DISASSEMBLY

1. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.1

(a) Using a straight hexagon wrench 14, remove the 2 screw plugs (RH cylinder).

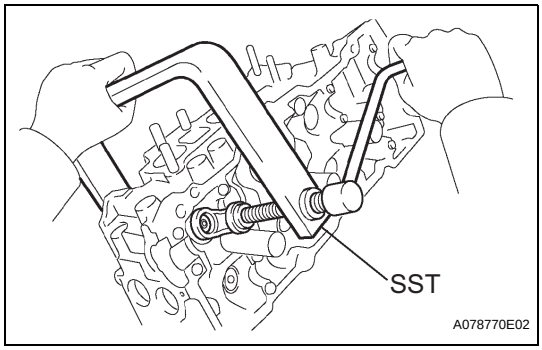
2. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.2

(a) Using a straight hexagon wrench 14, remove the 2 screw plugs (LH cylinder).

3. REMOVE VALVE LIFTER

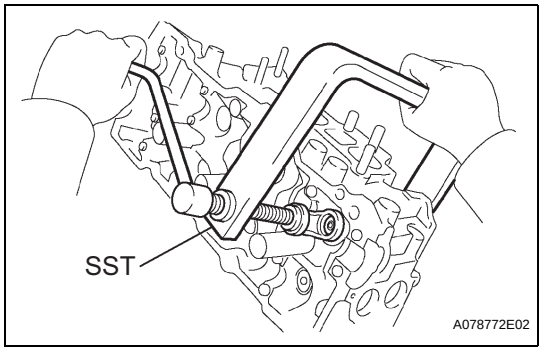
HINT:
Store the lifters in correct order so that they can be returned to the original locations when reassembling.

4. REMOVE INTAKE VALVE
SST 09202-70020 (09202-00010)



(a) Using SST, compress the valve spring and remove the 2 keepers, retainer spring and valve.
HINT:
Store the valves, valve springs, spring seats and spring retainers in correct order so that they can be returned to the original locations when reassembling.

5. REMOVE EXHAUST VALVE
SST 09202-70020 (09202-00010)



(a) Using SST, compress the valve spring and remove the 2 keepers, retainer spring and valve.
HINT:
Store the valves, valve springs, spring seats and spring retainers in correct order so that they can be returned to the original locations when reassembling.

6. REMOVE VALVE STEM OIL O SEAL OR RING

(a) Using needle-nose pliers, remove the oil seal.

7. REMOVE VALVE SPRING SEAT

8. REMOVE SEMICIRCULAR PLUG

INSPECTION

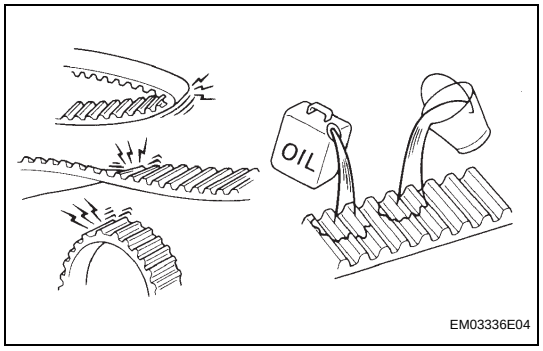
1. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mounting bolt of the camshaft timing pulley.**

Check the belt for any defects, as shown in the illustrations.

Also, check these points below.



(a) If there is premature parting :
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.

(b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.

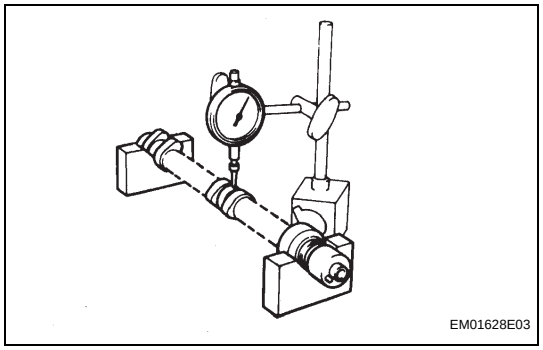
(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.

(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.

(e) If there is noticeable wear on the belt teeth:
- Check the timing cover for damage.
- Check that the gasket has been installed correctly.
- Check for foreign object on the pulley teeth.

