

Oil pressure:
 98 kPa (1.0 kg/cm², 14 psi) or more at 800 rpm
 294 kPa (3.0 kg/cm², 43 psi) or more at 5,000 rpm

CAUTION:

- If oil pressure is out of specification, check oil pump, oil filter and lubrication line. <Ref. to 2-4 [K100].>
- If oil pressure warning light is turned ON and oil pressure is in specification, replace oil pressure switch. <Ref. to 2-4 [W3A0].>

NOTE:

The specified data is based on an engine oil temperature of 80°C (176°F).

8) After measuring oil pressure, install oil pressure switch.

Tightening torque:

25±3 N·m (2.5±0.3 kg·m, 18.1±2.2 ft·lb)

9) Install generator and V-belt in the reverse order of removal, and adjust the V-belt deflection.

7. Valve Clearance

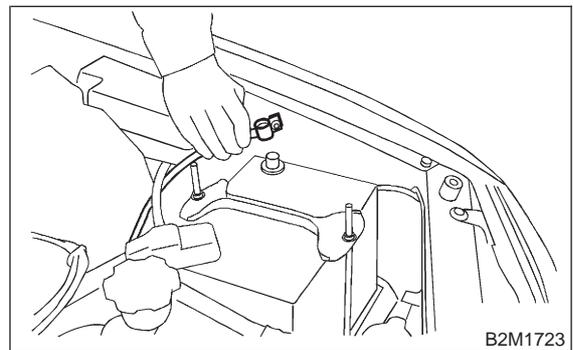
A: INSPECTION

1. 2200 cc MODEL

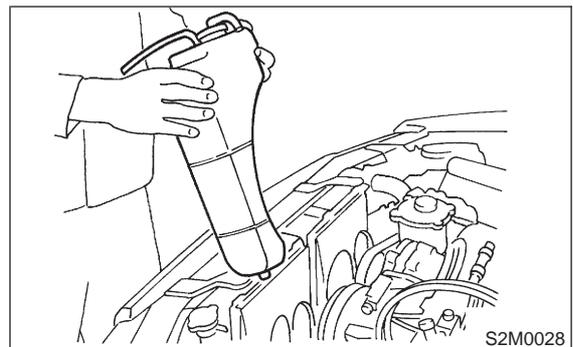
CAUTION:

Inspection and adjustment of valve clearance should be performed while engine is cold.

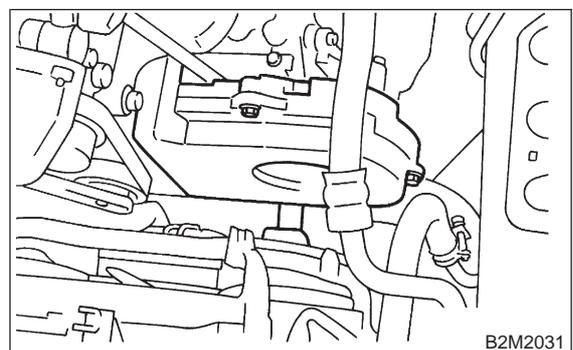
- 1) Set the vehicle onto the lift.
- 2) Disconnect battery ground cable.



- 3) Remove engine coolant reservoir tank. <Ref. to 2-5 [W9A0].>

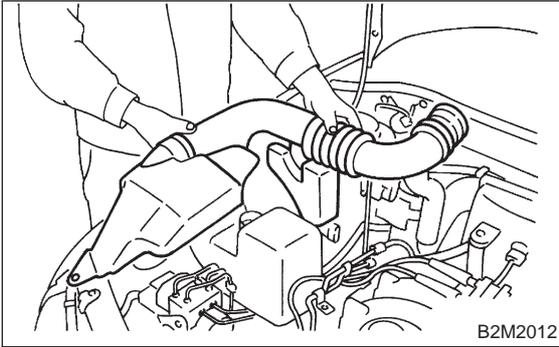


- 4) Remove timing belt cover (LH).

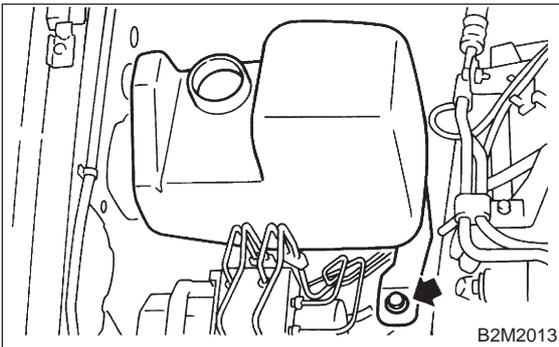


- 5) Remove rocker cover.
 - When inspecting #1 and #3 cylinders:
 - Low emission vehicle:

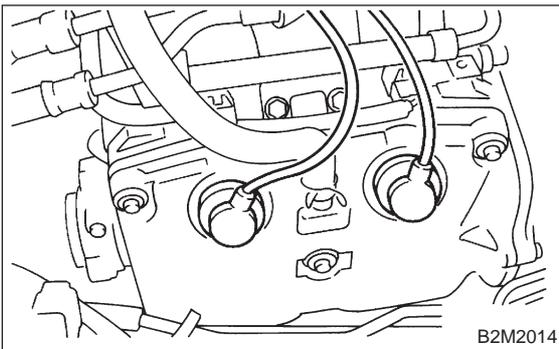
(1) Remove air intake duct A and B as a unit.



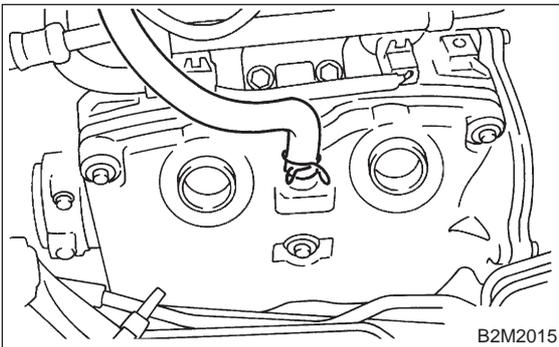
(2) Remove resonator chamber.



(3) Disconnect spark plug cords from spark plugs (#1 and #3 cylinders).

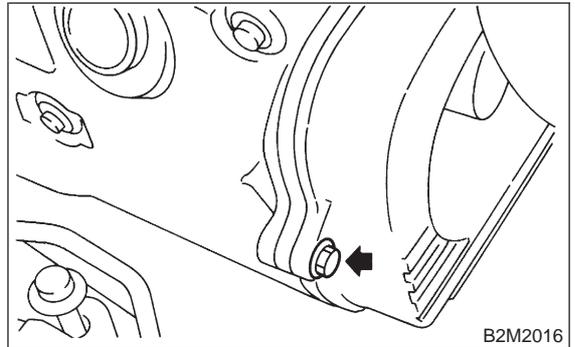


(4) Disconnect blow-by hose from rocker cover (RH).

