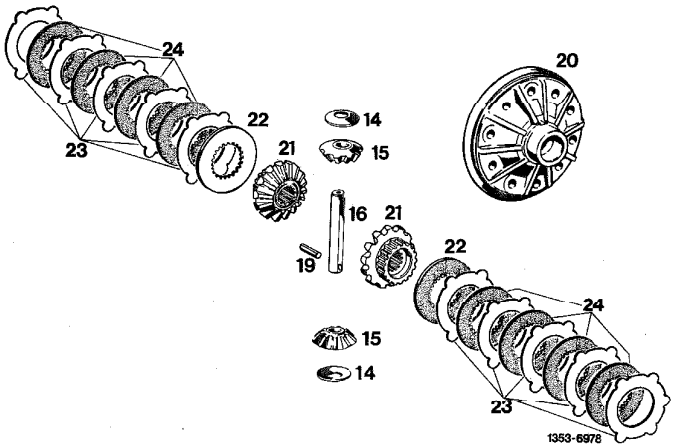
B. Differential with limited slip



14	Spherical washer	Renew
15	Differential pinion	Check for damage
16	Differential pinion shaft	Check for wear
19	Clamping sleeve	Renew
20	Differential housing	Check vertical and axial runout on fitted dia. for ring gear, max. 0.02 mm
21	Differential side gear	Check for damage
22	Friction disc with lining on one side	Renew, selecting thickness to obtain a friction torque of 80–140 Nm
23	Friction disc without lining	Check for wear
24	Friction disc with lining on both sides	Check for wear

35–560 Reconditioning differential

Adjustment of differential gears

Friction torque when rotating complete differential		80–140 Nm

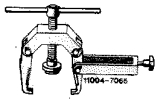
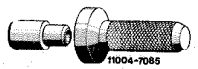
Differential

Permissible vertical runout of differential housing at fit for ring gear		0.02
Permissible lateral runout of differential housing at flange surface for ring gear		0.02

Thickness of friction discs

Without lining		1.1
With lining on both sides		1.8
With lining on one side	Thickness	3.0–3.6 and 4.0
	Steps	from 0.1 to 0.1 and 0.4
Clamping sleeve		6 x 45

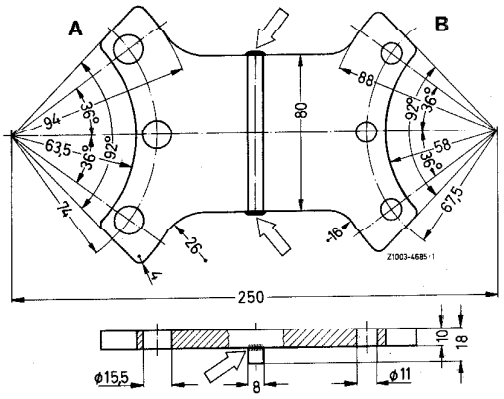
Special tools

Puller for tapered roller bearing		123 589 08 33 00
Assembly mandrel (2 each) for side gears		116 589 18 61 00
Assembly mandrel for differential gears		126 589 02 15 00
Assembly mandrel for inner race of tapered roller bearing		116 589 08 61 00

Self-made tool

Clamping device for differential

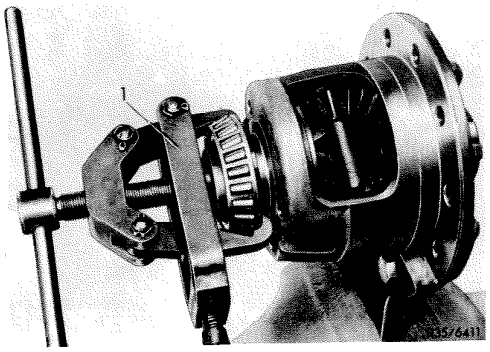
A = large rear axle center piece
B = small rear axle center piece
Arrow = intermediate web welded



Disassembly

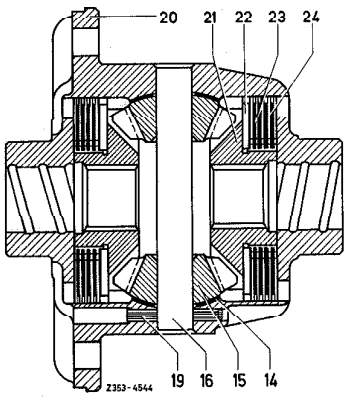
1 Clamp differential with clamping device (self-made) into vise.

2 Pull both tapered roller bearings from differential housing by means of puller (1).



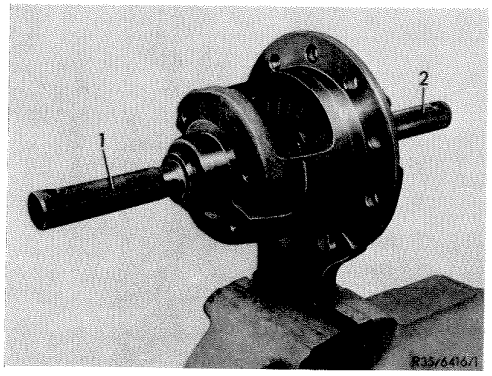
3 Knock clamping sleeve (19) for differential pinion shaft (16) out of differential housing (20) by means of a matching mandrel.

