by ajusa

electric vehicle line

# repair manual

## Kia Soul EV

(2014-2018)

with motor code ZD

**Ajusa reference EV000600**

# content

# general information

## WARNING!

**Electric vehicle propulsion**

This vehicle works with high-voltage electricity which can present **risks of severe or even lethal damages**.

## SAFETY PRECAUTIONS

When working with high-voltage circuits or components, make sure that the **following safety guidelines** are fulfilled:

Make sure all the staff working with the high-voltage systems of electric propulsion have been provided with **proper training** to conduct the necessary procedures.

Put up **high-voltage warning** signs to guarantee the staff safety in the work area.

Make sure that the staff who don't have proper training doesn't have access to any high-voltage circuits and components.

Always wear **insulation gloves** under the related local safety rules.

**Insulate** the high-voltage batteries ensemble.

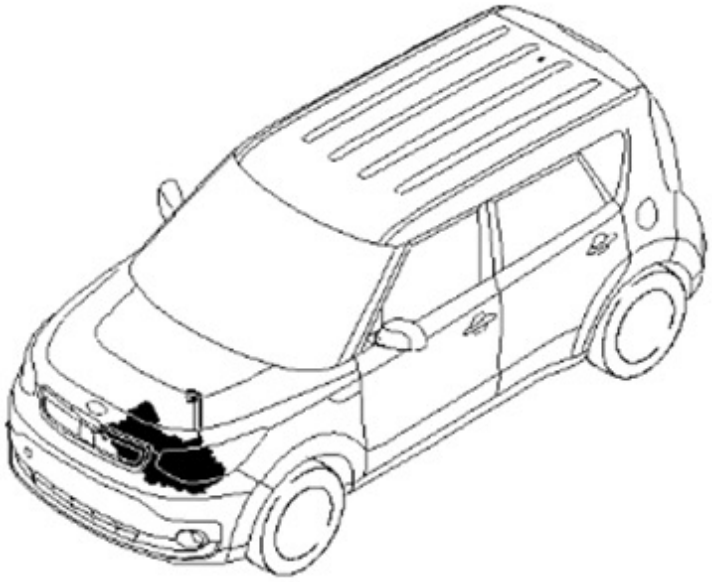
Before working with the electric propulsion system, make sure that the recommended **waiting time after insulating** the high-voltage batteries ensemble has passed by.

Check that the **residual voltage**, which may be in the circuit, is under the recommended safety level.

Make sure that all **test equipment and tools** are suitable to be used in high-voltage circuits or components.

To **ease the identification**, the high-voltage cabling in the electric propulsion system can be covered by an orange insulation.

# technical information



## Types of failure

Insulation failure.

Problems with the bearings.

## References

Ajusa kit is reference **EV000600**

It only fits in Kia Soul II 81KW, 110 CV.

Motor reference ZD.

# battery disconnection

**Recommendations to connect and disconnect the battery in electric vehicles**

Before getting started it is important to highlight that, in usual inspection and maintenance operations, as well as to disconnect the main battery of the vehicle it **is not necessary to disconnect** the batteries ensemble.

Disconnect the battery only when:

> Replacing the battery.
>
> In need to reset certain parameters of the vehicle.
>
> When the car is going to be parked for a long lapse of time, so that the battery doesn't get fully discharged.

**Safety precautions**

The batteries ensemble both in electric and hybrid vehicles work with **high voltage**.

> Any worker who doesn't have proper training mustn't have access to any high-voltage circuits and components.
>
> Always wear suitable personal protective equipment (PPE).

It is essential to put up the related signs to guarantee the safety both of the area and of the workers.

The **batteries ensemble** of the electric vehicle must be insulated at all times to prevent potential short circuits. To insulate and strip the batteries ensemble there are different special tools:

> Tool number 1076921-00-B. Insulation multimeter.
>
> Tool number 1130480-00-A. Cable for insulation multimeter.
>
> You must be sure that all the testing devices and equipment are compatible with high-voltage applications.

