<SUPPLEMENT-V>

ENGINE MECHANICAL

SECTION EM

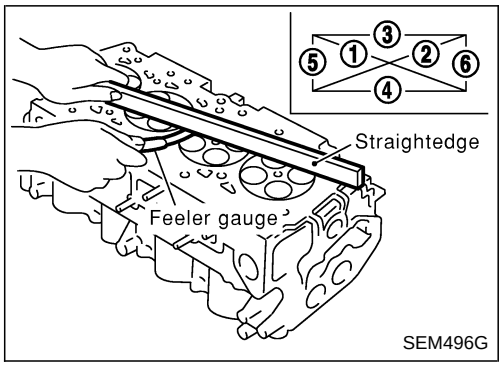
MODIFICATION NOTICE:

- YD25DDTi engine information has been added.

For information not included here, refer to information for YD25DDTi engine in D22 Supplement-VI 1st Revision Service Manual (SM1E-1D22FG1).

CONTENTS

YD



Inspection

CYLINDER HEAD DISTORTION

Clean surface of cylinder head. Use a reliable straightedge and feeler gauge to check the flatness of cylinder head surface. Check along six positions shown in the figure.

Head surface flatness: Limit 0.1 mm (0.004 in)

If beyond the specified limit, resurface or replace it.

The limit for cylinder head resurfacing is determined by the cylinder block resurfacing.

Resurfacing limit:

Amount of cylinder head resurfacing is “A”.

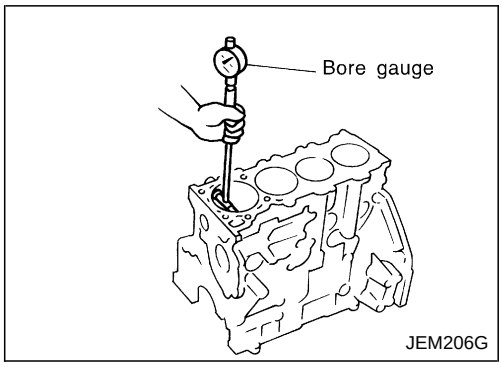
Amount of cylinder block resurfacing is “B”.

The maximum limit: A + B = 0.07 mm (0.0028 in)

After resurfacing cylinder head, check that camshaft rotates freely by hand. If resistance is felt, cylinder head must be replaced.

Nominal cylinder head height:

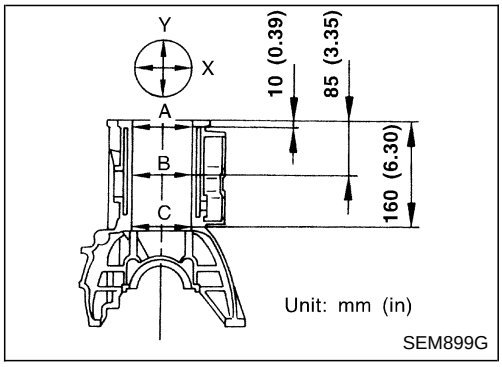
153.9 - 154.1 mm (6.059 - 6.067 in)

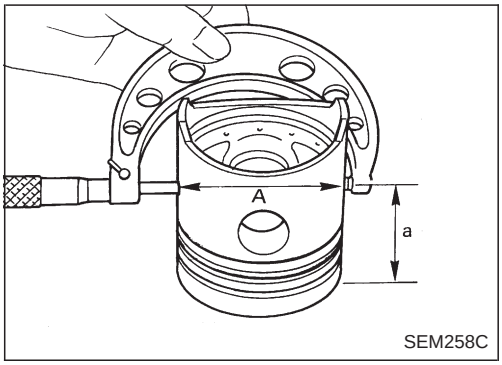


Inspection

PISTON-TO-BORE CLEARANCE

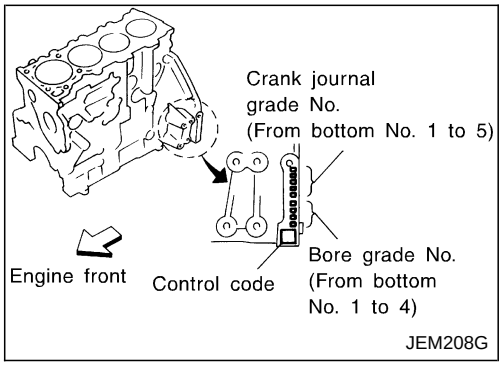
1. Using a bore gauge, measure cylinder bore in X and Y directions at A, B and C for wear, out-of-round and taper.
   Cylinder bore inner diameter:
   Standard
   89.000 - 89.030 mm (3.5039 - 3.5051 in)
   Wear limit
   0.07 mm (0.0028 in)
   If it exceeds the limit, rebore all cylinders. Replace cylinder block if necessary.
   Out-of-round (Difference between X and Y):
   Limit 0.015 mm (0.0006 in)
   Taper (Difference between A and C):
   Limit 0.010 mm (0.0004 in)
2. Check for scratches and seizure. If seizure is found, hone it.





3. Measure piston skirt diameter.
   Piston diameter “A”:
   Standard
   88.925 - 88.955 mm (3.5010 - 3.5022 in)
   Measuring point “a” (Distance from the top):
   59.0 mm (2.323 in)
4. Check that piston-to-bore clearance is within specification.

- Calculate the clearance by using outer diameter at piston skirt and inner diameter of cylinder (direction of X, point B):
  Piston-to-bore clearance = Cylinder bore − Piston diameter “A”
  Standard [at room temperature 20°C (68°F)]:
  0.065 - 0.085 mm (0.0026 - 0.0033 in)
- If the value is out of the specified range, replace piston and piston pin assembly.

