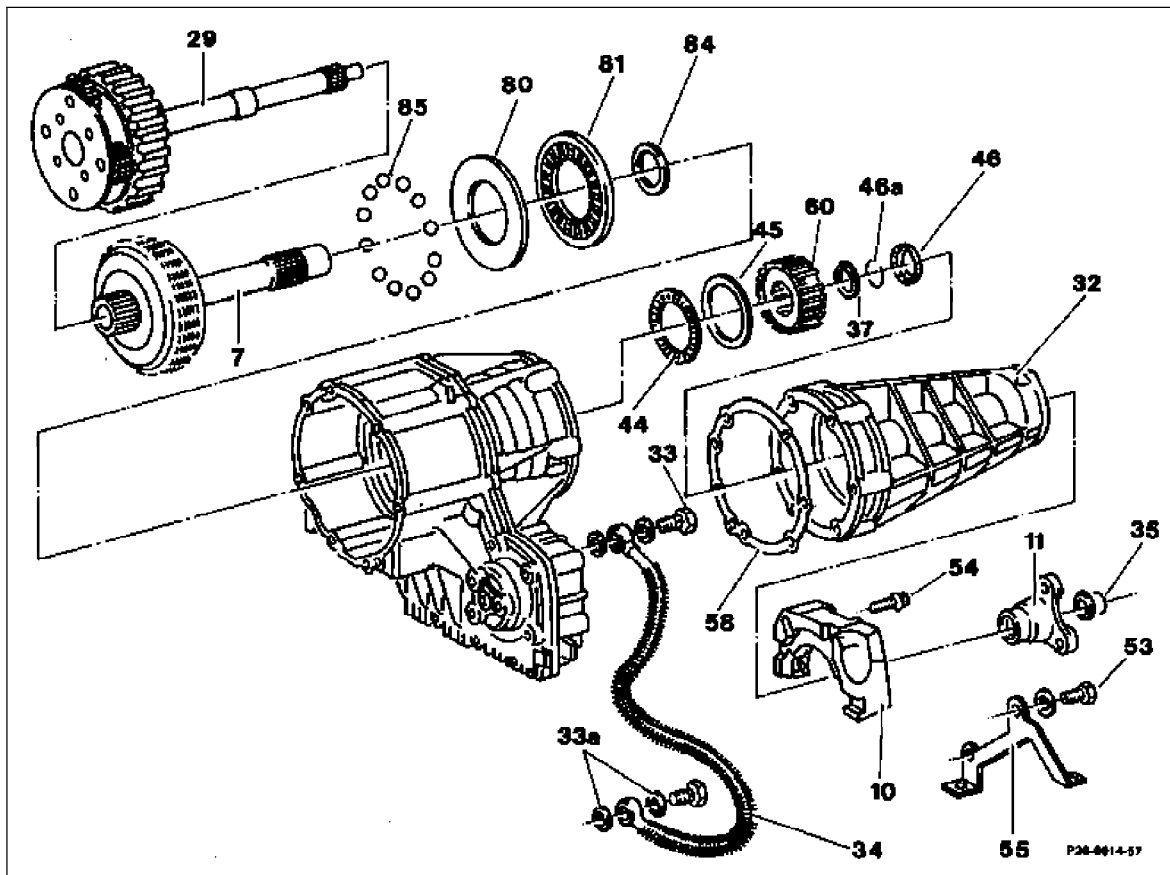


28-300 Dismantling and assembling transfer case

Preceding work:
Transfer case removed (28-200)

A. Removal and installation of sun gear shaft



Locating plate 124 589 22 63 00 _____ Detach, attach to assembling trestle 116 589 06 59 00 (number 1).

Internal-gear wheel 124 589 22 63 04 up to transmission no. 7012, internal-gear wheel 124 589 22 63 14 as of transmission no 7013 _____ Mount on the planet carrier (29). Note dowel pins (number 2).

Bolts (33) _____ Unscrew, screw on 55 Nm. Remove oil cooler pipe (34). Replace gasket (33a) (number 3)

Hydraulic connection of center differential lock (ZS) and front axle drive train (AV) _____

Collar nut (35) _____

Joint flange (11) _____

Bolts (54) _____

Unscrew, screw in.

Unscrew, screw on, 160 Nm. Replace and secure (number 3).

Socket wrench 126 589 02 09 00.

Detach, push on (number 3)

Unscrew, screw in, 20 Nm. Remove, mount vibration tilger (10) (number 4).

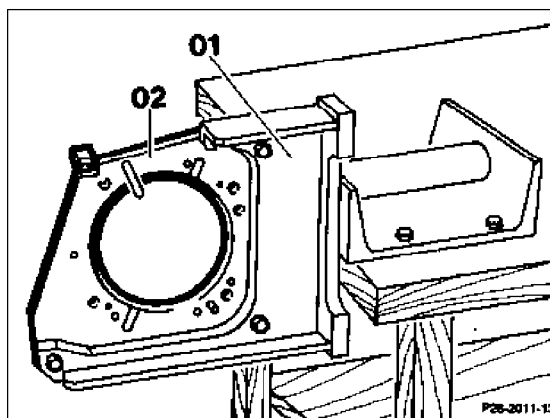
Bolts (53) _____	<p>Unscrew, screw in, 28 Nm.</p> <p>Withdraw transmission housing cover (32) and bracket (55). Clean sealing surfaces, lightly lubricate sealing lip and contact point of radial sealing ring. Replace gasket (58) (number 5).</p> <p>Note</p> <p>The transmission housing cover is fixed with two dowel pins.</p>
Bolts (46) _____	<p>Remove, install. Remove, install snap ring (46a) with pliers 000 589 52 37 00. Pull out, install planet gear shaft (29) (number 6).</p>
Sun gear shaft (7) _____	<p>To install, mount internal-gear wheel 124 589 23 63 04 or 124 589 22 63 14 on the planet gear shaft (29).</p> <p>Insert thrust pad 124 589 22 63 12. Screw on, screw off strip 124 589 22 63 06.</p> <p>Preload sun gear shaft (7), remove, install circlip (37) (number 7, 8 and 10).</p>
Inner multi-disk carrier of front axle drive train (AV) (60), thrust washer (45) and axial bearing (44) _____	<p>Remove, install (number 9).</p>
Sun gear shaft (7) _____	<p>Unscrew strip 124 589 22 63 06.</p> <p>Remove sun gear shaft (7), install, whilst noting the balls (85) (12 off) (number 10).</p>
Axial bearing (81), thrust washers (80 and 84) and balls (85) (12 off) _____	<p>Remove, install (number 10).</p>

Special tools



Removal and installation

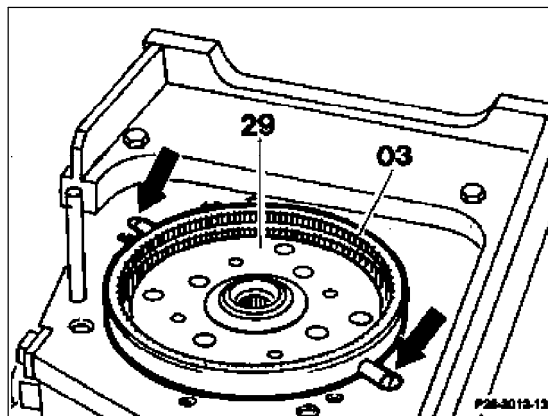
1 Mount locating plate (02) 124 589 22 63 00 on assembly trestle (01) 116 589 06 59 00 and fasten transfer case to locator (02).



2 Mount internal-gear wheel (03) on planet gear carrier (29). The dowel pins (arrows) must engage in the locator plate.

Note

Use internal-gear wheel 124 589 22 63 04, up to transmission no. 7012 and internal-gear wheel 124 589 22 63 14 as of transmission no. 7013.



3 Unscrew banjo bolts (33). Remove oil cooler pipe (34). Unlock collar nut (35) and unscrew using socket wrench bit 126 589 02 09 00. Withdraw joint flange (11).

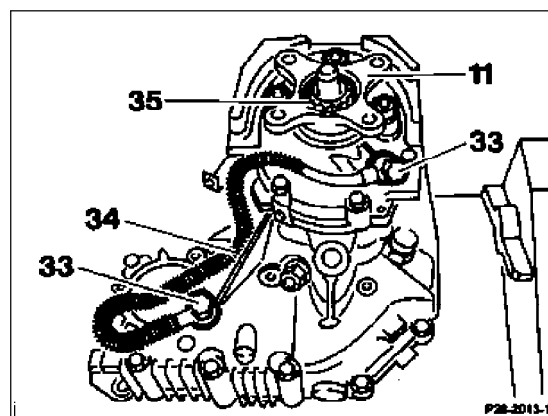
Installation note

Replace oil cooler pipe gaskets (33).

Tightening torque

Banjo bolts (33) 55 Nm,

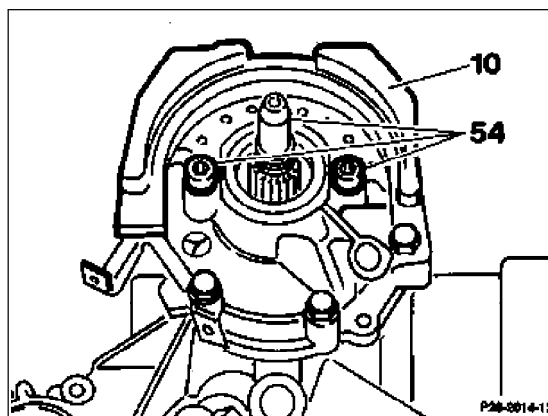
Collar nut (35) 160 Nm.



4 Unscrew bolt (54). Remove vibration tilger (10).

Installation note

Tightening torque 20 Nm.



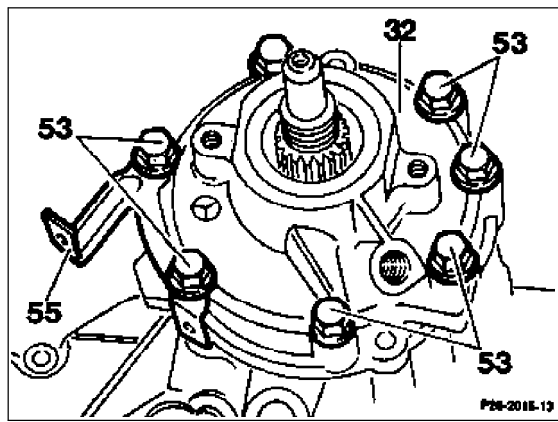
5 Unscrew bolts (53), remove bracket (55).
Withdraw transmission housing cover (32).

Note

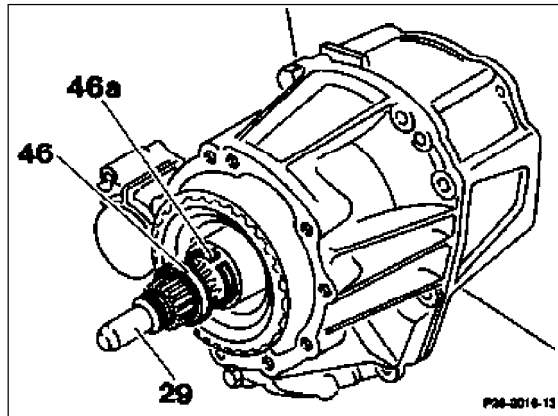
The transmission housing cover is located with two dowel pins.

Installation note

Clean sealing surface of transmission housing and transmission housing cover (32). Replace gasket. Lightly lubricate sealing lip of radial sealing ring and contact point on the planet gear shaft. Tightening torque 28 Nm.

