

DTC	P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED
DTC	P0301	CYLINDER 1 MISFIRE DETECTED
DTC	P0302	CYLINDER 2 MISFIRE DETECTED
DTC	P0303	CYLINDER 3 MISFIRE DETECTED
DTC	P0304	CYLINDER 4 MISFIRE DETECTED
DTC	P0305	CYLINDER 5 MISFIRE DETECTED
DTC	P0306	CYLINDER 6 MISFIRE DETECTED
DTC	P0307	CYLINDER 7 MISFIRE DETECTED
DTC	P0308	CYLINDER 8 MISFIRE DETECTED

CIRCUIT DESCRIPTION

When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emissions levels. High concentrations of HC can also cause the temperature of the catalyst to increase, possibly damaging the catalyst. To prevent this increase in emissions and limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the catalyst reaches a point of thermal degradation, the ECM will blink the MIL. For monitoring misfire, the ECM uses both the camshaft position sensor and the crankshaft position sensor. The camshaft position sensor is used to identify misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. The misfire counter increments when crankshaft rotation speed variations exceed threshold values.

If the misfiring rate exceeds the threshold value and could cause emissions deterioration, the ECM illuminates the MIL.

DTC No.	DTC Detection Condition	Trouble Area
P0300	Misfiring of random cylinders is detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM
P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	Misfiring of each cylinder is detected	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM

HINT:

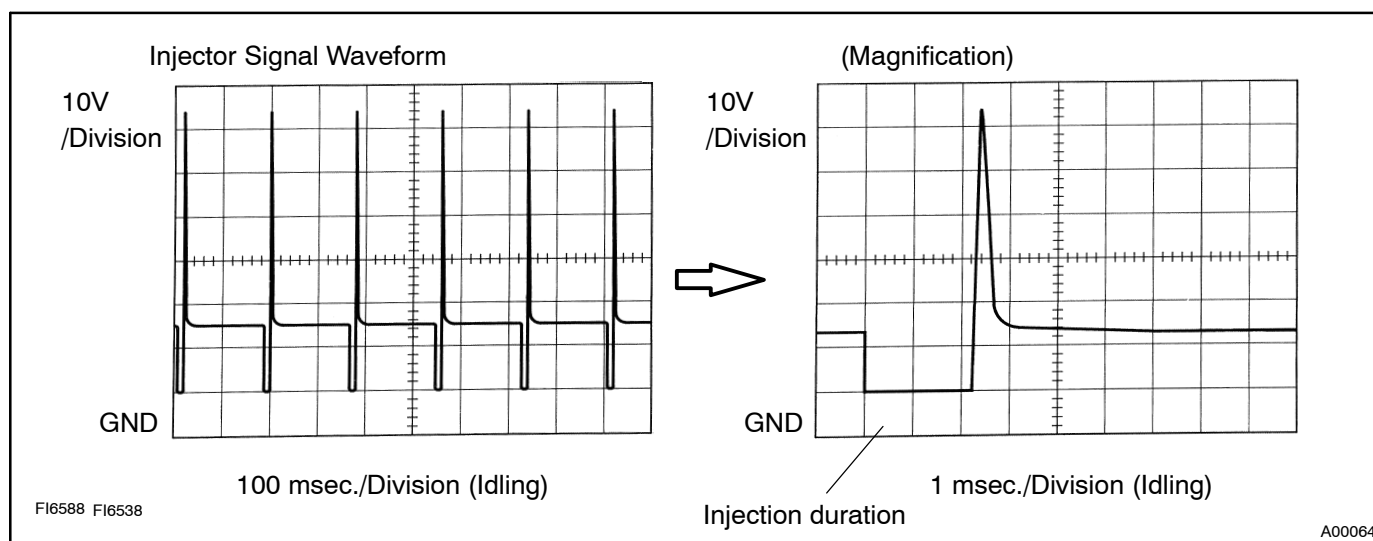
When several DTCs for a misfiring cylinder are recorded repeatedly but no random misfire code is recorded, it indicates that the misfires have been detected and recorded at different times.

