

Oil Types and Filling Capacity

Rear axle without positive traction differential	E. P. Hypoid Gear Oil SAE 90 see: Operative Materials page No. 235
Rear axle with positive traction differential (identification plate on rear axle housing)	Special E. P. Hypoid Gear Oil see: Operative Materials page No. 235.3
Filling capacities	Large center housing ¹⁾ 1.3 lits.
	Small center housing ¹⁾ 1.15 lits.

Compensating Washers for Adjusting Backlash

Thickness	Large center housing ¹⁾ 0.9 to 1.4
	Small center housing ¹⁾ 0.6 to 1.5
Steps	0.1 to 0.1

Note: If required, grind one compensating washer down to required thickness.

Adjusting Data of Gear Assembly

Backlash of gear assembly	0.08–0.14 mm
Adjustment of tapered roller bearing for differential: The tapered roller bearings are given the required preload by widening (spreading) the rear axle housing by	Large center housing ¹⁾ 0.15–0.20 mm
	Small center housing ¹⁾ 0.10–0.15 mm

Tightening Torques	Nm	(kpm)
Hex. bolts for bearing cover on rear axle housing	20	(2)
Hex. bolts for attaching end cover to rear axle housing	45	(4.5)
Ring gear bolts	Large center housing ¹⁾ 120	(12)
	Small center housing ¹⁾ 80	(8)

Special Tools

Remover for tapered roller bearing outer race at sealing ring from bearing cover	115 589 00 35 00
Disassembly tool for tapered roller bearing from bearing cover	116 589 00 35 00
Disc for tapered roller bearing in bearing cover	Large center housing ¹⁾ 116 589 11 61 00 Part 5
	Small center housing ¹⁾ 116 589 11 61 00 Part 1

1) Refer to installation survey rear axle center housing 35.1–500.

35.1

Installation of Differential and Ring Gear Adjustment of Backlash

Special Tools

Pressing-in sleeve for tapered roller bearing in bearing cover	116 589 06 43 00	
Remover for pulling tapered roller bearing from differential	187 589 05 33 00	
Punch for sealing ring on bearing cover	116 589 05 43 00	
2 Assembly fixtures for bearing cover	116 589 06 61 00	
Backlash measuring device	115 589 03 23 00	
Spread measuring device	Large center housing ³⁾	116 589 04 21 00
	Small center housing ³⁾	115 589 04 21 00
2 Supporting blocks for spread measuring device	Large center housing ³⁾	116 589 08 61 00
	Small center housing ³⁾	115 589 04 61 00
Assembly mandrel for tapered roller bearing on differential		
Assembly fixture for rear axle center piece	116 589 00 59 00	

3) Refer to installation survey rear axle center housing 35.1-R 500.