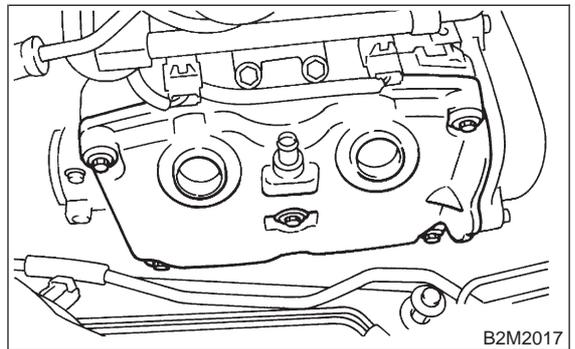


(5) Lift-up the vehicle.
(6) Remove under cover (RH).
(7) Place suitable container under the vehicle.

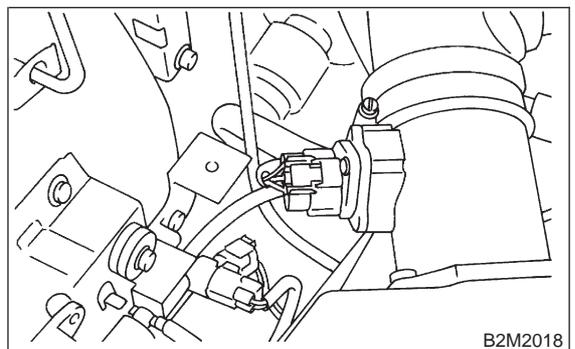
(8) Lower the vehicle.
(9) Remove the timing belt cover (RH) bolt.



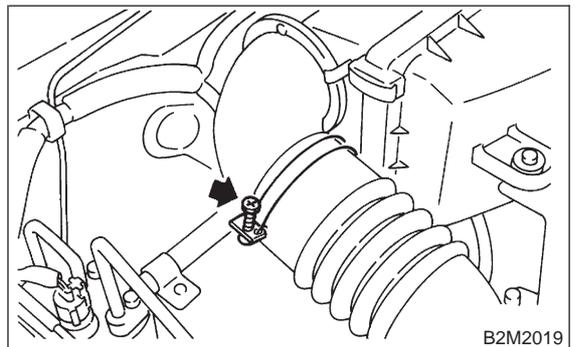
(10) Remove rocker cover bolts, then remove rocker cover (RH).



● Except low emission vehicle:
(1) Disconnect connector from mass air flow sensor.



(2) Loosen clamp which connects air intake duct and air intake chamber.



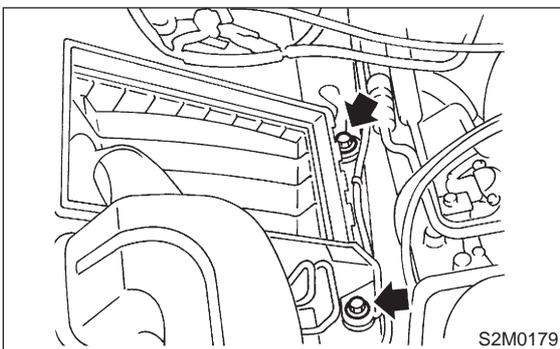
SERVICE PROCEDURE

[W7A1] 2-2
7. Valve Clearance

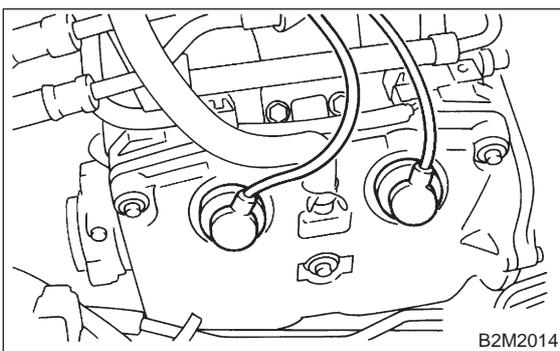
- (3) Remove clips of air cleaner upper cover.
- (4) Remove air intake duct and air cleaner upper cover as a unit.



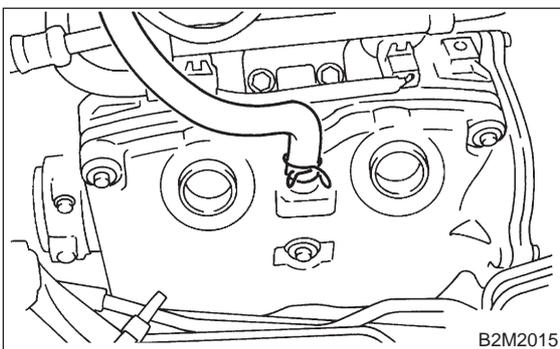
- (5) Remove air cleaner element.
- (6) Remove air cleaner lower case.



- (7) Disconnect spark plug cords from spark plugs (#1 and #3 cylinders).

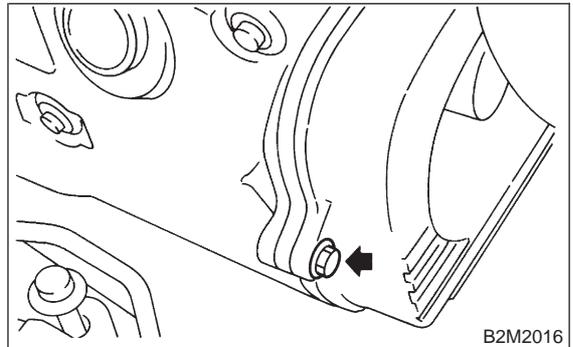


- (8) Disconnect blow-by hose from rocker cover (RH).

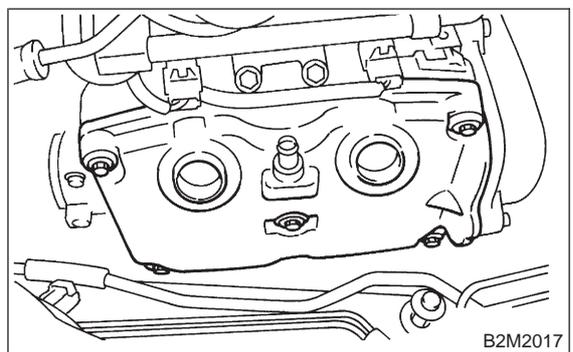


- (9) Lift-up the vehicle.

