

VALVE CLEARANCE CHECK AND ADJUSTMENT

NOTE

The valve clearance check and adjustment should be done when the engine is cold.

1. Remove the rocker cover.
2. Remove all the glow plugs.
3. Use the special tool to turn the crankshaft clockwise, and align the notch on the crankshaft pulley with timing mark "0" to set the No.1 cylinder or No.4 cylinder to the top dead centre of its compression stroke.

Caution

Never turn the crankshaft anticlockwise, or the tensioner for adjusting the timing chain tension at the timing gear can be damaged.

If it is turned anticlockwise, once remove the tensioner and reinstall.

NOTE

If the projection on the camshaft faces up, the No.1 cylinder is on the top dead centre of its compression stroke. When the crankshaft is turned just one more turn, the No.4 cylinder is at top dead centre.

4. When the No.1 or No.4 piston is on the top dead centre of its compression stroke, use a thickness gauge to measure the valve clearance indicated by the circle in the table below.

When the No.1 cylinder is at compression top dead centre:

Cylinder No.	1	2	3	4
Intake	○	○	-	-
Exhaust	○	-	○	-

When the No.4 cylinder is at compression top dead centre:

Cylinder No.	1	2	3	4
Intake	-	-	○	○
Exhaust	-	○	-	○

Standard value:

Intake side 0.1 mm

Exhaust side 0.15 mm

NOTE

If the thickness gauge is inserted and pulled out with resistance, its reading will be accurate.

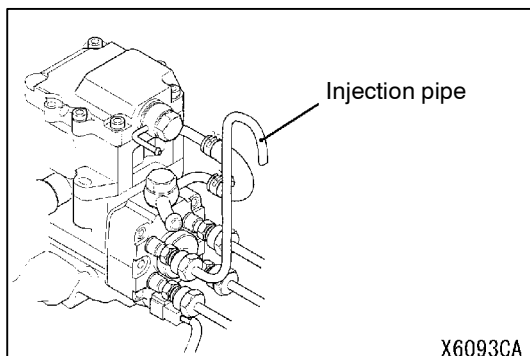
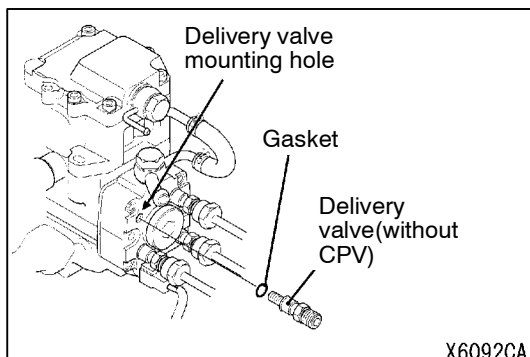
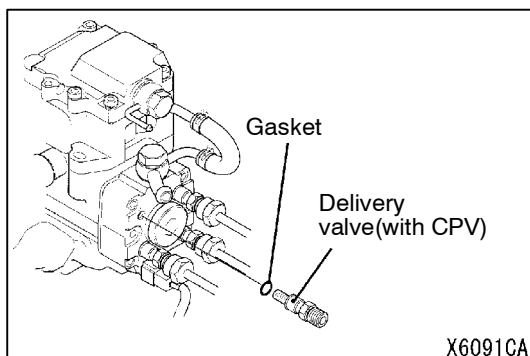
If the thickness gauge can be inserted and pulled out smoothly without resistance, its reading will be inaccurate.

5. If not at the standard value, adjust by the following procedure.
 - (1) Loosen the lock nut, and tighten the adjusting screw so that the thickness gauge can be passed with a slight drag.

- (2) After adjustment, tighten the lock nut to the specified torque while preventing the adjusting screw from turning with a screwdriver.

Tightening torque: 9.5 ± 0.5 N·m

- (3) Measure the valve clearance again, and check that it is at the standard value.



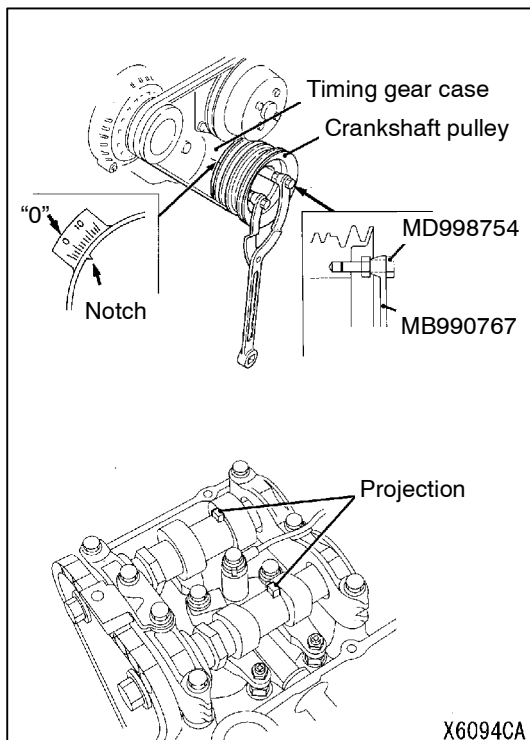
INJECTION TIMING CHECK AND ADJUSTMENT

1. Warm up the engine.
2. Remove all the glow plugs.
3. Remove the No.1 cylinder delivery valve (with CPV) and gasket of the injection pump.

