CHASSIS

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1. SPECIAL TOOLS...................................... 27
## 1. MAJOR CHANGES

### 1) Gear Shift Lever and Cable (Manual Transaxle)

#### Gear shift lever assembly

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Old Gear Shift Lever Assembly" /></td>
<td><img src="image" alt="New Gear Shift Lever Assembly" /></td>
</tr>
</tbody>
</table>

The gear shift lever bracket has been changed to adopt the premium console.

#### Gear shift cable assembly

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Old Gear Shift Cable Assembly" /></td>
<td><img src="image" alt="New Gear Shift Cable Assembly" /></td>
</tr>
</tbody>
</table>

The connection and socket to lever has been changed.
2) Steering Wheel Angle Sensor

The sensor has been changed due to newly adopted steering wheel heating system.

1. The sensor has been changed due to newly adopted steering wheel heating system.
2. The location of sensor connector and the pin arrangement of connector have been changed.

<table>
<thead>
<tr>
<th>Sensor connector</th>
<th>Sensor connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td>New</td>
</tr>
</tbody>
</table>

SWAS: Steering Wheel Angle Sensor
3) Steering Wheel Heating System

### Steering wheel heating unit

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Steering wheel heating unit" /></td>
<td><img src="image2" alt="Steering wheel heating unit" /></td>
</tr>
</tbody>
</table>

The steering wheel heated wire and the heating unit are installed in the steering wheel assembly.

### Lower main switch cluster

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Old lower main switch cluster" /></td>
<td><img src="image4" alt="New lower main switch cluster" /></td>
</tr>
</tbody>
</table>

The steering wheel heating switch has been added on the lower main switch cluster.

#### Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>Below 95W</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>12V</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>9V~16V</td>
</tr>
<tr>
<td>Rated current</td>
<td>6±2.0A</td>
</tr>
</tbody>
</table>
4) Parking Brake Lever Assembly

Parking brake lever assembly (Automatic transaxle equipped vehicle)

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Old Image" /></td>
<td><img src="image2.png" alt="New Image" /></td>
</tr>
</tbody>
</table>

The parking brake lever bracket has been changed to adopt the premium console.

---

Parking brake lever assembly (Manual transaxle equipped vehicle)

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Old Image" /></td>
<td><img src="image4.png" alt="New Image" /></td>
</tr>
</tbody>
</table>

The parking brake lever bracket has been changed to adopt the premium console.
### 2. MOUNTING LOCATIONS (CHASSIS)

<table>
<thead>
<tr>
<th>HECU (Hydraulic &amp; Electronic Control Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HECU for ABS</strong></td>
</tr>
<tr>
<td>Moto</td>
</tr>
<tr>
<td>HU (Hydraulic Unit)</td>
</tr>
<tr>
<td>ECU (Electronic Control Unit)</td>
</tr>
<tr>
<td><strong>HECU for EPS</strong></td>
</tr>
<tr>
<td>Moto</td>
</tr>
<tr>
<td>HU (Hydraulic Unit)</td>
</tr>
<tr>
<td>ECU (Electronic Control Unit)</td>
</tr>
</tbody>
</table>

The HECU (Hydraulic & Electronic Control Unit) determines the slip conditions of vehicle wheels by calculating each wheel's speed and the increment/decrement of speed based on the information detected by the sensors, and controls the pumping and boosting/reducing/keeping pressure by operating the valve and motor of HECU.

### EPS unit

- Motor angle (8P)
- Connector to vehicle (8P)
- Battery (2P)
- Torque angle sensor (8P)
- Motor power (3P)

The ECU controls the electric power steering system depending on the driving conditions, based on the signals from the torque and angle sensor.

### Fuse for vehicle with EPS

The vehicle with EPS has EPS fuse (80A) mounted to the positive (+) terminal of the battery not in the fuse box.

### Steering wheel angle sensor (SWAS)

The steering wheel angle sensor is mounted between the steering column and the steering column shaft. It is commonly used by the ESP (Electronic Stability Program) system. And it receives signals of the steering wheel angle sensor from the ESP HECU (Hydraulic & Electronic Control Unit).
For the vehicle with the ABS, a speed difference between the wheels is not noticeable as all the wheels are slipping during abrupt braking. Therefore, the vehicle needs the speed information from other sensors other than the wheel speed sensor. The longitudinal acceleration sensor (G-sensor) is used for this case. It controls the ABS by using the signals from the sensor during abrupt braking and acceleration.

