by ajusa

electric vehicle line

# repair manual

## Hyundai · Kia

Kona | Kauai | Niro EV | E-Soul (2018 - 2023)

---

with motor code EM16

**Ajusa Reference EV000501**

# 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 has 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 doesn'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.

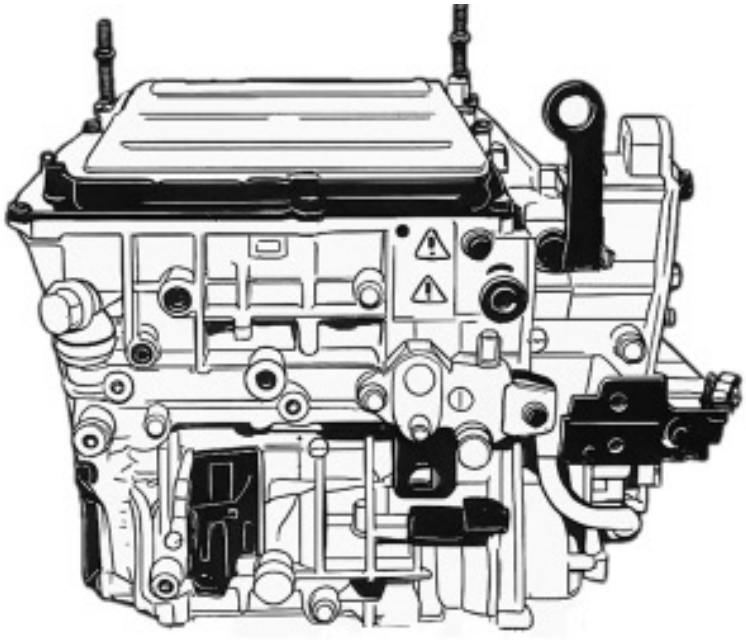
Before working with the electric propulsion system, make sure that the recommended **waiting time after insulating** the high-voltage batteries ensemble has passed by.

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 main bearing of the rotor.

## References

Ajusa kit is reference **EV000501**.

Front-wheel drive unit Motor.

Motor EM16. Fits in models such as Kia Soul EV (III), Kia Niro EV, Hyundai Kona and Hyundai Kauai.

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

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

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

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

6) Disconnect the vehicle's main battery, disassemble the truck floor cover and disassemble the bench and the back of the rear seat.

7) Disassemble the access cover to the **insulator of the electric** propulsion batteries ensemble figure 2.1., 3.1. or 4.1. depending on the vehicle.

8) Unlock the insulator of the electric propulsion batteries ensemble figure 2.2., 3.2 o 4.2.-4.3-4.4.-4.5. depending on the vehicle.

9) Disassemble the insulator of the electric propulsion batteries ensemble and wait for 5 minutes.

10) Disassemble the underbody protectors to have easier access to the connector of the inverter cabling figure 2.3 y 2.4.

11) Unplug the connector of the inverter cabling and check the voltage in the inverter terminals to make sure that the r**esidual voltage in the circuit is under 30 V** before going on figure 2.6.

## Connection of the batteries ensemble in the electric vehicle

1) Check that the power is not activated and that the keys are not inside the car and undo previous steps.

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

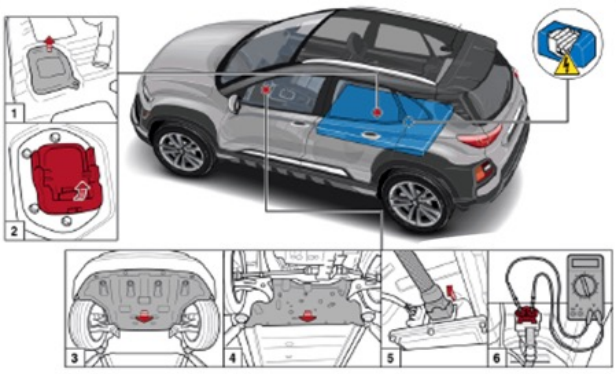


Figure 2. Location of the batteries ensemble in the Hyundai Kona.

