

## 46–740 Assembly of power steering pump

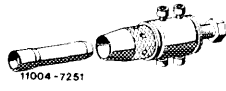


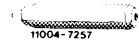
### Data

End play of drive shaft	on new pumps	max. 0.7
	on used pumps	max. 1.0

### Tightening torques

	Nm
Hex. screws on pump housing	35–40
Hollow screw for fastening supply tank	35–40

### Special tools

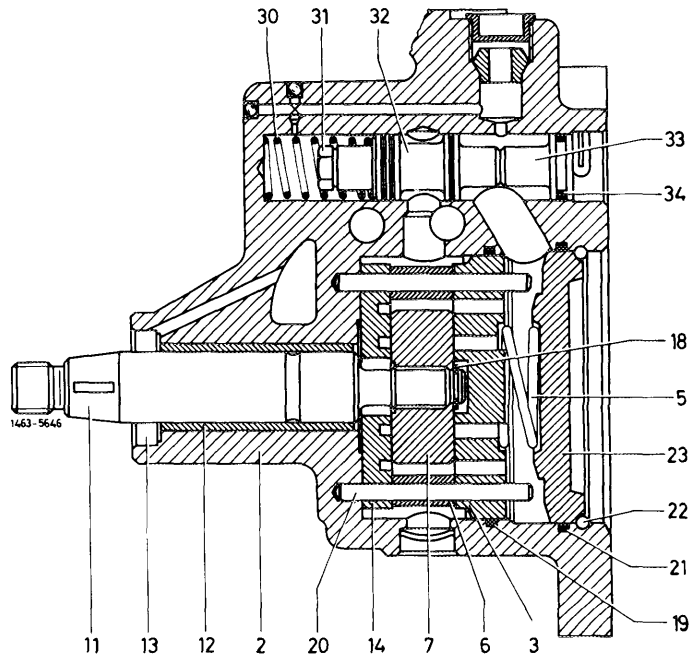
Puller for radial sealing ring (basic unit)		116 589 24 33 00
Mandrel 33 mm dia. VT 27, VT 49 2nd version, ZF		116 589 14 15 00
Mandrel 30 mm dia. VT 49 1st version		116 589 13 15 00
Assembly mandrel for locking ring		116 589 18 15 00

### Self-made tools

Pressing-in tool for bearing bushing	refer to Fig. item 2, note
Assembly sleeve	refer to section B fig. item 9, note
Assembly mandrel for needle bearing	refer to section B fig. item 2, note
Pressing-in mandrel for radial ball bearing and radial sealing ring	refer to section C fig. item 3, note

B. Vickers power steering pump VT 49 (grey iron and light alloy version)  
 ZF power steering pump (light alloy version)

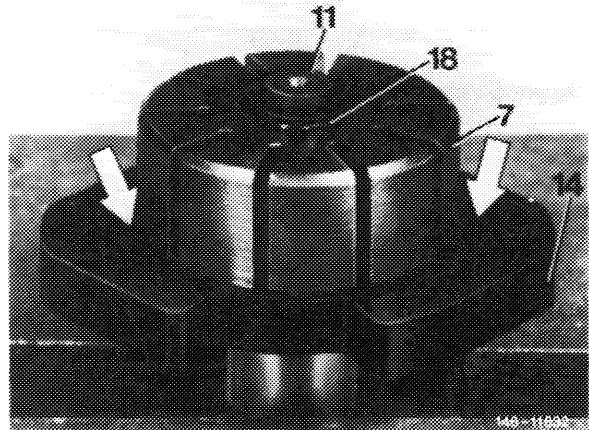
- 2 Pump housing
- 3 Pressure plate at cover end
- 5 Compression spring
- 6 Cam ring
- 7 Rotor with blade
- 11 Drive shaft
- 12 Bearing bushing
- 13 Radial sealing ring
- 14 Pressure plate at drive end
- 18 Locking ring
- 19 O-ring
- 20 Cyl. pin
- 21 O-ring
- 22 Circlip
- 23 Cover
- 30 Compression spring
- 31 Valve screw
- 32 Volume control valve
- 33 Closing plug
- 34 O-ring



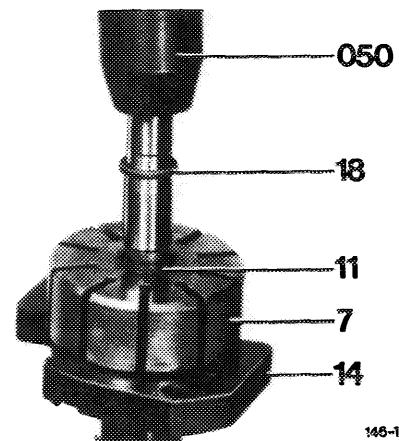
**Note**

Prior to assembly, coat all parts with manual transmission oil.

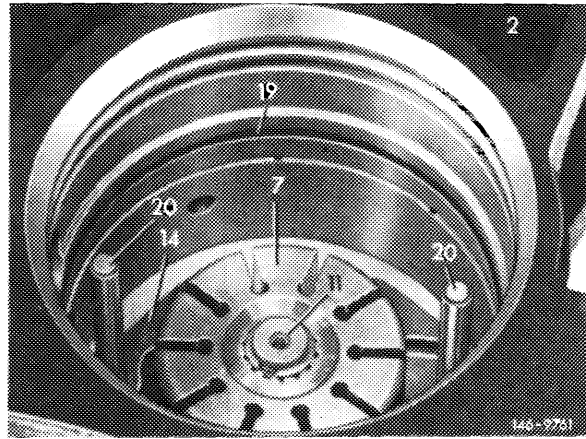
- 1 Place pressure plate at input end (14) with recesses (refer to arrow) toward splining on drive shaft (11). Place rotor (7) on splining of drive shaft (11).



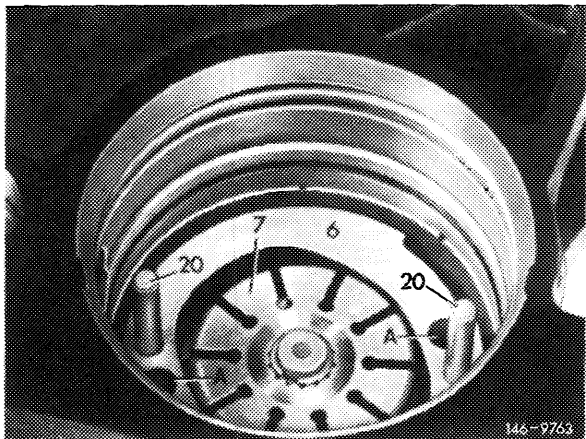
- 2 Insert locking ring (18) into groove of drive shaft (11) by means of assembly mandrel (050).



