

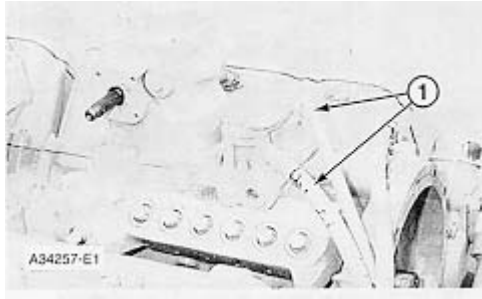
SMCS - 1253, 1268

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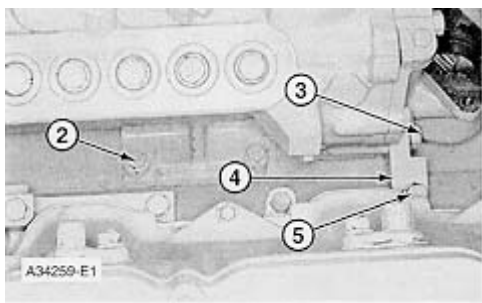
Remove Fuel Injection Pump Housing & Governor

Start By:

- a. remove automatic timing advance
- b. remove fuel transfer pump
- c. remove fuel injection lines



1. Disconnect two lines (1) to the governor plate. Cap or plug immediately.

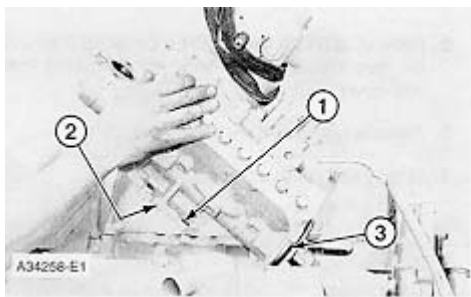


2. Remove bolts (3) and (5). Remove brackets (4). Remove bolts (2).

3. Fasten a hoist to the fuel injection pump housing and governor. Move the pump housing and governor toward the rear of the engine until the pump housing is clear of the timing advance housing.

4. Remove the fuel injection pump housing and governor. The weight of housing and governor is **54 kg (120 lb.)**.

Install Fuel Injection Pump Housing & Governor

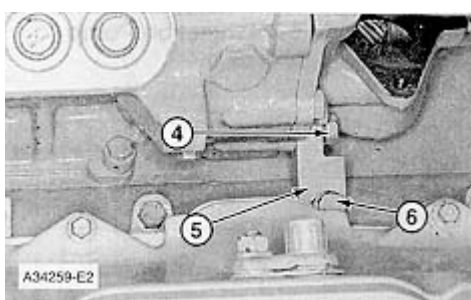


1. Put a light layer of **1P808 General Purpose Lubricant** on O-ring seal (3) and on the two O-ring seals found on the bottom (2) of the pump housing (oil inlet and oil outlet).

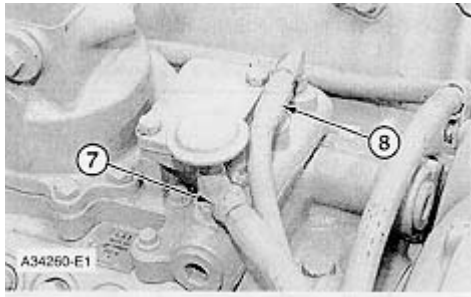
2. Put the fuel engine pump housing into position on the top of the engine. Install the bolts in location (1).

NOTICE

Make sure there is no paint, dirt or other foreign material on the machined surfaces of the engine or fuel injection pump housing. Be careful not to damage the O-ring seals for the oil inlet and oil outlet as the pump is put into position on the engine.



3. Install bracket (5) and bolts (4) and (6). Tighten bolts (6) finger tight. Tighten bolts (4) to standard torque. Tighten bolts (6) to **43 ± 7 N·m (32 ± 5 lb ft)**.



