



repair manual

Hyundai Ioniq EV 2016
(2016-2019)

with motor code EM09
Ajusa reference EV000700



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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 main bearing.

References

Ajusa kit is reference **EV000700**
It fits in Hyundai Ioniq EV with motor
EM 09, 88KW, 120 CV.

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.

7) Disassemble the truck floor cover.

8) Disassemble the access cover to the **insulator of the electric propulsion** batteries ensemble figure 2.1.

9) Unlock the insulator of the electric propulsion batteries ensemble figure 2.2.

10) Disassemble the electric propulsion batteries ensemble insulator figure 2.2 and wait 5 minutes.

11) Lift and support the vehicle.

12) Disassemble the electric propulsion batteries ensemble bottom protector in order to **access the inverter** figure 2.3.

13) Unplug the inverter cabling plug figure 2.4.

14) Check the voltage in the **high-voltage cabling plug terminals** to make sure that the residual voltage in the circuit is under 30 V before continuing figure 2.5.

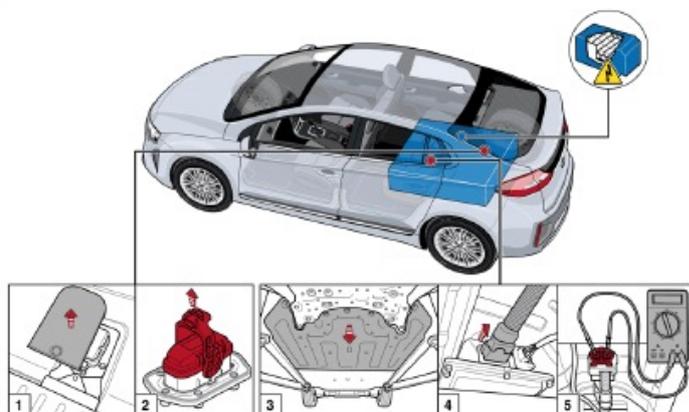


Figure 2. Batteries ensemble location.

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.

2. Undo previous steps.

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

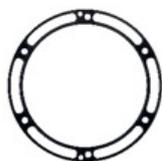
composition



Rotor bearings¹
(2 units)



Stator gasket (phases side)²
(1 unit)



Stator gasket (primary shaft side)³
(1 unit)



Left gear oil seals⁴
(1 unit)



Right gear seal⁵
(1 unit)



Primary shaft gasket⁶
(1 unit)



Washers⁷
(2 units)



Oil seal cover⁸
(1 unit)

repair

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

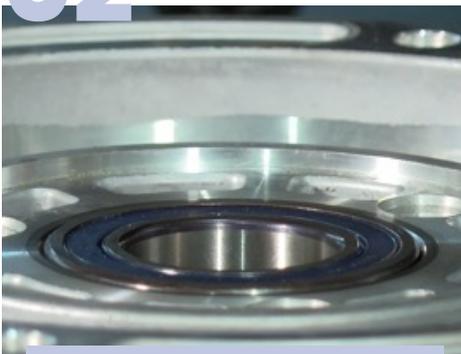
01



Bearing in the rotor

We will start by assembling the first **rotor bearing¹** as well as the trigger wheel with its bush.

02



Bearing in the cover

We will assemble the second **rotor bearing²** in the cover with the mounting plate, conduct a tightening of 25 Nm.

03



Front cover assembly

Next step will be fitting the bearing (already assembled in the cover) in the motor's rotor.

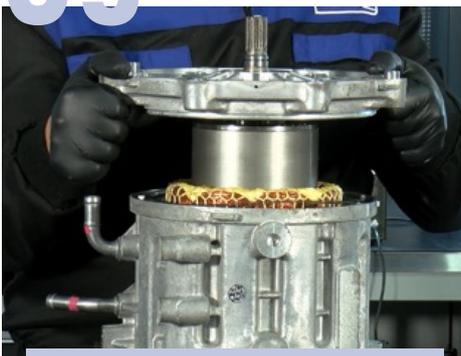
04



Cover closing

Now we place the end clip, and we assemble the **stator gasket (primary shaft side)³** which will be the rotor's front cover end gasket.

05



Assembly of the rotor in the stator

Next step will be placing the rotor in the stator, very carefully, and we will conduct a tightening of 25 Nm.

