by ajusa
electric vehicle line

repair manual

Tesla Model 3 · Tesla Model Y

(2017-2021) (2017 - 2021)

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with motor codes 1120980-00-G · 1120980-17-J · 1120990-00-J
1672095-00-C · 1672096-00-B · 1672096-00-C

Ajusa reference EV000301

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.

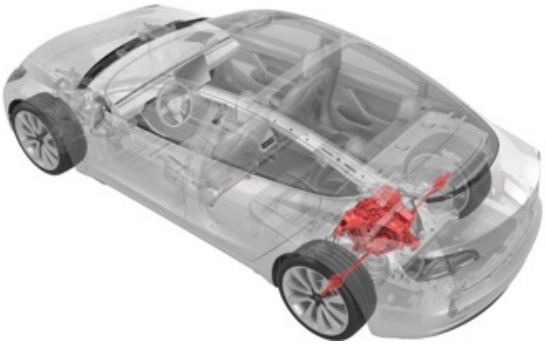
Before working with the electric propulsion system, make sure that the recommended **waiting time after insulating** the high-voltage batteries ensemble has passed by.

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 main bearing of the rotor.

References

Ajusa kit is reference **EV000301.**

Rear-wheel drive unit, motor large drive unit (4DU) with the following OEM references 1120980-00-G · 1120980-17-J 1120990-00-J · 1672095-00-C · 1672096-00-B · 1672096-00-C.

Fits in the following models: **Tesla Model 3** and **Model Y** (2017-2021) with the following denominations: 3D1, 3D3, 3D5, 3D6, 3D7.

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 disconnected.

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 **fully lower the driver's window** and slightly the the passengers 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.

8) Disassemble the rear seat's bench.

9) **Remove the cover** access of the terminals of the electric propulsion battery ensemble voltage testing socket figure 2.1.

10) Check the voltage in the electric propulsion battery ensemble voltage testing socket to make sure that the residual voltage in the circuit is under 10 V before continuing to figure 2.2.. Tools nº **1076921-00-B and 1130480-00-A.**

11) Check the voltage between the electric propulsion battery ensemble voltage testing socket positive terminal and the earth make sure that the residual voltage in the circuit is under 10 V before continuing figure 2.3. **Tools nº 1076921-00-B and 1130480-00-A**.

12) Check the voltage between the electric propulsion battery ensemble voltage testing socket negative terminal and the earth make sure that the residual voltage in the circuit is under 10 V before continuing figure 2.3. **Tools nº 1076921-00-B and 1130480-00-A.**

13) Place the cover access of the terminals of the electric propulsion battery ensemble voltage testing socket. Use new screws. Tightening torque: 6 Nm.

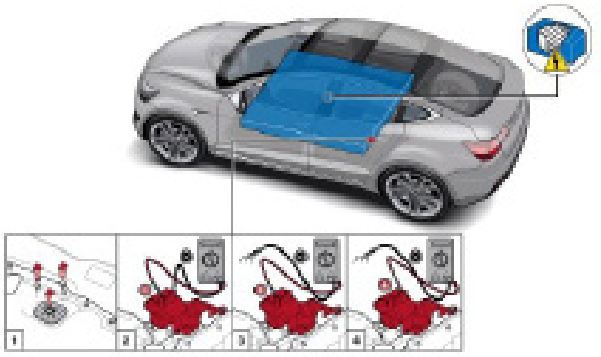


Figure 2. Battery access

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

Stator casing gasket[1]
(1 unit)

Inverter gasket[2]
(1 unit)

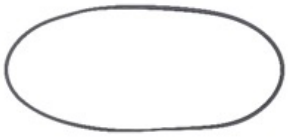
Gearbox end gasket[3]
(1 unit)

Encoder cover gasket[4]
(1 unit)

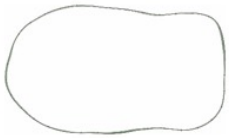
Encoder cover gasket[5]
(1 unit)

Bearings cover gasket[6]
(1 unit)

Cooler gasket[7]
(1 unit)

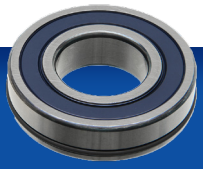


Winding protector inner gasket[8]
(1 unit)



Winding protector external gasket[9]
(1 unit)

Gearbox oil seals[10]
(2 units)

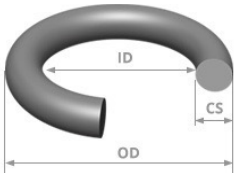


ATTENTION!

