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Schaeffler E-Axle RepSystem-G

Art. No. 761 0002 10
Repair solution for E-Axle
Disassembly / Assembly

Hyundai Ioniq AE-EV (Model Year 2016–2019 EM09 / 88 KW)

Schaeffler Automotive Aftermarket GmbH & Co. KG
August 2024

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Hyundai Ioniq AE-EV disassembly and assembly

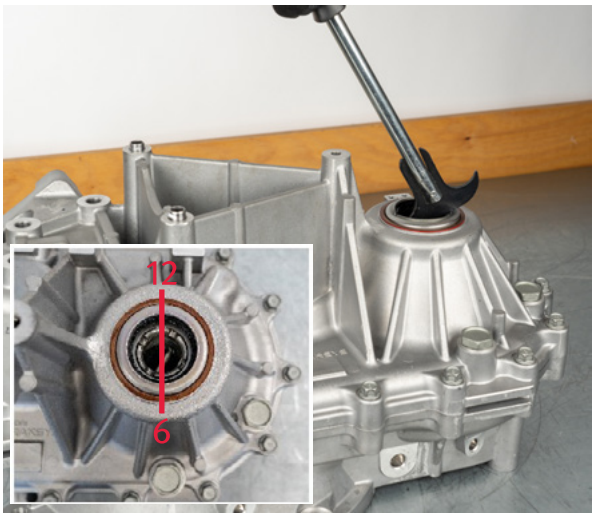
- The vehicle manufacturer's specifications and safety instructions must be observed when removing and installing the drive unit
- Work on electric vehicles may only be carried out in compliance with the country-specific legal regulations
- Repairs may only be carried out by specialist staff and using suitable garage equipment
- The bearing seats and the seats of the shaft seals need to be cleaned
- The inner and outer bearing races must not be interchanged
- Cleanliness must be ensured throughout the entire repair process
- When using thread lock or bolt sealant, it is necessary to clean the threads before application

- Drain the transmission oil
- Tighten the oil drain plug to 52 Nm
- Remove the gearbox in accordance with the vehicle manufacturer's specifications
- Disassemble attachment parts such as the gearbox suspension, etc.

- Remove the bolts and lift the parking lock actuator upwards

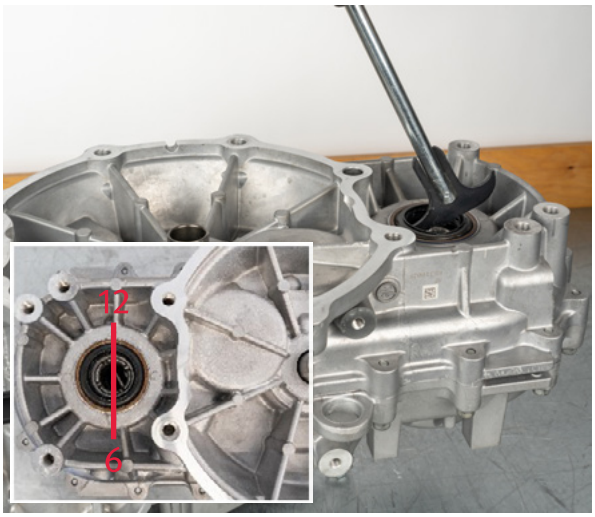
- Remove the gearbox-side shaft seal of the drive shaft

Note:
The disassembly tool must **not** be placed in the 12 or 6 o'clock positions in relation to the installation position in the vehicle as there are oil ducts in these positions



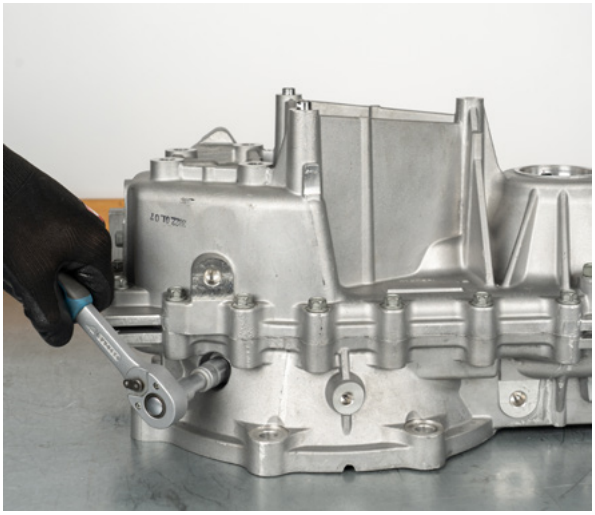
- Remove the motor-side shaft seal of the drive shaft

Note:
The disassembly tool must not be placed in the 12 or 6 o'clock positions in relation to the installation position in the vehicle as there are oil ducts in these positions

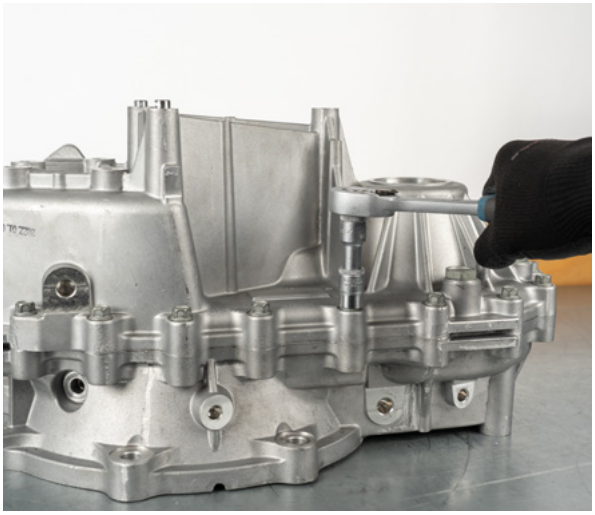


- Remove the first bolt for the parking lock

- Place the gearbox on the motor mounting surface
- Remove the second bolt for the parking lock

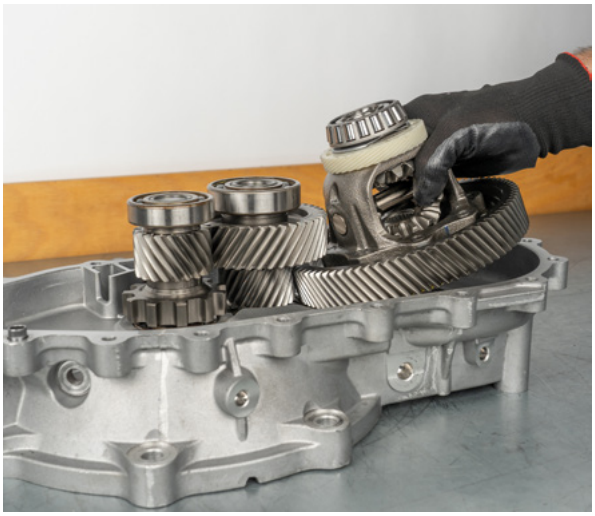


- Disassemble the gearbox housing bolts
- Lift the gearbox housing evenly upwards, using appropriate tools (e.g., mounting lever)