4. Connect fuel lines (7) and (8) to the governor plate.

End By:

- a. install fuel transfer pump
- b. install fuel injection lines
- c. install automatic timing advance

Disassemble Fuel Injection Pump Housing

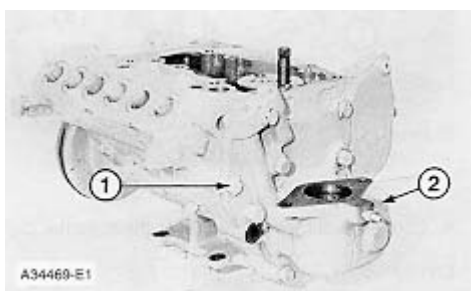
Tools Needed		A	B	C	D	E
8T5287	Wrench	1				
8S2244	Extractor		1			
5P0944	Dowel Puller Group			1		
5P9697	Timing Pin				1	
8S2241	Camshaft Bearing Removal & Installation Group					1

Start By:

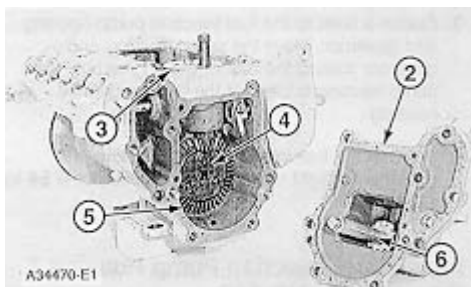
- a. remove fuel injection pump housing and governor
- b. remove governor

NOTICE

Be careful not to damage the inlet and outlet ports on the bottom of the pump housing. The pump housing must be put on blocks before disassembly.



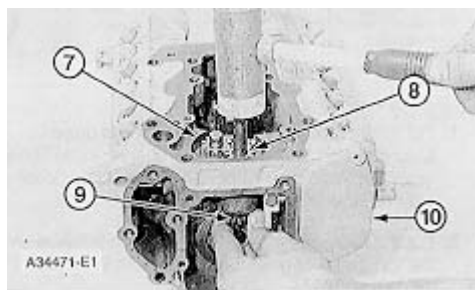
1. Remove bolts (1) from rear cover (2). Remove cover (2) and gasket.



2. Remove shaft (6) from the rear cover (2). Remove the gear from shaft (6). Remove the bushing from rear cover (2).

3. Remove retainer (4). Remove gear (5).

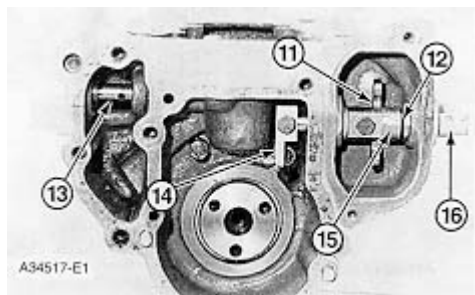
4. Remove oil pump cover (3).



5. Remove idler gear (7). Remove pinion gear assembly (9) from the pump housing with a soft hammer as shown. Remove drive gear (8).

NOTE: When pinion gear assembly (9) is removed, make a replacement of drive gear (8) with a new part.

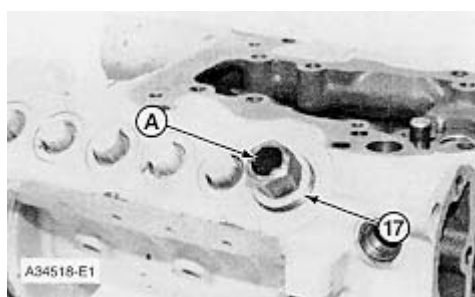
6. Remove cover (10).



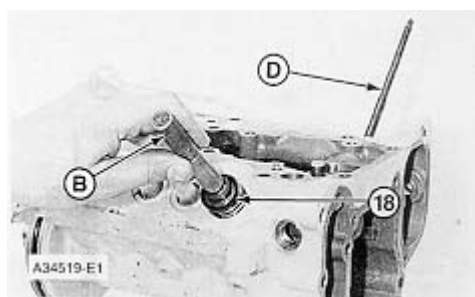
7. Remove the bolts from levers (14) and (11). Remove shaft (16), lever (14), lever (11), bearing (15) and spring washer (12).

NOTE: Step (7) is only necessary on earlier fuel systems. Later systems have shutoff in governor housing.