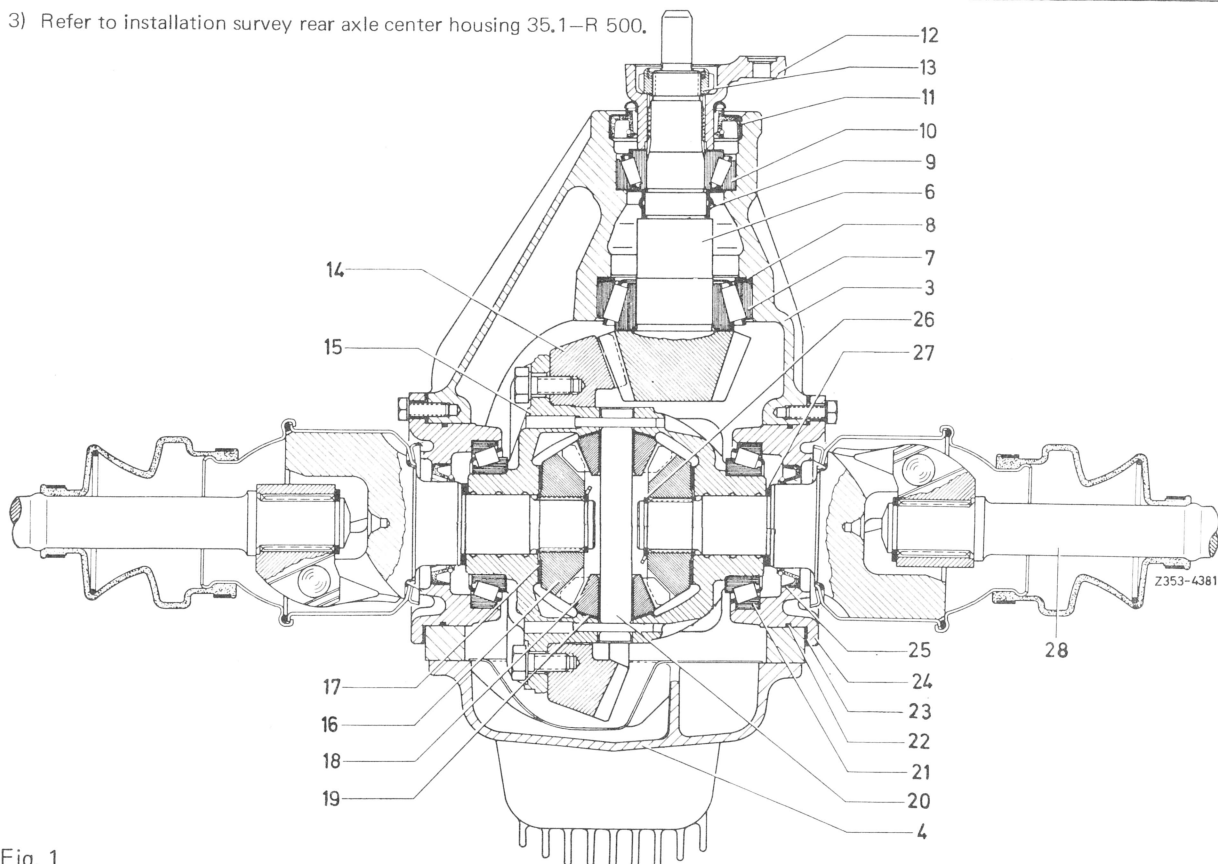


Fig. 1

- | | | | |
|---------------------------|-----------------------------|---------------------------|------------------------|
| 3 Rear axle housing | 11 Sealing ring | 17 Thrust plate | 23 Compensating washer |
| 4 End cover | 12 Universal flange | 18 Differential pinion | 24 Bearing cover |
| 6 Drive pinion | 13 Self-locking slotted nut | 19 Spherical washer | 25 Sealing ring |
| 7 Tapered roller bearing | 14 Ring gear | 20 Differential pin | 26 Locking ring |
| 8 Compensating washer | 15 Differential housing | 21 Tapered roller bearing | 27 Compensating washer |
| 9 Spacer sleeve | 16 Side gear | 22 Sealing ring | 28 Rear axle shaft |
| 10 Tapered roller bearing | | | |

Note

The backlash of the gear assembly and the required preload of the tapered roller bearings in relation to the bearings of the differential are adjusted by means of compensating washers placed between the bearing covers and the rear axle housing. Compensating washers are available in various degrees of thickness. For assembly, the previously removed bearing covers and compensating washers are most suitably re-installed on the same side.

Installation of Differential

1 Remove sealing rings with mandrel from bearing covers (Fig. 2).

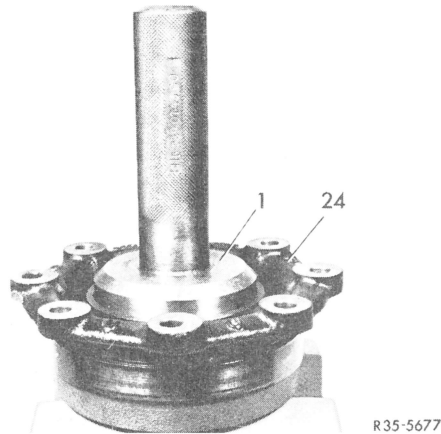


Fig. 2 (large center housing)

- 1 Mandrel 115 589 00 35 00 Part 5
- 24 Bearing cover

1a Press-out sealing rings and outer bearing races (Fig. 3).

