- **Refacing procedure for exhaust valve seats**

① Recondition the roughness on the valve-to-valve seat contact surface, using a 45-degree cutter.

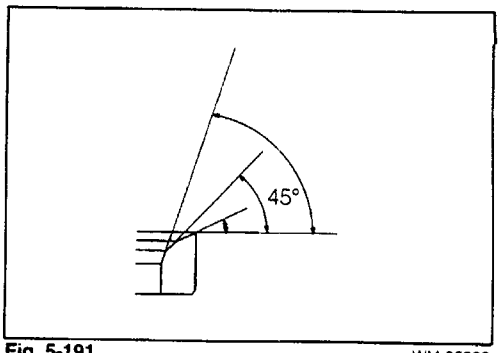

Fig. 5-191 WM-05222

② Using a 20-degree cutter, cut the valve seat in such a way that the circumference of the surface refaced by the 45-degree cutter may becomes 25.0 ± 0.1 mm (0.98 ± 0.004 inches).

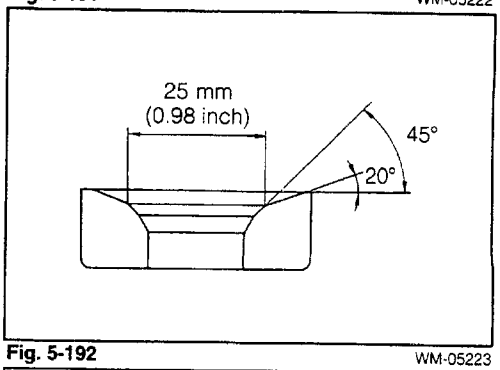

Fig. 5-192 WM-05223

③ Using a 70-degree cutter, cut the valve seat in such a way that the width of the surface refaced by the 45-degree cutter may becomes 1.4 ± 0.2 mm (0.055 ± 0.008 inches).

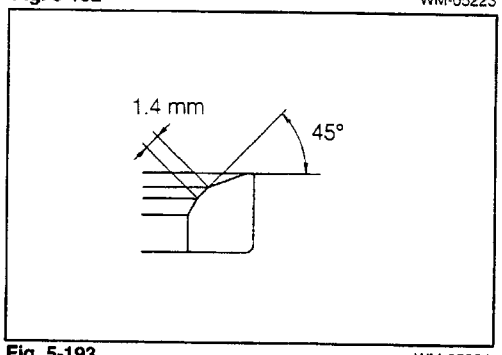

Fig. 5-193 WM-05224

④ Using the 45-degree cutter, remove burrs produced during the refacing by the 20-degree and 70-degree cutters.

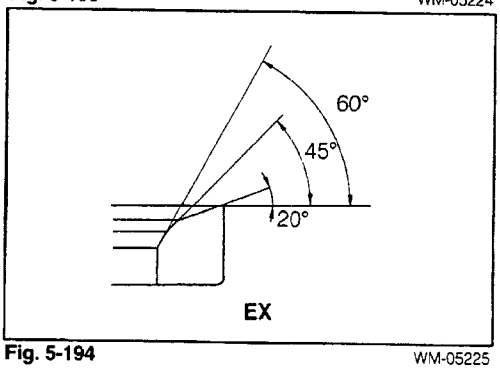

Fig. 5-194 WM-05225

(4) Checking of valve seat recession
After completion of the valve seat refacing, using a micrometer, measure the clearance between the upper end of the valve seat surface refaced by the 45-degree cutter and the cylinder head gasket surface.
Maximum Limit
Intake valve: 4.23 mm (0.1665 inch)
Exhaust valve: 5.30 mm (0.2087 inch)

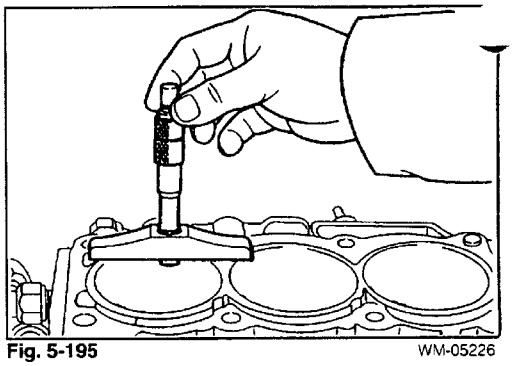
Fig. 5-195 WM-05226

NOTE:
If the recession exceeds the maximum limit, replace the cylinder head.

2. Checking of valves
(1) Checking valve stems
Visually inspect the valve stem for seizure or damage. If the valve exhibits damage, replace it together with the valve guide bush as a set.

