Document Title: **Valves, adjusting**	Function Group: **214**	Information Type: **Service Information**	Date: **2014/8/15**
Profile: **EXC, EC240C LR [GB]**			

Valves, adjusting

Op nbr 214-012

9998681 Rotation tool
885812 Timing tool

WARNING

Risk of burns - stop the diesel engine and allow it to cool down before starting any work.

1. Place the machine in service position B. See 091 Service positions
2. Open the engine hood.
3. Remove turbocharger inlet hose (1).

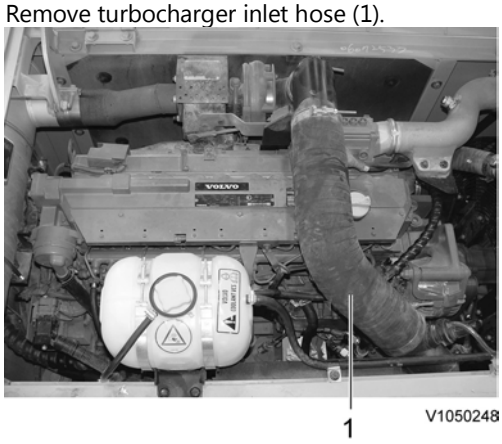

Figure 1

4. Remove dipstick gauge pipe mounting bracket (1).

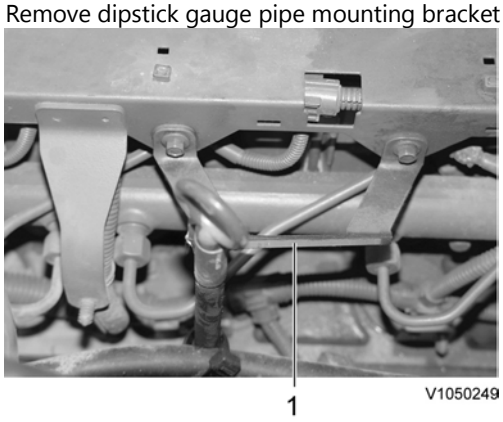

Figure 2

5. Remove crankcase ventilation duct (1).

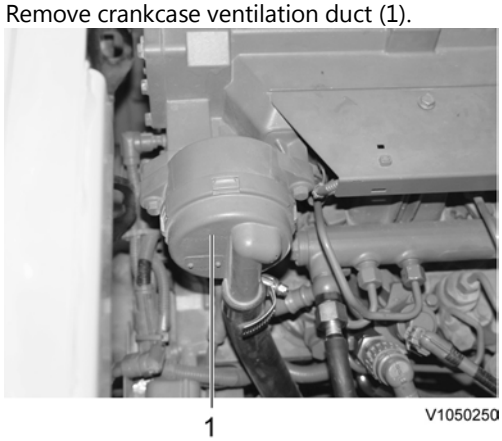

Figure 3

