| HYUNDAI Technical Service Bulletin | GROUP **RECALL** | NUMBER **21-01-022H-1** |
|---|---|---|
| | DATE **DECEMBER 2021** | MODEL(S) **APPLICABLE VEHICLES BELOW** |
| **SUBJECT:** | ENGINE INSPECTION / REPLACEMENT (RECALL CAMPAIGN 198) | |

**This TSB supersedes TSB# 21-01-022H to revise the Warranty Information and Service Procedure.**

**★ IMPORTANT**

***** Retail Vehicles *****

As required by federal law, dealers must not deliver new vehicles for sale or for lease to customers until all open recalls have been performed. Dealers must also perform all open recalls on used vehicles, demo, and rental vehicles prior to placing them into customer use and whenever an affected vehicle is in the shop for any maintenance or repair.

When a vehicle arrives at the Service Department, access Hyundai Motor America's "Vehicle Information Screen (VIS)" via WEBDCS to identify open recalls and campaigns.

**Description:** Certain applicable vehicles may have engines produced with conditions that can cause premature wear of the connecting rod bearings. A worn connecting rod bearing could result in abnormal knocking noise from the engine and/or illumination of the oil pressure warning light. Follow the procedure to inspect the vehicle to determine the applicable repair procedure based on the inspection results.

**Applicable Vehicles:**
Certain 2012 MY Santa Fe (CM) vehicles with Theta II 2.4L MPI engines
Certain 2011-2013 MY Sonata Hybrid (YF HEV) vehicles with Theta II 2.4L MPI Hybrid engines
Certain 2016 MY Sonata Hybrid (LF HEV) vehicles with Nu 2.0L GDI Hybrid engines
Certain 2015-2016 MY Veloster (FS) vehicles with Gamma 1.6L GDI engines

**Warranty Information:**

| MODEL | OP CODE | INSPECTION / OPERATION | OP TIME | CAUSAL P/N | NATURE CODE | CAUSE CODE |
|---|---|---|---|---|---|---|
| Santa Fe (CM) | 11D020I0 | BCT Pass | 0.6 M/H | 21101-2G404FFF | E74 | ZZ7 |
| | 11D020I1 | BCT No Pass | 0.9 M/H | | | |
| | 11D020I2 | No BCT | 1.2 M/H | | | |
| | 11D020I3 | BCT Pass w/ Abnormal Noise | 1.2 M/H | | | |
| | 11D020I4 | Crankshaft Cannot Rotate | 0.5 M/H | | | |

