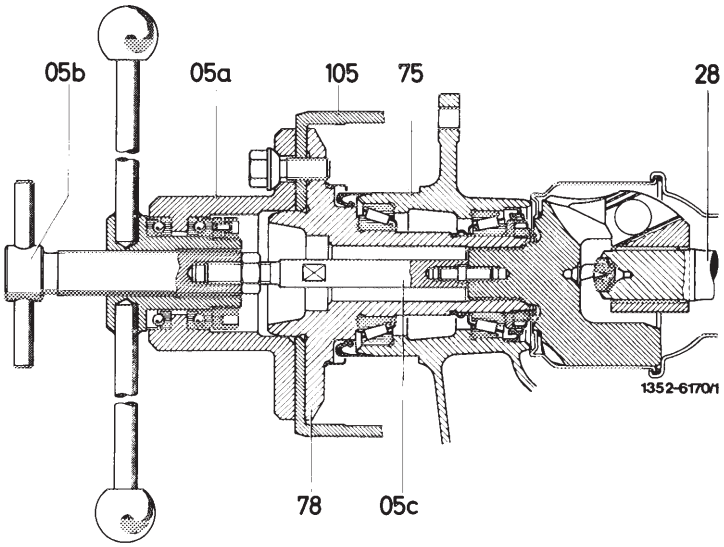


13 Check end play between inner spider and differential housing. There should be no noticeable end play; the locking ring (26) should just barely turn in groove. If required, use thicker or thinner spacing ring (27).

Attention!
Renew locking ring after one-time use.

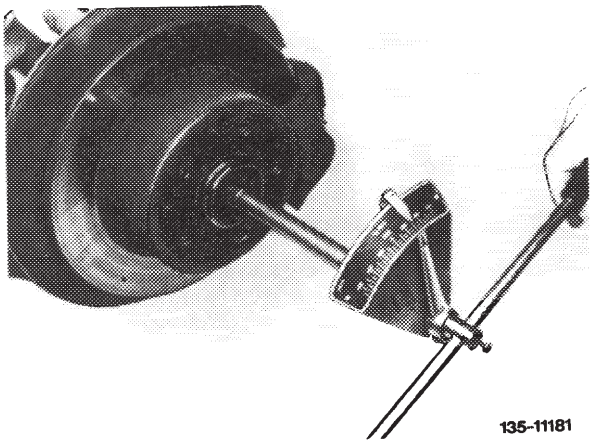


14 Telescope rear axle shaft completely and insert into rear axle shaft flange (78) by means of assembly tool (05a–05c).

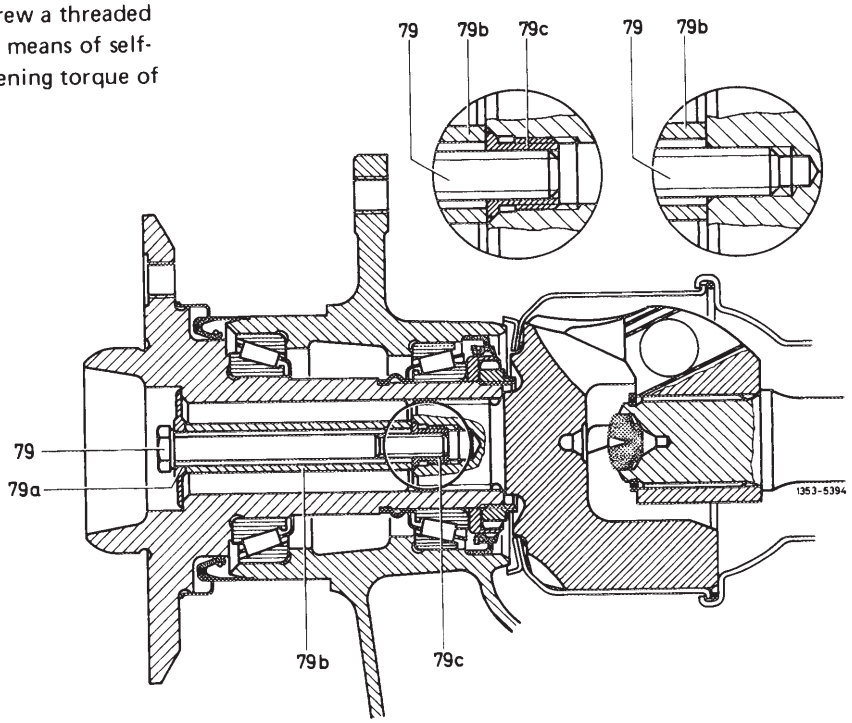


15 On version 1, tighten hex. screw M 12 to 95 Nm. On version 2, mount hex. screw M 8 with clamping disc and spacing sleeve and tighten to 30 Nm.

Attention!
Renew clamping disc after one-time use. Provide clamping disc with oil in range of screw head. Pay attention to correct length of spacing sleeve and hex. screw (refer to 35–110).



Note: In the event of complaints about clicking noises, exchange hex. screw M 12 with a thick washer for a hex. screw M 8 with pertinent spacing sleeve and clamping disc. To reduce threads, screw a threaded bushing (79c) into rear axle shaft by means of self-made tool (details at the left). Tightening torque of threaded bushing 30 Nm.

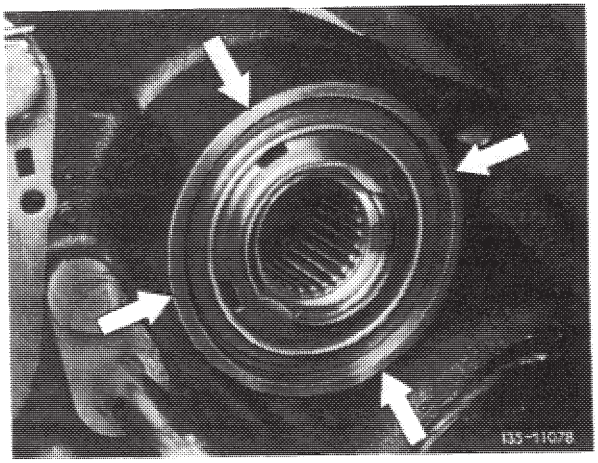


79 Hex. screw
79a Clamping disc
79b Spacing sleeve
79c Threaded bushing

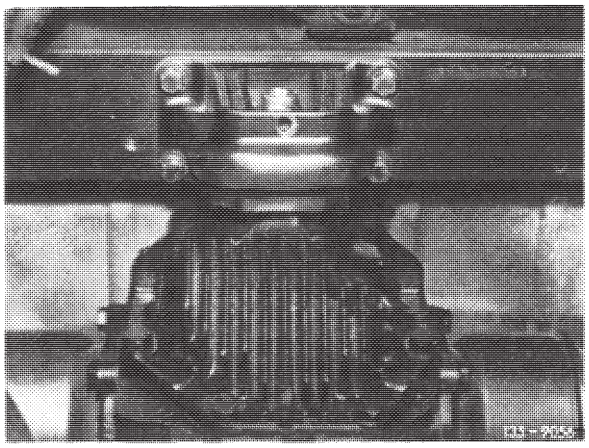
Detail at left:
Repair solution

Detail at right:
Standard version

Attention!
When installing a new or a reconditioned rear axle shaft with one-piece protective sleeve on outer joint, check semi-trailing arm in operating range of protective sleeve for weld residue. Remove weld beads, since otherwise the protective sleeve may be chafed through. Also check installed rear axle shaft for wiping noises. If wiping noises are heard when rotating rear axle shaft, refinish wheel carrier in operating range of protective sleeve (arrows).



16 Mount rear axle end cover with sealing compound and tighten hex. screws to 45 Nm.



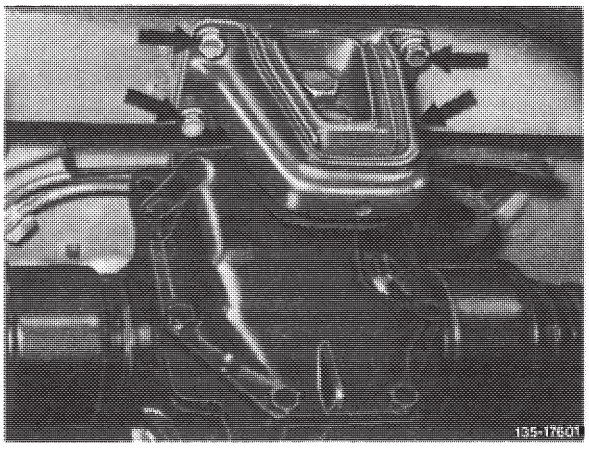
Model 107, 114, 115, 116 and 123

17 Lift rear axle housing and screw rubber bearing to frame floor. Tighten hex. screws (version 1) to 25 Nm or self-locking hex. screws (version 2) to 30 Nm.

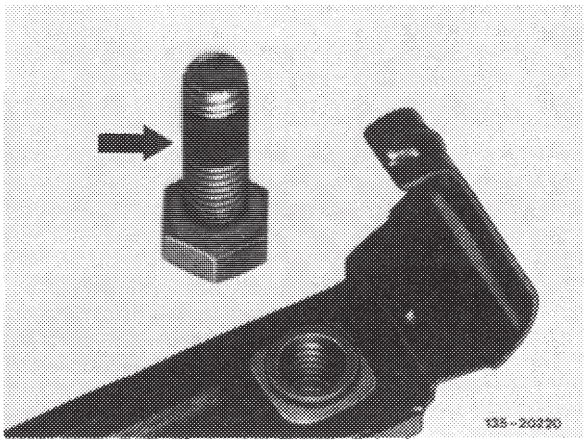
Attention!
Use self-locking hex. screws only once.

Model 126

18 Lift rear axle center piece up to frame floor and attach rubber bearing to frame floor. Tightening torque of self-locking hex. screws of version 1 or hex. screws of version 2 30 Nm.

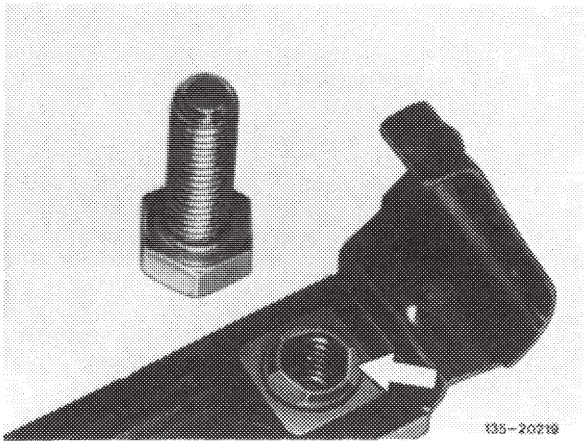


19 In the event of repairs, replace version 1 by version 2.



Version 1
Self-locking hex. screws (arrow) and holder with nut without lock.

Attention!
Always renew holder of version 2 after one-time unse on principle.

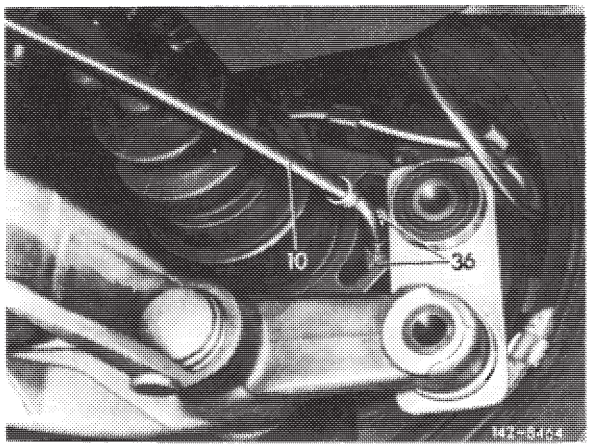


Version 2
Hex. screws without lock and holder with self-locking nuts (arrow).

