

|            |              |  |
|------------|--------------|--|
| <b>DTC</b> | <b>P0300</b> | <b>RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED</b> |
| <b>DTC</b> | <b>P0301</b> | <b>CYLINDER 1 MISFIRE DETECTED</b>               |
| <b>DTC</b> | <b>P0302</b> | <b>CYLINDER 2 MISFIRE DETECTED</b>               |
| <b>DTC</b> | <b>P0303</b> | <b>CYLINDER 3 MISFIRE DETECTED</b>               |
| <b>DTC</b> | <b>P0304</b> | <b>CYLINDER 4 MISFIRE DETECTED</b>               |
| <b>DTC</b> | <b>P0305</b> | <b>CYLINDER 5 MISFIRE DETECTED</b>               |
| <b>DTC</b> | <b>P0306</b> | <b>CYLINDER 6 MISFIRE DETECTED</b>               |

## CIRCUIT DESCRIPTION

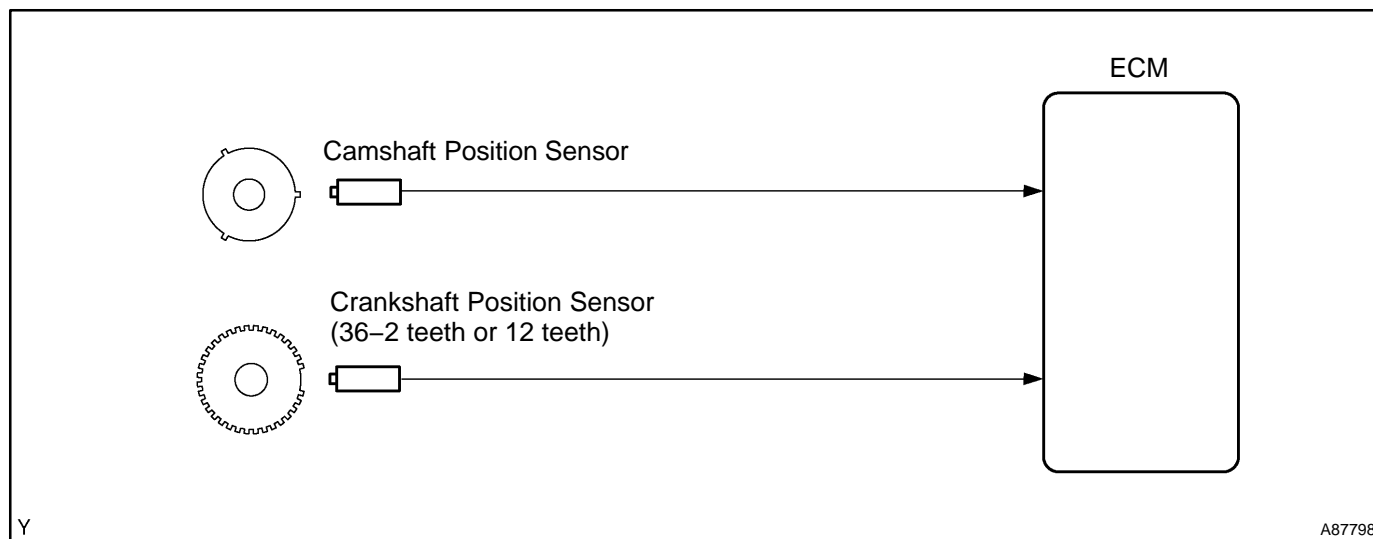
When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emissions levels. High concentrations of HC can also cause the temperature of the catalyst to increase, possibly damaging the 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 | <ul style="list-style-type: none"> <li>• Open or short in engine wire</li> <li>• Connector connection</li> <li>• Vacuum hose connection</li> <li>• Ignition system</li> <li>• Injector</li> <li>• Fuel pressure</li> <li>• MAF meter</li> <li>• ECT sensor</li> <li>• Compression pressure</li> <li>• Valve clearance</li> <li>• Valve timing</li> <li>• PCV hose connection</li> <li>• PCV hose</li> <li>• ECM</li> </ul> |
| P0301<br>P0302<br>P0303<br>P0304<br>P0305<br>P0306 | Misfiring of each cylinder is detected    | <ul style="list-style-type: none"> <li>• Open or short in engine wire</li> <li>• Connector connection</li> <li>• Vacuum hose connection</li> <li>• Ignition system</li> <li>• Injector</li> <li>• Fuel pressure</li> <li>• MAF meter</li> <li>• ECT sensor</li> <li>• Compression pressure</li> <li>• Valve clearance</li> <li>• Valve timing</li> <li>• PCV hose connection</li> <li>• PCV hose</li> <li>• ECM</li> </ul> |

**HINT:**

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

**MONITOR DESCRIPTION**

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

- The misfiring rate exceeds a threshold value and could cause emissions deterioration.
- During the first 1,000 engine revolutions after the engine starts, an excessive misfire rate (approximately 20 to 50 misfire per 1,000 engine revolutions) occurs 1 time.
- After the first 1,000 engine revolutions after the engine starts, an excessive misfire rate (approximately 20 to 50 misfire per 1,000 engine revolutions) occurs 4 times.

