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# SMART KEY ECU

## ( IBU-4E14 )

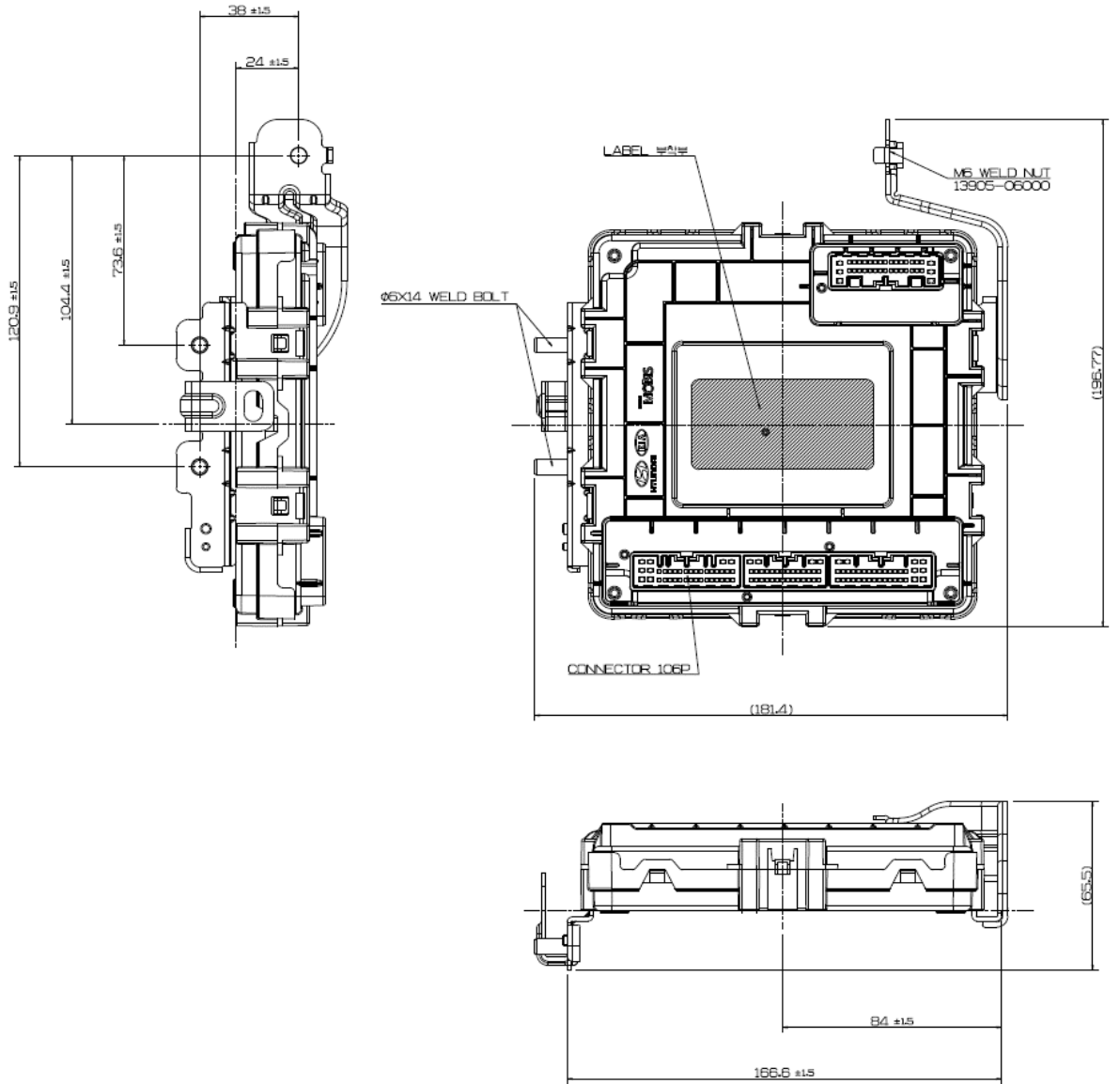
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# Outline of SMART KEY ECU

The SMART KEY ECU is a part of START-STOP BUTTON SYSTEM.