20 On rear axles with starting torque compensation, if removed:

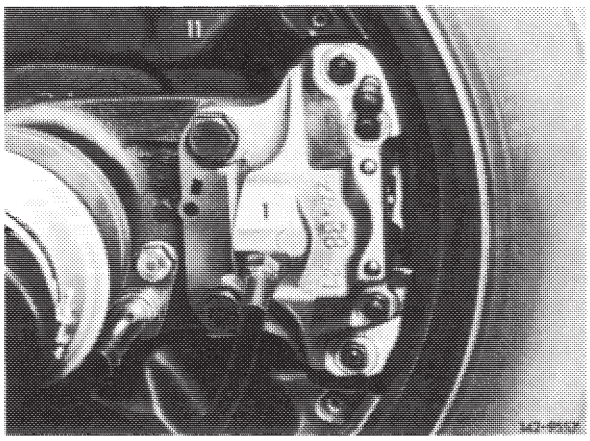
Mount brake hose.

Bleed brake system (42–010).

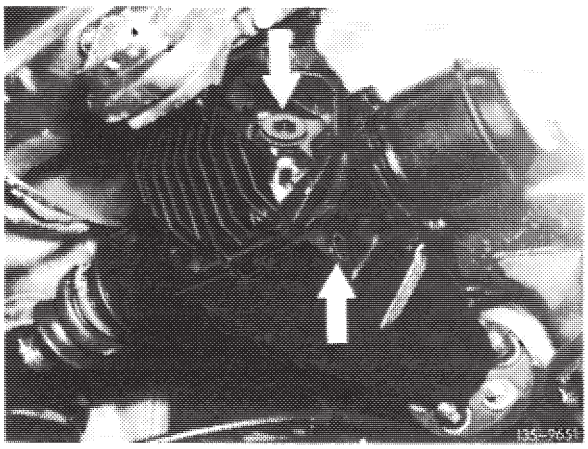


21 Remove vehicle jack or pitlift and top.

22 **On rear axles without starting torque compensation** mount caliper with new locking plate or self-locking hex bolts. Tightening torque of hex bolts 90 Nm.



23 Fill rear axle housing with oil up to level of filler hole.



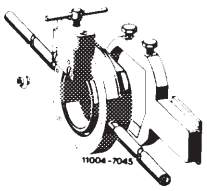
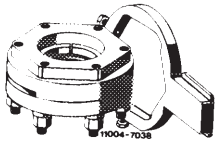
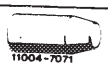
A. Model 107, 114, 115, 116, 123, 126.02/03

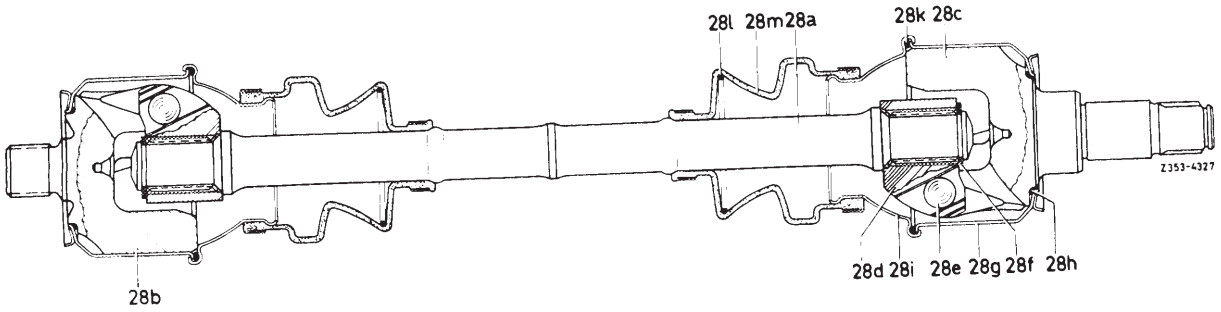
Lubricant for synchromesh joints

Model	Lubricant	Quantity in grams per joint inside	outside	Remarks
107.022/023/025 107.042/043/045 114 115 116.02 123 126.02 126.032/033	Spider joint oil	230	230	Spider joint oil included in each "rubber sleeve repair kit"
107.024/026/044 [1] 107.046 116.03 126.036/037 126.120 (USA)		310	230	
107 [2] (USA)		230	230	

[1] Model 107.044 (USA) installed starting chassis end no. 029599.
[2] Model 107.044 (USA) installed up to chassis end no. 029598.

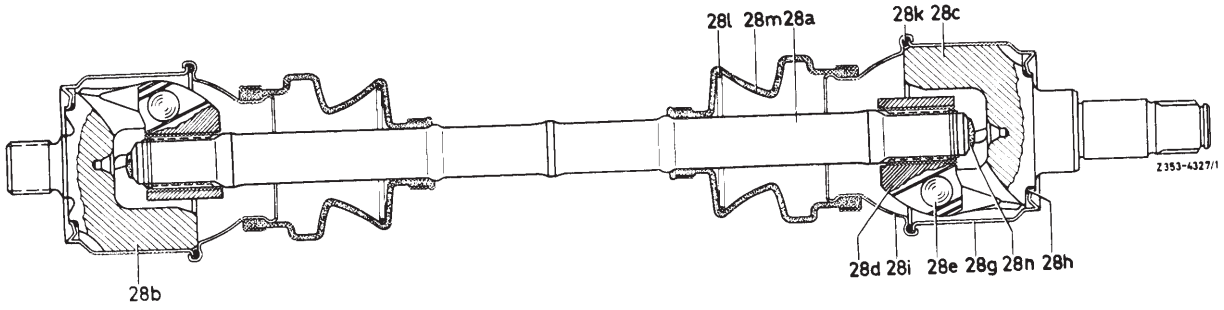
Special tools

Cutting tool for opening protective sleeve		 11004-7045	115 589 40 63 00
Beading tool for closing protective sleeve		 11004-7038	115 589 36 63 00
Assembly sleeve for rubber sleeve		 11004-7071	115 589 01 63 00
3-magnet ball holder for assembling balls		 11004-7078	115 589 05 63 00
Clamping jaws for rear axle shaft	25–27 mm dia. 32 mm dia.	 11004-7083	116 589 11 31 00 116 589 10 31 00
Installer and remover		 11004-7080	116 589 15 15 00



1st version

28a Rear axle shaft
28b Outer spider
28c Inner spider
28d Spider joint hub
28e Ball
28f Locking ring
28g Protective sleeve
28h Sealing ring
28i Stop sleeve
28k Sealing ring
28l Clamping ring
28m Rubber sleeve



2nd version

28a Rear axle shaft
28b Outer spider
28c Inner spider
28d Spider joint hub
28e Ball
28g Protective sleeve
28h Sealing ring
28i Stop sleeve
28k Sealing ring
28l Clamping ring
28m Rubber sleeve
28n Stop buffer

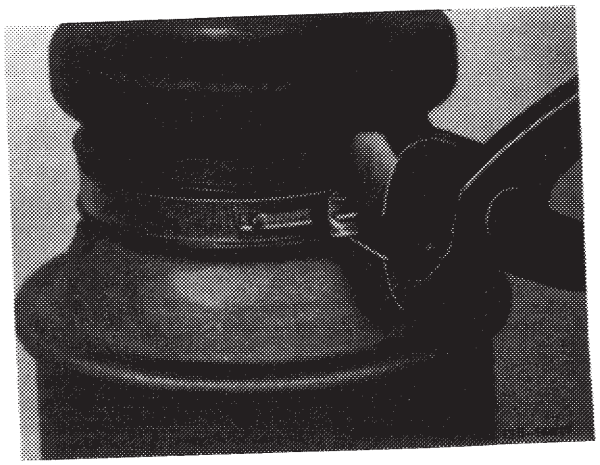
Note

The complete rear axle shaft can be individually removed (35–620). If the sleeves are replaced on both rear axle shafts, removal together with rear axle center piece (35–520) is recommended.

The rubber sleeve of rear axle shaft with large inner joint can be renewed only after disassembly of small joint. If the large inner joint is leaking e.g. between protective sleeve and spider or on bead between protective sleeve and stop sleeve, the complete rear axle shaft must be renewed, since no cutting and beading tool is available for the protective and stop sleeve of the large joint.

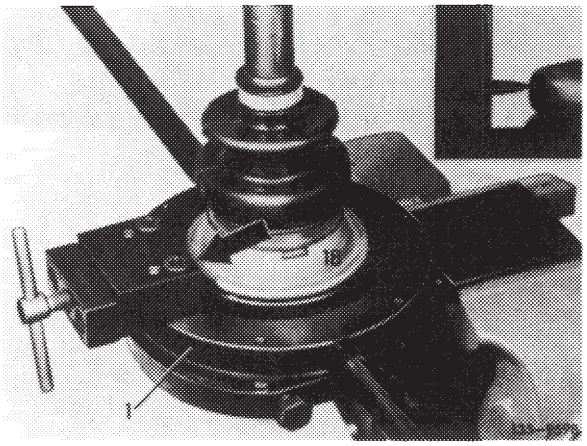
Disassembly

1 Loosen hose clamps and remove. Open hose clamps without clamping screw at tensioning eye by means of cutting pliers.



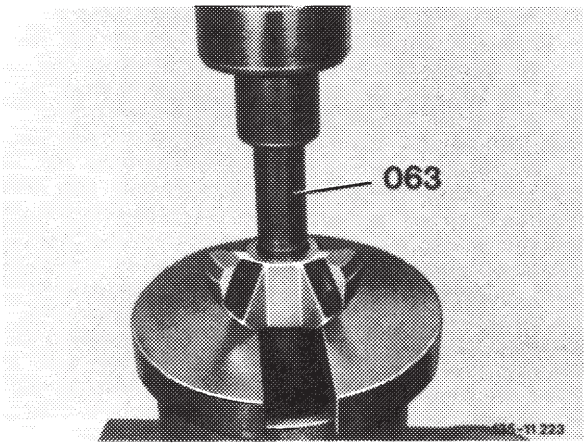
2 Slide back rubber sleeve and drain spider joint oil.

3 Open stop sleeve (18) of synchromesh joint at beaded edge by means of a cutting tool, via setting cutting wheel to center of bead and exerting slight pressure against stop sleeve (arrow).



4 Pull protective sleeve from spider and remove spider from spider joint hub together with 6 balls.

5 Remove locking ring, if installed, from groove in rear axle shaft and press spider joint hub from rear axle shaft by means of removing mandrel (063).

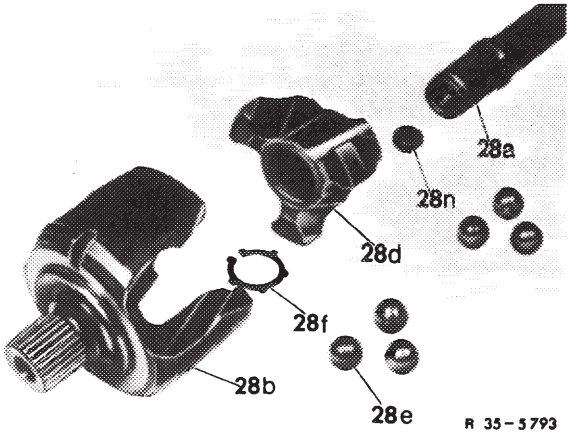


6 Pull stop sleeve and rubber sleeve from rear axle shaft.

Note: The second rubber sleeve can now be pulled off after loosening hose clip over disassembled end of rear axle shaft, if required. Make sure that none of the lubricant is getting lost and that no dirt is entering inside joint.

7 Carefully clean disassembled joint.

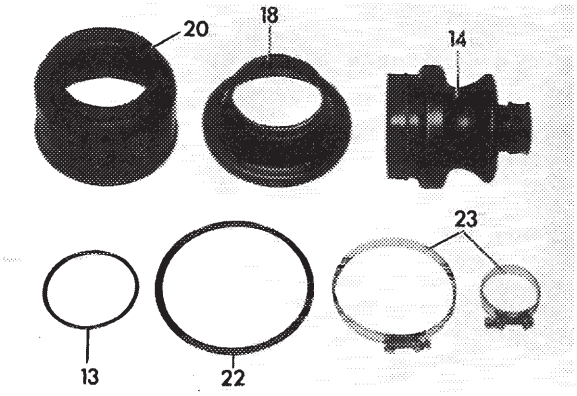
8 Check ball races of spider joint hub and spider as well as balls for wear. If these parts are badly worn, renew complete rear axle shaft.



28a Rear axle shaft
28b Spider
28d Spider joint hub
28e Ball
28f Locking ring (1st version only)
28n Stop buffer

Note: For changing sleeves, a repair kit with all required parts is available. If the same rear axle shaft requires a second sleeve, use an additional repair kit comprising a rubber sleeve and two hose clips.

