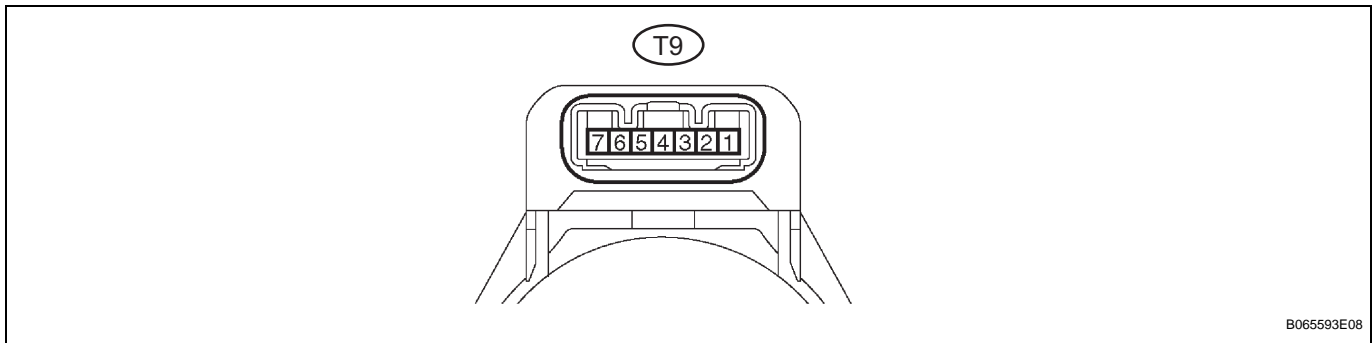


**PROBLEM SYMPTOMS TABLE****Immobiliser function**

Symptom	Suspected area	See page
Engine does not start	ECU power source circuit	<a href="#">EI-37</a>
	Transponder key ECU assembly	<a href="#">EI-13</a>
	SFI system (2TR-FE)	<a href="#">ES-29</a>
	SFI system (1GR-FE)	<a href="#">ES-28</a>

## TERMINALS OF ECU

### 1. CHECK TRANSPONDER KEY AMPLIFIER



B065593E08

- (a) Disconnect the T9 amplifier connector.
- (b) Measure the resistance of the wire harness side connector.

#### Standard resistance:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (T9-7) - Body ground	L - Body ground	Ground	Always	Below 1 $\Omega$

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

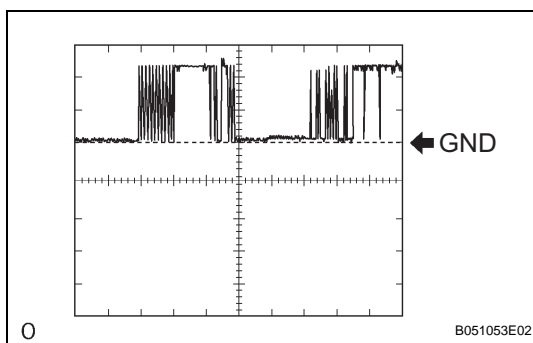
- (c) Reconnect the T9 amplifier connector.
- (d) Measure the resistance and voltage of the connector.

#### Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
VC5 (T9-1) - AGND(T9-7)	GR-B - L	Power source	No key in ignition key cylinder	0 V
VC5 (T9-1) - AGND(T9-7)	GR-B - L	Power source	Key inserted	4.6 to 5.4 V
CODE (T9-4) - AGND (T9-7)	P-G - L	Demodulated signal of key code data	No key in ignition key cylinder → Key inserted	Pulse generation (see waveform 1)
TXCT (T9-5) - AGND (T9-7)	LG-R - L	Key code output signal	No key in ignition key cylinder → Key inserted	Pulse generation (see waveform 2)
AGND (T9-7) - Body ground	L - Body ground	Ground	Always	Below 1 $\Omega$

If the result is not as specified, there may be a malfunction on the amplifier.

