Smart Key ECU

Product Outline

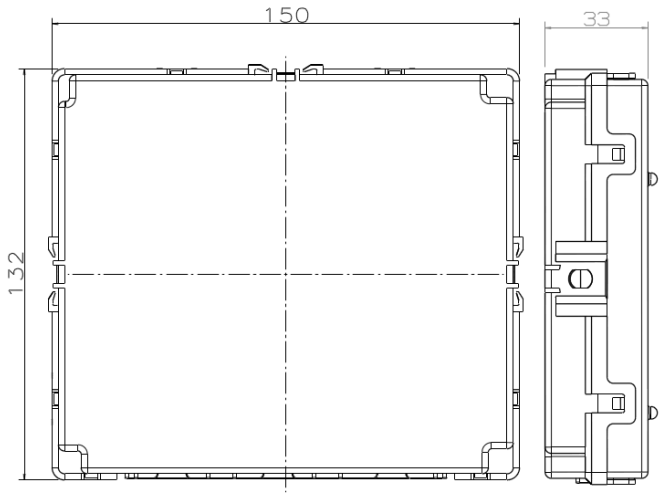
The Smart Key system is a comfort feature that allows the user to lock, unlock the doors of the vehicle without using a mechanical key.

The user has to carry with him the Smart Key Fob as a wireless authentication is performed when toggle button or Start Stop Button inputs are triggered.

For communication with the SMART Key FOB, Smart Key ECU generates a request (challenge) as an encoded and modulated signal (134.2 kHz..) at the inductive antenna outputs and receives the SMART Key FOB's response via the external RF ANT and internal receiver

This product is installed inside the vehicle.

Appearance



Unit : mm

Product Description

Product Type Number		EN00120
RF characteristic	Nominal frequency	433.92MHz
	Local oscillator frequency	52.9025MHz (Crystal)
	RF Antenna	Internal antenna
LF characteristic	Nominal frequency	134.2kHz
	Local oscillator frequency	4.2944MHz (Crystal)
	LF Antenna	External antenna (Ferrite antenna coil)
Transponder characteristic	Nominal frequency	134.2kHz
	Local oscillator frequency	4.00MHz (Ceramic Resonator)
	Transponder Antenna	External antenna (antenna coil)
Power Supply	Nominal supply voltage	12V DC

2. Technical description of the system

2.1 Type number

-Smart Key ECU : EN00120

2.2 Specifications

- Nominal Power supply voltage : 12VDC

Receiver(RF)

-Nominal frequency : 433.92MHz

-Oscillator frequency : 52.9025MHz (Crystal)

-Type of modulation : FSK(F1D)

-Type of receiving system : Super-heterodyne

-Antenna : RF ANT : Internal antenna

Transmitter(LF)

-Nominal frequency : 134.2kHz

-Oscillator frequency : 4.2944 MHz (Crystal)

-Type of modulation : OOK(A1D)

-Antenna : LF ANT1: External antenna (inside Cabin)
LF ANT2: External antenna (inside Trunk)
LF ANT3: External antenna (inside Bumper)
LF ANT4: External antenna (Built in Door HDL)
LF ANT5: External antenna (Built in Door HDL)

Transponder

-Nominal frequency : 134.2kHz

-Oscillator frequency : 4.00MHz (Resonator)

-Type of modulation : OOK(A1D)

-Antenna : TP ANT: External antenna (Built in SSB)

3. Outline of the system

A Smart Key system is a comfort feature that allows the user to lock, unlock without using a mechanical key.
Once the user has accessed into the vehicle, with his Smart Key Fob he has the possibility to switch between terminals (OFF-ACC-IGN) and to start the engine.
The user has to carry with him the Smart Key Fob as a wireless authentication is performed when toggle button or Start Stop Button inputs are triggered.

3.1. Smart Key ECU

The SMK manages all functions related to “SMK Start”
The SMK unit reads the inputs (e.g. Start Stop Button), controls the outputs (e.g. exterior and interior antennas), and communicates via the CAN network as well as a single line interface to further devices of the car.
For communication with the SMART FOB, SMK generates a request (challenge) as an encoded and modulated signal (134.2 kHz) at the inductive antenna outputs and receives the SMART key FOB's response via the internal RF ANT and internal receiver.
The LF antenna amplifier/driver generates a sinusoidal carrier signal (134.2 kHz), which is distributed to the different antennas. The signal is 100%-ASK modulated by switching on and off the carrier.

3.2. LF Antennas:

Inductive antennas in and at the vehicle are used to transform the current, driven by the SMK antenna driver, into a magnetic field (134.2 kHz), which is the carrier for the SMK challenge.
One antenna covers the vehicle’s interior. One antenna covers the interior of the Trunk.
Two antennas in the Door Handles (Left side and Right side) cover the area around the doors. One antenna in the rear bumper covers the area around the trunk for access to the trunk.. Those antennas are based on ferrite core and have a pair of twisted copper cables from antenna to pin header.

3.3. Transponder Antenna:

Built in the Start Stop Button to communicate with the transponder by a base station and using wireless communication :(134.2kHz)

3.4. Installation

All of antennas and ECU will be installed permanently by professional engineers and end user is not allowed to make any modification.

3.4 Installation in vehicle

The Smart Key ECU is installed inside the vehicle.

