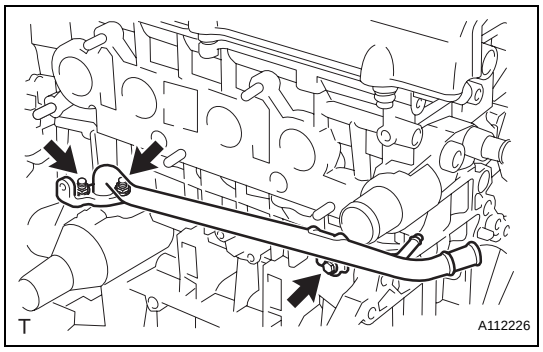
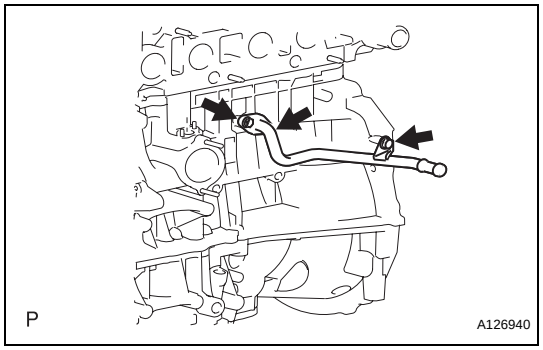
# DISASSEMBLY

1. **REMOVE IDLER PULLEY (See page EM-23)**
2. **REMOVE OIL DIPSTICK**
3. **REMOVE OIL DIPSTICK GUIDE (See page EM-57)**
4. **REMOVE MANIFOLD STAY (See page EM-57)**
5. **REMOVE NO. 2 MANIFOLD STAY (See page EM-58)**
6. **REMOVE NO. 1 EXHAUST MANIFOLD HEAT INSULATOR (See page EM-58)**
7. **REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY (See page EM-58)**
8. **REMOVE WATER INLET (See page CO-15)**
9. **REMOVE THERMOSTAT**
10. **REMOVE NO. 1 WATER BY-PASS PIPE**
    (a) Remove the bolt, 2 nuts, pipe and gasket.




11. **REMOVE NO. 3 WATER BY-PASS PIPE**
    (a) Remove the bolt, 2 nuts, pipe and gasket.
12. **REMOVE V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-26)**
13. **REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page ES-395)**
14. **REMOVE KNOCK SENSOR (See page ES-420)**
15. **REMOVE RADIO SETTING CONDENSER (See page EM-63)**
16. **REMOVE OIL PRESSURE SWITCH ASSEMBLY (See page EM-63)**
17. **REMOVE ENGINE COOLANT TEMPERATURE SENSOR (See page EM-63)**
18. **REMOVE CAMSHAFT POSITION SENSOR (See page EM-64)**
19. **REMOVE IGNITION COIL ASSEMBLY (See page IG-9)**

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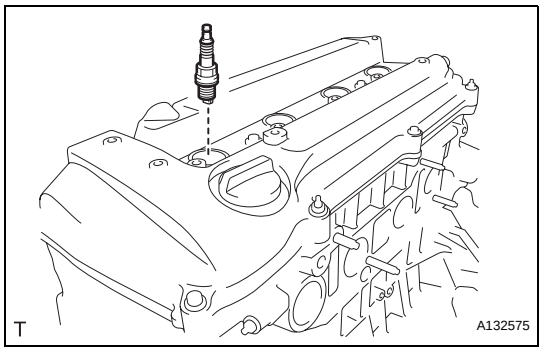
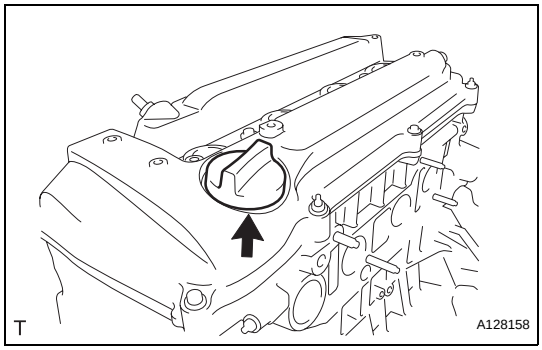
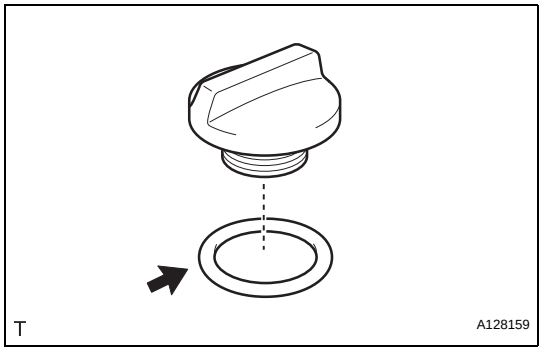



**20. REMOVE SPARK PLUG**



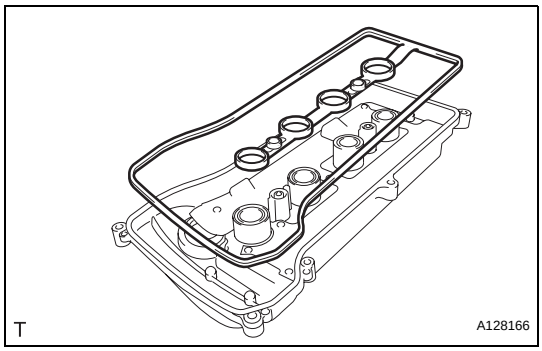

**21. REMOVE OIL FILLER CAP SUB-ASSEMBLY**




**22. REMOVE OIL FILLER CAP GASKET**

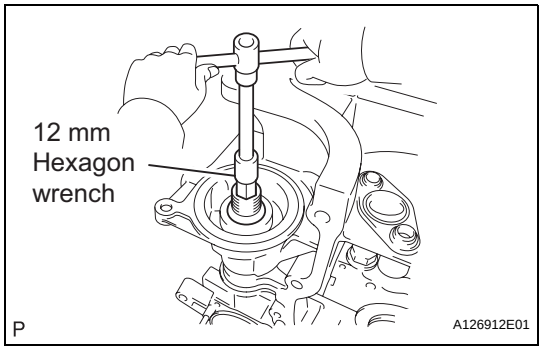
**23. REMOVE VENTILATION VALVE SUB-ASSEMBLY (See page EC-18)**

**24. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-24)**




**25. REMOVE CYLINDER HEAD COVER GASKET**

**26. REMOVE OIL FILTER SUB-ASSEMBLY (See page LU-4)**



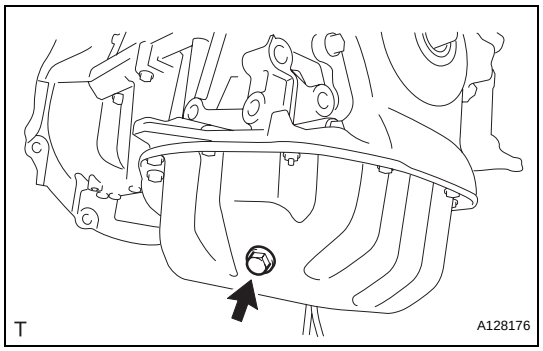

**27. REMOVE OIL FILTER UNION**

(a) Using a 12 mm hexagon wrench, remove the oil filter union.

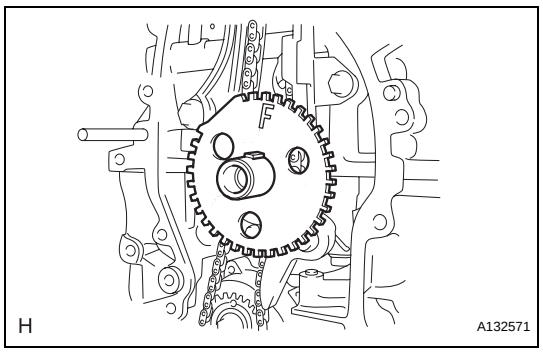
**28. REMOVE CRANKSHAFT POSITION SENSOR (See page ES-402)**

**29. REMOVE WATER PUMP PULLEY (See page CO-11)**

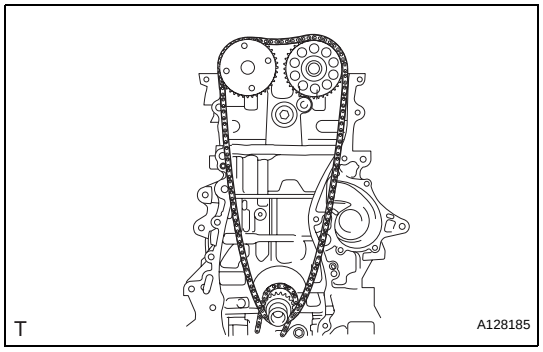
**30. REMOVE WATER PUMP ASSEMBLY (See page CO-11)**



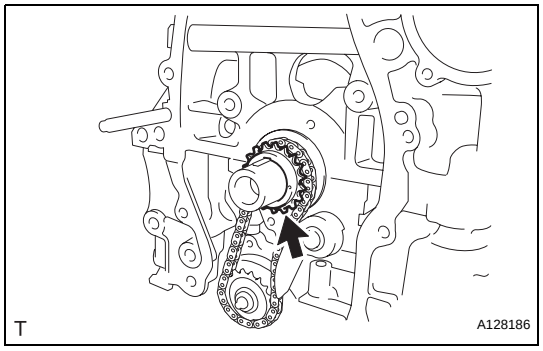

31. **REMOVE OIL PAN DRAIN PLUG**
    (a) Remove the oil pan drain plug and gasket.
32. **REMOVE OIL PAN SUB-ASSEMBLY (See page EM-24)**
33. **REMOVE CRANKSHAFT PULLEY (See page EM-25)**
34. **REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-26)**
35. **REMOVE TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-26)**
36. **REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE**



