

2AZ Engine Oil Consumption Repair Procedure

Service Category Engine/Hybrid System

Section Engine Mechanical

Market USA

Toyota Supports
 ASE Certification 

Applicability

| YEAR(S) | MODEL(S) | ADDITIONAL INFORMATION |
|-------------|----------|--|
| 2007 – 2011 | Camry HV | Engine(s): 2AZ VDS(s): BB3EK, BB46K |
| 2007 – 2009 | Camry | Engine(s): 2AZ VDS(s): BE46K |
| 2009 – 2011 | Corolla | Engine(s): 2AZ VDS(s): BE40E, BE4EE |
| 2009 – 2013 | Matrix | Engine(s): 2AZ VDS(s): GE40E, KE40E, KE42E, KE4EE, LE40E, LE4EE, ME4EE |
| 2006 – 2008 | RAV4 | Engine(s): 2AZ VDS(s): BD31V, BD32V, BD33V, BD34V, BD35V, ZD31V, ZD32V, ZD33V, ZD34V, ZD35V |
| 2007 – 2008 | Solara | Engine(s): 2AZ VDS(s): CE30P |

REVISION NOTICE

October 9, 2015 Rev1:

- The Parts Information and Repair Procedure sections have been updated.

Any previous printed versions of this bulletin should be discarded.

2AZ Engine Oil Consumption Repair Procedure

SUPERSESSON NOTICE

The information contained in this bulletin supersedes SB No. T-SB-0094-11.

- Applicability has been updated to include 2010 – 2011 model year Corolla and 2010 – 2013 model year Matrix vehicles.
- The Title has been updated.
- The Production Change Information section has been removed.

Service Bulletin No. T-SB-0094-11 is Obsolete and any printed versions should be discarded. Be sure to review the entire content of this bulletin before proceeding.

Introduction

NOTE

Service Bulletin No. [T-SB-0158-14](#), "2AZ Engine Oil Consumption Inspection Procedure," MUST be performed first **BEFORE** continuing with the procedure in this bulletin.

Some 2006 – 2013 model year vehicles equipped with the 2AZ engine may exhibit engine oil consumption. The piston assembly has been changed to minimize oil consumption. Use the following Repair Procedure to address this condition.

Warranty Information

| OP CODE | DESCRIPTION | MODEL | ENGINE | DRIVE-TRAIN | TIME | OFF | T1 | T2 |
|---------|---------------------------|----------|---------|-------------|------|--|----|----|
| EG9014 | R & R Piston and Ring Set | Camry | 2AZ-FE | – | 14.8 | 13211-0H040-A0 13211-0H040-B0 13211-0H040-C0 13211-0H041-A0 13211-0H041-B0 13211-0H041-C0 13211-28110-A0 13211-28110-B0 13211-28110-C0 13211-28111-A0 13211-28111-B0 13211-28111-C0 13211-28112-A0 13211-28112-B0 13211-28112-C0 | 11 | 99 |
| | | Camry HV | 2AZ-FXE | – | 15.5 | 13211-28120-A0 13211-28120-B0 13211-28120-C0 13211-28121-A0 13211-28121-B0 13211-28121-C0 | | |

2AZ Engine Oil Consumption Repair Procedure

Warranty Information (Continued)

| OP CODE | DESCRIPTION | MODEL | ENGINE | DRIVE-TRAIN | TIME | OFF | T1 | T2 | |
|---------|---------------------------|---------|--------|-------------|------|--|----|----|--|
| EG9014 | R & R Piston and Ring Set | Corolla | 2AZ-FE | - | 14.2 | 13211-28110-A0 13211-28110-B0 13211-28110-C0 13211-28111-A0 13211-28111-B0 13211-28111-C0 13211-28112-A0 13211-28112-B0 13211-28112-C0 | 11 | 99 | |
| | | Matrix | | 2WD | 14.2 | | | | |
| | | | | 4WD | 14.7 | | | | |
| | | RAV4 | | 2WD | 15.6 | | | | |
| | | | | 4WD | 16.3 | | | | |
| | | Solara | | - | 16.3 | | | | 13211-0H040-A0 13211-0H040-B0 13211-0H040-C0 13211-0H041-A0 13211-0H041-B0 13211-0H041-C0 |

APPLICABLE WARRANTY

- This repair is covered under the Toyota Powertrain Warranty. This warranty is in effect for 60 months or 60,000 miles, whichever occurs first, from the vehicle's in-service date.
- Warranty application is limited to occurrence of the specified condition described in this bulletin.

Parts Information

Required Kit Part Numbers

| MODEL | KIT PART NUMBER | KIT PART NAME* | QTY |
|----------|-----------------|-------------------------|-----|
| Camry | 04004-11228 | Repair Kit, Piston Ring | 1 |
| Camry HV | 04004-11428 | | 1 |
| Corolla | 04004-11628 | | 1 |
| Matrix | 04004-11728 | | 1 |
| RAV4 | 04005-42128 | | 1 |
| Solara | 04004-12228 | | 1 |

* See Kit Contents table for individual parts included in each kit.

Additional Required Parts

| MODEL | PART NUMBER | PART NAME | QTY |
|-----------------------|----------------|-------------|-----|
| ALL | 90915-YZZF1 | Filter, Oil | 1 |
| ALL (except Camry HV) | 04004-79128-#0 | Piston | 4 |

2AZ Engine Oil Consumption Repair Procedure

Parts Information (Continued)

| MODEL | PART NUMBER | PART NAME | QTY |
|-------------------|----------------|---|-----|
| Camry HV | 13211-28150-#0 | Piston | 4 |
| Camry (PZEV Only) | 17177-28040 | Gasket, Intake Manifold to Head | 1 |
| | 17171-28020 | Gasket, Intake Manifold to Exhaust Manifold Intake Runner | 1 |

Additional Parts: Only As Needed

| MODEL | PART NUMBER | | PART NAME | QTY |
|-------|----------------------------------|----------------|--------------------------|---------------|
| | PREVIOUS | NEW | | |
| ALL | 13251-0H030-#0 | | Pin, Piston | As Needed |
| | 13201-09790-#0 13201-09791-#0 | 13201-29686-#0 | Rod Sub-assy, Connecting | |
| | 13201-29686-#0 | | | |
| | 13281-0H031-0# | | Bearing, Connecting Rod | 8 (if Needed) |