4 Knock out differential bolt (16).

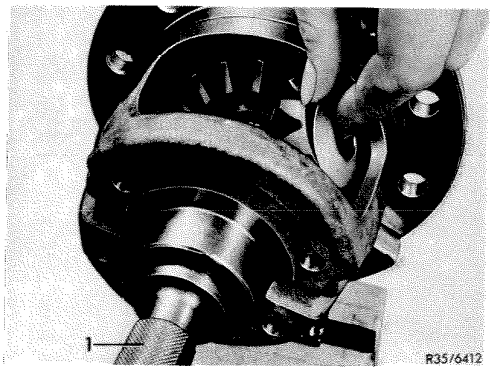


14 Ball washer (spherical washer)
15 Differential pinion
16 Differential pinion shaft
19 Clamping sleeve (hollow dowel pin)
20 Differential housing
21 Side gear
22 Friction disc with lining on one side
23 Friction disc with lining on both sides
24 Friction disc without lining

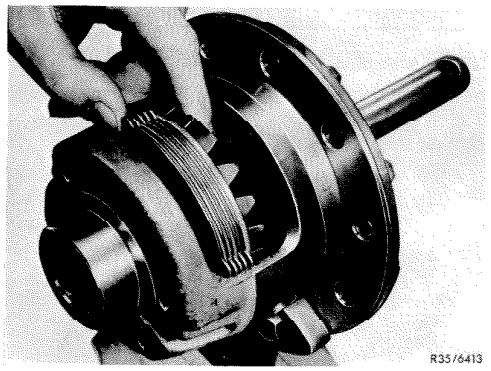
5 Insert assembly mandrels (1 and 2) for guiding side gears.



6 Turn out differential pinions with ball washers and remove.



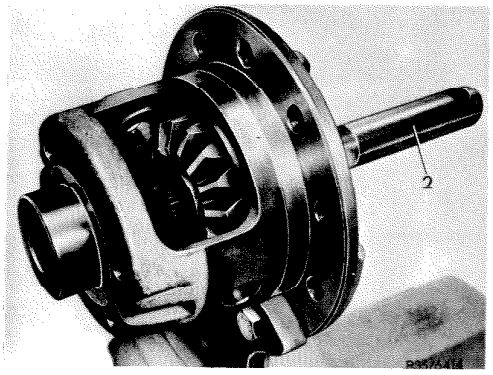
7 Remove righthand side gear with friction discs.



8 Remove lefthand side gear with friction discs.

9 Check individual parts for re-use and renew, if required.

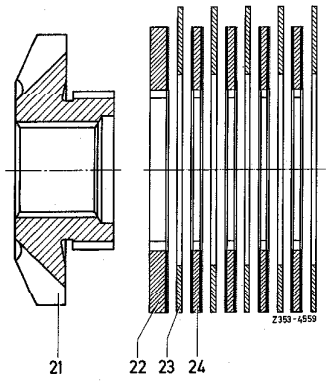
10 Check bores in differential housing. Check fit for ring gear for vertical runout and contact surface for lateral runout.



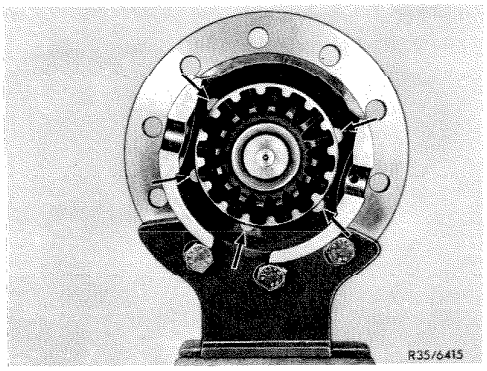
Assembly

Note: When new friction discs are installed, it will be of advantage to measure the removed friction discs with lining on one side (22) and to reinstall new friction discs of the same thickness.

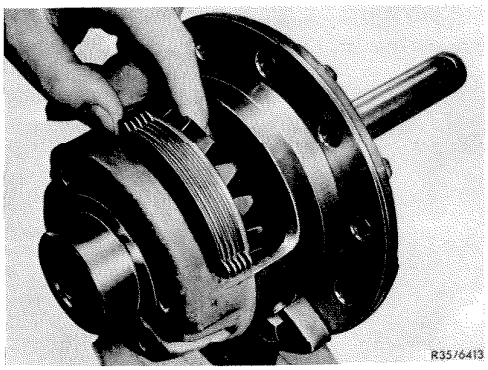
11 Place friction discs in correct sequence on both side gears and coat friction discs with lining (22 and 24) with Hypoid gear oil (refer to specifications for service products page 235.3).



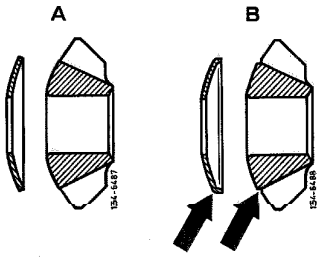
12 Install lefthand side gear (ring gear end) together with friction discs and insert assembly mandrel, while paying attention to lugs of friction discs without lining (arrows).



13 Install righthand side gear with friction discs and assembly mandrel.

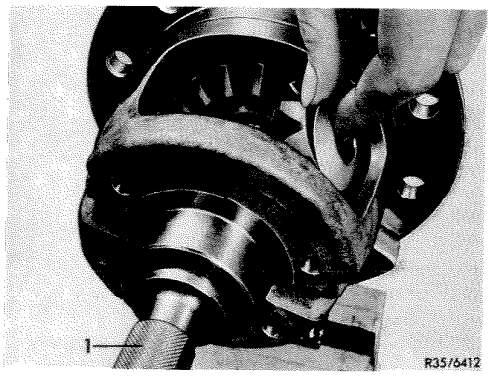


Attention!
To facilitate assembly, the ball washers of the present version (B) of the differential are provided with a collar at OD and the differential pinions with a shoulder (arrows). Mount differential pinions and ball washers only in the combination shown in illustration.