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

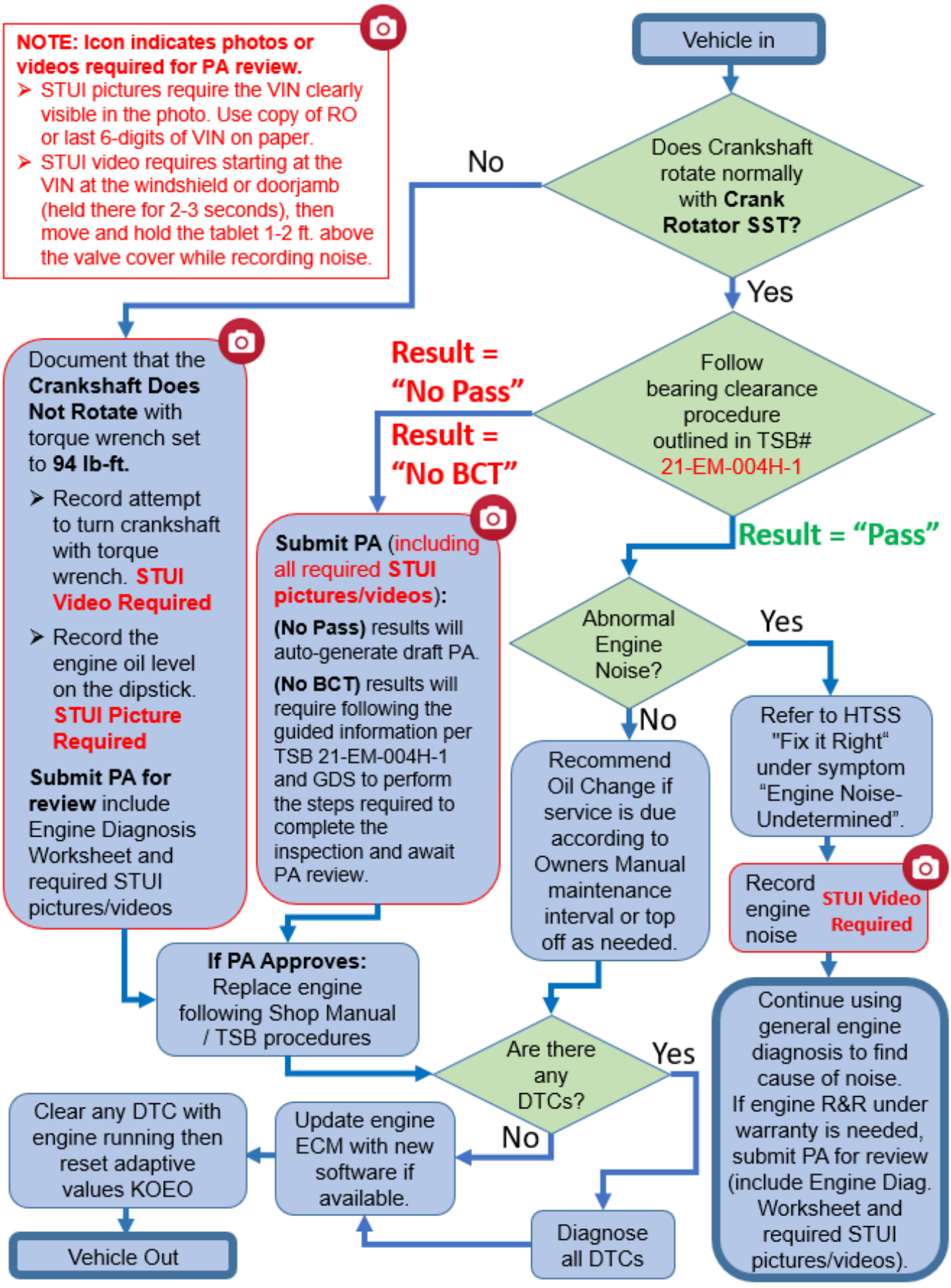
| | | | | | | |
|---|---|---|---|---|---|---|
| Sonata HEV (YF HEV) | 11D020I5 | BCT Pass | 0.6 M/H | 77RT2-2GF00 | E74 | ZZ7 |
| | 11D020I6 | BCT No Pass | 0.9 M/H | | | |
| | 11D020I7 | No BCT | 1.2 M/H | | | |
| | 11D020I8 | BCT Pass w/ Abnormal Noise | 1.2 M/H | | | |
| | 11D020I9 | Crankshaft Cannot Rotate | 0.5 M/H | | | |
| Sonata Hybrid (LF HEV) | 11D020J0 | BCT Pass | 0.6 M/H | 2D312-2EU02A | E74 | ZZ7 |
| | 11D020J1 | BCT No Pass | 0.9 M/H | | | |
| | 11D020J2 | No BCT | 1.2 M/H | | | |
| | 11D020J3 | BCT Pass w/ Abnormal Noise | 1.2 M/H | | | |
| | 11D020J4 | Crankshaft Cannot Rotate | 0.5 M/H | | | |
| Veloster (FS) | 11D020J5 | BCT Pass | 0.6 M/H | 21101-2BK04FFF | E74 | ZZ7 |
| | 11D020J6 | BCT No Pass | 0.9 M/H | | | |
| | 11D020J7 | No BCT | 1.2 M/H | | | |
| | 11D020J8 | BCT Pass w/ Abnormal Noise | 1.2 M/H | | | |
| | 11D020J9 | Crankshaft Cannot Rotate | 0.5 M/H | | | |

**NOTE 1:** *** Claim Submission Details ***

- **Inspection:** Submit for the inspection using the campaign claim entry screen & table specified above.
- **Engine Replacement:** If it is determined that the vehicle requires engine replacement based on the inspection results, submit the engine replacement as a separate warranty claim using standard LTS and follow the published service information from the applicable shop manual to remove and replace the engine assembly. Please ensure to follow standard warranty policy and use a new engine (long block) if vehicle is within 5 years/60,000 miles ("5/60") and a Reman when beyond 5/60 (if available).

**NOTE 2:** If a part that is not covered by this recall is found in need of replacement while performing this recall, and the affected part is still within warranty, include it with the separate engine warranty claim. If the affected part is out of warranty, submit a Prior Approval request for goodwill consideration prior to performing the work.

**Service Procedure Flowchart:**



**Service Procedure:** (Refer to the QR link for additional video information →)

Hyundai Service Learning – Recall 198 Service Procedure

**Engine Inspection - (Engine Rotation Check)**

1. Rotate the crankshaft with the crank rotator SST.

- If the crankshaft cannot be turned with a moderate force, then measure the force required to turn the crankshaft with a torque wrench.
- If the SST or shop tools do not fit the specific vehicle type, remove the front RH wheel, and wheel liner or underbody tray as needed to rotate the crankshaft.

