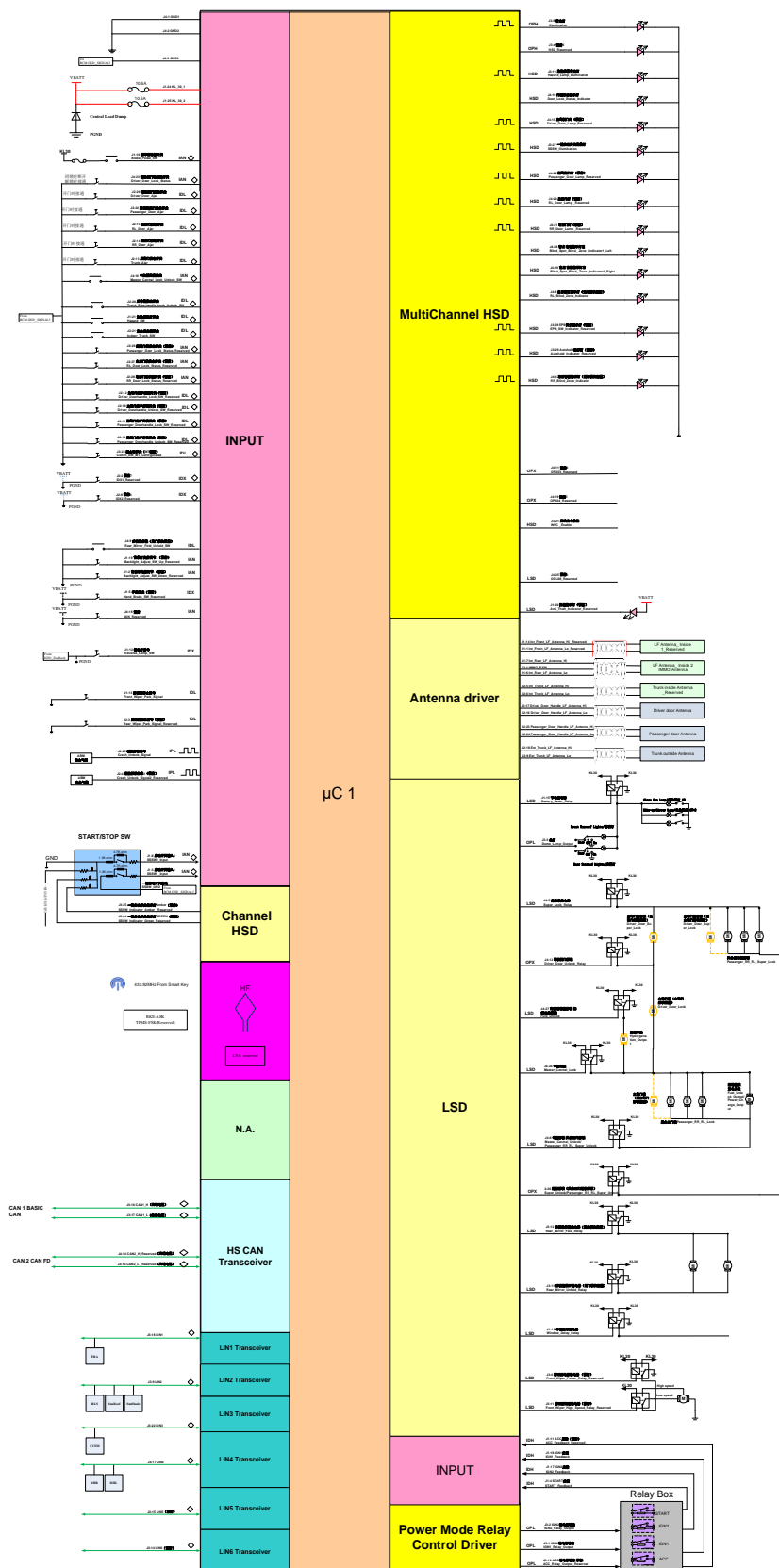


User Manual

A.1 System Drawing



A.2 System's working principle

1) Normal Start Mode: The user enters the vehicle with the authorized smart key, treads the brake or clutch pedal (The KBCM ECU begins to detect the smart key at once) and presses the engine-start-stop-button (SSSW). ESCL unlock will be done when the KBCM successfully detects the authorized smart key in the vehicle. After the ESCL is unlocked, KBCM changes the power mode from OFF to Crank and then the EMS is wake up. After the initialization of the EMS the engine-anti-theft authentication between KBCM and EMS should be achieved while the engine starter begins to run. If the authentication is successful, the engine can be started under the control of EMS.