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** (EV000300).

O rings gaskets kit
(25 units)

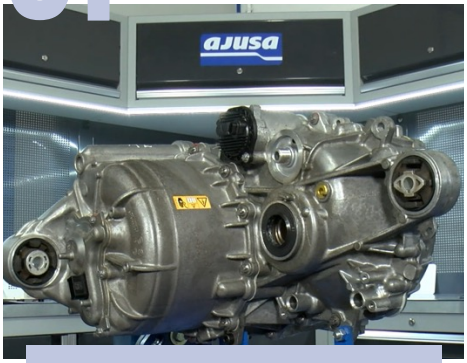


	OD (mm)	ID (mm)	CS (mm)
Oil pump small gasket[11] (1 unit)	43,00	39,00	2,00
Oil pump medium gasket[12] (1 unit)	61,00	57,00	2,00
Oil pump big gasket[13] (1 unit)	65,00	60,00	2,50
Inverter cooling nozzles gaskets[14] (2 units)	29,00	22,00	3,50
Cooler gaskets[15] (2 units)	18,00	13,00	2,50
Stator terminals base gasket[16] (3 units)	19,50	12,50	3,50
Oil spout gasket[17] (6 units)	17,40	12,00	2,70
Connection terminals end cover gasket[18] (3 units)	22,70	15,50	3,60
Phases feedthrough gaskets[19] (3 units)	-	27,00	5,50
Three-phase terminals closing cover[20] (3 units)	23,00	18,00	2,50
Oil breather cap[21] (1 unit)	20,00	16,00	2,00

repair

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

01



Transfer gearbox

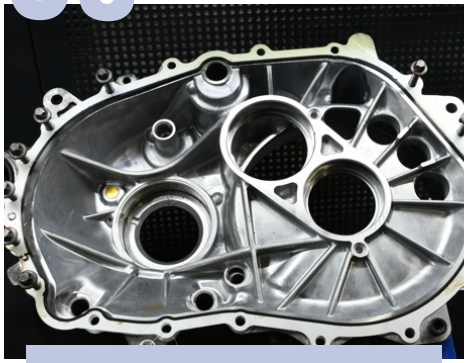
Before getting started with the repair, we must access the failure. So, we will **open and adapt** the transfer gearbox area.

02

Oil spout

Extract the oil spout from the ensemble and replace O rings or **oil spout gasket[18]**. It is important to take into consideration that one of the spouts must be placed together with the differential.

03



Transmission cover

Once the pinions or differential are located, we will place the **gearbox end gasket[3].**

04

Stator feedthrough

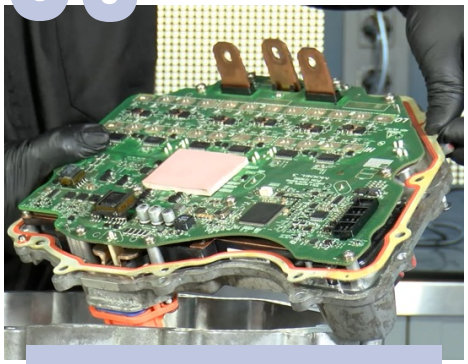
There are 3 **phases feedthrough gaskets[20]**. to be replaced. We will place the feedthrough by force-fitting, then we will assemble the other casing. Tightening torque, 22 Nm.

05

Differential bearings cover

The next step will be to assemble the access cover to the bearings of the main and secondary shafts. This cover will house the **bearings cover gasket[6]**. Tightening 10 Nm.