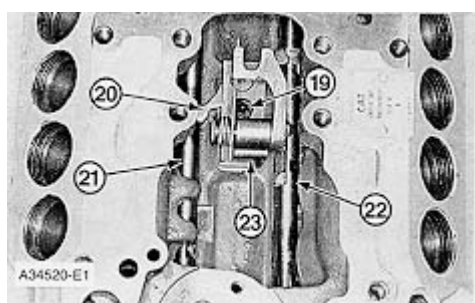
8. Remove bypass valve (13). Remove the O-ring seal, pin, piston and spring from the valve body.



9. Remove the felt washer from bushing (17). Remove bushing (17) from each of the injection pumps with Tool (A).

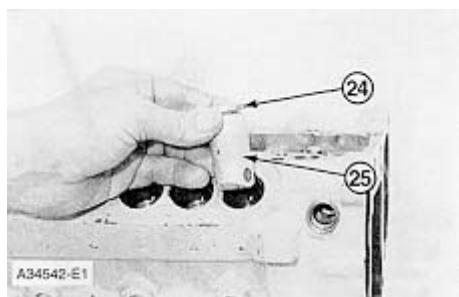


10. Install Tool (D) in the pump housing with the square end down (end with taper will be up). Hold the racks against Tool (D) and remove each of the injection pumps (18) with Tool (B). For more details, see Remove Fuel Injection Pumps.

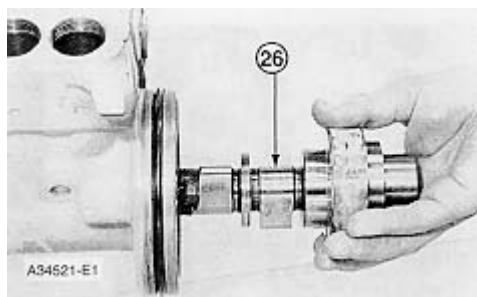


11. Remove bolt (19) that holds bracket (23) to the fuel injection pump housing. Remove bracket (23) and link (20).

12. Put identification on the left rack (21) and right rack (22). Remove racks (21) and (22).



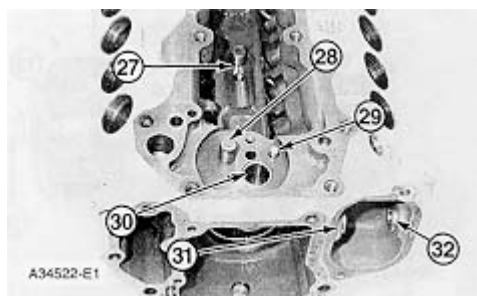
13. Remove spacers (24) and lifters (25) from the injection pump housing. Put identification on each of the spacers and lifters as to their location in the pump housing.



14. Remove camshaft (26) from the pump housing.

NOTICE

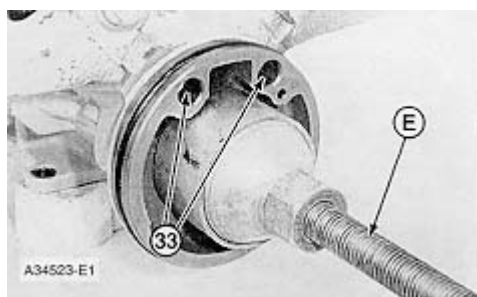
Be careful not to damage the camshaft bearings as the camshaft is removed.



15. Remove dowel (27), shaft (28) and dowel (29) with tool (C).

16. Remove lower and upper bearings (30) that are supports for the pinion assembly.

17. Remove bearing (31) and the lip type seal. Remove bearing (32) and the lip type seal.



18. Remove the rack bearings from locations (33).

19. Remove the camshaft bearings with Tool (E).

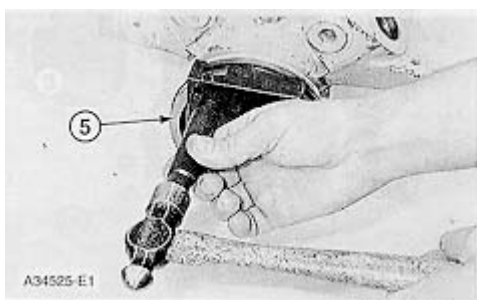
Assemble Fuel Injection Pump Housing

Tools Needed		A	B	C	D	E	F	G
5P6217	Fixture Assembly	1						
5P6218	Driver	1						
8S2241	Camshaft Bearing Removal and Installation Tool		1					
1P0529	Handle			1		1		
1P0461	Drive Plate		1	1	1			
1P0459	Drive Plate			1		1		
1P0455	Drive Plate				1			
1P0464	Drive Plate				1			
1B2714	Bolt				1			
9S8750	Nut				1			
5P9697	Timing Pin						1	
8T5287	Wrench							1