The TGS communicates with TCU (Transmission Control Unit), ECU, ESP HECU and instrument cluster to let the driver select the desired transmission gear and to maintain the desired driving condition. Also, the tip switch is installed on the lever knob and the steering wheel so that the driver select the gear manually when the shift lever is in "M".

The E-coupling unit is a control unit which determines the magnetic force by considering CAN signals (wheel speed, engine torque, pedal opening, ABS/ESP CAN signals, etc.) from other ECUs.

The TGS Lever assembly

The sensor cluster is linked to the sensors on the unit board and CAN interface. And they are housed in one case and mounted to the body.

The TCU unit

The transmission control unit (TCU) is installed under the driver seat, and controls the transmission. The TCU is operated by the ignition power supply and receives and processes the following information from the inner sensors through CAN buses.
3. CHASSIS COMPONENT LAYOUT

1) 4WD Vehicle With Automatic Transmission

**M11 6-speed A/T assembly**

M11 6-speed automatic transmission is available as 4WD- and 2WD-type, and provides 6 speeds for forward travel and 1 reverse travel. It is also equipped with the torque converter with inner lock-up clutch and electronically controlled solenoid which controls all hydraulic functions.

**PTU (Power Transfer Unit)**

The PTU is a device that transfers the power generated from the engine to the rear axle through propeller shaft and E-coupling by changing the power flow direction by 90° in the front wheel drive type 4WD vehicle.

**E-coupling control unit (E-Coupling ECU)**

The E-coupling unit is a control unit which determines the magnetic force by considering CAN signals (wheel speed, engine torque, pedal opening, ABS/ESP CAN signals, etc.) from other ECUs.

**Rear axle assembly**

The rear axle installed in this car is a removable axle, called IRDA (Independent Rear Differential Axle). The rear differential carrier is installed directly on the sub frame, and there is an independent suspension that allows each wheel on the same axle to move vertically independently of each other with the universal joint and the slip joint.
2) 2WD Vehicle With Manual Transmission

The 2WD vehicle with manual transmission is a front wheel drive type vehicle that doesn't have PTU, propeller shaft, E-coupling and rear axle which are applied to 4WD vehicle. Its under structure is very simple.

M6LF1 manual transmission is a model modified from the one that used in other vehicle so that it can be applied to FF (Front engine-Front wheel driving) type vehicle, and has an axle in one piece. The engine torque and gear ratio of this transmission have been optimized to maximize driving performance. It provides 6 speeds for forward travel and 1 reverse travel.

Clutch assembly

Clutch disc
Pressure plate

M6LF1 manual transmission is a model modified from the one that used in other vehicle so that it can be applied to FF (Front engine-Front wheel driving) type vehicle, and has an axle in one piece. The engine torque and gear ratio of this transmission have been optimized to maximize driving performance. It provides 6 speeds for forward travel and 1 reverse travel.
4. SUB FRAME AND STEERING GEAR BOX LAYOUT

Front sub frame with HPS type steering gear box assembly

The front sub frame consists of 4 body bush mountings and 2 transmission bush mountings which reduce the vibration from the powertrain and road, and also control the torque. And the frame is equipped with hydraulic pressure pipe of the HPS type steering gear box.

Front sub frame with EPS type steering gear box assembly

This kind of front sub frame system has the same mounting structure with the frame with HPS. But the EPS type steering gear box has no hydraulic pressure pipe since it is driven by the electric motor.
Rear sub frame assembly for 4WD

Body mounting

Rear side

Body mounting

Axle mounting

Body mounting

Front side

Body mounting

Body mounting

The rear sub frame for 4WD vehicle consists of 4 body (bush) mountings and 2 axle (direct) mountings which reduce the vibration from the powertrain and road, and also control the torque.

Rear sub frame assembly for 2WD

Body mounting

Rear side

Body mounting

Body mounting

Body mounting

The rear sub frame for 2WD vehicle functions in the same way as the one for 4WD vehicle, but the structure is different from the one for 4WD. It consists of 4 body (bush) mountings.
5. FRONT SUSPENSION COMPONENT LAYOUT

Front suspension supports the vehicle weight and absorbs the vibration from tires. And, in this type of suspension, the steering linkage tie rod is mounted on the knuckle. The Macpherson Strut suspension is an independent suspension which has a spring on the strut with a built-in shock absorber. The lower arm is installed on sub frame and large strut damper is installed on the knuckle to support the tire.