When the batteries are insulated, a recommended **waiting time must pass** by before proceeding to handling the electric propulsion system.

With the insulation multimeter you will check the residual voltage value in the circuit to be sure that such value is under the recommended value.

The high-voltage cabling in electric vehicles has an orange insulation. Knowing this feature, it is easy to identify it.

## Disconnection/insulation of the electric vehicle batteries ensemble

1) Find the battery. For this step, it is advisable to **look it up in the vehicle's manual**, as the method to reach the battery differs from one vehicle to another.

2) Check that the vehicle's charging cable is **off**.

3) **Start the vehicle** and verify that the instrument cluster works properly and that it doesn't show any warning or failure.

4) It is recommended to lower the driver's window fully and slightly lower the passenger's window as a safety measure.

5) Check that the gearbox is **neutral** and that the parking brake is activated.

6) Make sure that the power is not connected and the keys are not inside the vehicle. Make sure that all **electric components are off**.

7) Disconnect the vehicle's main battery and remove the cut part or the carpet figure 3.1.

8) Disassemble the **access cover to the electric propulsion batteries** ensemble insulator figure 3.2. Unlock the electric propulsion batteries ensemble insulator figure 3.3 and figure 3.4.

9) Disassemble the electric propulsion batteries ensemble insulator figure 3.5 and wait 5 minutes.

10) Disassemble the bottom electric propulsion batteries ensemble bottom protector.

11) Unplug the high-voltage cable of the electric propulsion batteries ensemble plug figure 4.1.

12) Check the **voltage in the high-voltage** cabling plug's terminals to make sure that the residual voltage in the circuit is below 30 V before continuing figure 4.2.

## Connection of the batteries ensemble in the electric vehicle

1) Check that the **power is not activated** and the keys are not inside the car.

2) Undo previous steps.

3) Connect the vehicle's main battery and check that everything works properly.

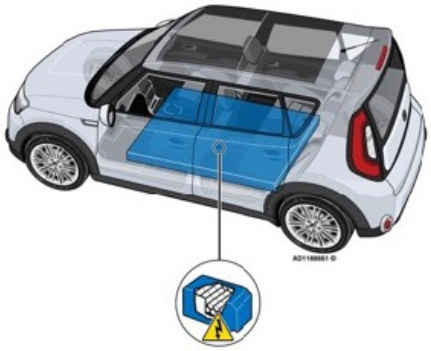


Figure 2. Access to the battery.