3 Insert both cyl. pins (20) into pump housing, then insert pre-assembled drive shaft.

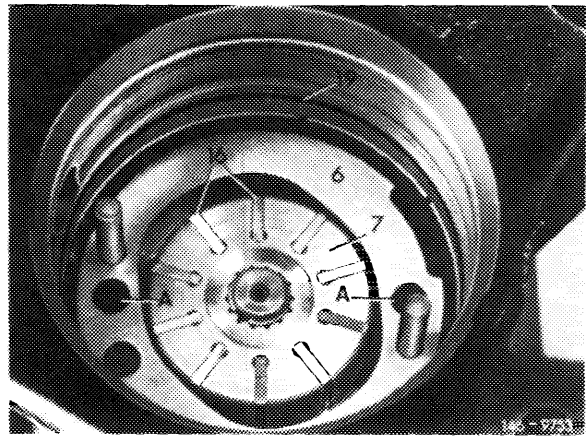


4 Place cam ring (6) with cast-in direction of rotation arrow in upward direction on cyl. pins (20). Pay attention to correct location of cam ring.

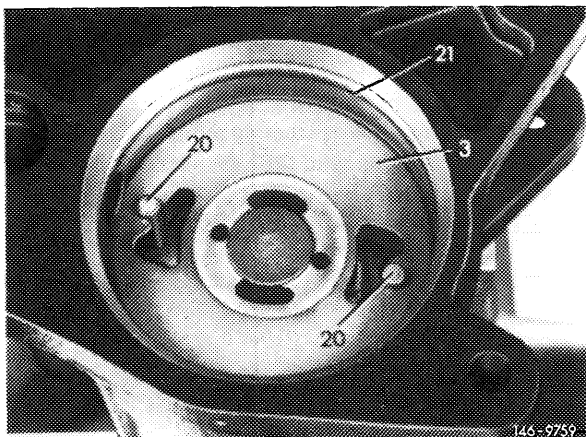


5 Insert blades (16) (10 each) into rotor (7) with rounded-off sides toward cam ring (6).

6 Insert O-ring (19) into housing.

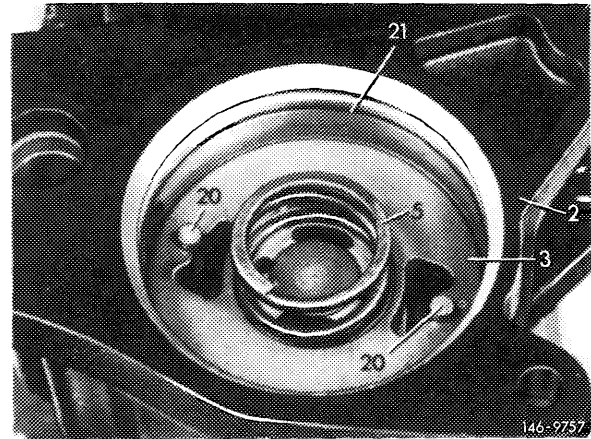


7 Insert pressure plate (3) into housing.

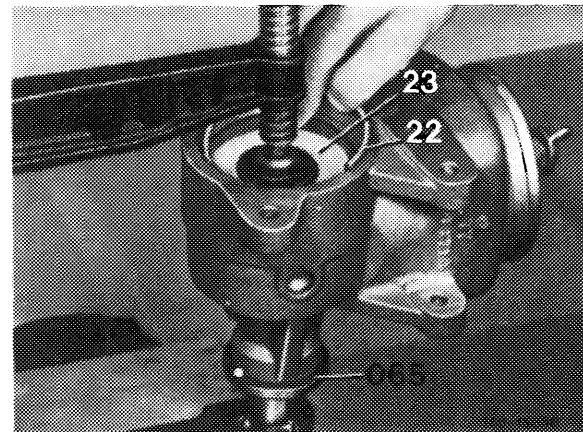


8 Insert O-ring (21) into housing. Place compression spring (5) on pressure plate (3).

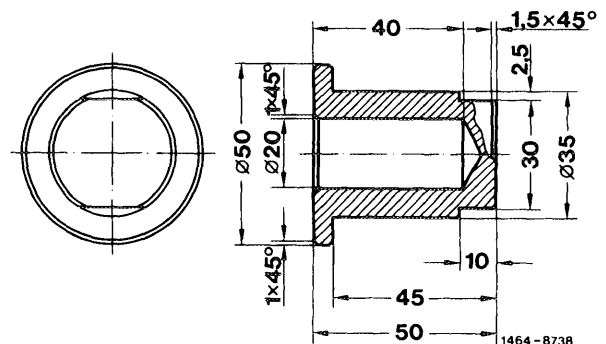
**Note:** O-ring (19) and (21) have different diameters. The O-ring (19) with the smaller diameter seals pressure plate (3), the larger O-ring (21) seals cover (23) in relation to housing.



9 Place assembly sleeve (065) on power steering pump and mount cover (23). Then press cover slightly into housing by means of a hand press. Insert circlip (22) into groove of housing, pay attention to correct location of ring.

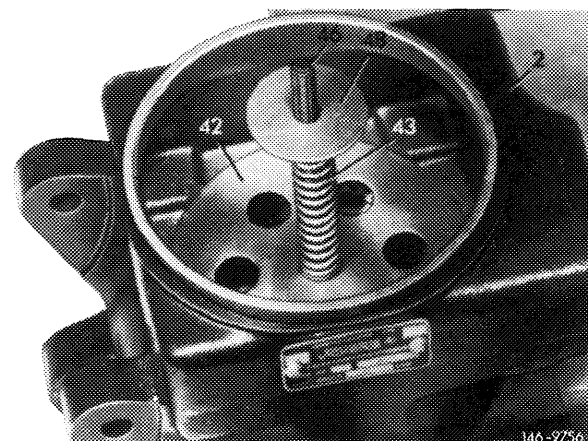


**Note:** The assembly sleeve is self-made according to specified dimensions.

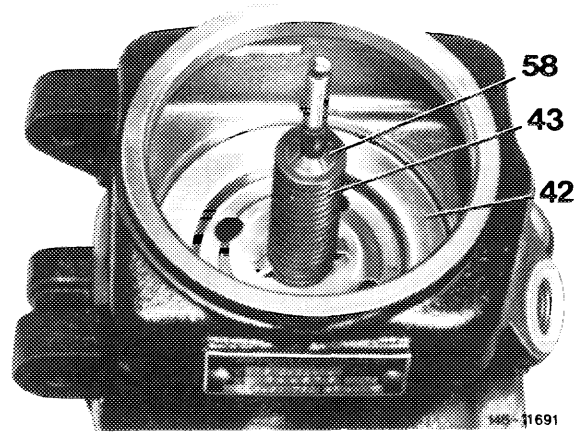


10 On grey iron pump, insert lower steadying plate (40), filter ring (41), upper steadying plate (42) and compression spring (43) into housing.