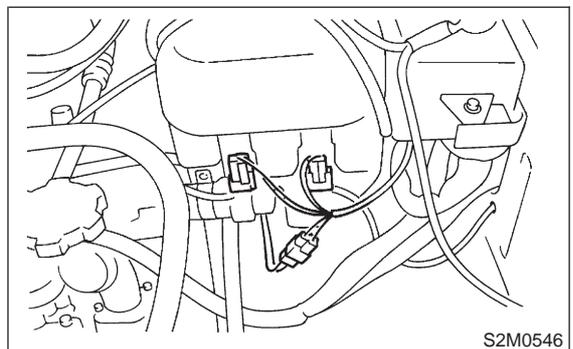
- (10) Remove under cover (RH).
- (11) Place suitable container under the vehicle.
- (12) Lower the vehicle.
- (13) Remove the timing belt cover (RH) bolt.



- (14) Remove rocker cover bolts, then remove rocker cover (RH).



- When inspecting #2 and #4 cylinders:
 - (1) Disconnect battery cables, and then remove battery and battery carrier.
 - (2) Disconnect front window washer motor connector.
 - (3) Disconnect rear gate glass washer motor connector. (Wagon only)



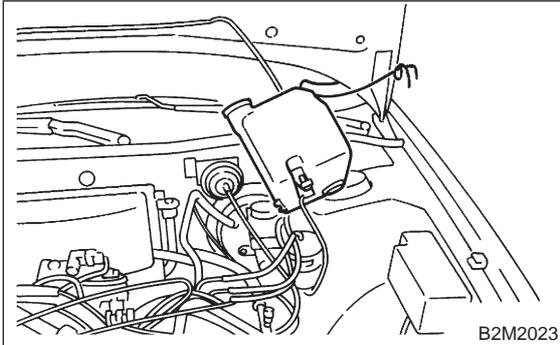
2-2 [W7A1]

7. Valve Clearance

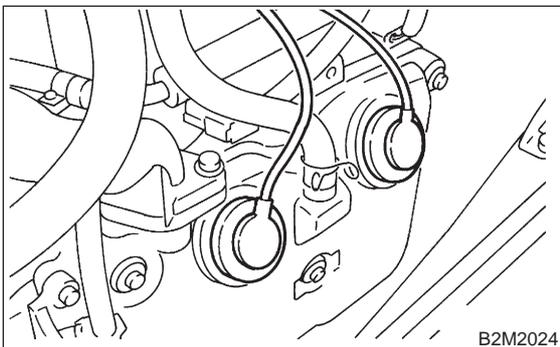
SERVICE PROCEDURE

(4) Disconnect rear gate glass washer hose from washer motor, then plug connection with a suitable cap. (Wagon only)

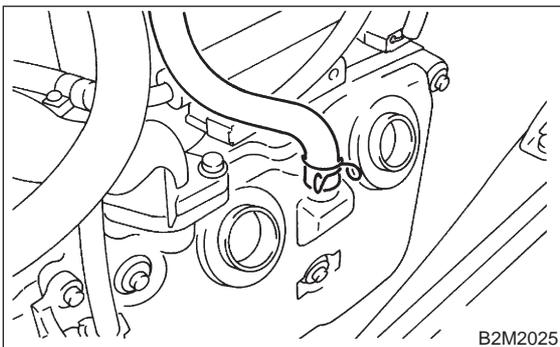
(5) Remove the two bolts which hold washer tank, then secure the tank away from working area.



(6) Disconnect spark plug cords from spark plugs (#2 and #4 cylinders).



(7) Disconnect blow-by hose from rocker cover (LH).

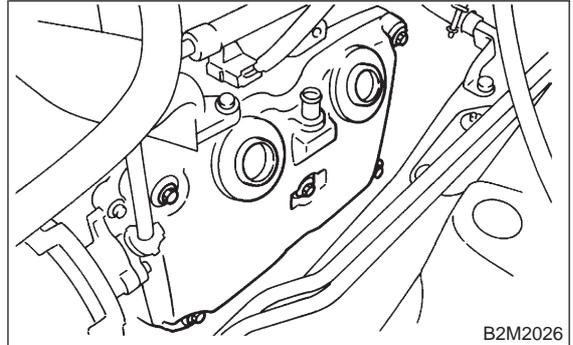


(8) Lift-up the vehicle.

(9) Remove under cover (LH).

(10) Place suitable container under the vehicle.

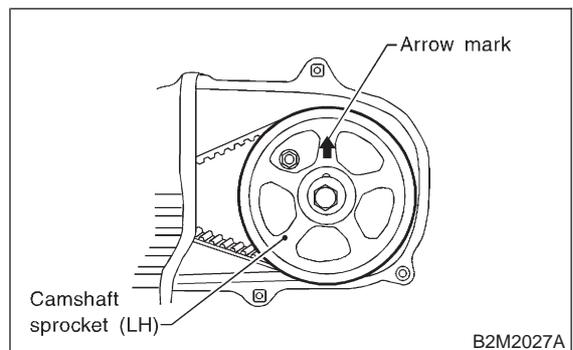
(11) Remove rocker cover bolts, then remove rocker cover (LH).



6) Set #1 cylinder piston to top dead center of compression stroke by rotating crankshaft pulley clockwise.

NOTE:

When arrow mark on camshaft sprocket (LH) comes exactly to the top, #1 cylinder piston is brought to the top dead center of the compression stroke.



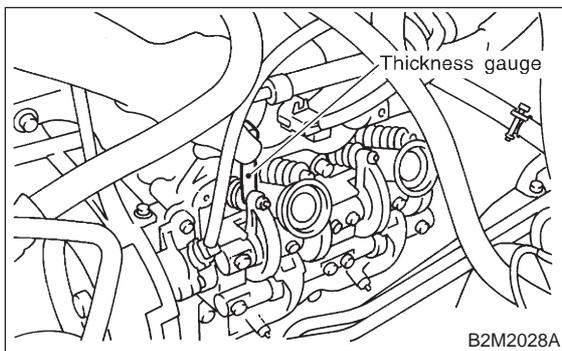
7) Measure #1 cylinder valve clearance by using thickness gauge.

CAUTION:

- Insert the thickness gauge in at as horizontal a direction as a possible with respect to the valve stem end face.
- Measure exhaust valve clearances while lift-up the vehicle.

Valve clearance:

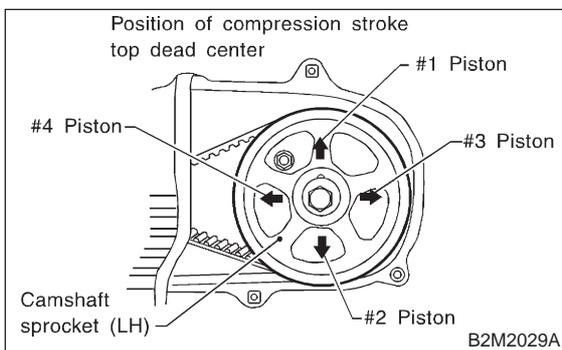
Intake: 0.20 ± 0.02 mm (0.0079 ± 0.0008 in)
Exhaust: 0.25 ± 0.02 mm (0.0098 ± 0.0008 in)



- 8) If necessary, adjust the valve clearance. <Ref. to 2-2 [W7B1].>
 9) Similar to measurement procedures used for #1 cylinder, measure #2, #3 and #4 cylinder valve clearances.