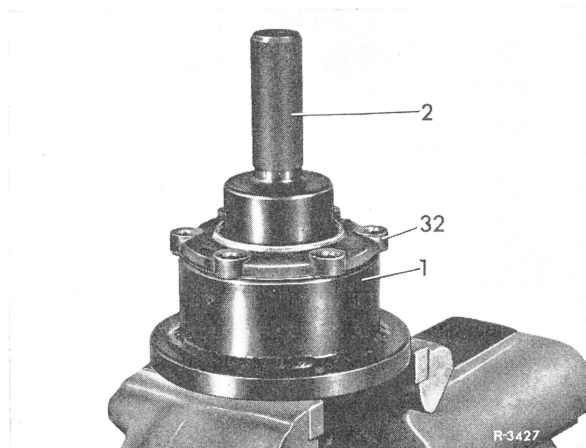


Fig. 3 (small center housing)

- 1, 2 Remover 115 589 00 35 00
- 32 Bearing cover

2 Remove bearing outer races with disassembly tool (Fig. 4).

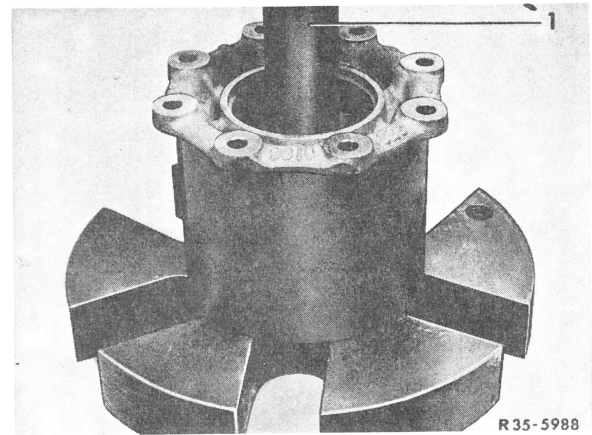


Fig. 4 (large center housing)

- 1 Disassembly tool 116 589 00 35 00

3 Press in new bearing races with installation sleeve (Fig. 5).

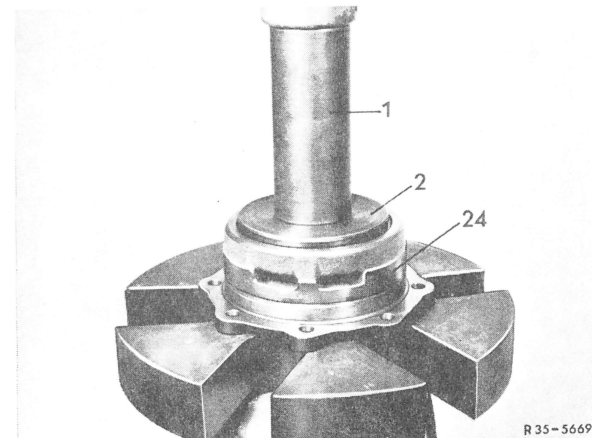


Fig. 5

- 1 Installation sleeve 116 589 06 43 00 Part 5 (large center housing)
- 2 Disc 115 589 00 61 00 Part 1 (small center housing)
- 24 Bearing cover

4 Coat new sealing rings on outside diameter with sealing compound and press into bearing covers with mandrel up to stop (Fig. 6).

5 Place the previously removed compensating washers on bearing covers and install new sealing rings into grooves of bearing covers (Fig. 7).

