

# After-sales Service Instructions

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## Repair

**46**

VDT-W-460/100 B  
Ed. 1

## Distributor-type Fuel-injection Pump

0 460 4...-VE...F..

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(3.76)



## 1. Introduction

This manual describes the dismantling, repair and assembly of the Bosch Distributor-type Fuel- Injection Pump VE .. F...

The construction and principles of operation are described in manual VDT-I-460/1.

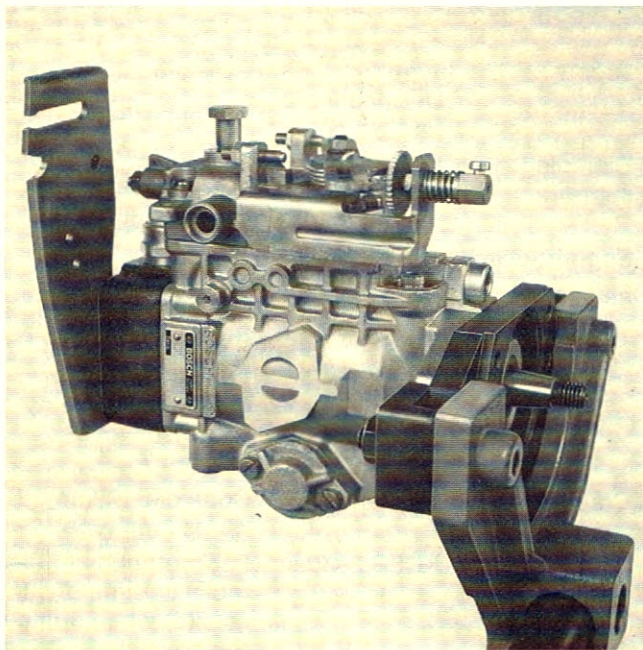
It is recommended that the latter manual be read before repairing the pump with the help of this publication.

Some special tools are required for the repair and these are summarised in Section 2.

The items with numbers given in brackets appearing in the text are shown in the sectional views on Page 26 (fold-out sheet).

## 2. Tools

Tool	Type Designation or Part Number	Utilisation
Clamping support	KDEP 2919 (EF 8498 C)	For holding in place distributor-type fuel injection pump
Support clamp	KDEP 2963	
Flange	1 685 720 062	VE .. with 2 and 3 hole flange. The old type of flange 1 685 720 062 can be modified as shown in Fig. 61, Section 7
Coupling	1 416 430 012	Cone dia. 17 mm (extra long type)
Assembling sleeve	KDEP 2939	For protection of the radial-lip-type of oil seal (3) when fitting the drive shaft. Cone dia. 17 mm
Assembling sleeve	KDEP 2937	For protection of the O-ring whilst fitting on the setting shaft (68) or lever shaft (76)
Extractor hook	KDEP 2938	For removing the seal rings (54)
Pre-stroke measuring instrument	1 688 130 045 Formerly EFEP 462 or KDEP 2931	For adjusting the pre-stroke
In addition		
Extension	1 683 458 019	Thread M 8 x 1
Measuring device	KDEP 1032	For adjusting dimensions "K" and "KF".
In addition		
Dial Indicator	1 687 233 012	With measuring foot thread M 3
Wrench	KDEP 1080	For central screw plug (130)
Adjustment tool	KDEP 1082	For governor shaft (108) with slotted round nut (107)
Spacer	KDEP 1084	For attaining dimension "MS".
Tubular single-end socket tee wrench	KDEP 1086	For control valve (135)

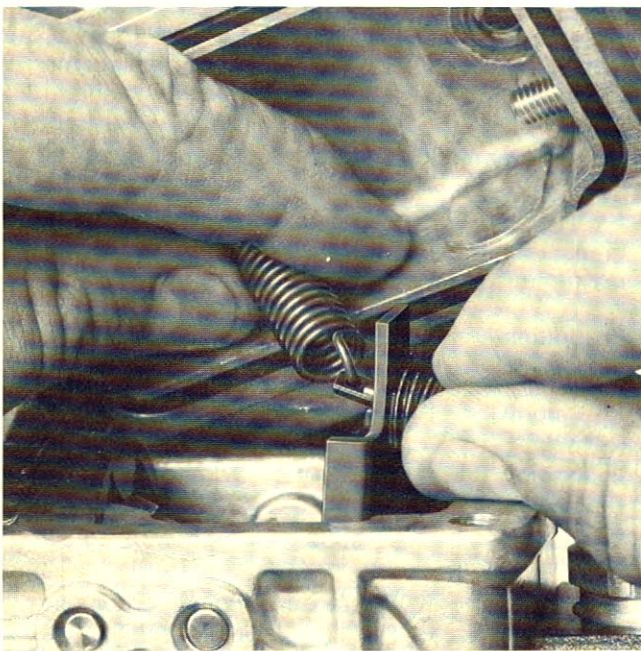


1

### 3. Dismantling

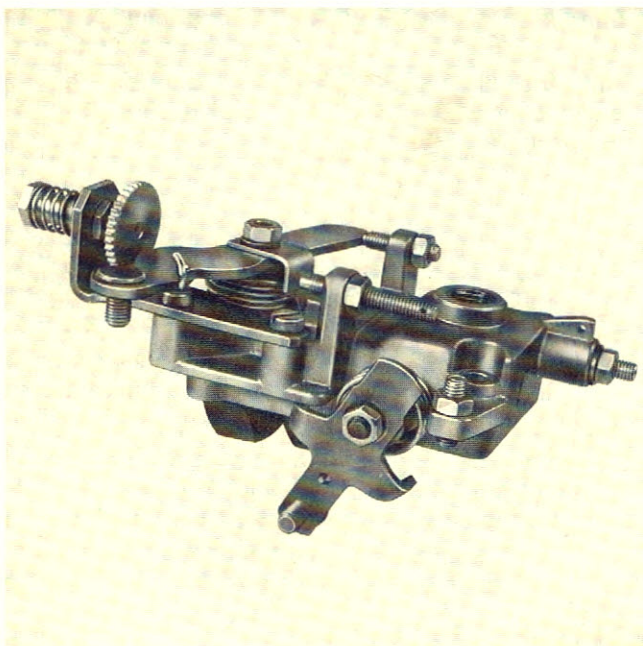
Remove inlet union screw (136) and drain the pump.

Secure pump with corresponding flange (see Section 2) and support clamp KDEP 2963 in clamping support KDEP 2919. Remove fillister-head screws (123) and take off housing cover (67)



2

Lift off housing cover (67) and remove extension spring (122) from the retaining pin (120). Remove retaining pin and helical compression springs (121, 215).



3

#### Dismantling the housing cover (67)

Unhook the extension spring (122) from the setting shaft (68) and torsion spring (220).

Remove hexagon nut (75) and lockwasher (73) and withdraw control lever (72).

Push through the setting shaft (68) in the direction of the inside of the cover.

Take away the O-ring (66) and the shim (69) from the setting shaft. Remove the seal ring (92).

Remove the threaded pin (88) with hexagonal nut (90), also the plain washer (87), O-ring (91) and spacer sleeve (89).

If a mechanical shut-off device (Fig. 3) is fitted in the housing cover, this can be removed in the same order as given for the assembly mentioned above.

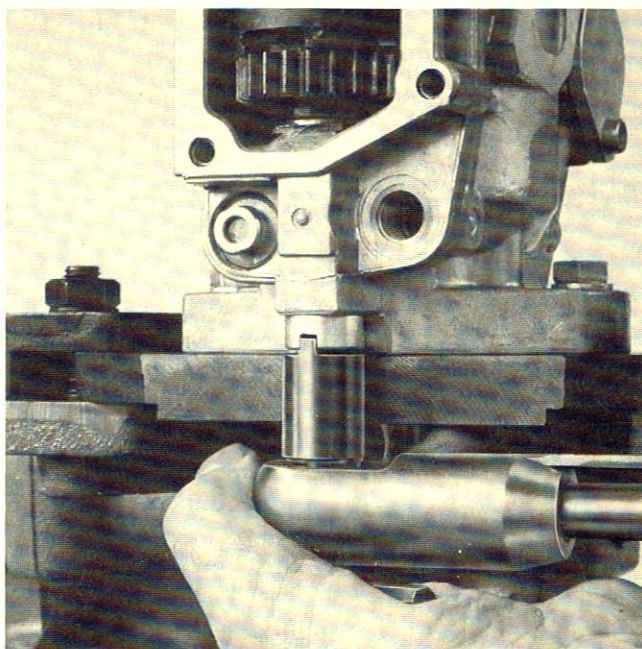
#### Note

It is recommended that the position of connection of the outer shut-off lever (78) to the lever shaft (76) be marked.



Stand the pump vertically. With adjustment tool KDEP 1082 (Fig. 4) slacken slotted nut (107) and unscrew governor shaft (108), taking care of the supporting plate (111) and shim plate.

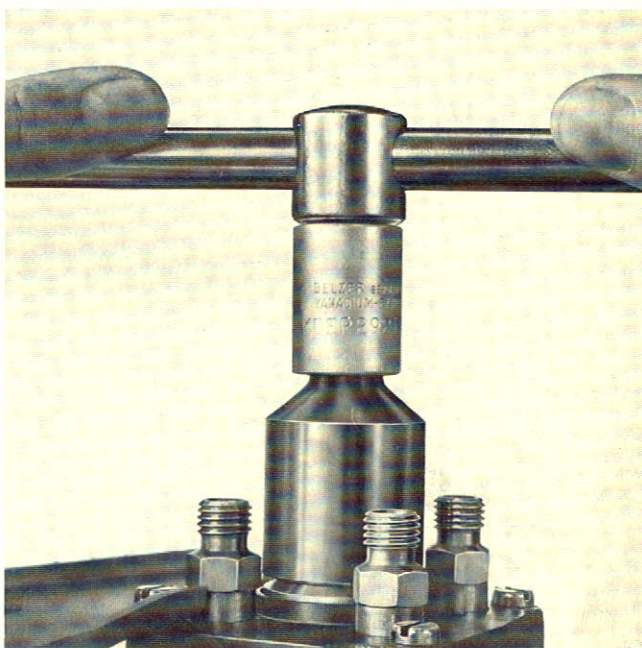
Lift out the flyweight assembly (112) with flyweights (113), spacer (114), sliding sleeve (115) and dismantle. Remove supporting plate (111) and shim plate (110).



4

Unscrew screw plug (130) with wrench KDEP 1080. Remove seal ring (129).

Remove fitting (58) (tube fitting), spring washers (56), shims (57) and delivery-valve assembly (55).



5

**Note:**

The outlets on the hydraulic head (50) are designated by letters A, B, etc. Remove fittings, compression springs etc. in the order of these letters, so that they can be fitted in the same place again.

Remove seal rings (54) with extractor hook KDEP 2938.

Unscrew fillister-head screws (60). Lift off hydraulic head (50).

Be careful with the two compression springs (106), guide pins (49), spacers (48) and spring seat (47).

Lift out distributor-pump plunger together with regulating plunger, shim (43), slotted disc (44), spring seat (45) and compression springs (46).



Be careful of the shim (52) under the plunger base.

Take seal ring (51) from the hydraulic head.

If fitted, remove solenoid-operated valve (240) and O-ring (241).

Remove slotted shoulder screw (104) and seal ring (105).

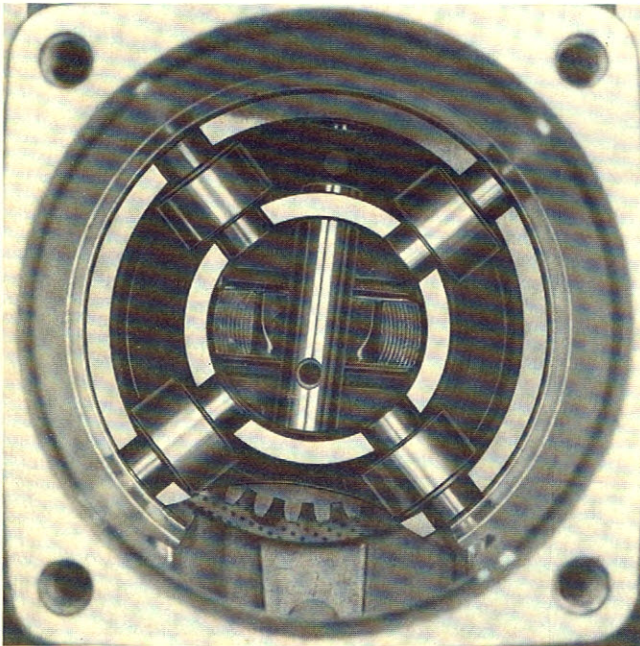
Remove control lever assembly consisting of start lever (95), tensioning lever (99) and correction lever (96).

Remove cam plate (29).

Remove cross-type disc (27) and, if fitted, the compression spring (200).

If present, remove the closing cover at the side for pointer adjustment. Take off seal ring and unscrew timing pointer..

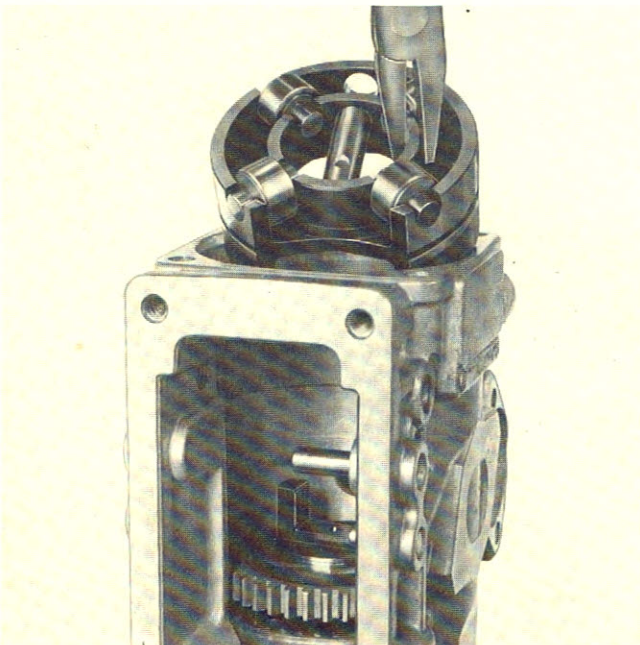
Dismantle timing device by unscrewing the closing cover (37) with shims (35). Remove seal ring (30) and compression spring (34). Unscrew cover plate (39) and remove seal ring (36).



