

Hinterachse

Rear axle
Essieu arrière
Asse posteriore
Eje trasero
Bakaxel
Achteras

33 Rear Axle

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Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A *)
33 00 . . . Rear axle, general		
Track in normal-load position ¹⁾	mm (in)	1384 (54.49)
at max. permissible axle load	mm (in)	1396 (54.96)
Body height (lower edge of wheel cutout to rim shoulder) in normal-load position		
– corresponding average value	mm (in)	492 ± 8 (19.37 ± 0.3)
– value at unladen weight	mm (in)	515 ± 10 (20.28 ± 0.4)
Suspension bump travel (at wheel)	mm (in)	530 ± 10 (20.87 ± 0.4)
Suspension rebound travel (at wheel)	mm (in)	100 (3.93)
33 10 . . . Final drive (with or without limited-slip differential)	mm (in)	130 (5.12)
Pattern	Short-neck	
Oil grade (SAE 90 brand-name hypoid gear oil)	Approved oils from list in Service Information Group 33 (Rear axle)	
Oil content – when initially filled	Imp. pint US quart	0.95 1.67 1.0
– at oil change	Imp. pint US quart	0.90 1.58 0.95 or to overflow point at oil filler orifice

*) Version for Sweden

1) Normal-load position: 2 × 68 kg (2 × 150 lb) on front seats, 1 × 68 kg (1 × 150 lb) on rear seat, 21 kg (46 lb) in luggage compartment, tank full

Rear axle

Specifications

Model	320/6 320/6 A	323 i 323 i A *)
33 10 . . . Final drive (with or without limited-slip differential) – (continued)		
Identification for ratio on final drive housing (units with limited-slip differential are stamped in addition with an "S")		
Color code identification on top or final drive housing (units with limited-slip differential are marked in addition with an "S")	Paint spot yellow ¹⁾	brown ²⁾
33 12 . . . Crown wheel and pinion (final drive with or without limited-slip differential)		
Tooth pattern	Klingelberg or Gleason	
Identification code for crown wheel and pinion	K 9 H 9	K 41 H 41

*) Version for Sweden

1) previously: green

2) previously: white

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A *)
33 12 . . . Crown wheel and pinion (final drive with or without limited-slip differential) – (continued)		
Number of teeth	Klingelnberg	40 : 11
	Gleason	40 : 11
Final drive ratio	Klingelnberg	3.64 : 1
	Gleason	3.64 : 1
Tooth backlash	mm (in)	0.06 . . . 0.11 (0.0024 . . . 0.0043)
Crown wheel installation temperature	°C (°F)	80 . . . 100 (176 . . . 212)
Taper roller bearing installation		cold
Input bevel pinion bearing friction at pinion turning speed 50 1/min.		
– without shaft sealing ring	Ncm (kpcm)	150 . . . max. 320 (15 . . . max. 32)
– with shaft sealing ring	Ncm (kpcm)	170 . . . max. 340 (17 . . . max. 34)

*) Version for Sweden

Specifications

Rear axle		
Model		323 i 323 i A *)
320/6 320/6 A		
33 12 ... Crown wheel and pinion (unit with or without limited-slip differential) – continued		
Total friction moment in crown wheel and pinion bearings – with shaft sealing ring = higher than friction moment of input bevel pinion bearings by ... Ncm (kpcm)		
		50 ... 70 (5 ... 7)
33 13 ... Differential		
Clearance between cup spring/and shim washer and output shaft to rear wheel	mm (in)	0.03 ... 0.10 (0.0012 ... 0.0039)

*) Version for Sweden

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A*)
33 14 . . . Additional details for limited-slip differential		
Make/designation	ZF DL - 175	
Locking factor (pre-loaded, and with molybdenum-coated inner plates)	%	25
Indication of locking factor on plate-type limited-slip differential housing		S 25
Slip moment with one rear wheel output shaft held and the other driven	Nm kpm lb.ft	30 . . . 50 3 . . . 5 22 . . . 37
Outer plate thickness (optional)	mm (in)	1.9/2.0/2.1 (0.0075/0.0079/0.0083)
Inner plate thickness	mm (in)	2.0 (0.079)
33 21 . . . Half-shafts		
Pattern	with homokinetic joint	
Grease packing per joint (correct grease contained in "Flexible gaiter" repair pack)	g (oz)	80 (2.82)

*) Version for Sweden

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A*)
33 21 . . . Half-shafts – (continued)		
Adhesive for flexible gaiter	Bostik 475	
Sealant for end cap and dust cup	Curil K	
33 41 . . . Wheel bearings		
Inner ball bearing	62/30 C 3	
Outer ball bearing	6206 C 3	
Wheel bearing axial play	mm (in)	0.05 . . . 0.10 (0.002 . . . 0.004)
Quantity of wheel bearing grease per wheel ²⁾	g (oz)	app. 35 (1.24) ¹⁾
Grease grade	see Service Information	
33 52 . . . Shock absorbers (standard version) ³⁾		
Make and number (stamped on)	Boge 33 52 1 120 694	Boge 33 52 1 120 695

*) Version for Sweden

1) plus app. 5 g (0.18 oz) for sealing rings

2) if wheel bearings have to be regreased, always renew entire grease content

3) Use only shock absorbers of the same make and pattern on any axle

Specifications

Rear axle

Model	320/6 320/6 A		323 i 323 i A*)	
33 52 . . . Shock absorbers (standard version) ¹⁾ (continued)				
Shock absorber testing ²⁾				
Test values for shock absorbers				
No. 33 53 1 120 694				
Speed of rotation 1/min				
Stroke	mm (in)	10	25	50
		100 (3.94)	100 (3.94)	100 (3.94)
Traction phase	kp	14.3	34.6 ± 4.1	93.8
				106
	N	140	340 ± 40	920
				1040
	lb.ft.	31.5	76.3 ± 9.0	207
				234
New condition				
				100
				100 (3.94)
				117 ± 9.2
				148.8
				1150 ± 90
				1460
				258 ± 20
				328
Compression				
phase	kp	13.2	16.3 ± 4.1	28.5
				42.8
	N	130	160 ± 40	280
				420
	lb.ft.	29	36 ± 9	63
				94
New condition				
				100
				62.2 ± 5.1
				106
Test values for shock absorbers				
No. 33 52 1 120 695				
Speed of rotation1/min				
Stroke	mm (in)	10	25	50
		100 (3.94)	100 (3.94)	100 (3.94)
Traction phase	kp	14.3	39.8 ± 5.1	102
				110
	N	140	390 ± 50	1000
				1080
	lb.ft.	31.5	88 ± 11	225
				243
New condition				
				100
				100 (3.94)
				118.2 ± 9.2
				146.8
				1160 ± 90
				1440
				261 ± 20
				324
Compression				
phase	kp	12.2	18.3 ± 4.1	33.6
				53
	N	120	180 ± 40	330
				520
	lb.ft.	27	40 ± 9	74
				117
				139 ± 11
				211

*) Version for Sweden

1) Use only shock absorbers of the same make and pattern on any axle

2) If shock absorber fails to reach test specification by more than 50 %, renew both shock absorbers on the affected axle

Rear axle

Specifications		
Rear axle		
Model	320/6 320/6 A	323 i 323 i A *)
33 52 . . . Shock absorbers (special equipment) ^{1,2)}		
Make and part number (stamped on) for HD suspension (arduous operating conditions) ³⁾ for trailer towing ⁴⁾	Boge 33 52 1 119 079 Boge 33 52 1 119 079	
Shock absorber test ⁵⁾ – special equipment – Test values for shock absorbers No. 33 52 1 119 079	New condition	100
Speed of rotation ¹⁾ /min	25	
Stroke mm (in)	100 (3.94)	100 (3.94)
Traction phase kp	47.4 ± 4.1	124.3 ± 10.2
N	465 ± 40	1219 ± 100
lb.ft.	104 ± 9	274 ± 22
Compression phase kp	24.8 ± 4.1	67.8 ± 6.1
N	243 ± 40	665 ± 60
lb.ft.	55 ± 9	149.5 ± 13.5

*) Version for Sweden

1) Use only shock absorbers of the same make and type on any axle

2) See also Group 31 (Front axle)

3) Permitted for HD suspension only if front axle is also converted (see Group 31, Front axle)

4) For trailer operation, installation required on rear axle only

5) If shock absorbers fail to meet test specifications by more than 50%, renew both shock absorbers on the affected axle

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A *)
33 53 . . . Coil springs (standard version) ¹⁾		
Part number (shown at end of spring)	33 53 1 118 814	33 53 1 121 138
Length, relaxed	mm (in) 334 -10 (13.15 -0.39)	337 +18 (13.27 +0.71) -10 (13.27 -0.39)
Extl. diameter of spring	mm (in) 100.85 (3.97)	101 (3.98)
Wire thickness	mm (in) 10.85 (0.427)	11 (0.433)
Number of turns	9.5	9.5
Number of effective turns	8	8
Pitch, relaxed	mm (in) 37.72 (1.485)	38.12 (1.501)
General color code (paint stripe on 3 turns)	1 × yellow	1 × grey
Coil spring rating (color code by paint stripes on 2 turns)	1 × red or none	1 × red or none

*) Version for Sweden

¹⁾ Use only coil springs of same length and rating on any axle

Specifications

Rear axle

Model	320/6 320/6 A		323 i 323 i A *)
33 53 . . . Coil springs (standard version) ¹⁾ – (continued)			
Spring rating color codes	red	N	
		kp	2844 . . . 2942
		lb.ft.	290 . . . 300
	none	N	639 . . . 661
		kp	2943 . . . 3050
Spring underlay (damping ring) for top of coil spring, spring rating	red	N	301 . . . 311
		kp	661 . . . 685
		lb.ft.	
	none	No.	1 114 966
		mm (in)	20 (0.79) ²⁾
Spring underlay (damping ring) for bottom of spring	none	No.	1 114 966
		mm (in)	20 (0.79) ²⁾
		No.	1 114 966
	26 (1.02) ²⁾	20 (0.79) ²⁾	1 114 966
		20 (0.79) ²⁾	1 114 966

*) Version for Sweden

1) Use only coil springs of the same length and rating on any axle

2) Height setting: see also Item 33 53 000 (Removing and installing rear coil springs)

Specifications

Rear axle			
Model		320/6 320/6 A	323 i 323 i A *)
33 53 .. Coil springs (special equipment) ¹⁾			
Part number, shown at end of coil spring – for HD suspension ²⁾ under arduous working conditions			
for trailer towing ³⁾		33 53 1 117 472	
Length, relaxed	mm (in)	33 53 1 117 472 347 + 18 (13.66 + 0.71) – 10 (– 0.39)	
Extl. diameter of spring	mm (in)	101.3 ± 1.5 (3.99 ± 0.06)	
Wire thickness	mm (in)	11.3 (0.44)	
Total number of turns		10	
Number of effective turns		8.5	
Pitch, relaxed	mm (in)	37 (1.46)	

*) Version for Sweden

1) Use only coil springs of the same length and rating on any axle

2) Permitted for HD suspension only if front axle is also converted (see Group 31, Front axle)

3) Required only on rear axle for trailer operation

Rear axle

Specifications

Model	320/6 320/6 A	323 i 323 i A *)
33 53 . . . Coil springs (special equipment) (continued)		
General color code (paint stripe on all turns)	1 × blue	
Spring rating color code (paint stripes on 2 turns)	1 × red, white or green	
Spring rate color codes	red	N 2726 . . . 2804 kp 278 . . . 285 lb.ft 613 . . . 630
	white	N 2805 . . . 2883 kp 286 . . . 294 lb.ft 630 . . . 648
	green	N 2884 . . . 2962 kp 295 . . . 302 lb.ft 648 . . . 666
33 53 . . . Auxiliary springs (bump stops)		
Length	mm (in)	80 (3.15)
Diameter	mm (in)	45 (1.77)
33 55 . . . Stabilizer (anti-roll bar) – standard version –		
Diameter	mm (in)	16 (0.63)
*) Version for Sweden		
		17 (0.67)

Specifications

Rear axle			
Model		320/6 320/6 A	323 i 323 i A *)
Tightening torques			
33 10 . . . Final drive (with or without limited-slip differential)			
Final drive to rear axle beam (M 12 × 1.5 mm)	Nm kpm lb.ft		81 . . . 90 8.3 . . . 9.2 60 . . . 66
Self-aligning strut at final drive (M 12 × 1.5 mm)			
	Nm kpm lb.ft		81 . . . 90 8.3 . . . 9.2 60 . . . 66
Final drive with self-aligning strut to body (M 12 × 1.5 mm)			
	Nm kpm lb.ft		81 . . . 90 8.3 . . . 9.2 60 . . . 66
33 11 . . . Final drive casing with cover (with or without limited-slip differential)			
Large cover on final drive casing (M 10)	Nm kpm lb.ft		43 . . . 48 4.4 . . . 4.9 32 . . . 35

*) Version for Sweden

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A*)
Tightening torques – (continued)		
33 11 . . . Final drive casing with cover (with or without limited slip differential) (continued)		
Side bearing cover on final drive casing (M 8)	Nm kpm lb.ft	22 . . . 24 ¹⁾ 2,4 . . . 2,4 ¹⁾ 16 . . . 18 ¹⁾
Oil filler and drain plugs (M 22 × 1.5 mm)	Nm kpm lb.ft	50 . . . 60 5,1 . . . 6,1 37 . . . 44
33 12 . . . Crown wheel and pinion (unit with or without limited-slip differential)		
Flange at input bevel pinion, min.	Nm kpm lb.ft	150 15,3 111
Crown wheel to differential casing ²⁾ (M 10)	Nm kpm lb.ft	85 . . . 100 8,7 . . . 10,2 63 . . . 74

*) Version for Sweden

1) previously 20 . . . 24 Nm (2.0 . . . 2.4 kpm, 15 . . . 18 lb.ft) with 4 retaining bolts

2) Insert screws with Loctite Type 270

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A *)
Tightening torques – (continued)		
3321 ... Half-shafts		
Half-shaft to rear wheel drive shaft (M 8 machine screws)	Nm kpm lb.ft	33 ... 36 3.4 ... 3.7 24 ... 27
Half-shaft to final drive output flange (M 8 machine screws)	Nm kpm lb.ft	33 ... 36 3.3 ... 3.7 24 ... 27
3331 ... Rear axle beam		
Rear axle beam with rubber mounting to body floor (M 14× 1.5 mm)	Nm kpm lb.ft	140 ... 155 14.3 ... 15.8 103 ... 114
Rubber mounting to rear axle beam (M 10)	Nm kpm lb.ft	81 ... 90 8.3 ... 9.2 60 ... 66

*) Version for Sweden

Specifications

Rear axle

Model	320/6 320/6 A	323 i 323 i A *)
Tightening torques (continued)		
33 32 . . . Semi-trailing arms and struts		
Semi-trailing arm to rear axle beam (M 12 × 1.5) ¹⁾	Nm	81 . . . 90
	kpm	8.3 . . . 9.2
	lb.ft	60 . . . 66
Support angle to body floor (M 8)	Nm	22 . . . 24 ²⁾
	kpm	2.2 . . . 2.4 ²⁾
	lb.ft	16 . . . 18 ²⁾
33 41 . . . Wheel bearings		
Drive flange at rear wheel shaft (castellated nut with shoulder)	Nm	400 . . . 470
	kpm	40.8 . . . 47.9
	lb.ft	295 . . . 347
33 52 . . . Shock absorbers		
Spring-damper strut to semi- trailing arm ¹⁾ (M 10)	Nm	49 . . . 54
	kpm	5.0 . . . 5.5
	lb.ft	36 . . . 40

*) Version for Sweden

1) In normal-load position: 2 × 68 kg (2 × 150 lb) on front seats, 1 × 68 kg (1 × 150 lb) on rear seat, 21 kg (46 lb) in luggage compartment, tank full

2) 24 . . . 26 Nm (2.4 . . . 2.6 kpm, 18 . . . 19 lb.ft) on 320/320 A

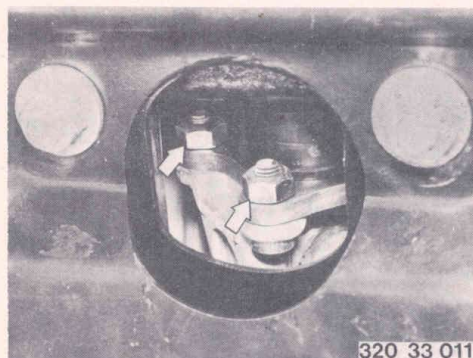
Specifications

Rear axle			
Model		320/6 320/6 A	323 i 323 i A *)
33 52 . . . Shock absorbers (continued)			
Spring-damper strut to body (wheel arch)	Nm kpm lb.ft		25 . . . 28 2.5 . . . 2.9 18 . . . 21
Pivot joint plate to damper piston rod (M 10 × 1 mm)	Nm kpm lb.ft		10 . . . 15 1.0 . . . 1.5 7 . . . 11
33 55 . . . Stabilizer (anti-roll bar)			
Stabilizer to rear axle beam (M 8)	Nm kpm lb.ft		22 . . . 24 2.2 . . . 2.4 16 . . . 18
Stabilizer to semi-trailing arm (M 8 locknut)	Nm kpm lb.ft		22 . . . 24 2.2 . . . 2.4 16 . . . 18
*) Version for Sweden			

33 10 010 Final drive – removing and installing

Detach propeller shaft.

