

|            |              |                                                   |
|------------|--------------|---------------------------------------------------|
| <b>DTC</b> | <b>P0351</b> | <b>Igniter Coil "A" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0352</b> | <b>Igniter Coil "B" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0353</b> | <b>Igniter Coil "C" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0354</b> | <b>Igniter Coil "D" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0355</b> | <b>Igniter Coil "E" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0356</b> | <b>Igniter Coil "F" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0357</b> | <b>Igniter Coil "G" Primary/Secondary Circuit</b> |
| <b>DTC</b> | <b>P0358</b> | <b>Igniter Coil "H" Primary/Secondary Circuit</b> |

**HINT:**

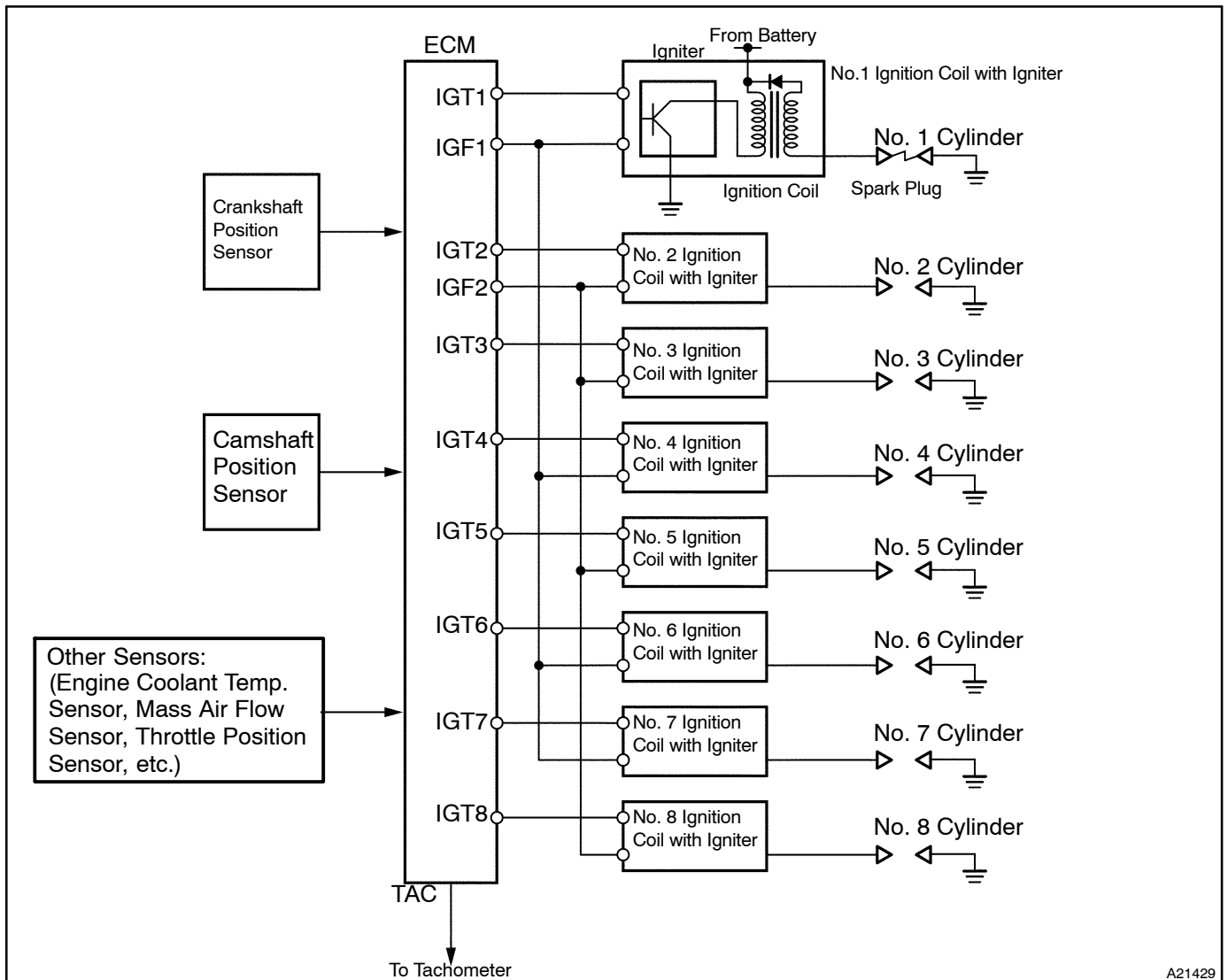
- These DTCs indicate a malfunction related to primary circuit.
- If DTC P0351 is displayed, check No. 1 ignition coil with igniter circuit.
- If DTC P0352 is displayed, check No. 2 ignition coil with igniter circuit.
- If DTC P0353 is displayed, check No. 3 ignition coil with igniter circuit.
- If DTC P0354 is displayed, check No. 4 ignition coil with igniter circuit.
- If DTC P0355 is displayed, check No. 5 ignition coil with igniter circuit.
- If DTC P0356 is displayed, check No. 6 ignition coil with igniter circuit.
- If DTC P0357 is displayed, check No. 7 ignition coil with igniter circuit.
- If DTC P0358 is displayed, check No. 8 ignition coil with igniter circuit.

