2.2 Driveline System

2012 CS35

2.2.1 Driveline system - General Information

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Description and Operation

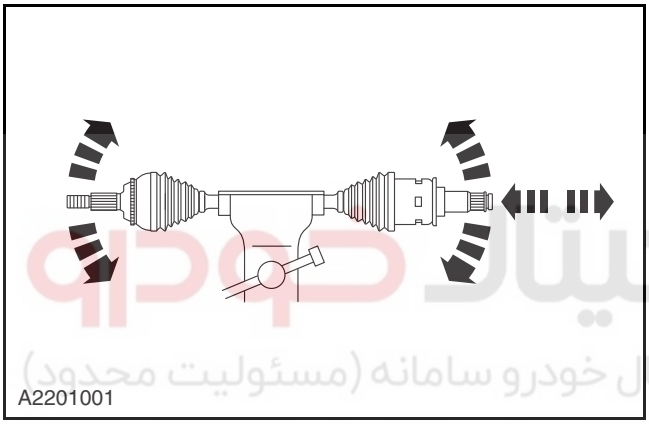
System Overview

Driveline system is of FF design and the differentialis installed in the transmission assembly. Half Shafts transfer power from the gearshift to the front wheel assembly. Each half shaft assembly is consisted of inner constant velocity (CV) joint and outer constant velocity joint that connect to the half shaft. 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 half shafts. This male spline is interlocking with the gearshift half shaft through clamp ring.

General Procedures

Half Shaft Inspection

1. Inspect and verify the outer ball joint has no oversize gap.
2. Inspect and verify the inner ball joint steady slide along the thrust direction.
3. Inspect and verify the radial internal clearance of the inner ball joint is not oversize.
4. Inspect whether the gaiter is damaged.
5. Inspect the snap ring connecting to the transmission.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Half Shaft Oil Seal Inspection

1. Inspect whether the oil seal lip and the seal spring are damaged.
2. Inspect whether the joint surface of the half shaft and oil seal is smooth for rust, scratched, burr or other anomalies.
3. Inspect the side oil seal installation surface of the transmission for rust, scratched, burr or other anomalies.

Symptom Diagnosis and Testing

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the symptom chart.

Symptom Chart

Symptom	Possible Sources	Action
Half shaft noises	• Inadequate or contaminated lube in half shaft CV joint • half shaft contacting other components • Gap bridge bearing damage	Refer to: Half Shaft Noises (2.2.1 Driveline System - General Information, Symptom Diagnosis and Testing).
Clunk noises when acceleration after neutral position coasting	• Universal joit gaiter crack or damage • Constant velocity universal joint wear or damage	Refer to: Clunk Noises At Acceleration After Neutral Position Coasting (2.2.1 Driveline 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 half shaft • Gap bridge bearing damage	• Refer to half shaft removal and installation description
Shudder or vibration during acceleration	• Improper assembling height caused too large angle of tripod universal joint • half shafthalf shaft excessively worn or damaged • Gap bridge bearing damage	Refer to: Shudder or Vibration During Acceleration (2.2.1 Driveline System - General Information, Symptom Diagnosis and Testing).
Tripod universal joint or slip ball joint falling-off	• half shaft retainer ring dropping or improperly installed in the differential	• Replace the retainer ring
	• Incorrect matching of engine/ transmission	• Inspect engine mounting bracket for worn/damage
	• Engine bracket or chassis distort • or bend	• Measure chassis
	• Front suspension component worn or damaged	• Inspect whether the axle bushing is worn or the components are distorted (stabilizer bar,suspension arm and etc.) and replace them if necessary

Symptom	Possible Sources	Action
Clicking, popping or grinding noises while driving.	• Inadequate or contaminated lube in half shaft CV joint	• Inspect, clean and lubricate as necessary
	• half shaft contacting other components • Gap bridge bearing damage	• Inspect and repair as necessary
	• Wheel bearings, brake, suspension or steering components worn or damaged	• Inspect and repair as necessary
Half shaft falling-off	• The jonit end snap ring of half shaft and transmission is distorted • half shaft deformed • Front strut deformed • half shaft retaining nut damaged	**Refer to: Half shaft Pullout (2.2.1 Driveline System - General Information, Symptom Diagnosis and Testing).**
Vehicle shimmy at low speed	• Wrong tire dynamic balance • Wrong wheel alignment • Wheel hub bearing damage • half shaft damage • Strut damage • Stabilizer bar and bushing wear or damage • Gap bridge bearing damage	**Refer to: Vehicle Shimmy At Low Speed (2.2.1 Driveline System - General Information, Symptom Diagnosis and Testing).**

Half Shaft Noises Diagnosis

Test conditions	Details/Results/Actions
1. Inspect whether the half shaft contacting other objects	
	A. Lift the vehicle. **Refer to: Lifting (1.1.3 Traction and Lifting, Description and Operation).** B. Inspect whether the half shaft is twisted by other debris. C. Inspect whether the half shaft contacting other parts. Is it normal? **Y** Go to step 2. **N** Dispose fault part.
2. Inspect half shaft dust boot	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C. Inspect whether there is leakage for half shaft universal joit lubrication. Is it normal? **Y** Go to step 3. **N** Dispose fault part.
3.Inspect the half shaft gap bridge bearing	
	A. Inspect whether the bolt of the half shaft gap bridge bearing bracket is loose. B. Inspect whether the half shaft gap bridge bearing is damaged. Is it normal? **Y** Go to step 4 **N** Dispose fault part.

Test conditions	Details/Results/Actions
4. Inspect the half shaft	
	A. Remove the half shaft. B. Inspect the half shaft. **Refer to: Half Shaft Inspection (2.2.1 Driveline System - General Information, General Procedures).** Is it normal? **Y** **Refer to: Noise Diagnosis (1.1.5 Noise, Vibration and Harshness).** **N** Replace the half shaft assembly.

