User Manual for Delphi Gen2-09 immobilizer

The electronic immobilizer protects the car against theft using an electronic engine locking device, thus the engine cannot be started.

The components of immobilizer system are as follows:

The main component parts
- Immobilizer control unit
- Antenna
- Transponder Key

The related component parts
- Engine control unit
- Diagnostic device

Brief description of the main function
o Regularity ID reference function
o The radio wave communication function with Transponder.
o The communication function with engine control unit
o The communication function with diagnostic device
o Indicator lamp signal output function

In each communication, the control unit is collated key ID and send to collation result to engine control unit.
In case of collation result is regularly, the engine control unit permits engine start and in case of collation result is not regularly, engine control unit prohibits engine start.

Anti-theft strategy
As the transponder needs specified field strength, the antenna coil will be fixed axially with the key lock. The Immobilizer ECU should be mounted on proper place in vehicle. The coil cable connects with immobilizer ECU through a connector. The Engine ECU communicates with immobilizer by CAN-line.
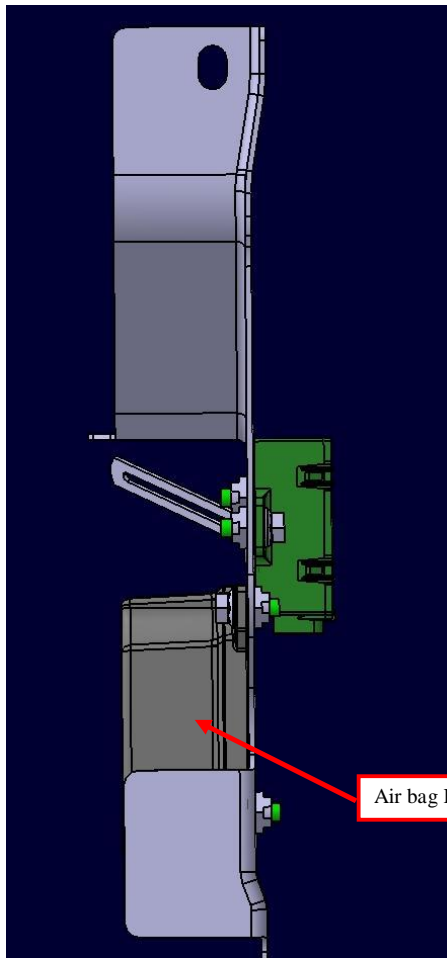
When the key is inserted into the ignition lock and the ignition is turned on, the communication between transponder and immobilizer, Engine ECU and immobilizer are set up. The immobilizer will authenticate them. If the authentications are successful, the engine start is permitted, otherwise go into fuel cut mode.
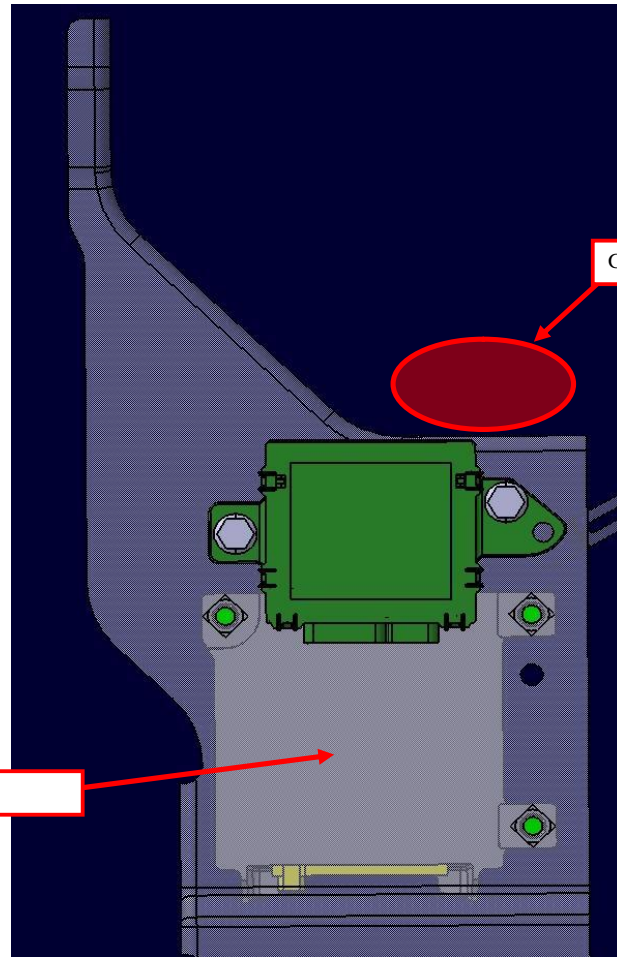
Vehicle Environment
The coil shall be mounted on the steering lock assembly consisting of lock and bracket. This assembly   influences the transponder read / write performance of the Immobilizer system.
This system is installed a position that satisfy regulation requirement.
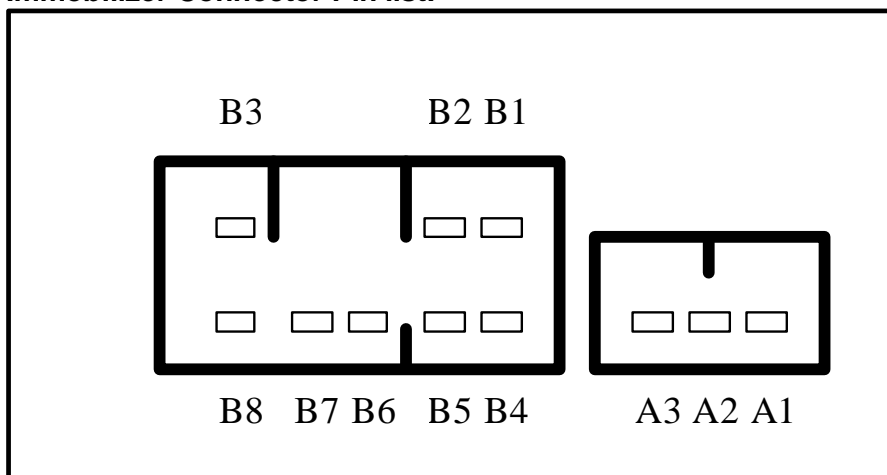Coil and Immobilizer ECU installation position is showed below:

G Sensor Accelerometer

Air bag ECU

Front View

Side View

Immobilizer Connector Pin list:

B3   B2 B1

B8   B7 B6   B5 B4   A3 A2 A1

Pin	Type	I/O	Pin Name
B1	NA	NA	
B2	Supply	GND	Ground connection of the module
B3	Supply	BATT+	Power Source, Input
B4	Supply	BATT+	Power Source, Input
B5	Supply	GND	Ground connection of the module
B6	I/O	CAN L	CAN L
B7	NA	NA	
B8	I/O	CAN H	CAN H
A1	Output	Coil+	Analogue
A2	NA	NA	
A3	Output	Coil-	Analogue

Interfaces requirements
1) Operating Voltage Range
The normal operating voltage range: 6 .0V to 16.0V
2) Operating Temperature Range
Operational Temperature: -40°C to +85°C
The Storage temperature: - 40 °C to +85 °C
3) Current Consumption
Imax = 0.3 mA (temperature: 25 +/- 3 °C)

Immobilizer ECU Registration
1) Supplier plant
 At supplier plant, the necessary tasks are as follows.
 - Write secret key into Immobilizer ECU.
 - Write key ID into transponder

2) Manufacturer plant
At manufacturer plant, the necessary tasks are as follows
 - Write secret key into transponder and key ID into immobilizer ECU
 - Write secret key into Engine ECU
3) Immobilizer ECU replacement
When Immobilizer ECU replacement, the necessary task are as follows.
 - Write secret key into transponder and key ID into immobilizer ECU
 - Write secret key into Engine ECU
4) Engine ECU replacement
 When Engine ECU replacement, the necessary task are as follows.
 -    Write secret key into Engine ECU

Table of Diagnostic Trouble Codes

No.	Priority/self_healing level	Description	DTC value [Hex]
1	1/1	**Immobilizer fault** This error code appears if a RAM-/ROM-Error was detected or the EEPROM is defect.	**0EF6EC**
2	2/3	**Missing transponder modulation** No TxP code was received. (i.e. IGN On with	**0FF6E2**

		No/mechanical key or No/broken/bad TxP in key) Reading of transponder information failed within the timeout after ignition-on. Transponder has a fault. Hardware fault in reading circuit.	
3	2/3	**Invalid Secret Key** This error appears if the lowest 6 bytes of Secret Key is set to all 0's or 1's	**10F6E2**
4	2/3	**Bad ECM Authentication** This Error appears if the ECM authentication was N.G.	**11F6E2**
5	2/3	**No ECM Challenge / Acknowledge** This error code appears if CAN-LINE is open or ECM damaged. This error code reflects a problem in the communications CAN-Line.	**12F6E2**
6	2/3	**Transponder Authentication Failed.** ID Not in EEPROM or Wrong Secret Key.	**13F6E2**
7	2/3	**Transponder ID table empty** Not TxP Code in EEPROM	**14F6E2**
8	2/3	**Transponder Data Format Error** TxP-Data format error (Format of the data received from TxP do not match with predefined format)	**15F6E2**
9	2/3	**CAN Bus Performance** Defines the status information about failure conditions of the transceiver (Bus-Off) provided by the communication controller.	**16F6F3**
10	2/3	**lost communication with SSAM** Defines the absence of specific bus messages as expected from SSAM at predefined periodic rates, or as required from SSAM for acknowledgement purposes.	**17F6F3**
11	2/3	**Watchdog reset**	**0EF6FF**

FCC COMPLIANCE STATEMENT
The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning:
Changes or modifications made to this device not expressly approved by Delphi.