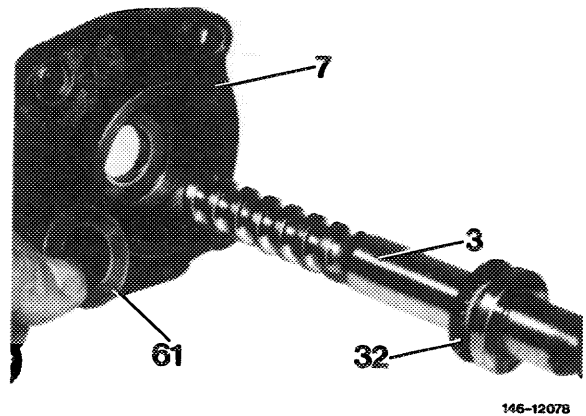


### Steering worm for steering with inside stop

48 Place lower axial cyl. roller cage (32) on steering worm.

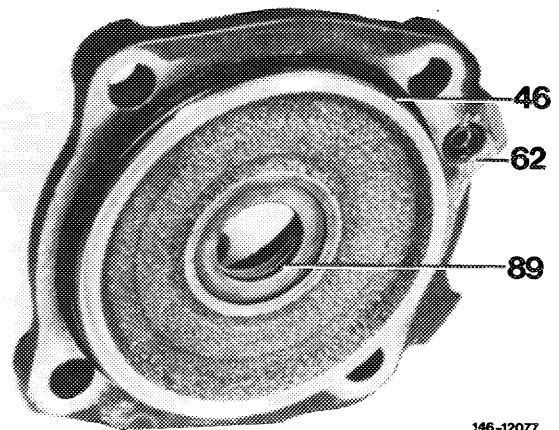


### Bearing cap for steering with inside stop

49 Insert O-ring (89) and sealing ring into bearing cap.

50 Fasten bearing cap in device, insert axial washer in bearing cap, then steering worm, making sure that sealing ring is not damaged in bearing cap.

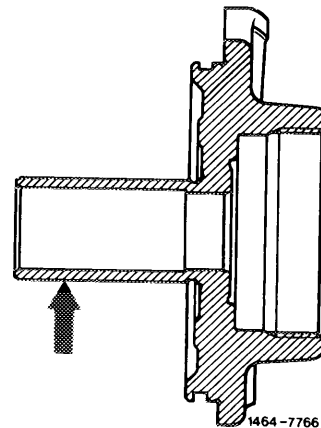
Special tool 123 589 02 59 00



### Attention!

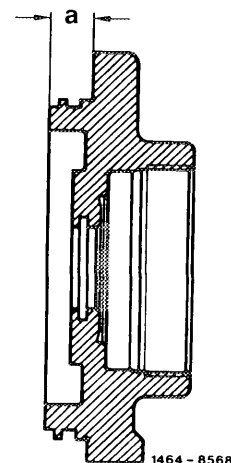
Bearing caps for steering with and without inside stop are different in design.

Bearing cap **with** neck (refer to arrow)  
for steering **without** inside stop  
Steering 765.700, 765.701, 765.702, 765.703



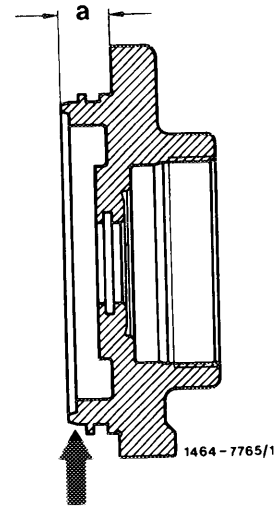
Only bearing cap with collar may be installed into steering with inside or additional stop. The collar is end stop for working piston at righthand lock.

Bearing cap **without** neck  
for steering **with** additional stop  
Steering 765.701  
Dimension "a" =  $11.4 \pm 0.1$  or  $8.5 \pm 0.1$   
(intermediate version)

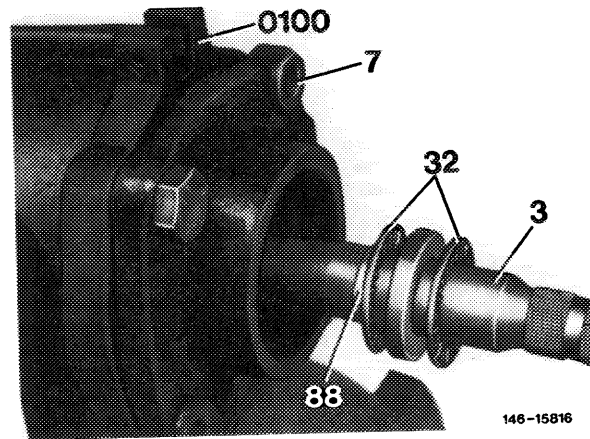


Install only bearing cap with dimension "a" = 11.4 mm into steering with additional stop (code letter "S" on steering case).

Bearing cap **without** neck for steering **with** inside stop  
 Steering 765.704  
 Dimension "a" = 13.7 ± 0.1  
 Steering 765.706  
 Dimension "a" = 13 ± 0.1

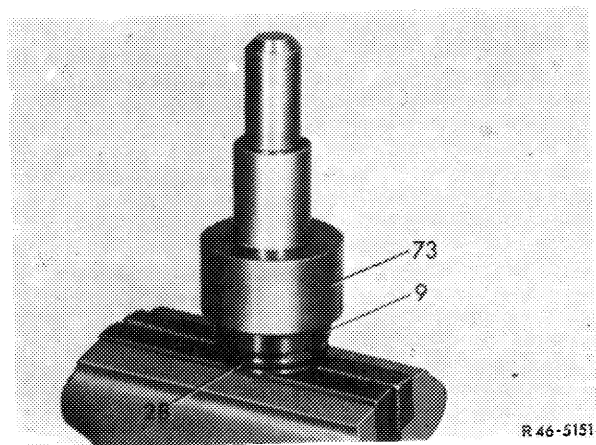


51 Place upper axial cyl. roller cage (32) on steering worm.



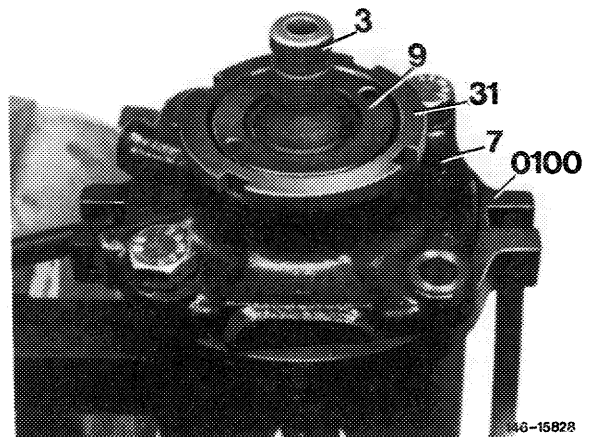
52 Press radial sealing ring into bearing insert (9) by means of pressing-in tool (73), fill space between both sealing lips with grease and insert locking ring.