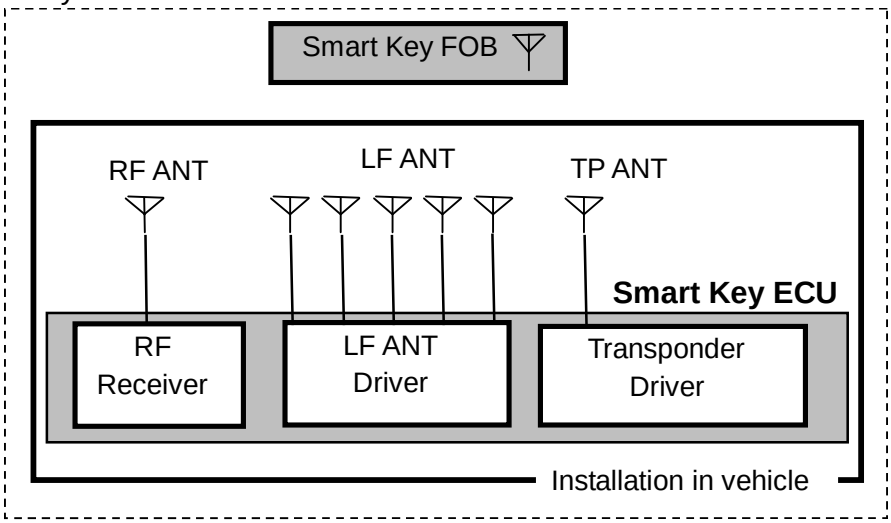


Fig. Outline of the System

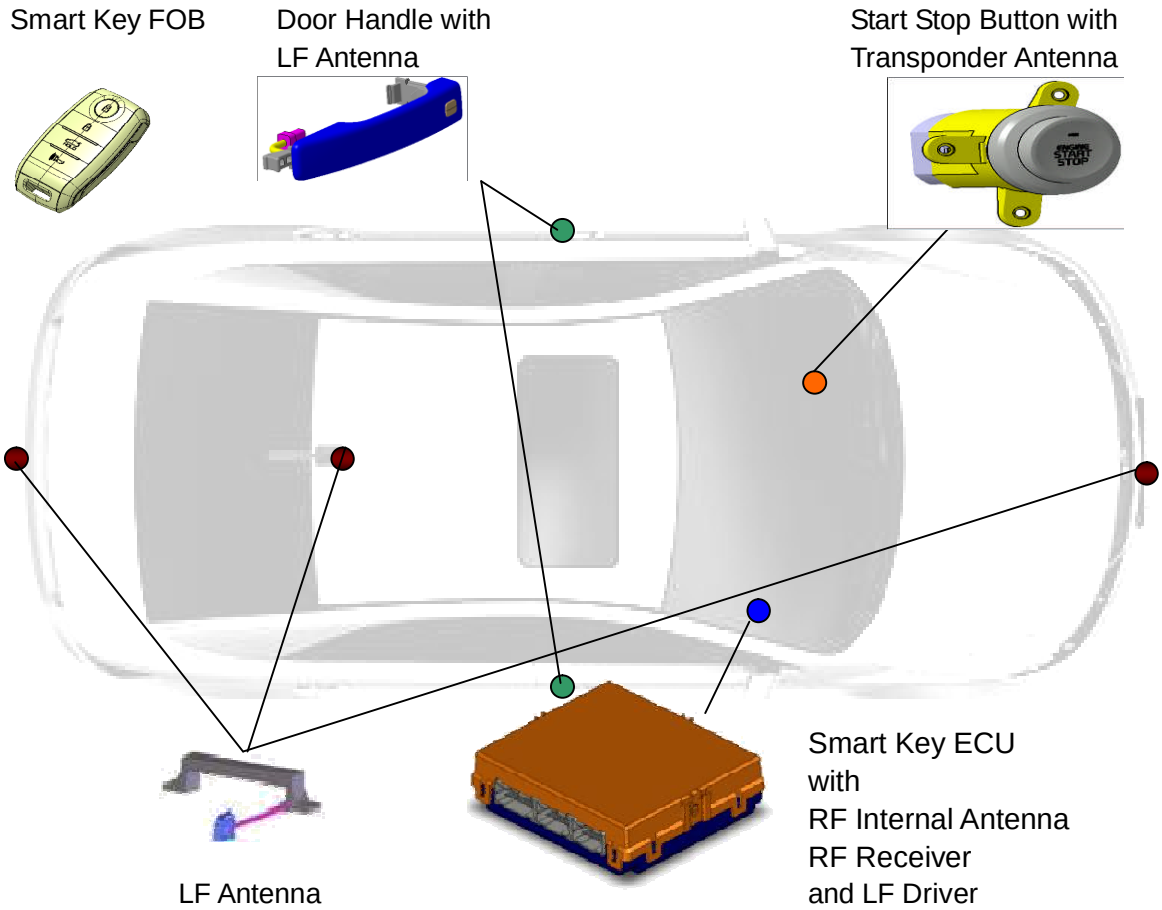


Fig. Installation of the System

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two 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.

IC Warning

"This device complies with Industry Canada licence-exempt RSS standard(s)."
Operation is subject to the following conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas provoquer de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.