Stabilizer bar assembly

The stabilizer bar assembly is not activated if the left/right wheels move up/down simultaneously, but if both wheels move up/down differently it is activated with frame to minimize the tilting of the body.

Lower arm assembly

The lower arm assembly connects the frame and knuckle. It supports the load transferred to the tire knuckle, relieves the impact from the vehicle and ground conditions, and ensures driving stability.
The coil spring is made by winding solid steel rod to form the coil shape. Its energy absorption rate per weight is higher than that of the leaf spring and it allows to absorb small vibration properly resulted in keeping the ride comforts. Therefore, it's difficult to make an effect on vibration damping because there is not any friction between coils.
6. REAR SUSPENSION COMPONENT LAYOUT

Multi-link type suspension is the independent suspension. It provides good ride comfort and drivability by reducing the coil spring weight. Also, it increases the space for passenger compartment by lowering the floor. This type of suspension consists of multiple links such as trailing arm, upper arm, lower arm and track rod.

**Shock absorber assembly**

This vehicle uses the gas shock absorber. This relieves the vertical vibrations of vehicle to provide ride comforts, prevents the spring break, enhances drivability, and extends the life span of steering components.

**Upper arm assembly**

Upper arm is installed between knuckle and sub frame and controls the lateral load and vehicle height.

**Trailing arm assembly**

Trailing arm is installed between knuckle and vehicle body and controls the front and rear load.

**Track rod assembly**

Track rod is installed between knuckle and rear sub frame and controls and compensates the lateral load.
The stabilizer bar assembly is not activated if the left/right wheels move up/down simultaneously, but if both wheels move up/down differently it is activated with frame to minimize the tilting of the body.

Coil spring is installed between the coil spring link and body frame. It relieves the vibrations and impacts from wheels to vehicle body.

The lower arm is installed between knuckle and rear sub frame and relieves the load to coil spring from wheel. In other word, it controls the longitudinal load.
7. BRAKE SYSTEM AND ESP SYSTEM LAYOUT

A. Indicators on instrument cluster

- ESP indicator
- Parking brake warning light
- ABS warning lamp

B. Master cylinder assembly

Description for master cylinder in this chapter is based on ABS/ESP equipped vehicle. For CBS, there is an extra pressure valve mounted to the master cylinder.

C. HECU assembly

The HECU assemblies for ABS and ESP have similar appearance but they have different inner structure and connector connections from each other.

D. Front brake assembly

The disc brake for 4WD vehicle is the same with the one for 2WD vehicle.
The parking brake is the mechanical device to hold the vehicle. When pulling up the lever, the parking brake cable between the lever and the rear drum brake trailing shoe pulls the parking brake lining to contact to drum.

The disc brake for 4WD vehicle has the same structure with the one for 2WD vehicle, but the appearance and knuckle shape is different from each other.
The steering gear box assembly consists of power cylinder and control valve. The power cylinder has a cylinder, piston and piston rod. The control valve directs the oil to one end face of the piston to enhance the steering force. There is a safety check valve which lets the driver steer manually when there is a malfunction in the hydraulic circuit.

**8. STEERING SYSTEM LAYOUT**

1) **HPS (Hydraulic Power Steering)**

- The hydraulic pump is a vane type pump and consists of the flow control valve and pressure relief valve.
- The oil reservoir sends the oil to the power steering pump and receives the oil from the power steering gear.
- There is a shock absorber which is folded in the axial direction when the vehicle is crashed and a ignition switch assembly on the column shaft.

The lower shaft minimizes the torque change using a CV joint which has constant angular speed.
2) EPS (Electric Power Steering)

The ECU controls the electric power steering system depending on the driving conditions, based on the signals from the torque and angle sensor.

The vehicle with EPS has EPS fuse (80A) mounted to the positive (+) terminal of the battery, and this fuse supplies power to the EPS unit directly.

The column shaft assembly consists of BLAC motor, ECU, torque and angle sensors. The electric power steering (EPS) system uses the electric motor to assist the steering force. It functions independently regardless of whether the engine is running or not, unlike the existing hydraulic power steering. The lower shaft functions in the same way as the hydraulic type.