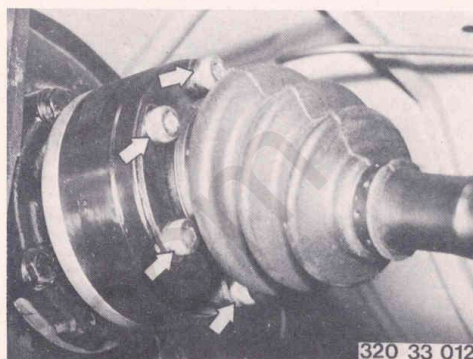
When installing: note tightening torque¹⁾.



320 33 011

Detach half shafts and tie up.

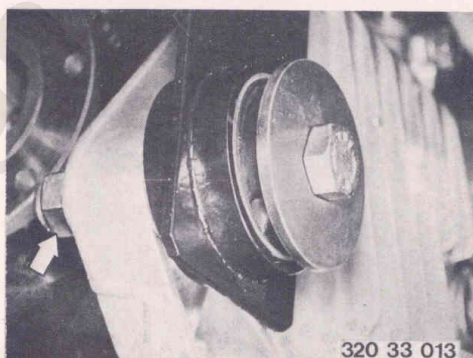
When installing: note tightening torque¹⁾.



320 33 012

Detach the self-aligning support from the final drive.

When installing: Use a new self-locking nut. Note correct tightening torque¹⁾.

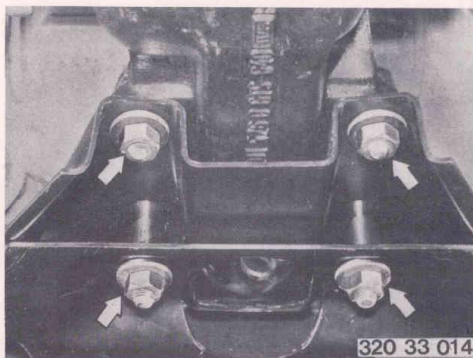


320 33 013

Detach and remove the final drive at the rear axle beam.

When installing: Mount final drive free from stresses.

Note correct tightening torque¹⁾.



320 33 014

¹⁾ See specifications

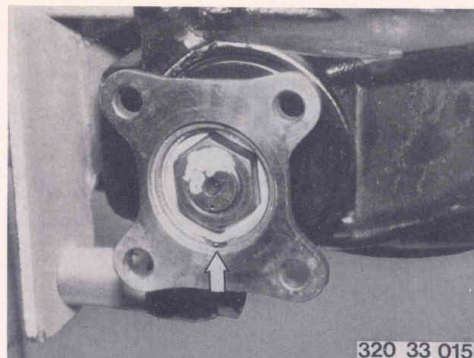
33 11 011 Final drive flange shaft seal – renewing
 – with removal and installation of bevel drive pinion –

Remove and install complete differential housing – 33 13 010 or 33 14 010.

Remove lockplate.

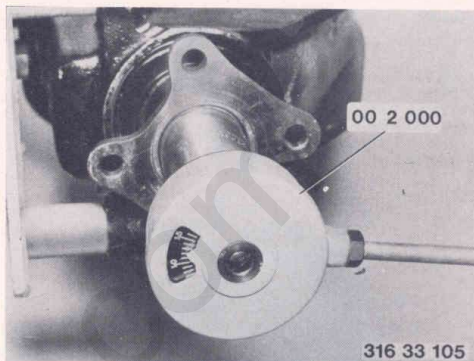
Mark installed position of drive flange with a centerpunch mark.

When installing: Lock collar nut in groove of drive flange with a new lockplate.



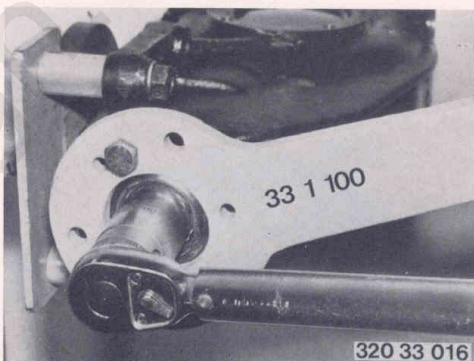
Measure and note friction with special tool 00 2 000.

For example: 120 Ncm / 12 kpcm.



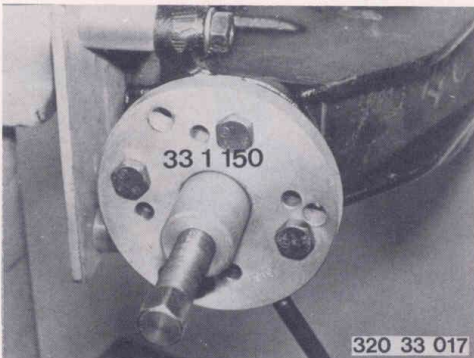
Hold drive flange with special tool 33 1 100 and remove collar nut.

When installing: note tightening torque¹⁾.

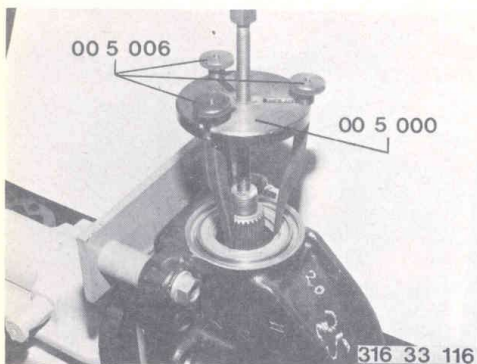


Pull off drive flange with special tool 33 1 150.

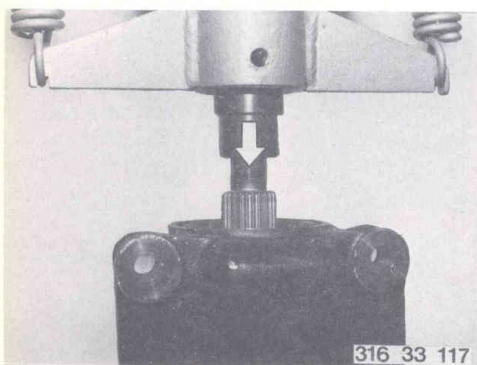
When installing: check shaft seal bearing surface on drive flange. Renew shafts with a seriously worn bearing surface.



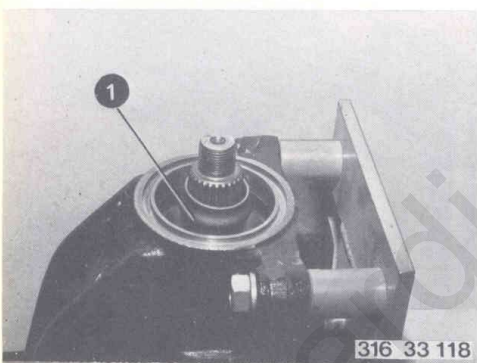
¹⁾ See specifications



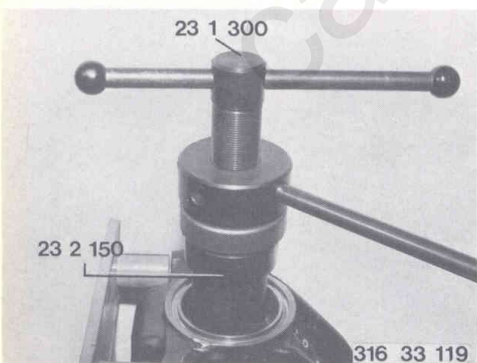
Extract shaft sealing ring with puller 00 5 000 in conjunction with new claws 00 5 006.



**Press out the input bevel pinion.
Remove the taper roller bearing and the old tensioning bushing.**



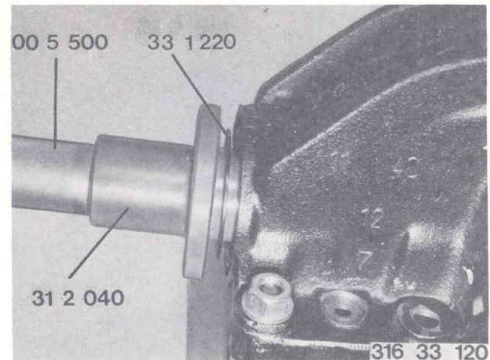
When installing: insert the input bevel pinion and install the new dowel sleeve (1) from the top.



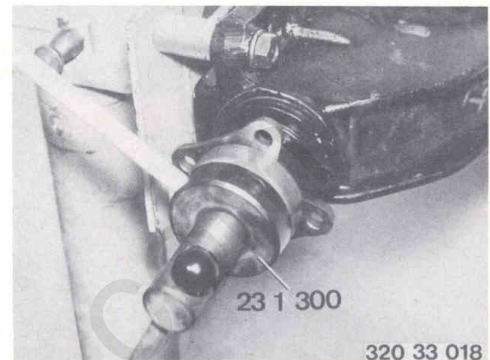
When installing: pull the front taper roller bearing on to the input bevel pinion with special tool 23 1 300 in conjunction with sleeve 23 2 150.

Warning: if the taper roller bearing is heated in an oilbath, do not attempt bearing adjustment and measurement of friction until the taper roller bearing has cooled down completely.

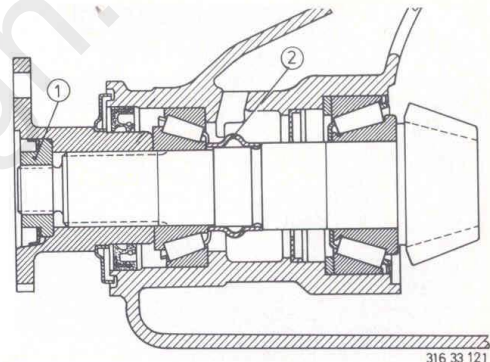
When installing: immerse the shaft sealing ring in final drive gear oil and drive in flush using hollow drift 31 2 040 in conjunction with handle 00 5 500 and disc 33 1 220.



Press the input flange on to the input bevel pinion with tool 23 1 300, noting the marks on the input flange and pinion. Tighten the shouldered nut.



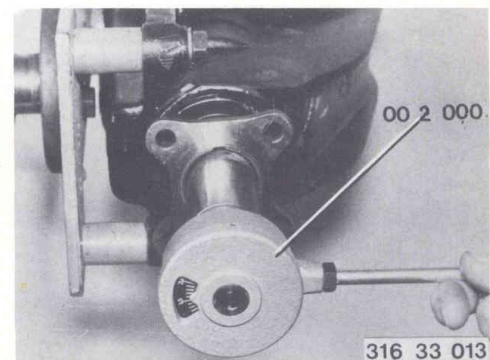
Warning: the shouldered nut must be tightened to at least a torque of 150 Nm (15 kpm, 111 lb. ft.). If this value is not reached or the friction moment – see example – exceeded, the tensioning bushing (2) must be renewed and the measurement repeated.



Adjust the input bevel pinion to the friction moment determined before dismantling, plus 20 Ncm (2 kpcm) for the new shaft sealing ring.
Example:

Friction moment before stripping	120 Ncm (12 kpcm)
New shaft sealing ring	+ 20 Ncm (2 kpcm)

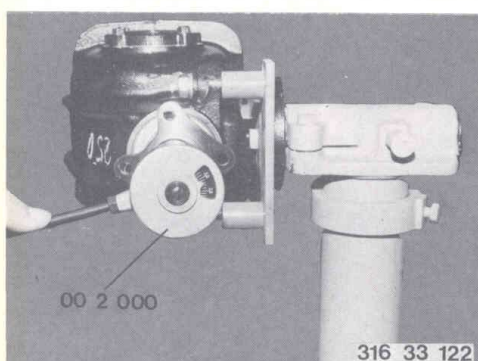
Adjust input bevel pinion to	140 Ncm (14 kpcm)
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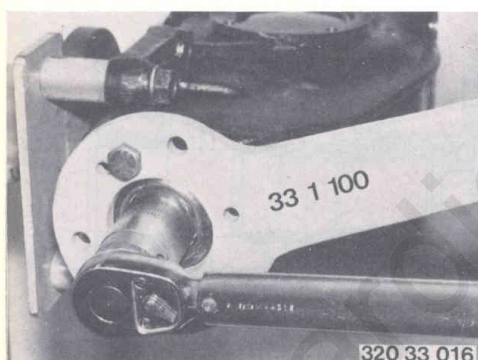


33 11 021 Final drive flange shaft seal – renewing
 – without removal and installation of drive pinion –

Remove and install final drive – 33 10 010.
 Drain oil.
 Mount final drive on special tool 33 1 040 after removing oil drain plug (1).
 When installing: add oil¹⁾.



Remove lockplate.
 Measure total friction with special tool 00 2 000 and note value, e.g. 220 Ncm or 22 kpcm.
Important: This measured total friction plus the friction for the new shaft seal must be reached when assembled, but not exceeded.



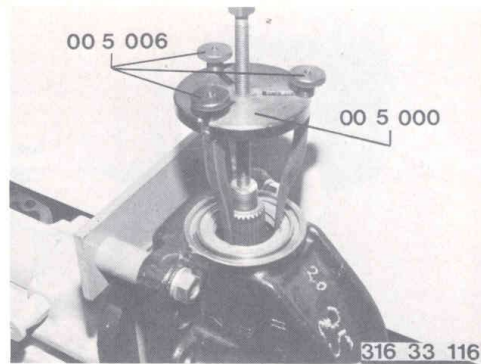
Mark position of drive flange and collar nut to pinion. Hold drive flange with special tool 33 1 100 and loosen collar nut.
 When installing: note tightening torque¹⁾.