6

Remove cam roller ring (20) and timing-device piston (31) by withdrawing retaining bracket (26) and removing retaining pin (25) with pliers. Push adjusting pin (24) in the direction of the centre of the cam roller ring. This must be done whilst the drive shaft jaw is at right angles to the pin.

Push out the timing-device piston (31) including slider (32) (be careful with the slider).



7

Lift out the cam roller ring (20) with rollers (22) without tilting.

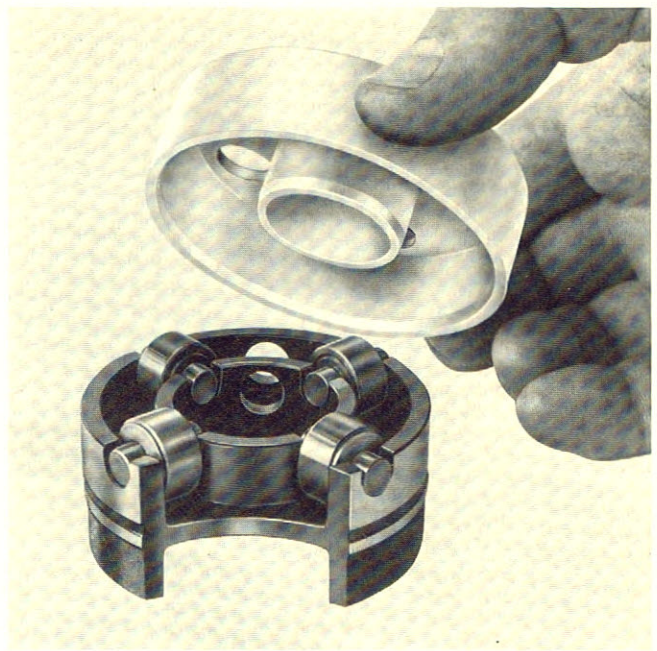
Caution:  
Take care not to interchange the rollers!



Push the adjusting pin (24) out of the cam roller ring (20).

To prevent the rollers falling out make a protective cap and slip it over the cam roller ring (see Auxiliary Tools, Section 6, Fig. 57).

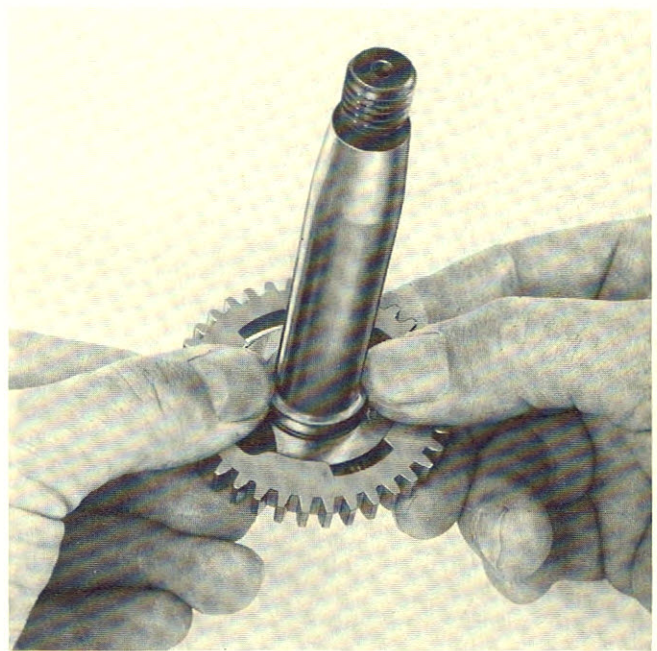
Push the drive shaft (12) upwards, taking care with the Woodruff key (13).



8

Withdraw gear wheel (16) and rubber buffer from drive shaft.

Extract slotted disc (17) from the housing.



9

To remove vane-type pump:

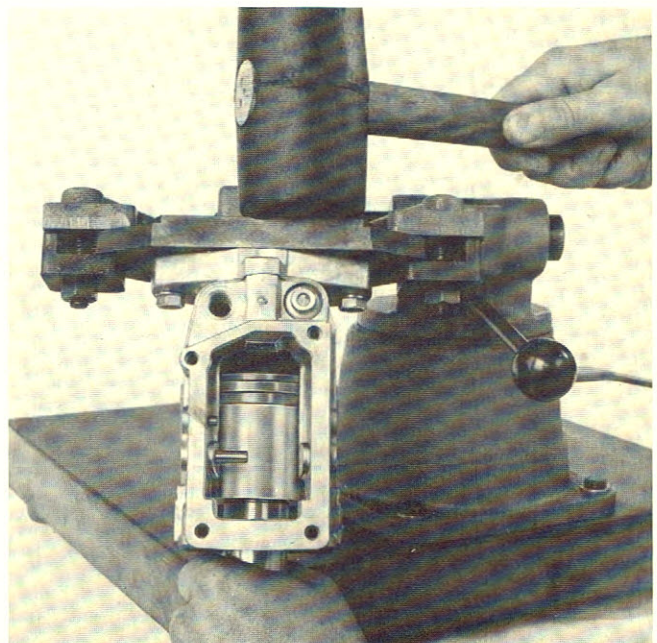
Unscrew countersunk flat bolt (10).

For the following work we recommend that a tool be specially made (see Auxiliary Tools, Section 6, Fig. 59).

Introduce the specially-made tool into the injection-pump housing. Tilt the pump downwards and at the same time press the tool into the pump housing.

Whilst continually tapping gently with the rubber hammer on the housing, knock out downwards the support ring (9) and supply pump consisting of impeller wheel (8) with impeller vanes and eccentric ring (6).

If the eccentric ring (6) is tilted it can be withdrawn as described in VDT-WJP 161/4 1<sup>st</sup> Supplement.



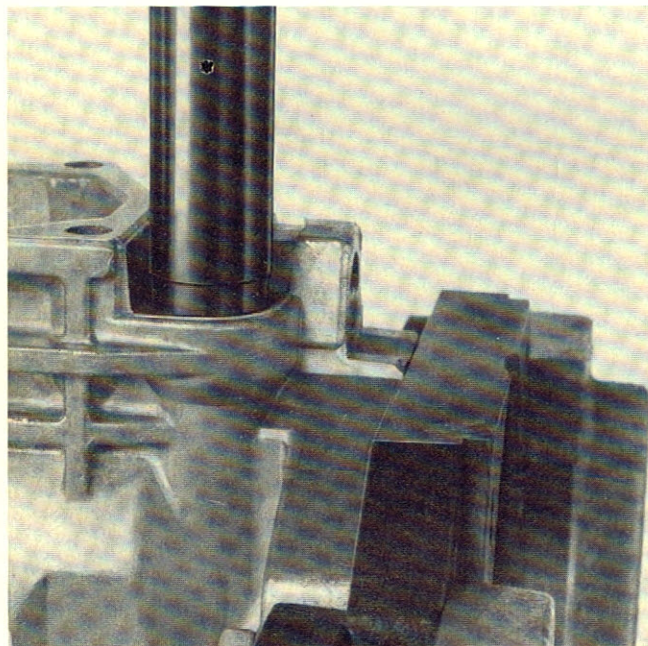
10





11

Place the specially-made assembly cup (see Auxiliary Tools, Section 6, Fig. 58) upside down over the pump impeller (8) and pump impeller vanes.



12

Unscrew control valve (135) out of the pump housing with socket wrench KDEP 1086 and remove O-rings (133, 134).

Take out radial-lip-type oil seal (3).

#### 4. Testing the Parts

Wash out thoroughly all the individual parts.

Replace worn and damaged parts.

The control edges of the distributor-pump plunger must be sharp and the contact surfaces must not exhibit any noticeable running tracks.

It is to be noted that the following assemblies of service parts are always to be replaced as a unit: Pump plunger and regulating plunger. Cam roller ring with rollers (22) and spring seat (23). Pump impeller (8) and vanes with eccentric ring (6).

Always fit new seal rings and O-rings whenever the apparatus is repaired.



## 5. Assembly

Make sure the work place is clean before assembling the injection pump.

All moving parts, seal and O-rings are to be oiled with test oil.

All screws must be tightened with the torque prescribed in Section 7.

Press the radial-lip-type oil seal into the housing.

Secure the pump housing (1) with the corresponding flange (see Section 2) and clamps KDEP 2963 in the support KDEP 2919 and turn downwards.

Place support ring (9), impeller wheel with vanes (8), and eccentric ring (6) on the specially made tool (Fig. 58) as follows:

Firstly, place the support ring (9) on the tool.

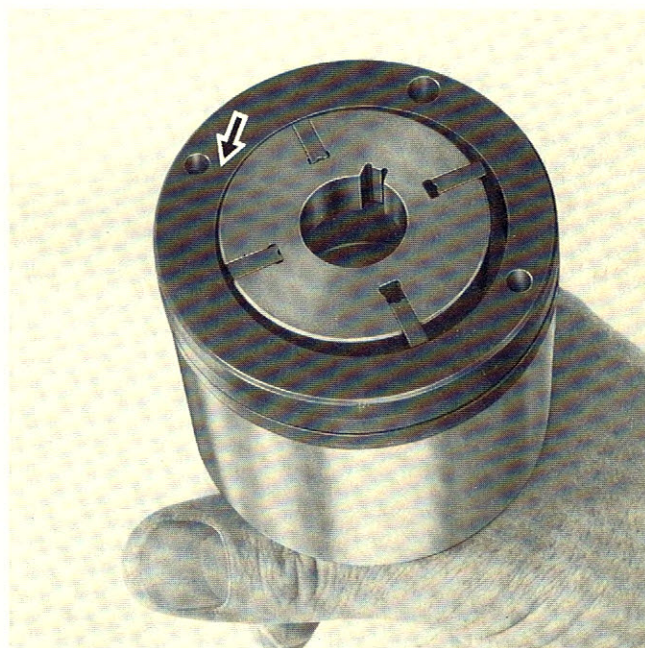
The two holes opposite one another in the eccentric ring (6) are not equally spaced to the inner wall of the ring.

As guide for installation of the eccentric ring the hole furthest from the inner wall is to be noted (arrow).

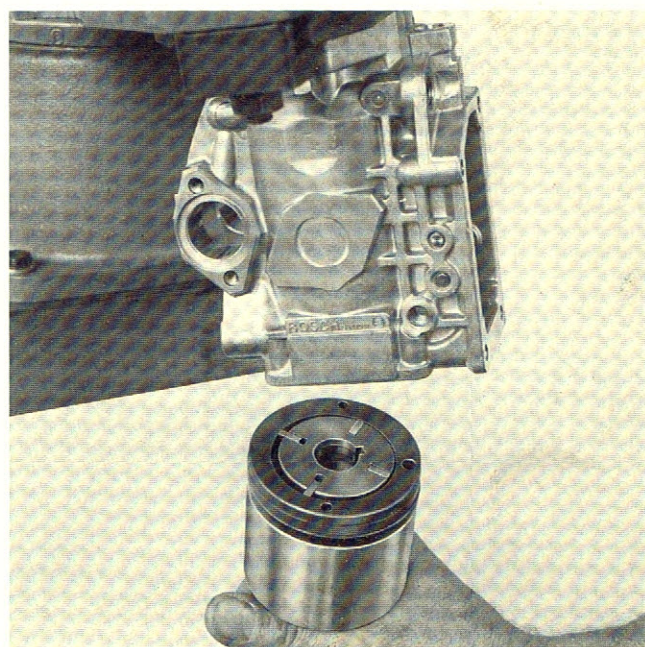
If the direction of rotation of the injection pump is given as "L", this hole must be seen to the left when looking on to the special tool (or on to the drive) (Fig. 13), and when the direction of rotation is given as "R" the hole must be to the right.

When the supply pump is fitted, the third hole must be on the governor side. Fit the pump vanes so that the crowned ends contact the walls of the eccentric ring.

Introduce the supply pump parts into the injection pump housing with the special tool from underneath without tilting the eccentric ring (6). Do not remove the special tool yet.