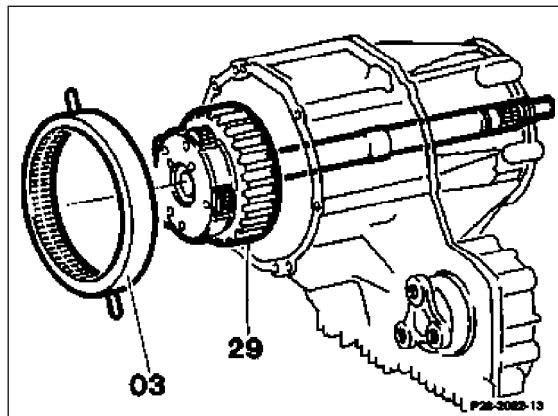


6 Swivel transmission to the horizontal. Remove retaining ring (46). Remove snap ring (46a) using pliers 000 589 52 37 00. Withdraw planet gear shaft (29).

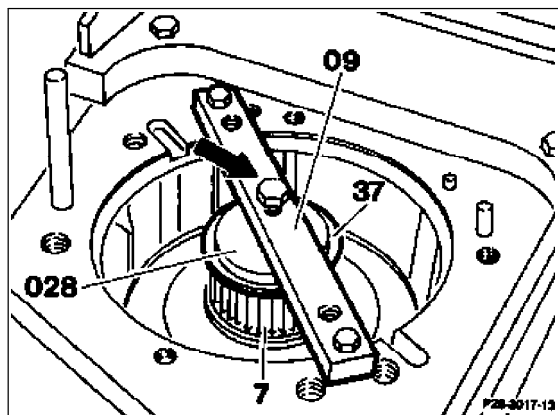


Installation note

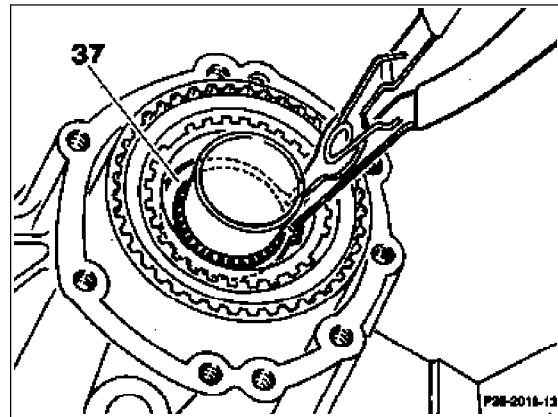
Mount internal-gear wheel (03) 124 589 22 63 04 or 126 589 22 63 14 on the planet gear shaft (29) and install together in the transmission housing.



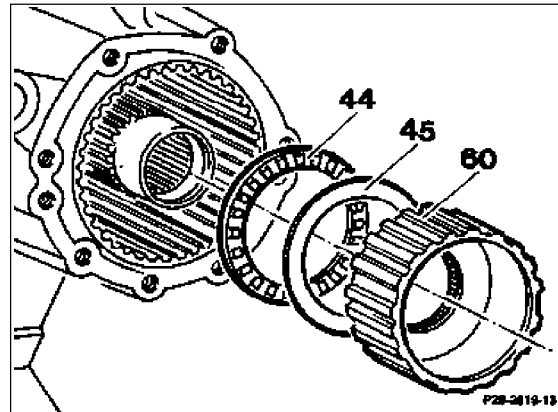
7 Swivel transmission through 90°. Insert thrust pad (028) 124 589 22 63 12 into the sun gear shaft (7). Screw on strip (09) 124 589 22 63 06. Pre-load sun gear shaft (center differential lock (ZS) clutch) with bolt (arrow) until circlip (37) is released.



8 Position transmission upright (multi-disk clutch of front axle drive train (AV) upwards). Remove circlip (37) with circlip pliers.



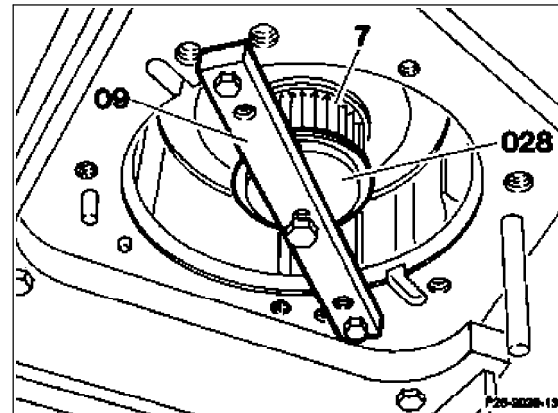
9 Remove inner multi-disk carrier of front axle drive train (AV) (60), thrust washer (45) and axial bearing (44).



10 Unscrew strip bracket (09) 124 589 22 63 06, secure sun gear shaft (7) and thrust pad (028) 124 589 22 63 12, remove downwards.

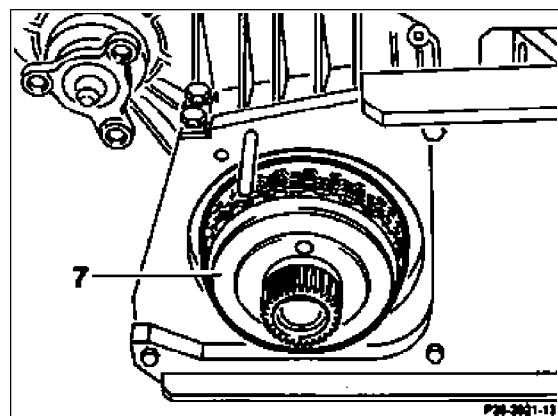
Note

Ensure that the 12 balls do not fall out.



Installation note

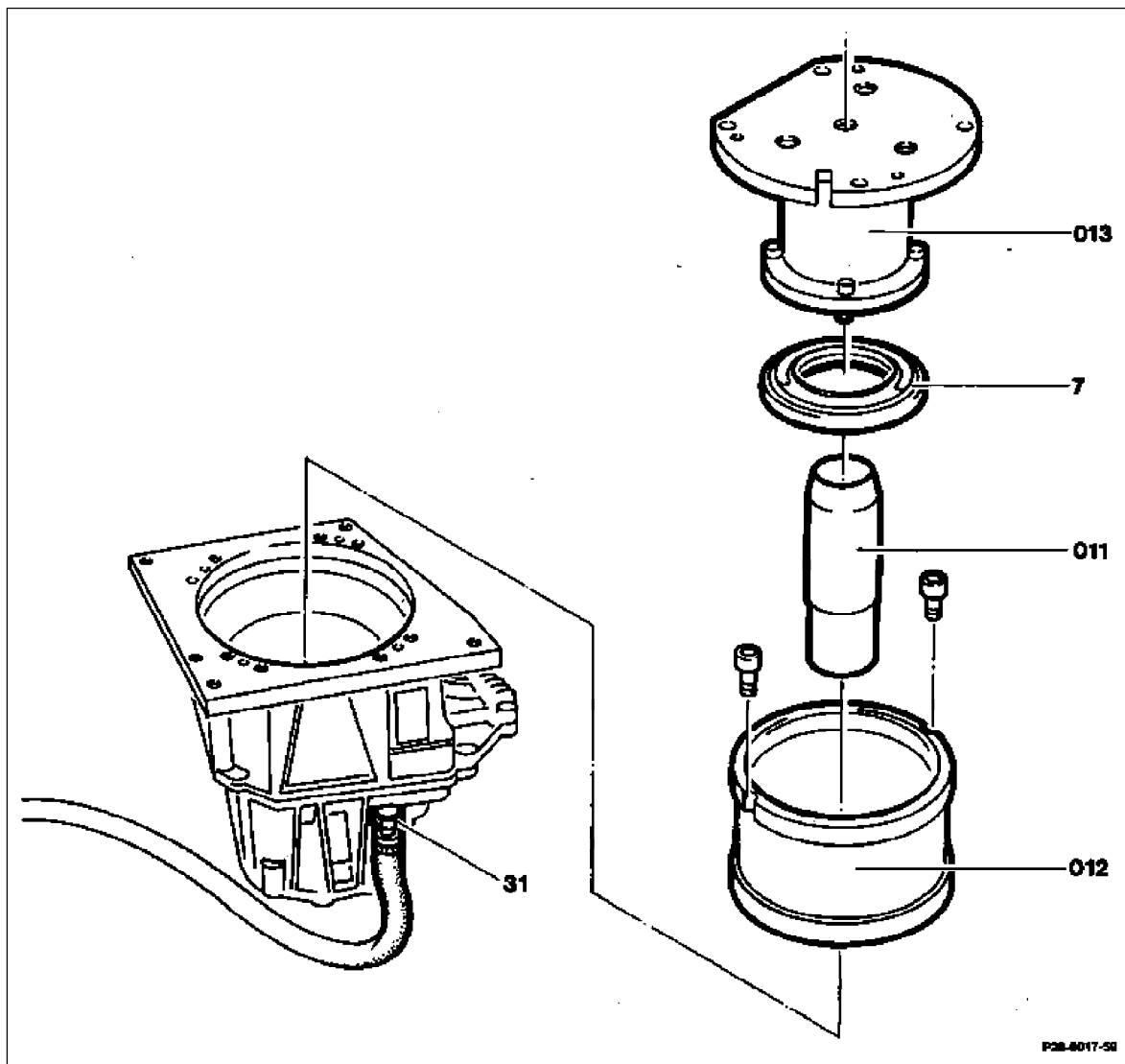
Position transmission upright (multi-disk clutch of front axle drive train (AV) upwards). Push in sun gear shaft (7) complete with 12 balls, thrust washers and axial bearing from below. Swivel transmission through 180°.



B. Removal and installation of center differential lock (ZS) piston

Preceding work:

Sun gear shaft removed (28-300, section A).



Inner bushing (011) 124 589 05 14 00 _____ Insert.
 Outer bushing (012) 124 589 03 14 00 _____ Insert and screw on, unscrew.
 Assembly fixture (013) 124 589 04 14 00 _____ Install and screw on, screw off at center differential lock (ZS) piston (7).
 Hydraulic connection of center differential lock (ZS) (31) _____ Apply compressed air, press out center differential piston (ZS) (7).

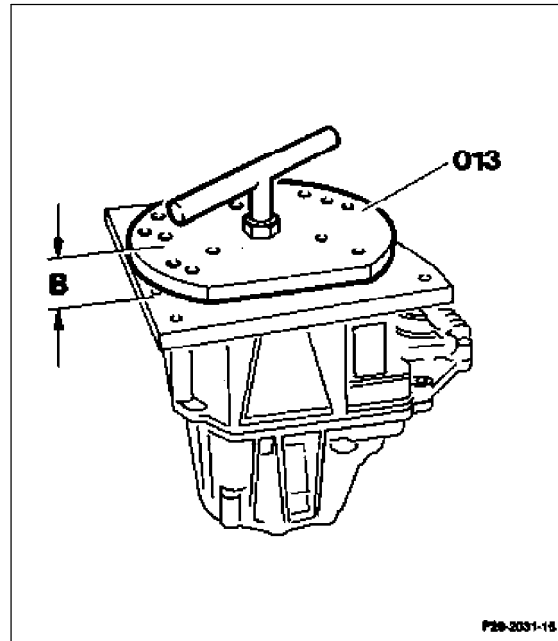
Center differential lock piston (ZS) (7) _____ Coat sealing lip with hydraulic oil.
 Center differential lock piston (ZS) (7) with
 assembly fixture 124 589 04 14 00 _____ Insert into outer bushing (012), press in.
 Note pilot pin.
 Note gap dimension "B" 30.5 F 1 mm.
 Center differential lock piston (ZS) (7) _____ Check for leaks (28-303).

Special tools



Gap dimension "B"

Check gap dimension "B" ($B = 30.5 \pm 1 \text{ mm}$), by measuring on the assembly fixture (013) 124 589 04 14 00 to locating plate using depth caliper gauge. If the gap dimension "B" is incorrect, withdraw center differential lock (ZS) piston again and check the position of the springs (28-300, section C).