If there is any doubt about the belt condition, replace the timing belt.

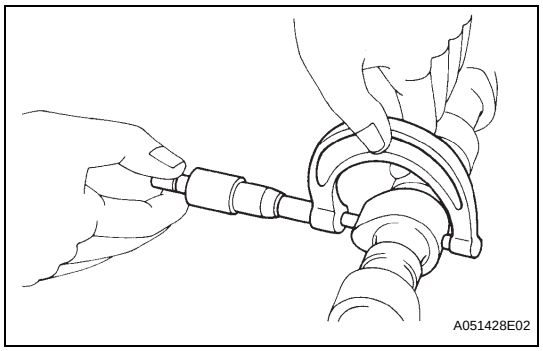
2. INSPECT CAMSHAFT



(a) Inspect camshaft for runout.
(1) Place the camshaft on V-blocks.
(2) Using a dial indicator, measure the runout at the center journal.

Maximum circle runout:
0.06 mm (0.0024 in.)

If the runout is greater than maximum, replace the camshaft.

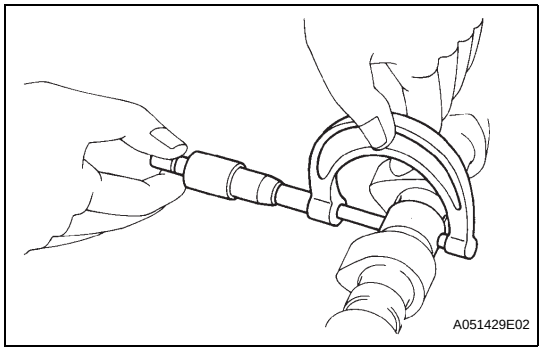


(b) Inspect cam lobes.
(1) Using a micrometer, measure the cam lobe height.

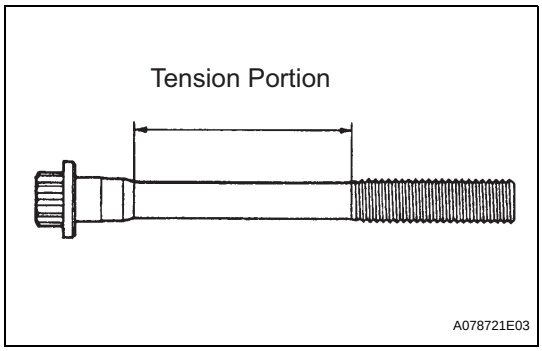
Standard cam lobe height:
Intake 43.132 to 43.232 mm (1.6981 to 1.7020 in.)
Exhaust 43.010 to 43.110 mm (1.6933 to 1.6972 in.)
Minimum cam lobe height:

Intake 42.98 mm (1.6921 in.)
Exhaust 42.86 mm (1.6874 in.)

If the cam lobe height is less than minimum, replace the camshaft .

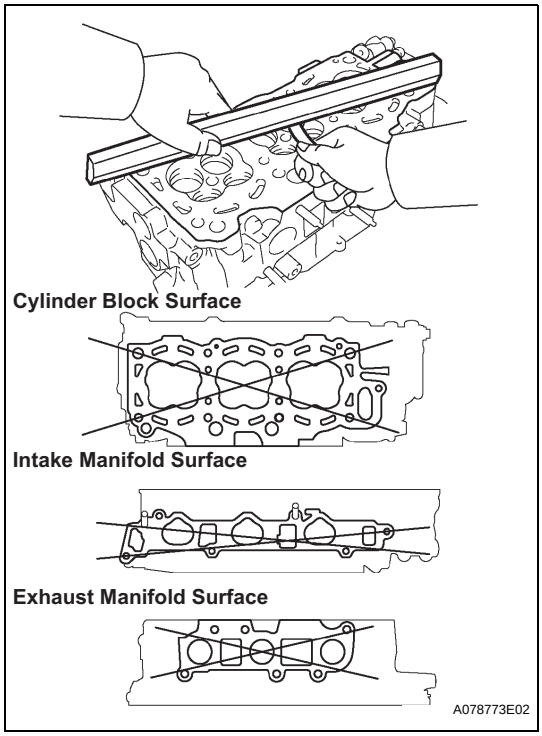


(c) Inspect camshaft journals.
(1) Using a micrometer, measure the journal diameter.
Journal diameter:
26.959 to 26.975 mm (1.0614 to 1.0620 in.)
If the journal diameter is not as specified, check the oil clearance.