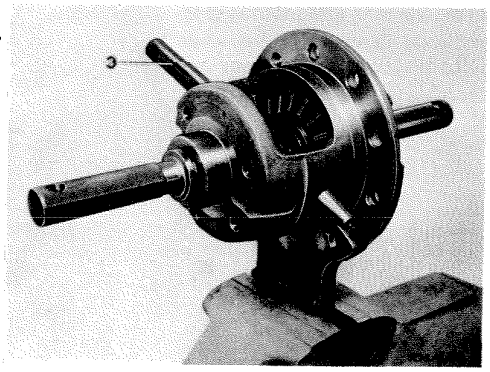


14 Insert one differential pinion with ball washer into differential and turn downward.

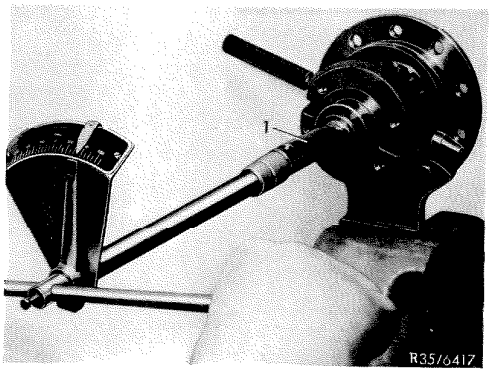
15 Insert second differential pinion with ball washer exactly opposite and turn down together until bores of differential pinion and differential housing are in alignment.



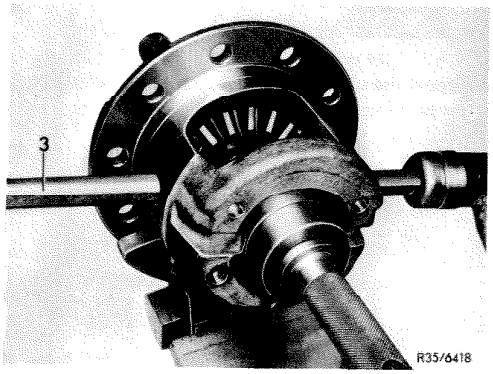
16 Insert assembly mandrel (3) instead of differential pinion shaft to locate differential pinions and ball washers.



17 Check friction torque. Friction torque should amount to approx 80–140 Nm.

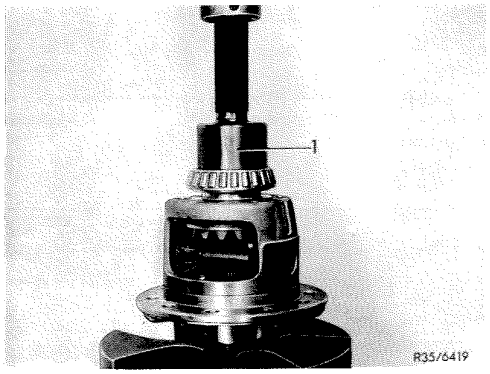


18 Knock in differential pinion shaft and remove assembly mandrel (3).

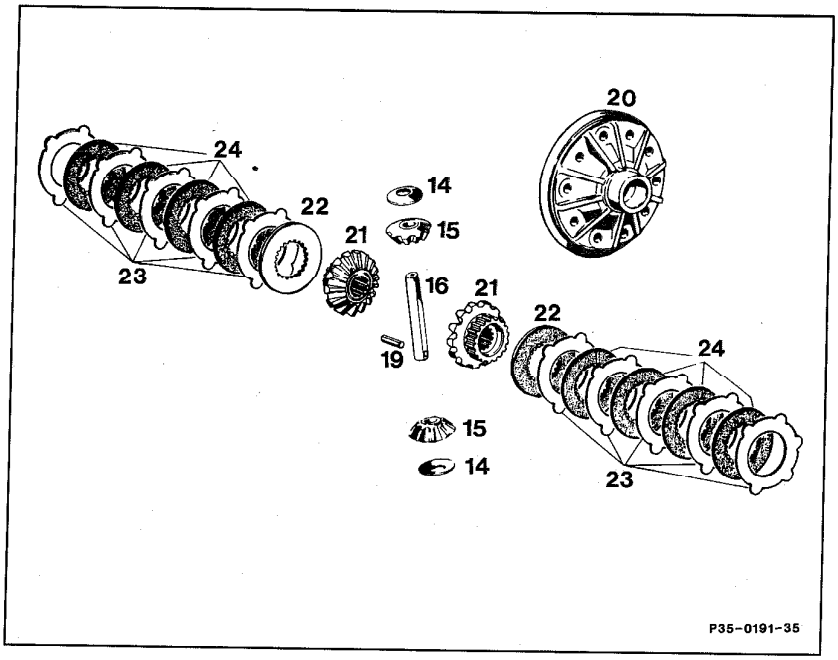


19 Knock in new clamping sleeve.

20 Press on inner races of tapered roller bearings by means of assembly mandrel (1).



B. Limited slip differential, ring gear diameter 210 mm



P35-0191-35

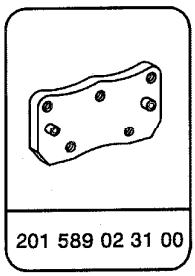
Differential	clamp, unclamp. Clamping tool 201 589 02 31 00.
Clamping sleeve (19)	drive out, drive in, replace.
Differential pinion gear (16)	press out, press in. Insert installation punches 116 589 18 61 00 into rear axle shaft gears. To assemble first fix differential gears (15) and ball washers (14) with installation punch 126 589 02 15 00 and **check frictional torque** (nominal value 80-160 Nm, steps 3–6). Remove installation punch.
Differential gears (15), ball washers (14)	screw out, screw in.
Right rear axle shaft gear (21) with friction disks (22, 23, 24)	remove, install.
Left rear axle shaft gear (21) with friction disks (22, 23, 24)	remove, install. Installation punch 116 589 18 61 00.
Check	all parts for reusability (steps 9-10).

