



GROUP
Safety Recall Campaign

MODEL
**2011-2014MY
Optima
(QF/TF)
2012-2014MY
Sorento (XMa)
2011-2013MY
Sportage (SL)**

NUMBER
SC147 (Rev 13, 01/05/2021)

DATE
June 2017

SAFETY RECALL CAMPAIGN

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT

* NOTICE

This bulletin has been revised to include additional information. New/revised sections of this bulletin are indicated by a black bar in the margin area.

* NOTICE

Prior to conducting the procedure described in PI1803, please make certain this (SC147) inspection/repair procedure has been completed on the affected vehicles. If this inspection/repair procedure has not been completed with any affected vehicles, please complete the SC147 inspection/repair procedure BEFORE you perform the software update requested in PI1803.

This bulletin provides the procedure to inspect, and if necessary, replace the engine long block assembly on the following vehicles:

- All 2011-2013MY Optima (QF/TF) vehicles equipped with the 2.4L Gasoline Direct Injection (GDI) and 2.0L Turbocharged GDI (T-GDI) engines produced from August 12, 2010 through September 27, 2013;
- All 2014MY Optima (QF) vehicles equipped with the 2.4L Gasoline Direct Injection (GDI) and 2.0L Turbocharged GDI (T-GDI) engines produced at KMMG from August 28, 2013 through May 15, 2014;
- All 2012-2014MY Sorento (XMa) vehicles equipped with the 2.4L Gasoline Direct Injection (GDI) engines produced from April 19, 2011 through February 10, 2014; and
- All 2011-2013MY Sportage (SL) vehicles equipped with the 2.0L Turbo Gasoline Direct Injection (T-GDI) engines produced from December 30, 2010 through August 30, 2013.

Metal debris may have been generated from factory machining operations of the engine crankshaft and may not have been completely removed from the crankshaft's oil passages during the cleaning process. It was also determined that the additional machining processes of the crankpins may have caused uneven surface roughness. These combined conditions can restrict oil flow to the bearings increasing the potential for premature bearing wear. *(Continued on page 2)*

**Printed TSB copy is for reference only; information may be updated at any time.
Always refer to KGIS for the latest information.**

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

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

A worn connecting rod bearing will produce a cyclic knocking noise from the engine and may also result in the illumination of the vehicle's engine warning and/or oil pressure lamp on the instrument panel. If the warnings are ignored and the vehicle is continued to be driven, the bearing may fail and the vehicle could stall while in motion. An engine stall at higher speeds can increase the risk of a crash.

Follow the procedure outlined in this bulletin to inspect, and if necessary, replace the engine long block assembly. Before conducting the procedure, verify the vehicle is included in the list of affected VINs.

★ NOTICE

There is no charge to the vehicle owner for this repair. Under applicable law, you may not sell or otherwise deliver any affected new vehicle until it has been repaired pursuant to the procedures set forth in this bulletin.

To ensure complete customer satisfaction, always remember to refer to WebDCS Warranty Coverage (validation) Inquiry Screen (Service → Warranty Coverage → Warranty Coverage Inquiry) for a list of any additional campaigns that may need to be performed on the vehicle before returning it to the customer.

For Optima models included in SC147:

- VINs that start with “5” are designated Optima (QF) and produced in the United States.
- VINs that start with “K” are designated Optima (TF) and produced in Korea.

★ NOTICE

Guidelines in case of Catastrophic Failure:

Replacement engines can be damaged due to ingestion of foreign material soon after installation. The source of this foreign material has been found to be metal debris from the original (damaged) engine. When an engine fails due to connecting rod breakage or piston failure, especially when the damage includes the combustion chamber area (valves/pistons/rings), pieces of metal or debris can be pushed past the intake valves and come to rest in the intake or exhaust manifold. After engine replacement, this metal debris will be pulled back into the engine via engine vacuum, usually during start up or during the first several miles of operation. Variable length intake runner systems are especially susceptible to this as the metal debris may come to rest on either side of the intake butterfly valves. In case of catastrophic failure, replace the intake manifold.

Do not replace intake or exhaust manifold if the engine is running and has a bearing or rod knock only.

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Note: If any concerns arise after completing the flow chart(s), open a Techline case online.