Special tool 116 589 08 43 00



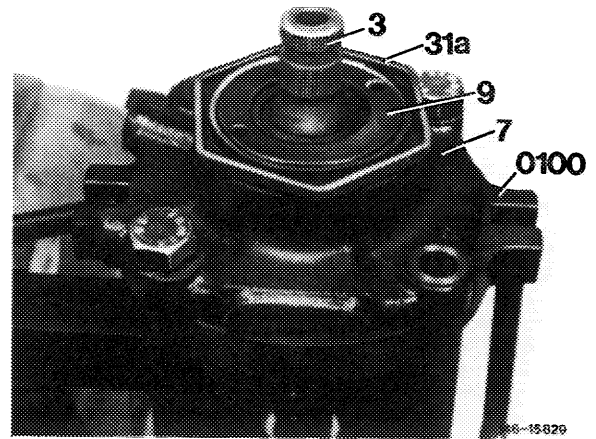
### Bearing cap and steering worm

53 Screw bearing insert (9) into bearing cap (7) and tighten slightly. Screw slot nut or hex. nut on bearing insert.



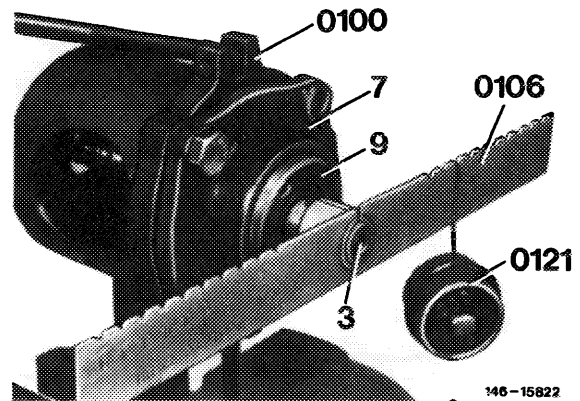
Layout bearing insert with slot nut

Layout bearing insert  
with hex. nut



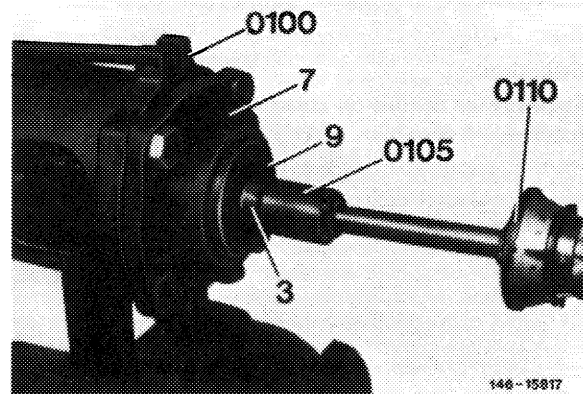
54 Measure friction torque of steering worm in bearing cap (sealing components only), for this purpose place measuring device (0106) on splining of steering worm. Friction torque should amount to  $\leq 12 \text{ Ncm} = 200 \text{ g}$  in notch "6" of measuring device.

Special tool 116 589 03 21 00



55 In combination with socket (0105) the friction torque can also be measured with torque screwdriver (0110).

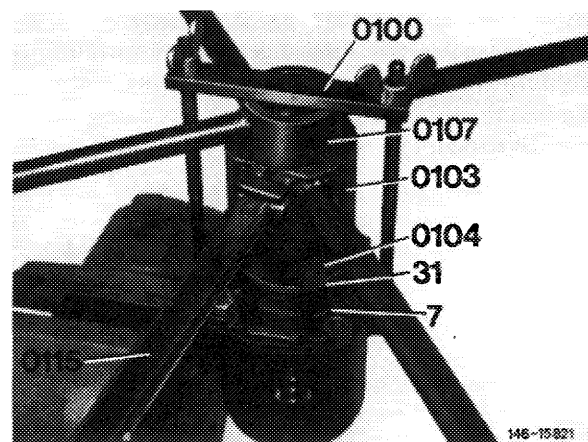
Special tool 123 589 00 08 00,  
001 589 09 21 00



56 Tighten bearing insert (9) with insert including tommy handle (0107) until an additional friction torque of 4–7 Ncm is available. Tighten slot nut or hex. nut to 140–160 Nm and check friction torque once again.

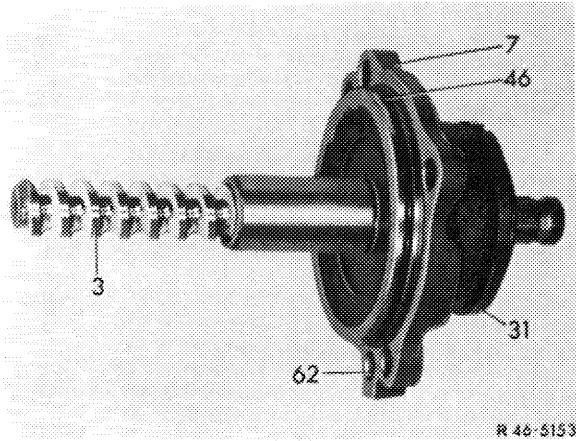
Special tool for slot or hex. nut  
126 589 00 16 00, 123 589 01 07 00,  
001 589 67 21 00, 123 589 09 09 00

Special tool for bearing insert  
123 589 01 16 00, 123 589 02 07 00

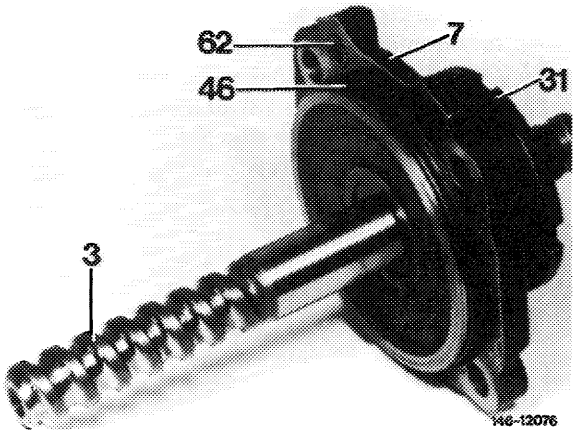


57 Remove bearing cap from device, mount both O-rings (46 and 62).

Bearing cap (with neck) and steering worm  
1st version for steering without inside stop  
sealing ring (teflon) and O-ring on steering  
worm



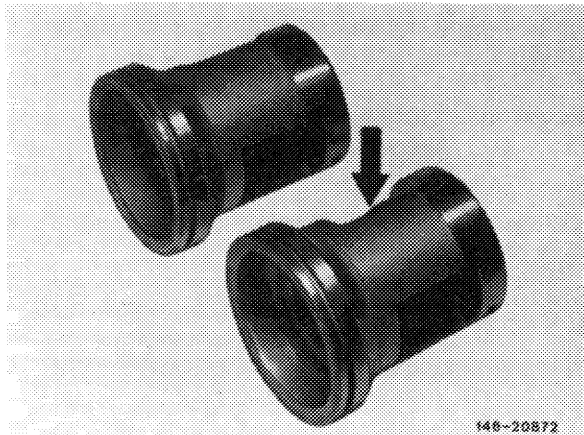
Bearing cap (without neck) and steering worm  
2nd version for steering with inside stop seal-  
ing ring (teflon) and O-ring in bearing cap



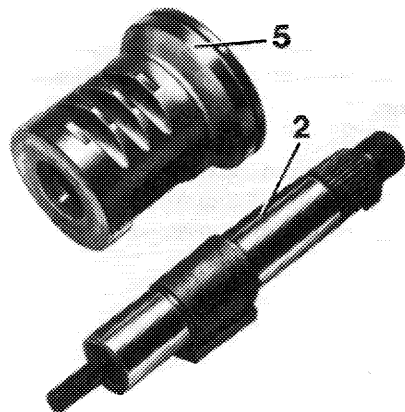
### Working piston and steering nut

#### Attention!

The working pistons for steering with and without automatic compensation for play are different. The working piston with automatic compensation for play is provided with a recess (refer to arrow).



