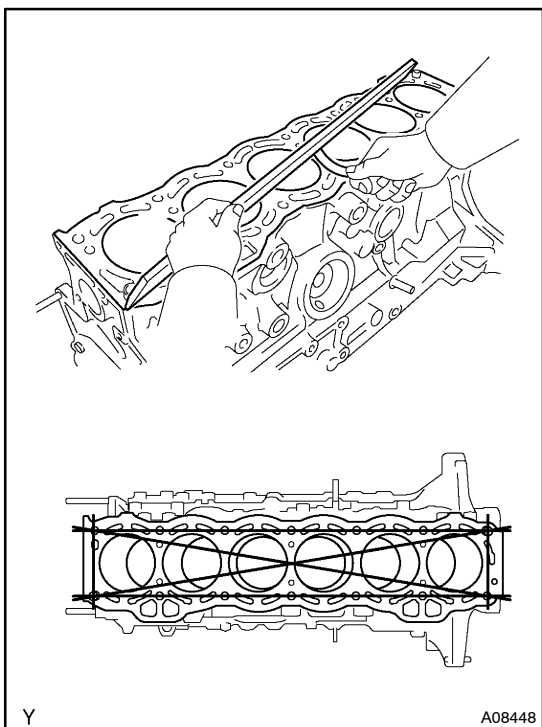


## INSPECTION

### 1. CLEAN CYLINDER BLOCK

- (a) Remove the gasket material.  
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.
- (b) Clean the cylinder block.  
Using a soft brush and solvent, thoroughly clean the cylinder block.

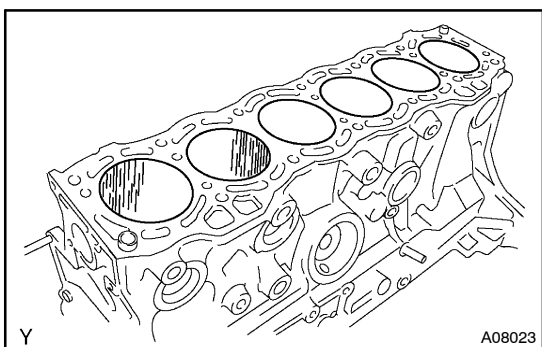


### 2. INSPECT CYLINDER BLOCK

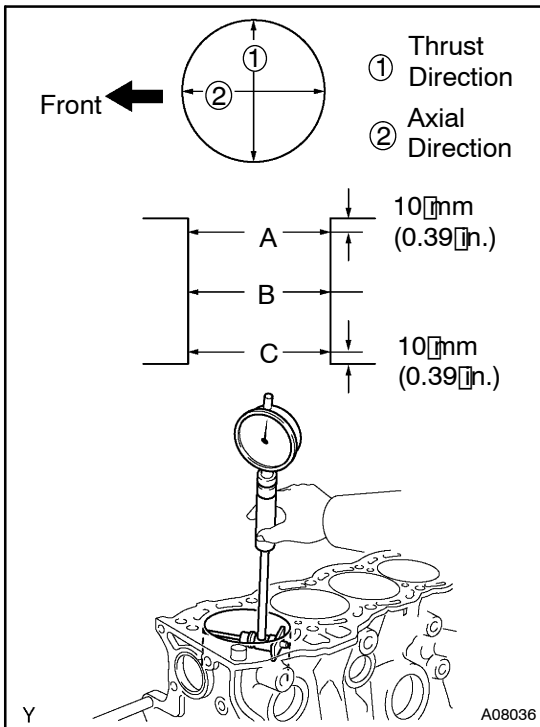
- (a) Inspect for flatness.  
Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

**Maximum warpage: 0.05 mm (0.0020 in.)**

If warpage is greater than maximum, replace the cylinder block.



- (b) Visually check the cylinder for vertical scratches.  
If deep scratches are found, rebore all the 6 cylinders and replace all the 6 pistons. (See page EM-94) If necessary, replace the cylinder block.



