2.2 Driveline System

2012 EADO

2.2.1 Driverline System - General Information

Description and Operation

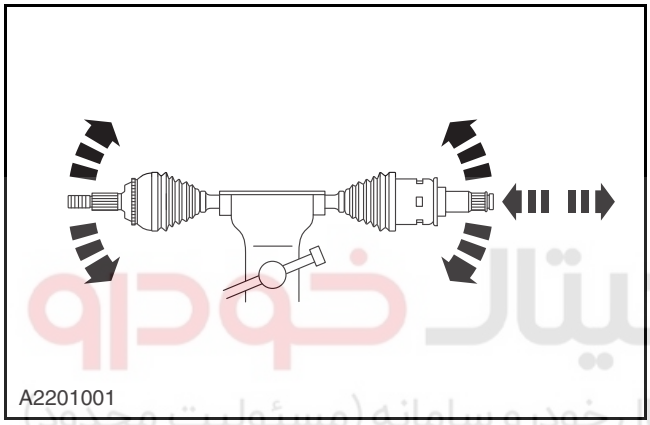
System Overview

Driveline system is of FF design and the differential is installed in the transmission assembly. Drive Shafts transfer power from the gearshift to the front wheel assembly. Each driveshaft assembly is consisted of inner constant velocity (CV) joint and outer constant velocity joint that connect to the driveshaft. The inner constant velocity joint has perfect flexibility and it can expand to the inside and the outside. The outer constant velocity joint is also flexible but can't be expanded. A male spline is on the inner end of both driveshafts. This male spline is interlocking with the gearshift driveshaft through clamp ring.

General Procedures

Drive Shaft Inspection

1. Check and verify the outer ball joint has no oversize end play.
2. Check and verify the inner ball joint steady slide along the thrust direction.
3. Check and verify the inner ball joint has no oversize radial end play.
4. Check whether the rubber boots are damaged.
5. Check the snap ring at transmission side.



Drive Shaft Oil Seal Inspection

1. Check whether the oil seal lip and the seal spring are damaged.
2. Check whether the joint surface of the driveshaft and oil seal is unsmooth for rust, scratch, burr or other anomalies.
3. Check the transimission side oil seal installation surface for rust, scratch, burr or other anomalies.

Symptom Diagnosis and Testing

Inspection and Verification

1. Verify customer concerns.
2. Visually inspect whether there is obvious mechanical damage.
3. If the inspection shows obvious evidence of the problem, the fault symptom should be cleared before the next step.
4. If the visual inspection is ok, confirm the fault and go to the symptom chart.

Symptom Chart

Symptom	Possible Sources	Action
Drive Shaft noises	• Inadequate or contaminated lube in driveshaft CV joint • Another component contacting driveshaft assembly • Gap bridge bearing damage	**Refer to: Drive Shaft Noises (2.2.1 Driverline System - General Information, Symptom Diagnosis and Testing).**
Clunk noises when acceleration after neutral position coasting	• CV joint rubber boot crack or damage • CV joint wear or damage	**Refer to: Clunk Noises At Acceleration After Neutral Position Coasting (2.2.1 Driverline System - General Information, Symptom Diagnosis and Testing).**
Vibration at high speed	• Wheels out of balance	• Wheels balance
	• Large radial runout of front wheel • Incorrect installation of driveshaft • Gap bridge bearing damage	• Refer to driveshaft removal and installation
Shudder or vibration during acceleration	• Improper assembling height caused too large angle of tripod CV joint • Driveshaft excessively worn or damaged • Gap bridge bearing damage	**Refer to: Shudder or Vibration During Acceleration (2.2.1 Driverline System - General Information, Symptom Diagnosis and Testing).**