Kit Contents

NOTE

This is NOT a list of individual parts to order for this Repair Procedure. This is only a list of parts included in the required kit. Please consult the above required parts sections for ordering details.

| MODEL | Camry | Camry HV | Corolla | Matrix | RAV4 | Solara |
|------------------------|-------------|-------------|--------------------|-------------|-------------|-------------|
| KIT PART NUMBER | 04004-11228 | 04004-11428 | 04004-11628 | 04004-11728 | 04005-42128 | 04004-12228 |
| PART NUMBER | PART NAME | | QUANTITY (per Kit) | | | |
| 13011-28260 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15708-28011 | 4 | 4 | 4 | 4 | 4 | 4 |
| 11115-28040 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11213-28021 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12157-10010 | - | - | - | 2 | 2 | - |
| 13552-28010 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16258-28040 | 1 | - | 1 | - | - | - |
| 17173-28010 | 1 | 1 | 1 | 1 | 1 | 1 |
| 17177-28031 | 1 | 1 | 1 | 1 | 1 | 1 |
| 17177-28040 | 1 | - | - | - | - | - |
| 17451-28070 | - | - | 1 | 1 | 1 | - |
| 90917-06090 | 1 | 1 | - | - | - | 1 |

2AZ Engine Oil Consumption Repair Procedure

Parts Information (Continued)

| MODEL | | Camry | Camry HV | Corolla | Matrix | RAV4 | Solara |
|-----------------|--|--------------------|-------------|-------------|-------------|-------------|-------------|
| KIT PART NUMBER | | 04004-11228 | 04004-11428 | 04004-11628 | 04004-11728 | 04005-42128 | 04004-12228 |
| PART NUMBER | PART NAME | QUANTITY (per Kit) | | | | | |
| 94185-60800 | Bolt (Front Exhaust Pipe No. 1 Support Bracket) | 2 | 2 | - | - | - | 2 |
| 90917-06078 | Gasket, Exhaust Pipe, Center | - | - | 1 | 1 | 1 | - |
| 90917-06076 | | 1 | 1 | - | - | - | 1 |
| 90177-22001 | Nut (for Front Axle Shaft) | 2 | 2 | 2 | 2 | 2 | 2 |
| 90119-10461 | Bolt (for Drive Shaft Bearing Bracket Setting No. 1) | 1 | 1 | 1 | 1 | 1 | 1 |
| 90901-19060 | | - | - | - | 1 | - | - |
| 90311-38098 | Seal, Oil (for Timing Chain Case) | 1 | 1 | 1 | 1 | 1 | 1 |
| 90311-89010 | Seal, Engine Rear Oil | 1 | 1 | 1 | 1 | 1 | 1 |
| 90430-12031 | Gasket (for Oil Pan Drain Plug) | 1 | 1 | 1 | 1 | 1 | 1 |
| 90430-18008 | Gasket, Drain Plug, etc. | 2 | 3 | 2 | 2 | 1 | 2 |
| 90468-04193 | Clip (Transmission Control Cable) | - | 1 | - | - | - | - |
| 90468-14016 | | 2 | - | 2 | 2 | 1 | 2 |
| 90520-22025 | Ring, Hole Snap (for Piston Pin) | 8 | 8 | 8 | 8 | 8 | 8 |
| 90520-38015 | Ring, Hole Snap (for Front Drive Shaft RH) | 1 | 1 | 1 | 1 | 2 | 1 |
| 90520-33008 | | - | - | - | - | 1 | - |
| 90521-33002 | Ring, Hole Snap (for Front Drive Shaft LH) | 1 | 1 | 1 | 1 | 1 | 1 |
| 95381-03020 | Pin, Cotter (Tie Rod) | - | - | 2 | 2 | - | - |
| 95381-03025 | | 2 | 2 | - | - | 2 | 2 |
| 96721-19010 | Ring, O (for Oil Level Gage Guide) | 1 | 1 | 1 | 1 | 1 | 1 |
| 96761-24020 | Ring, O (for Cylinder Block to Crankcase Stiffener) | 1 | 1 | 1 | 1 | 1 | 1 |
| G1917-32010 | Ring, O (for Camshaft Timing Oil Control Valve) | 1 | 1 | 1 | 1 | 1 | 1 |

2AZ Engine Oil Consumption Repair Procedure

Required Tools & Equipment

| TOOLS & MATERIAL | PART NUMBER | QUANTITY | |
|---|-------------|--|-------------------------------|
| Three Bond 1324 or Equivalent | – | As Needed | |
| FIPG Sealant or Equivalent | 00295-00103 | As Needed | |
| Super Long Life Coolant (SLLC) | 00272-SLLC2 | 6.6 U.S. qts. (6.2 liters) | |
| ILSAC GF-4 Multi-grade SAE 0W-20 or 5W-20 | – | Camry, Camry HV, RAV4, Solara | 4.5 U.S. qts. (4.3 liters) |
| | – | Corolla, Matrix | 4.0 U.S. qts. (3.8 liters) |
| Green Plastigage™ | – | As Needed | |
| Cylinder Ridge Reamer | – | 1 | |
| Torque Yield Wrench | – | 1 | |
| Precision Straight Edge | – | 1 | |
| Piston Heater | – | 1 | |
| Piston Ring Compressor | – | 1 | |
| Torque Wrench | – | 1 | |
| Large Brass Punch | – | 1 | |
| Piston Ring Expander | – | 1 | |
| Thread Chaser | – | 1 | |
| Feeler Gauge | – | 1 | |
| Caliper Gauge | – | 1 | |
| Micrometer | – | 1 | |
| Vernier Caliper | – | 1 | |
| Engine Stand | – | 1 | |

| SPECIAL SERVICE TOOLS (SST) | PART NUMBER | QTY |
|-----------------------------|-----------------------------|-----|
| Gasket Seal Cutter | 09032-00100 | 1 |

NOTE
Additional SSTs may be ordered by calling 1-800-933-8335.

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure

NOTE

Verify that Service Bulletin No. [T-SB-0158-14](#), "2AZ Engine Oil Consumption Inspection Procedure," has been performed **BEFORE** continuing with this bulletin.

Replace the piston and piston ring set.

1. Remove the engine assembly and place on an engine stand.

Refer to the Technical Information System (TIS), applicable model and model year Repair Manual:

NOTE

Removal and replacement of automatic transmission fluid is unnecessary and is **NOT** covered under this bulletin.

- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – "2AZ-FE Engine Mechanical: Engine Assembly: Removal"

NOTE

Removal of the oil cooler pipe (with oil cooler) is necessary, replacement gasket is included in parts kit.

- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – "2AZ-FXE Engine Mechanical: Engine Assembly: Removal"
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – "2AZ-FE Engine Mechanical: Engine Assembly: Removal"
- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – "2AZ-FE Engine Mechanical: Engine Assembly: Removal"
- [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – "2AZ-FE Engine Mechanical: Engine Assembly: Removal"

NOTE

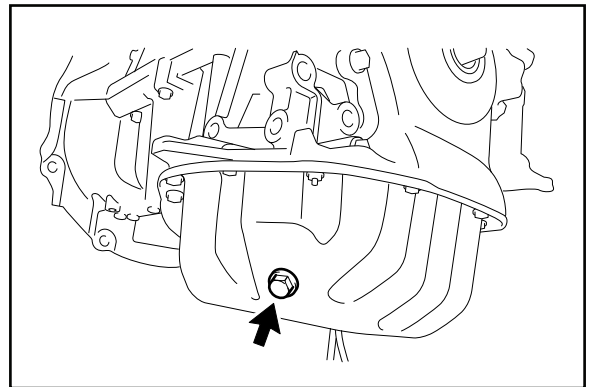
Do **NOT** remove No. 1 and No. 2 water by-pass pipes. Gaskets are **NOT** included in parts kits.

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Removal”
2. Remove the cylinder head assembly.
- Refer to TIS, applicable model and model year Repair Manual:
- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head: Removal”
 - [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Cylinder Head: Removal”
 - [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head Gasket: Removal”
 - [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head Gasket: Removal”
 - [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head: Removal”
 - [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
3. Remove the pistons from the connecting rods.
- A. Remove the oil pan drain plug and gasket.

Figure 1.



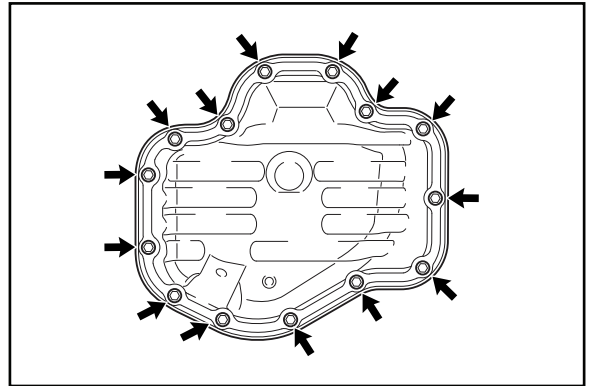
2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

B. Remove the oil pan sub-assembly.

- (1) Remove the 12 bolts and 2 nuts.

Figure 2.



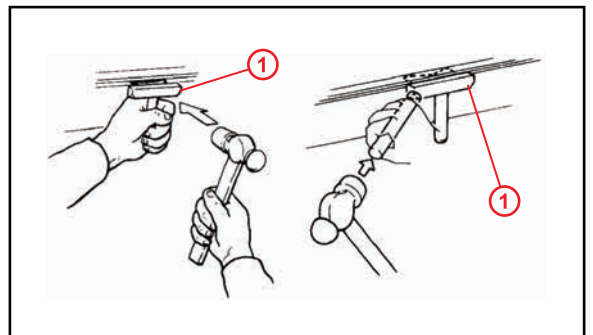
- (2) Insert the blade of the Gasket Seal Cutter between the crankcase and oil pan. Cut through the sealer and remove the oil pan.

SST: 09032-00100

NOTICE

Be careful NOT to damage the contact surfaces of the crankcase, chain cover, and oil pan.

Figure 3.



1 Gasket Seal Cutter

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

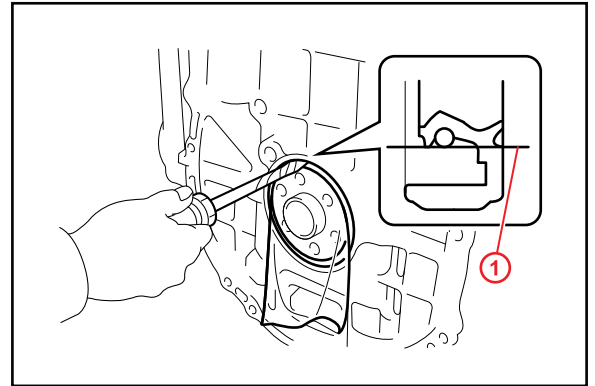
C. Remove the engine rear oil seal.

- (1) Using a knife, cut off the oil seal lip.
- (2) Using a screwdriver (with a taped tip), pry out the oil seal.

NOTICE

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

Figure 4.



1 Cut Position

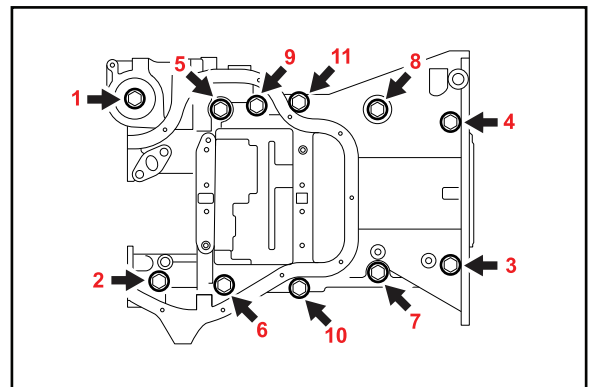
D. Remove the stiffening crankcase assembly.

NOTICE

Remove the stiffening crankcase as a unit. Do NOT separate the halves of the assembly, exposing the balance shaft bearings.

- (1) Uniformly loosen and remove the 11 bolts in the sequence shown in the illustration.

Figure 5.