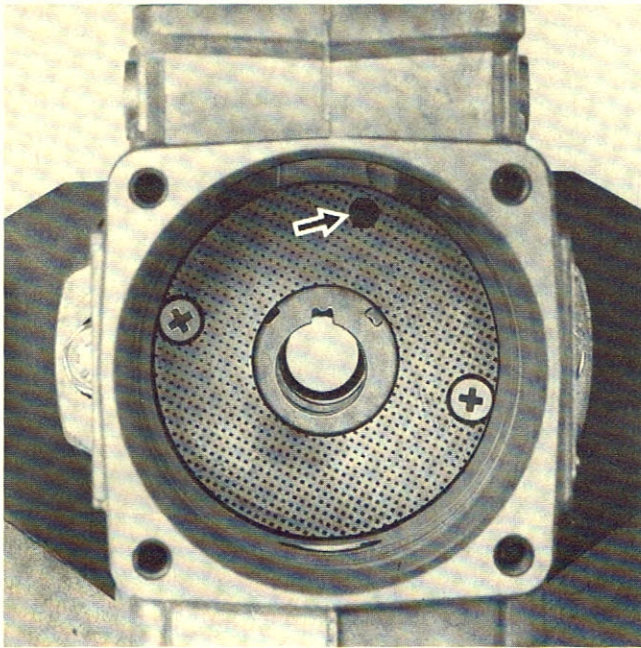


13



14

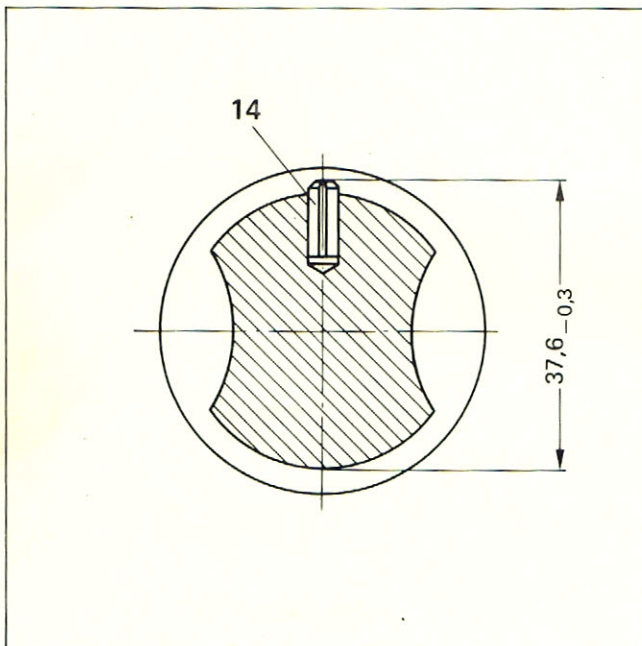




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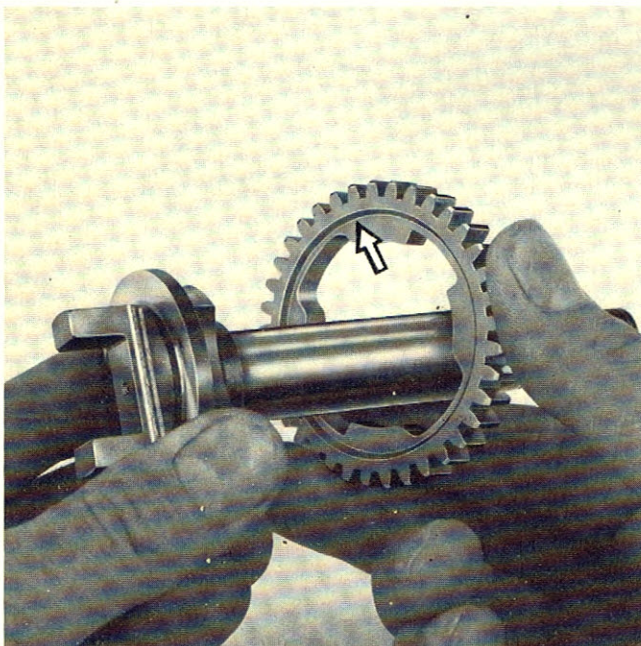
Turn the pump housing upward through 180° and withdraw special tool.

Before fastening the support ring (9) with the countersunk screws (10) check that all three holes agree with the eccentric ring (6) and that the third hole points upwards the governor (Fig. 15).



16

If the slotted spring pin (14) in the drive shaft (12) was renewed, it must be pressed in to the push-fit dimension (Fig. 16). Remove any loose metal chips.



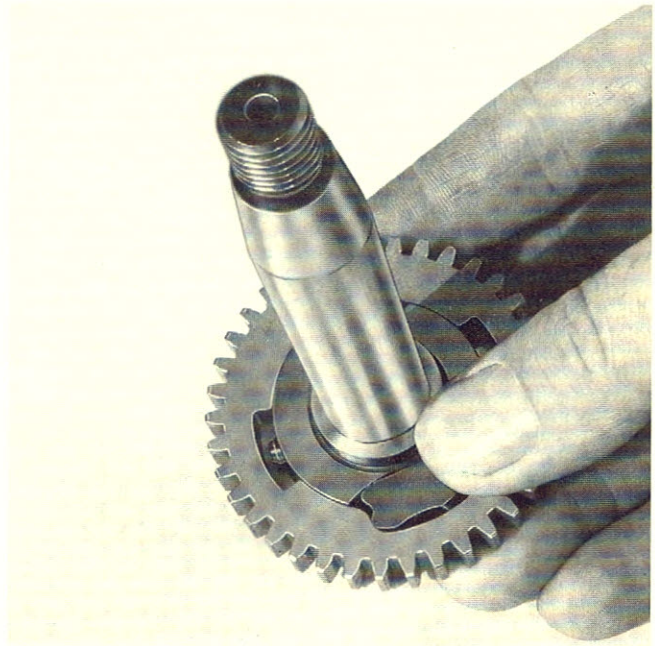
17

Push on the gear wheel (16) on the drive shaft (12) so that the recess in the gear wheel faces the jaws of the drive shaft.



Press a new rubber buffer into the gear by hand.

Using grease, stick the slotted disc (17) on the drive shaft (12) and stick the Woodruff key (13) in the shaft.



18

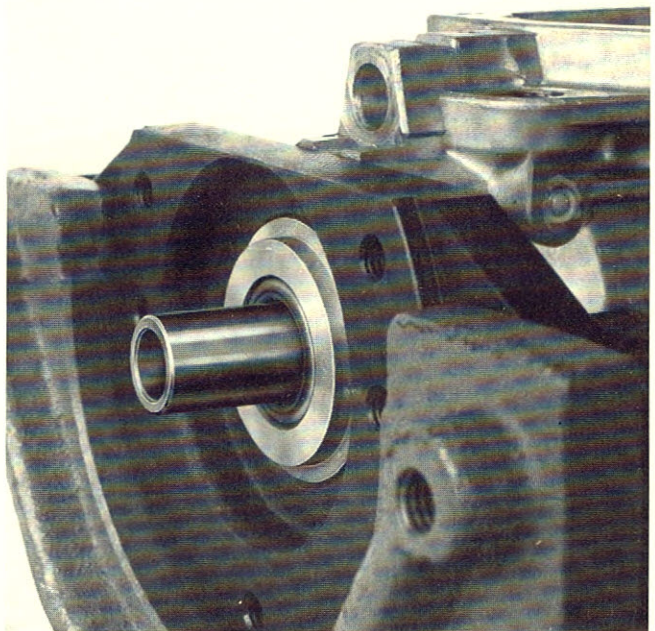
Place the pump housing in the horizontal position.

To protect the radial-lip-type oil seal (13), fit the assembly sleeve.

Insert the pre-assembled drive shaft into the pump housing so that the Woodruff key (13) engages with the keyway in the impeller wheel (8). Place the pump housing vertically.

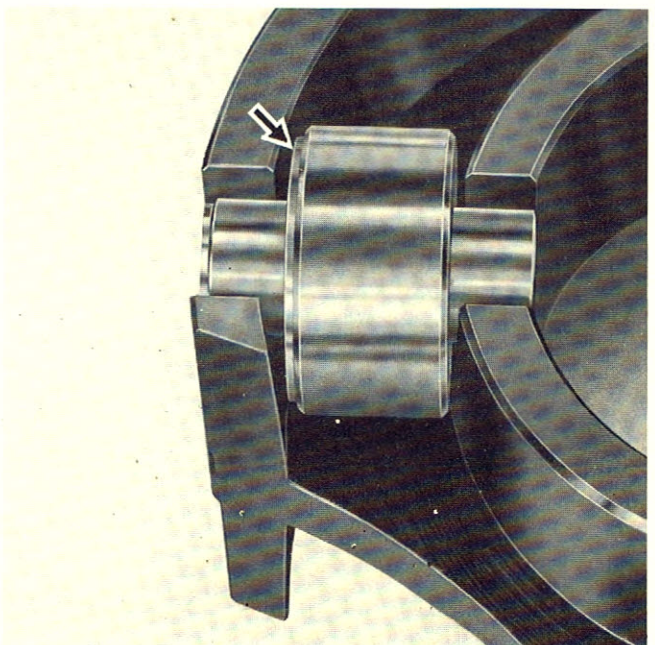
Prepare the cam roller ring.

The rollers (22) of the cam roller ring (20) should not fall out or be interchanged. If this should happen, however, the height of the rollers must be re-measured. The difference in the roller heights must not be more than 0.02 mm (from max. roller height to min. roller height).



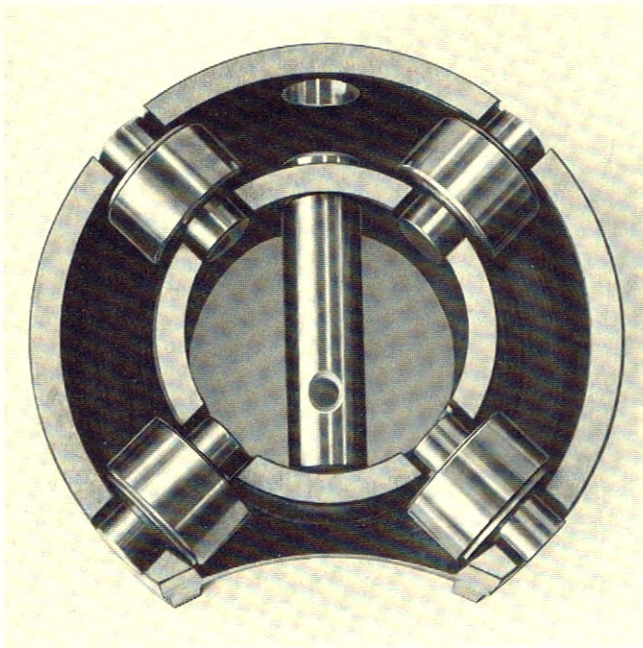
19

When fitting the rollers take care that the spring seat (23 – arrow) is outside on the rollers. The crowned side must face the outer ring.



20

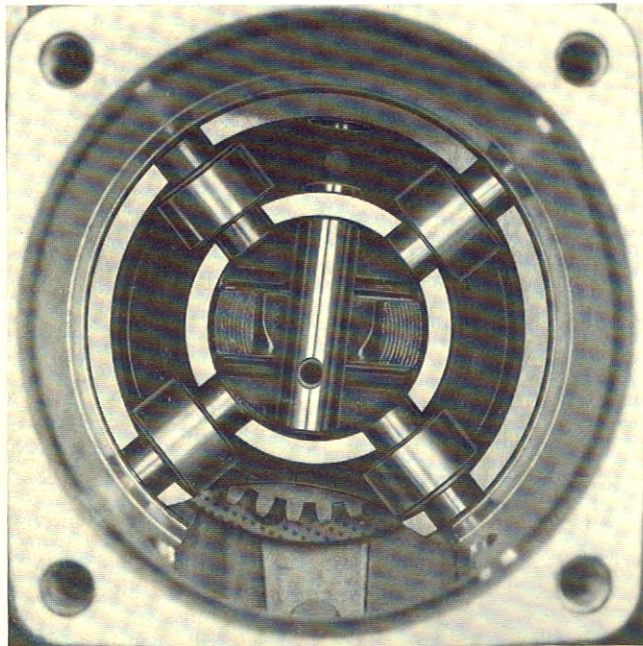




21

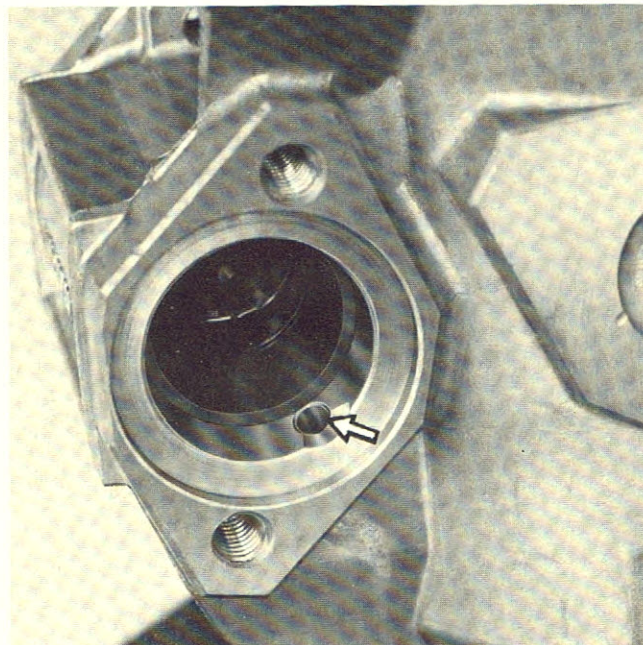
Push the adjusting pin (24), cross bore first, right into the cam roller ring. The cross bore must be vertical.

Put the jaws of the drive shaft parallel to the timing device



22

Insert the cam roller ring so that the adjusting pin (24) points in the direction of the timing device.



23

Stick the slider (32) and shim (33) in the timing device piston (31) with grease.

Insert the timing device piston (31) into the housing so that the recess for the compression spring is on the same side as the return bore (see arrow).

The hole in the sliding piece (32) then points in the direction of the cam roller ring.

Push the adjusting pin (24) into the sliding piece of the timing device piston and secure with retaining pin (25).