When the driver turns the steering wheel, a torque is generated and the torque sensor and the steering angle sensor in the EPS system detect the rotation of the steering column to run the electric motor. At this time, the worm gear connected to the motor drives the helical gear mounted to the steering column to generate the assist torque for the steering column. This allows the driver to operate the steering wheel easier.
1. GUIDELINES FOR SERVICE WORKS

1) For Safety

To perform the service works easily and safely, the service technicians must keep the proper working procedures and rules. This manual provides the useful instructions to the service technicians so that they can perform the service works with standard working process, skills, tips in time. Please read this manual and follow the instructions carefully.

Signal words such as “WARNING”, “CAUTION” and “NOTE” have special meanings.

**NOTE**
indicates information to assist maintenance and instructions.

**CAUTION**
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

**WARNING**
indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

However, above references and cautions cannot be inclusive measures, so should have habits of paying attentions and cautions based on common senses.
2) Equipment

- Korando is FF (Front Engine Front Drive) type vehicle, and engine and powertrain system are integrated into a module. Therefore, 2-post lift and general equipment are necessary when working on the engine and transmission.
- Major equipment: Engine and transmission jack, Engine stand, Engine crane, Transmission jack, Engine hanger

Remove the engine and transaxle as a set.
- Manual transaxle: Transaxle can be separated after removing the front module (sub frame, engine and transaxle).
- Automatic transaxle: Transaxle can be separated after removing the sub frame.

3) General Instructions

1) Before lifting up the vehicle with a lift, correctly support the lifting points.
2) When using a jack, park the vehicle on a level ground and place the wheel chocks under the tires. Position the jack under the frame and lift up the vehicle and then support with chassis stand before service work.
3) Make sure to disconnect the negative (-) cable from the battery to prevent any damage to electric systems.
4) If you have to work on vehicle, cover the seats and floor with protection covers to avoid any damage and contamination.
5) Brake fluid and anti-freeze can damage the painted surface of body. So carefully handle them during service work.
6) To improve the efficiency of service work, use only recommended and specified tools.
7) Use only Ssangyong genuine spare parts.
8) Never reuse the cotter pin, gasket, O-ring, oil seal, lock washer and self-locking nut. Replace them with new ones. If reused, normal functions cannot be maintained.
9) Store the disassembled parts as a set based on disassembly order and unit.
10) Pay particular attention not to miss or mix the fasteners.
11) If necessary, especially for inspection, clean the removed parts completely.
12) Apply the oil or grease on the running and sliding surfaces before installation. Use the specified sealant and gasket to prevent leakage if necessary.
13) Tighten the fasteners to the specified tightening torque.
14) As a final stage of service work, check if the serviced system is working properly and the problem has been eliminated clearly.
4) Basic Inspection

(1) Horn operation
- Listen for the horn sound when pressing the horn pad on the steering wheel.

(2) Brake operation
- Check if there is any abnormal noise, unusually long braking distance, or uneven braking
  force. If the brake warning lamp does not go out even after starting the engine or are flashing
  during driving, have the brake system checked immediately.
- Check the brake pipes and hoses for connection, oil leak, crack or interference after changing
  the position of tires. When replacing the tires, check the brake disc for surface condition and
  wear.
- Check the parking brake cable and brake operation. Shorten the checking interval if the
  parking brake is used frequently.

(3) Exhaust system
- Be aware to any changes in sound or smell from the exhaust system. These may be caused by
  leak or overheat. Have the exhaust system checked and repaired immediately.
- Inspect the exhaust system including catalytic converter. Inspect all the components and body
  frame near the exhaust system.

(4) Tires
- Unusual vibration of the steering wheel and seats or pulling to one side on the straight and level
  roads may indicates the uneven tire inflation pressure or poor wheel balance.

(5) Steering and suspension system
- Inspect the front and rear suspension and the steering system for damage, looseness or
  missing parts, signs of wear or lack of lubrication. Inspect the power steering line and the
  hoses for connection, leak, crack and chafing. Inspect the drive axle boot and seals for
  damage, tear or leak. Replace or repair the system if necessary.

(6) Engine oil
- Check the oil level when the engine is still warm and add the specified engine oil if necessary.

