

# 2GR-FE Engine Ticking Noise and/or MIL "ON" P0014, P0015, P0024, P0025, P0017, or P0018

**Service Category** Engine/Hybrid System

**Section** Engine Mechanical

**Market** USA

Toyota Supports  
ASE Certification 

## Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION
2005 – 2009	Avalon	
2007 – 2009	Camry	VDS(s): BK46K
2008 – 2009	Highlander	
2006 – 2009	RAV4	Engine(s): 2GR VDS(s): BK31V, BK32V, BK33V, BK34V, BK35V, ZK31V, ZK32V, ZK33V, ZK34V, ZK35V
2007 – 2009	Sienna	
2009	Venza	VDS(s): BK11A, ZK11A

### TSB REVISION NOTICE

**April 15, 2010 Rev2:**

- Warranty Information has been updated (Combo C).

**June 18, 2009 Rev1:**

- An important statement has been added to the Introduction — PLEASE READ.
- Applicability has been updated to include 2009 model year Venza.
- Production Change Information with VIN breaks has been added.
- Parts Information has been updated.

**Any previous printed versions of this service bulletin should be discarded.**

## Introduction

### IMPORTANT

**It is mandatory that the VVT-i gear actuator bolts, actuator center section alignment, and actuator body be inspected BEFORE performing this TSB. If no concerns are noted with these parts, this TSB does NOT apply.**

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### Introduction (Continued)

Some 2005 – 2009 model year vehicles with 2GR-FE engines may exhibit a ticking/clicking type noise from the cylinder head cover area which may be accompanied by a MIL "ON" and one or more VVT-i related Diagnostic Trouble Codes (DTCs). Please use the following repair procedure to address customer concerns.

### Production Change Information

This TSB applies to vehicles produced **BEFORE** the Production Change Effective VINs shown below.

MODEL	PLANT	DRIVETRAIN	PRODUCTION CHANGE EFFECTIVE VIN
Avalon	TMMK	2WD	4T1BK36B#9U340368
Camry	TMMK Line 1		4T1BK46K#9U097547
	TMMK Line 2		4T1BK46K#9U596688
	Tsutsumi		JTHBK46K#93043985
Highlander	TMK	2WD	JTEDS4#A#92068773
		AWD	JTEES4#A#92110201
Sienna	TMMI	2WD	5TDZK2#C#9S285934
		AWD	5TDBK2#C#9S028074
RAV4	Shokki	2WD	JTMZK3#V#9D000346
		AWD	JTMBK3#V#9D001222
	Tahara	2WD	JTMZK3#V#95024381
		AWD	JTMBK3#V#95072873
Venza	TMMK	2WD	4T3ZK11A#9U007813
		AWD	4T3BK11A#9U007793

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### Warranty Information

OP CODE	DESCRIPTION	MODEL	DRIVE-TRAIN	TIME	OFP	T1	T2
EG8053	R & R Exhaust VVT-i Gear, Camshaft, Camshaft Housing	Avalon	2WD	16.0	13080-##0#0	91	99
		Camry		14.3			
		Highlander		16.6			
			AWD	17.1			
		RAV4	2WD	15.4			
			AWD	16.0			
		Sienna	2WD	14.1			
			AWD	14.3			
		Venza	2WD	14.4			
			AWD	15.2			
Combo A	Add R & R Intake VVT-i Gear	—	—	0.2			
Combo B	Add R & R Exhaust VVT-i Gear, Camshaft & Camshaft Housing (Opposite Bank)	—	—	1.2			
Combo C	Add R & R Intake VVT-i Gear (Opposite Bank)	—	—	0.2			

#### 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.

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### Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QUANTITY		
			BANK 1 REPAIR ONLY	BANK 2 REPAIR ONLY	BOTH BANKS REPAIR
11103-3102# 11103-0P01#	11103-0P014	Housing Sub-assembly, Camshaft, RH	1	0	1
13502-31040 13502-0P020	13502-0P021	Camshaft Sub-assembly No.2	1	0	1
11104-3102# 11104-0P010	11104-0P011	Housing Sub-assembly, Camshaft, LH	0	1	1
13054-31030 13054-0P020	13054-0P021	Camshaft Sub-assembly No.4	0	1	1
13080-31030 13080-0P020	13080-0P040	Gear Assembly, Camshaft Timing, Exhaust, LH	1	1	2
13050-0P#### 13050-31####	13050-0P070	Gear Assembly, Camshaft Timing	1*	1*	2*
17176-0P020	Same	Gasket, Air Surge Tank to Intake Manifold	3	3	3
17177-0P020	Same	Gasket, Intake Manifold to Head, No.1	1	1	1
17178-0P020	Same	Gasket, Intake Manifold to Head, No.2	1	1	1
11159-0P010	Same	Gasket, Camshaft Bearing Cap Oil Hole	4	4	4
90430-A0001	Same	O-ring (standard part)	2	2	2
90430-12031	Same	Gasket, Oil Pan Drain Plug	1	1	1
15147-0P020	Same	Gasket, Oil Strainer	1	1	1
12151-0P010	Same	Gasket, Oil Pan	2	2	2
96721-19010	Same	O-ring, for Oil Level Gauge Guide, No. 2	1	1	1
90301-12018	Same	O-ring, for Oil Level Gauge Guide	1	1	1
15193-0P010	Same	Gasket Oil Pump	1	1	1
11213-0P010	Same	Gasket, Cylinder Head Cover	1	1	1
11214-0P040	Same	Gasket, Cylinder Head Cover No. 2	1	1	1
90430-16016	Same	Gasket, Oil Pipe No. 2	2	2	2
90430-16012	90430-16017	Gasket, Oil Pipe No. 1	4	4	4

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### Parts Information (Continued)

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QUANTITY		
			BANK 1 REPAIR ONLY	BANK 2 REPAIR ONLY	BOTH BANKS REPAIR
90311-A0005	Same	Seal, Oil, for Timing Gear Case	1	1	1
11328-0P010	Same	Gasket, Timing Gear Cover	1	1	1
96761-24021	Same	O-ring (standard part), Coolant Pipe	1	1	1
16325-31010	Same	Gasket, Water Inlet Housing No. 2	1	1	1
90080-43036	Same	Gasket, Exhaust Pipe	1	1	1
04152-31090	04152-YZZA1	Element Kit, Oil Filter	1	1	1
16271-0P010	Same	Gasket, Water Pump	1	1	1

\* Part may not be needed based on inspection.