**NOTICE**

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

- **If the crankshaft rotates normally,** go to Step 2 below for "Bearing Clearance Test".
- **If the force required for rotating the crankshaft is greater than 94 lb-ft., documentation through STUI video is required.**
  - Bearing Clearance Test is not possible.
  - **Take a STUI picture of the engine oil level on the dipstick** with the VIN clearly visible in the photo using a copy of the RO or last 6-digits of VIN on paper.
  - Submit PA for engine replacement approval.
  - Use appropriate Op Code for "**Crankshaft Cannot Rotate**" from the Warranty Information table to complete the inspection procedure.
  - **Please submit the engine replacement as a separate warranty claim** using standard LTS labor operations for the applicable model for long block engine replacement.

**Engine Inspection - (Bearing Clearance Test)**

2. Refer to TSB # 21-EM-004H-1 to complete the Service Procedure for Bearing Clearance Test.
   - **If the test result is "PASS":**
     - Save a screenshot of the results screen.
     - Follow the remaining steps of the inspection TSB.
     - 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.
     - Refer to Campaign 966 to update the Engine ECM if new software is available.
     - Use appropriate Op Code for "**BCT Pass**" from the Warranty Information table to complete the inspection procedure.

- **If the test result is "NO PASS":**
  **** IMPORTANT *** Please note that a PA and Engine Diagnosis Worksheet will be auto generated and SAVED in DRAFT if a "NO PASS" result is achieved.*
  - Save a screenshot of the results screen.
  - Submit PA for engine replacement approval.
  - Follow the remaining steps of this TSB to replace the engine (upon PA approval).
  - Check for DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present to complete the procedure.
  - Refer to Campaign 966 to update the Engine ECM if new software is available.
  - Use appropriate Op Code for "**BCT No Pass**" from the Warranty Information table to complete the inspection procedure.
  - **Please submit the engine replacement as a separate warranty claim** using standard LTS labor operations for the applicable model for long block engine replacement.

- **If the test result is "No BCT":**
  - This screen may result if one or more cylinders were skipped in the BCT Process.
  - Save a screenshot of the results screen.
  - Record Error Code Number on Repair Order.
  - Follow "Skipped Cylinder STUI Video Submission" steps on page 10 of **TSB 21-EM-004H-1** (or later) for recording appropriate STUI video of Skipped Cylinder Test.
  - Submit PA for engine replacement approval.
  - Follow the remaining steps of this TSB to replace the engine (upon PA approval).
  - Check for DTCs and perform the appropriate diagnostic service. Ensure no warning lights are present to complete the procedure.
  - Refer to Campaign 966 to update the Engine ECM if new software is available.
  - Use appropriate Op Code for "**No BCT**" from the Warranty Information table to complete the inspection procedure.
  - **Please submit the engine replacement as a separate warranty claim** using standard LTS labor operations for the applicable model for long block engine replacement.

***NOTICE***

**PA Approval is required for engine replacement. Submit PA and refer to the Dealer Best Practices guide for the latest requirements for engine approval.**
- **A picture of the lower end damage is required if present**
- **Use STUI feature on the GDS to take and submit pictures and videos.**

***** IF ENGINE REPLACEMENT IS REQUIRED AND APPROVED BY PA *****

Follow the published Service Information from the applicable **Shop Manual** to remove and replace the Engine Assembly.