Reference: Inspection using oscilloscope

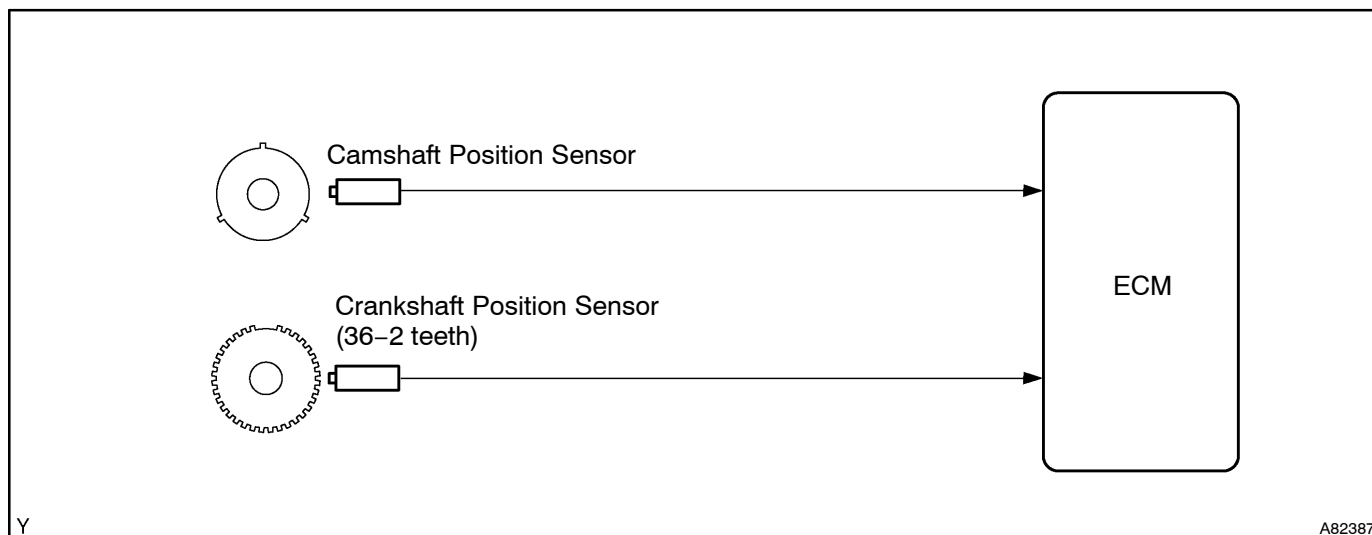
With the engine idling, check the waveform between terminals #1 to #8 and E01 of the ECM connectors.

HINT:

The correct waveform is as shown.



MONITOR DESCRIPTION



The ECM illuminates the MIL (2 trip detection logic) if:

- The ECM will illuminate the MIL when the percent misfire exceeds the specified limit per 1,000 engine revolutions. One occurrence of excessive misfire during engine start will set the MIL. Four occurrences are required to set the MIL 1,000 revolutions after engine start.

The ECM blinks the MIL (MIL blinks immediately) if:

- Within 200 engine revolutions at a high engine rpm, the threshold for "percent of misfire causing catalyst damage" is reached 1 time.
- Within 200 engine revolutions at a normal engine rpm, the threshold for "percent of misfire causing catalyst damage" is reached 3 times.

MONITOR STRATEGY

Related DTCs	P0300: Random/Multiple cylinder misfire detected P0301: Cylinder 1 misfire detected P0302: Cylinder 2 misfire detected P0303: Cylinder 3 misfire detected P0304: Cylinder 4 misfire detected P0305: Cylinder 5 misfire detected P0306: Cylinder 6 misfire detected P0307: Cylinder 7 misfire detected P0308: Cylinder 8 misfire detected
Required sensors/ components (Main)	Camshaft position sensor, Crankshaft position sensor
Required sensors / components (Related)	Engine coolant temperature sensor, Intake air temperature sensor, Throttle position sensor
Frequency of operation	Continuous
Duration	Every 1,000 revolutions (soon after engine is started: 1 time, other 4 times) (emission related misfire) Every 200 revolutions (1 or 3 times) (catalyst deteriorating misfire)
MIL operation	2 driving cycles MIL ON Immediate MIL blinking (Catalyst deteriorating misfire)
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See page 05-13
Battery voltage	8 V or more
VVT system	Normal operation (i. e. not under scan-tool control)
Engine speed fluctuation	Engine speed should not have changed rapidly
Engine RPM (Two full revolutions (2 revolutions) after engine has started)	400 to 5,300 rpm
All of the following conditions are met:	A, B and C
A. Engine coolant temperature	-10°C (14°F) or more
B. Either of the following conditions is met:	(a) or (b)
(a) Intake air temperature	-10°C (14°F) or more
(b) Engine coolant temperature	Less than 75°C (167°F)
C. Either of the following conditions is met:	(a) or (b)
(a) Engine coolant temperature at engine start	More than -7°C (19°F)
(b) Engine coolant temperature	More than 20°C (68°F)
Intake air amount per revolution (varies with engine speed)	0.4 g/rev or more
Throttle position learning	Completed
Throttle position	Rapid throttle opening or closing operation has not occurred
Throttle position	Changing value of throttle position Less than 0.5° per 0.008 second
Rough road counter	14 times/1,000 revolutions (Not running on rough road)