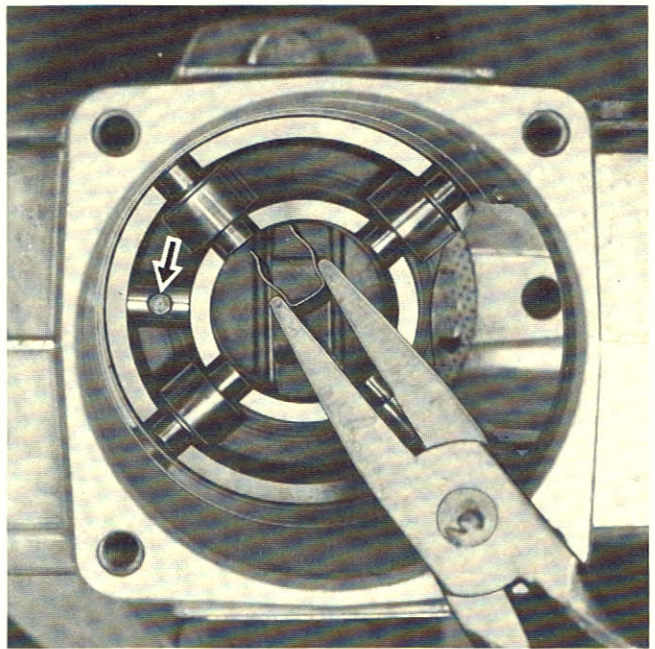


Place the retaining bracket (26) over the adjusting pin onto the retaining pin. Check the timing device for freedom of movement.

Fit cover plate (39) with seal ring (36).

Note:

Timing device travel is determined by the length of the piston and need not be measured.



24

Ascertain from the Test Specification Sheet the thickness of the timing device disc (dimension "SVS").

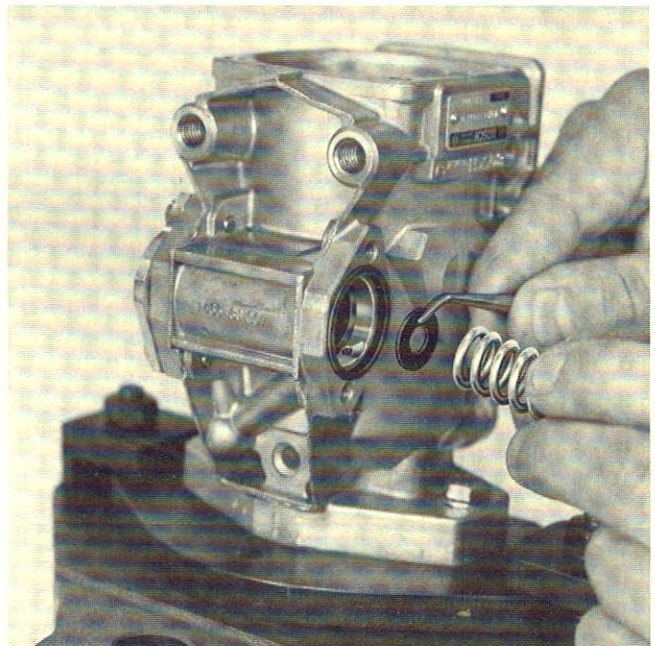
Measure the thickness of the stack of discs (consisting of item 33 and item(s) 35). The shim (33) in the timing-device piston **must** be included in the measurement.

Insert the shim (33) 0.6 mm thick in the timing device piston.

Fit the compression spring (34), seal ring (30) and the cover plate (37) with the remaining discs (35) from dimension "SVS".

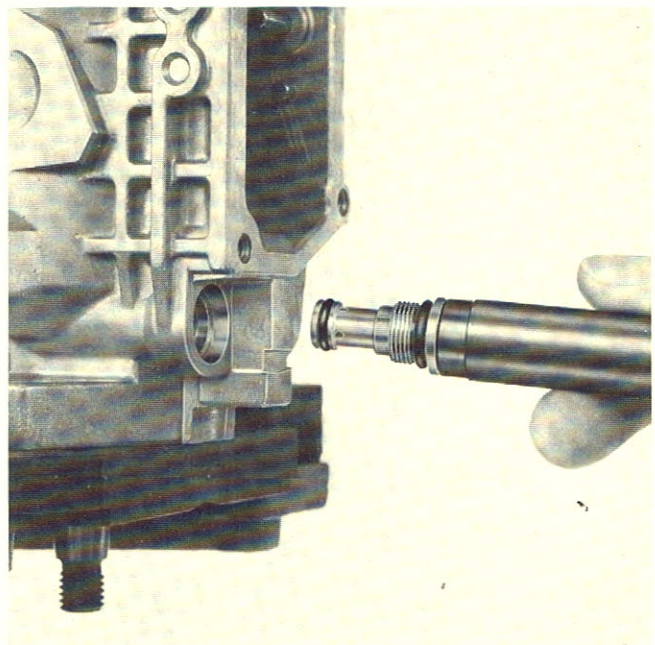
Caution:

At least one disc must be fitted at each side of the compression spring (34).



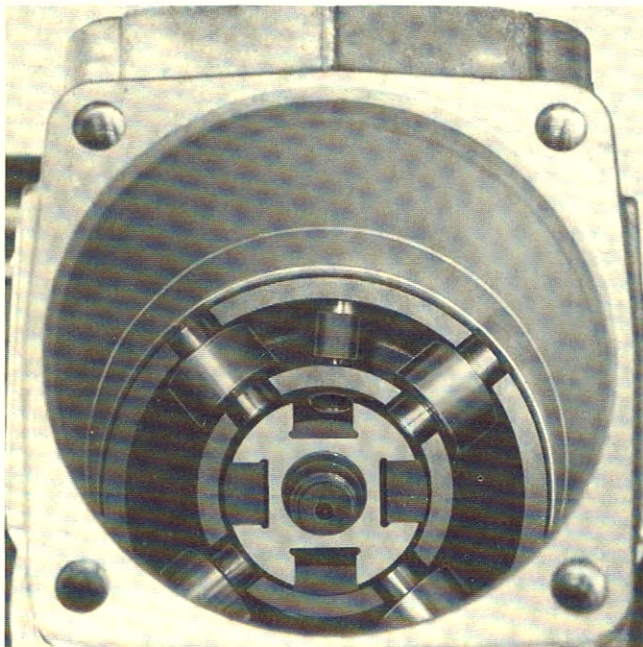
25

Using socket wrench KDEP 1086, screw in control valve (135) with O-rings (133, 134).



26





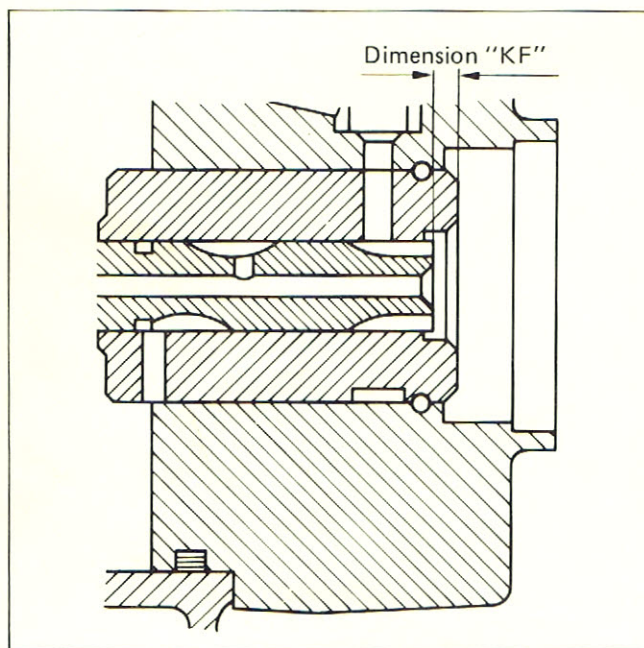
27

Fit the cross-type disc (27) in the cam roller ring (20), paying attention to the following.

If a compression spring (200) is incorporated between the cross-type disc (27) and the cam plate (29), the notch provided for it in the disc must face upwards.

So insert the cam plate (29) that the drive pin points in the direction of the Woodruff keyway in the drive shaft.

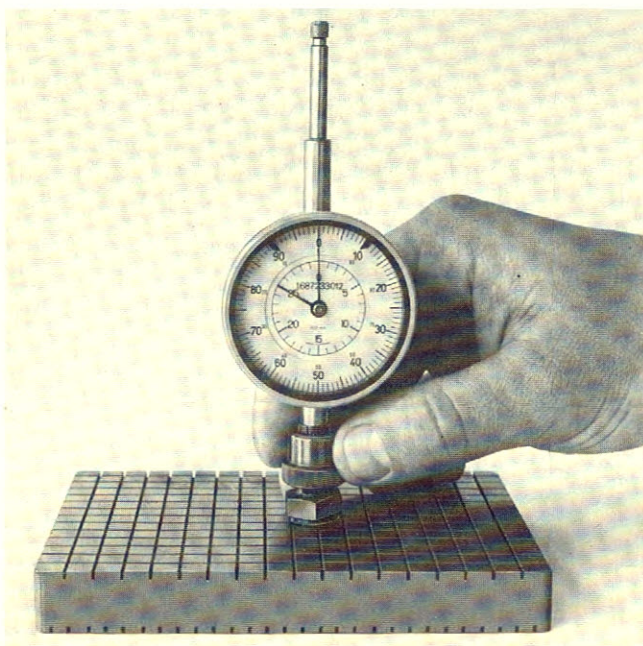
If one is to be incorporated, fit the solenoid-operated valve (240), together with O-ring, in the hydraulic head.



28

### Determine the dimension "KF" (plunger-spring stroke):

The dimension "KF" is the distance between the sealing surface on the end face of the hydraulic head (50) and the surface of the end face of the distributor pump plunger.



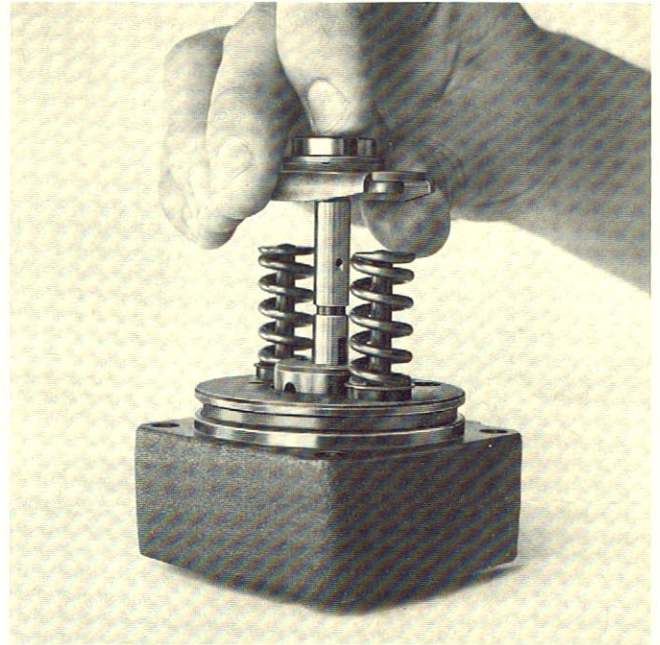
29

Grip dial indicator 1 687 233 012 with measuring device in holder KDEP 1032. Set up the holder on the flat marking-off table. Move the dial indicator so that it reads about 25 mm initially and adjust it to the zero position.



Stick the guide pins (49) into the hydraulic head and slip both spring seats (47) (without the shims (48)) and compression springs (46) over the guide pins (49). Lay the shim (43), slotted disc (44) and spring seat (45) on the distributor-pump plunger and push into the hydraulic head.

30

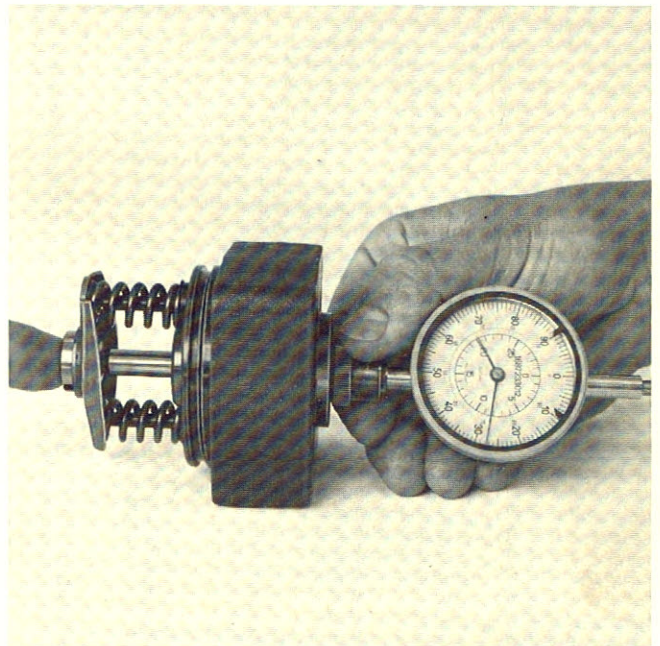


Hold the hydraulic head in the horizontal position.

Measure dimension "KF". This entails placing holder KDEP 1032 squarely on the sealing surface (see Fig. 28) in the hydraulic head.

By applying axial pressure on the distributor-pump plunger base press with just sufficient force to make contact with the compression springs (46). Do not compress the springs.

31



Compare the measured dimension (red figures on the dial indicator) with the nominal value for "KF" given in the Test Specification Sheet and equalise with a shim (48).

If there is a choice between two different thicknesses of spacer, the thicker spacer is to be chosen.

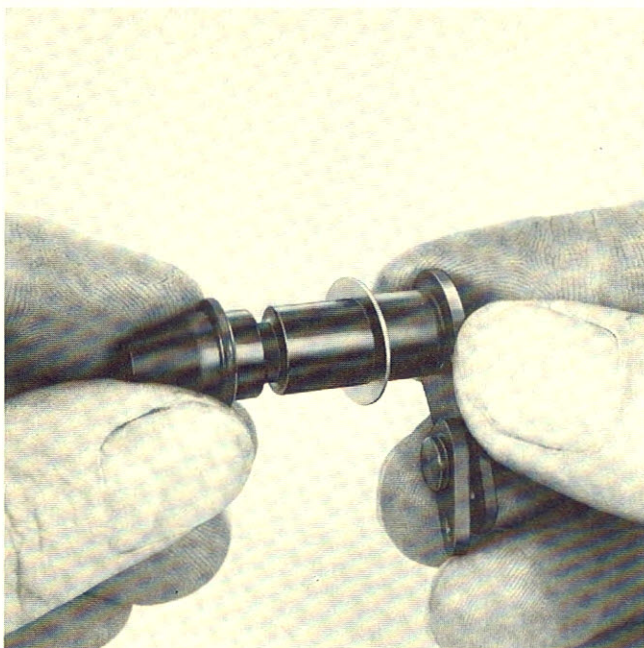
Attention:

On each end there should not be more than one shim of like thickness.