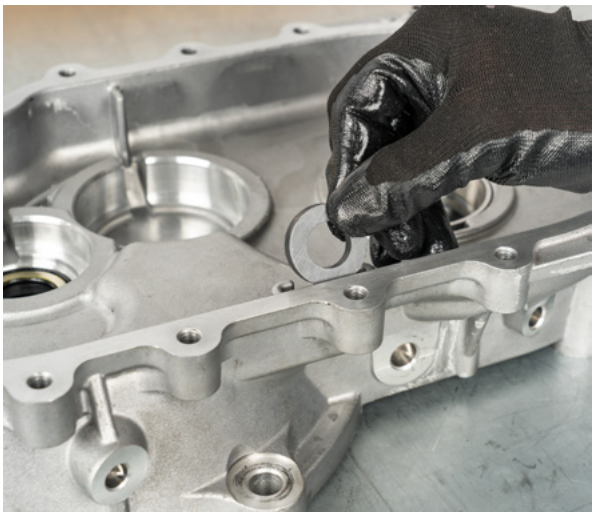
- Remove the two adjusting shims from the input and output shaft

- Remove the differential gear

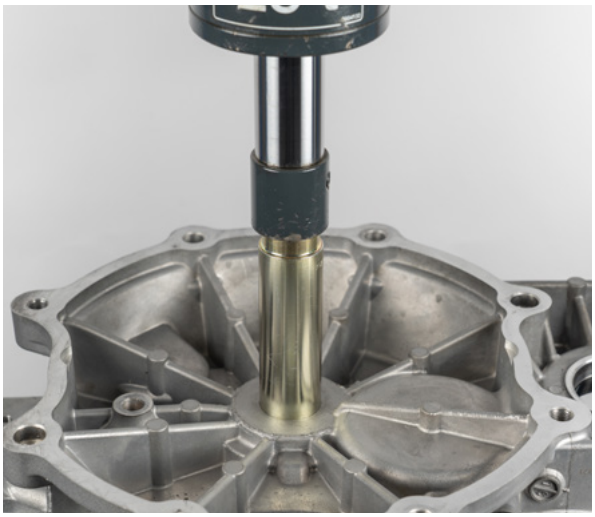


- Remove the input and output shaft

- Remove the magnet

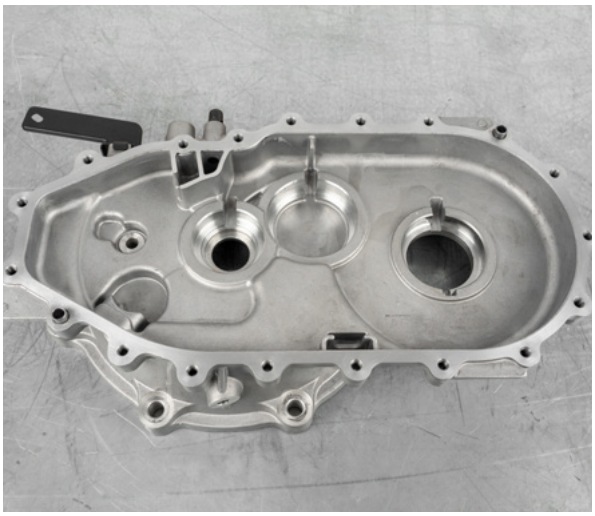


- Remove the input shaft oil seal



- Remove the motor-side bearing outer race in the gearbox housing using a suitable internal extractor

- Clean off all old residual sealant
- Clean the motor side housing



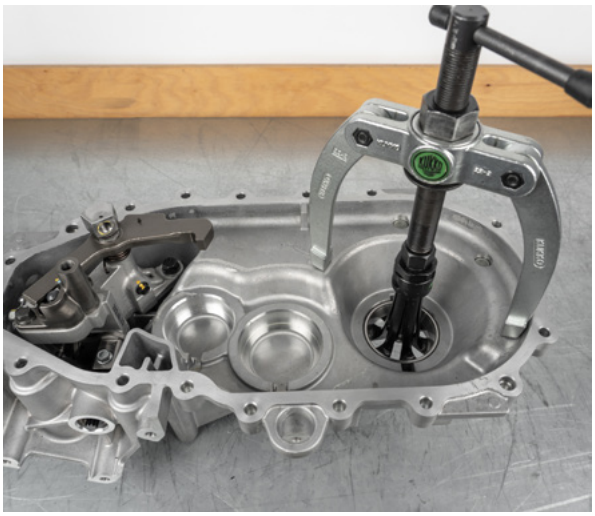
- Press the new motor-side bearing outer race into the gearbox housing

- Press in the new input shaft oil seal

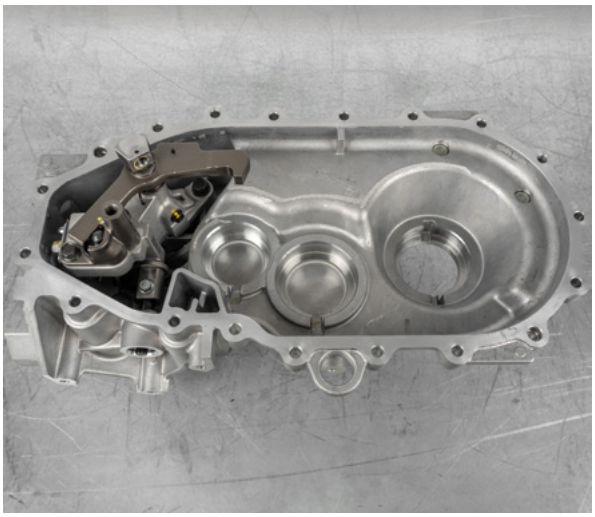
Note:
Pay attention to the installation position

- Remove the gearbox-side bearing outer race in the gearbox housing using a suitable internal extractor

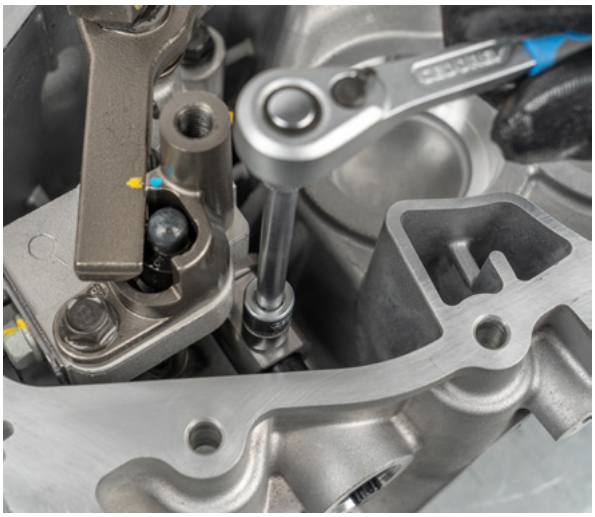
Note:
An adjusting shim is located under the bearing outer ring