TYPICAL MALFUNCTION THRESHOLDS

Emission related misfire rate:

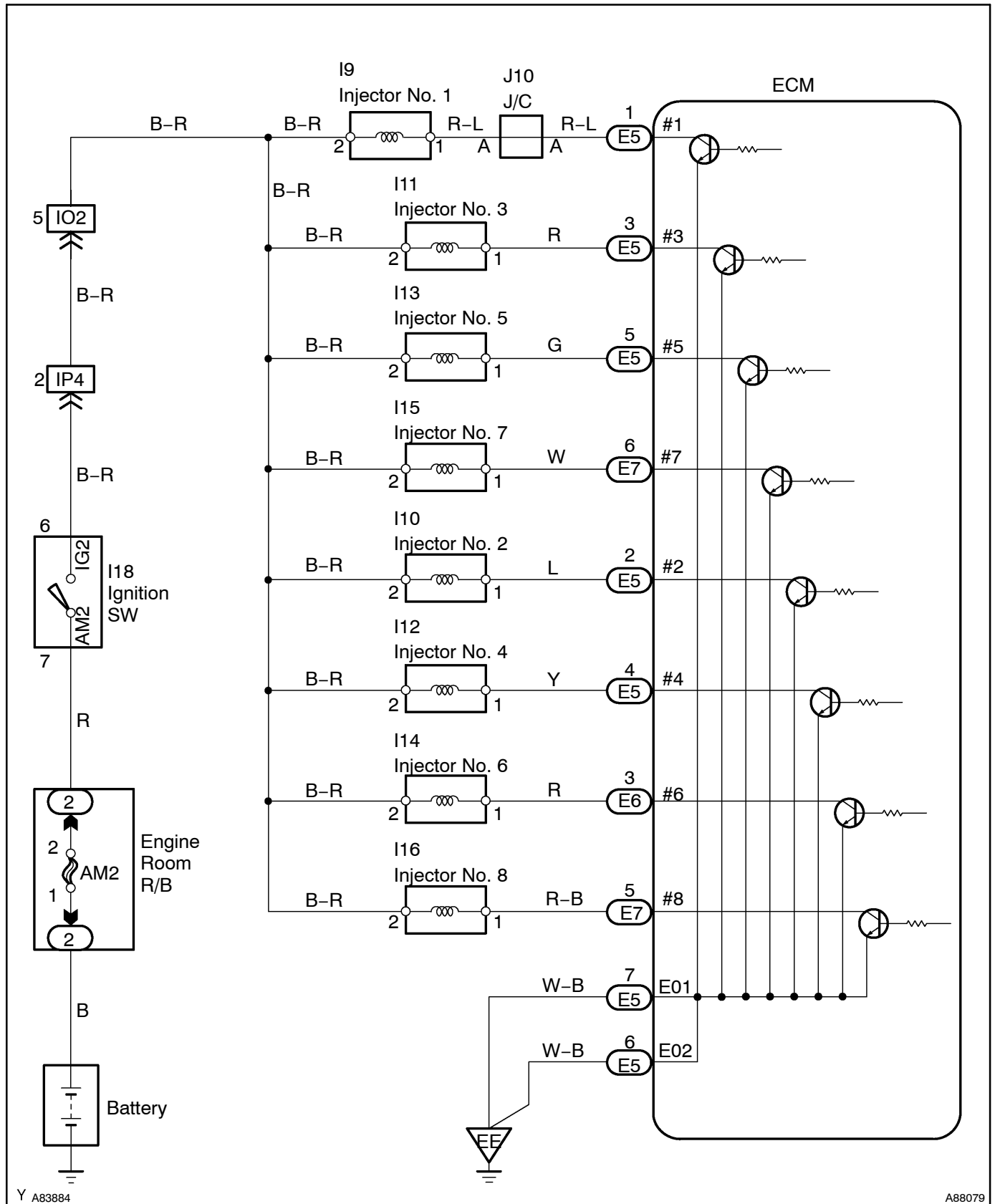
Emission related misfire rate: 1. During the first 1,000 revolutions after engine start (MIL is set when misfire is detected 1 time) 2. After the first 1,000 revolutions have occurred (MIL is set when misfire is detected 4 times)	2 %/1,000 revolutions
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Catalyst damage misfire rate:

Catalyst damage misfire count: 1. Low engine rpm area (ex. less than 3,000 rpm): 200 revolutions (MIL is set when misfire is detected 3 times) 2. High engine rpm area: Every 200 revolutions	85 count/200 revolutions (Threshold varies with engine speed and intake air amount per revolution)
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WIRING DIAGRAM

Refer to DTC P0351 on page 05-186 for the wiring diagram of the ignition system.



CONFIRMATION DRIVING PATTERN

- (a) Connect the hand-held tester to the DLC3.
- (b) Record DTC and the freeze frame data.
- (c) Switch the hand-held tester from normal mode to check mode (see page 05-38).
- (d) Read the value on the misfire counter for each cylinder when idling. If the value is displayed on the misfire counter, skip the following procedure of confirmation driving.
- (e) Drive the vehicle several times with the engine speed, load and its surrounding range shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no hand-held tester, turn the ignition switch to OFF after the symptom is simulated once. Then repeat the simulation process again.

HINT:

In order to memorize the misfire DTC, it is necessary to drive with MISFIRE RPM, MISFIRE LOAD in the DATA LIST for the period of time in the chart below. Take care not to turn the ignition switch to OFF. Turning the ignition switch to OFF switches the diagnosis system from check mode to normal mode and all DTCs, freeze frame data and other data are erased.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

- (f) Check if there is misfire and DTC and the freeze frame data. Record the DTC's, freeze frame data and misfire counter data.
- (g) Turn the ignition switch to OFF and wait for at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If DTCs besides misfire DTCs are memorized simultaneously, troubleshoot the non-misfire DTCs first.
- Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If the misfire does not occur when the vehicle is brought to the workshop, the misfire can be confirmed by reproducing the condition of the freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See confirmation driving pattern).
- On 6 and 8 cylinder engines, misfiring cylinder identification is disabled at high engine speed and only a general misfire fault code P0300 is stored instead of a cylinder specific misfire fault code (P0301 to P0308).

If the misfire starts in a high engine speed area or the misfire occurs only in a high engine speed area, only P0300 may be stored.

When only a general misfire fault code like P0300 is stored:

- Erase the general misfire fault code from the hand-held tester or OBD II scan tool.
- Start the engine and drive the confirmation pattern.
- Read the value of the misfire ratio for each cylinder. Or read the DTC.
- Perform repairs on the cylinder that has a high misfire ratio. Or repair the cylinder indicated by the DTC.
- After finishing the repair, drive the confirmation pattern again and confirm that no misfire occurs.
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is over the range of $\pm 20\%$, there is a possibility that the air-fuel ratio is becoming RICH (-20% or less) or LEAN ($+20\%$ or more).

- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during engine warm-up.
- If the misfire cannot be reproduced, the following reasons may apply: 1) the vehicle has low fuel, 2) improper fuel is being used, and 3) the ignition plug is contaminated.
- Be sure to check the value on the misfire counter after the repair.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO MISFIRE DTCS)

- Connect the hand-held tester or the OBD II scan tool to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester or the OBD II scan tool ON.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read the DTCs.

Result:

Display (DTC output)	Proceed to
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308	A
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 or P0308 and other DTCs	B

HINT:

If any other codes besides P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308 are output, perform the troubleshooting for those DTCs first.

B

GO TO RELEVANT DTC CHART
(See page 05-47)

A

2 CHECK WIRE HARNESS, CONNECTOR AND VACUUM HOSE IN ENGINE ROOM

- Check the connection conditions of the wire harness and connector.
- Check the vacuum hose piping for disconnection or breaks.