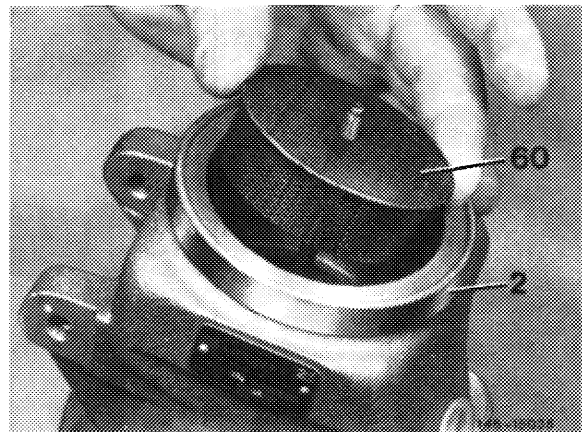
11 On grey iron power steering pump 1st version, place washer (48) on stud (46), fasten closing cover (45) together with paper gasket (44) by means of wing nut (47).



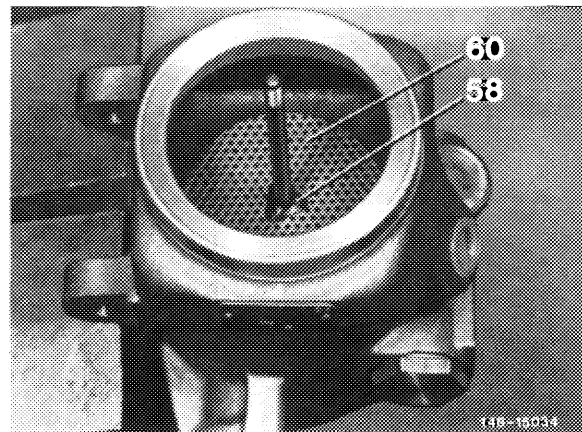
12 On grey iron power steering pump and on light alloy pump 2nd version, press detent spring (58) on stud and fasten closing cover together with paper gasket by means of wing nut.

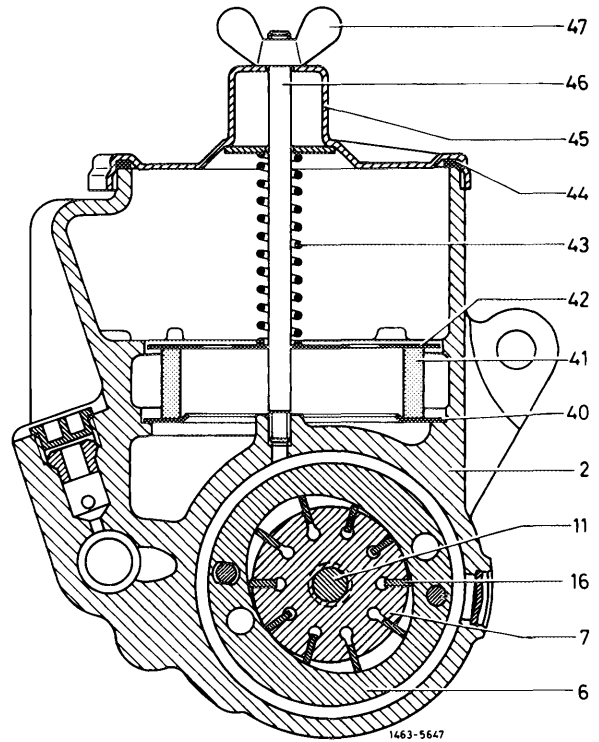


13 On light alloy power steering pump 1st version, place steadying basket (60) into housing.



14 On light alloy power steering pump 1st version, press detent spring (58) on stud.

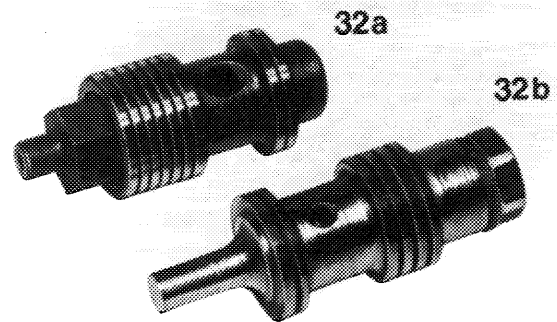




- 2 Pump housing
- 6 Cam ring
- 7 Rotor
- 11 Drive shaft
- 16 Blade
- 40 Lower steadying plate
- 41 Filter ring
- 42 Upper steadying plate
- 43 Compression spring
- 44 Gasket
- 45 Closing cover
- 46 Stud
- 47 Wing nut

15 If a new volume control valve is installed, make sure that a valve with correct opening pressure of pressure relief valve is installed. In addition, pay attention to manufacturer of volume control valve:

- 32a = Vickers valve
- 32b = ZF valve

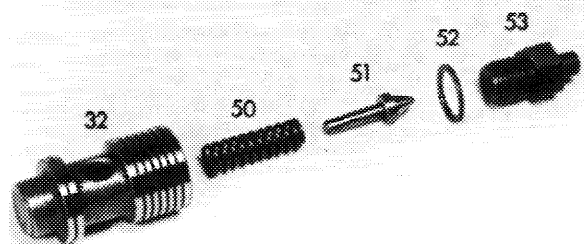


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16 Clean volume control valve prior to assembly, immerse in manual transmission oil and introduce into housing bore. Valve should slide easily in housing bore.

17 Install pressure relief valve from respective repair set into volume control valve. Insert compression spring (50) first, then valve cone (51). Then place spacing washers (52) for adjusting opening pressure into valve screw (53).