6. Remove cable bracket (1).

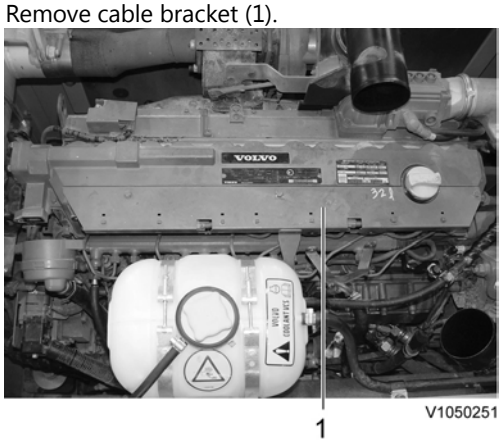

Figure 4

7. Remove engine intake sensor cover (1).

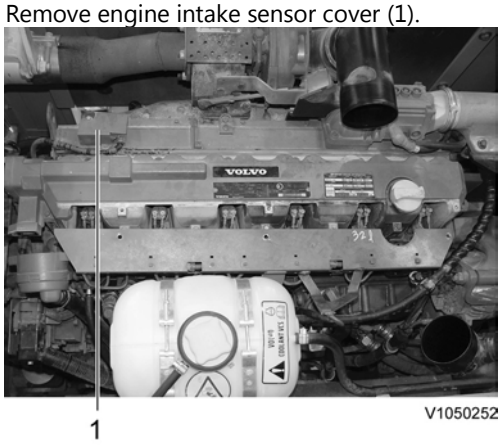

Figure 5

8. Disconnect engine intake sensor (1) and preheating coil terminal (2).

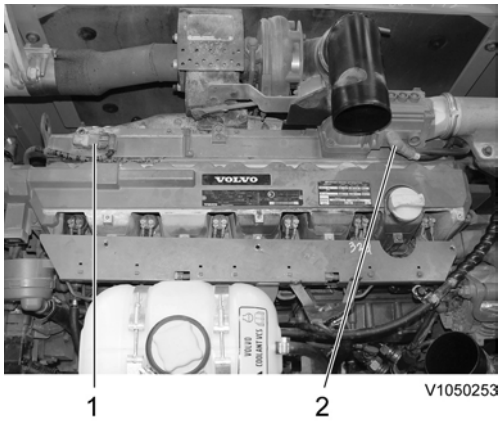

Figure 6

9. Remove dust seal (1) and then remove rocker arm cover (2).

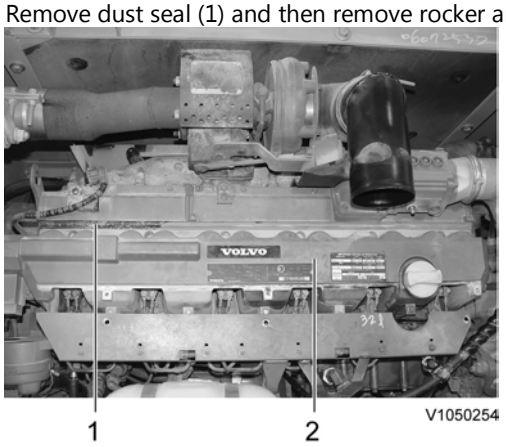

Figure 7

10. Open the side door on the right side of the machine.

11. Remove screws and put away two covers.

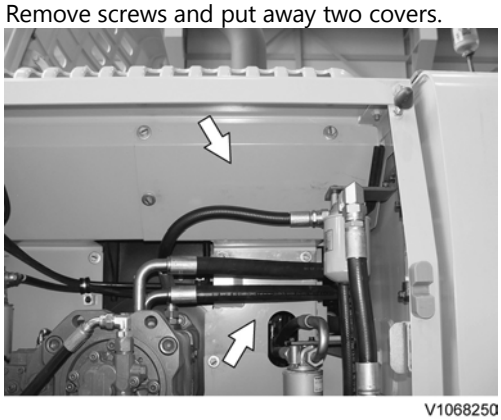

Figure 8

12. Remove the camshaft gear cover (1) and install turning gear (2).
    NOTE!
    The teeth of the turning gear must mesh fully with the teeth of the camshaft gear.