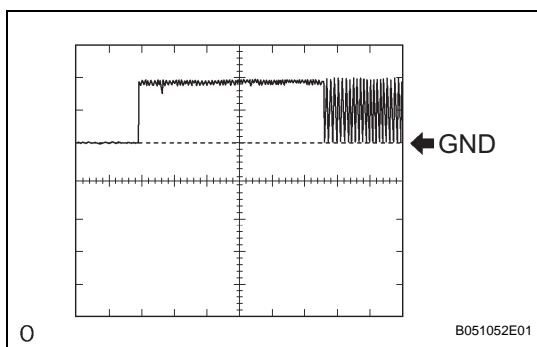
- (e) Inspect using an oscilloscope.
  - (1) Waveform 1



B051053E02

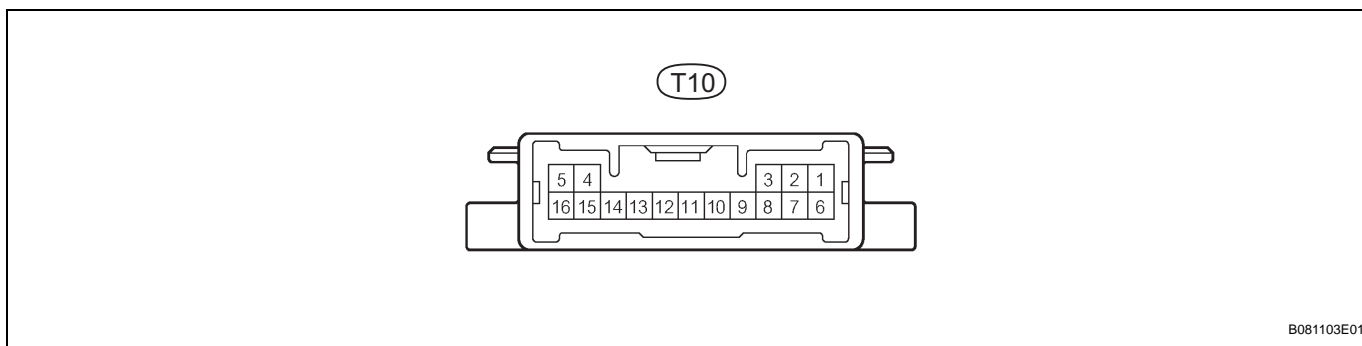
Terminal	CODE (T9-4) - AGND (T9-7)
Tool Setting	2 V/DIV., 20 msec/DIV.
Condition	No key in ignition key cylinder → Key inserted

(2) Waveform 2



Terminal	TXCT (T9-5) - AGND (T9-7)
Tool Setting	2 V/DIV., 20 msec/DIV.
Condition	No key in ignition key cylinder → Key inserted

**2. CHECK TRANSPONDER KEY ECU ASSEMBLY**



- (a) Disconnect the T10 ECU connector.
- (b) Measure the resistance and voltage of the wire harness side connector.

**Standard:**

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (T10-16) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
+B (T10-1) - GND (T10-16)	R - W-B	Battery	Always	10 to 14 V
IG (T10-2) - GND (T10-16)	O - W-B	Ignition switch	Ignition switch OFF	0 V
IG (T10-2) - GND (T10-16)	O - W-B	Ignition switch	Ignition switch ON	10 to 14 V
KSW (T10-3) - AGND (T10-5)	G-B - L	Unlock warning switch	No key in ignition key cylinder	10 kΩ or higher
KSW (T10-3) - AGND (T10-5)	G-B - L	Unlock warning switch	Key inserted	Below 1Ω

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

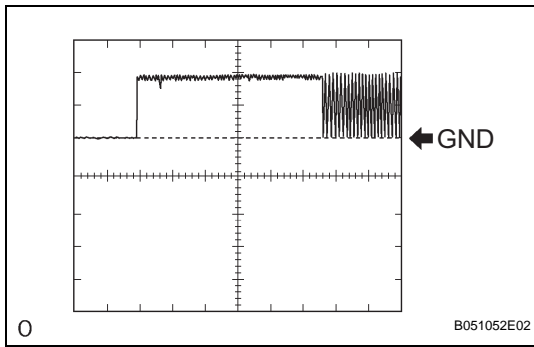
- (c) Reconnect the T10 ECU connector.
- (d) Measure the voltage of the connector.