2AZ Engine Oil Consumption Repair Procedure

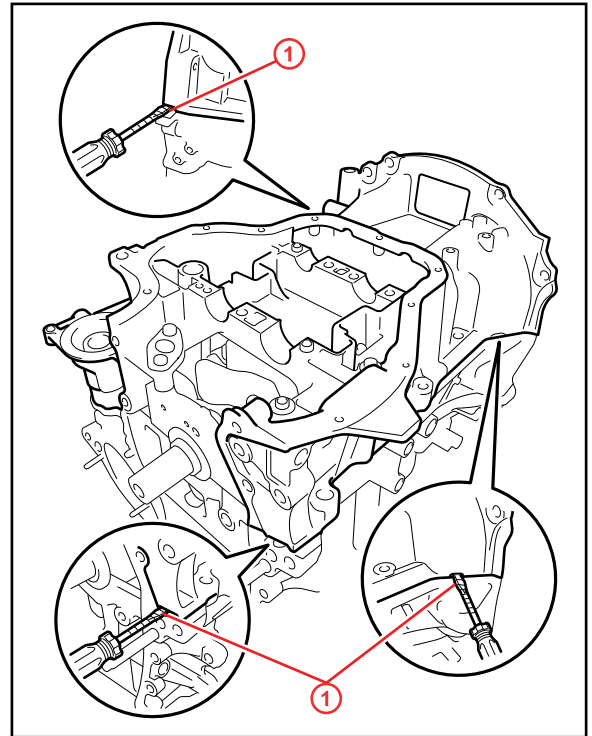
Repair Procedure (Continued)

- (2) Using a screwdriver (with a taped tip), remove the crankcase by prying between the crankcase and cylinder block.

NOTICE

Be careful NOT to damage the contact surfaces of the crankcase and cylinder block.

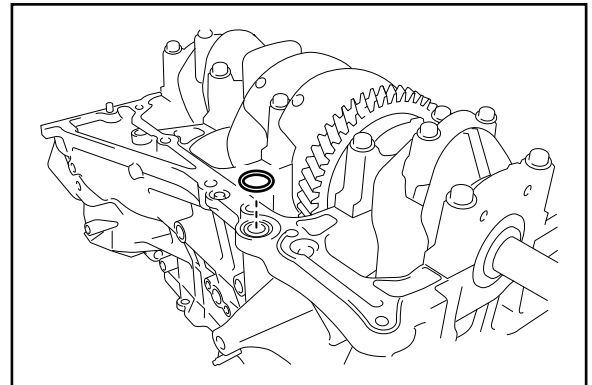
Figure 6.



1 Protective Tape

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

Figure 7.



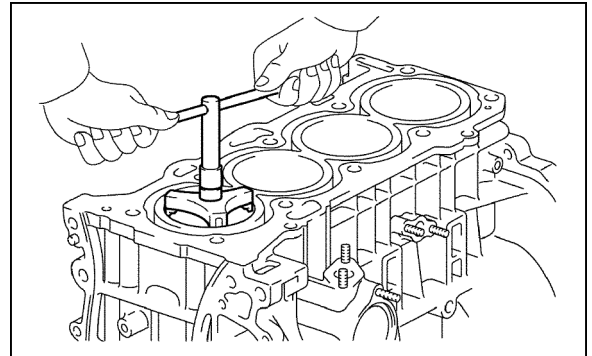
2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

E. Remove the piston sub-assemblies with connecting rod.

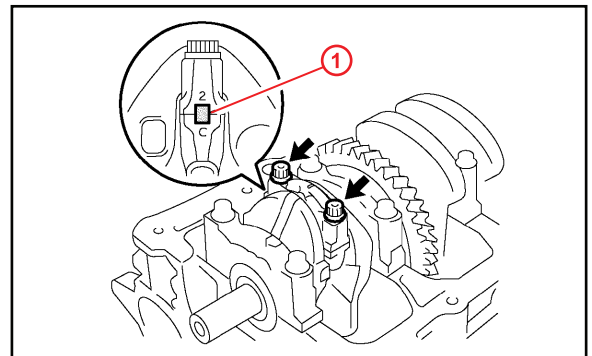
- (1) Using a ridge reamer, remove all the carbon from the top of the cylinder.

Figure 8.



- (2) Check that the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.

Figure 9.



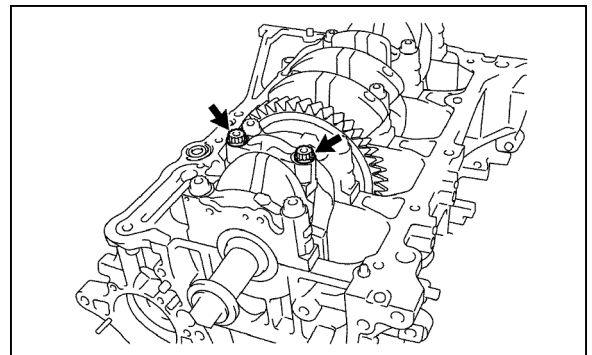
HINT

The matchmarks on the connecting rods and caps are provided for ensuring correct reassembly.

| | |
|----------|------------------|
| 1 | Matchmark |
|----------|------------------|

- (3) Using a 12 mm socket wrench, uniformly loosen the 2 bolts.

Figure 10.



2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

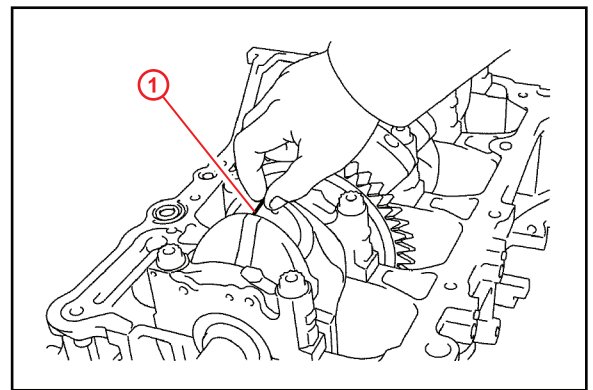
- (4) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by moving the connecting rod cap right and left.

HINT

Keep the lower bearing inserted in the connecting rod cap.

- (5) Inspect the connecting rod oil clearance.
 1. Clean the crank pin and bearing.
 2. Check the crank pin and bearing for pitting and scratches.
 3. Lay a strip of Plastigage™ on the crank pin.

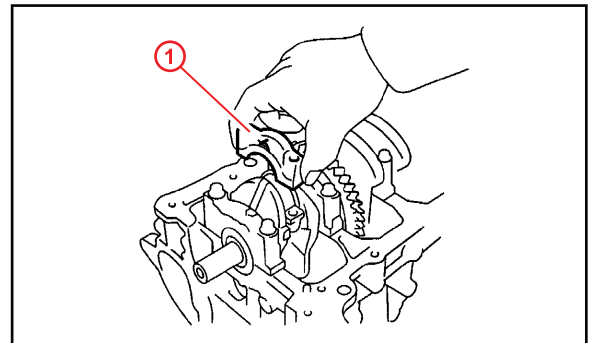
Figure 11.