Withdraw the pump plunger from the hydraulic head and take off the remaining parts.

Note: Compression springs must only be replaced in pairs (parts set).



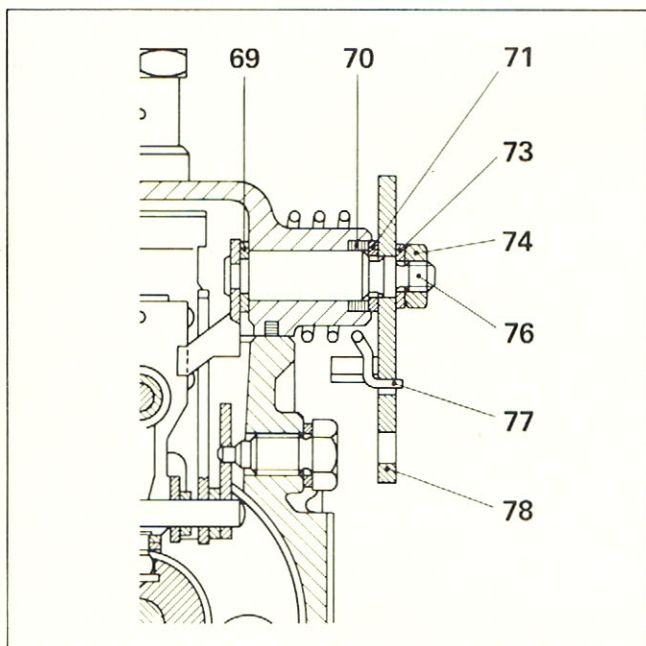


32

### Assembling the housing cover (67)

Place shim (69) and O-ring (66) on setting shaft (68) (use assembling sleeve KDEP 2937) and then push into the housing cover hole.

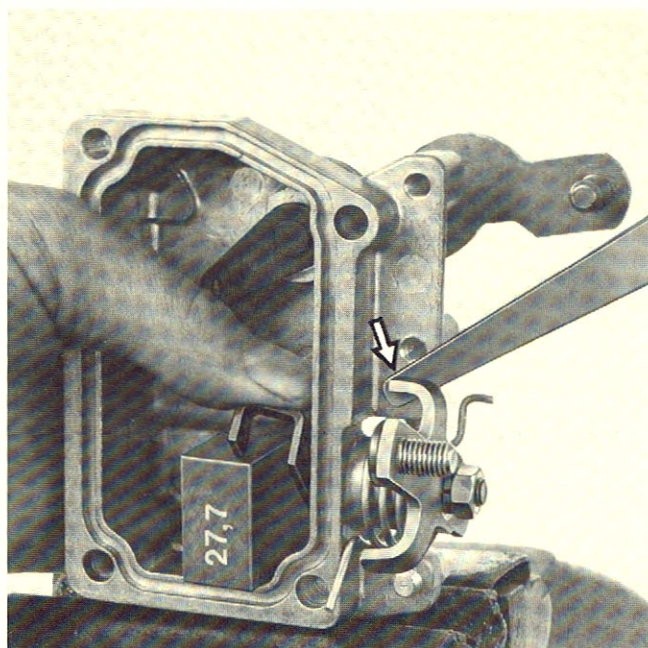
If there is a spring clip (220), fit the shim (69), control lever (72), spring washer (73) and hexagon nut (75). Whilst doing this the control lever should be set parallel to the lever of the setting shaft (68).



33

If to be incorporated, shut-off lever assembly parts should be fitted in the housing cover.

If whilst dismantling, the position of the shut-off lever (78) with respect to the lever shaft (76) was not marked, or the stop screw of the shut-off lever (78) was loosened, the following procedure should be adopted.



34

A spacer 27.7 mm long (see Auxiliary Tools, Section 6, Fig. 60) should be made and inserted between the inside edge of the housing cover and the interior shut-off lever. With the shaft in position, install the outside shut-off lever (78) on the toothed end of the shaft so that the smallest possible gap exists between the shut-off lever (78) and the housing cover (arrow).

Measure the gap with a feeler gauge and make a note of it.

Tighten up the shut-off lever with the hexagon nut (74).

Fit the threaded pin (88) together with the spacer sleeve (89), O-ring (91), plain washer (87) and hexagon nut (90).

Lay the seal ring (92) in the housing cover.



## Adjusting the position of the distributor-pump plunger

### Distributor pumps without pre-stroke:

(see measurements given for dimension "K" in Test Specification Sheet).

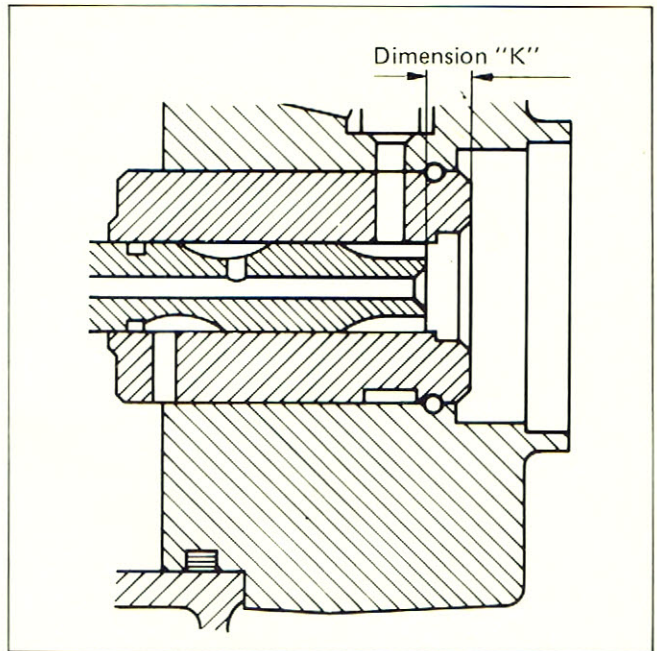
Lay any dry shim (52) in the plunger base.  
Do not stick with grease etc.

#### Note:

If a compression spring is present (200) do not fit it.

Ensure when inserting pump plungers with shim (52) into the cam plate that the drive pin goes into the recess in the plunger base.

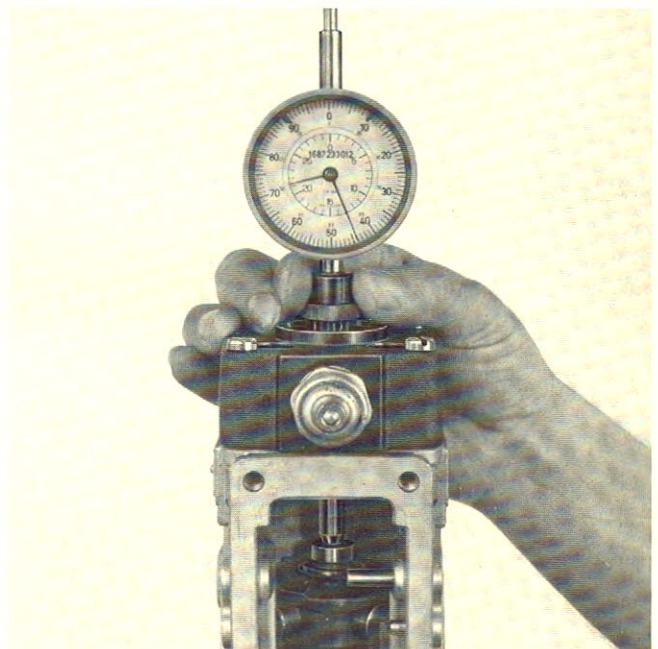
Carefully, without tilting it, introduce the hydraulic head over the distributor-pump plunger into the housing and secure with screws (60).



Measure dimension "K" (plunger dimension) (Fig. 35):

Dimension "K" is the distance between the sealing surface of the end face of the hydraulic head and the end face of the pump plunger.

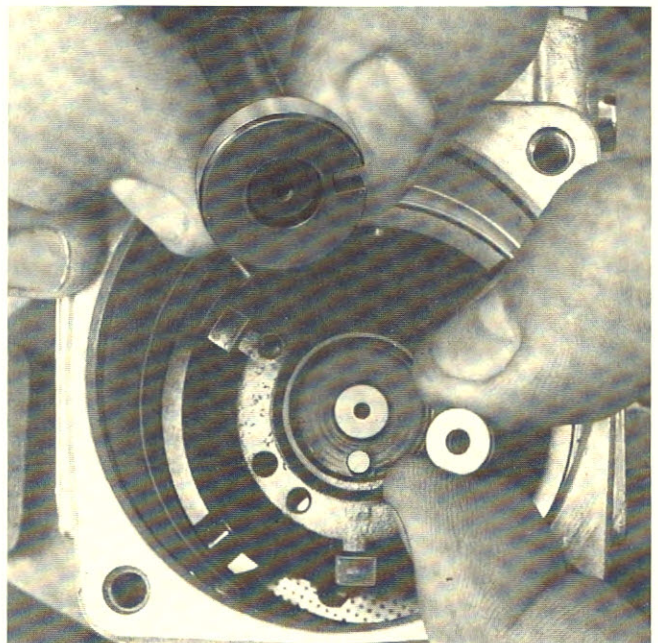
Bring the pump plunger to the BDC position.



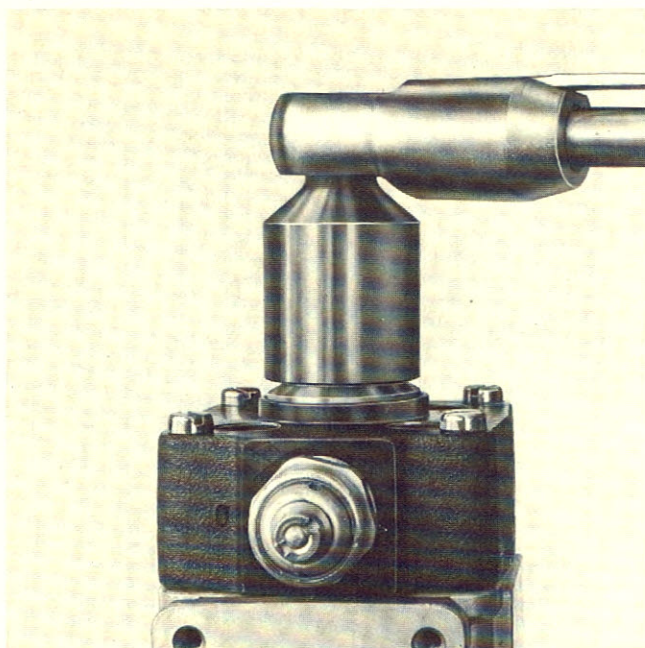
Measurement of dimension "K" is carried out in the same way as was the measurement of dimension "KF" with KDEP 1032 (Fig. 36).

Compare the measured value (red figures of the dial indicator) with the value given as nominal for "K" in the Test Specification Sheet and equalise with the shim (52) in the plunger base (Fig. 37).

If the measured diameter is greater than the specified nominal value of "K" a thicker shim (52) needs to be inserted, whilst if the measured diameter is less than the nominal value of "K" a thinner shim (52) is required. Finally, check dimension "K" again.







38

Screw a new central screw plug (130) with seal ring (129) into the hydraulic head with wrench KDEP 1080.

Observe tightening torque.

Install delivery-valve assembly (55) with sealing disc (54), compression spring (56), shim (57) and fitting (58) in hydraulic head.

Observe tightening torque.

Remove the hydraulic head.

Check pump plunger for freedom of movement.

#### **Distributor-type pump with pre-stroke:**

(see "Pre-stroke Adjustment" in the Test Specification Sheets).

This measurement is carried out hydraulically on the test stand.

Lay a dry shim (52) in the plunger base.

Do not stick with grease etc.

Fit O-ring (51).

Note:

If a compression spring is present (200) do not fit it.

Now fit the pump plunger with shim (52) into the cam plate so that the drive pin goes into the recess in the plunger base. A helical compression spring of low power must be inserted between the plunger base and the slider, so that the slider is always pressing against the hydraulic head during the measurement. Place the slider on the plunger.

Carefully, without tilting it, introduce the hydraulic head over the distributor pump plunger into the housing and secure with screws (60).

Screw a new central screw plug (130) and seal ring (129) into the hydraulic head with wrench KDEP 1080.

Observe tightening torque.

If pump is designed for a solenoid-operated valve (240), screw the latter in together with an O-ring (241).

Screw delivery-valve assembly (55) with sealing disc (54), compression spring (56), shim (57) and fitting (58) into hydraulic head.

Observe tightening torque.

Provisionally screw into the housing the governor shaft (108) with O-ring (109) and slotted shoulder screw (104) with flat seal ring (105).

Provisionally fasten on the assembled housing cover with fillister-head screws (123).

Close the threaded hole (M 12 x 1.5) in the housing cover with a blanking plug.

Screw the pre-stroke measuring device (1 688 130 045) with appropriate extension and dial indicator 1 687 233 012 into the central screw plug (130). In the BDC position of the distributor-pump plunger set the dial indicator to read 4 mm.



Remove the injection pump from the clamping support and fit it in the clamping bracket on the injection pump test bench. Fit on the drive coupling.