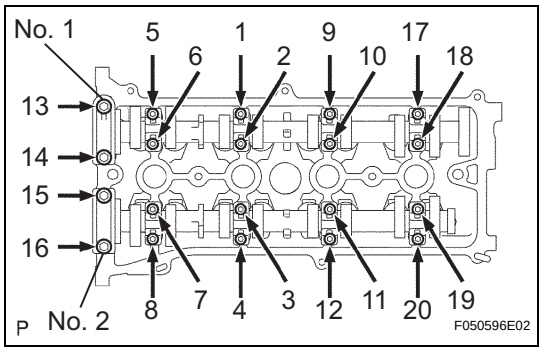

37. **REMOVE TIMING CHAIN GUIDE (See page EM-28)**
38. **REMOVE CHAIN TENSIONER SLIPPER (See page EM-28)**
39. **REMOVE NO. 1 CHAIN VIBRATION DAMPER (See page EM-28)**




40. **REMOVE CHAIN SUB-ASSEMBLY**

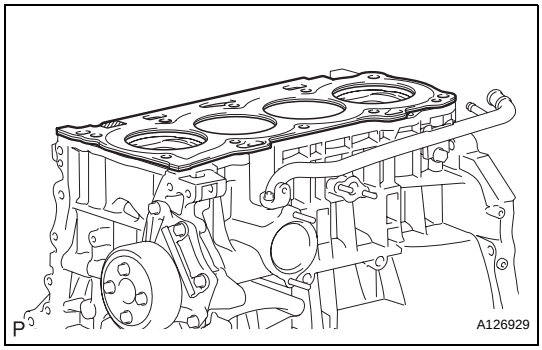



41. **REMOVE CRANKSHAFT TIMING SPROCKET**
42. **REMOVE NO. 2 CHAIN SUB-ASSEMBLY (See page EM-29)**
43. **REMOVE OIL PUMP DRIVE GEAR**
44. **REMOVE OIL PUMP ASSEMBLY (See page LU-12)**

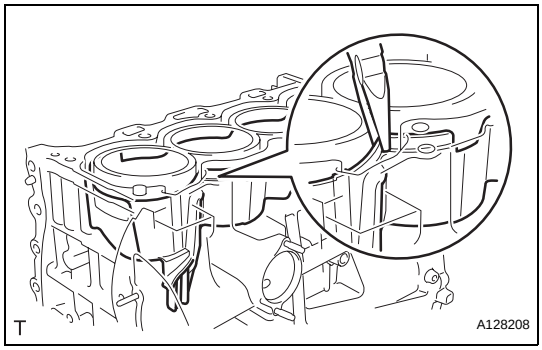



45. **REMOVE CAMSHAFT**
    (a) Using several steps, uniformly loosen and remove the 20 bearing cap bolts in the sequence shown in the illustration.
    (b) Remove the 10 bearing caps, then remove the camshaft and No. 2 camshaft.
46. **REMOVE CYLINDER HEAD SUB-ASSEMBLY (See page EM-62)**

EM



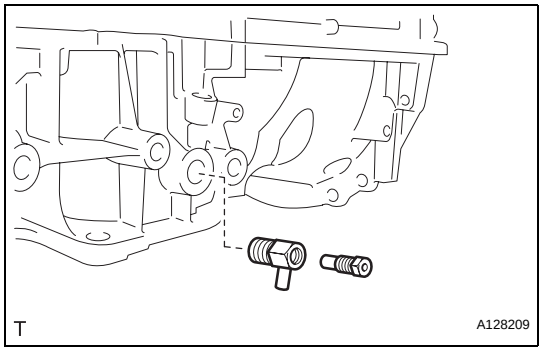

**47. REMOVE CYLINDER HEAD GASKET**



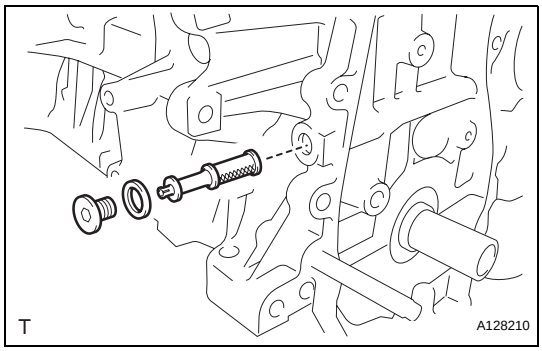

**48. REMOVE CYLINDER BLOCK WATER JACKET SPACER**

(a) Using needle-nose pliers, remove the cylinder block water jacket spacer from the water jacket.

**NOTICE:**
**Before turning the cylinder block upside down, make sure that the water jacket spacer is removed, as it will fall out.**

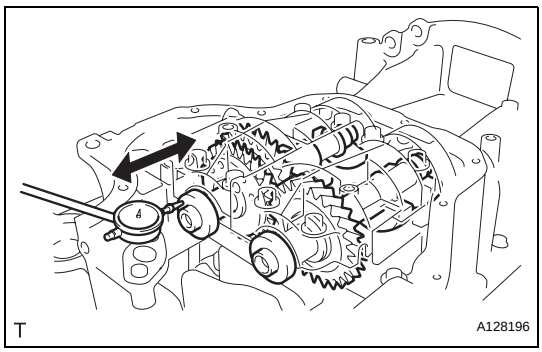



**49. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY**




**50. REMOVE OIL CONTROL VALVE FILTER**

(a) Using a 6 mm socket hexagon wrench, remove the plug and gasket.
(b) Remove the oil control valve filter.

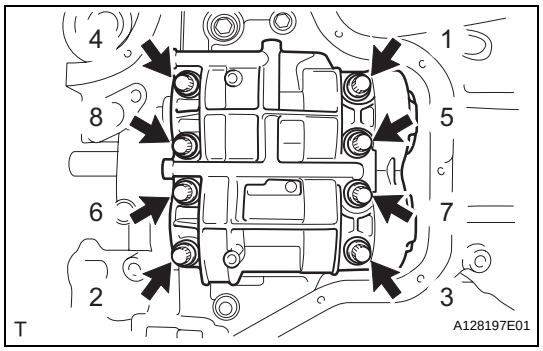



**51. INSPECT BALANCE SHAFT THRUST CLEARANCE**

(a) Using a dial indicator, measure the thrust clearance while moving the balance shaft back and forth.

**Standard thrust clearance:**
**0.05 to 0.09 mm (0.0020 to 0.0035 in.)**
**Maximum thrust clearance:**
**0.09 mm (0.0035 in.)**

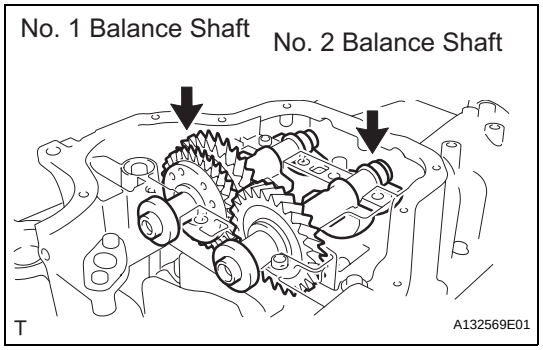
If the thrust clearance is greater than the maximum, replace the balance shaft housing and bearings. If necessary, replace the balance shaft.




**52. INSPECT BALANCE SHAFT OIL CLEARANCE**

(a) Using several steps, uniformly loosen and remove the 8 bolts in the sequence shown in the illustration.

(b) Remove the balance shaft housing from the crankcase.
HINT:
Keep the lower bearing and balance shaft housing together.

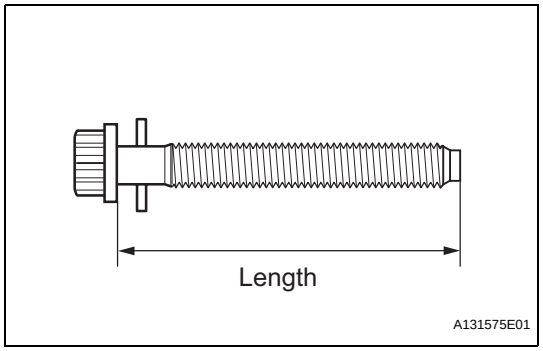



(c) Lift out the No. 1 and No. 2 balance shafts.
HINT:
Keep the upper bearing with the crankcase.

(d) Clean each bearing and journal.

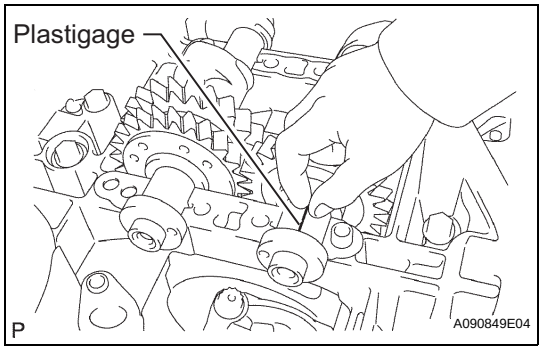
(e) Check each bearing and journal for pitting and scratches.
If a bearing or journal is damaged, replace the bearings. If necessary, replace the balance shaft.

EM




(f) Inspect the balance shaft housing bolt.
(1) Using a vernier caliper, measure the length of the bolts from the seat to the end.
**Standard bolt length:**
**58.3 to 59.7 mm (2.295 to 2.350 in.)**
**Maximum bolt length:**
**60.3 mm (2.374 in.)**
If the bolt length is greater than the maximum, replace the balance shaft bolt.

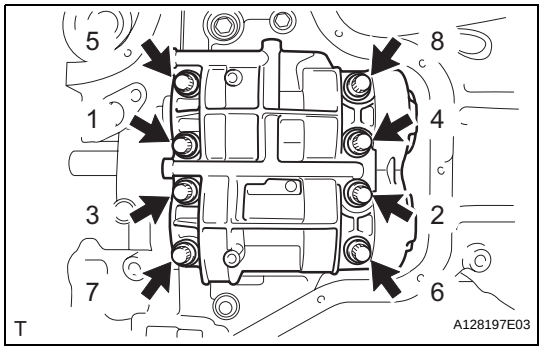
(g) Place the No. 1 and No. 2 balance shafts onto the crankcase.



