



repair manual

Tesla Model S · Tesla Model X
(2012-2021) (2015 - 2021)

Mercedes B-Class · Toyota Rav4 EV
EDB250e (2014-2017) (2012-2014)

with motor codes 1002633-00-U / 1002633-01-U / 1025598-01-U
Ajusa reference EV000800



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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
of the rotor.

References

Ajusa kit is reference **EV000800**

Rear-wheel drive unit motor – Large drive
unit (LDU) with OEM references
1002633-00-U / 1002633-01-U / 1025598-01-U

Fits in the following models **Tesla Model S**
(2012–2021) and **Model X** (2015–2021) with
the following denominations: 60,60D, 70, 70D,
75, 75D, 85, 85D, 90, 90D, 100D, and in the
performance versions P85D, P90D y P100D. In
Mercedes B-Class B250e (2014–2017) and
Toyota RAV4 EV (2012–2014) too.

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.

In figure 2 you can see the terminals to jump start.

It is highly advisable to connect the jumper's negative cable to a suitable earth point in the bodywork or the electric propulsion motor. **Do not connect the jumper's cable directly** to the negative terminal of the battery. If you conduct this method, you will prevent the risk of damaging the battery's state sensor which may be located in the earth cable's terminal of the battery.

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 lower the driver's window fully and slightly lower the passenger's window as a safety measure.

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

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

6) Disconnect the earth cable in the battery.

7) Disconnect the First Responder Loop figure 3 and wait for 2 minutes.

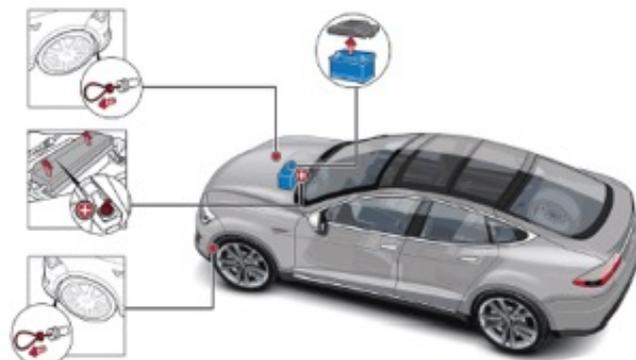


Figure 2. Batteries ensemble location.

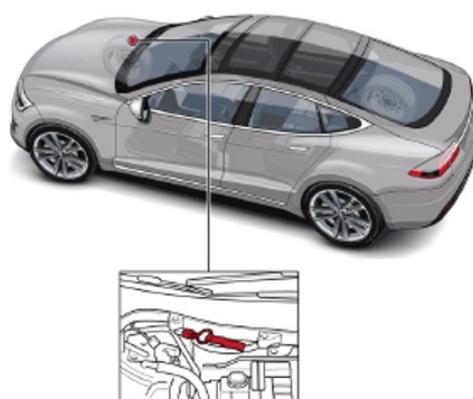


Figure 3. First Responder Loop.

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.

After connecting the battery

Electric window operators and sliding roof

- 1) Make sure that the door is **wide open**.
- 2) Roll up the window fully.
- 3) Activate manually the **open-door** fastener with a suitable tool (screwdriver).
- 4) Use the door's inner handle to disable the fastener.
- 5) Push the window switch to the automatic opening position.
- 6) If the **window lowers slightly**:
 - a. Conduct the calibration process of the electric window operators.
- 7) If the **window lowers fully**:
 - a. Make sure that the door is fully closed.
 - b. Place a spacer between the upper part of the window and the frame of the window.
 - c. Raise and hold the window switch. Make sure that the window lowers when touching the spacer. Repeat this procedure 14 times.
 - d. Conduct the calibration process of the electric window operators.
- 8) **Calibration process** of the electric window operator:
 - a. Push and hold the window switch to fully lower the window. Keep the switch activated for 2 seconds.
 - b. Raise and hold the window switch. Keep the switch activated for 5 seconds.
- 9) Check that the automatic opening and locking functions are **working properly**.

Note: The sliding roof can only be set up with a diagnosis equipment.

composition



Inverter gasket¹
(1 unit)



Inverter inner cooling gasket²
(3 units)



Gear middle-part cooling gasket³
(1 unit)



Electric motor back cover cooling gasket⁴
(1 unit)



Stator back cover cooling gasket⁵
(1 unit)



Stator cooling sealing seal⁶
(1 unit)



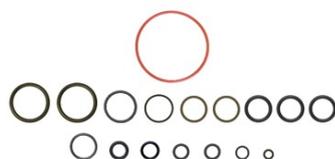
Gearbox sealing seal⁷
(1 unit)



