

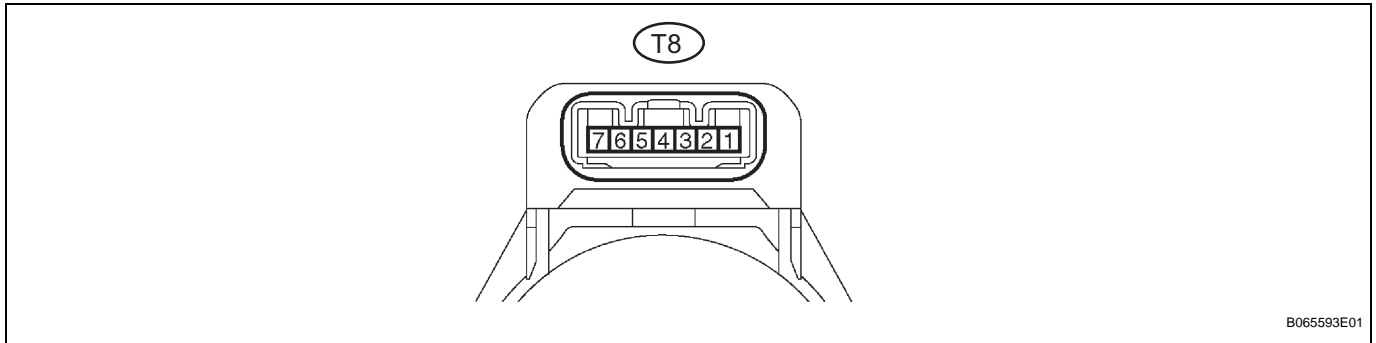
PROBLEM SYMPTOMS TABLE

ENGINE IMMOBILISER SYSTEM

| Symptom | Suspected area | See page |
|-----------------------|---|-----------------------|
| Engine does not start | 1. Key (Transponder chip malfunction) | EI-24 |
| | 2. Key (Unmatched encryption code) | EI-25 |
| | 3. Key (Unmatched key code) | EI-26 |
| | 4. Key (No communication in immobiliser system) | EI-27 |
| | 5. Key (Communication malfunction) | EI-31 |
| | 6. Transponder key amplifier (Antenna coil open / short) | EI-21 |
| | 7. Transponder key amplifier (No communication in immobiliser system) | EI-27 |
| | 8. Transponder key amplifier (Communication malfunction) | EI-31 |
| | 9. Transponder key ECU assembly (Key unlock warning switch malfunction) | EI-18 |
| | 10. Transponder key ECU assembly (Antenna coil open / short) | EI-21 |
| | 11. Transponder key ECU assembly (No communication in immobiliser system) | EI-27 |
| | 12. Transponder key ECU assembly (Communication malfunction) | EI-31 |
| | 13. Transponder key ECU assembly (Engine immobiliser system malfunction) | EI-34 |

TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



- (a) Disconnect the T8 amplifier connector and measure the resistance between the terminal of the wire harness side connector and body ground.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|--------------------------|-----------------|----------------------|-----------|---------------------|
| GND (T8-7) - Body ground | W - Body ground | Ground | Always | Below 1 Ω |

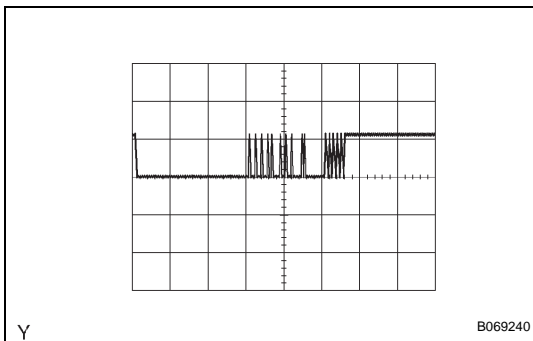
If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the T8 amplifier connector and measure the resistance and voltage of each terminal of the connector.