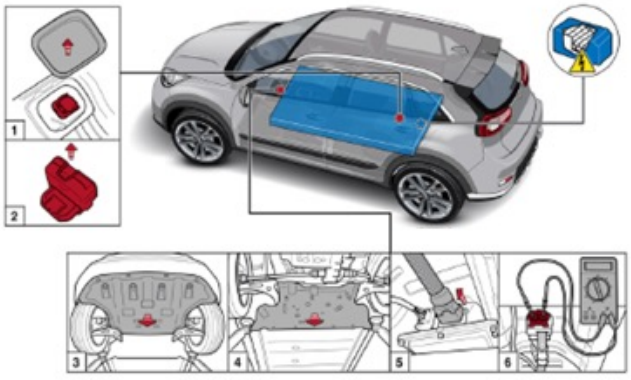


Figure 3. Location of the batteries ensemble in the Niro I.

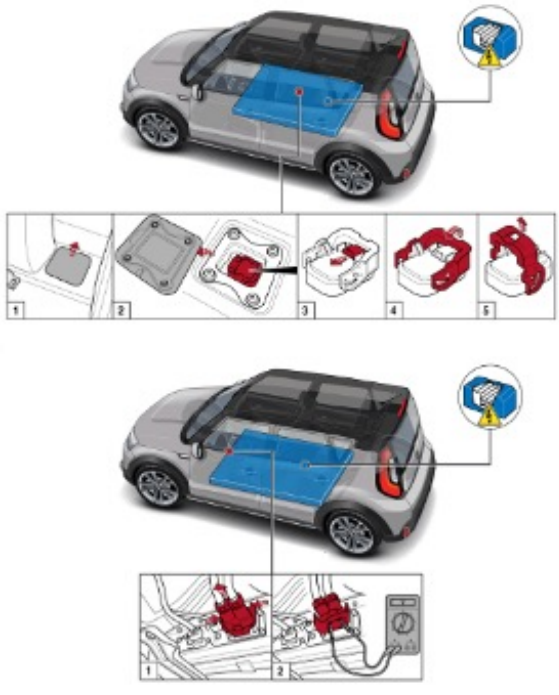


Figure 4. Location of the batteries in the Soul III.

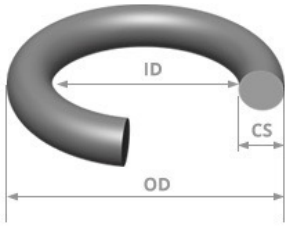
# composition

**Left gear seal**[1]
(1 unit)

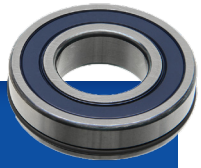
**Right gear seal**[2]
(1 unit)

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

**O rings**
(2 units)




| | OD (mm) | ID (mm) | CS (mm) |
|---|---|---|---|
| **Primary shaft O ring gasket**[4] (1 unit) | 25,60 | 22,00 | 1,80 |
| **Electronic data connector gasket**[5] (1 unit) | - | 15,00 | 2,50 |



**ATTENTION!**

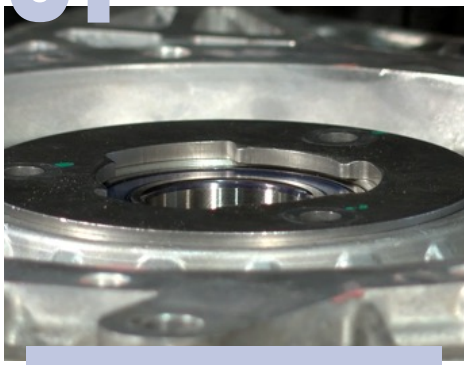
This Ajusa kit **does not include** the bearing, but we recommend replacing it during the repair to ensure an optimal and long-lasting result.

**Prefer a more complete solution?** Ajusa also offers this same kit with the bearing included, so you have everything you need under **a single reference** (EV000500).

# repair

We will start working for cleaning and opening the transfer gearbox.

01



***Mounting plate***

Now, we will place the mounting plate over the cover bearing. We will screw it with a tightening of 25 Nm.

02

***Trigger wheel***

Next step will be to assemble the trigger wheel and its mounting ring.

03

***Front cover***

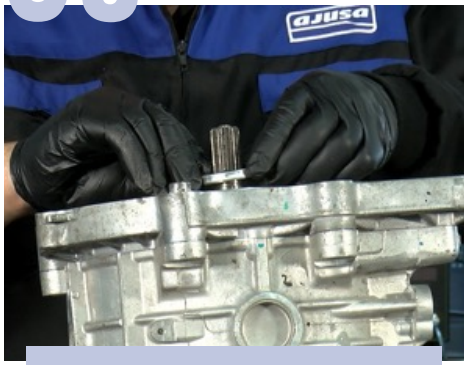
We will place the front cover (with the rotor) together with the adjusting washer.