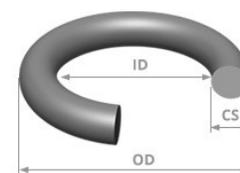
Gears seals⁸
(2 units)



Bearings⁹
(2 units)



O rings gaskets kit
(17 units)



OD (mm) ID (mm) CS (mm)

Oil feed pipe gasket¹⁰
(1 unit)

17,50

11,50

3,00

Encoder sensor gasket¹¹
(1 unit)

27,08

23,52

1,78

Coolant drain gasket¹²
(2 units)

25,54

20,30

2,63

**Oil pump sprinkler gasket
(small)¹³**
(1 unit)

9,90

6,30

1,80

Oil pump sprinkler gasket (big)¹⁴
(1 unit)

13,10

9,50

1,80

Metallic water entry gasket¹⁵
(2 units)

36,70

29,70

3,50

Phases connections cover gasket¹⁶
(3 units)

25,50

18,50

3,50

Cooling pipe gasket¹⁷
(2 units)

14,90

10,30

2,30

Rotor shaft gasket¹⁸ (1 unit)	30,40	25,00	2,70
Stator bearing and back cover sealing gasket¹⁹ (1 unit)	-	2,60	62
Oil breather cap gasket²⁰ (1 unit)	25,30	20,00	2,65
Auxiliary gasket²¹ (1 unit)	17,40	12,00	2,70

repair

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

01



Oil pump sprinkler

First we will conduct the assembly of the oil pump sprinkler, in which we will place the 2 O rings gaskets **oil pump sprinkler (small)¹³** and **oil pump sprinkler (big)¹⁴**.
Tighten 6 Nm.

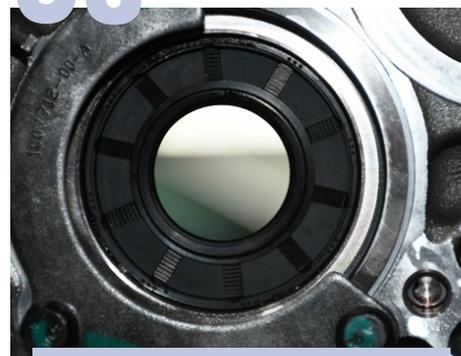
02



Bearing

We will assemble the **stator bearing and back cover sealing gasket¹⁹** in the rotor bearing's housing.

03



Gear seal

We will assemble the **gearbox sealing seal⁷** in its housing. A special tool will be used for that.

04



Heat inductor for mounting bearings

Before starting, make sure the work area is free from pollutants (especially metallic objects). Make sure you have the tools you need, apart from the personal protective equipment (gloves and glasses).

05



Bearing placement in heat inductor

We put the **bearing**⁹ with the liner always trying that it fits with the inner diameter (if it is necessary we will use 2) Once it is in it, we will place it over the supports of the inductor previously greased.

06



Temperature tube placement

Next, we will place the temperature tube, always in the inner part of the **bearing**⁹. This way, the inductor will tell us when the bearing reaches the temperature we want, usually between 80 and 120°C

07



Heating

Once the temperature is reached, we switch off the station and disconnect the temperature tube. We take of the **bearing**⁹ from its base and we are ready for placement.

08



Bearing assemble

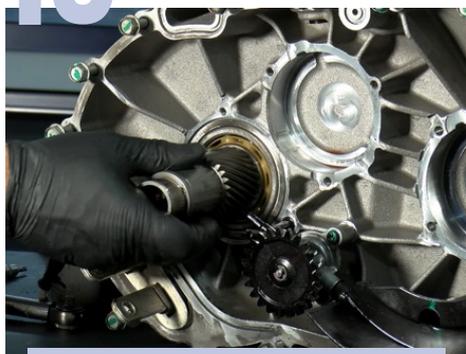
Align properly the **bearing**⁹ with the axis. Heat should have dilated the material, the bearing can be placed easily. Make sure that the rotor's axis has a good finish and that the rest of the parts do not show damages. Only parts fulfilling the required quality standards should be fitted.

09



Final appearance of the bearing

10



Primary semi shaft gear

Once the seal is placed, we can place the gear that fits with the rotor's shaft.

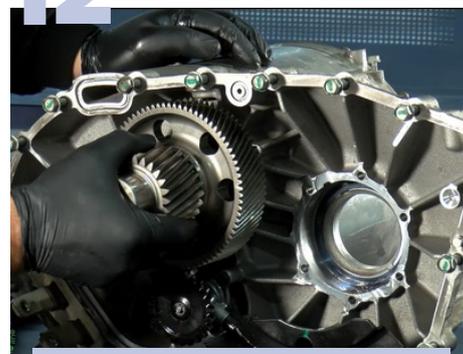
11



Halfmoon platen

We secure the bearing of such shaft with the halfmoon platen, where we will apply a tightening torque of 4 Nm.