Fasten the injection pump to the test bench so that play is eliminated. To do this, the drive coupling of the injection pump should be attached to the backlash-free coupling of the test bench. Loosen the fastening screw of the clamping bracket and pull the bracket with the pump clamped to it against the drive. At the same time tighten the fastening screw.

Connect the test-oil supply hose.

Switch on the test bench and adjust for 0.2 bar (0.2 kgf/cm<sup>2</sup>) supply pressure.

If fitted, switch on the solenoid-operated valve (240).

Turn the pump plunger into BDC position and set the dial indicator at "0". (The test oil runs out of the overflow pipe of the measuring device).

Turn the drive shaft slowly in the direction of rotation until the start of delivery.

Delivery starts when the test oil flow at the overflow pipe turns to drops.

Now read the dial indicator and compare the reading with the nominal value for "Pre-stroke adjustment" given in the test specification sheet.

Put right any deviation by inserting a suitable shim (52) under the base of the plunger. To do this take the pump from the test bench, secure in the clamping support and remove the hydraulic head.

If the pre-stroke is too large, insert a thicker shim, if too small insert a thinner shim.

If a choice has to be made between 2 thicknesses available, the thicker one should be chosen. After this make a check measurement. Then re-install the hydraulic head and repeat the measurement on the test bench, if dial indicator reading is correct remove the pump and clamp it vertically in the clamping support.

Remove the drive coupling.

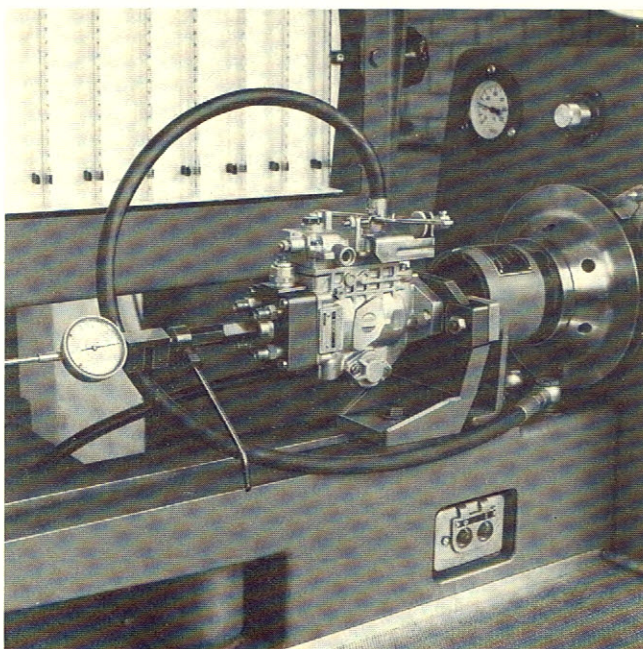
Dismantle pre-stroke measuring device and remove hydraulic head together with pump plunger and shim (52). Remove auxiliary helical compression spring. Check pump plunger for freedom of movement.

Unscrew housing cover, governor shaft (108) and slotted shoulder screw (104).

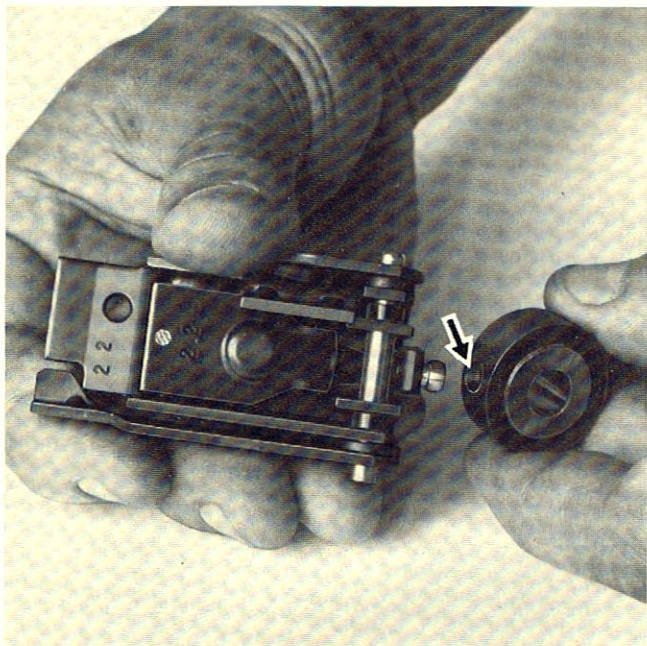
Note:

**The following text is valid for both types of pump.**

39





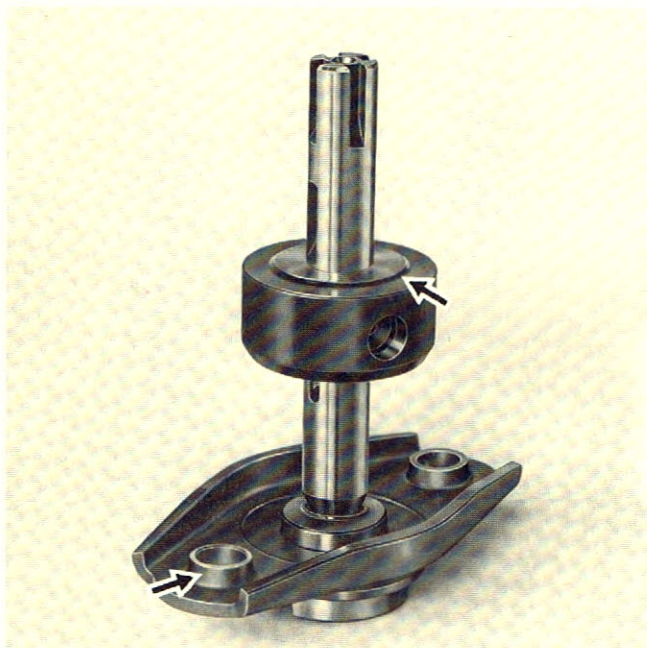


Install helical compression spring (200), if present, between the cross-type disc (27) and the cam plate (29). (Caution: The drive pin of the cam plate must point to the Woodruff keyway).

Check the ball stud of the control lever assembly in the plunger hole (arrow) for freedom of movement.

Place the shim (43), slotted disc (44) and the spring seat (45) (spring guides point upwards) on the pump plunger.

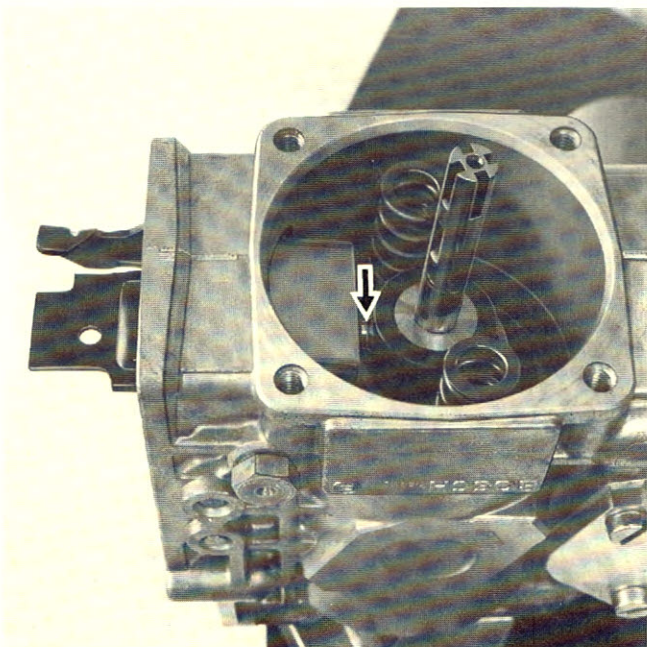
40



Push the slide onto the pump plunger so that the ground collar faces upwards (Fig. 41).

Insert the complete pump plunger with the correct shim (52) into the cam plate, so that the drive pin fits in the recess in the base of the plunger. Place the helical compression springs (46) on the spring seats (45).

41



Install the control lever assembly with slotted shoulder screws (104) and flat seal ring (105) in the housing and push the ball stud into the hole in the slider on the pump plunger (arrow).

42



Install guide pins (49), correct shim (48) (see Dimension "KF") and spring seat (47) in the hydraulic head with the use of grease.

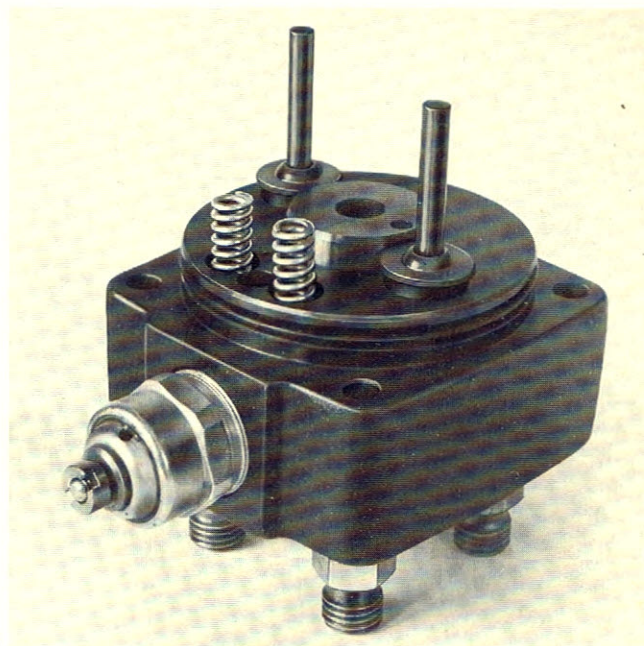
Stick the helical compression springs (106) into the hydraulic head with grease.

Push the pre-assembled hydraulic head and the pump plunger (do not tilt) into the housing so that the helical compression springs (106) are pointing to the control lever assembly.

**Warning:**

Particular care should be taken to ensure the guide pins (46) are located in the guide holes of the spring seat (45) when the hydraulic head is introduced and tightened (danger of breaking the spring seat). Moreover, make sure the ball stud of the control lever assembly is in the slider hole.

Fasten the hydraulic head with fillister-head screws (60).



43

Installing the mechanical governor:

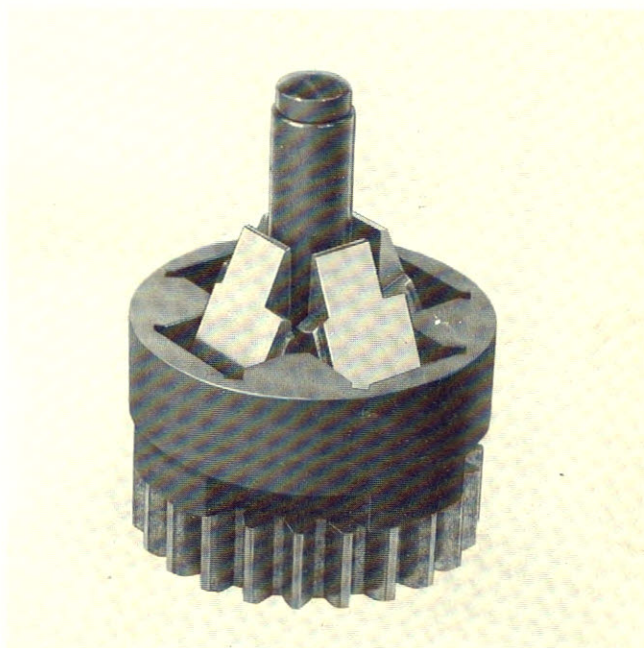
Stick the shim (110) and supporting disc (111) in the housing with grease.

Assemble the flyweight assembly (112), flyweights (113), shim ring (114) and the sliding sleeve (115) with blanking plug (117).

**Note:**

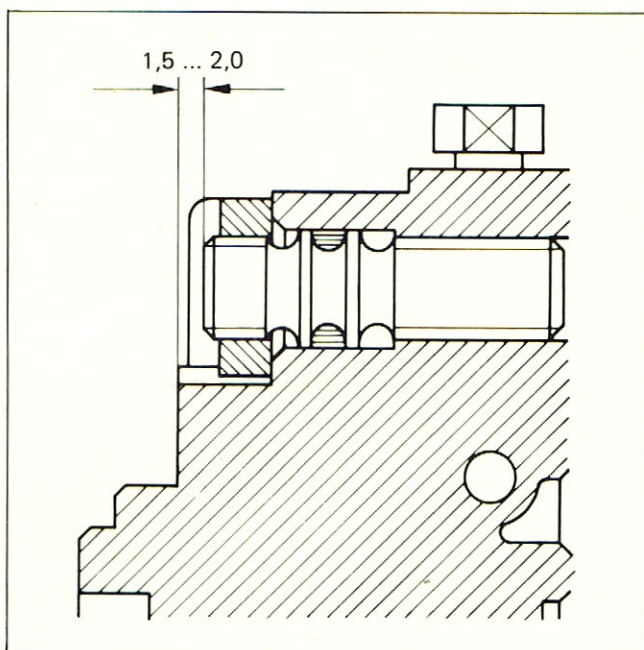
The flyweights must not be replaced singly but only as a set (parts set).

Install the complete flyweight assembly in the housing.