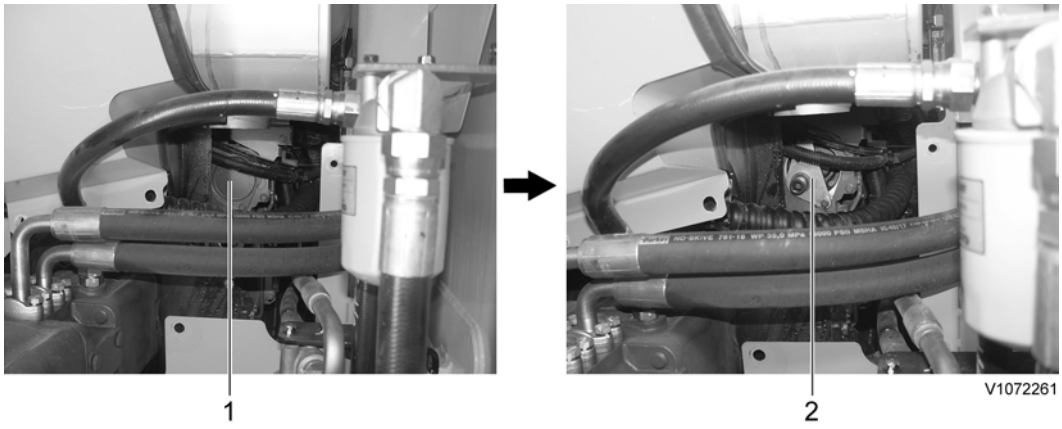

Figure 9

13. Remove the IEGR unit. (If installed)
Install M 8 x 75 mm – 10.9 screws in the holes for the IEGR unit on the rocker arm holders.

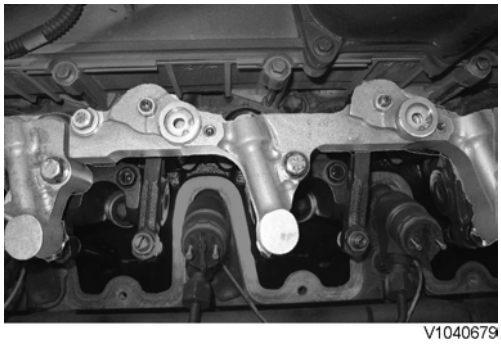

Figure 10

14. **Setting engine to valve overlap**
Turn crankshaft using turning gear (3) until the valve overlap of cylinder 1 is reached.

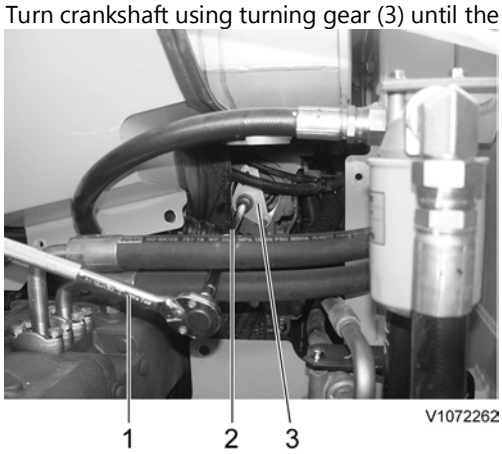

Figure 11

1. Wrench
2. Extension bar
3. Turning gear

Overlapping means that the exhaust valve is about to open and the inlet valve is about to close. It should not be possible to rotate any push rods by hand for the cylinder in question in this position.

