HYUNDAI **Technical Service Bulletin**	GROUP **CAMPAIGN**	NUMBER **20-01-004H-1**
	DATE **JUNE 2020**	MODEL(S) **APPLICABLE VEHICLES BELOW**
SUBJECT:	THETA GDI ENGINE DTC P1326 - ENGINE INSPECTION / REPLACEMENT (SERVICE CAMPAIGN T3G)	

This TSB supersedes TSB# 20-01-004H to revise the Parts and Warranty information.

★ IMPORTANT

***** Dealer Stock & Retail Vehicles *****

Dealers must perform this Service Campaign on all affected vehicles prior to customer retail delivery and whenever an affected vehicle is in the shop for any maintenance or repair.

Description: Applicable vehicles with 2.0L Turbo and 2.4L GDI engines may experience the Check Engine warning lamp illuminated with DTC P1326. Follow the procedure to inspect the vehicle and replace the engine or update the engine ECU software based on the inspection results.

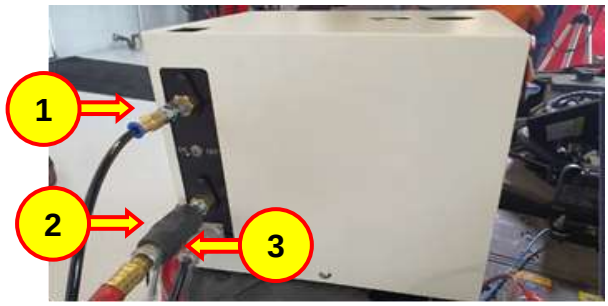
Applicable Vehicles:
Certain 2011-2014 MY Sonata (YF) vehicles with 2.0L Turbo and 2.4L engines
Certain 2015-2019 MY Sonata (LF) vehicles with 2.0L Turbo and 2.4L engines
Certain 2013-2018 MY Santa Fe Sport (AN) vehicles with 2.0L Turbo and 2.4L engines
Certain 2019 MY Santa Fe (TM) vehicles with 2.0L Turbo and 2.4L engines
Certain 2014-2015 MY Tucson (LM) vehicles with 2.4L engines
Certain 2018-2019 MY Tucson (TL) vehicles with 2.4L engines
Certain 2019 MY Veloster N (JSN) vehicles with 2.0L Turbo engines

SST Information:

Part Name	Part Number / Figure	Note
Torque Wrench Socket	09314-3Q100-01	Only needed if engine replacement is required. Refer to TSB 19-FL-001H for the detailed usage instructions. Order replacements through Bosch at 1-866-539-4248.
Injector Combustion Seal Ring Installer	09353-2B000	

Circulate To: General Manager, Service Manager, Parts Manager, Warranty Manager, Service Advisors, Technicians, Body Shop Manager, Fleet Repair

SST Information (cont.)

Part Name	Part Number / Figure	Note
BEARING CLEARANCE TESTER SET (BEARING TOOL)	  **(1) TEST HOSE (2) MAIN HOSE (3) POWER SUPPLY CABLE**	One bearing tool will be provided to dealers. Confirm the following pressures meet the below requirements: **Shop air supply: 0.36MPa (50 psi) minimum** **AP: 0.1 ~ 0.11MPa, VC: -73 ~ -83Kpa**  For replacements or questions on the bearing tool, contact GIT at: 866-539-4248 Note that individual component parts of the kit may not be available separately.
	KQ231-2T110QQH	BEARING CLEARANCE TESTER SET (BEARING TOOL) (includes A - F)
	KQ231-2T100QQH	(A) BODY
	KQ231-2T101QQH	(B) SPARK PLUG ROD (CLEARANCE GAUGE)
	KQ231-2T102QQH	(C) CRANK ROTATOR TOOL
	KQ231-2T103QQH	(D) CLEARANCE GAUGE
	KQ231-2T104QQH	(E) POWER SUPPLY CABLE
	KQ231-2T105QQH	(F) TEST HOSE (AIR HOSE FOR CLEARANCE GAUGE)

Part Information:
1) Order the required parts based on the vehicle inspection results. Refer to Page 4.