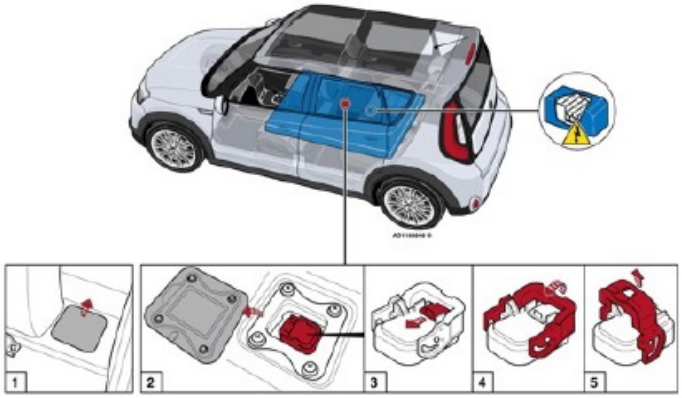



Figure 3. Access to the batteries ensemble insulator

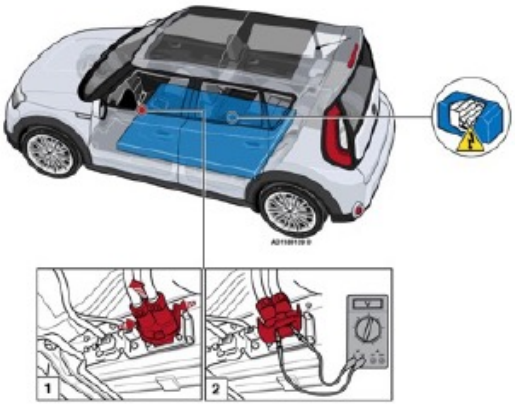



Figure 4. Batteries ensemble plug

# composition

**Rotor bearings**[1]
(2 units)

**Electric data connector gasket**[2]
(1 unit)

**Right gear oil seal**[3]
(1 unit)

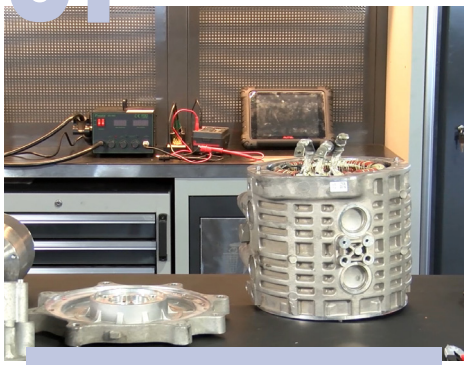
**Left gear oil seals**[4]
(2 units)

**Primary shaft gasket**[5]
(1 unit)

# repair

As follows we will show you in simple steps the repair of this motor.

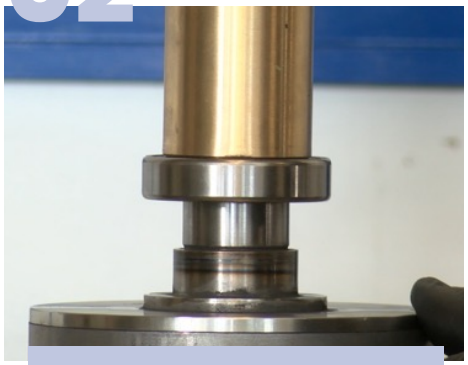
01



***Transfer gearbox***

Before starting with the repair, we must access the failure. For this, we will detach the motor from the transfer gearbox in order to work on it comfortably.

02



***Rotor bearings***

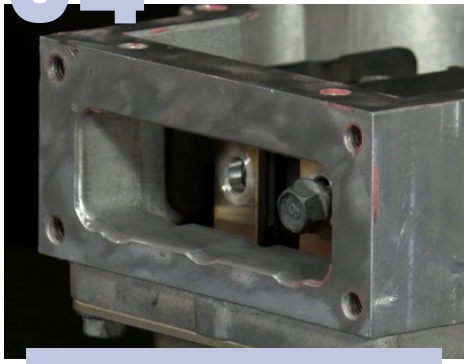
Once the motor is open, the first step is placing **rotor bearings**[1]. As always, a hydraulic press will make the operation easier for us.

03

***Plug in the casing***

We will continue by assembling the three-phase plug over the motor's casing, applying a tightening torque of 10 Nm.

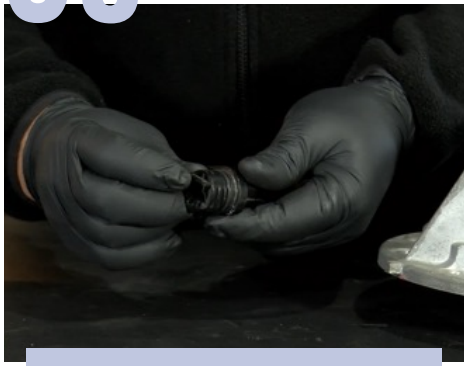
04



***Stator phases***

Once the plug is assembled, we will proceed to connect the terminals. The tightening to the phases will be 10 Nm.