Symptom	Possible Sources	Action
Tripod joint or slip ball joint pullout	• Driveshaft retainer snap ring missing or not correctly seated in the differential	• Replace the retainer ring
	• Incorrect installation of engine and transmission	• Check engine mounting bracket for wear and damage
	• Engine bracket or chassis distort or bend	• Measure chassis
	• Front suspension component worn or damaged	• Check whether the axle bushing is worn or the components are distorted (stabilizer bar, suspension arm and etc.) and replace them if necessary
Clicking, popping or grinding noises while driving	• Inadequate or contaminated lube in driveshaft CV joint	• inspect, clean and lubricate as necessary
	• Another component contacting driveshaft assembly • Gap bridge bearing damage	• Inspect and repair as necessary
	• Wheel bearings, brake, suspension or steering components worn or damaged	• Inspect and repair as necessary
Drive Shaft Pullout	• The joint retainer snap ring of driveshaft and transmission is distorted • Driveshaft distorted • Front strut distorted • Driveshaft retaining nut damaged	**Refer to: Driveshaft Pullout (2.2.1 Driverline System - General Information, Symptom Diagnosis and Testing).**
Vehicle shimmy at low speed	• Wrong tire dynamic balance • Incorrect wheel alignment • Wheel hub bearing damaged • Driveshaft damaged • Strut damaged • Stabilizer bar and bushing wear or damaged • Gap bridge bearing damage	**Refer to: Vehicle Shimmy At Low Speed (2.2.1 Driverline System - General Information, Symptom Diagnosis and Testing).**

Drive Shaft Noises

Testing Conditions	Details/Results/Actions
1. Inspect whether the driveshaft contacting other components	
	A. Lift the vehicle. **Refer to: Lifting (1.1.3 Traction and Lifting, Description and Operation).** B. Inspect whether the driveshaft is twisted by other debris. C. Inspect whether the driveshaft is contacting other parts. Normal or not? **Y** Go to step 2. **N** Troubleshooting.
2. Inspect the driveshaft rubber boot	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether there is leakage for driveshaft joint lubrication. Normal or not? **Y** Go to step 3. **N** Troubleshooting.
3. Inspect the driveshaft gap bridge bearing	
	A. Inspect whether the bolt of the driveshaft gap bridge bearing bracket is loose. B. Inspect whether the driveshaft gap bridge bearing is damaged. Normal or not? **Y** Go to step 4. **N** Troubleshooting.

Testing Conditions	Details/Results/Actions
4. Inspect the driveshaft	
	A. Remove the driveshaft. B. Inspect the driveshaft. **Refer to: Driveshaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** Normal or not? **Y** **Refer to: (1.1.5 Noises, Vibration and Harshness).** **N** Replace the driveshaft assembly.

Clunk Noises at Acceleration After Neutral Position Coasting

CAUTION: Clunk during accelerating-coasting or start from standstill, may caused by wear or damage of the wheel driveshaft inner CV joint. This damage normally caused by grease lacking and/or foreign matter and dirt in the CV joint. It is normally caused by cracking or damage of the inner CV joint sealing boot.

Testing Conditions	Details/Results/Actions
1. Inspect the driveshaft rubber boot	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether there is leakage for driveshaft joint lubrication. Normal or not? **Y** Go to step 2. **N** Troubleshooting.

Testing Conditions	Details/Results/Actions
2. Inspect the driveshaft gap bridge bearing	
	A. Inspect whether the bolt of the driveshaft gap bridge bearing bracket is loosing. B. Inspect whether the driveshaft gap bridge bearing is damaged. Normal or not? **Y** Go to step 3. **N** Troubleshooting.
3. Inspect the driveshaft	
	A. Remove the driveshaft. B. Inspect the driveshaft. **Refer to: Driveshaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** C. Any seized or blocked CV joint shows potential damage that may lead to. Normal or not? **Y** **Refer to: (1.1.5 Noises, Vibration and Harshness).** **N** Replace the driveshaft assembly.

Shudder or Vibration During Acceleration

Testing Conditions	Details/Results/Actions
1. Inspect the front strut assembly height	
	A. Inspect whether the front strut assembly is distorted. Normal or not? **Y** Go to step 2. **N** Troubleshooting. Replace the front strut assembly when necessary.

