

User Manual

PEPS for

STELLANTIS SCW-433MHz

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2. HISTORY

Version	Date	Author	Details
1.0	2024-08-30	Feng Xiao	

3. ABBREVIATION

CAN	Controller Area Network
ECU	Electronic control Unit
RKE	Remote Keyless Entry
PEPS	Passive entry passive start
BCM	Body Control Module
EMS	Engine Management System
IPC	Instrument Panel Cluster
SSSW	Start Stop Switch
ESCL	Electrical Steering Column Lock
LF	Low Radiated Frequency
RF	Radiated Frequency
PDU	Power distribution unit
TBD	To Be Defined

4. SCOPE AND CONTROL OF DOCUMENT

4.1 Scope of document

The intent of this document is to establish and define requirements for the PEPS system for Stellantis. This document establishes the functional, performance requirements for the SCW Vehicle Platform. The test and validation requirements are not included in this document.

4.2 Authority for this document

Stellantis System engineer and Kostal China System Engineer are the approval authorities of this document. Any changes on the requirements / specifications are to be reviewed and agreed with Stellantis and Kostal. Any new requirements or modified requirements shall have to be analyzed, reviewed and agreed by the corresponding of Stellantis engineering group and Kostal.

4.3 Change control for this document

After the initial release Kostal System Engineer shall be responsible to update and release new revisions as and when the need arises.

Changes to the format and content of this specification shall be made only after getting approval from Stellantis System Engineer and Kostal System Engineer.

5. PRODUCT SYSTEM OVERVIEW

5.1 System architecture

This document describes the system called Passive Entry and Passive Start System (PEPS System). The PEPS system architecture is shown in figure 5.1. This PEPS system includes 1 PEPS ECU, 4 LF antennas (1 interior antennas, 2 door-side antennas, 1 rear bump antenna) and 2 smart keys.



Fig 5.1 System architecture

The main components in PEPS system are listed as below:

No.	Name	Quantity	Description
1	PEPS ECU	1	PEPS system main controller, in charge of LF antenna driver, IMMO driver and RF receiver
2	Smart Key	2	Intelligent key with LF receiver, IMMO communication and RF transmitter
3	LF Antenna with IMMO	1	LF transmitter Multiplex as IMMO coil Equipped under the cup holder
4	Door LF Antenna with high performance	2	LF transmitter High performance Equipped in the driver-side door or passenger-side door
5	Rear trunk LF Antenna	1	LF transmitter Equipped on the rear bump