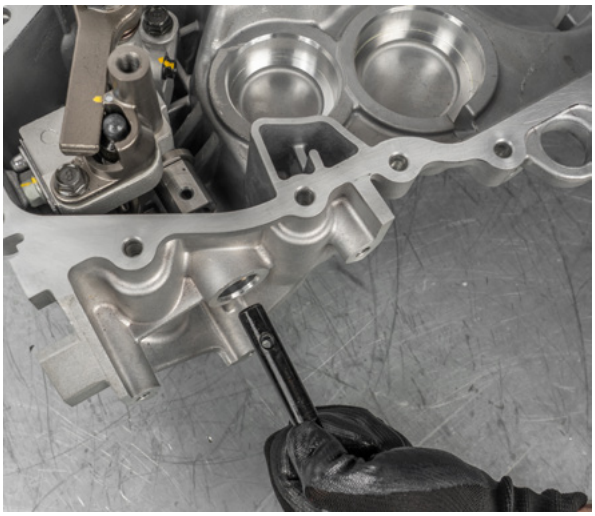
- Clean off all old residual sealant
- Clean the gearbox side housing



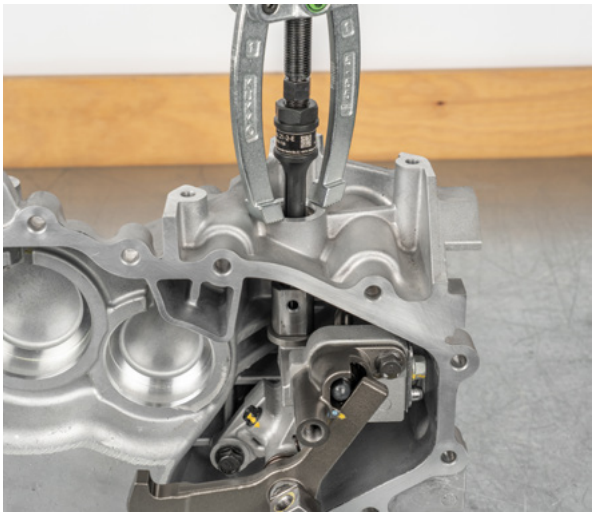
- Unscrew the bolt for the parking lock shaft



- Remove the shaft

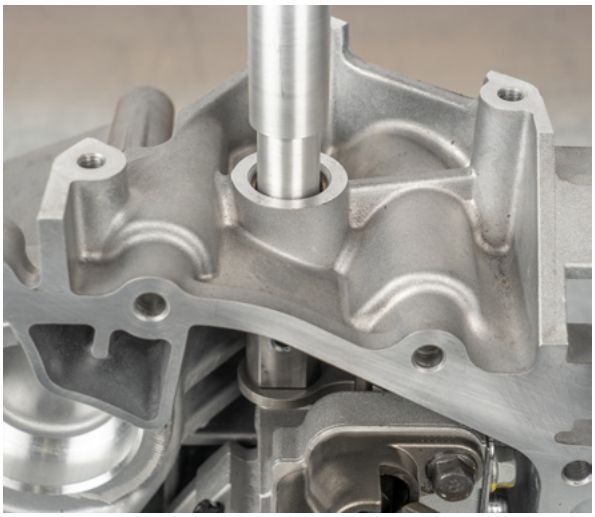


- Remove the shaft seal with a suitable internal extractor
- Ensure the puller only to grip the shaft seal and not the needle roller bearing underneath

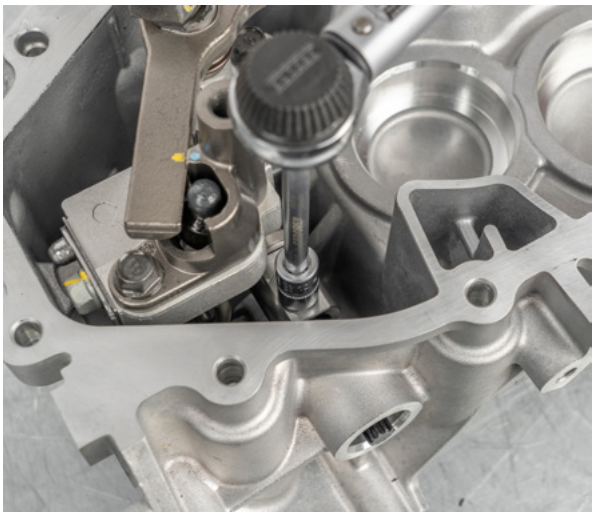


Note:
Note the installation depth of the shaft seal ring

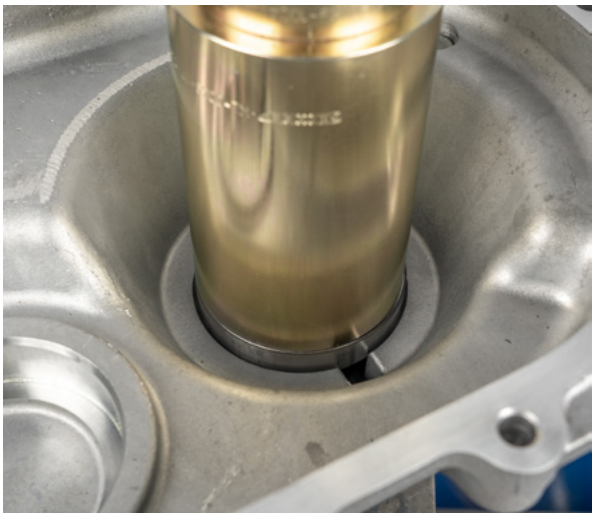
- Assemble a new shaft seal at the previous installation depth



- Installing the parking lock mechanism
- Insert the shaft bolt and tighten to 10 Nm

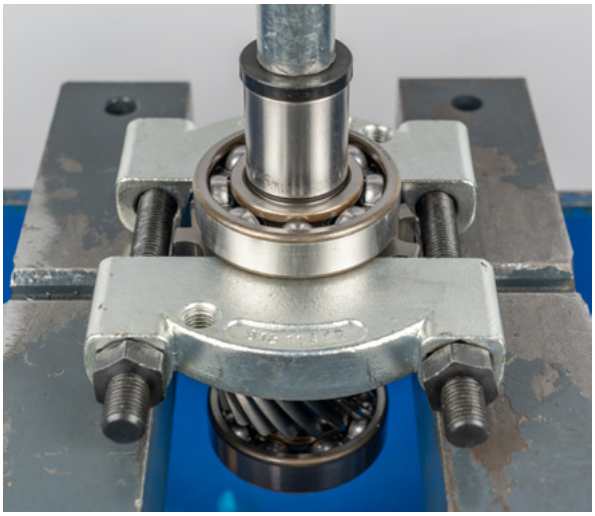


- Press a gearbox-side new outer bearing race **without an adjusting shim** into the gearbox housing

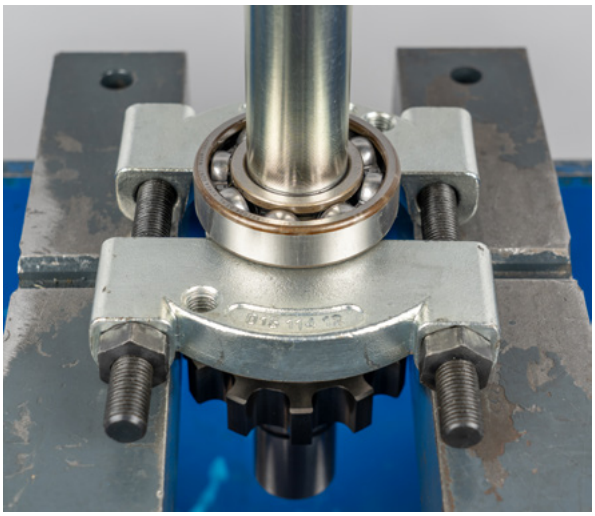


Please note:
The correct adjusting shim is not determined until a later work step and then assembled