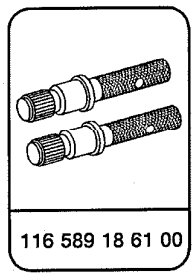
Adjustment of differential gears		
Friction torque when rotating complete differential		80–160 Nm

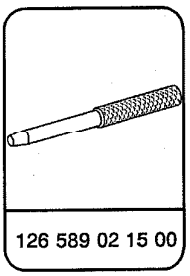
Differential		
Permissible vertical runout of differential case on fit for ring gear		0.02
Permissible lateral runout of differential case on flange surface for ring gear		0.02

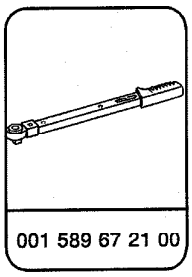
Thickness of friction disks		
Without lining		1.1
With lining on both sides		1.8
With lining on one side	Thickness	2.8-3.6 and 4.0
	Increments	0.1 to 0.1 and 0.4
Clamping sleeve		6 × 45

Special tools


201 589 02 31 00

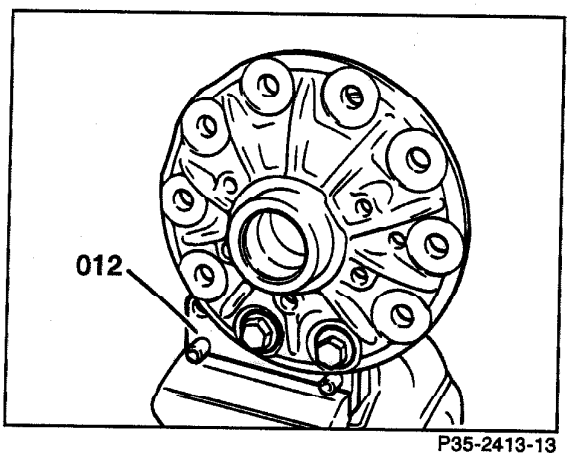

116 589 18 61 00


126 589 02 15 00


001 589 67 21 00

Disassembly, assembly

1 Clamp differential onto clamping tool (012) 201 589 02 31 00, unclamp.

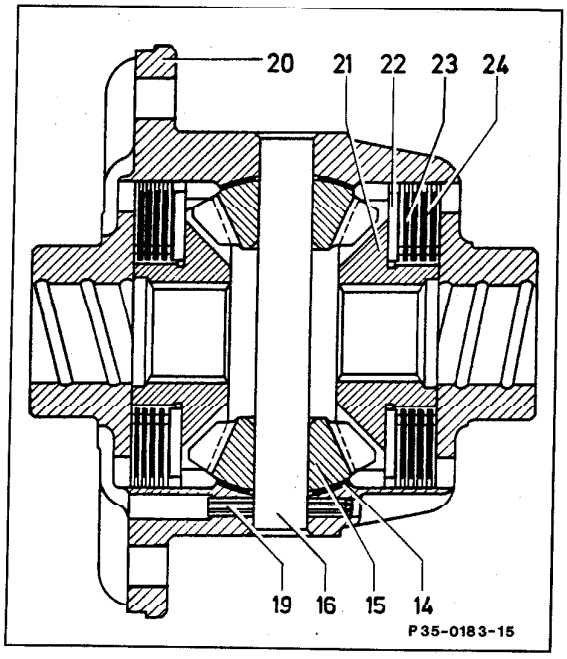


P35-2413-13

2 Press clamping sleeve (19) for differential pinion shaft (16) out of differential case (12) with correct size punch, press in.

Installation note
Replace clamping sleeve.

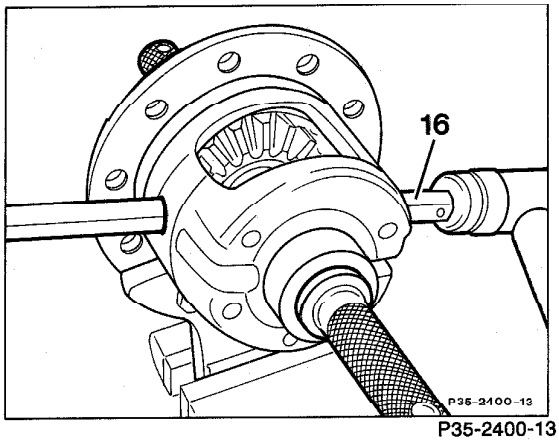
3 Knock out differential pinion shaft (16) with punch 126 589 02 15 00.



P35-0183-15

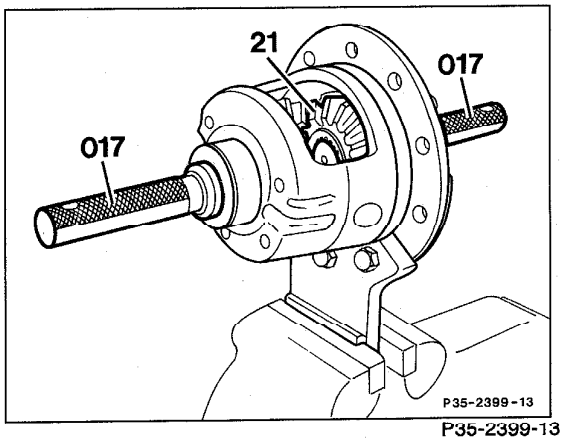
14 Ball washer
15 Differential gear
16 Differential pinion shaft
19 Clamping sleeve
20 Differential case
21 Rear axle shaft gear
22 Friction disk with lining on one side
23 Friction disk without lining
24 Friction disk with lining on both sides

Installation note
When knocking in differential pinion shaft (16) pay attention to bore for clamping sleeve. Remove installation punch.