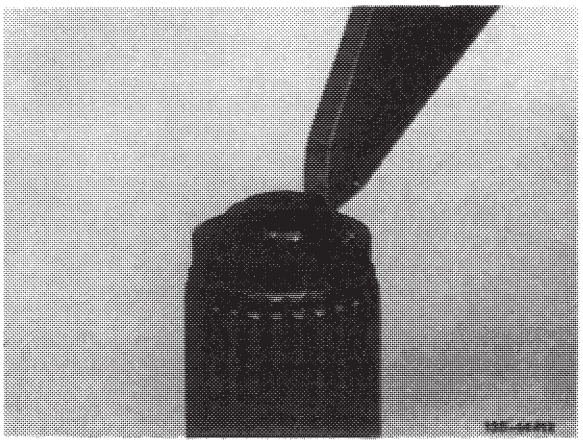
13 Sealing ring
14 Rubber sleeve
18 Stop sleeve
20 Protective sleeve
22 Sealing ring
23 Hose clip



R-3478

9 Check stop buffer for damage. Renew badly distorted stop buffers.

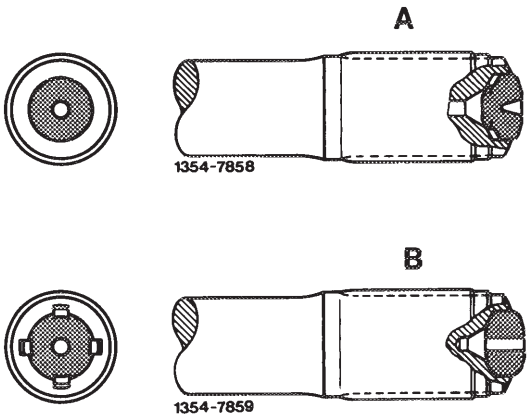
10 Split stop buffers with suitable tool into two parts and then remove.



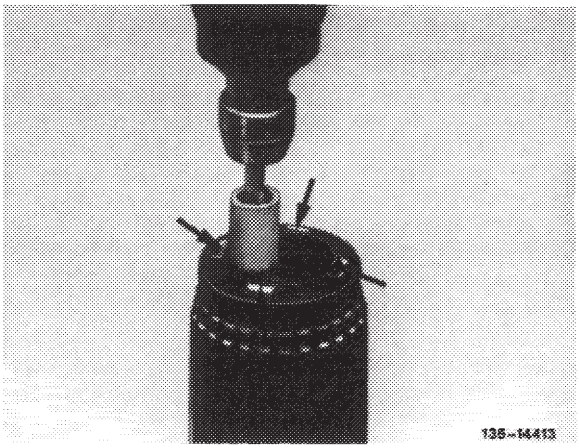
Assembly

11 Push-in stop buffer with holding spring up to contact surface.

A = 1st version with holding spring and repair solution
B = 2nd version without holding spring, peened — series version



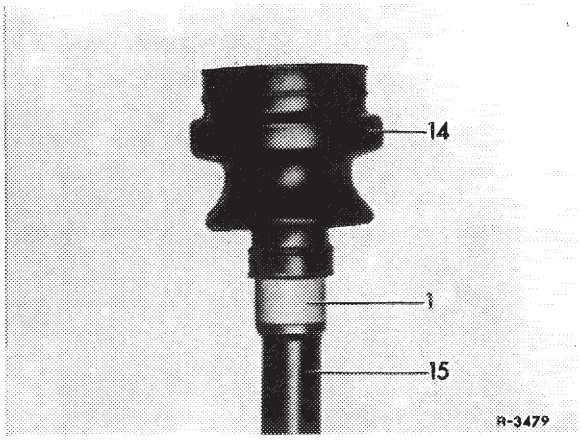
Note: Only stop buffers with holding spring (A) are available as spare parts. On rear axle shafts of 2nd version first remove dents caused by peening from inside by means of a grinder.



12 Place assembly sleeve (1) on splining of rear axle shaft (15).

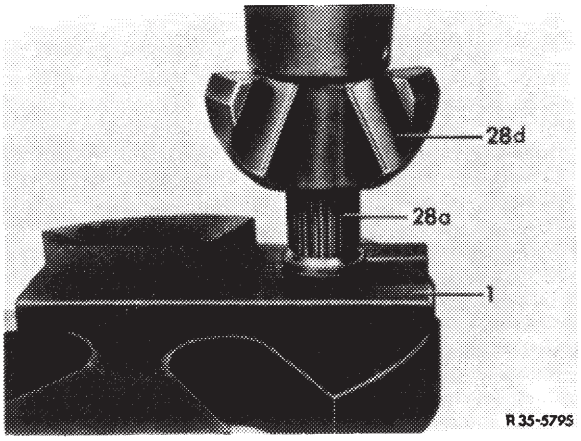
13 Slip new rubber sleeve (14) on rear axle shaft.

14 Attach new stop sleeve over rear axle shaft.



15 Position clamping device (1) against sleeve flange of rear axle shaft.

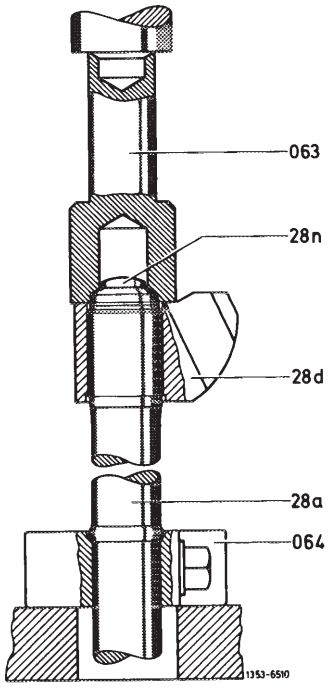
16 Press on spider joint hub (28d) of 1st version up to stop surface of rear axle shaft.



17 Press on spider joint hub (28d) of 2nd version (without stop surface) by means of installing mandrel (063) until mandrel rests against cone of rear axle shaft.

Attention!
The minimum pressure of the joint hub against rear axle shaft should amount to **5000 N.**

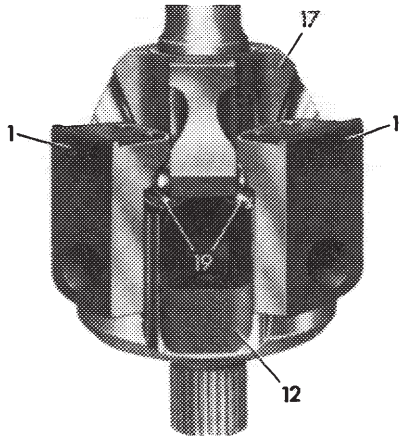
18 Mount locking ring, if installed. (Starting Jan. 1973, the locking ring will no longer be installed).



28a Rear axle shaft
28d Spider joint hub
28n Stop buffer
063 Removing and installing mandrel
064 Clamping device

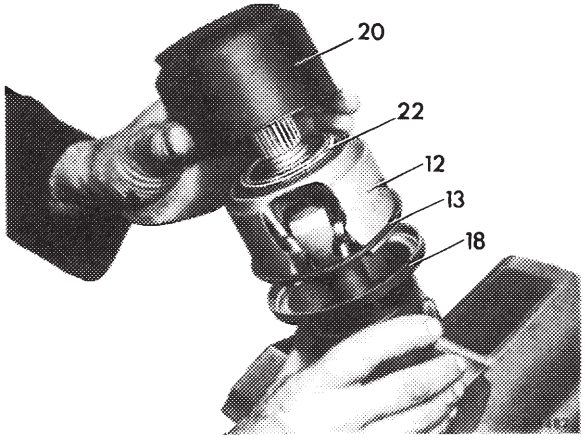
19 Assemble spider (12), the six balls (19) and the spider joint hub (17) with the aid of three magnetic ball holders (1).

Note: When new, the balls are mounted with a slight overlap. In used joint, balls and spider are moving somewhat easier. The rear axle shaft is completely replaced only whenever torsional play is showing up.

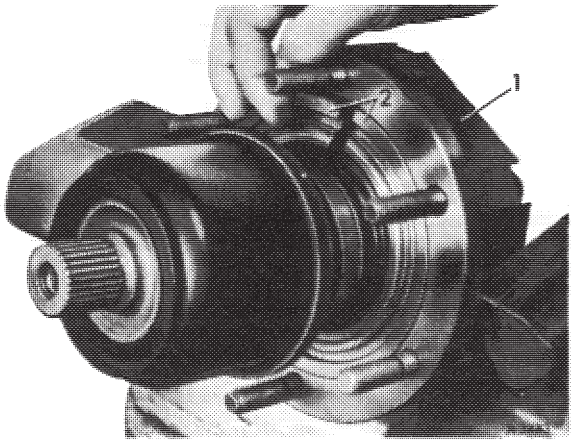


135 - 6 279/1

20 Place new sealing rings (13 and 22) on spider (12) and attach new protective sleeve (20).

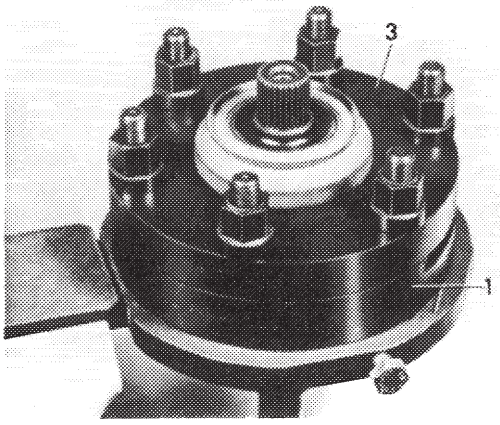


21 Introduce rear axle shaft completely into beading tool (1) and insert split mounting ring (2).



22 Mount beading ring (3) and screw in hex nut up to bead ring. Then tighten hex nut uniformly crosswise until bead ring rests against beading device (1).

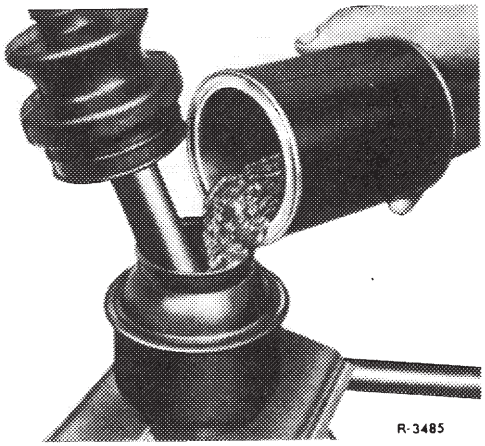
23 Remove rear axle shaft out of beading tool.



135-9588

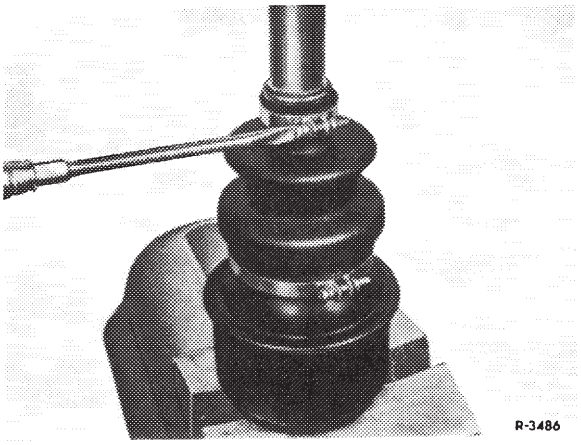
24 Fill synchromesh joint with spider joint oil.

Attention!
Use specified lubricant only in specified quantity.



25 Attach rubber sleeve on stop sleeve and on rear axle shaft with new hose clips, while sliding sleeve up to bead machined on rear axle shaft.

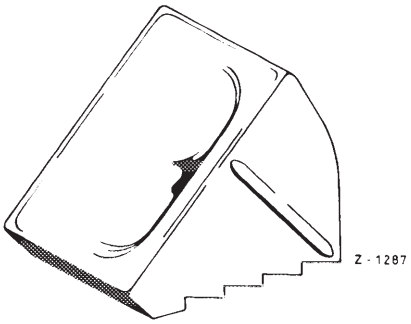
Note: The screws of the two hose clips on one sleeve should always point in one direction. Align the screws of both hose clips on second sleeve of a rear axle shaft each turned by 180°.



