PRODEMAND

YMMS: 2013 Hyundai Sonata Limited
Engine: 2.0L Eng
VIN:

Jul 31, 2021
License:
Odometer:

THETA GDI ENGINE DTC P1326 - ENGINE INSPECTION/REPLACEMENT (SERVICE CAMPAIGN T3G)

SERVICE CAMPAIGN BULLETIN

Reference Number(s): 20-01-004H-3, Date of Issue: December 22, 2020
HYUNDAI: 2011-2014 Sonata (YF); 2015-2019 Sonata (LF); 2013-2018 Santa Fe Sport (AN); 2019 Santa Fe (TM); 2014-2015 Tucson (LM); 2018-2019 Tucson (TL); 2019 Veloster N (JSN)
GROUP: CAMPAIGN
Superceded Bulletin(s): 20-01-004H-2, Date of Issue: December 01, 2020

REVISION HISTORY

This TSB supersedes TSB# 20-01-004H-2 to update the Service Procedure Flowchart and Service Procedure contents to reflect various process revisions.

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.

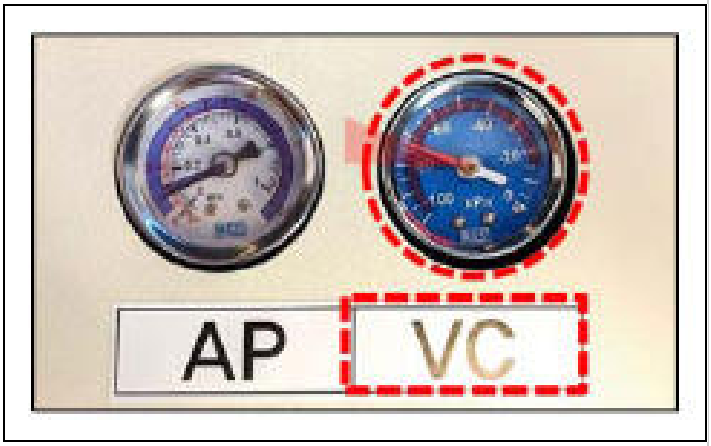
DESCRIPTION

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

SST INFORMATION

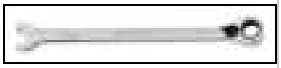
Part Name	Part Name/Figure	Note
Torque Wrench Socket	09314-3Q100-01	Only needed if engine replacement is required. Refer to TSB 19-FL-001H for the detailed usage instructions.

Injector Combustion Seal Ring Installer	09353-2B000	Order replacements through Bosch at 1-866-539-4248.
5 Quart Container	 ULINE S-22984	Required to drain oil if necessary. Order from ULINE at 800-295-5510 or ULINE.com. An alternative container can be used but it must have clear markings to indicate fluid levels in quarts (1-4 quarts) for PA Approval purposes.
BEARING CLEARANCE TESTER SET (BEARING TOOL)		Confirm the following pressures meet requirements. The correct ranges for AP/VC air pressures are also indicated with red/blue decals on the gauges: **Shop air supply: 50 psi minimum** **AP: 0.1 ~ 0.11MPa VC: -73 ~ -83Kpa** **(Refer to TSB 20-GI-009H or later for calibration procedure)**
		
	1. TEST HOSE 2. MAIN HOSE 3. POWER SUPPLY CABLE One BEARING CLEARANCE TESTER SET provided to dealers. (Additional units can be ordered.)	For Bearing Clearance Tester software related issues, contact GITA at: 888-437-0308 For Bearing Clearance Tester hardware related issues, contact Techline at: 800-325-6604
	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)

OPTIONAL TOOL

PARTS INFORMATION

Part Name	Part Name/Figure	Note
17 mm 12-Point Metric Flank Drive® Reversible Ratcheting Box/Speed Open-End Combination Wrench	(Snap-on) SRXRM17 	For unfastening torque converter bolts to separate engine/trans between bellhousing if engine cannot rotate.

PARTS INFORMATION

> **NOTE:** *Use the Service Process Results Worksheet in the following page as a guide to determine the appropriate Part Number(s).*

1. Order the required parts based on the vehicle inspection results outlined in the Service Procedure Flowchart. (Use the **Service Process Results Worksheet** in the following page as a guide to determine the appropriate part numbers.)
2. Refer to TSB # 20-01-024H-2 (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

> **NOTE:** *Use the Service Process Results Worksheet in the following page as a guide to determine the appropriate Op Code.*

1. The Campaign 953 Engine ECM Update is only required if new software is available. In this case, choose one of the following methods:
    1. Select a Campaign T3G Op Code with the ECM update included if available, OR
    2. Submit a separate campaign claim for the ECM update using Campaign 953 op codes (in addition to submitting applicable T3G op code)
2. Refer to TSB # 20-01-024H-2 (or latest revision) for OP Codes

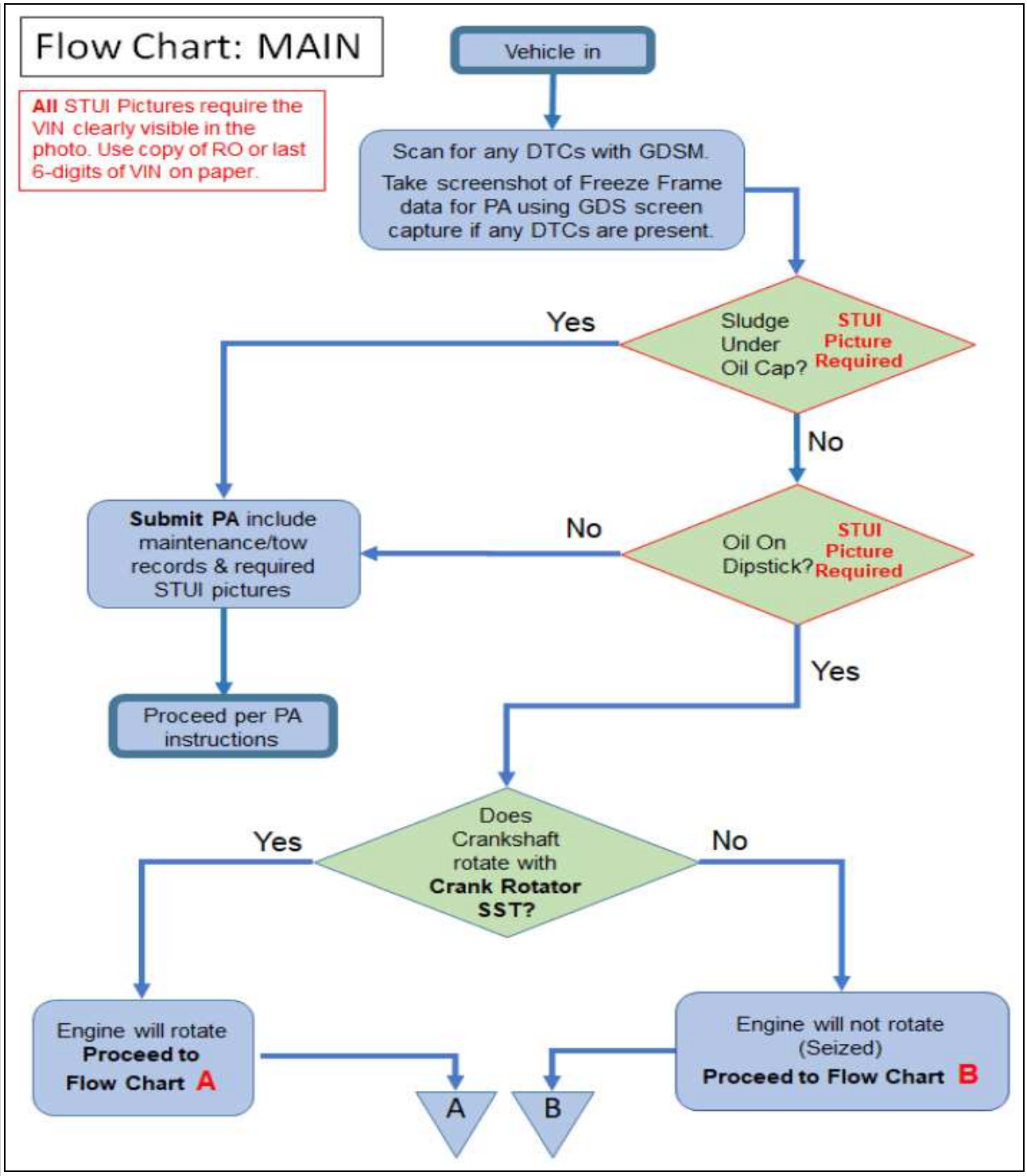
3. Campaign T3G OP codes for engine replacement should only be used if engine replacement is deemed necessary by the service procedure in this TSB.
    1. Refer to **Prior Approval Submission Documentation** at last page for checklist of PA items.
    2. General engine replacement for conditions outside of those contained in this TSB are not covered by Campaign T3G.