06



Inverter

We will assemble the **the inverter gasket[2]** by placing it on positioning or centering pins. The tightening will be of 12,5 Nm.

07

Cooler

It is now the **cooler cover gasket's**[7] turn, located in the power inverter cooler. Once placed in its place, we will proceed with a tightening of 10 Nm.

08

Inverter cooling nozzles

The cooler's inlet and outlet intakes are composed of nozzles that have O ring gaskets called **inverter cooling nozzles gaskets**[15]. Tightening for the noozles are 6 Nm.

09

Gearbox seals

It is time now for the **gearbox oil seals**[10]. We will use an appropriate implement for its installation.

10

Motor phases

Next step will be assembling the **stator terminals base gaskets**[17], which are the three-phase phases which go in the feedthrough, then move to the bearings.

11

Heat inductor for mounting bearings

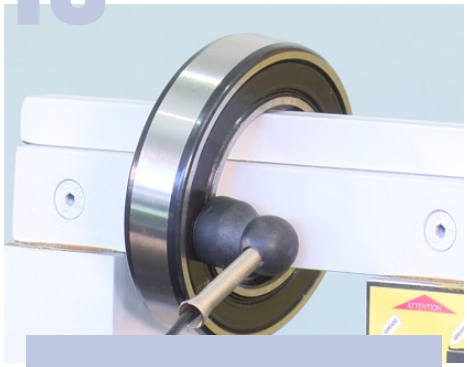
Before starting, make sure the work area is free from pollutants (especially metallic objects) Make sure you have the tools you need, apart from the personal protective equipment (gloves and glasses).

12

Bearing placement in heat inductor

We put the **bearing**[11] 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.

13



Temperature tube placement

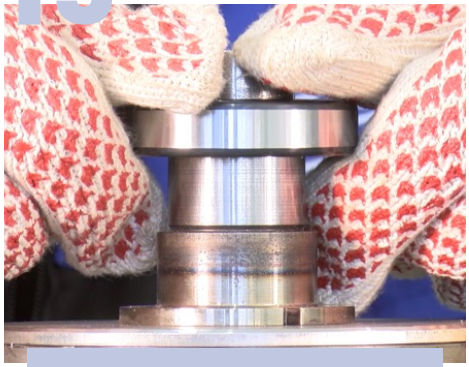
Next, we will place the temperature tube, always in the inner part of the **bearing**[11]. This way, the inductor will tell us when the **bearing**[11] reaches the temperature we want, usually between 80 and 120ºC

14

Heating

Once the temperature is reached, we switch off the station and disconnect the temperature tube. We take of the **bearing**[11] from its base and we are ready for placement.

15



Bearing assemble

Align properly the bearing with the axis. Heat should have dilated the material, the **bearing**[11] 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.

16

Final appearance of the bearing

17

Stator assembly

Once the bearings and the impulse wheel have been placed, we will assemble the entire assembly on the stator. Great caution must be taken due to the magnetic force.

18

Winding protector gaskets

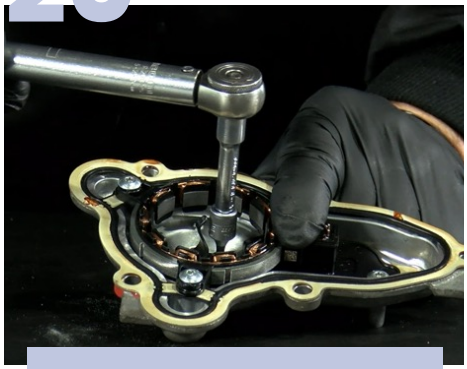
We will place **winding protector inner gasket**[8] and the **winding protector external gasket**[9].

19

Stator casing gasket

We will place the electric motor gasket and the gearbox **stator casing**[1] with the help of the centering pins which will allow us to center the gasket. Tighten 25 Nm.