Note

Carefully lift vehicle to avoid accidents and damage to vehicle. Prior to lifting vehicle with a vehicle jack, be sure to protect vehicle by means of chocks (part No. 110 583 01 75) or the like against moving off.

For safety reasons (risk of tilting) T-sedans model 123 and special vehicles (special body) models 114, 115 and 123 should be lifted in empty condition only.



On level ground, protect one wheel of opposite vehicle end against moving off.

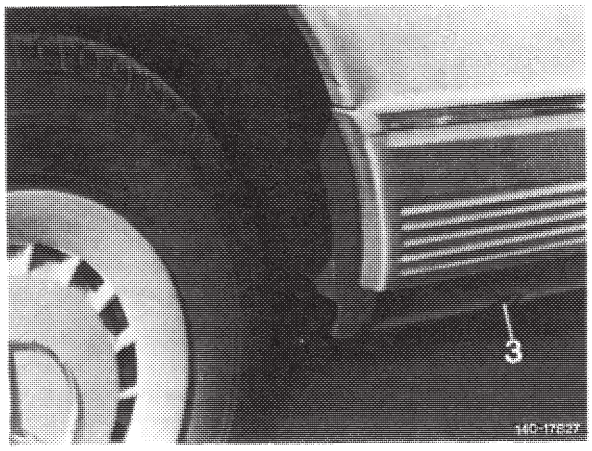
On a gradient, protect both wheels of opposite vehicle end against moving off.

On vehicles with manual transmission, engage first gear step. On vehicles with automatic transmission, place selector lever into position "P".

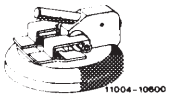
Step down energetically on parking brake pedal.

Push mounting pin of vehicle jack completely into respective plug-in tube (3) in outer longitudinal member of frame.

Position vehicle jack vertically – also on a gradient.



Special tools

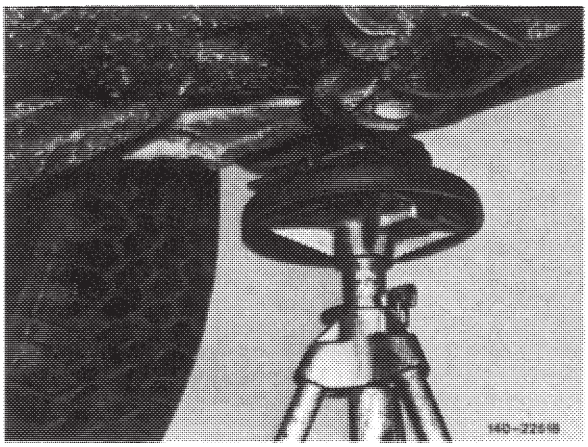
Jacking-up shoe required 4 each		123 589 11 63 00

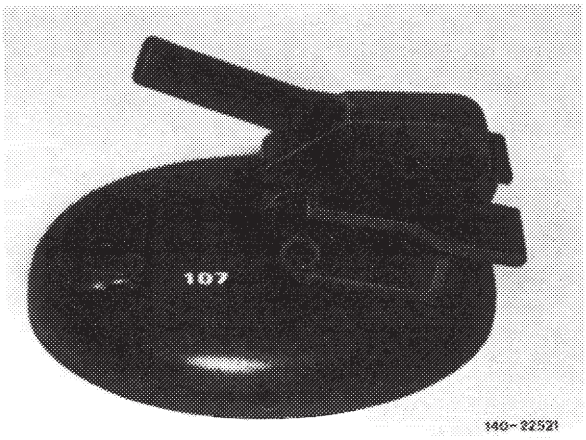
A. Models 107, 114, 115, 116 and 123

Between jack and frame floor, as well as when lifting vehicle with short stroke lifting platform, use jacking-up shoes for plugging-in at outer frame side members.

These jacking-up shoes will reliably prevent any denting of outer frame floor side members. The jacking-up shoes are providing the additional advantage that no bending torque is exerted against the plug-in tubes themselves, and there are no objections against loads against body for extended periods.

The flap positions required for positioning the jacking-up shoes for the individual models are shown on identification.





Model 107

B. Model 114

Model	Rim	Summer tires Convent. tires (diagonal) Tire size	Belted tires (radial) tubeless Tire size	Winter tires Belted tires (radial) tubeless Tire size
Sedans and coupes standard version				
114.010 114.011	5 1/2J x 14 H2	6.95 H 14/ 175 H 14 6 PR	175 R 14 88 H[1])	175 R 14 88 Q M + S
114.015		6.95 S 14/ 175 S 14 4 PR	175 R 14 88 S[1])	
114.021 114.022		6.95 H 14/ 175 H 14 6 PR	175 R 14 88 H[1])	
114.023			175 R 14 88 S	
114.060[2]) 114.073[2])		—		
114.060 114.062 114.072 114.073	6 J x 14 H2	—	185 R 14 90 H	185 R 14 90 Q M + S
Sedans and coupes special version with 15" wheels for countries with poor road conditions (higher vehicle level)				
114.010 114.011 114.02 114.06 114.07	5 1/2 J x 15 H2	7.00 H 15 L 6 PR	185 R 15 93 H[1])[3])	185 R 15 93 Q M + S
114.015		7.00 S 15 L 6 PR		
Special sedans with higher permissible rear axle load 1160 kg (e.g. police radio cars)				
114.01 114.06	6 J x 14 H2	—	185 R 14 90 H	185 R 14 90 Q M + S
Sedans long (wheel base 3400 mm)				
114.017	5 1/2J x 15 H2	—	185 R 15 93 H	185 R 15 93 Q M + S
Special vehicles (special body): **Station wagons, ambulances, ambulances long**				
114.005 114.07 114.008	5 1/2J x 15 H2	—	185 R 15 93 H	185 R 15 93 Q M + S

[1]) Belted tires up to May 1974 optional, starting June 1974 standard.
[2]) Only vehicles USA version up to model year 1974, wheels for vehicles starting model year 1975 are similar to standard version.
[3]) Belted tires can be subsequently provided only.

Possible conversions

Prior to conversion, pay attention to national laws and regulations!

Model		Rim	Summer tires Belted tires (radial) tubeless Tire size	Winter tires Belted tires (radial) tubeless Tire size
114.010 114.015 114.023	114.011 114.021	6 J x 14 H2[1])	185 R 14 90 H or 195/70 R 14 90 S[2])[3])	185 R 14 90 Q M + S or 195/70 R 14 90 Q M + S[2])[3])
114.022			185 HR 14 90 H 195/70 R 14 90 H[2])[3])	
114.06	114.07		195/70 R 14 90 H[3])	195/70 R 14 90 Q M + S[3])

[1]) Do not use standard rims 5 1/2 J x 14 H2.
[2]) Only possible on vehicles with front wheel hubs 2nd version (standard starting August 1971) with 104 mm hole circle dia., as well as steering knuckle arm of 2nd version (standard starting December 1971). Prior to conversion, pertinent information from ZKD-TP1 is required.
[3]) Tires of production up to 1979 carry the load capacity code number 89.

C. Model 115

Model		Rim	Summer tires Convent. tires (diagonal) Tire size	Belted tires (radial) tubeless Tire size	Winter tires Belted tires (radial) tubeless Tire size
Sedans standard version					
115.010 115.017	115.015	5 1/2J x 14 H2	6.95 S 14/ 175 S 14 4 PR	175 R 14 88 S[1])	175 R 14 88 Q M + S
115.110 115.115	115.114 115.117		6.95–14/ 175–14 4 PR		
Sedans special version with 15" wheels for countries with poor road conditions (higher vehicle level)					
115.010 115.017	115.015	5 1/2J x 15 H2	7.00 S 15 L 6 PR	185 R 15 93 H[1])[2])	185 R 15
115.110 115.117	115.115		7.00–15 L 4 PR		
Special sedans with higher permissible rear axle load 1160 kg (e.g. police radio cars)					
115.0	115.1	6 J x 14 H2	–	185 R 14 90 H	185 R 14 90 Q M + S

Model		Rim	Summer tires Convent. tires (diagonal) Tire size	Belted tires (radial) tubeless Tire size	Winter tires Belted tires (radial) tubeless Tire size
Sedans long (wheel base 3400 mm)					
115.112	115.119	5 1/2 J x 15 H2	–	185 R 15 93 H	185 R 15 93 Q M + S
Special vehicles (special body): **Station wagons, ambulances, ambulances long**					
115.000 115.005 115.102 115.105 115.108	115.002 115.100 115.103 115.107	5 1/2 J x 15 H2	–	185 R 15 93 H	185 R 15 93 Q M + S

[1]) Belted tires up to May 1974 optional, starting June 1974 standard.
[2]) Belted tires can be subsequently provided only.

Possible conversion

Prior to conversion, pay attention to national laws and regulations!

Model		Rim	Summer tires Belted tires (radial) tubeless Tire size	Winter tires Belted tires (radial) tubeless Tire size
115.010 115.110	115.015 115.115	6 J x 14 H2[1])	185 R 14 90 H or 195/70 R 14 90 S[2])[3])	185 R 14 90 Q M + S or 195/70 R 14 90 Q M + S[2])[3])
115.017	115.114		185 R 14 90 H or 195/70 R 14 90 S[3])	185 R 14 90 Q M + S or 195/70 R 14 90 Q M + S[3])

[1]) Do not use standard rims 5 1/2 J x 14 H2.
2) Only possible on vehicles with front wheel hubs 2nd version (standard starting August 1971) with 104 mm hole circle dia., as well as steering knuckle arm of 2nd version (standard starting December 1971). Prior to conversion, pertinent information from ZKD-TP1 is required.
[3]) Tires of production up to 1979 carry the load capacity code number 89.

Note

Each vehicle should be provided with rims of the same version on principle.

Mount only rims approved by us. When in doubt, the MB part no. adjacent to general designation will be decisive.

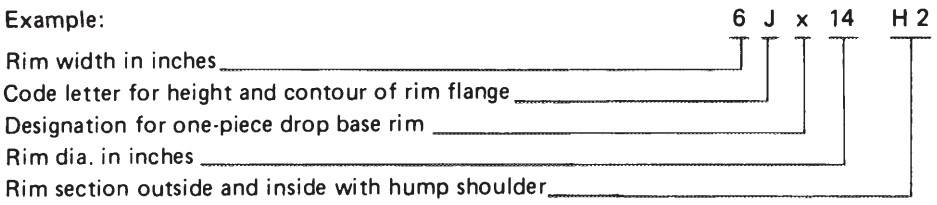
Designation and part no. are located on wheel disk (on steel plate and light alloy rims outside, on forged light alloy rims inside). As an additional identification a Mercedes star is impressed on steel plate rims starting July 1973, on light alloy rims from start of production.

The additional identification A for symmetrical rim section, B for asymmetric rim section is no longer used on present passenger car rims, since only wheels with asymmetric rims are mounted. Mercedes-Benz wheels have an asymmetric rim and are provided outside and inside with a normal hump.

Rims with a hump at outside only are carrying the designation "H". At high air loss of tire, the hump prevents sliding of tire bead into well-base rim, that is, a sudden venting of tire. For tubeless tires at least one hump on rim outer side is specified.

If, in connection with a change of tire size, vehicles are converted to another rim size, approved by the company, attention must be paid to national laws and regulations prior to conversion.

Rim designations



a Rim width in inches

d Rim dia. in inches (measuring points dia.)

