

IMMOBILIZER CONTROL SYSTEM

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IMMOBILIZER CONTROL SYSTEM

- Function of the SMARTRA and the transponder.
- Data (stored in the ECM related to the immobilizer function.

DIAGNOSIS OF IMMOBILIZER FAULTS

EEE9CD73

The following table shows the assignment of immobilizer related faults to each type:

- Communication between the ECM and the SMARTRA.

Immobilizer Related Faults	Fault types	Diagnostic codes
SMARTRA fault	1. No response from SMARTRA 2. Antenna coil error 3. Communication line error (Open/Short etc.) 4. Invalid message from SMARTRA to PCM(ECM)	P1690 (SMARTRA no response)
Immobilizer indicator lamp fault	1. Immobilizer indicator lamp error (Cluster)	P1692 (Immobilizer lamp error)
Transponder key fault	1. Corrupted data from transponder 2. More than one transponder in the magnetic field (Antenna coil) 3. No transponder (Key without transponder) in the magnetic field (Antenna coil)	P1693 (Transponder no response error/invalid response)
EMS internal permanent memory fault	1. EMS internal permanent memory fault 2. Invalid write operation to permanent memory	P1695 (EMS memory error)
Invalid key fault	1. Virgin transponder at PCM(ECM) status "Learnt" Learnt (Invalid) Transponder at PCM(ECM) status "Learnt"(Authentication fail)	P1696 (Authentication fail)
Hi-Scan fault	1. Hi-Scan message error	P1697
Transponder invalid	1. Invalid transponder	P1698

IMMOBILIZER (SMARTRA) DTC LIST

No.	Fault code	Monitor strategy description	Gasoline	Diesel
1	P1690	SMARTRA no response	O	O
2	P1692	Immobilizer lamp error	-	O
3	P1693	Transponder no response error / Invalid response	O	O
4	P1695	EMS memory error	O	O
5	P1696	Authentication fail	O	O
6	P1697	HI-SCAN message error	O	O
7	P1698	Transponder Invalid	O	O

DTC P1690 SMARTRA NO RESPONSE

GENERAL DESCRIPTION EE46AEE6

The SMARTRA carries out communication with the built-in transponder of the ignition key. This wireless communication runs on RF (Radio frequency of 125 kHz). The SMARTRA is mounted at the ignition lock close to the antenna coil for RF transmission and receiving. The RF signal from the transponder received by the antenna coil is converted into messages for serial communication by the SMARTRA device. And the received messages from the ECM are converted into an RF signal, which is transmitted to the transponder by the antenna. The SMARTRA does not carry out the validity check of transponder or the calculation of encryption algorithm. This device is only an advanced interface, which converts the RF data flow of the transponder into serial communication to ECM and vice versa.

* SMARTRA : SMART Transponder Antenna

DTC DESCRIPTION EC2DECE1

The ECM sets DTC P1690 if there's No Response from SMARTRA.

DTC DETECTING CONDITION E1AB4FCA

Item	Detecting Condition	Possible Cause
DTC Strategy		• Open Circuit in signal harness • Short Circuit in signal harness • Faulty SMARTRA
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

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MONITOR DTC STATUS EFFDC6E5

1. Connect scantool to Data Link Connector(DLC).
2. Ignition "ON" & engine "OFF".
3. Monitor the "KEY STATUS" and "ECU STATUS" Parameter on the Scantool.

Specification : 'LEARNT'

1.1 CURRENT DATA	
01. NO. OF LEARNT KEY	1
02. ECU STATUS	LEARNT
03. KEY STATUS	LEARNT
FIX SCRN FULL PART GRPH HELP	

Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

4. Are "KEY STATUS" and "ECU STATUS" Parameter within specifications?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Go to "Inspection & Repair" procedure.

TERMINAL AND CONNECTOR INSPECTION EC246D0E

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

YES

Repair as necessary and go to "Verification Vehicle Repair" procedure.

NO

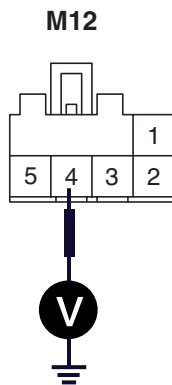
Go to "W/Harness Inspection" procedure .