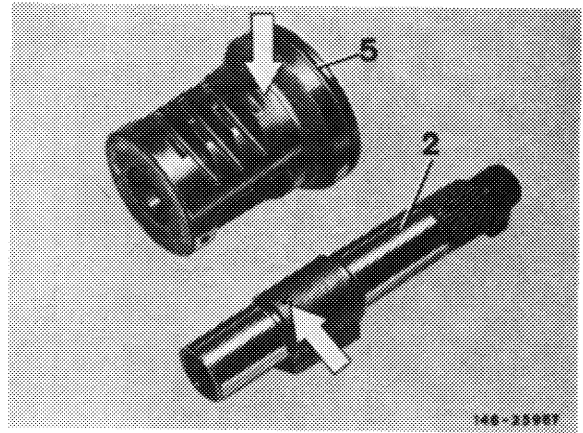
When renewing pitman arm pay attention to different version. Since the middle of 1983, working pistons and pitman shafts with modified tooth-  
ing are installed (2nd version with stamped notch, refer to arrow).



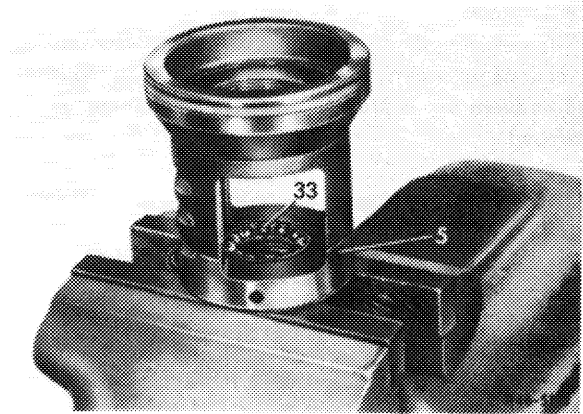
1st version

146-25965

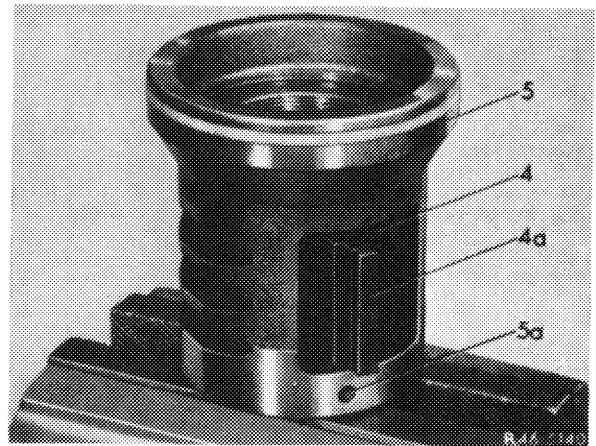
2nd version



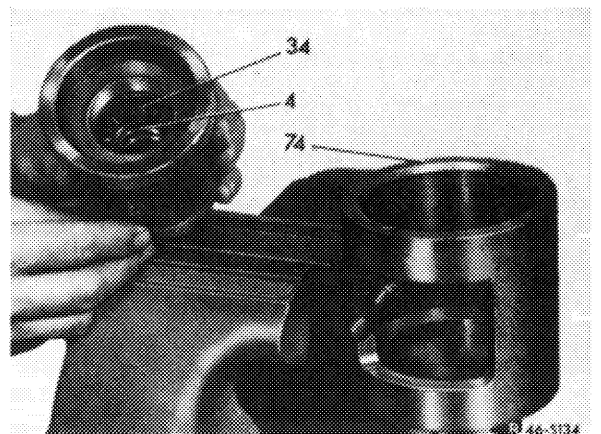
58 Press outer race of axial angular ball bearing (33) into working piston (5), mount ball race.



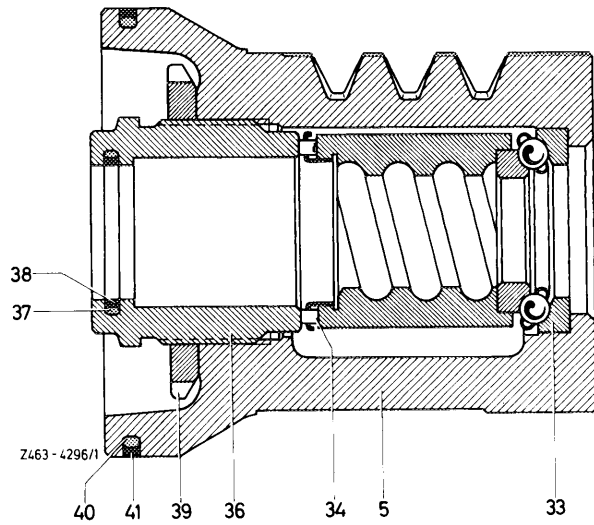
59 Insert steering nut (4) into working piston.



60 Insert axial cyl. roller cage (34) into working piston (5) in such a manner that the sheet metal guide on roller cage engages steering nut (4).



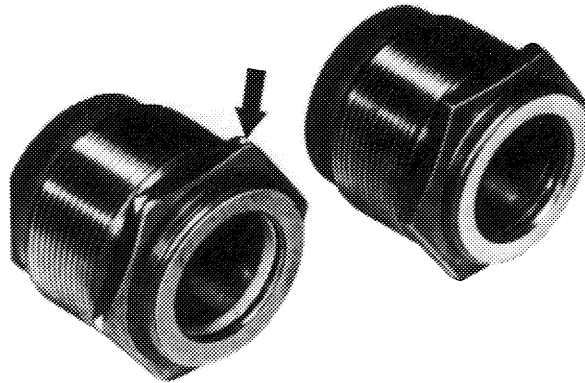
61 Insert O-ring (37) and sealing ring (38) into screw cap (36).



**Attention!**

The recessing depth in screw cap (power steering 1st version) for sealing ring and O-ring has been reduced. This screw cap is provided **with notches** (refer to arrow).

The sealing components for both screw cap versions are contained in repair set part No. 107 586 02 46. Pay attention to note in repair set.