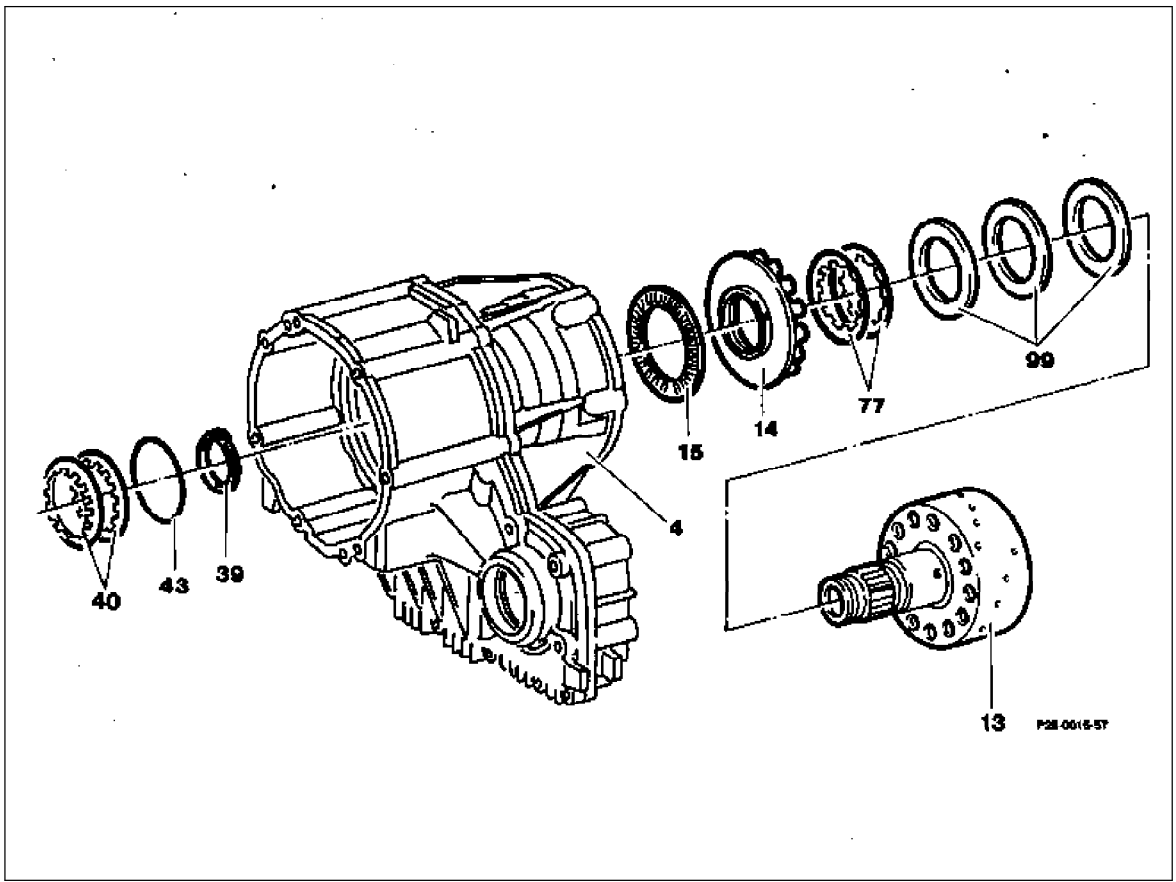


C. Removal and installation of outer multi-disk carrier of front axle drive train (AV)

Preceding work:

Sun gear shaft removed (28-300, section A).

Center differential lock (ZS) piston removed (28-300, section B).



Springs (40) and spacer ring (43) _____ Remove. When installing, check correct installed position (number 1).

Circlip (39) _____ Remove, install (number 2). When installing, assemble with minimum play (circlips are available in thicknesses of 3.0; 3.05; 3.1; 3.15).

Outer multi-disk carrier of front axle drive train (AV) (13) _____ Withdraw from transfer case housing (4), push in from below (number 3).

Axial bearing (15), thrust pad (14), springs (77) and shims (99) _____ Remove, install.

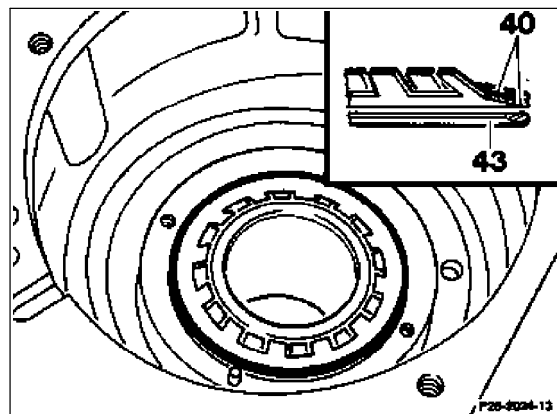
Installation note
Ensure correct installed position of springs (77).

Removal, installation

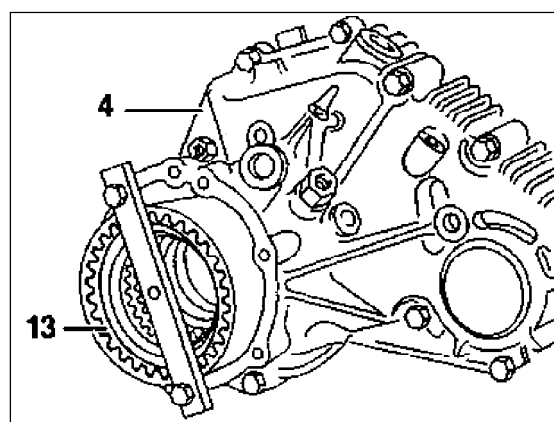
- 1 Remove two springs (40) and spacer ring (43).

Installation note

Install spacer ring (43) with the straight side upwards.
Install the springs (40) so that the spring tongues are at the same height.



2 Preload outer multi-disk carrier of front axle drive train with the strip 124 589 22 63 12 screwed onto the transfer case housing.

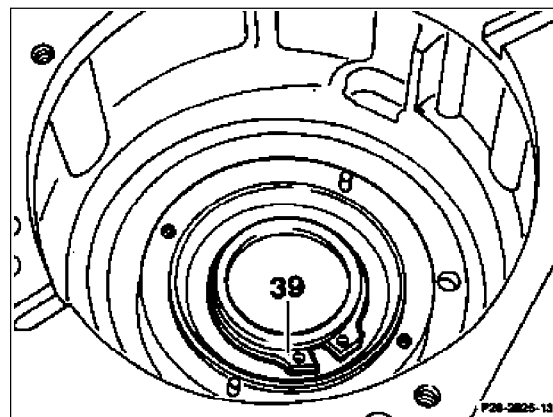


3 Remove circlip (39), preloading the outer multi-disk carrier using the strip 124 589 22 63 12 screwed onto the transfer case housing.

Installation note

Mount circlip and check axial play of outer multi-disk carrier. The axial play can be reduced to the minimum play by means of circlips of different thicknesses. However, attention has to be paid to the correct seating of the circlip in the groove.

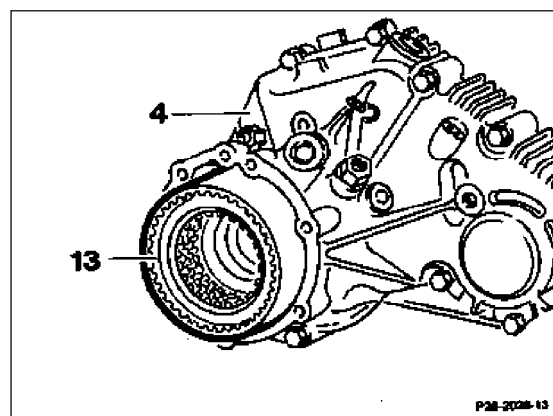
Circlips are available in the following thicknesses: 3.0; 3.05; 3.1 and 3.15 mm.



4 Withdraw outer multi-disk carrier of front axle drive train (13) from the transfer case housing (4).

Installation note

Push in outer multi-disk carrier of front axle drive train (AV) from below.

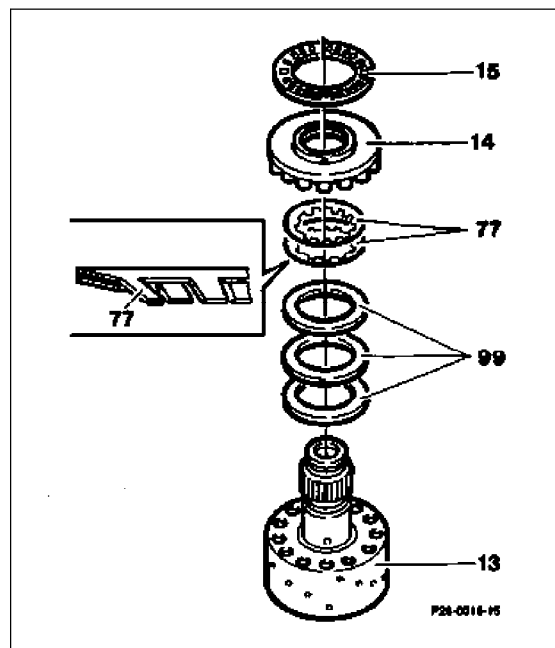


5 Remove axial bearing (15), thrust pad (14), springs (77), and shims (99) from the outer multi-disk carrier of front axle drive train (AV) (13).

Installation note

Assemble springs (77) so that the spring tongues are at the same height.

6 Install in reverse sequence.



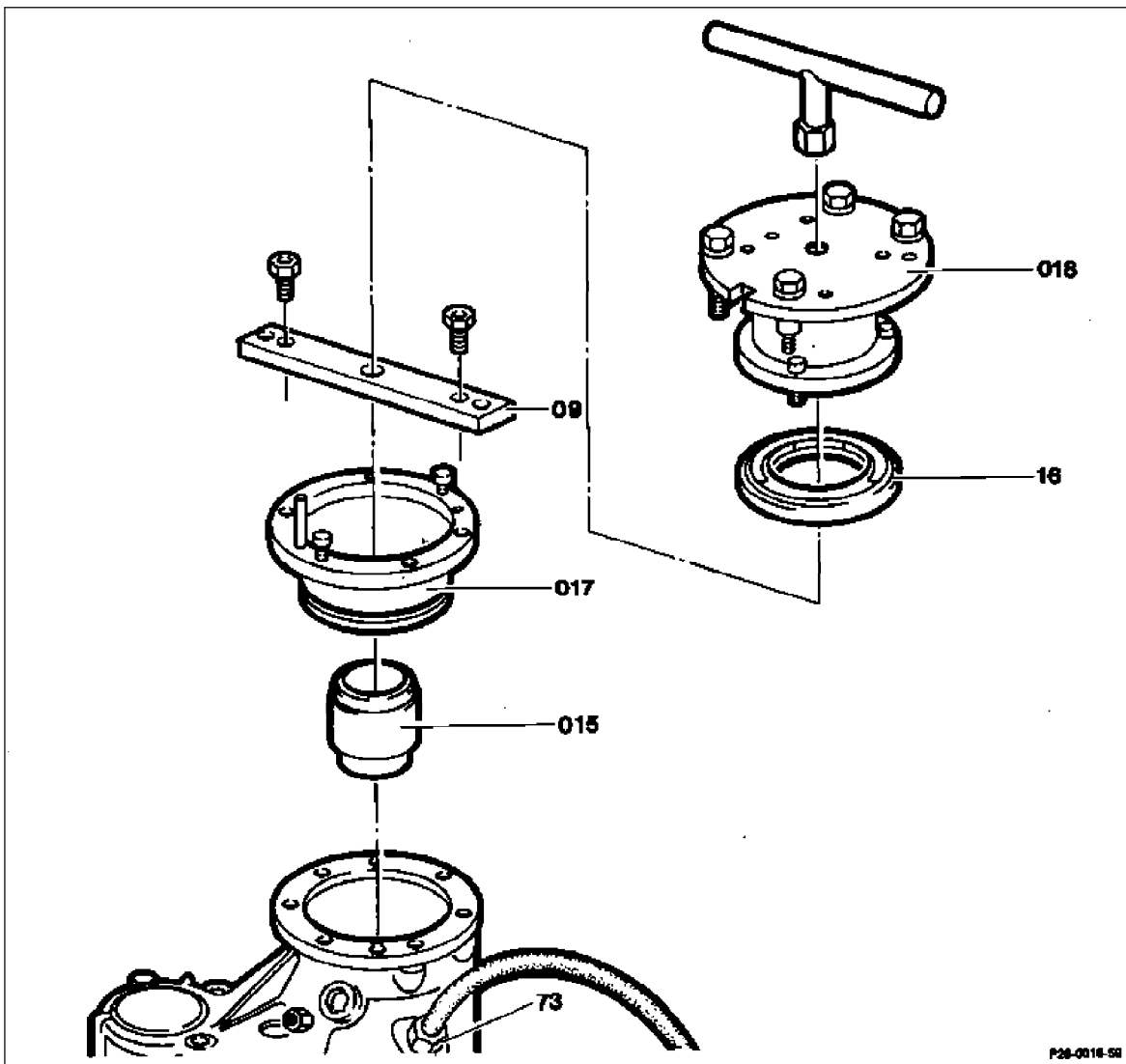
D. Removal and installation of front axle drive train (AV) piston

Preceding work:

Sun gear shaft removed (28-300, section A).