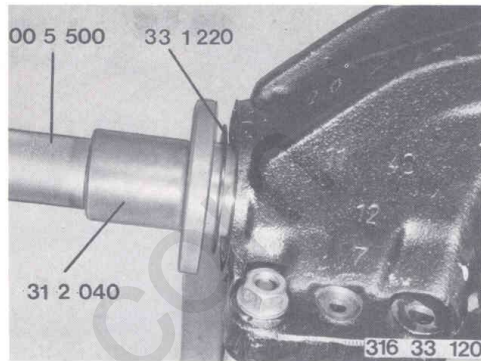
Pull off drive flange with special tool 33 1 150.
 When installing: check bearing surface of shaft seal on input flange.
 Renew a drive or input flange with a seriously worn bearing surface.

¹⁾ See specifications

Pull out shaft seal with special tools 00 5 000 and 00 5 006.

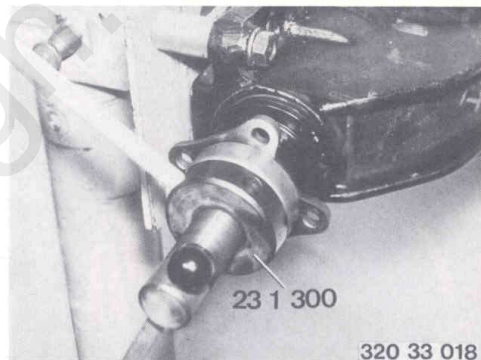


When installing: Dip shaft seal in final drive gear oil and drive it in flush with the housing, using special tools 31 2 040, 33 1 220 and 00 5 000.



Important! Note marks on drive flange and pinion.

Press drive flange on to bevel pinion with special tool 23 1 300.

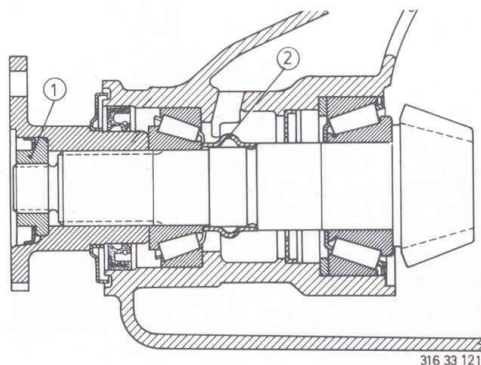


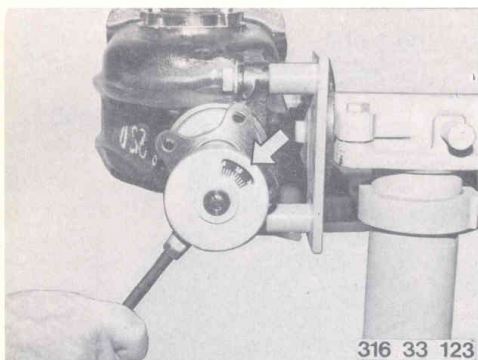
Tighten collar nut up to punch mark.

Important: Collar nut (1) must be tightened to at least 150 Nm (15 kpm, 108 ft.lb).

If 150 Nm (15 kpm, 108 ft.lb) are not reached or the new total friction value is exceeded, replace bushing (2) and repeat measuring procedure.

Secure collar nut with a new lockplate.





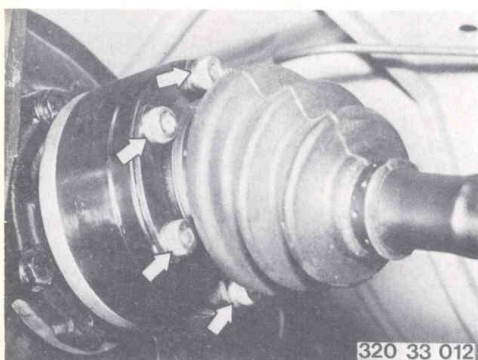
Determine the new total friction moment.

Example:

Total friction moment before stripping down 220 Ncm (22 kpcm)

Friction moment for new shaft sealing ring + 20 Ncm (2 kpcm)

New total friction moment
240 Ncm (24 kpcm)

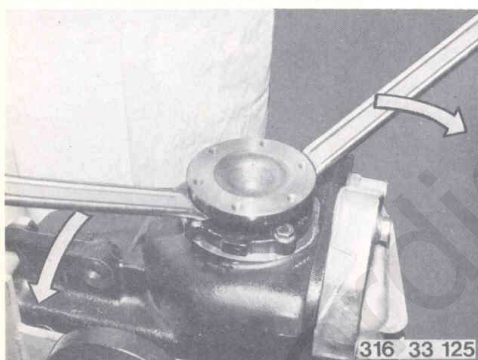


33 11 091 Driving flange – renewing

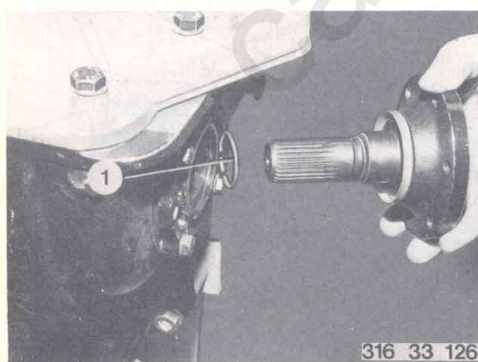
Important note: the method of attachment of the driving flanges has been modified. The earlier version used an internal keeper; the new version has a round-section wire snap ring.

A) New version (bearing cap retained with 6 bolts) – also for limited-slip differential. Detach the halfshaft.

When installing: note correct tightening torque¹⁾.



Press off the driving flange with a tire lever.



When installing: before the driving flange is installed, wire snap ring (1) must be placed in the groove in the differential housing with both ends recessed into the groove. This prevents the ring from flexing sideways. Press the driving flange in by hand, turning slightly, until the snap ring is heard to engage. Renew stretched snap rings.

¹⁾ See specifications

B) Earlier version (bearing cap retained by 4 bolts):

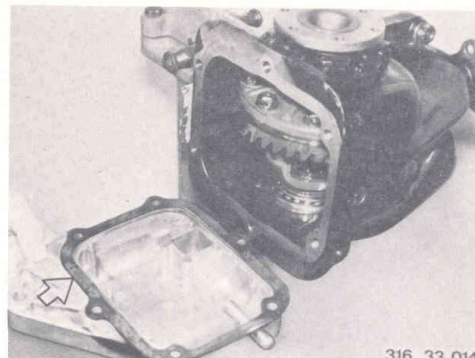
**Remove and install the final drive – 33 10 010.
Drain the oil.**

**Attach the final drive to mounting stirrup
33 1 040.**

Take off the housing cover.

When installing: renew gasket. Add oil¹⁾.

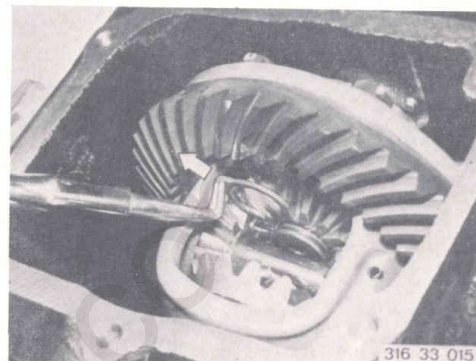
Note correct tightening torque¹⁾.



**Pull out the driving flange keepers with
cranked Seeger circlip pliers.**

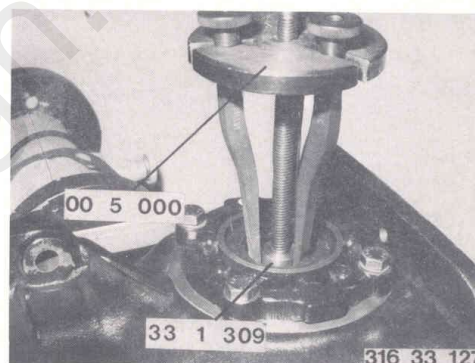
Take off the driving flanges.

*When installing: make sure the circlips are
correctly seated.*



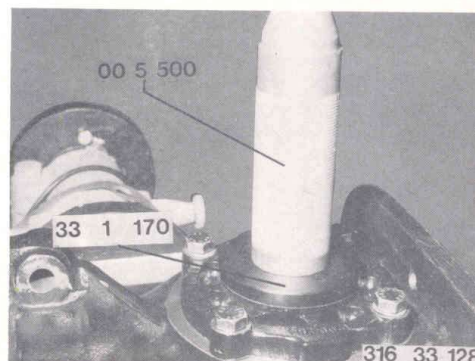
33 11 151 Driving flange shaft sealing ring – renewing

**Remove and install the driving flange – see job
33 11 091. Extract shaft sealing ring with puller
00 5 000, new claws 00 5 006 and thrust pad
33 1 309.**



*When installing: immerse the shaft sealing ring
in final drive gear oil. Drive the shaft sealing
ring in flush with hollow drift 33 1 170 and
handle 00 5 500.*

**Renew the driving flange if the running surface
is severely scored or worn.**



¹⁾ See specifications

33 12 510 Input bevel pinion – removing and installing

Procedure is identical to 33 11 011 – Renewing drive flange shaft sealing ring.

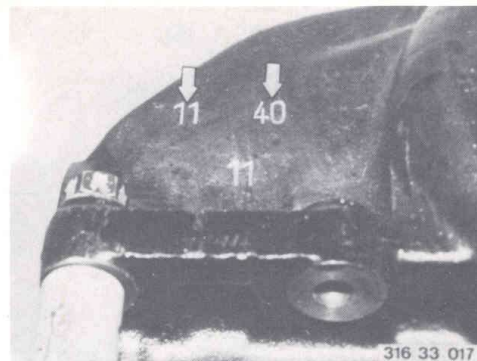
**33 12 551 Crown wheel and pinion – renewing
– final drive removed –**

Remove and install the input bevel pinion – 33 12 510.

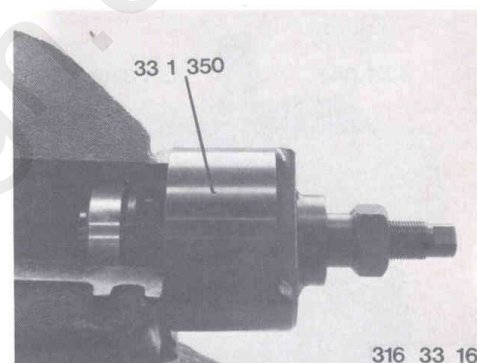
The number of teeth for the installed gear set is stamped on the housing, e.g. 11:40.

If the crown wheel and pinion have failed, it can be assumed that the taper roller bearings are also damaged.

Screw stop disc 33 1 372 on to extractor spider 33 1 371.



Screw extractor spider on to fixture 33 1 350 and install on front bearing outer race.



Attachment sequence:

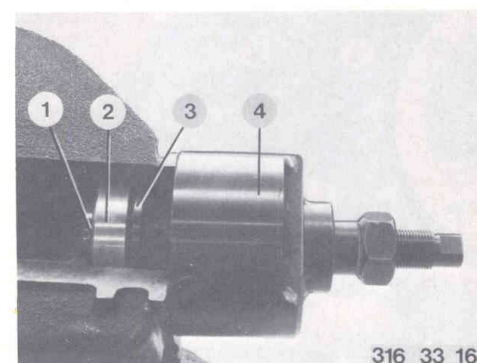
1 = Extractor spider 33 1 371

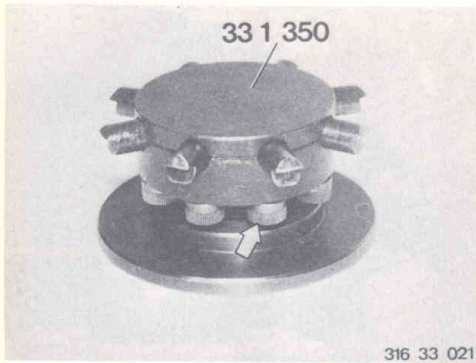
2 = Bearing outer race

3 = Stop disc 33 1 372

4 = Fixture 33 1 350

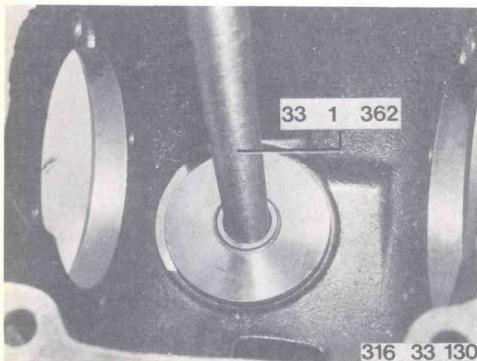
Pull out the outer bearing race.



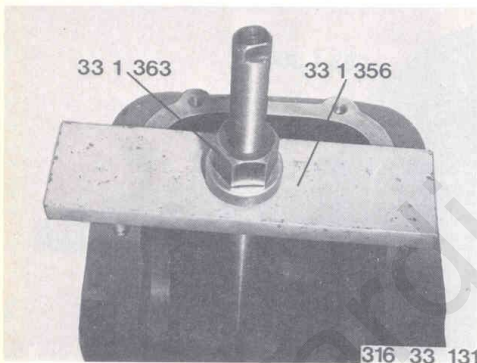


Allow the stop disc to rest on the extractor spider with the shouldered side on the bolt heads.

The extractor spider and stop disc are components of fixture 33 1 350.

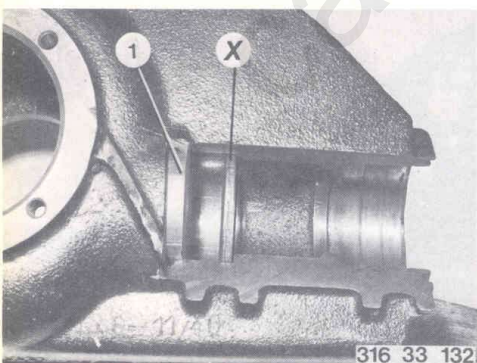


Screw threaded spindle 33 1 362 into the extractor spider and press into the rear bearing outer race.



Attach bridge piece 33 1 356 and thrust nut 33 1 363.

Pull out the rear outer bearing race. Shim 'X' is located behind the outer bearing race.

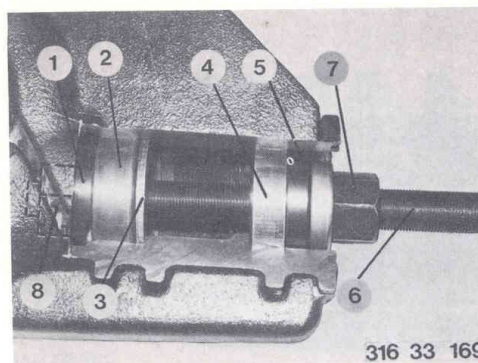


Shim 'X' is to be re-used, and must be installed before the rear bearing outer race (1). This speeds up determination of the basic setting.

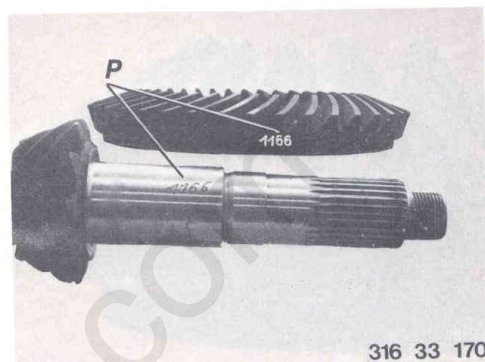
The front and rear outer bearing races are pulled in together.

Attachment order:

- 1 = puller disc for rear bearing outer race – 33 1 373
- 2 = rear outer bearing race
- 3 = shim 'X'
- 4 = front outer bearing race
- 5 = puller disc for front outer bearing race – 33 1 374
- 6 = threaded spindle – 33 1 362
- 7 = thrust nut – 33 1 363
- 8 = counter-nut – 33 1 354



The pinion and crown wheel are matched for minimum running noise on special machines. The matching number (P) is electrically engraved on the pinion and crown wheel. Never install items with differing matching numbers.