## CIRCUIT DESCRIPTION

These DTCs indicate a malfunction related to primary circuit.

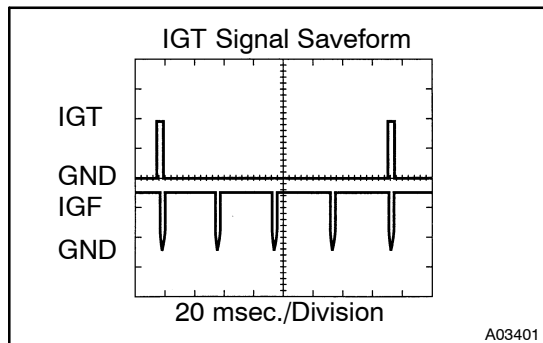
The DIS is a 1-cylinder ignition system which ignites one cylinder with one ignition coil. In the 1-cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug passes from the center electrode to the ground electrode.

The ECM determines the ignition timing and outputs the ignition signals (IGTs) for each cylinder. Using the IGT, the ECM turns on and off the power transistor inside the igniter and this switches on and off the current to the primary coil. When current to the primary coil is cut off, high-voltage is generated in the secondary coil and this voltage is applied to the spark plugs to create sparks inside the cylinders. As the ECM cuts the current to the primary coil, the igniter sends back the ignition confirmation signal (IGF) for each cylinder ignition to the ECM.