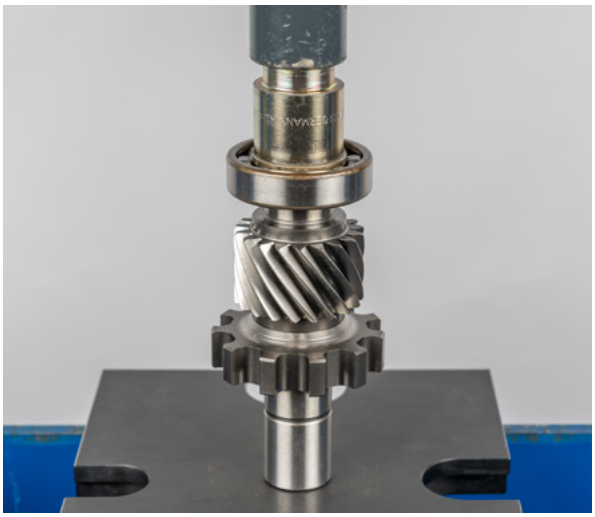
- Press off the motor-side bearing for the input shaft



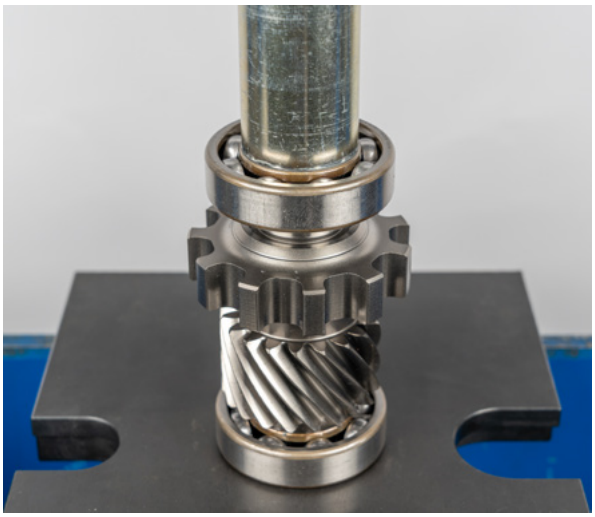
- Press off the gearbox-side bearing for the input shaft



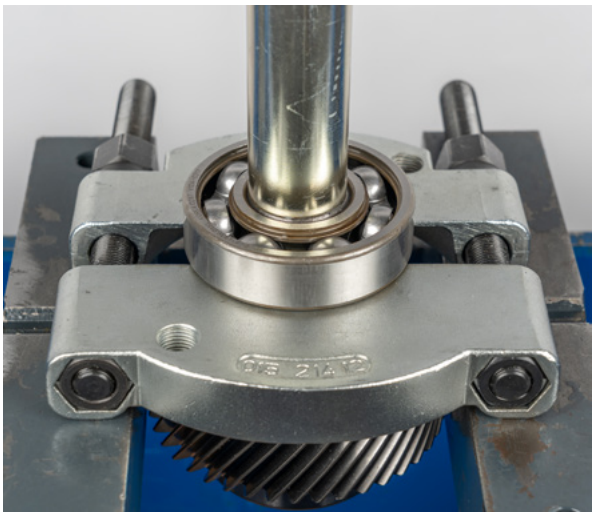
- Press on the new gearbox-side bearing for the input shaft



- Press on the new motor-side bearing for the input shaft

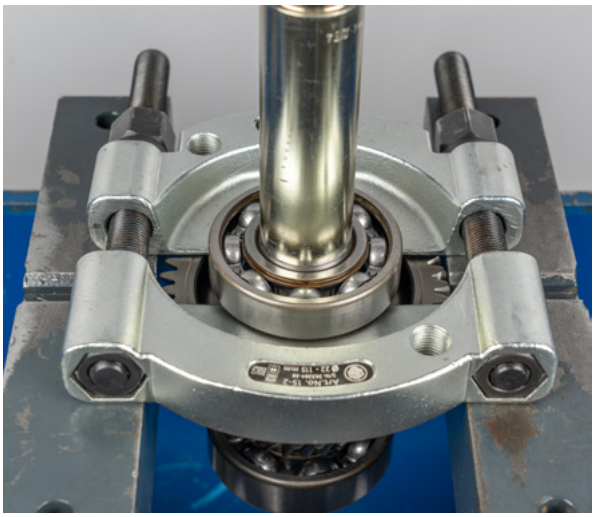


- Press off the motor-side bearing for the output shaft

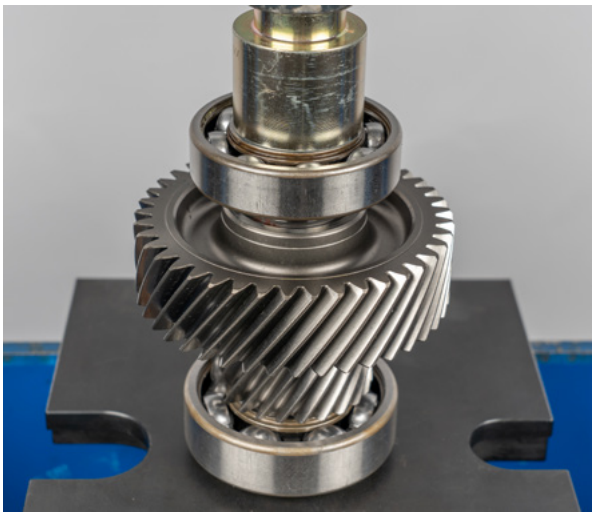


- Press on the new motor-side bearing for the output shaft

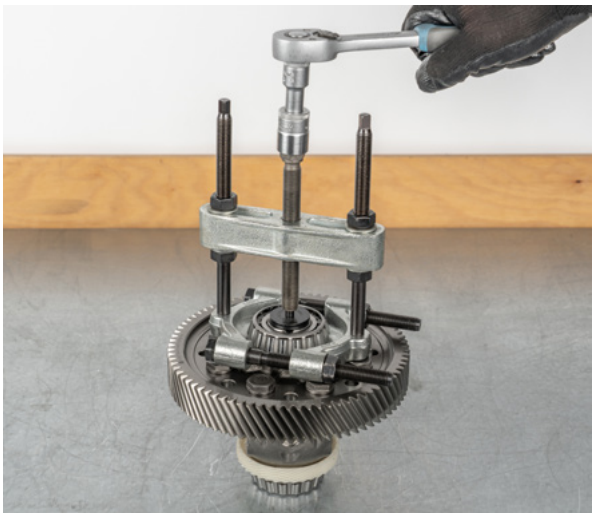
- Press off the gearbox-side bearing for the output shaft