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

- Within 200 engine revolutions at a high rpm, the threshold for "percent of misfire causing catalyst damage" is reached 1 time.
- Within 200 engine revolutions at a normal rpm, the threshold for "percent of misfire causing catalyst damage" is reached 3 times. (for the 2nd trip, reaching the threshold once will cause the MIL to flash).

## MONITOR STRATEGY

|   |   |
|---|---|
| Related DTCs                            | P0300: Multiple Cylinder Misfire<br>P0301: Cylinder 1 Misfire<br>P0302: Cylinder 2 Misfire<br>P0303: Cylinder 3 Misfire<br>P0304: Cylinder 4 Misfire<br>P0305: Cylinder 5 Misfire<br>P0306: Cylinder 6 Misfire  |
| Required sensors / components (Main)    | Injector, Ignition coil, Spark plug   |
| Required sensors / components (Related) | Crankshaft position sensor, Camshaft position sensor, ECT sensor, IAT sensor<br>MAF meter   |
| Frequency of operation                  | Continuous  |
| Duration                                | First 1,000 revolutions (engine starting): 1 emission-related misfire<br>First 1,000 revolutions (engine running): 4 emission-related misfires<br>First 200 revolutions (above 3,000 rpm): 1 catalyst-damage misfire<br>First 200 revolutions (below 3,000 rpm): 3 catalyst-damage misfires |
| MIL operation                           | 2 driving cycle: emission-related misfire<br>MIL flashes immediately: catalyst-damage misfire   |
| Sequence operation                      | None  |

## TYPICAL ENABLING CONDITIONS

### 1MZ-FE:

|  |                                 |
|--|---------------------------------|
| The monitor will run whenever these DTCs are not present | See page <a href="#">05-507</a> |
| Battery voltage  | 8 V or more                     |
| Throttle position learning                               | Completed                       |
| VVT system   | Not operate by scan tool        |
| Engine RPM   | 450 to 6,300 rpm                |
| All of the following conditions are met                  | Condition 1, 2 and 3            |
| 1. ECT   | -10°C (14°F) or more            |
| 2. Either of the following conditions is met             | Condition (a) or (b)            |
| (a) IAT  | -10°C (14°F) or more            |
| (b) ECT  | 75°C (167°F) or more            |
| 3. Either of the following conditions is met             | Condition (c) or (d)            |
| (c) ECT at engine start                                  | More than -7°C (19.4°F)         |
| (d) ECT  | More than 20°C (68°F)           |
| Fuel cut   | OFF                             |

### Monitor period of Emission-related-misfire:

|   |                                  |
|---|----------------------------------|
| First 1,000 revolutions after engine start, or Check Mode | Crankshaft 1,000 revolutions     |
| Except above  | Crankshaft 1,000 revolutions x 4 |

### Monitor period of Catalyst-damage-misfire:

|  |                                |
|--|--------------------------------|
| All of the following conditions 1, 2 and 3 are met | Crankshaft 200 revolutions     |
| 1. Driving cycle                                   | 1st                            |
| 2. Check Mode                                      | OFF                            |
| 3. Engine RPM                                      | Less than 3,000 rpm            |
| Except above                                       | Crankshaft 200 revolutions x 3 |

**3MZ-FE:**

|  |   |
|--|---|
| The monitor will run whenever these DTCs are not present | See page <a href="#">05-507</a>   |
| Battery voltage  | 8 V or more   |
| Throttle position learning                               | Completed   |
| VVT system   | Not operate by scan tool  |
| Engine RPM   | 450 to 5,900 rpm  |
| ECT  | -10°C (14°F) or more  |
| Either of the following conditions (a) or (b) is met     | (a) Engine start ECT is more than -7°C (19.4°F)<br>(b) ECT is more than 20°C (68°F) |
| Fuel cut   | OFF   |

**Monitor period of Emission-related-misfire:**

|   |                                  |
|---|----------------------------------|
| First 1,000 revolutions after engine start, or Check Mode | Crankshaft 1,000 revolutions     |
| Except above  | Crankshaft 1,000 revolutions x 4 |