If the user starts the engine not in the power mode OFF but in the power mode ON, the start process could be simplified, because the ESCL should be already unlocked, the EMS works in normal way and the engine-anti-theft authentication is finished.

The user presses the engine-start-stop-button when all of the conditions for engine start are satisfied, which are listed as below:

- a) The brake pedal is treaded, and
- b) The gear shift is in P or N.

The engine won't be started if the conditions are not satisfied when the engine-start-stop-button is pressed. But the power mode will be changed according to the power mode management.

The response time for engine start that is specially focused is the interval from the moment the engine-start-stop-button is pressed to the moment the engine starter begins to work. Following is the proper operation process: the user treads the brake pedal first and then presses the engine-start-stop-button. As to the normal response time of human being, there is at least 100ms between the two actions above. The KBCM takes less than 100ms to detect the smart key. Therefore the detection and authentication of the smart key should be finished before the user presses the engine-start-stop-button.

2) Emergency Start Mode : If the battery in the smart key is so weak that the engine cannot be started in normal way, the KBCM system might start the engine with emergent method.

By emergency start the smart key should be close to the appointed position where IMMO module mounted is, when the user presses the button. The IMMO coil and the transponder chip in the smart key communicate with each other in low frequency under the control of the KBCM. After the information of transponder is extracted, the engine anti-theft authentication between KBCM and EMS will be done. If the authentication is successful, the engine can be started under the control of EMS. The only difference is the method to detect the smart key. By the normal start the authorized smart key is detected with interior LF antennas while by the emergency start with the IMMO coil.

The location of the smart key is particular for the emergency start. To assure the regular communication between the IMMO base and the smart key, the smart key must be placed within the inclination of 30 ° from the center axis of the coil and within the distance of 30mm from the center of the coil.

3) Vehicle Anti-Theft: There are four Anti-Theft status: Disarmed, Pre-armed, Armed, Alarm status, Default status is Disarmed status, when system power mode is OFF mode, if execute valid lock door action(Mechanical key/PKE/RKE/T-BOX lock five doors or Auto Relock successfully), Anti-theft status shall go to Pre-armed status, after skip to Pre-armed status, if keeping time of Pre-armed status is more than 15seconds, skip from Pre-armed status to Armed status.

During Armed status, if any one condition of below conditions is fulfilled, skip from Armed status to Alarm status:

- (1) Any one door of five doors is opened from closed or CAN message HoodSts_F_Pbox value (shall store to EEPROM) is from 0x0:Closed to 0x1:Open

- (2) Mechanical key unlock successfully
- (3) Anti drag vehicle warning signal is from invalid to valid

When skip to Alarm status:

- (1) KBCM send LIN message(InSts=1 and send SoundCmd=1) with cycle time 400ms and duty cycle 50%) for 28seconds,
- (2) KBCM shall activate turn right light and turn left light blinking for 28seconds (frequency is 2.5Hz ,duty cycle is 50%),
- (3) then pause 2seconds, KBCM send messages (turn light is off and SoundCmd=0 and InSts=0), which is one alarm cycle (28s+2s=30s),
shall keep 6 alarm cycles, total time is 3minutes. When 3 minutes is over, KBCM send messages(InSts=0 and SoundCmd=0) and turn off turn right light.

When in Alarm or Armed status, if any one condition of below conditions is fulfilled, skip to Disarmed status:

- (1) PKE/RKE/T-BOX unlock successfully
 - (2) System power mode has changed to (ACC or ON) mode
 - (3) Trunk is unlocked by PKE/RKE
- 4) Body Control Mode: KBCM shall active door locking motor or lighter or wiper motor by hardware inputs or CAN/LIN message, when user is close to vehicle and press unlock/lock button of smart key or touch unlock/lock switch of door handle, KBCM shall control five door locking motor to unlock or lock the door, and when light switch is active, KBCM shall turn on corresponding light if activation condition is fulfilled, besides the KBCM also can control front and rear wiper or wash motor, Anti-Drag Vehicle detection function base on its activation conditions.