1 Plastigage™

4. Check that the front mark of the connecting rod cap is facing forward.

Figure 12.



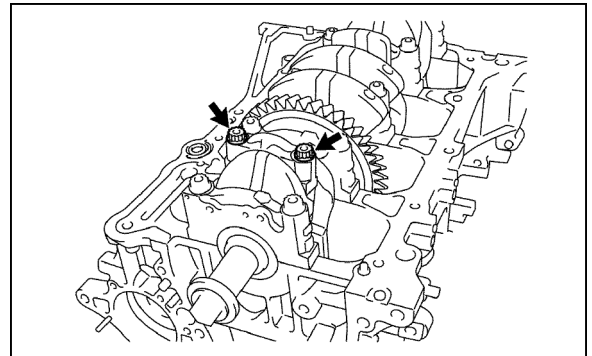
1 Front Mark

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

5. Install and alternately tighten the bolts of the connecting rod cap in several steps.

Figure 13.



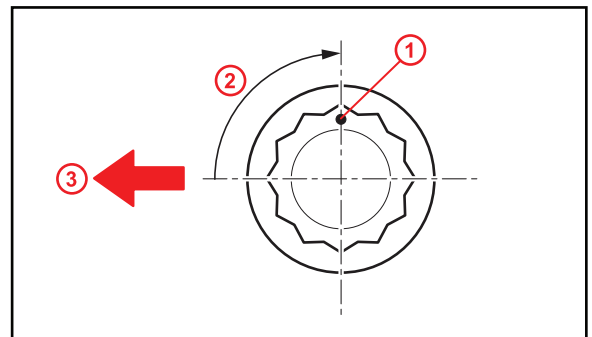
Torque: 25 N*m (250 kgf*cm, 18 ft*lbf)

NOTE

The connecting cap bolts should be tightened in 2 progressive steps.

6. Mark the front of the connecting rod cap bolts with paint.
Retighten the cap bolts by 90° as shown in the illustration.

Figure 14.



| | |
|----------|---------------------|
| 1 | Paint Mark |
| 2 | 90° |
| 3 | Engine Front |

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

7. Remove the 2 bolts and connecting rod cap.
8. 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.)

If the oil clearance is greater than the maximum, replace the connecting rod bearings. If necessary, inspect the crankshaft.

NOTE

Completely remove the Plastigage™ after the measurement.

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

HINT

If replacing a bearing, replace it with one that has the same number as its respective connecting rod cap. Each bearing's standard thickness is indicated by a 1, 2, or 3 mark on its surface.

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.) |

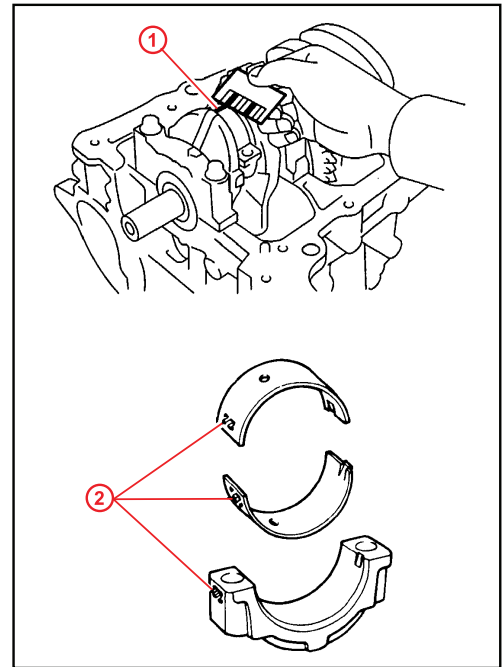
Standard Connecting Rod Bearing Thickness:

| 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:

| MARK | SPECIFIED CONDITION |
|--------|--|
| Mark 1 | 47.990 to 48.000 (1.8894 to 1.8898 in.) |
| Mark 2 | |
| Mark 3 | |

Figure 15.



| | |
|---|-----------------|
| 1 | Plastigage™ |
| 2 | 1, 2, or 3 Mark |

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- (6) 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.**

- (7) Repeat for the other 3 piston/connecting rod assemblies.

- F. Remove the connecting rod bearings.

HINT

Arrange the removed parts in the correct order.

- G. Inspect the cylinder bore for abnormal damage.

Visually check the cylinder bore for the presence of crosshatch.

- **If the cylinder bore has visible crosshatch, the cylinder block is OK to re-use.**
- Confirm that only light vertical marks are present, if any.

NOTE

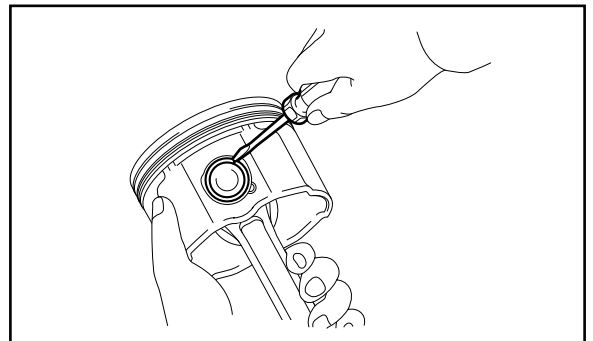
- **It is normal for an in-service block to have light markings present from carbon and should NOT be interpreted as excessive cylinder wall scratches.**
- **ONLY** replace the short block if multiple, severe scratches are present.
- **Do NOT** hone the cylinder walls.

- H. Using a screwdriver, pry out the 2 piston pin hole snap rings.

HINT

If necessary, subcontract the following specialized and precision operations to a local engine machining shop.

Figure 16.



2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

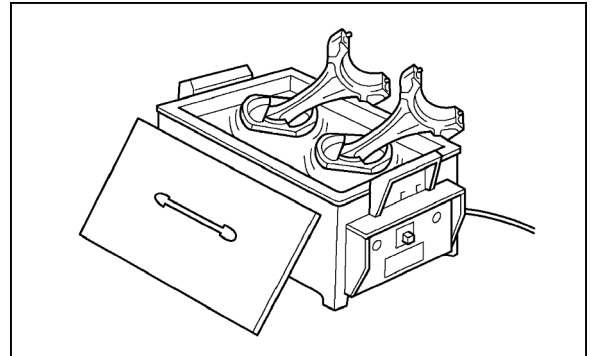
I. Remove the piston.