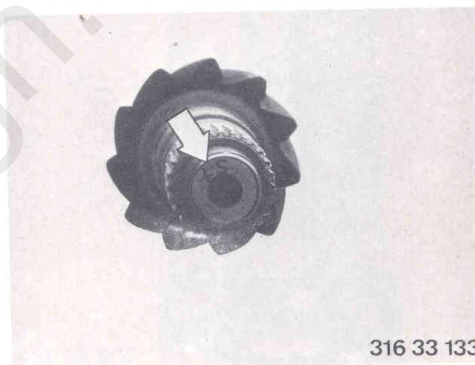
The figure (e) with + or – prefix shows the deviation from the basic setting (C) in hundredths of a millimeter and is needed to determine the thickness of shim X.

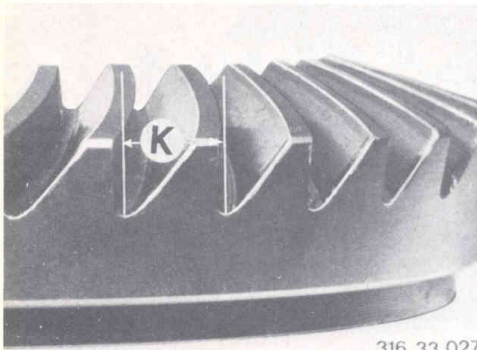
Add e + to C; subtract e – from C.

The stamped letter H or K indicates the gearing pattern:

H = Gleason

K = Klingelnberg



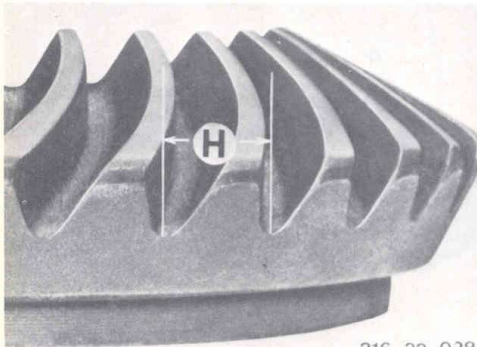


316 33 027

If the gear form of the crown wheel and pinion is not shown by a code letter, examine the shape of the teeth.

Klingelnberg tooth pattern:

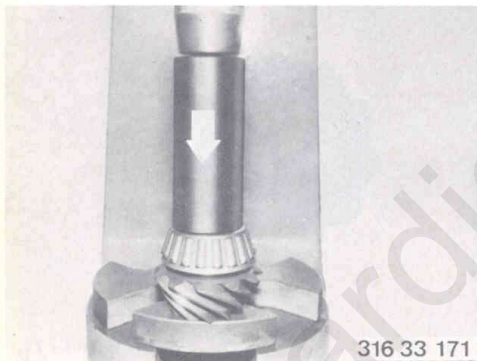
The tooth back and the height of the tooth are constant. If checked with a curved piece of 2 mm (0.08 in) diameter welding rod, distance (K) must be the same at the outer and inner diameters.



316 33 028

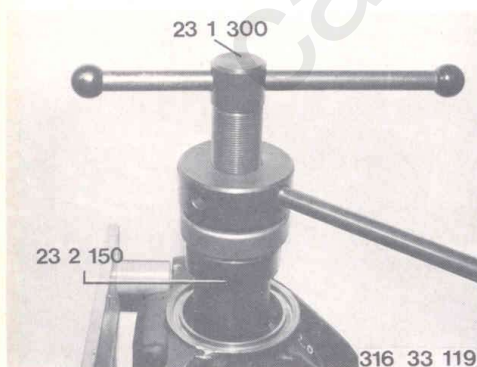
Gleason tooth pattern:

The tooth back is higher and wider at the outside. If checked with a piece of curved welding rod of 2 mm (0.08 in) diameter, distance (H) is greater at the outer diameter than at the inner.



316 33 171

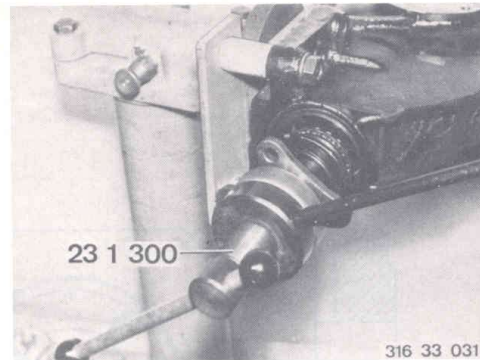
Press the taper roller bearing fully home on the bevel pinion with a suitable sleeve.



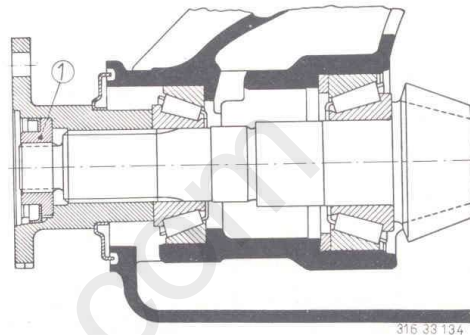
316 33 119

Install the bevel pinion (with a new taper roller bearing) without the dowel sleeve. Pull the taper roller bearing on to the pinion with tool 23 1 300 in conjunction with sleeve 23 2 150.

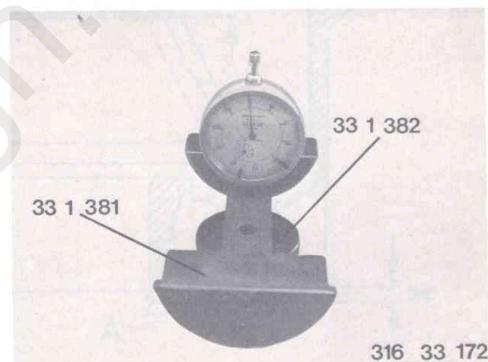
Press the drive flange on to the bevel pinion with tool 23 1 300.



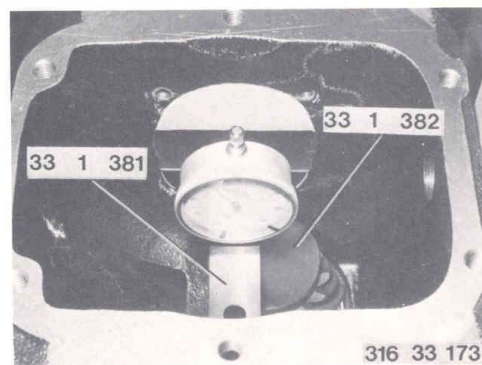
Adjust the friction moment¹⁾ of the bevel pinion roller bearings by tightening the shouldered nut (1).



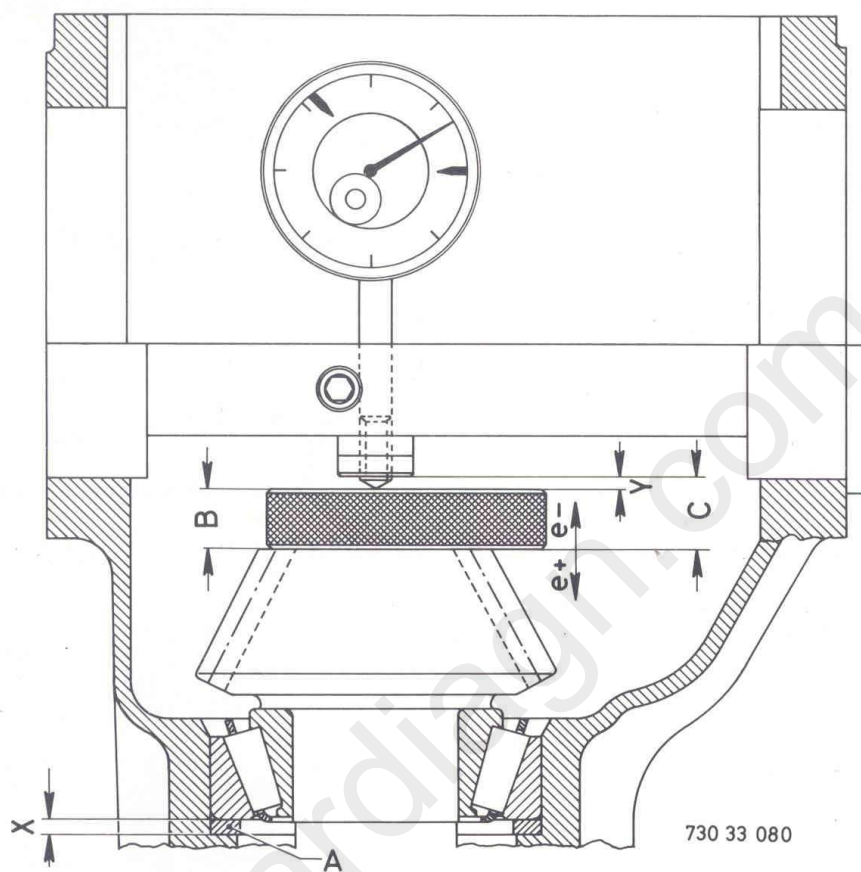
Attach dial gauge to measuring device 33 1 381.
Place dial gauge and device on measuring disc 33 1 382 and set to zero with 4 mm (0.157 in) preload.



Place measuring disc 33 1 382 on the drive pinion.
Install measuring device 33 1 381 in the housing and determine value Y.
Basic setting C = 11.02 mm (0.434 in)
Measuring disc B = 9.00 mm (0.354 in)



¹⁾ See specifications



Example I

C	10.02 mm (0.394 in)
e-	0.05 mm (0.002 in)

C desired	10.07 mm (0.392 in)
-----------	---------------------

Measured value Y at dial gauge
1.20 mm (0.047 in)

Total B	9.00 mm (0.354 in)
Total Y +	1.20 mm (0.047 in)

C actual	10.20 mm (0.401 in)
----------	---------------------

C actual	10.20 mm (0.401 in)
C desired	- 9.97 mm (0.393 in)

a	0.23 mm (0.008 in)
---	--------------------

Measuring

disc A	3.40 mm (0.134 in)
+ a	0.23 mm (0.008 in)

Shim X	3.63 mm (0.142 in)
--------	--------------------

If C desired is smaller than C actual, add
a to shim X (+).

Permissible thickness tolerance of shim X available in steps 0.01 . . . 0.03 mm
(0.0004 . . . 0.0012 in).

Example II

C	11.02 mm (0.434 in)
e +	0.07 mm (0.003 in)

C desired	11.09 mm (0.437 in)
-----------	---------------------

Measured value Y at dial gauge
2.06 mm (0.081 in)

Total B	9.00 mm (0.354 in)
Total Y +	2.06 mm (0.081 in)

C actual	11.06 mm (0.435 in)
----------	---------------------

C actual	11.09 mm (0.437 in)
C desired	-11.06 mm (0.435 in)

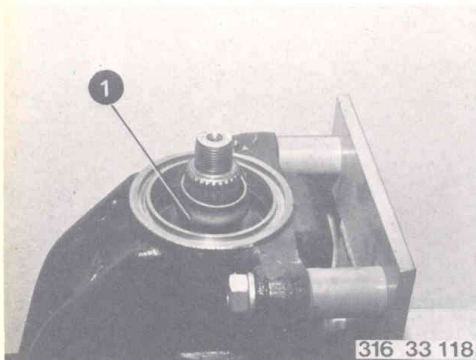
a	0.03 mm (0.002 in)
---	--------------------

Measuring

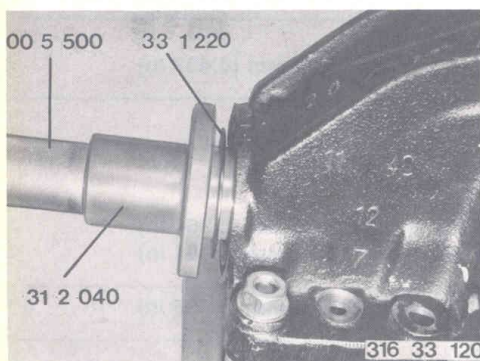
disc A	3.76 mm (0.148 in)
- a	0.03 mm (0.002 in)

Shim X	3.73 mm (0.146 in)
--------	--------------------

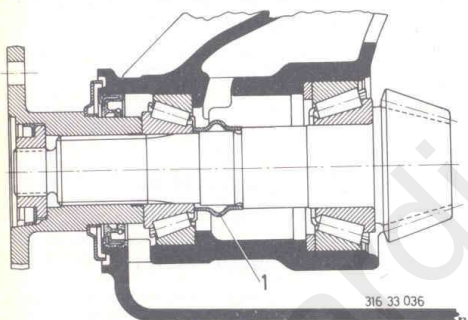
If C desired is greater than C actual,
deduct a from shim X (-).



Remove input bevel pinion and rear outer bearing race.
Install shim X of the thickness just determined, and the bevel pinion with a new dowel sleeve (1).

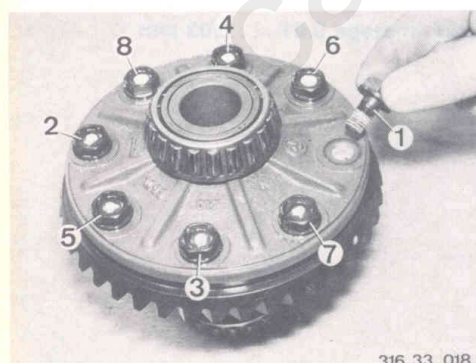


Drive in the new shaft sealing ring until flush, using hollow drift 31 2 040 with 33 1 220 and handle 00 5 500.



Attach the driving flange. Tighten the shouldered nut¹⁾ and determine the friction moment¹⁾.

Secure the shouldered nut with its keeper.
Warning: if the friction moment is exceeded, the dowel sleeve (1) must be renewed and the measurement repeated.

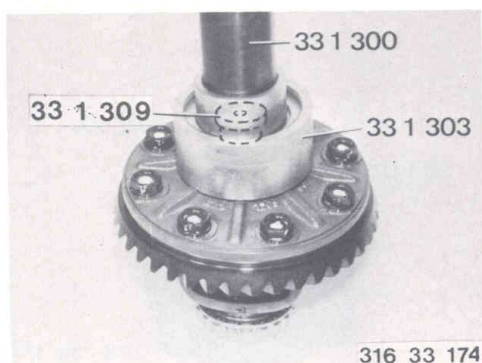


Detach the crown wheel (cold).
When installing: clean the thread most thoroughly.
Apply Loctite 270 to bolts and tighten in the sequence 1... 8. Note correct tightening torque¹⁾.

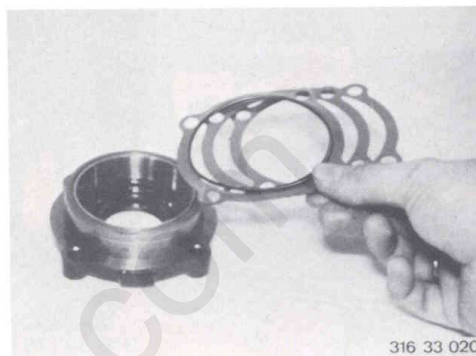
¹⁾ See specifications

Take off taper roller bearing with Rollex puller 33 1 300. Use shells 33 1 303 and thrust pad 33 1 309.

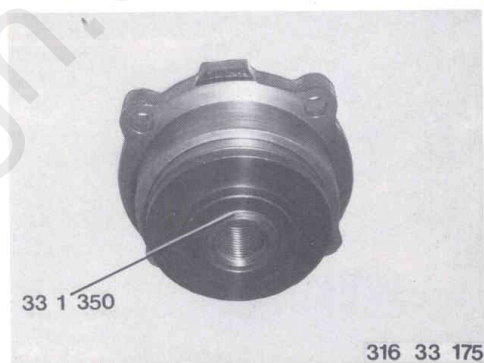
When installing: press on the taper roller bearing cold.