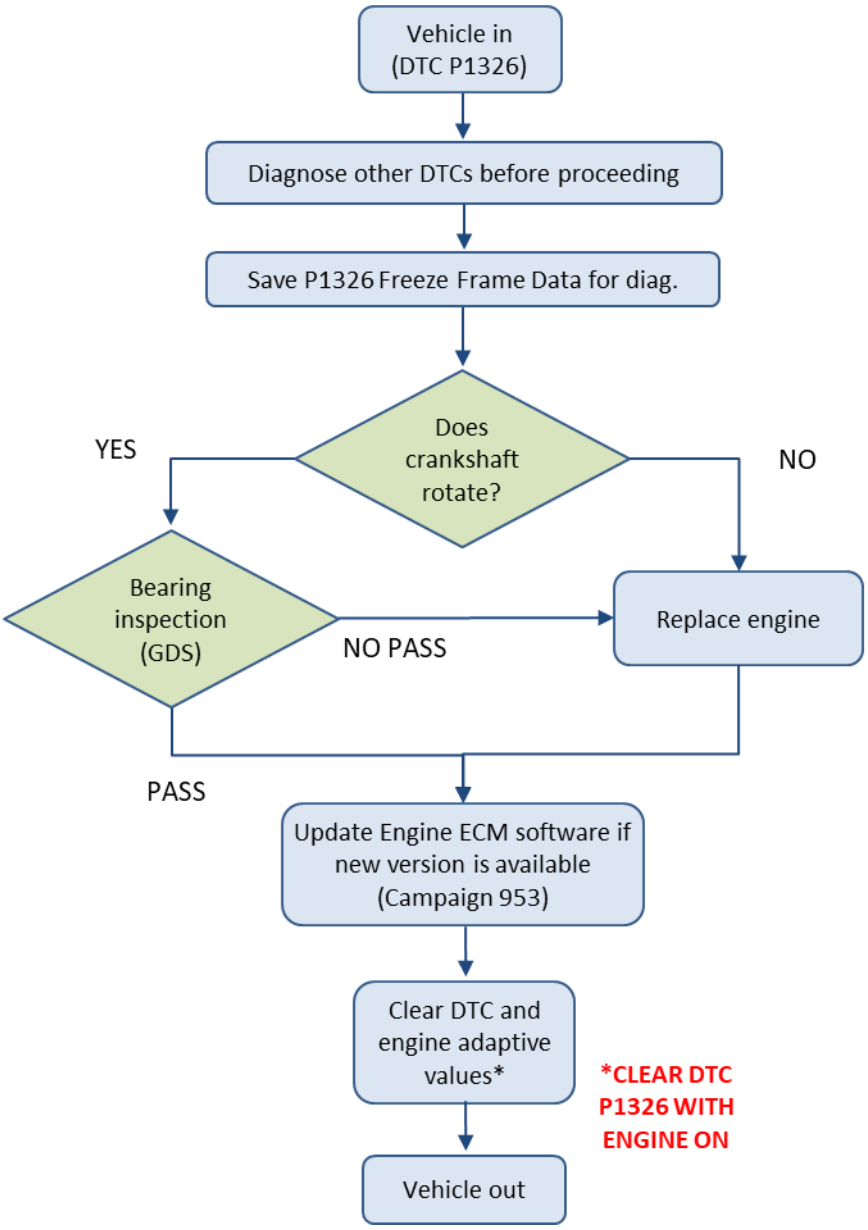
2) Refer to TSB # 20-01-024H (or latest revision) for parts information

3) Refer to HMA Warranty Policy prior to ordering a reman engine. A standard service engine or QQH engine is required in certain cases.

Warranty Information:
1) Submit an additional claim for the engine ECM update if required using OP codes in Campaign 953. The Engine ECM update is only required if new software is available.

2) Refer to TSB # 20-01-024H (or latest revision) for OP Codes

Service Procedure Flowchart:



Engine Rotation Check:

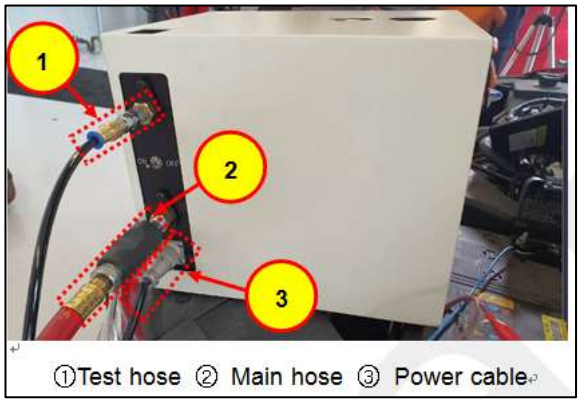
1. Rotate the crankshaft with the crank rotator SST. If the SST does not fit the specific vehicle type, remove the front passenger wheel and wheel liner or underbody tray as needed to rotate the crankshaft using standard shop tools.