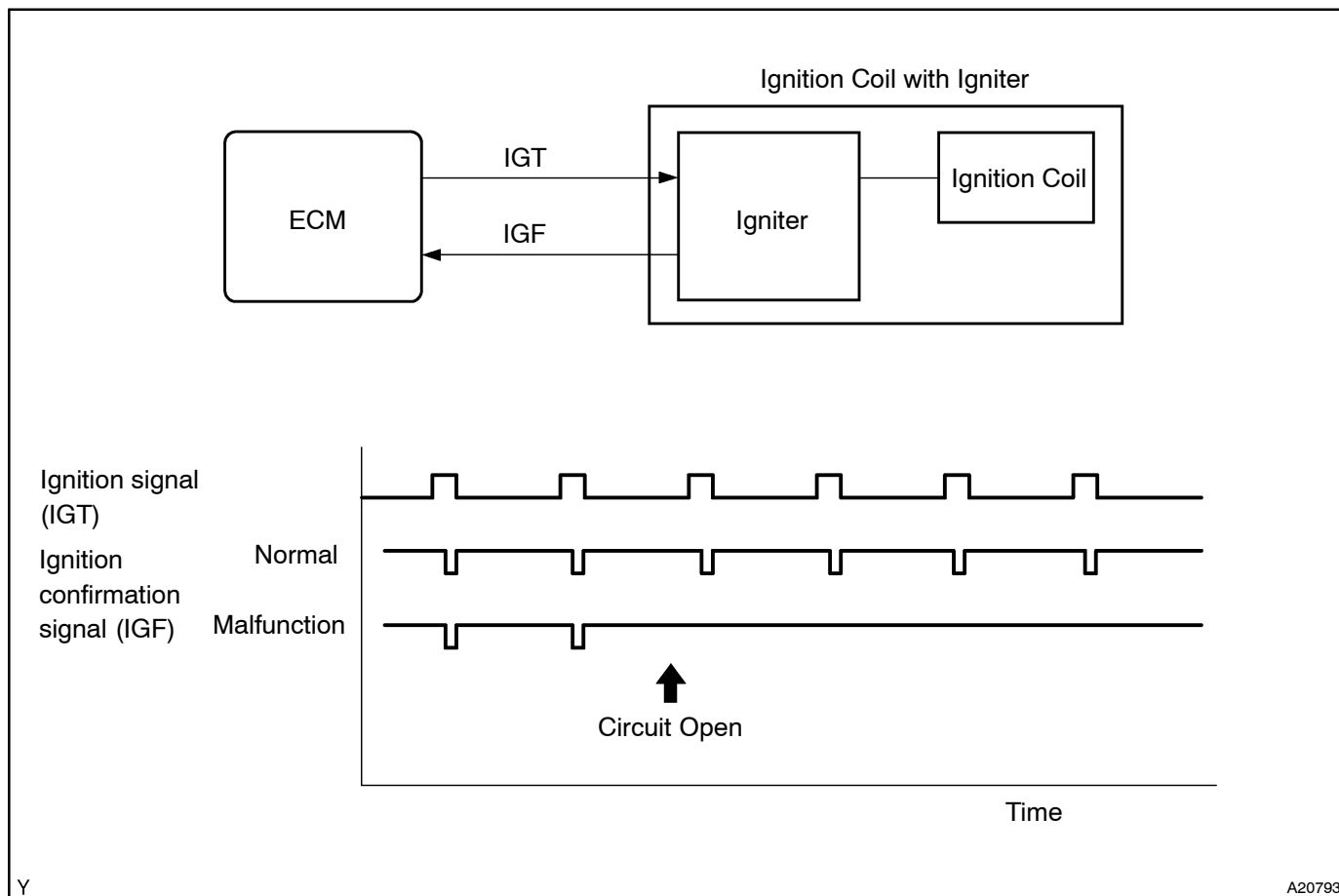
A21429

| DTC No.                                                              | DTC Detecting Condition                      | Trouble Area                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0351<br>P0352<br>P0353<br>P0354<br>P0355<br>P0356<br>P0357<br>P0358 | No IGF signal to ECM while engine is running | <ul style="list-style-type: none"> <li>• Open or short in IGF1 or IGF2 and IGT1 to IGT8 circuit from ignition coil with igniter to ECM</li> <li>• No. 1 to No. 8 ignition coil with igniter</li> <li>• Ignition system</li> <li>• ECM</li> </ul> |


**Reference: Inspection using the oscilloscope.**

During cranking or idling, check the waveform between terminals IG1 to IG8 and E1, and IGF1, IGF2 and E1 of the E5 and E7 ECM connectors.

## MONITOR DESCRIPTION



If the ECM does not receive the IGF after sending the IGT it interprets this as a fault in the igniter and sets a DTC.