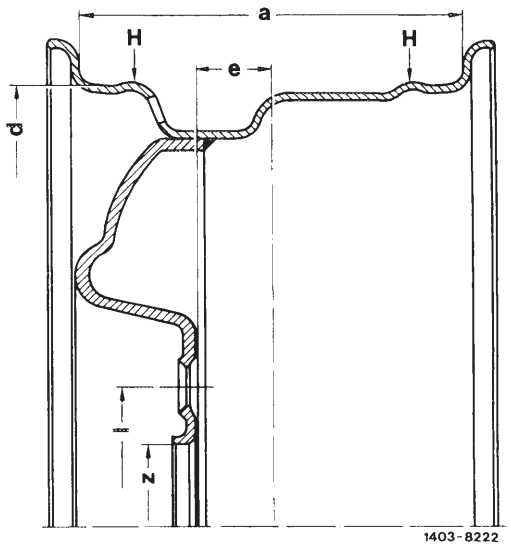
e Rim offset – ET
(distance from rim center to contact surface of wheel disk, measured in mm)

l Hole circle dia. = 112 mm

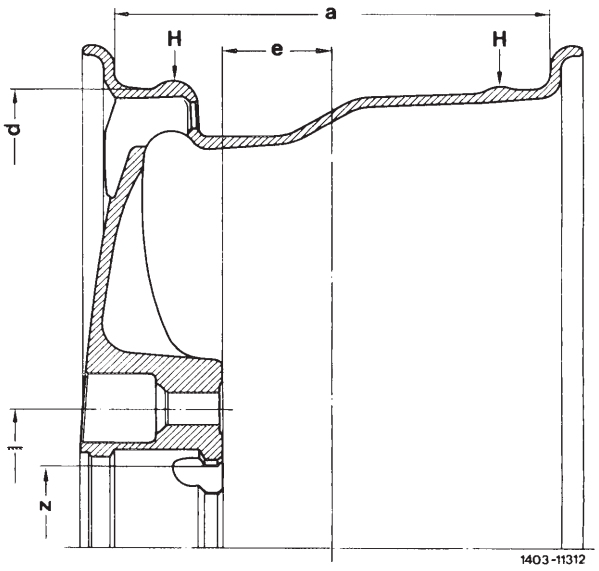
z Centering bore dia. = 66.5 ± 0.1 mm

H Hump (rim with safety shoulder)

Steel plate and light alloy rim



Forged light alloy rim



Rim designation

1 Rim designation e.g. 6 J x 14 H 2

2 Part no. e.g. 108 400 14 02

3 Identification as original Mercedes-Benz part.

4 Production code number or production date

a) Identification of production plate including month/year up to February 1978, e.g. = January 1978

b) Identification of production date including week/year starting March 1978, e.g. 13 78 = 13th week 1978

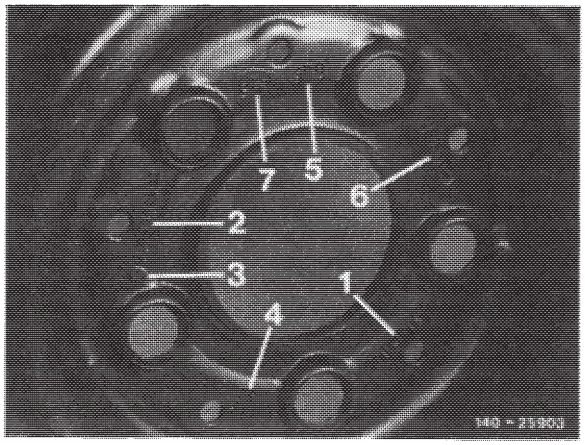
5 Trademark of manufacturer

6 Part number of manufacturer

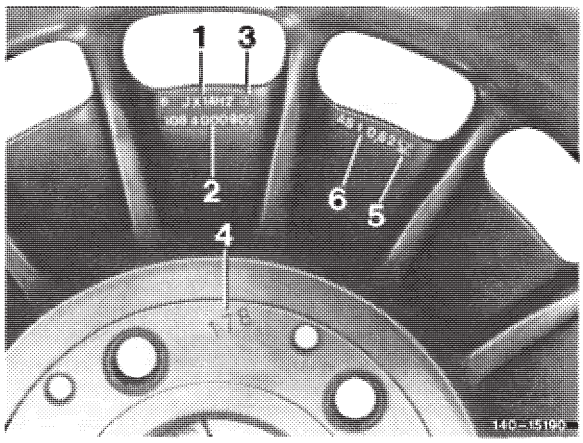
7 Rim offset – ET
Designation of rim offset:

a) On steel plate rims for the first time with ET 50 (rim 5 J x 14 H2 only) starting with production code number 41 81.

b) On forged light alloy rims starting with production code number 32 81.

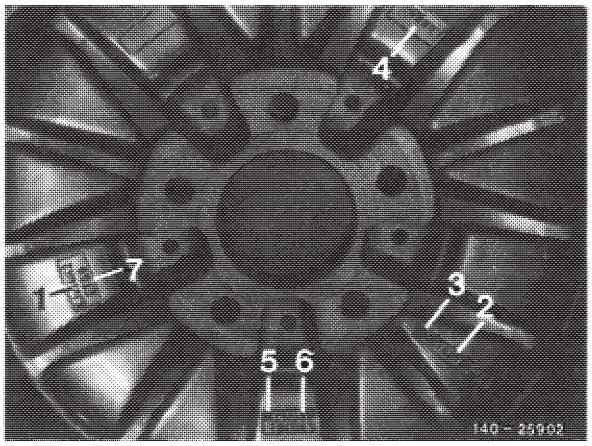


Identification on steel plate and light alloy rims outside



Identification on forged light-alloy rims inside

Version for models 107, 114, 115, 116, 123 and 126



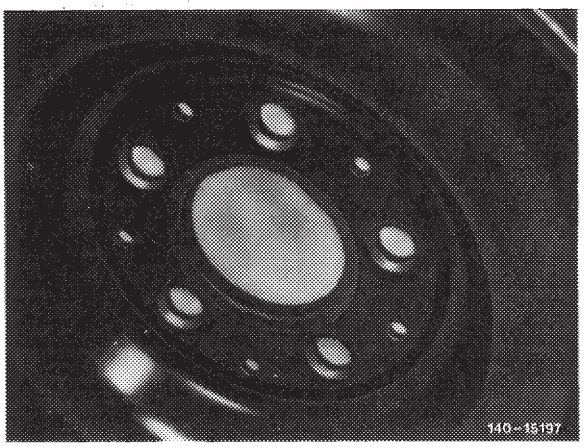
Version for model 201

Steel plate rims

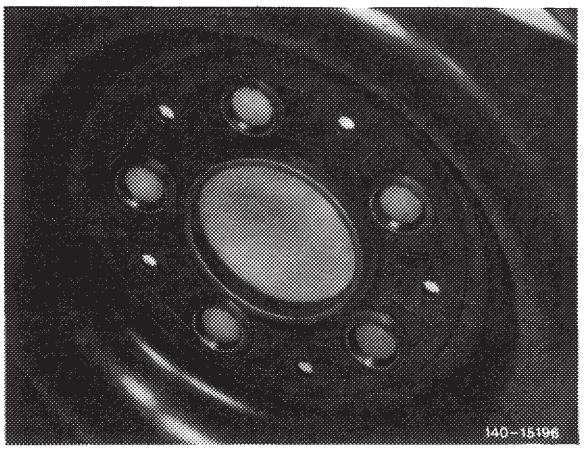
On steel plate rims the seat of the tire bead on radius toward rim flange and on rim flange itself, as well as the outer surfaces, particularly on inside of wheel, should not show any rust marks. Prior to fitting a new rubber valve, clean contact surfaces on rim. If required, derust surfaces and apply fresh paint.

Particularly during the six winter months, check rims inside for contamination and clean, if required.

For steel plate rims the design of the fastening eyes is decisive for accurate fastening of wheels. Wheels with raised fastening eyes provide a very high degree of safety against excessive tightening of spherical collar bolts as compared with recessed fastening eyes used on former types of wheels.



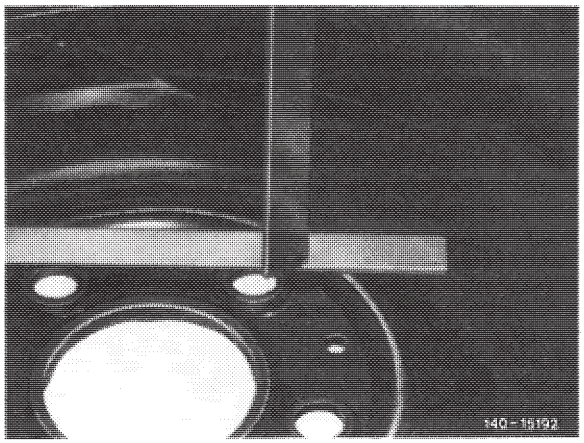
1st version
Wheel with recessed fastening eyes

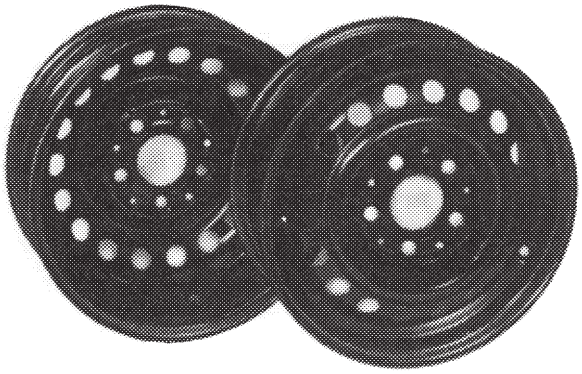


2nd version
Wheel with raised fastening eyes

Wheels with reduced inside spacing in relation to contact surface caused by often, excessive tightening of spherical collar bolts should no longer be mounted.

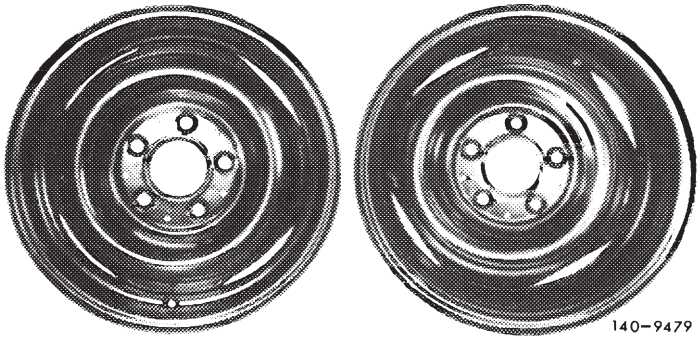
On a removed wheel, the distance between the contact surface and the range of the fastening eyes should amount to at least 0.7 mm. For measuring, use a straightedge and a sliding caliper with depth gage.





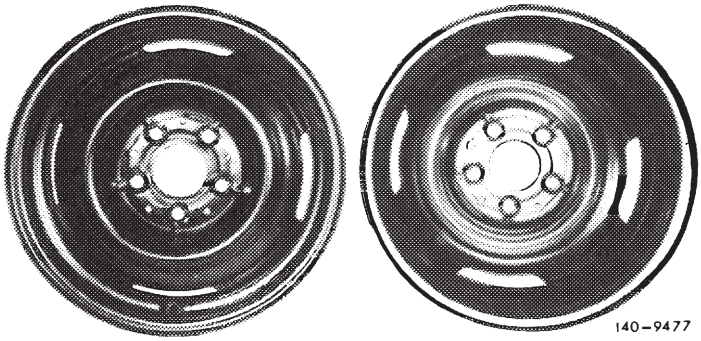
Steel plate rim
5 J x 14 H 2
without inner venting ring
wheel disk with 18 vent holes
of 20 mm dia.