If the crankshaft rotates:
Proceed to bearing inspection.

If the crankshaft does NOT rotate:
Continue with the engine replacement procedure and update the Engine ECM software if a newer version is available.

Bearing Inspection:

1. Connect the main hose (shop air supply) and test hose to the bearing tool. The other end of the test hose should be disconnected.



Confirm the shop air pressure and AP/VC pressures on the bearing tool meet requirements:

Shop air supply:
0.36MPa (50 psi) minimum

AP: 0.1 ~ 0.11MPa,
VC: -73 ~ -83Kpa

AP **VC**

2. Remove the engine cover and the 4 ignition coils.

Tightening Torque (ignition coils):
9.8 - 11.8 N·m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb·ft)

3. Remove the 4 spark plugs.

Tightening Torque:
14.7 - 24.5 N·m
(1.5 - 2.5 kgf·m, 10.9 - 18.0 lb·ft)

4. Insert the spark plug rod SST (A) into Cylinder #1 spark plug hole and turn until hand tight. Insert the clearance gauge SST into the spark plug rod and tighten using the thumb screw.

NOTICE

DO NOT use a wrench.
DO NOT connect the test air hose.

5. Connect the GDS to the vehicle and turn the ignition ‘ON’.

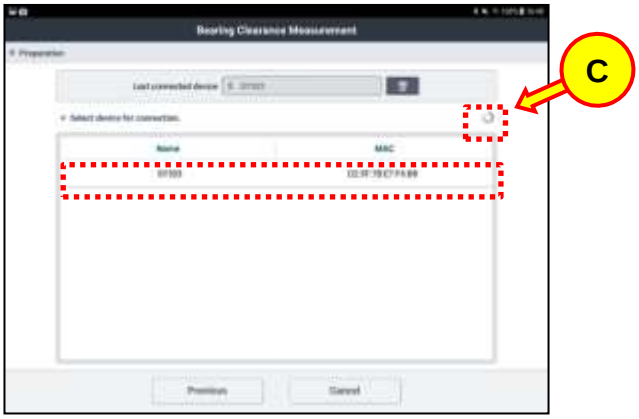
6. Swipe up on the ‘More’ tab at the bottom of the GDS home screen. Select the ‘Special Inspection’ function.

7. Select ‘Bearing Clearance Measurement’ on the GDS.

8. Enter the vehicle info into the GDS as prompted then select ‘Next’.

9. Connect the GDS to the clearance gauge SST (gauge) via Bluetooth:

- Press the “Set’ button (B) on the gauge to turn it on.
- Press the “Set” (B) and “Mode” buttons at the same time for about 4 sec until the “reset” message is displayed.
- Select the gauge in the list of devices on the GDS. Select the ‘Refresh’ icon (C) if the gauge doesn’t appear automatically.



NOTICE

If more than one device appears in the list of devices, there is another device in range. Move away from the other device to pair the gauge.

10. Turn the ignition ‘OFF’ and remove the VCI.

11. Follow the instructions on the GDS to start the test and select ‘Next’.

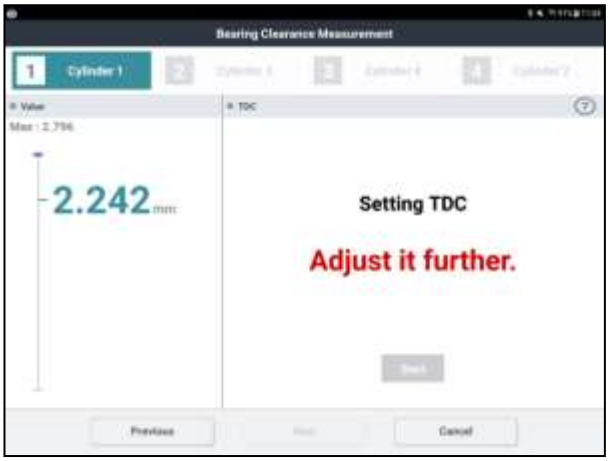
NOTICE

Do NOT connect the test hose to the clearance gauge yet.

