

Previous Screen

Product: EXCAVATOR

Model: 235C EXCAVATOR 2PG

Configuration: 235C EXCAVATOR 2PG00001-UP (MACHINE) POWERED BY 3306 ENGINE

**Disassembly and Assembly  
3306 VEHICULAR ENGINE FOR 235C & 235D EXCAVATOR**

Media Number -SEN3833-01

Publication Date -01/12/1991

Date Updated -11/10/2001

## Fuel Injection Pump Housing

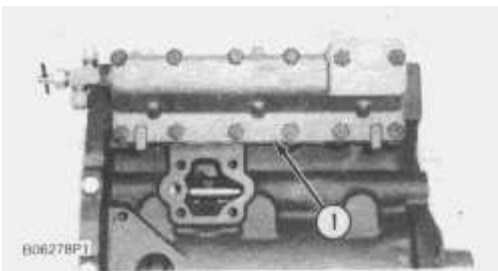
SMCS - 1253-015; 1253-016

### Disassemble Fuel Injection Pump Housing

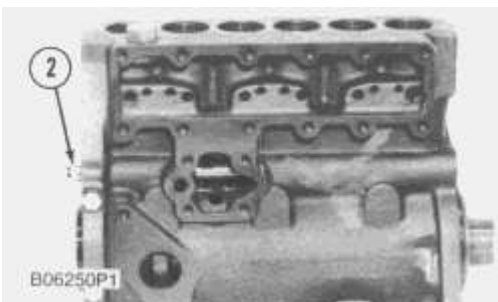
Tools Needed		A
1P1860	Pliers	1

Start By:

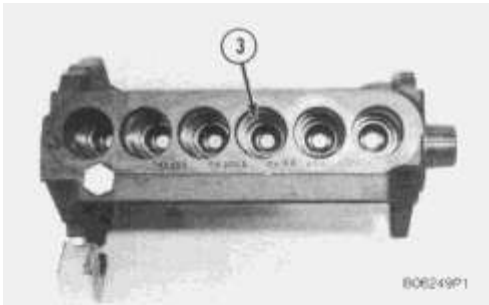
- a. disassemble governor
- b. remove fuel injection pumps



1. Remove cover (1) and gasket from the fuel injection pump housing.



2. Remove rack (2) from the fuel injection pump housing.



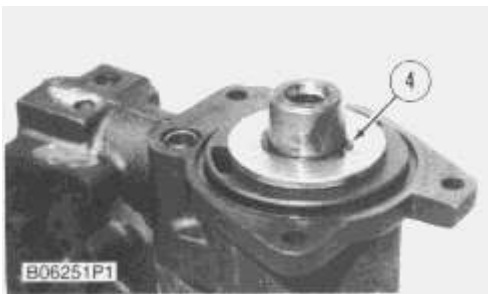
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## NOTICE

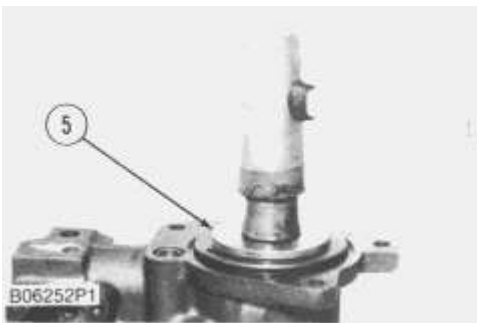
**If the original lifters are to be installed in the fuel injection pump housing, put identification marks on them as to their location in the housing.**

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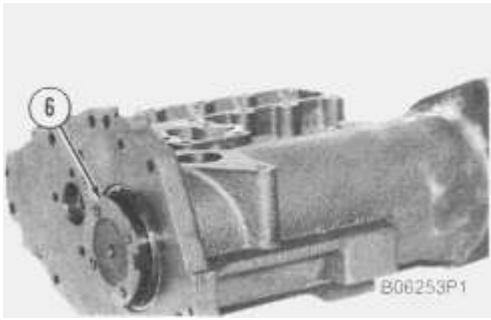
3. Remove lifters (3) from the fuel injection pump housing.



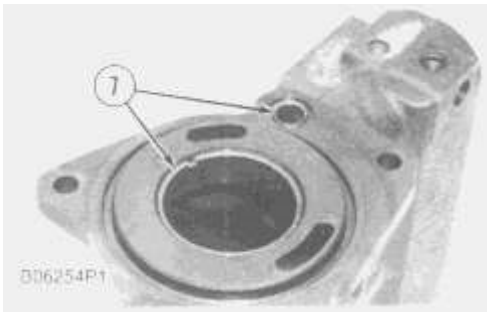
4. Put the fuel injection pump housing on end on blocks, and use tool (A) to remove snap ring (4) from the camshaft.



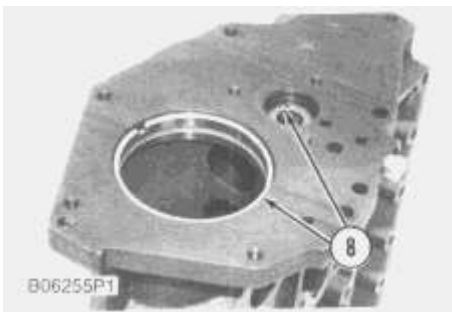
5. Use a soft hammer to push the camshaft toward the governor end of the fuel injection pump housing to loosen washer (5) on the camshaft. Remove washer (5).



6. Remove camshaft (6) from the fuel injection pump housing.



7. Remove bearings (7) from the drive end of the fuel injection pump housing.



8. Remove bearings (8) from the governor end of the fuel injection pump housing.

## Assemble Fuel Injection Pump Housing

Tools Needed		A	B	C
1P1860	Pliers	1		
1P0510	Driver Group		1	
6V2016	Plate Assembly			1
S1594	Bolt (3/8 in - 16 NC x 1 in long)			2
9S6329	Driver			1

**NOTE:** Be sure all oil passages are clear, and put clean oil on all parts before assembly.

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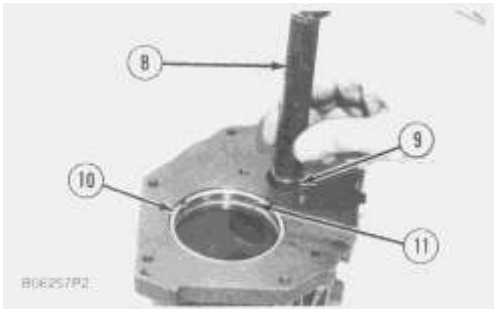
Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

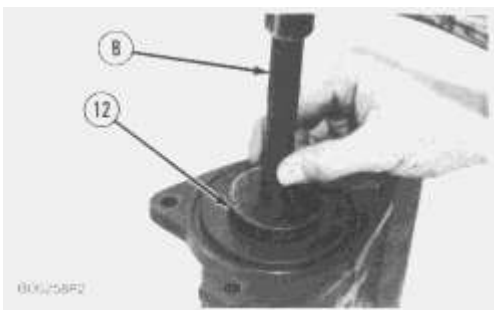
The full manual is available for immediate download.

