

CYLINDER HEAD

Inspection (Cont'd)

CAMSHAFT CAM HEIGHT

1. Measure camshaft cam height.

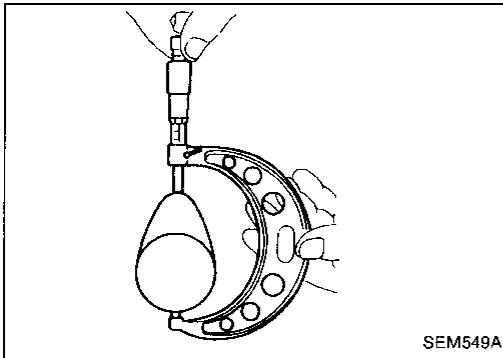
Standard cam height:

Unit: mm (in)

Standard cam height	Non-turbocharger Turbocharger M/T	Turbocharger A/T
	Intake	40.405 - 40.595
Exhaust	(1.5907 - 1.5982)	40.405 - 40.595 (1.5907 - 1.5982)

Cam wear limit: 0.15 mm (0.0059 in)

2. If wear is beyond the limit, replace camshaft.

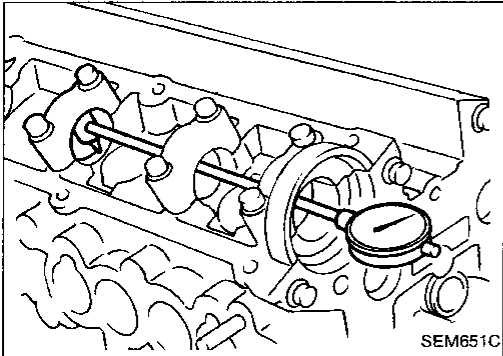


CAMSHAFT JOURNAL CLEARANCE

1. Install camshaft bracket and tighten bolts to the specified torque.
2. Measure inner diameter of camshaft bearing.

Standard inner diameter:

28.000 - 28.021 mm (1.1024 - 1.1032 in)



3. Measure outer diameter of camshaft journal.

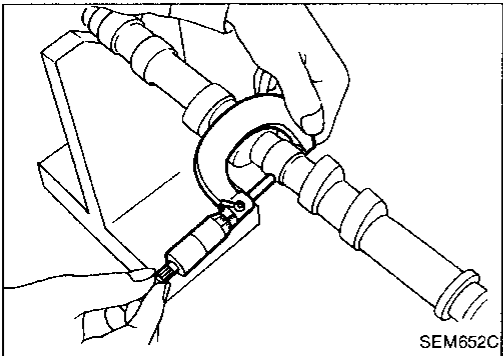
Standard outer diameter:

27.935 - 27.955 mm (1.0998 - 1.1006 in)

4. If clearance exceeds the limit, replace camshaft and/or cylinder head.

Camshaft journal clearance limit:

0.15 mm (0.0059 in)



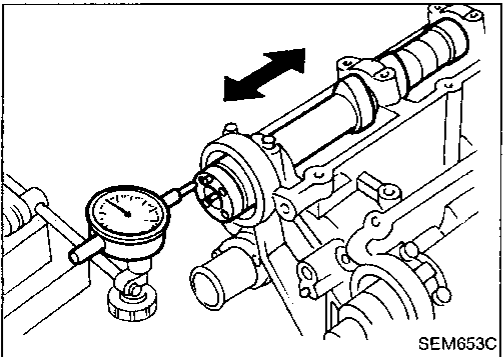
CAMSHAFT END PLAY

1. Install camshaft in cylinder head.
2. Measure camshaft end play.

Camshaft end play:

Standard

0.03 - 0.08 mm (0.0012 - 0.0031 in)

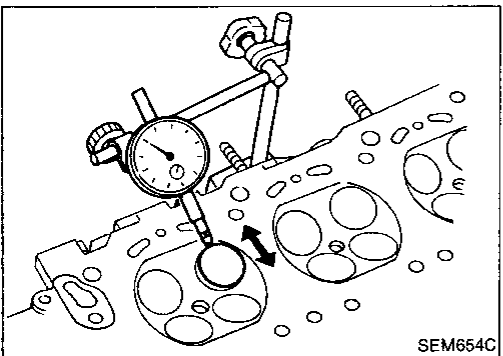


VALVE GUIDE CLEARANCE

1. Push valve stem out so that its end is even with valve guide end. Measure valve runout by moving valve.

Valve deflection limit (Dial gauge reading):