04


***AjusEV***

It is time now to apply our silicon sealant AjusEV on the stator base. Once placed, we will perform on its screws a tightening of 25 Nm.

05




***Dust cap seal***

We will continue assembling the dust cap seal.

06

***Gasket in the primary shift***

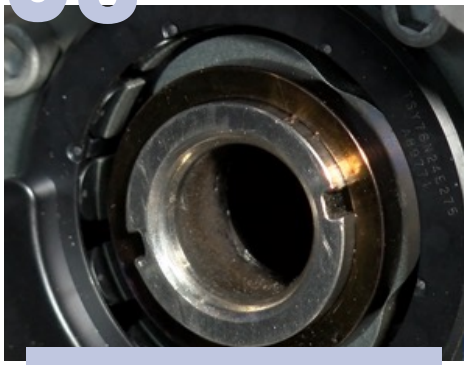
We can now place the **primary shaft O ring gasket**[4] in the housing of said shaft.

07

***Electric data connector***

We assemble the electrical data connector and place the **electronic data connector gasket**[5], and tighten its screw to 8 Nm

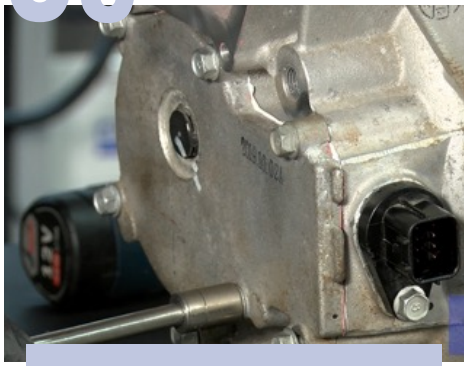
08



***Encoder assembly***

The next step will be to assemble the encoder, on which we will perform a tightening of 8 Nm.

09



***Encoder cover***

Now, we will place the encoder cover, using AjusEV on its perimeter, and performing on its screws a tightening of 10 Nm.

10

***Cover of the three-phase plug***

Finally we will use AjusaEV again on the closing cover of the rotor three-phase plug. Tightening torque 10 Nm.

11

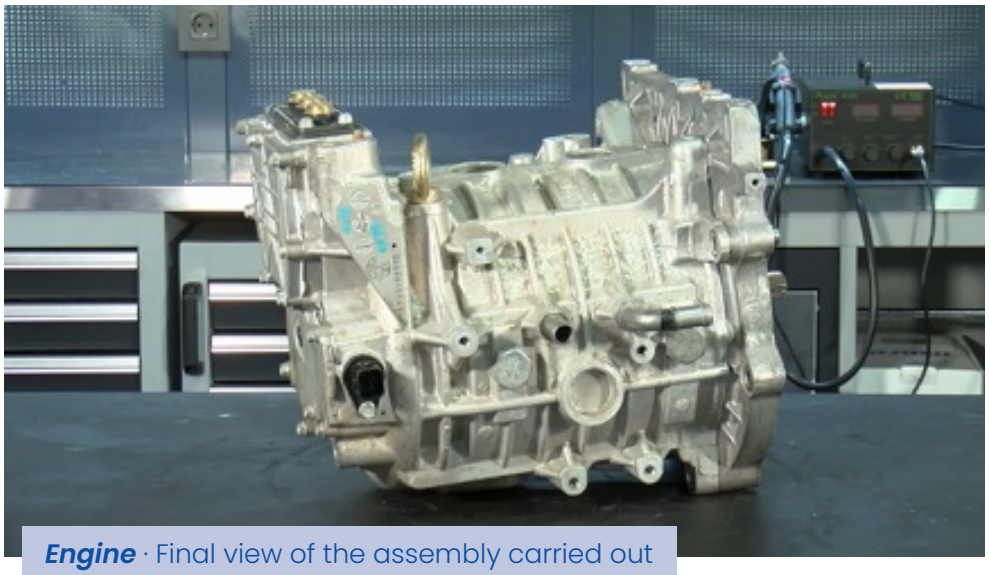
***Left gear seal***

Lastly, we will place the **left gear seal**[1] with an specific tool.

12

***Right gear seal***

Same procedure for the **right gear seal**[2].



***Engine*** · Final view of the assembly carried out

# 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