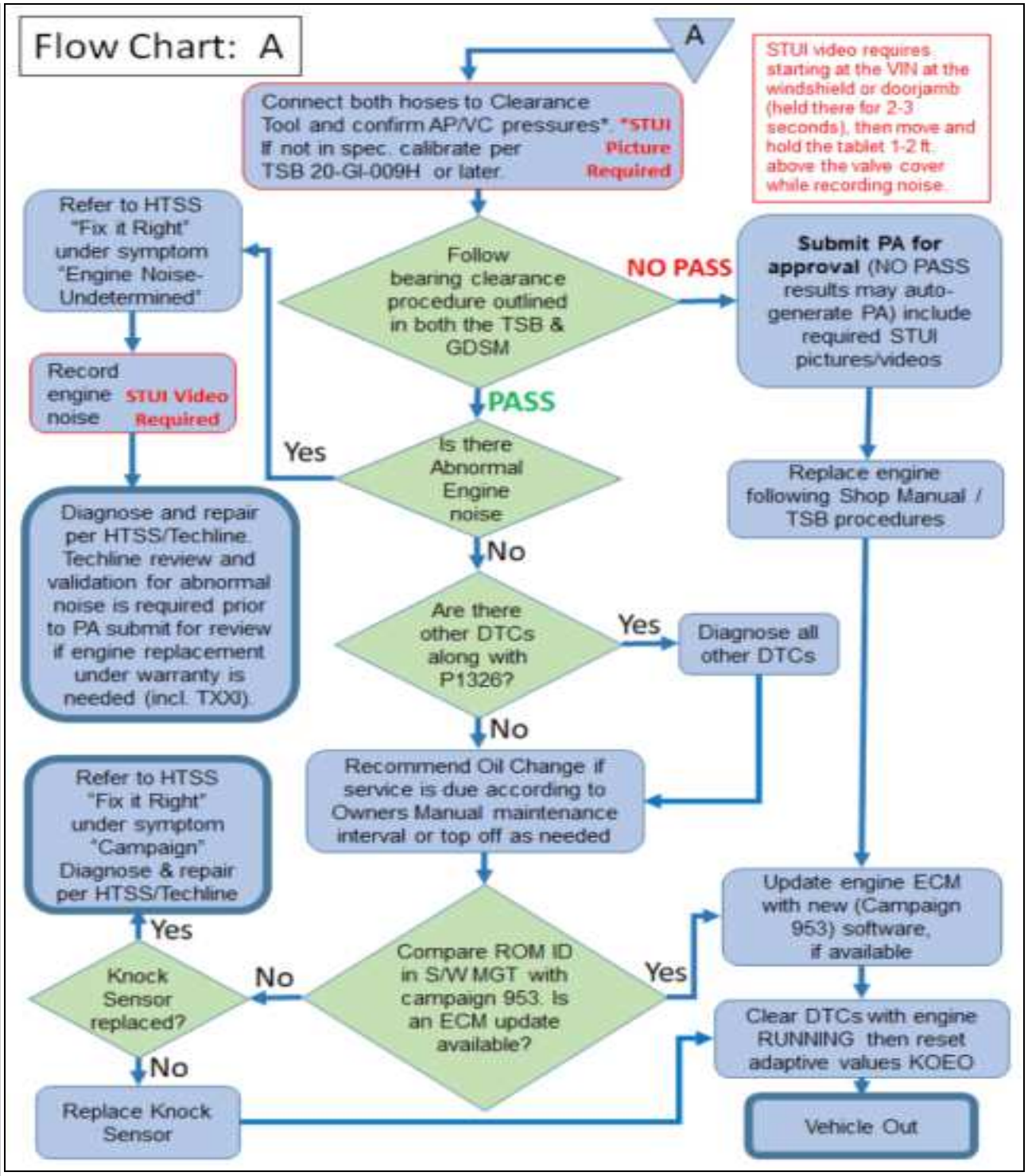
Engine Oil Maintenance Information	
Poor oil maintenance reduces the engine oil lubrication and cooling capacities. As a result, internal engine parts can be damaged resulting in abnormal wear to internal engine parts, excessive carbon deposits, sludge, and other various conditions. An inspection for these conditions and others may be required prior to engine approval. **NOTE:** *Engine oil is used to lubricate, cool, and operate various engine parts. Engine oil changes and engine oil level checks are required on a regular basis for all engines.* *Engine oil level checks and top-ups are recommended if they are needed prior to the end of an oil change interval.*	  

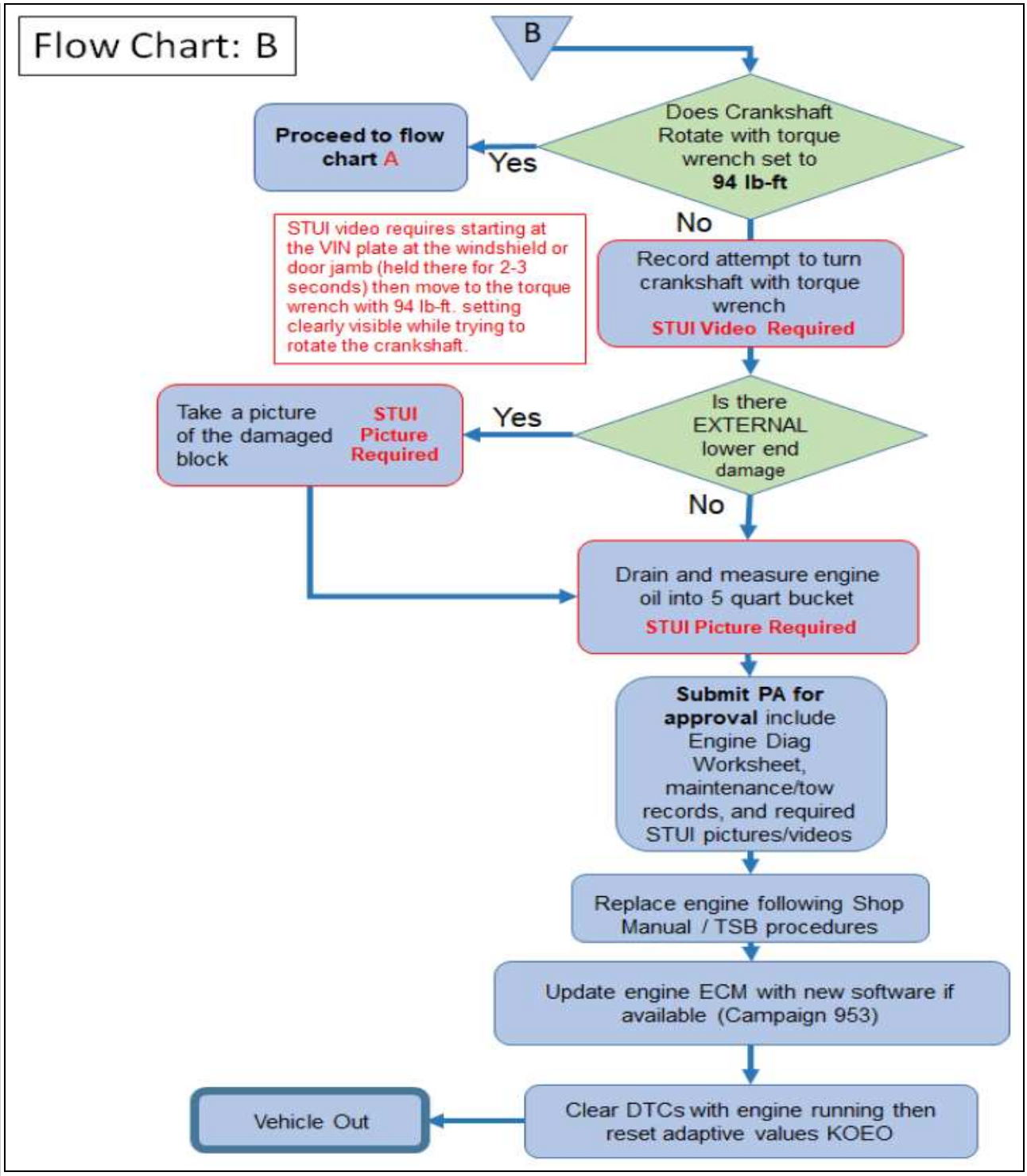
SERVICE PROCESS RESULTS WORKSHEET: (PRINT COPIES OF THE FORM BELOW IN THIS PAGE FOR MULTIPLE USES.)

6-Digit VIN:	Repair Order #:				
Options / Tests / Procedures	**(Circle ALL Vehicle Options / Test Results / Performed Procedures That Apply)**				
Vehicle Model Year	11	12	13	14	15
	16	17	18	19	
Vehicle Model Type	SONATA			SANTA FE SPORT	
	TUCSON			VELOSTER N	
Vehicle Engine Size	2.4L			2.0T	
Smart Cruise Control (SCC)	Yes			No	
All Wheel Drive (AWD)	Yes			No	
Crank Rotation (w/ 94 lb-ft. or less)	Yes			No	
External Lower End Damage	DAMAGED			NOT DAMAGED	
Oil Drain Procedure Required	Yes			No	
Bearing Clearance Test Performed	Yes			No	
Bearing Clearance Test Result	PASS			NO PASS	
Abnormal Engine Noise	Yes			No	
Knock Sensor Replaced (in this Repair Order)	Yes			No	
Replaced Engine (in this Repair Order)	Yes			No	
Replacement Engine (if replaced)	NEW			REMAN	
ECM Newly Updated (in this Repair Order)	Yes			No	
Contacted Techline	Yes			No	

SERVICE PROCEDURE FLOWCHART


Flow Chart: MAIN
All STUI Pictures require the VIN clearly visible in the photo. Use copy of RO or last 6-digits of VIN on paper.
Vehicle in
Scan for any DTCs with GDSM.
Take screenshot of Freeze Frame data for PA using GDS screen capture if any DTCs are present.
Sludge Under Oil Cap?
STUI Picture Required
Yes
No
Oil On Dipstick?
STUI Picture Required
No
Yes
Submit PA include maintenance/tow records & required STUI pictures
Proceed per PA instructions
Does Crankshaft rotate with Crank Rotator SST?
Yes
No
Engine will rotate Proceed to Flow Chart A
Engine will not rotate (Seized) Proceed to Flow Chart B
A
B


Flow Chart: A
A
STUI video requires starting at the VIN at the windshield or doorjamb (held there for 2-3 seconds), then move and hold the tablet 1-2 ft. above the valve cover while recording noise.
Connect both hoses to Clearance Tool and confirm AP/VC pressures*. If not in spec. calibrate per TSB 20-GI-009H or later. *STUI Picture Required
Refer to HTSS "Fix it Right" under symptom "Engine Noise-Undetermined"
Follow bearing clearance procedure outlined in both the TSB & GDSM
NO PASS
Submit PA for approval (NO PASS results may auto-generate PA) include required STUI pictures/videos
Record engine noise STUI Video Required
PASS
Yes
Is there Abnormal Engine noise
Diagnose and repair per HTSS/Techline. Techline review and validation for abnormal noise is required prior to PA submit for review if engine replacement under warranty is needed (incl. TXX).
Replace engine following Shop Manual / TSB procedures
No
Are there other DTCs along with P1326?
Yes
Diagnose all other DTCs
No
Recommend Oil Change if service is due according to Owners Manual maintenance interval or top off as needed
Refer to HTSS "Fix it Right" under symptom "Campaign" Diagnose & repair per HTSS/Techline
Update engine ECM with new (Campaign 953) software, if available
Yes
Knock Sensor replaced?
No
Compare ROM ID in S/W MGT with campaign 953. Is an ECM update available?
Yes
No
Clear DTCs with engine RUNNING then reset adaptive values KOEO
Replace Knock Sensor
Vehicle Out



SERVICE PROCEDURE

Initial Inspection

1. Scan for DTC P1326 using the GDS.
    1. If DTC P1326 (or any other code) is present, take screenshot of Freeze Frame data for PA using GDS screen capture if any DTCs are present and proceed to Step 2.