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

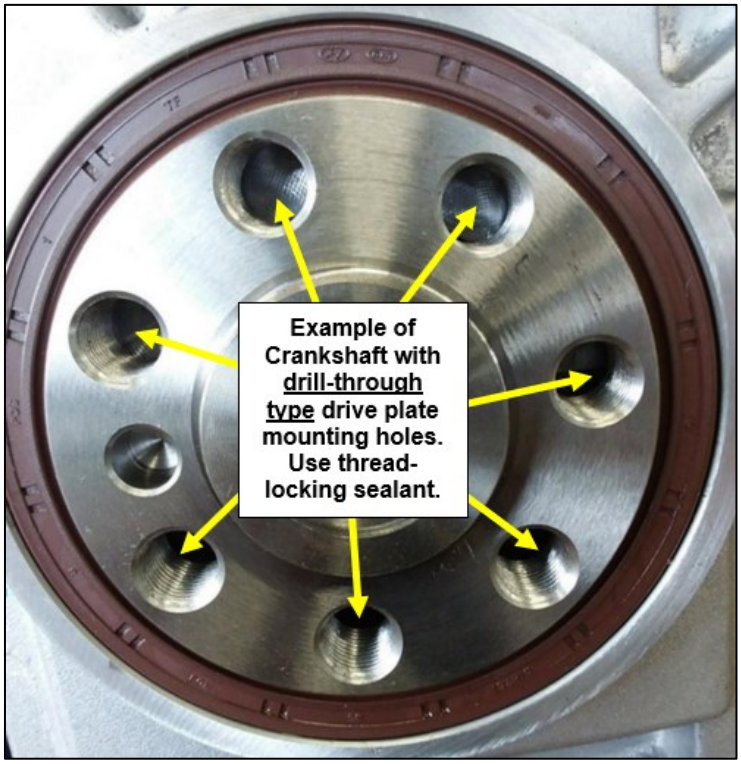
## NOTICE

**Certain types of engines may have crankshaft with drill-through type drive plate mounting holes. Apply thread-locking sealant to prevent any oil seepage through the drive plate bolts.**

- **Apply on all threads a low/medium strength thread-locking adhesive that seals fasteners and are tolerant to engine oil.**

  **[Suggested Products] ThreeBond 2403, LOCTITE 200, LOCTITE 204, LOCTITE 243 (or equivalent)**

- **Be sure to lightly brush all the bolt threads free of debris/residue and clean off any oil prior to applying the thread-locking sealant for installation.**

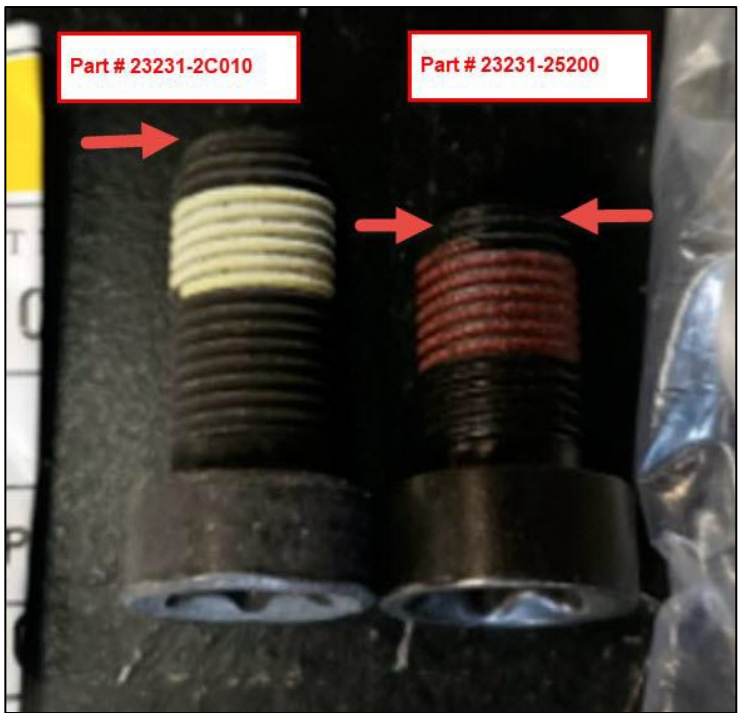



## NOTICE

**For 11-12MY Sonata Hybrid (YF HEV):**

**When installing a new engine, the drive plate bolts must be replaced with P/N 23231-25200.**

- **Due to changes to the crankshaft design, the existing bolts are ~2mm too long and will result in improperly fastened drive plate if reused.**
- **The 13-15MY version drive plate bolts (P/N 23231-25200) are correct length for the new engine and will provide proper fastening during engine installation.**



a) Be sure to connect the (2) oil coolant hoses between the oil cooler and the water temperature control assembly (if equipped).
   - Fill the cooling system with 50/50 ~ 70/30 (Water/Anti-Freeze) coolant mixture.

b) Fill the engine crankcase:
   - Add engine oil amount specified for the engine for the **initial dry fill** of the crankcase.
   - With the fuel system disabled temporarily, crank the engine for several seconds to prime the lubrication system prior to starting the engine.

   - **Recommended Oil Specifications:**
     - 5W-30 Full Synthetic type with API SN/SN+/SP, ILSAC GF4/GF5 or higher service grade

c) 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 up the "F" mark as shown**.


d) Check for additional TSB to update the Engine ECM if new software is available.

e) 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 any DTC's (if present) with engine ON**.
     - Certain DTC's may reset if it's not cleared with the engine running.
     - Perform the appropriate diagnostic service for any DTC's.
     - 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 any DTC's (if present) with engine ON. Certain DTC's may reset if not cleared with the engine running.**
- **Reset engine adaptive values.**