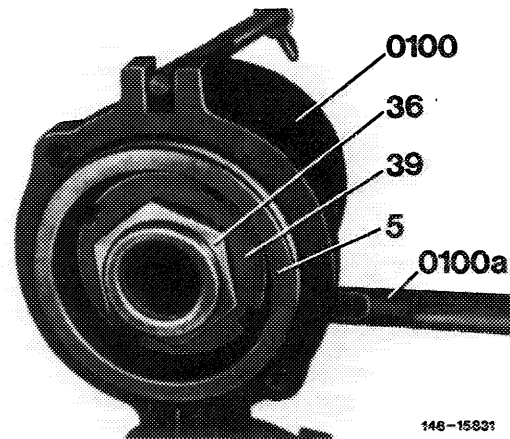


146-9658

62 Fasten working piston (5) including steering nut in device (0100) by means of plug (0100 a).

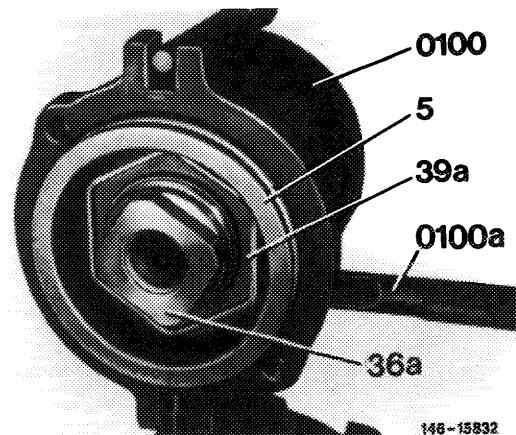
Special tool 123 589 02 59 00

63 Screw slot nut or hex. nut (39) on screw cap, screw cover (36) into working piston (5) and tighten slightly.



Layout screw cap (36) with hexagon SW 36 or 46 mm and slot nut (39)

146-15831

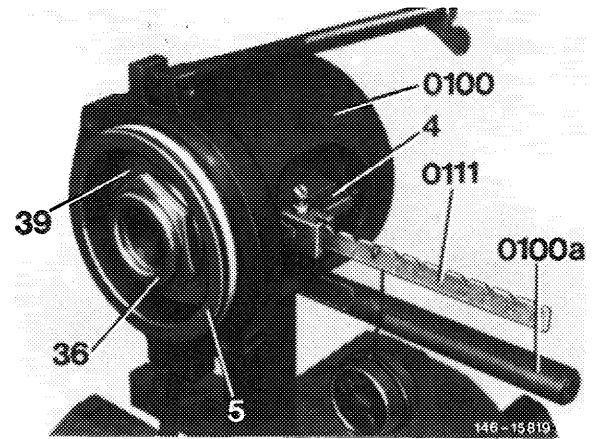


Layout screw cap (36 a) with square nut and hex. nut (39 a)

146-15832

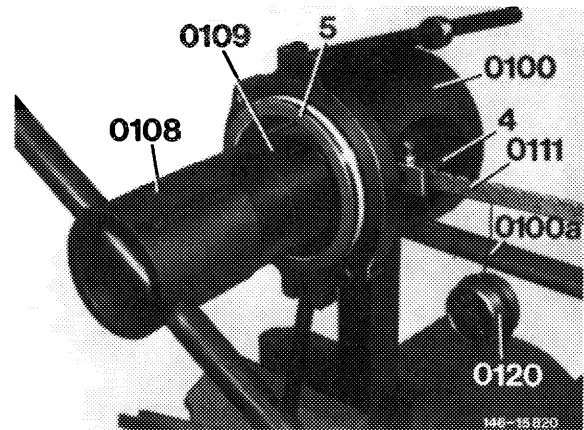
64 For measuring friction torque of steering nut (4) in working piston (5), slip measuring device (0111) on straightedge of steering nut.

Special tool 116 589 02 21 00



65 The friction torque should amount to 6–10 Ncm = 100 g in notch "6" up to "10" of measuring device. For adjusting screw cover, tighten with respective insert (0109) and tommy handle (0108) until weight on measuring device is just turning steering nut.

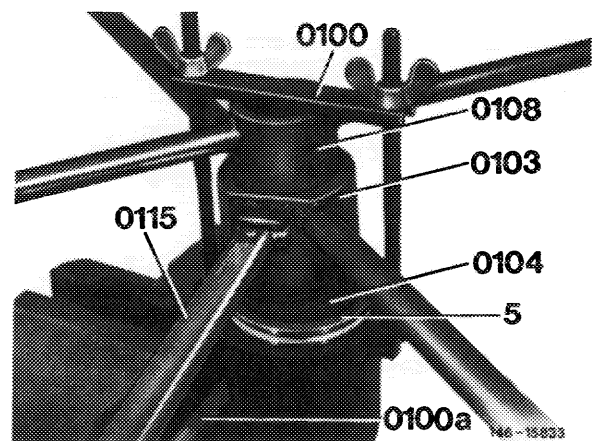
Special tool 123 589 01 16 00, 123 589 05 09 00, 123 589 06 09 00, 123 589 07 09 00



66 Secure screw cover with slot nut or hex. nut while applying counterhold to screw cover. Tightening torque 200–240 Nm. Then check friction torque of steering nut once again.

Special tool for slot or hex. nut  
126 589 00 16 00, 123 589 00 07 00,  
123 589 09 09 00

Special tool for screw cover  
123 589 01 16 00, 123 589 05 09 00,  
123 589 06 09 00, 123 589 07 09 00



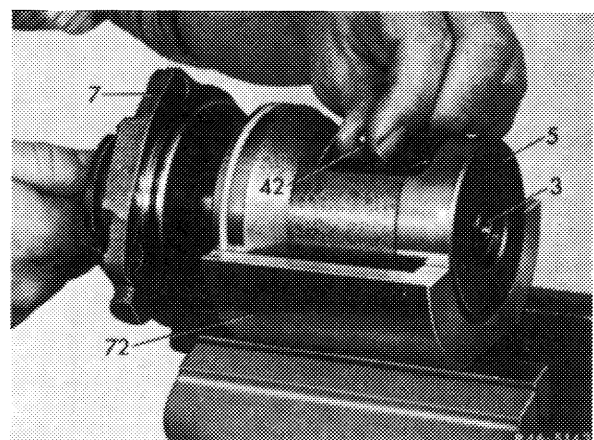
67 Unclamp working piston from device and place into assembly shell (72).

Special tool 201 589 02 59 00

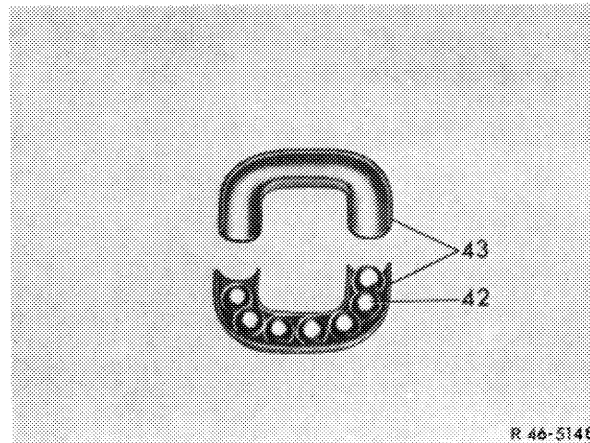
### Steering worm, steering nut

68 Introduce steering worm (3) into steering nut until one ball circuit is fully visible through bore (for balls) in steering nut.