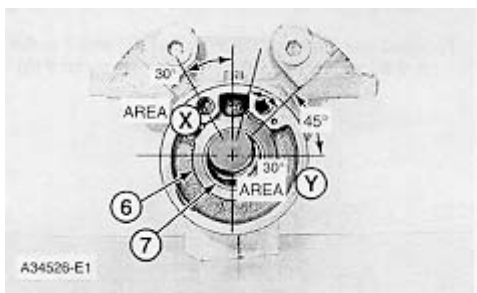
Tools Needed		H	J	K
1P0529	Handle		1	
8S2244	Extractor	1		
1P0454	Drive Plate		1	
1P0463	Drive Plate		1	
9S0240	Rack Position Tool Group			1

Tools Needed		H	J	K
1P0529	Handle		1	
8S2244	Extractor	1		
1P0454	Drive Plate		1	
1P0463	Drive Plate		1	
9S0240	Rack Position Tool Group			1

- Put fixture assembly (3) (part of Tool (A)) on the pump housing with the dowel in fixture (3) engaged in the right rack bore. Install bolt (4).
- Put a new bearing (2) in position between fixture (3) and the rack bore with the tab of the bearing up. Install the bearing with driver (1) until the shoulder of the driver makes contact with the fixture.
- Turn the fixture and make alignment of the dowels on the fixture with the left rack bore. Install the right rack bearing according to the instructions in Step 2.

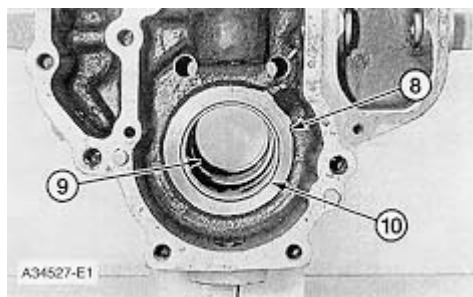


- Install O-ring seal (5).



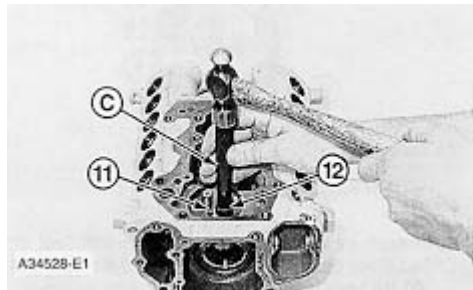
- Install the camshaft front bearing (7) with Tool (B). Install the bearing until it is 1.02 ± 0.51 mm ($.04 \pm .02$ in) from front surface (6) of the pump housing.

NOTE: Install a camshaft bearings with the bearing joint in area "X". This will put the oil hole in area "Y". For more complete illustration of bearing installation make reference to Specifications.



6. Install center bearing (9) with Tool (B) until the rear edge of the bearing is 127.00 ± 0.51 mm ($5.00 \pm .02$ in) from rear surface (8) of the pump housing.

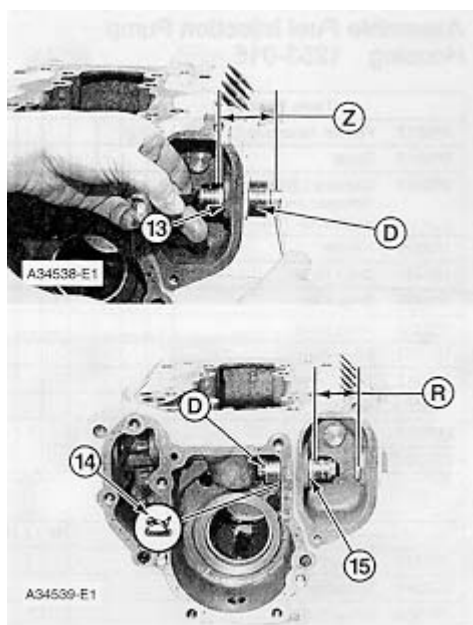
7. Install rear bearing (10) with Tool (B) until it is 4.83 ± 0.51 mm ($.19 \pm .02$ in) from rear surface (8).