**<https://www.ebooklibonline.com>**

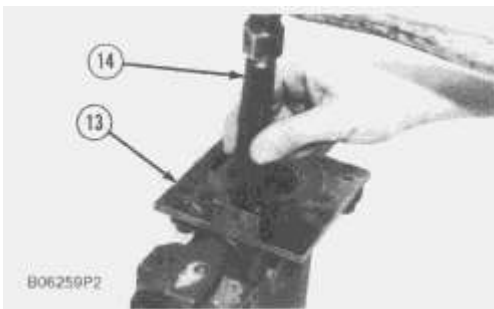


1. Use tooling (B) to install bearing (10) in the governor end of the fuel injection pump housing with junction (joint) (11) toward the top of the fuel injection pump housing. Install the bearing so it is **0.25 ± 0.20 mm (0.10 ± 0.008 in.)** below the surface of the housing.

2. Use tooling (B) to install bearing (9) in the governor end of the fuel injection pump housing so it is **7.16 ± 0.13 mm (0.282 ± 0.005 in.)** below the surface of the housing.

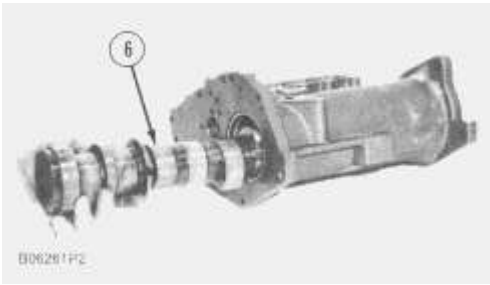


3. Use tooling (B) to install bearing (12) in the drive end of the fuel injection pump housing with the junction (joint) in the bearing toward the top of the fuel injection pump housing. Install the bearing so it is **1.00 ± 0.25 mm (9.039 ± 0.010 in.)** below the surface of the housing.



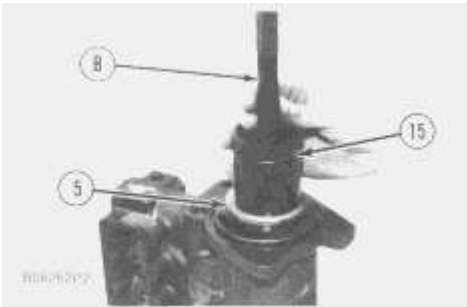
4. Install plate (13) of tooling (C) on the drive end of the fuel injection pump housing to install the bearing for the rack. Use clean grease to hold the new rack bearing on driver (14) of tooling (C). Install the driver and bearing in plate (13) with the groove in the driver in alignment with the pin in the plate and use a hammer to push the bearing into position. The bearing will be installed to the correct depth when the shoulder of the driver is against plate (13).

5. Remove tooling (C) from the fuel injection pump housing. The rack bearing must be installed so it is **0.25 ± 0.25 mm (0.010 ± 0.010 in.)** below the surface of the housing.

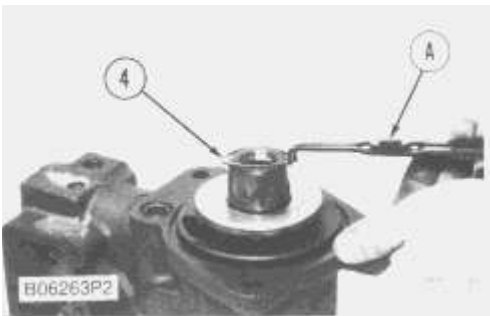


6. Install camshaft (6) in the fuel injection pump housing.

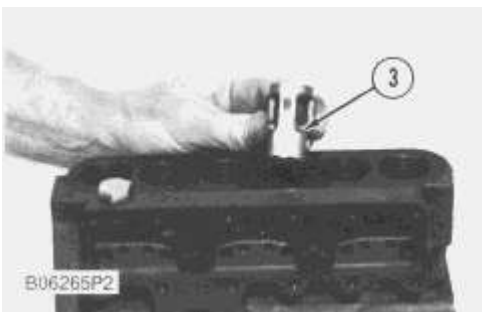
7. Put the fuel injection pump housing on end, and put a block under the camshaft.



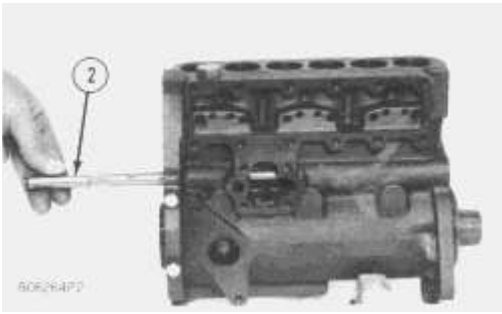
8. Put the washer (5) over the end of the camshaft and use tooling (B) and a spacer (15) that has an inside diameter of **38.1 mm (1.5 in.)** and a length of **31.75 mm (1.25 in.)** to push the washer against its seat on the camshaft. Camshaft must have  **$0.285 \pm 0.235$  mm ( $0.0112 \pm 0.0093$  in.)** end play when washer is pushed against cam shoulder.



9. Use tool (A) to install snap ring (4) in the groove in the camshaft.

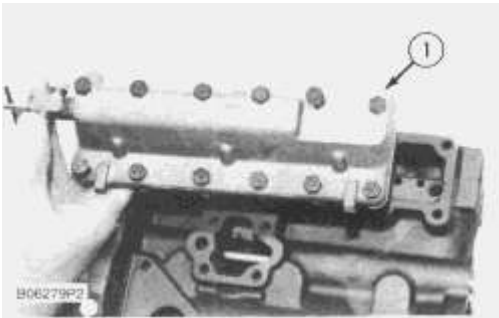


10. Install six lifters (3) in the fuel injection pump housing with the groove in the lifter in alignment with the pin in the housing.



**11.** Install rack (2) in the fuel injection pump housing, with the groove in the end of the rack in alignment with the ear (tab) of the rack bearing, at the drive end of the fuel injection pump housing.

**NOTE:** The six lifters are all the same and can be mixed.



**12.** Install the gasket and cover (1) on the fuel injection pump housing.

End By:

**a.** assemble governor

**b.** install fuel injection pumps

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**Disassembly and Assembly  
3306 VEHICULAR ENGINE FOR 235C & 235D EXCAVATOR**

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## Governor

SMCS - 1264-015; 1264-016

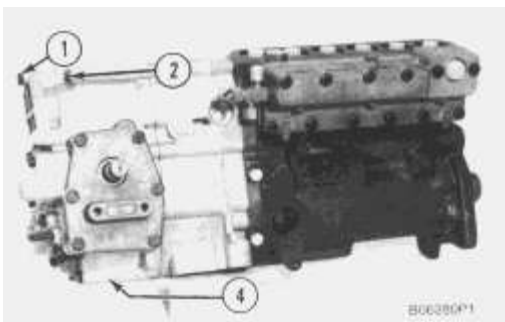
### Disassemble Governor

Tools Needed		A	B	C
1P0510	Driver Group	1		
6V2163	Clamp Assembly-Spring Compressor		1	
1P1855	Snap Ring Pliers			1