69 Introduce 17 balls into ball circuit while slowly turning steering worm to the right.

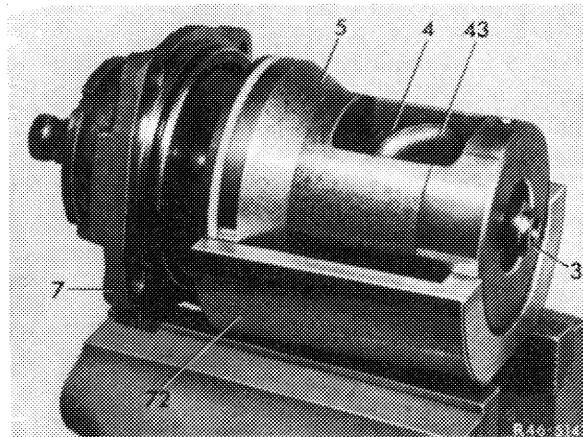


70 Fill one ball guide half (43) with grease and place the remaining 7 balls (42) into this guide half, close both openings with grease.



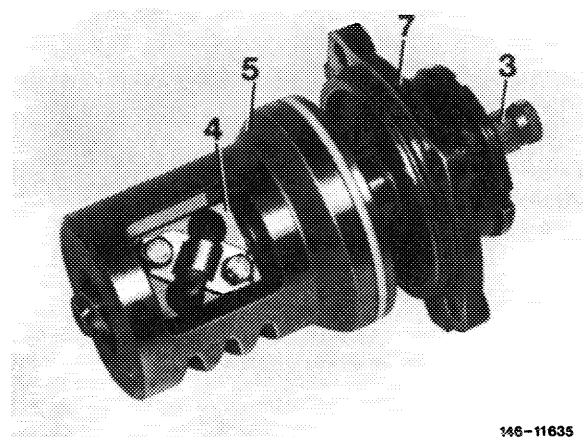
R 46-5146

71 Insert ball guide halves (43) into steering nut.



R 46-5146

72 Place fastening shell with locking plate on steering nut (4). Screw in hex. screws and tighten to 12–16 Nm Secure hex. screws.

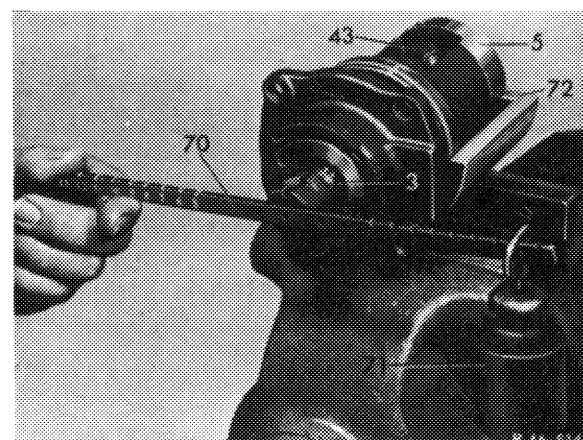


146-11635

73 Place measuring device (70) on splining of steering worm (3) and measure friction torque of ball circuit.

Special tool 116 589 03 21 00

The friction torque steering nut – steering worm should be 5–50 Ncm, i.e. 50 g in notch "10" as lowest or 500 g in notch "6" to "12" as highest friction torque.

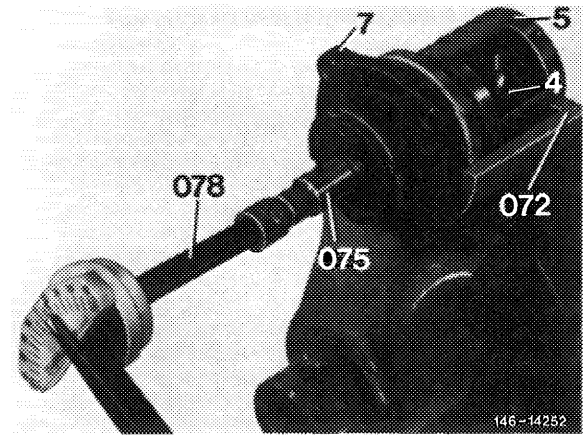


R 46-5146



74 The friction torque can also be measured with torque wrench in combination with socket (075).

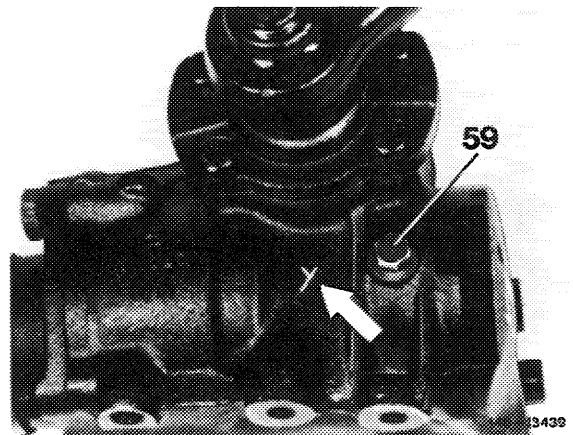
Special tool 123 589 02 21 00,  
123 589 00 08 00



### Steering case, control valve

**Note:** On steerings with inside stop observe the following:

a) The steering case should be reinforced. Identification: one or two cast-in "y" (arrow).

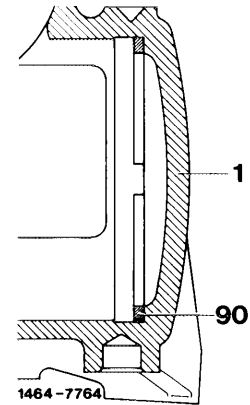


b) Stop ring (90) is located in steering case as a stop for working piston in lefthand lock. If the stop ring has been removed, note that there are rings of different thickness:

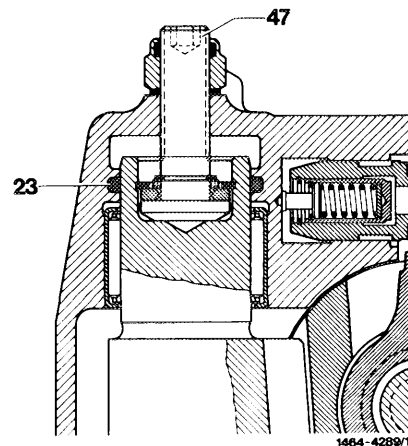
Steering 765.704 = 2.46-0.1

Steering 765.706 = 1.8-0.1

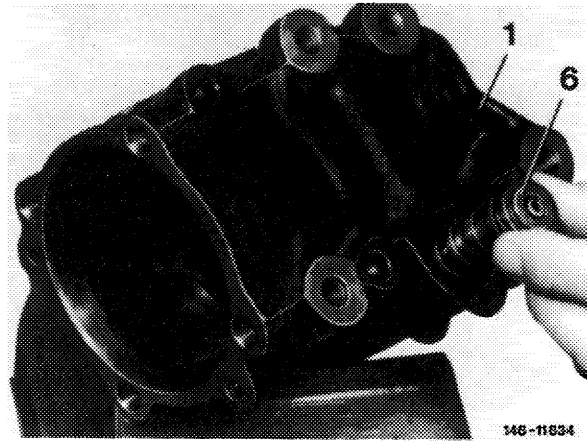
c) Steering 765.701 code letter "S" has no stop ring.