5.2 System schema

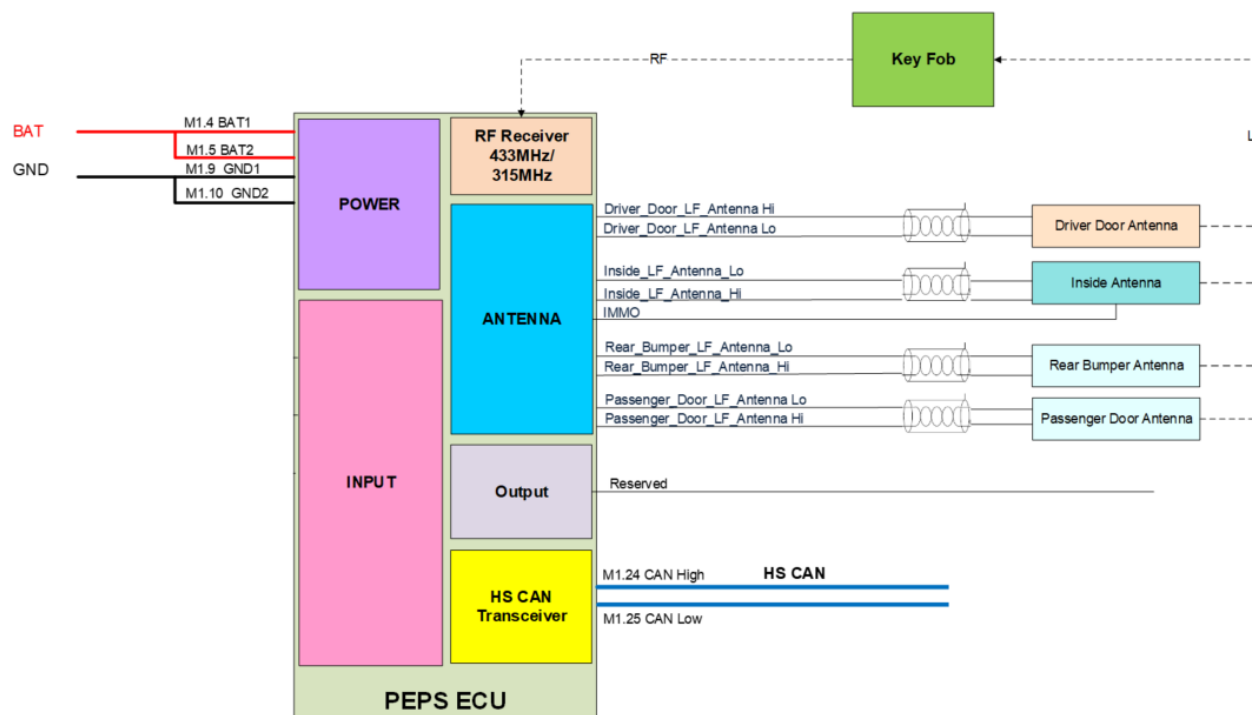


Fig 5.2.1 SCW-433MHz system schema

5.3 System functional description

The section describes the basic functions of PEPS:

➤ Approach unlock and leave away lock (for SCW)

PEPS ECU implements LF polling and detects the valid key fob approaching or leaving the vehicle. When the key fob enters the unlock area, PEPS shall send an unlock command; when the key fob leaves the lock area, PEPS shall send a lock command. Whenever PEPS ECU needs to wake up the CAN network, it shall set the RCU output as high active (12V).

➤ Engine start (for SCW)

Normal start: The engine is started with one-button-style. If the brake pedal is treaded, the gear shift is in P or N and the smart key is inside the vehicle, the engine could be started as soon as the engine-start-stop-button is pressed.

Emergency start: In emergency (for example the battery is empty) the smart key should be close to the IMMO antenna when the start-stop-switch is pressed. When the smart key and the PEPS ECU are authenticated successfully by each other with IMMO method, the engine could be started.

➤ RKE (for SCW)

There are 2 push buttons on the smart key with the functions of remote lock and unlock. When the unlock/lock-button is pressed longer than 2s, PEPS ECU sends the signal via CAN to inform BCM to control the windows.



➤ **Warning (for SCW)**

Several warning functions are integrated in PEPS system, no valid key in the vehicle warning, key of low battery warning, key in the vehicle when exit warning etc.

Function list:

Function	Sub-function	SCW
Remote Control	RKE lock	√
	RKE unlock	√
	Window up	√
	Window down	√
Passive Start	Key searching inside car	√
	PEPS-ECM Immo logic	√
Passive Entry with micro switch	Passive lock	
	Passive unlock	
	Passive tailgate access	√
	Warning for keys in the trunk	√

LF Polling	Approach unlock	√
	Walk away	√
IMMO	Key fob learning	√
	Backup start	√
RCD Wakeup	RCD output to wake up vehicles	√

