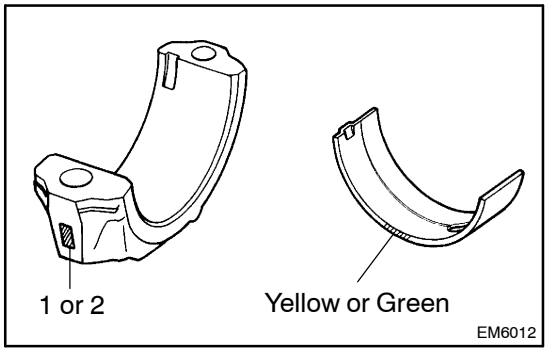
EM14O–03

# INSPECTION




## 1. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

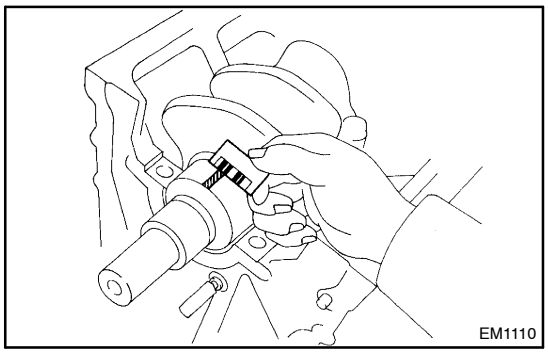
HINT:

There are 2 sizes of standard bearings, colored yellow and green. If using a standard bearing, select one having the color corresponding to the number on the bearing cap:

1 with Yellow, 2 with Green

**Standard sized bearing center wall thickness:**

| | |
|---|---|
| Yellow | 1.980 – 1.985 mm (0.0780 – 0.0781 in.) |
| Green | 1.986 – 1.990 mm (0.0782 – 0.0783 in.) |




## 2. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

Check crankshaft journal oil clearance

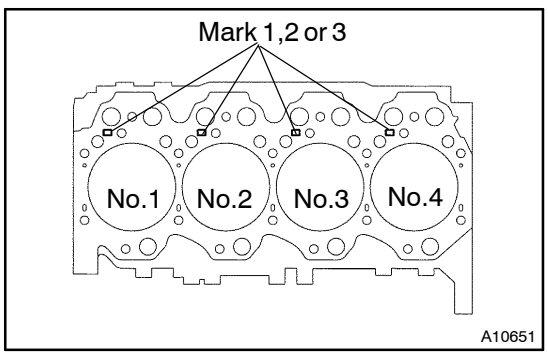
**Standard oil clearance:**

| | | |
|---|---|---|
| STD | No.3 | 0.059 – 0.099 mm (0.0023 – 0.0039 in.) |
| | Others | 0.029 – 0.069 mm (0.0011 – 0.0027 in.) |
| U/S | No.3 | 0.059 – 0.101 mm (0.0023 – 0.0040 in.) |
| | Others | 0.029 – 0.071 mm (0.0011 – 0.0028 in.) |

**Maximum clearance:**

| | |
|---|---|
| No.3 | 0.15 mm (0.0059 in.) |
| Others | 0.10 mm (0.0039 in.) |

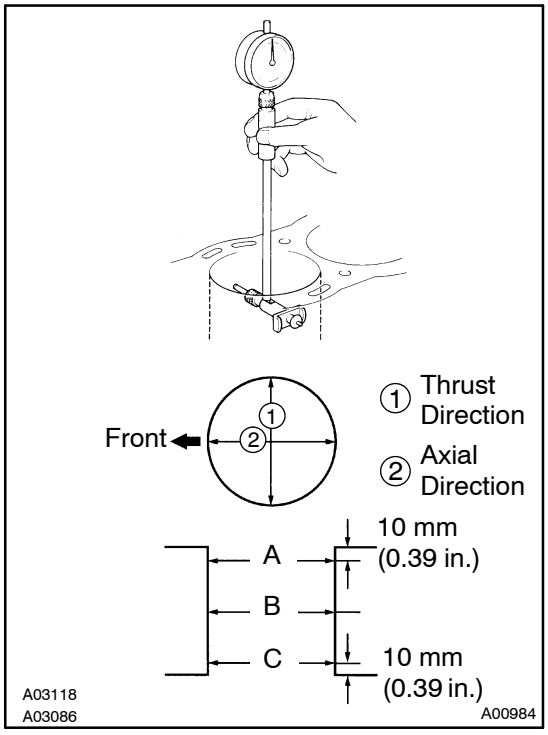
If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.