NOTE:

- Be sure to set cylinder pistons to their respective top dead centers on the compression stroke before measuring valve clearances.
- To set #3, #2 and #4 cylinder pistons to their top dead centers on the compression stroke, turn crankshaft pulley clockwise 90° at a time starting with arrow mark on left-hand camshaft sprocket facing up.



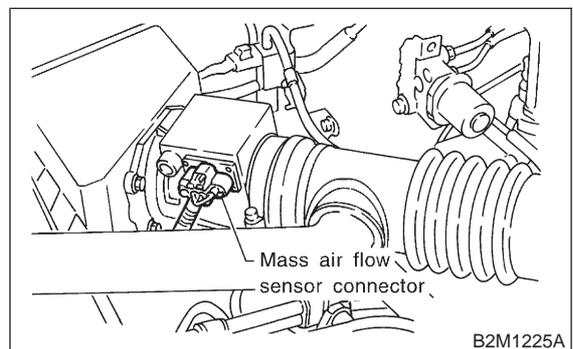
10) After inspection, install the related parts in the reverse order of removal.

2. 2500 cc MODEL

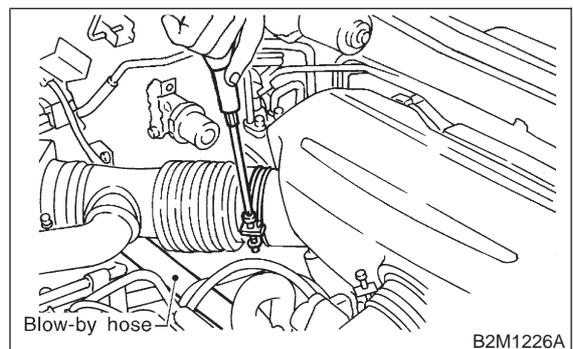
CAUTION:

Inspection and adjustment of valve clearance should be performed while engine is cold.

- 1) Set the vehicle onto the lift.
 - 2) Disconnect battery ground cable.
 - 3) Remove canister (Taiwan spec. vehicles only).
 - 4) Remove two bolts on the upper side which secure timing belt cover (RH).
 - 5) Lift-up the vehicle.
 - 6) Remove under cover (RH).
 - 7) Remove canister bracket (Taiwan spec. vehicles only).
 - 8) Loosen remaining bolt on under side which secures timing belt cover (RH), then remove belt cover.
 - 9) Lower the vehicle.
 - 10) Remove rocker cover.
- When inspecting #1 and #3 cylinders;
 - (1) Disconnect connector from mass air flow sensor.



- (2) Loosen clamp which connects air intake duct to air intake chamber.



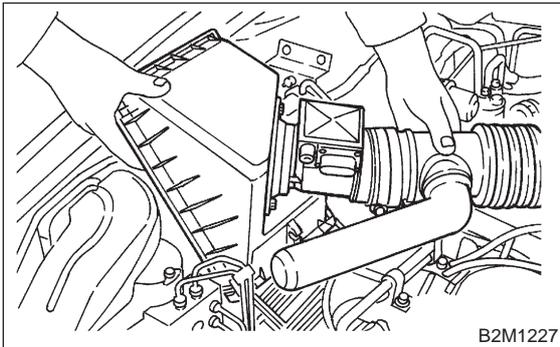
- (3) Remove the two clips from air cleaner upper cover.

CAUTION:

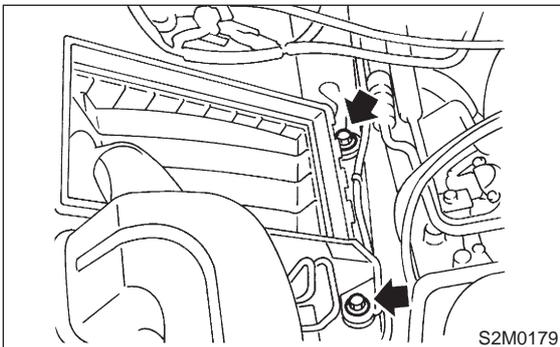
Before installing air cleaner upper cover, align hole(s) with protruding portions of air cleaner lower case, then secure upper cover.

- (4) Disconnect blow-by hose from air intake duct.

- (5) Remove air intake duct and air cleaner upper cover as a unit.

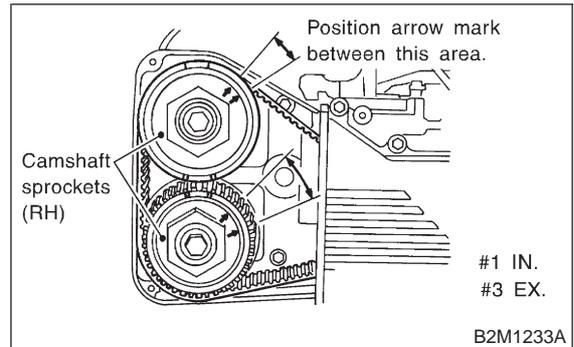


- (6) Remove air cleaner element.
 (7) Remove air cleaner lower case.



- (8) Disconnect spark plug cords from spark plugs (#1 and #3 cylinders).
 (9) Place suitable container under the vehicle.
 (10) Disconnect PCV hose from rocker cover (RH).
 (11) Remove bolts, then remove rocker cover (RH).
- When inspecting # 2 and #4 cylinders;
 - (1) Disconnect battery cables, and then remove battery and battery carrier.
 - (2) Disconnect washer motor connectors.
 - (3) Disconnect washer hoses from washer motors, then plug connections with suitable caps.
 - (4) Remove washer tank.
 - (5) Disconnect spark plug cords from spark plugs (#2 and #4 cylinders).
 - (6) Remove under cover (LH).
 - (7) Place suitable container under the vehicle.
 - (8) Disconnect PCV hose from rocker cover (LH).
 - (9) Remove bolts, then remove rocker cover (LH).

- 11) Turn crankshaft pulley clockwise until arrow mark on camshaft sprocket is set to position shown in figure.



- 12) Measure #1 cylinder intake valve and #3 cylinder exhaust valve clearances by using thickness gauge.