2. Check for any sludge under the engine oil filler cap.

1. Using STUI on the GDS, take and submit a picture of the oil cap underside with the VIN in the background of the photo (RO or last 6 digits written on paper). **VIN must be legible.**
    1. **Sludge under oil cap:** Submit Warranty Prior Approval (PA).
    2. **No sludge under oil cap:** Continue to next step.

3. Check for any engine oil on the engine oil dipstick.
    1. Using STUI on the GDS, take and submit a picture of the dipstick with the VIN in the background of the photo (RO or last 6 digits written on paper). VIN must be legible.
        1. **No engine oil on dipstick:** Submit Warranty Prior Approval (PA)
        2. **Engine oil on the dipstick:** Continue to Engine Rotation Check.

Engine Rotation Check

1. Rotate the crankshaft with the crank rotator SST.
    1. If the crankshaft cannot be turned with a moderate force, then measure the force required to turn the crankshaft with a torque wrench.
    2. If the SST or shop tools do not fit the specific vehicle type, remove the front passenger wheel and wheel liner or underbody tray as needed to rotate the crankshaft.
        1. **If the crankshaft rotates normally:**
            1. Proceed to Bearing Inspection and follow the procedure sequence in **Flow Chart A** .
        2. **If the force required for rotating the crankshaft is greater than 94 lb-ft., documentation through STUI video is required.**
            1. Follow the procedure sequence in Flow Chart B and note the following differences.
                1. **If there is NO lower end damage:**
                    1. Follow the Oil Drain Procedure in the following page.
                2. **If there is external lower end damage:**
                    1. Using STUI in the GDS, submit a picture of the damage with the VIN in the background of the photo (RO or last 6 digits written on paper). **VIN must be legible** .
                    2. Follow the Oil Drain Procedure in the following page.

NOTE: *If other engine accessory components are seized, remove the engine accessory belt prior to completing the engine rotation check.*

NOTE: *PA Approval is required for engine replacement. Submit PA and refer to the Dealer Best Practices guide for the latest requirements for engine approval.*

1. If engine does not rotate normally, a STUI video including the following is required:

1. VIN Plate (at windshield or on door jamb)

2. Attempt to rotate the crankshaft

2. Save the crankshaft rotation torque value

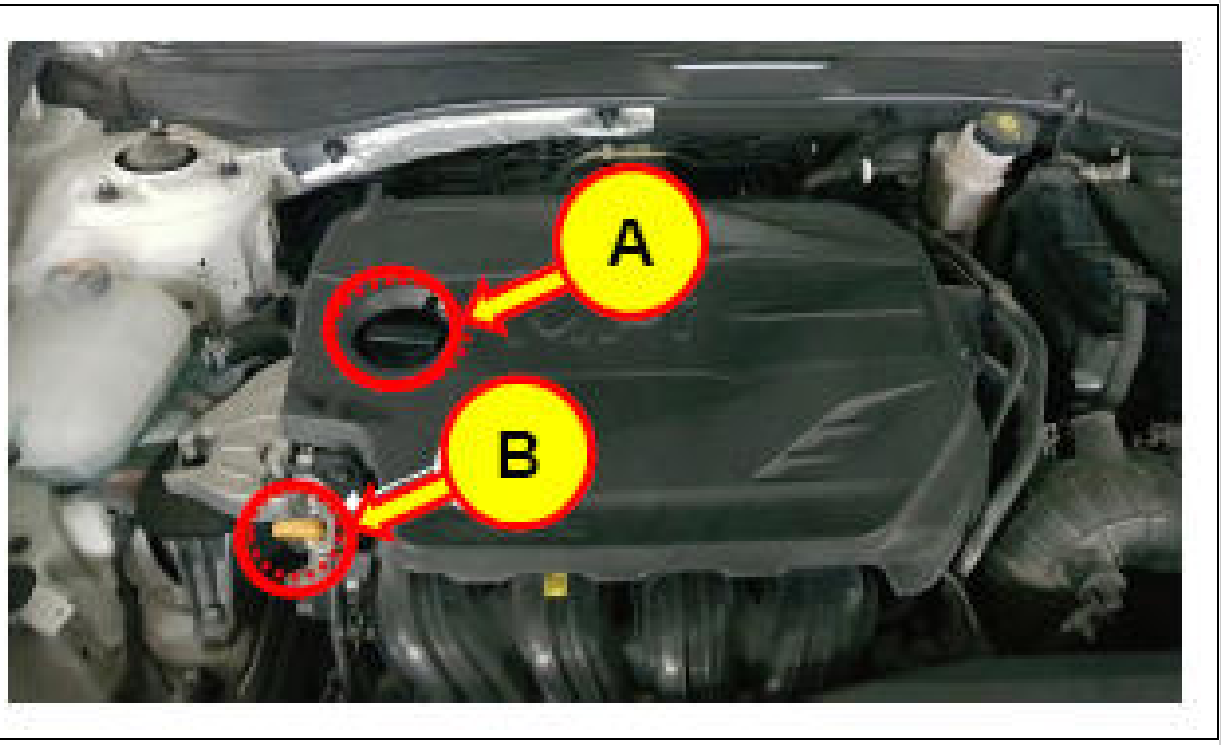
3. A picture of the lower end damage is required if present

Additional documentation may be required:

- *Refer to Prior Approval Submission Documentation at last page for PA required items.*
- *Use STUI feature on the GDS to take and submit pictures and videos.*

Oil Drain Procedure

1. Remove the engine oil filler cap (A) and engine oil level gauge (B).



2. Lift up the vehicle and remove the oil drain plug (C).

3. Drain the engine oil into a container. The 1-4 quart level should be clearly marked and visible on the container. Using STUI in the GDS, take and submit a picture of the oil container with the drained oil level clearly visible and the VIN in the background of the photo (RO or last 6 digits written on paper) for records, if needed. **VIN must be legible.**
4. Submit PA for engine replacement approval.

Bearing Inspection

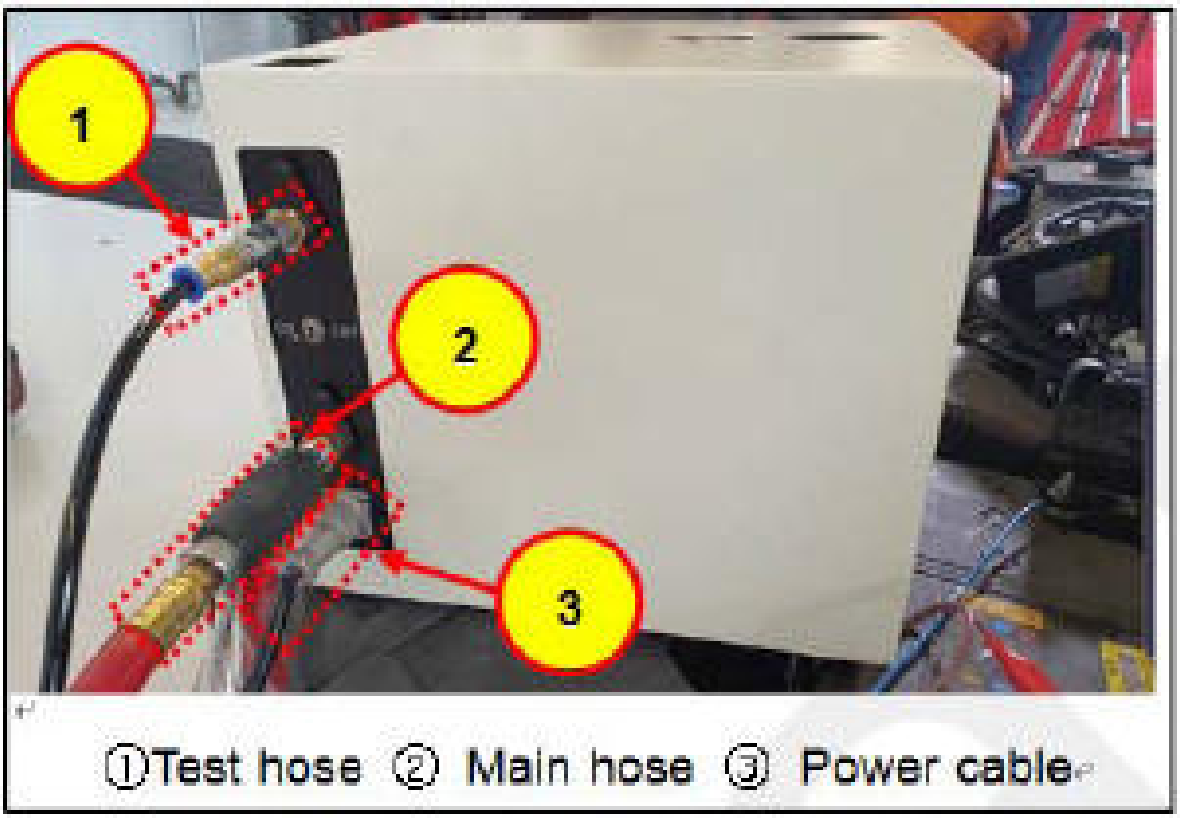
1. Connect the main hose (shop air supply) and test hose to the bearing tool (with other end of the test hose disconnected). (The power to the bearing tool main unit is not necessary at this time.)
   Confirm the shop air pressure and AP/VC pressures on the bearing tool meet requirements. The correct ranges for AP/VC air pressures are also indicated with red/blue decals on the gauges. Using STUI in the GDS, take and submit a picture of the gauges with the pressure levels clearly visible and the VIN in the background of the photo (RO or last 6 digits written on paper) for records.
   Shop air supply: 50 psi minimum
   AP/VC air pressure calibration check:

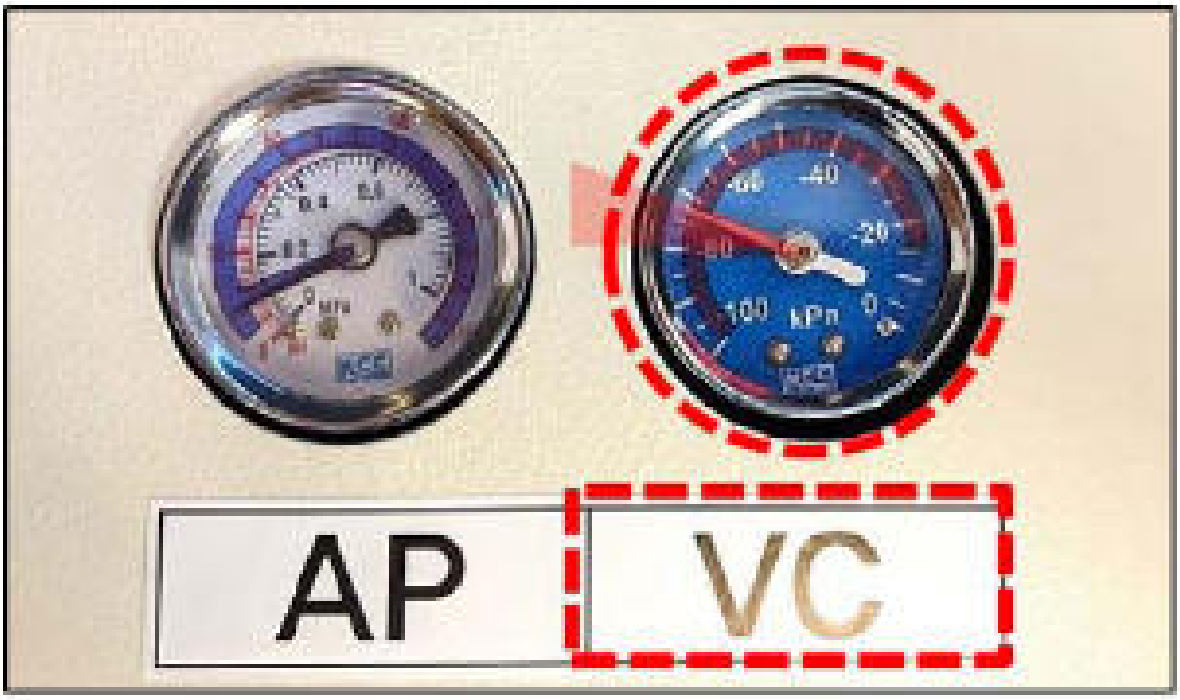
   a. Connect the main air compressor hose.

   b. Connect the test hose. (The other end of the test hose should be left disconnected from the spark plug rod.)

   c. Confirm that the AP/VC toggle switch at top is in the middle position.

   d. Inspect the AP/C gauge indicators and compare to the specification range:
      a. **AP:** 0.1 ~ 0.11MPa
      b. **VC:** -73 ~ -83Kpa


1
2
3
①Test hose ② Main hose ③ Power cable


AP
VC

NOTE: *Do not continue if any of the above readings are out of specification range.*

1. *Adjust shop air to consistently provide at least 50 PSI of air pressure or greater.*
2. *Do not use a portable air compressor to perform the bearing clearance testing.*
3. *Be sure to check that the shop air water separator is functioning correctly.*
4. *If any of the AP/VC air pressure indications are out of the specified range, recalibration of the Bearing Clearance Tester is required.*
    1. *Refer to latest instructions outlined in the Engine Bearing Clearance Tester Calibration Procedure TSB 20-GI-009H or later for calibration procedure.*

NOTE: *For Bearing Clearance Tester* ***software*** *related issues, contact GITA at: 888-437-0308*

For Bearing Clearance Tester ***hardware*** *related issues, contact Techline at: 800-325-6604*

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)

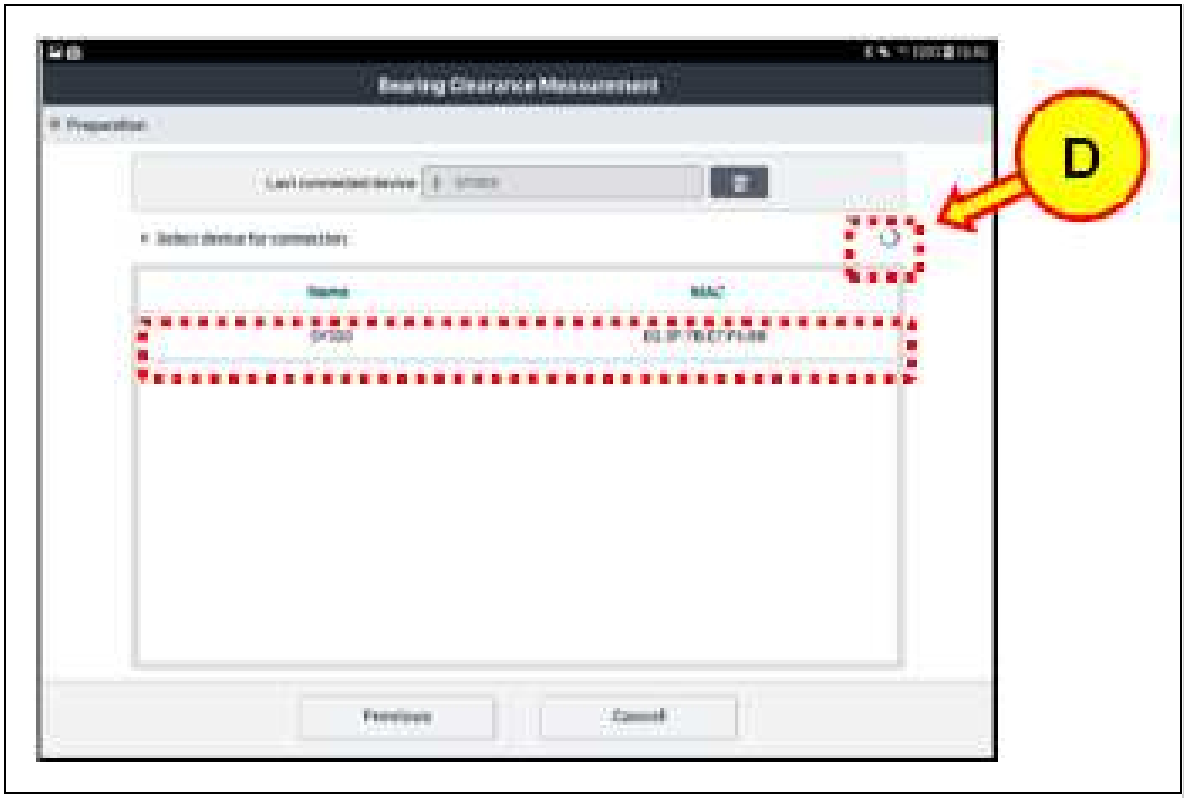
3. Remove the 4 spark plugs.
   Tightening Torque:
   14.7 - 24.5 N.m (1.5 - 2.5 kgf.m, 10.9 - 18.0 lb.ft)

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.

NOTE: *DO NOT connect the test air hose to the clearance gauge at this time.*

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. Enter the vehicle info into the GDS as prompted then select 'Next'.

8. Connect the GDS to the clearance gauge SST (gauge) via Bluetooth:
    1. Press the "Set" button (B) on the gauge to turn it on.
    2. Press the "Set" (B) and "Mode" (C) buttons at the same time for about 4 sec until the "reset" message is displayed.
    3. Select the gauge in the list of devices on the GDS. Select the 'Refresh' icon (D) if the gauge doesn't appear automatically.