**Monitor period of Catalyst-damage-misfire:**

|  |                                |
|--|--------------------------------|
| All of the following conditions 1, 2 and 3 are met | Crankshaft 200 revolutions     |
| 1. Driving cycle                                   | 1st                            |
| 2. Check Mode                                      | OFF                            |
| 3. Engine RPM                                      | Less than 3,000 rpm            |
| Except above                                       | Crankshaft 200 revolutions x 3 |

**TYPICAL MALFUNCTION THRESHOLDS****1MZ-FE:****Emission-related-misfire:**

|              |             |
|--------------|-------------|
| Misfire rate | 2 % or more |
|--------------|-------------|

**Catalyst-damage-misfire:**

|                                       |  |
|---------------------------------------|--|
| Number of misfire per 200 revolutions | 90 or more (varies with intake air amount and RPM) |
| Paired cylinders misfire              | Detected   |

**3MZ-FE:****Emission-related-misfire:**

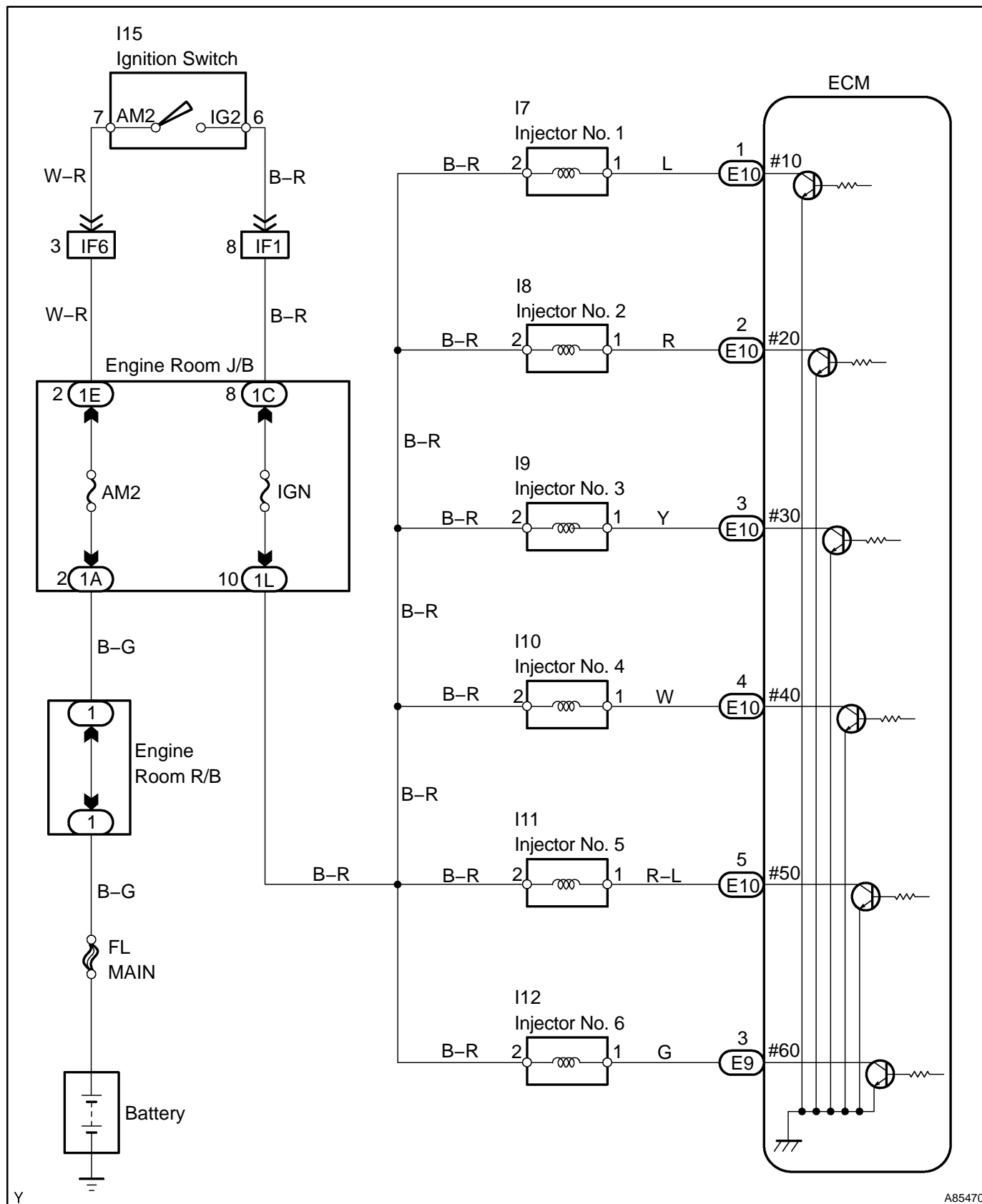
|              |                |
|--------------|----------------|
| Misfire rate | 1.82 % or more |
|--------------|----------------|

**Catalyst-damage-misfire:**

|                                       |  |
|---------------------------------------|--|
| Number of misfire per 200 revolutions | 77 or more (varies with intake air amount and RPM) |
| Paired cylinders misfire              | Detected   |

## WIRING DIAGRAM

Refer to DTC P0351 on page 05-681 for the wiring diagram of the ignition system.