6. GENERAL TECHNICAL REQUIREMENTS

6.1 PEPS ECU

6.1.1. Mechanical dimension requirement

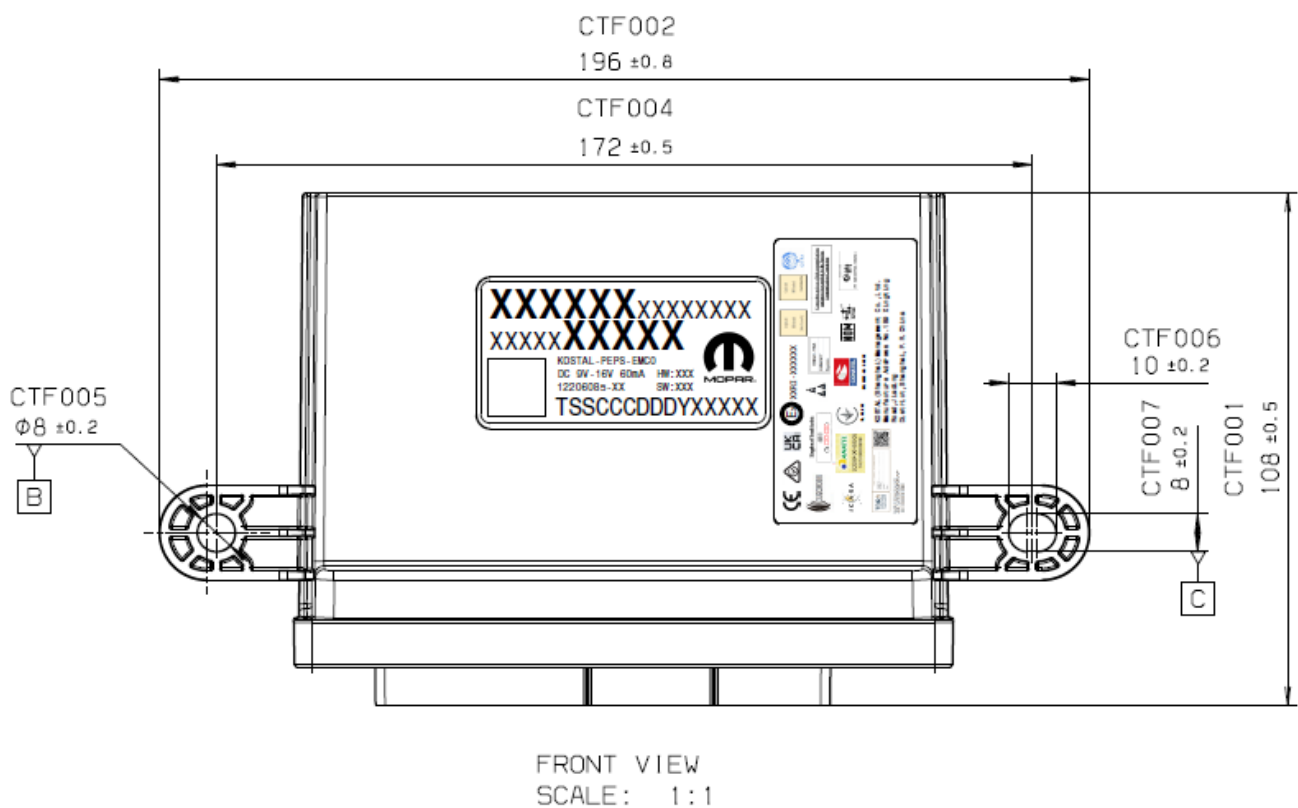


Fig 6.1 PEPS ECU dimension 1

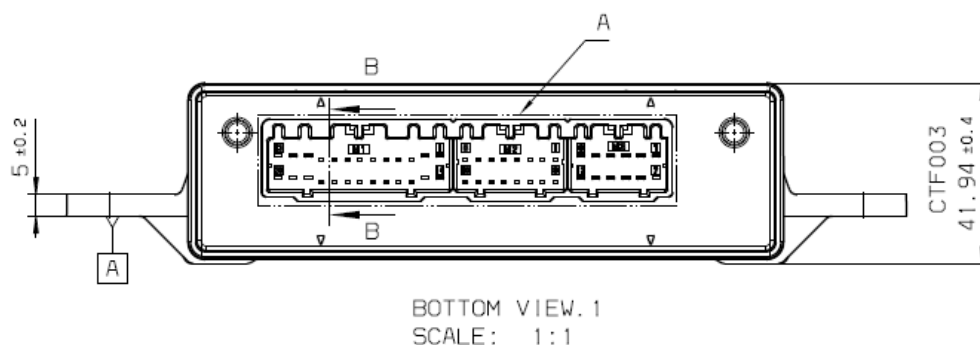


Fig 6.2 PEPS ECU dimension 2

Physical dimensions of DUT and Max. weight

$L \times B \times H = 108 \text{ mm} \times 196 \text{ mm} \times 42 \text{ mm}$

$W = 197 \text{ g}$

6.1.2. Electrical parameters

Parameters	Values		
	SCW-433MHz		SCW-315MHz
Working Voltage	DC 9V~16V		
GND shift	±1V		
PEPS ECU quiescent current	≤13mA		≤0.65mA
CAN working voltage	7V-18V		
Working frequency	LF: 125KHz RF: 433MHz		LF: 125KHz RF: 315MHz
Transmit power	<20.54dB μ A/m @ 10m (TBD)		
Operating current	180mA		180mA
Maximal current	2A		
Working Temperature	-40° C~+85° C		
Reserving Temperature	-40° C~+90° C		

6.1.3. Location in the vehicle

As the RF receiver is integrated in the PEPS module, the PEPS module must be located inside IPC platform and can not be under the seats. Following are the detailed requirements:

- The PEPS module could not be close to the large metallic parts.
- The PEPS module should be mounted vertically as much as possible like Fig 6.3.
- The PEPS module should be mounted as high as possible.