Center differential lock (ZS) piston removed (28-300, section B).

Outer multi-disk carrier of front axle drive train (AV) removed (28-300, section C).



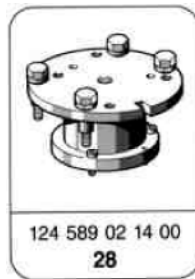
Outer bushing (017) 124 589 01 14 00 _____ Install and screw on, unscrew.
 Inner bushing (015) 124 589 00 14 00 _____ Install.
 Strip (09) 124 589 22 63 00 _____ Screw on, unscrew.
 Hydraulic connection of front axle drive train (AV) (73) _____ Apply compressed air, press out front axle drive train (AV) piston (16).

Assembly fixture (018) 124 589 02 14 01 _____ Screw on, unscrew at front axle drive train (AV) piston (16) and coat sealing lip of front axle drive train (AV) piston (16) with hydraulic oil.

Front axle drive train (AV) piston (16) (018) 124 589 02 14 01 _____ Insert, press into outer bushing (017) with assembly fixture

Front axle drive train (AV) piston (16) _____ Check for leaks (28-303).

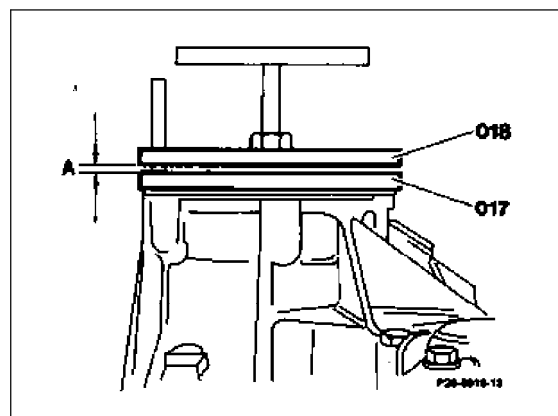
Special tool



Gap dimension "A"

Note gap dimension "A" (A approx, 1 mm).
 If the gap dimension is greater than 1.5 mm, the piston is not seating correctly in the piston guide.

017 Outer bushing
 018 Assembly fixture



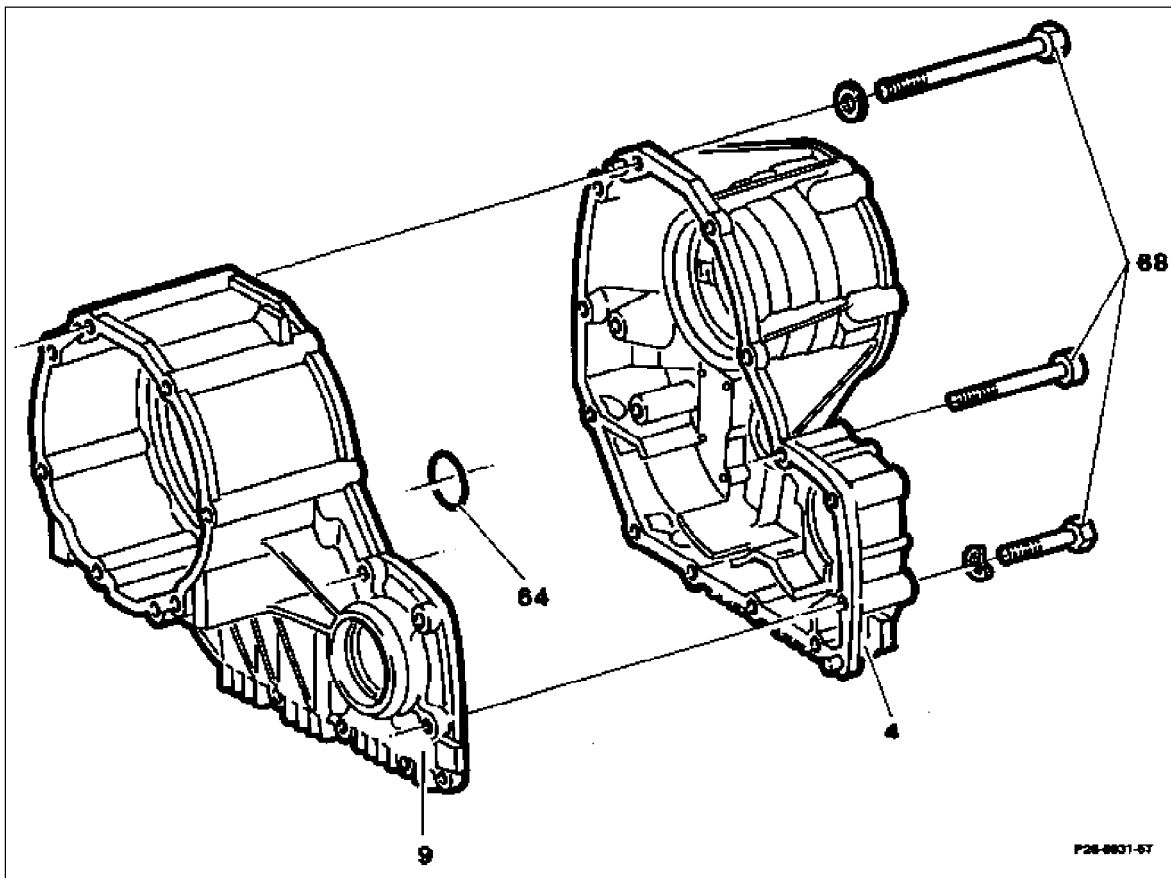
E. Detaching and assembling transfer case

Preceding work:

Sun gear shaft removed (28-300, section A).

Center differential lock (ZS) piston removed (28-300, section B).

Outer multi-disk carrier of front axle drive train (AV) removed (28-300, section C).

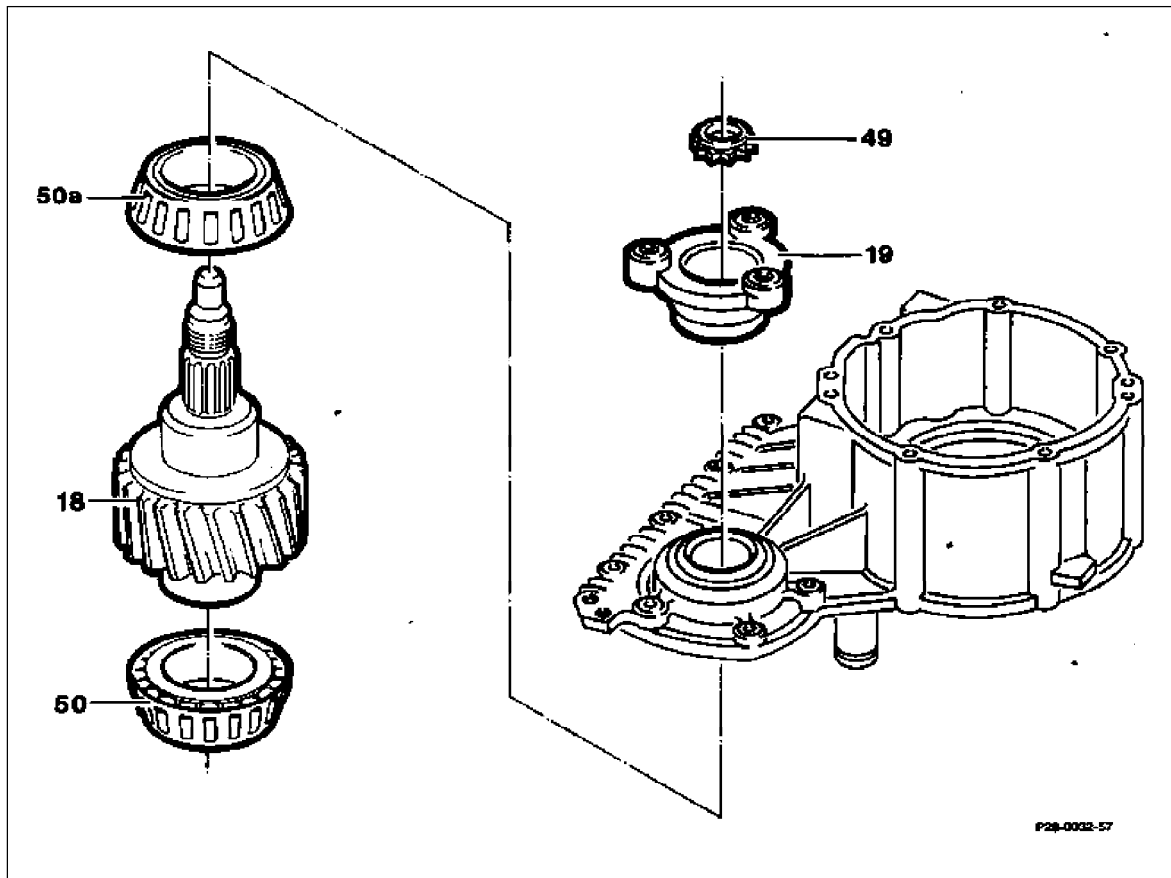


Hydraulic connection of center differential lock (ZS)	Unscrew, screw in, 40 Nm.
Bolts (68)	Unscrew, screw in, 28 Nm.
Transfer case housing (4)	Detach, mount at intermediate housing (9). Note dowel pins.
Sealing surfaces	Clean. Coat liquid seal gasket in accordance with DBL 793 820.
O-ring (64)	Replace.
Tapered roller bearing	Lubricate lightly.

F. Dismantling and assembling output shaft

Preceding work:

Transfer case detached (28-300, section E).