## MONITOR STRATEGY

|                             |            |                                                      |
|-----------------------------|------------|------------------------------------------------------|
| Related DTCs                | P0351      | No. 1 ignition coil with igniter circuit malfunction |
|                             | P0352      | No. 2 ignition coil with igniter circuit malfunction |
|                             | P0353      | No. 3 ignition coil with igniter circuit malfunction |
|                             | P0354      | No. 4 ignition coil with igniter circuit malfunction |
|                             | P0355      | No. 5 ignition coil with igniter circuit malfunction |
|                             | P0356      | No. 6 ignition coil with igniter circuit malfunction |
|                             | P0357      | No. 7 ignition coil with igniter circuit malfunction |
|                             | P0358      | No. 8 ignition coil with igniter circuit malfunction |
| Required sensors/components | Igniter    |                                                      |
| Frequency of operation      | Continuous |                                                      |
| Duration                    | 0.256 sec. |                                                      |
| MIL operation               | Immediate  |                                                      |
| Sequence of operation       | None       |                                                      |

## TYPICAL ENABLING CONDITIONS

| Item                                                             | Specification                                                   |           |
|------------------------------------------------------------------|-----------------------------------------------------------------|-----------|
|                                                                  | Minimum                                                         | Maximum   |
| The monitor will run whenever the following DTCs are not present | See "List of disable a monitor" (on page <a href="#">DI-3</a> ) |           |
| Engine speed                                                     | –                                                               | 1,500 rpm |
| Either of the following conditions is met:                       | A or B                                                          |           |
| A. Following conditions are met:                                 | (a) and (b)                                                     |           |
| (a) Engine speed                                                 | –                                                               | 500 rpm   |
| (b) Battery voltage                                              | 6 V                                                             | –         |
| B. Following conditions are met:                                 | (a) and (b)                                                     |           |
| (a) Engine speed                                                 | 500 rpm                                                         | –         |
| (b) Battery voltage                                              | 10 V                                                            | –         |

