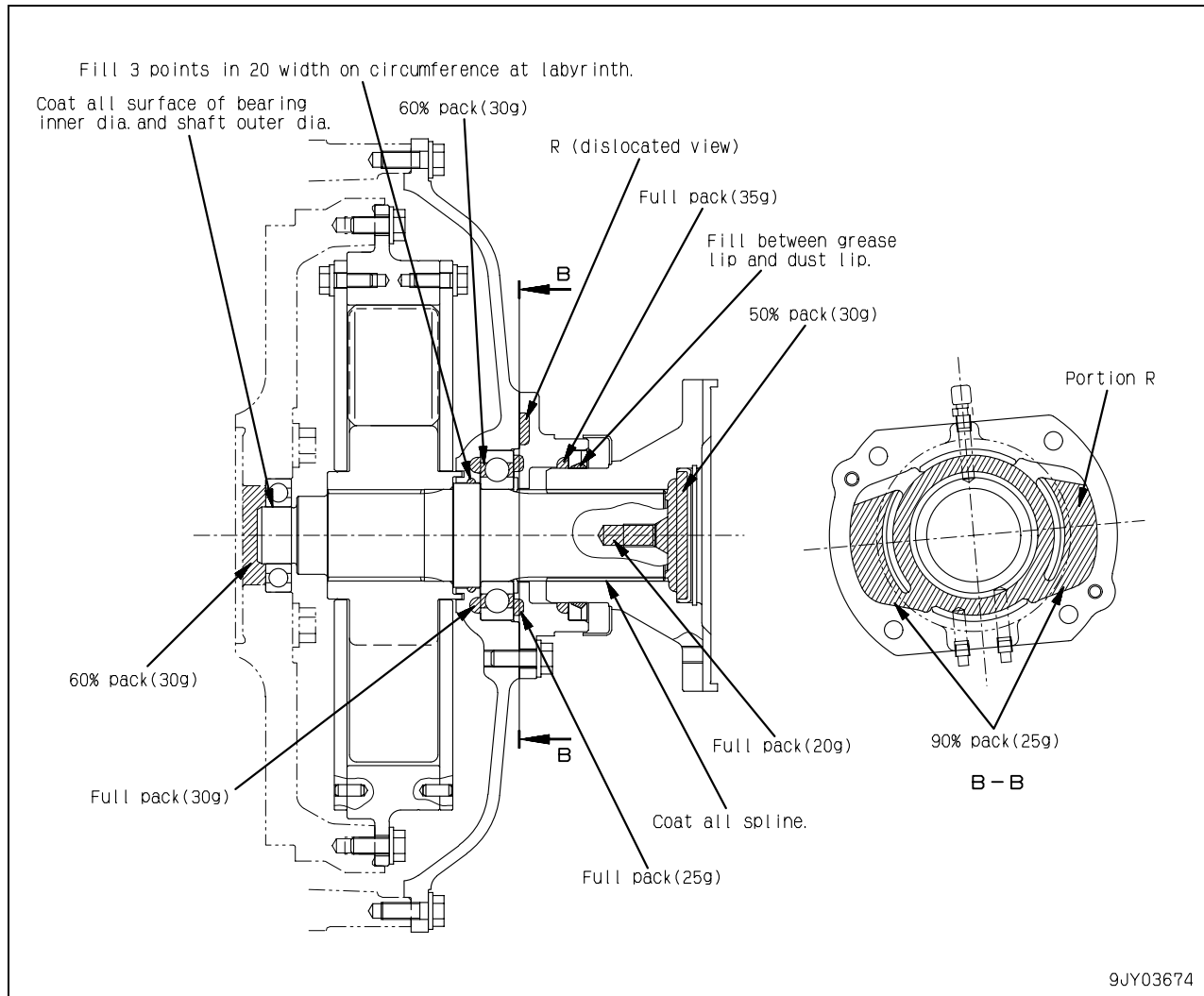


- Procedure for filling ENS grease
 - 1) Part No. of ENS grease: **427-12-11871**
 - 2) Parts to be filled with ENS grease and quantity of ENS grease to be supplied
(Total: Approx. 225 g)



Removal and installation of fuel supply pump assembly

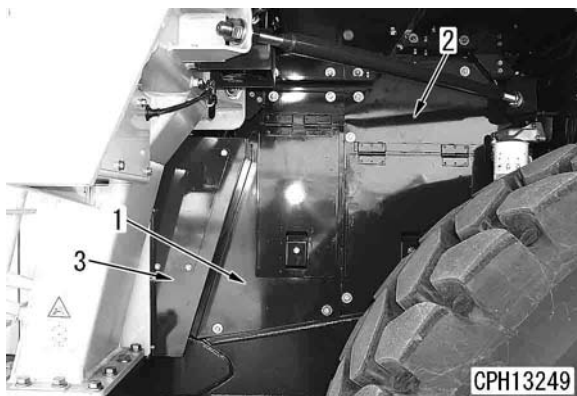
Special tools

Symbol		Part No.	Part name	Necessity	Q'ty	New/Remodel	Sketch
A	1	795-630-5500	Standard puller	■	1		
	2	01010-81090	Bolt	■	2		
	3	01643-31032	Washer	■	2		

Removal

⚠ Disconnect the cable from the negative (–) terminal of the battery.