A.3 Index of technique

- 1. Rated voltage: DC12V;
- 2. Voltage range of work: DC9V~DC16V;
- 3. Working temperature: $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$;
- 4. Storage temperature: $-40^{\circ}\text{C}\sim+90^{\circ}\text{C}$;
- 5. Maximum current: 14.0A (MAX);
- 6. Standby current: $\leq 3.5\text{mA}$ (Test voltage 13.5V);
- 7. Working current: 7A (Nominal);
- 8. Waterproof and dustproof type: IP5K0;

A.4 System's safety Instructions

The system includes multi-layers encryption and decryption technique. The part of key certifying is using the mature technique of RFID certified by ATMEL Company. The communication between key core and immobilizer is using low level communicating mode.

System certify the key by first step and then ECU, the repentance of key is low to $1/2^{80}$.

Only when be authorized, the system could enter the matching process, doing the operation like adding or deleting key, replacing system parts and so on.

There will be a new certifying process when each igniting, the certifying data is produced randomly.

A.5 Preventions of accident starts

When someone tried to start the vehicle, if the security data control system did not pass certification, the engine control unit (ECU) will be closed Circuit Cypriots did not start the ignition. The normal operation of the engine will not be able to meet the conditions, the vehicles failed to start.

When someone tried to start the vehicle, it is first necessary that the correct smart key is in the car, and the smart key should do data encryption certification with KBCM ECU, if the certification is passed, then KBCM ECU will start the encryption certification with EMS, after this certification, the encryption certification between anti-theft controller and ECU control module can be done. After the adoption of authentication, engine control unit will provide continuous operation of the engine condition, the vehicle can start.

When someone attempts to use other means of authentication data through encryption, he needs to know encryption algorithm and key. Encryption algorithm is a company confidential which composed by 80 bytes.

B.1 The installed position

B30 KBCM ECU is installed under the central IP.

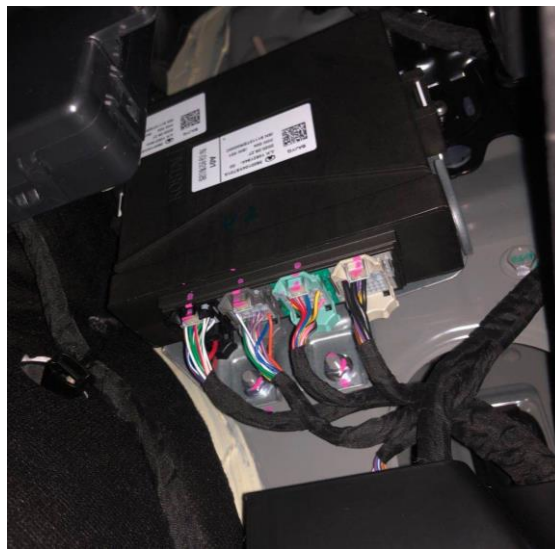
Transponder is integrated assembled in the smart key.

B30 immobilizer driver (also used for LF antenna) is installed under the cup holder.

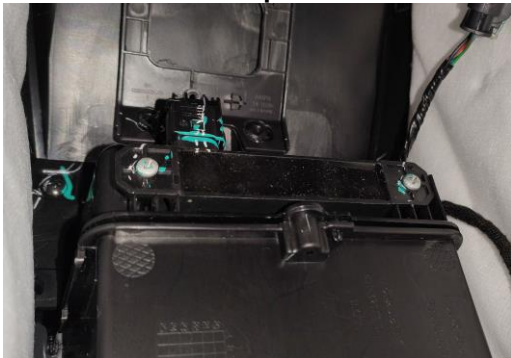
After the controller and LF antennas are installed, insert the wiring harness into the right place.