(7) Coolant
- Check the coolant level in the coolant reservoir, coolant conditions (contamination, foreign
  material), and hoses for damage and leak. Replace or add the Ssangyong genuine coolant, if
  needed.

(8) Engine drive belt
- Check all drive belts on the engine for wear, crack and looseness. Retighten or replace the
  belt, if needed.
2. JACK-UP POINTS

- Stand jack-up points and installation status (front side)

Stand jack-up points and installation status (front side)

Installation status

Stand jack-up points and installation status (rear side)

Installation status

Jack-up points for 2-post lift

Jack-up points for 2-post lift
3. STANDARD BOLTS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Bolt</th>
<th>Pitch</th>
<th>Tightening torque (kgf.cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4T</td>
</tr>
<tr>
<td>M3</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td>M4</td>
<td>0.7</td>
<td>12</td>
</tr>
<tr>
<td>M5</td>
<td>0.8</td>
<td>24</td>
</tr>
<tr>
<td>M6</td>
<td>1.0</td>
<td>41</td>
</tr>
<tr>
<td>M8</td>
<td>1.25</td>
<td>88</td>
</tr>
<tr>
<td>M10</td>
<td>1.25</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>190</td>
</tr>
<tr>
<td>M12</td>
<td>1.25</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>1.75</td>
<td>330</td>
</tr>
<tr>
<td>M14</td>
<td>1.5</td>
<td>550</td>
</tr>
<tr>
<td>M16</td>
<td>1.5</td>
<td>830</td>
</tr>
<tr>
<td>M18</td>
<td>1.5</td>
<td>1,200</td>
</tr>
<tr>
<td>M20</td>
<td>1.5</td>
<td>1,700</td>
</tr>
<tr>
<td>M22</td>
<td>1.5</td>
<td>2,300</td>
</tr>
<tr>
<td>M24</td>
<td>1.5</td>
<td>2,900</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>2,800</td>
</tr>
</tbody>
</table>

1) Metric bolt strength is embossed on the head of each bolt. The strength of bolt can be classified as 4T, 7T, 8.8T, 10.9T, 11T and 12.9T in general.

2) Observe standard tightening torque during bolt tightening works and can adjust torque to be proper within 15% if necessary. Try not to over max. allowable tightening torque if not required to do so.

3) Determine extra proper tightening torque if tightens with washer or packing.

4) If tightens bolts on the below materials, be sure to determine the proper torque.
   - Aluminum alloy: Tighten to 80% of above torque table.
   - Plastics: Tighten to 20% of above torque table.
## 1. SPECIAL TOOLS

**Chassis**

<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Special tool</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number: T99300010A Name: Centering pin for clutch</td>
<td><img src="image1.jpg" alt="Image" /></td>
<td>Installing the clutch disc and pressure plate to engine.</td>
</tr>
</tbody>
</table>
| Part number: T99410010A Name: Remover and installer for rear knuckle bushing | ![Image](image2.jpg) | Installing and removing the rear knuckle bushing.  
1. 1 + 2 + 3  
When servicing the knuckle bushing on lower arm  
2. 1 + 2 + 4  
When servicing the knuckle bushing on shock absorber (A) and upper arm (B) |
| Part number: T99420010A Name: Installer for differential gear oil seal | ![Image](image3.jpg) | Special tool for transmission: T88310011A-8  
With a special tool for transmission, installing the side gear oil seal (inner) in differential assembly. |
## 1) Equipment for Engine Assembly

<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Equipment</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Engine and transmission jack</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Heavy duty jack for removing the engine and transmission as a set</td>
</tr>
<tr>
<td>Name: Engine stand (1 ton or more)</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Fixing the removed engine or engine and transmission (transaxle).</td>
</tr>
<tr>
<td>Name: Engine crane (1 ton or more)</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Moving the engine module (including transaxle) to working area or on engine stand.</td>
</tr>
</tbody>
</table>
# 2) Special Tools for Manual Transaxle

<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Tool</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number: T88310011A-16</td>
<td><img src="image1" alt="Tool Image" /></td>
<td><img src="image2" alt="Tool Image" /></td>
</tr>
<tr>
<td>Name: Special tool set for manual transaxle</td>
<td><img src="image3" alt="Tool Image" /></td>
<td><img src="image4" alt="Tool Image" /></td>
</tr>
<tr>
<td>This tool set is designated for manual transaxle (WM6F1) and consists of 16</td>
<td><img src="image5" alt="Tool Image" /></td>
<td><img src="image6" alt="Tool Image" /></td>
</tr>
</tbody>
</table>

Part number T88310011A-1
Name: Installer for gear

Use:
With the bearing support (T88310011A-9), installing the gear and hub on each output shaft.