P35-2400-13

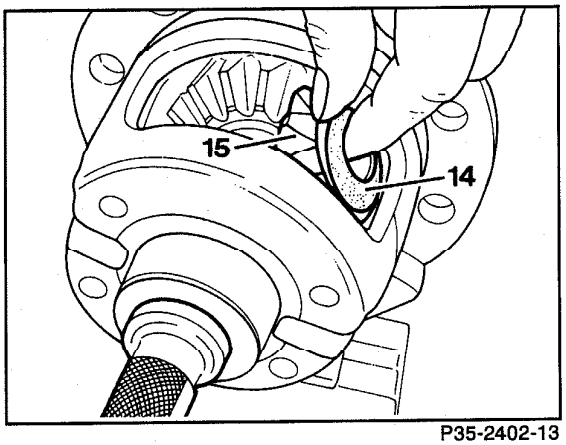
4 Insert installation punches (017) 116 589 18 61 00 for guiding rear axle shaft gears (21).



P35-2399-13

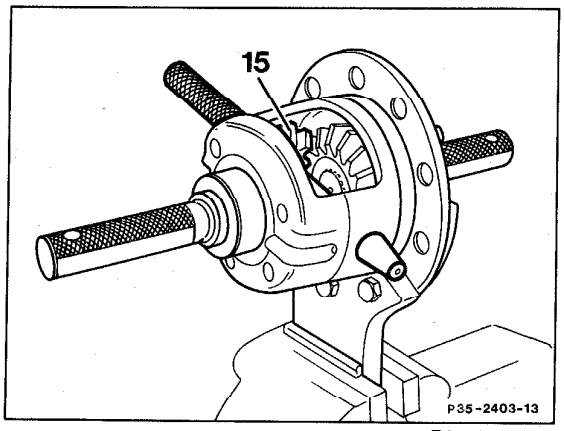
5 Screw out differential gears (15) with ball washers (14) and remove.

Installation note
Insert differential gears (15) with ball washers (14) one after another and screw in until the bores in the differential gears and differential case coincide.



P35-2402-13

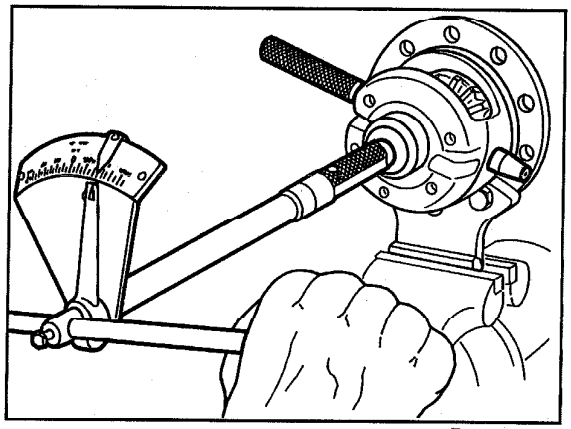
Insert installation punch 126 589 02 15 00 in place of differential pinion shaft for fixing differential gears (15) and washers.



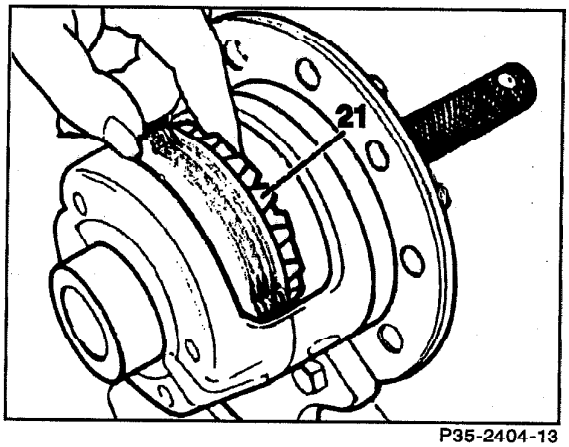
P35-2403-13

6 Check frictional torque.

Note
Select friction disks with lining on one side for rear axle shaft gears so that the frictional torque after assembly is 80-160 Nm.

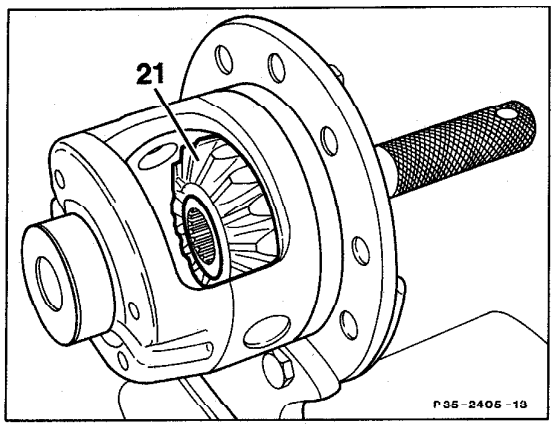

P35-2401-13

7 First remove right rear axle shaft gear (21) with friction disks.



P35-2404-13

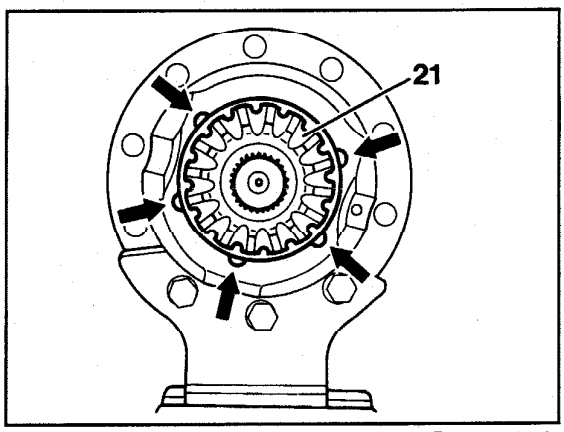
8 Remove left rear axle shaft gear (21) with friction disks.