B.2 Picture Description

B.2.1 KBCM installed picture



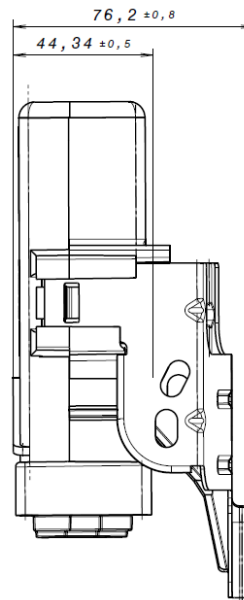
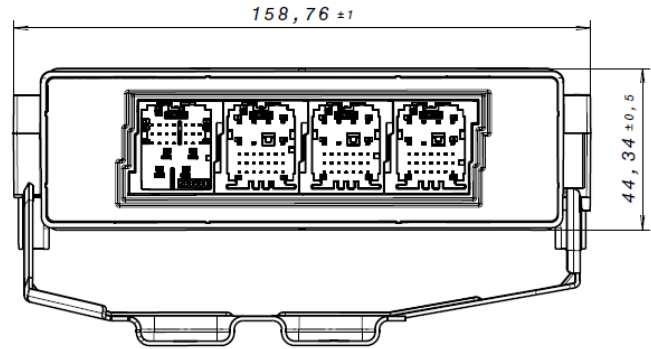
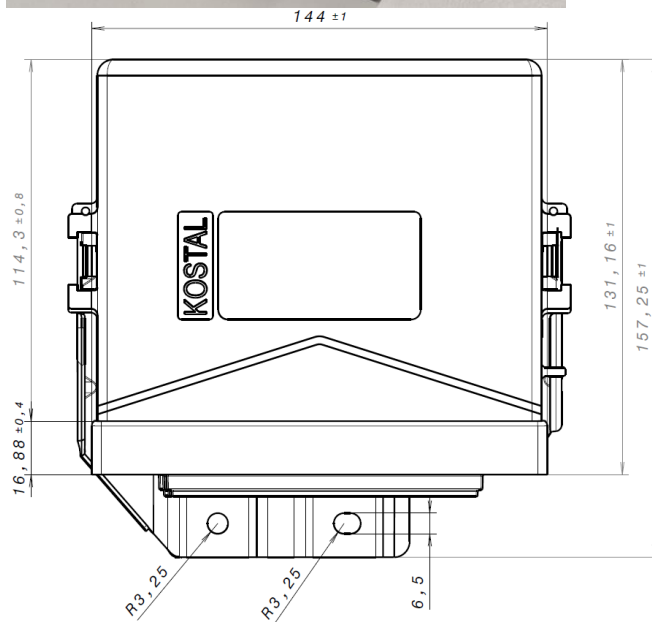
B.2.2 IMMO installed picture