POWER SUPPLY CIRCUIT INSPECTION

E40FAE7B

1. Check for open in harness
 - 1) Ignition "OFF"
 - 2) Disconnect SMARTRA.
 - 3) Ignition "ON" & Engine "OFF"
 - 4) Measure voltage value between terminal "4" of SMARTRA and chassis ground.

Specification : 9~16V



1. Coil antenna
2. Coil antenna
3. Ground
4. **Power**
5. Signal

SBLBE6753L

- 5) Is the measured voltage within specifications?

YES

Go to "Signal circuit Inspection" procedure

NO

Check for open or short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

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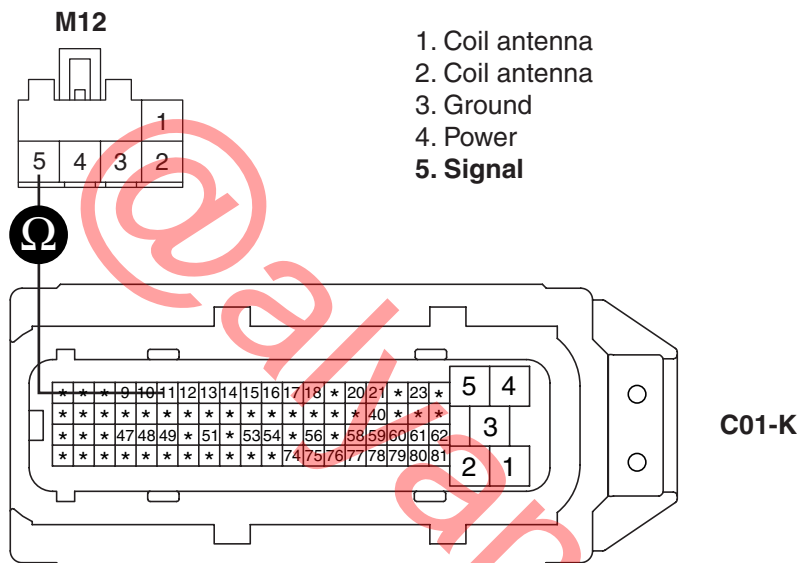
SIGNAL CIRCUIT INSPECTION

EF0C12DE

1. Check for open in harness
 - 1) Ignition "OFF"
 - 2) Disconnect SMARTRA.
 - 3) Measure resistance between terminal "5" of SMARTRA and terminal C01-K-11(WGT) or C02-K-47(VGT) or C144-A-45(GSL)

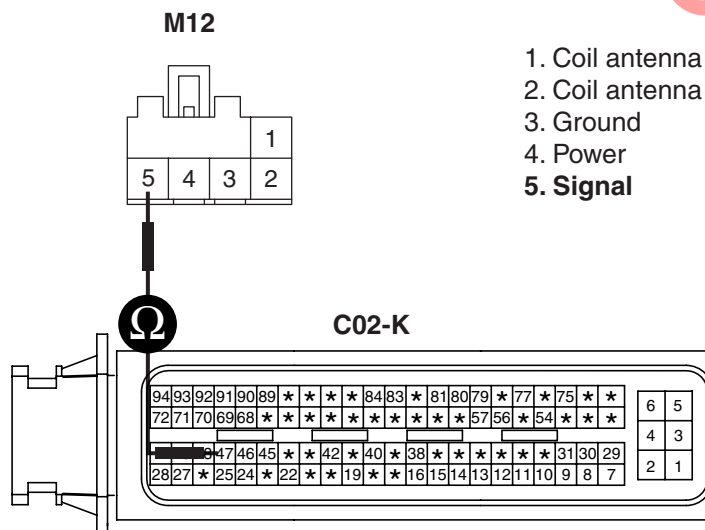
Specification : 1 Ω or less

[WGT]