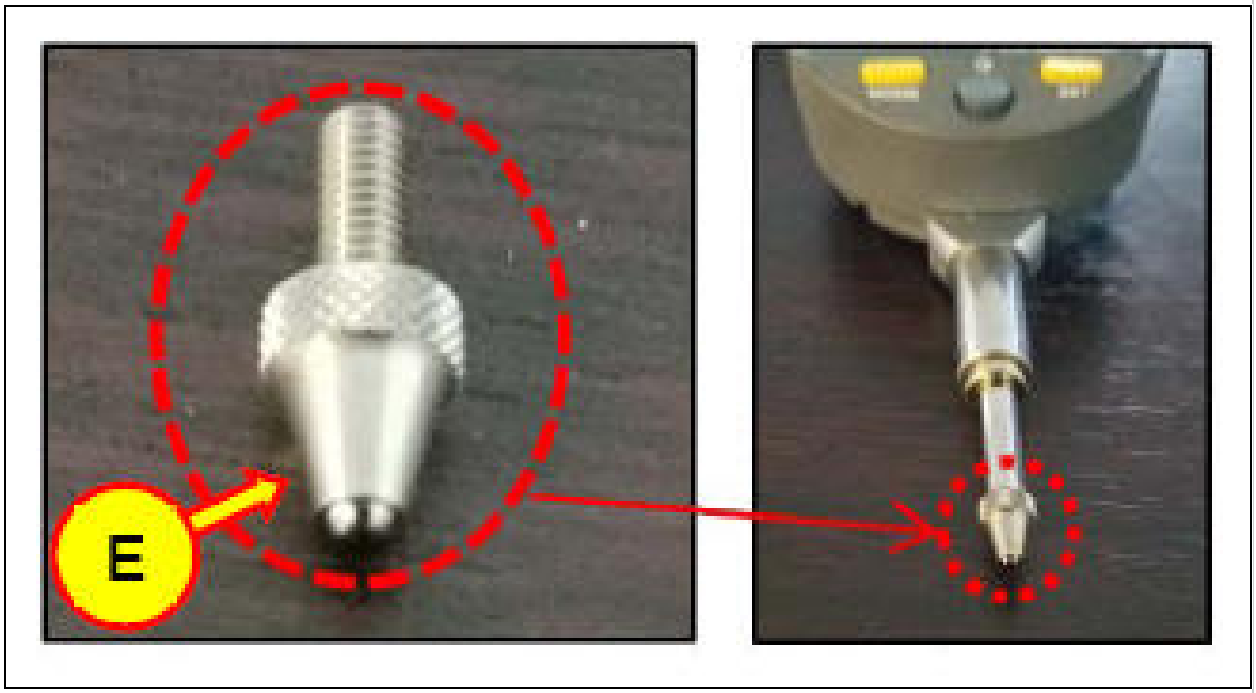


4. Check that the ball point tip (E) of the clearance gauge SST is securely installed to the tool as shown. **Do not continue if ball point tip (E) is loose or missing.**

9. Turn the ignition 'OFF' and remove the VCI.

10. Follow the instructions on the GDS to start the test and select 'Next'.

NOTE: *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.*



NOTE:

1. *For the following steps, the Crank Rotator Tool or a long handled wrench should be used for moving the crankshaft slowly and precisely.*
2. *Ensure the test hose is disconnected from the clearance gauge when finding TDC piston depth.*

NOTE: *Please take note of the following crank/piston position definitions.*

1. *BTDC (Before Top Dead Center)*
2. *TDC (Top Dead Center) <- Find TDC during the compression stroke.*
3. *ATDC (After Top Dead Center)*

In the following steps, the TDC point for testing must be at MAX (piston height) value minus 0.03mm as the crank has

moved slightly into ATDC (from its TDC dwell point).

If TDC is difficult to find, refer to **Shop Manual Section Location:** Engine Mechanical System > Timing System > Timing Chain

11. 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.)
    1. Monitor the piston height value on GDS screen or the clearance gauge SST while rotating the engine clockwise using the Crank Rotator Tool.
        1. Rotate the engine SLOWLY as the value increases towards a MAX value. (BTDC → TDC)
        2. When the value changes direction (increasing/BTDC → TDC → decreasing/ATDC), stop rotating the crank when the piston height is at MAX value minus 0.03mm.

NOTE: *The testing point is slightly towards ATDC from TDC when the piston has moved down 0.03mm from its highest position.*

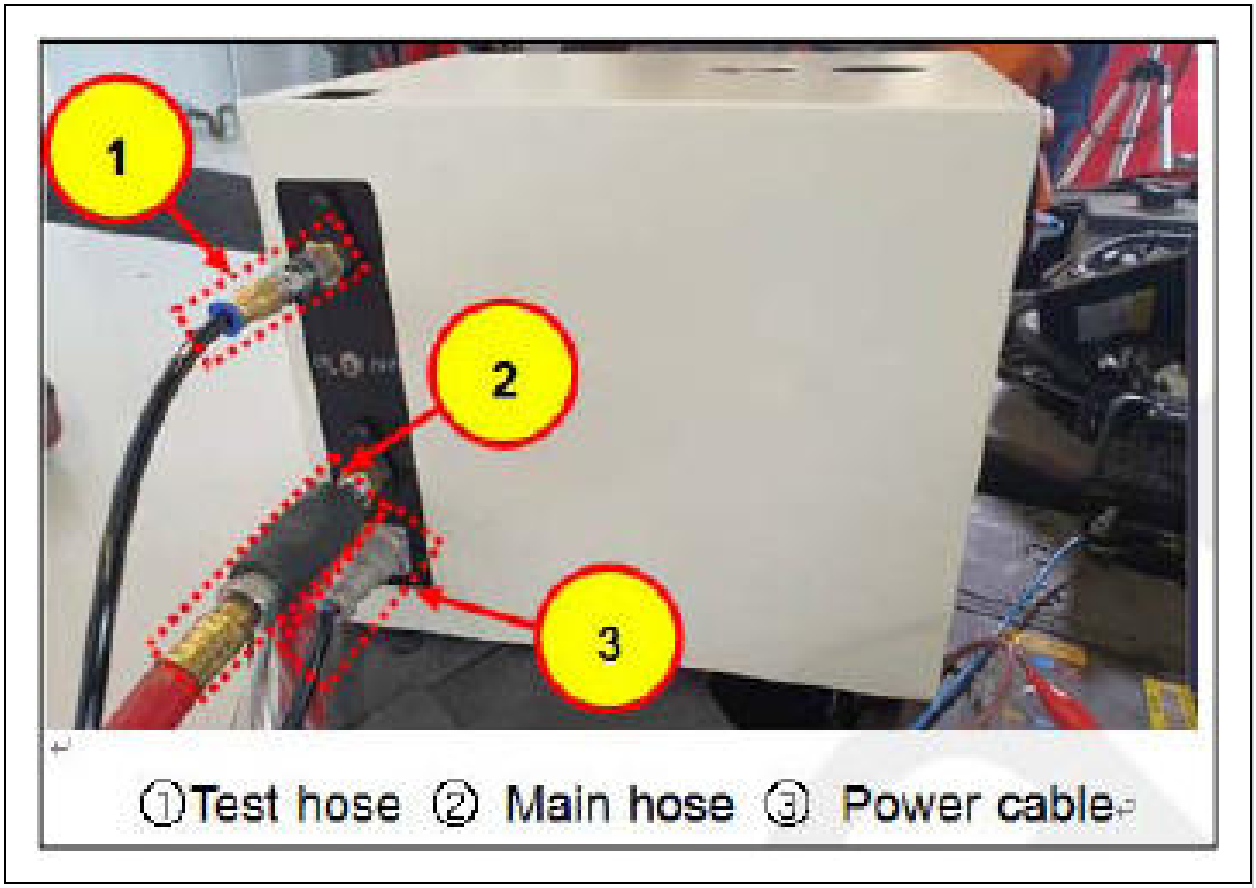
12. Select 'Next' when TDC is found.

1. Ideal set point for testing from TDC is found when the maximum value minus 0.03mm is reached on the clearance gauge SST (F).
2. The value is also displayed on the GDS.

13. Once the set point for bearing testing is found, select 'Start' in the GDS screen and proceed directly to the next step below.
    1. Do not turn the crank rotator SST until instructed to do so.

> **NOTE:** *The value at TDC varies depending on the specific vehicle and engine type.*

14. Connect the test hose (1) to the spark plug rod SST and to the bearing tool SST.



15. Connect the SST power cables to a fully charged 12V battery or to an external AC/DC power supply.
    1. Turn the bearing tool SST power switch 'ON'.

NOTE: **** Bearing Tool SST Power Check ****

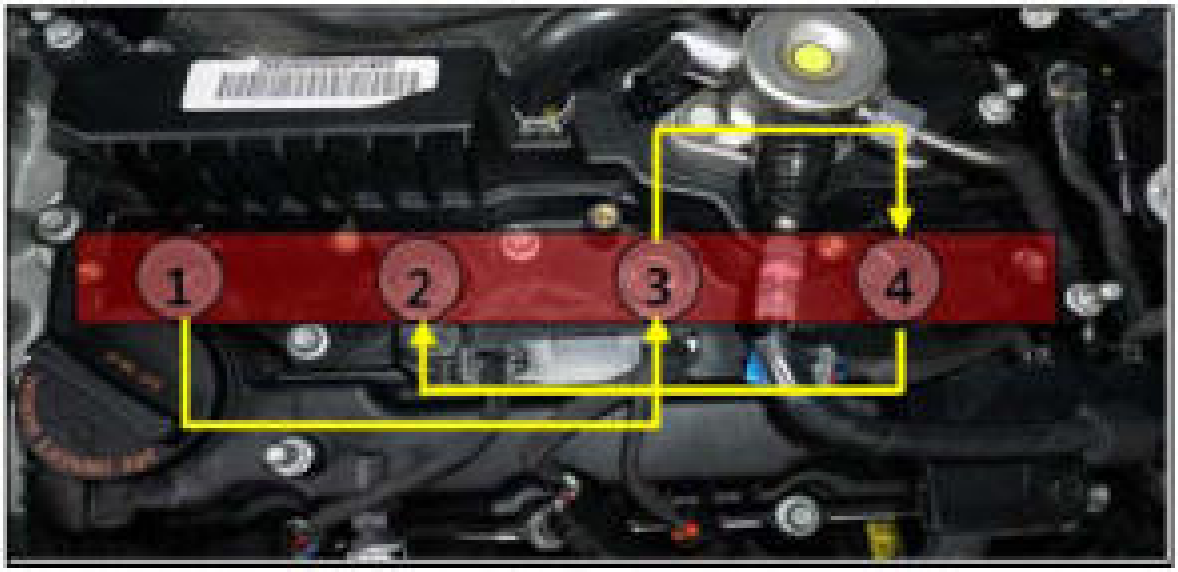
a. Supply 12 volts (or an alternate external AC/DC 13.8 volt power supply with at least ~2 amp output) to the power cable (3) connected to the bearing tool SST.

b. Turn power switch to ON.