1. Remove engine side covers (1) – (3).



2. Remove corrosion resistor (4) and fuel filter (5).



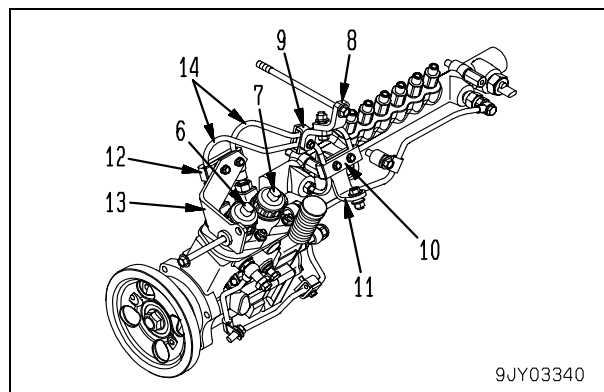
3. Disconnect connectors PCV1 (6) and PCV2 (7).

★ Remove the 2 scatter prevention covers from the high pressure pipe sleeve nuts first.

4. Remove the stay and clamps (8) – (13).

5. Remove 2 high pressure pipes (14).

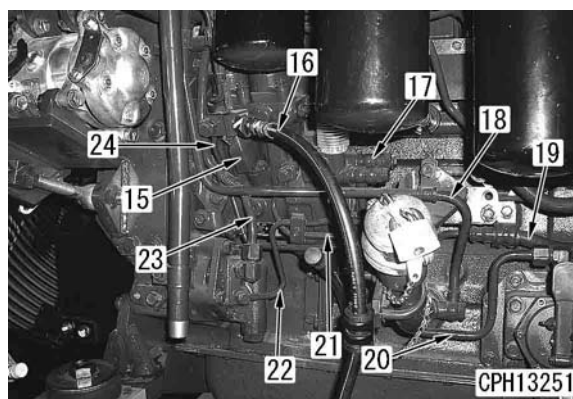
★ Remove the 2 scatter prevention covers from the common rail side of the high-pressure pipes first.



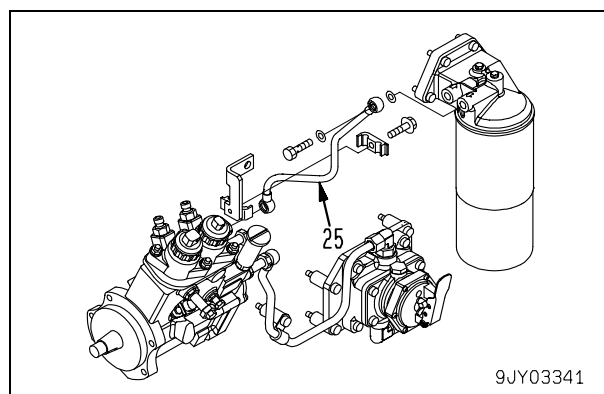
6. Disconnect connector G (15).

7. Disconnect fuel hose (16).

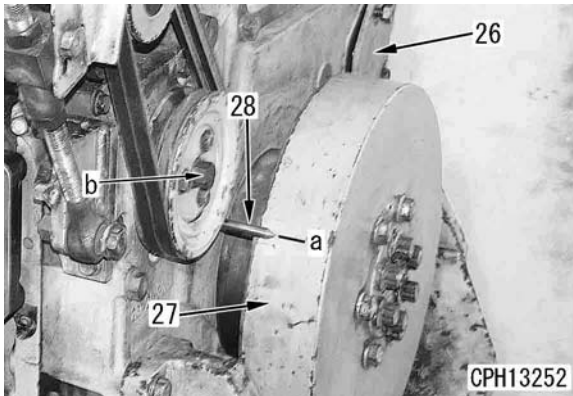
8. Disconnect tubes (17) – (24). [*1]