Testing Conditions	Details/Results/Actions
2. Inspect the arm ball	
	A. Inspect whether there is clearance or damage of the arm ball. Normal or not? **Y** Go to step 3. **N** Replace the lower arm ball.
3. Inspect the arm and each mounting bolt	
	A. Remove each mounting bolt of the arm and inspect for looseness. B. Inspect each arm bushing for damage. Normal or not? **Y** Go to step 4. **N** Troubleshooting. Replace the arm assembly when necessary.
4. Inspect the driveshaft rubber boot	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether there is leakage for driveshaft joint lubrication. Normal or not? **Y** Go to step 5. **N** Troubleshooting.
5. Inspect the driveshaft gap bridge bearing	
	A. Inspect whether the bolt of the driveshaft gap bridge bearing bracket is loosing. B. Inspect whether the driveshaft gap bridge bearing is damaged. Normal or not? **Y** Go to step 6. **N** Troubleshooting.

Testing Conditions	Details/Results/Actions
6. Inspect the driveshaft	
	A. Remove the driveshaft. B. Inspect the driveshaft. **Refer to: Driveshaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** Normal or not? **Y** **Refer to: (1.1.5 Noises, Vibration and Harshness).** **N** Replace the driveshaft assembly.

Drive Shaft Pullout

Testing Conditions	Details/Results/Actions
1. Inspect the driveshaft	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether the driveshaft is bend or deformed. Normal or not? **Y** Go to step 2. **N** Troubleshooting.
2. Inspect the driveshaft and the snap ring at transmission side	
	A. Remove the driveshaft. B. Inspect the snap ring at transmission side. **Refer to: Driveshaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** Normal or not? **Y** Go to step 3. **N** Replace the driveshaft assembly.

Testing Conditions	Details/Results/Actions
3. Inspect the front strut	
	A. Inspect whether the front strut assembly is deformed. Normal or not? **Y** Go to step 4. **N** Replace the front strut assembly.
4. Inspect the driveshaft retaining nut	
	A. Inspect whether the driveshaft retaining nut is damaged. Normal or not? **Y** **Refer to: (1.1.5 Noises, Vibration and Harshness).** **N** Replace the retaining nut.

Drive Shaft Swing

Testing Conditions	Details/Results/Actions
1. Inspect the driveshaft	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether the driveshaft is bend or deformed. Normal or not? **Y** Go to step 2. **N** Troubleshooting.
2. Inspect the driveshaft gap bridge bearing	
	A. Inspect whether the bolt of the driveshaft gap bridge bearing bracket is loosing. B. Inspect whether the driveshaft gap bridge bearing is damaged. Normal or not? **Y** Go to step 3. **N** Troubleshooting.

Testing Conditions	Details/Results/Actions
3. Inspect the driveshaft and the snap ring at transmission side	
	A. Remove the driveshaft. B. Inspect the snap ring at transmission side. **Refer to: Driveshaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** Normal or not? **Y** Verify the system for normal operation. **N** Replace the driveshaft assembly.

Vehicle Shimmy At Low Speed

Testing Conditions	Details/Results/Actions
1. Inspect the wheel	
	A. Inspect whether the wheel runout is normal. **Refer to: Wheel Runout Inspection (2.1.4 Wheels and Tires, General Procedures).** Normal or not? **Y** Go to step 2. **N** Troubleshooting.
2. Inspect the wheel alignment	
	A. Inspect whether the wheel alignment is normal. Normal or not? **Y** Go to step 3. **N** Troubleshooting.

Testing Conditions	Details/Results/Actions
3. Inspect the driveshaft	
	A. Inspect whether the driveshaft rubber boot is damaged. B. Inspect whether the driveshaft rubber boot is correctly installed. C. Inspect whether the driveshaft is bend or deformed. Normal or not? **Y** Go to step 4. **N** Troubleshooting.
4. Inspect the suspension system	
	A. Inspect the suspension system. **Refer to: (2.1.1 Suspension System - General Information, General Procedures).** Normal or not? **Y** **Refer to: (1.1.5 Noises, Vibration and Harshness).** **N** Troubleshooting.