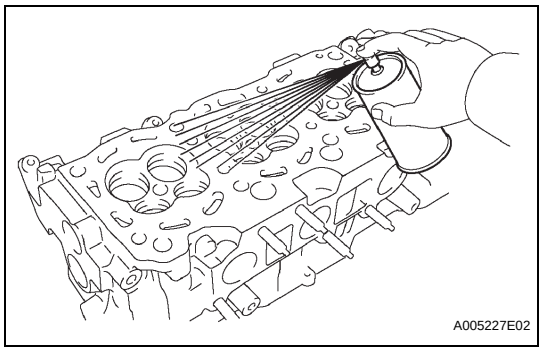
3. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.
Standard outside diameter:
8.95 to 9.05 mm (0.3524 to 0.3563 in.)
Minimum outside diameter:
8.75 mm (0.3445 in.)
If the diameter is less than minimum, replace the bolt.



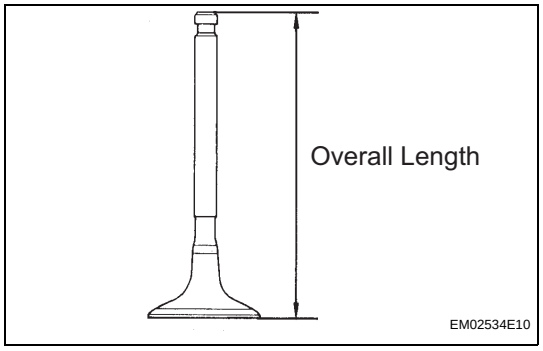
4. INSPECT CYLINDER HEAD FOR FLATNESS

(a) Using a precision straight edge and a feeler gauge, measure the surface contacting the cylinder block and the manifolds for warpage.
Maximum warpage:
Cylinder block surface 0.05 mm (0.0020 in.)
Intake manifold surface 0.10 mm (0.0039 in.)
Exhaust manifold surface 0.10 mm (0.0039 in.)
If warpage is greater than minimum, replace the cylinder head.



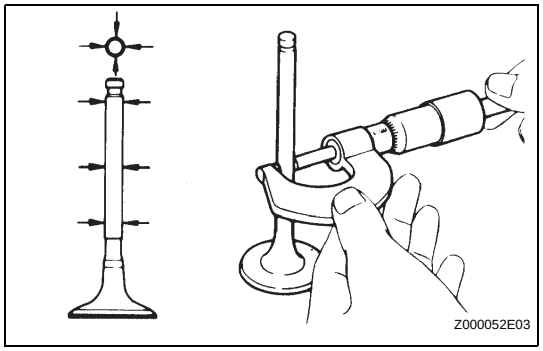
5. INSPECT CYLINDER HEAD FOR CRACKS

(a) Using a dye penetrate, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.
If cracked, replace the cylinder head.

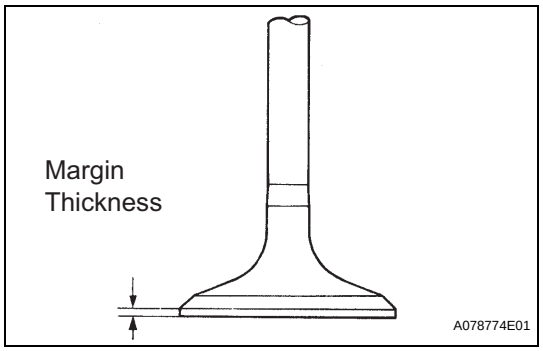


6. INSPECT INTAKE VALVE

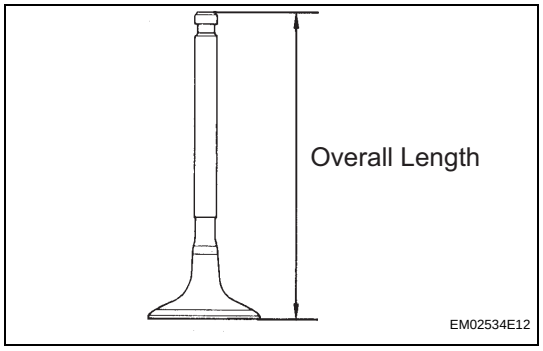
(a) Check the valve overall length.
Standard overall length:
95.45 mm (3.7579 in.)
Minimum overall length:
94.95 mm (3.7382 in.)