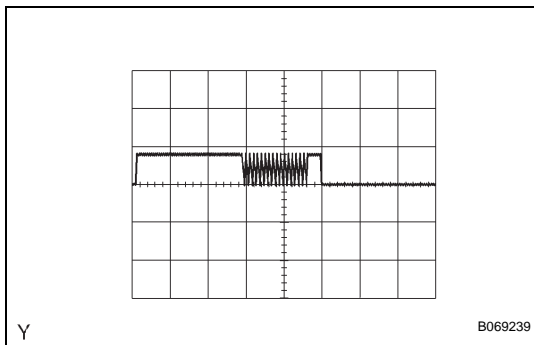
| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|--------------------------|-----------------|-------------------------------------|------------------------------------|---------------------|
| VC5 (T8-1) - GND (T8-7) | P - W | Power source | No key is in ignition key cylinder | Below 1 V |
| | | | Key is in ignition key cylinder | 4.6 to 5.4 V |
| CODE (T8-4) - GND (T8-7) | LG - W | Demodulated signal of key code date | No key is in ignition key cylinder | Below 1 V |
| | | | Key is in ignition key cylinder | Waveform 1 |
| TXCT (T8-5) - GND (T8-7) | BR - W | Key code output signal | No key is in ignition key cylinder | Below 1 V |
| | | | Key is in ignition key cylinder | Waveform 2 |
| GND (T8-7) - Body ground | W - Body ground | Ground | Always | Below 1 Ω |

If the result is not as specified, the amplifier may have a malfunction.

- (c) Inspect using an oscilloscope.
(1) Waveform 1 (Reference):



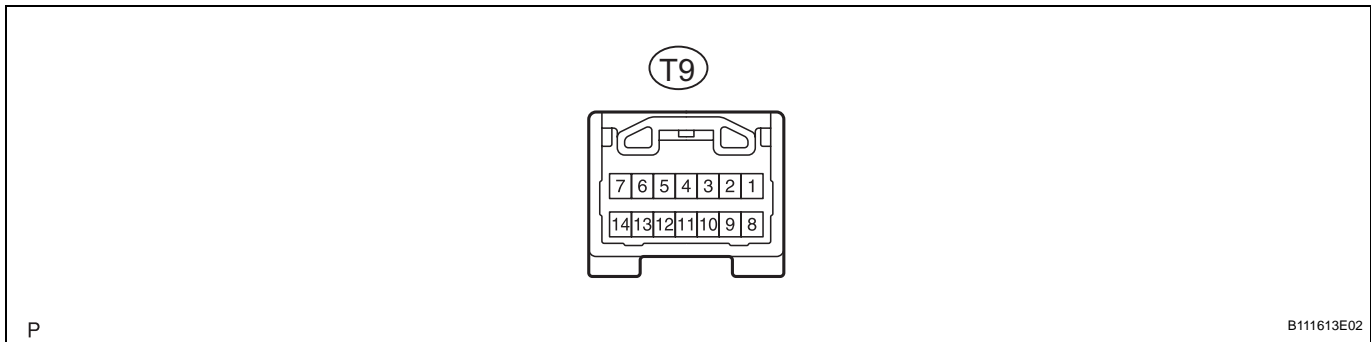
| | |
|--------------|---------------------------------|
| Terminal | CODE - GND |
| Tool Setting | 5 V/DIV., 20 ms/DIV. |
| Condition | Key is in ignition key cylinder |



(2) Waveform 2 (Reference):

| | |
|--------------|---------------------------------|
| Terminal | TXCT - GND |
| Tool Setting | 5 V/DIV., 20 ms/DIV. |
| Condition | Key is in ignition key cylinder |

2. CHECK TRANSPONDER KEY ECU ASSEMBLY



- (a) Disconnect the T9 ECU connector and measure the resistance and voltage between each terminal of the wire harness side connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---------------------------|--------------|-----------------------|------------------------------------|-------------------------|
| CPUB (T9-1) - GND (T9-14) | V - W-B | Battery | Always | 10 to 14 V |
| IG2 (T9-2) - GND (T9-14) | G - W-B | Ignition switch | Ignition switch off | Below 1 V |
| | | | Ignition switch on | 10 to 14 V |
| KSW (T9-3) - GND (T9-14) | B - W-B | Unlock warning switch | No key is in ignition key cylinder | 10 k Ω or higher |
| | | | Key is in ignition key cylinder | Below 1 Ω |

If the result is not as specified, there may be a malfunction on the wire harness side.