**Attention!**  
Use the same washers which were previously installed.

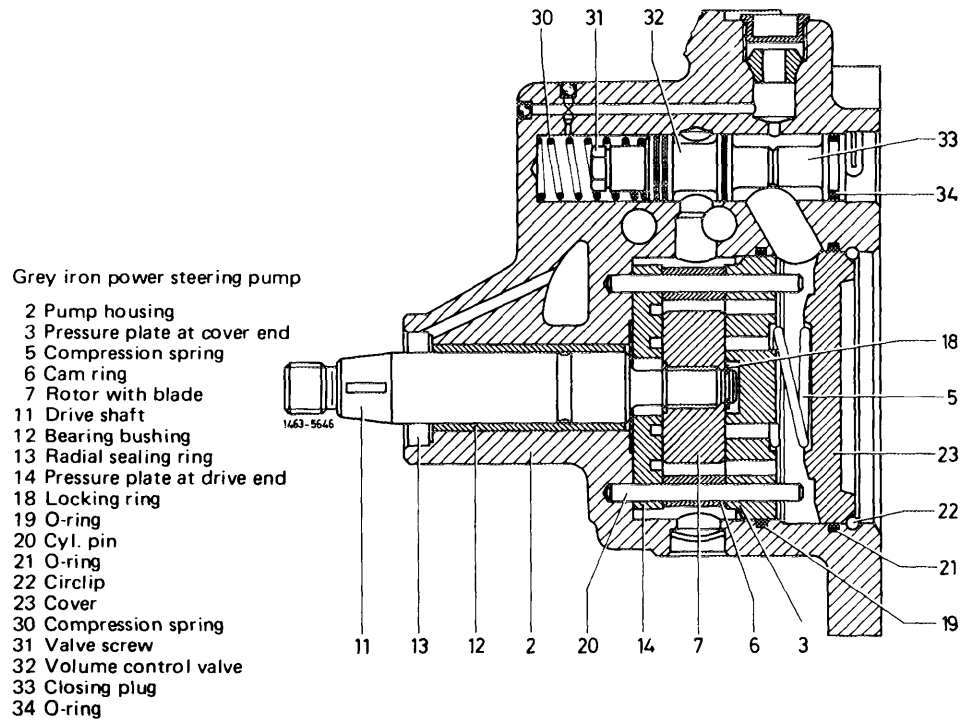
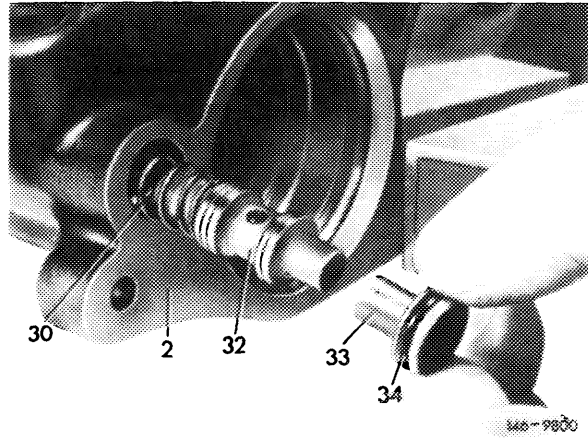


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18 Clamp volume control valve (32) with its unground part into vise, screw in valve screw (53) and tighten.

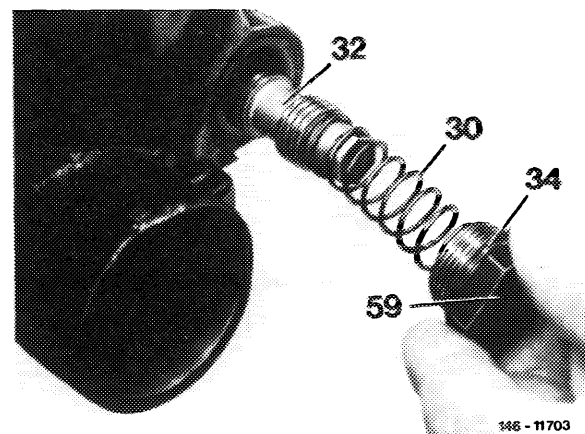
19 On grey iron power steering pump, insert compression spring (30) into bore of pump housing (2). Flush volume control valve once again, immerse in manual transmission oil and introduce into housing bore in such a manner that the valve screw is pointing inwards.

20 Fit a new O-ring (34) on closing plug (33). Force closing cover with bolt inwards into housing bore and secure by knocking in setpin.



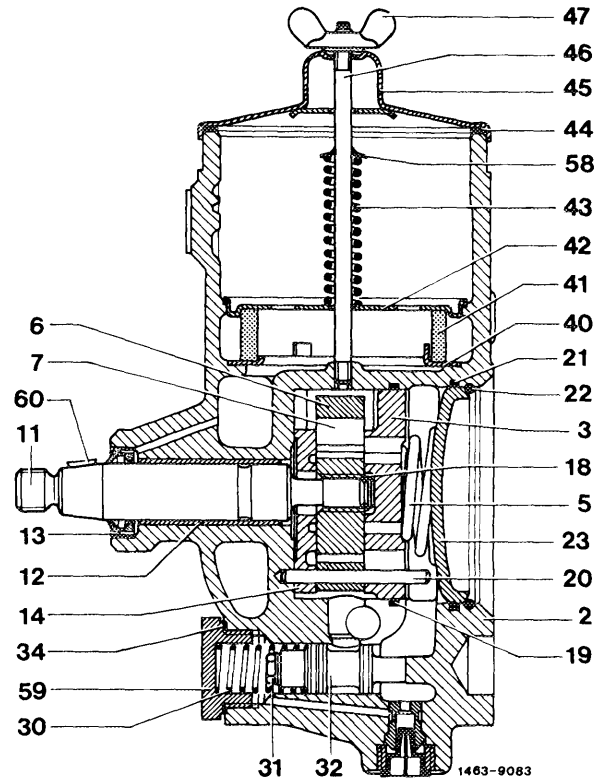
21 On light alloy power steering pump, insert volume control valve (32) and compression spring (30) into housing.

**Note:** Install volume control valve in such a manner that valve screw of pressure relief valve is pointing toward closing plug.

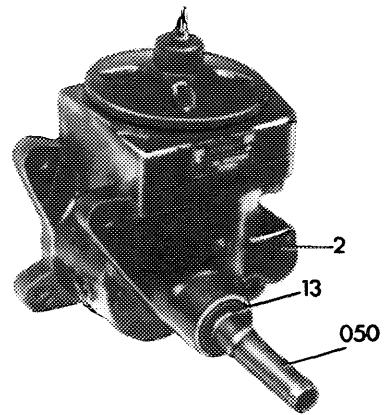


Light alloy power steering pump

- 2 Pump housing
- 3 Pressure plate at cover end
- 5 Compression spring
- 6 Cam ring
- 7 Rotor with blade
- 11 Drive shaft
- 12 Bearing bushing
- 13 Radial sealing ring
- 14 Pressure plate at drive end
- 18 Locking ring
- 19 O-ring
- 20 Cyl. pin
- 21 O-ring
- 22 Circlip
- 23 Cover
- 30 Compression spring
- 31 Valve screw
- 32 Volume control valve
- 34 Closing plug
- 40 Lower steadying plate
- 41 Filter ring
- 42 Upper steadying plate
- 43 Compression spring
- 44 Gasket
- 45 Closing cover
- 46 Stud
- 47 Wing nut
- 58 Detent spring
- 59 Closing plug
- 60 Woodruff key