(b) Using a micrometer, measure the diameter of the valve stem.
Valve steam diameter:
5.470 to 5.485 mm(0.2154 to 0.2159 in.)

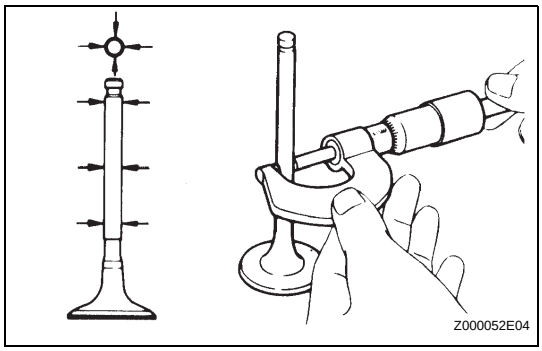


(c) Check the valve head margin thickness.
Standard margin thickness:
1.0 mm (0.039 in.)
Minimum margin thickness:
0.5 mm (0.020 in.)

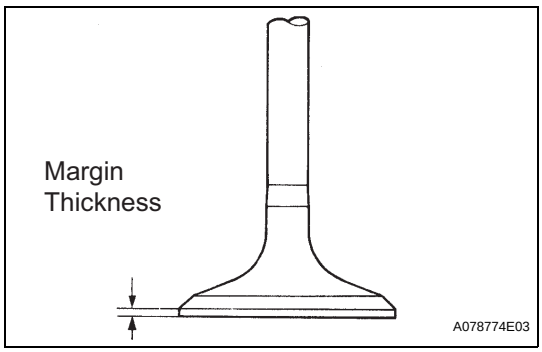


7. INSPECT EXHAUST VALVE

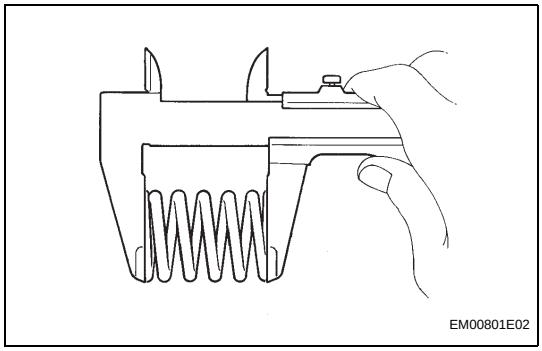
(a) Check the valve overall length.
Standard overall length:
95.40 mm (3.7559 in.)
Minimum overall length:
94.90 mm (3.7362 in.)



(b) Using a micrometer, measure the diameter of the valve stem.
Valve steam diameter:
5.465 to 5.480 mm (0.2152 to 0.2157 in.)

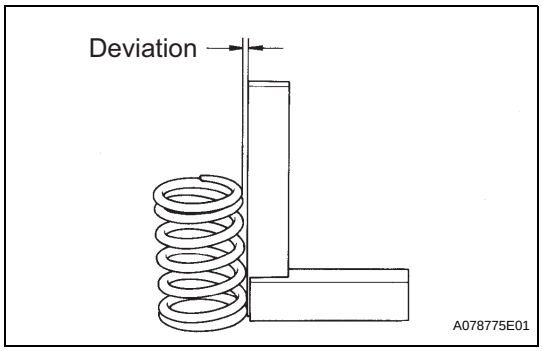


(c) Check the valve head margin thickness.
Standard margin thickness:
1.0 mm (0.039 in.)
Minimum margin thickness:
0.5 mm (0.020 in.)