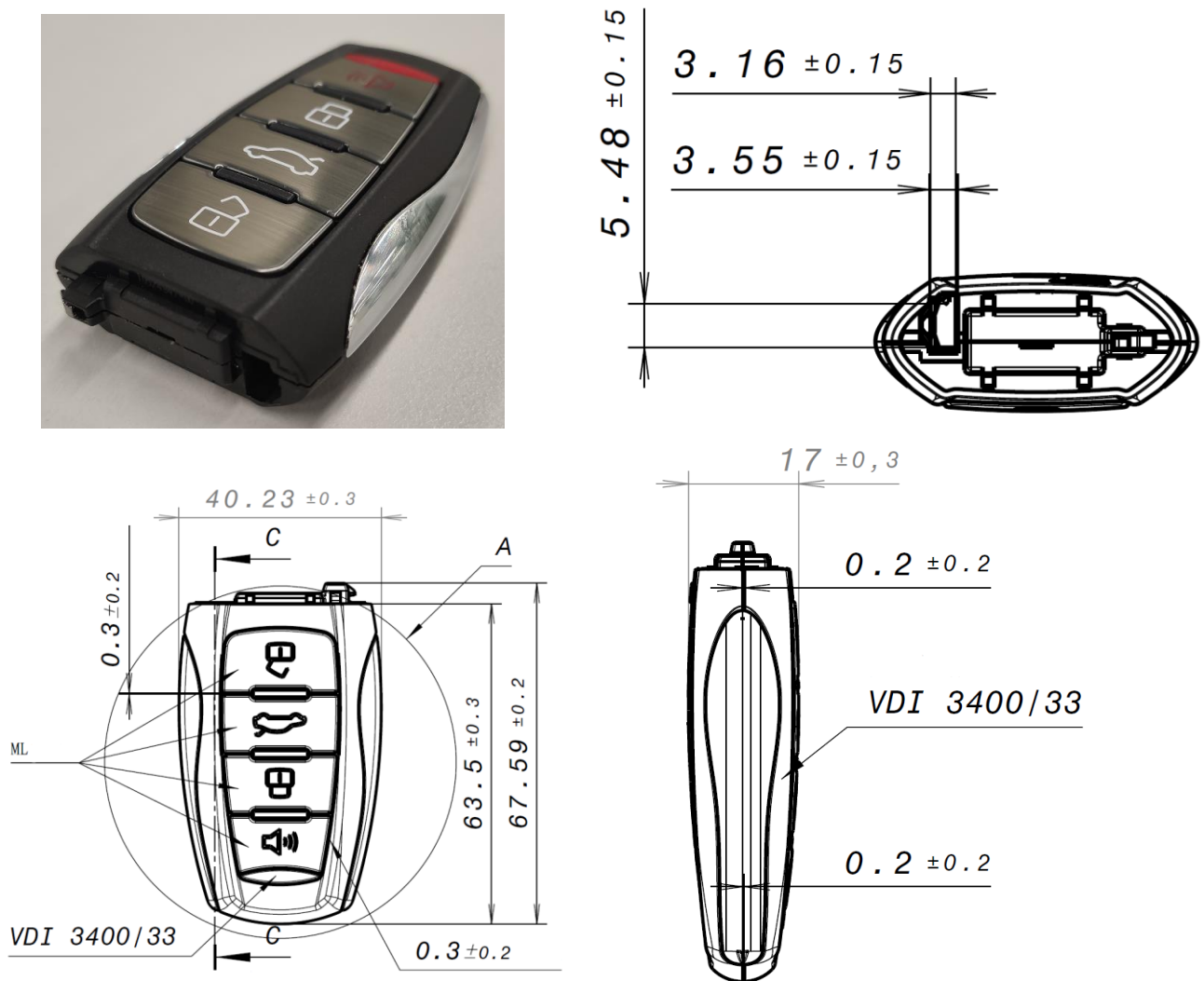
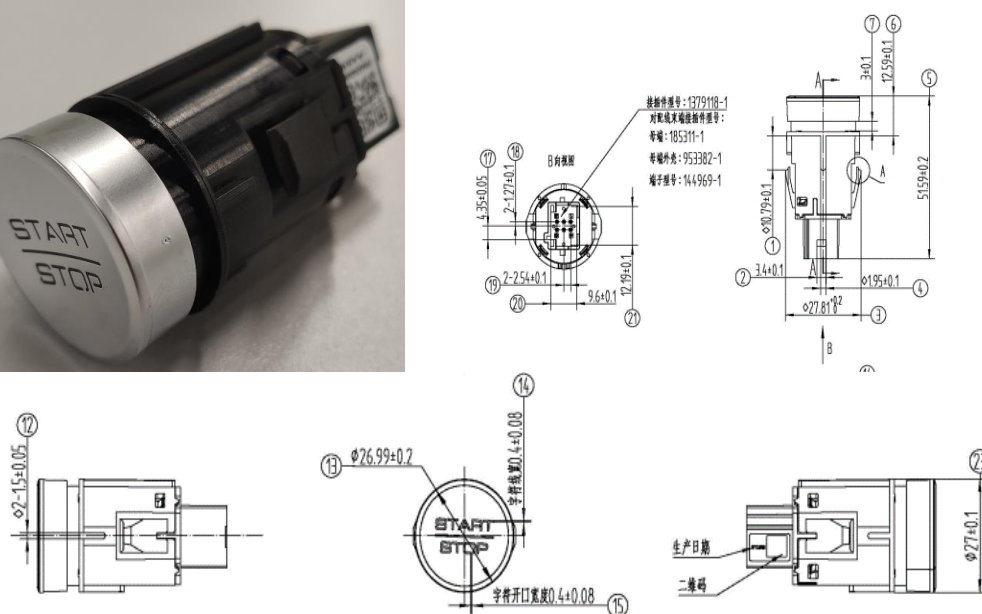