## CONFIRMATION DRIVING PATTERN

- Connect the hand-held tester to the DLC3.
  - Record DTC and the freeze frame data.
  - Set the hand-held tester to check mode (see page 05-533).
  - 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.
  - 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 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 OFF. Turning the ignition switch 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             |

- Check if there is misfire and DTC and the freeze frame data. Record the DTC's, freeze frame data and misfire counter data.
- Turn the ignition switch 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, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- 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, cylinder specific misfire fault codes are disabled at high engine speeds. If the misfire starts in a high engine speed area or the misfire occurs only in a high engine speed area, only the general fault code P0300 will be stored.

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

- Erase the general misfire fault code from the ECM using 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 repairs, 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)

- (a) Read the DTC using the hand-held tester or the OBD II scan tool.

### Result:

| Display (DTC Output)  | Proceed to |
|---|------------|
| Only P0300, P0301, P0302, P0303, P0304, P0305 and/or P0306 are output       | A          |
| P0300, P0301, P0302, P0303, P0304, P0305 or P0306 and other DTCs are output | B          |

### HINT:

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

**B**

**GO TO RELEVANT DTC CHART**  
(See page [05-543](#))

**A**

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

- (a) Check the connection conditions of the wire harness and connector.  
(b) Check for the disconnection, piping and break of the vacuum hose.

**OK: Connected correctly and no damage ON wire harness.**

**NG**

**REPAIR OR REPLACE, THEN CONFIRM THAT THERE IS NO MISFIRE**

**OK**

## 3 CHECK CONNECTION OF PCV HOSE

**OK: PCV hose is connected correctly. And PCV hose has no damage.**

**NG**

**REPAIR OR REPLACE PCV HOSE**

**OK**

|          |   |
|----------|---|
| <b>4</b> | <b>READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL (NUMBER OF MISFIRE)</b> |
|----------|---|

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON. Push the hand-held tester or the OBD II scan tool main switch ON.
- (c) Start the engine.
- (d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL#1 to CYL#6.
- (e) Read the number of misfires 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          |

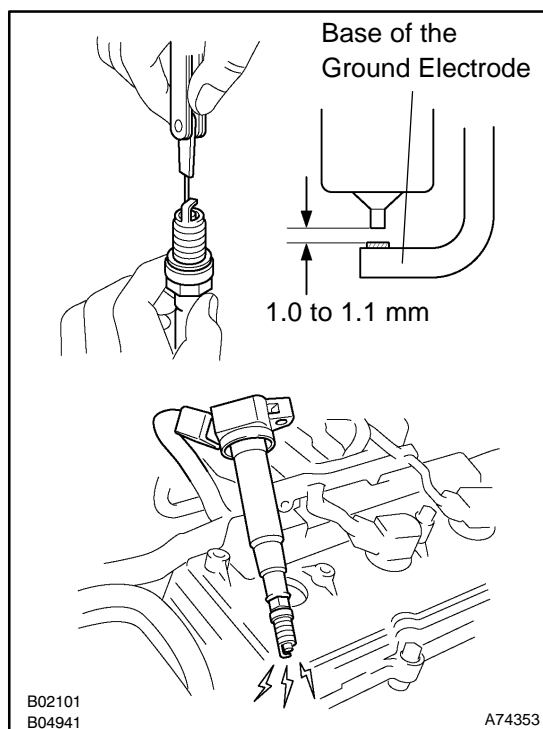
**B**

**Go to step 15**

**A**



## 5 CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER



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

### Recommended spark plug:

|            |         |
|------------|---------|
| DENSO made | SK20R11 |
| NGK made   | IFR6A11 |

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

### NOTICE:

If adjusting the gap of a new spark plug, bend only the base of the 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:

Always 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.

**OK: Spark jumps across electrode gap.**

OK

Go to step 8

NG

## 6 CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

- Change to a normal spark plug.
- Perform a spark test.

### CAUTION:

Always 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.