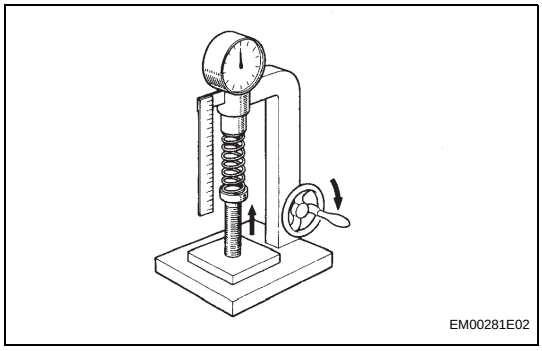


8. INSPECT INNER COMPRESSION SPRING

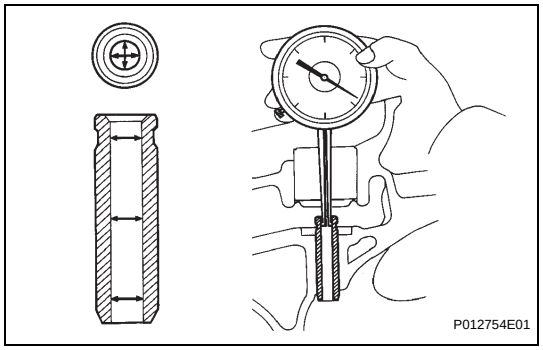
(a) Using vernier calipers, measure the free length of the valve spring.
Free length:
45.50 mm (1.7913 in.)



(b) Using a steel square, measure the deviation of the valve spring.
Maximum deviation:
2.0 mm (0.079 in.)



(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.
Installed tension:
186 to 206 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf) at 33.8 mm (1.331 in.)
If the installed tension is not as specified, replace the valve spring.



9. INSPECT VALVE GUIDE BUSH OIL CLEARANCE

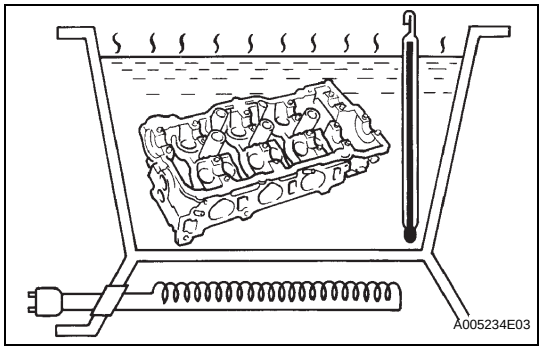
(a) Using a caliper gauge, measure the inside diameter of the valve guide bushing.

Bushing inside diameter:
5.510 to 5.530 mm (0.2169 to 0.2177 in.)

(b) Subtract the valve stem diameter measurement from the valve guide bushing inside diameter measurement.

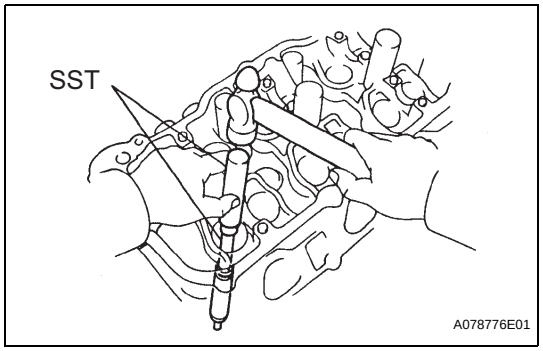
Standard oil clearance:
Intake 0.025 to 0.060 mm (0.0010 to 0.0024 in.)
Exhaust 0.030 to 0.065 mm (0.0012 to 0.0026 in.)
Maximum oil clearance:
Intake 0.08 mm (0.0031 in.)
Exhaust 0.10 mm (0.0039 in.)

EM



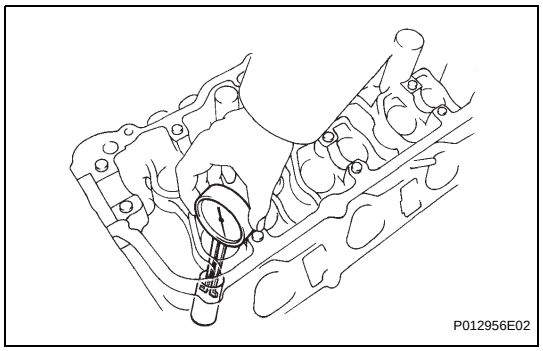
10. REMOVE VALVE GUIDE BUSHING

(a) Heat the cylinder head to 80 to 100 °C (176 to 212 °F).