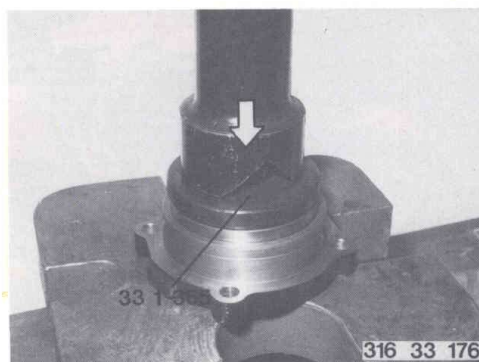
Remove O-ring and shims from bearing cap. Check O-ring and renew if necessary.

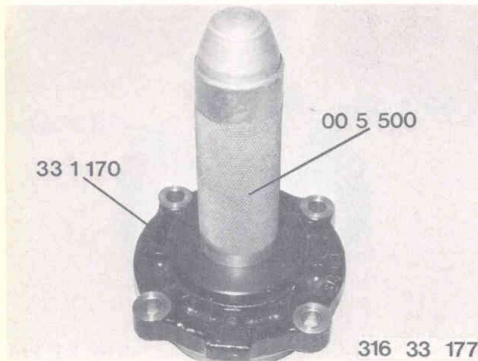


Insert extractor spider from tool 33 1 350 in bearing cap and press out the outer taper roller bearing race.



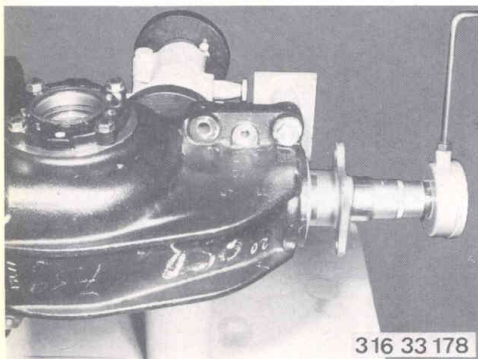
When installing: press in the outer bearing race with thrust pad 33 1 365.





Carefully extract the shaft sealing ring.

When installing: immerse the shaft sealing ring in final drive gear oil, and drive in with hollow drift 33 1 170 and handle 00 5 500.

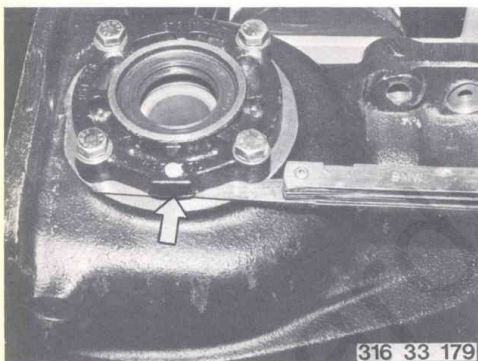


Place the differential housing and crown wheel into the housing.

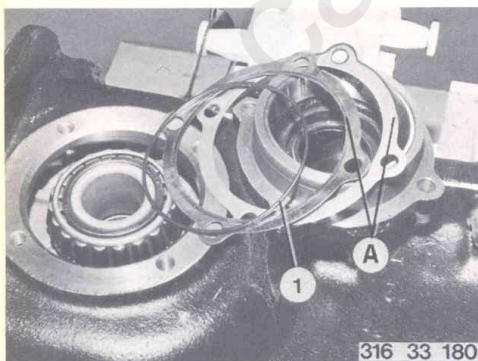
Attach the right bearing cap without shims.

Attach the left bearing cap without shims.

Tighten the bolts uniformly until the overall friction moment¹⁾.



Measure the distance between the bearing cap and the housing with a feeler gauge.



Distribute shims (A) uniformly between the two sides at first.

Example: distance as measured = 1.8 mm (0.071 in).

Install 0.9 mm (0.035 in) shims in front of each bearing cap.

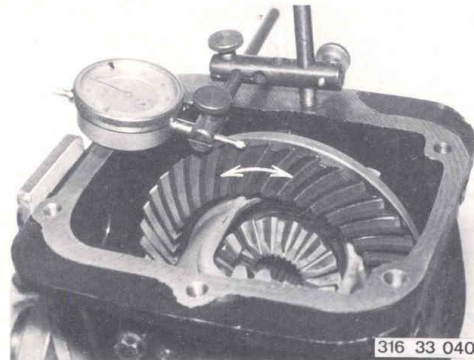
Do not forget the O-ring.

¹⁾ See specifications

Install dial gauge holder 00 2 500 and check backlash¹⁾ with dial gauge.

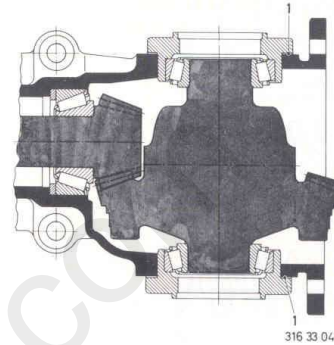
Warning: correct contact pattern must always be obtained. See basic instructions for adjusting contact pattern.

Coat ring gear with engineer's blue to take tooth contact pattern, turn gear in both directions several times and stop with a piece of hard wood.



Correct tooth backlash and contact pattern by moving shims (1) from one side to the other.

Warning: Never alter the total thickness of the shims used.



Basic instructions for adjusting contact pattern

Klingelnberg gearing:

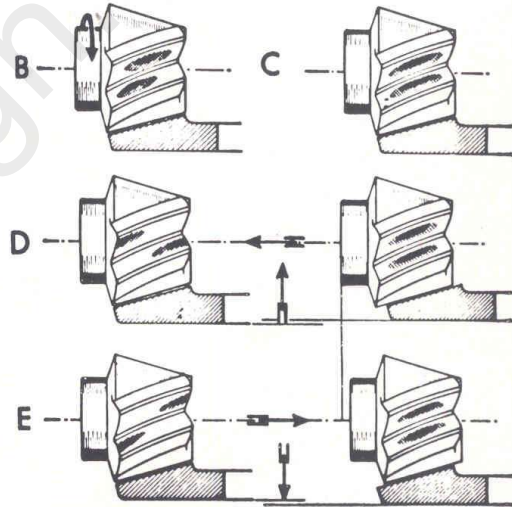
The contact pattern at the forward and rear faces of the drive pinion should be at approximately the center of tooth link and tooth height.

B Contact pattern off load

C Contact pattern under load

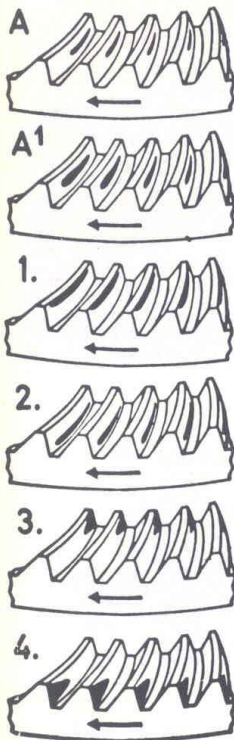
D By installing a thicker shim "X" behind the drive pinion, the contact pattern of the forward face will move toward the larger drive pinion diameter, and will approach the smaller drive pinion diameter at the rear face.

For further changes, refer to drawing



730 33 117

¹⁾ See specifications



730 33 116

Gleason gearing:

A

Correct contact pattern off-load.

A 1

Under load, the contact pattern shifts slightly farther outwards. Moving the crown wheel will mainly change the backlash, while in addition displacing the contact pattern along the teeth. Shifting the bevel pinion will change the contact pattern in the direction of tooth height; backlash will be altered only slightly.

These are the four basic incorrect contact patterns, which generally appear in combination. Knowing these patterns will facilitate adjustment.

1. High, narrow pattern (tip contact) on crown wheel. Shift the drive pinion towards the crown wheel axis and correct tooth flank backlash by moving crown wheel away from pinion if necessary.

2. Deep, narrow contact pattern (root contact) on crown wheel. Move drive pinion away from crown wheel axis and correct backlash by moving crown wheel closer if required.

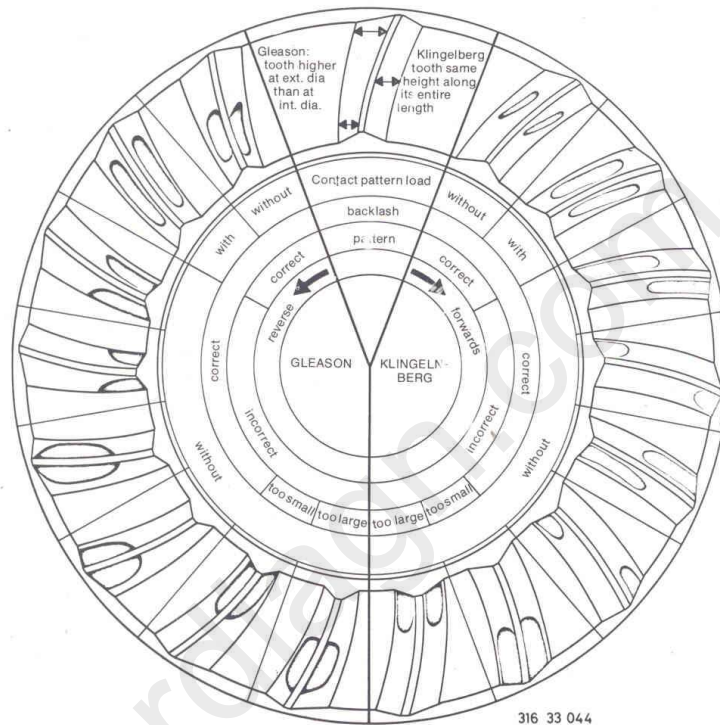
3. Short contact pattern on small tooth ends (toe contact) of crown wheel.

Move crown wheel away from drive pinion. Move drive pinion closer to crown wheel axis if required.

4. Short contact pattern at large tooth ends (heel contact) of crown wheel.

Move crown wheel towards drive pinion. Move drive pinion away from crown wheel axis if required.

Adjustment of contact pattern



33-12/13

2.78

33 13 010 Complete differential housing – removing and installing

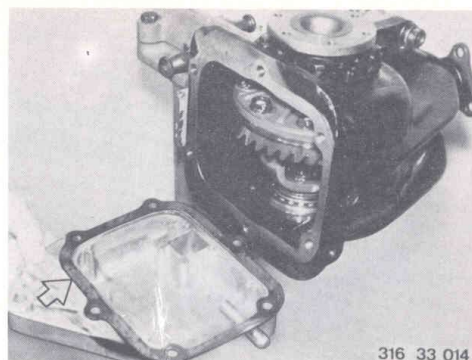
Remove and install final drive – 33 10 010.

Drain the oil.

Attach the final drive to mounting stirrup
33 1 040.

Take off the housing cover.

When installing: use a new gasket. Note correct
tightening torque¹⁾. Add oil¹⁾.



Remove driving flanges – see job 33 11 091.

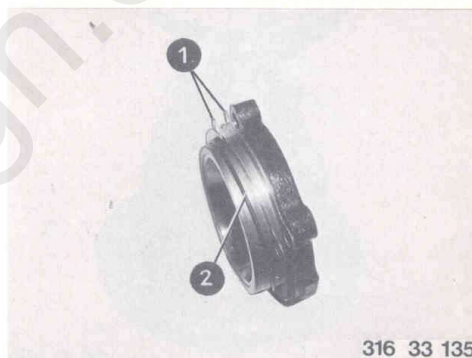
Take off both bearing caps.

Important: mark the caps and do not accidentally
interchange them.

When installing: note correct tightening torque¹⁾.

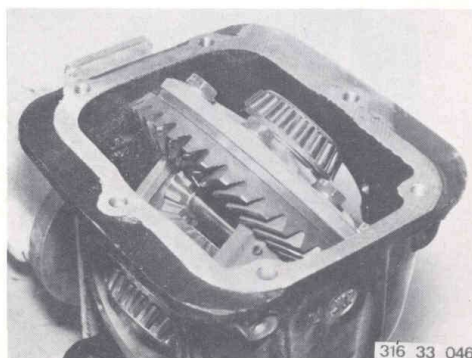


The shims (1) are used to adjust the differential
housing position and tooth backlash.
Check O-ring (2) and renew if necessary.

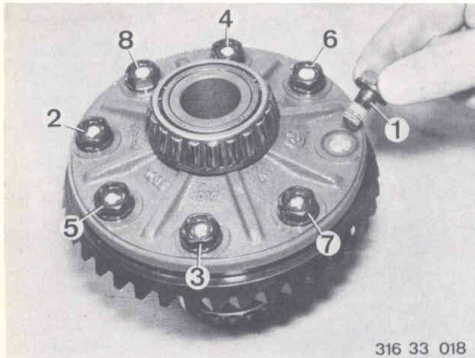


Place the open end of the differential housing
parallel to the housing joint face.

Place the bearing as far as possible through
the bearing cap hole, and lift out the differential
housing.



1) See specifications



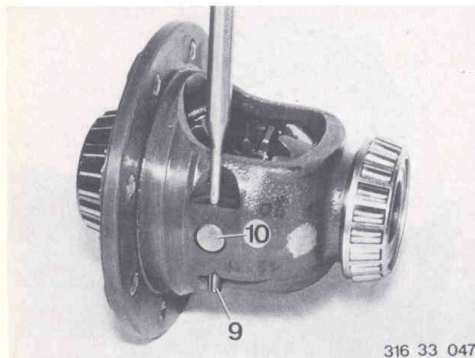
316 33 018

33 13611 Differential bevel pinions – re- newing differential housing removed –

Detach the crown wheel (cold).

When installing: clean the thread thoroughly. Insert bolts with Loctite 270 and tighten in the sequence (1... 8).

Note correct tightening torque¹⁾.



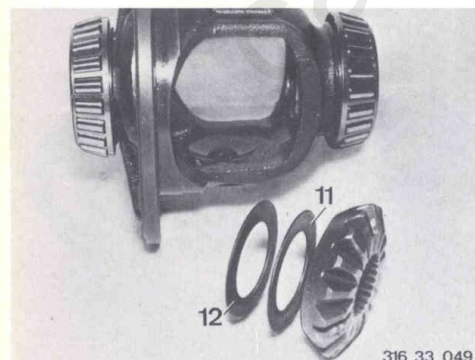
316 33 047

Drive out dowel sleeve (9) and differential pinion shaft (10).



316 33 048

Unscrew and remove differential bevel pinions with drive flange.

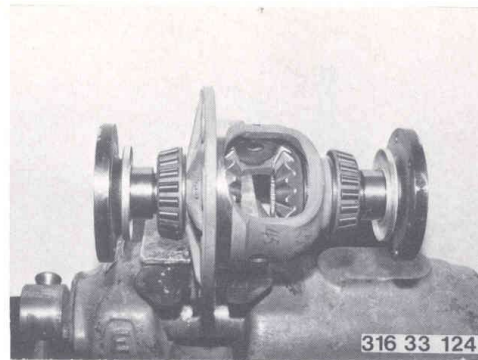


316 33 049

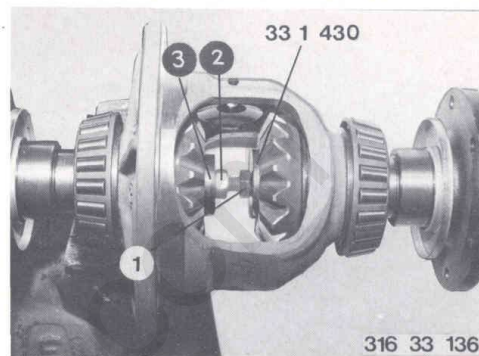
Remove both rear axle drive shafts with cup springs (11) and shims (12).