140-23735



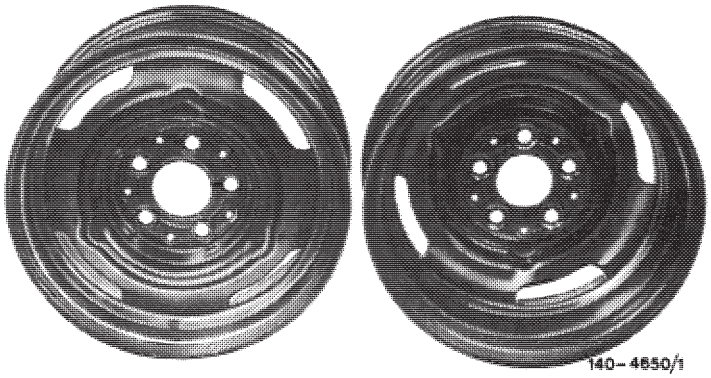
Steel plate rim
5 1/2 J x 14 H 2
(version up to September 1977)

140-9479

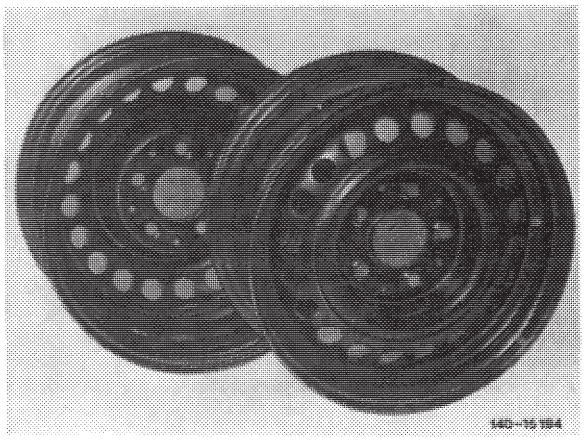


Steel plate rim
5 1/2 J x 14 H 2
(version starting October 1977)

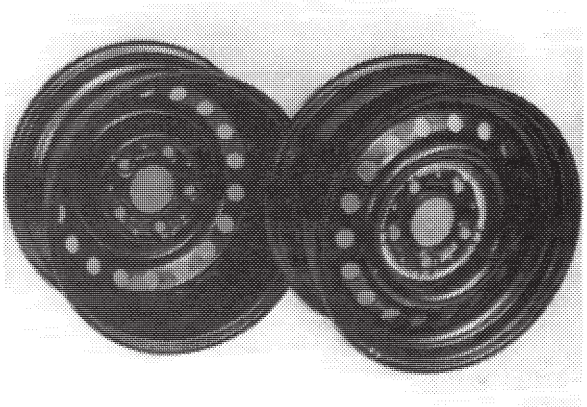
140-9477



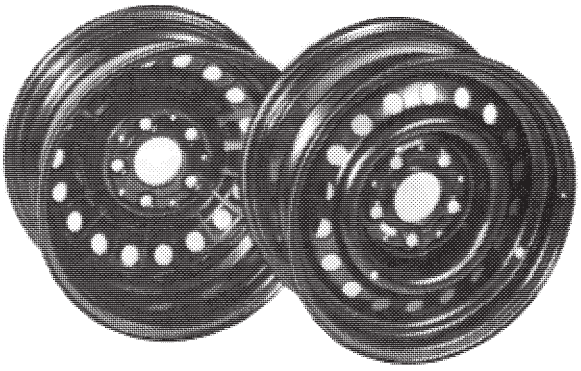
Steel plate rim
6 J x 14 H 2
(version up to December 1969)



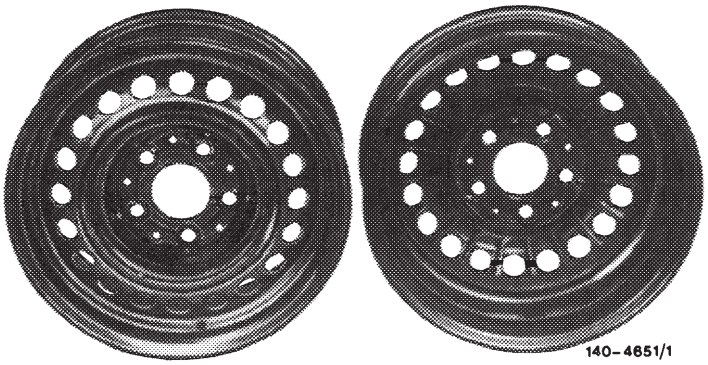
Steel plate rim
6 J x 14 H 2
without inner venting ring
Wheel disk with 20 vent holes of 28 mm dia.
(version starting January 1970 up to October 1981)



Steel plate rim
6 J x 14 H 2
without inner venting ring
Wheel disk with 18 vent holes of 25 mm dia.
(version starting November 1981)

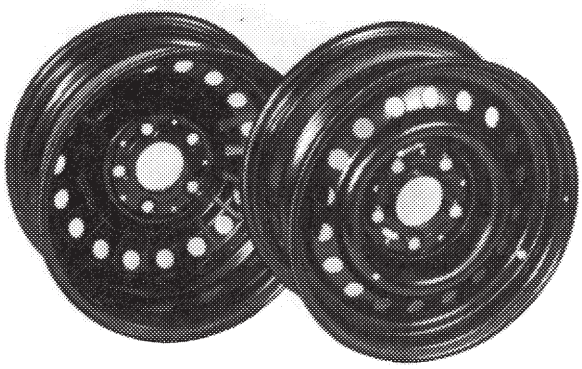


Steel plate rim
6 J x 14 H 2
with inner venting ring
Wheel disk with 18 vent holes of 25 mm dia.



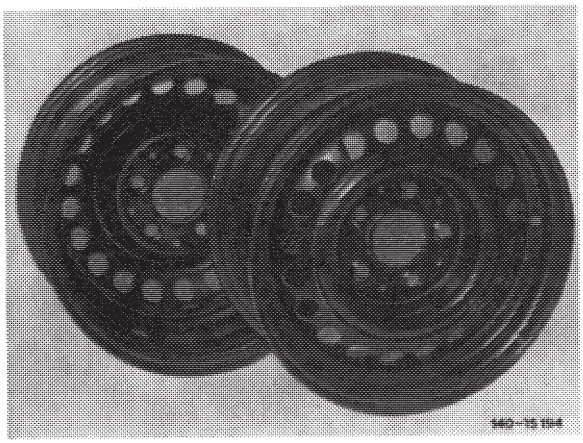
140-4651/1

Steel plate rim
6 1/2 J x 14 H 2
with inner venting ring
Wheel disk with 20 vent
holes of 28 mm dia.
(version up to December 1979)

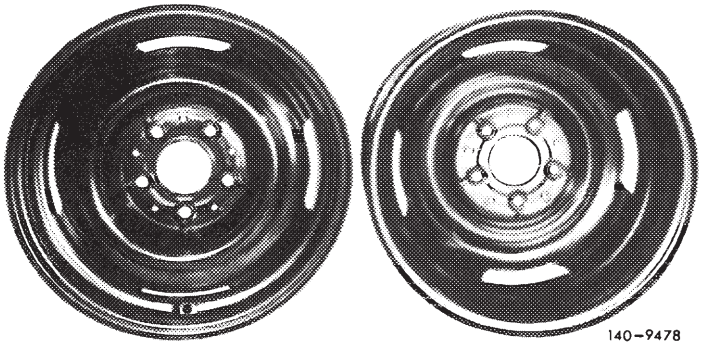


140-20049

Steel plate rim
6 1/2 J x 14 H 2
with inner venting ring
Wheel disk with 18 vent holes of 25 mm dia.
(version starting January 1980)

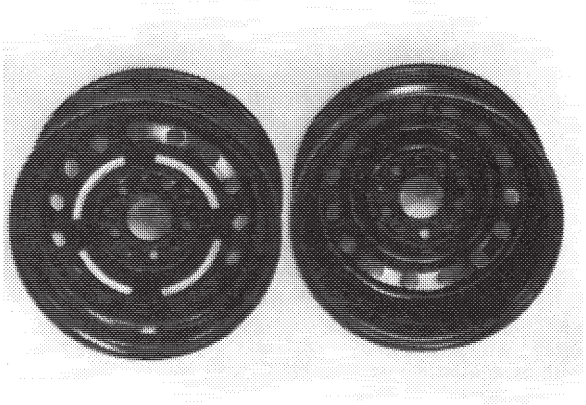


Steel plate rim
6 1/2 J x 14 H 2
without inner venting ring
Wheel disk with 18 vent
holes of 25 mm dia.



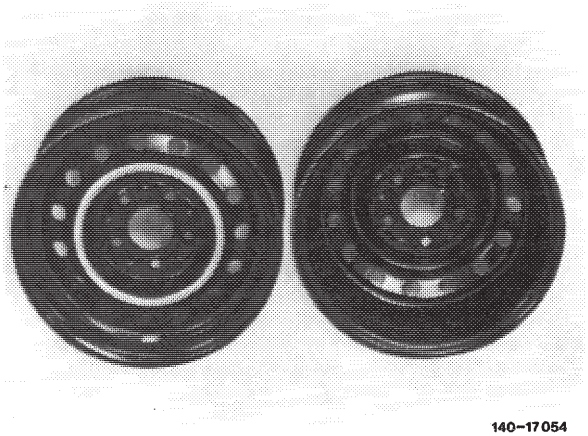
140-9478

Steel plate rim
5 1/2 J x 15 H 2



140-17054/1

Light alloy rim
5 1/2 J x 14 H 2



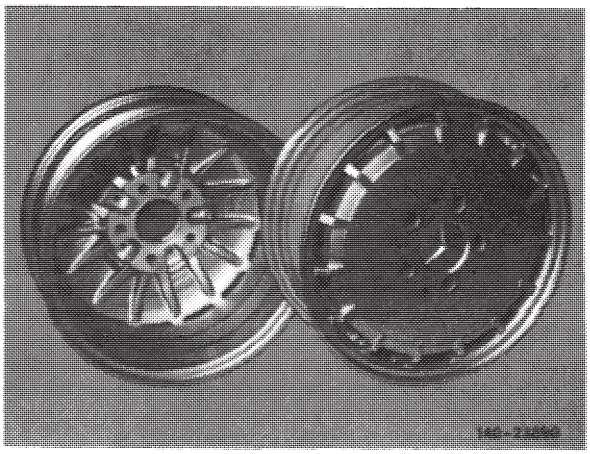
140-17054

Light alloy rim
6 J x 14 H 2

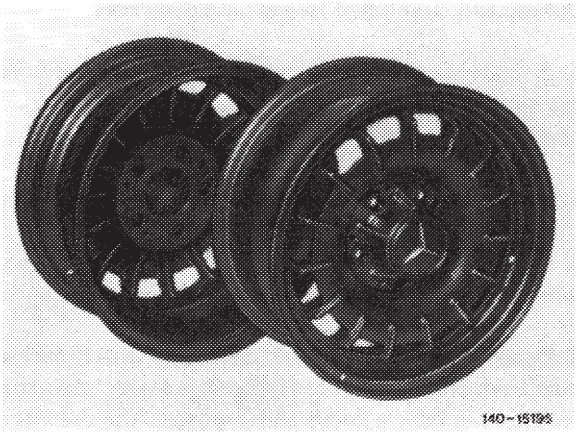
Forged light alloy rims

The rim flanges of light alloy rims may show increased wear under the following operating conditions: high load, trailer operation, not enough tire inflation pressure, use of unrecommended tire makes or tire versions, accumulation of dirt, sand and road salt (particularly during winter months). Prior to mounting a new tire, check rim flanges for wear. Remove burr, if any. Replace rim as soon as wear limit is attained (40–120).

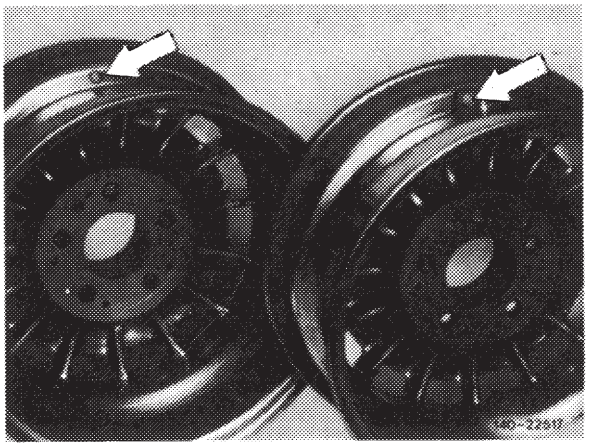
Particularly during the six winter months, check rims inside for contamination and clean, if required.



Forged light alloy rim
5 J x 14 H 2



Forged light alloy rim
5 1/2 J x 14 H 2, 6 J x 14 H 2, 6 1/2 J x 14 H 2,
7 J x 15 H 2



Version up to September 1981
(**wihtout** cavity on valve seat –
for special metal valve)

Version starting October 1981
(**with** cavity on valve seat –
for rubber valve)

Upkeep and cleaning of forged light alloy rims

Light alloy rims are coated with a special metallic paint. For this reason, they must be serviced and cleaned with paint-protecting compounds only, just like the vehicle body. Any damage to clear paint surface may lead to peeling.

For this reason, the following instructions should be observed and maintained for upkeep and cleaning.

1. Never treat light alloy rims with abrasive compounds, compounds or sponges which are containing acids or are heavily alkaline. High-pressure hot-water cleaning units should also not be used.