P35-2405-13

Installation note

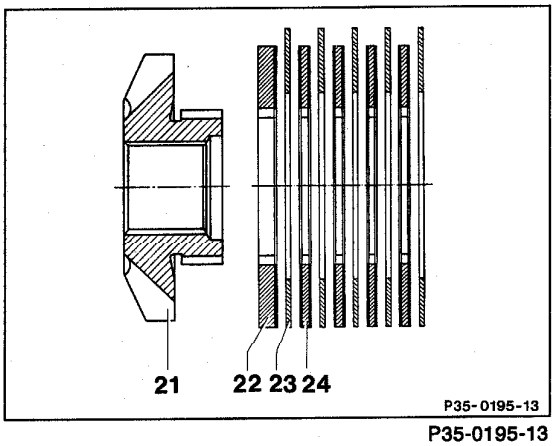
First install left, then right rear axle shaft gear (21, ring gear side) with friction disks, and insert installation punch 116 589 18 61 00, while paying attention to lugs on friction disks without lining (arrows).



P35-2406-13

If new friction disks are installed, it is most practical to measure the friction disks with lining on one side (22) removed previously and install new friction disks of the same thickness.

Install friction disks on both rear axle shaft gears in proper order and coat friction disks with lining (22 and 24) well with hypoid gear oil (refer to Factory Approved Service Products list).

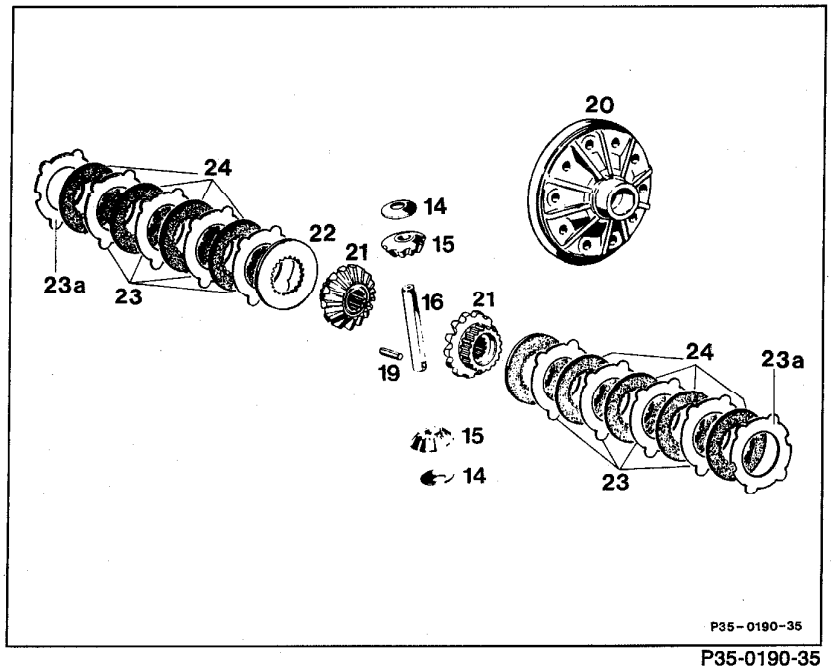


P35-0195-13

9 Check individual parts for reusability and replace, if required.

10 Check bores in differential case. Check vertical runout of fit for ring gear and lateral runout of contact surfaces.

C. Differential with ASD, ring gear diameter 185 mm



P35-0190-35

Differential	clamp, unclamp. Clamping tool 201 589 02 31 00.
Clamping sleeve (19)	drive out, drive in, replace.
Differential pinion gear (16)	press out, press in. Insert installation punches 116 589 18 61 00 into rear axle shaft gears. To assemble first fix differential gears (15) and ball washers (14) with installation punch 123 589 06 15 00 and **check frictional torque** (nominal value 80-160 Nm, steps 3–6). Remove installation punch.
Differential gears (15), ball washers (14)	screw out, screw in (step 5).
Right rear axle shaft gear (21) with friction disks (22, 23, 23a, 24)	remove, install. Installation punch 116 589 18 61 00 (step 6).
Left rear axle shaft gear (21) with friction disks (22, 23, 23a, 24)	remove, install. Installation punch 116 589 18 61 00 (step 7).
Check	all parts for reusability (step 9).

Adjustment of differential gears

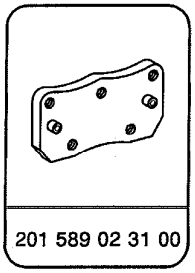
Friction torque when rotating complete differential	80–160 Nm

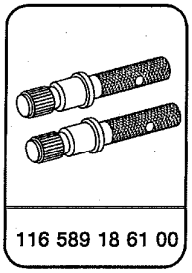
Differential

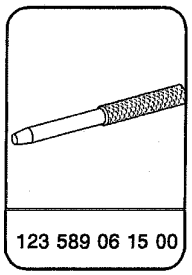
Permissible vertical runout of differential case on fit for ring gear	0.02
Permissible lateral runout of differential case on flange surface for ring gear	0.02

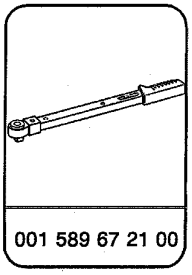
Thickness of friction disks		
Without lining with 5 tabs (4 per side)		1.0
Without lining with 4 tabs and 2 grooves (1 per side)		
With lining on both sides		1.8
With lining on one side	Thickness	2.8-3.6 and 4.0
	Increments	0.1 to 0.1 and 0.2
Clamping sleeve		6×40