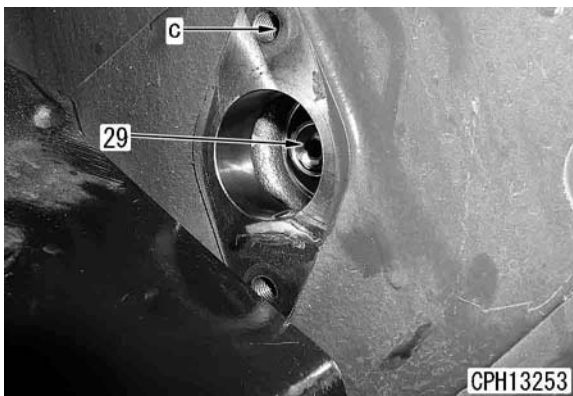
9. Remove tube (25). [*2]



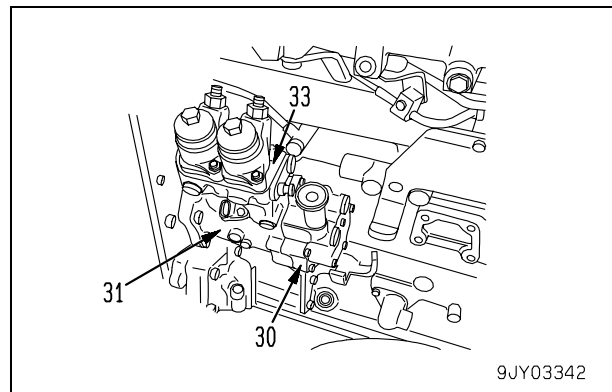
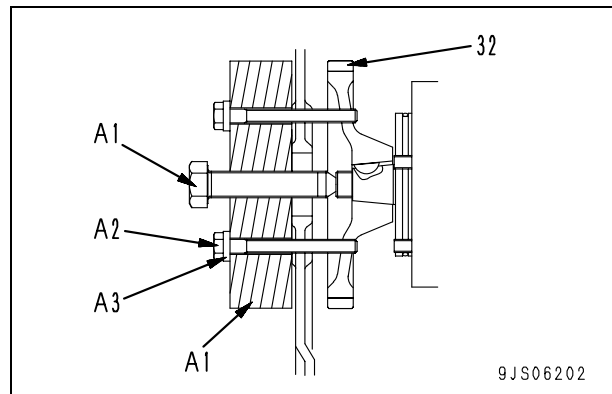
10. Remove cover (26).
11. Rotate the crankshaft forward and set intermediate point (a) between the stamps of "2/5TOP" and "3/4TOP" on damper (27) to pointer (28).
 - ★ Rotate the crankshaft with hexagonal part (b) at the end of the water pump drive shaft.
 - ★ At this time, check that the forcing tap of the drive gear is set to bolt hole (c) at the top of cover (29). (If not, rotate the crankshaft 1 more turn.)
 - ★ At this position, the key of the pump shaft is rotated clockwise 15° from the top.



12. Remove mounting nut (29). [*3]
 - ★ Take care not to drop the nut in the gear case.

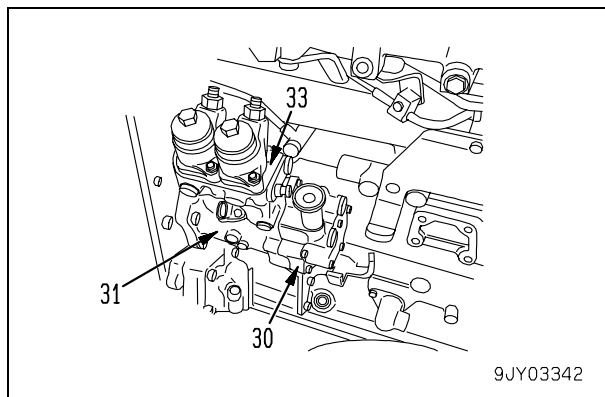
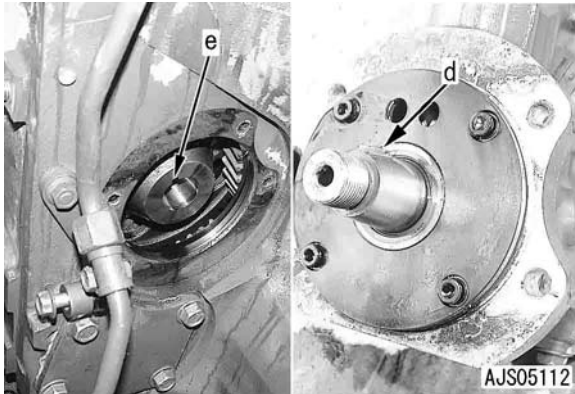


13. Remove bracket (30) and loosen 4 mounting bolts (31).
14. Set tools **A1**, **A2** and **A3** to drive shaft (32) and tighten the center bolt of tool **A1** to remove drive gear (32) from the shaft.
15. Remove mounting bolts (31) and fuel supply pump assembly (33).
 - ★ If tools **A1**, **A2** and **A3** are removed, drive gear (32) falls. Accordingly, keep those tools installed until the fuel supply pump assembly is installed.