6 Pull off bearing inner races (Fig. 8).

7 Press on new bearing inner races (Fig. 9).

35.1 Installation of Differential and Ring Gear Adjustment of Backlash

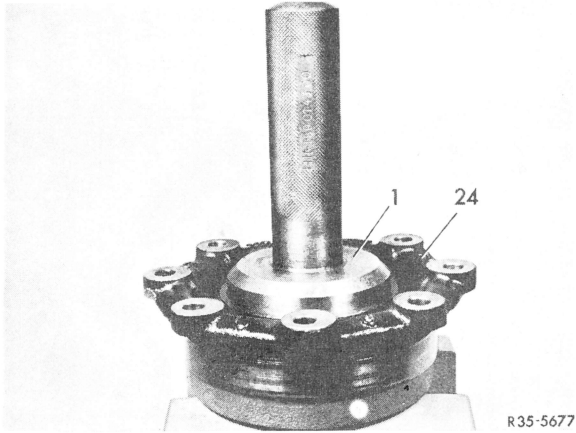


Fig. 6
1 Punch 116 589 05 43 00 24 Bearing cover

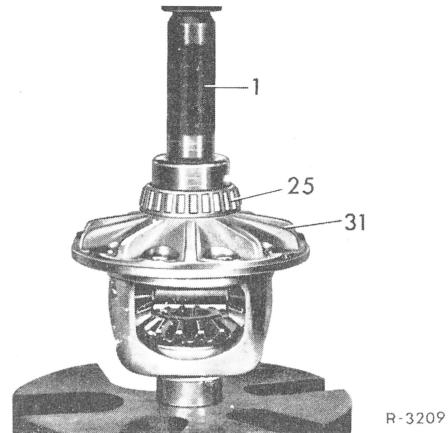


Fig. 9
1 Assembly mandrel 116 589 08 61 00
(large center housing)
115 589 04 61 00 (small center housing)
25 Tapered roller bearing inner race
31 Differential housing

8 Carefully clean bore of ring gear and seat on differential housing. Heat ring gear to approx. 60–70°C and place on differential housing, while observing the markings of the ring gear and the differential housing, if applicable.

Note: If the ring gear does not drop on the differential housing, assist with light hammer blows (rubber hammer). Make sure that no chips will occur during installation.