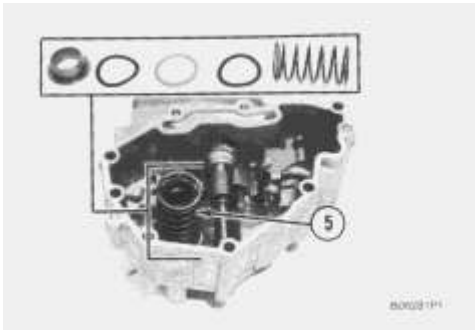
Start By:

- a. remove fuel injection pump housing and governor
- b. remove fuel transfer pump

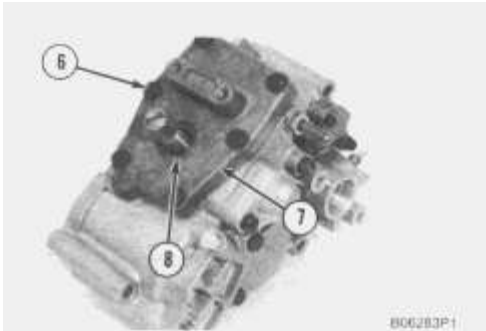
**NOTE:** If it is desired to only remove the governor so the fuel injection pump housing can be disassembled, do only Steps 1, 13, 19, 23-26, 29, 31, 32 and 35.



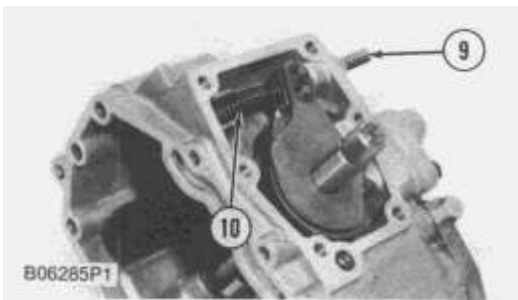
- 1. Remove bolt (1), six bolts (2), two top bolts, housing (4) and the gasket.



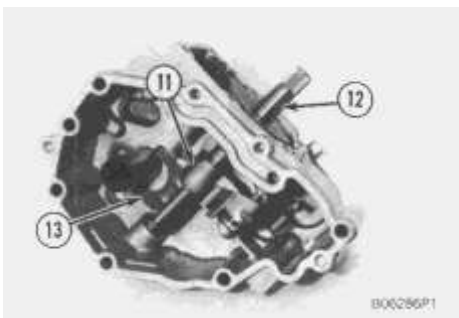
2. Remove governor spring (5), the two wave washers, one flat washer and seat from the guide in the housing.



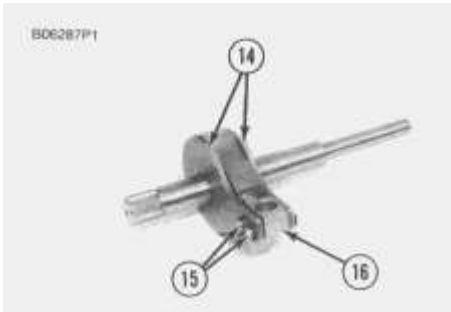
3. Remove bolts (6), cover (7) and the gasket from the housing. Use tooling (A) to remove seal (8) from the cover.



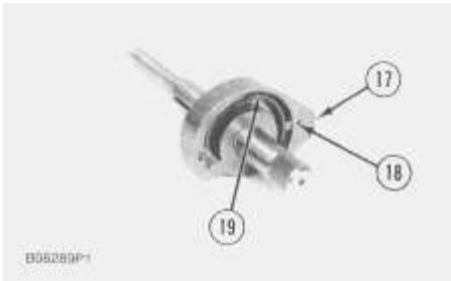
4. Remove low idle adjustment screw (9) and spring (10) from the housing.



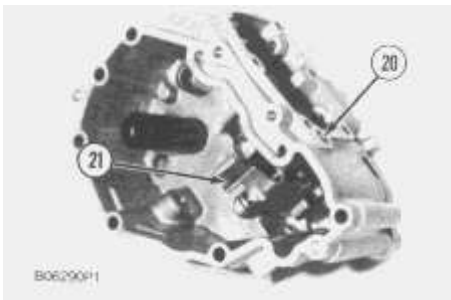
5. Remove shaft assembly (12), lever (11) and lever (13) from the housing.



6. Remove two snap rings from pins (15) and remove pins (15). Remove plates (14) and stop (16) from the shaft assembly.



7. Remove pin (18), pin (17) and spring (19) from the shaft assembly.



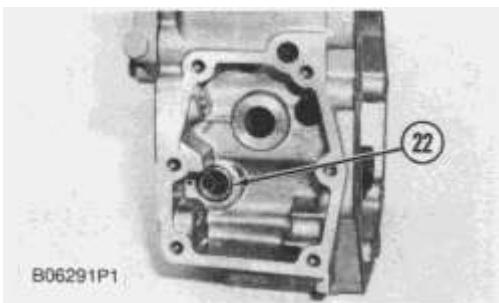
8. Remove shaft (20) and lever (21) from the housing.

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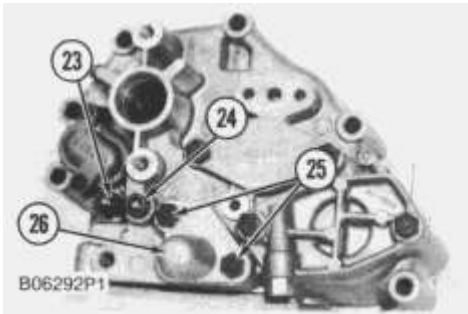
### NOTICE

**Remove check valve (22) only if a replacement is necessary. The check valve will be damaged during removal.**

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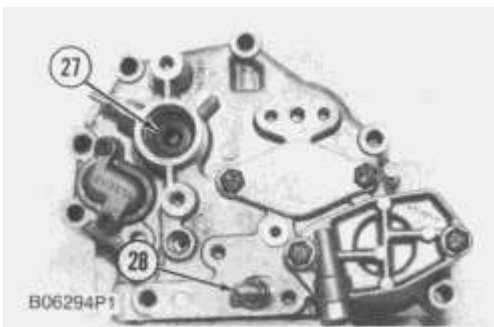


9. Remove check valve (22) if a replacement is necessary.



10. Remove contact (23) and body (24) for the governor dashpot adjustment screw from the housing.

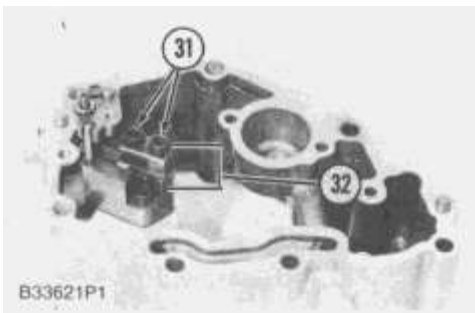
11. Remove bolts (25), cover (26) and the gasket from the housing.