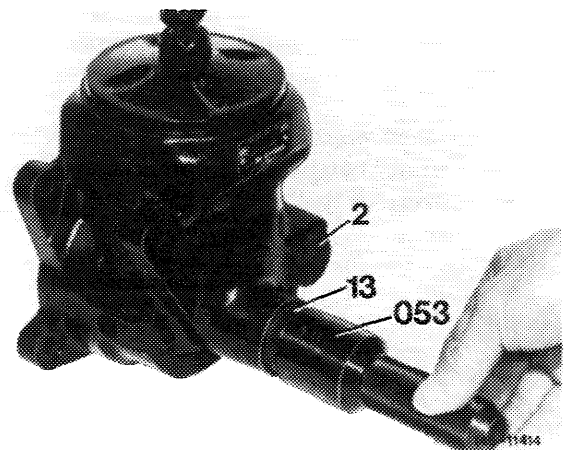


22 Screw guide sleeve from 116 589 24 33 00 (050) on drive shaft.



23 Press radial sealing ring (13) into housing by means of mandrel (053).

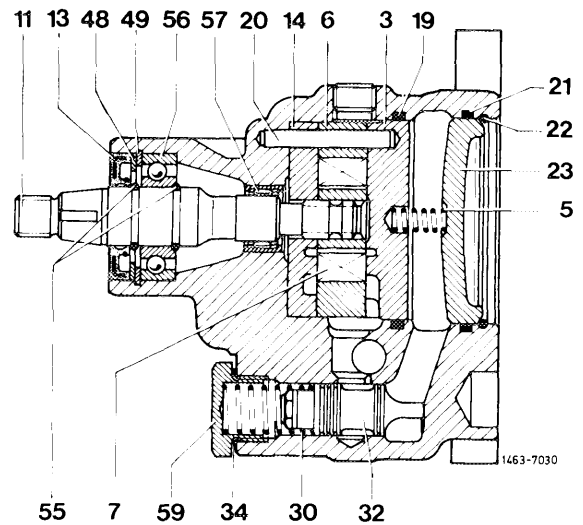
24 Insert Woodruff key into groove of drive shaft.





### C. ZF power steering pump (grey iron version)

- 3 Pressure plate at cover end
- 5 Compression spring
- 6 Cam ring
- 7 Rotor with blade
- 11 Drive shaft
- 13 Sealing ring
- 14 Pressure plate at drive end
- 19 O-ring
- 20 Cyl. pin
- 21 O-ring
- 22 Hooked circlip
- 23 Cover
- 30 Compression spring
- 32 Volume control valve
- 34 Sealing ring
- 48 Washer
- 49 Locking ring
- 55 Circlip
- 56 Radial ball bearing
- 57 Needle bearing
- 59 Closing plug

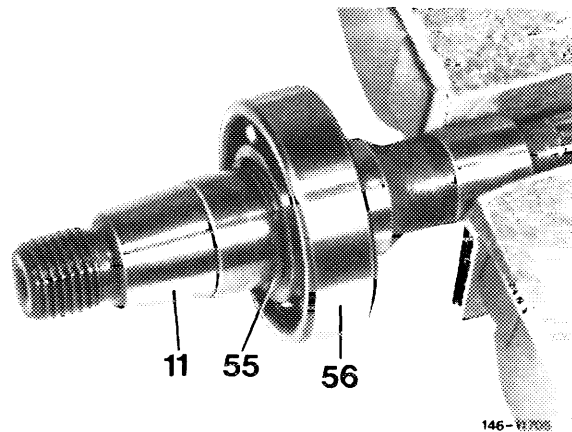


#### Note

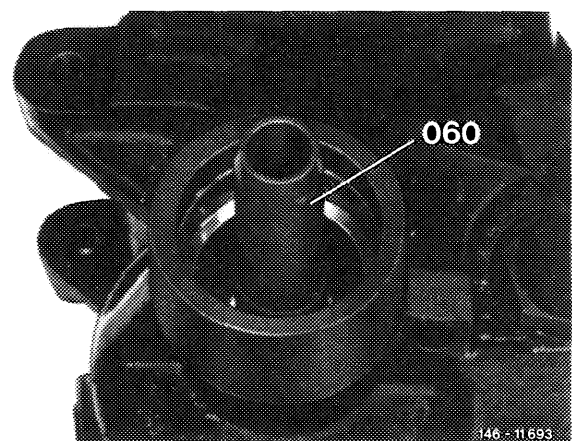
Coat all parts with manual transmission oil prior to assembly.

1 Insert front circlip (55) into groove of drive shaft (11). Press on radial ball bearing and insert 2nd circlip.

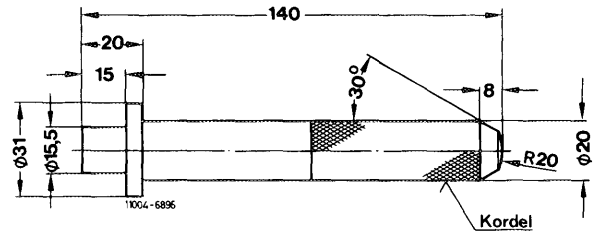
**Note:** Install all parts from splined end of drive shaft, to prevent damage to ground surface for radial sealing ring.



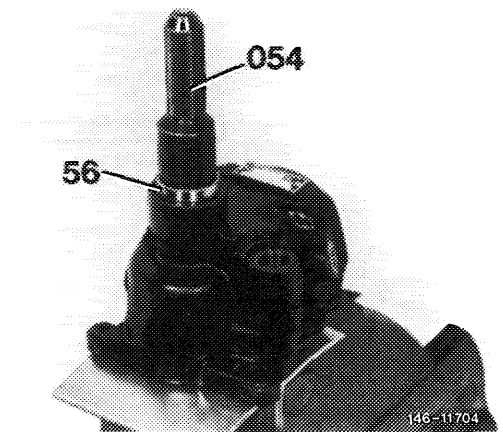
2 Press needle bearing into housing by means of assembly mandrel.