Part number T88310011A-2
Name: Installer for oil seal and taper roller bearing

Use:
Installing the taper roller bearing (1) on input shaft and oil seal (2) on clutch housing.
<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Tool</th>
<th>Use</th>
</tr>
</thead>
</table>
| Part number T88310011A-3  
Name: Installer for bearing outer race | 1 | T88310011A-8  
[Image of tool and bearing outer race] |
| **Use:**  
With the handle (T88310011A-8), installing the bearing outer race on following shafts.  
1. Input shaft on transaxle housing  
2. No.2 output shaft on transaxle housing  
3. No.2 output shaft on clutch housing | 2 | T88310011A-8  
[Image of tool and bearing outer race] |
| Part number T88310011A-4  
Use:  
With the handle (T88310011A-8), installing the bearing outer race on differential assembly in transaxle housing. | 3 | T88310011A-8  
[Image of tool and bearing outer race] |
<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Tool</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number T88310011A-5&lt;br&gt;Name: Installer for bearing outer race</td>
<td><img src="T88310011A-8" alt="Image" /></td>
<td>1</td>
</tr>
<tr>
<td><strong>Use:</strong>&lt;br&gt;With the handle (T88310011A-8), installing the bearing outer race on following shafts.&lt;br&gt;1. No.1 output shaft on clutch housing&lt;br&gt;2. No.1 output shaft on transaxle housing</td>
<td><img src="T88310011A-8" alt="Image" /></td>
<td>2</td>
</tr>
</tbody>
</table>

| Part number T88310011A-6<br>Name: Installer for bearing outer race | ![Image](T88310011A-8) |  |
| **Use:**<br>With the handle (T88310011A-8), installing the front bearing outer race on differential assembly in clutch housing. | ![Image](T88310011A-8) |  |

<p>| Part number T88310011A-7&lt;br&gt;Name: Installer for bearing outer race | <img src="T88310011A-8" alt="Image" /> |  |
| <strong>Use:</strong>&lt;br&gt;With the handle (T88310011A-8), installing the bearing outer race on outer shaft in clutch housing. | <img src="T88310011A-8" alt="Image" /> |  |</p>
<table>
<thead>
<tr>
<th>Name and Part Number</th>
<th>Tool</th>
<th>Use</th>
</tr>
</thead>
</table>
| Part number T88310011A-8  
Name: Handle | ![Tool Image] | Installing the bearing outer race. |
| Part number T88310011A-9  
Name: Bearing support | ![Tool Image] | Supporting the shaft when installing the gear, hub bearing or input shaft bearing. |
| Part number T88310011A-10  
Name: Installer for taper roller bearing | ![Tool Image] | With the bearing support (T88310011A-9), installing the taper roller bearing on each output shaft. |
| Part number T88310011A-11  
Name: Installer for taper roller bearing on No.1 output shaft | ![Tool Image] | With the bearing support (T88310011A-9), installing the taper roller bearing No.1 output shaft (1st gear side). |
<table>
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<tr>
<th>Name and Part Number</th>
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</tr>
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</table>
| Part number T88310011A-12  
Name: Installer for taper roller bearing | ![T88310011A-12] | Use: With the bearing support (T88310011A-9), installing the taper roller bearing on differential assembly. |
| Part number T88310011A-13  
Name: Installer for taper roller bearing | ![T88310011A-13] | Use: With the bearing support (T88310011A-9), installing the taper roller bearing on differential assembly. |
| Part number T88310011A-14  
Name: Installer for oil seal | ![T88310011A-14] | Use: With the handle (T88310011A-8), installing the oil seal on transaxle housing. |
| Part number T88310011A-15  
Name: Installer for oil seal | ![T88310011A-15] | Use: With the handle (T88310011A-8), installing the oil seal on clutch housing. |
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<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number T88310011A-16 Name: Installer for oil seal</td>
<td>![Image of the tool]</td>
<td>Installing the oil seal on control shaft.</td>
</tr>
</tbody>
</table>