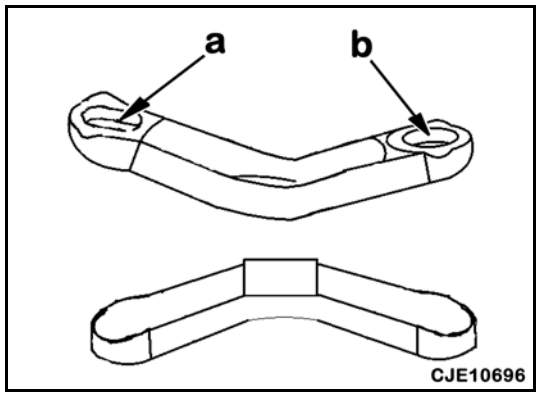
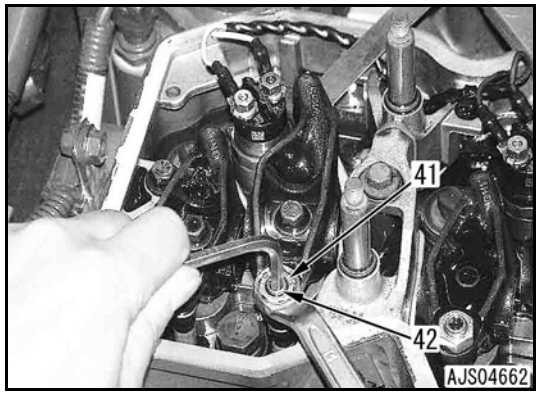
5. Crosshead and rocker arm

A. Install the crosshead and rocker arm.

★ The shapes of holes (a) and (b) of each crosshead are different. When reusing the crossheads, install each of them to the same intake/exhaust valve in the same direction as it has been installed.



★ Before tightening the mounting bolts, check that the ball of adjustment screw (42) is set in the push rod socket securely.



Rocker arm mounting bolt: 36 ±5 N•m (27 ±4 lbf ft)

B. Adjust the valve clearance. For details, see *ENGINE COMPONENTS: Valve Clearance* in the *Testing and Adjusting* section.

Locknut (41): 20 – 28 N•m (15 – 21 lbf ft)

★ Carry out the following installation in the reverse order of removal.

[*1]

Tube mounting band: 7 ±1 N•m (62 ±9 lbf in)

[*2]

Air intake connector mounting bolt: 24 ±4 N•m (18 ±3 lbf ft)

[*3]

Fuel filter bracket mounting bolt: 24 ±4 N•m (18 ±3 lbf ft)

[*4]

WARNING! Install each high-pressure pipe and wiring harness at least 10 mm (0.394 in) from each other.

[*5]

Mounting bolt of high-pressure pipe clamp bracket: 24 ±4 N•m (18 ±3 lbf ft)

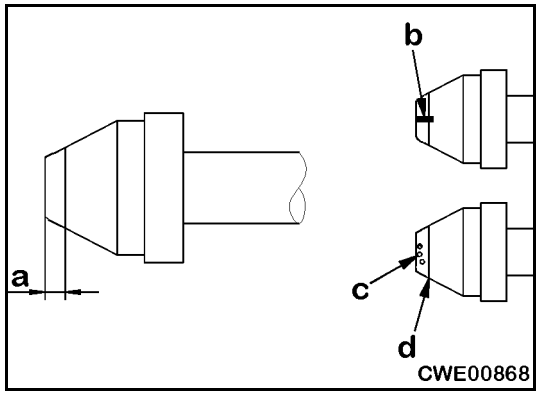
[*6] [*7]

High-pressure pipe

WARNING! Do not bend the high-pressure pipe to correct it before installation.

WARNING! Be sure to use the genuine high-pressure pipe clamps and observe the tightening torque.

★ When installing each high-pressure pipe, check the taper seal of its joint (part (a): part of 2 mm from the end) for visible lengthwise slit (b) and spot (c).
★ Check part (d) (end of taper seal: part at 2 mm from the end) for stepped-type wear caused by fatigue which you can feel with your nail.
★ If there is any of these defects, it can cause fuel leakage. In this case, replace the high-pressure pipe.