12. To find TDC compression (TDC), rotate the crankshaft with the crank rotator SST at least one cycle (1/2 turn). If the SST does not fit the specific vehicle type, remove the front passenger wheel and wheel liner or underbody tray as needed to rotate the crankshaft using standard shop tools.

Monitor the value on GDS screen or the clearance gauge SST while turning the wrench. Turn the wrench slowly as the value reaches a max/min value. When the value changes direction (increasing → decreasing or decreasing → increasing), stop turning the crank.

If TDC is difficult to find, refer to the shop manual: Engine Mechanical System > Timing System > Timing chain.



NOTICE

Ensure the test hose is disconnected from the clearance gauge when finding TDC.

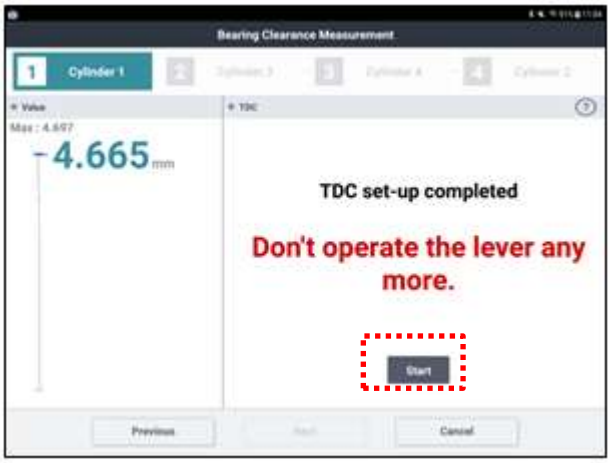
13. Select ‘Next’ when TDC is found.

TDC is found when the maximum value is reached on the clearance gauge SST (D). The value is also displayed on the GDS.

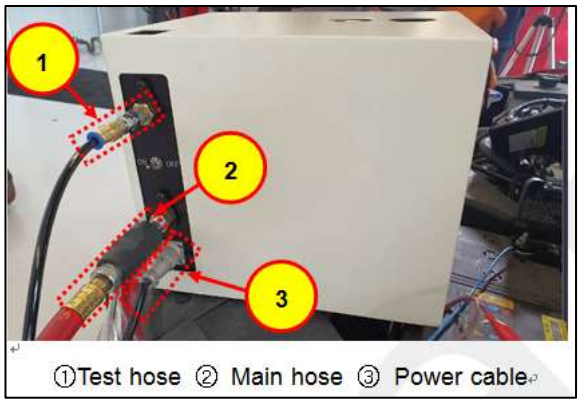
14. Select ‘Start’ and proceed directly to the next step below. Do not turn the crank rotator SST until instructed to do so.

NOTICE

The value at TDC varies depending on the specific vehicle and engine type.



15. Connect the test hose (1) to the spark plug rod SST and the power cable (3) to the bearing tool SST as shown.

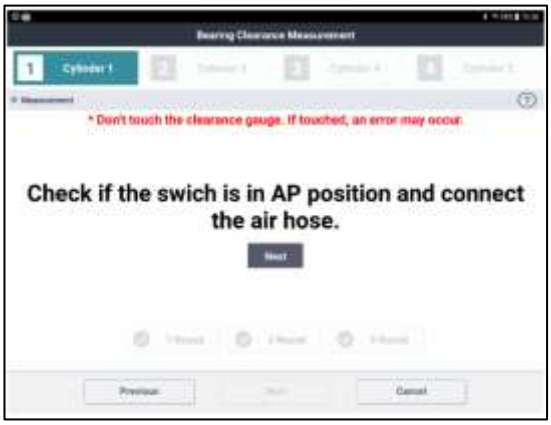


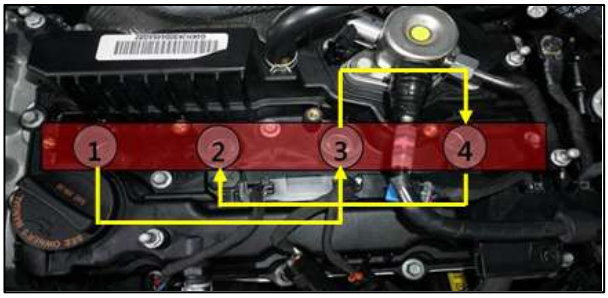
16. Connect the SST power cables to the vehicle’s 12V battery. Turn the bearing tool SST power switch ‘ON’.