2. Depending on accumulated dirt, clean wheels once a week, whenever possible. Normal dirt including abrasive dust from brake linings can be removed with lukewarm water, a mild solvent for removing dirt (of the type used for cleaning vehicle body) and a sponge. Also use lots of water.

If the wheel cleaning job in combination with a normal vehicle wash is not enough, special preserving and cleaning compounds for light alloy rims are now available (used after precleaning with water).

If repainting of light alloy rims is required, refer to paintwork repair instructions.

Service compounds and cleaners for light alloy rims

1 Spray bottle (1 liter)
2 Canister – refill pack (5 liters)
3 Bottle (1/4 liter)
4 Bottle – refill pack (1 liter)

Materials

Designation		Part No.
Service compound for light alloy rims	1-liter spray bottle 5-liter canister	000 986 95 71 000 986 98 71

For regular treatment of rims, also if heavily contaminated, but not for tightly sticking residual dirt. Compound has a preservating effect.

Cleaner for light alloy rims	1/4-liter bottle for approx. 5 treatments	000 986 94 71
	1-liter bottle	000 986 97 71

For removing tightly sticking dirt which cannot be removed with service compounds for light alloy rims. After a cleaning job with this compound a subsequent preservation with gloss preservation 000 986 06 74 or service compound for light alloy rims 000 986 95 71 must be performed.

Rims

Designation	Rim offset	Part no.	Model	Remarks
Steel plate rims				
5 J x 14 H 2	50 mm	201 400 05 02	201	**wihtout** inner vent ring-wheel disk with 18 vent holes of 20 mm dia.
5 1/2 J x 14 H 2	30 mm	115 400 13 02	114 115 123	version up to September 1977
		123 400 03 02		version starting October 1977 with modified wheel disk
6 J x 14 H 2	30 mm	108 400 00 02	114, 115 special sedans with higher permissible rear axle load 1160 kg	versions up to December 1969
		108 400 14 02	114 116 123	version starting January 1970 to October 1981 **without** inner vent ring — wheel disk with 20 vent holes of 28 mm dia.
		123 400 16 02	114 115 116 123	version starting November 1981 **without** inner vent ring-wheel disk with 18 vent holes of 25 mm dia.
		126 400 06 02	126	**with** inner vent ring — wheel disk with 18 vent holes of 25 mm dia.

Designation	Rim offset	Part no.	Model	Remarks
6 1/2 J x 14 H 2	30 mm	108 400 08 02	107 116	version up to December 1979 **with** inner vent ring – wheel disk with 20 vent holes of 28 mm dia.
		126 400 07 02	107 126.02 126.03	version starting January 1980 **with** inner vent ring – wheel disk with 18 vent holes of 25 mm dia.
		126 400 15 02	126.04	**without** inner vent – wheel disk with 18 vent holes of 25 mm dia.
		116 400 04 02	116.036	reinforced wheel disk **with** inner vent ring – wheel disk with 20 vent holes of 24 mm dia. additional designation: white edge on vehicle disk
5 1/2 J x 15 H 2	35 mm	115 400 14 02	114 115 123	version up to October 1978
		123 400 10 02		version starting November 1978 with modified wheel disk

Light alloy rims

5 1/2 J x 14 H 2	30 mm	123 400 13 02	123.123 (USA)	–
6 J x 14 H 2	30 mm	123 400 15 02	123.033 (USA) 123.130 (USA)	–

Forged light alloy rims

5 J x 14 H 2	50 mm	201 401 02 02[1])	201	spare parts – scope of delivery 201 400 06 02[1])[5])
5 1/2 J x 14 H 2	30 mm	123 400 08 02[2])	114 115 123	spare parts – scope of delivery 123 400 11 02[2])[4])[6])
		123 400 17 02[3])		spare parts – scope of delivery 123 400 18 02[3])[5])
6 J x 14 H 2	30 mm	108 400 09 02[2])	114 115 116 123 126	spare parts – scope of delivery 108 400 21 02[2])[4])
		126 400 19 02[3])		spare parts – scope of delivery 126 400 23 02[3])[5])
6 1/2 J x 14 H 2	30 mm	108 400 10 02[2])	107 116 126	spare parts – scope of delivery 108 400 22 02[2])[4])
		126 400 21 02[3])	107 116 126	spare parts – scope of delivery 126 400 24 02[3])[5])

Designation	Rim offset	Part no.	Model	Remarks
7 J x 15 H 2	25 mm	126 400 22 02[1])	107 116 126	spare parts — scope of delivery 126 400 27 02[1])[5])

[1]) With trough-shaped cavity in valve seat — for rubber valve.
[2]) Version up to September 1981 (**without** trough-shaped cavity on valve seat — for special metal valve).
[3]) Version starting October 1981 with trough-shaped cavity on valve seat — for rubber valve.
[4]) Spare parts scope includes: Rim, cap, spherical collar screws, special metal valve and tag "Important information concerning light alloy rims".
[5]) Spare parts scope includes: Ring gear, hub cap, spherical collar screws, rubber valve and tag "Important information concerning wheel assembly".
[6]) With plastic hub cap (part no. 107 400 00 25) only.

Note

Use only tires recommended by us. Pay attention to our tire recommendations particularly with regard to light alloy rims.

As replacements or for a conversion, use tires of similar construction, similar make and similar version for all rims. We do not approve combination of belted tires (radial) with conventional tires (diagonal), steel belted tires with textile belted tires, as well as winter tires (M + S) with summer tires.

In the event of replacements, tires approved for higher speeds may of course be used instead of the tires specified for the respective model (example: belted tires 195/70 R 14 90 H instead of 195/70 R 14 90 S).

When replacing tires, include spare wheel as a road wheel, but only if depth of tire treads and tire version are similar. Avoid excessive ageing of tires!

New tires should be run in prior to demanding full efficiency. About 100 km driven at moderate speed are enough. Avoid sharp acceleration and braking.

Storage areas for keeping tires in stock should be dark, cool and dry. Avoid drafts as much as possible, since oxygen accelerates ageing of rubber compound.

Place tubes upright in shelf (min. 10 cm ground clearance) or in sets one upon the other on wooden gratings.

On removed tires, put tubes into tires lightly inflated and dusted with talcum, make sure that tires are not coming into contact with gasoline, oil or technical greases.

Apply safety rules as a protection against fire!

If vehicles are converted to a different tire size than the one ex factory, pay attention to national laws and regulations prior to conversion.

For tube type tires use only new tubes of the same make and specified designation.

For tubeless tires, insert valves of specified version into rims (refer to 40–120).
When renewing a tire, also exchange rubber valve as a safety measure. Prior to inserting the new rubber valve, clean contact surfaces on rim. If required, de-rust surfaces and re-paint.

Screw only metal or rigid plastic valve caps with rubber sealing rings, part no. 007757 008600, on valves.

Tire designation

1 Tire designation

Example: 195/70 R 14 90 H[1])

Identification for nominal width of tire in mm

Designation for tires of series 70
(cross section ratio height: width 70 %)

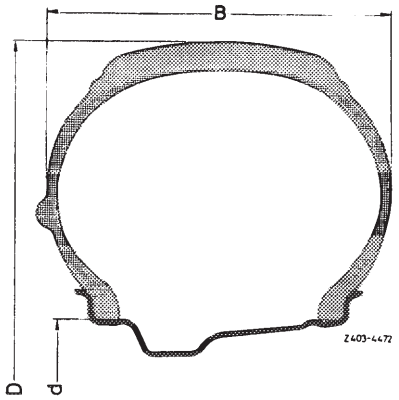
Code letter for belted tires in radial type

Rim dia. in inches

Code number for load carrying capacity of tire

Code letter for max. speed up to 210 km/h

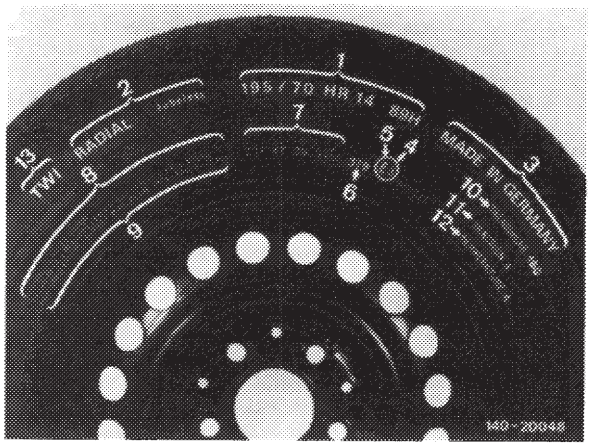
[1]) For designation of tires according to ECE-regulation no. 30 (starting 1978), with the exception of VR-version tires, the operational identification, that is, the code letter for the permissible max. speed and the code number for load carrying capacity is named following the tire designation. The former designation of tire was 195/70 HR 14 or as a temporary designation 195/70 HR 14 90 H.



B = Nominal width of tire in mm
D = Tire OD
d = Rim dia. in inches

2 Additional tire designations

Radial	=	designation for belted tires
tube-type	=	tube-type tires or assembly with tube
tubeless	=	tubeless version tires
M + S	=	mud and snow tires



3 Indication of manufacturing country

4 Country code number for licence number

Example:
3 = Italy, 1 = Germany, 2 = France.
0132239 = registration number for type or model test

5 Europe licence number

E = Europe

6 Production date code number

The 3-digit code or production code number is at end of letter and number sequence beginning with DOT and located in bead range of outer tire flanc.

Number 1 and 2 = production week
Number 3 = last digit of production year

7 (USA) **licence number**

DOT = Certificate of Department of Transportation

XT = Manufacturer's code

J9 = Size code

XKNC = Type or version code

8 (USA) **identification for tire understructure**

Example:
SIDEWALL 2 PLIES RAYON = Sidewall of carcass comprises 2 layers rayon cord.

TREAD AREA 2 PLIES RAYON + 2 PLIES STEEL + 1 PLY NYLON = Tread zone has 2 layers rayon cord of carcass and 2 layers steel cord + 1 layer Nylon of belt.

9 (USA) **identifications for max. wheel load and max. air pressure**

Example:
MAX. LOAD RATING 1340 LBS =
max. permissible wheel load 1340 pounds
MAX. PERM. INFL. PRESS 36 PSI =
Max. permissible air pressure 36 pounds per square inch

10 (USA) **identification for tread wear**

TREAD WEAR 160 = Wear code number in % as compared with an average US comparison tire.

11 (USA) identification for anti-skid properties

TRACTION A = Identification for deceleration on wet asphalt and concrete.

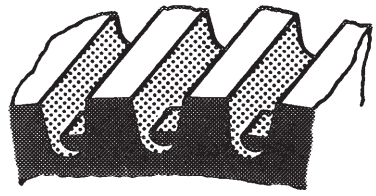
12 (USA) identification for temperature stress

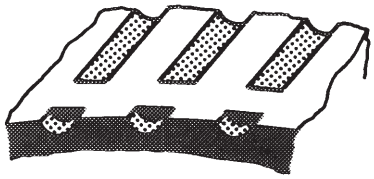
TEMPERATURE A = Identification for temperature behavior during fast dynamometer run

13 Tire wear limit

The wear limit of 1.6 mm for tire tread specified for USA and lately for other countries has already been indicated for a number of years by the "TWI" tread wear indicator on tire.

These humps are 1.6 mm high and embedded in base of tread at 6 points of circumference and will show up as cross stripes on tread when the wear limit is attained.





1404-6058

Permissible max. speed for passenger car belted tires (radial)

Code letter Q up to 160 km/h
Code letter R up to 170 km/h
Code letter S up to 180 km/h
Code letter T up to 190 km/h
Code letter H up to 210 km/h
Code letter V above 210 km/h

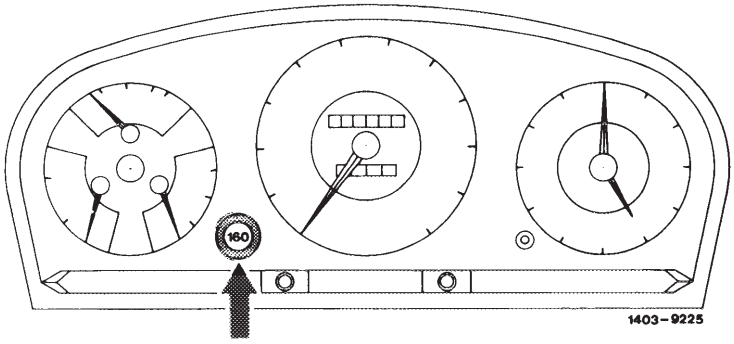
Sticker for M + S tires

Regulations in the Federal Republic of Germany are specifying that the legally permitted maximum speed for M + S tires "should be clearly displayed within view of driver", if the max. speed permitted for M + S tires is **below** the max. speed of the vehicle (refer to vehicle documents).