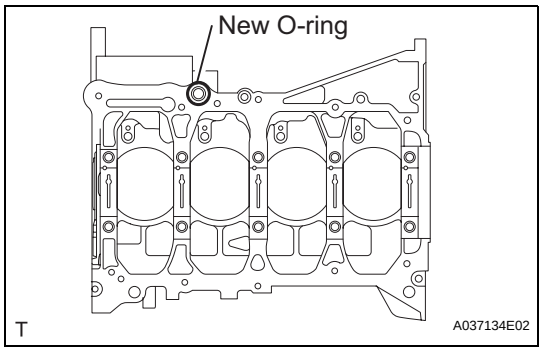

(h) Lay a strip of Plastigage across each journal.

(i) Install the balance shaft housing.

(j) Apply a light coat of engine oil on the threads and under the heads of the bolts.




(k) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
**Torque: 21.6 N*m (220 kgf*cm, 16 ft.*lbf)**




(l) Mark the front of the bolts with paint.
(m) Retighten the bolts 90° as shown in the illustration.
(n) Check that the paint mark is now at a 90° angle to the front.
(o) Remove the balance shaft housing from the crankcase.
(p) Measure the Plastigage at its widest point.

**Standard oil clearance:**
**0.004 to 0.049 mm (0.0002 to 0.0019 in.)**
**Maximum oil clearance:**
**0.049 mm (0.0019 in.)**
**NOTICE:**
**Remove the Plastigage completely after the measurement.**
If the oil clearance is greater than the maximum, replace the bearing. If necessary, replace the balance shaft.
HINT:
If replacing a bearing, select a new one with the same number.

**Standard balance shaft housing journal bore diameter**

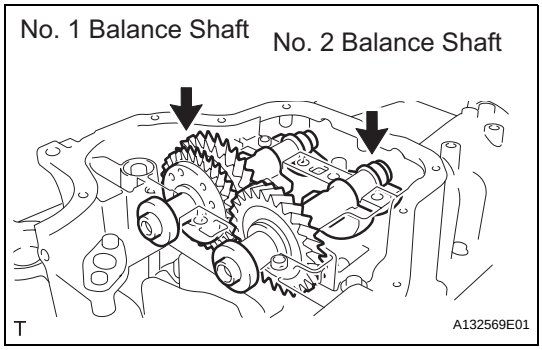
| Item | Specified Condition |
|---|---|
| Mark 1 | 26.000 to 26.006 mm (1.0236 to 1.0239 in.) |
| Mark 2 | 26.007 to 26.012 mm (1.0239 to 1.0214 in.) |
| Mark 3 | 26.013 to 26.018 mm (1.0241 to 1.0243 in.) |

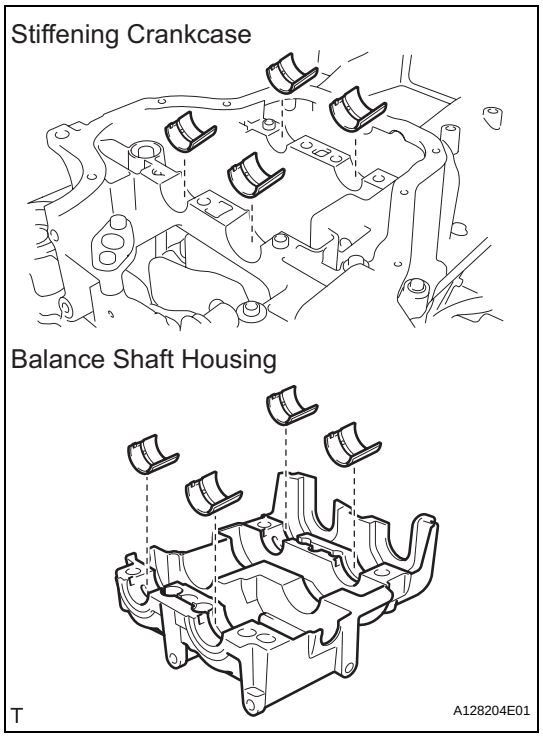
**Standard balance shaft journal diameter:**
**22.985 to 23.000 mm (0.9049 to 0.9055 in.)**

**Standard bearing center wall thickness**

| Item | Specified Condition |
|---|---|
| Mark 1 | 1.486 to 1.489 mm (0.05850 to 0.05862 in.) |
| Mark 2 | 1.490 to 1.492 mm (0.05866 to 0.05874 in.) |
| Mark 3 | 1.493 to 1.495 mm (0.0585 to 0.0586 in.) |

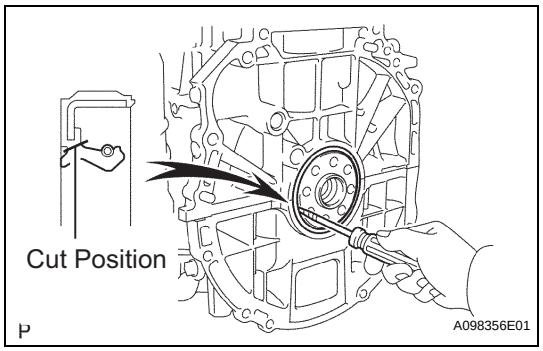
## 53. REMOVE BALANCE SHAFT






**54. REMOVE NO. 1 BALANCE SHAFT BEARING**





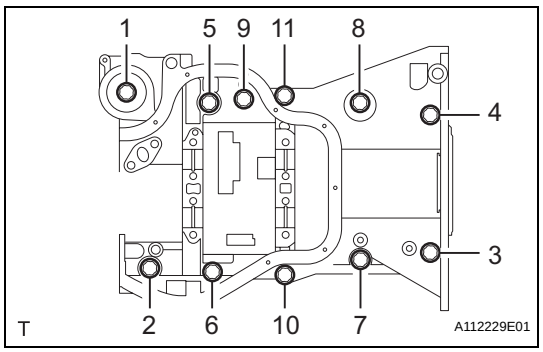

**55. REMOVE ENGINE REAR OIL SEAL**

(a) Using a knife, cut off the lip of the oil seal.

(b) Using a screwdriver with its tip wrapped with tape, pry out the oil seal.

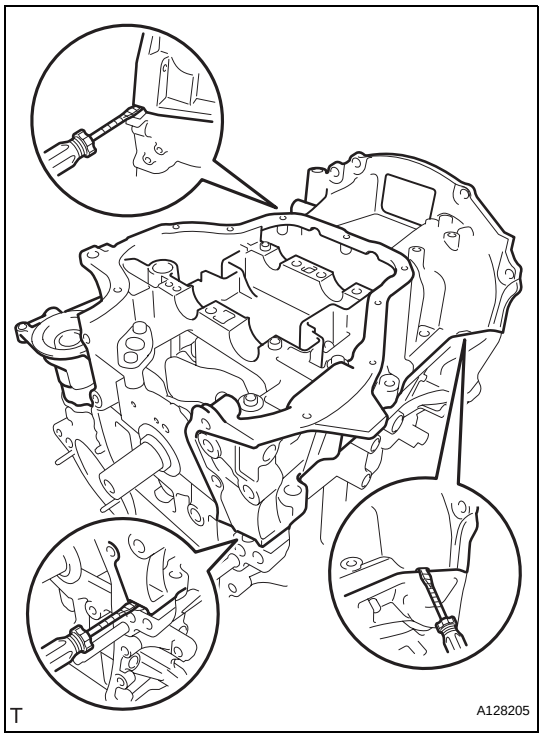
**NOTICE:**

**After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.**



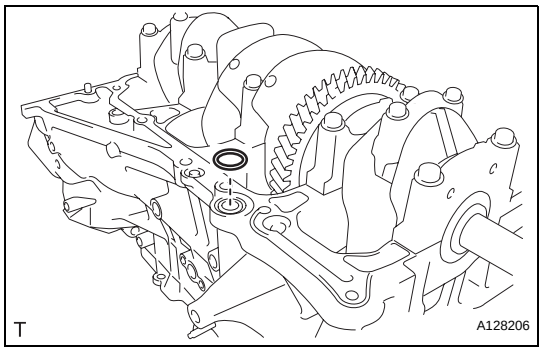

**56. REMOVE STIFFENING CRANKCASE ASSEMBLY**

(a) Using several steps, uniformly loosen and remove the 11 bolts in the sequence shown in the illustration.

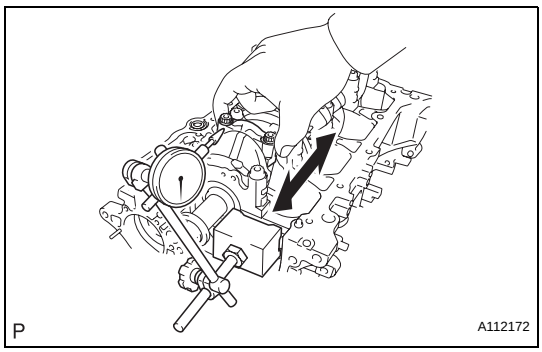



(b) Remove the crankcase by prying the portions between the crankcase and cylinder block.
**NOTICE:**
**Be careful not to damage the contact surfaces of the crankcase and cylinder bock.**





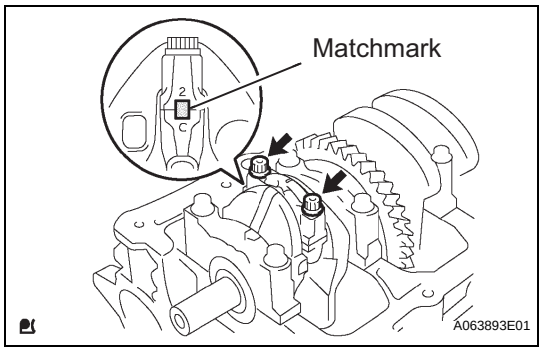

(c) Remove the O-ring from the cylinder block.