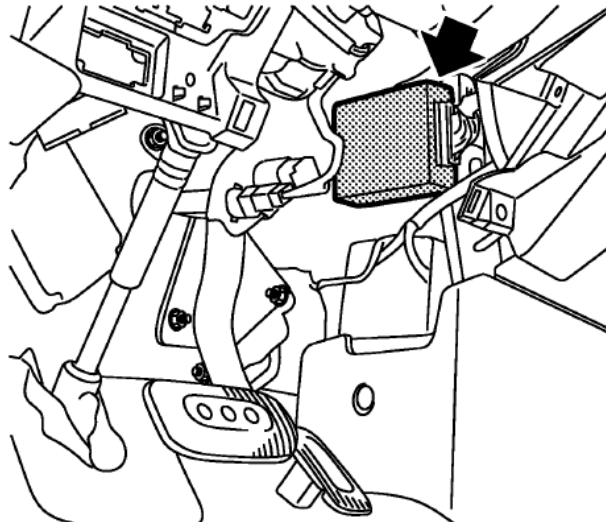


Fig 6.3 PEPS module mounting illustration

In practice the following two positions in Fig 6.4 can be considered as reference:

Position 1: The PEPS module could be mounted in the left of the IPC platform.

Position 2: The PEPS module could be mounted in the right of the IPC platform and the left of the center control panel.

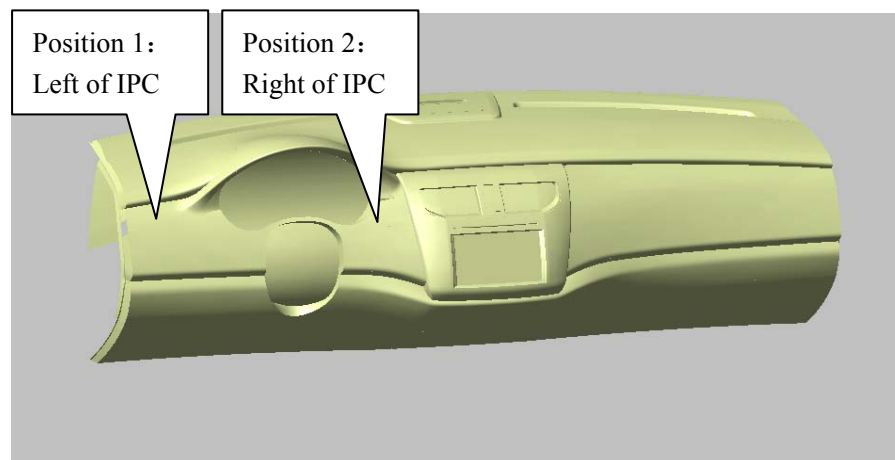


Fig 6.4 PEPS module mounting position

6.2.2 Electrical parameters

Parameters	Values
Working temperature	-40°C ~ +80°C
Reserving Temperature	-40°C ~ +85°C
Quiescent current	<1 μ A
Operating current	200mA ~ 600mA

6.2.3 Location in the vehicle

There are 4 LF antennas altogether: 1 interior antennas, 2 door-side antennas, and 1 rear bumper antenna. The entire location is illustrated in Fig 6.8.