**OK: Spark jumps across electrode gap.**

OK

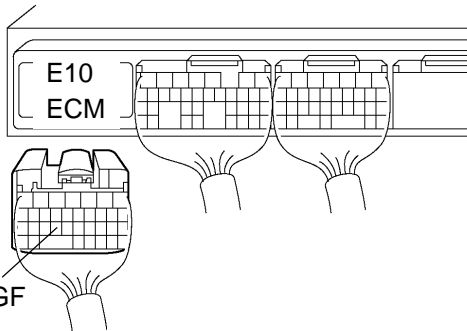
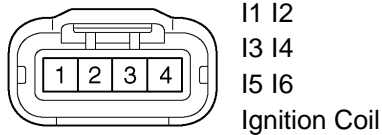
REPLACE SPARK PLUG

NG

## 7

## CHECK WIRE HARNESS OF MISFIRING CYLINDER (IGNITION COIL - ECM)

## Wire Harness Side



Y  
A54393  
A81699

A85513

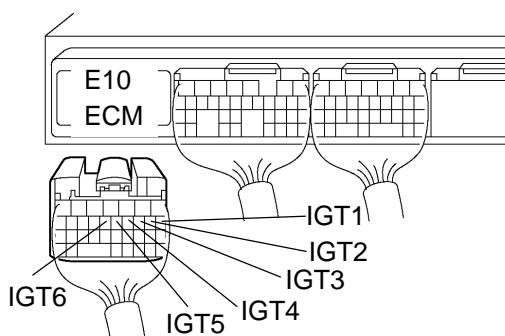
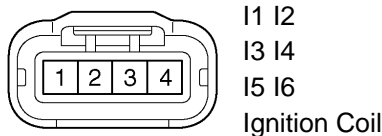
- (a) Check the wire harness between the ignition coil and ECM.

- (1) Disconnect the I1, I2, I3, I4, I5 and I6 ignition coil connector.
- (2) Disconnect the E10 ECM connector.
- (3) Check the resistance of the wire harness side connectors.

## Standard:

| Tester Connection  | Specified Condition     |
|--|-------------------------|
| I1-2 - E10-24 (IGF)<br>I2-2 - E10-24 (IGF)<br>I3-2 - E10-24 (IGF)<br>I4-2 - E10-24 (IGF)<br>I5-2 - E10-24 (IGF)<br>I6-2 - E10-24 (IGF)   | Below 1 $\Omega$        |
| I1-2 or E10-24 (IGF) - Body ground<br>I2-2 or E10-24 (IGF) - Body ground<br>I3-2 or E10-24 (IGF) - Body ground<br>I4-2 or E10-24 (IGF) - Body ground<br>I5-2 or E10-24 (IGF) - Body ground<br>I6-2 or E10-24 (IGF) - Body ground | 10 k $\Omega$ or higher |

## Wire Harness Side



Y  
A54393  
A81699

A85513

- (b) Check the wire harness between the ignition coil and ECM.

- (1) Disconnect the I1, I2, I3, I4, I5 and I6 ignition coil connector.
- (2) Disconnect the E10 ECM connector.
- (3) Check the resistance of the wire harness side connectors.

## Standard:

| Tester Connection  | Specified Condition     |
|--|-------------------------|
| I1-3 - E10-8 (IGT1)<br>I2-3 - E10-9 (IGT2)<br>I3-3 - E10-10 (IGT3)<br>I4-3 - E10-11 (IGT4)<br>I5-3 - E10-12 (IGT5)<br>I6-3 - E10-13 (IGT6)   | Below 1 $\Omega$        |
| I1-3 or E10-8 (IGT1) - Body ground<br>I2-3 or E10-9 (IGT2) - Body ground<br>I3-3 or E10-10 (IGT3) - Body ground<br>I4-3 or E10-11 (IGT4) - Body ground<br>I5-3 or E10-12 (IGT5) - Body ground<br>I6-3 or E10-13 (IGT6) - Body ground | 10 k $\Omega$ or higher |

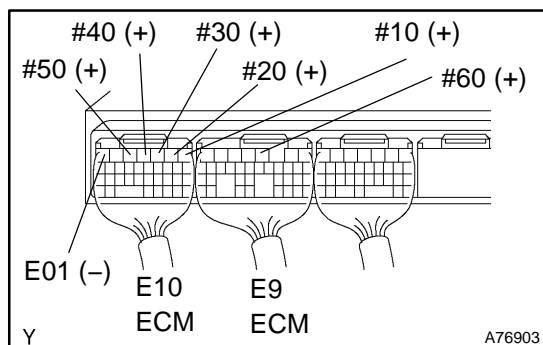
OK

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

NG

**REPAIR OR REPLACE HARNESS AND CONNECTOR**

# 8 INSPECT ECM TERMINAL OF MISFIRING CYLINDER (#10, #20, #30, #40, #50 OR #60 VOLTAGE)



- Turn the ignition switch ON.
- Check the voltage of the ECM connectors.