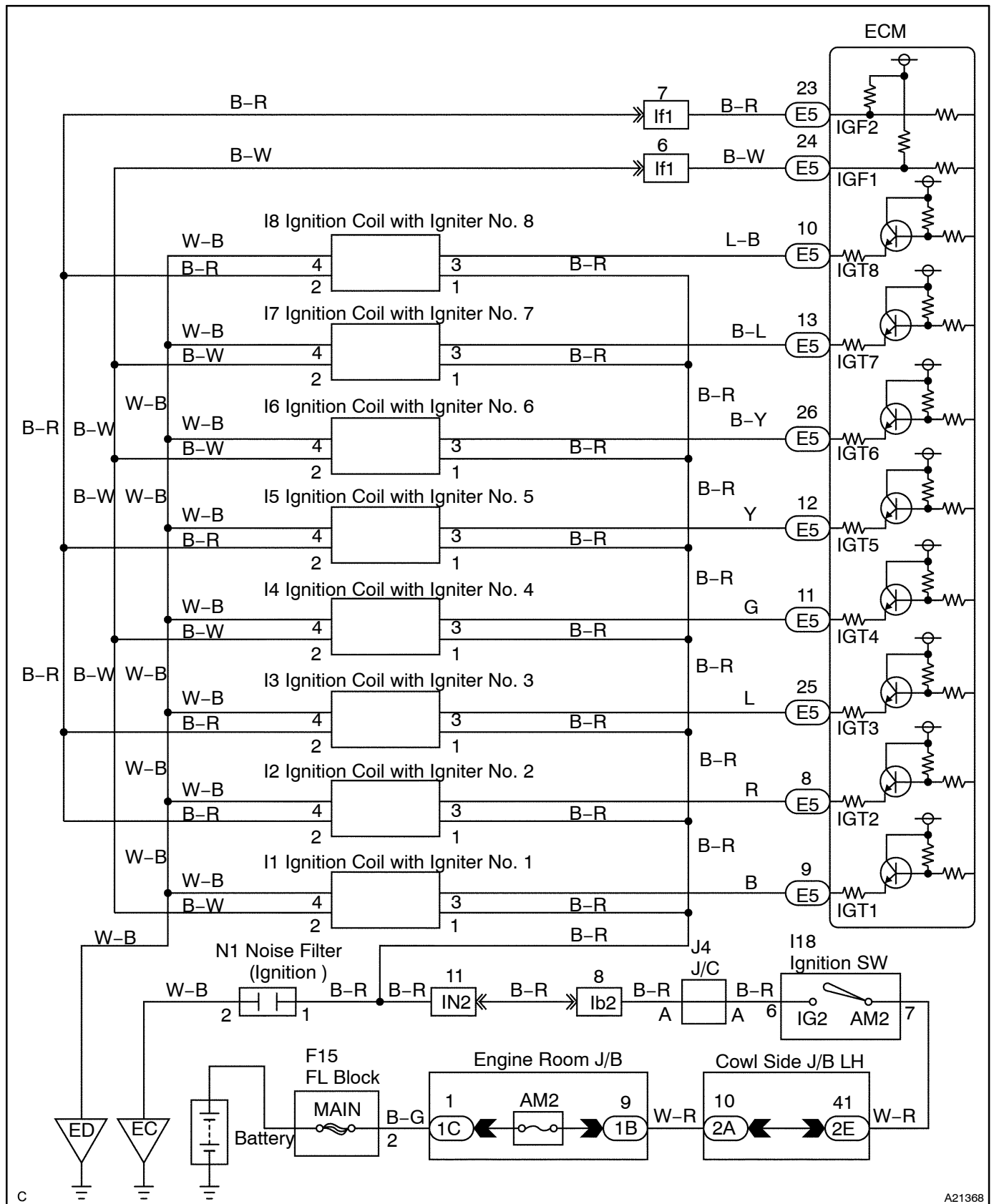
## TYPICAL MALFUNCTION THRESHOLDS

| Detection Criteria                          | Threshold                                          |
|---------------------------------------------|----------------------------------------------------|
| "Ignition signal fail count"                | More than 2                                        |
| "Ignition signal fail count" is as follows: | When IGF should have returned despite sending IGT. |

## COMPONENT OPERATING RANGE

| Standard Value                                   |
|--------------------------------------------------|
| Confirmed signal number = ignition signal number |

## WIRING DIAGRAM



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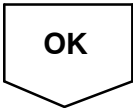
INSPECTION PROCEDURE

HINT:

- If DTCs P0351, P0354, P0356 and P0357 are output simultaneously, IGF1 circuit may be open or short.
- If DTCs P0352, P0353, P0355 and P0358 are output simultaneously, IGF2 circuit may be open or short.
- 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, as well as other data from the time when a malfunction occurred.

|   |                                                              |
|---|--------------------------------------------------------------|
| 1 | Check spark plug and spark (See page <a href="#">IG-1</a> ). |
|---|--------------------------------------------------------------|

|    |               |
|----|---------------|
| NG | Go to step 4. |
|----|---------------|

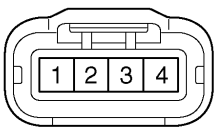


2

**Check for open and short in harness and connector in IGF signal circuits between ECM and ignition coil with igniter.**

### Wire Harness Side:

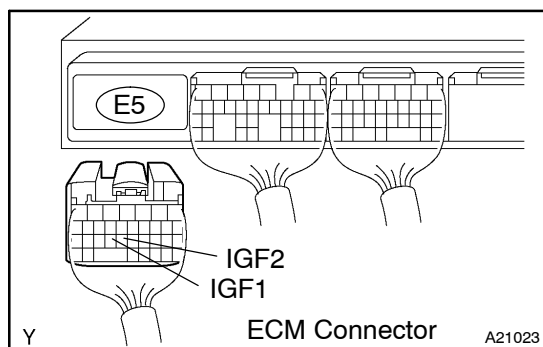
I1 I2  
I3 I4  
I5 I6  
I7 I8



Ignition Coil with Igniter Connector

Y

A21025



Y

A21023

### PREPARATION:

- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- Disconnect the E5 ECM connector.

### CHECK:

Check the resistance between the wire harness side connectors.