17. Locate the AP/VC switch on the bearing tool SST and switch it to the AP Position.

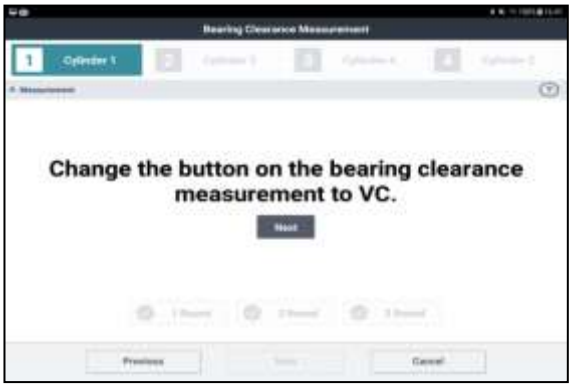
18. Follow the instructions on the GDS to test each cylinder. Cylinder #1 is checked first.

The cylinders will be checked per the engine's firing order : #1→#3→#4→#2.





19. On the bearing tool SST, change the AP/VC switch to the VC position when instructed by the GDS.



NOTICE

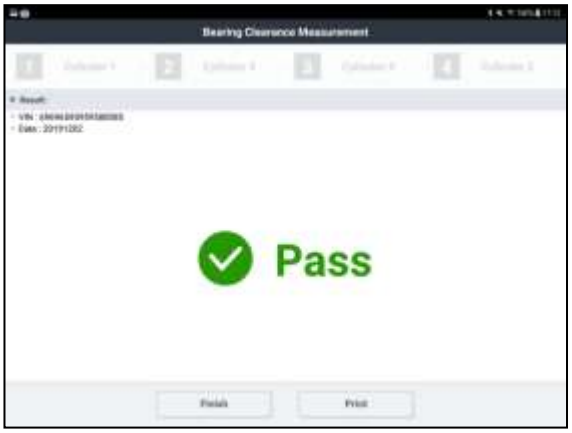
If the bearing measurement value does not change when the AP/VC is switched or the "Unable to measure" message appears on the GDS, rotate the crankshaft further as the exhaust valves could be open. Set the crankshaft to TDC again (Step 11).

Ensure the test hose is disconnected from the clearance gauge SST when finding TDC.

20. Continue following the instructions on the GDS to complete the bearing inspection. Check the engine oil level and select the level in the GDS.

21. If the test result is “PASS”:

- Save a screenshot of the results screen.
- Refer to Campaign 953 to update the Engine ECM if new software is available.
- Reinstall all components in the reverse order of removal.
- Check for DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present to complete the procedure.



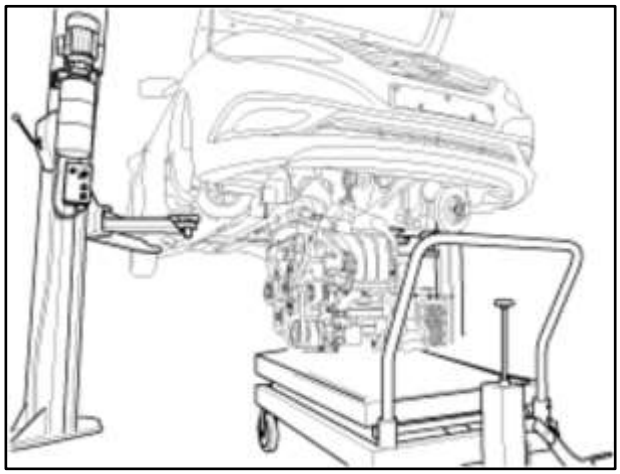
If the test result is “NO PASS”:

- Save a screenshot of the results screen.
- Continue to the engine replacement procedure.
- Refer to Campaign 953 to update the Engine ECM if new software is available.
- Check for DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present to complete the procedure.

Engine Replacement:

1. Continue if DTC P1326 is detected and the bearing inspection is NO PASS.

2. Follow the published Service Information from the applicable **Shop Manual** to remove the Sub Engine Assembly from the vehicle.