12



Secondary gear

Next step will be placing the secondary gear, applying a torsion of 6 Nm to its fixator.

13



Differential

Now we will assemble the differential, tightening its nuts 6 Nm.

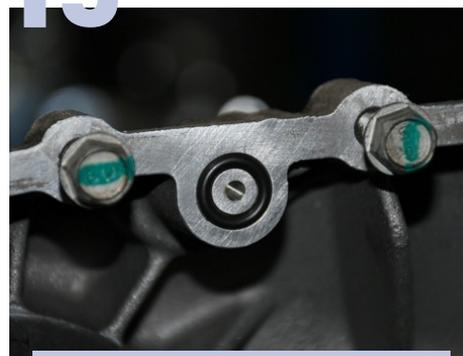
14



Cooling gasket

Then, we will assemble the **gear middle part cooling gasket³**.

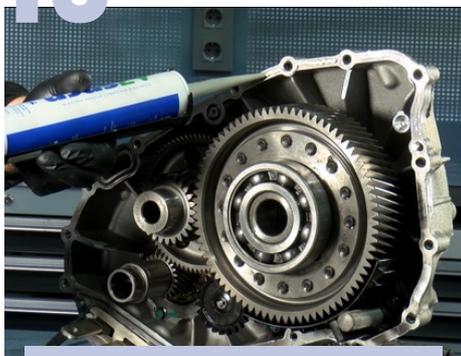
15



Oil passage

Now we will place the O ring **oil feed pipe gasket¹⁰** through which the oil will pass.

16



Transfer gearbox sealing

Once these gaskets are placed, we will proceed to apply AjusEV over the perimeter of the box, concluding with a tightening of 14 Nm.

17



Rotor's primary shaft

Once we have placed the bearings in the rotor, we place the **rotor shaft gasket**¹⁸.

18



Cooling gasket

We can now place the rotor in the stator, by placing the **electric motor back cover cooling gasket**⁵ we will apply AjusEV and then we will seal the cover and we will conclude with a tightening torque of 16 Nm to its screws.

19



Seal housing in the back cover

Next step will be placing the **stator bearing and back cover sealing gasket**¹⁹ in the housing of the bearing in the back cover.

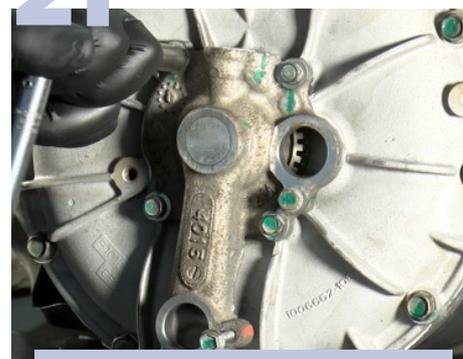
20



Stator cover gasket

Once we have sealed the trigger wheel, it is time to assemble the rotor's cooling manifold, with its seal. For that, we will place the **stator back cover cooling gasket**⁵.

21



AjusEV

We apply an AjusEV line, and we will conduct a tightening of 4 Nm.

22



Encoder

Now we can assemble the encoder sensor, with its O ring **encoder sensor gasket¹¹** and we will conduct a tightening of 8 Nm.

23



Coolant drain nozzle

Then, we assemble the coolant drain nozzle with its gasket **coolant drain gasket¹²** and we will conduct a tightening of 8 Nm.

24



Gear seal

We can now assemble the **gear seals⁹** in its related housings in the gearbox, using a specific implement or tool.

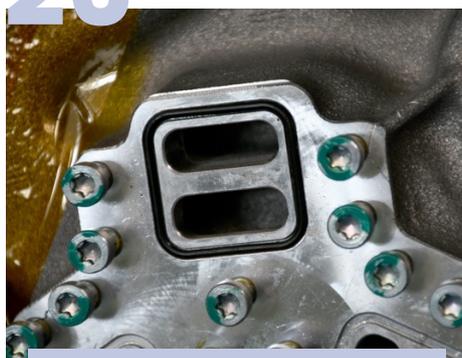
25



Coolant metallic nozzle

Now we will place the coolant metallic nozzle with its **metallic water entry gasket¹⁵** and we will conduct a tightening of 8 Nm.

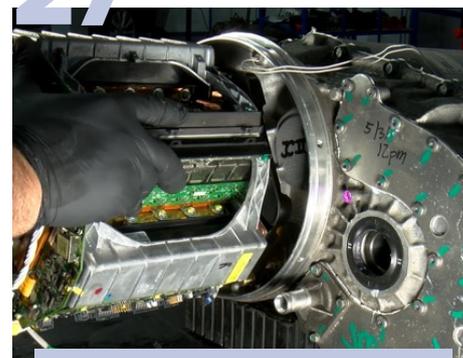
26



Motor inner cooling gasket

Then, we will place the 3 inverter cooling gaskets, which correspond to **inverter inner cooling gasket²**.