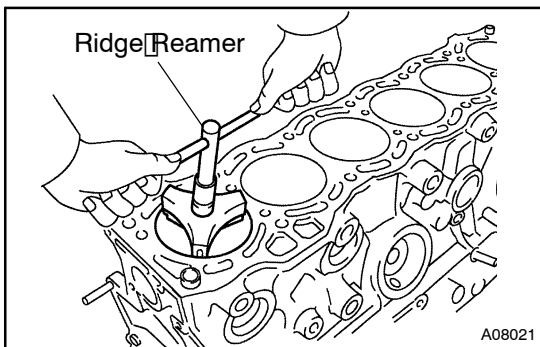
- (c) Inspect the cylinder bore diameter. Using a cylinder gauge, measure the cylinder bore diameter at the positions A, B and C in the thrust and axial directions.

**Standard diameter:**

**75.010 – 75.023 mm (2.9531 – 2.9537 in.)**

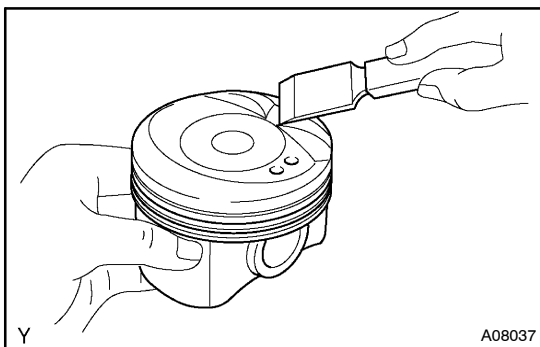
**Maximum diameter: 75.223 mm (2.9615 in.)**

If the diameter is greater than maximum, rebore all the 6 cylinders and replace all the 6 pistons. (See page EM-94) If necessary, replace the cylinder block.



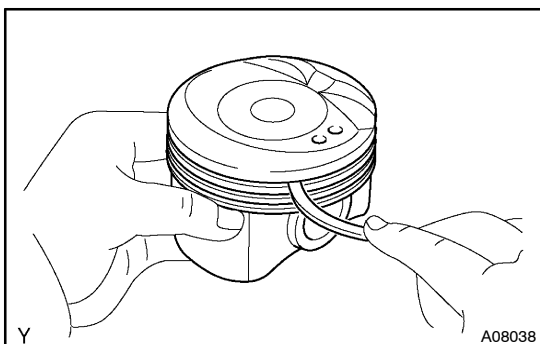
- (d) Remove the cylinder ridge.

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

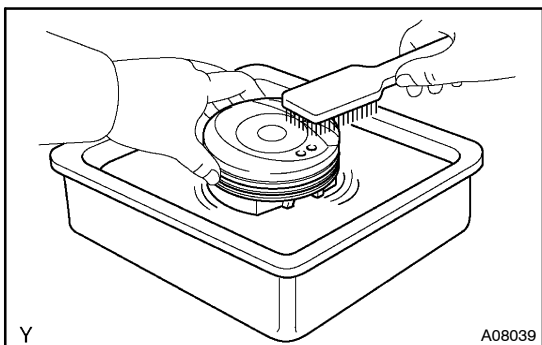


### 3. CLEAN PISTON

- (a) Using a gasket scraper, remove the carbon from the piston top.



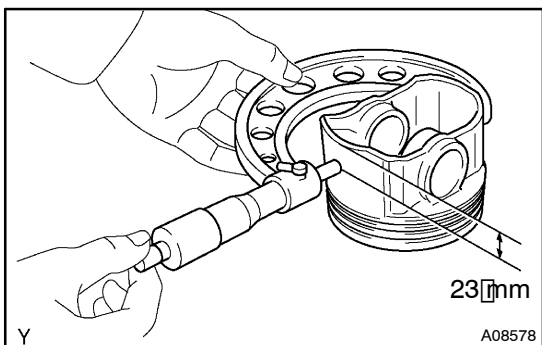
- (b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

**NOTICE:**

**Do not use a wire brush.**



**4. INSPECT PISTON AND CONNECTING ROD**

(a) Inspect the piston oil clearance.

- (1) Using a micrometer, measure the piston diameter at a right angles to the piston pin center line, 23 mm (0.91 in.) below the skirt bottom edge.

**Piston diameter:**

STD	74.93 - 74.94 mm (2.9500 - 2.9504 in.)
O/S 0.50	75.43 - 75.44 mm (2.9697 - 2.9701 in.)