¹⁾ See specifications

Immerse the cup springs and shims in final drive oil. Install both rear axle drive gears with cup springs and shims. The concave face of the cup spring faces the rear axle drive pinion. Center the rear axle drive pinions with the driving flanges.

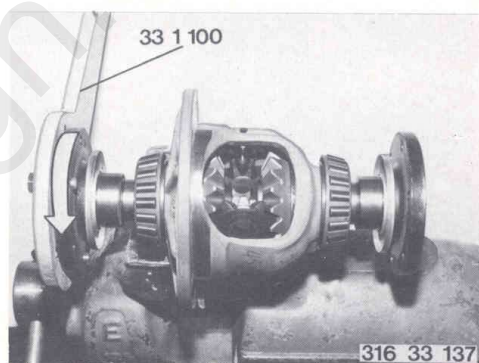


Insert one M 10 × 25 mm bolt (1) with nut (2), threaded plate 33 1 430 and washer (3) of 35 mm (1.38 in) diameter, 10 mm (0.39 in) hole. Press the rear axle drive pinions apart sufficiently for the driving flanges to just be capable of turning.

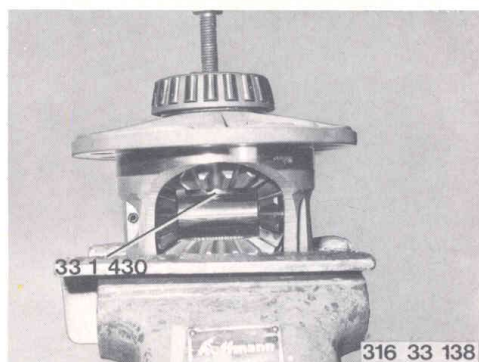


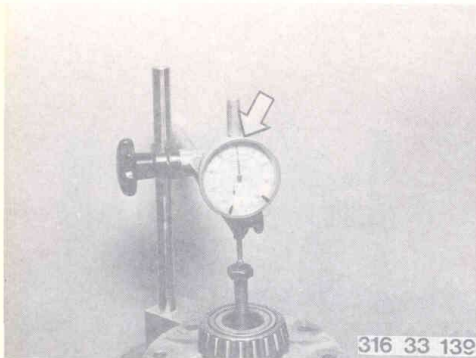
Insert the differential bevel pinions. Attach retaining wrench 33 1 100 to the driving flange and insert the differential bevel pinions. Remove bolt and washers. Drive in the differential pinion shaft.

Secure the differential pinion shaft with a dowel sleeve.

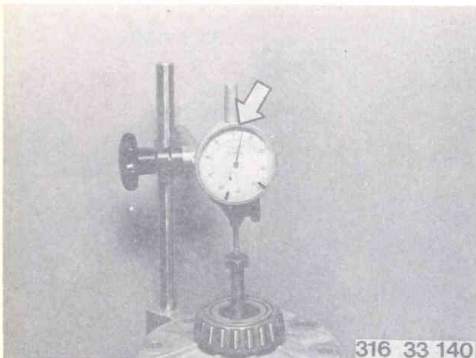


Attach threaded plate 33 1 430 to inside of rear axle drive pinion with measuring bolt, and tighten.





Attach dial gauge with holder.
Set dial gauge to zero, allowing for preload.

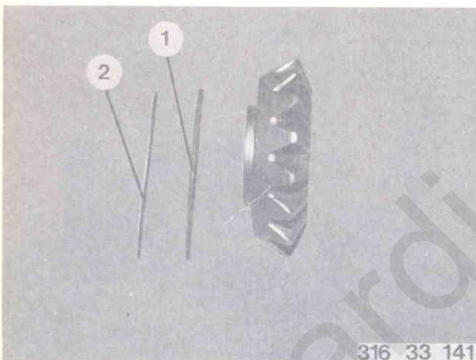


Release measuring screw until cup spring is relaxed.

Read off the dial gauge.

To prevent the cup spring from being preloaded to the limit of its range, a clearance of 0.03...0.10 mm (0.0012... 0.0039 in) must be present.

Start work at the lowest value. Shims are available in 0.05 mm (0.002 in) steps. Determine the value for the opposite side by the same method.



When installing: Install shims (2) of the thickness just determined, and cup spring (1).

The concave face of cup spring (1) is towards the rear axle drive pinion.

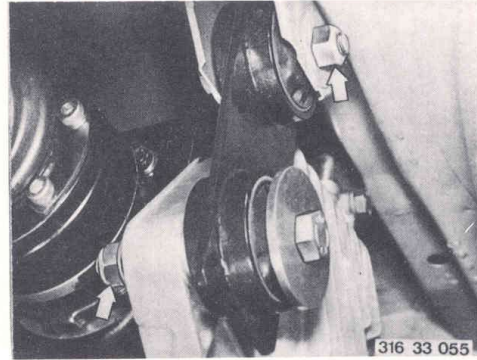
33 17 030 Self-aligning support – renewing

Place jack or blocks under final drive.

Loosen stop nuts and remove bolts.

Take out the self-aligning support.

When installing: use new self-locking nuts. Note correct tightening torque¹⁾.



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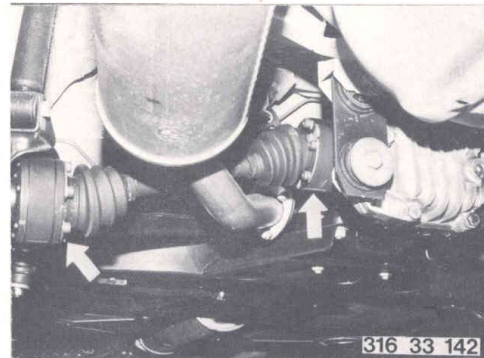
¹⁾ See specifications

33 21 000 Half-shaft – removing and installing

Spring strut serves as a retaining strap.
The trailing arm must be supported when detaching the spring strut.

Detach half-shaft at final drive and rear axle shaft.

When installing: Note correct tightening torque¹⁾.



33 21 071 Flexible gaiter – renewing

Important: Use repair kit.

Remove and install half-shaft – 33 21 000.

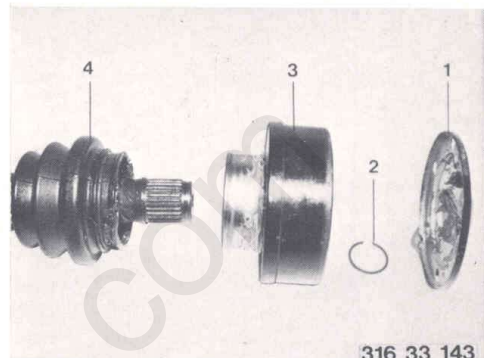
Remove sealing cover (1).

Remove circlip (2).

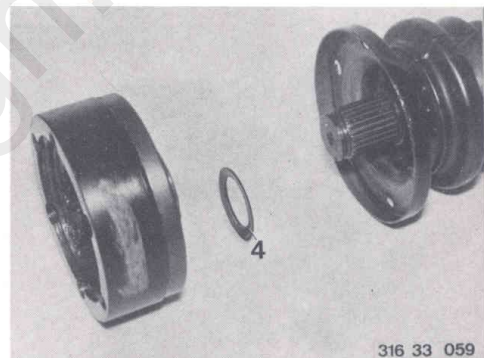
Loosen clip on flexible gaiter.

Press half-shaft out of joint (3).

Remove dust cover (4).



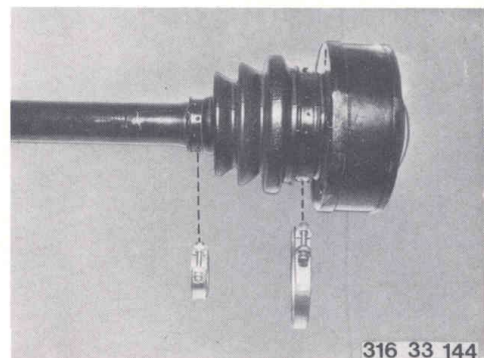
Push flexible gaiter on to half-shaft.
The inner convex face of the axial clamp ring (4) faces the joint. Press on the joint and install the circlip.



Fill joint and gaiter with grease¹⁾.
Clean sealing surfaces for gaiter to remove grease.

Coat gaiter with adhesive¹⁾ and install, using new clips.

Seal the sealing cover with Curil and install.

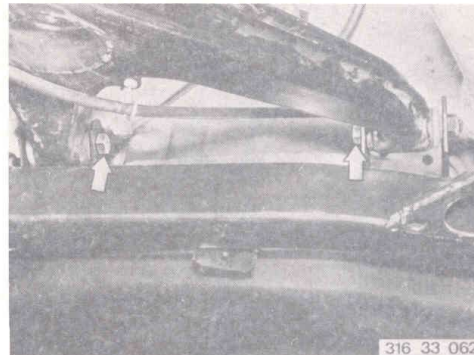


¹⁾ See specifications

33 31 011 Rear axle beam – renewing

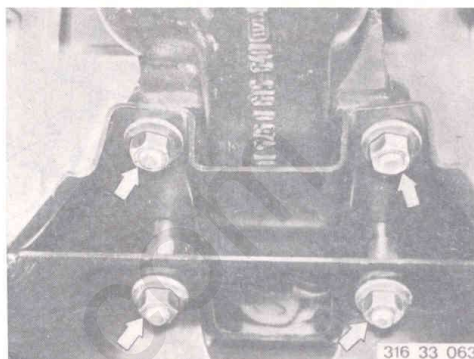
Remove and install stabilizer – 33 55 000.
Remove the bolts holding the semi-trailing arm.

When installing: note correct tightening torque¹⁾.



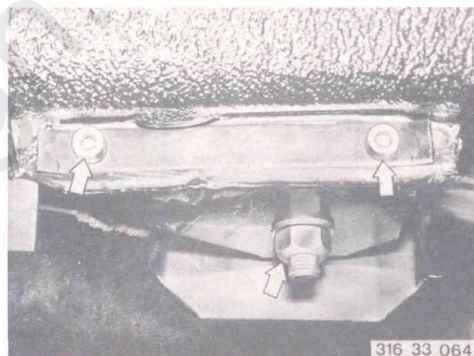
Separate the final drive from the rear axle beam.

When installing: note correct tightening torque¹⁾.



Remove the support bolts and unscrew the nuts at the rubber mounting.

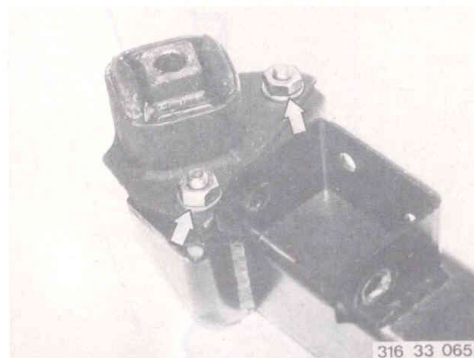
When installing: note correct tightening torque¹⁾.



Remove the rear axle beam.

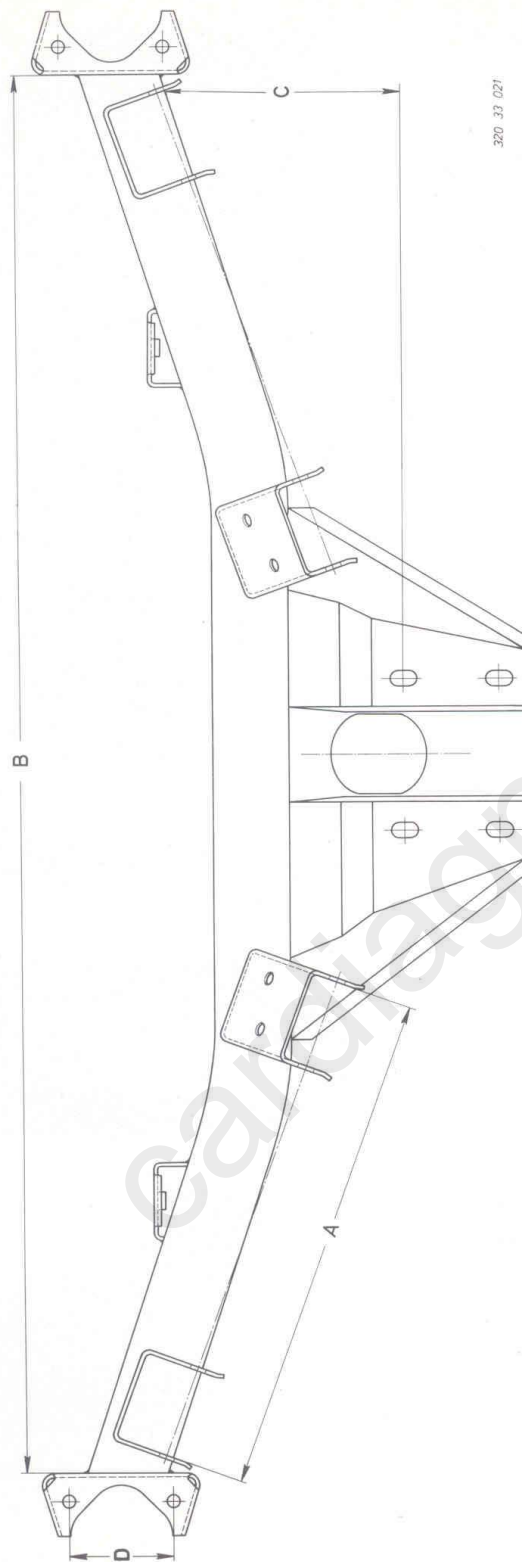
Unscrew the rubber mounting.

*When installing: Check condition of rubber mounting and renew if necessary.
Check condition of knurled pin. Note correct tightening torque¹⁾.*



¹⁾ See specifications

33-31/2



320 33 021

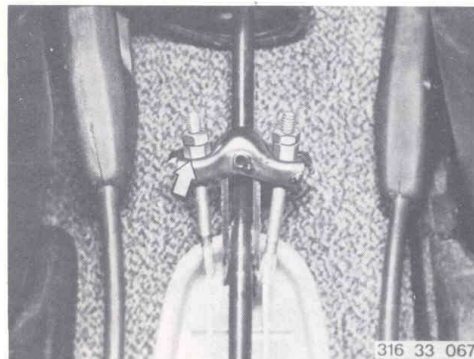
Check rear axle beam dimensions

- A = 395.8 mm (15.58 in)
- B = 1099.4 ± 0.8 mm (43.28 ± 0.03 in)
- C = 185.9 ± 1 mm (7.32 ± 0.04 in)
- D = 82 mm (3.23 in)

**33 32 000 Complete semi-trailing arm
– removing and installing**

Disconnect the handbrake cable at the handbrake lever.

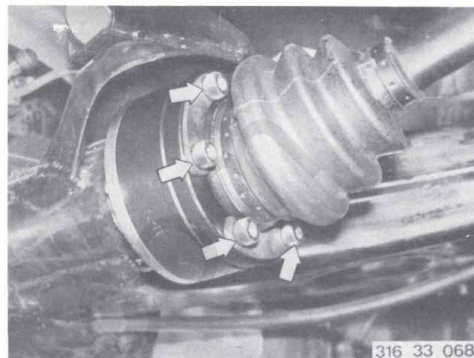
When installing: **Adjust handbrake 34 10 014.**



Separate the half-shaft from the rear wheel shaft.