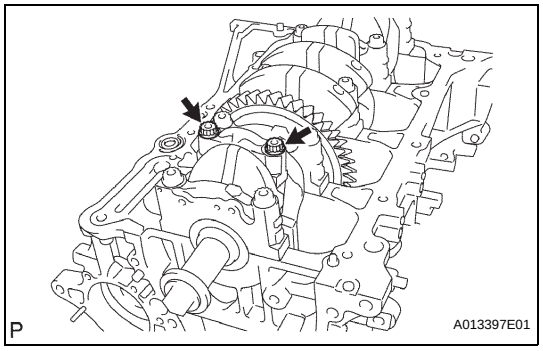

**57. INSPECT CONNECTING ROD THRUST CLEARANCE**

(a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.
**Standard thrust clearance:**
**0.160 to 0.362 mm (0.0063 to 0.0143 in.)**
**Maximum thrust clearance:**
**0.362 mm (0.0143 in.)**
If the thrust clearance is greater than the maximum, replace the connecting rod. If necessary, replace the crankshaft.

**58. INSPECT CONNECTING ROD OIL CLEARANCE**
**NOTICE:**
**Do not turn the crankshaft during the measurement.**

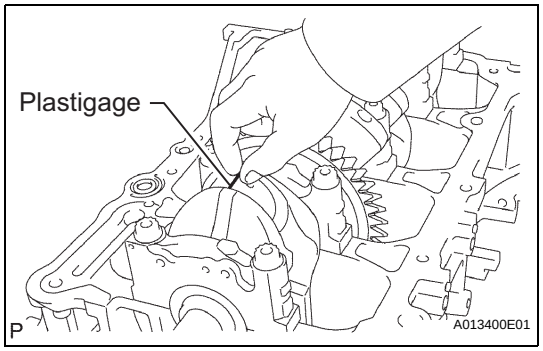



(a) Using marking paint, write the matched cylinder number on each connecting rod and cap.
HINT:
The matchmarks in the connecting rods and caps are for ensuring correct reassembly.

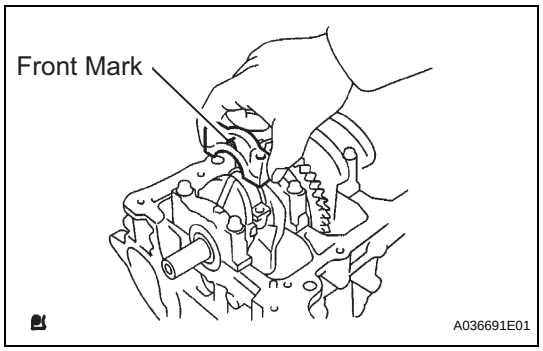



(b) Using a 12 mm socket wrench, remove the 2 bolts and connecting rod cap.
(c) Clean the crank pin and bearing.
(d) Check the crank pin and bearing for pitting and scratches.

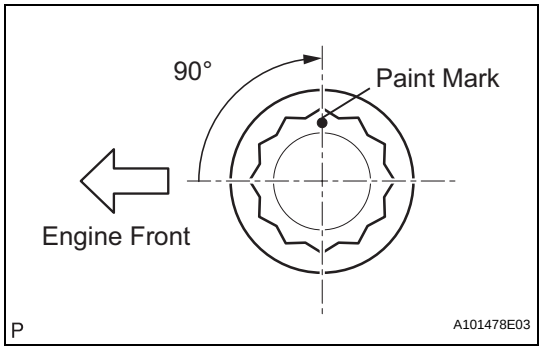
EM



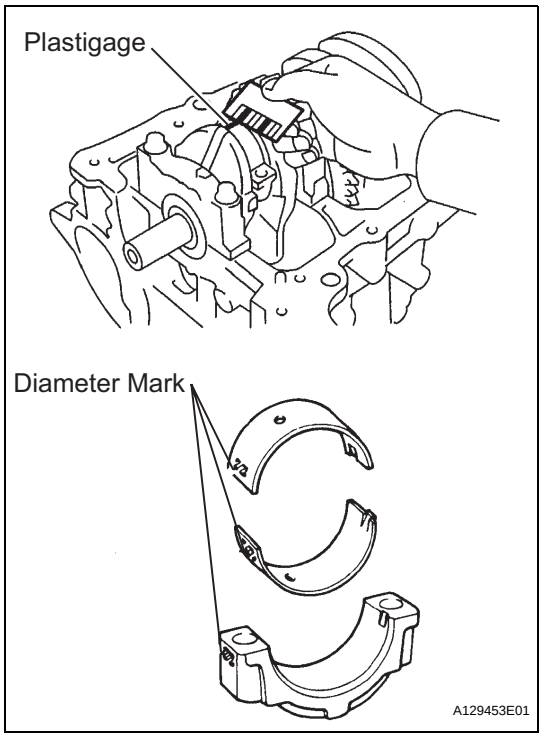

(e) Lay a strip of Plastigage on the crank pin.




(f) Check that the front mark of the connecting rod cap is facing in the correct direction.
(g) Apply a light coat of engine oil to the threads and under the heads of the connecting rod bolts.
(h) Using a 12 mm socket wrench, tighten the bolts in several passes to the specified torque.
**Torque: 24.5 N*m (250 kgf*cm, 18 ft.*lbf)**




(i) Mark the front of the connecting rod bolts with paint.
(j) Retighten the cap bolts 90° as shown in the illustration.
(k) Check that the crankshaft turns smoothly.
(l) Using a 12 mm socket wrench, remove the 2 bolts and connecting rod cap.



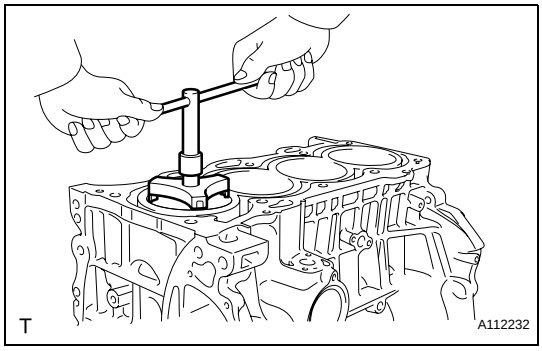

(m) Measure the Plastigage at its widest point.
**Standard oil clearance:**
**0.024 to 0.048 mm (0.0009 to 0.0019 in.)**
**Maximum oil clearance:**
**0.08 mm (0.0032 in.)**
**NOTICE:**
**Remove the Plastigage completely after the measurement.**
If the oil clearance is greater than the maximum, replace the connecting rod bearing. If necessary, grind or replace the crankshaft.
HINT:
If replacing a bearing, select a new one with the same number as marked on the connecting rod. There are 3 sizes of standard bearings, marked "1", "2" and "3" accordingly.
**Standard connecting rod large end bore diameter**

| Mark | Specified Condition |
|---|---|
| Mark 1 | 51.000 to 51.007 mm (2.0079 to 2.0082 in.) |
| Mark 2 | 51.008 to 51.013 mm (2.0082 to 2.0084 in.) |
| Mark 3 | 51.014 to 51.020 mm (2.0084 to 2.0087 in.) |

**Standard connecting rod bearing thickness**

| Mark | Specified Condition |
|---|---|
| Mark 1 | 1.485 to 1.488 mm (0.0585 to 0.0586 in.) |
| Mark 2 | 1.489 to 1.491 mm (0.0586 to 0.0587 in.) |
| Mark 3 | 1.492 to 1.494 mm (0.0587 to 0.0588 in.) |

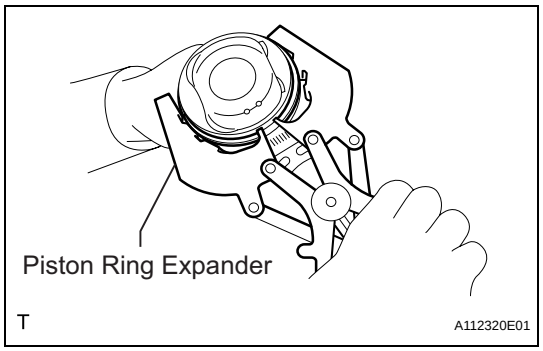
**Standard crankshaft pin diameter:**
**47.990 to 48.000 (1.8894 to 1.8898 in.)**




**59. REMOVE PISTON WITH CONNECTING ROD**

(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.
HINT:
- Keep the bearing, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.

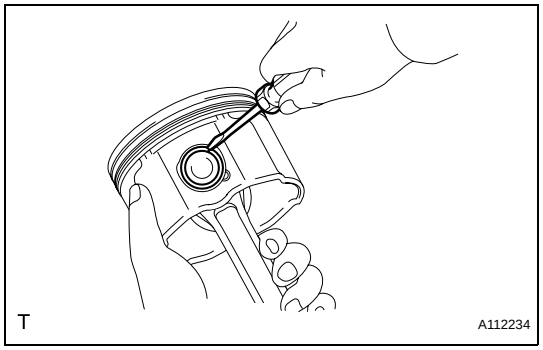
**60. REMOVE CONNECTING ROD BEARING**




**61. REMOVE PISTON RING SET**

(a) Using a piston ring expander, remove the 2 compression rings.

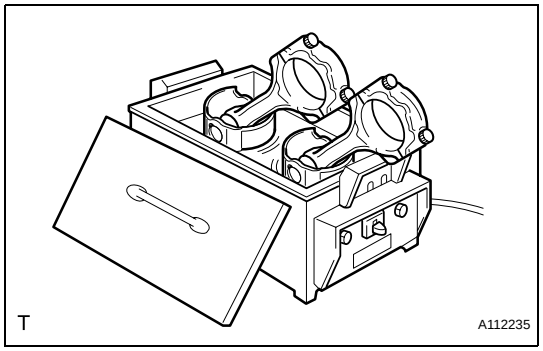
(b) Remove the oil ring and expander by hand.




**62. REMOVE PISTON PIN HOLE SNAP RING**

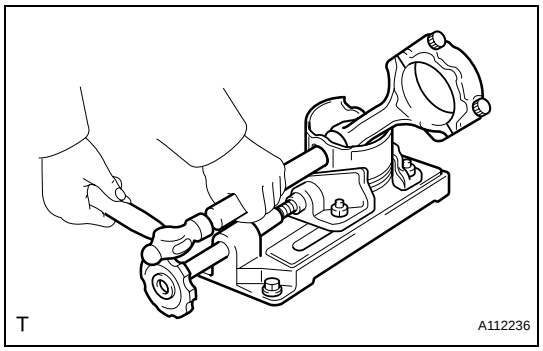
(a) Using a small screwdriver, pry out the 2 snap rings.