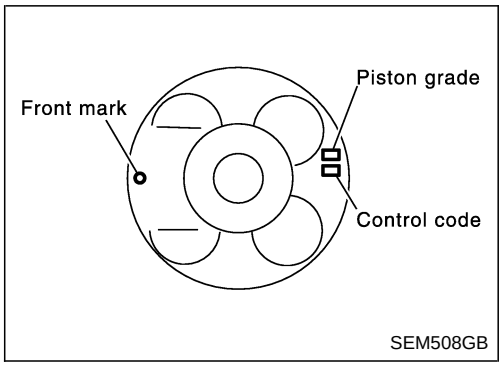


- If cylinder block or pistons are replaced with new ones, select piston as follows:

When using a new cylinder block:

- Identify the cylinder bore grade (No. 1, 2, or 3) on LH surface at the rear of cylinder block and select a piston of the same grade.
- The part No. of piston is specified together with the piston pin as an assembly.

Inspection (Cont'd)



When re-using a removed cylinder block:

- Measure the inner diameter of the cylinder block bore.
- Determine the bore grade by comparing the measurement with the values under "Cylinder bore ID" of the table below. Choose a piston of the same grade.

Selective fitting for piston:

Unit: mm (in)

Grade (punched)	1	2	3
Cylinder bore ID	89.000 - 89.010 (3.5039 - 3.5043)	89.010 - 89.020 (3.5043 - 3.5047)	89.020 - 89.030 (3.5047 - 3.5051)
Piston OD	88.925 - 88.935 (3.5010 - 3.5014)	88.935 - 88.945 (3.5014 - 3.5018)	88.945 - 88.955 (3.5018 - 3.5022)

5. Determine piston oversize according to amount of cylinder wear.

- **For oversize pistons, 0.25 and 0.5 OS [0.25 mm (0.0098 in), 0.5 mm (0.0197 in) oversize] are available as service parts. Refer to SDS, EM-5006. When using an oversize piston, hone cylinder so that the clearance between piston and cylinder becomes the specified value. Be sure to use appropriate oversize piston ring for the oversize piston.**

6. Cylinder bore size is determined by adding piston-to-bore clearance to piston diameter "A".

   Rebored size calculation: D = A + B − C

   where,
   D: Bored diameter
   A: Piston diameter as measured
   B: Piston-to-bore clearance
   C: Honing allowance 0.02 mm (0.0008 in)

7. Cut cylinder bores.

- **When any cylinder needs boring, all other cylinders must also be bored.**
- **Do not cut too much out of cylinder bore at a time. Cut only 0.05 mm (0.0020 in) or so in diameter at a time.**

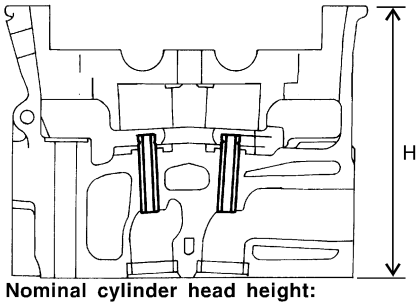
8. Hone cylinders to obtain specified piston-to-bore clearance.
9. Measure finished cylinder bore for out-of-round and taper.

- **Measurement should be done after cylinder bore cools down.**

Cylinder Head

Unit: mm (in)

	Standard	Limit
Head surface distortion	Less than 0.03 (0.0012)	0.1 (0.004)

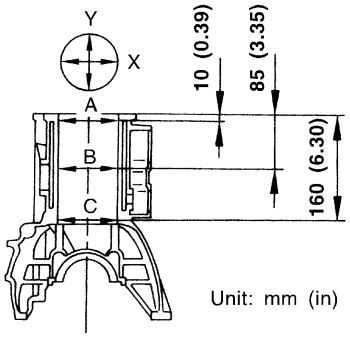


Nominal cylinder head height:
H = 153.9 - 154.1 mm (6.059 - 6.067 in)

JEM204G

Cylinder Block

Unit: mm (in)



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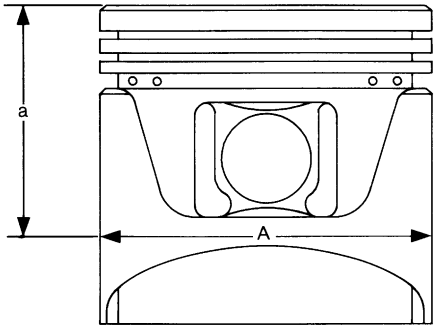
Surface flatness	Standard			Less than 0.03 (0.0012)
	Limit			0.1 (0.004)
Cylinder bore	Inner diameter	Standard	Grade No. 1	89.000 - 89.010 (3.5039 - 3.5043)
			Grade No. 2	89.010 - 89.020 (3.5043 - 3.5047)
			Grade No. 3	89.020 - 89.030 (3.5047 - 3.5051)
		Wear limit		0.07 (0.0028)
Out-of-round (Difference between X and Y)				Less than 0.015 (0.0006)
Taper (Difference between A and C)				Less than 0.010 (0.0004)

Piston, Piston Ring and Piston Pin

AVAILABLE PISTON

Unit: mm (in)



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Piston skirt diameter “A”	Standard	Grade No. 1	88.925 - 88.935 (3.5010 - 3.5014)
		Grade No. 2	88.935 - 88.945 (3.5014 - 3.5018)
		Grade No. 3	88.945 - 88.955 (3.5018 - 3.5022)
		0.25 (0.0098) oversize (Service)	89.175 - 89.205 (3.5108 - 3.5120)
		0.50 (0.0197) oversize (Service)	89.425 - 89.455 (3.5207 - 3.5218)
“a” dimension			59.0 (2.323)
Piston clearance to cylinder block			0.065 - 0.085 (0.0026 - 0.0033)