NG

REPAIR OR REPLACE, THEN CONFIRM THAT THERE IS NO MISFIRE

OK

3 CHECK CONNECTION OF PCV HOSE (See page 12-3)

NG

REPAIR OR REPLACE PCV HOSE

OK

4 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(NUMBER OF MISFIRE)

- Connect the hand-held tester or the OBD II scan tool to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester or the OBD II scan tool ON.
- Start the engine.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL#1 to CYL#8.
- Read the number of misfire on the hand-held tester or the OBD II scan tool.

HINT:

When a misfire is not reproduced, be sure to branch below based on the stored DTC.

Result:

High Misfire Rate Cylinder	Proceed to
1 or 2 cylinders	A
More than 3 cylinders	B

B

Go to step 15

A

5 CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER

- Remove the ignition coil assembly.
- Remove the spark plug.
- Check the spark plug type.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11

- Check the spark plug electrode gap.
Electrode gap: 1.0 to 1.1 mm (0.039 to 0.043 in.)
Maximum electrode gap: 1.3 mm (0.051 in.)

NOTICE:

If adjusting the gap of a new spark plug, bend only "the base/ground" electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.

- Check the electrode for carbon deposits.
- Perform a spark test.

CAUTION:

Absolutely disconnect each injector connector.

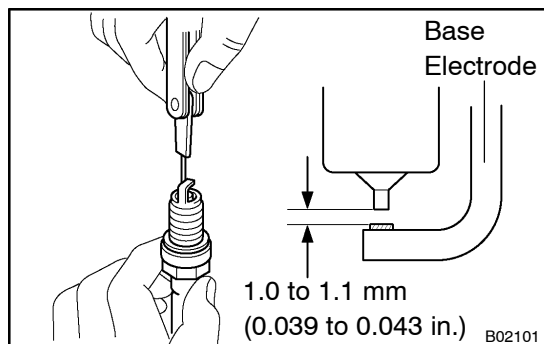
NOTICE:

Do not crank the engine for more than 2 seconds.

- Install the spark plug to the ignition coil, and connect the ignition coil connector.
- Disconnect the injector connector.
- Ground the spark plug.
- Check if spark occurs while the engine is being cranked.

Standard: Spark jumps across electrode gap.

- Reinstall the spark plug.
- Reinstall the ignition coil assy.



OK

Go to step 8

NG

6 CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

- (a) Change to the normal spark plug.
 (b) Perform a spark test.

CAUTION:**Absolutely disconnect the each injector connector.****NOTICE:****Do not crank the engine for more than 5 to 10 seconds at a time.**

- (1) Install the spark plug to the ignition coil, and connect the ignition coil connector.
- (2) Disconnect the injector connector.
- (3) Ground the spark plug.
- (4) Check if spark occurs while the engine is being cranked.

Standard: Spark jumps across electrode gap.

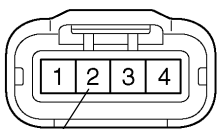
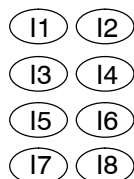
OK

REPLACE SPARK PLUG

NG

7 CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(IGNITION COIL - ECM)**Wire Harness Side:**

Ignition Coil Connector



IGF

Front View

Y

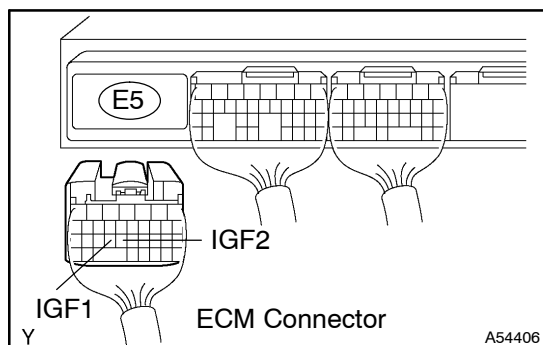
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- (a) Check the harness and connector between the ignition coil and ECM (IGF terminal).