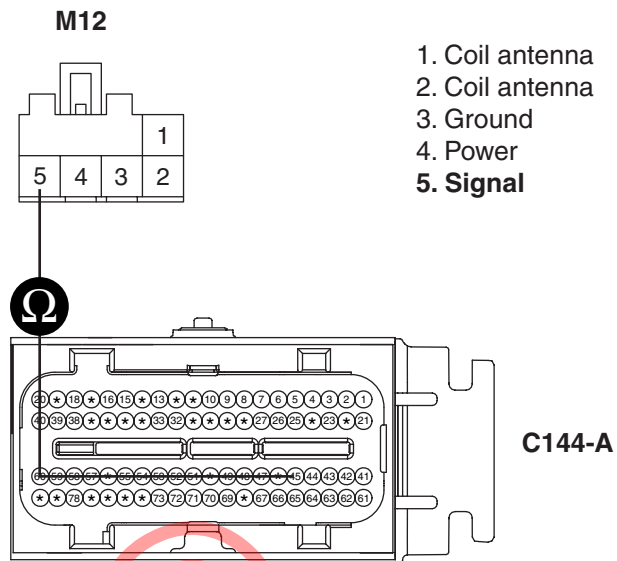
SBLBE6754L

[VGT]



SBLBE6755L

[GSL]



SBLBE6759L

4) Is the measured resistance within specifications?

YES

Go to "Check for short in harness" procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

2. Check for short in harness

- 1) Ignition "OFF"
- 2) Disconnect SMARTRA.
- 3) Ignition "ON" & Engine "OFF"
- 4) Measure voltage value between terminal "5" of SMARTRA and chassis ground.

Specification :Approx. 5.48V



SBLBE6756L

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- 5) Is the measured voltage within specifications?

YES

Go to "Signal circuit Inspection" procedure

NO

Check for short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION

E036E618

1. Check for open in ground harness

- 1) Ignition "OFF"
- 2) Disconnect SMARTRA.
- 3) Measure resistance between terminal "3" of SMARTRA and chassis ground.

Specification : 1 Ω or less



SBLBE6757L

- 4) Is the measured resistance within specifications?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EAE05C0C

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

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IMMOBILIZER CONTROL SYSTEM

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DTC P1692 IMMOBILIZER LAMP ERROR

GENERAL DESCRIPTION

EAA1D43B

When driver inserts key and IGN "ON", Immobilizer informs status of system and result of Authentication by blinking of immobilizer lamp on instrument cluster. through Authentication procedure immobilizer lamp keep lighting up till engine starts. In normal status. Immobilizer lamp lights up for 30sec Right after ignition "ON". If there's any fault in immobilizer system or in Authentication, lamp blinks 5 times after ignition "ON".

DTC DESCRIPTION

E8A838F8

The ECM sets DTC P1692 if there's short circuit in immobilizer lamp circuit.

DTC DETECTING CONDITION

EB66D8E7

Item	Detecting Condition	Possible Cause
DTC Strategy		- Short Circuit in immobilizer lamp circuit. - Open/Short in control harness - Faulty ECM
Enable Conditions	IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS

E0D0A0B8

1. Connect scantool to Data Link Connector(DLC).
2. Ignition "ON" & engine "OFF".
3. Selet "Diagnostic Trouble Codes(DTCs)"mode and monitor "DTC Status" parameter
4. Is the DTC B1692 present?

YES

Go to "Inspection & Repair" procedure

NO

Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

TERMINAL AND CONNECTOR INSPECTION

EDB459B6

1. Many malfunctions in the electrical system are caused by poor harness and terminals.
Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

YES

Repair as necessary and go to "Verification Vehicle Repair" procedure

NO

Go to "W/Harness Inspection" procedure

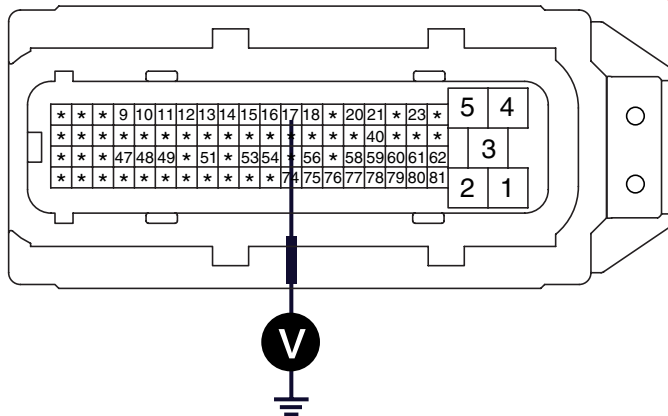
CONTROL CIRCUIT INSPECTION

E8FB4A56

1. Check for open in harness
 - 1) Ignition "OFF"
 - 2) Disconnect SMARTRA.
 - 3) Ignition "ON" & Engine "OFF"
 - 4) Measure voltage value between terminal C01-K-17(WGT) or C02-K-92(VGT) or C144-A-72(GSL) and chassis ground.