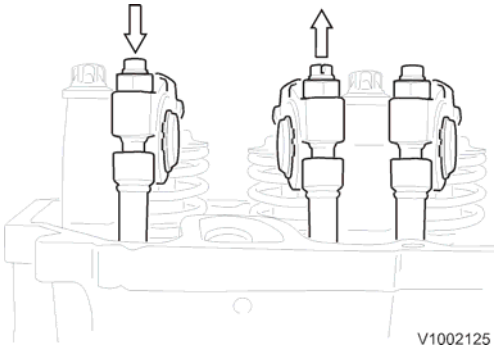

Figure 12
Overlapping

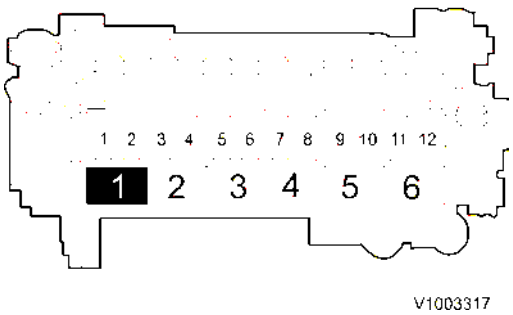

Figure 13

1, 3, 5, 7, 9 and 11 are exhaust valves
2, 4, 6, 8, 10 are 12 inlet valves

15. Adjust the valve clearance for each cylinder according to the black markings in the figure. Procedure for adjusting:

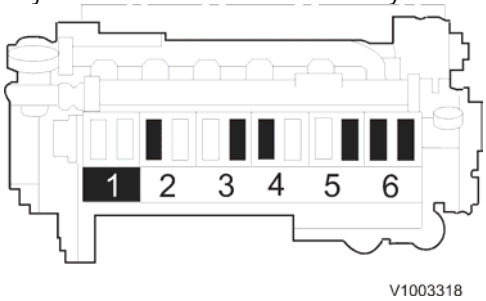

Figure 14

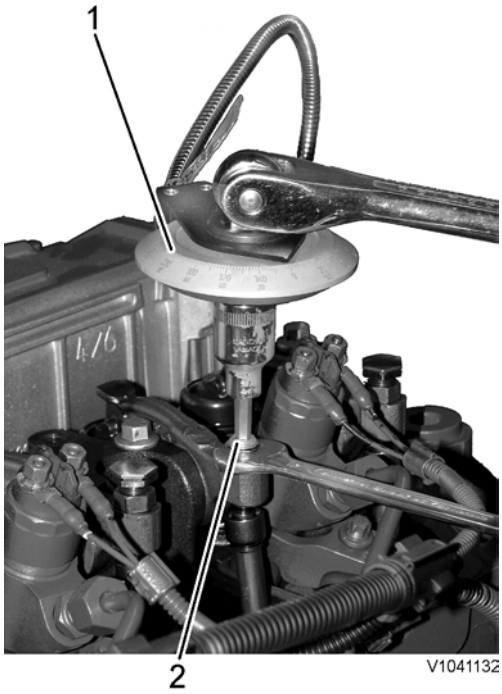

Figure 15

1. 885812 Timing tool
2. Adjusting screw

1. Loosen the adjusting screw's lock bolt on the rocker arm.
2. Install the protractor on the adjusting screw.
3. Turn the adjusting screw until zero clearance is obtained between rocker arm and valve. Reset the protractor to zero.
4. Turn the adjusting screw counterclockwise 90° for inlet valve and 150° for exhaust valve.
5. Hold the adjusting screw and tighten the lock nut at the same time. Tightening torque: see 200 Engine, tightening torques

16. Rotate the crankshaft another full turn until the valves for cylinder 6 overlap. Adjust the valve clearance for each cylinder according to the black markings in the figure.
    NOTE!
    When all valves are adjusted, do not rotate the engine. Continue directly with installing and adjusting the IEGR unit.

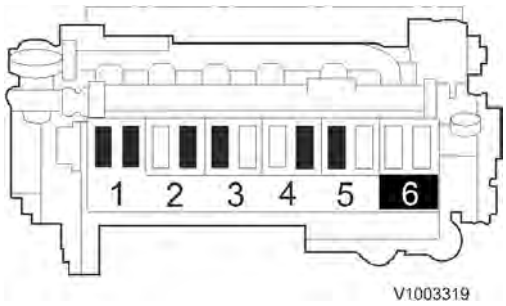

Figure 16

Installing and adjusting IEGR unit (If installed)

17. Change the O-rings on the pipe between the two IEGR sections. Lubricate the O-rings.

18. Remove the replacement bolts from the IEGR unit's installation holes.

19. Install the IEGR unit.

20. With overlapping valves for cylinder 6, adjust IEGR-opening piston for cylinder 1, 3 and 5. Procedure for adjusting IEGR-opening piston:

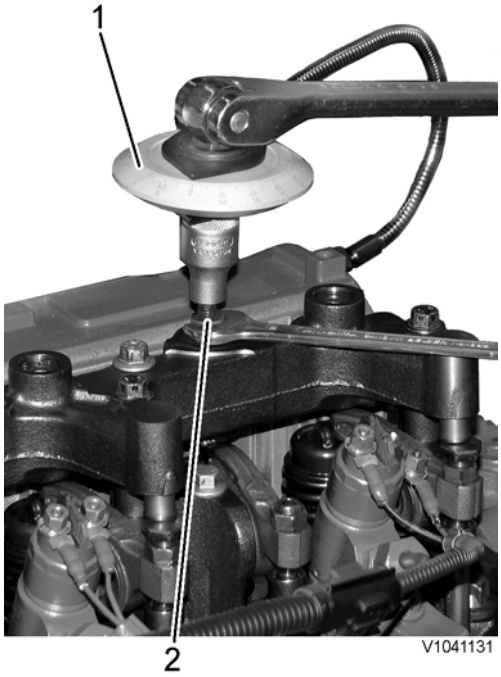

Figure 17

1. 885812 Timing tool
2. Adjusting screw

1. Loosen the adjusting screw's lock bolt on the IEGR unit.
2. Install the protractor on the adjusting screw.
3. Turn the adjusting screw until zero clearance is obtained between the IEGR-opening piston and exhaust rocker arm. Reset the protractor to zero.
4. Turn the adjusting screw counterclockwise 144°.
5. Hold the adjusting screw and tighten the lock nut at the same time. Tightening torque: see 200 Engine, tightening torques

21. Rotate the crankshaft another full turn until the valves for cylinder 1 overlap. Adjust IEGR-opening piston for cylinder 2, 4 and 6.

22. Install the new gasket on the valve cover.
NOTE!
Make sure that the tab (1) on the gasket is positioned correctly.

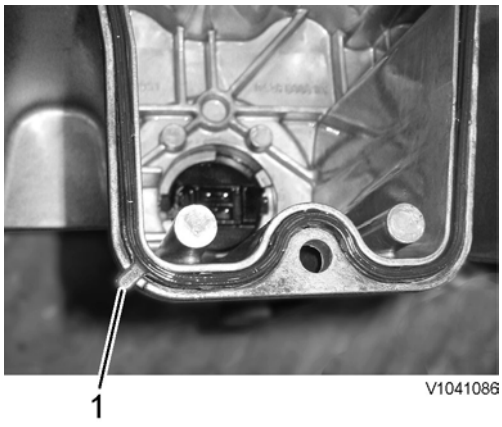

Figure 18

Assembly

23. For assembly, reverse disassembly procedure.
    NOTE!
    Do not reuse the O-rings and gasket.

24. After the completion of the work, start the engine and check for leaks and operating condition.

Document Title: **Engine timing gear, description**	Function Group: **215**	Information Type: **Service Information**	Date: **2014/8/15**
Profile: **EXC, EC240C LR [GB]**			

Engine timing gear, description

On the engines, the timing gears are located at the flywheel end for the camshaft and power take-off. Stamped markings on the crankshaft and camshaft gears are used to facilitate correct setting.

Figure 1

No.	Thread size	Tightening torque
1	M 22 × 130	686 ±69 (70 ±7, 505 ±50.5)
8	M 16 × 45	265 ±24.5 (27 ±2.5, 195 ±18) **Assembling after coated with Loctite.**
9	M 12 × 40	113 ±5 (11.5 ±0.5, 83 ±3.6) **Assembling after coated with Loctite.**
12		

Document Title: **Lubrication system, description**	Function Group: **220**	Information Type: **Service Information**	Date: **2014/8/15**
Profile: **EXC, EC240C LR [GB]**			

Lubrication system, description

Engine lubricating oil is supplied to the contact faces of rotating components such as turbocharger, crankshaft, camshaft, piston, inlet/exhaust valve, rocker arm and timing gear by means of forced lubrication from the oil pump.