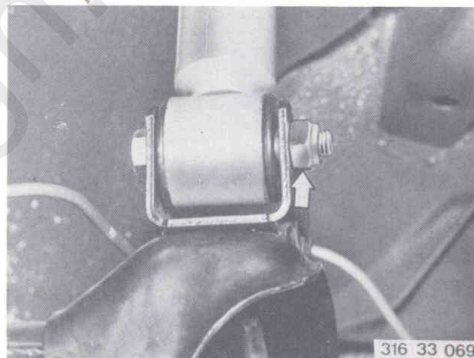
Detach the wheel.

When installing: **note correct tightening torque¹⁾.**



Separate the spring-shock absorber strut from the semi-trailing arm.

When installing: **note correct tightening torque¹⁾.**

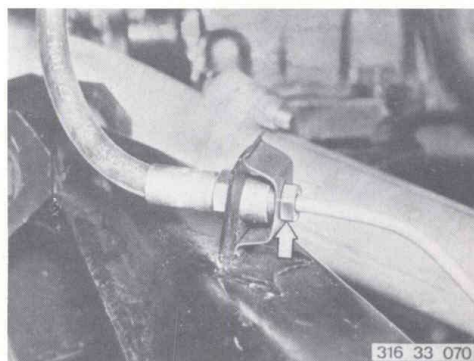


Detach the brake hose at the brake pipe.
Plug the brake hose with an "Ate" dust cap to prevent dirt from entering.

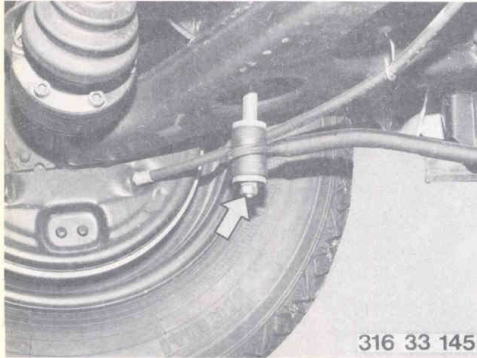
When installing: **Bleed the brakes.**

Do not twist the brake hose.

Note correct tightening torque¹⁾.

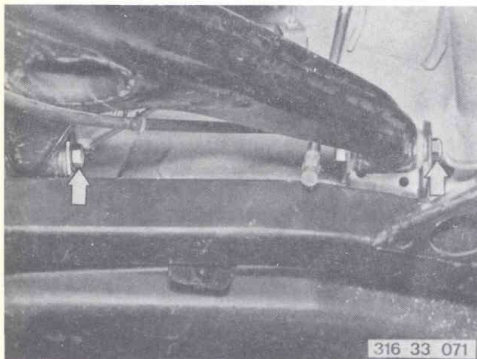


¹⁾ See specifications



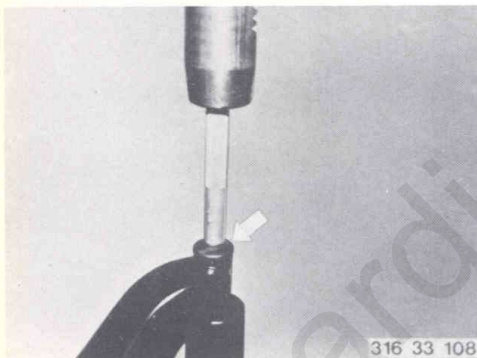
316 33 145

Detach stabilizer from semi-trailing arm.
When installing: note correct tightening torque¹⁾.



316 33 071

Remove both bolts holding the semi-trailing arm.
When installing: Tighten the bolts in the normal load position¹⁾.
Pull out the handbrake cable.
Remove the semi-trailing arm.



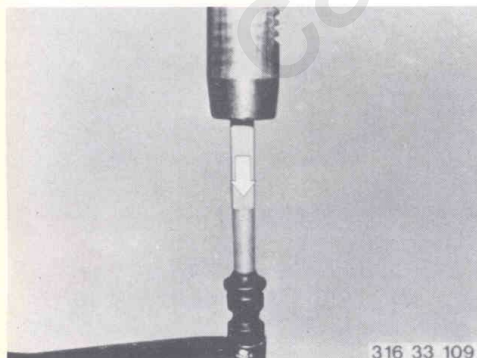
316 33 108

33 32 021 Semi-trailing arm – renewing

Remove and install semi-trailing arm – 33 32 000. Renew fluid blocks – 33 32 561. Renew wheel bearings and shaft seal – 33 41 601. Transfer guard plate.

33 32 561 Both flange blocks – renewing – trailing arm removed –

Press out flange blocks in a hydraulic press. If necessary, cut off collar end with a knife.



316 33 109

When installing: Coat fluid blocks with diluted Cresta, lubricating oil II or water from which the surface tension has been removed.

Collar side faces out.

Press in flange blocks until flush with a hydraulic press.

¹⁾ See specifications

**33 32 609 Measuring semi-trailing arm
– semi-trailing arm removed –**

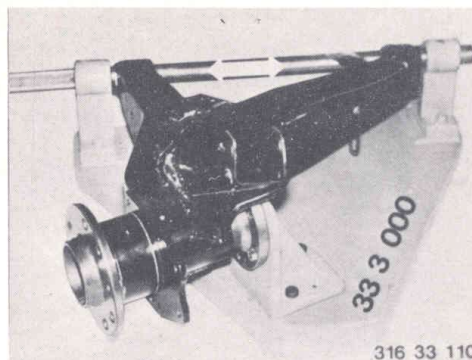
Press out the 'Flanbloc' bushings.

Attach driving flange to test fixture 33 3 000.

The test mandrel must pass smoothly through the pickup hole.

Warning: semi-trailing arms may only be re-aligned if there are no visible cracks or other signs of damage.

When installing: coat new 'Flanbloc' bushings with diluted 'Cresta', easing oil II or detensioned water.



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33-32/3

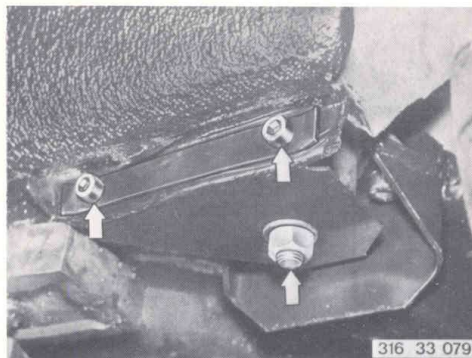
2.78

2.78

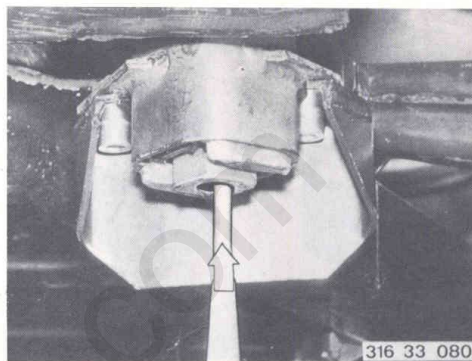
33-32/3

33 33 071 Rubber mounting for rear axle beam – renewing

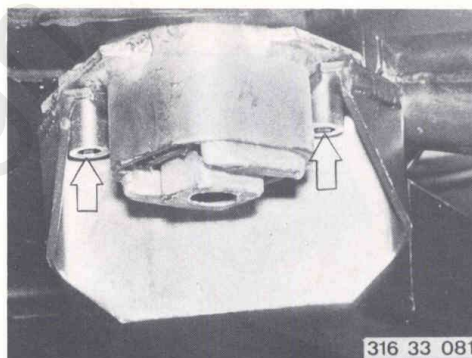
Remove the Allen screws for the strengthening plate and the stop nuts at the knurled pins.
When installing: note tightening torque¹⁾.



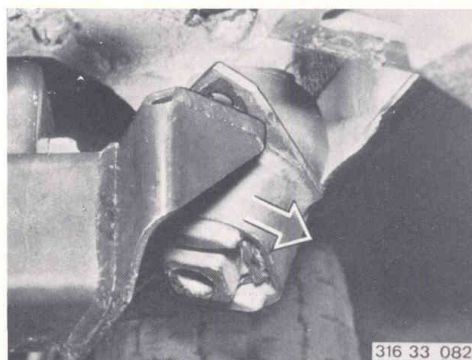
Remove the rear seat.
Drive the knurled pins out upwards.
When installing: Check condition of knurled pins and renew if necessary.



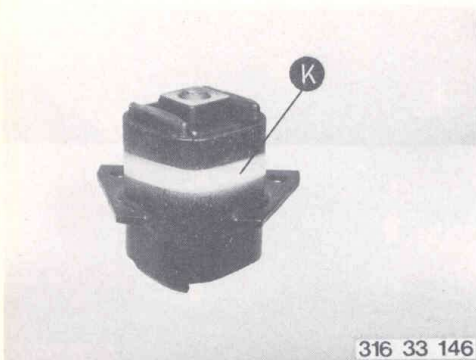
Remove the bolts holding the rubber mounting.
When installing: note tightening torque¹⁾.



Remove the rubber mounting.



¹⁾ See specifications



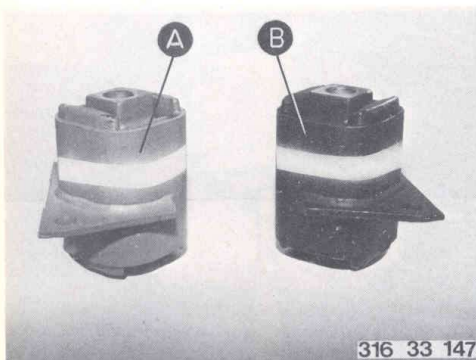
When installing: note classification of rubber bushing.

Codes (K) must be the same at left and right.

Color code:

white paint stripe = hard

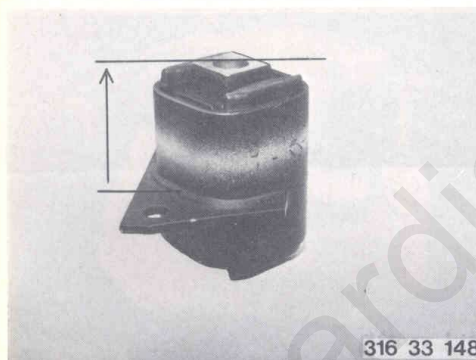
without paint stripe = soft



To make identification easier, the left and right rubber bushings are painted differently.

A – grey finish = left side

B – black finish = right side



In addition, make sure that the longer side of the rubber bushing faces the body when installed (see Service Information, Group 33).

33 41 000 Drive flange at rear wheel shaft – removing and installing

Lift out the hub cap.

Remove split pin from castellated nut and unscrew nut.

When installing: note correct tightening torque¹⁾.

Secure castellated nut with split pin.

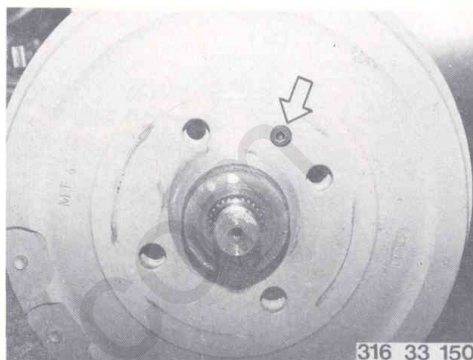


316 33 149

Detach and attach the rear wheel – 36 10 300. Unscrew the Allen screw and take off the brake drum.

If necessary, release the eccentric.

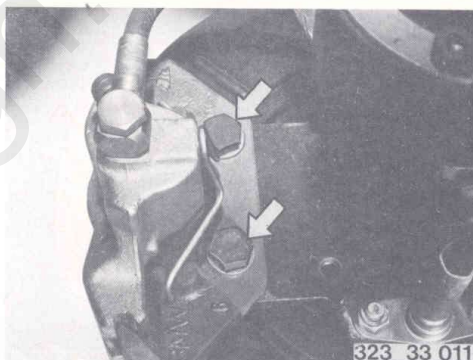
When installing: note correct tightening torque¹⁾.



316 33 150

Detach brake caliper; the brake line remains attached.

When installing: note correct tightening torque¹⁾.



323 33 011

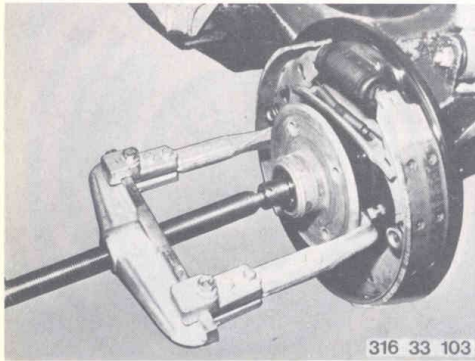
Remove Allen screw and take off brake disc.

When installing: note correct tightening torque¹⁾.



323 33 012

¹⁾ See specifications



Attach 'Kukko' puller and pull off the drive flange.

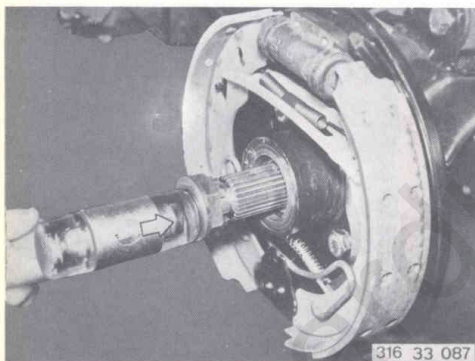
When installing: check rubbing surface for shaft sealing ring at drive flange, and condition of shaft sealing ring.



33 41 100 Rear wheel shaft – removing and installing

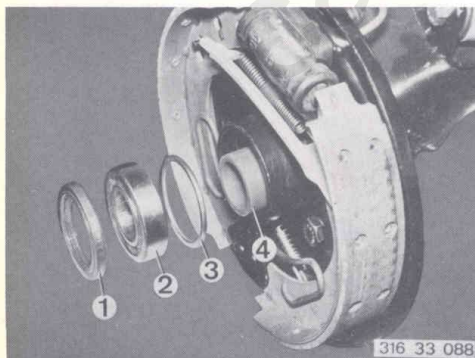
Remove and install drive flange – 33 41 000. Detach the half-shaft and tie up.

When installing: note correct tightening torque¹⁾.



Drive out the rear wheel shaft with a plastic-faced hammer.

Screw on the castellated nut to protect the rear wheel shaft.



33 41 151 Wheel bearings and rear wheel shaft sealing rings – renewing

Remove and install the rear wheel shaft – 33 41 100.

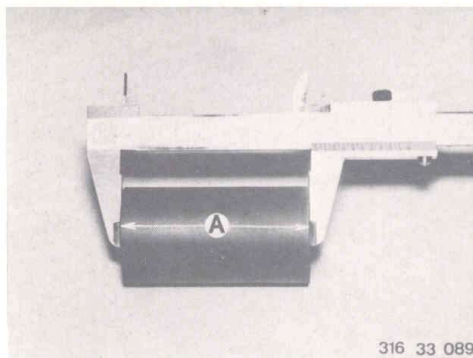
Use a drift to force out ball bearing (2) complete with shaft sealing ring (1).

Take out spacing sleeve (4) and shim disc (3).

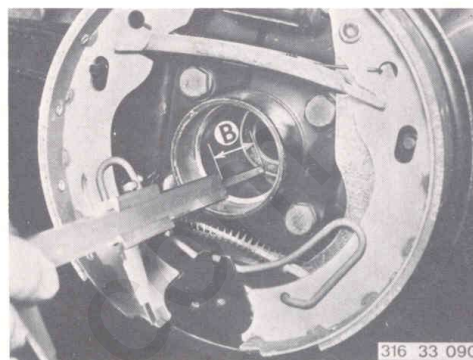
When installing: pack the sealing lip of the shaft sealing ring with Shell Retinax A (1). Pack the hub with grease¹⁾.