Specification : Approx. 11V

[WGT]

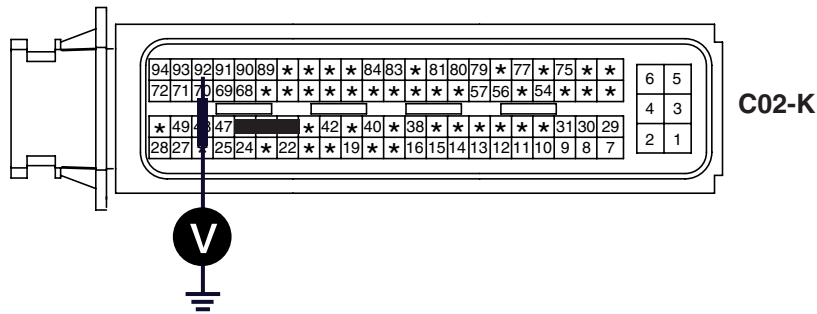


C01-K

IMMOBILIZER CONTROL SYSTEM

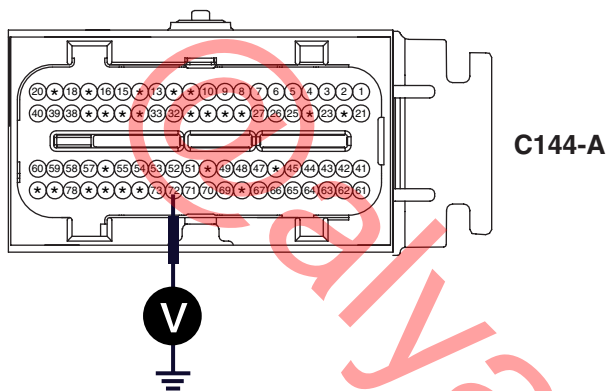
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[VGT]



SBLBE6761L

[GSL]



SBLBE6762L

5) Is the measured voltage within specifications?

YES

Go to "Component Inspection" procedure

NO

Check for open or short in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VISUAL / PHYSICAL INSPECTION

EE478DE7

1. Check immobilizer lamp circuit.

- 1) Ignition "ON" & Engine "OFF"
- 2) Check if immobilizer lamp operates properly.

NOTE

Right after ignition "ON", Immobilizer lamp lights up for 30sec.
If lamp blinks 5 times after ignition "ON", there's any fault in immobilizer system.

3) Is immobilizer lamp operates properly?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Go to "Component Inspection" procedure

COMPONENT INSPECTION

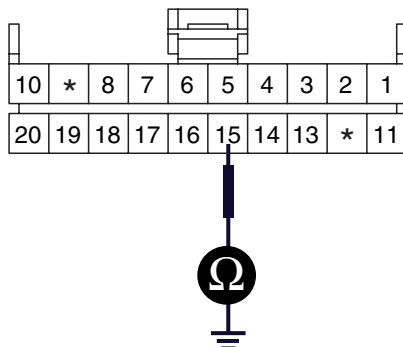
EC6B260E

1. Check immobilizer lamp.

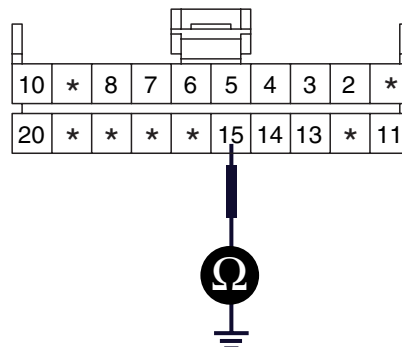
- 1) Ignition "OFF"
- 2) Disconnect ECM.
- 3) Ground terminal "15" of immobilizer lamp.
- 4) Ignition "ON" and Monitor operation of immobilizer lamp.