4. Install the gasket (ME741133) and delivery valve (without: MH063483) to the injection pump delivery valve mounting hole, and tighten them to the specified torque.

Tightening torque: 49 ± 5 N·m

5. Install an old the auxiliary injection pipe to the delivery valve. Cut out the open end of the injection pipe, and bend it down so as to observe the fuel flow.



- Use the special tool to turn the crankshaft clockwise, align the notch on the crankshaft pulley with the "0" timing mark to set the No.1 cylinder to the top dead centre of its compression stroke.

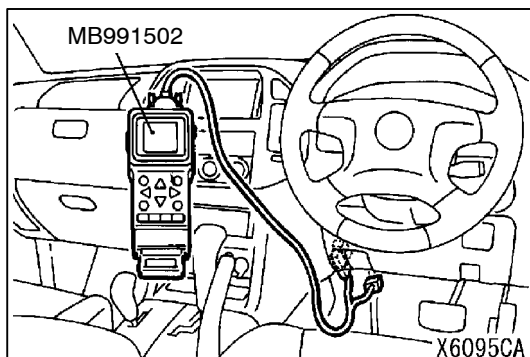
Caution

Never turn the crankshaft anticlockwise, or the tensioner for adjusting the timing chain tension at the timing gear can be damaged. If it is turned anticlockwise, once remove it and reinstall.

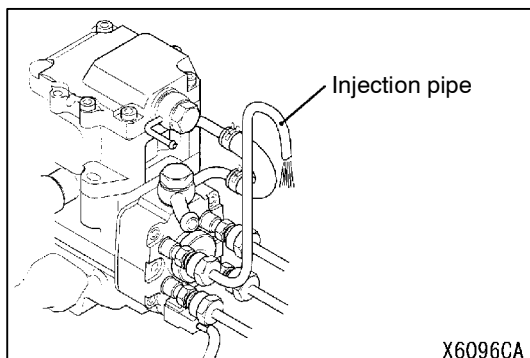
NOTE

Remove the filler cap, and check the camshaft condition. If the camshaft projection faces up, the No.1 cylinder is on top dead centre of its compression stroke.

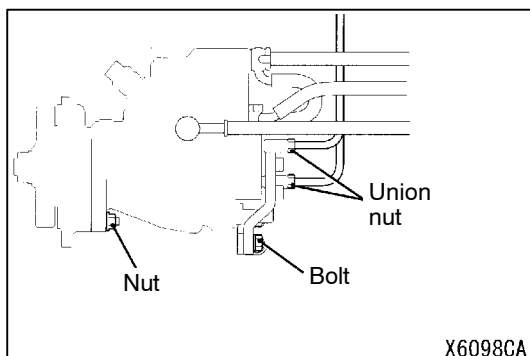
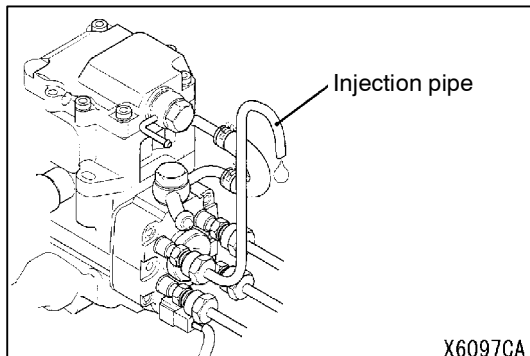
- Turn the crankshaft pulley clockwise, and set the No.1 cylinder to before top dead centre 30° of its compression stroke.



- Turn the ignition switch to "LOCK"(OFF), and connect the diagnosis connector to the MUT-II.
- Turn the ignition switch ON.
- Carry out the actuator test (No.34) on MUT-II.



- Supply the fuel by operating the fuel filler hand pump, and turn the engine clockwise while allowing the fuel to flow through the injection pipe.



12. If the fuel flow through the injection pipe decreases, turn the engine more slowly. Then stop turning the engine when the fuel flow stops completely. Check the fuel injection timing during this condition.

Standard value: 4° BTDC

13. If not at the standard value, adjust by the following procedure.

- (1) Loose the fuel injection pipe union nut, the injection pump securing bolt and nut in that order.

Caution

a. **When the union nut is loosened, use a open end wrench to prevent the delivery valve holder from rotating with it.**

b. **Do not remove the bolt and nut at this time.**

- (2) Tilt the injection pump housing to the left or the right to adjust.
- (3) Tilt the injection pump mounting nut and bolt temporarily.
- (4) Repeat steps 9 - 12 to check that the injection timing is correct.
- (5) Tilt the injection pump mounting nut and bolt securely.
- (6) Loose the fuel injection pipe union nut securely.

Caution

Hold the delivery pipe holder with a open end wrench when tightening the union nut.

14. Remove the special tool.
15. Install the delivery valve (with CPV) and the new gasket.
16. Install the glow plugs.