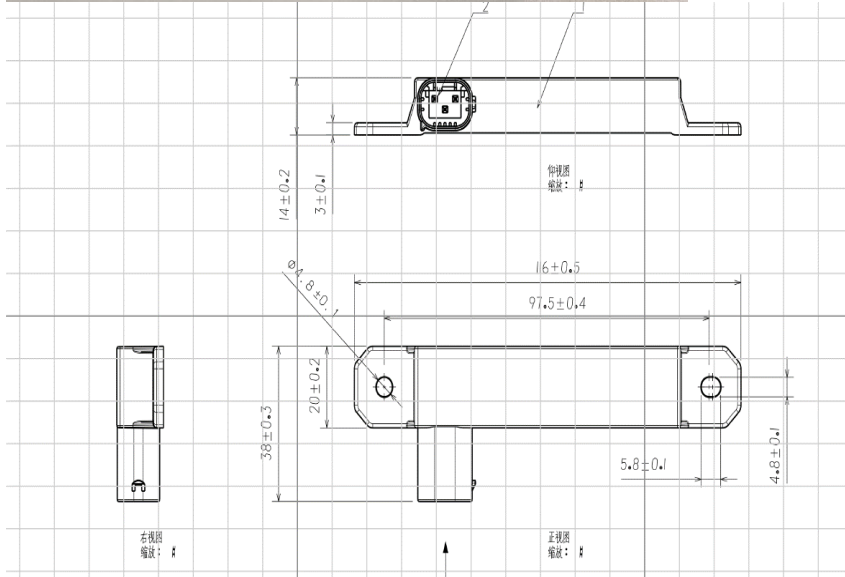
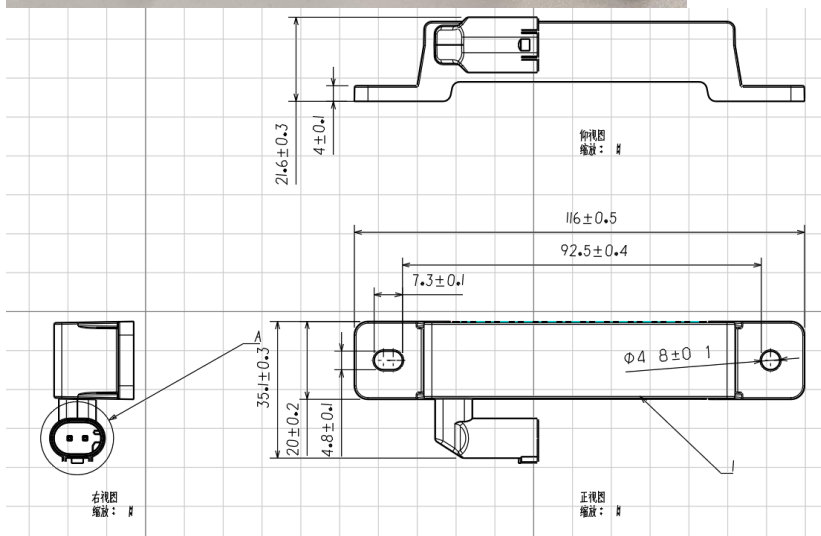
Appendix D