1. Temporarily install high-pressure pipes (58) – (63) between common rail (19) and the cylinder head.

Sleeve nut: 0.2 – 0.8 N•m (2 – 7 lbf in)

2. Tighten high-pressure pipes (58) – (63) in the following order.

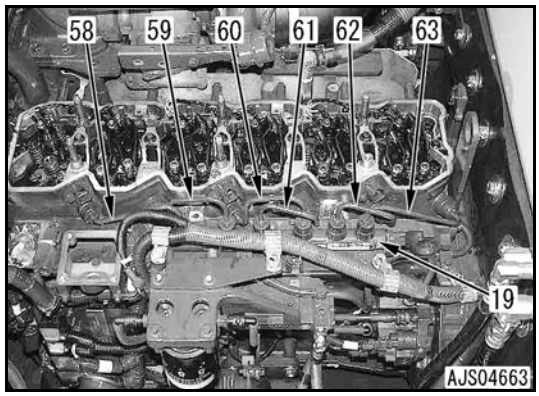
Sleeve nut: 35 ±3.5 N•m (26 ±3 lbf ft)

A. Tighten head side of high-pressure pipes (58) and (63).

B. Tighten common rail side of high-pressure pipes (63) and (58).

C. Tighten head side of high-pressure pipes (59), (60), (61), and (62) in this order.

D. Tighten common rail side of high-pressure pipes (59), (60), (61), and (62) in this order.



3. Install the high-pressure pipes between the common rail and fuel supply pump according to the following procedure.

A. Use your fingers to tighten the sleeve nuts on the fuel supply pump side and common rail side.

B. Tighten the sleeve nut on the fuel supply pump side first and then that on the common rail side.

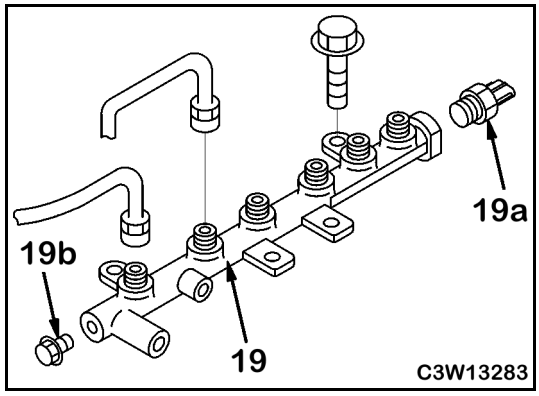
Sleeve nut: 35 ±3.5 N•m (26 ±3 lbf ft)

4. Install the bellows to each high-pressure pipe.
   - Install each bellows with the slits out and down.
   - ★ The bellows are installed so that fuel does not spout over the hot parts of the engine and catch fire if it leaks.

[*8]

Fuel pressure sensor and relief valve

1. Replace fuel pressure sensor (19a), if necessary, according to the following procedure.
   - ★ Do not remove fuel pressure sensor (19a) from common rail (19) for purposes other than replacement.
   - ★ Once the fuel pressure sensor is removed from the common rail, be sure to replace it.



   A. Before removing the fuel pressure sensor, remove mud and dirt from around it and clean it.

   B. Remove the fuel pressure sensor.

   C. Check the fuel pressure sensor connector for cracks, breakage, damage of the seal, foreign matter on the pin, corrosion, bending, and breakage of the pin.

   D. Install a new fuel pressure sensor.

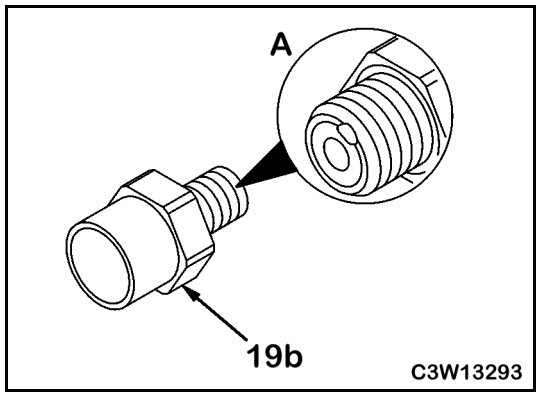
Threaded part of fuel pressure sensor: Gear oil (#90)

Fuel pressure sensor: 70 ±5 N•m (52 ±4 lbf ft)

   E. Connect the engine wiring harness. At this time, be careful not to connect the wiring harness in reverse.

   F. Start the engine and check that fuel does not leak.
      - ★ For the testing procedure, see *FUEL SYSTEM: Testing Leakage in Fuel System* in the *Testing and Adjusting* section.

2. Replace relief valve (19b), if necessary, according to the following procedure.
   - ★ Before removing the relief valve, remove mud and dirt from around it and clean it.



   A. Remove the relief valve.

   B. If the leakage from the relief valve exceeds the specified value, do not reuse it.

   C. Check that high-pressure seal surfaces (A) of the relief valve and rail are free from damage.

D. Install the relief valve.

Threaded part of relief valve: Gear oil (#90)

Relief valve: 100 ±4 N•m (74 ±3 lbf ft)

★ Excessive tightening can cause leakage. Be careful not to tighten too strongly.

E. Start the engine and check that fuel does not leak.

★ For the testing procedure, see *FUEL SYSTEM: Testing Leakage in Fuel System* in the *Testing and Adjusting* section.