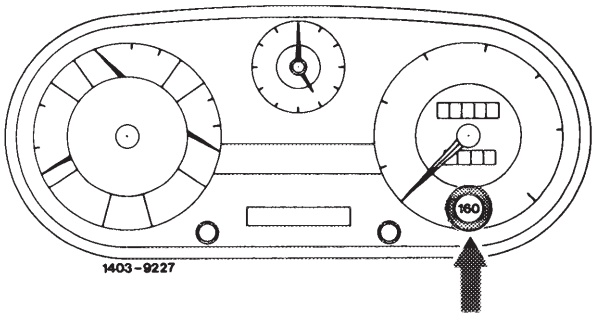
This sticker may be attached to the spot specified for this purpose only. On models 123 and 126 do not place this sticker on glass of instrument cluster, since this glass may be damaged when the residual glue is removed (plexiglass).

Sticker for M + S tire version
Q = up to 160 km/h

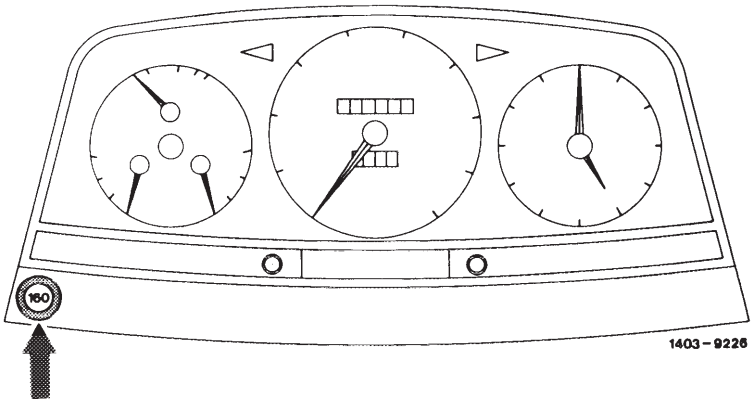
Sticker for M + S tire version
T = up to 190 km/h



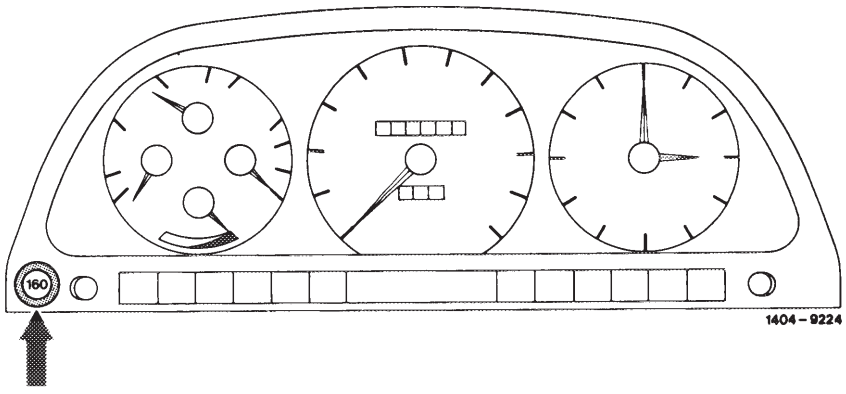
Models 107, 116



Models 114, 115

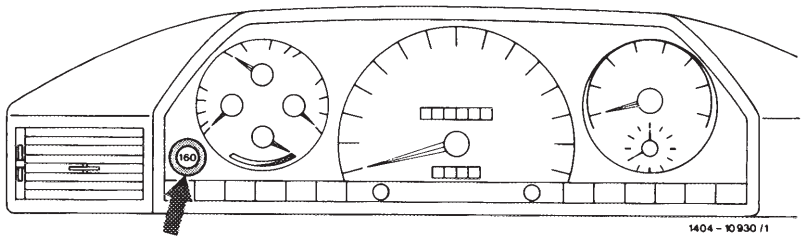


Model 123



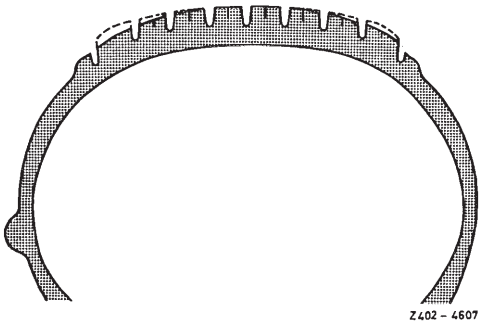
Model 126

Model 201



Tire wear

When evaluating tire wear patterns proceed as follows:



Front axle

On front wheels, a slightly higher wear of tire shoulders as compared with center of thread is normal, while the wear on tire shoulder facing the road center (e. g. with righthand traffic on outside of lefthand wheel, on inside of righthand wheel) may be more distinctive.

Causes of increased tire wear

1. Not enough inflation pressure, influencing both outer and inner shoulder to the same extent.

2. Predominantly city or highway driving, as well as sports style driving. The habit of driving around sharp bends while decelerating may lead to increased shoulder wear. Wear occurs mostly on outer shoulders, with righthand traffic particularly more clearly at lefthand front wheel.

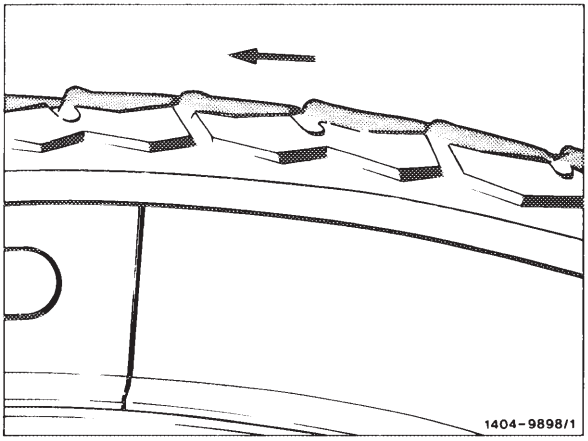
3. Deviations of toe-in. Even minor deviations beyond normal tolerance range may lead to increased wear on tire shoulders, particularly on white tires (starting with series 70) each time on both wheels. At insufficient toe-in, increased wear will show up on inner shoulders or at increased toe-in on outer shoulders. In the event of toe-in deviations, which are clearly exceeding the tolerance limits, the wear may extend from tire shoulder almost to center of tread, in which case the tread may be slightly roughened.

If deviations of pivot point position from nominal value are too high, increased shoulder wear may occur on both wheels as well as on one wheel only, since changes of toe-in during deflection will be too high. A pivot point which, for example, is substantially too low will lead to an increased change of track in minus direction during downstroke, while a pivot point which is substantially too high will lead too early to a change of track in minus direction during upstroke.

If the track difference angle deviates too much, an unfavorable wheel position may result in influences which lead to increased shoulder wear.

4. In depencence of tire version and tire tread, the wear on shoulders, predominantly outside, may have a saw-toothed shape. This wear pattern is particularly distinctive on tires with a shoulder zone open in outward direction, e. g. sports style summer tires and M + S tires.

Saw tooth-shaped wear occurs predominantly on front axle, but to a lesser degree also on rear axle.



Saw tooth-shaped wear on front wheel tires

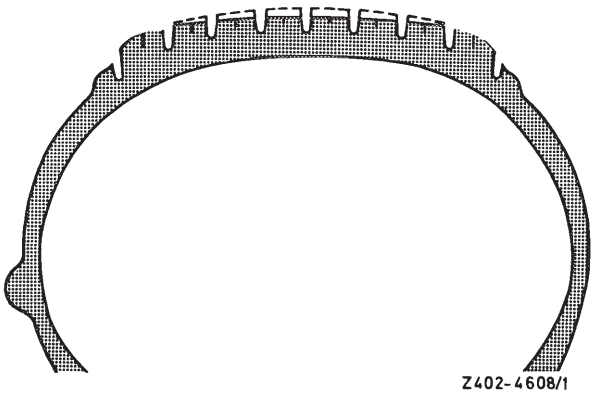
Rear axle

On rear wheels, wear is normally distributed across entire tire tread surface, but may be slightly higher in tread center than at the shoulders.

Causes of increased wear

1. Depending on load of vehicle rear end (on vehicles without level compensation increased minus camber at high load) wear on inner side of tread is higher than on outer side.

2. If toe-in is wrong, the same applies as explained in section "front axle".

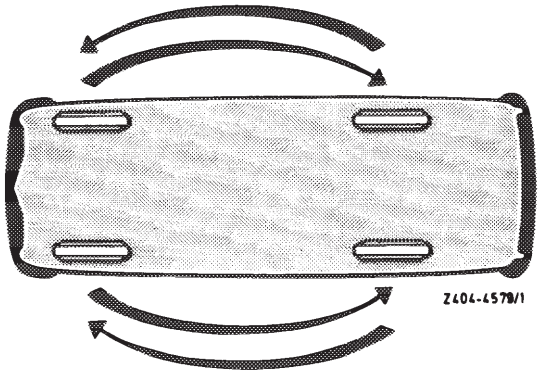


Rotation (switching) of wheels

Summer tires and winter tires (M + S):

For max. mileage while simultaneously maintaining good driving characteristics.

Rotate (switch) wheels depending on tire wear (that is, between 5000 and 10,000 km as shown by experience) while keeping driving direction of wheels the same.



However, the wheels should be rotated (switched) prior to attaining a distinctive, characteristic wear pattern, since otherwise driving characteristics will turn to the worse. Optimal driving characteristics, in turn, can be obtained only if the wheels are left in their position or are rotated (switched) at very short intervals (mileage).

Rebalancing of wheels may be required depending on driving style, wear pattern and condition of tires.

Upon rotation (switching) of wheels, make sure of correct tire inflation pressure.

Note

The tire inflation pressure specified by vehicle manufacturer is determined in accordance with the following criteria:

1. Consideration of axle loads on vehicle under influence of full load.

2. Consideration of attainable max. speed of respective vehicle.

3. Good driving characteristics, also for sports-style driving.

4. Satisfactory driving comfort.

5. Favorable tire wear pattern.

A wrong tire inflation pressure, particularly when the air pressure is too low, will influence the driving characteristics and the life of the tires depending on extent of deviation from specified value, and will also lead to an additional, higher fuel consumption.

If the tire inflation pressure is too low, flexing and thereby excessive heating will increase. The understructure of such a tire will lose its compactness. The results: tread and belt will come loose. Depending on size of reduced inflation pressure and driven speeds, the life of the tire will become shorter, while even short-term "inflation pressure sins" may lead to permanent damage.

On the other hand, a tire inflation pressure which is essentially too high (higher than the values named for fast driving or for max. loads) incorporates the disadvantages of a high loss in comfort, while the smaller tire road contact area results in a worsening of driving characteristics and on a wet road also in a higher trend toward aquaplaning.

Notes concerning tire inflation pressure checkup

1. Check inflation pressure of tubeless tires every two weeks.

On tube-type tires, checking inflation pressure once a week will be of advantage.

2. Measure inflation pressure as much as possible when tires are cold, while taking the respective outside temperature into account. Here, approx. 10 °C are equal to an air pressure change by 0.1 bar.

Example 1

The specified air pressure is valid if the temperature of the tires is in accordance with outside temperature.

Example 2

If the temperature of the tires is equal to room temperature (ambient temperature) e. g. + 20 °C, and the outside temperature amounts to approx. 0 °C, the tire inflation pressure must be set 0.2 bar higher than the specified air pressure.

3. If the inflation pressure is measured on warm tire, an increase up to 0.5 bar must be taken into consideration depending on extent of heating up caused for example by fast driving on a highway, by hot weather or by exposure to sunshine. Following normal driving, the increase in air pressure will amount to approx. 02. bar.