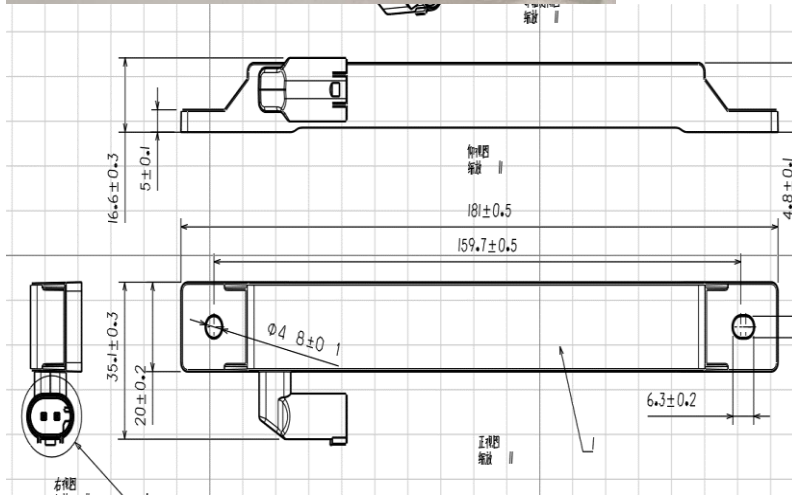
Main Parts Drawing

D.1 KBCM ECU drawing



D.2 Smart Key drawing**B.2.3 SSSW drawing**

B.2.4 IMMO and LF Antenna drawing**B.2.5 LF Antenna drawing**



Appendix F

Instruction for use

F1. Summarize

With the rapid development of electronic information technology, the electronic information technology, data communications technology, sensor technology, control technology, computer technology and vehicle network technology and others are used in modern automobile anti-theft technology, promoting it highly intelligent, diversified function. Electronic security controller is the most widely used automobile anti-theft devices. KOSTAL KBCM is the most effective controller among this kind of product; it is locking the engine ECU to achieve security purposes.

F2. System components

Kostal KBCM is mainly made up by smart key, IMMO driver and LF antenna, controllers, tester and status indicators, among which the controller is the core of the anti-theft and Body control system

F3. System's working principle

1) Normal Start Mode: The user enters the vehicle with the authorized smart key, treads the brake or clutch pedal (The KBCM ECU begins to detect the smart key at once) and presses the engine-start-stop-button (SSSW). ESCL unlock will be done when the KBCM successfully detects the authorized smart key in the vehicle. After the ESCL is unlocked, KBCM changes the power mode from OFF to Crank and then the EMS is wake up. After the initialization of the EMS the engine-anti-theft authentication between KBCM and EMS should be achieved while the engine starter begins to run. If the authentication is successful, the engine can be started under the control of EMS.

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F4. Index of technique

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2. Voltage range of work: DC9V~DC16V;
3. Working temperature: -40°C~+85°C;
4. Storage temperature: -40°C~+90°C;
5. Maximum current: 14.0A (MAX);
6. Standby current: ≤3.5mA (Test voltage 13.5V);
7. Working current: 7A (Nominal);
8. Waterproof and dustproof type: IP5K0;

F5. Definition of interface

Component Side Connector Interface Drawing

PART NUMBER	KEY	COLOR
2005020251	1	GREEN
2005020252	2	GRAY
2005020253	3	BLACK
2005020254	4	DARK GRAY

PART NUMBER	KEY	COLOR
2005020281	1	DARK GRAY
2005020282	2	GREEN
2005020283	3	GRAY
2005020284	4	BLACK

Component Side Connector 3D Drawing

J1 J2 J3 J4

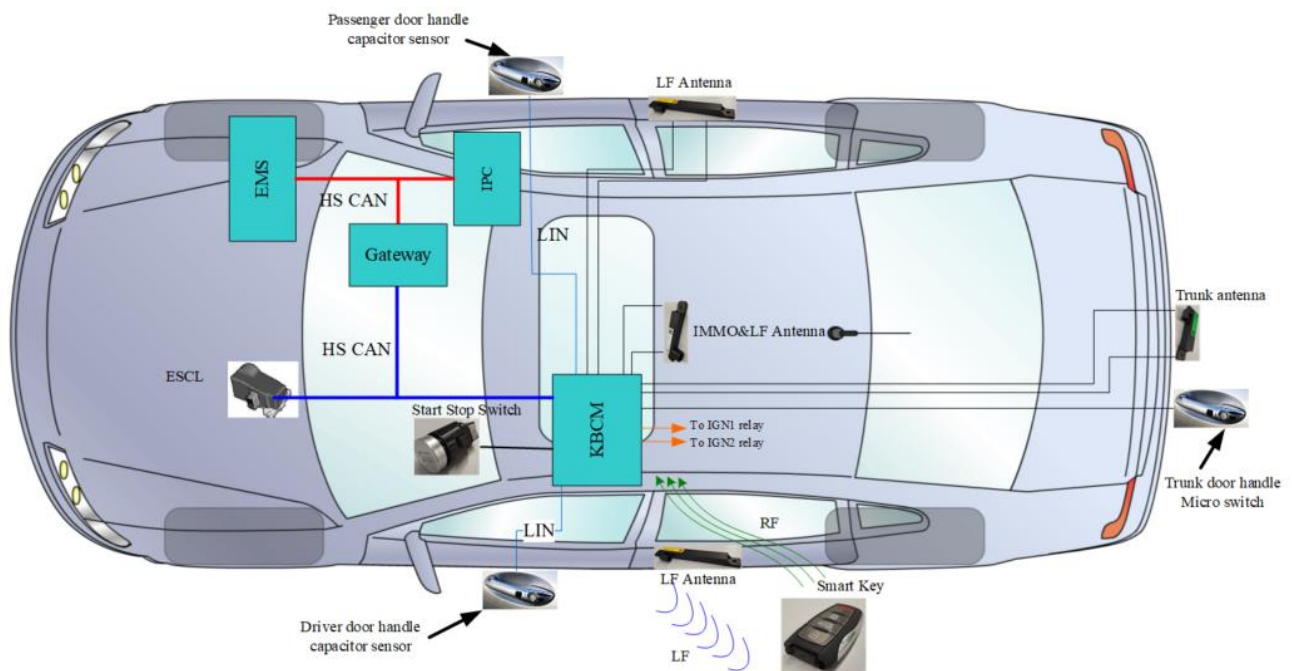
Harness Side Connector Interface Drawing