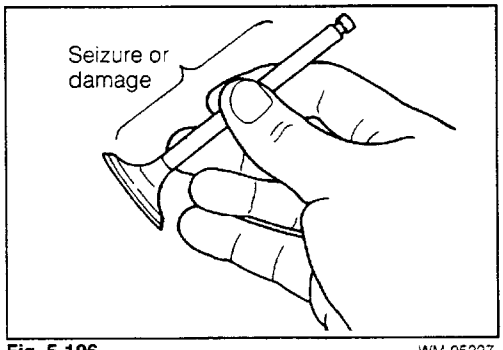

Fig. 5-196 WM-05227

(2) Checking valve stem end
① Check the valve stem end for abnormal wear or damage.

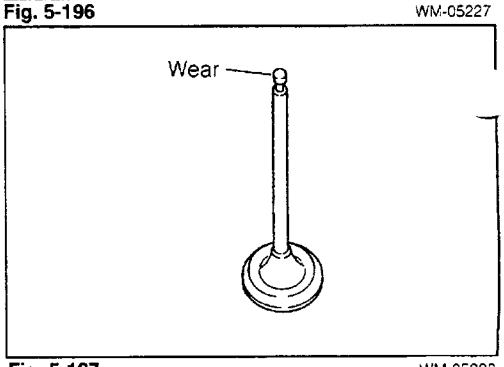

Fig. 5-197 WM-05228

② If the valve stem exhibits abnormal wear, correct the stem end with a valve refacer.
However, make sure that the valve has the following minimum valve overall length given below.
Minimum Valve Overall Length:
Intake valve: 106.4 mm (4.189 inches)
Exhaust valve: 106.6 mm (4.197 inches)

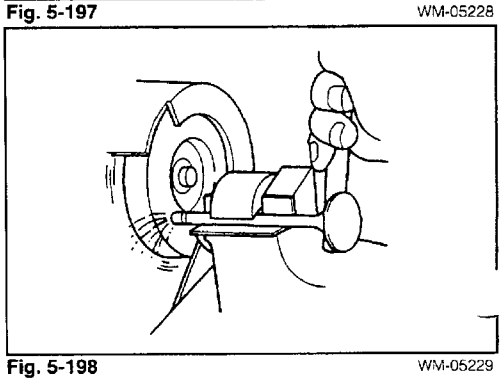
Fig. 5-198 WM-05229

(3) Checking of valve heads

① Check the valve-to-valve seat contact surface for roughness or damage.

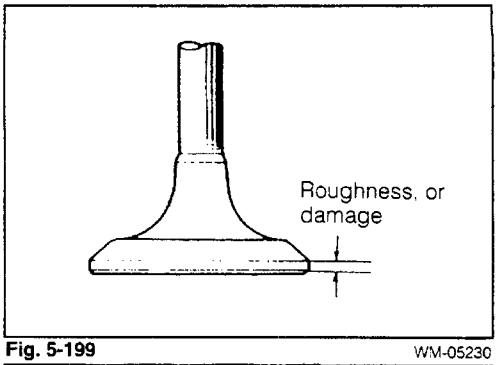

Fig. 5-199 WM-05230

② If the valve-to-valve seat contact surface exhibits any damage, grind the surface with a valve refacer.
Valve Face Angle: 45.5

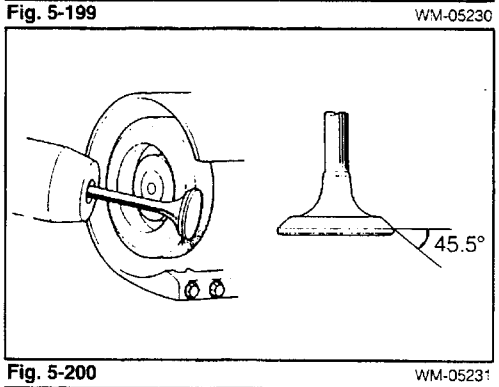

Fig. 5-200 WM-05231

③ After the valve head has been ground, measure the stock thickness of the valve head.
Minimum Limit Intake valve 0.7 mm (0.028 inch)
Exhaust valve 0.8 mm (0.031 inch)

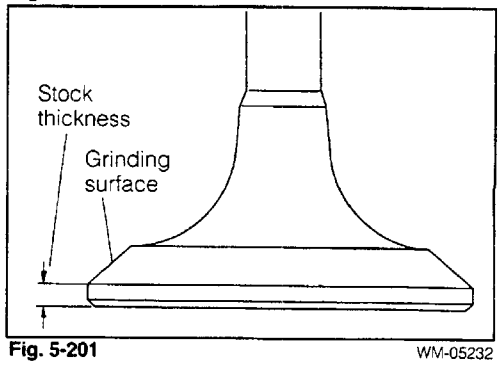

Fig. 5-201 WM-05232

NOTE:
If the stock thickness of the valve head is less than the limit, replace it with a new one.
When replacing the valve head, be sure to check the oil clearance with the valve guide bush.