- (2) Measure the cylinder bore diameter in the thrust directions. (See step 2)

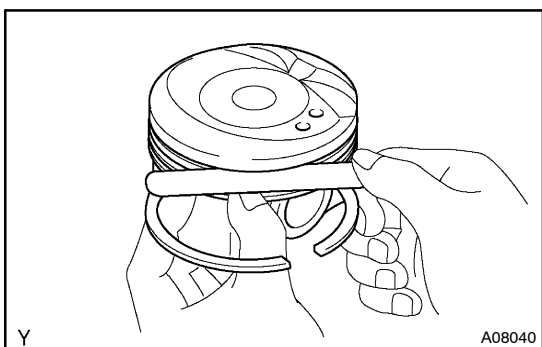
- (3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

**Standard oil clearance:**

**0.070 - 0.093 mm (0.0028 - 0.0037 in.)**

**Maximum oil clearance: 0.11 mm (0.0043 in.)**

If the oil clearance is greater than maximum, replace all the pistons and rebore all the cylinders. (See page EM-94) If necessary, replace the cylinder block.



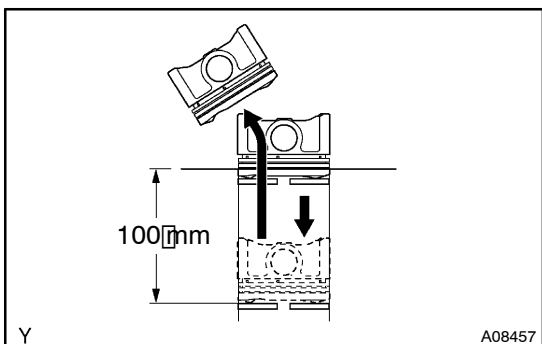
(b) Inspect the piston ring groove clearance.

Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

**Ring groove clearance:**

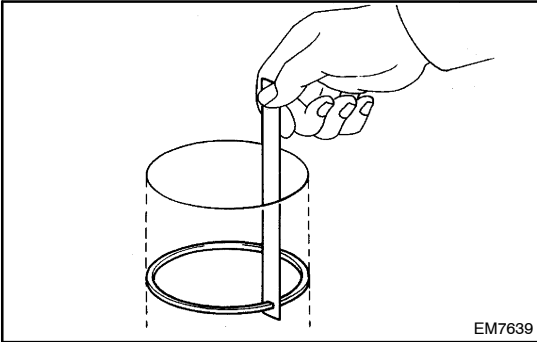
No.1	0.030 - 0.080 mm (0.0012 - 0.0031 in.)
No.2	0.030 - 0.070 mm (0.0012 - 0.0028 in.)

If the clearance is not as specified, replace the piston.



(c) Inspect the piston ring end gap.

- (1) Insert the piston ring into the cylinder bore.
- (2) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 100 mm (3.94 in.) from the top of the cylinder block.



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(3) Using a feeler gauge, measure the end gap.

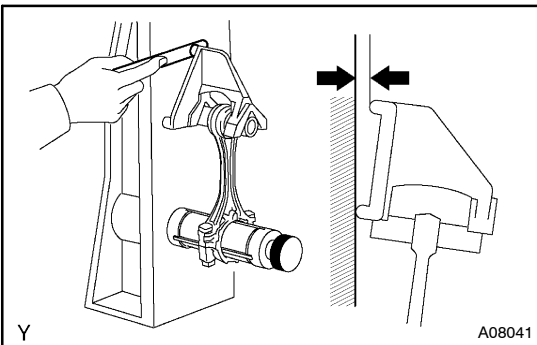
**Standard end gap:**

No.1	0.20–0.30 mm (0.0078 – 0.0118 in.)
No.2	0.35 – 0.50 mm (0.0138 – 0.0196 in.)
Oil (Side/Jail)	0.15 – 0.40 mm (0.0059 – 0.0157 in.)

**Maximum end gap:**

No.1	0.90 mm (0.0354 in.)
No.2	1.10 mm (0.0433 in.)
Oil (Side/Jail)	1.00 mm (0.0394 in.)

If the end gap is greater than maximum, replace the piston ring. If the end gap is greater than maximum, even with a new piston ring, rebore all the cylinders (see page EM-94) or replace the cylinder block.