Installation

1. Set fuel supply pump assembly (33).
 - ★ Before setting, check that key (d) of the shaft is matched to key way (e) of the drive gear.
2. Finger tighten 4 mounting bolts (31) and bracket (30).
 - 🔧 Mounting bolt: **Adhesive (LT-2)**



High-pressure pipe

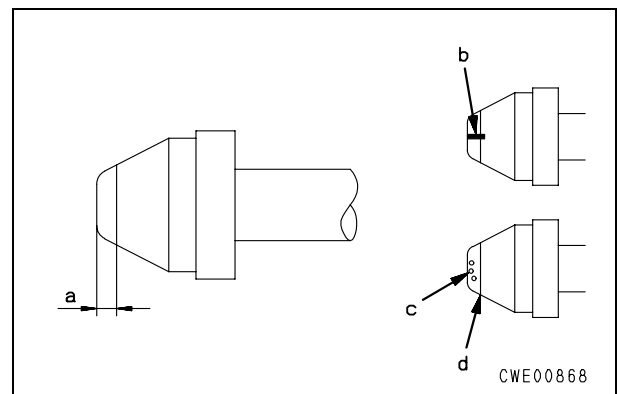
⚠ When handling the high-pressure pipe and clamp, observe the following.

- Do not bend the high-pressure pipe to collect before installing or use it for another section.
- Install the specified clamp to the specified position securely.
- Do not apply lubricant to the high-pressure pipe sleeve nut and the threads of the mating part.

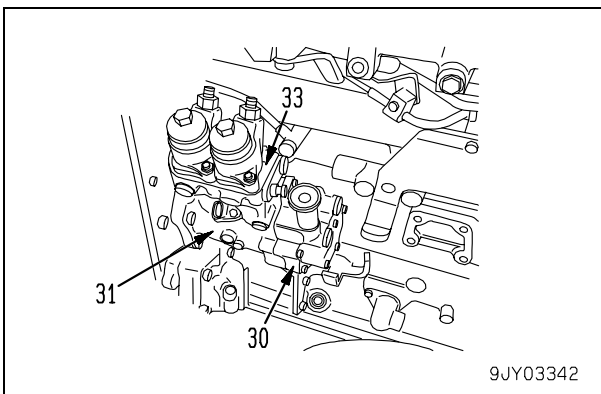
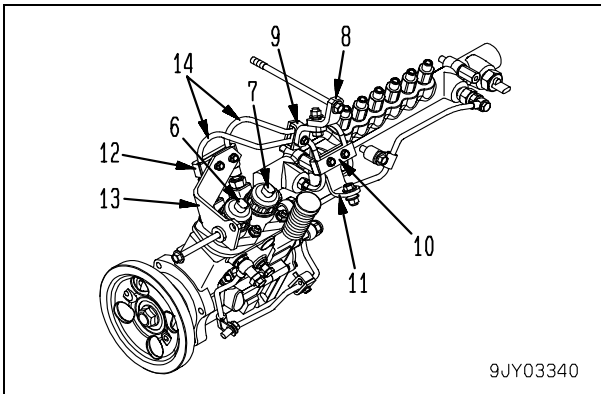
★ If lubricant is applied, the axial tension is increased too much and the high-pressure pipe may be broken when the sleeve nut is tightened.

⚠ Before installing the high-pressure pipe, check it. If it has any defect, replace it since fuel may leak.

- Check the taper seal of the connecting part (Part (a): Part of 2 mm from the end) for visible lengthwise slit (b) and dent (c).
- Check part (d) (End of the taper seal: Part at 2 mm from the end) for stepped-type wear (fatigue) which your nail can feel.



3. Finger tighten high-pressure pipe (14) first and then tighten it to the following torque.
 - ☞ Sleeve nut (Common rail side):
39.2 – 58.8 Nm {4 – 6 kgm}
 - ☞ Sleeve nut (Supply pump side):
39.2 – 49 Nm {4 – 5 kgm}
4. Tighten 4 mounting bolts (31) permanently.
5. Tighten bracket (30) permanently.
 - ☞ Mounting bolt:
19.6 – 29.4 Nm {2.0 – 3.0 kgm}
6. Tighten clamps (10), (9) and (12) and stays (1), (8) and (13).
7. Tighten clamps (10), (9) and (12) permanently.
 - ★ Tighten clamps (10), (9) and (12) in order.
 - ☞ Clamp bolt: **9.8 ± 1.0 Nm {1 ± 0.1 kgm}**
8. Tighten stays (11), (8) and (13) permanently.
 - ★ Tighten stays (11), (8) and (13) in order.
 - ★ Set the notch of the scatter prevention cover on the supply pump toward the block and set that on the common rail side down.