**Standard voltage:**

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
VC5 (T10-14) - GND (T10-16)	GR-B - W-B	Power source	No key in ignition key cylinder	0 V
VC5 (T10-14) - GND (T10-16)	GR-B - W-B	Power source	Key inserted	4.6 to 5.4 V
TXCT (T10-4) - GND (T10-16)	LG-R - W-B	Transponder key amplifier communication signal	No key in ignition key cylinder → Key inserted	Pulse generation (see waveform 1)
CODE (T10-15) - GND (T10-16)	P-G - W-B	Transponder key amplifier communication signal	No key in ignition key cylinder → Key inserted	Pulse generation (see waveform 2)
EFIO (T10-13) - GND (T10-16)	L-W - W-B	ECM output signal	Ignition switch OFF → ON	Pulse generation (see waveform 3)
EFII (T10-12) - GND (T10-16)	LG-B - W-B	ECM input signal	Ignition switch OFF → ON	Pulse generation (see waveform 4)

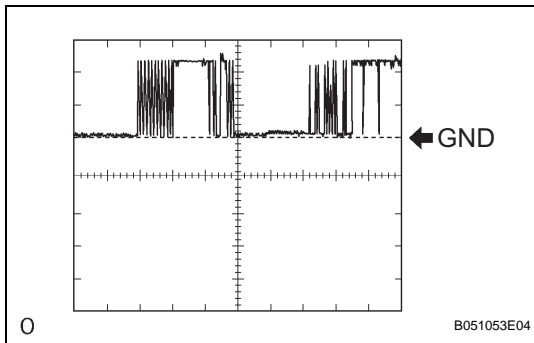
If the result is not as specified, there may be a malfunction on the ECU.

- (e) Inspect using an oscilloscope.
  - (1) Waveform 1



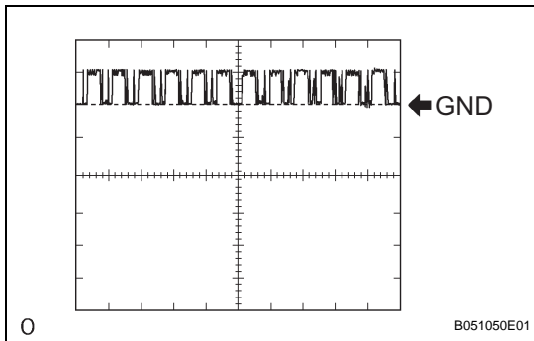
Terminal	TXCT (T10-4) - GND (T10-16)
Tool Setting	2.5 V/DIV., 20 msec/DIV.
Condition	No key in ignition key cylinder → Key inserted

- (2) Waveform 2 (Reference)



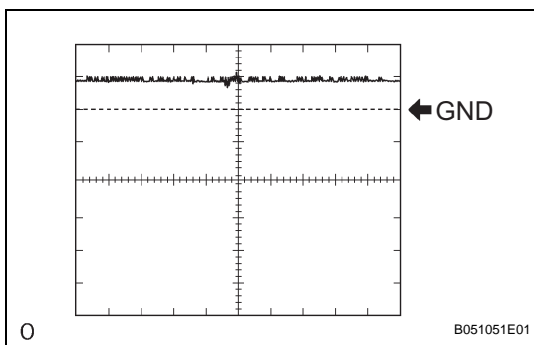
Terminal	CODE (T10-15) - GND (T10-16)
Tool Setting	2.5 V/DIV., 20 msec/DIV.
Condition	No key in ignition key cylinder → Key inserted