3. Checking of valve guide bush-to-valve stem oil clearance

(1) Measuring oil clearance
Measure the valve guide bush-to-valve stem oil clearance.
Oil clearance = Inner diameter of valve guide bush − Outer diameter of valve stem
Specified Value: Intake valve: 0.025 - 0.08 mm (0.0009 - 0.0031 inch)
Exhaust valve: 0.030 - 0.09 mm (0.0012 - 0.0035 inch)

WM-05233

① Measurement of inner diameter of valve guide bush
Perform the measurement at six points.

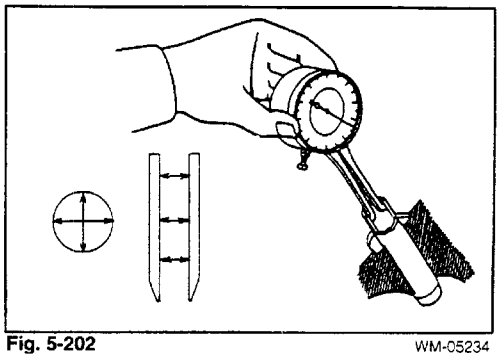

Fig. 5-202 WM-05234

② Measurement of outer diameter of valve stem
Perform the measurement at six points.

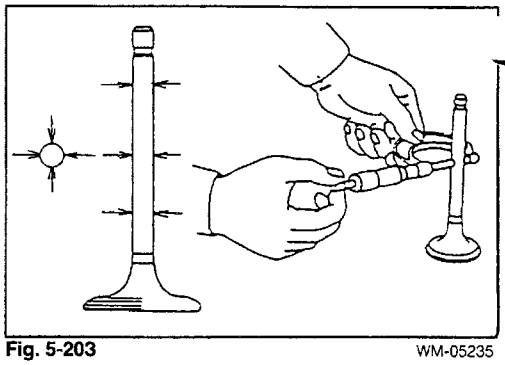
Fig. 5-203 WM-05235

(2) Replacing valve guide bush if necessary
NOTE:
When replacing the valve guide bush, replace also the valve as a set. However, if the intake valve guide bushes with rings (replacement part) have been already installed as valve guide bushes, replace the cylinder head.

WM-05236

- **Exhaust side**

① Drive out valve guide bush from the combustion chamber side, using the SST.
SST: 09201-87201-000

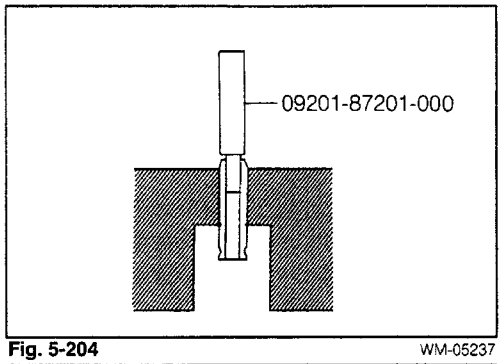

Fig. 5-204 WM-05237

② Measure the inner diameter of the installation hole of the valve guide bush of the cylinder head.
Specified Inner Diameter:
11.05 mm dia. (0.45 inch dia.)

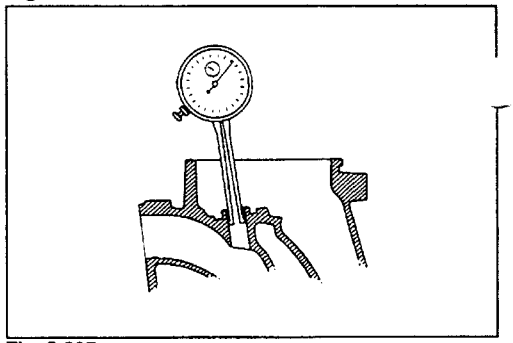
Fig. 5-205 WM-05239

NOTE:
If the measured value exceeds the specified value, replace the cylinder head.