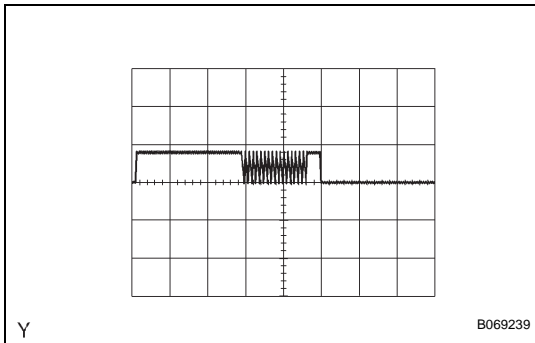
- (b) Reconnect the T9 ECU connector and measure the voltage of each terminal of the connector.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|-----------------------------|-----------------|--|------------------------------------|---------------------|
| AGND (T9-13) - Body ground | W - Body ground | Ground | Always | Below 1 Ω |
| KSW (T9-3) - GND (T9-14) | B - W-B | Unlock warning switch | No key is in ignition key cylinder | 10 to 14 V |
| | | | Key is in ignition key cylinder | Below 1 V |
| VC5 (T9-9) - AGND (T9-13) | P - W | Power source | Ignition switch off | Below 1 V |
| | | | Ignition switch on | 4.6 to 5.4 V |
| TXCT (T9-12) - AGND (T9-13) | BR - W | Transponder key amplifier communication signal | No key is in ignition key cylinder | Below 1 V |
| | | | Key is in ignition key cylinder | Waveform 1 |
| CODE (T9-10) - AGND (T9-13) | LG - W | Transponder key amplifier ground | No key is in ignition key cylinder | Below 1 V |
| | | | Key is in ignition key cylinder | Waveform 2 |

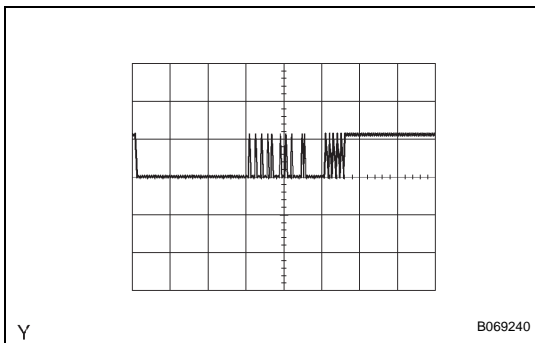
| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|---------------------------|--------------|--|---------------------|---------------------|
| EFIO (T9-6) - GND (T9-14) | GR - W-B | Hybrid vehicle control ECU output signal | Ignition switch off | Below 1 V |
| | | | Ignition switch on | Waveform 3 |
| EFII (T9-7) - GND (T9-14) | L - W-B | Hybrid vehicle control ECU input signal | Ignition switch off | Below 1 V |
| | | | Ignition switch on | Waveform 4 |

If the result is not as specified, the ECU may have a malfunction.

- (c) Inspect using an oscilloscope.
- (1) Wave form 1 (Reference):

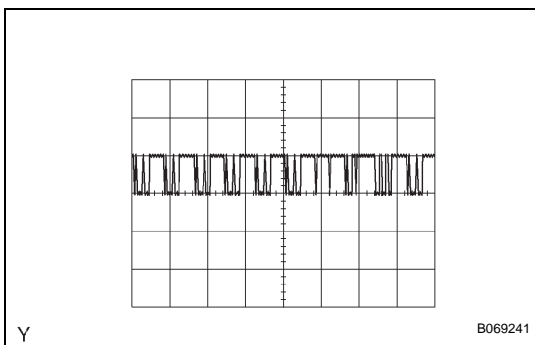


| | |
|--------------|---------------------------------|
| Terminal | TXCT - AGND |
| Tool Setting | 5 V/DIV., 20 ms/DIV. |
| Condition | Key is in ignition key cylinder |



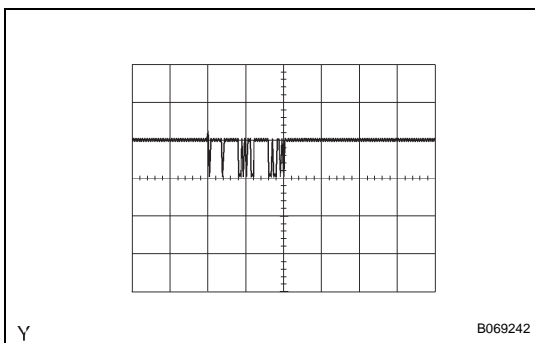
- (2) Wave form 2 (Reference):

| | |
|--------------|---------------------------------|
| Terminal | CODE - AGND |
| Tool Setting | 5 V/DIV., 20 ms/DIV. |
| Condition | Key is in ignition key cylinder |



- (3) Wave form 3 (Reference):