06



Cover seal with the primary shaft

We will continue by assembling the cover oil seal, which joins the primary shaft.

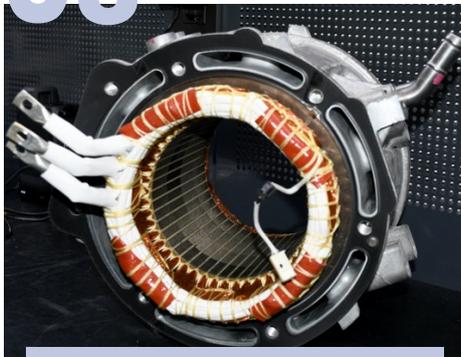
07



Shaft O ring

Then, we will assemble the gasket **primary O ring**⁶ in the related shaft.

08



Phases side gasket

Then we will assemble the **stator gasket (phases side)**² and the adjusting washer in the shaft.

09



Back cover assembly

We will place the cover and we will guide the phases cables and the temperature sensor in its related housings, we will apply a tightening of 25 Nm.

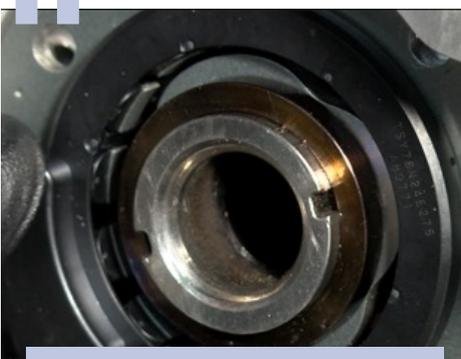
10



Electric data connector

It is time to assemble the electric data connector **O ring gasket**. We will screw it with a tightening torque of 8 Nm.

11



Encoder assembly

Then, we will assemble the encoder and we will tighten 10 Nm. Right after that, we will **connect it to the port**.

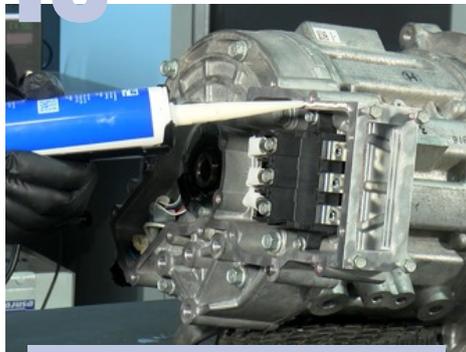
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Phases connection

We will connect the **stator three-phases** phases and we will apply a tightening torque of 10 Nm.

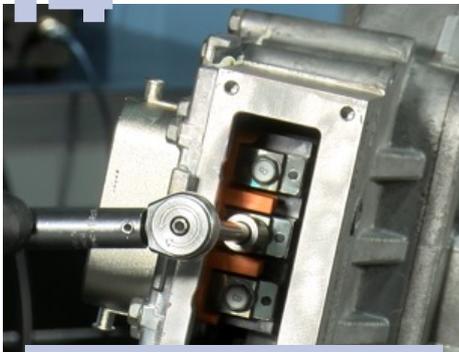
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AjusEV

Apply AjusEV on the encoder cover perimeter, conclude with a tightening torque of 10 Nm to its screws.

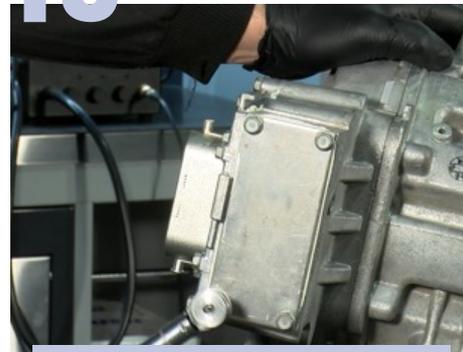
14



Phases connection

Now we will connect the phases in their **plug out**.
Tightening, 10 Nm.

15



End cover sealing

Then, we apply AjusEV in the three-phase connections end cover and we will conduct a tightening of 10 Nm.

16



Gear seals

To conclude the repair, and before assembling gears, we will place **right gear oil seal⁵** and **left gear oil seal⁴**.

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