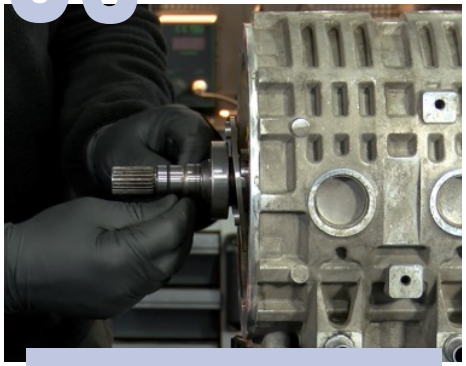
05



***Electric data connector***

We will now place the O ring gasket or **electric data connector gasket**[2]. Tightening of 8 Nm.

06



***Rotor assembly***

We put the rotor into the stator, and we will place its O ring gasket **primary shaft gasket**[5] the primary pinion.

07

### *AjusEV sealant*

In order to seal the stator with its front cover we will use AjusEV, our **silicone sealant** exclusive for electric and hybrid vehicles.

08

### *Stator*

Once the cover is placed, we will apply a tightening torque of 25 Nm to its screws, the same as to the bearing cover screws.

09

### *Adjusting washer*

We will place the adjusting washer over the back cover that, once we have sealed it, will be assembled over the ensemble. We must take care of guiding the phases and the temperature sensor through its housings. Tightening of 25 Nm.

10

### *Stator phases*

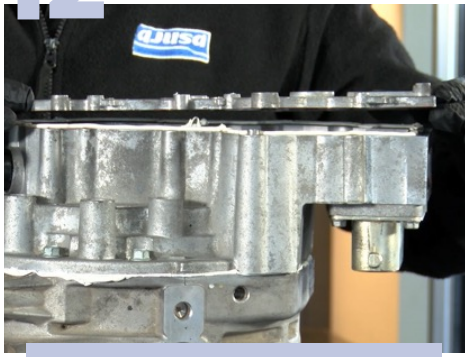
We will continue by connecting the **stator with the three-phase** plug, applying a tightening to its screws of 10 Nm.

11

### *Encoder*

Next step will be placing the encoder over its housing and connecting it, to fix its screws apply a tightening of 10 Nm.

12



### *Encoder register cover*

We will apply AjusEV again, this time all over the perimeter of the register cover, conducting a tightening of 12 Nm.

13

***Electric terminals register cover***

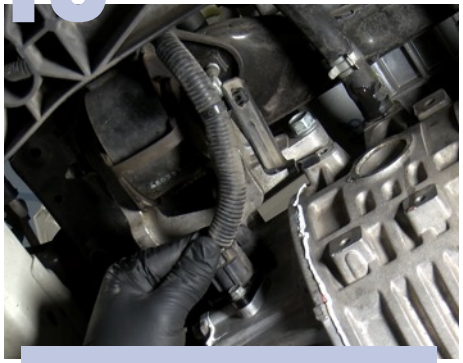
We will also apply AjusEV to assemble the three-phase plug terminals register cover and tighten 12 Nm.

14

***Motor assembly***

We will place the motor over the transfer **gearbox, fitting** the primary pinion over the box. We will tighten the screws over the box 55 Nm. Same tightening for the engine assembly.

15



***Plugs and hoses assembly***

Now we will connect the coolant liquid hoses and the electric plugs.

16

***Gears***

Before assembling the gears, we will assemble both the **right gear oil seal**[3] and **left gear oil seal**[4].

# additional information

Do you know **which are the tools you need** to repair the motor of an electric vehicle? Do you know the safety measures to conduct this repair? Is it that you don't know where to start?

Visit the electric vehicle section on our website where we will give you the answers to all these doubts and much more.

You will be able to see the **safety measures video** as well as the **video tutorial** in which you'll see step by step the assembly of the Ajusa kit related to this vehicle.

Furthermore, you can contact our technical assistance department to solve any doubt.

**Subscribe** to our Youtube channel and learn everything you must know about mechanics.


Click here to watch the **assembly video**:

VIDEO