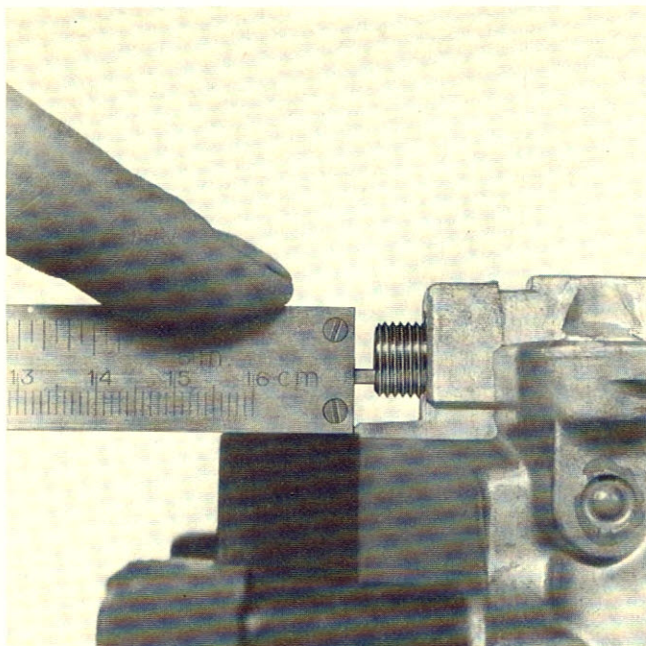
44

Screw the governor shaft (108), together with the O-ring (109), into the housing until the dimension 1.5 to 2.0 mm is reached, measured from the surface of the flange to the end face of the governor shaft.



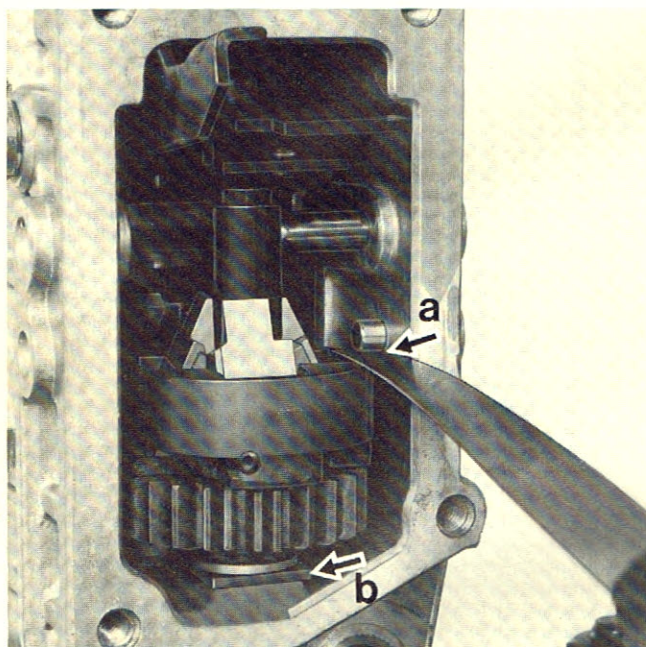
45





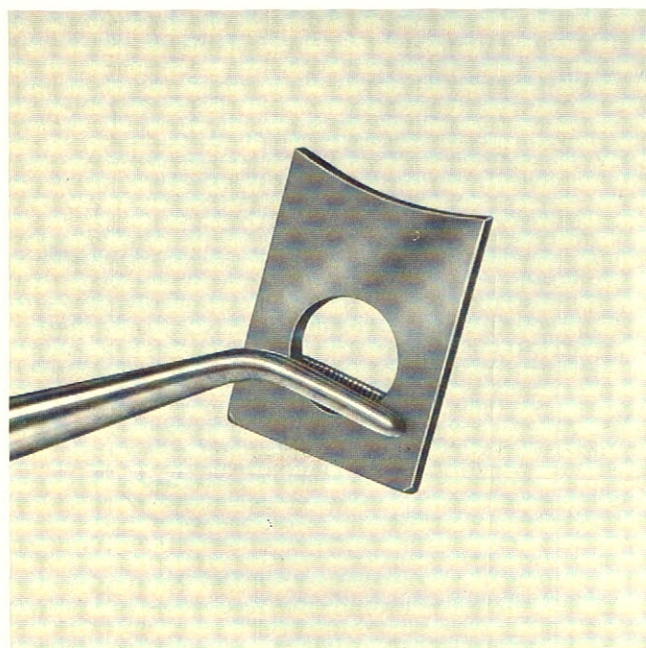
In the case of injection pumps having load-dependent port closing (see Test Specification Sheet, Section 1.7) the governor shaft is screwed in approx. 3.00 mm instead of 1.5 mm, the exact amount is determined when the pump is tested).

46



Measure the axial play of the flyweight assembly (112) with the feeler gauge (arrow "a").

47



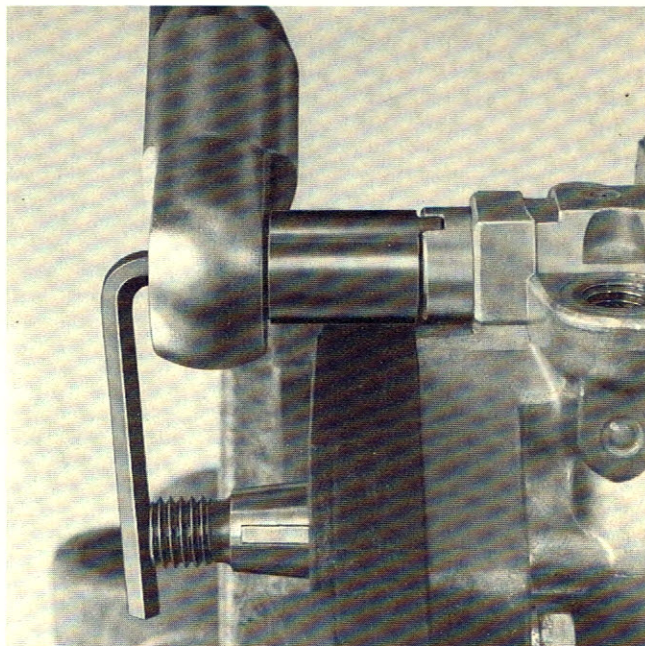
Adjust the play to between 0.15 and 0.35 mm by using the appropriate shim (110) (arrow "b").

48



Place the pump vertically.

Lock the governor shaft with slotted round nut (107) using the specified tightening torque and adjustment tool KDEP 1082.



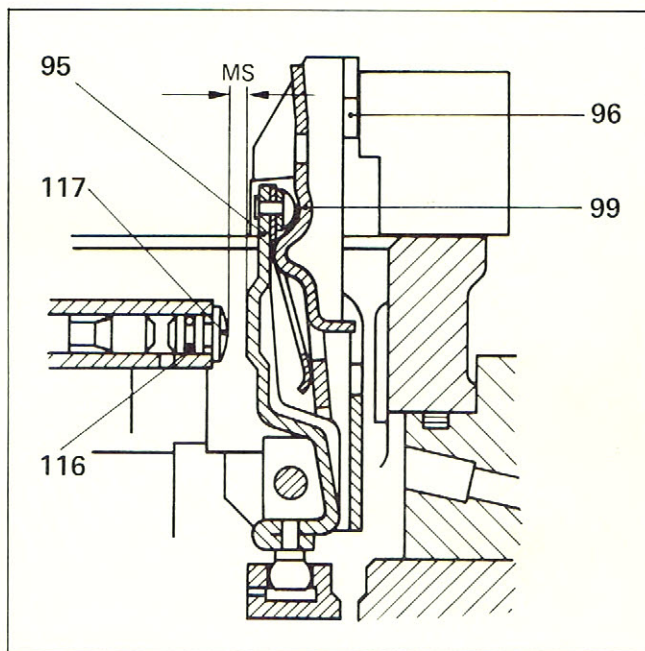
49

#### **Determining the dimension "MS" (starting fuel).**

Screw on spacer KDEP 1084 on the pump housing with fillister-head screws (123), note groove in the spacer.

The correction lever (96) is up against the spacer. Push the tensioning lever (99) against the stop pin.

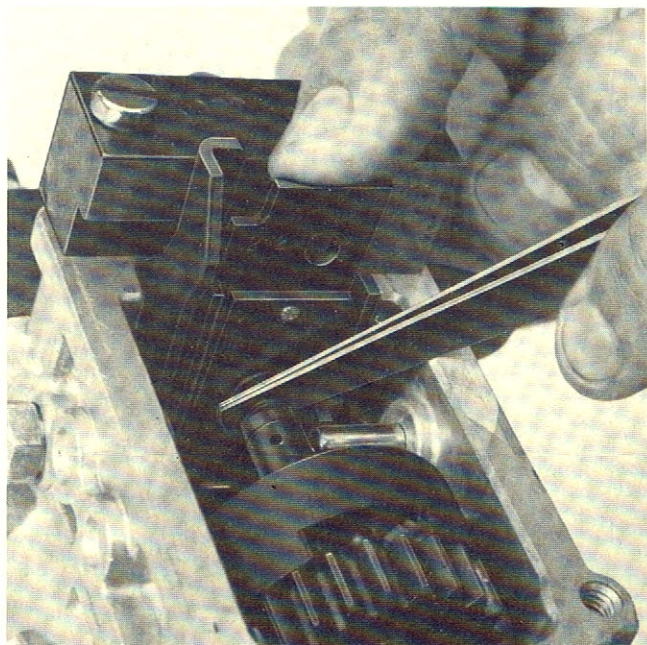
The dimension "MS" is the distance between the plug (117) and the starting lever (95) which is up against the tensioning lever (99).



50

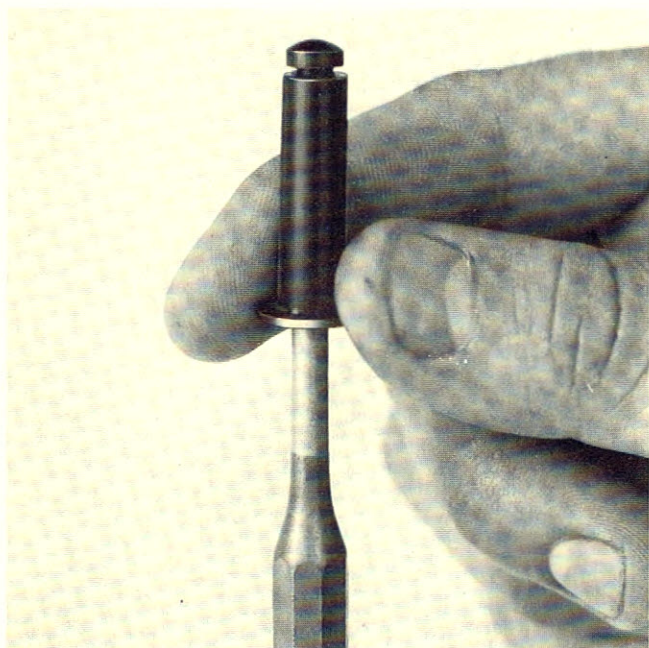
Measure dimension "MS" with a feeler gauge and compare with the nominal value given in the Test Specification Sheet.

Correct the dimension by using the appropriate plug (117). This entails removing the complete flyweight assembly and the sliding sleeve (115) again.



51



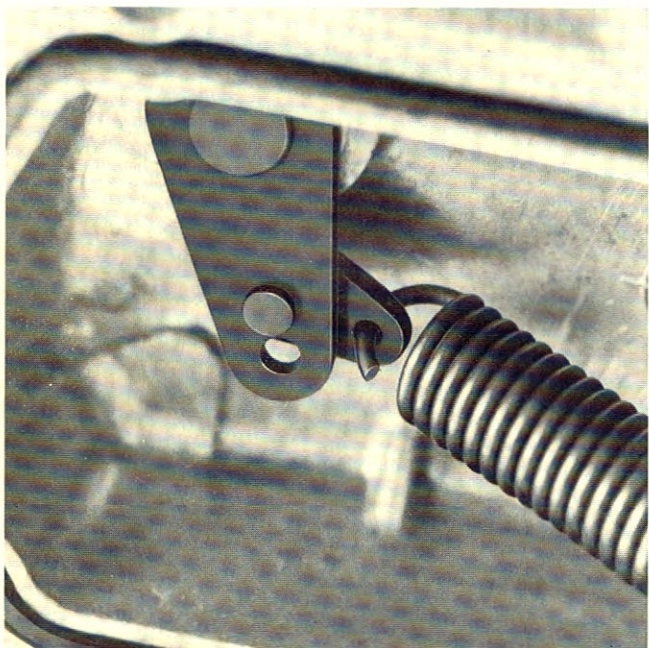


Push out the plug (117) with a suitable tool. When pushing in the new plug be careful with its retainer (116) (see Fig. 50).

Install the flyweight assembly again as already described and check dimension "MS".

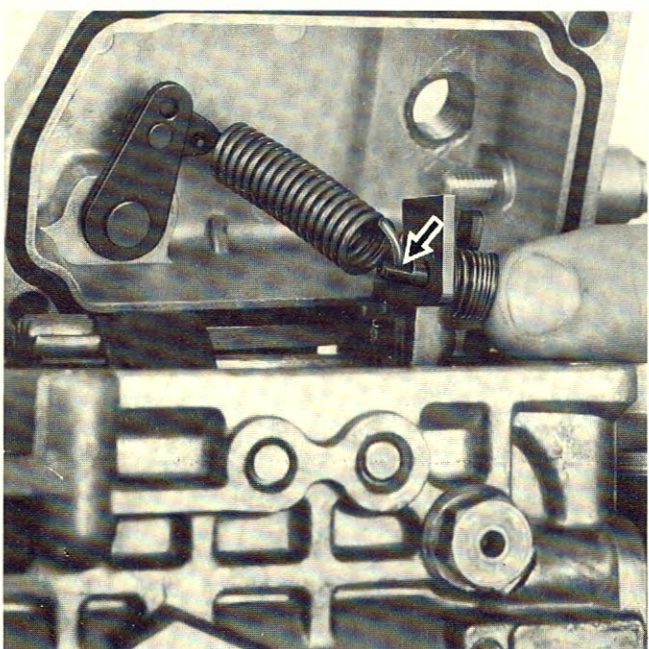
Remove spacer KDEP 1084.

52



Hook the tension spring (122) into the bar of the setting shaft (68) so that the opening in the spring hook is pointing downwards.

53



Push the retaining pin (120) with the helical compression springs (121, 215) through the hole in the tensioning lever (99) and attach the tension spring (122) (arrow).