Special tools


201 589 02 31 00

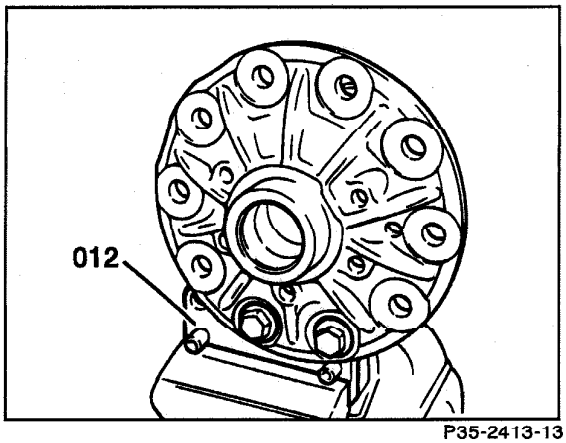

116 589 18 61 00


123 589 06 15 00


001 589 67 21 00

Disassembly, assembly

1 Clamp differential onto clamping tool (012) 201 589 02 31 00, unclamp.

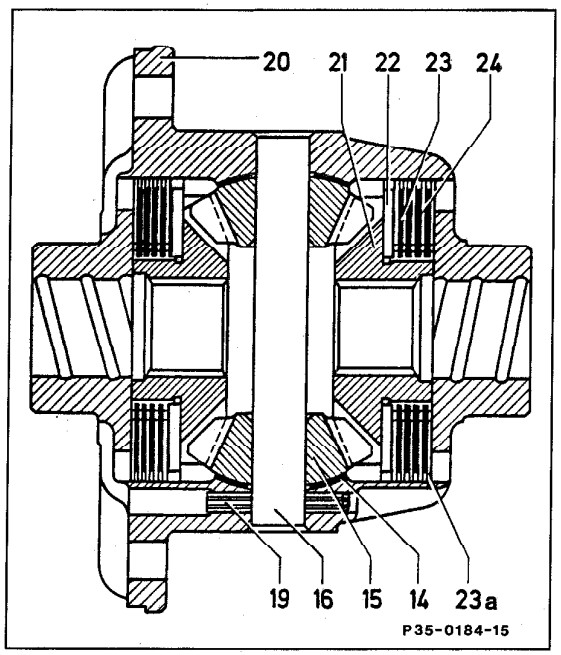


P35-2413-13

2 Press clamping sleeve (19) for differential pinion shaft (16) out of differential case (20) with correct size punch, press in.

Installation note
Replace clamping sleeve.

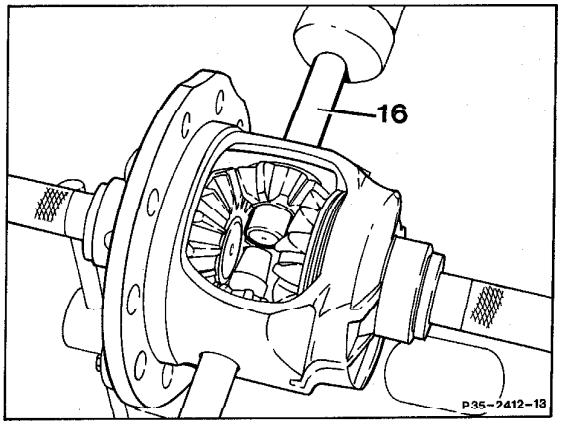
3 Knock out differential pinion shaft (16) with punch 123 589 06 15 00.



P35-0184-15

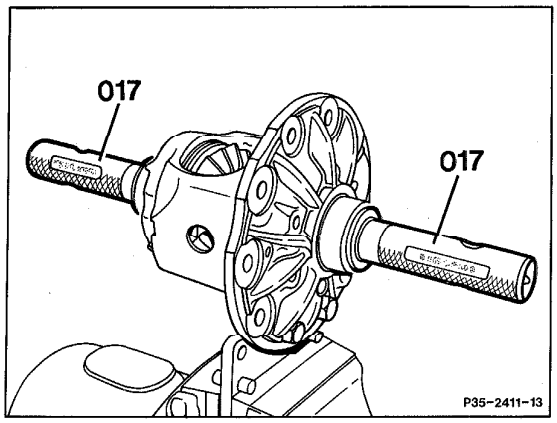
14 Ball washer
15 Differential gear
16 Differential pinion shaft
19 Clamping sleeve
20 Differential case
21 Rear axle shaft gear
22 Friction disk with lining on one side
23 Friction disks without lining with 5 tabs
23a Friction disk without lining with 4 tabs and 2 grooves
24 Friction disks with lining on both sides

Installation note
When knocking in differential pinion shaft (16) pay attention to bore for clamping sleeve.
Remove installation punch