## 3. INSPECT CYLINDER BORE DIAMETER

HINT:

There are 3 sizes of the standard cylinder bore diameter, marked ”1”, ”2” and ”3” accordingly. The mark is stamped on the top of the cylinder block.




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

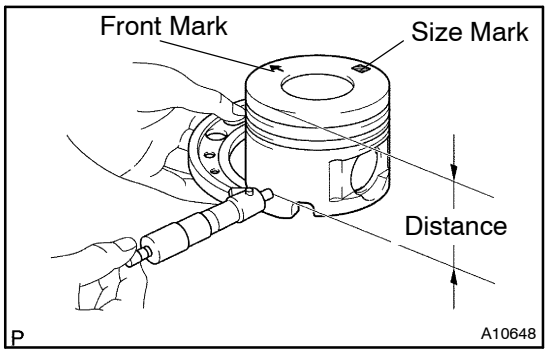
**Standard diameter:**

| | |
|---|---|
| STD Mark 1 | 108.000 – 108.010 mm (4.2520 – 4.2524 in.) |
| Mark 2 | 108.010 – 108.020 mm (4.2524 – 4.2528 in.) |
| Mark 3 | 108.020 – 108.030 mm (4.2528 – 4.2531 in.) |
| O/S 0.50 | 108.500 – 108.530 mm (4.2717 – 4.2728 in.) |
| O/S 0.75 | 108.750 – 108.780 mm (4.2815 – 4.2827 in.) |
| O/S 1.00 | 109.000 – 109.030 mm (4.2913 – 4.2925 in.) |

**Maximum diameter:**

| | |
|---|---|
| STD | 108.030 mm (4.2531 in.) |
| O/S 0.50 | 108.530 mm (4.2728 in.) |
| O/S 0.75 | 108.780 mm (4.2827 in.) |
| O/S 1.00 | 109.030 mm (4.2925 in.) |

If the diameter is greater than maximum, rebore all the 4 cylinders. If necessary, replace the cylinder block.




**4. INSPECT PISTON AND PISTON RING**

(a) Inspect the piston oil clearance

HINT:

There are 3 sizes of the standard piston diameter, marked ”1”, ”2” and ”3” accordingly. The mark is stamped on the piston top.

(1) Using a micrometer, measure the piston diameter at right angles to the piston center line, the indicated distance from the piston head.

**Distance: 76.55 mm (3.0138 in.)**

**Piston diameter:**

| | |
|---|---|
| STD Mark 1 | 107.880 – 107.890 mm (4.2472 – 4.2476 in.) |
| Mark 2 | 107.890 – 107.900 mm (4.2476 – 4.2480 in.) |
| Mark 3 | 107.900 – 107.910 mm (4.2480 – 4.2484 in.) |
| O/S 0.50 | 108.380 – 108.410 mm (4.2669 – 4.2681 in.) |
| O/S 0.75 | 108.630 – 108.660 mm (4.2768 – 4.2779 in.) |
| O/S 1.00 | 108.880 – 108.910 mm (4.2866 – 4.2878 in.) |

(2) Measure the cylinder bore diameter in the thrust directions. (See step 3)

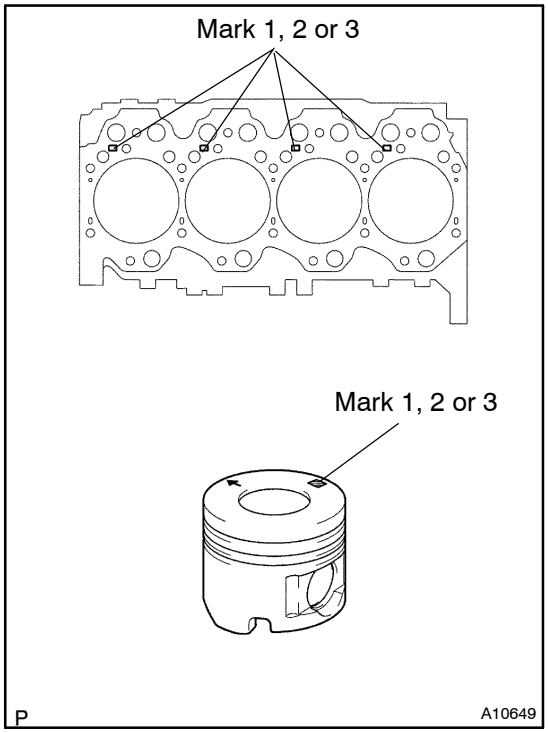
(3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