12. Remove seal (27) and adjustment screw (28) for the high idle.

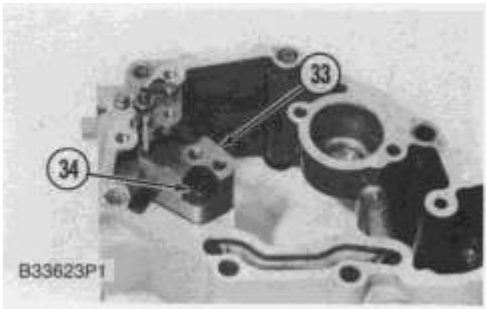


13. Remove two bolts (29), housing (30) and the gasket from the fuel injection pump housing.

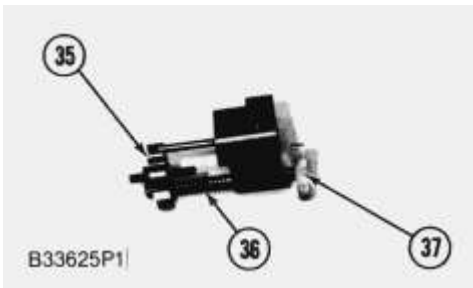


14. Remove bolts (31) and torque control group (32).

15. Disassemble the torque control group and inspect the spacer, spring and insulator for damage or wear.

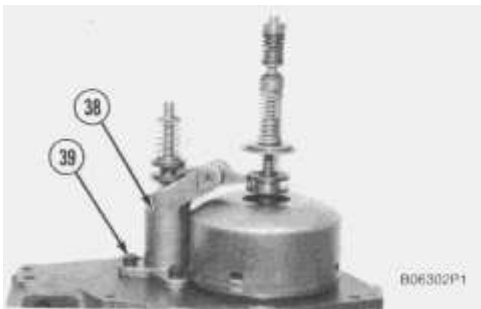


16. Remove bolts (34) and block (33) for the full load stop from the housing.

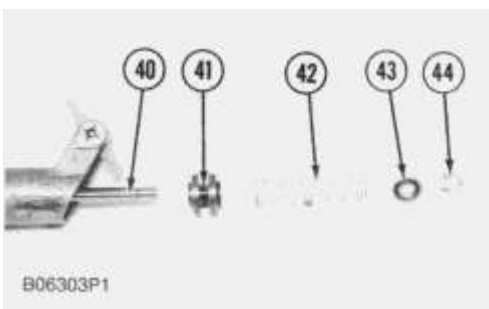


17. Remove the bolt that holds collar (35) to bolt (37). Remove collar (35) and spring (36) from bolt (37). Remove bolt (37) from the block.

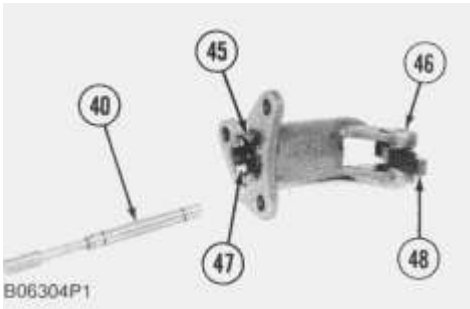
18. Remove the stop screw from collar (35), if a replacement is necessary.



19. Remove bolts (39) and governor servo (38) from the fuel injection pump.

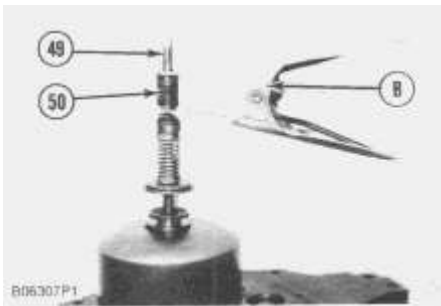


20. Remove locking (44), seat (43), spring (broken link spring) (42) and sleeve (41) from valve (40). Remove the other locking (44) from the groove in the center of valve (40).



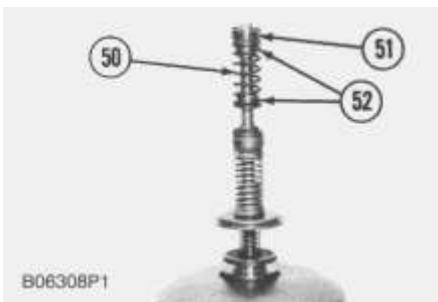
**21.** Remove valve (40), sleeve (45) and piston (47) from the governor servo. Remove the O-ring seal from sleeve (45).

**22.** Remove pin (46) and lever (48) from the governor servo.

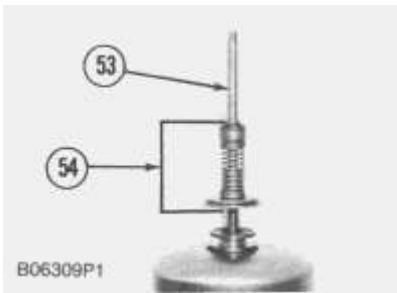


**23.** Use tool (B) to hold spring (50) in compression so ring (49) can be removed. Spring (50) is used to put a preload on the thrust bearing for the camshaft in the fuel injection pump housing.

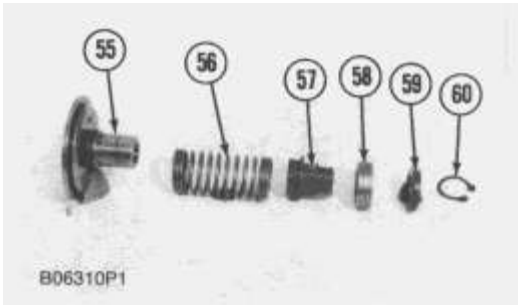
**24.** Remove ring (49) then remove tool (B).



**25.** Remove bearing (51), sleeves (52) and spring (50) from the governor shaft.

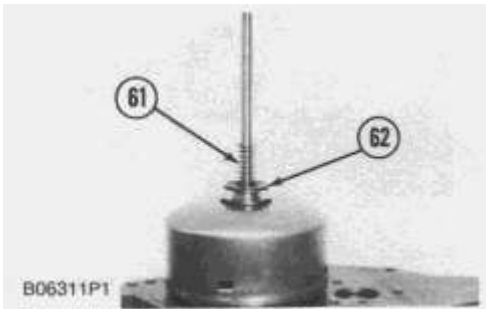


**26.** Remove ring (53) and dashpot assembly (54) from the governor shaft.

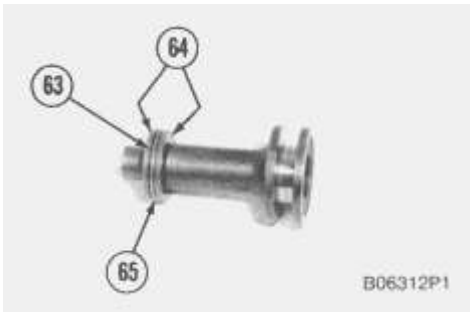


**27.** Use tool (C) to remove snap ring (60) from seat (57). Remove ring (59) and spool (58) from seat (57).

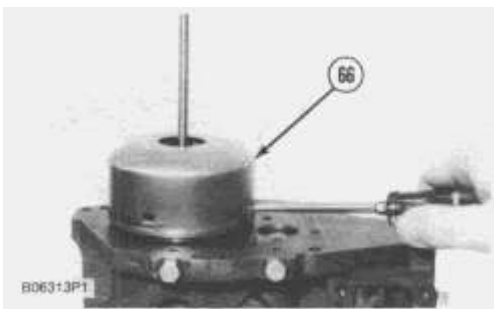
**28.** Remove seat (57) from spring (56) and remove spring (56) from seat (55).