75 Renew O-ring (23) in steering case.

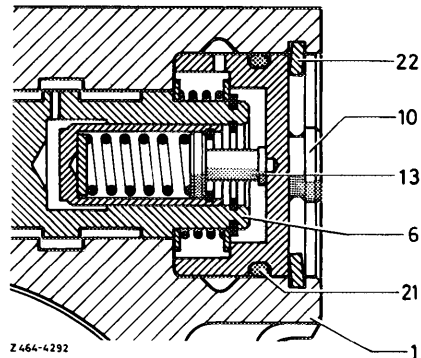


76 Insert control valve (6) into steering case.



a) Control valve 1st version  
(reaction piston 1 mm dia.)

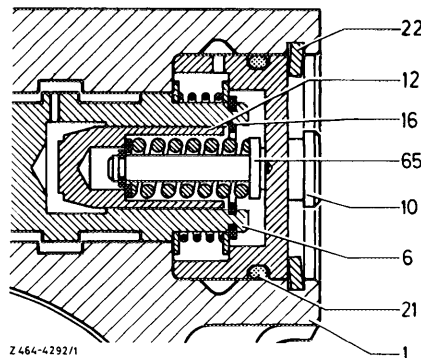
- 1 Steering case
- 6 Control valve
- 10 Closing cap
- 13 Supporting bolt
- 21 O-ring
- 22 Locking ring



b) Control valve 2nd version  
(reaction piston 10 mm dia.)

**Note:** Grease spring bolts (65) so that they will not fall out when installing control valve.

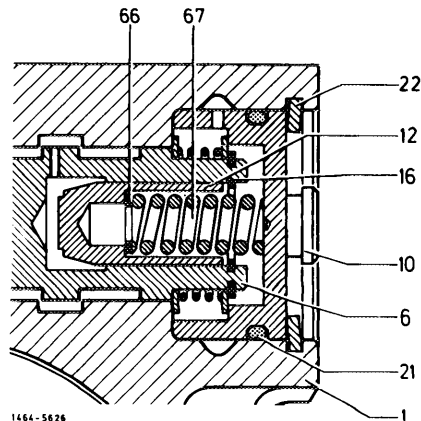
- 1 Steering case
- 6 Control valve
- 10 Closing cap
- 12 Reaction piston
- 21 O-ring
- 22 Locking ring
- 65 Spring bolt



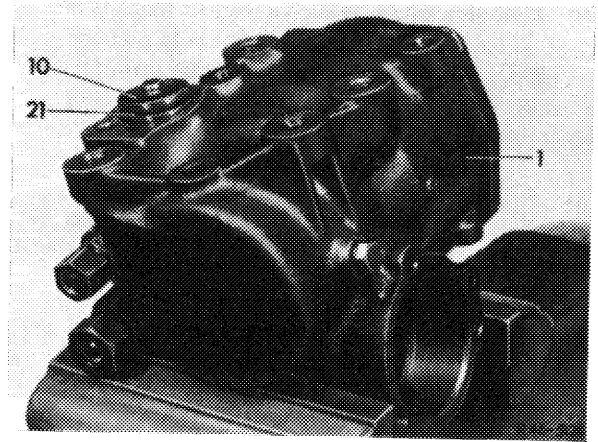
c) Control valve 3rd and 4th version  
(reaction piston 11 or 11.5 mm dia.)

**Note:** Grease springs (67) so that they will not fall out when installing control valve.

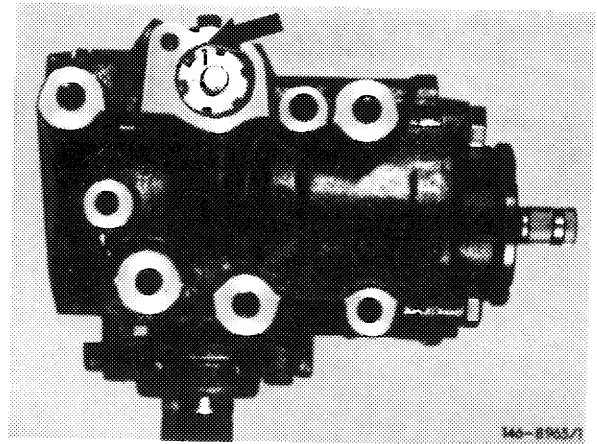
- 1 Steering case
- 6 Control valve
- 10 Closing cap
- 12 Reaction piston
- 16 Locking ring
- 21 O-ring
- 22 Locking ring
- 66 Compensating washer
- 67 Spring



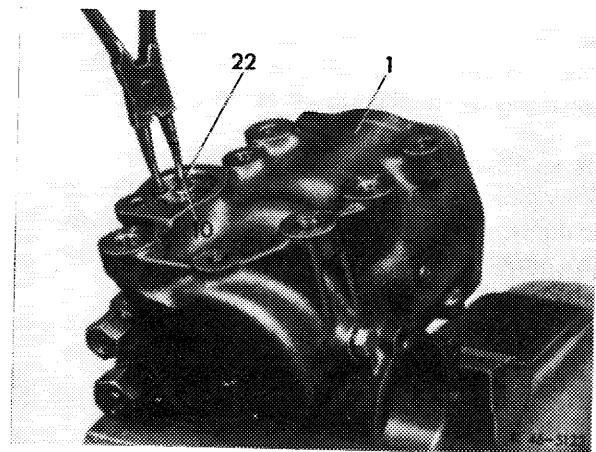
77 Renew O-ring (21) on closing cap (10), then knock closing cap into steering case by means of a plastic hammer. Note that bore in cap faces upwards (to tapped hole in steering case for adjusting screw).



**Note:** The punched in code number in closing cap indicates the diameter of the reaction pistons (11 or 11.5 mm). For this reason, the cap should be identified with code number "1".



78 Insert locking ring (22) into steering case (1) in such a manner that the lugs of the ring exert pressure on closing cover (10). Knock in locking ring by means of a mandrel until it is correctly seated in groove of steering case.

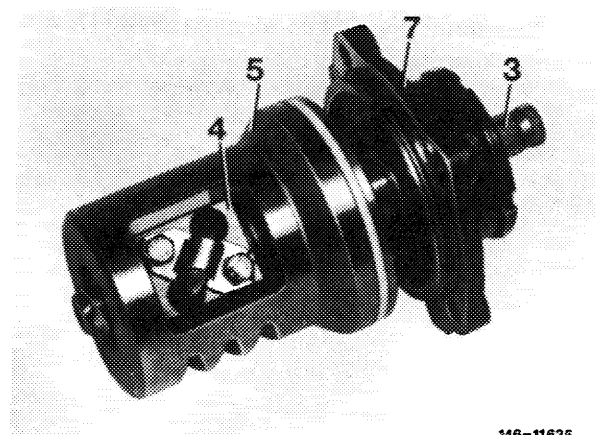


### **Steering case, working piston**

79 Carefully install working piston (5) complete with steering worm (3), steering nut (4) and bearing cap (7) into steering case, while introducing straightedge of steering nut into groove of control valve.