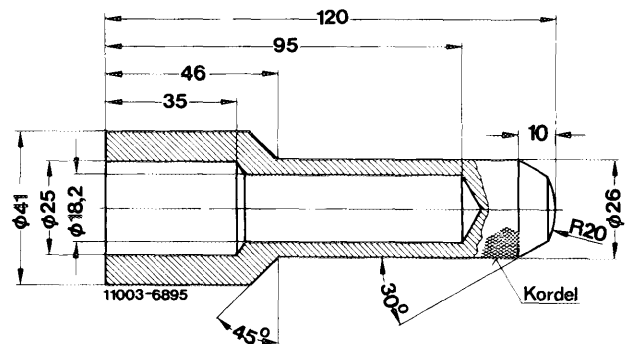
**Note:** The assembly mandrel is self-made according to specified dimensions.



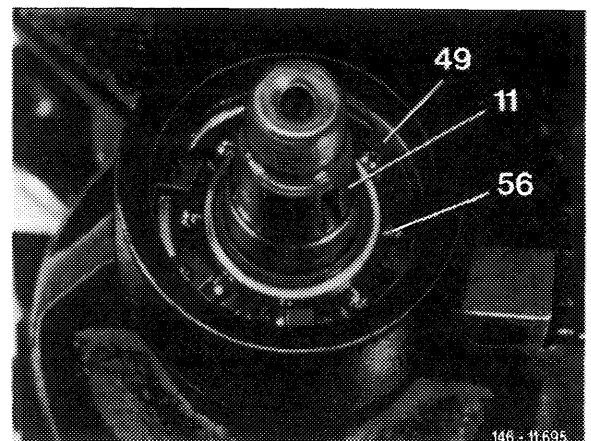
3 Press drive shaft into housing by means of pressing-in mandrel.



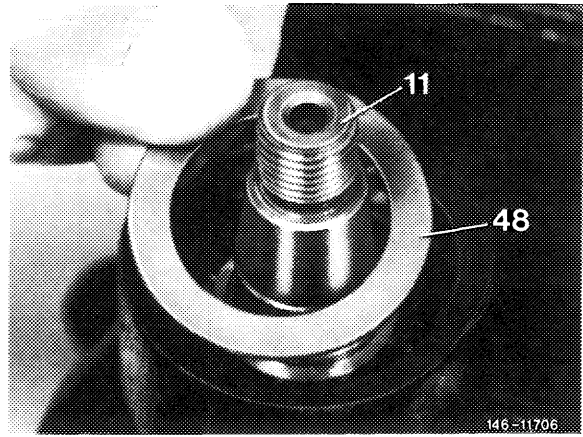
**Note:** The pressing-in mandrel is self-made according to specified dimensions.



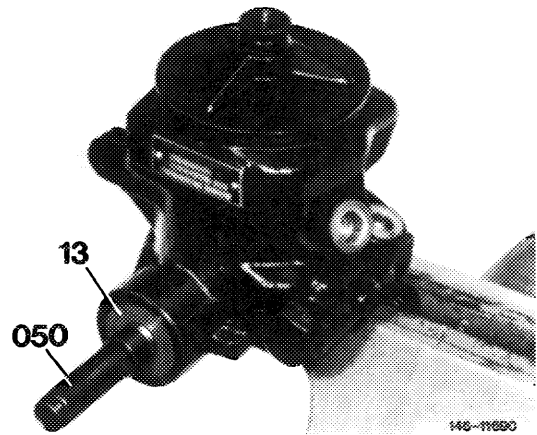
4 Insert locking ring (49), pay attention to correct seat of locking ring.



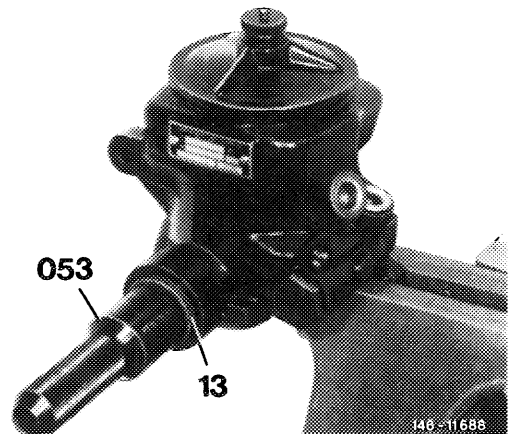
5 Place washer (48) on drive shaft.



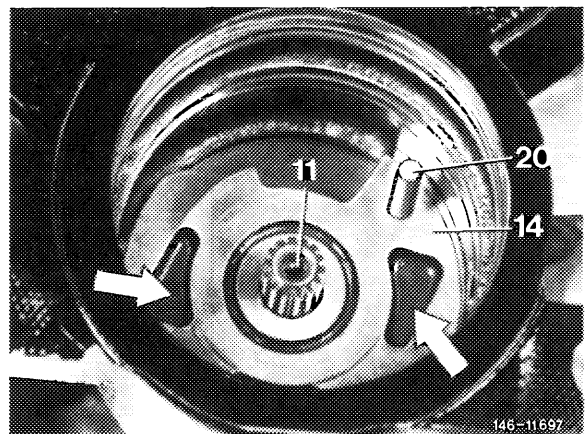
6 Screw guide sleeve from 116 589 24 33 00 (050) on drive shaft.



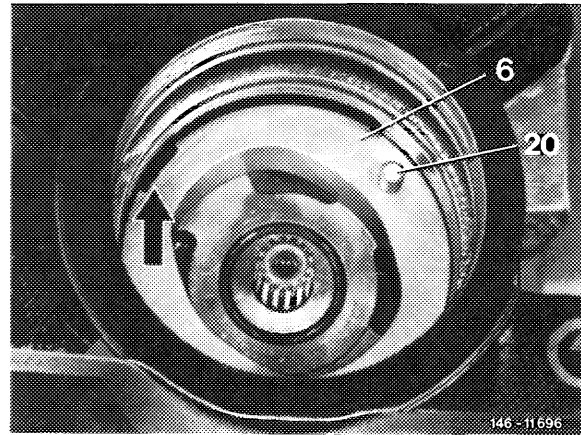
7 Press radial sealing ring (13) into housing by means of pressing-in mandrel. Insert Woodruff key into groove of drive shaft.



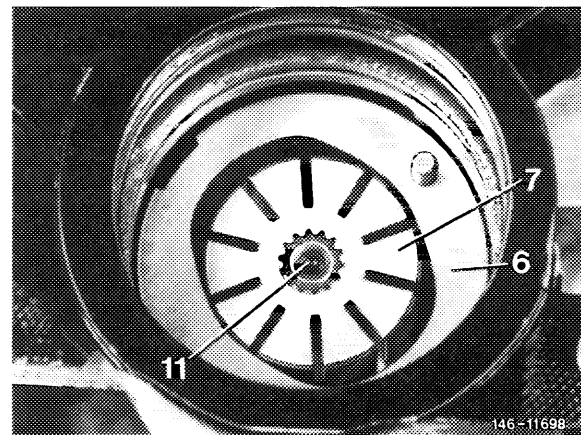
8 Place pressure plate (14) at drive end with groove (arrow) in upward direction over setpin into housing.