- (1) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (2) Disconnect the E5 ECM connector.
- (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGF (I1-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I2-2) - IGF2 (E5-23)	Below 1 Ω
IGF (I3-2) - IGF2 (E5-23)	Below 1 Ω
IGF (I4-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I5-2) - IGF2 (E5-23)	Below 1 Ω
IGF (I6-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I7-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I8-2) - IGF2 (E5-23)	Below 1 Ω



Y

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Standard (Check for short):

Tester Connection	Specified Condition
IGF (I1-2) or IGF1 (E5-24) - Body ground	10 k Ω or higher
IGF (I2-2) or IGF2 (E5-23) - Body ground	10 k Ω or higher
IGF (I3-2) or IGF2 (E5-23) - Body ground	10 k Ω or higher
IGF (I4-2) or IGF1 (E5-24) - Body ground	10 k Ω or higher
IGF (I5-2) or IGF2 (E5-23) - Body ground	10 k Ω or higher
IGF (I6-2) or IGF1 (E5-24) - Body ground	10 k Ω or higher
IGF (I7-2) or IGF1 (E5-24) - Body ground	10 k Ω or higher
IGF (I8-2) or IGF2 (E5-23) - Body ground	10 k Ω or higher

(4) Reconnect the ignition coil connector.

(5) Reconnect the ECM connector.

(b) Check the harness and connector between the ignition coil and ECM (IGT terminal).

(1) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.

(2) Disconnect the E5 ECM connector.

(3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGT (I1-3) - IGT1 (E5-9)	Below 1 Ω
IGT (I2-3) - IGT2 (E5-8)	Below 1 Ω
IGT (I3-3) - IGT3 (E5-25)	Below 1 Ω
IGT (I4-3) - IGT4 (E5-11)	Below 1 Ω
IGT (I5-3) - IGT5 (E5-12)	Below 1 Ω
IGT (I6-3) - IGT6 (E5-26)	Below 1 Ω
IGT (I7-3) - IGT7 (E5-13)	Below 1 Ω
IGT (I8-3) - IGT8 (E5-10)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
IGT (I1-3) or IGT1 (E5-9) - Body ground	10 k Ω or higher
IGT (I2-3) or IGT2 (E5-8) - Body ground	10 k Ω or higher
IGT (I3-3) or IGT3 (E5-25) - Body ground	10 k Ω or higher
IGT (I4-3) or IGT4 (E5-11) - Body ground	10 k Ω or higher
IGT (I5-3) or IGT5 (E5-12) - Body ground	10 k Ω or higher
IGT (I6-3) or IGT6 (E5-26) - Body ground	10 k Ω or higher
IGT (I7-3) or IGT7 (E5-13) - Body ground	10 k Ω or higher
IGT (I8-3) or IGT8 (E5-10) - Body ground	10 k Ω or higher

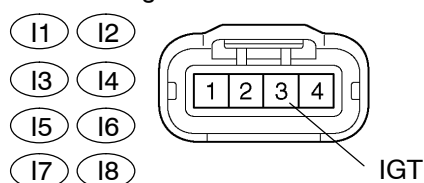
(4) Reconnect the ignition coil connector.

(5) Reconnect the ECM connector.

OK

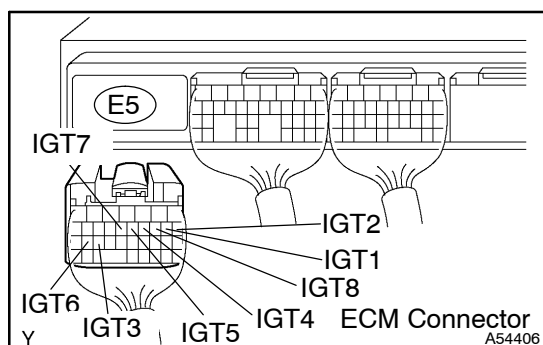
REPLACE IGNITION COIL ASSY (THEN CONFIRM THAT THERE IS NO MISFIRE)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR**Wire Harness Side:****Ignition Coil Connector**

Front View

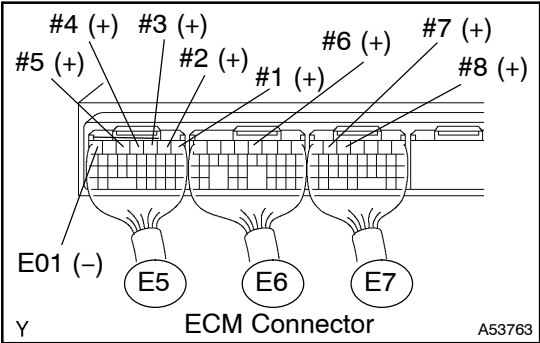
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8

INSPECT ECM TERMINAL OF MISFIRING CYLINDER(#1, #2, #3, #4, #5, #6, #7 OR #8 VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the applicable terminals of the E5, E6 and E7 ECM connectors.