0.20 mm (0.0079 in)



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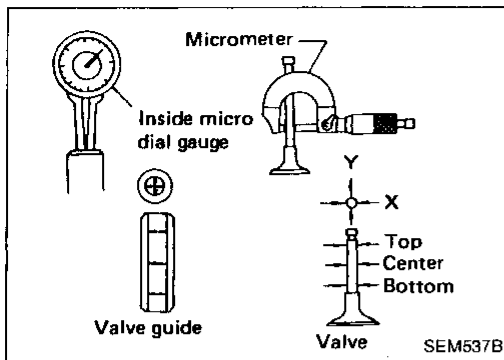
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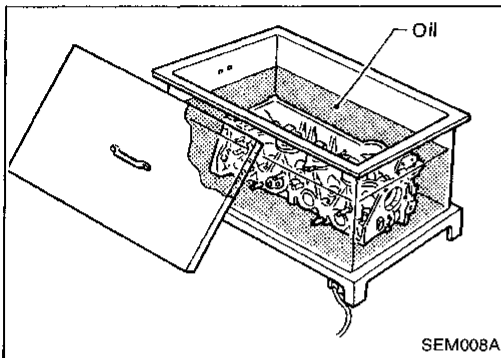
CYLINDER HEAD

Inspection (Cont'd)

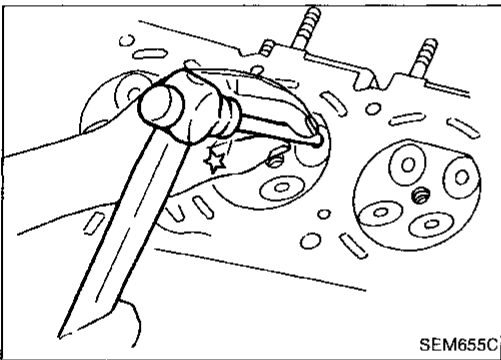


2. If it exceeds the limit, check valve to valve guide clearance.
 - a. Measure valve stem diameter and valve guide inner diameter.
 - b. Check that clearance is within specification.
Valve to valve guide clearance limit:
0.10 mm (0.0039 in)
 - c. If it exceeds the limit, replace valve or valve guide.

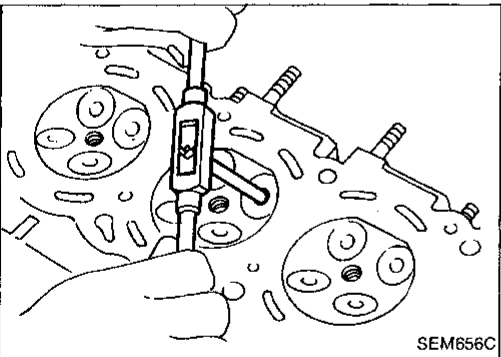
VALVE GUIDE REPLACEMENT



1. To remove valve guide, heat cylinder head to 150 to 160°C (302 to 320°F).



2. Drive out valve guide with a press [under a 20 kN (2 ton, 2.2 US ton, 2.0 Imp ton) pressure] or hammer and suitable tool.

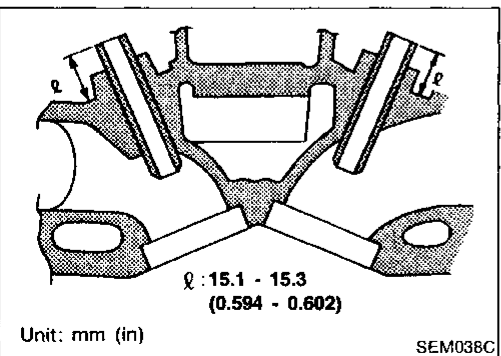


3. Ream cylinder head valve guide hole.

**Valve guide hole diameter
(for service parts):**

Intake and Exhaust

10.175 - 10.196 mm (0.4006 - 0.4014 in)