9. Carry out the following installation in the reverse order to removal.

[*1]

- ☞ Joint bolt of fuel tubes (17) and (19):
14.8 – 19.6 Nm {1.5 – 2.0 kgm}
(Supply pump side)
- ☞ Sleeve nut: **43 – 47 Nm {4.4 – 4.8 kgm}**
- ☞ Joint bolt of tube (21) (Supply pump side): **7.9 – 12.7 Nm {0.8 – 1.3 kgm}**
- ☞ Sleeve nut of oil tube (23):
43 – 47 Nm {4.4 – 4.8 kgm}
- ☞ Joint bolt fuel tube (24):
17.7 – 22.6 Nm {1.8 – 2.3 kgm}
(Common rail side)

[*2]

- ☞ Joint bolt of fuel tube (25):
24.5 – 34.3 Nm {2.5 – 3.5 kgm}
(Filter side)
- ☞ Joint bolt of fuel tube (25):
14.8 – 19.6 Nm {1.5 – 2.0 kgm}
(Supply pump side)

[*3]

- ☞ Nut: **176 – 196 Nm {18 – 20 kgm}**

⚠ Check that each high-pressure pipe is at least 10 mm apart from the wiring harness around it. If not, adjust the wiring harness to secure a clearance of 10 mm.

- **Bleeding air**

Bleed air from the fuel circuit. For details, see Testing and adjusting, "Bleeding air from fuel circuit".

Removal and installation of cylinder head assembly

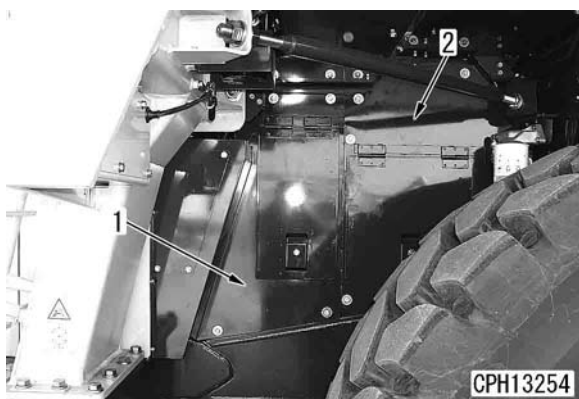
Special tools

Sym- bol	Part No.	Part name	Necessity	Q'ty	New/Remodel	Sketch
A 2	790-331-1120	Wrench	●	1		

Removal

- ⚠ Stop the machine on a level ground and lock the tires with chocks.
- ⚠ Disconnect the cable from the negative (-) terminal of the battery.

1. Remove engine left side covers (1) and (2).



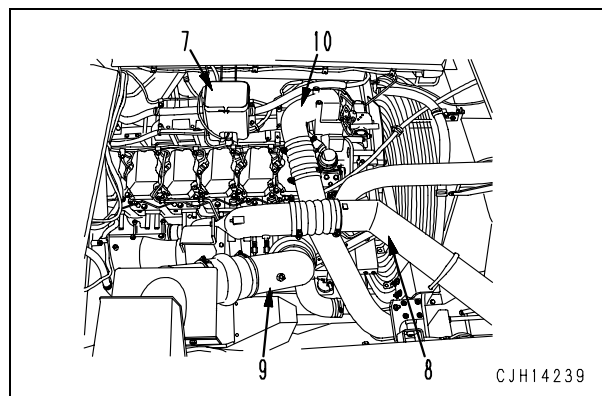
2. Remove cover (3).



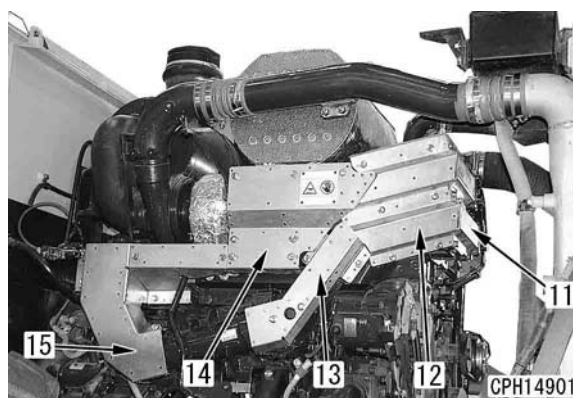
3. Remove engine right side covers (4) – (6).