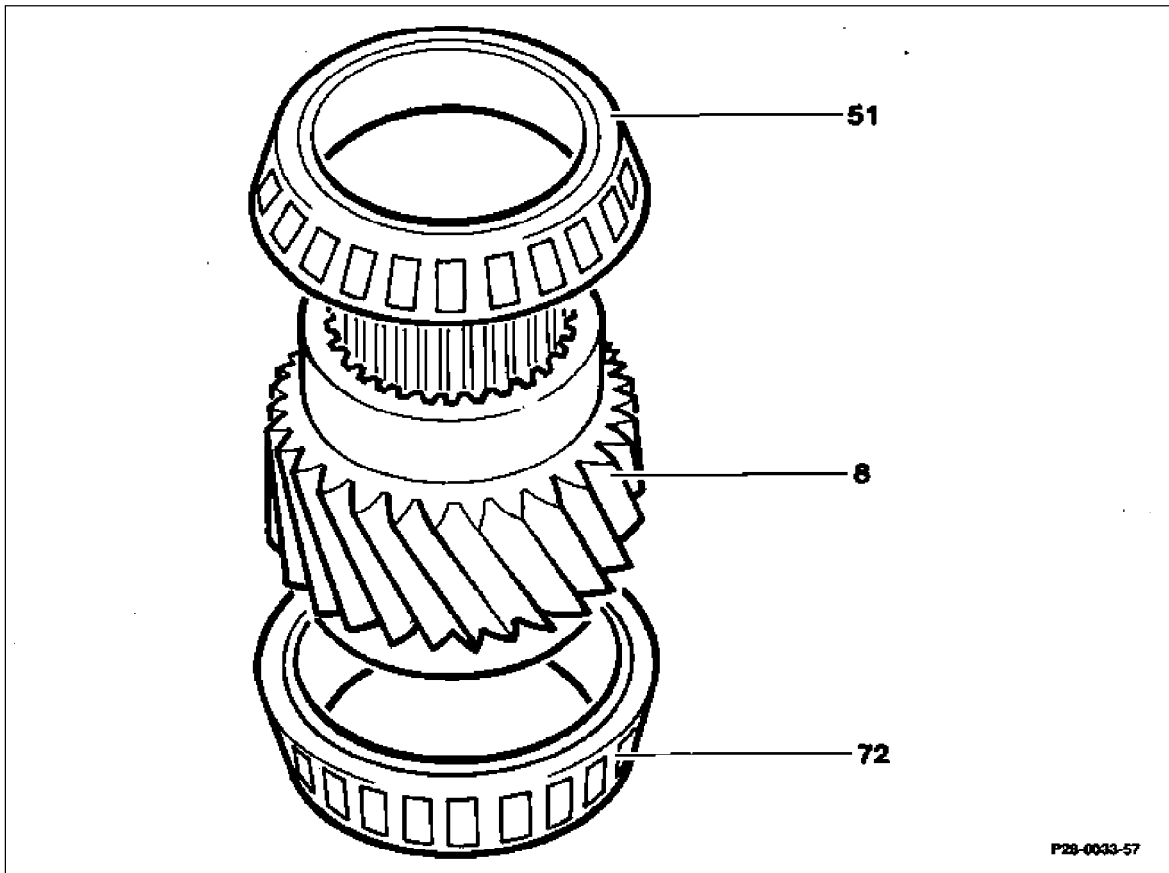
Collar nut (49)	Unscrew, screw on, 160 Nm. Replace and lock.
	Stud driver 129 589 01 07 00, Socket wrench 201 589 00 09 00.
Joint flange (19)	Unscrew, screw on, 160 Nm. Replace and lock.
Output shaft (18)	Clamp, use aluminum jaws.
Tapered roller bearing (50a)	Detach, press on.
	Collet chuck 124 589 00 34 00, Puller 001 589 36 33 00, Mandrel 123 589 04 15 00.
Tapered roller bearing (50)	Pull off, press on.
	Collet chuck 124 589 00 34 00, Puller 001 589 36 33 00, Thrust pad 124 589 02 34 00, Mandrel 123 589 04 15 00.
Bearing plate	Measure, adjust (28-300, section L).

Special tools



G. Dismantling and assembling drive gear

Preceding work:
Transfer case detached (28-300, section E).



- | | | |
|---------------------------------|-------|--------------------------------------------|
| Drive gear (8) | _____ | Clamp, using aluminum jaws. |
| Tapered roller bearing (51, 72) | _____ | Pull off and press on using suitable tube. |
| | | Collet chuck 124 589 01 34 00, |
| | | Puller 001 589 36 33 00, |
| | | Mandrel 126 589 00 15 00. |

Note

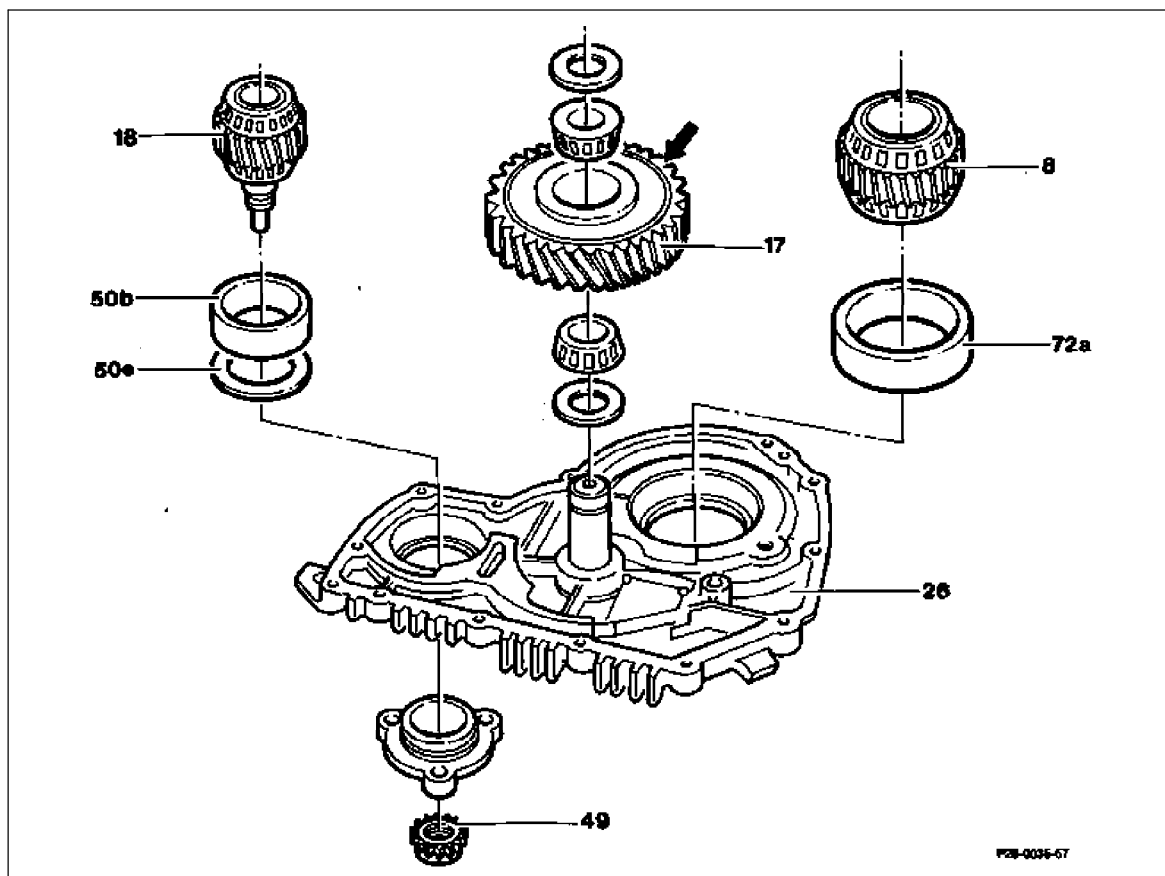
Tapered roller bearings (51, 72) must abut flat with the drive gear (8).

Special tools



H. Removal and installation of bearing outer rings from intermediate housing

Preceding work:
Transfer case detached (28-300, section E).



- | | |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Collar nut (49) | Unscrew, screw on, 160 Nm. Replace and lock. |
| | Stud driver 129 589 01 07 00, |
| | Socket wrench 126 589 02 09 00. |
| Output shaft (18), drive gear (8), intermediate gear (17) | Remove, install. When installing, the identification groove (arrow) on the intermediate gear (17) must point upwards. |

Bearing outer ring (50b)	Withdraw, replace. Support counter steady with two pieces of wood on the adapter housing (26).
	Internal extractor 000 589 30 33 00,
	Steady 000 589 34 33 00,
	Mandrel 201 589 00 15 00.

Distance spacer (50e)	Remove, install.
Bearing outer ring (72a)	Drive out of adapter housing (26) with a suitable drift punch. Press in bearing outer ring (72a) without shim using suitable mandrel.
Bearing play	Measure, adjust (28-300, section L).

Special tools

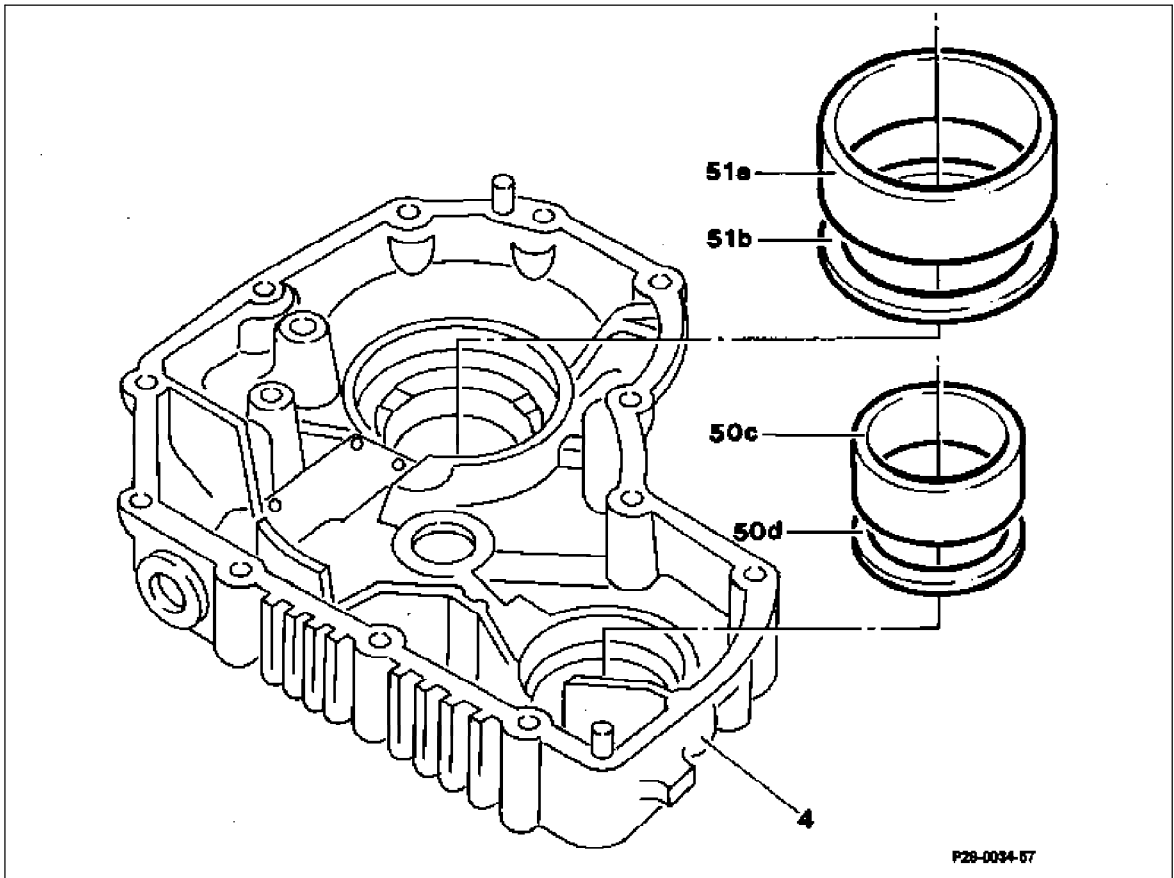


Note

When installing new bearing outer rings and tapered roller bearings the spacers which have been removed are to be re-installed.