- (3) Waveform 3



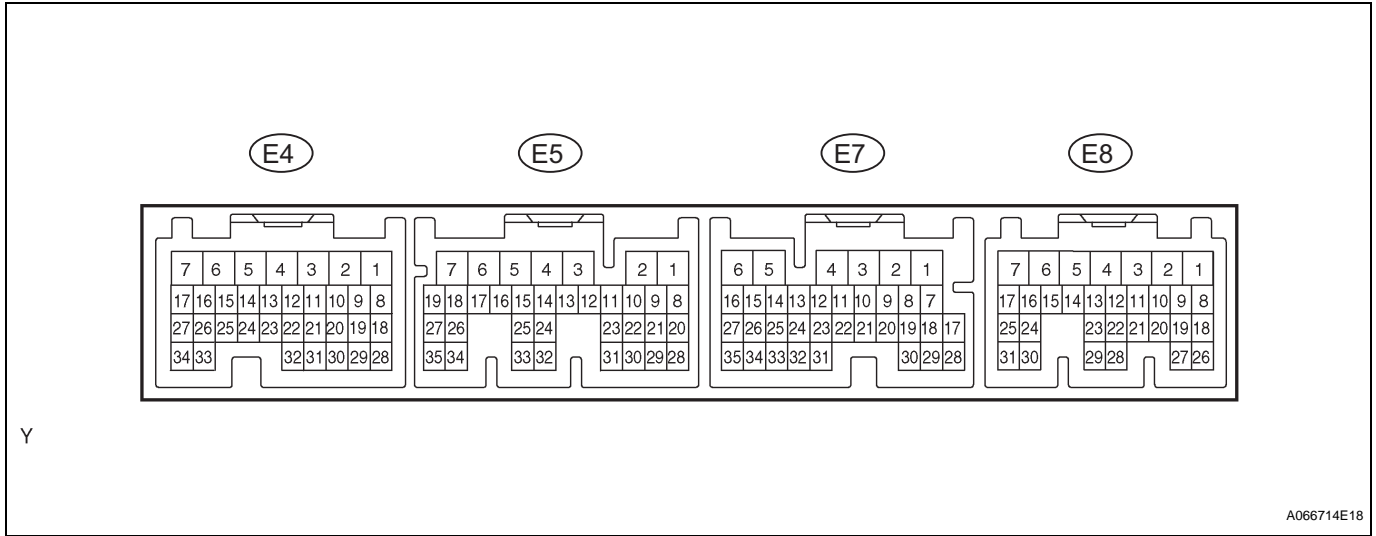
Terminal	EFIO (T10-13) - GND (T10-16)
Tool Setting	12 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON

- (4) Waveform 4



Terminal	EFII (T10-12) - GND (T10-16)
Tool Setting	10 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON

3. CHECK ECM (2TR-FE)



- (a) Disconnect the E7 and E8 ECM connectors.
- (b) Measure the resistance and voltage of the wire harness side connector.

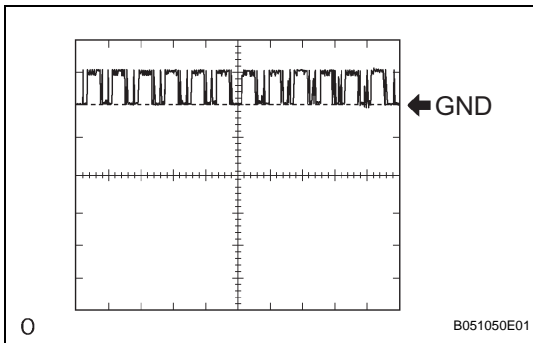
Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IMI (E7-16) - EOM (E8-29)	L-W - W-B	Transponder key ECU input signal	Ignition switch OFF → ON	Pulse generation (see waveform 1)
IMO (E7-15) - EOM (E8-29)	LG-B - W-B	Transponder key ECU output signal	Ignition switch OFF → ON	Pulse generation (see waveform 2)
EOM (E8-29) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

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

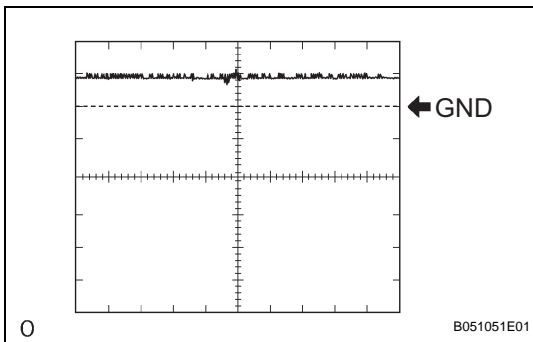
- (c) Inspect using an oscilloscope.