9 Tighten hex. bolts for attaching ring gear uniformly and crosswise to the torque indicated in page 1 (Fig. 10).

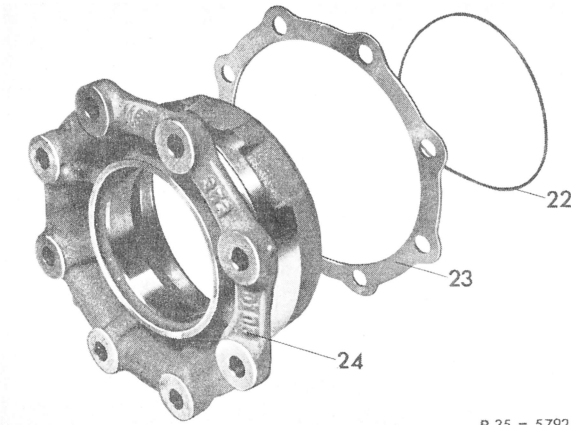


Fig. 7
22 Sealing ring
23 Compensating washer
24 Bearing cover

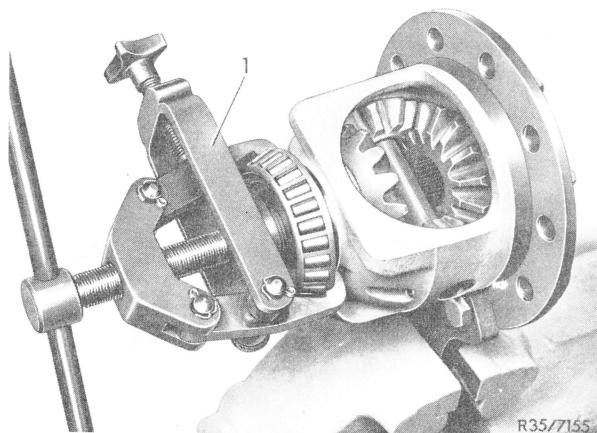


Fig. 8
1 Remover 187 589 05 33 00

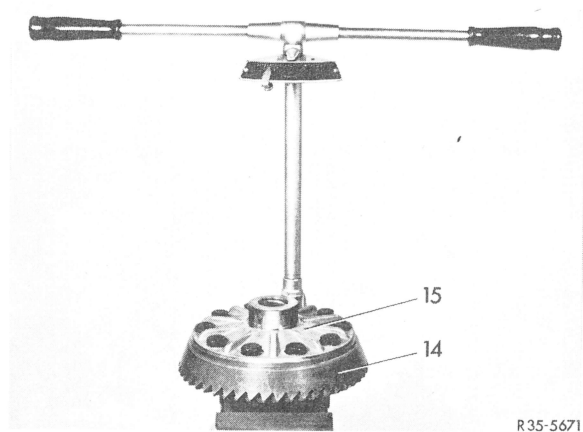


Fig. 10
14 Ring gear
15 Differential housing

10 Place differential into rear axle housing (Fig. 11 and 12).

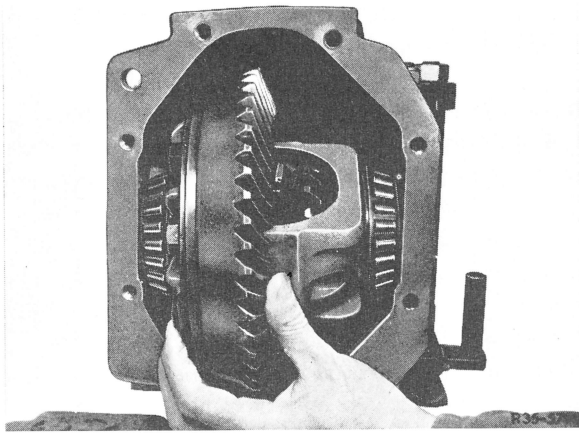


Fig. 11 (large center housing)

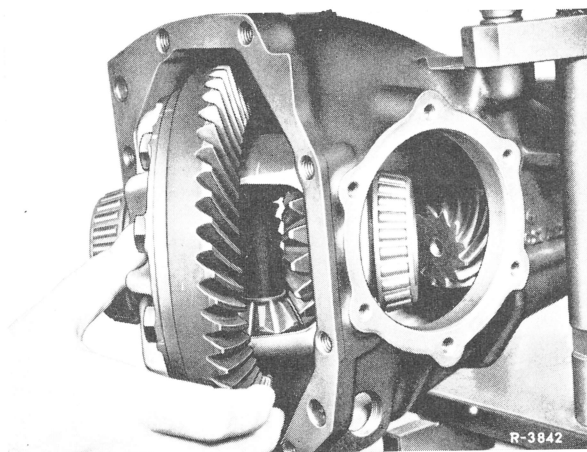


Fig. 12 (small center housing)

Adjustment of Backlash

11 Attach assembly fixture to rear axle housing. Place both bearing covers with compensating washers on centering surface and slide into rear axle housing on the same side from which they were removed while simultaneously centering the differential housing (Fig. 13).