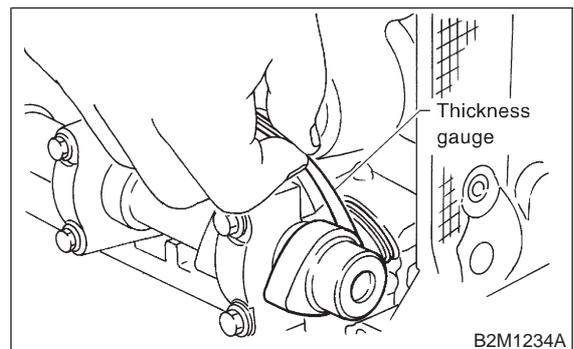
CAUTION:

- Insert the thickness gauge in as horizontal a direction as possible with respect to the shim.
- Measure exhaust valve clearances while lifting-up the vehicle.

Valve clearance:

Intake: 0.20 ± 0.02 mm (0.0079 ± 0.0008 in)

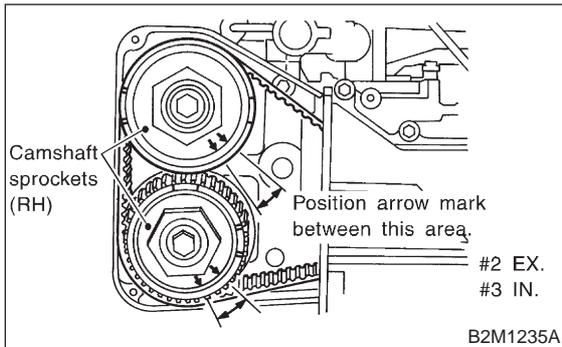
Exhaust: 0.25 ± 0.02 mm (0.0098 ± 0.0008 in)



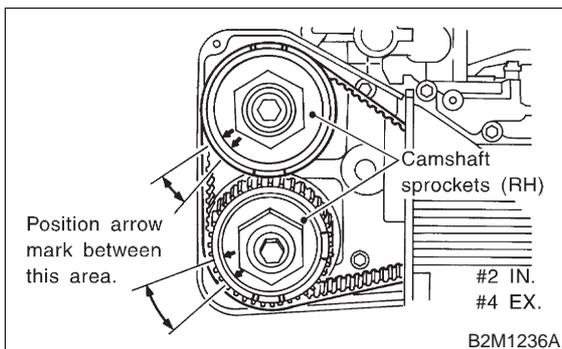
- 13) If necessary, adjust the valve clearance. <Ref. to 2-2 [W7B2].>

- 14) Further turn crankshaft pulley clockwise. Using the same procedures as in step 12) above, measure valve clearances.

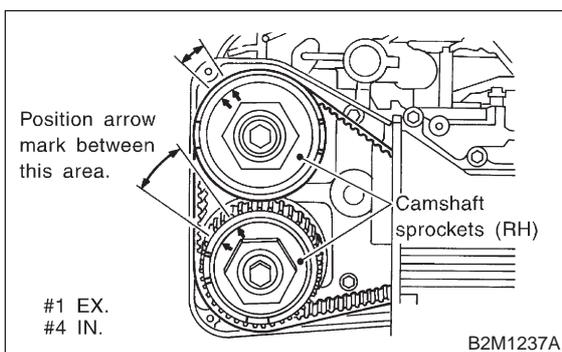
(1) Set arrow mark on camshaft sprocket to position shown in figure, and measure #2 cylinder exhaust valve and #3 cylinder intake valve clearances.



(2) Set arrow mark on camshaft sprocket to position shown in figure, and measure #2 cylinder intake valve and #4 cylinder exhaust valve clearances.



(3) Set arrow mark on camshaft sprocket to position shown in figure, and measure #1 cylinder exhaust valve and #4 cylinder intake valve clearances.



15) After inspection, install the related parts in the reverse order of removal.

B: ADJUSTMENT

1. 2200 cc MODEL

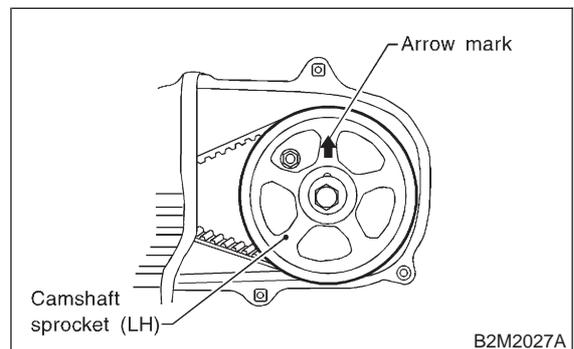
CAUTION:

Adjustment of valve clearance should be performed while engine is cold.

1) Set #1 cylinder piston to top dead center of compression stroke by rotating crankshaft pulley clockwise.

NOTE:

When arrow mark on camshaft sprocket (LH) comes exactly to the top, #1 cylinder piston is brought to the top dead center of the compression stroke.



2-2 [W7B2]

7. Valve Clearance

SERVICE PROCEDURE

- 2) Adjust the #1 cylinder valve clearance.
 - (1) Loosen the valve rocker nut and screw.
 - (2) Place suitable thickness gauge.
 - (3) While noting valve clearance, tighten valve rocker adjust screw.
 - (4) When specified valve clearance is obtained, tighten valve rocker nut.

Tightening torque:

10 ± 1 N·m (1.0 ± 0.1 kg·m, 7.2 ± 0.7 ft·lb)

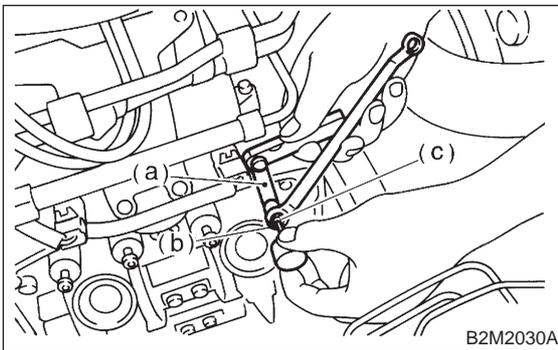
CAUTION:

- Insert the thickness gauge in at as horizontal a direction as possible with respect to the valve stem end face.
- Adjust exhaust valve clearances while lifting-up the vehicle.

Valve clearance:

Intake: 0.20 ± 0.02 mm (0.0079 ± 0.0008 in)

Exhaust: 0.25 ± 0.02 mm (0.0098 ± 0.0008 in)



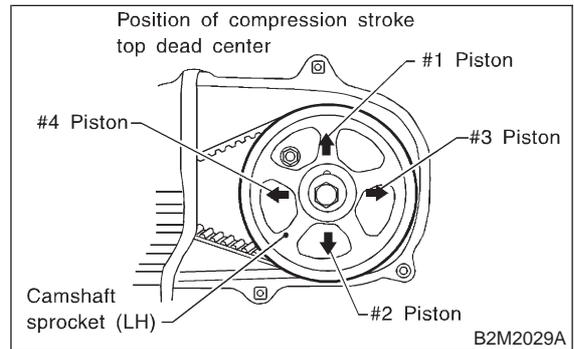
- (a) Thickness gauge
- (b) Valve rocker nut
- (c) Valve rocker screw

- 3) Ensure that valve clearances are within specifications.
- 4) Turn crankshaft two complete rotations until #1 cylinder piston is again set to top dead center on compression stroke.
- 5) Ensure that valve clearances are within specifications. If necessary, re-adjust valve clearances.