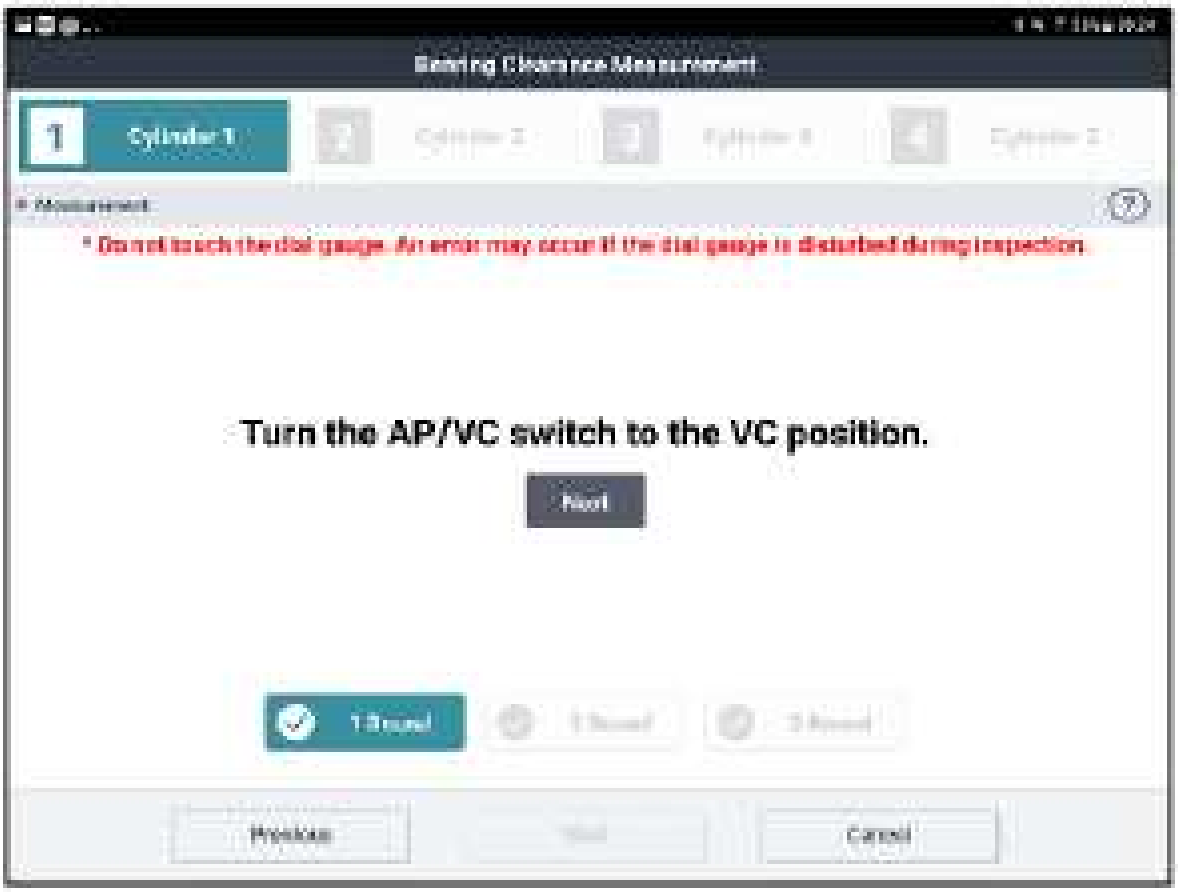
c. Toggle AP/VC transfer switch between AP <> VC.

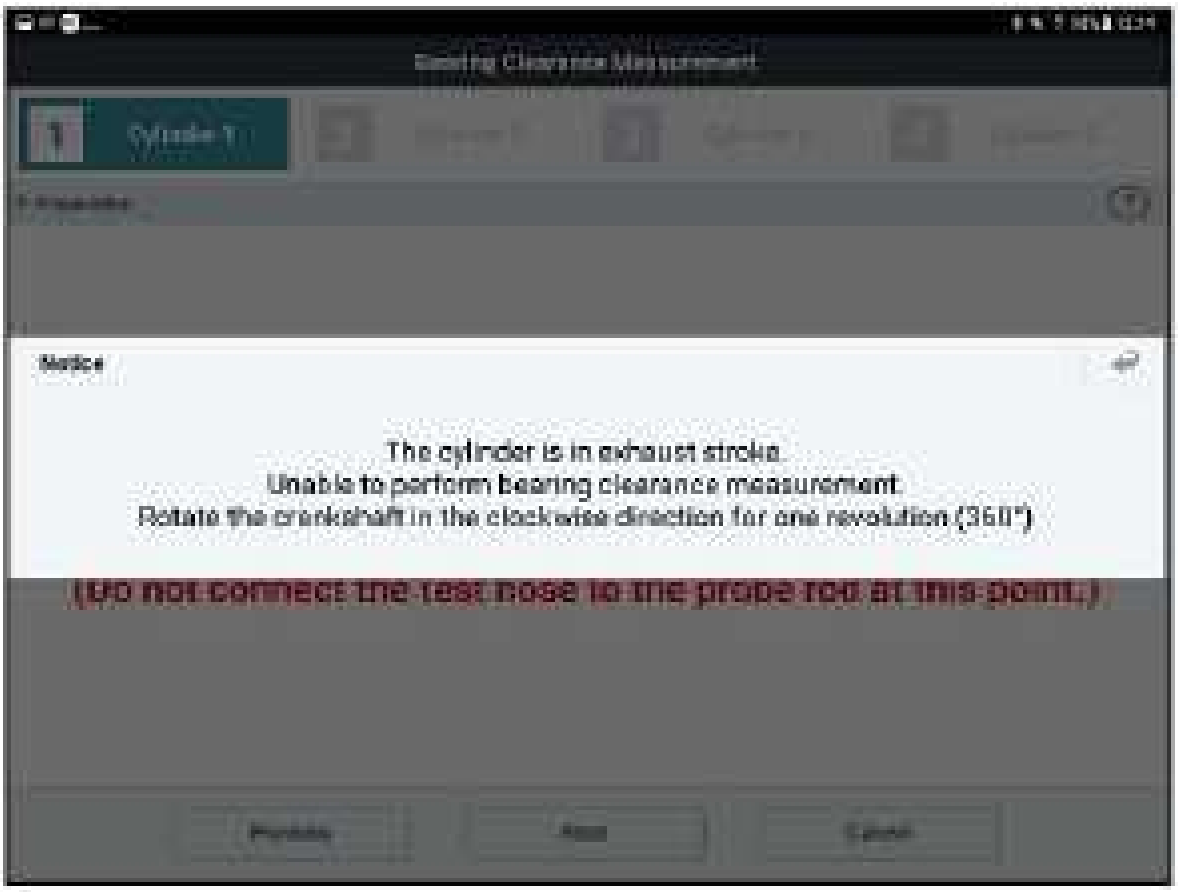
- *a. The solenoids should "click" while switching between AP/VC when the unit is ON.*
- *b. If the solenoids are not switching, then check the power cable or the power supply.*

16. Locate the AP/VC switch on the bearing tool SST and switch it to the AP Position.
17. Follow the instructions on the GDS to test each cylinder. Cylinder #1 is checked first.
    1. The cylinders will be checked per the engine firing order: #1→#3→#4→#2.
18. On the bearing tool SST, change the AP/VC switch to the VC position when instructed by the GDS.