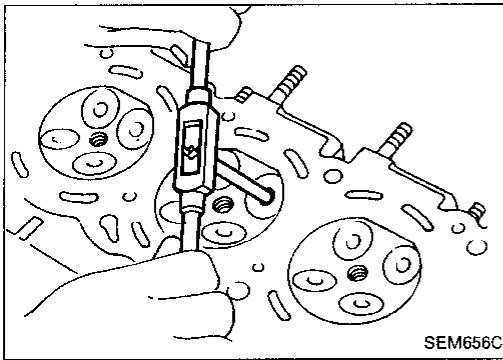
4. Heat cylinder head to 150 to 160°C (302 to 320°F) and press service valve guide onto cylinder head.

Projection "ℓ":

15.1 - 15.3 mm (0.594 - 0.602 in)

CYLINDER HEAD

Inspection (Cont'd)



SEM656C

5. Ream valve guide.

Finished size:

Intake and Exhaust

6.000 - 6.018 mm (0.2362 - 0.2369 in)

GI

MA

EM

VALVE SEATS

Check valve seats for evidence of pitting at valve contact surface. Reseat or replace if it is worn excessively.

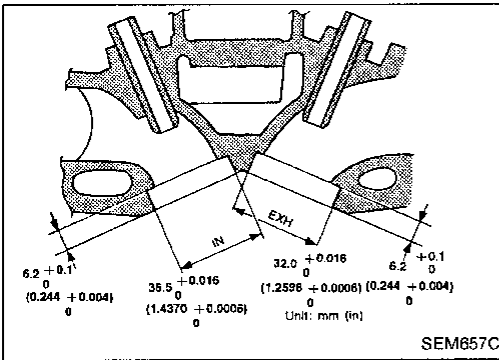
- Before repairing valve seats, check valve and valve guide for wear. If they have worn, replace them. Then correct valve seat.
- Cut with both hands to assure a uniform surface.

LC

EF &
EC

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SEM657C

REPLACING VALVE SEAT FOR SERVICE PARTS

1. Bore out old seat until it collapses. The machine depth stop should be set so that boring cannot continue beyond the bottom face of the seat recess in cylinder head.
2. Ream cylinder head recess.

Reaming bore for service valve seat

Oversize [0.5 mm (0.020 in)]:

Intake 36.500 - 36.516 mm (1.4370 - 1.4376 in)

Exhaust 32.000 - 32.016 mm (1.2598 - 1.2605 in)

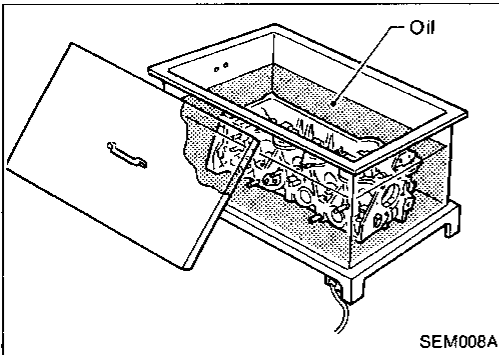
Reaming should be done to the concentric circles to valve guide center so that valve seat will have the correct fit.

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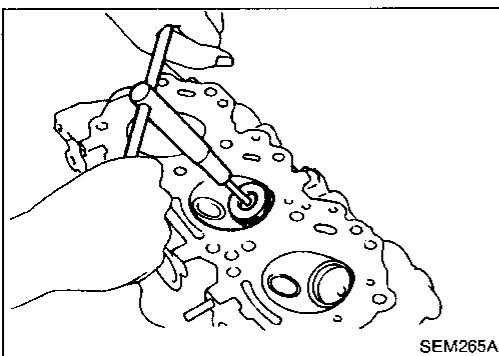
3. Heat cylinder head to 150 to 160°C (302 to 320°F).
4. Press fit valve seat until it seats on the bottom.

RA

BR

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BF



SEM265A

5. Cut or grind valve seat using suitable tool at the specified dimensions as shown in SDS (EM-55).
6. After cutting, lap valve seat with abrasive compound.
7. Check valve seat contact condition.

HA

EL

IDX