### OK:

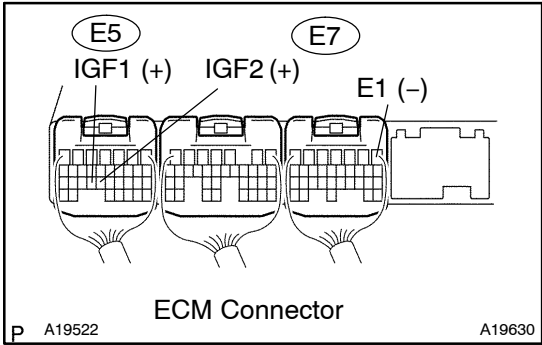
| Tester Connection                                  | Specified Condition     |
|----------------------------------------------------|-------------------------|
| Ignition coil (I1-2) - IGF1 (E5-24)                | Below 1 $\Omega$        |
| Ignition coil (I2-2) - IGF2 (E5-23)                | Below 1 $\Omega$        |
| Ignition coil (I3-2) - IGF1 (E5-24)                | Below 1 $\Omega$        |
| Ignition coil (I4-2) - IGF2 (E5-23)                | Below 1 $\Omega$        |
| Ignition coil (I5-2) - IGF1 (E5-24)                | Below 1 $\Omega$        |
| Ignition coil (I6-2) - IGF2 (E5-23)                | Below 1 $\Omega$        |
| Ignition coil (I7-2) - IGF1 (E5-24)                | Below 1 $\Omega$        |
| Ignition coil (I8-2) - IGF2 (E5-23)                | Below 1 $\Omega$        |
| Ignition coil (I1-2) or IGF1 (E5-24) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I2-2) or IGF2 (E5-23) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I3-2) or IGF1 (E5-24) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I4-2) or IGF2 (E5-23) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I5-2) or IGF1 (E5-24) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I6-2) or IGF2 (E5-23) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I7-2) or IGF1 (E5-24) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I8-2) or IGF2 (E5-23) - Body ground | 10 k $\Omega$ or higher |

NG

**Repair or replace harness or connector.**

OK

**3     Disconnect ignition coil with igniter connector, and check voltage between terminals IGF1, IGF2 and E1 of ECM connector.**



**PREPARATION:**

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the E5 and E7 ECM connectors.

**OK:**

| Tester Connection        | Specified Condition |
|--------------------------|---------------------|
| IGF1 (E5-24) - E1 (E7-1) | 4.5 to 5.5 V        |
| IGF2 (E5-23) - E1 (E7-1) | 4.5 to 5.5 V        |

**NG**

**Replace ECM (See page [SF-60](#)).**

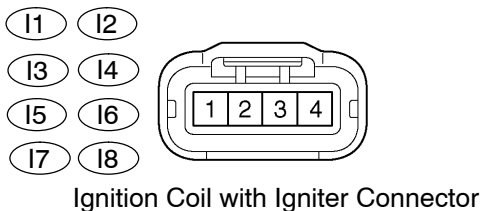
**OK**

**Replace ignition coil with igniter.**



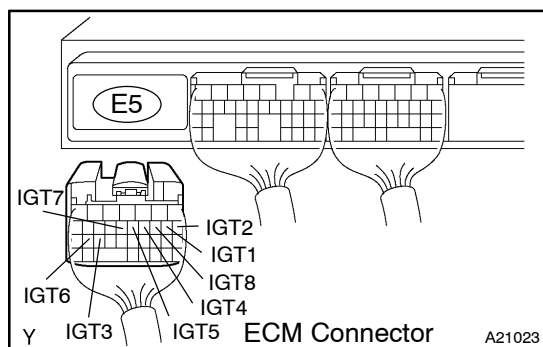
# 4 Check for open and short in harness and connector in IGT signal circuit between ECM and ignition coil with igniter.

## Wire Harness Side:



Y

A21025



Y

A21023

## PREPARATION:

- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- Disconnect the E5 ECM connector.

## CHECK:

Check the resistance between the wire harness side connectors.