Standard:

Tester Connection	Specified Condition
#1 (E5-1) - E01 (E5-7)	9 to 14 V
#2 (E5-2) - E01 (E5-7)	9 to 14 V
#3 (E5-3) - E01 (E5-7)	9 to 14 V
#4 (E5-4) - E01 (E5-7)	9 to 14 V
#5 (E5-5) - E01 (E5-7)	9 to 14 V
#6 (E6-3) - E01 (E5-7)	9 to 14 V
#7 (E7-6) - E01 (E5-7)	9 to 14 V
#8 (E7-5) - E01 (E5-7)	9 to 14 V

OK

Go to step 11

NG

9

INSPECT FUEL INJECTOR RESISTANCE OF MISFIRING CYLINDER
(See page 11-7)

NG

REPLACE FUEL INJECTOR ASSY
(See page 11-11)

OK

10 CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(INJECTOR - ECM, INJECTOR - IGNITION SWITCH)

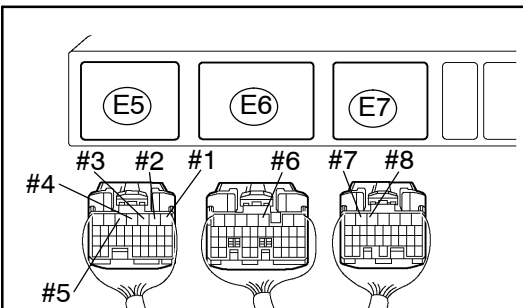
Wire Harness Side:



Injector Connector
Front View

Y

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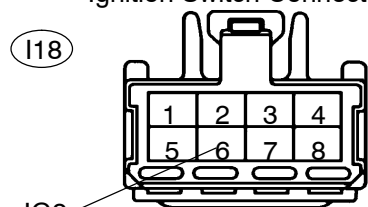
ECM Connector

Y

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Wire Harness Side:

Ignition Switch Connector



Front View

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- (a) Check the harness and connector between the injector and ECM.

- (1) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
- (2) Disconnect the E5, E6 or E7 ECM connector.
- (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I9-2) - #1 (E5-1)	Below 1 Ω
Injector (I10-2) - #2 (E5-2)	Below 1 Ω
Injector (I11-2) - #3 (E5-3)	Below 1 Ω
Injector (I12-2) - #4 (E5-4)	Below 1 Ω
Injector (I13-2) - #5 (E5-5)	Below 1 Ω
Injector (I14-2) - #6 (E6-3)	Below 1 Ω
Injector (I15-2) - #7 (E7-6)	Below 1 Ω
Injector (I16-2) - #8 (E7-5)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I9-2) or #1 (E5-1) - Body ground	10 k Ω or higher
Injector (I10-2) or #2 (E5-2) - Body ground	10 k Ω or higher
Injector (I11-2) or #3 (E5-3) - Body ground	10 k Ω or higher
Injector (I12-2) or #4 (E5-4) - Body ground	10 k Ω or higher
Injector (I13-2) or #5 (E5-5) - Body ground	10 k Ω or higher
Injector (I14-2) or #6 (E6-3) - Body ground	10 k Ω or higher
Injector (I15-2) or #7 (E7-6) - Body ground	10 k Ω or higher
Injector (I16-2) or #8 (E7-5) - Body ground	10 k Ω or higher

- (4) Reconnect the injector connector.
 - (5) Reconnect the ECM connector.
- (b) Check the harness and connector between the injector and ignition switch.
- (1) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
 - (2) Disconnect the I18 ignition switch connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I9-1) - IG2 (I18-6)	Below 1 Ω
Injector (I10-1) - IG2 (I18-6)	Below 1 Ω
Injector (I11-1) - IG2 (I18-6)	Below 1 Ω
Injector (I12-1) - IG2 (I18-6)	Below 1 Ω
Injector (I13-1) - IG2 (I18-6)	Below 1 Ω
Injector (I14-1) - IG2 (I18-6)	Below 1 Ω
Injector (I15-1) - IG2 (I18-6)	Below 1 Ω
Injector (I16-1) - IG2 (I18-6)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I9-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I10-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I11-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I12-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I13-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I14-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I15-1) or IG2 (I18-6) – Body ground	10 kΩ or higher
Injector (I16-1) or IG2 (I18-6) – Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reconnect the ECM connector.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****11 INSPECT FUEL INJECTOR INJECTION AND VOLUME OF MISFIRING CYLINDER (See page 11-7)****NG****REPLACE FUEL INJECTOR ASSY (See page 11-11)****OK****12 CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER (See page 14-1)****NG****REPAIR OR REPLACE****OK****13 CHECK VALVE CLEARANCE OF MISFIRING CYLINDER (See page 14-6)****NG****ADJUST VALVE CLEARANCE (See page 14-6)****OK****14 SWITCH STEP BY NUMBER OF MISFIRE CYLINDER(REFER RESULT OF STEP 4)****HINT:**