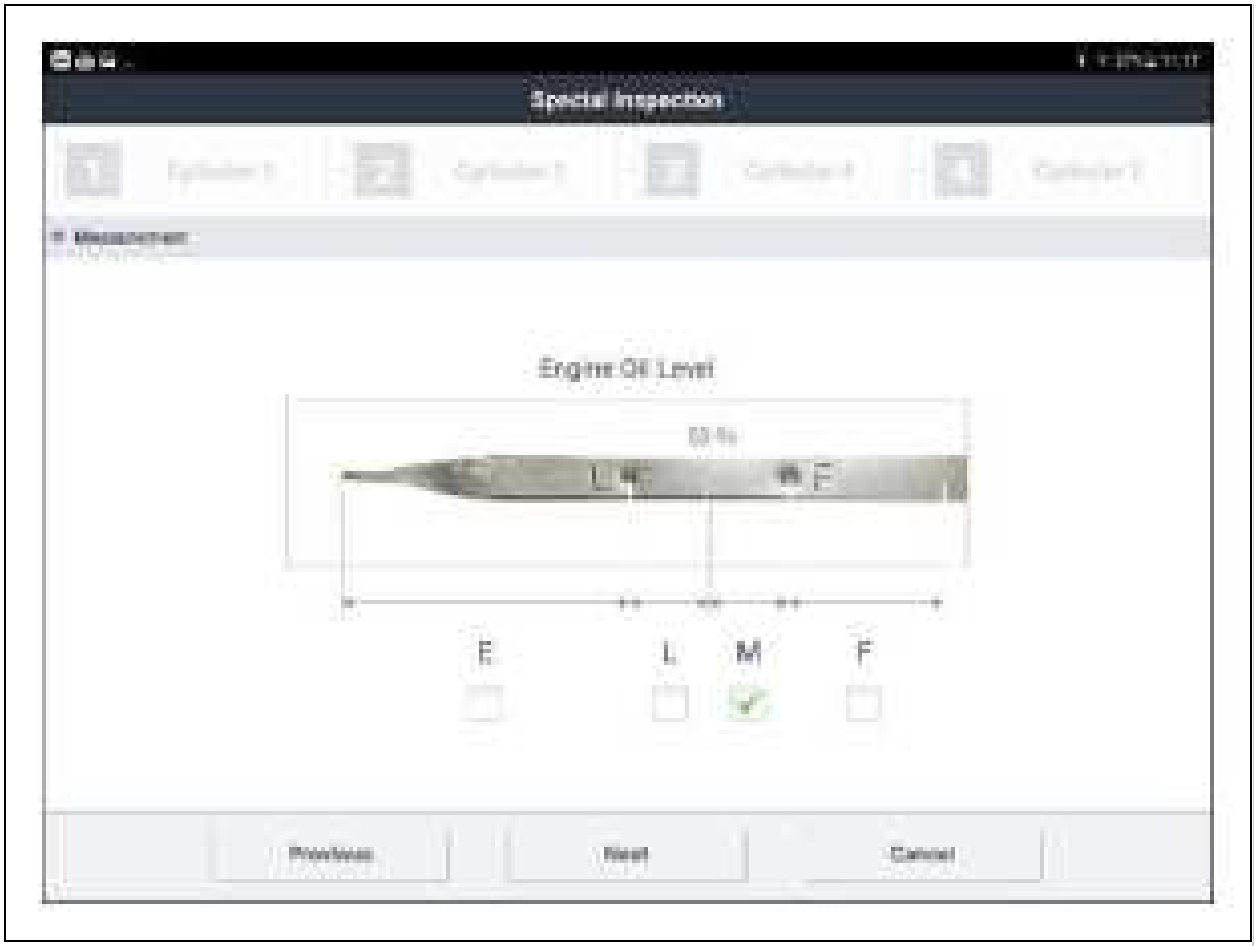


NOTE: *If the bearing measurement value does not change when the AP/VC is switched or the "Unable to measure" message appears on the GDS, rotate the crankshaft further as the exhaust valves could be open. Set the crankshaft to TDC again (Step 10).*
Ensure the test hose is disconnected from the clearance gauge SST when finding TDC.


Bearing Clearance Measurement
1
Cylinder 1
Turn the AP/VC switch to the VC position.
Next
Cancel



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

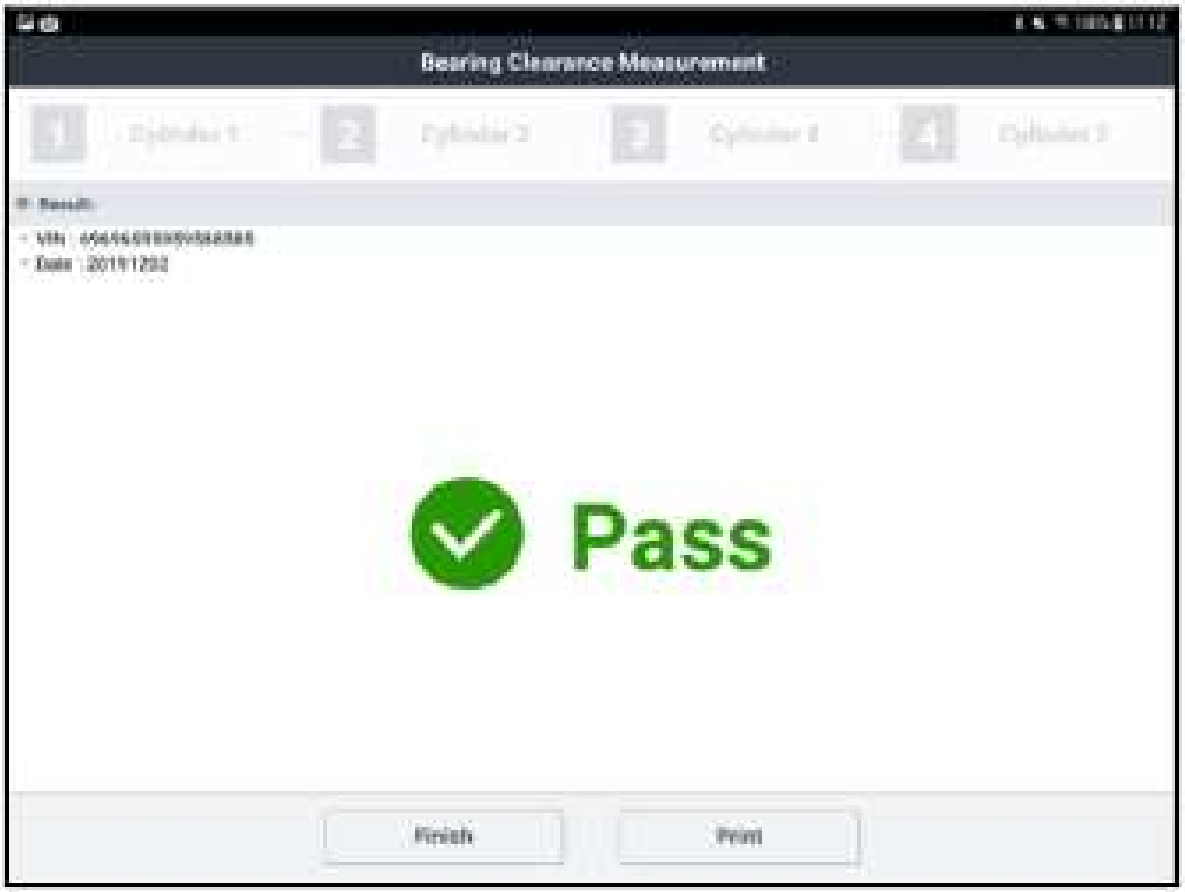


20. **If the test result is "PASS":**

    a. Save a screenshot of the results screen.
        a. If there is audible engine noise:
        Refer to HTSS "Fix it Right" under symptom: "Engine Noise-vUndetermined"
        Using STUI on the GDS, record and submit a video of the engine noise 12 ft above the valve cover. Include the VIN Plate (at windshield or on door jamb) in the beginning of the video.
        Follow remainder of Flow Chart A to complete the procedure.
        b. If there is no audible engine noise:
        Follow remainder of Flow Chart A to complete the procedure.

    b. Reinstall all components in the reverse order of removal.

    c. 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":

a. Save a screenshot of the results screen.

b. Submit PA for engine replacement approval.

c. Follow remainder of Flow Chart A and Engine Replacement section of this TSB to complete the service procedure.

d. Check for DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present to complete the procedure.

NOTE: *PA Approval is required for engine replacement. Submit PA and refer to the Dealer Best Practices guide for the latest requirements for engine approval.*

1. *Refer to Prior Approval Submission Documentation section at the last page of this TSB for the itemized checklist.*