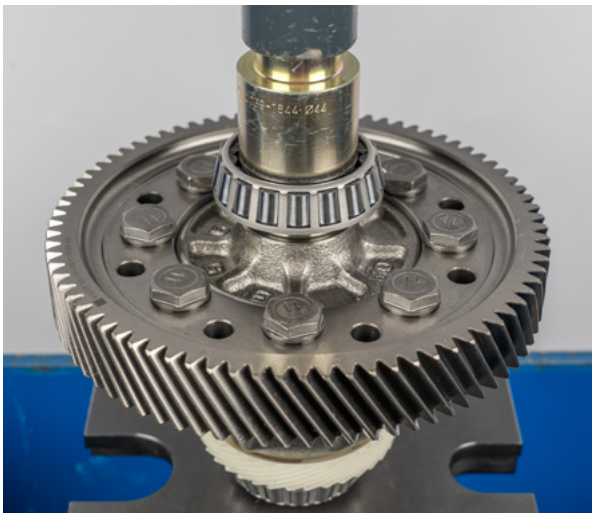
- Press on the new gearbox-side bearing for the output shaft



- Pull off the motor-side tapered roller bearing from the differential gear

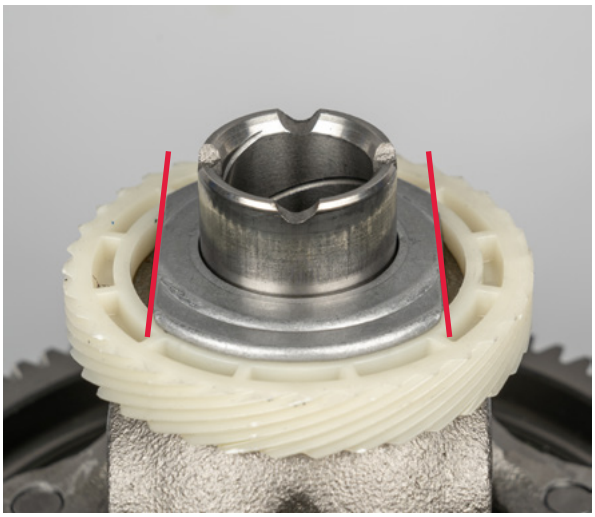


- Press the new motor-side tapered roller bearing onto the differential gear

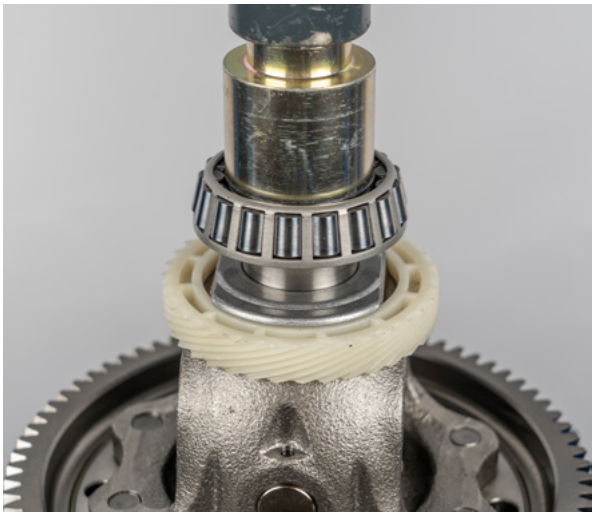


- Press off the gearbox-side tapered roller bearing from the differential gear

- Place the intermediate plate as shown in the image



- Press the new gearbox-side tapered roller bearing onto the differential gear



- Motor housing side:

Measure the distance between the sealing surface and the bearing seat of the output shaft at four points using a depth caliper and two flat rulers and calculate the average value

For example:

$$\frac{(55.48 + 55.46 + 55.48 + 55.47)\ \text{mm}}{4} = 55.47\ \text{mm}$$

Note:
The thickness of the flat rulers must be removed from the calculation

- Gearbox housing side:

Measure the distance between the sealing surface and the bearing seat of the output shaft at four points using a depth caliper and two flat rulers and calculate the average value

For example:

$$\frac{(62.73 + 62.73 + 62.72 + 62.74)\ \text{mm}}{4} = 62.73\text{mm}$$

Note:
The thickness of the flat rulers must be removed from the calculation

- Place the existing adjusting shim of the output shaft together with the output shaft on a suitable measuring plate

- Place any adjusting shim that fits the upper bearing of the output shaft on a measuring plate

- Measure the thickness of the adjusting shim with a depth caliper and set the depth caliper to “zero”

- Place the adjusting shim from the previous step onto the upper bearing of the output shaft
- Measure the distance between the bearing outer rings, including the two adjusting shims

For example:118.26 mm

- The nominal value of the bearing play is **0.00 mm to 0.08 mm**
- **Calculate the existing bearing setting:**
  Motor housing side distance
  + gearbox housing side distance
  = distance between bearing seats

  Distance between bearing seats
  – distance between bearing outer rings
  = existing bearing setting

Note:
Negative value (-) = preload
positive value (+) = clearance

- **Example:**
  55.47 mm
  + 62.73 mm
  = 118.20 mm

  118.20 mm
  – 118.26 mm
  = - 0.06 mm (preload)

- If the determined value is outside the above target value, the required bearing play has to be adapted by replacing the adjusting shim

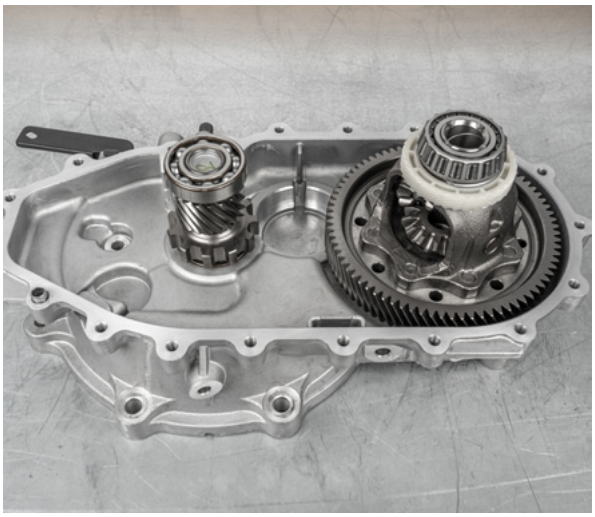
- In our example, the existing adjusting shim (1.02 mm) would have to be 0.06 mm to 0.14 mm thinner

- The new adjusting shim would then have a thickness of 0.96 mm to 0.88 mm

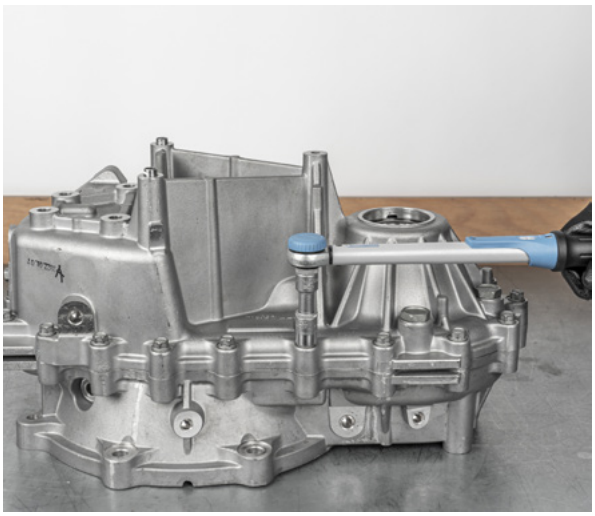
Note:
Information on the adjusting shims can be found in the appendix