- (1) Gradually heat the piston to approximately 176° to 194°F (80° to 90°C).

HINT

If necessary, sublet the following specialized and precision operations to a local engine machining shop.

Figure 17.

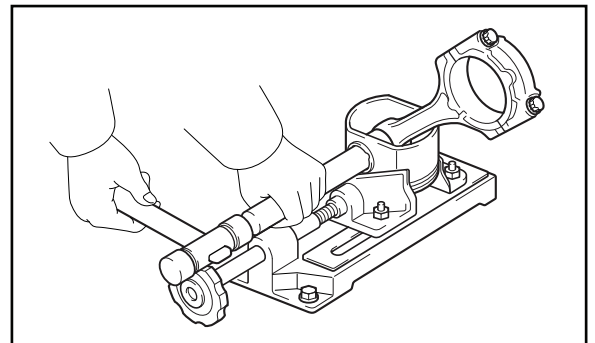


- (2) Using a plastic hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

NOTICE

- The piston, pin and connecting rod are a matched set.
- Arrange the pistons, pins, rings, connecting rods, and bearings in the correct order.

Figure 18.



For additional information, refer to TIS, applicable model and model year Repair Manual:

- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Engine Unit: Disassembly”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Disassembly”

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
 - [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Disassembly”
 - [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
 - [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Disassembly”
4. Inspect piston, pin, connecting rod and bearings to determine replacement part numbers and measure to determine if parts are suitable for re-use.

NOTE

The following steps are required to determine the correct replacement part numbers.

HINT

If necessary, sublet the following specialized and precision operations to a local engine machining shop.

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- A. Inspect the piston bore diameter mark located on the top face in order to determine correct replacement parts. Piston type will be: A, B, or C.

NOTE

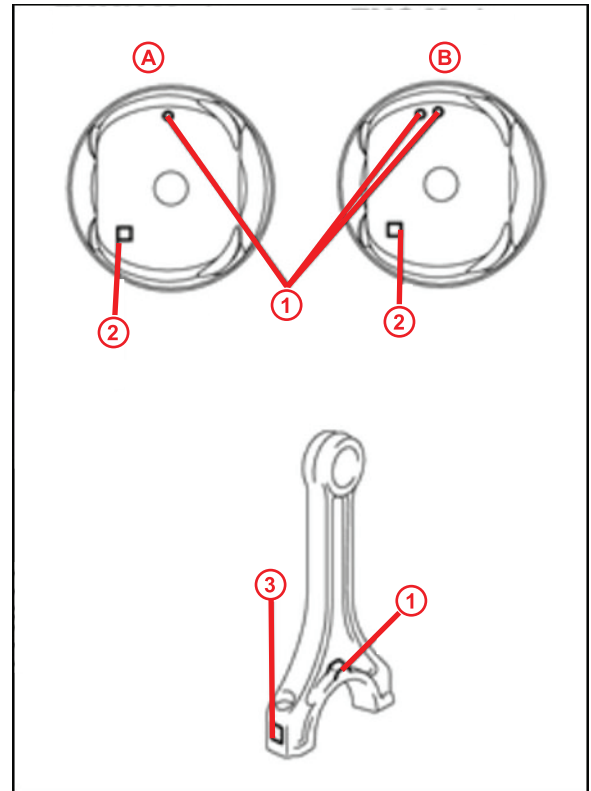
Due to carbon build up, piston face may need to be cleaned before reading designated piston type. If piston type cannot be found, reference connecting rod.

| PART NUMBER | |
|---|----------------|
| CAMRY, COROLLA, MATRIX, RAV4, SOLARA | CAMRY HV |
| 04004-79128-A0 | 13211-28150-A0 |
| 04004-79128-B0 | 13211-28150-B0 |
| 04004-79128-C0 | 13211-28150-C0 |

NOTE

Although B” pistons are the most commonly used in production, any engine can have any combination of all 3 pistons (A, B, C). The approximate production mix for pistons is as follows: A = 4%, B = 92%, C = 4%.

Figure 19.



| | |
|----------|-------------------------------|
| A | TMMK Made |
| B | TMC Made |
| 1 | Front Mark |
| 2 | Piston Pin Bore Diameter Mark |
| 3 | Connecting Rod |

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

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

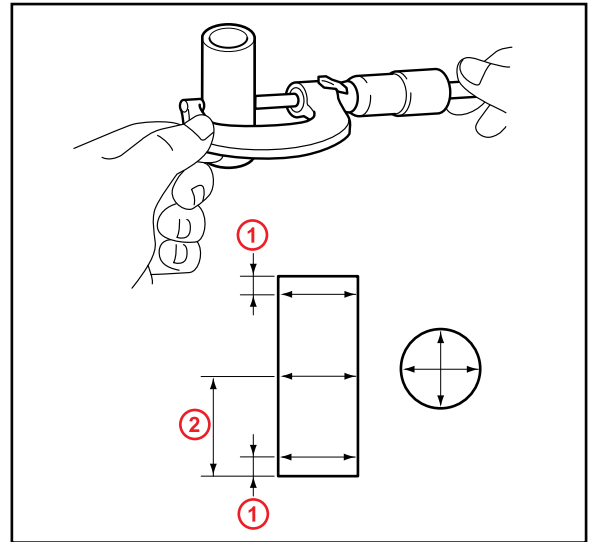
Standard Piston Pin Diameter: 21.997 to 22.006 mm (0.8660 to 0.8664 in.)

Ensure the connecting rod small end bore diameter measurement is within specification for the piston bore diameter mark inspected previously. If the diameter is NOT as specified, replace the piston pin.