Shop Manual Section Location:
Engine Mechanical >
Engine And Transaxle Assembly >
Engine And Transaxle Assembly >
Repair Procedures

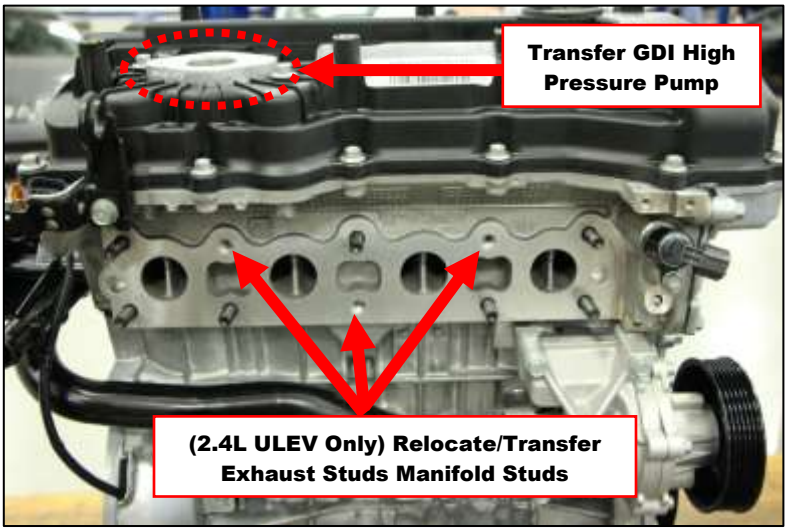
NOTICE

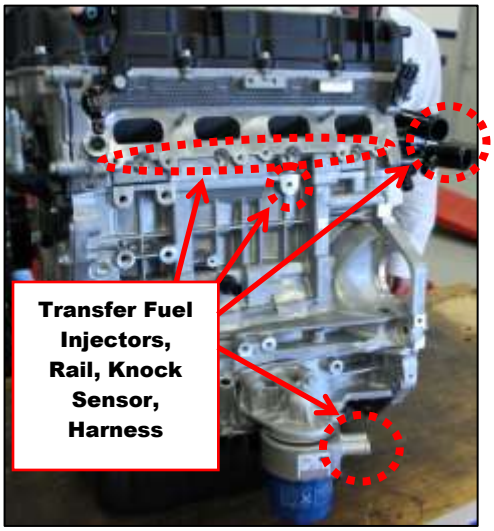
Record the audio station presets (XM, AM, FM, etc) prior to disconnecting the battery.

3. Certain replacement engines must be prepared prior to installation. Some components from the existing engine must be transferred to the new engine.

NOTICE

Be careful to reserve the vehicle's original parts for reinstallation on the replacement engine.



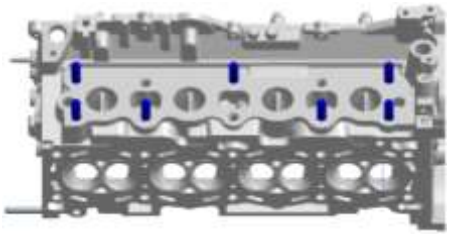


4. **For 2.4L with ULEV / FED emissions only**
2.4L replacement engines are produced with the exhaust manifold studs configured for SULEV / CAL emissions package.

Two exhaust studs must be relocated on the new engine and 1 exhaust stud must be transferred from the old engine.

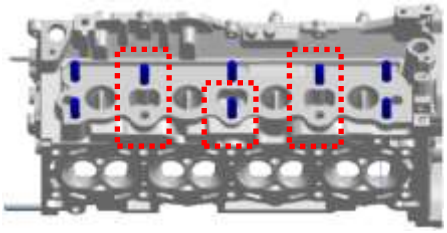
- Use a commercially available stud removal tool or use the double-nut technique to complete this step.

SULEV / CAL Spec



Exhaust Stud Position Relocation Information

ULEV / FED Spec



5. Remove and reinstall the engine knock sensor from the old engine to the new engine.

***Knock Sensor Fastener Tightening torque**: 21Nm (15.5lb-ft)*

NOTICE

Ensure the knock sensor is torqued to specification using a torque wrench. Improper installation can result in DTC codes.