- The adjusting shim determined is placed in the gearbox housing at a later time

- Place the differential gear and input shaft **without** an adjusting shim in the motor housing



- Put on the housing cover and tighten all bolts to 15 Nm



- Turn the gearbox over

- Mount the dial gauge as shown, place the measuring tip on the input shaft, and make sure of the preload

- Pull the input shaft up to the stop by hand and read off and note the value

For example: 2.77 mm

- The nominal value of the bearing play is **0.00 mm to 0.06 mm**

- **Determine the correct adjusting shim:**

Value from previous step
– bearing play
= thickness of adjusting shim

- **Example:**
  2.77 mm
  - 0.00 mm to 0.06 mm
  = 2.77 mm to 2.71 mm

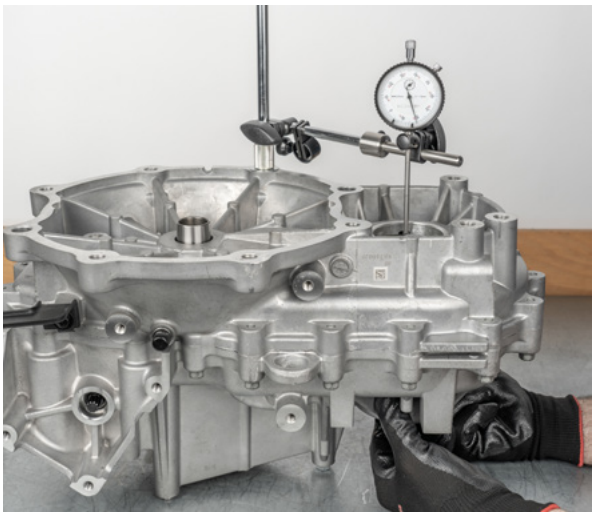
- The adjusting shim determined is placed in the gearbox-side housing at a later time

Note:
Information on the adjusting shims can be found in the appendix

- Disassemble the dial gauge, assemble it as shown for another measurement, place the measuring tip on the bearing inner ring of the differential, and make sure of the preload

- Pull the differential up to the stop by hand and read off and note the value

For example: 0.81 mm



- The nominal value of the bearing preload is **0.10 mm to 0.16 mm**

- **Determine the correct adjusting shim:**

  Value from previous step
  + bearing play
  = thickness of adjusting shim

- **Example:**
  0.81 mm
  + 0.10 mm to 0.16 mm
  = 0.91 mm to 0.97 mm

- The adjusting shim determined is placed in the gearbox-side housing at a later time

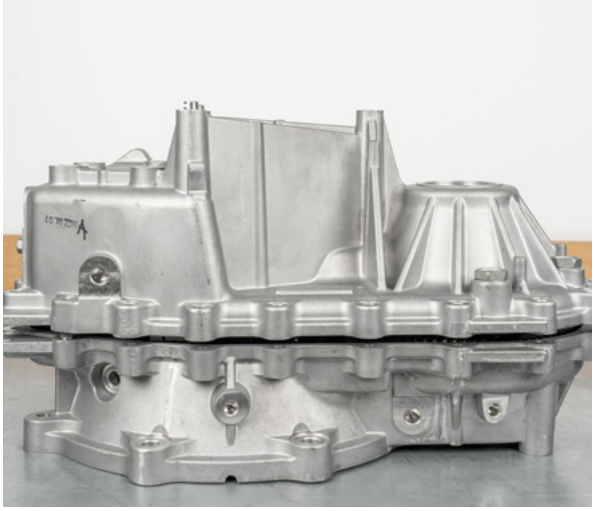
Note:
Information on the adjusting shims can be found in the appendix

- Disassemble the dial gauge

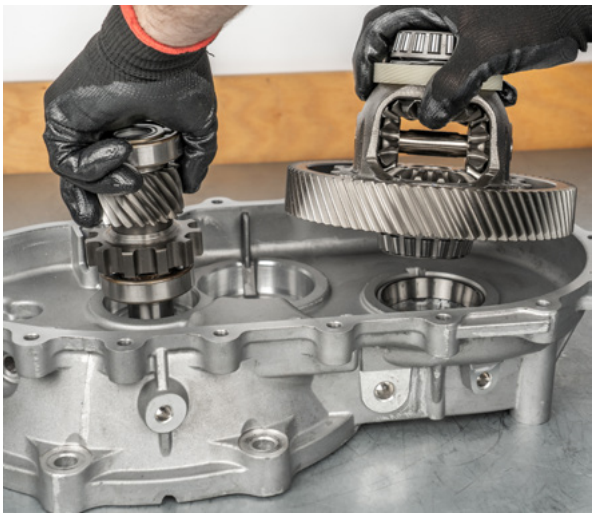
- Place the gearbox on the motor side

- Remove the gearbox housing bolts

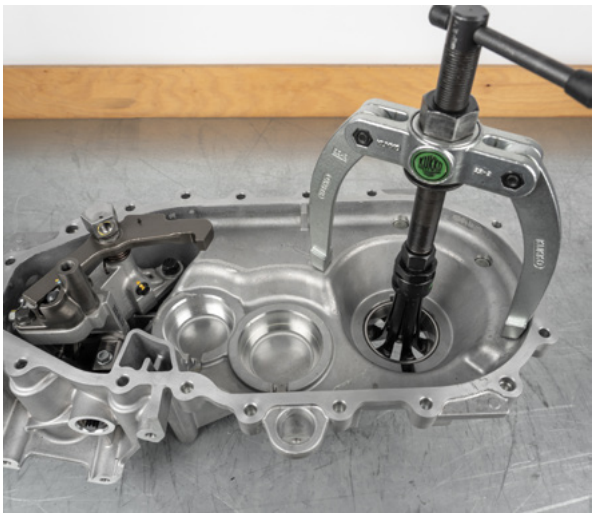
- Lift the gearbox housing evenly up and off with a suitable tool (e.g., mounting lever)



- Remove the input shaft and differential gear from the housing

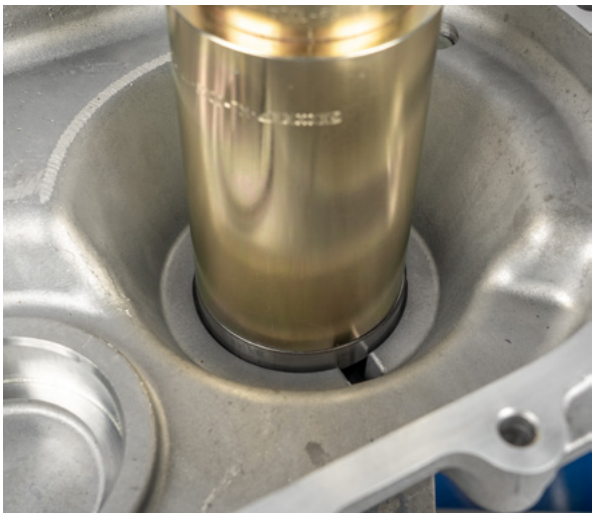


- Remove the gearbox-side bearing outer race in the gearbox housing using a suitable internal extractor