NOTE

Piston pin type is a matched set with the piston and connecting rod. For example: if the piston removed has a "B" marking, the piston pin diameter should be 22.001 - 22.003 mm

Figure 20.



| | |
|---|------------------|
| 1 | 5 mm (0.20 in.) |
| 2 | 30 mm (1.18 in.) |

| PART NUMBER | SPECIFIED CONDITION |
|----------------|--|
| 13251-0H030-A0 | 21.997 to 22.000 mm (0.8660 to 0.8661 in.) |
| 13251-0H030-B0 | 22.001 to 22.003 mm (0.8662 to 0.8663 in.) |
| 13251-0H030-C0 | 22.004 to 22.006 mm (0.8663 to 0.8664 in.) |

2AZ Engine Oil Consumption Repair Procedure

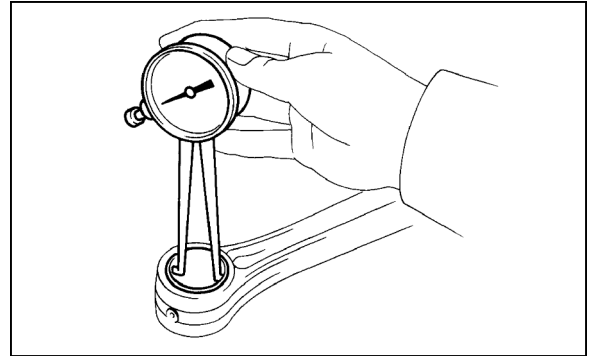
Repair Procedure (Continued)

- (2) 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.)

Ensure the connecting rod small end bore diameter measurement is within specification for the piston bore diameter mark inspected previously. If the diameter is NOT as specified, replace the piston pin.

Figure 21.



NOTE

Connecting Rod type is a matched set with the piston and piston pin. For example: if the piston removed has a "B" marking, the connecting rod small end bore diameter should be 22.009 - 22.011 mm.

| PART NUMBER | | SPECIFIED CONDITION |
|----------------|----------------|--|
| PREVIOUS | NEW | |
| 13201-09790-A0 | 13201-29686-A0 | 22.005 to 22.008 mm (0.8663 to 0.8665 in.) |
| 13201-09790-B0 | 13201-29686-B0 | 22.009 to 22.011 mm (0.8665 to 0.8666 in.) |
| 13201-09790-C0 | 13201-29686-C0 | 22.012 to 22.014 mm (0.8666 to 0.8667 in.) |

- B. Inspect the connecting rod bolt.

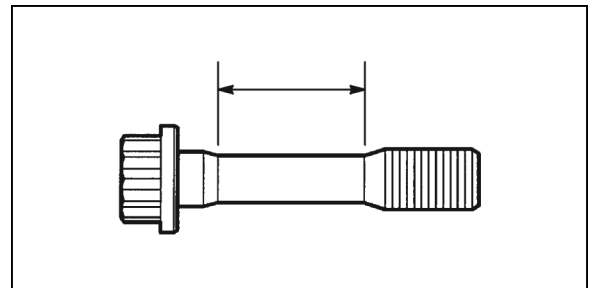
Using vernier calipers, measure the tension portion diameter of the bolt.

Standard Diameter: 7.2 to 7.3 mm (0.283 to 0.287 in.)

Minimum Diameter: 7.0 mm (0.276 in.)

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

Figure 22.



For additional information, refer to TIS, applicable model and model year Repair Manual:

- [2007](#) / [2008](#) / [2009](#) Camry: *Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Inspection”*

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

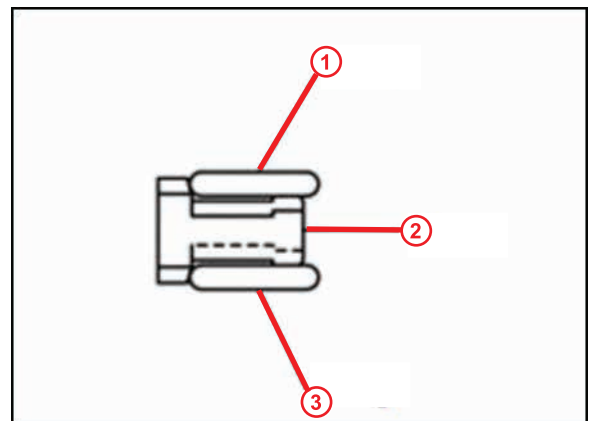
- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Engine Unit: Inspection”
 - [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Inspection”
 - [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Inspection”
 - [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Inspection”
 - [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Inspection”
5. Install the NEW pistons and rings and reassemble the engine in reverse order of disassembly.

NOTE

3 piece oil control ring installation procedure is NOT included in the Repair Manual. Follow the steps below to install the piston rings and refer to the repair manual for all other reassembly steps.

A. Install Piston Ring Set.

Figure 23.



| | |
|----------|---|
| 1 | Upper Oil Ring Side Rail |
| 2 | Oil Ring Expander |
| 3 | Lower Oil Lower Oil Ring Side Rail |

2AZ Engine Oil Consumption Repair Procedure

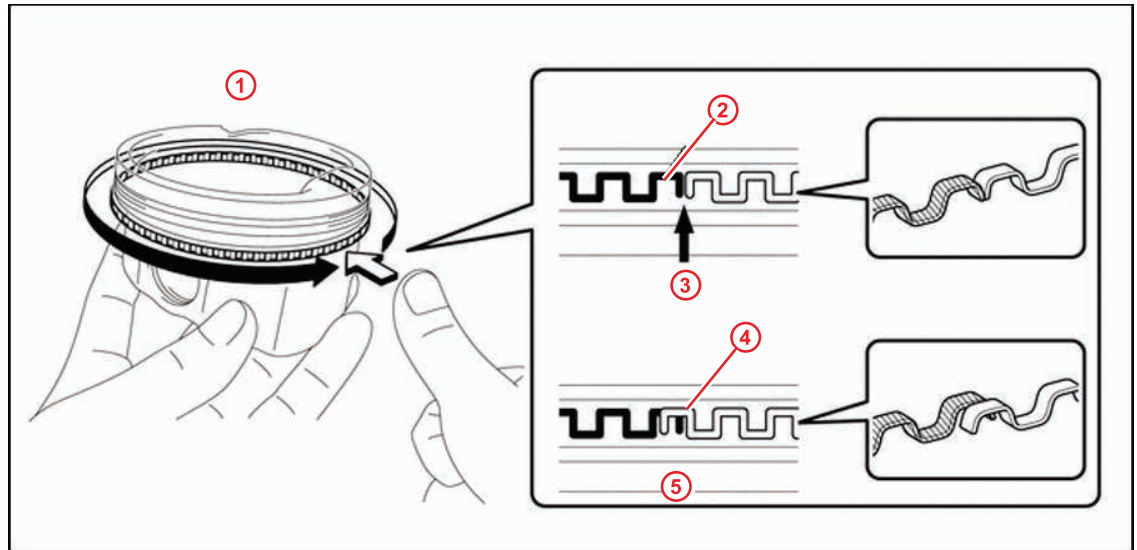
Repair Procedure (Continued)

- (1) Install the oil ring expander and 2 oil ring side rails by hand.