Specification : Immobilizer lamp "ON"

I01-3(A/T)



I01-3(M/T)



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5) Is the Immobilizer lamp "ON"?

YES

Substitute with a known-good ECM and check for proper operation.

If the problem is corrected, replace ECM and then go to "Verification of Vehicle Repair" procedure.

NOTE

ECM substituted for old one must be in "Virgin" or "Neutral" status and Pin code is required to Neutralize ECM and to Register transponder key

NO

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EBD9A0EB

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC P1693 TRANSPONDER NO RESPONSE ERROR / INVALID RESPONSE

GENERAL DESCRIPTION E92214B8

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.

The transponder memory is split into two strings called authenticator and key password. After this programming the transponder memory is locked and the data (PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit.

Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser. Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION E06B68B9

The ECM sets DTC P1693 if there's abnormal response from transponder.

DTC DETECTING CONDITION EDAE7E7A

Item	Detecting Condition	Possible Cause
DTC Strategy		- Corrupted data from Transponder - More than one TP in the magnetic field - No TP (Key without TP) in the magnetic field
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

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COMPONENT INSPECTION

EEBECFD2

1. Check transponder and ECU status

- 1) IGN "ON" & Engine "OFF"
- 2) Monitor the "KEY STATUS" and "ECU STATUS" Parameter on the Scantool.

Specification : 'LEARNT'

1.1 CURRENT DATA	
01. NO. OF LEARNT KEY	1
02. ECU STATUS	LEARNT
03. KEY STATUS	LEARNT
FIX SCRN FULL PART GRPH HELP	

Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

3) Are "KEY STATUS" and "ECU STATUS" Parameter within specifications?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Go to "Check transponder" procedure.

2. Check transponder

- 1) IGN "ON" & Engine "OFF"
- 2) Neutralize ECM and Register transponder key by scantool.

NOTE

Pin code is required to Neutralize ECM and to Register transponder key

- 3) Are Neutralizing and Registering completed normally?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good transponder and check for proper operation.
If the problem is corrected, replace transponder and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E5B3CB0C

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

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DTC P1695 EMS MEMORY ERROR

GENERAL DESCRIPTION

EED231EB

The relevant data for the immobilizer function are stored at permanent memory (EEPROM or Flash etc.).

The immobilizer data are stored by three independent entries.

The data from EEPROM are evaluated by "2 of 3 decision". That means all three entries are read and the content is compared before authentication process.

If the contents of all entries are equal, the authentication will run without additional measures.

If only the contents of two entries are equal, the authentication will run and fault code "EEPROM defective" is stored at ECM.

If the contents of all three entries are different from each other, no authentication will be possible and the fault code "EEPROM defective" will be stored. The limp home function cannot be activated. The ECM shall be replaced if the EEPROM related fault occurs again after new teaching of all keys.

DTC DESCRIPTION

EEE30417

The ECM sets DTC P1694 if there's any fault in EMS internal permanent memory (EEPROM or Flash etc.)

DTC DETECTING CONDITION

EAF6F7E7

Item	Detecting Condition	Possible Cause
DTC Strategy		Faulty EMS
Enable Conditions	IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION E0F9E5E6

1. Check transponder and ECU status
 - 1) IGN "ON" & Engine "OFF"
 - 2) Monitor the "KEY STATUS" and "ECU STATUS" Parameter on the Scantool.

Specification : 'LEARNT'

1.1 CURRENT DATA	
01. NO. OF LEARNT KEY	1
02. ECU STATUS	LEARNT
03. KEY STATUS	LEARNT
FIX SCRN FULL PART GRPH HELP	

Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

- 3) Are "KEY STATUS" and "ECU STATUS" Parameter within specifications?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Go to "Check transponder" procedure

IMMOBILIZER CONTROL SYSTEM

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2. Check ECM

- 1) IGN "ON" & Engine "OFF"
- 2) Neutralize ECM and Register transponder key by scantool.

NOTE

Pin code is required to Neutralize ECM and to Register transponder key

- 3) Are Neutralizing and Registering completed normally?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good ECM and check for proper operation.
If the problem is corrected, replace ECM and then go to "Verification of Vehicle Repair" procedure.