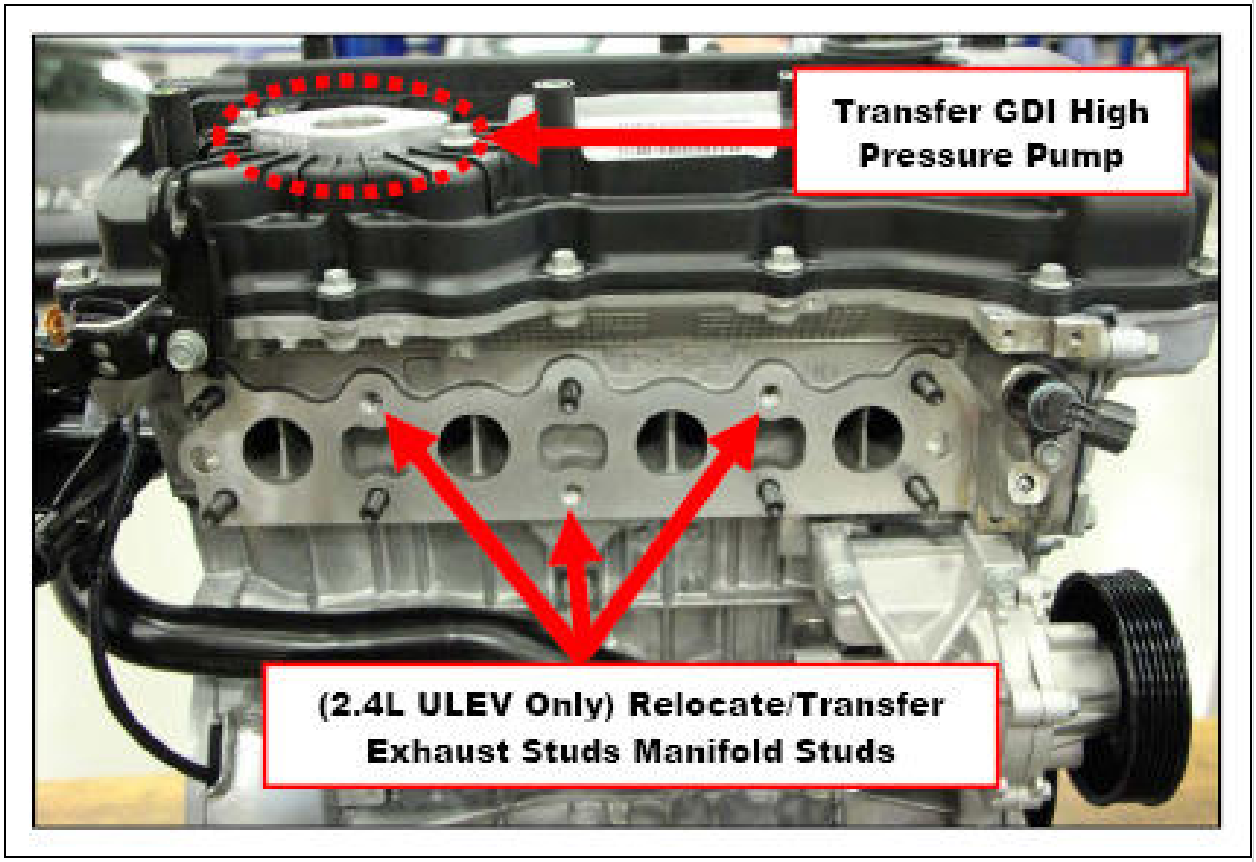
Engine Replacement

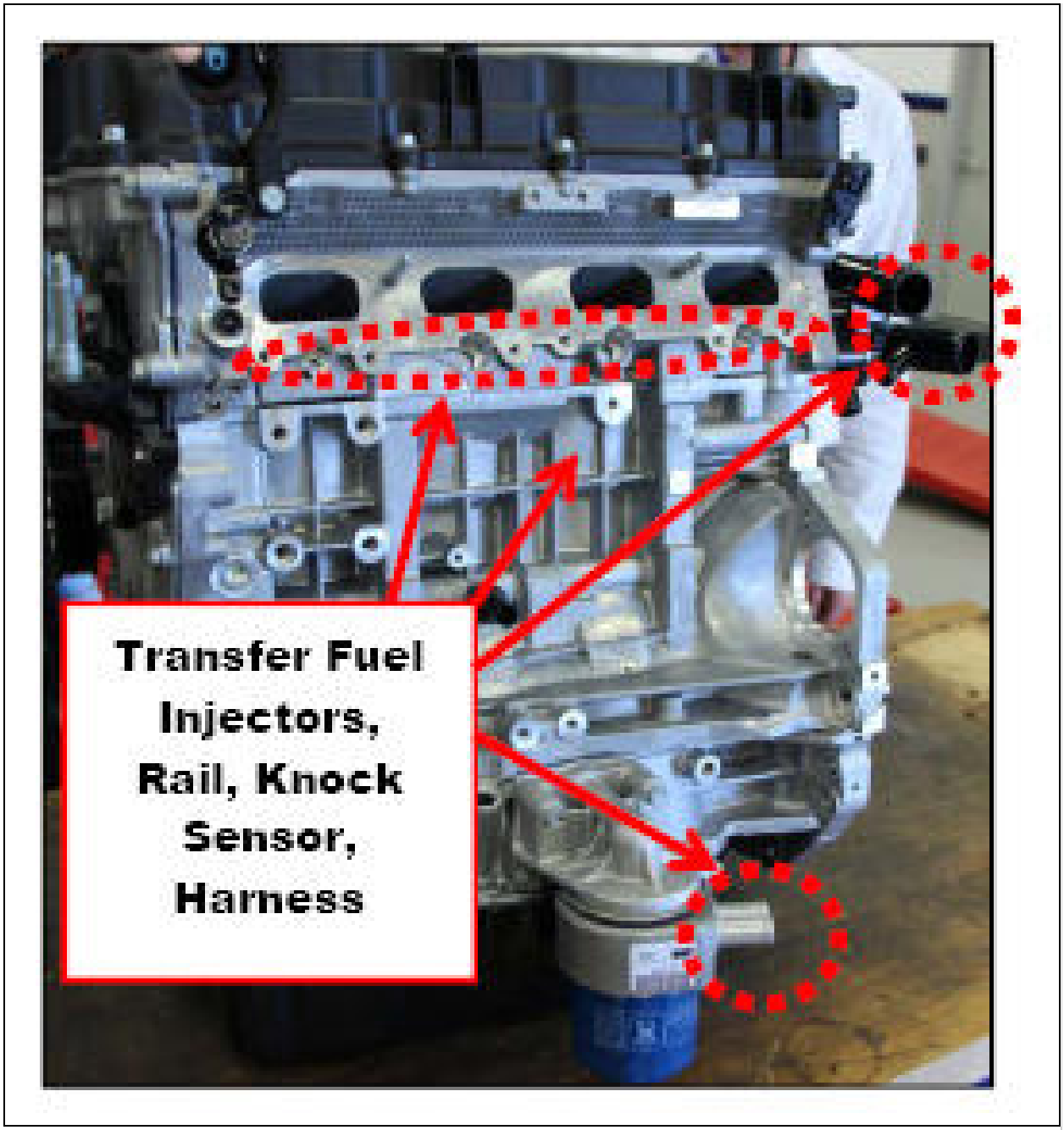
1. Continue with engine replacement if necessary according to the Service Procedure Flowchart.
2. Follow the applicable shop manual to remove the engine from the vehicle. The specific method for removal varies by model.
    1. **Shop Manual Section Location:** Engine Mechanical > Engine And Transaxle Assembly > Engine And Transaxle Assembly > **Repair Procedures**

NOTE: *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.

> **NOTE:** *Take special care of the original engine parts that will be required for reinstallation on to 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.
    1. Two exhaust studs must be relocated on the new engine and 1 exhaust stud must be transferred from the old engine.
        1. Use a commercially available stud removal tool or use the double-nut technique to complete this step.

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)

> **NOTE:** *Ensure the knock sensor is torqued to specification using a torque wrench.*
>
> *1. Improper installation can result in DTC codes.*

6. **If 21101-2GK70QQA engine is used:**
   1. Install the oil filler cap from the old engine to the new one.
   2. Install the drive plate/flywheel on the new engine using new bolts (QTY 7).
      1. **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:
    1. GDI High Pressure Pump
    2. Fuel Injectors (4)
    3. 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.

8. Install the new oil cooler hoses if applicable.

9. Reconnect and reinstall the engine front harness.

> **CAUTION:** *Follow TSB 19-FL-001H carefully and replace the following newly supplied parts from the Service Kits:*
>
> *1. Mounting flange O-ring (for High Pressure Pump)*
> *2. O-rings, Backup Rings, Washer Seals, Combustion Seal Rings, and clips (for Fuel Injectors)*
> *3. 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.*

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

NOTE: *Be sure to replace the following newly supplied parts from the Service Kit:*

1. *Oil Level Rod & Oil Level Guide Assy.*
2. *Intake Manifold Gaskets (4)*
3. *Exhaust Manifold Gasket*
4. *Fuel Pipe Assembly*
5. *(2.0T Only) Turbo Oil Feed Hose & Pipe*
6. *(2.0T Only) Turbo Oil Drain Gasket (2)*
7. *(2.0T Only) Oil Drain Gasket*
8. *(2.0T Only) Gasket (2)*

NOTE: *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 5/16 -9/16 (8-14 mm) into the transaxle case when reinstalling the automatic transaxle.*
Check the depth of the torque converter to confirm it's fully installed in the transmission otherwise the oil pump may be damaged resulting in transmission failure.

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

12. Fill the engine crankcase:

    a. Add 5.8 quarts for the **initial dry fill** of the engine.

    b. With the fuel system disabled temporarily, crank the engine for several seconds to prime the lubrication system prior to starting the engine.
    1. **Recommended Oil Specifications:**
        1. For all models excluding Veloster N (JSN):
            1. 5W-30 Full Synthetic type with API SN/SN+/SP, ILSAC GF4/GF5 or higher service grade
        2. For Veloster N (JSN):
            1. 0W-30 (or 5W30 if not available) 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.
    1. Check for any leaks during this time.
    2. 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:
    a. Set the customer's audio station presets.
    b. Relearn the Steering Angle Sensor using the GDS.
    c. **Clear DTC P1326 with engine ON** . P1326 may reset if it's not cleared with the engine running. Then check for other DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present.
    d. **Reset the engine adaptive values** using the GDS.
    e. Perform a short road test to confirm normal vehicle drivability.

NOTE:

a. Clear DTC P1326 with engine ON. P1326 may reset if not cleared with the engine running.
b. Reset engine adaptive values.

PRIOR APPROVAL SUBMISSION DOCUMENTATION

- Refer to chart below for items needed for submissions based on condition.
- If current condition does not fall within the chart below, contact Techline.

	Cannot Rotate Crankshaft @94lb-ft / Damaged	Knocking Concern & BCT Test "PASS"	Sludge on Oil Cap or No Oil on Dipstick	132/192 Kurtosis "NO PASS"	T3C Bearing Clearance "NO PASS"
Repair Order	✓	✓	✓	N/A	N/A
Engine Diagnostic Worksheet	✓	✓	✓	N/A	✓
Towing Invoice	*If Available*	*If Applicable*	*If Applicable*	N/A	N/A
GDS DTC Freeze Frame Screen Print	✓	✓	✓	N/A	✓
Two Sound Tests Uploaded	N/A	N/A	N/A	✓	N/A
One Bearing Test Uploaded	N/A	✓	N/A	N/A	✓
BCT Calibration Photo**	N/A	✓	N/A	N/A	✓
Photo of Oil Cap**	✓	✓	✓	N/A	✓
Photo of Oil Dipstick**	✓	✓	✓	N/A	✓
Photo of Oil Drain Measurement	✓	N/A	*If Requested*	N/A	N/A
Crank Rotation Video	✓	N/A	N/A	N/A	N/A
Engine Noise Video	N/A	✓	N/A	N/A	N/A
Photo of Cylinder Block Damage**	*If Applicable*	N/A	N/A	N/A	N/A
Copy of Maintenance Records	*If Requested by PA*	*If Requested by PA*	*If Requested by PA*	N/A	*If Requested by PA*
Photo of Valvetrain**	*If Requested by PA*	*If Requested by PA*	*If Requested by PA*	N/A	*If Requested by PA*
Photo of Accident Damage**	*If Applicable*	*If Applicable*	*If Applicable*	N/A	*If Applicable*

****Proper Photos/Videos:**

- VIN in view when photo is taken of the item in question. (Windshield or doorjamb VIN Plate)
  - **Exception:** For oil Measurement photo, a Repair Order in photo will suffice.
- Photo taken with clear focus, showing the item being presented.
- BCT Connection Calibration Test - show connections and gauges clearly (up to two photos)
- Crank Rotation Video and Engine Noise Video - start at the Windshield VIN Plate and move to the front of the engine showing no crankshaft movement or noise (as applicable) in a continuous video beginning to end.
  - ***Returned engines may be inspected by WTC for a seized condition***

MEDIA SUBMISSION PROCESS

- All photos/videos will be submitted via Single Technician User Interface (STUI). (See Page 4 of Tech Net Times Vol 30 Issue 7 for additional details.)