J. Removal and installation of bearing outer rings from transfer case housing

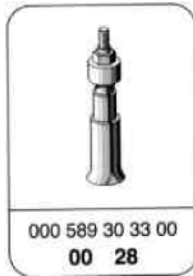
Preceding work:
Transfer case removed (28-300, section E).



P28-0034-07

Bearing outer ring (50c)	Withdraw, replace. Press in using suitable mandrel. Support counter steady on the transfer gear housing (4) with two pieces of wood. Internal extractor 000 589 30 33 00, Steady 000 589 34 33 00.
Bearing outer ring (51a)	Withdraw, replace. Press in using suitable mandrel. Support counter steady on the transfer gear housing (4) with two pieces of wood. Internal extractor 000 589 68 33 00, Steady 000 589 34 33 00.
Spacer (50d, 51b)	Remove, install.
Bearing play	Measure, adjust (28-300, section L).

Special tools



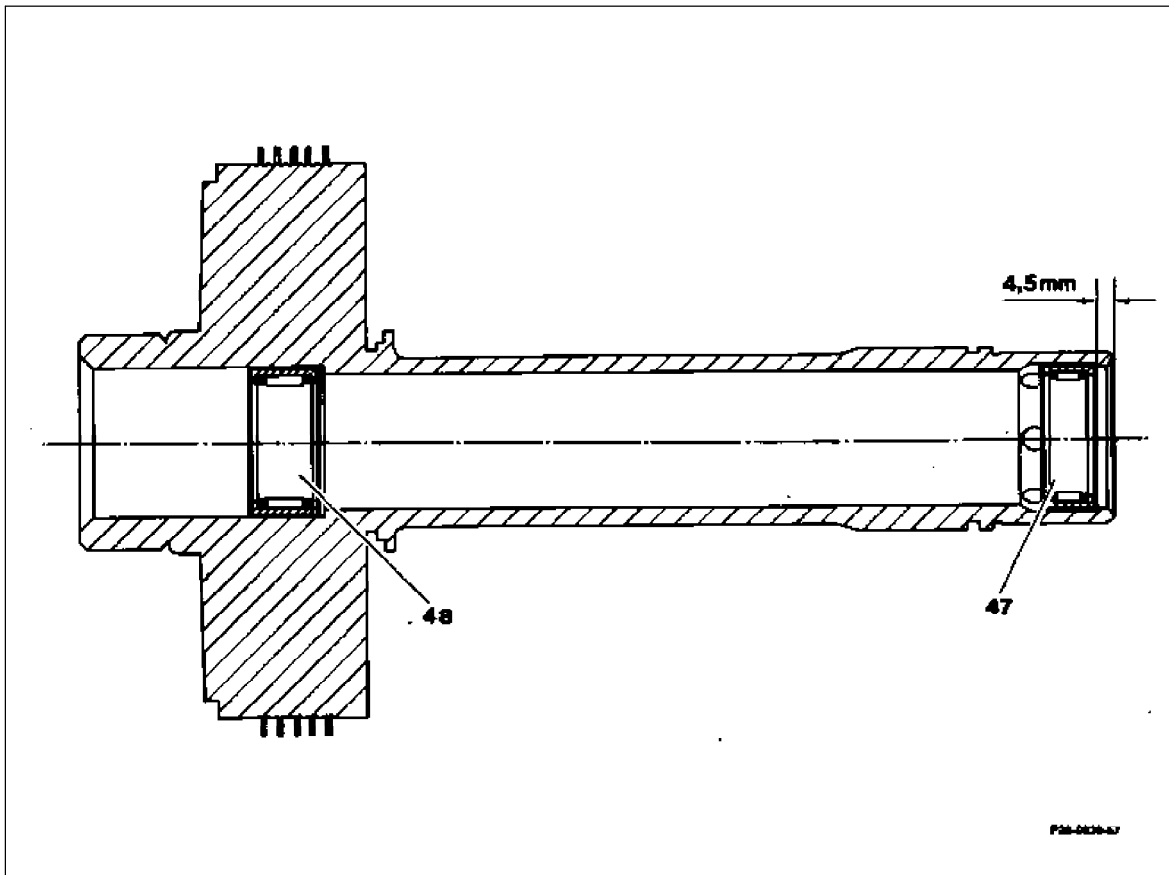
Note

When installing new bearing outer rings the spacers which have been removed are to be reinstalled.

K. Removal and installation of needle bearings in sun gear shaft

Preceding work:

Sun gear shaft removed (28-300, section A).



- | | |
|----------------------------------|------------------------------------------------------------------------|
| Needle roller bearing (47) _____ | Pull out, press in.
When pressing in, note inset of $4.5 + 0.3$ mm. |
| Needle roller bearing (48) _____ | Pull out, press in.
Press in needle roller bearings up to the stop. |

L. Checking and if necessary adjusting bearing play

Preceding work:

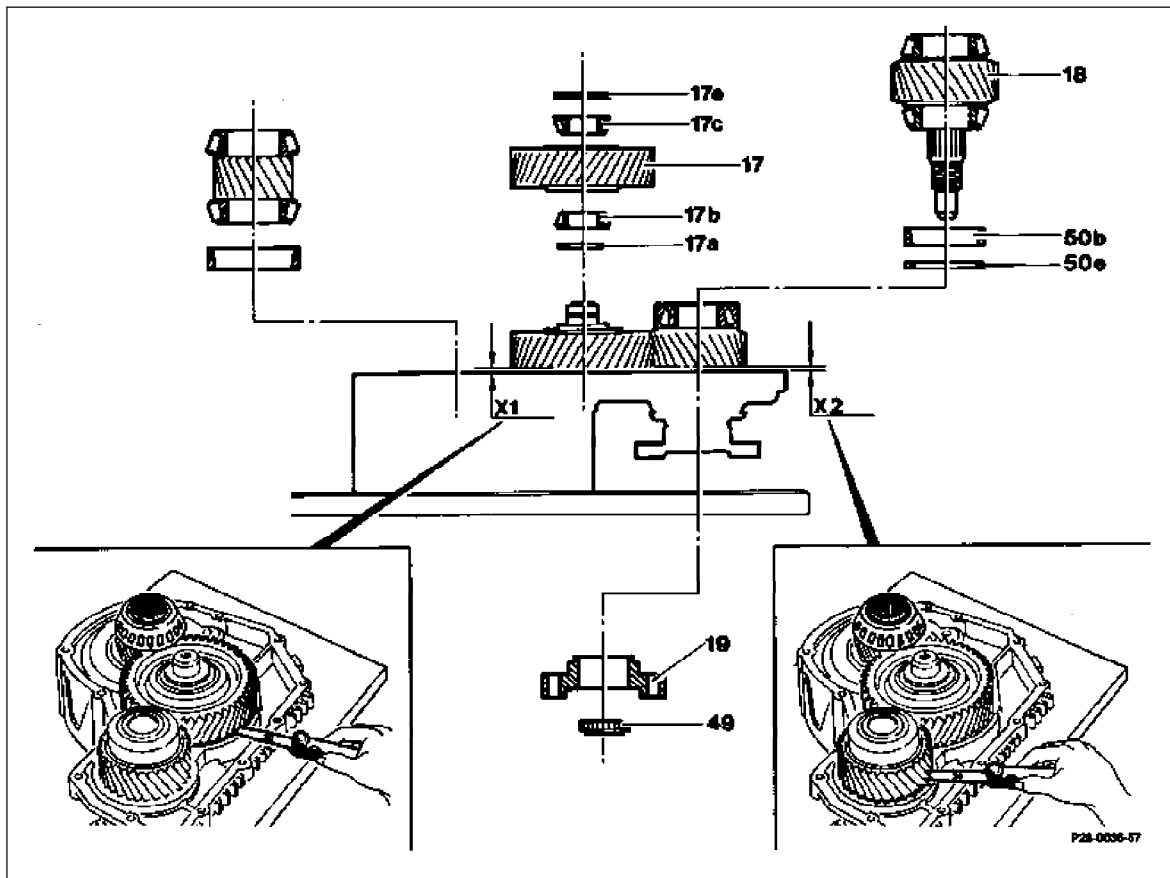
Transfer case removed (28-200).

Sun gear shaft removed (28-300, section A).

Center differential lock (ZS) piston removed (28-300, section B).

Outer multi-disk carrier of front axle drive train (AV) removed (28-300, section C).

Detaching and assembling transfer case (28-300, section E).

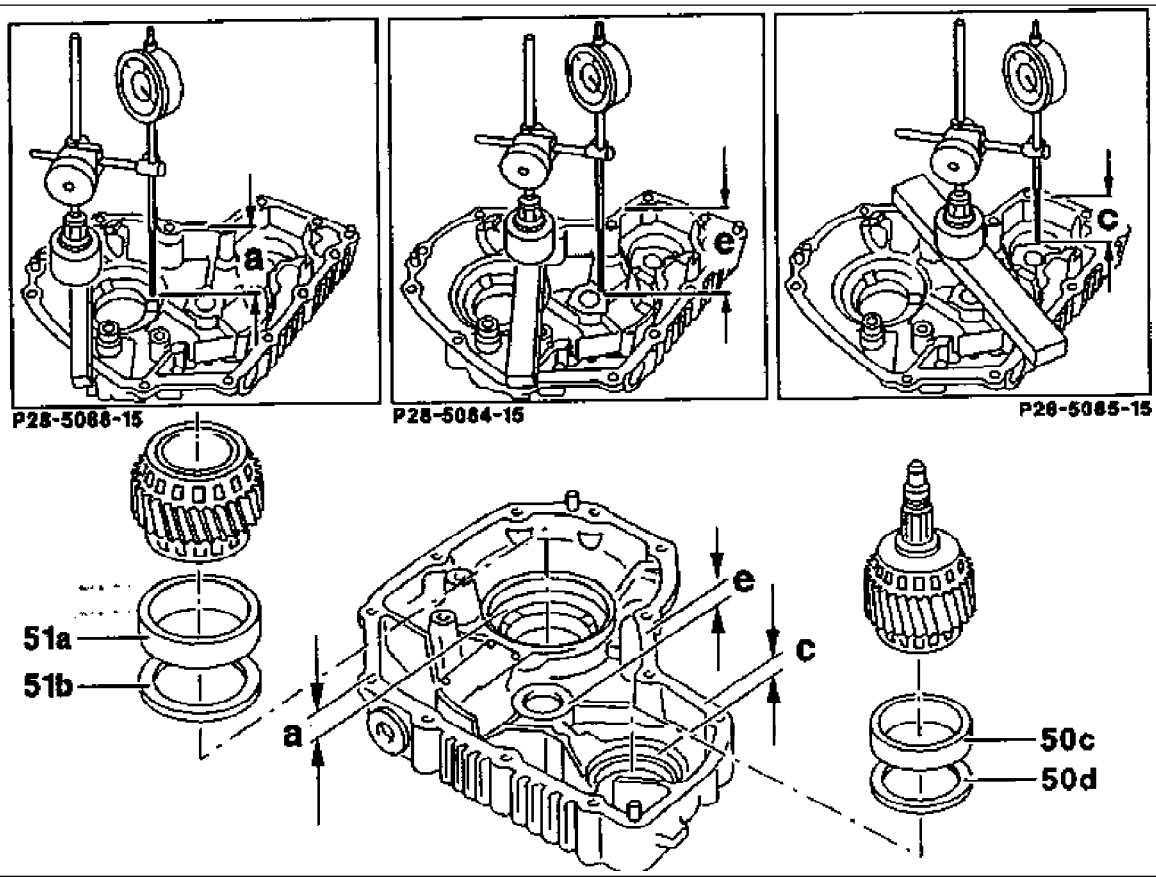


Note _____ **In order to ensure the satisfactory operation of the transfer case, the bearing preload is to be measured extremely carefully.**