⑤ Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.
SST: 09201-87201-000

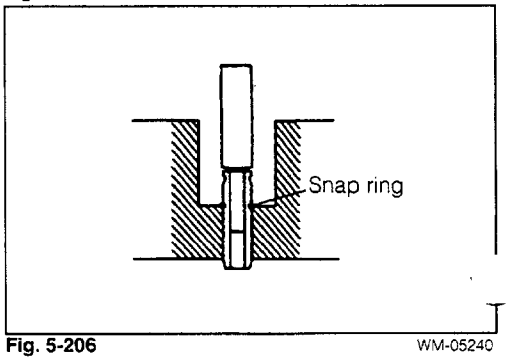

Fig. 5-206 WM-05240

NOTE:
After the valve guide bush has been driven into position, remove any burr or the like, using an adjustable reamer. At this time, make sure that the specified oil clearance is assured between the valve guide bush and the valve stem.

- **Intake side**

① Drive out the valve guide bush from the combustion chamber side, using the following SST.

SST: 09201-87201-000

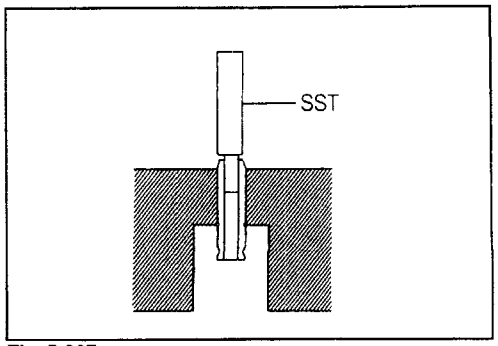

Fig. 5-207 WM-05241

② Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.

SST: 09201-87201-000

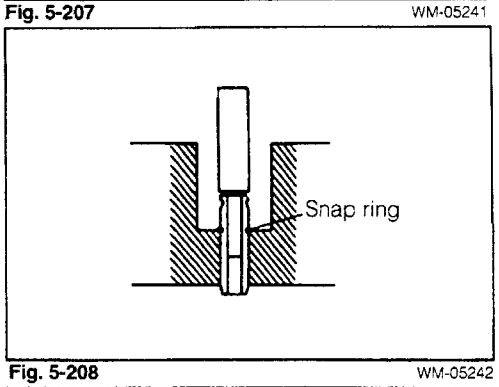

Fig. 5-208 WM-05242

NOTE:

After the valve guide bush has been driven into position, remove any burr or the like, using an adjustable reamer. At this time, make sure that the specified oil clearance is assured between the valve guide bush and the valve stem.

4. Checking of valve springs

(1) Check the valve spring for squareness, using a square.

Maximum limit: 1.6 mm (0.063 inch)

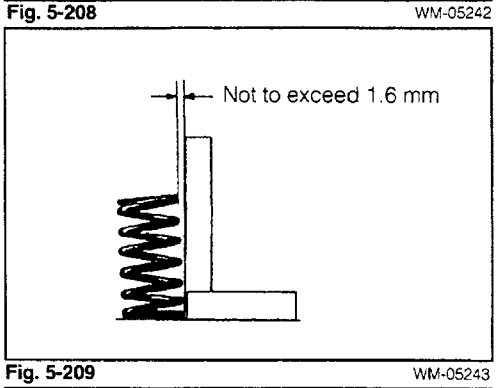

Fig. 5-209 WM-05243

(2) Using a spring tester, measure the free length. Also, measure the spring tension with the spring compressed to the specified installed length.

Minimum free length: 44.5 mm (1.75 inches)

Spring tension:

Minimum limit/installation height

34.4 kg/27.67 mm (75.9 lb/1.09 inches)

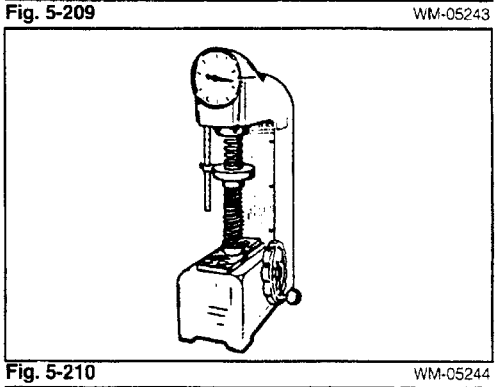

Fig. 5-210 WM-05244

5. Checking of valve lifters and shims

(1) Check the valve lifter shim surfaces for wear or damage.

NOTE:

If the valve lifter exhibits wear or damage, replace it with a shim of the same size as the original valve lifter shim. (The shim size is stamped on the valve lifter shim.)

(2) Checking valve lifters

Check the valve lifters for seizure or damage.