**29.** Remove spring (overfueling spring) (61) and riser (62) from the governor shaft.

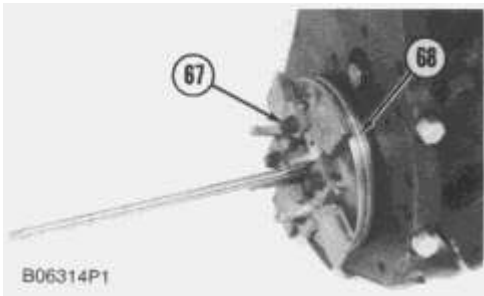


**30** Remove ring (63), races (64) and bearing (65) from the riser.

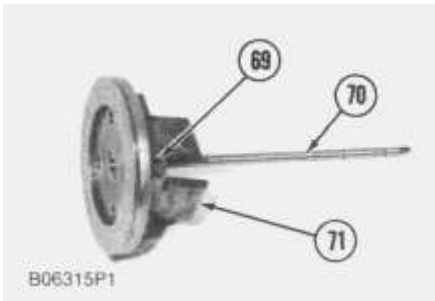


**31.** Use a screwdriver to remove shield (66) as shown.

**NOTE:** Make a replacement of shield (66) any time it is removed.

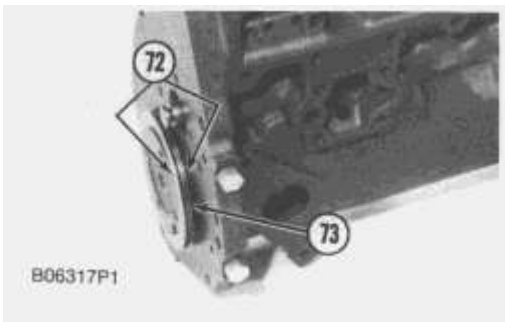


32. Remove bolts (67) and carrier (68) for the governor flyweights.



33. Remove dowels (69) and flyweights (71) from the carrier.

34. Remove shaft (70) from the carrier. Remove the dowel from shaft (70).

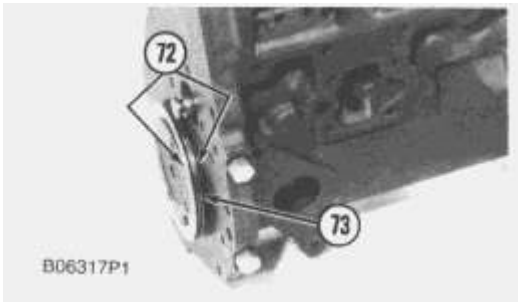


35. Remove races (72) and bearing (73) from the camshaft in the fuel injection pump housing.

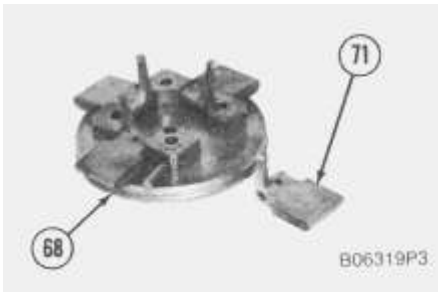
## Assemble Governor

Tools Needed		A	B	C	D
1P0510	Driver Group	1			
6V2163	Clamp Assembly-Spring Compressor		1		
1P1855	Snap Ring Pliers			†	
6V2054	Shield Driver				1

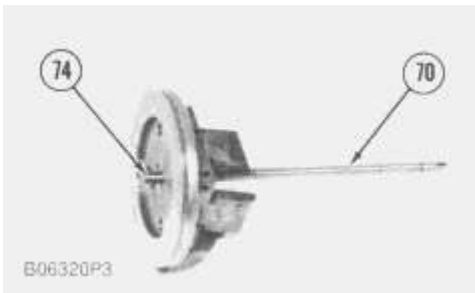
**NOTE:** Put clean oil on all parts before assembly. Be sure all oil passages are clear.



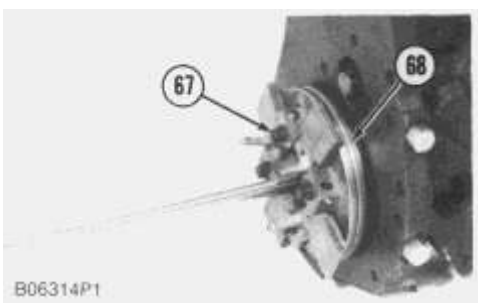
1. Install one race (72), bearing (73) and the other race (72) on the camshaft in the fuel injection pump housing.



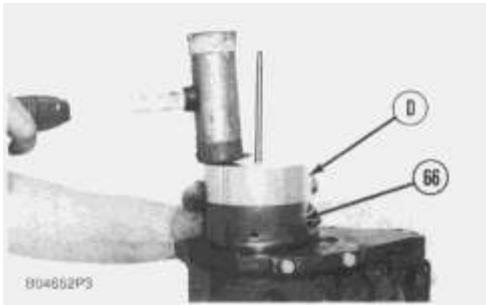
2. Put flyweights (71) in position on carrier (68) and install the dowels to hold the flyweights in place. The flyweights must move freely on the dowels and have **0.010 to 0.23 mm (0.0004 to 0.009 in.)** end play.



3. Install dowel (74) in governor shaft (70) and install the governor shaft in the carrier as shown.

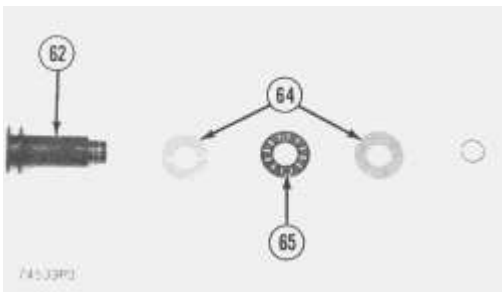


4. Put carrier (68) in position on the camshaft and install bolts (67) that hold the carrier in place.

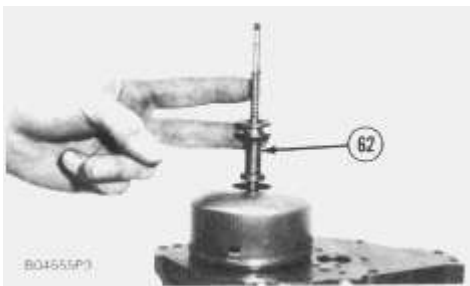


**NOTE:** Make a replacement of shield (66) any time it is removed.

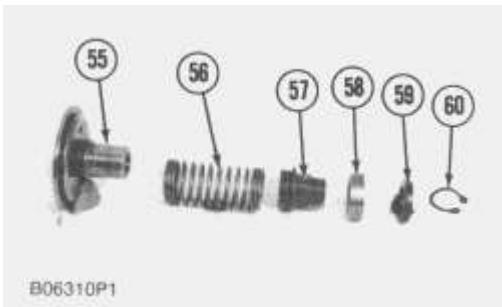
**5.** Install shield (66) on the carrier and use tool (D) to push the shield against its seat. Use a hammer and punch to move the metal (stake) two places on the side of the shield  $180^\circ \pm 15^\circ$  apart next to the holes in the shield.