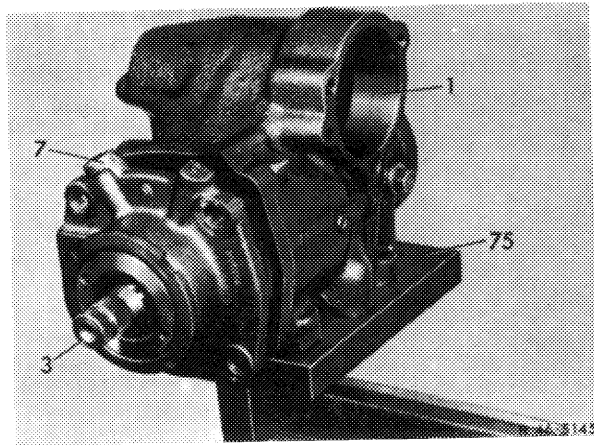
#### **Caution!**

Do not use force.



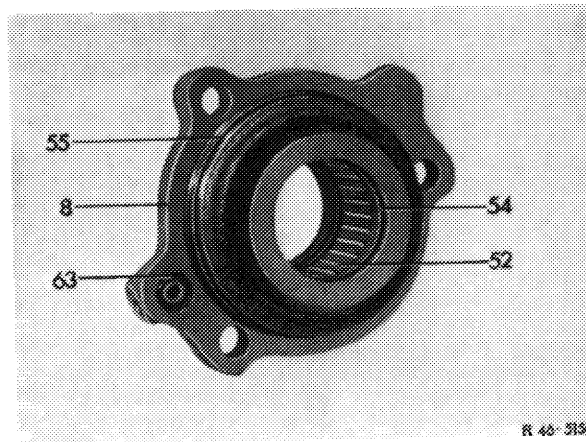
80 Turn bearing cap in such a manner that the oil duct on steering case is in alignment with oil bore on bearing cap. Pay attention to correct seat of O-rings. Then screw in hex. screws without spring rings and washers and tighten to 70 to 75 Nm.

81 Turn steering worm in such a manner that the center tooth gap on working piston is in center of steering case.



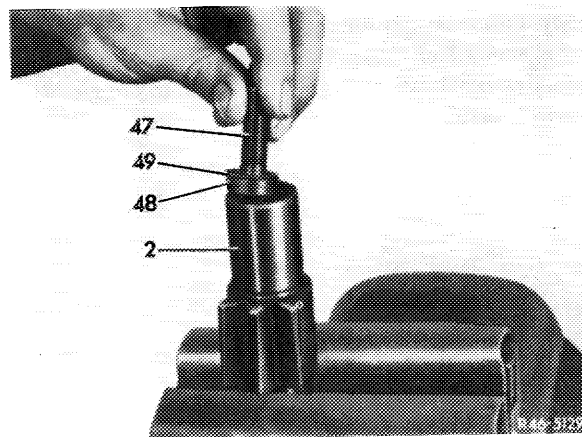
**Pitman shaft, casing cover**

82 Insert O-rings (54, 55 and 63) into casing cover (8).

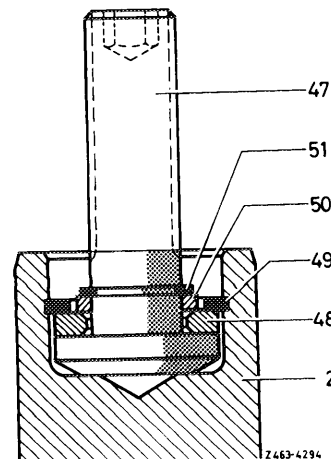


83 Insert adjusting screw (47) including thrust washer (48) and locking ring (49) into pitman shaft (2), while paying attention to perfect seat of locking ring.

**Note:** The adjusting screw should be mounted in pitman shaft as much as possible free of play. For this purpose, thrust washers of the following thickness are available: 2.65 – 2.70 – 2.75 – 2.80 – 2.85 – 2.90 – 2.95 – 3.00 – 3.05 – 3.10 mm.

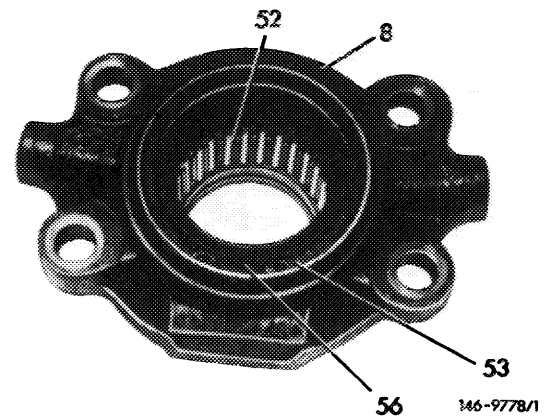


84 Place thrust ring (50) on adjusting screw (47) and insert locking ring (51).

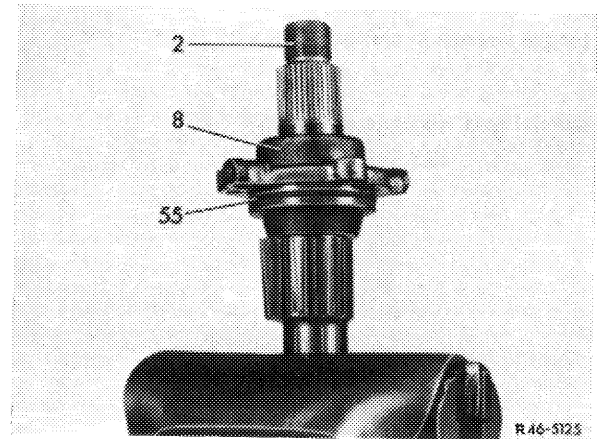


85 Press radial sealing ring (56) into casing cover (8) and insert locking ring.

Special tool 116 589 07 43 00



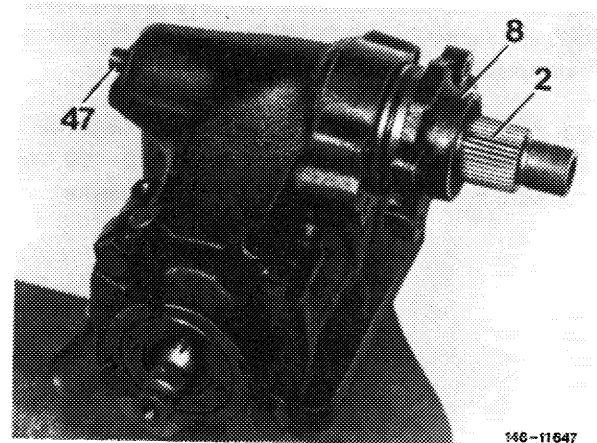
86 Place casing cover (8) on pitman shaft (2), then insert pitman shaft into steering case. Make sure that the center tooth of pitman shaft enters center tooth gap of working piston and that the O-rings are correctly seated.



87 Screw adjusting screw (47) into steering case until it is hard to move.

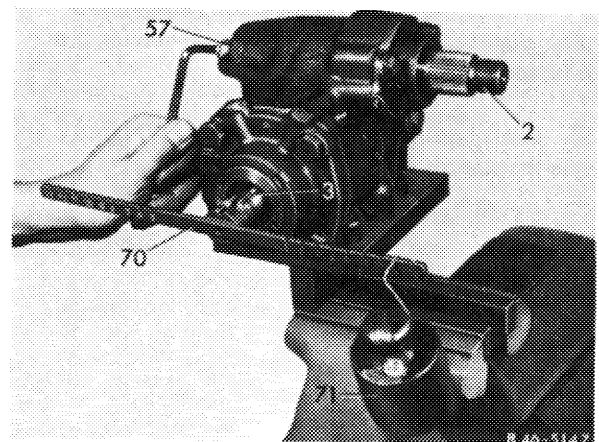
88 Turn casing cover (8) in such a manner that both oil ducts are one above the other. Then screw in **new** plastic-coated hex. screws and tighten to 30–35 Nm.