(b) Using SST and a hammer, tap out the valve guide bushing.

SST 09201-10000, 09201-01055, 09950-70010 (09951-07100)



11. INSTALL VALVE GUIDE BUSHING

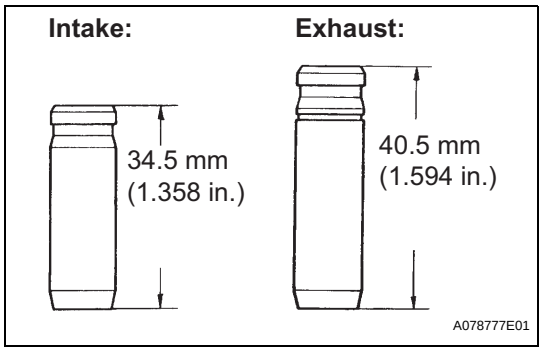
(a) Using a caliper gauge, measure the valve guide bushing bore diameter of the cylinder head.

Diameter:
10.295 to 10.313 mm (0.4053 to 0.4060 in.)

If the bushing bore diameter of the cylinder dead is greater than 10.313 mm (0.4060 in.), machine the valve guide bushing bore to the dimension of 10.345 to 10.363 mm (0.4073 to 0.4080 in.)

Valve guide bushing diameter

STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
O/S	10.383 to 10.394 mm (0.4088 to 0.4092 in.)

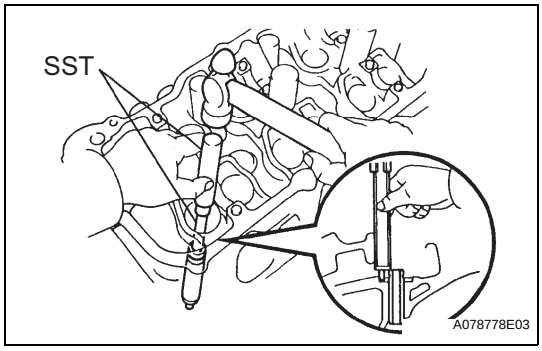


(b) Using vernier calipers, measure the new valve guide bushing length.

Valve guide bushing length

Intake	34.5 mm (1.358 in.)
Exhaust	40.5 mm (1.594 in.)

(c) Heat the cylinder head to 80 to 100 °C (176 to 212 °F).

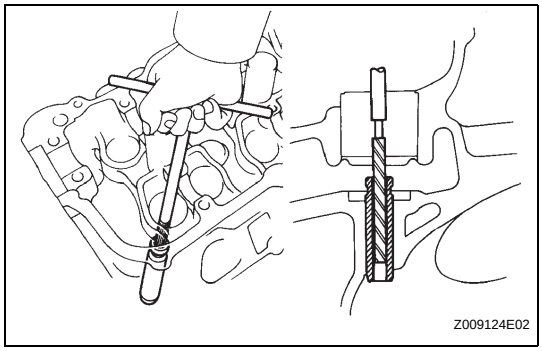


(d) Using SST and a hammer, tap in a new valve guide bushing to the specified protrusion height.

SST 09201-10000, 09201-01055, 09950-70010 (09951-07100)

Protrusion height:

Intake 11.1 to 11.5 mm (0.437 to 0.453 in.)
Exhaust 8.9 to 9.3 mm (0.350 to 0.336 in.)



(e) Using a sharp 5.5 mm reamer, ream the valve guide bushing to obtain the standard specified clearance between the valve guide bushing and the valve stem.

Standard oil clearance:

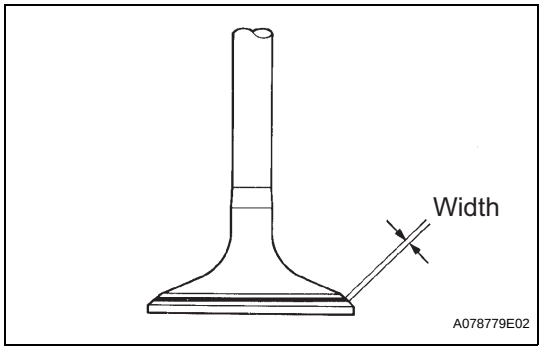
Intake 0.025 to 0.060 mm (0.0010 to 0.0024 in.)
Exhaust 0.030 to 0.065 mm (0.0012 to 0.0026 in.).