**6.** Install one race (64), bearing (65) the other race (64) and use tool (C) to install the ring on riser (62) as shown.



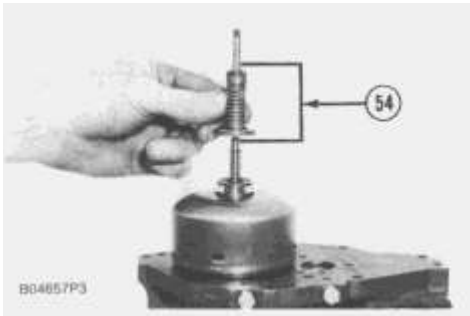
**7.** Install riser (62) and spring (overfueling spring) on the governor shaft as shown.



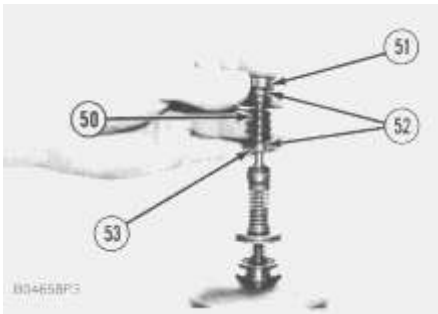
**8.** Assemble the dashpot as follows:

**a.** Install spring (56) on seat (55) and install seat (57) in spring (56).

**b.** Put spool (58) and ring (59) in position on seat (57) and use tool (C) to install snap ring (60) to hold them in place.

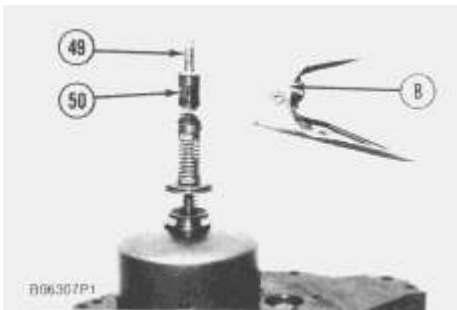


9. Install dashpot assembly (54) on the governor shaft as shown.

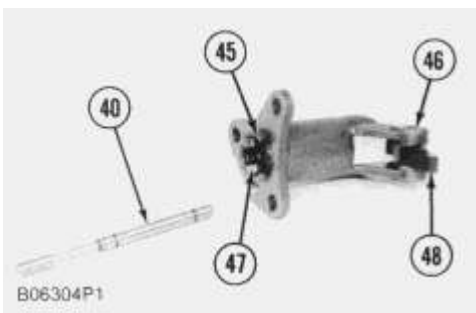


10. Install ring (53) in the lower groove in the governor shaft. Install one sleeve (52), spring (50), the other sleeve (52) and bearing (51) on the governor shaft as shown.

**NOTE:** Spring (50) is used to put a preload on the thrust bearing on the camshaft in the fuel injection pump housing.



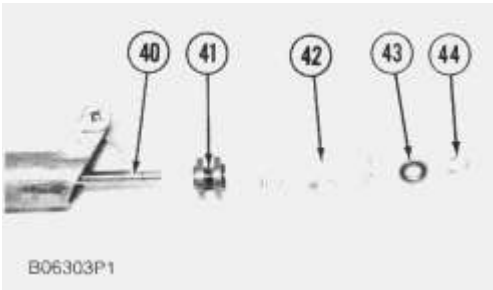
11. Use tool (B) to hold spring (50) in compression and install ring (49) in the groove in the governor shaft. Remove tool (B).



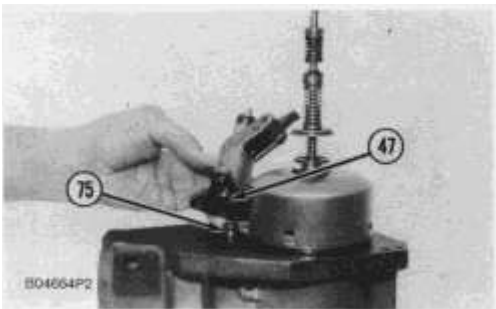
12. Put lever (48) in position on the governor servo and install pin (46) to hold the lever in place. Use a hammer and chisel to move the metal (stake) four places **90°** apart on the outside surface on both legs of the governor servo to hold pin (46) in place.

**13.** Install the O-ring seal on sleeve (45). Install piston (47) and sleeve (45) in the governor servo as shown.

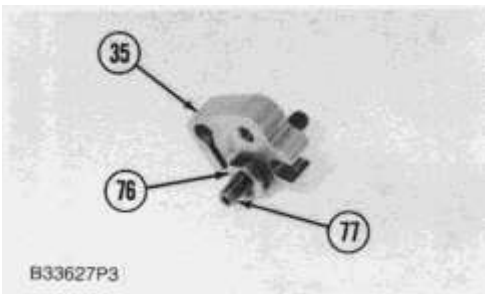
**14.** Install valve (40) in the governor servo as shown.



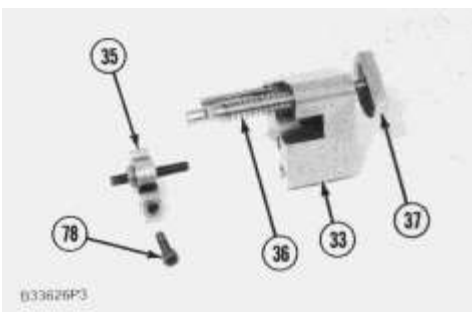
**15.** Install one lockring (44) in the groove near the center of valve (40). Put sleeve (41), spring (broken link spring) (42) and seat (43) in position on valve (40) and install the other lockring (44) to hold them in place.



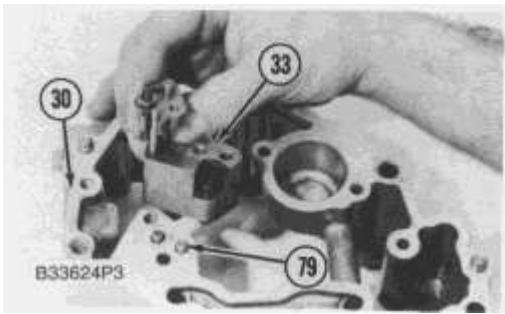
**16.** Put the governor servo in position on the fuel injection pump housing with piston (47) engaged over rack (75) and install the bolts that hold the governor servo in place.