Lubrication oil flow diagram

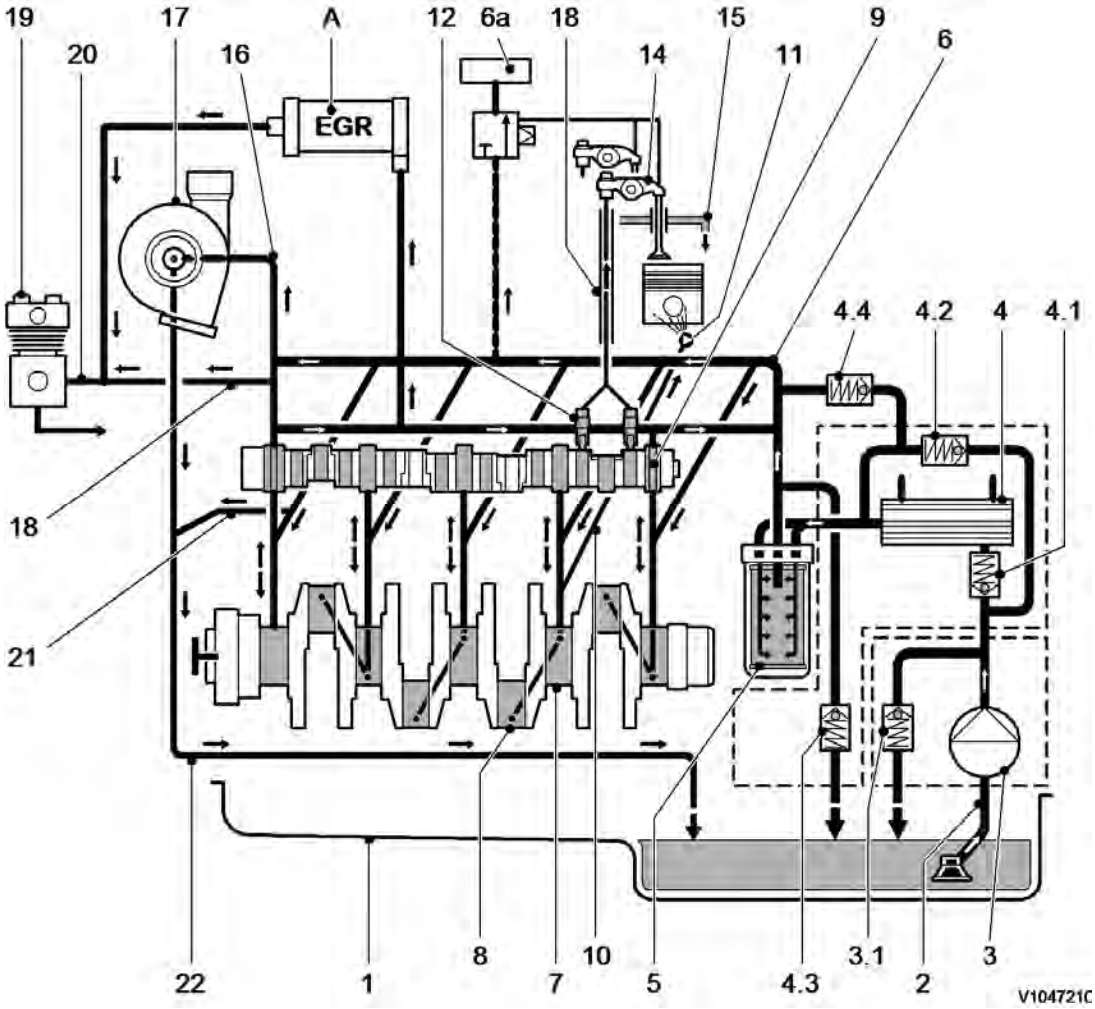

Figure 1
Lubrication oil flow

1	Oil pan	9	Camshaft bearing
2	Intake pipe	10	line to injection nozzle
3	Lube oil pump	11	Injection nozzle for piston cooling
3-1	Safety valve	12	Tappet with rocker arm pulse lubrication
4	Lube oil cooler	13	Stop rod, oil supply for rocker arm lubrication
4-1	Reverse lock valve	14	Rocker arm
4-2	Bypass valve	15	Return line to oil pan