**63. REMOVE PISTON**

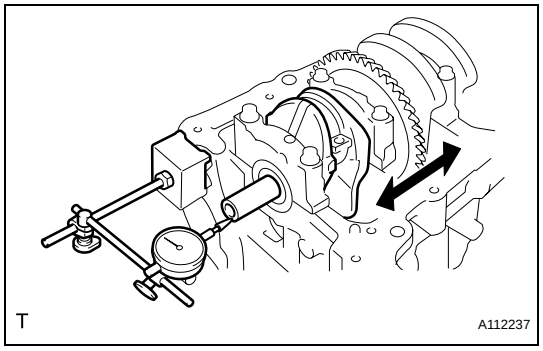
(a) Gradually heat the piston up to 80 to 90°C (176 to 194°F).




(b) Using a plastic-faced hammer and brass bar, lightly tap out the piston pin, then remove the connecting rod.

HINT:

- The piston and pin are a matched set.
- Arrange the piston, pin, ring, connecting rod and bearings in the correct order.




**64. INSPECT CRANKSHAFT THRUST CLEARANCE**

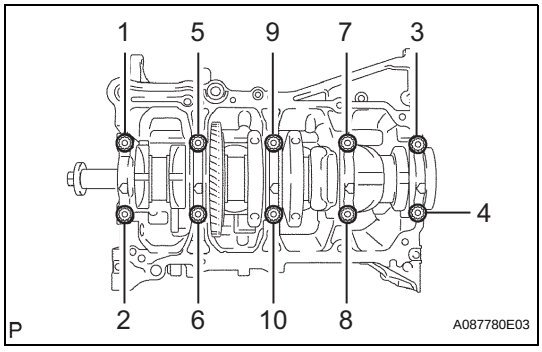
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

**Standard thrust clearance:**
**0.04 to 0.24 mm (0.0016 to 0.0095 in.)**
**Maximum thrust clearance:**
**0.30 mm (0.012 in.)**

If the thrust clearance is greater than the maximum, replace the thrust washers as a set.

HINT:
The thrust washer thickness is 1.93 to 1.98 mm (0.0760 to 0.0780 in.).

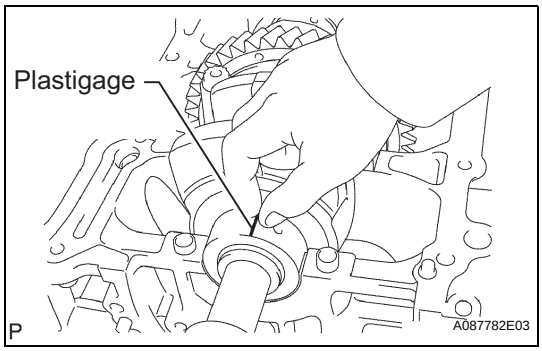
**65. INSPECT CRANKSHAFT OIL CLEARANCE**
**NOTICE:**
**Do not turn the crankshaft during the measurement.**



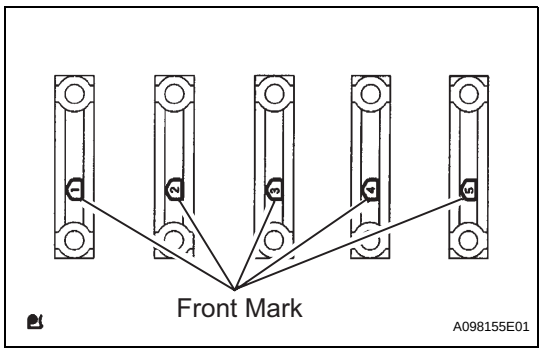

(a) Using several steps, uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration.
(b) Remove the 5 bearing caps from the cylinder block.
HINT:
- Keep the No. 2 crankshaft bearings and crankshaft bearing caps together.
- Arrange the bearing caps in correct order.

(c) Remove the crankshaft.
HINT:
Keep the crankshaft bearings and crankshaft thrust washer uppers together with the cylinder block.
(d) Clean each main journal and bearing.
(e) Check each main journal and bearing for pitting and scratches.
- If the journal or bearing is damaged, replace the bearings.
- If necessary, replace the crankshaft.

(f) Place the crankshaft onto the cylinder block.

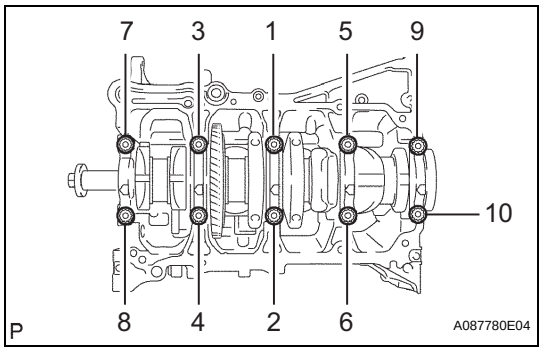



(g) Lay a strip of Plastigage across each journal.

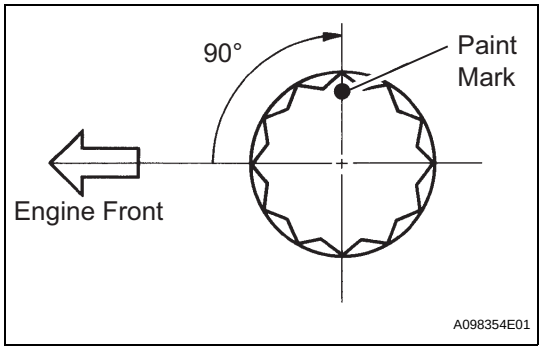



(h) Examine the front marks and numbers, and install the bearing caps onto the cylinder block in the order shown in the illustration.
(i) Apply a light coat of engine oil to the threads and under the heads of the crankshaft bearing cap set bolts.

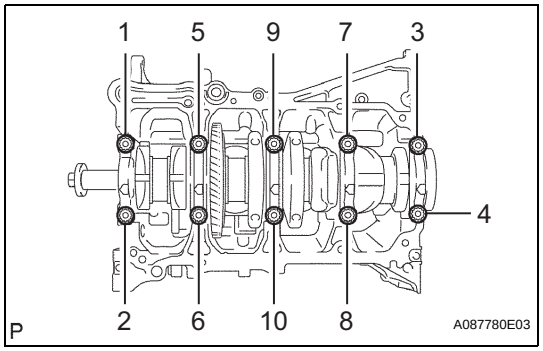
EM




(j) Using several steps, uniformly install and tighten the 10 bearing cap bolts in the sequence shown in the illustration.
**Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)**

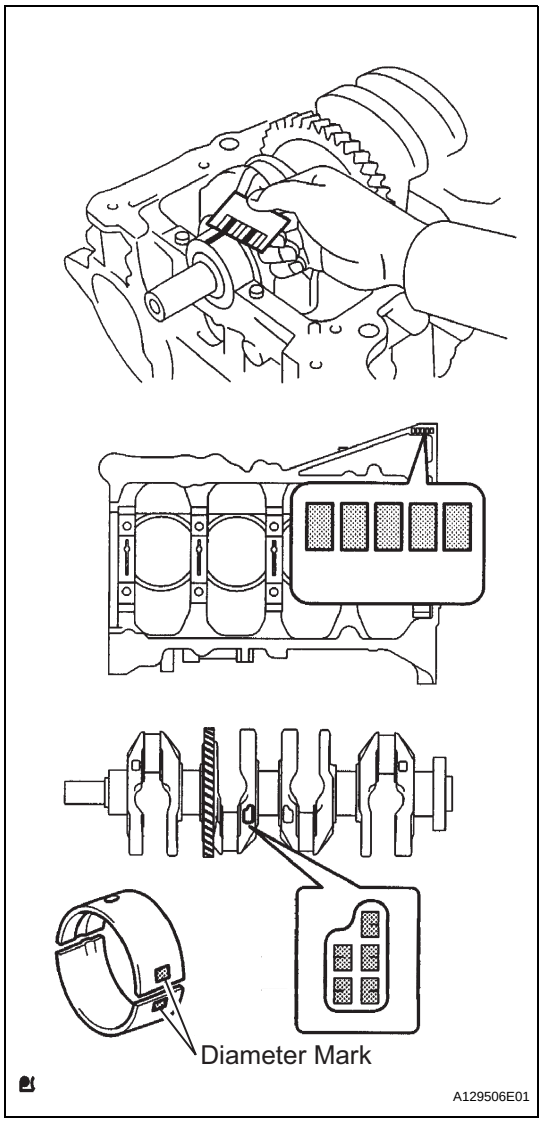



(k) Mark the front of the bearing cap bolts with paint.
(l) Retighten the 10 bearing cap bolts by 90°.
(m) Check that the paint marks are at a 90° angle to the front.




(n) Remove the crankshaft bearing caps.

EM




(o) Measure the Plastigage at its widest point.

**Standard oil clearance:**
**0.008 to 0.024 mm (0.0003 to 0.0010 in.)**
**Maximum oil clearance:**
**0.050 mm (0.0020 in.)**
**NOTICE:**
**Remove the Plastigage completely after the measurement.**

If the oil clearance is greater than the maximum, replace the crankshaft bearing. If necessary, replace the crankshaft.

HINT:

If replacing a bearing, select a new one with the same number. If the number of the bearing cannot be determined, calculate the correct bearing number by adding together the numbers imprinted on the cylinder block and crankshaft. Then select a new bearing with the calculated number. There are 4 sizes of standard bearings, marked "1", "2", "3" and "4" accordingly.

| | | | | |
|---|---|---|---|---|
| Cylinder block + Crankshaft | 0 to 2 | 3 to 5 | 6 to 8 | 9 to 11 |
| Use bearing | "1" | "2" | "3" | "4" |

EXAMPLE

- Imprinted number on the cylinder block is 3.
- Imprinted number on the crankshaft is 4.
  3 + 4 = 7
  Select the bearing marked "3".