PART NUMBER	PLATING	SUPPLIER	WIRE GAUGE (mm ²)	TERMINAL FAMILY	WIRE SPECIFICATION
200096-0101	TIN PLATING	MOLEX	0.35	TAK FAMILY (0.5mm)	VW 1602 OR GMW 1602 (SEE APPLICATION SPECIFICATION FOR MORE DETAILS)
200096-0201	TIN PLATING	MOLEX	0.13	TAK FAMILY (0.5mm)	
2272196-2	TIN PLATING	TE	0.35	Generation 50 Locking Lancer (0.5mm)	SAE J1128 THIN WALL INSULATION
2272196-1	TIN PLATING	TE	0.13	Generation 50 Locking Lancer (0.5mm)	
1-688851-1	TIN PLATING	TE	1.0 - 2.5	AMP MCP 2.5	GMW 1602 INSULATION TYPE FLR (REGULAR THIN WALL)
1-688849-1	TIN PLATING	TE	0.5 - 1.0	AMP MCP 2.5	
15457949	TIN PLATING	DELPHI	1.5 - 2.5	CTS 2.8mm	
15457949	TIN PLATING	DELPHI	0.5 - 1.0	CTS 2.8mm	

PART NUMBER	PLATING	SUPPLIER	WIRE GAUGE (mm ²)	TERMINAL FAMILY	WIRE SPECIFICATION
200096-0101	TIN PLATING	MOLEX	0.35	TAK FAMILY (0.5mm)	VW 1602 OR GMW 1602 (SEE APPLICATION SPECIFICATION FOR MORE DETAILS)
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2272196-2	TIN PLATING	TE	0.35	Generation 50 Locking Lancer (0.5mm)	SAE J1128 THIN WALL INSULATION
2272196-1	TIN PLATING	TE	0.13	Generation 50 Locking Lancer (0.5mm)	
1807793	TIN PLATING	DELPHI	0.28 - 0.5	TAK TERM 028 1.2	GMW 1602 INSULATION TYPE FLR (REGULAR THIN WALL)
1807794	TIN PLATING	DELPHI	0.28 - 0.5	TAK TERM 028 1.2	
1807795	TIN PLATING	DELPHI	0.4 - 1.0	TAK TERM 028 1.2	
1807796	TIN PLATING	DELPHI	1.28 - 1.5	TAK TERM 028 1.2	
1807797	TIN PLATING	DELPHI	0.4 - 0.75	TAK TERM 028 1.2	
1807798	TIN PLATING	DELPHI	1.28 - 1.5	TAK TERM 028 1.2	

Harness Side Connector 3D Drawing

F6. Component of system



F7. Applicable scope

KBCM is applied to the engines which have the function of ECU locking system, such as: GWM H6 model.

F8. Attentions of installation and use

The device is generally installed under the center IP. IMMO is installed under the cup holder or in other appointed position. Transmitter is integrated in the smart key. First using tester to matching the key through diagnosis interface, then the key is certified.

When using this system, make sure all parts installed strongly, connecting between pins and the controller reliable. During the process of key matching and EMS, make sure to follow the matching process strictly.

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.

FCC statement

This equipment has been tested and found to comply with the limits for a Class B 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.

RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.