## Standard:

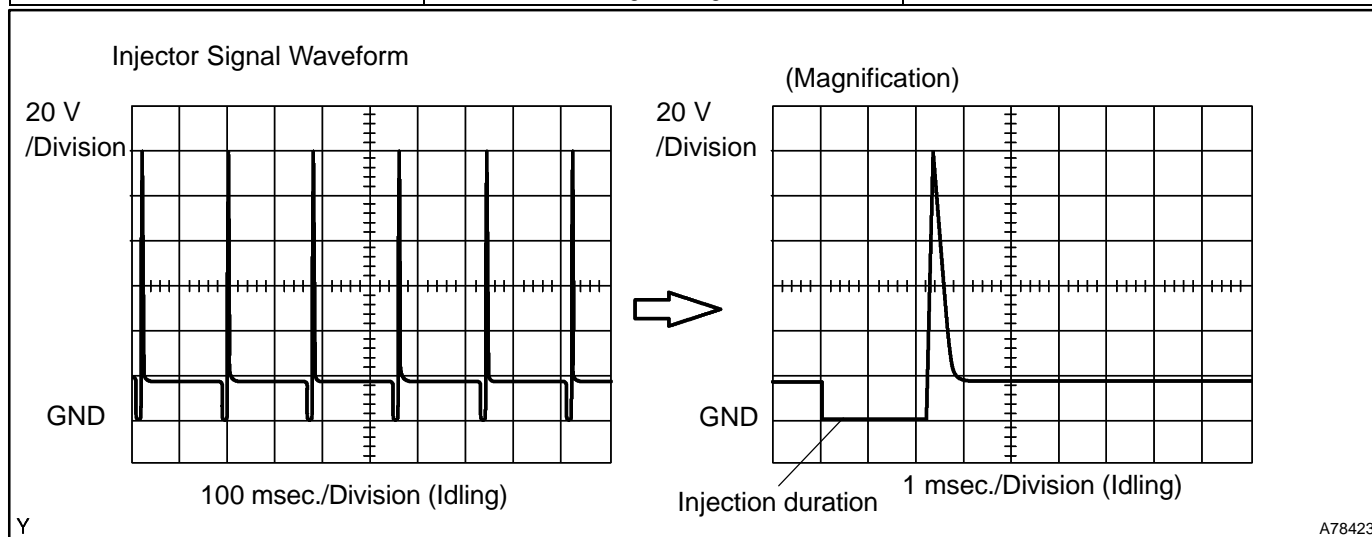
| Tester Connection         | Specified Condition |
|---------------------------|---------------------|
| E10-1 (#10) - E10-7 (E01) | 9 to 14 V           |
| E10-2 (#20) - E10-7 (E01) |                     |
| E10-3 (#30) - E10-7 (E01) |                     |
| E10-4 (#40) - E10-7 (E01) |                     |
| E10-5 (#50) - E10-7 (E01) |                     |
| E9-3 (#60) - E10-7 (E01)  |                     |

## HINT:

Reference: Inspection using the oscilloscope.

During cranking or idling, check the waveform between the terminals of the ECM connector.

| Tester Connection | Condition     | Specified Condition          |
|-------------------|---------------|------------------------------|
| #1 to #6 - E01    | Engine idling | Connect waveform is as shown |



OK

Go to step 11

NG

# 9 INSPECT FUEL INJECTOR RESISTANCE OF MISFIRING CYLINDER (See page 11-32)

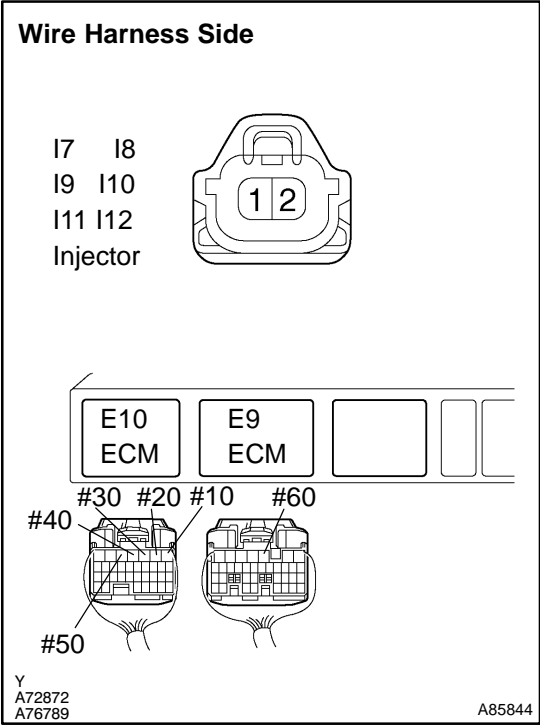
NG

REPLACE FUEL INJECTOR ASSY  
(See page 11-32)