P35-2412-13

4 Insert installation punches (017) 116 589 18 61 00 for guiding rear axle shaft gears.

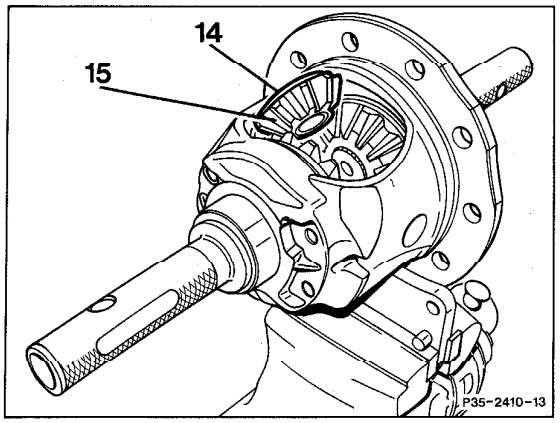


P35-2411-13

5 Screw out differential gears (15) with ball washers (14) and remove.

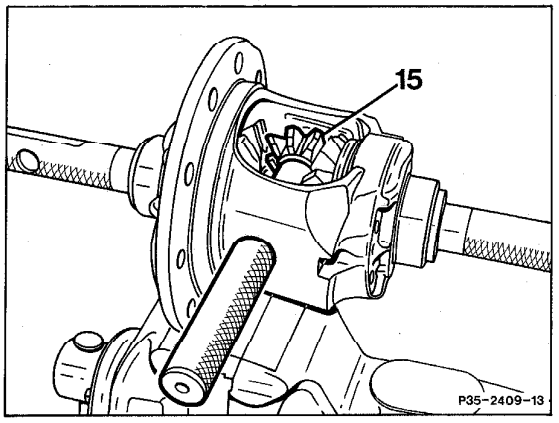
Installation note

Insert differential gears (15) with ball washers (14) one after another and screw in until the bores in the differential gears and differential case coincide.



P35-2410-13

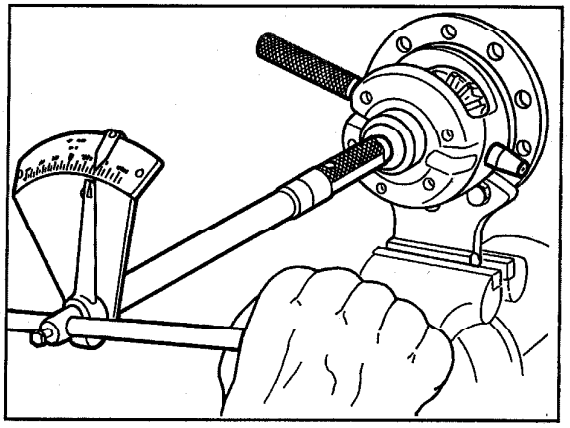
Insert installation punch 123 589 06 15 00 in place of differential pinion shaft for fixing differential gears (15) and washers.



P35-2409-13

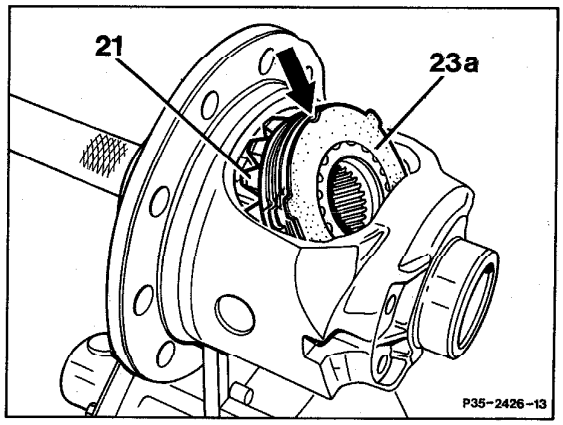
6 Check frictional torque.

Note
Select friction disks with lining on one side for rear axle shaft gears so that the frictional torque after assembly is 80-160 Nm.



P35-2401-13

7 First remove right rear axle shaft gear (21) with friction disks.



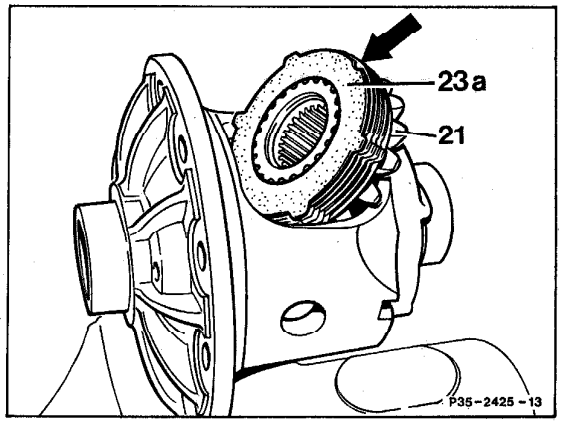
P35-2426-13

8 Remove left rear axle shaft gear (21) with friction disks.

Installation note
First install left, then right rear axle shaft gear (21, ring gear side) with friction disks, and insert installation punch 116 589 18 61 00.

⚠

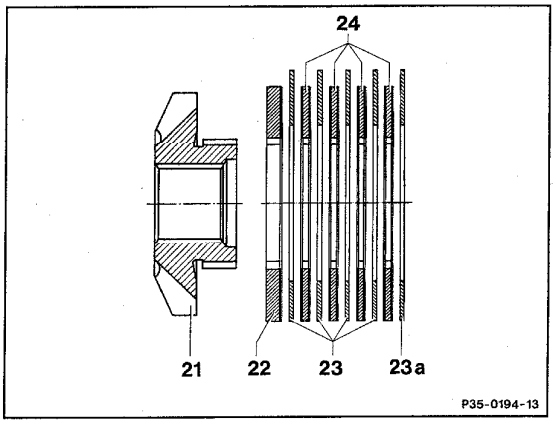
Install friction disk (23a) without lining with two grooves (arrow) as final friction disk (observe installation position).



P35-2425-13

If new friction disks are installed, it is most practical to measure the friction disks with lining on one side (22) removed previously and install new friction disks of the same thickness.

Install friction disks on both rear axle shaft gears in proper order and coat friction disks with lining (22 and 24) well with hypoid gear oil (see Specifications for Service Products page No. 235.3).



P35-0194-13

21 Rear axle shaft gear
22 Friction disk with lining on one side
23 Friction disks without lining with 5 tabs
23a Friction disk without lining with 4 tabs and 2 grooves
24 Friction disks with lining on both sides

9 Check individual parts for reusability and replace, if required.

10 Check bores in differential case. Check vertical runout of fit for ring gear and lateral runout of contact surfaces.