27



Inverter assembly

Now we can assemble the inverter, tightening its screws 8 Nm.

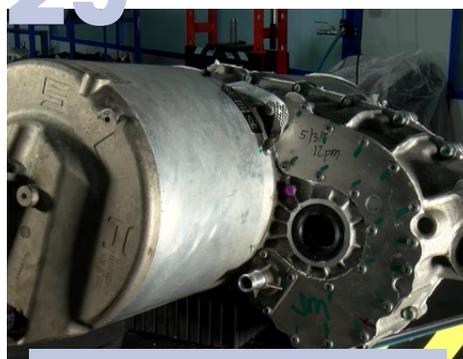
28



Inverter gasket

Next step will be assembling the **inverter gasket**¹.

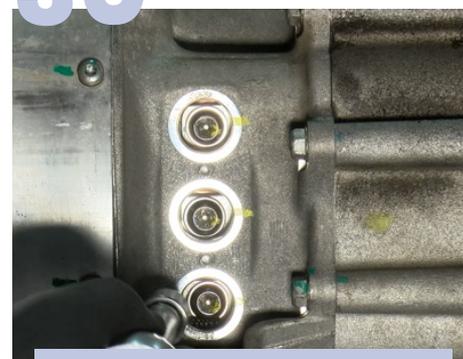
29



Inverter cover

We place the cover, with a tightening of 14 Nm.

30



Three-phase connections

We can now conduct the inverter and the stator three-phase connection, in which we will apply a tightening torque of 13,5 Nm to its 3 screws

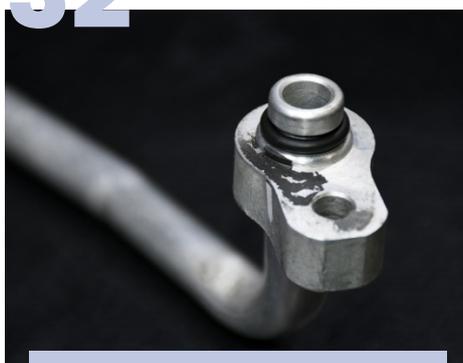
31



Phases connections cover

We will continue with the 3 **phases connections cover gaskets**¹⁶ in which we will conduct a tightening torque of 2 Nm.

32



Cooling pipe

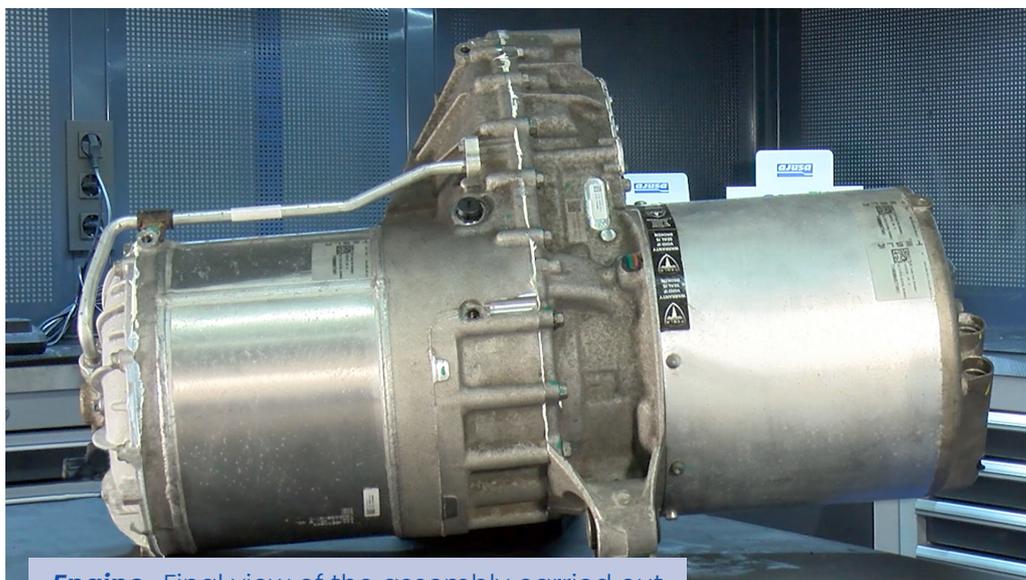
Next step will be assembling the cooling pipe, in which we will place the **2 cooling pipe gaskets**¹⁷ and we will conduct a tightening of 10 Nm to its screws.

33



Oil breather cap

We will finish the repair assembling the **gasket**²⁰ applying a tightening torque of 5 Nm.



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