6. **If 21101-2GK70QQA engine is used:**

- Install the oil filler cap from the old engine to the new one.
- Install the drive plate/flywheel on the new engine using new bolts (QTY 7).

***Drive Plate Tightening torque** :*
111.7 ~ 127.5 Nm (86.8 ~ 94.1 lb-ft)

7. Follow the published procedure outlined in **TSB 19-FL-001H** to remove and reinstall the following GDI high pressure fuel system components from the existing engine to the new engine:
   - GDI High Pressure Pump
   - Fuel Injectors (4)
   - Fuel Rail

   The corresponding Service Kits will supply the required new parts per TSB 19-FL-001H to complete the transfer of the above existing parts.

⚠ CAUTION

Follow TSB 19-FL-001H carefully and replace the following newly supplied parts from the Service Kits:
- **Mounting flange O-ring (for High Pressure Pump)**
- **O-rings, Backup Rings, Washer Seals, Combustion Seal Rings, and clips (for Fuel Injectors)**
- **Fuel Pipe (between High Pressure Pump and Fuel Rail)**

In addition, the Service Kits include (1) Exhaust Pipe Gasket. Install this new gasket when attaching the front and center muffler assemblies together during the engine installation.

8. Install the new oil cooler hoses if applicable.

9. Reconnect and reinstall the engine front harness.

10. Follow the published Service Information from the applicable **Shop Manual** to reinstall the Sub Engine Assembly.

Shop Manual Section Location:
Engine Mechanical >
Engine And Transaxle Assembly >
Engine And Transaxle Assembly >
Repair Procedures

NOTICE

Be sure to replace the following newly supplied parts from the Service Kit:
- **Oil Level Rod & Oil Level Guide Assy.**
- **Intake Manifold Gaskets (4)**
- **Exhaust Manifold Gasket**
- **Fuel Pipe Assembly**
- **(2.0T Only) Turbo Oil Feed Hose & Pipe**
- **(2.0T Only) Turbo Oil Drain Gasket (2)**
- **(2.0T Only) Oil Drain Gasket**
- **(2.0T Only) Gasket (2)**

NOTICE

If the torque converter has moved from the fully inserted position, carefully push inward and rotate the torque converter until the converter is recessed approximately 9/16 - 5/8” (14 -16 mm) into the transaxle case when reinstalling the automatic transaxle.

11. Connect the (2) oil coolant hoses between the oil cooler and the water temperature control assembly.
    - Fill the cooling system with 50/50 ~ 70/30 (Water/Anti-Freeze) coolant mixture.

12. Fill the engine crankcase:
    - Add 5.8 quarts for the **initial dry fill** of the engine.
    - With the fuel system disabled temporarily, crank the engine for several seconds to prime the lubrication system prior to starting the engine.

    For all models excluding Veloster N (JSN):
    - Use Pennzoil Platinum 5W30 Full Synthetic SN PLUS, Quaker State Ultimate Durability 5W30 Full Synthetic SN PLUS, Dexos Gen2 5W30 or above.
    - If not available, use other brand 5W30 full synthetic type with API SN/SN+/SP, ILSAC GF4/GF5 or higher service grade.

    For Veloster N (JSN):
    - Use Penzoil Maximum Power 0W30 Full Synthetic API SN PLUS or Dexos Gen2 0W30.
    - If not available, use other brand 0W30 or 5W30 Full Synthetic type with SN/SN+/SP, ILSAC GF4/5 or higher grade.

13. Start the engine to warm it up and begin the cooling system air bleeding process.
    - Check for any leaks during this time.
    - After the engine has warmed up to normal operating temperature, turn the engine off, wait a few minutes, and then **adjust the engine oil level to near the "F" mark as shown**.

14. Refer to Campaign 953 to update the Engine ECM if new software is available.

15. When all fluids have been fully filled and all work quality checks are completed:
    - Set the customer's audio station presets.
    - Relearn the Steering Angle Sensor using the GDS.
    - **Clear DTC P1326 with engine ON**. P1326 may reset if it's not cleared with the Engine ON. Then check for other DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present.
    - **Reset the engine adaptive values** using the GDS.
    - Perform a short road test to confirm normal vehicle drivability.

NOTICE

- **Clear DTC P1326 with engine ON. P1326 may reset if not cleared with the engine ON.**
- **Reset engine adaptive values**