**Standard cylinder block journal bore diameter**

| Mark | Specified Condition |
|---|---|
| 0 | 59.000 to 59.002 mm (2.3228 to 2.3229 in.) |
| 1 | 59.003 to 59.004 mm (2.3230 to 2.3230 in.) |
| 2 | 59.005 to 59.006 mm (2.3230 to 2.3231 in.) |
| 3 | 59.007 to 59.009 mm (2.3231 to 2.3232 in.) |
| 4 | 59.010 to 59.011 mm (2.3232 to 2.3233 in.) |
| 5 | 59.012 to 59.013 mm (2.3233 to 2.3234 in.) |
| 6 | 59.014 to 59.016 mm (2.3234 to 2.3235 in.) |

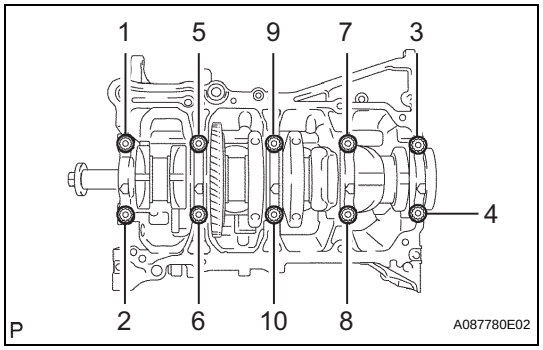
**Standard crankshaft journal diameter**

| Mark | Specified Condition |
|---|---|
| 0 | 54.999 to 55.000 mm (2.1653 to 2.1654 in.) |
| 1 | 54.997 to 54.998 mm (2.1652 to 2.1653 in.) |
| 2 | 54.995 to 54.996 mm (2.1652 to 2.1652 in.) |
| 3 | 54.993 to 54.994 mm (2.1651 to 2.1651 in.) |

| Mark | Specified Condition |
|---|---|
| 4 | 54.991 to 54.992 mm (2.1650 to 2.1650 in.) |
| 5 | 54.988 to 54.990 mm (2.1649 to 2.1650 in.) |

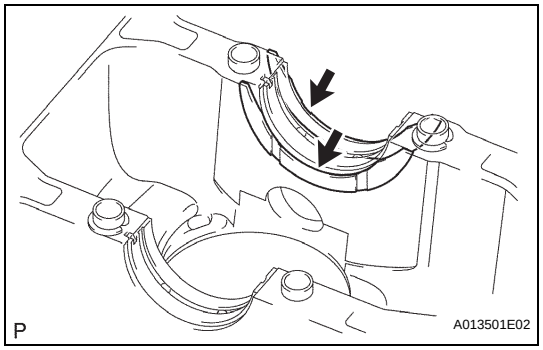
**Standard bearing center wall thickness**

| Mark | Specified Condition |
|---|---|
| 1 | 1.993 to 1.996 mm (0.0785 to 0.0786 in.) |
| 2 | 1.997 to 1.999 mm (0.0786 to 0.0787 in.) |
| 3 | 2.000 to 2.002 mm (0.0787 to 0.0788 in.) |
| 4 | 2.003 to 2.005 mm (0.0789 to 0.0789 in.) |

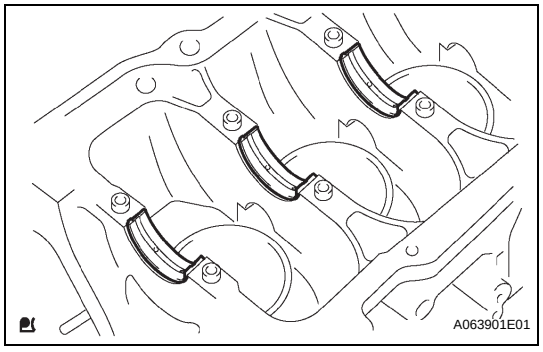



**66. REMOVE CRANKSHAFT**

(a) Using several steps, uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration.
(b) Remove the 5 bearing caps from the cylinder block.
(c) Remove the crankshaft from the cylinder block.

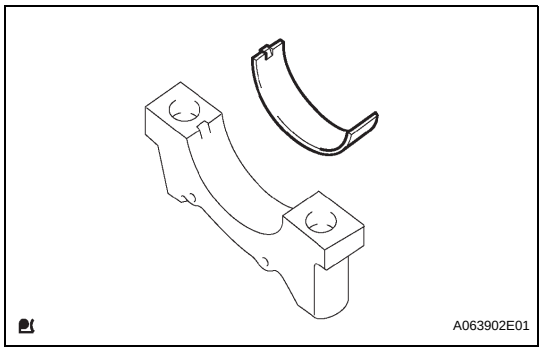



**67. REMOVE CRANKSHAFT THRUST WASHER UPPER**




**68. REMOVE CRANKSHAFT BEARING**

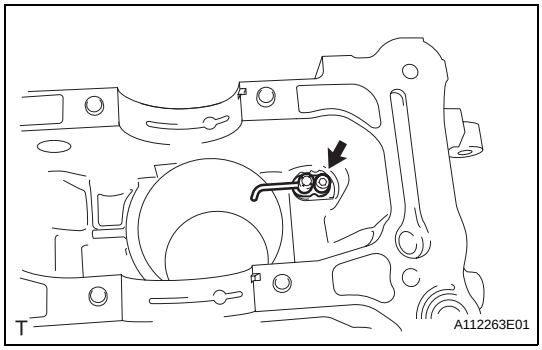
HINT:
Arrange the bearings in the correct order.




**69. REMOVE NO. 2 CRANKSHAFT BEARING**

HINT:

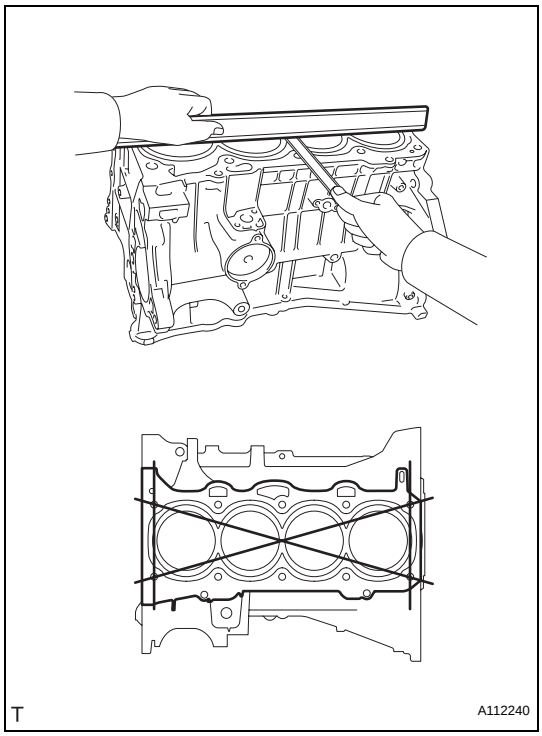
Arrange the bearings in the correct order.




**70. REMOVE NO. 1 OIL NOZZLE SUB-ASSEMBLY**

(a) Remove the 4 bolts and 4 oil nozzles.






# INSPECTION

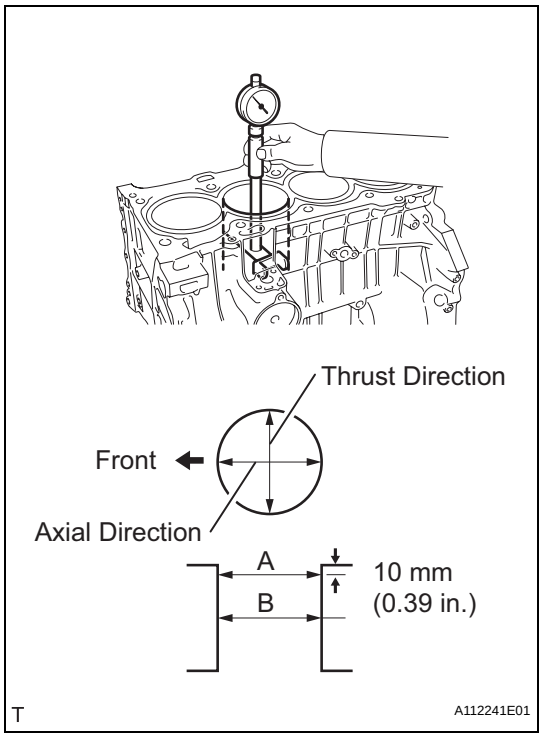
**1. INSPECT CYLINDER BLOCK FOR WARPAGE**

(a) Using a precision straightedge and feeler gauge, measure the warpage of the surface that is in contact with the cylinder head gasket.

**Maximum warpage:**

**0.05 mm (0.0020 in.)**

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



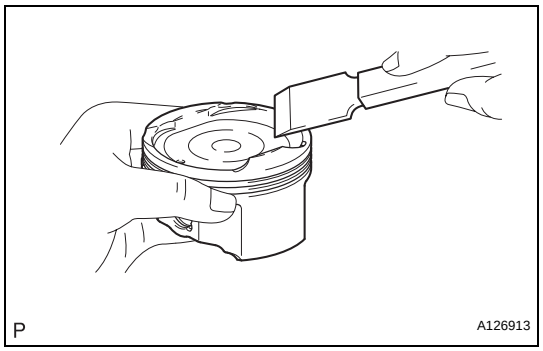

**2. INSPECT CYLINDER BORE**

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

**Standard diameter:**
**88.500 to 88.513 mm (3.4843 to 3.4847 in.)**
**Maximum diameter:**
**88.633 mm (3.4894 in.)**

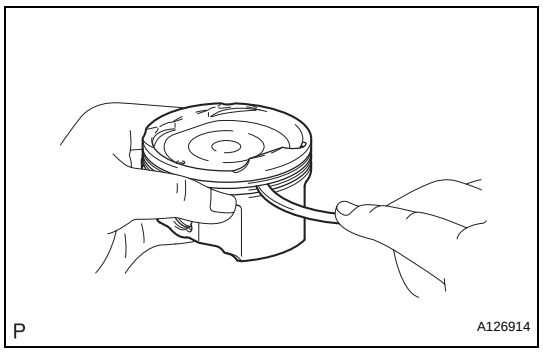
If the average diameter of the 4 positions is greater than the maximum, replace the cylinder block.