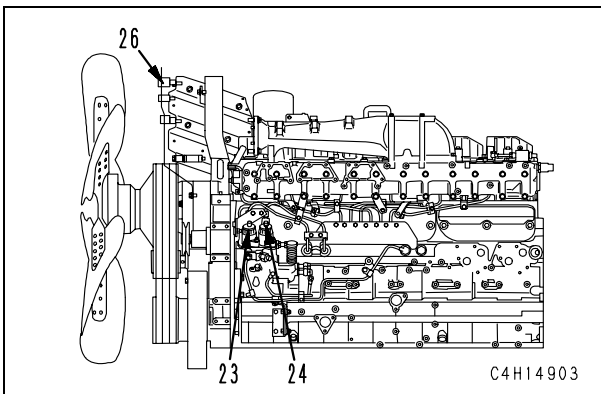
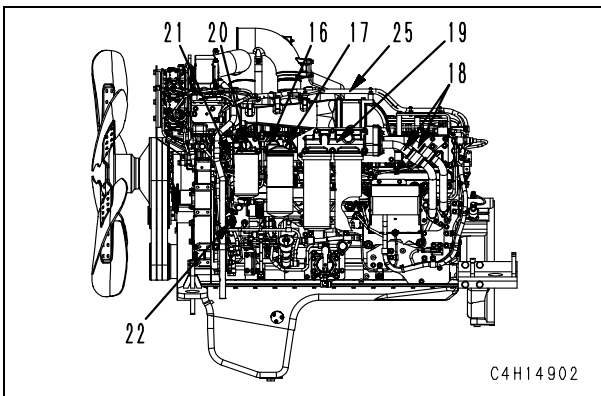
4. Open engine hood.
5. Remove washer tank (7).
6. Remove tube (8) – (10). [*1]



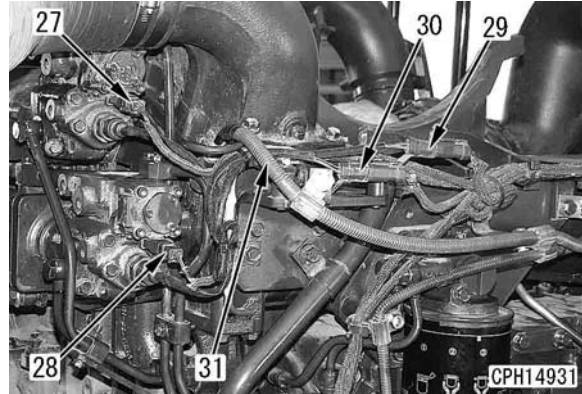
7. Remove EGR covers (11), (12), (13), (14) and (15).



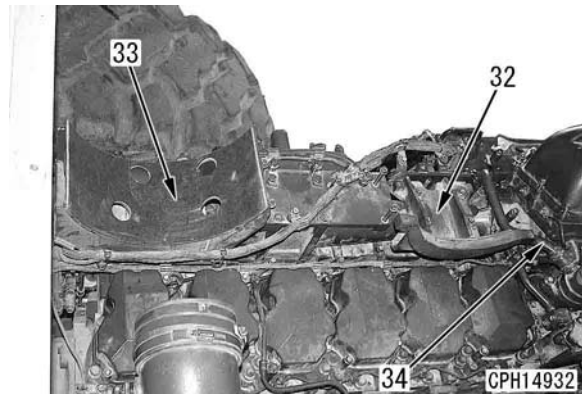
8. Remove fuel tubes (16). [*2]
9. Remove fuel filter head assembly (17).
10. Remove oil tube (18).
★ To avoid installation error, mark the top, bottom, inlet and outlet side of this tube.
11. Remove oil filter head assembly (19).
12. Remove 2 tubes (20) and remove corrosion resistor head assembly (21). [*3]
13. Disconnect connectors PCV1 (23), PCV2 (24) and G (22) and remove the wiring harness clamp.
14. Remove all the clamps of wiring harness (25) above the engine and move the wiring harness.
15. Remove plate (26).



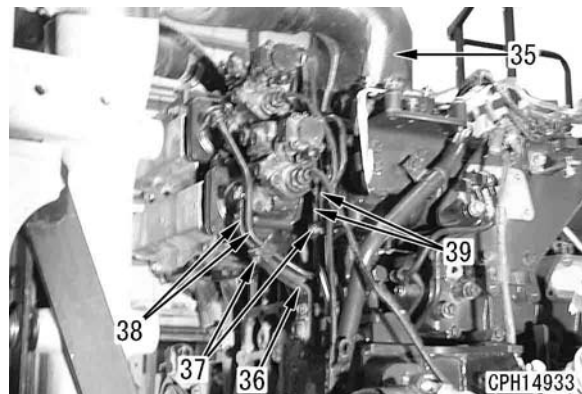
16. Disconnect EGR valve connectors SBP (27), BP (28), SEGR (29) and EGR (30) and remove the wiring harness clamp.
17. Disconnect electrical intake air heater wiring harness (31) and remove the wiring harness clamp.