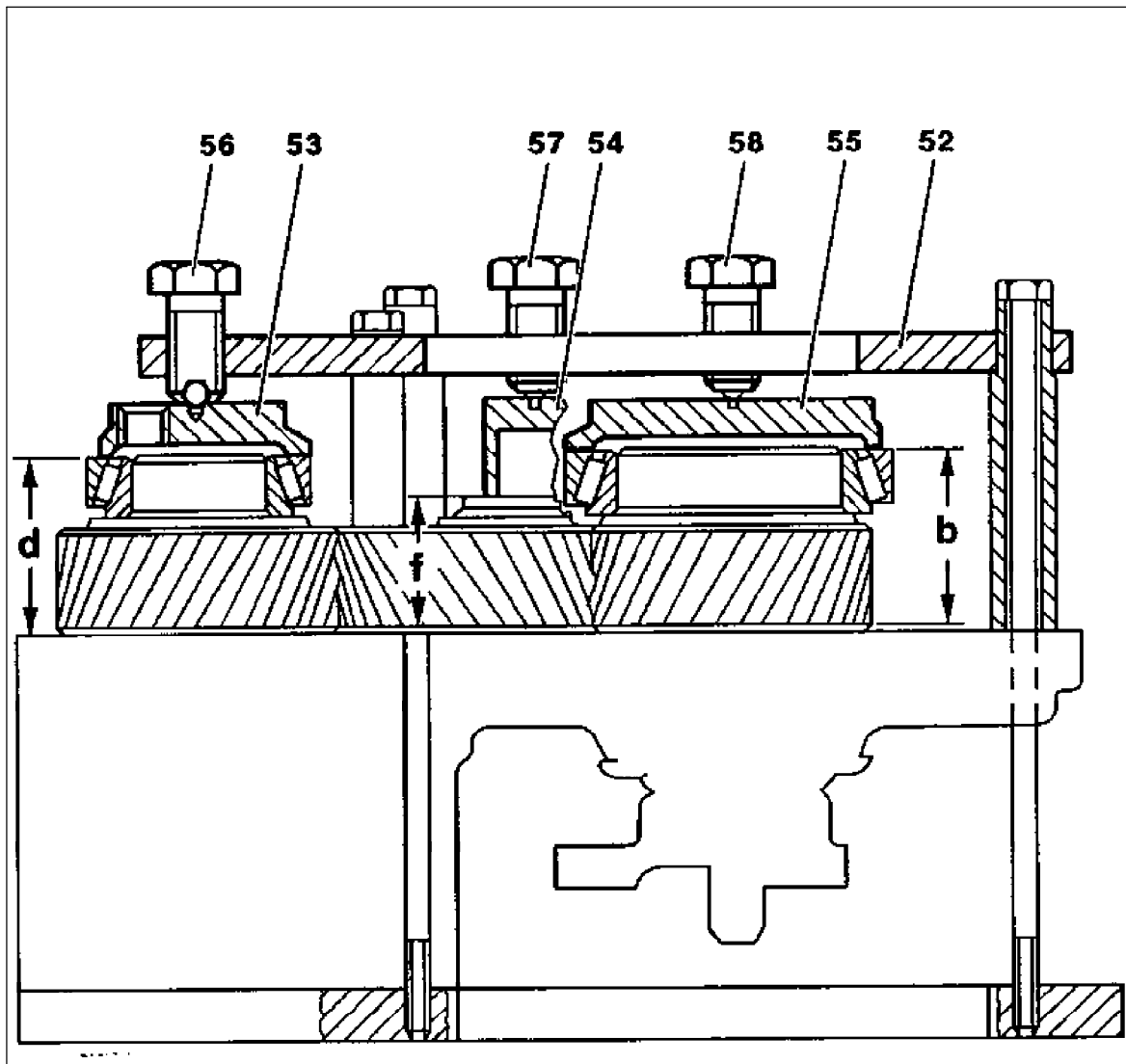
Collar nut (49) _____ Unlock, replace, 160 Nm and secure. Withdraw, slide on joint flange (19). Stud driver 129 589 01 07 00, socket wrench 126 589 02 09 00.

Dimension "X2" _____ Measure ($X2 = 0.2 \text{ mm}$), adjust, if necessary remove to adjust bearing outer ring (50 b). Install shims (50e) (numbers 2 to 7).

Dimension "X1" _____ Measure ($X1 = 0.2 \text{ mm}$), adjust, if necessary remove to adjust intermediate gear (17) and tapered roller bearing (17 b, 17 c), install shim (17a) (number 8).



P28-5091-57



P28-5092-59

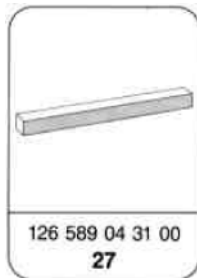
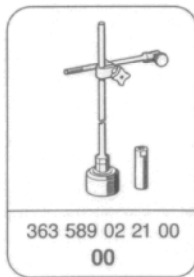
Bearing outer rings (51a, 50c) _____ Remove from transfer case housing (28-300, section J).

Bearing outer rings (51a, 50c) _____ Mount on gear drives and output shaft (number 9).

Pressure members (53, 54, 55) _____ Mount on the bearing outer rings (51a, 50c) (number 10).
 Retaining plate (52) _____ Mount and fasten to transfer case housing (number 11).
 Bolts (56, 57, 58) _____ Tighten to 1 Nm (number 12).

Dimension "a" _____ Measure (number 13), enter in shop-made table.
 Dimension "b" _____ Measure (number 14), enter in shop-made table.
 Dimension "c" _____ Measure (number 15), enter in shop-made table.
 Dimension "d" _____ Measure (number 16), enter in shop-made table.
 Dimension "e" _____ Measure (number 17), enter in shop-made table.
 Dimension "f" _____ Measure (number 18), enter in shop-made table.
 Spacer thickness _____ Calculate with aid of table and install.
 Bearing outer rings (51a, 51c) _____ Install in transfer case housing (number 19).
 3-arm flange _____ Install on front axle.
 Output friction coefficient _____ Measure (number 20)

Special tools

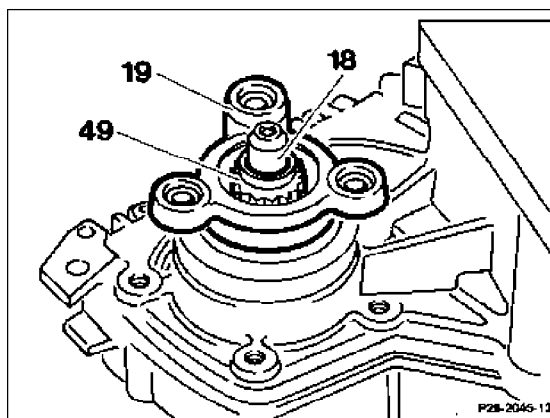


Note

In order to ensure the satisfactory operation of the transfer case, the bearing preload is to be measured extremely carefully.

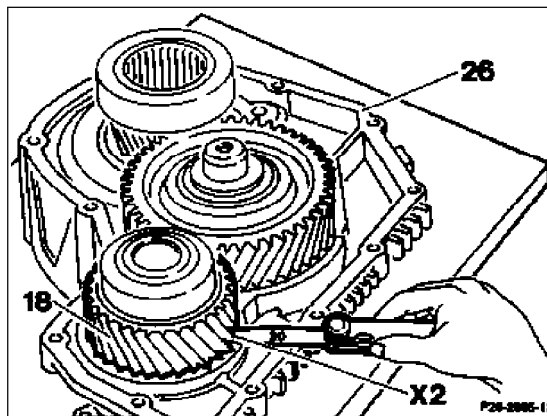
Measuring

1 Unlock collar nut (49) and slacken with socket wrench 126 589 02 09 00 whilst steadying with stud driver 129 589 01 07 00 and turn down. Withdraw joint flange (19).



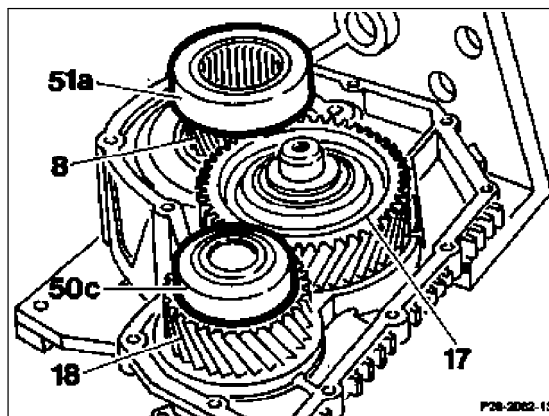
2 Measure dimension "X2" between intermediate housing (26) and output shaft gear (18) with feeler gauge.

X2=0.2 mm (constant)



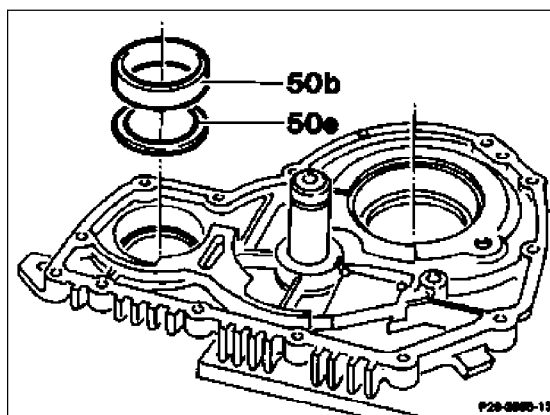
3 To adjust to the dimension "X2", remove bearing outer ring and insert suitable spacer.

4 Remove bearing outer rings (51a and 50c), output shaft (18), intermediate gear (17) and gear drive (8).

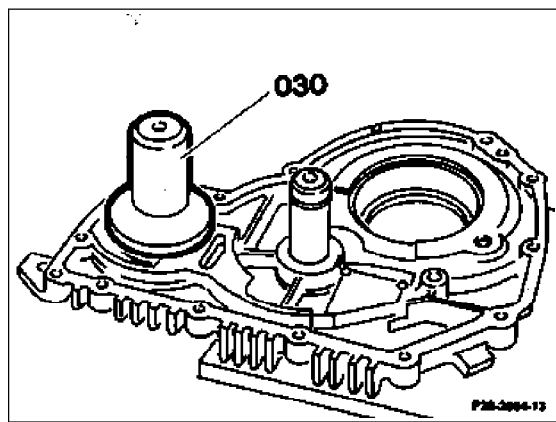


5 Drive out bearing outer ring (50b) using suitable mandrel, install spacer (50e) depending on measured value.

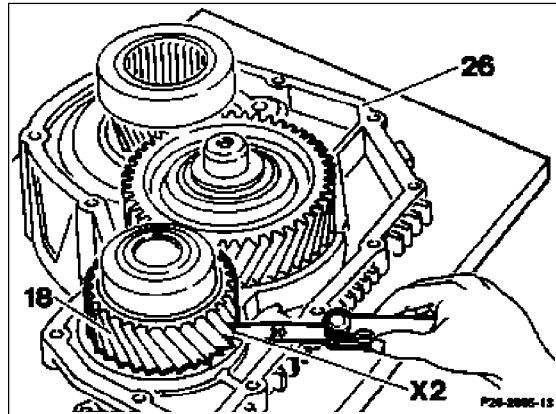
Spacers are available in thicknesses of 0.05; 0.1; 0.3 and 0.5 mm.



6 Using mandrel (030) 201 589 00 15 00, press in bearing outer ring (50b) until it abuts.



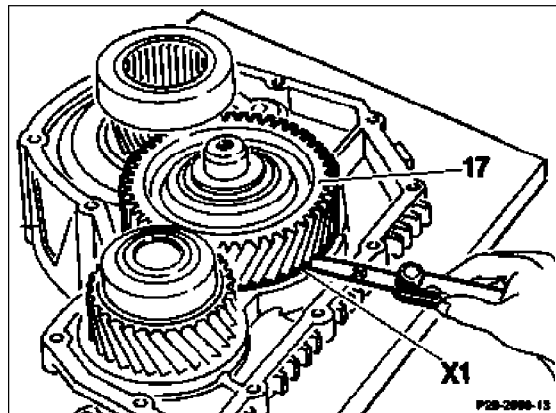
7 Check dimension "X2".