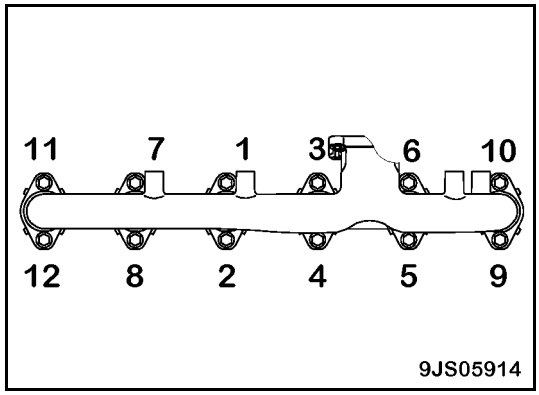
[*9]

Tube mounting band: 7 ±1 N•m (62 ±9 lbf in)

[*10]

★ Tighten the mounting bolts in the order shown below.

Exhaust manifold mounting bolts:
1st time: Tighten all the bolts to 24 ±4 N•m (18 ±3 lbf ft) in the order of [1] to [12].
2nd time: Tighten all the bolts to 53 ±5 N•m (39 ±4 lbf ft) in the order of [1] to [12].
3rd time: Tighten only bolts [1] – [4] to 53 ±5 N•m (39 ±4 lbf ft) in the order of [1] to [4].



[*11]

Blow-by duct mounting bolt: 7 ±2 N•m (62 ±18 lbf in)

[*12]

Head cover mounting nut: 24 ±4 N•m (18 ±3 lbf ft)

Refilling with Coolant

1. Add coolant through the coolant filler to the specified level.
2. Run the engine to circulate the coolant through the system.
3. Check the coolant level again.

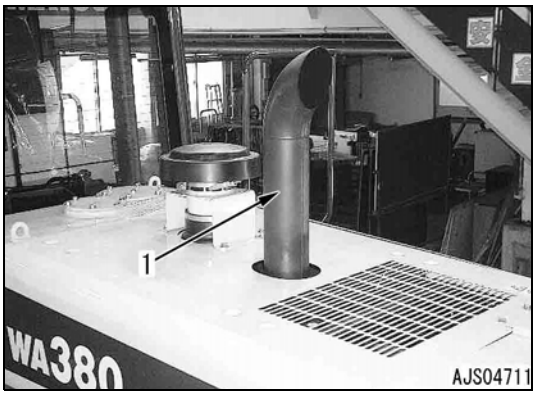
Coolant: Approximately 30.5 ℓ (8.1 gal)

Engine Hood

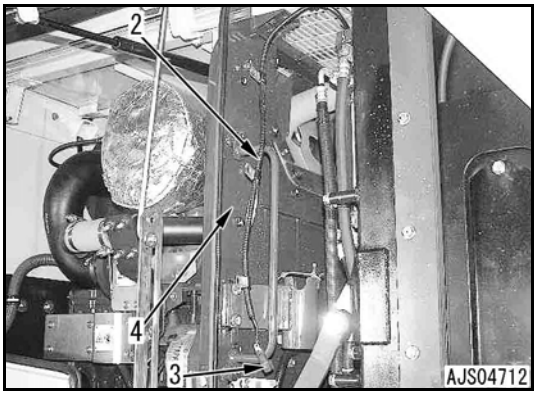
Removal

WARNING! Disconnect the cable from the negative (-) terminal of the battery.

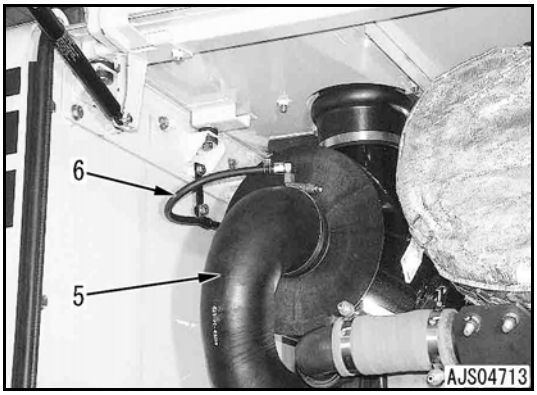
1. Remove exhaust pipe (1).



2. Unplug connector GR1 (3) of wiring (2).
3. Remove the three clamps and remove wiring (2) from divider board (4).
   ★ Remove wiring (2) and engine hood together.



4. Remove hose (5) between the air cleaner and turbocharger. **[*1]**



5. Remove hose (8) from oil filler of hydraulic oil tank.
6. Remove the clamp of hose (8) and wiring (6).
   ★ Unplug connector E33 (7). (KOMTRAX specification only)