- 6) Similar to adjustment procedures used for #1 cylinder, adjust #2, #3 and #4 cylinder valve clearances.

NOTE:

- Be sure to set cylinder pistons to their respective top dead centers on the compression stroke before adjusting valve clearances.
- To set #3, #2 and #4 cylinder pistons to their top dead centers on the compression stroke, turn crankshaft pulley clockwise 90° at a time starting with arrow mark on left-hand camshaft sprocket facing up.



2. 2500 cc MODEL

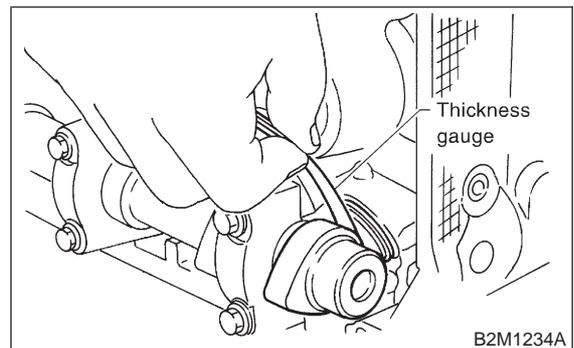
CAUTION:

Adjustment of valve clearance should be performed while engine is cold.

- 1) Measure all valve clearances. <Ref. to 2-2 [W7A2].>

NOTE:

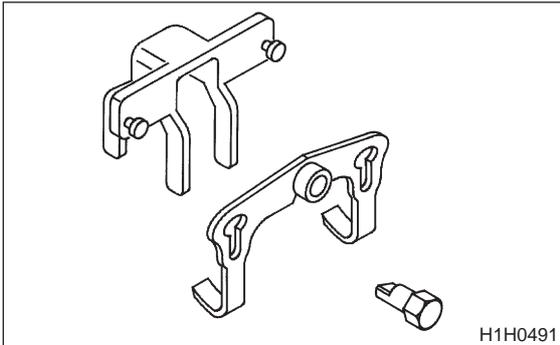
Record each valve clearance after it has been measured.



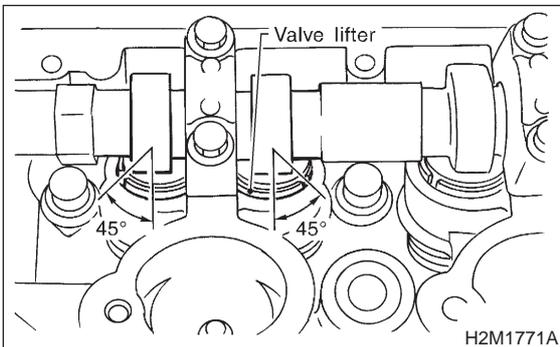
2) Remove shim of intake side.

(1) Prepare the ST.

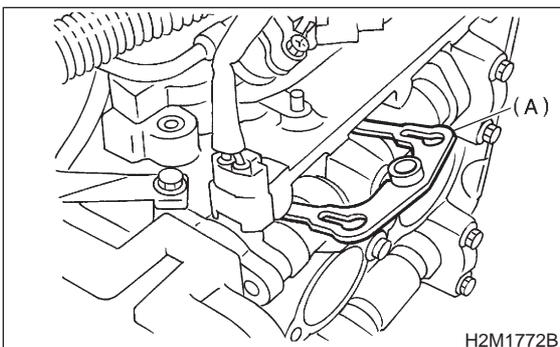
ST 498187100 SHIM REPLACER KIT



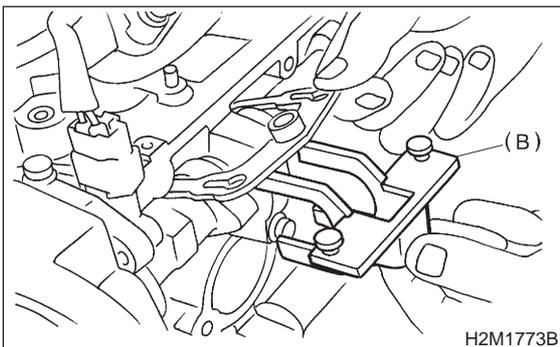
(2) Rotate the notch of the valve lifter outward by 45°.



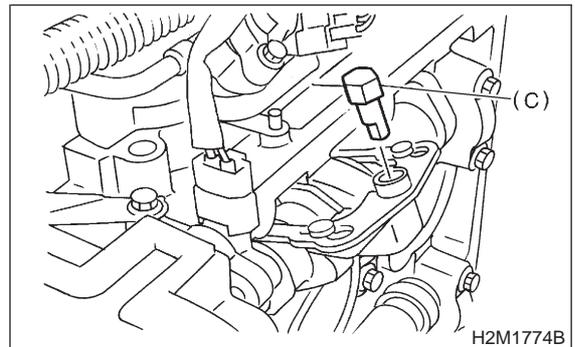
(3) Set REPLACER No. 1 (A) to intake camshaft.



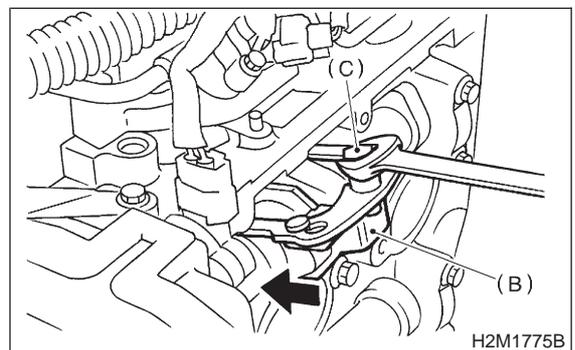
(4) Set REPLACER No. 2 (B).



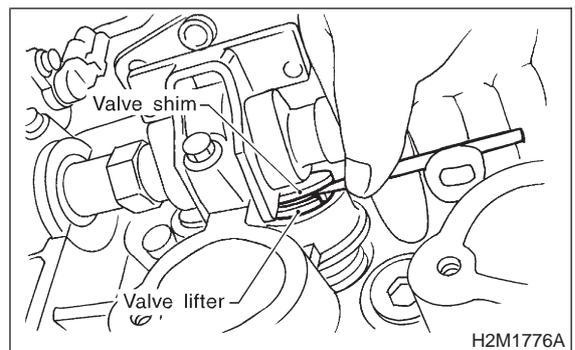
(5) Set REPLACER No. 3 (C) to hole of REPLACER No. 1.