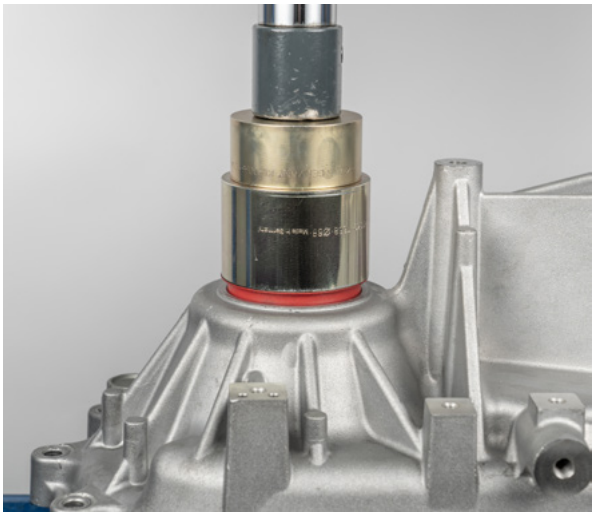
- Insert the previously determined adjusting shim for the differential gear

- Press the gearbox-side bearing outer race back into the gearbox housing

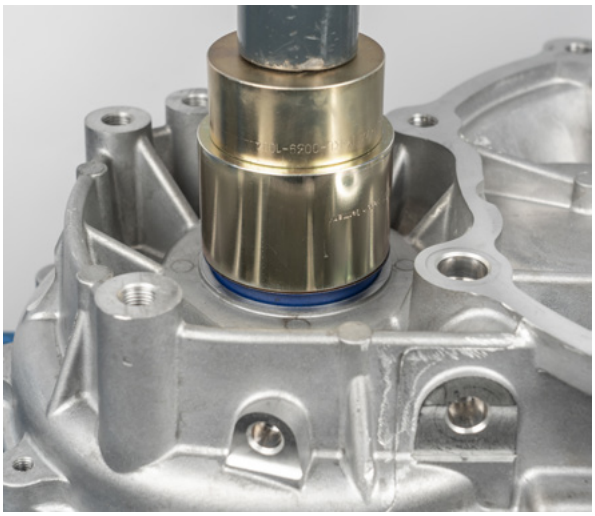


- Press in the red, gearbox side drive shaft seal

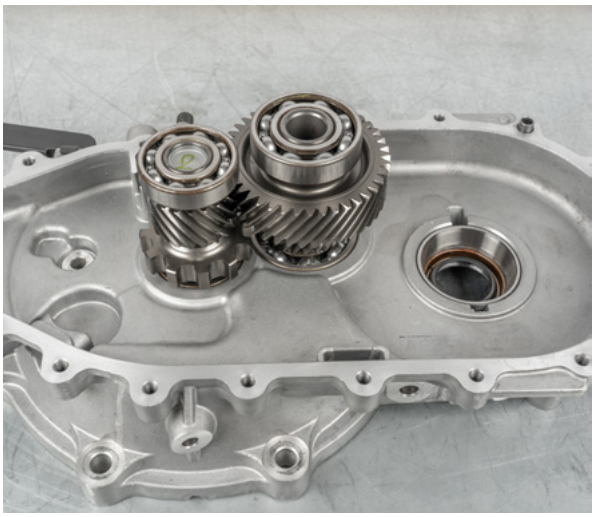
Note:
The drive shaft seals are different and must not be interchanged



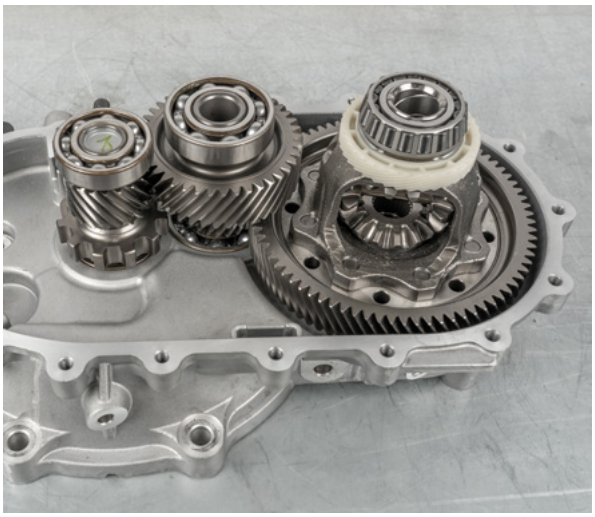
- Press in the blue, motor side drive shaft oil seal



- Insert the input shaft and output shaft into the housing



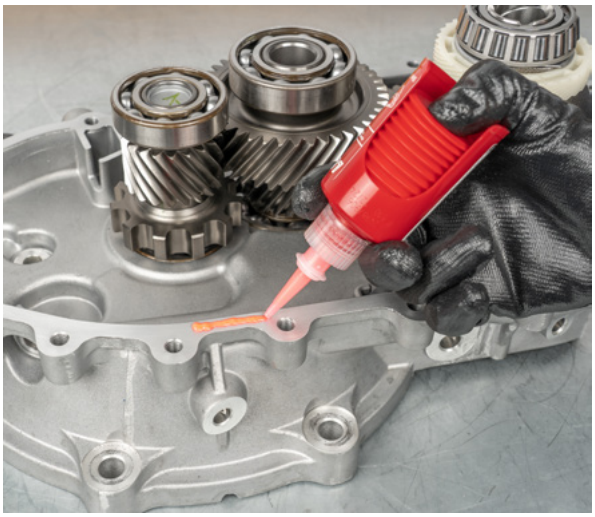
- Insert the differential gear into the housing



- Clean the magnet
- Place the magnet in the housing

- Clean the sealing surfaces with a suitable cleaner, such as Loctite SF 7063

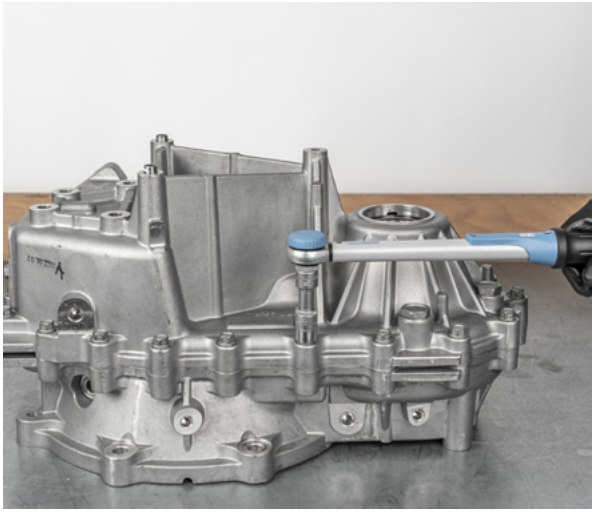
- Apply a suitable sealant, such as Loctite 510, to the housing