- If the result of step 4 is "1 or 2 cylinders", proceed to A.
- If the result of step 4 is "more than 3 cylinders", proceed to B.

B**CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)**

A

15 CHECK VALVE TIMING(CHECK FOR LOOSE AND A JUMPED TOOTH OF TIMING BELT) (See page 14-5)

NG

**ADJUST VALVE TIMING
(REPAIR OR REPLACE TIMING BELT)**

OK

16 CHECK FUEL PRESSURE (See page 11-5)

NG

**CHECK AND REPLACE FUEL PUMP,
PRESSURE REGULATOR, FUEL PIPE LINE AND
FILTER**

OK

17 READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL(INTAKE AIR TEMPERATURE AND MASS AIR FLOW RATE)

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Check the intake air temperature.
 - (1) On the hand-held tester or the OBD II scan tool, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
 - (2) Read the values.
- (d) Check the air flow rate.
 - (1) On the hand-held tester or the OBD II scan tool, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.
 - (2) Read the values.

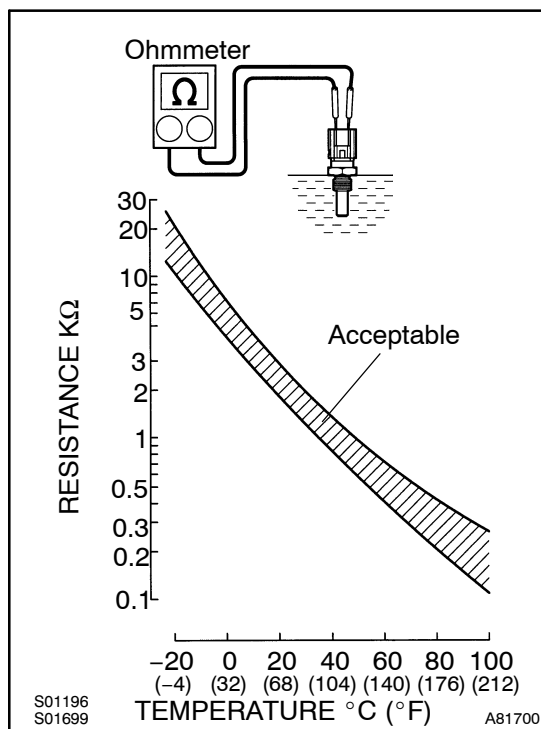
Standard:

Condition	Air flow rate (gm/s)
Ignition switch ON (do not start engine)	0
Idling	4 to 6
Running without load (2,500 rpm)	13 to 20
Idling to quickly accelerating	Air flow rate fluctuates

NG

REPLACE MASS AIR FLOW METER

OK

18 INSPECT ENGINE COOLANT TEMPERATURE SENSOR(RESISTANCE)

- Remove the engine coolant temperature sensor.
- Measure the resistance between the terminals of the engine coolant temperature sensor.

Resistance:

Tester Connection	Temperature	Specified Condition
1 - 2	20°C (68°F)	2.32 to 2.59 kΩ
1 - 2	80°C (176°F)	0.310 to 0.326 kΩ

NOTICE:

When checking the engine coolant temperature sensor in water, be careful not to allow water to contact the terminals. After checking, dry the sensor.

HINT:

Alternate procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values to the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

- Reinstall the engine coolant temperature sensor.

NG**REPLACE ENGINE COOLANT TEMPERATURE SENSOR****OK****19 SWITCH STEP BY NUMBER OF MISFIRE CYLINDER(REFER RESULT OF STEP 4)****HINT:**

- If the result of step 4 is "1 or 2 cylinders", proceed to A.
- If the result of step 4 is "more than 3 cylinders", proceed to B.

B**Go to step 5****A****CHECK FOR INTERMITTENT PROBLEMS (See page 05-10)**