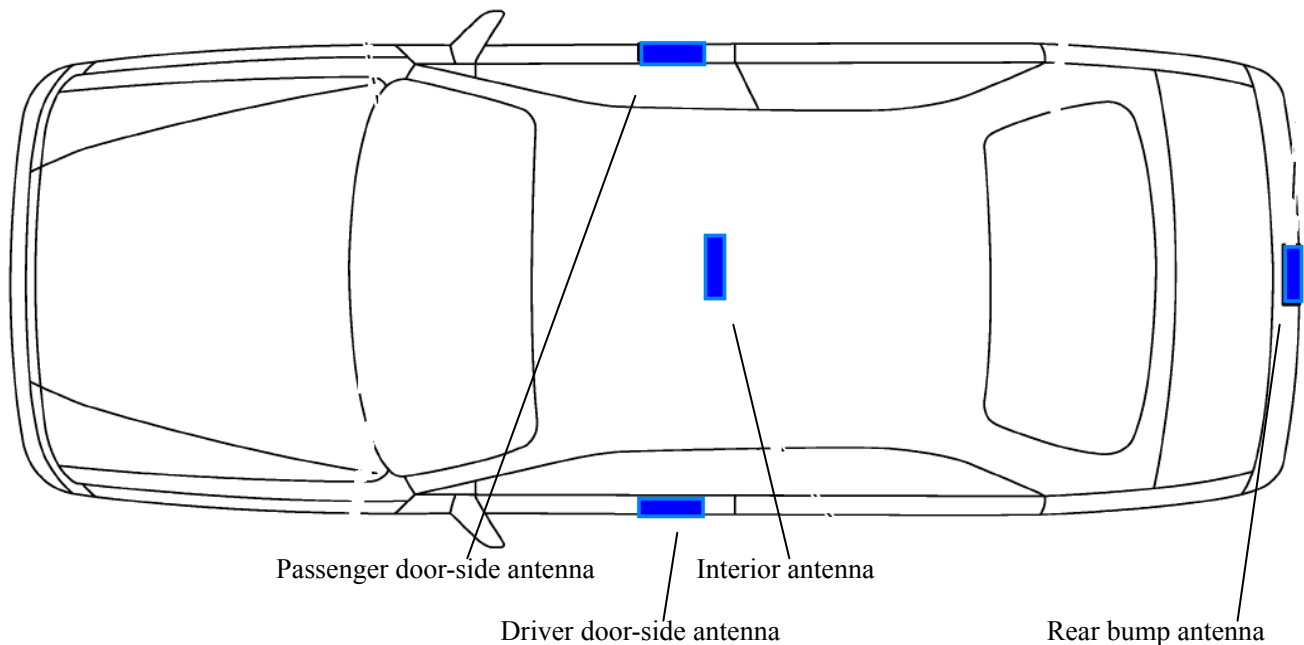


Fig 6.8 Antennas entire location

➤ Door-side LF antennas

The door-side antennas could be mounted in the door decoration, close to the door handles.

➤ Interior LF antenna

The interior antenna must be mounted along the center line of the car body. It is suggested that the interior antenna should be placed under the cup holder.

➤ Rear bump LF antenna

The rear bump antenna must be mounted horizontally and vertically to the car body direction. It is suggested that the antenna could be placed on the rear bumper.

6.4 addition info of product

Warning



EU Declaration of Conformity

Kostal (shanghai) Management Co.Ltd. hereby declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. This product is allowed to be used in all EU member states. www.kostal.com



UK Declaration of Conformity

Hereby, [Kostal (shanghai) Management Co.Ltd] declares that the radio equipment type is in compliance with Directive 2017 (SI 2017 No. 1206, as amended by SI 2019 No. 696).The full text of the UK declaration of conformity is available at the following internet address: www.kostal.com

Battery Instructional safeguard

Equipment containing one or more coin / button cell batteries shall have an instructional safeguard in accordance with Clause F.5.

The instructional safeguard is not required where these batteries are not intended to be replaced or are only accessible after damaging the equipment.

The elements of the instructional safeguard shall be as follows:

-element 1a: not available

- element 2: "Do not ingest battery, Chemical Burn Hazard" or equivalent wording

- element 3: the following or equivalent text

[The remote control supplied with] This product contains a coin / button cell battery. If the coin / button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

- element 4: the following or equivalent text

Keep new and used batteries away from children.

If the battery compartment does not close securely, stop using the product and keep it away from children.

If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

FCC Statement

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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 important announcement

Important Note:

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

低功率射頻器材技術規範

取得審驗證明之低功率射頻器材,非經核准,公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信;經發現有干擾現象時,應立即停用,並改善至無干擾時方得繼續使用。前述合法通信,指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。