8. Install the lower and upper bearings for the pinion gear assembly with Tool (C). Install the upper bearing until it is even with the top of the bearing bore and the bottom bearing until it is even with the bottom of the bearing bore.

9. Install shaft (11) in the pump housing until it is extended 16.76 ± 0.51 mm ($.66 \pm .02$ in) from the top of the pump housing. Install dowel (12) until it is extended 11.18 ± 0.51 mm ($.44 \pm .02$ in) from the top of the pump housing.

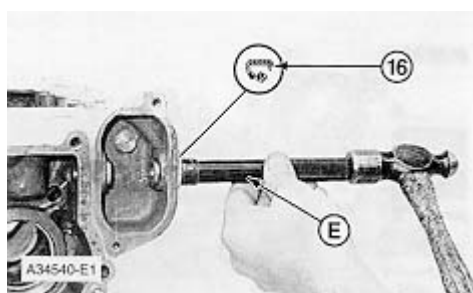
NOTE: Steps 10 thru 13 and Step 24 apply only to earlier fuel systems with fuel shutoff shaft in injection pump housing.



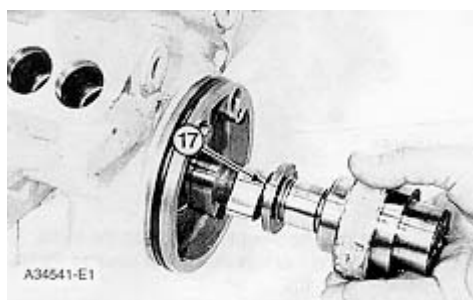
10. Install bearing (13) with Tool (D) until dimension "Z" is 38.23 ± 0.51 mm ($1.505 \pm .020$ in) Dimension "Z" is taken from the end of bearing (13) to the outside as shown.

11. Install seal (14) with Tool (D). Install the seal even with the surface of the housing and with the lip toward the outside as shown.

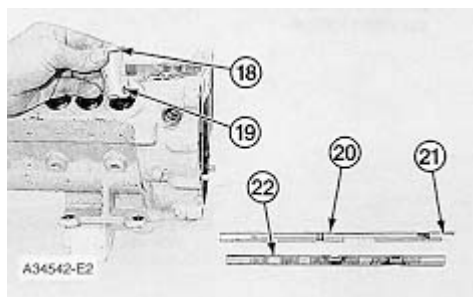
12. Install bearing (15) with Tool (D) until dimension "R" is 34.80 ± 0.51 mm ($1.370 \pm .020$ in). Dimension "R" is the distance between bearings.



13. Install seal (16) with Tool (E). Install the seal until it is even with the surface of the pump housing and with the lip toward the outside as shown.



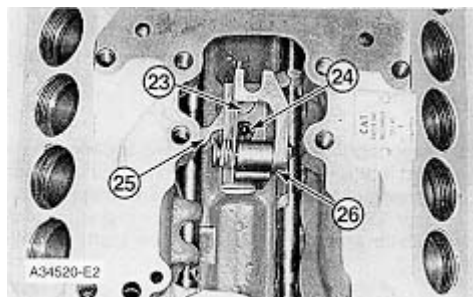
14. Put clean engine oil on the camshaft bearings and on camshaft (17). Install camshaft (17) as shown.



15. Put clean engine oil on lifters (19). Install lifters (19) and spacers (18) for each of the injection pumps. Be sure the lifters and spacers are put in their original location in the pump housing.

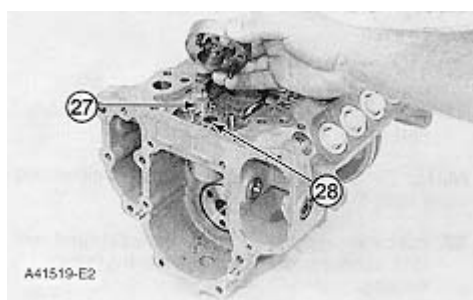
16. Put clean engine oil on fuel racks (20) and (22). Install left rack (22) in the pump housing with the groove in the rack engaged with the tab of the rack bearing. Install right rack (20) with the groove in the rack engaged with the tab of the rack bearing.