OK

10

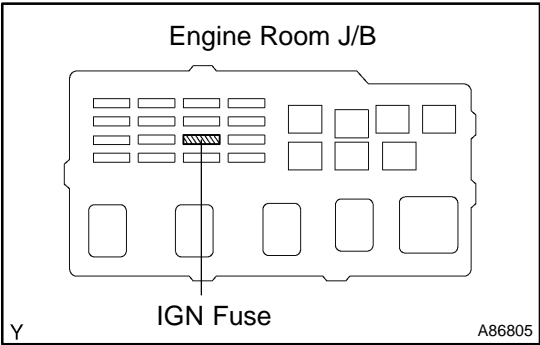
CHECK WIRE HARNESS OF MISFIRING CYLINDER (INJECTOR – ECM, INJECTOR – IGNITION SWITCH)



- (a) Check the wire harness between the injector and ECM.
- (1) Disconnect the I7, I8, I9, I10, I11 and I12 injector connectors.
- (2) Disconnect the E9 or E10 ECM connector.
- (3) Check the resistance of the wire harness side connectors.

Standard:

| Tester Connection  | Specified Condition |
|--|---------------------|
| I7-1 – E10-1 (#10)<br>I8-1 – E10-2 (#20)<br>I9-1 – E10-3 (#30)<br>I10-1 – E10-4 (#40)<br>I11-1 – E10-5 (#50)<br>I12-1 – E9-3 (#60)   | Below 1 Ω           |
| I7-1 or E10-1 (#10) – Body ground<br>I8-1 or E10-2 (#20) – Body ground<br>I9-1 or E10-3 (#30) – Body ground<br>I10-1 or E10-4 (#40) – Body ground<br>I11-1 or E10-5 (#50) – Body ground<br>I12-1 or E9-3 (#60) – Body ground | 10 kΩ or higher     |

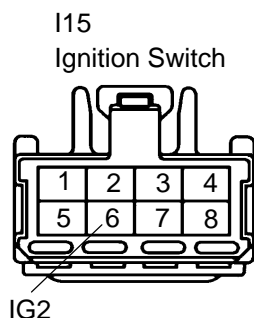
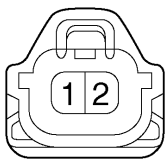


- (b) Check the IGN fuse.
- (1) Remove the IGN fuse from the engine room J/B.
- (2) Check the resistance of the IGN fuse.

OK: Below 1Ω

## Wire Harness Side

I7 I8  
I9 I10  
I11 I12  
Injector



Y  
A72872  
A85676

A88566

(c) Check the wire harness between the injector and ignition switch.

- (1) Disconnect the I7, I8, I9, I10, I11 and I12 injector connector.
- (2) Disconnect the I15 ignition switch connector.
- (3) Check the resistance of the wire harness side connectors.

## Standard:

| Tester Connection   | Specified Condition     |
|---|-------------------------|
| I7-2 – I15-6 (IG2)<br>I8-2 – I15-6 (IG2)<br>I9-2 – I15-6 (IG2)<br>I10-2 – I15-6 (IG2)<br>I11-2 – I15-6 (IG2)<br>I12-2 – I15-6 (IG2)   | Below 1 $\Omega$        |
| I7-2 or I15-6 (IG2) – Body ground<br>I8-2 or I15-6 (IG2) – Body ground<br>I9-2 or I15-6 (IG2) – Body ground<br>I10-2 or I15-6 (IG2) – Body ground<br>I11-2 or I15-6 (IG2) – Body ground<br>I12-2 or I15-6 (IG2) – Body ground | 10 k $\Omega$ or higher |

NG

**REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

## 11 INSPECT FUEL INJECTOR INJECTION AND VOLUME OF MISFIRING CYLINDER (See page 11-32)

## Standard:

| Injection volume  | Difference between each injector        |
|---|---|
| 60 to 73 cm <sup>3</sup> (3.7 to 4.5 cu in.) per 15 seconds | 13 cm <sup>3</sup> (0.8 cu in.) or less |

NG

**REPLACE FUEL INJECTOR ASSY**

OK

## 12 CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER (See page 14-136)

## Standard:

|                                   |  |
|-----------------------------------|--|
| Compression pressure:             | 1.5 MPa (15.3 kgf/cm <sup>2</sup> , 218 psi) |
| Minimum pressure:                 | 1.0 MPa (10.2 kgf/cm <sup>2</sup> , 145 psi) |
| Difference between each cylinder: | 100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)   |