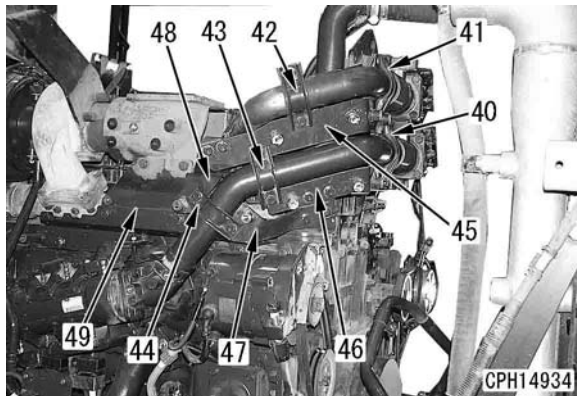
18. Remove muffler bracket (32).
19. Remove air cleaner bracket (33).
20. Remove blow-by breather (34).



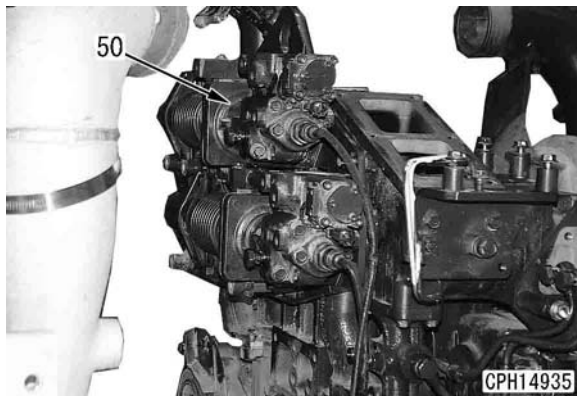
21. Remove air connector (35) and electrical intake air heater.
22. Remove bracket (36), clamps (37) and EGR tubes (38) and (39). [*4]



23. Remove clamps (40), (41), (42), (43) and (44) and brackets (45), (46), (47), (48) and (49).



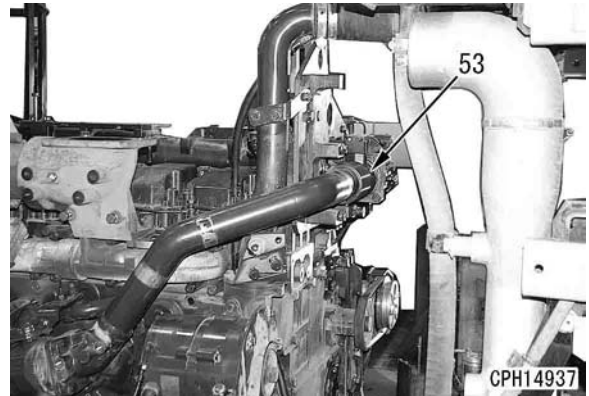
24. Remove upper bypass valve assembly (50) and tube together. [*5]