¹⁾ See specifications

When installing: adjust wheel bearing play¹⁾.
Measure length of spacing sleeve (A), e.g.
78.9 mm (3.106 in).



Install the inner ball bearing.
Measure distance (B) from contact face of
outer ball bearing in hub to outer race of inner
ball bearing, e.g. 75.8 mm (2.984 in).



Determine installed clearance:

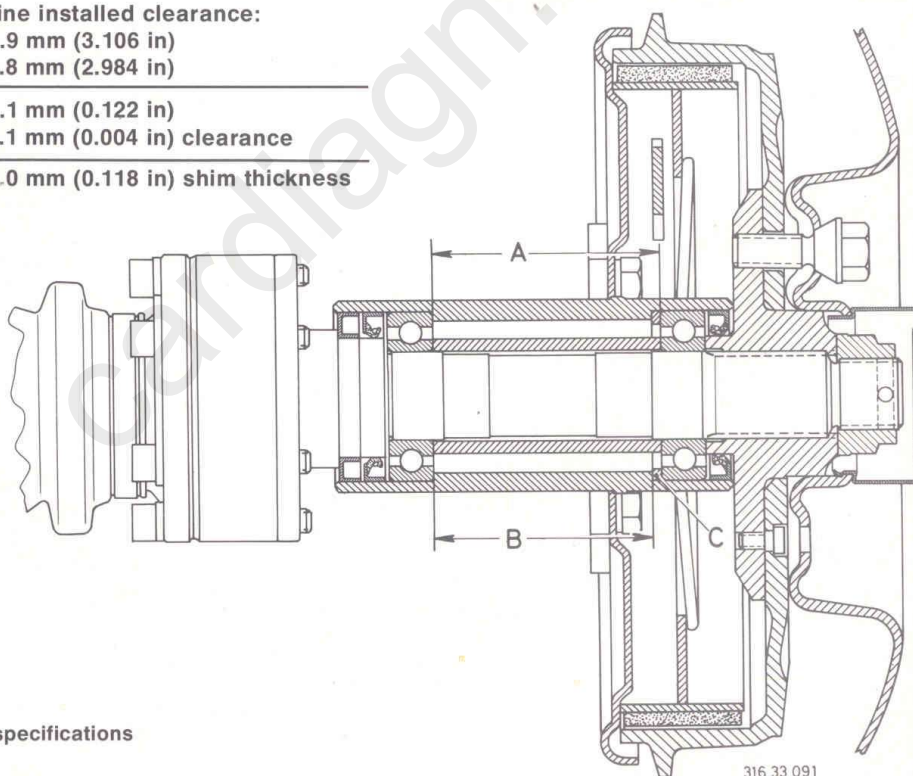
A = 78.9 mm (3.106 in)

– B = 75.8 mm (2.984 in)

3.1 mm (0.122 in)

– 0.1 mm (0.004 in) clearance

C = 3.0 mm (0.118 in) shim thickness



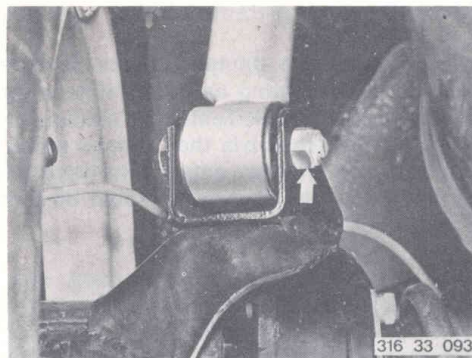
¹⁾ See specifications

**33 52 100 Complete spring-damper strut
– removing and installing**

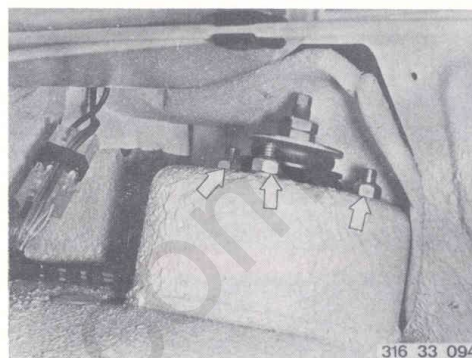
Warning: the strut acts as a suspension rebound strap.

Do not remove the spring-damper strut unless the semi-trailing arm is supported from below. Unscrew the retaining bolt.

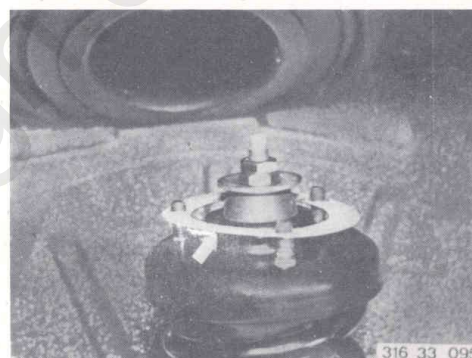
When installing: tighten retaining bolt with the car in the normal-load position¹⁾.



Detach the centering cup from the wheel arch.
When installing: note correct tightening torque¹⁾.



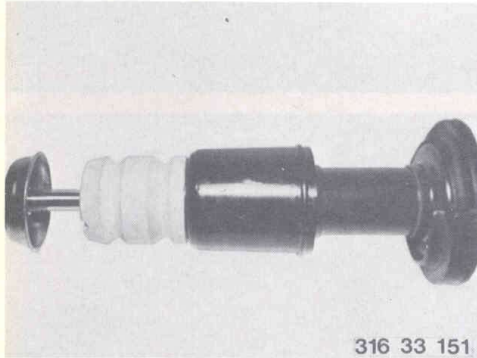
Remove the spring-damper strut.
Important: note gasket.



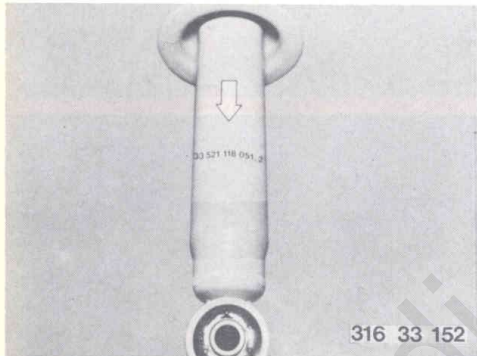
¹⁾ See specifications

33 52 131 Spring-damper strut – renewing

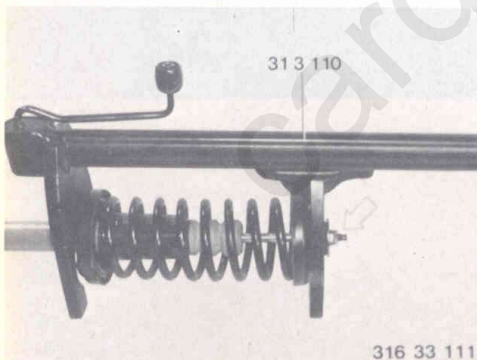
When renewing a damper (shock absorber), always install the same make as before. Only accurate testing can determine when a damper needs to be renewed. Test on the vehicle with a 'Shok-Tester' or similar, or after removal on a shock-absorber test rig¹⁾. A useful rule of thumb is that damper efficiency will have dropped to less than 50% of the original value after two sets of tires have been worn out. At this stage, the dampers should be tested and both renewed at once on each axle if necessary.



Remove and install rear coil spring – 33 53 000. Pull off support disc and auxiliary spring (bump stop) with protective tube. Detach the lower spring mount. *When installing:* check condition of auxiliary spring, protective tube and spring mount, and renew if necessary.



Note damper code and BMW number¹⁾.

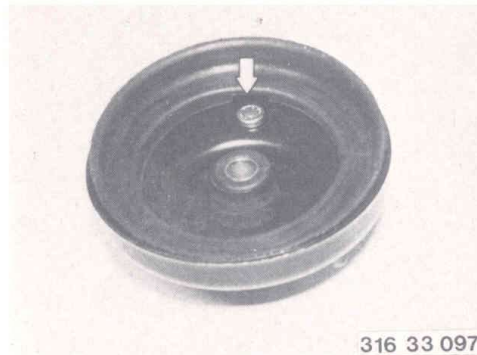


33 52 200 Centering cup – removing and installing

Remove and install the spring-damper strut – 33 52 100. Pull off the protective cap. Compress the coil spring with spring clamp 31 3 110 until the centering cup can be removed. Release the coil spring and take off the centering cup.

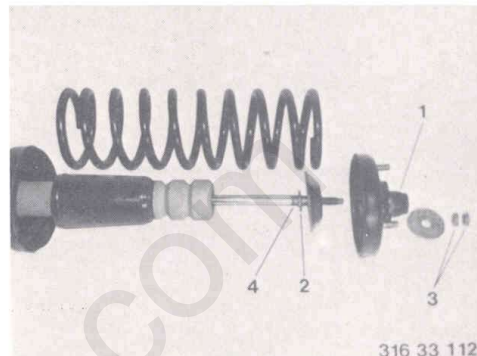
¹⁾ See specifications

When installing: note correct installed position. The knurled pins locate in cutouts on the rubber underlay. Check condition of damper rings in spring cup and of centering cup, and renew if necessary.



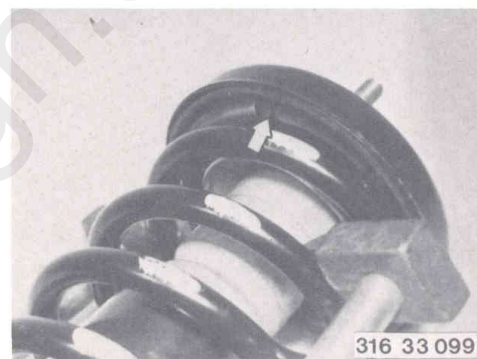
316 33 097

When installing: check condition of rubber bushing (1) and renew if necessary. Shoulder on disc (2) faces lock ring (4). Tighten nut (3) until firmly seated¹⁾.



316 33 112

When installing: align the coil spring before clamping.

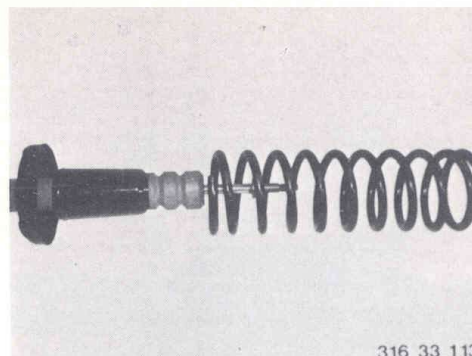


316 33 099

¹⁾ See specifications

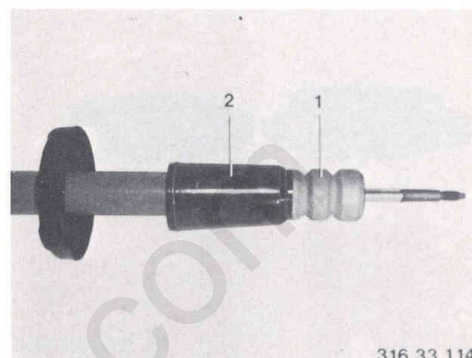
33 53 000 Rear coil spring – removing and installing

Remove and install centering cup – 33 52 000. Detach coil spring from damper (shock absorber).



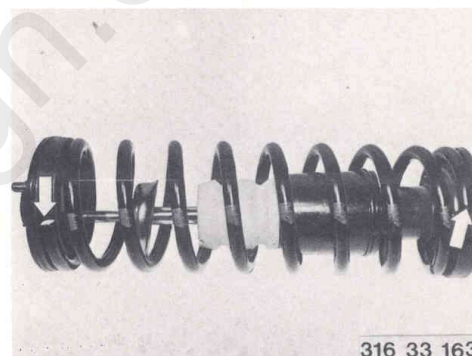
316 33 113

Check condition of auxiliary spring (1) and protective tube (2) and renew if necessary.



316 33 114

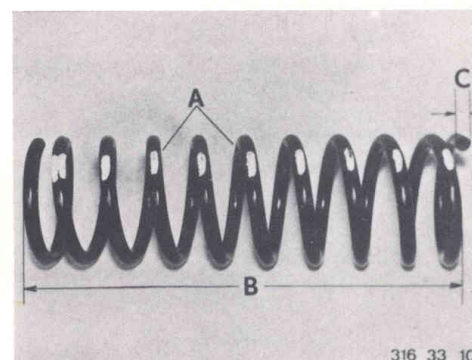
When installing: make sure that the ends of the coil spring locate correctly in the cutouts on the centering cup and the lower spring plate.



316 33 163

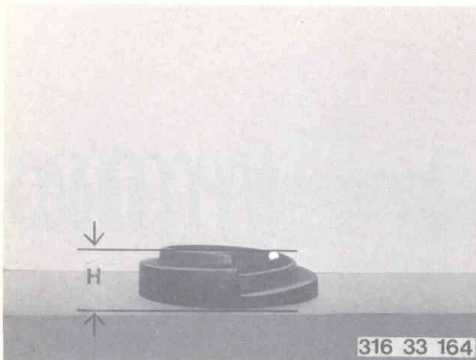
When renewing: Spring rate A¹), spring length B¹) and wire thickness C¹) must be the same on the left and right sides of the car.

When installing heavy-duty conversion, see notes in Specifications.

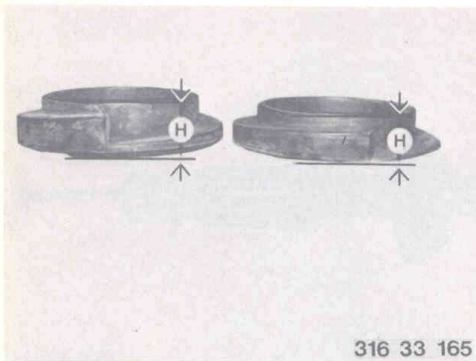


316 33 101

1) See specifications



Check condition of upper and lower spring underlays and renew if necessary.
BMW 320 top and bottom H = 20 mm (0.79 in).

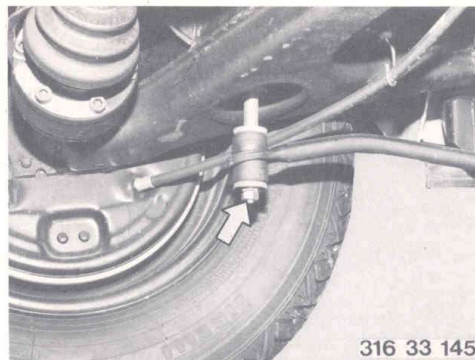


BMW 323i:
Upper and lower coil spring underlays without identification mark: H = 20 mm (0.79 in).
Upper and lower coil spring underlays color-coded red:
Top: H = 26 mm (1.02 in)
Bottom: H = 20 mm (0.79 in)

33 55 000 Stabilizer (anti-roll bar) – removing and installing

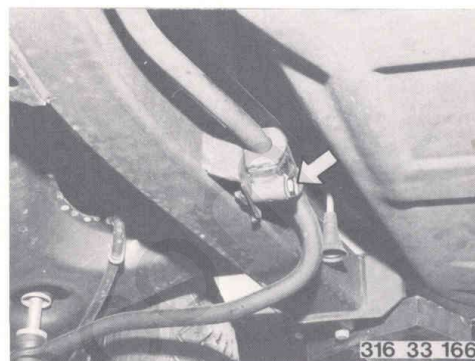
Detach stabilizer from semi-trailing arm.

When installing: note correct tightening torque¹⁾.



Detach stabilizer from rear axle beam.

When installing: check condition of retaining bushings and renew if necessary. Slotted side of rubber bushing must face upwards. Note correct tightening torque¹⁾.



¹⁾ See specifications

¹⁾ See specifications