**Standard oil clearance:**

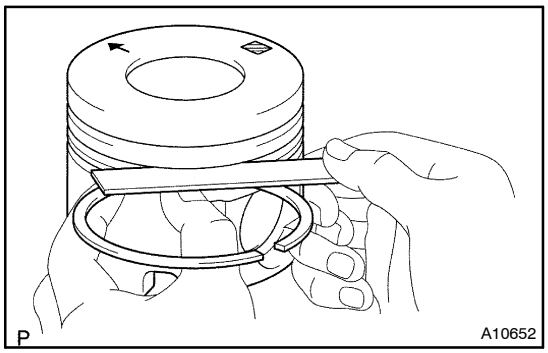
**0.110 – 0.130 mm (0.0043 – 0.0051 in.)**

**Maximum oil clearance: 0.18 mm (0.0071 in.)**

If the oil clearance is greater than maximum, replace all the 4 pistons and rebore all the 4 cylinders. If necessary, replace the cylinder block.




HINT:
Use new cylinder block:
Use a piston with the same number mark as the cylinder bore diameter marked on the cylinder block.



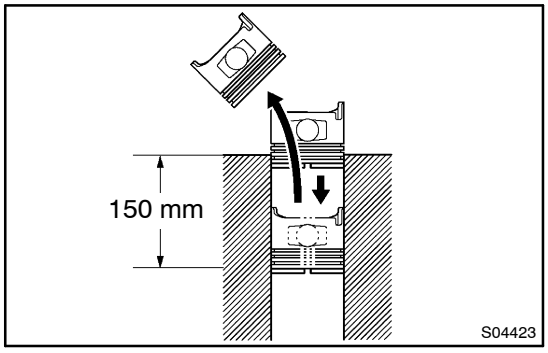

(b) Inspect piston ring groove clearance

**Standard groove clearance:**

| | |
|---|---|
| No.1 | 0.070 – 0.110 mm (0.0028 – 0.0043 in.) |
| No.2 | 0.060 – 0.100 mm (0.0024 – 0.0039 in.) |
| Oil | 0.030 – 0.070 mm (0.0012 – 0.0028 in.) |

**Maximum groove clearance: 0.20 mm (0.0079 in.)**

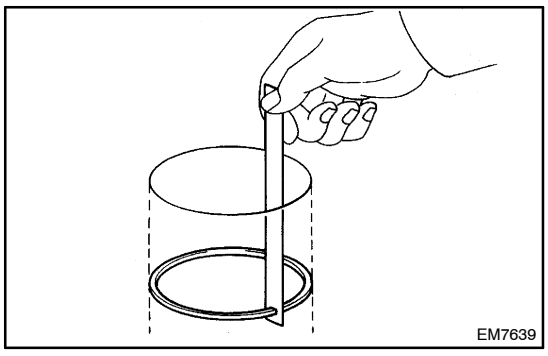
If the clearance is greater than maximum, replace the piston.




(c) Inspect 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, 150 mm (5.91 in.) from the top of the cylinder block.




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

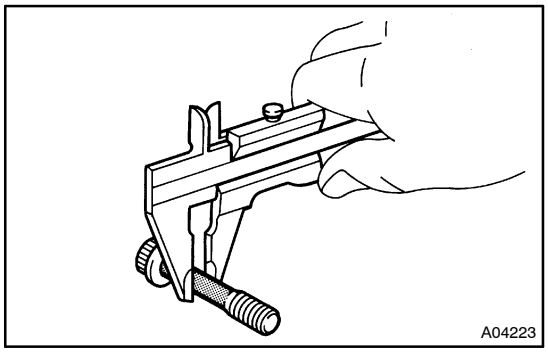
**Standard end gap:**

| | |
|---|---|
| No.1 | 0.35 – 0.45 mm (0.0138 – 0.0177 in.) |
| No.2 | 0.47 – 0.60 mm (0.0185 – 0.0236 in.) |
| Oil | 0.20 – 0.40 mm (0.0078 – 0.0158 in.) |

**Maximum end gap:**

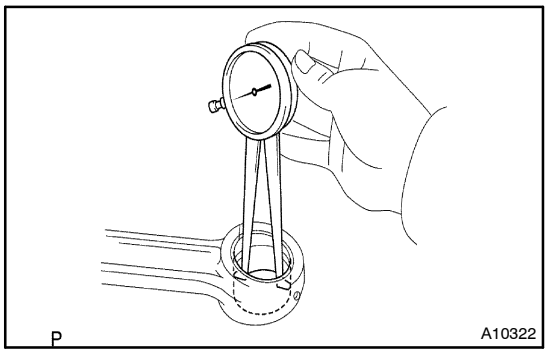
| | |
|---|---|
| No.1 | 1.41 mm (0.0555 in.) |
| No.2 | 1.61 mm (0.0634 in.) |
| Oil | 1.61 mm (0.0634 in.) |

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 4 cylinders or replace the cylinder block.


