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IMMOBILIZER

GENERAL INFORMATION

1. SPECIFICATIONS

Item	ltem	Specification
	Operating voltage (CAN)	6.0 V to 16.0 V (6.0 V ~18.0 V)
	Operating temperature	-30℃ ~ 80℃
Immobilizer	Coil inductance	420 uH ± 20 uH
unit	Modulation method	FSK (Frequency Shift Keying : frequency displacement)
	Frequency	134.2 KHz ± 4 KHz
	Frequency	134.2 KHz ± 4 KHz
Transponder	Operating temperature	-40℃ ~ +85℃
	Transponder coding	Up to 5

2. CAUTIONS

A CAUTION

- 1. The vehicle owner must observe the service works when deleting the transponder codes or registering additional keys.
- 2. In any cases, the immobilizer system can not be removed from the vehicle. If you attempt to remove it and damage the system, starting will be impossible, so never attempt to remove, damage or modify it.
- 3. The remote engine starter cannot be installed to the vehicle equipped with the immobilizer
- 4. Do not drop or shock to the transponder in the ignition key as it may be damaged.
- 5. With a damaged transponder, the engine cannot be started.
- 6. For the vehicle with the immobilizer, there can be a problem in starting the vehicle or the system error:
 - When more than one immobilizer keys come into contact with (each) other(s) or key is close to any device sending or receiving electromagnetic fields or waves
 - When the ignition key is close to any electronic or electric devices such as lighting equipment, security keys or security cards
 - When the ignition key is close to a magnetic or metal object or a battery

Modification basis	
Application basis	
Affected VIN	

OVERVIEW AND OPERATING PROCESS

1. SYSTEM LAYOUT

1) Location











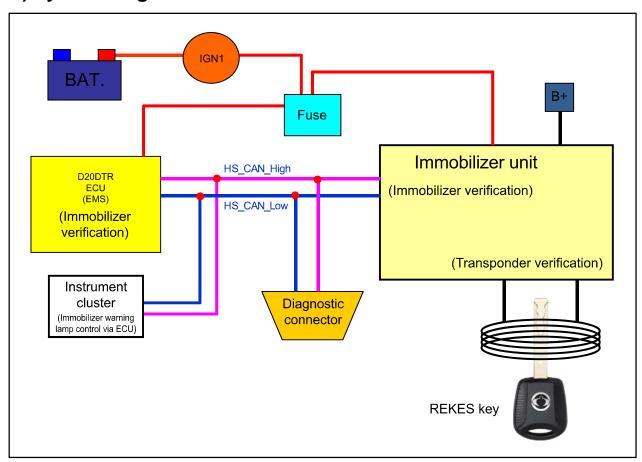


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2) System Diagram



The certification for the immobilizer is performed when turning the ignition switch to the "ON" position after the CAN communication between the ECU and immobilizer is established.

Modification basis	
Application basis	
Affected VIN	

2. OVERVIEW

The Immobilizer System provides an additional theft deterrent to the vehicle in which it is installed and prevents it from being started by unauthorized persons. The transponder integrated in the key and the engine control unit have the same code. When the ignition key with the integrated transponder is turned to the ON position, the ECU (Engine Control Unit) checks the crypto code of the key and, if correct, allows the vehicle to start the engine. If the verification has been failed, the engine cannot be started and the immobilizer warning lamp blinks.



Modification basis	
Application basis	
Affected VIN	

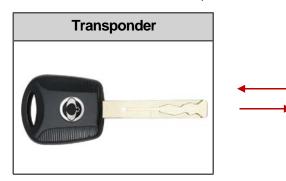
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Memo	

3. VERIFICATION OF KEY

1) Verification

The immobilizer system prevents the vehicle theft by allowing only the authorized key to start the engine. The transponder inside the key communicates with the immobilizer installed in the key box, and the system permits the engine to start after confirming the encrypted coding from the engine ECU.

> (2) The immobilizer unit transmits the encrypted code to the transponder.





- (3) The transponder sends an encrypted signal to the unit as a response.
- (4) The transmitted code is changed to an encrypted signal in the unit.
- (5) The system compares the signal from transponder and the encrypted signal in immobilizer unit.

A CAUTION

In the following cases, a driver may be unable to start the vehicle with the immobilizer.

- When two or more immobilizer keys come into contact with (each) other(s).
- When the key is close to any device sending or receiving electromagnetic fields or waves. When the key is close to any electronic or electric devices such as lightening equipment,
- security keys or security cards. When the key is close to a magnetic or metal object or a battery.

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▶ Immobilizer Indicator and Warning Lamp



(1) When turning the ignition key to ON position, the ECU transmits the challenge message to the immobilizer unit to verify whether the key is valid. This indicator comes on when the ignition key is communicating with the engine control unit (during engine starting) and goes out after starting the engine.

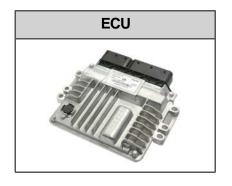
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Lamp ON: in communication Blinking twice for one second: immobilizer system failure Blinking once for two seconds: immobilizer unit is not coded



A CAUTION

The immobilizer indicator does not come on if the communication time between immobilizer key and ECU is too short.



- (6) Only when the two signals are identical, it
- (7) recognizes the key as the authorized one and transmits the positive message to the ECU. The ECU allows the engine to be started.

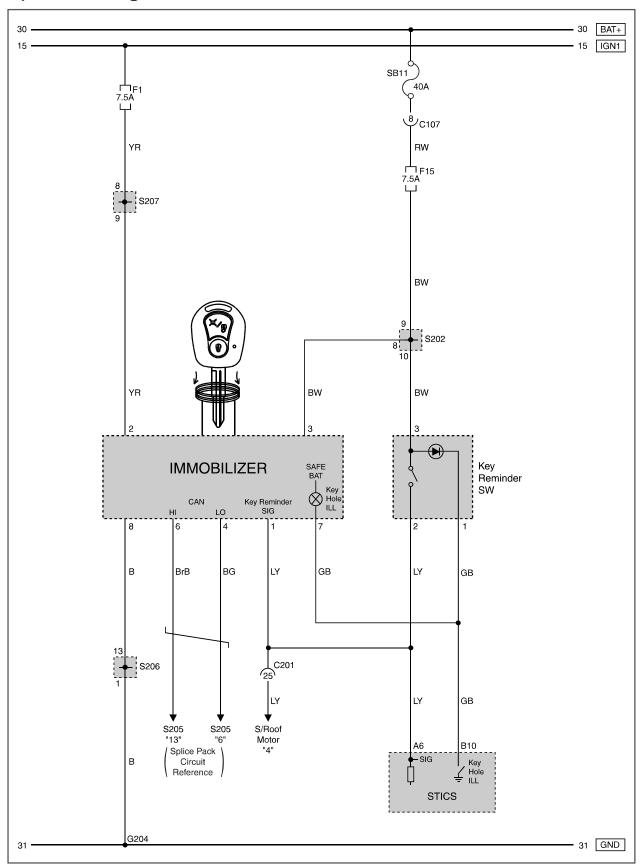


A CAUTION

- Do not drop or shock to the transponder in the key as it may be damaged.
- With a damaged transponder, the engine cannot be started.
- When you erase the code or register an extra key, let the owner attend on the site.
- In any case, the immobilizer system cannot be removed from the vehicle. If you attempt to remove it and damage the system, starting will be impossible, so never attempt to remove, damage or modify it.
- The remote engine starter cannot be installed on the vehicle equipped with the immobilizer system.

Modification basis	
Application basis	
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2) Circuit Diagram



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Modification basis	
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