NG

**REPAIR OR REPLACE**

OK

|           |  |
|-----------|--|
| <b>13</b> | <b>CHECK VALVE CLEARANCE OF MISFIRING CYLINDER (See page 14-142)</b> |
|-----------|--|

**Standard (Cold):**

| Item    | Specified Condition                    |
|---------|--|
| Intake  | 0.15 to 0.25 mm (0.059 to 0.0098 in.)  |
| Exhaust | 0.25 to 0.35 mm (0.098 to 0.00138 in.) |

**NG**

**ADJUST VALVE CLEARANCE**  
(See page 14-142)

**OK**

|           |   |
|-----------|---|
| <b>14</b> | <b>SWITCH STEP BY NUMBER OF MISFIRE CYLINDER (REFER TO RESULTS OF STEP 4)</b> |
|-----------|---|

**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 05-500)

**A**

|           |  |
|-----------|--|
| <b>15</b> | <b>CHECK VALVE TIMING (CHECK FOR LOOSENESS OR A JUMPED TOOTH OF THE TIMING BELT) (See page 14-142)</b> |
|-----------|--|

**OK:** The matchmarks of crankshaft pulley and camshaft pulley are aligning.

**NG**

**ADJUST VALVE TIMING (See page 14-142)**  
**(REPAIR OR REPLACE TIMING BELT)**

**OK**

|           |   |
|-----------|---|
| <b>16</b> | <b>CHECK FUEL PRESSURE (See page 11-29)</b> |
|-----------|---|

**Standard:**

Fuel pressure: 304 to 343 kPa (3.1 to 3.5 kgf/cm<sup>2</sup>, 44 to 55 psi).

**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 ON.
- (c) Check the intake air temperature.
  - (1) On the hand-held tester or the OBD II scan tool, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR. Read the values.

**Temperature: Equivalent to ambient temperature**

- (d) Check the air flow rate.
  - (1) On the hand-held tester or the OBD II scan tool, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF. Read the values.

**Standard:**

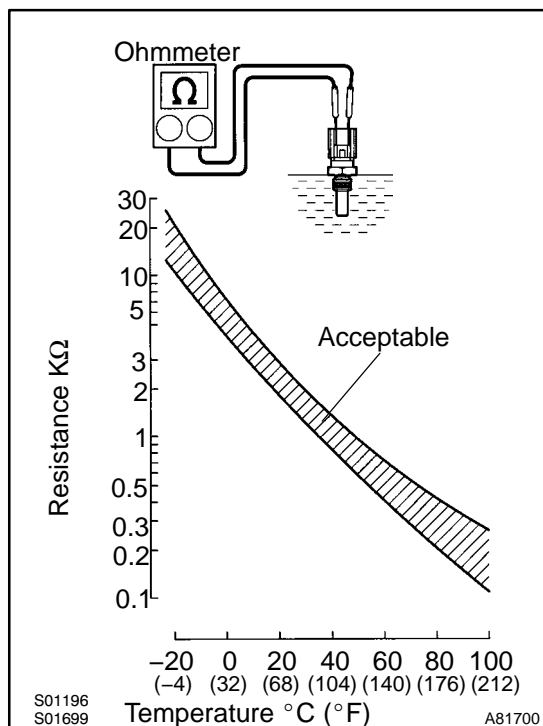
| Condition                                | Air Flow Rate (gm/s)     |
|--|--------------------------|
| Ignition switch ON (do not start engine) | 0                        |
| Idling                                   | 4 to 6                   |
| Running without load (2,500 rpm)         | 13 to 20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

**NG**

**REPLACE MASS AIR FLOW METER**

**OK**

# 18 INSPECT ENGINE COOLANT TEMPERATURE SENSOR (RESISTANCE)



- (a) Remove the ECT sensor.
- (b) Check the resistance between the terminals.

**Standard:**

| Tester Connection | Condition    | 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:**

**If of checking the ECT sensor in the water, be careful not to allow water to contact the terminals. After the check, dry the sensor.**

**HINT:**

Alternate procedure: Connect an ohmmeter to the installed ECT 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.

**NG**

**REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

**OK**

|           |   |
|-----------|---|
| <b>19</b> | <b>SWITCH STEP BY NUMBER OF MISFIRE CYLINDER (REFER TO RESULTS OF STEP 4)</b> |
|-----------|---|

## 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** **AGAIN GO TO STEP 5**

**A**

**CHECK FOR INTERMITTENT PROBLEMS (See page [05-500](#))**