

SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

The engine immobiliser system is designed to prevent the vehicle from being stolen. This system uses a transponder key ECU that stores the key codes of authorized ignition keys. If an attempt is made to start the engine using an unauthorized key, the transponder key ECU sends a signal to the ECM to prohibit fuel delivery and ignition, effectively disabling the engine.

2. FUNCTION OF MAIN COMPONENT

Component	Outline
Transponder key coil/amplifier	When key is inserted in ignition key cylinder, key coil receives key's code. Then amplifier amplifies ID code and outputs it to transponder key ECU.
Unlock warning switch	Detects if key is in ignition key cylinder and outputs results to transponder key ECU
ECM	Through SFI communication*1, ECM receives ID verification results from transponder key ECU. ECM also verifies ECUs. Then judgment of whether or not to disable engine is made.
Security indicator light	Illuminates or starts flashing. Illumination is controlled by transponder key ECU

3. SYSTEM FUNCTION

When the transponder key ECU detects that the unlock warning switch is ON, the ECU provides current to the transponder key coil and produces a faint electric wave. A transponder chip in the key grip receives the wave. Upon receiving the wave, the transponder chip outputs a key ID code signal. The transponder key coil receives this signal, the transponder key amplifier amplifies it, and then the signal is transmitted to the transponder key ECU. The transponder key ECU matches the key's ID code with the vehicle's ID code, which was previously registered in the transponder key ECU. If the ID codes match, the transponder key ECU turns OFF the security indicator. Then when the ignition key cylinder is turned, the code match results are sent through the transponder key ECU to the ECM. After the identification results show that the key's ID code matches the vehicle's ID code and the transponder key ECU has confirmed their match, the immobiliser system is canceled and the engine starting controls (fuel injection control and ignition control) enter standby mode.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the engine immobiliser system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 INSPECT BATTERY VOLTAGE

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3 CRANK ENGINE FOR MORE THAN 10 SECONDS

NEXT

4 CHECK FOR DTCs*

- Check for DTCs and note any codes that are output (see page [EI-19](#)).
- Delete the DTC.
- Recheck for DTCs. Based on the DTC output in (a), try to force output of the same SFI system DTC or engine immobiliser system DTC by simulating the original activity indicated by the DTC.

Result:

Result	Proceed to
DTC output does not reoccur	A
SFI system DTC output reoccurs	B
Engine immobiliser system DTC output reoccurs	C

B **GO TO SFI SYSTEM**

C **GO TO STEP 8**

A

5 READ VALUE OF INTELLIGENT TESTER*

- Connect the intelligent tester to the DLC3.

- (b) Turn the ignition switch ON and push the intelligent tester main switch ON.
- (c) On the intelligent tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / IMMOBILISER / KEY SW. Read the values.

Transponder key ECU assembly:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Unlock warning switch signal/ ON or OFF	OFF: No key is in ignition key cylinder ON: Key is in ignition key cylinder	-

OK:

ON (key is in ignition key cylinder) appears on the screen.

NG**GO TO DTC B2780****OK****6 PROBLEM SYMPTOMS TABLE****Result:**

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B**GO TO STEP 8****A****7 OVERALL ANALYSIS AND TROUBLESHOOTING***

- (a) DATA LIST/ACTIVE TEST (see page [EI-19](#))
 - (1) Inspection with intelligent tester (DATA LIST)
 - (2) Inspection with intelligent tester (ACTIVE TEST)
- (b) Terminals of ECU (see page [EI-13](#))

NEXT**8 ADJUST, REPAIR OR REPLACE****NEXT****9 CONFIRMATION TEST****NEXT****END**