89 Loosen adjusting screw (47) until steering worm can be easily rotated, then measure friction torque of steering worm and take note of value.



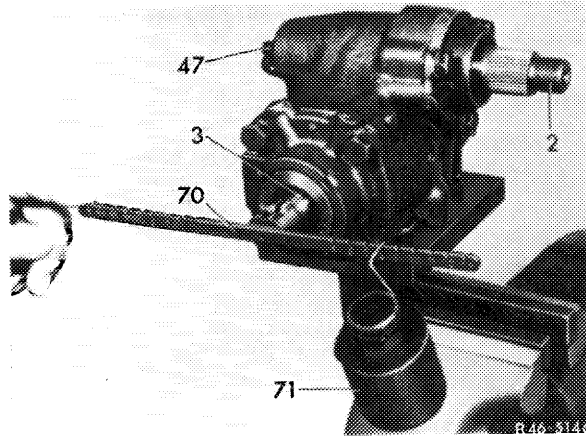
90 Slip measuring device (70) on steering worm (3). Adjust pressure device of pitman shaft (2), for this purpose turn adjusting screw to the left until friction torque has increased by 40 – 60 Ncm. That is, when the steering worm is turned beyond center position the friction torque should amount to 110 – 160 Ncm. The steering is correctly set, if a weight of 2000 g in notch "6" to "8" of measuring device turns steering worm beyond center position.

Special tool 116 589 03 21 00



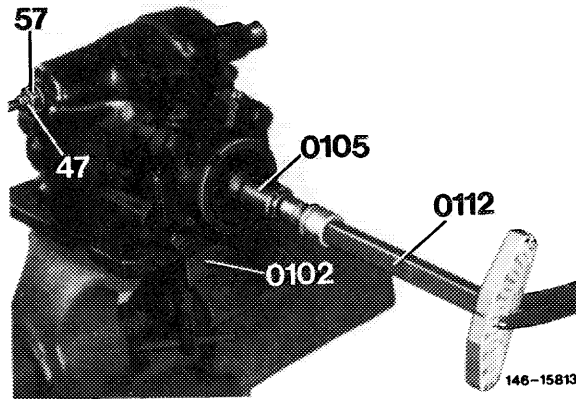
**Attention!**

When turning beyond center position, a light pressure point should be noticeable. When the steering worm is turned from lock to lock, the steering should not bind.



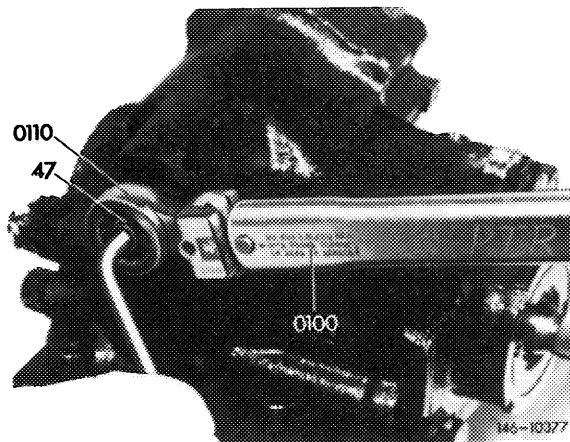
91 The friction torque can also be measured with torque wrench in combination with respective socket.

Special tool 123 589 02 21 00,  
123 589 00 08 00



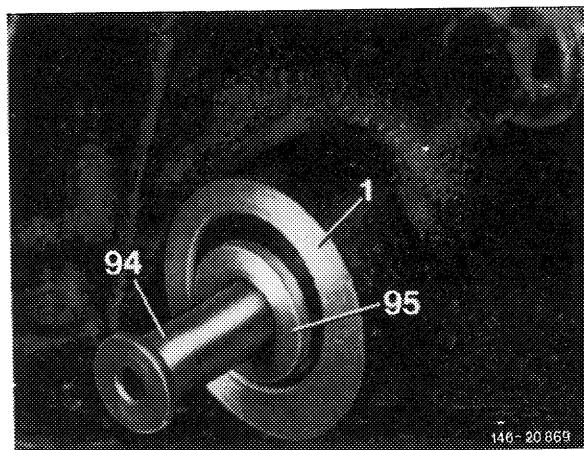
92 Screw SEAL-LOCK collar nut on adjusting screw (47) and tighten to 60–65 Nm, while applying counterhold to adjusting screw.

93 Check total friction torque once again (refer to item 43 to 47) which should amount to 110–160 Ncm = 2000 g in notch "6" to "8" of measuring device.



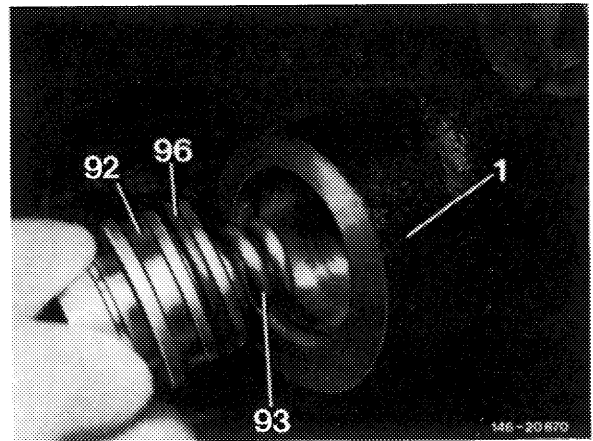
94 On steering with automatic compensation for play, slightly turn steering worm until working piston is no longer in center of steering.

95 Insert bushing (95) and spring bolt (94) into steering case.

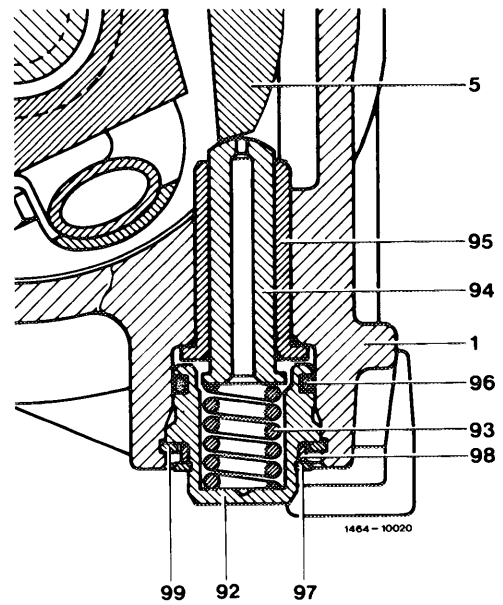


96 Renew O-ring (96) on cover (92).

97 Insert compression spring (93) into cover and cover into steering case.



98 Insert locking ring (99) into steering case. Place thrust ring (98) on cover (92).



99 Insert locking ring (97) into cover. Make sure that locking rings are correctly seated.