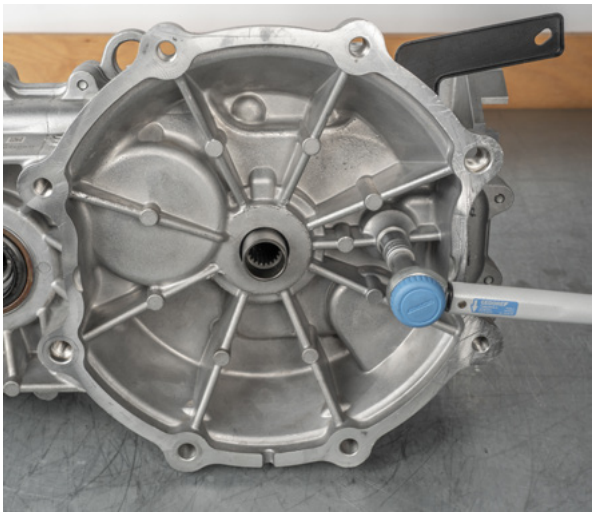
Note:
Ensure that the alignment dowels sleeves are correctly positioned in the housing

- Place the previously determined adjusting shims for the input and output shaft onto the bearings

- Assemble the gearbox housing cover and tighten the bolts to 25 Nm

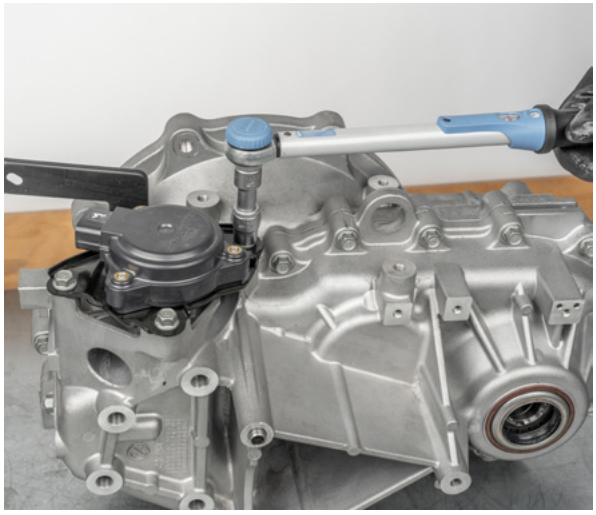


- Clean the first bolt for the parking lock
- Put on the new sealing shim
- Apply thread sealant, such as Loctite 577
- Tighten the bolt to 25 Nm

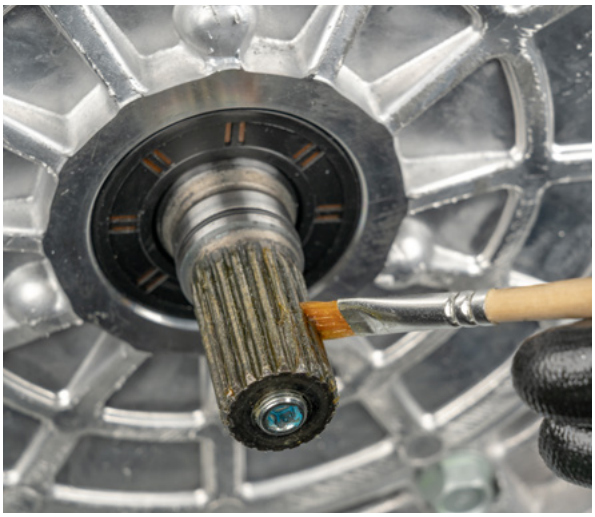


- Clean the second bolt for the parking lock
- Put on the new sealing shim
- Apply thread sealant, such as Loctite 577
- Tighten the bolt to 25 Nm

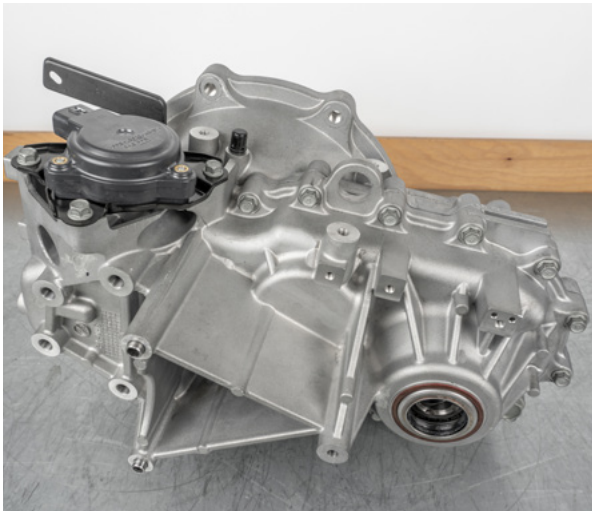
- Assemble the parking lock actuator and tighten the bolts to 24 Nm



- Remove the O-ring for the rotor shaft
- Clean the rotor shaft splines
- Replace the O-ring
- Apply grease to the rotor shaft splines (e.g., CASMOLY L9508)



- Install the gearbox, observing the vehicle manufacturer's instructions
- Gear oil quantity: 1.0 to 1.1 liters
- Oil specification: 70W, API GL-4, TGO-9 (MS517-14)
- Tightening torque of the oil level bolts: 52 Nm
- Tightening torque of the fastening bolts for the gearbox and electric motor: 47 Nm



APPENDIX

Set of adjusting shims for output shaft bearing
Art. no. 464 0026 10

Shim thickness:
0.60 mm
0.65 mm
0.70 mm
0.75 mm
0.80 mm
0.85 mm
0.90 mm
0.95 mm
1.00 mm
1.05 mm
1.10 mm
1.15 mm
1.20 mm
1.25 mm
1.30 mm
1.35 mm
1.40 mm
1.45 mm
1.50 mm
1.55 mm
1.60 mm

Set of adjusting shims for input shaft bearing
Art. no. 464 0025 10

Shim thickness:
2.20 mm
2.25 mm
2.30 mm
2.35 mm
2.40 mm
2.45 mm
2.50 mm
2.55 mm
2.60 mm
2.65 mm
2.70 mm
2.75 mm
2.80 mm
2.85 mm
2.90 mm
2.95 mm
3.00 mm
3.05 mm
3.10 mm
3.15 mm
3.20 mm

Set of adjusting shims for differential gear bearing
Art. no. 464 0027 10

Shim thickness:
0.60 mm
0.65 mm
0.70 mm
0.75 mm
0.80 mm
0.85 mm
0.90 mm
0.95 mm
1.00 mm
1.05 mm
1.10 mm
1.15 mm
1.20 mm
1.25 mm
1.30 mm
1.35 mm
1.40 mm
1.45 mm
1.50 mm
1.55 mm
1.60 mm

If individual adjusting shims are required to supplement the respective set, These can be ordered at **https://www.repxpert.com/repsystem-g-shims**.