NOTE

ECM substituted for old one must be in "Virgin" or "Neutral" status and Pin code is required to Neutralize ECM and to Register transponder key

VERIFICATION OF VEHICLE REPAIR

EEDCC139

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC P1696 AUTHENTICATION FAIL

GENERAL DESCRIPTION E2EF3E5E

During the key teaching procedure the transponder will be programmed with vehicle specific data. The vehicle specific data are written into the transponder memory. The write procedure is unique; therefore the content of transponder can never be modified or changed. The data are a string of 9 bytes defined by vehicle manufacturer.

The transponder memory is split into two strings called authenticator and key password. After this programming the transponder memory is locked and the data (PIN code) cannot be read or changed respectively. The transponder status changes from "virgin" to "learnt". Additionally every transponder includes a unique IDE (Identifier number) of 32 bit.

Unique means that the IDE of all transponder is different from each other. The IDE is programmed by the transponder manufacturer and is a read-only value. The authenticator and the key password are not transferred from ECM to transponder or vice versa. Only the results from the encryption algorithm are transferred. It is almost impossible to calculate the vehicle specific data from the encryption result.

For teaching of keys and special purposes the ECM is connected to the tester device.

When IG is ON, the coil supplies energy to the transponder which in turn accumulates energy in the condenser.

Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

DTC DESCRIPTION EF510E45

The ECM sets DTC P1696 if invalid key is inserted into key hole for Authentication.

DTC DETECTING CONDITION EC8BD3DF

Item	Detecting Condition	Possible Cause
DTC Strategy		• Virgin TP at EMS status "Learnt" • Learnt(Invalid) TP at EMS status "Learnt"
Enable Conditions	• IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

COMPONENT INSPECTION EDDDE33B

1. Check transponder and ECU status

1) IGN "ON" & Engine "OFF"

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- 2) Monitor the "KEY STATUS" and "ECU STATUS" Parameter on the Scantool.

Specification : 'LEARNT'

1.1 CURRENT DATA	
01. NO. OF LEARNT KEY	1
02. ECU STATUS	LEARNT
03. KEY STATUS	LEARNT
FIX SCRN FULL PART GRPH HELP	

Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

- 3) Are "KEY STATUS" and "ECU STATUS" Parameter within specifications?

YES

Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Register as necessary and then go to "Verification of Vehicle Repair" procedure.

CASE 1. KEY STATUS "VIRGIN" : Register transponder key now inserted

CASE 2. KEY STATUS "INVAILD" : Register all transponder key

VERIFICATION OF VEHICLE REPAIR

E6CD6BCB

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

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BODY ELECTRICAL SYSTEM

DTC P1697 HI-SCAN MESSAGE ERROR

GENERAL DESCRIPTION E036FDC3

In immobilizer system, scantool is mainly used for diagnosis. besides this, registration of key and neutralization of ECM is executed by scantool. For ECM communicate with other components such as SMARTRA and scantool by changing type of communication through just one line, K-line communication between scantool and ECM is unavailable while communication between ECM and SMARTRA is in progress.

DTC DESCRIPTION E29ABB1D

The ECM sets DTC P1696 if Request from Tester is Invalid.

DTC DETECTING CONDITION E6DB0ACF

Item	Detecting Condition	Possible Cause
DTC Strategy		- Invalid request - Protocol layer violation - Check sum error
Enable Conditions	IG ON	
Threshold value		
Detecting time		
FAIL SAFE		

MONITOR DTC STATUS EEBBC90D

1. Connect scantool to Data Link Connector(DLC).
2. Ignition "ON" & engine "OFF".
3. Selet "Diagnostic Trouble Codes(DTCs)" mode and monitor "DTC Status" parameter
4. Is the DTC B1697 present?

YES

Go to "Inspection & Repair" procedure.

NO

Fault is intermittent caused by poor contact in SMARTRA's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EBA0A88E

1. Check communication between ECM and scantool
 - 1) IGN "ON" & Engine "OFF"
 - 2) Connect scantool to Data Link Connector(DLC).