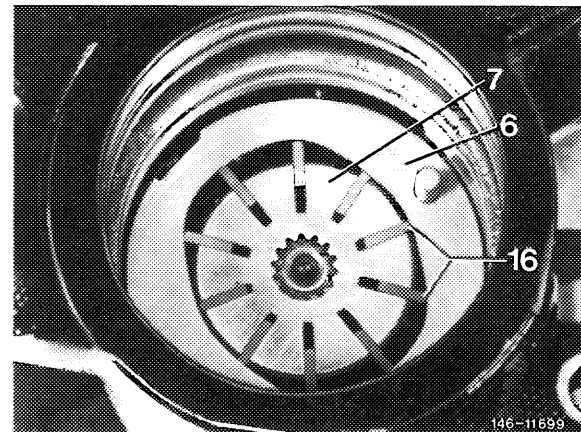
9 Insert cam ring (6) with direction of rotation arrow (arrow) in upward direction into housing.



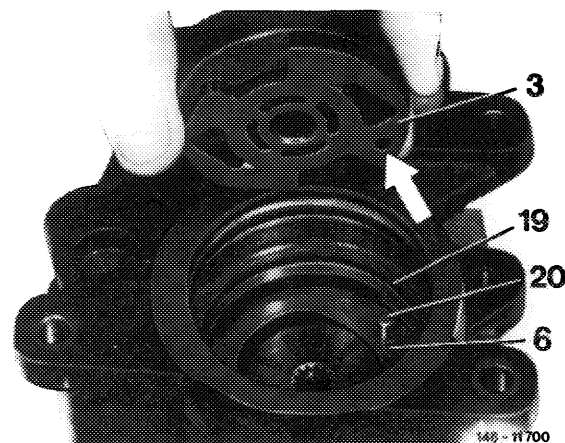
10 Slip rotor (7) on splining of drive shaft.



11 Insert blade (16) into grooves of rotor in such a manner that the rounded off sides are facing outwards toward cam ring.

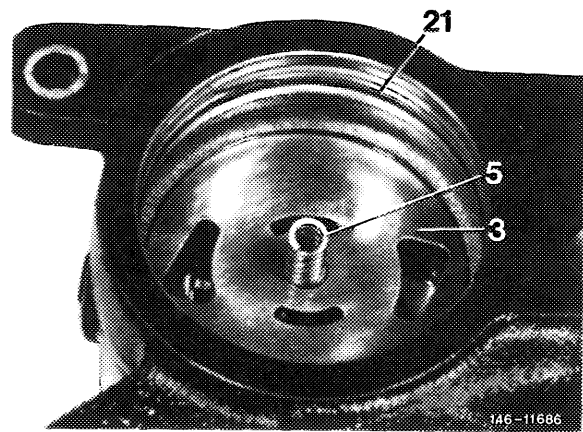


12 Insert O-ring (19), then pressure plate at cover end (3) into housing, making sure that blind hole of pressure plate slips over setpin.

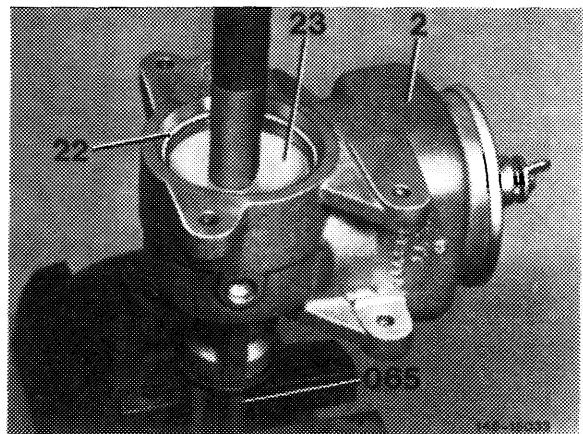


13 Insert O-ring (21) into housing, place compression spring (5) on pressure plate.

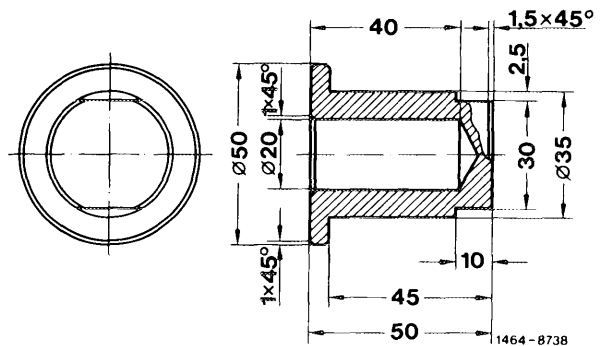
**Note:** The O-rings (19) and (21) have different diameters. The O-ring with the small diameter seals the pressure plate, the larger O-ring the cover in relation to housing.



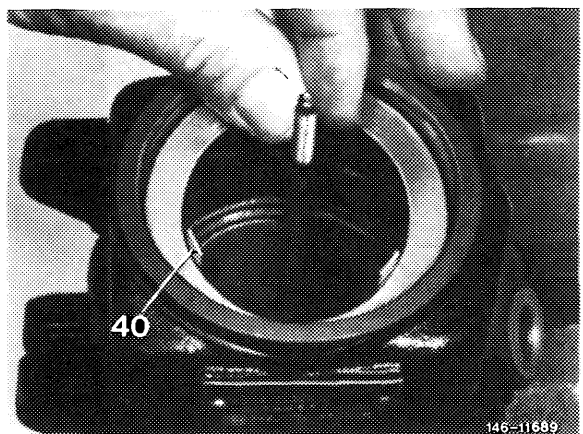
14 Place assembly sleeve (065) on power steering pump and mount cover (23). Then force cover slightly into housing by means of a hand press and insert hooked circlip (22). Pay attention to correct location of ring



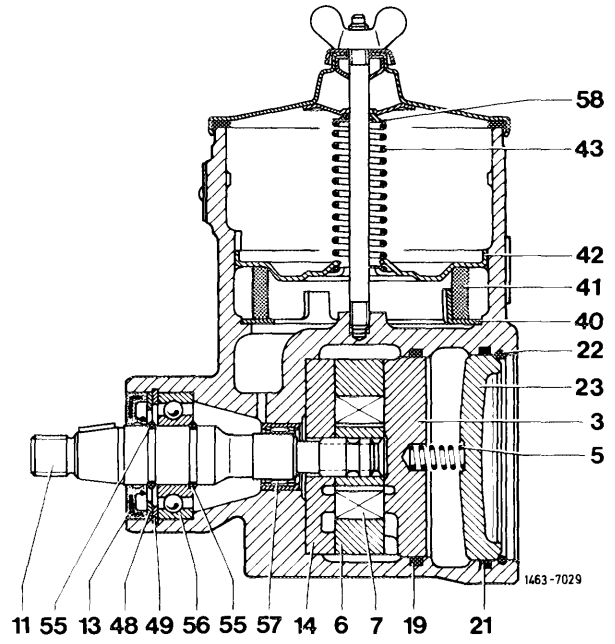
**Note:** The assembly sleeve is self-made according to specified dimensions.