NOTE

When installing oil expander ring, do NOT overlap the ends.

Figure 24.



| | |
|---|---|
| 1 | Push Oil Ring Expander Surface Into Piston With Thumb |
| 2 | Normal Condition |
| 3 | Align End of Ring |

| | |
|---|----------------|
| 4 | NG Condition |
| 5 | Do NOT Overlap |

2AZ Engine Oil Consumption Repair Procedure

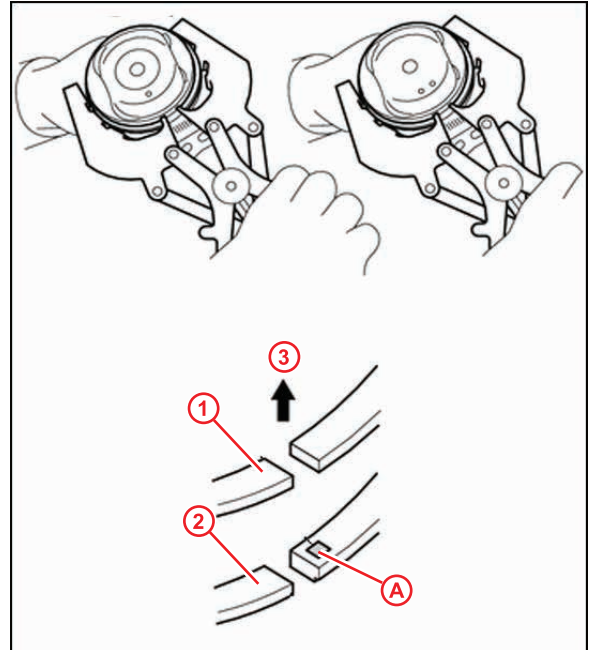
Repair Procedure (Continued)

- (2) Using a piston ring expander, install the No. 1 compression ring and No. 2 compression ring with the code mark positioned as shown in the illustration.

NOTE

Install the No. 2 compression ring with the code mark facing upward.

Figure 25.



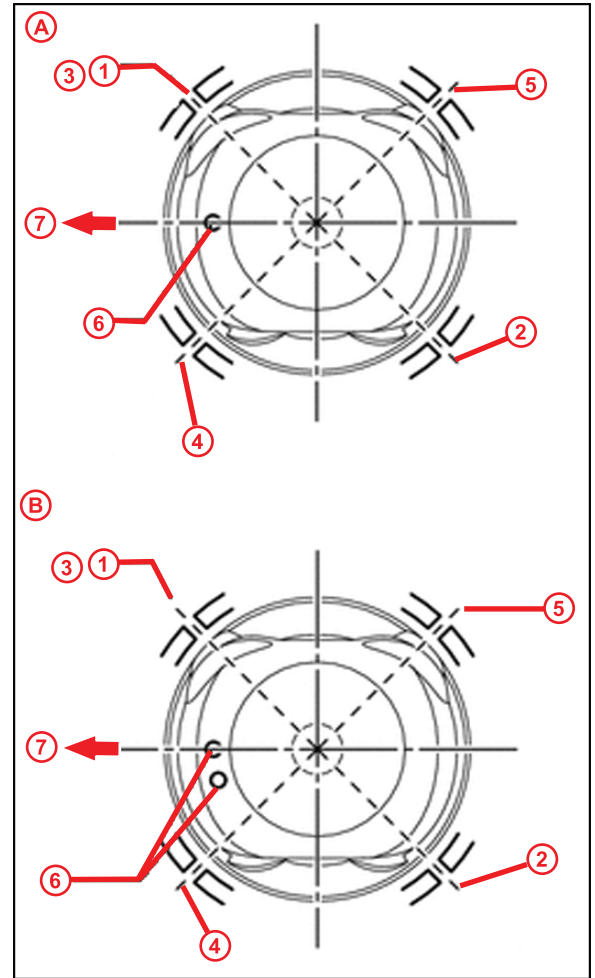
| | |
|----------|------------------------|
| A | Code Mark |
| 1 | No. 1 Compression Ring |
| 2 | No. 2 Compression Ring |
| 3 | Upward |

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- (3) Position the piston rings so that the ends are as shown in the illustration.

Figure 26.



| | |
|----------|---|
| A | TMC Made |
| B | TMMK Made |
| 1 | No. 1 Compression Ring |
| 2 | No. 2 Compression Ring |
| 3 | Oil Ring Expander |
| 4 | Upper Side Rail – Oil Control Ring |
| 5 | Lower Side Rail – Oil Control Ring |
| 6 | Front Mark |
| 7 | Front Side |

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

B. Install the NEW pistons and reassemble the engine in reverse order of disassembly.

For additional information, refer to TIS, applicable model and model year Repair Manual:

- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Reassembly”
- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head: Installation”
- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Engine Unit: Reassembly”
- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Cylinder Head: Installation”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Reassembly”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Reassembly”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head Gasket: Installation”
- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Block: Reassembly”
- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Reassembly”
- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head Gasket: Installation”
- [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Reassembly”
- [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Cylinder Head: Installation”

2AZ Engine Oil Consumption Repair Procedure

Repair Procedure (Continued)

- [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Unit: Reassembly”

6. Install the engine assembly.

Refer to TIS, applicable model and model year Repair Manual:

- [2007](#) / [2008](#) / [2009](#) Camry:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Installation”
- [2007 \(to 10/06\)](#) / [2007 \(10/06 & later\)](#) / [2008](#) / [2009](#) / [2010](#) / [2011](#) Camry HV:
Engine/Hybrid System – Engine Mechanical – “2AZ-FXE Engine Mechanical: Engine Assembly: Installation”
- [2009](#) / [2010](#) / [2011](#) Corolla:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Installation”
- [2009](#) / [2010](#) / [2011](#) / [2012](#) / [2013](#) Matrix:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Installation”
- [2006](#) / [2007](#) / [2008](#) RAV4:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Installation”
- [2007](#) / [2008](#) Solara:
Engine/Hybrid System – Engine Mechanical – “2AZ-FE Engine Mechanical: Engine Assembly: Installation”

7. Test drive the vehicle to verify normal operation.