12 Turn both bearing covers in such a manner that the marking "bottom" ("unten") faces downwards (Fig. 14).

13 Remove assembly fixture from rear axle housing.

14 Screw-in hex. bolts for attaching bearing cover to rear axle housing, but **do not yet tighten**.

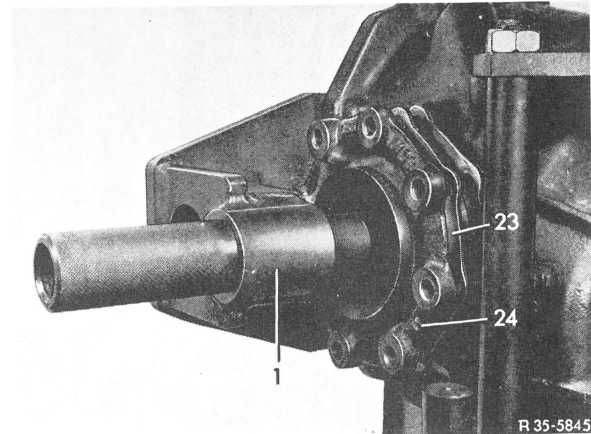


Fig. 13

1 Assembly fixture
116 589 06 61 00

23 Compensating washer
24 Bearing cover

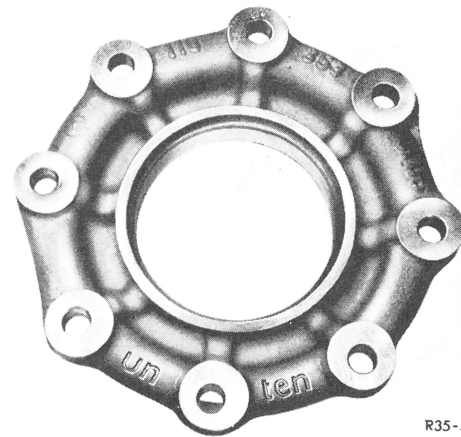


Fig. 14

15 Screw supporting blocks for spread measuring device at right and left to sealing surface of rear axle housing. Place spread measuring device with dial gauge on supporting blocks and set dial gauge under preload to "0" (Fig. 15).

16 Tighten all hex. bolts on bearing covers cross-wise to a torque of 20 Nm (2 kpm).

17 Place spread measuring device again on supporting blocks and measure spread (expansion) of rear axle housing. The required spread of the rear axle housing and thereby the correct preload of the tapered roller bearings on differential is attained when the spread is in range of values stated on page 1.

35.1 Installation of Differential and Ring Gear Adjustment of Backlash

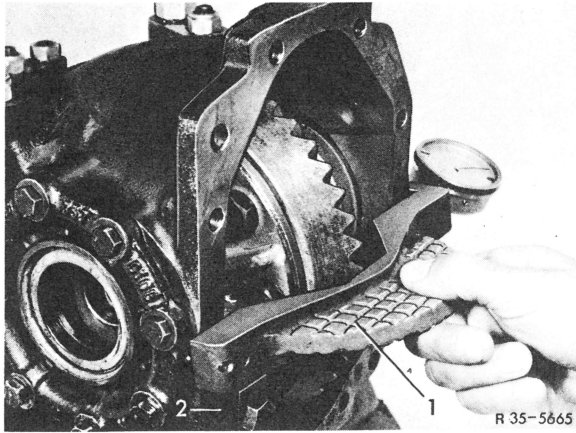


Fig. 15

- 1 Spread measuring device
116 589 04 21 00 (large center housing)
115 589 04 21 00 (small center housing)
- 2 Support 115 589 04 21 00 Part 3

18 Insert backlash measuring instrument into righthand bore of differential housing and clamp down (Fig. 16).

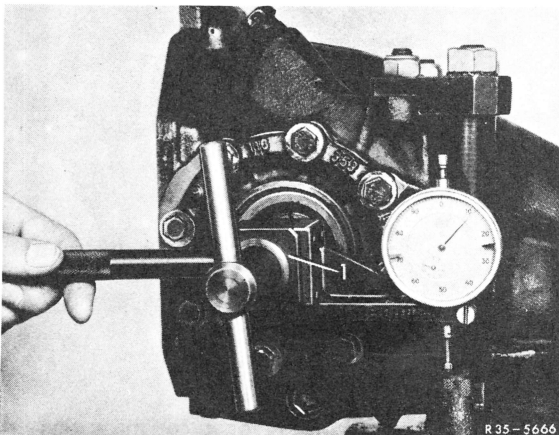


Fig. 16

- 1 Backlash measuring device

19 Move dial gauge holder to measure backlash at four points with reference to circumference of ring gear. The lowest backlash is decisive. **The backlash should be 0.08 to 0.14 mm.** Hold drive pinion in position on universal flange when measuring.

Note: The adjustment of the tapered roller bearings and of the gear assembly is in order, when the spread (expansion) of the rear axle housing and the backlash are within the range of the nominal values. If these values are not attained, adjustments must be repeated with pertinently thicker or thinner compensating washers. If, for example, the backlash is in order, but the spread of the rear axle housing is too low, use compensating washers on both bearing covers which are each thinner by the same amount.

20 Install lefthand and righthand rear axle shaft with **new** locking rings (35.1–220).

21 Clean sealing surface on end cover and on rear axle housing and coat with sealing compound. Mount end cover (tightening torque of hex. bolts 45 Nm (4.5 kpm)).

22 Install rear axle center piece with rear axle shafts (35.1–110 or 120).