20



Enconder cover gaskets

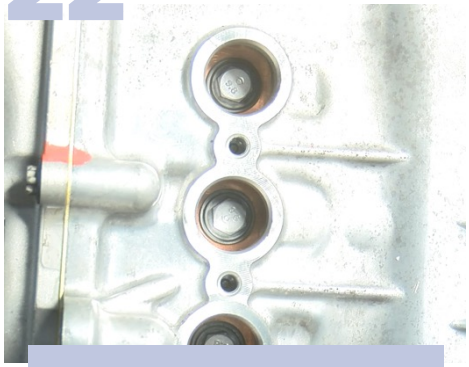
First the **enconder cover gasket**[4] and then **encoder cover gasket**[5]. To fix the encoder, tightening will be 4 Nm. Once it is placed, we will place the ensemble cover-encoder. This time tighten will be 8 Nm.

21

Oil pump

In the pump we locate 3 O rings gaskets (**oil pump big gasket**[14], **oil pump medium gasket**[13] and **oil pump small gasket**[12]). Once they are placed, we will take the pump to its housing and apply a tightening torque of 5 Nm + 20º

22



Terminals

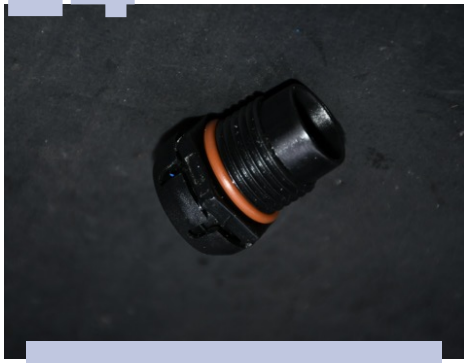
It is time to connect the stator to the inverter. The tightening of the three connecting screws is of 11,5 Nm.

23

Terminals closing cover

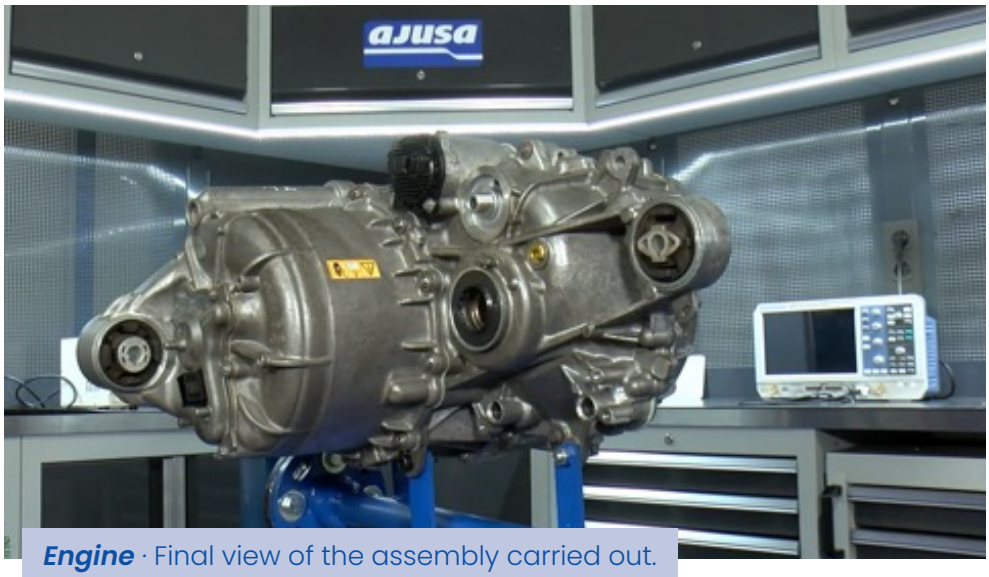
We will place the **three-phase terminals closing cover gaskets** [21] on its cover, and, once it is placed, we will tighten 10 Nm.

24



Oil breather

Lastly, we will place the **oil breather cap gasket**[22]. O ring. This cap is made of plastic, so the tightening torque mustn't exceed 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 see the **assembly video**:

VIDEO