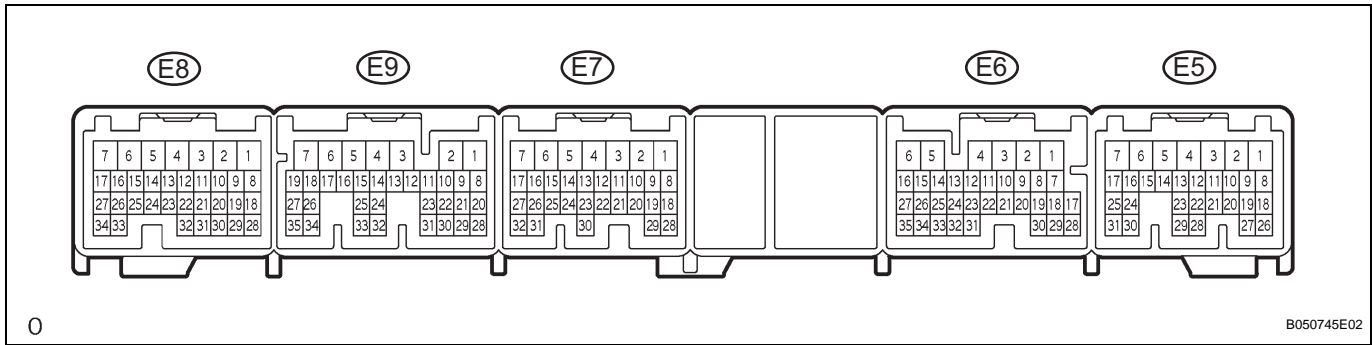
| | |
|--------------|-----------------------|
| Terminal | EFIO - AGND |
| Tool Setting | 10 V/DIV., 500ms/DIV. |
| Condition | Ignition switch on |



- (4) Wave form 4 (Reference):

| | |
|--------------|------------------------|
| Terminal | EFII - AGND |
| Tool Setting | 10 V/DIV., 500 ms/DIV. |
| Condition | Ignition switch on |

3. CHECK ECM



- (a) Disconnect the E6 ECM connector and measure the resistance between the terminal of the wire harness side connector and body ground.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|-------------------------|------------------|----------------------|-----------|---------------------|
| E1 (E6-1) - Body ground | BR - Body ground | Ground | Always | Below 1 Ω |

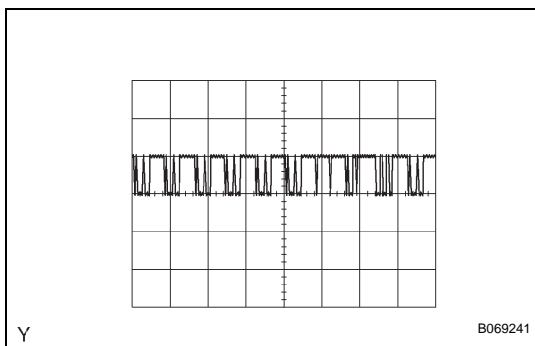
If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the E6 ECM. Measure the voltage between each terminal of the connector according to the value(s) in the table below.

| Symbols (Terminal No.) | Wiring Color | Terminal Description | Condition | Specified Condition |
|--------------------------|--------------|-----------------------------------|---------------------|---------------------|
| IMI (H29-22) - E1 (E6-1) | GR - BR | Transponder key ECU input signal | Ignition switch off | Below 1 V |
| | | | Ignition switch on | Waveform 1 |
| IMO (H29-28) - E1 (E6-1) | L- BR | Transponder key ECU output signal | Ignition switch off | Below 1 V |
| | | | Ignition switch on | Waveform 2 |

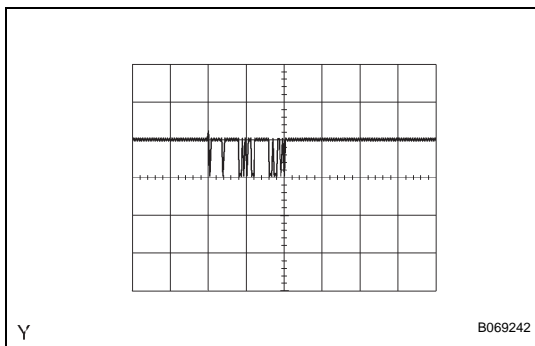
If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Inspect using an oscilloscope.
 - (1) Waveform 1 (Reference):



| | |
|--------------|------------------------|
| Terminal | IMI - E1 |
| Tool Setting | 10 V/DIV., 500 ms/DIV. |
| Condition | Ignition switch on |

- (2) Waveform 2 (Reference):



| | |
|--------------|------------------------|
| Terminal | IMO - E1 |
| Tool Setting | 10 V/DIV., 500 ms/DIV. |
| Condition | Ignition switch on |