25. Remove tubes (51) and (52).

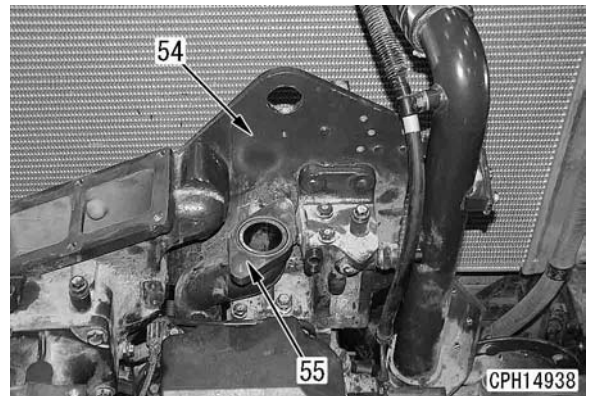


26. Remove lower bypass valve assembly (53) and tube together. [*6]

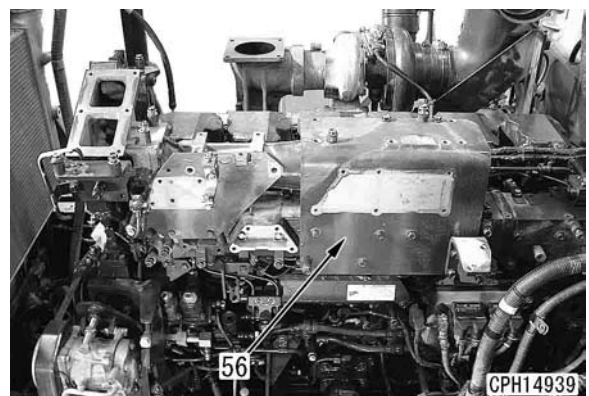


27. Remove bypass valve assembly mounting plate (54).

28. Remove blow-by tube (55).



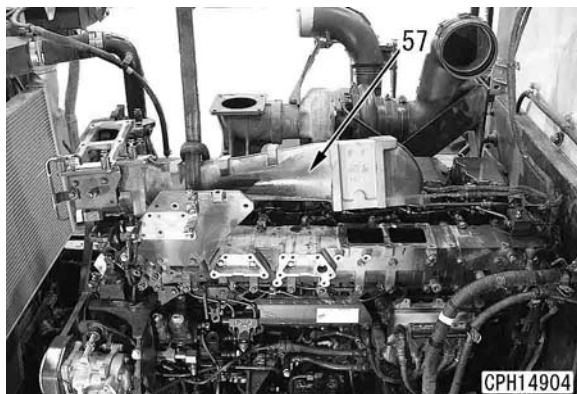
29. Remove oil filter assembly mounting bracket (56).



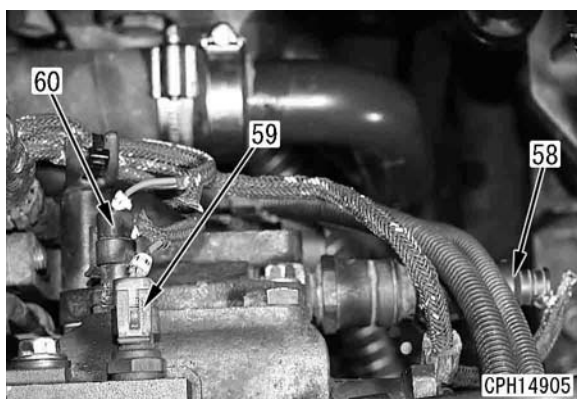
30. Lift off air intake connector assembly (57) and joint housing together.



Air intake connector assembly: **35 kg**

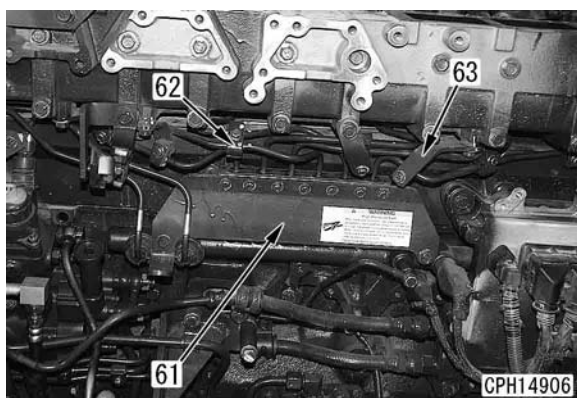


31. Disconnect connectors TIM (58), PIM (59) and TFUEL (60).



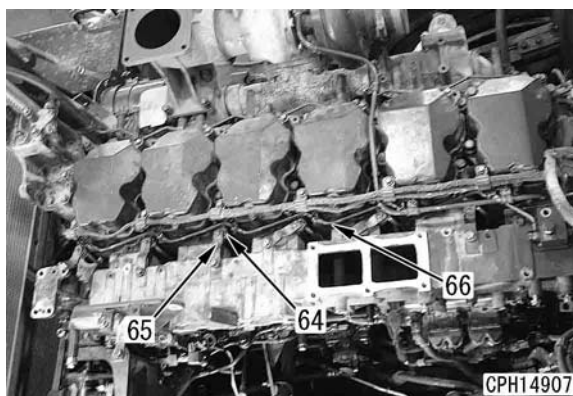
32. Remove bracket (61).

33. Remove 10 high-pressure pipe clamps (62) and 7 brackets (63). [*7]

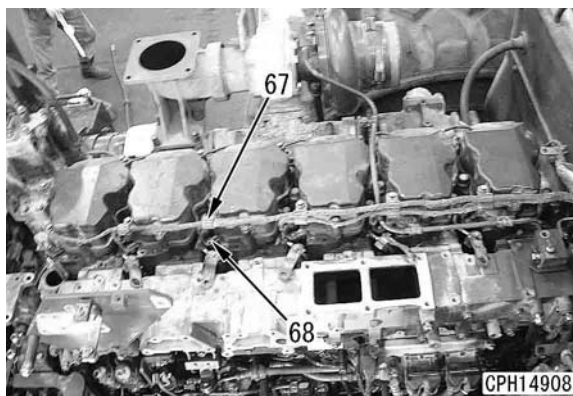


34. Remove 6 high-pressure pipe clamps (64) and remove brackets (65). [*8]

35. Remove spill pipe (66). [*9]



36. Remove 6 wiring harness clamps (67) and disconnect 6 injector connectors (68) and move them toward the hydraulic tank.



- ★ Insert flat-head screwdriver [3] in shoulder (a). While pressing stopper (b), move the screwdriver in direction (X), and connector (c) is disconnected. (d): Fuel injector wiring side