12. INSPECT VALVE SEATS

(a) Apply a light coat of prussian blue (or white lead) to the valve face.

(b) Lightly press the valve against the seat.

NOTICE:
Do not rotate the valve.



(c) Check the valve face and seat according to the following procedure.

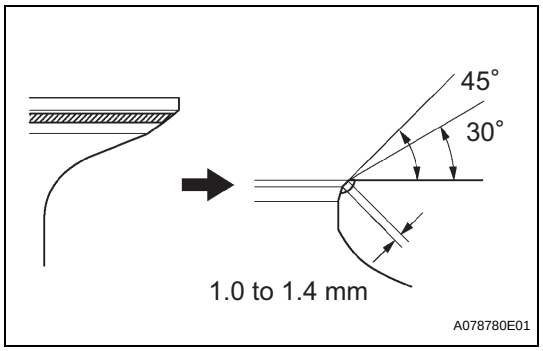
(1) If blue appears 360° around the face, the valve is concentric. If not, replace the valve.

(2) If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.

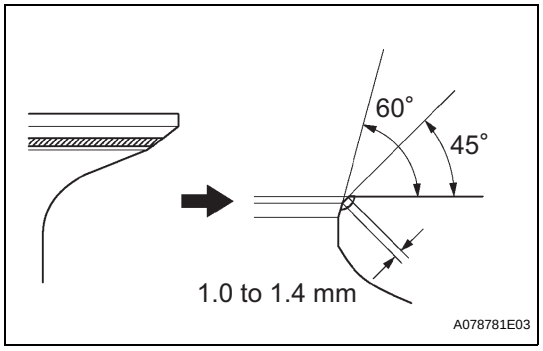
(3) Check that the seat contact is in the middle of the valve face with the width between 1.0 to 1.4 mm (0.039 to 0.055 in.).

13. REPAIR VALVE SEATS

NOTICE:
Releasing the seat-cutter pressure gradually helps to make smoother valve seat faces.

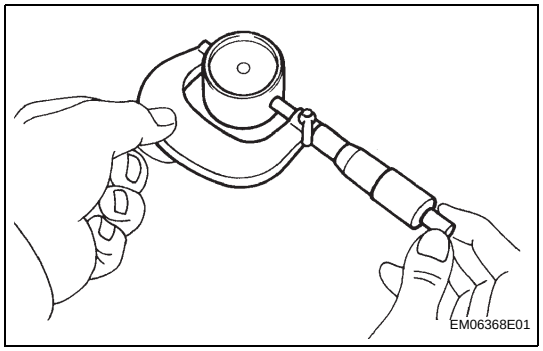


(a) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.



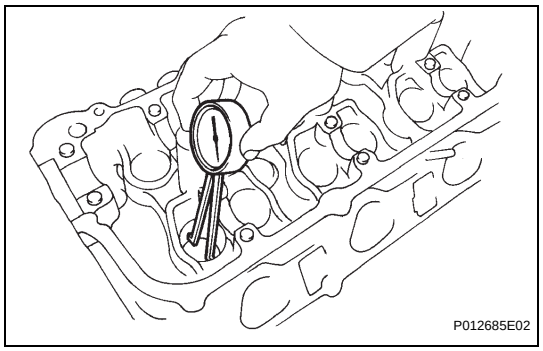
(b) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.
(c) Hand-lap the valve and valve seat with an abrasive compound.
(d) Recheck the valve seating position.

EM



14. INSPECT VALVE LIFTER

(a) Using a micrometer, measure the lifter diameter.
Lifter diameter:
30.966 to 30.976 mm (1.2191 to 1.2195 in.)