## OK:

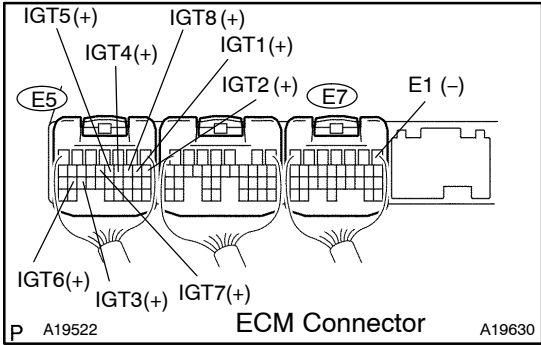
| Tester Connection                                  | Specified Condition     |
|----------------------------------------------------|-------------------------|
| Ignition coil (I1-2) - IGT1 (E5-9)                 | Below 1 $\Omega$        |
| Ignition coil (I2-2) - IGT2 (E5-8)                 | Below 1 $\Omega$        |
| Ignition coil (I3-2) - IGT3 (E5-25)                | Below 1 $\Omega$        |
| Ignition coil (I4-2) - IGT4 (E5-11)                | Below 1 $\Omega$        |
| Ignition coil (I5-2) - IGT5 (E5-12)                | Below 1 $\Omega$        |
| Ignition coil (I6-2) - IGT6 (E5-26)                | Below 1 $\Omega$        |
| Ignition coil (I7-2) - IGT7 (E5-13)                | Below 1 $\Omega$        |
| Ignition coil (I8-2) - IGT8 (E5-10)                | Below 1 $\Omega$        |
| Ignition coil (I1-2) or IGT1 (E5-9) - Body ground  | 10 k $\Omega$ or higher |
| Ignition coil (I2-2) or IGT2 (E5-8) - Body ground  | 10 k $\Omega$ or higher |
| Ignition coil (I3-2) or IGT3 (E5-25) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I4-2) or IGT4 (E5-11) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I5-2) or IGT5 (E5-12) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I6-2) or IGT6 (E5-26) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I7-2) or IGT7 (E5-13) - Body ground | 10 k $\Omega$ or higher |
| Ignition coil (I8-2) or IGT8 (E5-10) - Body ground | 10 k $\Omega$ or higher |

NG

Repair or replace harness or connector.

OK

**5 Check voltage between terminals IGT1 - IGT8 and E1 of ECM connector and body ground.**



**CHECK:**

Measure the voltage between terminals the E5 and E7 ECM connectors when the engine is cranked.

**OK:**

| Tester Connection        | Specified Condition                |
|--------------------------|------------------------------------|
| IGT1 (E5-9) - E1 (E7-1)  | More than 0.1 V or less than 4.5 V |
| IGT2 (E5-8) - E1 (E7-1)  |                                    |
| IGT3 (E5-25) - E1 (E7-1) |                                    |
| IGT4 (E5-11) - E1 (E7-1) |                                    |
| IGT5 (E5-12) - E1 (E7-1) |                                    |
| IGT6 (E5-26) - E1 (E7-1) |                                    |
| IGT7 (E5-13) - E1 (E7-1) |                                    |
| IGT8 (E5-10) - E1 (E7-1) |                                    |

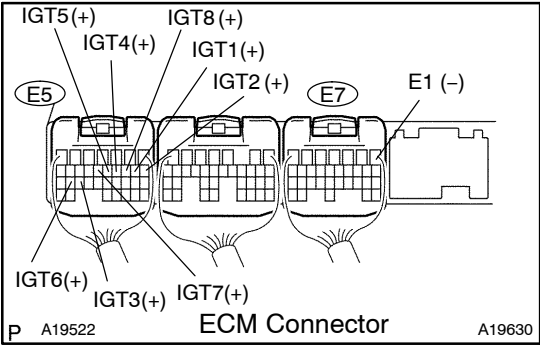
**NG**

**Replace ECM (See page SF-60).**

**OK**

6

Disconnect ignition coil with igniter connector, and check voltage between terminals IGT1 - IGT8 of ECM connector and body ground.