(6) Rotate REPLACER No. 3 (C) until REPLACER No. 2 (B) pushes away valve lifter.



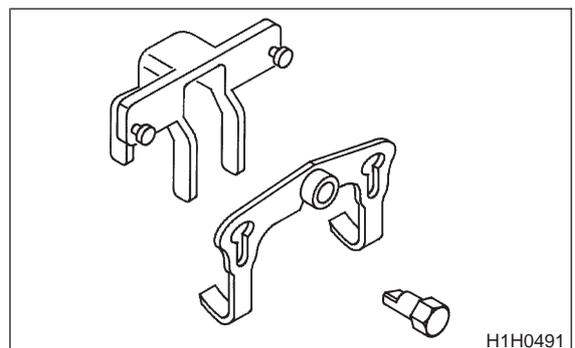
(7) Insert tweezers into the notch of the valve lifter, and take the shim out.



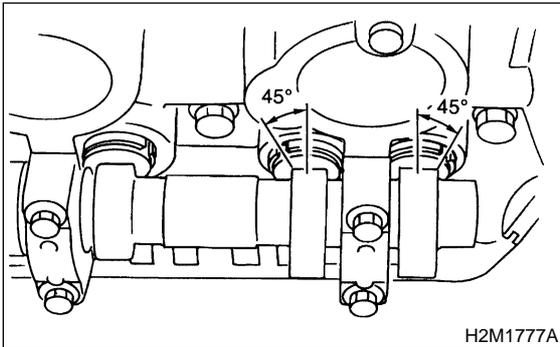
3) Remove shim of exhaust side.

(1) Prepare the ST.

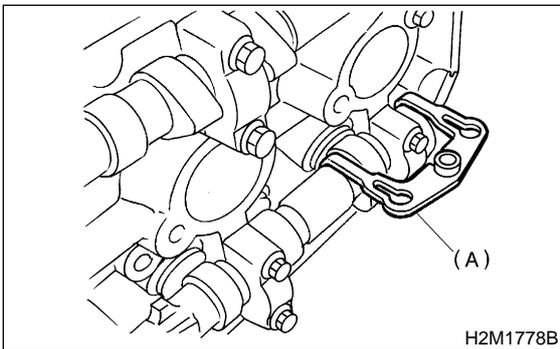
ST 498187100 SHIM REPLACER KIT



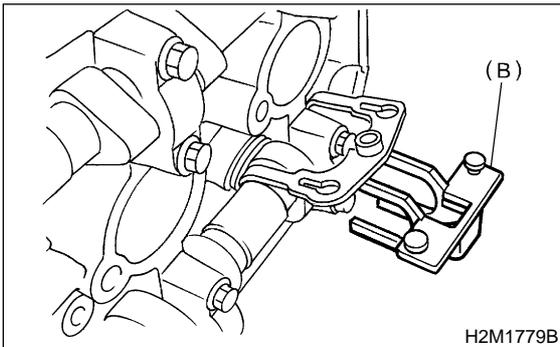
(2) Rotate the notch of the valve lifter outward by 45°.



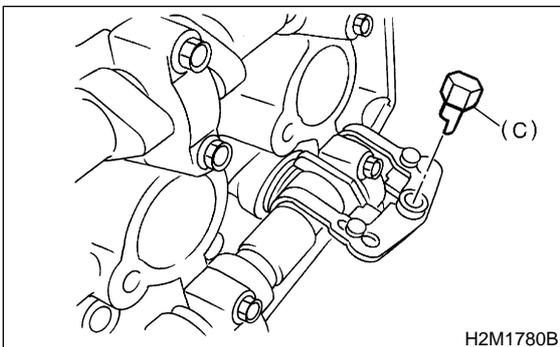
(3) Set REPLACER No. 1 (A) to exhaust camshaft.



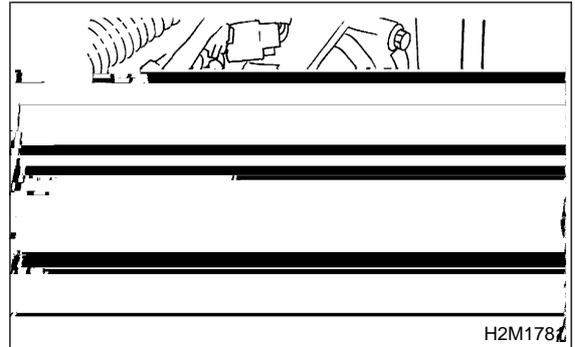
(4) Set REPLACER No. 2 (B).



(5) Set REPLACER No. 3 (C) to hole of REPLACER No. 1.



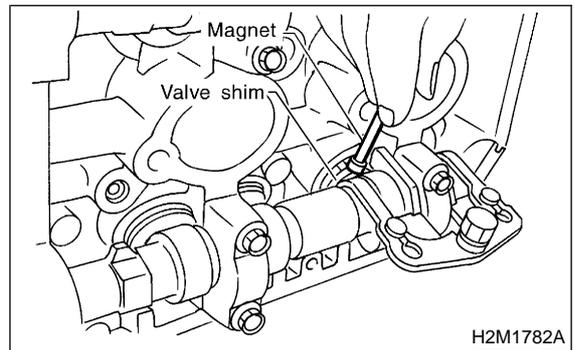
(6) Rotate REPLACER No. 3 until REPLACER No. 2 pushes away valve lifter.



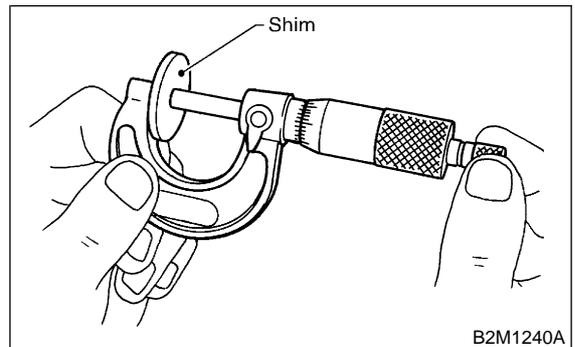
(7) Insert tweezers into the notch of the valve lifter, and take the shim out.

NOTE:

By using a magnet, the shim can be taken out without dropping it.



4) Measure thickness of shim with micrometer.



SERVICE PROCEDURE

[W7B2] 2-2
7. Valve Clearance

5) Select a shim of suitable thickness using measured valve clearance and shim thickness, using the following table.