Clunk Noises at Acceleration after Neutral Position Coasting Diagnosis

⚠ **CAUTION: Clunk during accelerating-coasting or start from standstill, may caused by wear or damage of the wheel half shaft 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.**

Test conditions	Details/Results/Actions
1. Inspect half shaft dust boot	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C. Inspect whether there is leakage for half shaft universal joit lubrication. Is it normal? **Y** Go to step 2. **N** Dispose fault part.
2. Inspect the half shaft gap bridge bearing	
	A. Inspect whether the bolt of the half shaft gap bridge bearing bracket is loosing. B. Inspect whether the half shaft gap bridge bearing is damaged. Is it normal? **Y** Go to step 3. **N** Dispose fault part.

Test conditions	Details/Results/Actions
3. Inspect the half shaft	
	A. Remove the half shaft. B. Inspect the half shaft. **Refer to: Half shaft Inspection (2.2.1 Driveline System - General Information, General Procedure).** C. Any seized or blocked universal joint shows potential damage that may lead to breakdown. Is it normal? **Y** **Refer to: Noise Diagnosis (1.1.5 Noise, Vibration and Harshness).** **N** Replace the half shaft assembly.

Shudder or Vibration During Acceleration Diagnosis

Test conditions	Details/Results/Actions
1. Inspect the front strut assembly height	
	A. Inspect whether the front strut assembly is deformed. Is it normal? **Y** Go to step 2. **N** Troubleshooting. Replace the front strut assembly when necessary.
2. Inspect the arm ball	
	A.Inspect whether there is clearance or damage of the swing arm ball. Is it normal? **Y** Go to step 3 **N** Replace lower arm ball.

Test conditions	Details/Results/Actions
3. Inspect the arm and each mounting bolt	
	A. Remove all the mounting bolt of the swing arm and Inspect for loosing. B. Inspect each swing arm bushing for damage. Is it normal? **Y** Go to step 4. **N** Dispose fault part. Replace the arm assembly when necessary.
4. Inspect the half shaft dust boot	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C. Inspect whether there is leakage for half shaft universal joit lubrication. Is it normal? **Y** Go to step 5. **N** Dispose fault part.
5. Inspect the half shaft gap bridge bearing	
	A. Inspect whether the bolt of the half shaft gap bridge bearing bracket is loosing. B. Inspect whether the half shaft gap bridge bearing is damaged. Is it normal? **Y** Go to step 6. **N** Dispose fault part.
6. Inspect the half shaft	
	A. Remove the half shaft. B. Inspect the half shaft. **Refer to: Half Shaft Inspection (2.2.1 Driveline System - General Information, General Procedure).** Is it normal? **Y** **Refer to: Noise Diagnosis (1.1.5 Noise, Vibration and Harshness).** **N** Replace the half shaft assembly.

Half Shaft Falling - Off Diagnosis

Test conditions	Details/Results/Actions
1. Inspect the half shaft	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C.Inspect whether the half shaft is bend or deformed. Is it normal? **Y** Go to step 2. **N** Dispose fault part.
2. Inspect the half shaft and the snap ringsnap ring on the side of transmission	
	A. Remove the half shaft. B. Inspect the snap ring on the side of transmission. **Refer to: Half Shaft Inspection (2.2.1 Driveline System - General Information, General Procedure).** Is it normal? **Y** Go to step 3. **N** Replace the half shaft assembly.
3. Inspect the front strut	
	A. Inspect whether the front strut assembly is deformed. Is it normal? Y Go to step 4. N Replace the front strut assy assembly.
4. Inspect the half shaft locking nut	
	A. Inspect whether the half shaft locking nut is damaged. Is it normal? **Y** **Refer to: Noise Diagnosis (1.1.5 Noise, Vibration and Harshness).** **N** Replace the locking nut.

Half Shaft Swing Diagnosis

Test conditions	Details/Results/Actions
1. Inspect the half shaft	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C. Inspect whether the half shaft is bend or deformed. Is it normal? **Y** Go to step 2. **N** Dispose fault part.
2. Inspect the half shaft gap bridge bearing	
	A. Inspect whether the bolt of the half shaft gap bridge bearing bracket is loosing. B. Inspect whether the half shaft gap bridge bearing is damaged. Is it normal? **Y** Go to step 3. **N** Dispose fault part.
3. Inspect the half shaft and the snap ring on the side of transmission	
	A. Remove the half shaft. B. Inspect the snap ring on the side of transmission. **Refer to: Half shaft Inspection (2.2.1 Driveline System - General Information, General Procedure).** Is it normal? **Y** Go to step 3. **N** Replace the half shaft assembly.

Vehicle Shimmy at Low Speed Diagnosis

Test 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).** Is it normal? **Y** Go to step 2. **N** Dispose fault part.
2. Inspect the wheel alignment	
	A. Inspect whether the wheel alignment is normal. Is the inspection normal? **Y** Go to step 3. **N** Dispose fault part.
3. Inspect the half shaft	
	A. Inspect whether the half shaft dust boot is damaged. B. Inspect whether the half shaft dust boot is correctly installed. C. Inspect whether the half shaft is bend or deformed. Is it normal? **Y** Go to step 4. **N** Dispose fault part.
4. Inspect the suspension system	
	A. Inspect the suspension system. **Refer to: Suspension Device Inspection (2.1.1 Suspension System - General Information, General Procedures).** Is it normal? **Y** **Refer to: Noise Diagnosis (1.1.5 Noise, Vibration and Harshness).** **N** Dispose fault part.