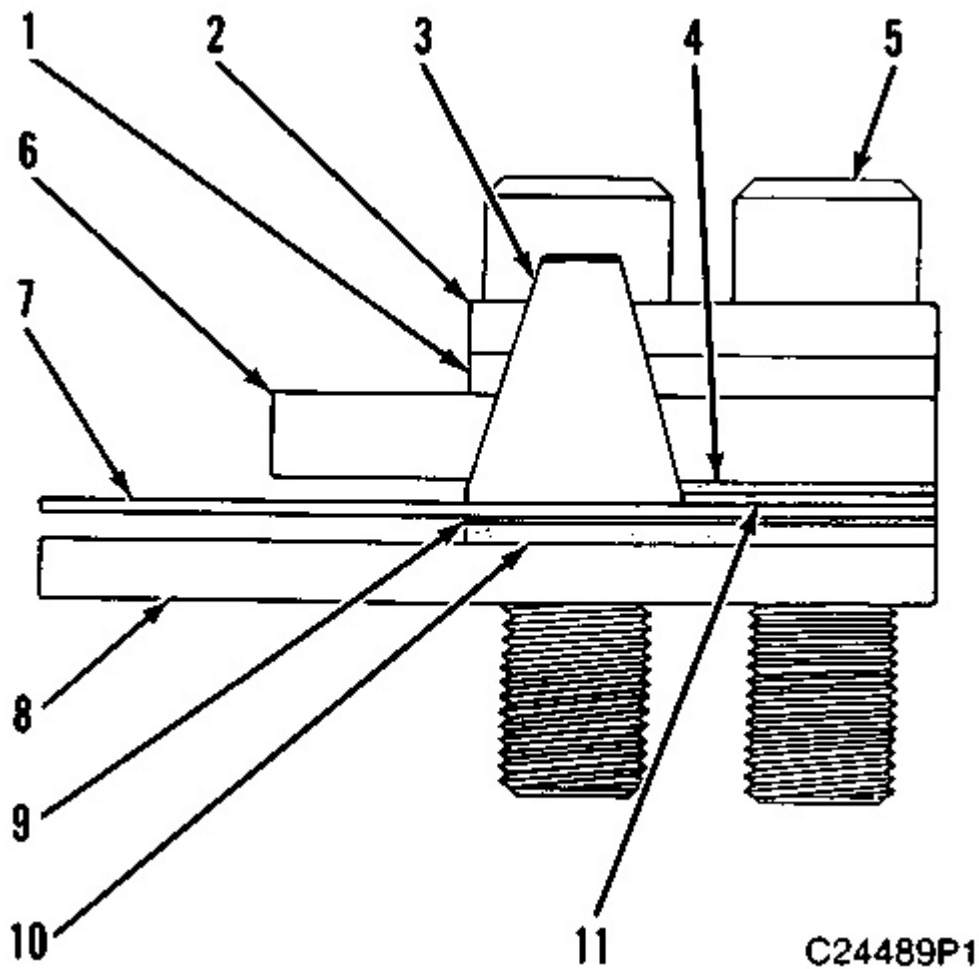
**17.** Install torque rise adjustment screw (77) in collar (35) as shown and install locknut (76) on the screw.



18. Install bolt (37) in block (33) as shown. Install spring (36) on bolt (37) as shown. Put collar (35) in position on bolt (37) with the hole in the collar in alignment with the notch in bolt (37) and install bolt (78) to hold the collar in place.

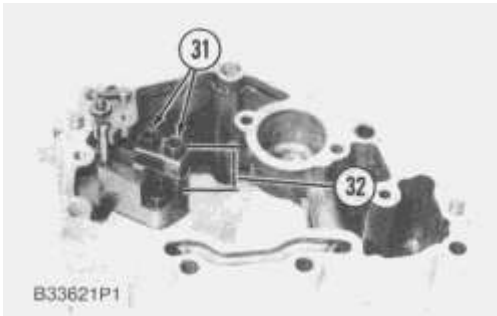


19. Put block (33) in position on housing (30) with the holes in the block in alignment with dowels (79). Install the bolts that hold the block in place.

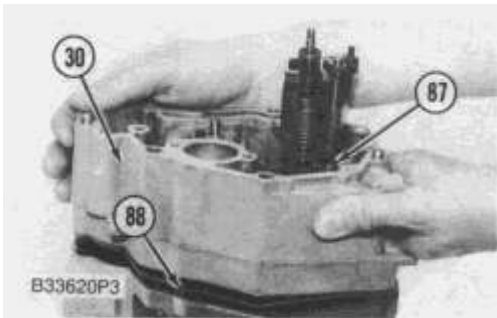


20. Assemble the torque control group as follows:

- a. Install shim (9), spring (7), spacer (11), contact (3) and spacer (4) on insulator (10) as shown.
- b. Install retainer (2), shim (1), bar (6), the insulator assembly and bar (8) on bolts (5).



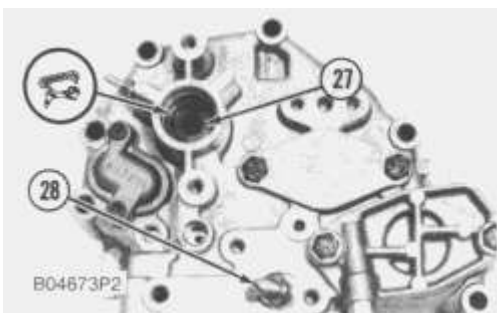
21. Install torque control group (31) on block (32) as shown.



## **WARNING**

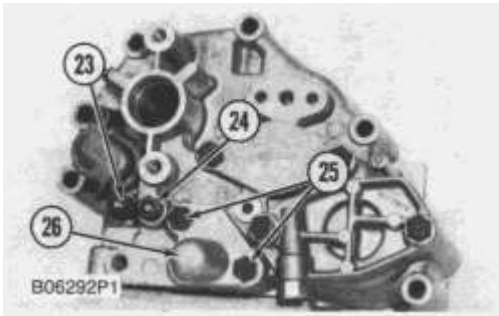
**When housing (30) is installed on the fuel injection pump housing, the flange on bolt (87) must be behind the dashpot. If housing (30) is installed with the flange on bolt (87) on the wrong side of the dashpot, the riser in the governor will be held in the maximum fuel delivery position.**

22. Install gasket (88) on the fuel injection pump housing. Put housing (30) in position on the fuel injection pump housing with bolt (87) behind the dashpot as shown. Install the bolts that hold housing (30) in place.



23. Use tooling (A) to install lip type seal (27) in the outer governor housing with the lip in as shown.

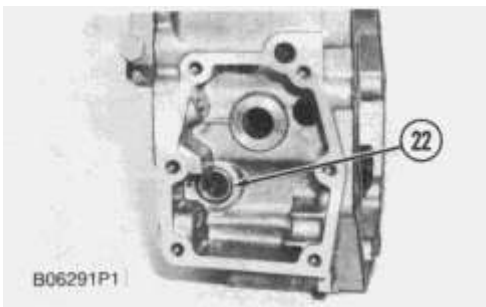
24. Install adjustment screw (28) and the locknut for the high idle adjustment.



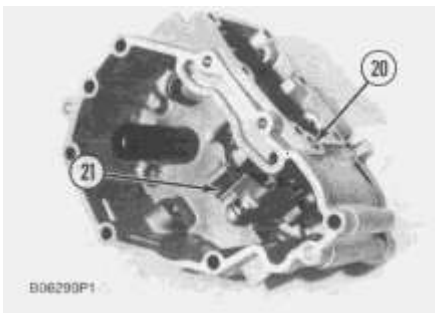
25. Install an O-ring seal on body (24) for the dashpot adjustment and install the body in the housing.

26. Install cover (26) on the housing with bolts (25).

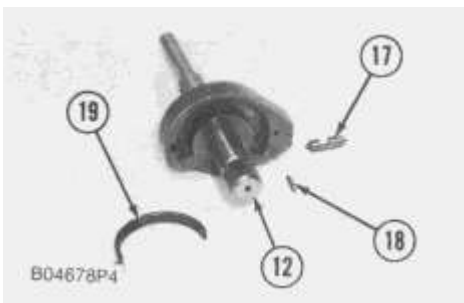
27. Install contact (23) in the housing and tighten to a torque of  $4.5 \pm 0.6 \text{ N}\cdot\text{m}$  ( $40 \pm 5 \text{ lb}\cdot\text{in.}$ ).