8 Measure dimension "X1" between intermediate housing and intermediate gear (17) using feeler gauge. Insert spacer depending on the measured value.

X1=0.2 mm (constant)

Spacers are available in thicknesses of 0.05; 0.1; 0.3 and 0.5 mm.



9 Mount bearing outer rings (51a, 50c) on the gear drives and output shaft.

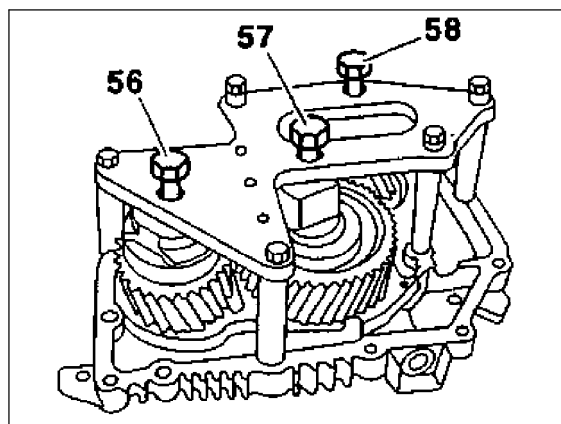
10 Mount pressure members (53, 54, 55) on the bearing outer rings (51a, 50c).

11 Mount retaining plate 124 589 23 21 00 and fasten to the transfer case housing.

12 Tighten bolts (56, 57, 58) to 1 Nm, centering the pressure member at the same time.

Note

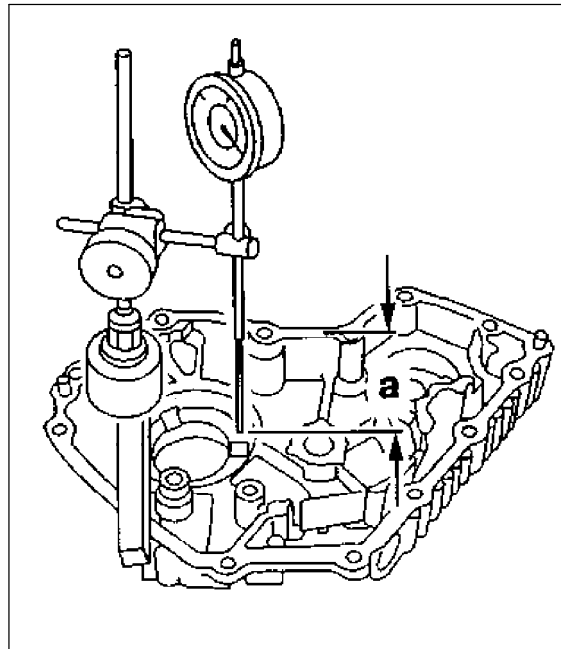
The tightening torque of 1 Nm corresponds to a bearing pre-load of 0.05 mm.



P28-5089-13

13 Measure dimension "a" between the joint face of the transfer case housing and the bearing surface of the bearing outer ring and enter in shop-made table.

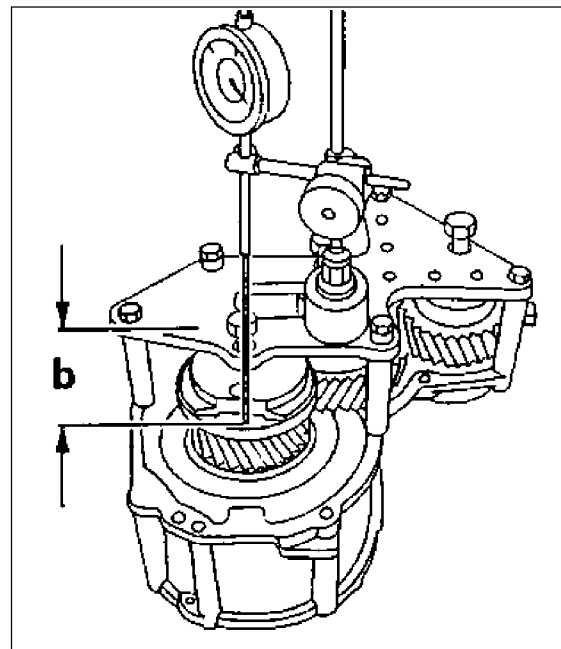
Measuring bridge 126 589 04 31 00,
magnet holder 116 589 12 21 00,
dial gauge 001 589 82 21 00.



P28-5088-15

14 Measure dimension "b" between bearing outer ring and joint face of intermediate housing and enter in shop-made table.

Magnet holder 116 589 12 21 00,
Dial gauge 001 589 82 21 00.



P28-5087-15

Examples

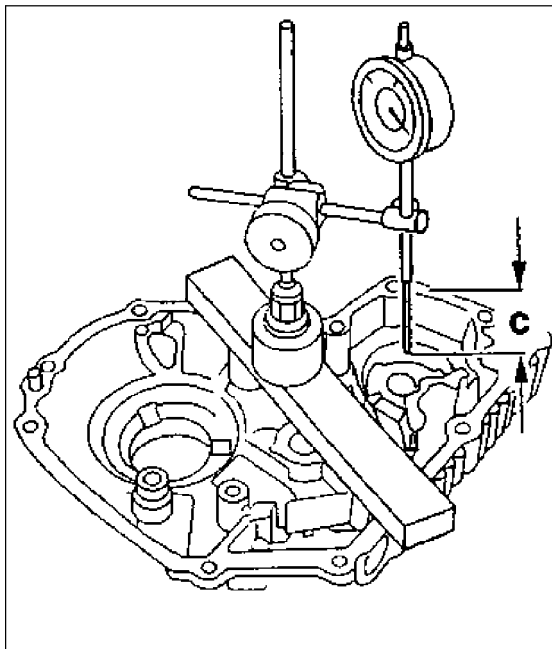
Gear drive			
Dimension	"a"	51.42	mm
Dimension	"-b"	-51.11	mm
Difference		0.31	mm
Actual spacers installed		0.30	mm

15 Measure dimension "c" between joint face of transfer case housing and bearing surface of bearing outer ring and enter in shop-made table.
Measuring bridge 126 589 04 31 00,
magnet holder 116 589 12 21 00,
dial gauge 001 589 82 21 00.

Install or remove spacers with aid of table.

Note

When determining the thickness of the spacer, round off value downwards.

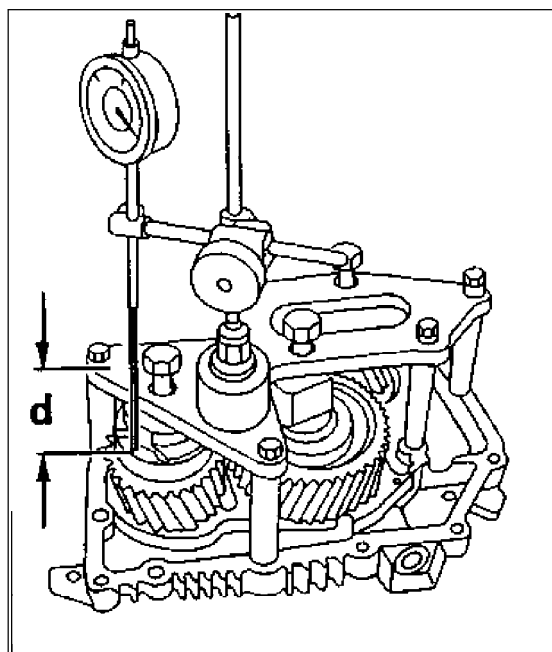


P28-5085-15

16 Measure dimension "d" between bearing outer ring and joint face of intermediate housing and enter in shop-made table.

Magnet holder 116 589 12 21 00

Dial gauge 001 589 82 21 00.



P28-5086-15

Output shaft			
Dimension	"c"	51.23	mm
Dimension	"- d"	-50.88	mm
Difference		0.35	mm
Actual spacers installed		0.35	mm

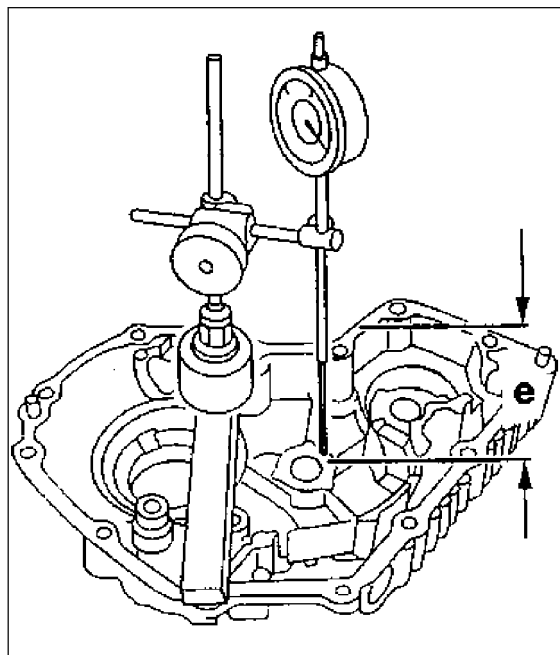
Install or remove spacers with aid of table.

Note

When determining the thickness of the spacers, round off value downwards.

17 Measure dimension "e" between joint face of transfer case housing and bearing surface of tapered roller bearing inner ring and enter in shop-made table.

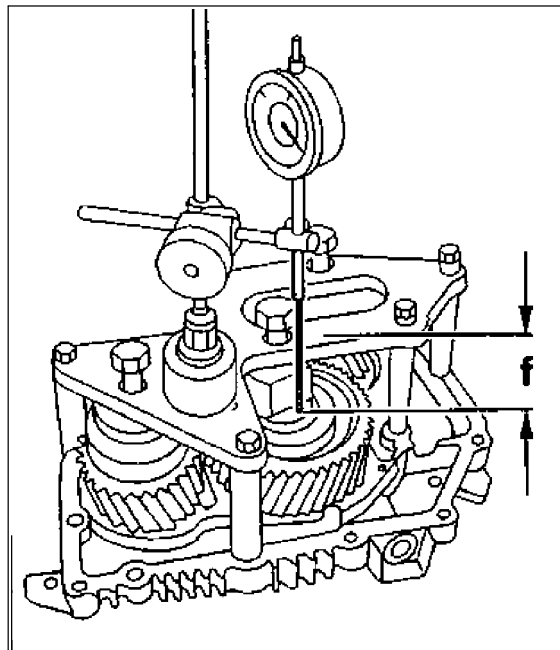
Measuring bridge 126 589 04 31 00,
magnetic holder 116 589 12 21 00,
dial gauge 001 589 82 21 00.



P28-5084-15

18 Measure dimension "f" between joint face of intermediate housing and bearing inner ring and enter in shop-made table.

Magnet holder 116 589 12 21 00,
Dial gauge 001 589 82 21 00.



P28-5083-15

Intermediate gear			
Dimension	"e"	37.69	mm
Dimension	"- f"	-37.17	mm
<hr/>			
Difference		0.52	mm
Actual spacers installed		0.50	mm

Install or remove spacers with aid of table.

Note

When determining the thickness of the spacers, round off value downwards.

Checking the output torque

19 Install bearing outer rings of transfer case housing (28-300, section J).

20 Screw on 3-arm flange at front axle and measure output friction coefficient using a friction coefficient tester.

Specified value: 15 - 25 Nm

Note

If the output friction coefficient is excessive or insufficient, a mistake was made when measuring the bearing preload.

In this case, repeat the complete measurement.