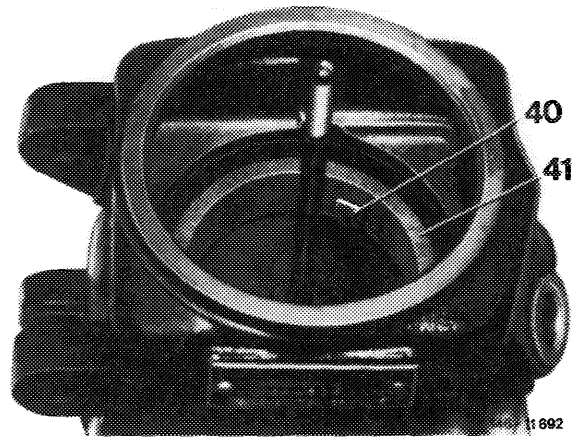
15 Insert lower steadying plate into housing.



- 3 Pressure plate at cover end
- 5 Compression spring
- 6 Cam ring
- 7 Rotor with blade
- 11 Drive shaft
- 13 Sealing ring
- 14 Pressure plate at drive end
- 19 O-ring
- 21 O-ring
- 22 Hook circlip
- 23 Cover
- 40 Lower steadying plate
- 41 Filter ring
- 42 Upper steadying plate
- 43 Compression spring
- 48 Washer
- 49 Locking ring
- 55 Circlip
- 56 Radial ball bearing
- 57 Needle bearing
- 58 Detent spring

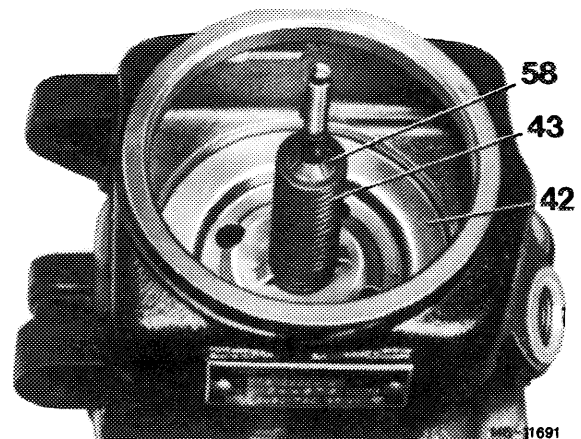


16 Place filter ring (41) on lower steadying plate.



17 Insert upper steadying plate (42) including compression spring (43) into housing and press detent spring (58) on stud.

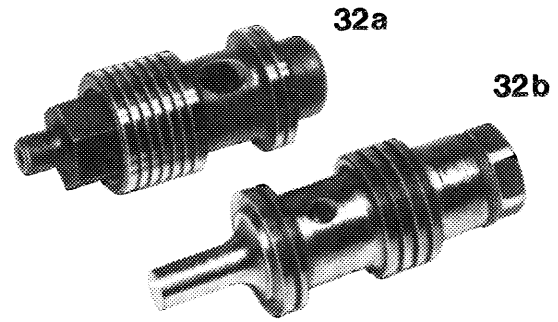
18 Mount closing cover including paper gasket, screw on knurled nut.



19 If a new volume control valve is installed, make sure that the pressure relief valve has the correct opening pressure. Also pay attention to manufacturer of volume control valve.

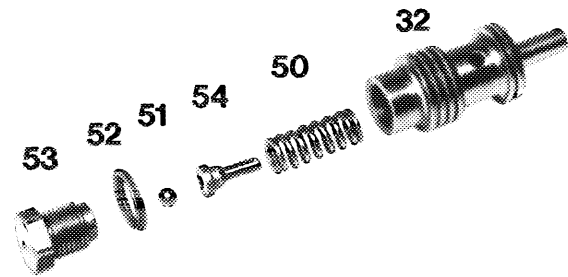
32a = Vickers valve

32b = ZF valve



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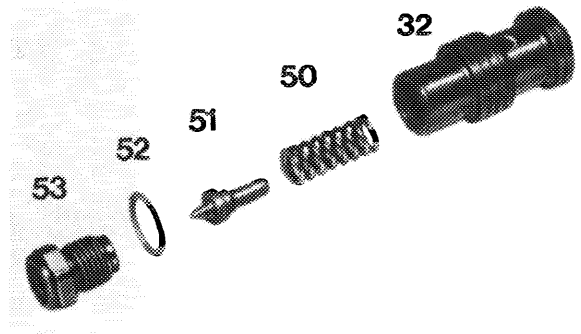
20 Install pressure relief valve into volume control valve. Insert compression spring (50) with pressure pin (54) first, then insert valve ball (51) on volume control valve 1st version. Place spacing washers (52) on valve screw (53) and screw valve screw into volume control valve.



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21 On 2nd version, insert compression spring (50), then valve cone (51). Then insert spacing washers (52) for adjusting opening pressure into valve screw (53).

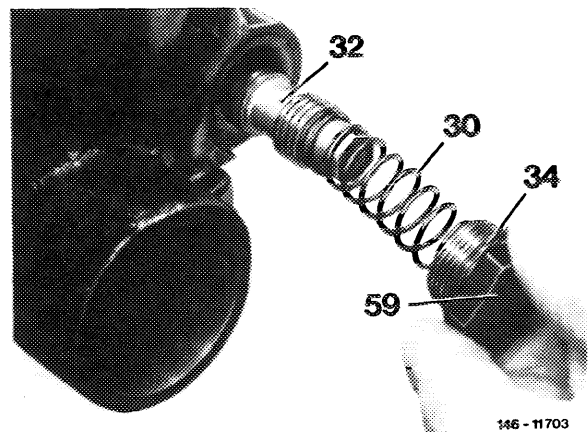
**Note: Always use the same washers which were previously installed.**



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22 Clamp volume control valve (32) with its unground part into vise and tighten valve screw.

23 Insert volume control valve and compression spring (32) into housing, screw in closing plug (59) with new sealing ring (34) and tighten.



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