Intake valve (mm): $S = (V + T) - 0.20$
 Exhaust valve (mm): $S = (V + T) - 0.25$

S: Shim thickness to be used

V: Measured valve clearance

T: Shim thickness required

Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
13218AC230	2.22 (0.0874)	13218AC480	2.52 (0.0992)
13218AE000	2.23 (0.0878)	13218AC490	2.53 (0.0996)
13218AC240	2.24 (0.0882)	13218AC500	2.54 (0.1000)
13218AE010	2.25 (0.0886)	13218AC510	2.55 (0.1004)
13218AC250	2.26 (0.0890)	13218AC520	2.56 (0.1008)
13218AE020	2.27 (0.0894)	13218AC530	2.57 (0.1012)
13218AC260	2.28 (0.0898)	13218AC540	2.58 (0.1016)
13218AE030	2.29 (0.0902)	13218AC550	2.59 (0.1020)
13218AC270	2.30 (0.0906)	13218AC560	2.60 (0.1024)
13218AE040	2.31 (0.0909)	13218AC570	2.61 (0.1028)
13218AC280	2.32 (0.0913)	13218AC580	2.62 (0.1031)
13218AC290	2.33 (0.0917)	13218AC590	2.63 (0.1035)
13218AC300	2.34 (0.0921)	13218AC600	2.64 (0.1039)
13218AC310	2.35 (0.0925)	13218AC610	2.65 (0.1043)
13218AC320	2.36 (0.0929)	13218AC620	2.66 (0.1047)
13218AC330	2.37 (0.0933)	13218AC630	2.67 (0.1051)
13218AC340	2.38 (0.0937)	13218AC640	2.68 (0.1055)
13218AC350	2.39 (0.0941)	13218AC650	2.69 (0.1059)
13218AC360	2.40 (0.0945)	13218AC660	2.70 (0.1063)
13218AC370	2.41 (0.0949)	13218AE050	2.71 (0.1067)
13218AC380	2.42 (0.0953)	13218AC670	2.72 (0.1071)
13218AC390	2.43 (0.0957)	13218AE060	2.73 (0.1075)
13218AC400	2.44 (0.0961)	13218AC680	2.74 (0.1079)
13218AC410	2.45 (0.0965)	13218AE070	2.75 (0.1083)
13218AC420	2.46 (0.0969)	13218AC690	2.76 (0.1087)
13218AC430	2.47 (0.0972)	13218AE080	2.77 (0.1091)
13218AC440	2.48 (0.0976)	13218AC700	2.78 (0.1094)
13218AC450	2.49 (0.0980)	13218AE090	2.79 (0.1098)
13218AC460	2.50 (0.0984)	13218AC710	2.80 (0.1102)
13218AC470	2.51 (0.0988)	13218AE100	2.81 (0.1106)

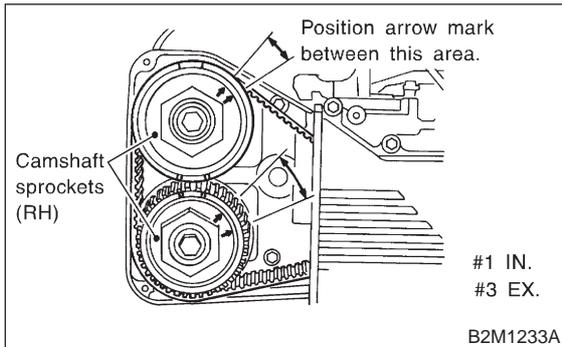
6) Set suitable shim selected in one step before, to valve lifter.

2-2 [W7B2]

7. Valve Clearance

SERVICE PROCEDURE

7) Turn crankshaft pulley clockwise until arrow mark on camshaft sprocket is set to position shown in figure.



8) Ensure that #1 cylinder intake valve and #3 cylinder exhaust valve are adjusted to specifications.

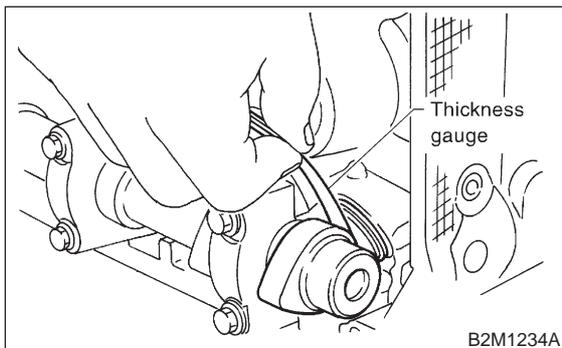
CAUTION:

- Insert the thickness gauge in as horizontal a direction as possible with respect to the shim.
- Adjust exhaust valve clearances while lifting-up the vehicle.

Valve clearance:

Intake: 0.20 ± 0.02 mm (0.0079 ± 0.0008 in)

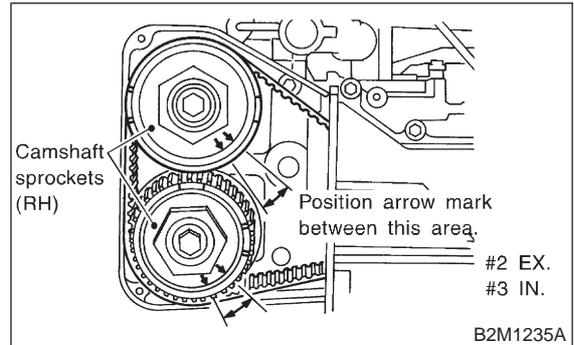
Exhaust: 0.25 ± 0.02 mm (0.0098 ± 0.0008 in)



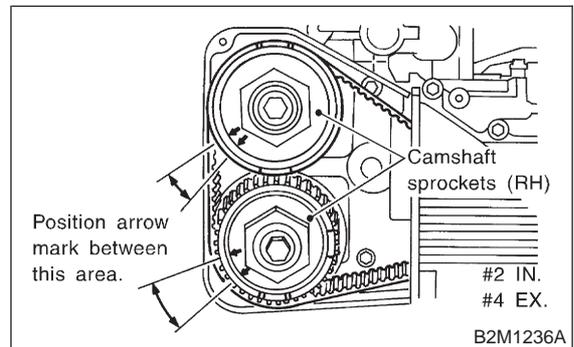
9) Turn crankshaft two complete rotations. Check again to ensure that #1 cylinder intake valve and #3 cylinder exhaust valve clearances are within specifications. If necessary, re-adjust valve clearances.

10) Further turn crankshaft pulley clockwise. Using the same procedures as in two steps before, measure valve clearances.

(1) Set arrow mark on camshaft sprocket to position shown in figure, and check #2 cylinder exhaust valve and #3 cylinder intake valve clearances.



(2) Set arrow mark on camshaft sprocket to position shown in figure, and check #2 cylinder intake valve and #4 cylinder exhaust valve clearances.



(3) Set arrow mark on camshaft sprocket to position shown in figure, and check #1 cylinder exhaust valve and #4 cylinder intake valve clearances.