NOTE: The right rack has a notch (21) cut into the rear end of the rack:

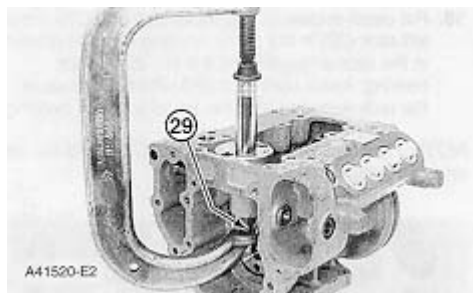


17. Install dowel (23) in the pump housing until it is extended $12.2 \pm 0.5 \text{ mm}$ ($.48 \pm .02$) from the surface of the pump housing.

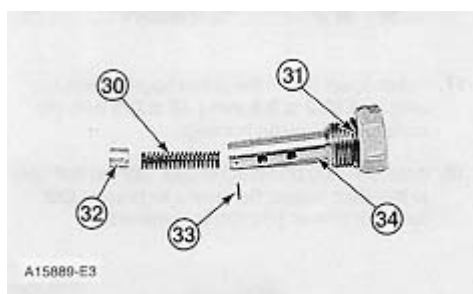
18. Install link (25) and bracket (26). Tighten bolt (24) to standard torque. Be careful so bracket (26) does not turn as bolt (24) is tightened.



19. Install idler gear (27) on the shaft. Put drive gear (28) in position with the bevel side of the gear down. Make sure the teeth of the idler gear and drive gear are in alignment and install the pump cover.



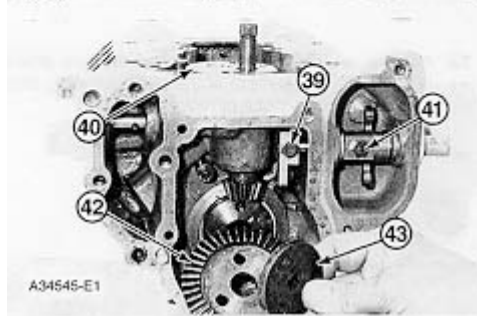
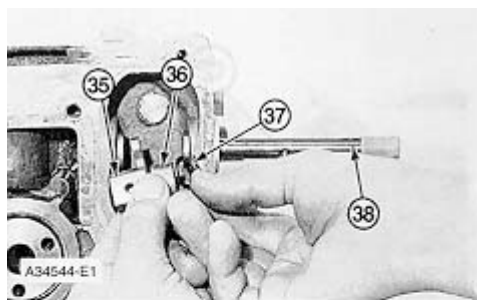
20. Install pinion gear (29) in the pump housing. Use an 11/16 socket and a "C" clamp with a minimum opening of **22.9 cm (9 inches)** and install pinion gear (29) until the pump drive makes contact with the shoulder of the pinion gear shaft.



21. Install spring (30) and piston (32) in valve body (34). Install pin (33). Install seal (31).

NOTE: Pin (33) must not extend out from either side of valve body (34).

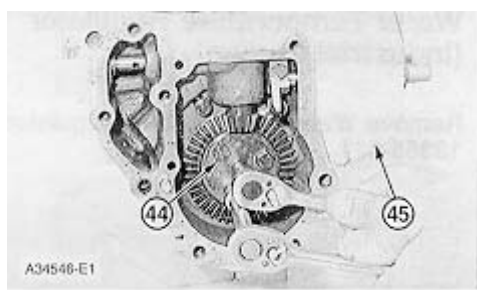
22. Put clean engine oil on valve body (34) and seal (31). Install the oil bypass valve in the pump housing.