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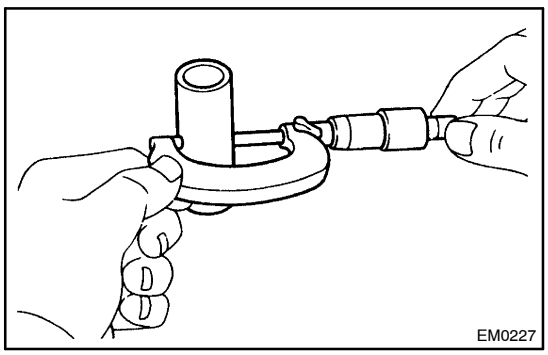
**5. INSPECT CONNECTING ROD**

(a) Inspect connecting rod bolt
Using vernier calipers, measure the tension portion diameter.
**Standerd diameter:**
**10.80 – 11.00 mm (0.4252 – 0.4331 in.)**
**Minimum diameter: 10.50 mm (0.4134 in.)**
If the diameter is less than minimum, replace the connecting rod bolt.

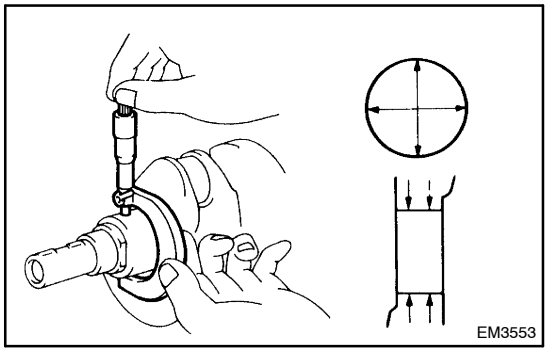


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(b) Inspect piston pin oil clearance
(1) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.
**Bushing inside diameter:**
**37.009 – 37.019 mm (1.4570 – 1.4574 in.)**


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(2) Using a micrometer, measure the piston pin diameter.
**Piston pin diameter:**
**37.000 – 37.008 mm (1.4567 – 1.4570 in.)**
(3) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.
**Standard oil clearance:**
**0.005 – 0.015 mm (0.0002 – 0.0006 in.)**
**Maximum oil clearance: 0.05 mm (0.0020 in.)**
If the oil clearance is greater than maximum, replace the busing. If necessary, replace the piston and piston pin as a set.




## 6. INSPECT CRANKSHAFT

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

**Main journal diameter:**

| | | |
|---|---|---|
| STD | No.3 | 76.950 – 76.970 mm (3.0295 – 3.0303 in.) |
| | Others | 76.980 – 77.000 mm (3.0307 – 3.0315 in.) |
| U/S 0.25 | No.3 | 76.700 – 76.720 mm (3.0197 – 3.0205 in.) |
| | Others | 76.730 – 76.750 mm (3.0209 – 3.0216 in.) |
| U/S 0.50 | No.3 | 76.450 – 76.470 mm (3.0098 – 3.0106 in.) |
| | Others | 76.480 – 76.500 mm (3.0110 – 3.0118 in.) |
| U/S 1.00 | No.3 | 75.950 – 75.970 mm (2.9902 – 2.9909 in.) |
| | Others | 75.980 – 76.000 mm (2.9913 – 2.9921 in.) |

**Crank pin diameter:**

| | |
|---|---|
| STD | 65.980 – 66.000 mm (2.5976 – 2.5984 in.) |
| U/S 0.25 | 65.730 – 65.750 mm (2.5878 – 2.5886 in.) |
| U/S 0.50 | 65.480 – 65.500 mm (2.5779 – 2.5787 in.) |
| U/S 1.00 | 64.980 – 65.000 mm (2.5583 – 2.5591 in.) |

If the diameter is not as specified, check the oil clearance. (See Pub. No. RM464E, page EG – 91) If necessary, grind or replace the crankshaft.