(1) Waveform 1



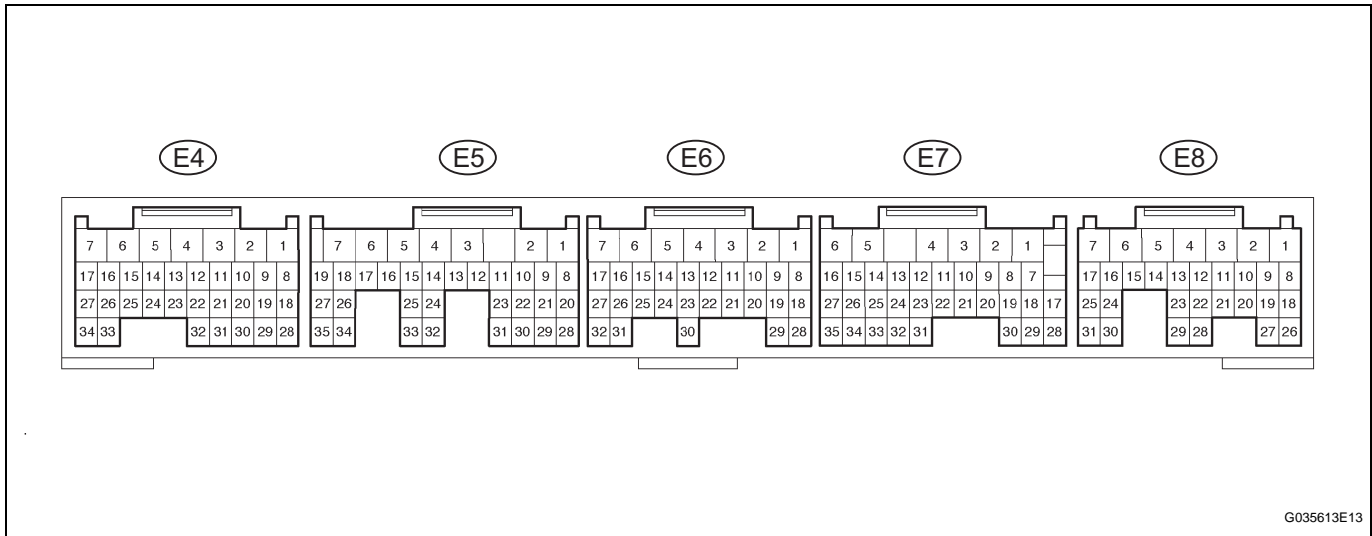
Terminal	IMI (E7-16) - EOM (E8-29)
Tool Setting	12 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON

(2) Waveform 2



Terminal	IMO (E7-15) - EOM (E8-29)
Tool Setting	10 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON

4. CHECK ECM (1GR-FE)



G035613E13

- (a) Disconnect the E7 ECM connectors.
- (b) Measure the resistance and voltage of the wire harness side connector.

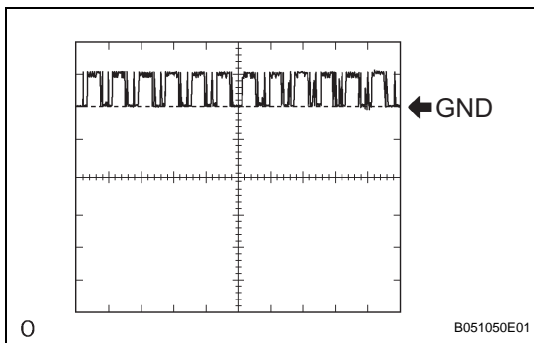
Standard:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IMI (E7-16) - EOM (E7-35)	L-W - W-B	Transponder key ECU input signal	Ignition switch OFF → ON	Pulse generation (see waveform 1)
IMO (E7-15) - EOM (E7-35)	LG-B - W-B	Transponder key ECU output signal	Ignition switch OFF → ON	Pulse generation (see waveform 2)
EOM (E7-35) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

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

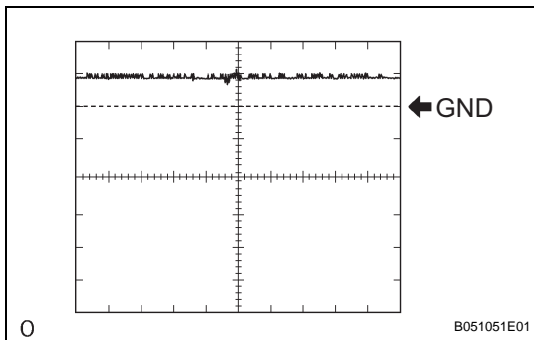
- (c) Inspect using an oscilloscope.

(1) Waveform 1



Terminal	IMI (E7-16) - EOM (E7-35)
Tool Setting	12 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON

(2) Waveform 2



Terminal	IMO (E7-15) - EOM (E7-35)
Tool Setting	10 V/DIV., 100 msec/DIV.
Condition	Ignition switch OFF → ON