EM

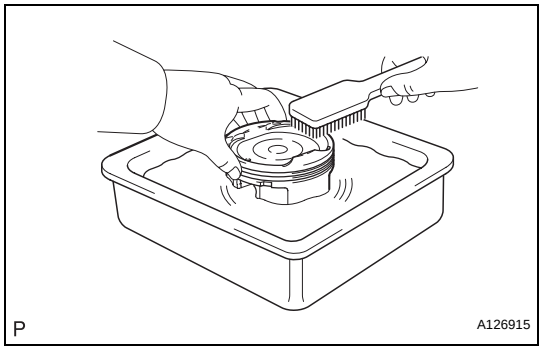



**3. INSPECT PISTON**

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

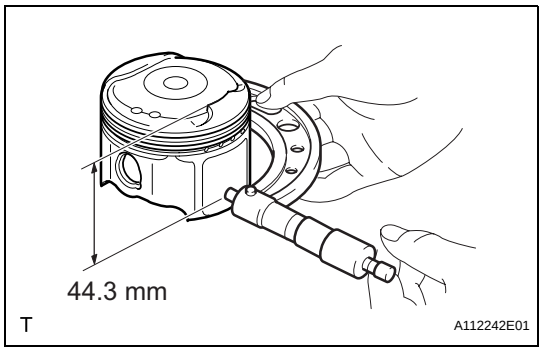



(b) Using a groove cleaning tool or a broken ring, clean the piston ring grooves.




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

**NOTICE:**
**Do not use a wire brush.**

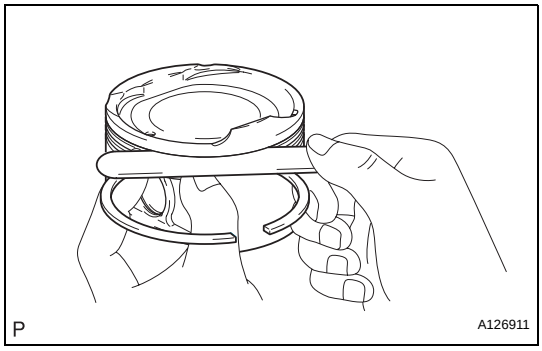



(d) Using a micrometer, measure the piston diameter at right angles to the piston pin hole, and at the piston 44.3 mm (1.7587 in.) from the piston head.
**Standard piston diameter:**
**88.477 to 88.487 mm (3.5125 to 3.5129 in.)**
If the diameter is not as specified, replace the piston.

**4. INSPECT PISTON OIL CLEARANCE**

(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.
**Standard oil clearance:**
**0.021 to 0.044 mm (0.0008 to 0.0017 in.)**
**Maximum oil clearance:**
**0.10 mm (0.0039 in.)**
If the oil clearance is greater than the maximum, replace all the pistons. If necessary, replace the cylinder block.

EM

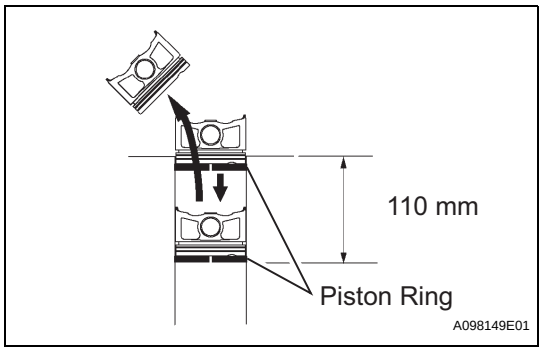



**5. INSPECT RING GROOVE CLEARANCE**

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

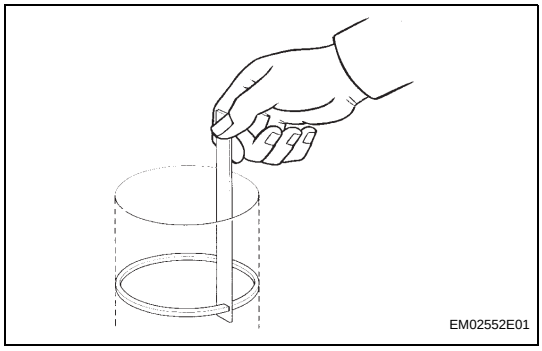
| Item | Specified Condition |
|---|---|
| No. 1 ring | 0.020 to 0.070 mm (0.0008 to 0.0028 in.) |
| No. 2 ring | 0.020 to 0.060 mm (0.0008 to 0.0024 in.) |
| Oil ring | 0.020 to 0.070 mm (0.0008 to 0.0028 in.) |

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




**6. INSPECT PISTON RING END GAP**

(a) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 110 mm (4.33 in.) from the top of the cylinder block.




(b) Using a feeler gauge, measure the end gap.
**Standard end gap**

| Item | Specified Condition |
|---|---|
| No. 1 ring | 0.24 to 0.31 mm (0.0094 to 0.0122 in.) |
| No. 2 ring | 0.33 to 0.43 mm (0.0130 to 0.0169 in.) |
| Oil ring | 0.10 to 0.30 mm (0.0040 to 0.0119 in.) |

**Maximum end gap**

| Item | Specified Condition |
|---|---|
| No. 1 ring | 0.89 mm (0.0350 in.) |

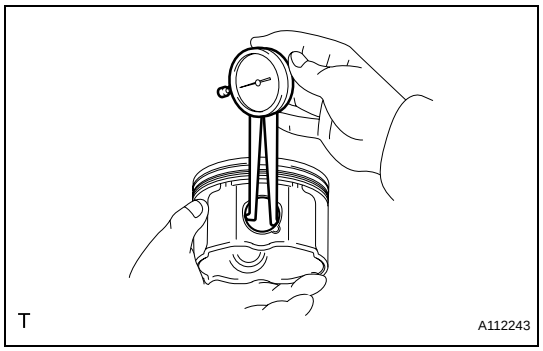
| Item | Specified Condition |
|---|---|
| No. 2 ring | 1.37 mm (0.0539 in.) |
| Oil ring | 0.73 mm (0.0287 in.) |

If the end gap is greater than the maximum, replace the piston ring. If the end gap is greater than the maximum, even with a new piston ring, replace the cylinder block.

**7. INSPECT PISTON PIN OIL CLEARANCE**

(a) Using a caliper gauge, measure the piston pin bore diameter.

**Standard piston pin bore diameter:**
**22.001 to 22.010 mm (0.8662 to 0.8665 in.)**

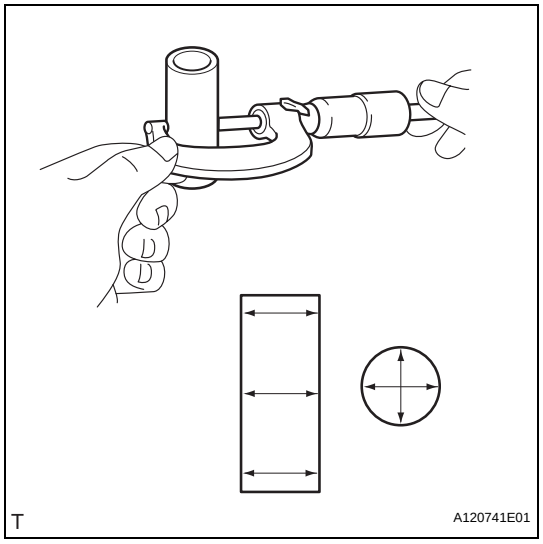



| Item | Specified Condition |
|---|---|
| A | 22.001 to 22.004 mm (0.8662 to 0.8663 in.) |
| B | 22.005 to 22.007 mm (0.8663 to 0.8664 in.) |
| C | 22.008 to 22.010 mm (0.8665 to 0.8665 in.) |

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

(b) Using a micrometer, measure the piston pin diameter.

**Standard piston pin diameter:**
**21.997 to 22.006 mm (0.8660 to 0.8664 in.)**

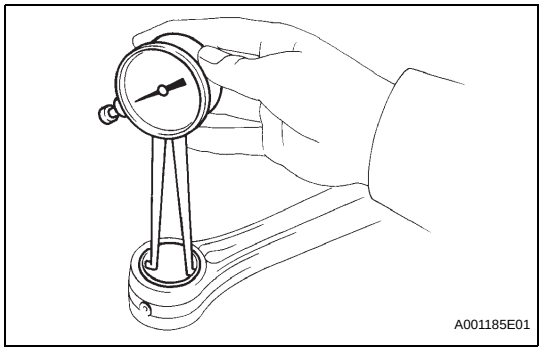



| Item | Specified Condition |
|---|---|
| A | 21.997 to 22.000 mm (0.8660 to 0.8661 in.) |
| B | 22.001 to 22.003 mm (0.8662 to 0.8663 in.) |
| C | 22.004 to 22.006 mm (0.8663 to 0.8664 in.) |

If the diameter is not as specified, replace the piston pin.

(c) Using a caliper gauge, measure the connecting rod small end bore diameter.