- 3) Erase the DTC and Monitor Parameter of immobilizer on the Scantool.
 ※ Try one more time from "select car model " even if "Communication error" is present on the scantool.

1.1 CURRENT DATA	
01. NO. OF LEARNT KEY	1
02. ECU STATUS	LEARNT
03. KEY STATUS	LEARNT

Fig 1

Fig 1) The current data in abnormal state

SCMBE6752L

- 4) Is the communication between ECM and scantool normal?

YES

If ECM is in "Locked by Timer" status. Keep "KEY ON" status for 1 hours to withdraw "Locked by Timer" status. Then repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good scantool and check for proper operation.
If the problem is corrected, Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E1C7EA4D

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC P1698 INVALID TP (TP HAS DIFFERENT PIN)

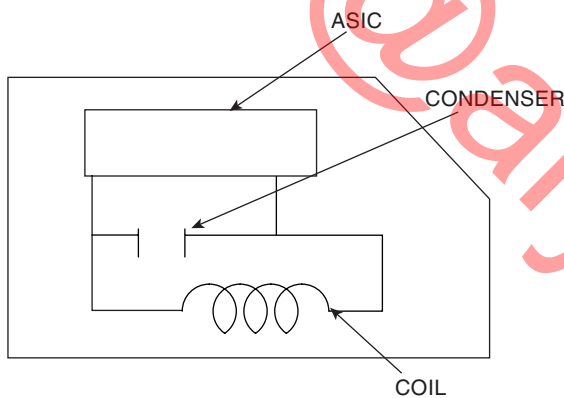
GENERAL DESCRIPTION E2E81A0A

A transponder is incorporated in the head section of the key. The antenna coil supplies energy to the transponder. The transponder accumulates energy in the condenser. Once the energy supply from the coil has stopped, using the stored energy in the condenser, the transponder transmits the ID CODE (stored within the ASIC).

When Ignition is set 'ON' the ICM receives a request signal from the ECM and starts ID Code registering sequence. If the ID code format from the transponder is not correct, the ICM repeatedly performs the registering sequence.

When the correct ID code format is registered, the code is verified by the ICM. If the code is not verified, the registering sequence is repeated a maximum of 5 times which is equivalent to 1 second duration.

Once the correct ID code is registered and verified after Ignition is turned ON, the registering sequence is not reperformed until Ignition is turned OFF.



LTIF743K

DTC DESCRIPTION EBE3440D

This DTC is defined as Invalid(virgin or invalid) Transponder Data.

DTC DETECTING CONDITION EF3301BE

Item	Detecting Condition	Possible cause
Enable Condition	IG ON	Faulty TP(Virgin or Invalid)
Detecting factors	Invalid TP	
Detecting Criteria	- Virgin TP at EMS STATUS "Learnt" - Learnt(Invalid) TP at EMS status "Learnt"(Authentication fail)	

IMMOBILIZER CONTROL SYSTEM

BE -71

MONITOR SCANTOOL DATA EDAB0F6B

1. Ignition "ON" & Engine "OFF"
2. After connecting Scantool, Monitor the DTCs and CURRENT DATA to check key status.

1.1 DIAGNOSTIC TROUBLE CODES	1.2 CURRENT DATE
B1698 TRANSPONDER - INVALID	NUMBER OF LEARNT KEY 2.0
	ECU STATUS LEARNT
	ICU STATE LEARNT
	KEY STATUS INVALID
NUMBER OF DTC : 1 ITEMS	
PART ERAS HELP	FIX SCRIN FULL PART GRPH HELP

LTIF743G

3. Are DTSs and CURRENT DATA displayed as above?

YES

If key status is "invalid" is displayed, check transponder(key) and then go to "Verification of Vehicle Repair" procedure.

NOTE

1. Be sure that P1698 is displayed, when transponder(key) is unintentionally exchanged with another key.
2. Be sure that P 1698 is displayed, when using virgin transponder(key) with lernt ICU.
3. Be sure that P1698 is displayed by arbnormal stop when key theaching is performed by learnt key(with same PIN code)

NO

Fault is intermittent caused by poor contact in the ICU and/or the antenna coil connector or was repaired and ICU memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E8386910

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

@alyance,