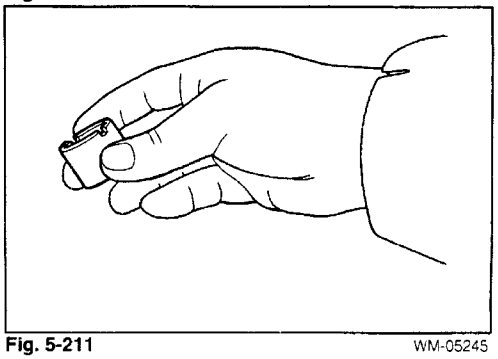

Fig. 5-211 WM-05245

6. Checking of valve lifter-to-cylinder head oil clearance

(1) Measure the inner diameter of the valve lifter hole of the cylinder head.

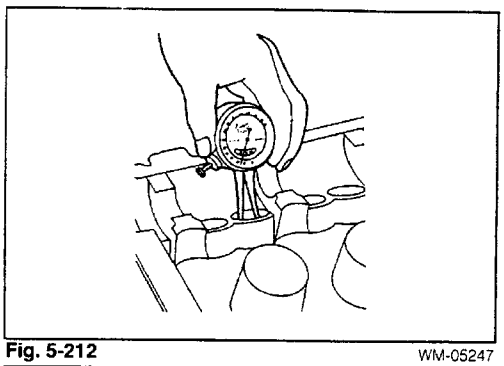

Fig. 5-212 WM-05247

(2) Measure the outer diameter of the valve lifter.
This measurement should be conducted in two directions, 90 degrees apart from each other.

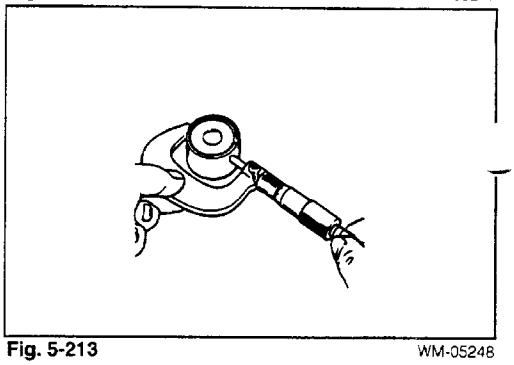

Fig. 5-213 WM-05248

Oil clearance 0.015 - 0.07 mm (0.0006 - 0.0028 inch)
If the oil clearance exceeds the specified value, replace the valve lifter with a new one and/or cylinder head, as required, referring to the following specified dimensions of new valve lifters.

Outer diameter of valve lifter (New part)
29.975 - 29.985 mm (1.1801 - 1.1805 inches)

WM-05249

7. Checking of camshaft
(1) Checking camshaft for runout
Support the camshaft at its both ends with V-shaped blocks. Set a dial gauge to each of the camshaft journal sections No.2, No.3, No.6 and No.7. Turn the camshaft one turn, making sure that the camshaft will not move in the axial direction. Take a reading on the dial gauge during the turning. Calculate the maximum runout, i.e. the difference between the maximum and minimum readings.
Maximum runout: 0.03 mm (0.0012 inch)

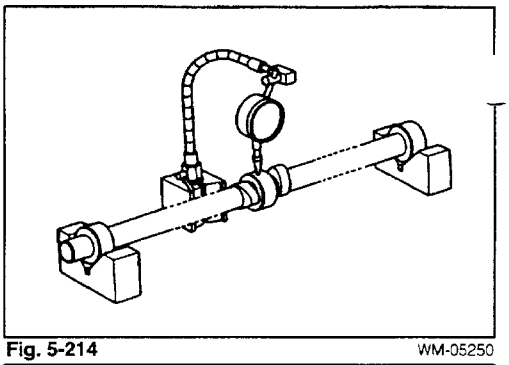

Fig. 5-214 WM-05250

(2) Checking cam lobe height
Measure the cam lobe height.
Minimum limit Intake valve 39.4 mm (1.55 inches)
Exhaust valve 39.0 mm (1.53 inches)

If the measured height is less than the minimum limit, replace the camshaft.

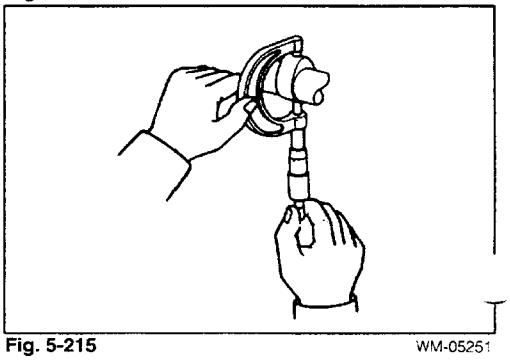

Fig. 5-215 WM-05251