**PREPARATION:**  
Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.

**CHECK:**  
Measure the voltage between terminals the E5 and E7 ECM connectors when the engine is cranked.

| Tester Connection        | Specified Condition |
|--------------------------|---------------------|
| IGT1 (E5-9) - E1 (E7-1)  | 4.5 V or more       |
| IGT2 (E5-8) - E1 (E7-1)  |                     |
| IGT3 (E5-25) - E1 (E7-1) |                     |
| IGT4 (E5-11) - E1 (E7-1) |                     |
| IGT5 (E5-12) - E1 (E7-1) |                     |
| IGT6 (E5-26) - E1 (E7-1) |                     |
| IGT7 (E5-13) - E1 (E7-1) |                     |
| IGT8 (E5-10) - E1 (E7-1) |                     |

NG

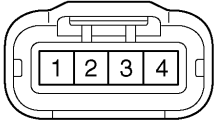
Replace ECM (See page SF-60).

OK

**7 Check ignition coil with igniter power source circuit.**

**Wire Harness Side:**

I1 I2  
I3 I4  
I5 I6  
I7 I8



Ignition Coil with Igniter Connector

Y

A21025

**PREPARATION:**

Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.

**CHECK:**

Measure the voltage between the terminal of the wire harness side connector and body ground.

**OK:**

| Tester Connection  | Specified Condition |
|--------------------|---------------------|
| I1-1 - Body ground | 9 to 14 V           |
| I2-1 - Body ground |                     |
| I3-1 - Body ground |                     |
| I4-1 - Body ground |                     |
| I5-1 - Body ground |                     |
| I6-1 - Body ground |                     |
| I7-1 - Body ground |                     |
| I8-1 - Body ground |                     |

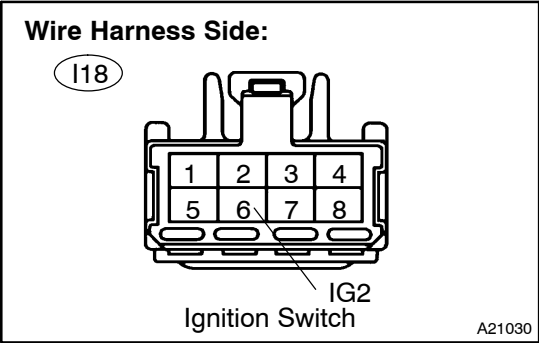
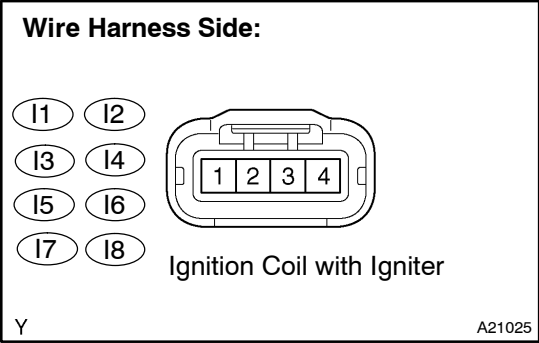
**OK**

**Repair ignition coil with igniter.**

**NG**

8

Check for open and short in harness and connector between ignition switch and ignition coil with igniter.



PREPARATION:

- (a) Disconnect the I1, 2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- (b) Disconnect the I18 ignition switch connector.

CHECK:

Measure the resistance between the wire harness side connectors.

OK:

| Tester Connection                                 | Specified Condition |
|---------------------------------------------------|---------------------|
| Ignition coil (I1-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I2-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I3-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I4-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I5-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I6-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I7-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I8-1) – IG2 (I18-6)                | Below 1 Ω           |
| Ignition coil (I1-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I2-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I3-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I4-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I5-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I6-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I7-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |
| Ignition coil (I8-1) or IG2 (I18-6) – Body ground | 10 kΩ or higher     |

NG

Repair or replace harness or connector.

OK

Replace ignition coil with igniter.