It is possible to output the LF(125kHz) signal by pushing the button of door handle and SSB.



# Description of SMART KEY ECU

## 1. GENERAL DISCRIPTION

If the button of door handle or SSB button is pressed, SMART KEY ECU the LF(125kHz) signal.

- 1) LF signal output for engine start
- SSB button is pressed, SMART KEY ECU output LF signal through the interior LF antenna for Fob searching.
- 2) LF signal output for door lock/unlock and trunk release
- The button of door handle or trunk is pressed, SMART KEY ECU output LF signal ththrough the exterior LF antenna for Fob searching

## 2. ELECTRICAL CHARACTERISTICS

|                       |                                             |
|-----------------------|---------------------------------------------|
| model name            | SMART KEY ECU                               |
| Operating voltage     | 9V ~ 16V                                    |
| Dark current          | 5mA Max.                                    |
| Operating frequency   | 125KHz                                      |
| Modulation            | ASK                                         |
| Operating temperature | -30℃ ~ +75℃                                 |
| Antenna Type          | Coil Antenna (Tx), PCB Pattern Antenna (Rx) |

## 3. MESSAGE TELEGRAM

### 3.1 CONFIRMING EXISTENCE

| Preamble, Synchronization, Wake UP ID |          |                  |            |            | DATA       |        |     |     |        |     |
|---------------------------------------|----------|------------------|------------|------------|------------|--------|-----|-----|--------|-----|
| Frame size (bit)                      | Preamble | Synchronizat ion | Wake UP ID | Wake UP ID | First DATA | LF_CMD | VID | VID | SP BIT | CRC |
| 43                                    | 8        | 9                | 8          | 2          | 1          | 3      | 4   | 4   | 2      | 2   |

### 3.2 CHECKING POSITION AND ID FUNCTION

| Frame size (bit) | Preamble, Synchronization, Wake UP ID |                     |            |            |            |        |                   | DATA      |           |              |       |     |
|------------------|---------------------------------------|---------------------|------------|------------|------------|--------|-------------------|-----------|-----------|--------------|-------|-----|
|                  | Preamble                              | Synchronizat<br>ion | Wake UP ID | Wake UP ID | First DATA | LF_CMD | Rssi_Meas_<br>Num | Challenge | Encrypted | FID          | Dummy | CRC |
|                  |                                       |                     |            |            |            |        |                   |           | Password  | (except PID) |       |     |
| 131              | 8                                     | 9                   | 8          | 2          | 1          | 3      | 4                 | 32        | 32        | 28           | 2     | 2   |

### 3.3 WELCOME LIGHT

| Frame size (bit) | Preamble, Synchronization, Wake UP ID |                  |            |
|------------------|---------------------------------------|------------------|------------|
|                  | Preamble                              | Synchronizat ion | Wake UP ID |
| 27               | 8                                     | 9                | 10         |

### 3.4 Field Definition

#### Wake UP ID

When this ID is matched, the Fob wakes up and processes the LF message.

#### First DATA

fixed to “0”.

#### LF CMD

The command types of LF message.

“001” : Confirming existence

“011” : Checking position and ID

#### VID

Vehicle IDentifier.

#### SP BIT

Special Bits; these bits specify the Confirming existence Key LF’s response..

#### TID

Token IDentifier which indexes Fob.

#### Challenge

32bit random number.

#### Encrypted Password

Password.

#### CRC

CRC data of 2bit.

#### Rssi\_Meas\_Num

Antenna number.

# FCC/ISED NOTICE

## [FCC]

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.

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

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

This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC

## [ISED]

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the ISED

Cet appareil est conforme aux limites d'exposition aux rayonnements de l'ISDE pour un environnement non contrôlé.

L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur, à moins d'y être autorisé par l'ISDE.

## Note

This device is used at least 10 cm away from body.

Ce dispositif est utilisé à au moins 10 cm du corps.