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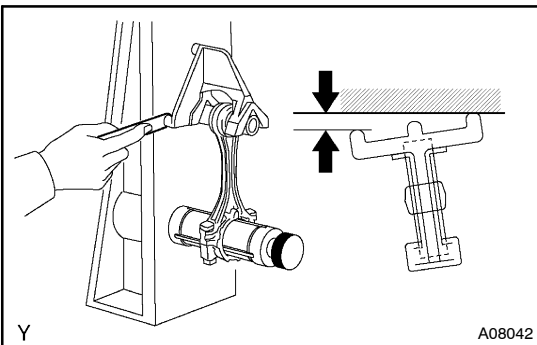
A08041

(d) Using a rod aligner and feeler gauge, check the connecting rod alignment.

(1) Check for out-of-alignment.

**Maximum out-of-alignment:****0.05 mm (0.0020 in.) per 100 mm (3.94 in.)**

If out-of-alignment is greater than maximum, replace the connecting rod assembly.



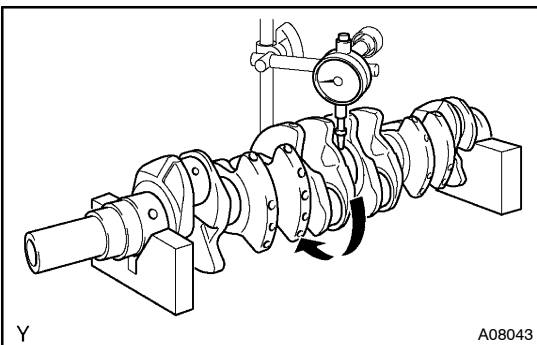
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(2) Check for twist

**Maximum twist:****0.15 mm (0.0059 in.) per 100 mm (3.94 in.)**

If twist is greater than maximum, replace the connecting rod assembly.



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A08043

**5. INSPECT CRANKSHAFT**

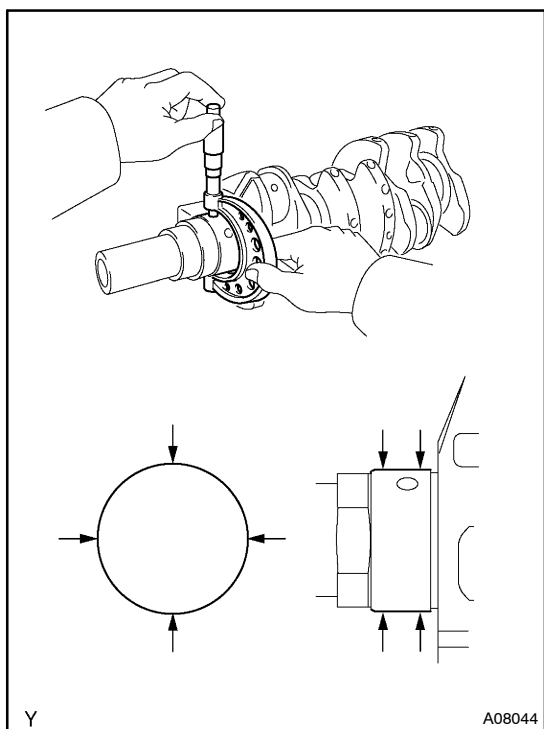
(a) Inspect for circle runout.

(1) Place the crankshaft on V-blocks.

(2) Using a dial indicator, measure the circle runout at the center journal.

**Maximum circle runout: 0.06 mm (0.0024 in.)**

If the circle runout is greater than maximum, replace the crankshaft.



(b) Inspect the main journals and crank pins.

(1) Using a micrometer, measure the diameter of each main journal and crank pin.

**Main journal diameter:**

No.4	STD size	54.970 - 54.988 mm (2.1641 - 2.1649 in.)
Others	STD size	54.982 - 55.000 mm (2.1646 - 2.1654 in.)

**Crank pin diameter:**

STD size	43.985 - 44.000 mm (1.7317 - 1.7322 in.)
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If the diameter is not as specified, check the oil clearance. (See page EM-82) If necessary, grind or replace the crankshaft.

(2) Check each main journal and crank pin for taper and out-of-round as shown.

**Maximum taper and out-of-round:**

**0.02 mm (0.0008 in.)**

If the taper and out-of-round is greater than maximum, replace the crankshaft.

**6. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS**

Grind and hone the main journals and/or crank pins to the finished undersized diameter. (See procedure in step 5) Install new main journal and/or crankshaft pin undersized bearings.