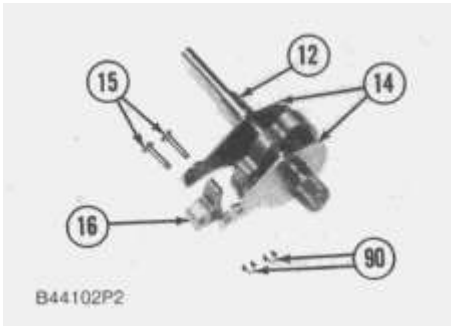
28. Install check valve (22) in the housing as shown.



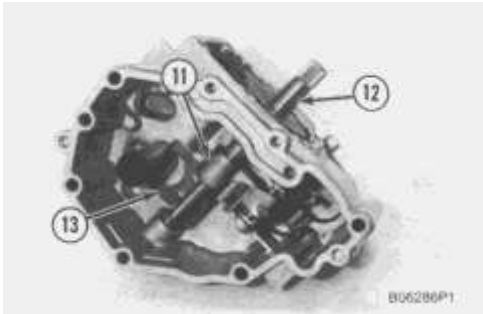
29. Put lever (21) in position in the housing as shown and install shaft (20) to hold the lever in place.



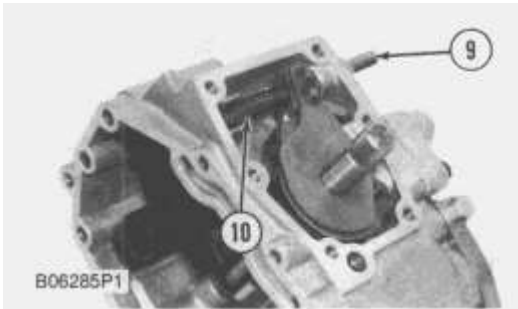
30. Install spring (19) in shaft assembly (12). Install pin (17) in the shaft assembly (12) with the tip of the pin engaged in the hole in spring (19). Install pin (18) in the shaft assembly to hold pin (17) in place.



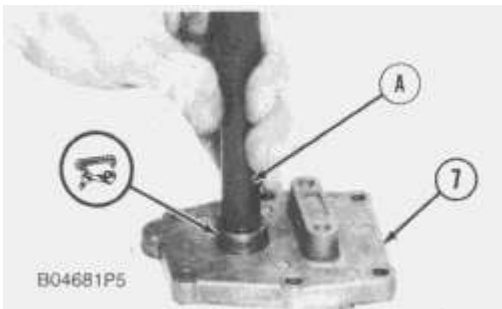
**31.** Put stop (16) and plates (14) in position on shaft assembly (12) and install pins (15) to hold the plates and stop in place. Install snap rings (90) to hold pins (15) in place.



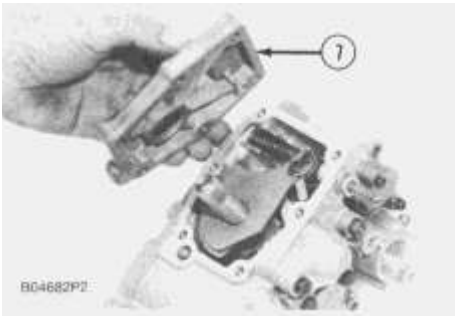
**32.** Put levers (11) and (13) in position in the housing as shown and install shaft assembly (12) to hold the levers in place.



**33.** Install adjustment screw (9) and the locknut for the low idle adjustment in the housing. Install spring (10) in the hole in the shaft assembly and in the housing.

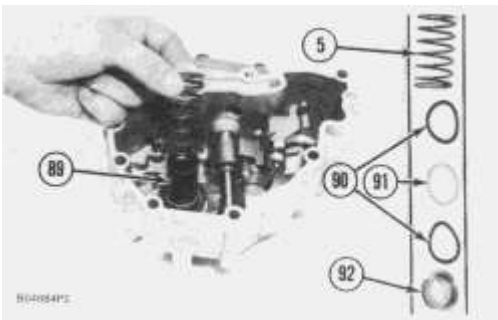


**34.** Use tooling (A) to install the lip type seal in cover (7) with the lip in as shown.



**35.** Put the gasket and cover (7) in position on the housing and install the bolts that hold it in place.

**NOTE:** Make sure the seat, washers and spring are on top of the lever as shown. These parts must be kept in this position when housing (4) is put in position on the inner governor housing.



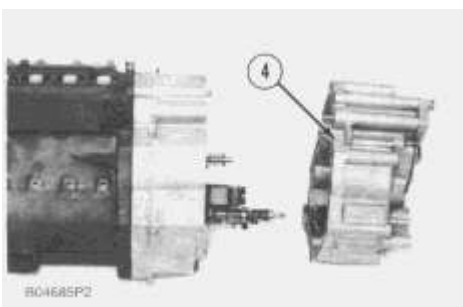
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### NOTICE

**Flat washer (91) must be installed between wave washers (90).**

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**36.** Install the governor spring assembly on guide (89) as follows: Install seat (92), one wave washer (90), flat washer (91), the other wave washer (90) and spring (5) on guide (89) as shown.



**37.** Put the gasket and housing (4) in position on the inner governor housing and install the nine bolts that hold it in place.

**38.** Make the governor adjustments. See the topic, Governor Adjustments in Testing And Adjusting.

End By:

**a.** install fuel transfer pump

**b.** install fuel injection pump housing and governor

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Product: EXCAVATOR

Model: 235C EXCAVATOR 2PG

Configuration: 235C EXCAVATOR 2PG00001-UP (MACHINE) POWERED BY 3306 ENGINE

## Disassembly and Assembly

### 3306 VEHICULAR ENGINE FOR 235C & 235D EXCAVATOR

Media Number -SEN3833-01

Publication Date -01/12/1991

Date Updated -11/10/2001

## Oil Filter Base

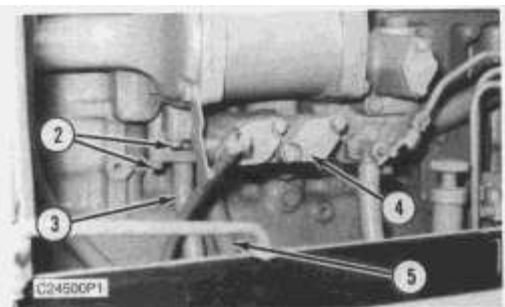
SMCS - 1306-010; 1306-017

### Remove & Install Oil Filter Base

Tools Needed		A
2P8250	Strap Wrench	1



1. Remove oil filter (1) using tool (A).



2. Remove the bolts, tube assemblies (3) and (5) and the gaskets.

3. Remove four bolts (2), and remove oil filter base (4) from the engine oil cooler.

**NOTE:** The following steps are for installation of the oil filter base.

4. Position oil filter base (4) on the engine oil cooler, and install four bolts (2) that hold it in place.

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