**Warning:**  
The retaining pin (120) with helical compression springs (121, 215) are considered as one unit and should only be replaced together (parts set).

Secure the housing cover (67) with fillister-head screws (123).  
Fit the appropriate supporting bracket.

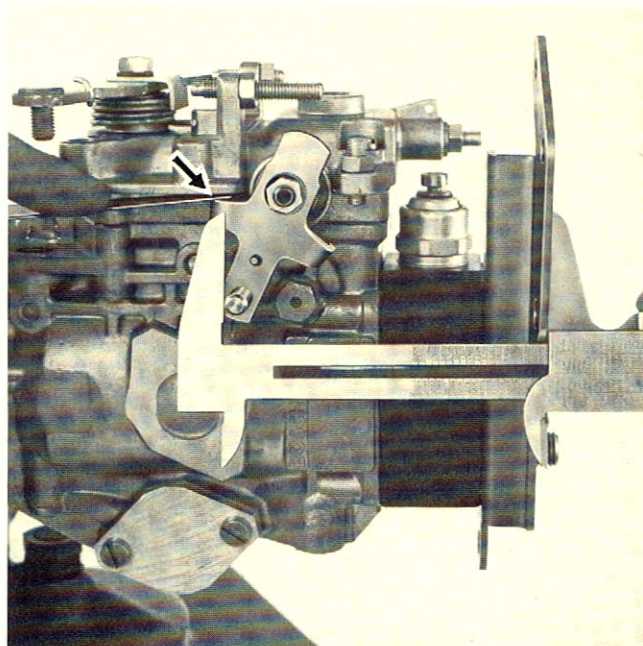
If the shut-off lever (78) was adjusted with respect to the lever shaft (76) (see Fig. 33) the shut-off stroke is to be adjusted with the threaded stop bolt (85) as follows.

54



Insert a feeler gauge of the thickness noted for Fig. 34 between the housing cover and the shut-off lever (arrow).

With a slide caliper measure the distance from the support bracket to the shut-off lever. So adjust the threaded stop bolt that the adjustment stroke amounts to 21.5 to 22.0 mm.

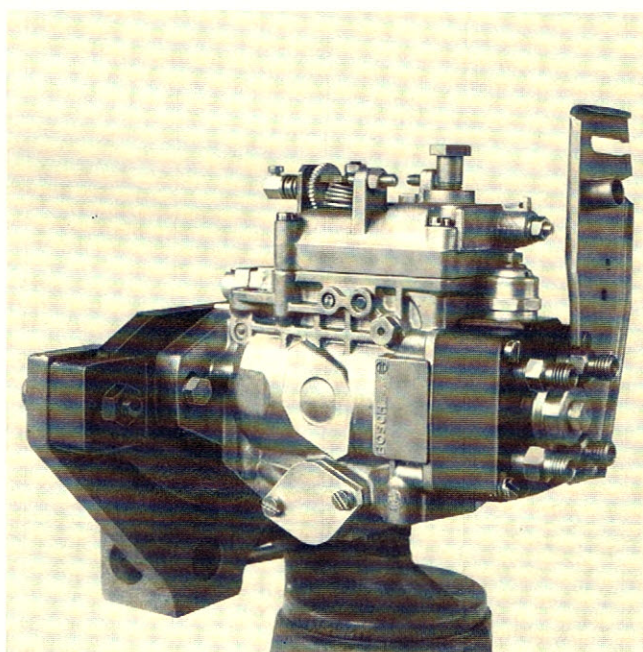


55

Lock the threaded stop bolt.

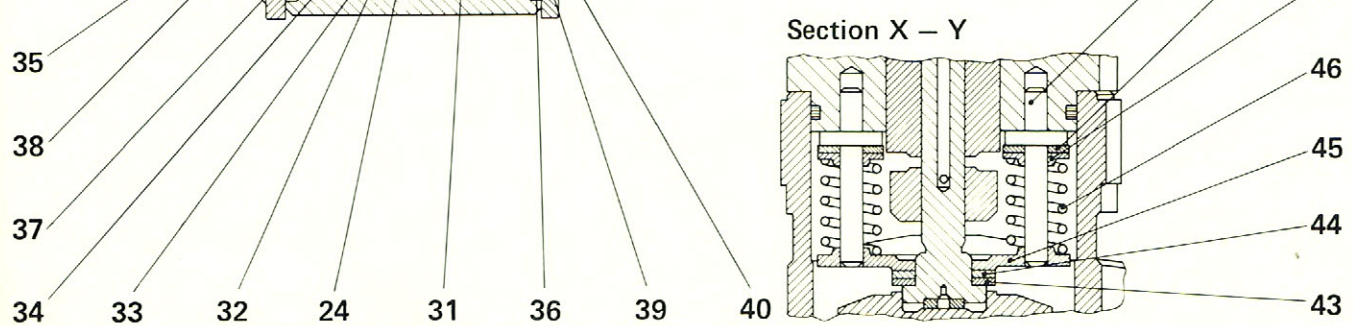
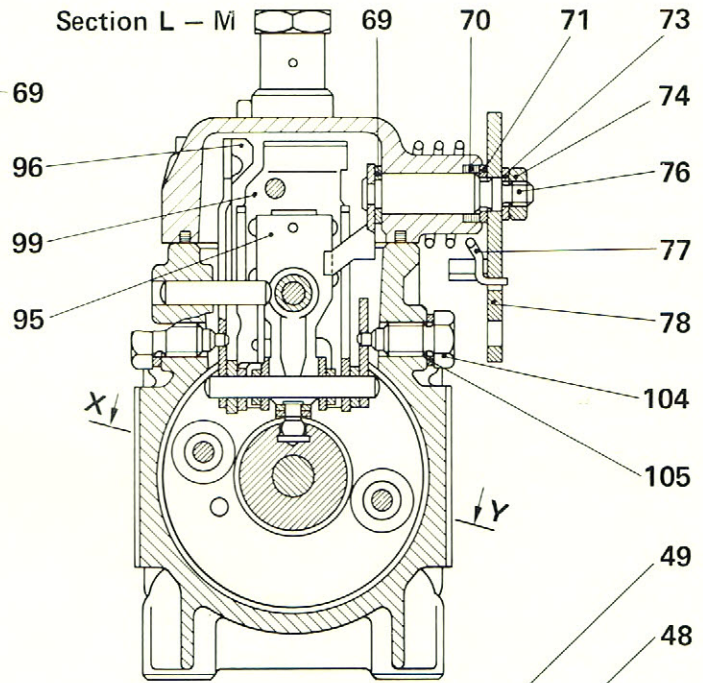
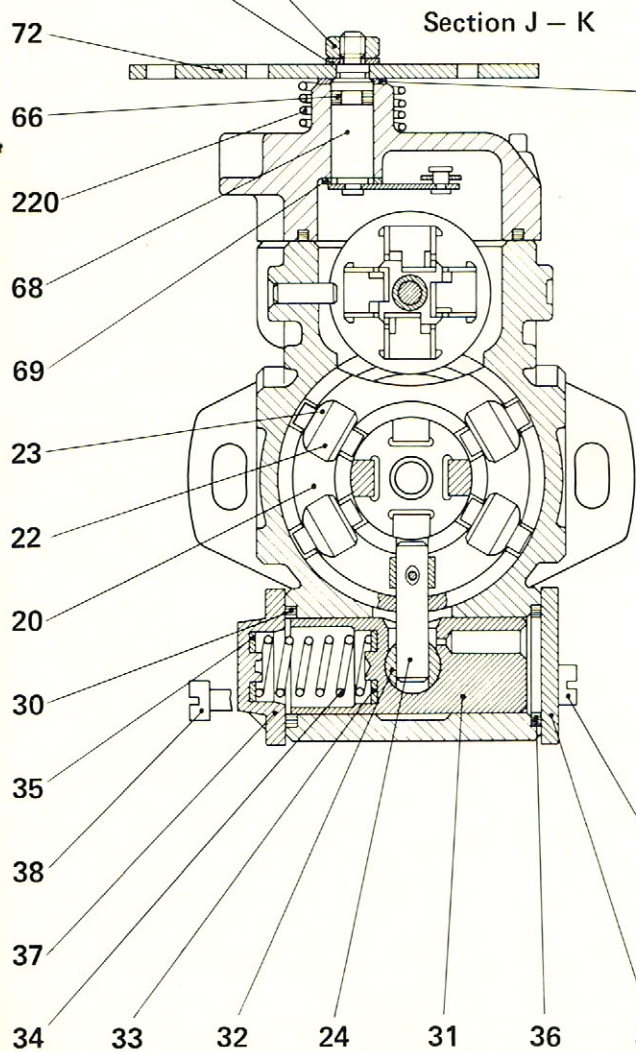
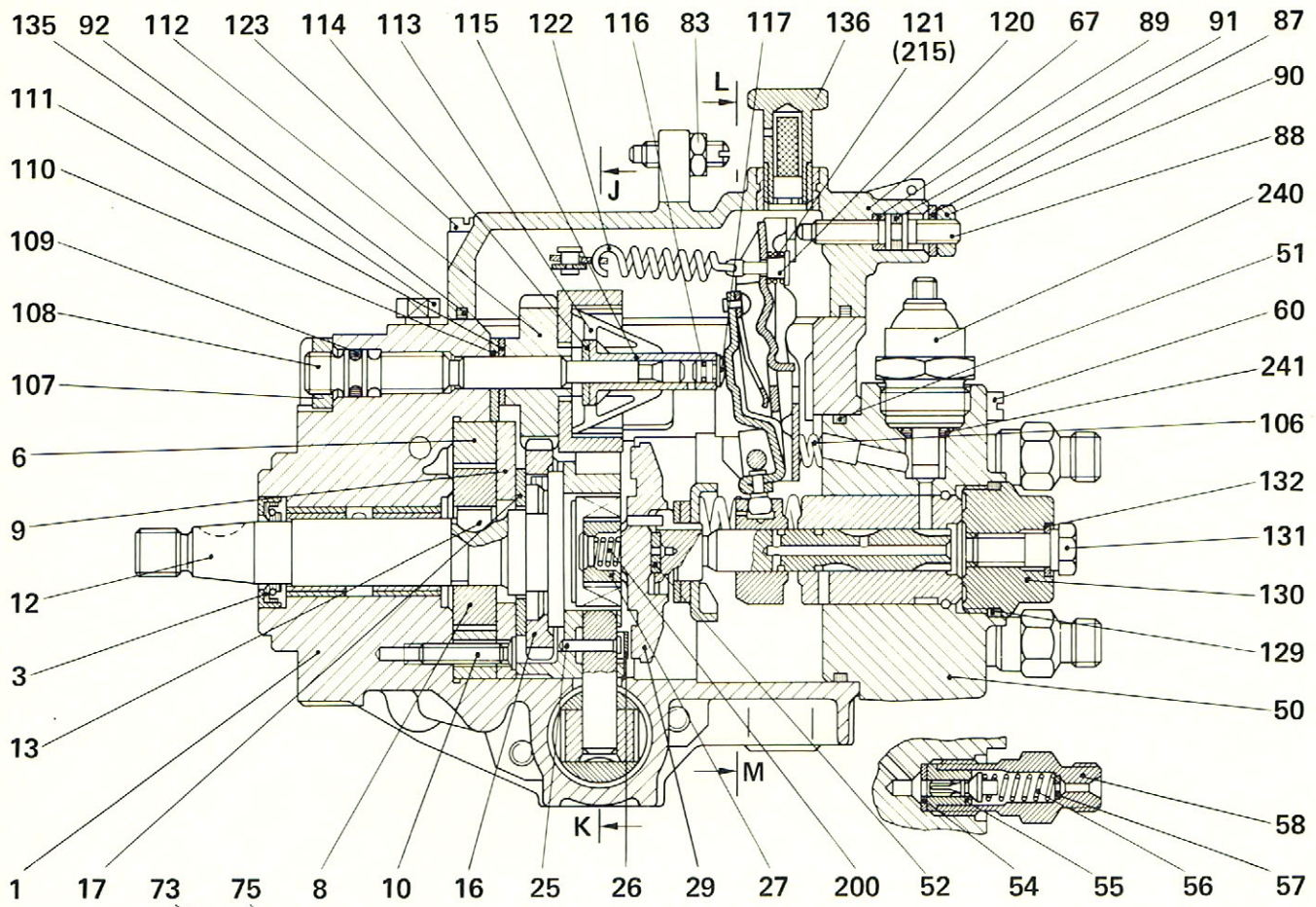
Install the bleeder screw (131) with flat seal ring (132).

Screw in the inlet union screw.



56







## 7. Tightening Torques

Item No.	Description	Nm	kgf.m
10	Countersunk-head screw	2 ... 3	0,2 ... 0,3
38	Fillister-head screw	6 ... 8	0,6 ... 0,8
40	Fillister-head screw	6 ... 8	0,6 ... 0,8
58	Fitting	35 ... 45	3,5 ... 4,5
60	Fillister-head screw	11 ... 13	1,1 ... 1,3
74	Hexagon nut	5 ... 10	0,5 ... 1,0
75	Hexagon nut	5 ... 10	0,5 ... 1,0
83	Hexagon nut	5 ... 6	0,5 ... 0,6
90	Hexagon nut	7 ... 9	0,7 ... 0,9
104	Slotted shoulder screw	10 ... 13	1,0 ... 1,3
107	Slotted round nut	25 ... 30	2,5 ... 3,0
130	Screw plug	60 ... 80	6,0 ... 8,0
131	Bleeder screw	8 ... 10	0,8 ... 1,0
135	Control valve	8 ... 9	0,8 ... 0,9
136	Inlet union screw	20 ... 25	2,0 ... 2,5
240	Solenoid-operated valve	40 ... 45	4,0 ... 4,5