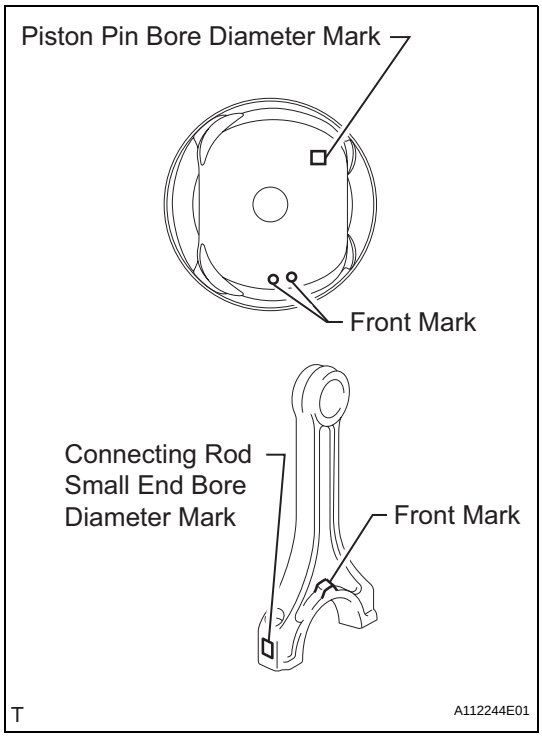
**Standard connecting rod small end bore diameter:**
**22.005 to 22.014 mm (0.8663 to 0.8667 in.)**




| Item | Specified Condition |
|---|---|
| A | 22.005 to 22.008 mm (0.8663 to 0.8665 in.) |
| B | 22.009 to 22.011 mm (0.8665 to 0.8666 in.) |
| C | 22.012 to 22.014 mm (0.8666 to 0.8667 in.) |

If the diameter is not as specified, replace the connecting rod.

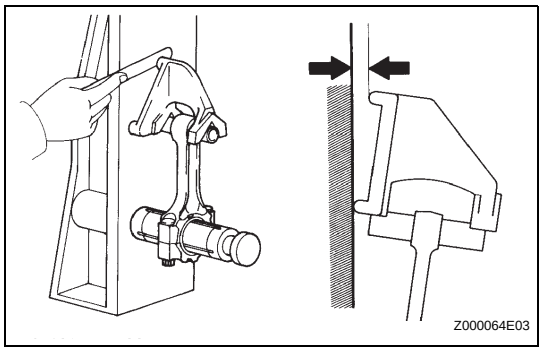
EM




(d) Subtract the piston pin diameter measurement from the piston pin bore diameter measurement.
**Standard oil clearance:**
**0.001 to 0.007 mm (0.00004 to 0.0003 in.)**
**Maximum oil clearance:**
**0.013 mm (0.0005 in.)**
If the oil clearance is greater than the maximum, replace the connecting rod. If necessary, replace the piston and piston pin as a set.

(e) Subtract the piston pin diameter measurement from the connecting rod small end bore diameter measurement.
**Standard oil clearance:**
**0.005 to 0.011 mm (0.0002 to 0.0004 in.)**
**Maximum oil clearance:**
**0.017 mm (0.0007 in.)**
If the oil clearance is greater than the maximum, replace the connecting rod. If necessary, replace the connecting rod and piston pin as a set.

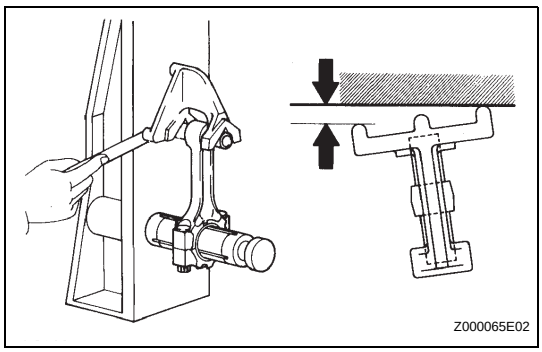
EM



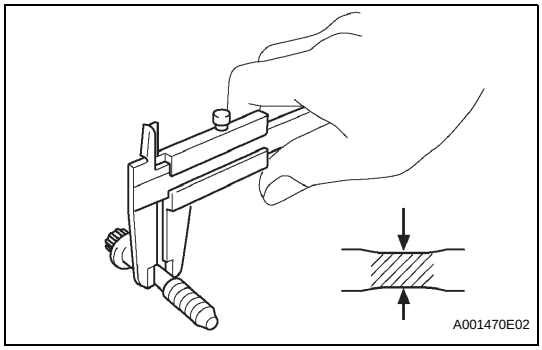

**8. INSPECT CONNECTING ROD SUB-ASSEMBLY**

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

(1) Check for misalignment.
**Maximum misalignment:**
**0.05 mm (0.0020 in.) per 100 mm (3.94 in.)**
If the misalignment is greater than the maximum, replace the connecting rod.

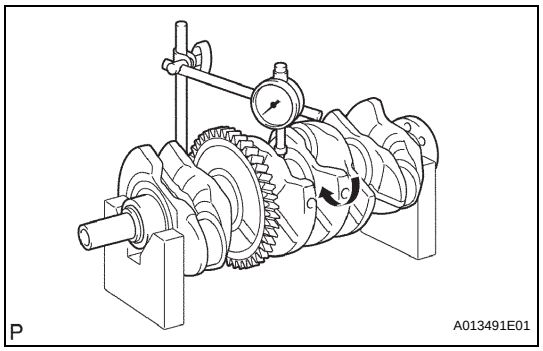



(2) Check for twist.
**Maximum twist:**
**0.15 mm (0.0059 in.) per 100 mm (3.94 in.)**
If the twist is greater than the maximum, replace the connecting rod.



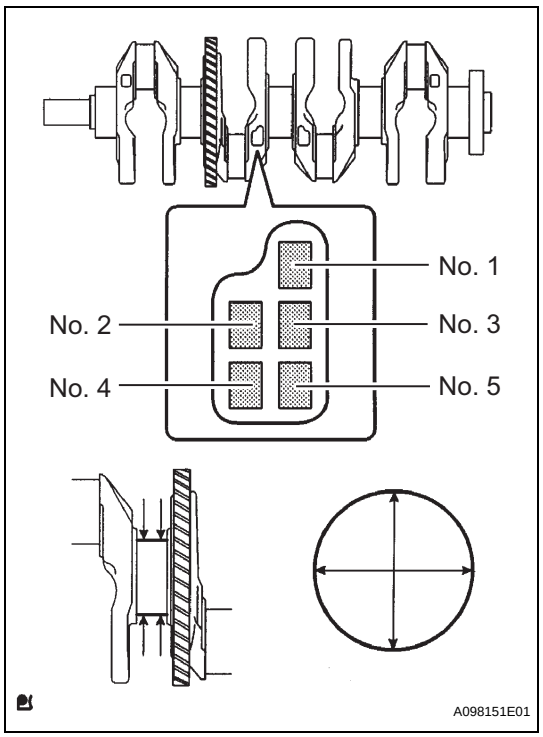

**9. INSPECT CONNECTING ROD BOLT**

(a) Using a vernier caliper, measure the tension portion diameter of the bolt.
**Standard diameter:**
**7.2 to 7.3 mm (0.283 to 0.287 in.)**
**Maximum diameter:**
**7.0 mm (0.276 in.)**
If the diameter is less than the minimum, replace the connecting rod bolt.




**10. INSPECT CRANKSHAFT**

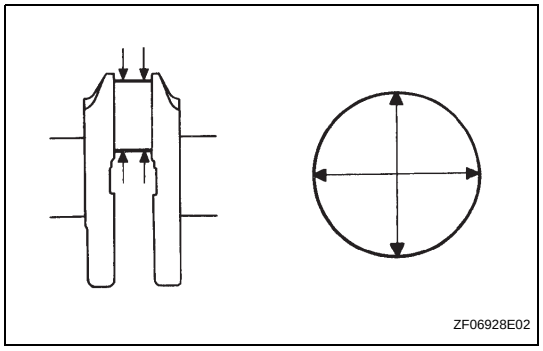
(a) Using a dial indicator and V-blocks, measure the circle runout as shown in the illustration.
**Maximum taper and distortion:**
**0.003 mm (0.0001 in.)**
If the taper and distortion are greater than the maximum, replace the crankshaft.




(b) Using a micrometer, measure the diameter of each main journal.
**Standard diameter:**
**54.988 to 55.000 mm (2.1830 to 2.1654 in.)**
If the diameter is not as specified, check the crankshaft oil clearance.

(c) Check each main journal for taper and distortion as shown in the illustration.
**Maximum taper and distortion:**
**0.003 mm (0.0001 in.)**
If the taper and distortion are greater than the maximum, replace the crankshaft.
**Standard diameter (Reference)**

| Mark | Specified Condition |
|---|---|
| 0 | 54.999 to 55.000 mm (2.1653 to 2.1654 in.) |
| 1 | 54.997 to 54.998 mm (2.1652 to 2.1653 in.) |
| 2 | 54.995 to 54.996 mm (2.1652 to 2.1652 in.) |
| 3 | 54.993 to 54.994 mm (2.1651 to 2.1651 in.) |
| 4 | 54.991 to 54.992 mm (2.1650 to 2.1650 in.) |
| 5 | 54.998 to 54.990 mm (2.1649 to 2.1650 in.) |




(d) Using a micrometer, measure the diameter of each crank pin.
**Standard diameter:**
**47.990 to 48.000 mm (1.8894 to 1.8898 in.)**
If the diameter is not as specified, check the connecting rod oil clearance.

(e) Inspect each crank pin for taper and distortion as shown in the illustration.
**Maximum taper and distortion:**
**0.003 mm (0.0001 in.)**
If the taper and distortion are greater than the maximum, replace the crankshaft.

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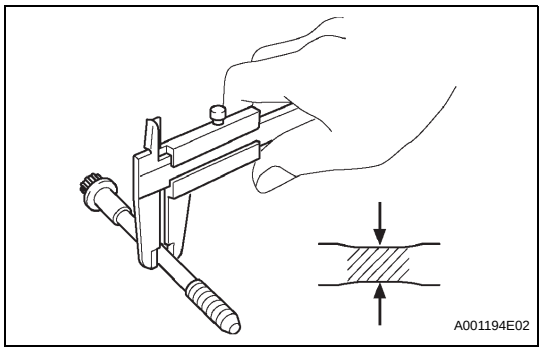


**11. INSPECT CRANKSHAFT BEARING CAP SET BOLT**

(a) Using a vernier caliper, measure the tension portion diameter of the bolts.

**Standard diameter:**

**7.5 to 7.6 mm (0.295 to 0.299 in.)**

**Minimum diameter:**

**7.5 mm (0.295 in.)**

If the diameter is less than the minimum, replace the bolt.