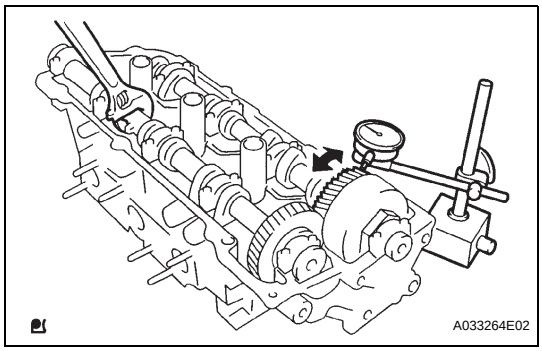


15. INSPECT VALVE LIFTER OIL CLEARANCE

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.
Lifter bore diameter:
31.009 to 31.025 mm (1.2208 to 1.2215 in.)
(b) Subtract the lifter diameter measurement from the lifter bore diameter measurement.
Standard oil clearance:
0.033 to 0.059 mm (0.0013 to 0.0023 in.)
Maximum oil clearance:
0.07 mm (0.0028 in.)

16. INSPECT CAMSHAFT GEAR BACKLASH

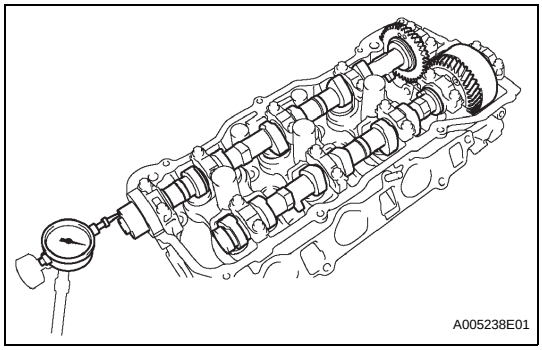
(a) Install camshaft timing gear assembly.
(b) Install the camshafts to the cylinder head.
NOTICE:
- **Install without valves and sub-gear.**
- **Install with its timing mark matched.**



(c) Set the dial indicator to the teeth of the intake camshaft at a right angle (90°).
(d) Measure the backlash of the camshaft timing gear at least 4 positions.
Standard backlash:
0.020 to 0.200 mm (0.0008 to 0.0079 in.)
Maximum backlash:
0.30 mm (0.0118 in.)

17. INSPECT CAMSHAFT THRUST CLEARANCE

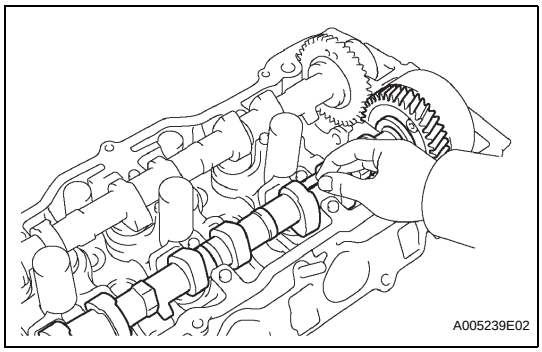
(a) Install the camshafts.



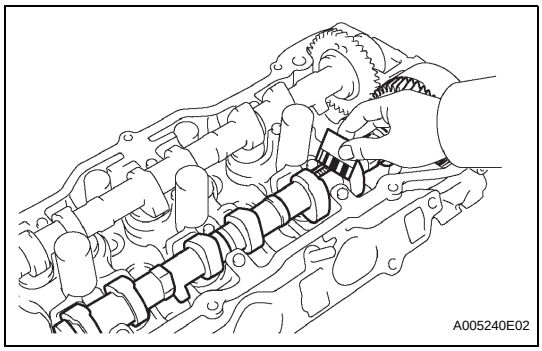
(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.
Standard thrust clearance:
0.040 to 0.090 mm (0.0016 to 0.0035 in.)
Maximum thrust clearance :
0.12 mm (0.0047 in.)
If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head together.

18. INSPECT CAMSHAFT OIL CLEARANCE

(a) Clean the bearing caps and camshaft journals.
(b) Place the camshafts on the cylinder head.



(c) Lay a strip of plastigage across each of the camshaft journal.
(d) Install the bearing caps.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)
NOTICE:
Do not turn the camshaft.
(e) Remove the bearing caps.



(f) Measure the plastigage at its widest point.
Standard oil clearance:
Intake #4, #5 journals 0.025 to 0.057 mm (0.0010 to 0.0022 in.)
Other journals 0.025 to 0.062 mm (0.0010 to 0.0024 in.)
Maximum oil clearance:
0.10 mm (0.039 in.)
If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head together.
NOTICE:
Completely remove the plastigage.