### Required Tools & Equipment

REQUIRED MATERIAL	PART NUMBER	QTY
Three Bond 1324 or Equivalent	—	As Needed
FIPG Sealant or Equivalent	08826-00080	As Needed
Toyota Genuine Seal Packing Black, Three Bond 1207B, or Equivalent	—	As Needed
Toyota Genuine Seal Packing Black, Three Bond 1282B, or Equivalent	—	As Needed
Toyota Genuine Adhesive 1344, Three Bond 1344, or Equivalent	—	As Needed
ILSAC GF-4 Multi-grade SAE 5W-30	00279-1QT5W-01	6.0 U.S. qts. (5.7 liters)
Super Long Life Coolant (SLLC)	00272-SLLC2	9.5 U.S. qts. (9.0 liters)

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### Required Tools & Equipment (Continued)

SPECIAL SERVICE TOOLS (SST'S)	PART NUMBER	QTY
Universal Puller Set "C"* NOTE: All Components from this kit/set are required.	<a href="#">09950-50013-01</a>	1
Oil Filter Wrench*	<a href="#">09228-06500-02</a>	1
Companion Flange Holding Tool*	<a href="#">09330-00021</a>	1
Gasket Seal Cutter	<a href="#">09032-00100</a>	1

\* Essential SST.

#### NOTE

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

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER
R-134a Refrigerant Recovery/Recycling Machine	ADE	—

#### NOTE

Additional refrigerant service equipment may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787.

### Inspection Procedure

1. Start the engine and listen for any ticking/clicking type noises coming from the VVT-i gear area of the engine.

#### NOTE

This condition may or may not be accompanied by one or more of the following DTCs stored in the Engine Control Module (ECM) (SAE term: Powertrain Control Module/PCM):

- P0014: Camshaft Position "B" – Timing Advanced or System Performance (Bank 1)
- P0015: Camshaft Position "B" Timing Over Retarded (Bank 1)
- P0017: Crankshaft Position Camshaft Position Correlation (Bank 1 Sensor B)
- P0018: Crankshaft Position Camshaft Position Correlation (Bank 2 Sensor A)
- P0024: Camshaft Position "B" – Timing Over-Advanced or System Performance (Bank 2)
- P0025: Camshaft Position "B" – Timing Over-Retarded (Bank 2)

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### Inspection Procedure (Continued)

2. Remove the cylinder head cover and inspect the exhaust VVT-i gear assembly on the affected cylinder bank.

#### NOTE

If **NO** concerns are found with the VVT-i gear actuator bolts, the actuator center section alignment, or actuator body, this TSB does **NOT** apply. Refer to Repair Manual procedures for further diagnosis.

### Repair Procedure

1. If any concerns are noted with the exhaust VVT-i gear bolts or actuator follow the four steps below:
  - A. Replace the camshaft housing sub-assembly, exhaust camshaft, and exhaust VVT-i gear assembly on the **affected** bank.
  - B. Inspect the intake VVT-i gear assembly and bolts on the **affected** bank. Replace the intake VVT-i gear assembly if necessary.
  - C. Inspect the **opposite** bank exhaust VVT-i gear actuator and bolts. If any concerns are noted replace the opposite bank camshaft housing sub-assembly, exhaust camshaft, and exhaust VVT-i gear assembly.
  - D. Inspect the **opposite** bank intake gear actuator assembly and bolts. Replace the intake VVT-i gear assembly if necessary.

For complete disassembly procedures refer to the Technical Information System (TIS), applicable model and model year Repair Manual:

- 2005 Avalon:  
*Engine/Hybrid System – Engine Mechanical – “Engine Mechanical: Camshaft ([LH Bank](#)) / ([RH Bank](#)) (2GR-FE): Replacement”*
- [2006](#) / [2007](#) / [2008](#) / [2009](#) Avalon:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*
- [2007](#) / [2008](#) / [2009](#) Camry:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*
- [2008](#) / [2009](#) Highlander:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*
- [2006](#) / [2007](#) / [2008](#) / [2009](#) RAV4:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*

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### Repair Procedure (Continued)

- [2007](#) / [2008](#) / [2009](#) Sienna:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*
- [2009](#) Venza:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Disassembly”*

For complete reassembly procedures refer to TIS, applicable model and model year Repair Manual:

- [2006](#) / [2007](#) / [2008](#) / [2009](#) Avalon:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*
- [2007](#) / [2008](#) / [2009](#) Camry:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*
- [2008](#) / [2009](#) Highlander:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*
- [2006](#) / [2007](#) / [2008](#) / [2009](#) RAV4:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*
- [2007](#) / [2008](#) / [2009](#) Sienna:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*
- [2009](#) Venza:  
*Engine/Hybrid System – Engine Mechanical – “2GR-FE Engine Mechanical: Engine Unit: Reassembly”*

2. Start engine and test drive to verify the repair.