23. Remove pump cover (40) and clean the metal clips from the fuel injection pump housing. Install pump cover (40).

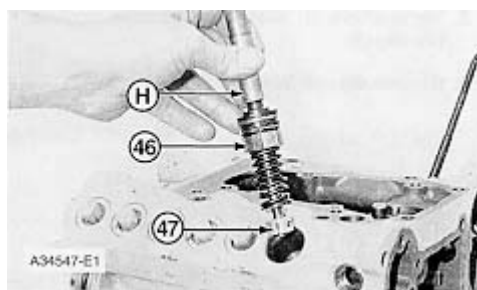
24. Put lever (35) bearing and spring washer (37) into position in the pump housing. Install shaft (38). Install lever (39). Install bolts (41).

25. Put gear (42) and retainer (43) into position in the pump housing. Install bolts (44) and tighten them to standard torque.

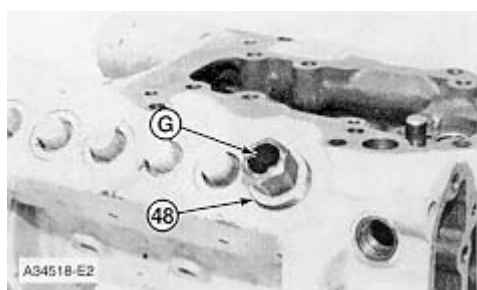


26. Install cover (45).

27. Install Tool (F) in the injection pump housing with the flat end down. Use a punch or a screwdriver to push the rack into housing. At the same time, push down on Tool (F) until it engages in slot (groove) in the rack. The rack is now centered (in the zero position) and the fuel injection pump can be installed.



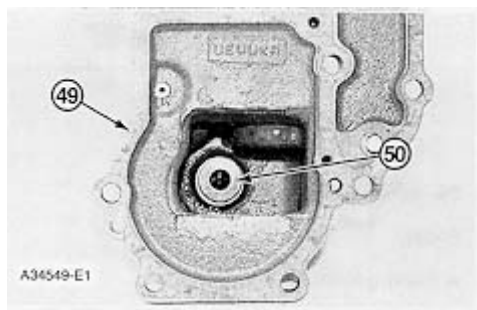
28. Put the space in gear segment (47) alignment with the groove in pump barrel (46). Put the injection pump straight down into the housing bore with the space in gear segment (47) engaged with the pin in the lifter and the groove in barrel (36) engaged with the dowel in the pump housing. Use Tool (H) to install the pumps.



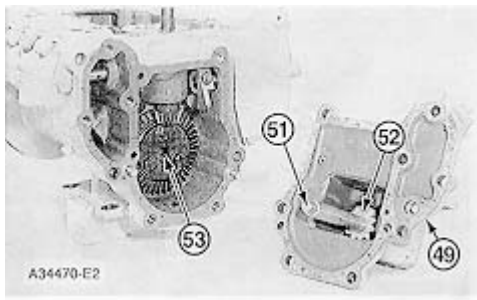
29. Install bushing (48) in the pump housing bore. If the injection pump is in the correct position, bushing (48) will turn into the threads of the pump housing with the fingers until it is even with the housing.

30. Tighten bushings (48) to $205 \pm 14 \text{ N}\cdot\text{m}$ ($150 \pm 10 \text{ lb ft}$) with Tool (G). Install the felt washer for each injection pump. For more detail see Install Fuel Injection Pumps.

31. Check the rack movement (travel) with Tool (K) after each pump is installed. See Injection Pump Installation in Testing and Adjusting.

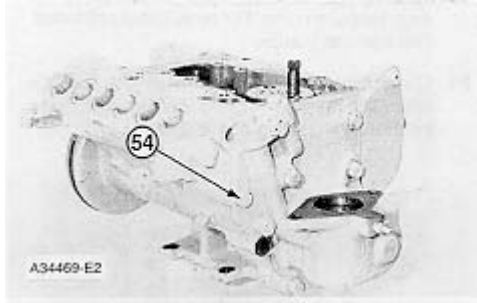


32. Install bearing (50) in rear cover (49) with Tool (J).



33. Heat gear (52) to a maximum temperature of **232°C (450°F)**. Install the gear on shaft (51) until it makes contact with the shoulder of the shaft.

34. Put rear cover (49) into position on the pump housing with shaft (51) in alignment with hole (53).



35. Install bolts (54).

End By:

a. install governor

b. install fuel injection pump housing and governor

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