Bearing Clearance Test Procedure:

1. Open the hood and remove the engine cover.



[Bearing Clearance Test \(BCT\) Video](#)

❗ IMPORTANT

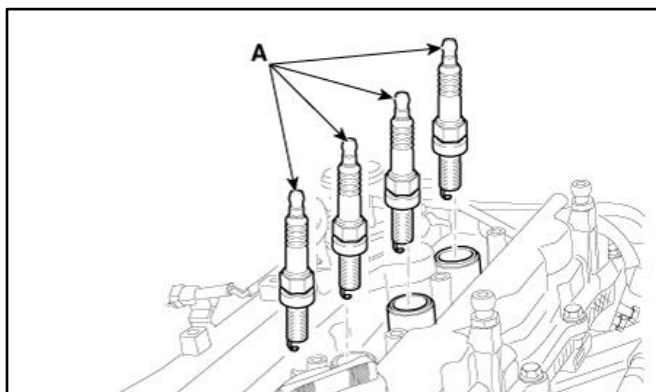
Have the SST Engine Bearing Clearance kit ready. Place it on a table/cart next to the vehicle and use a fender cover.



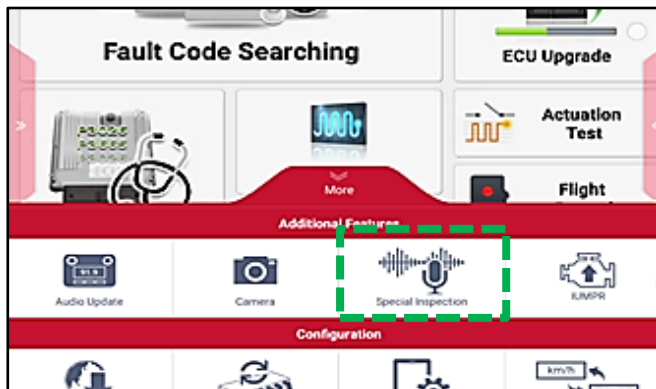
For troubleshooting assistance, contact the GITA Support Line at: (888) 542-4371.

2. Remove the four (4) spark plugs (A) by referring to the "Maintenance → Power Train → Spark Plug → Repair procedures (Replacement)" in the applicable Shop Manual on KGIS.

Tightening torque for Spark Plugs:
10.9 – 18.0 lb.ft (14.7 – 24.5 N.m,
1.5 – 2.5 kgf.m)

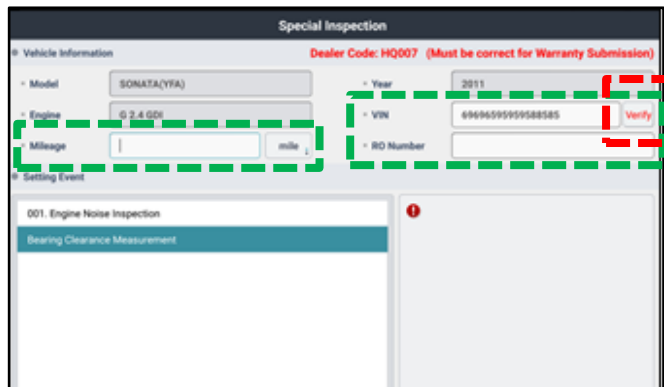


- 3a. Using KDS, connect the VCI-II to the vehicle's OBD-II port.
- 3b. Turn the ignition to 'ON'.
- 3c. On the KDS screen, select '**Special Inspection**' on the bottom tab of the Home screen.
- 3d. Select the applicable vehicle model/year.



The VIN is recognized automatically and will populate the 'Model' and 'Year'.

- 4a. Enter the vehicle information: the vehicle mileage and RO number.
- 4b. Select 'Verify' to confirm the automatically detected VIN.

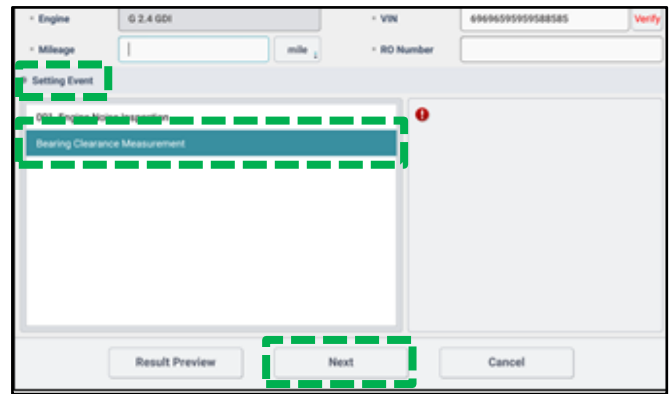


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

- 5a. Under “Setting Event”, select **‘Bearing Clearance Measurement’** and then select **‘Next’**.
- 5b. Turn the ignition to ‘OFF’ and remove the VCI-II after verifying the VIN on KDS.

**CAUTION**

DO NOT attempt to start the engine at any time as damage to the SST and/or engine may occur.



6. **STOP** on this screen, proceed to step 7 first before continuing to KDS.

**IMPORTANT**

DO NOT select ‘Next’ at this time. Proceed to steps 7 – 9 first and continue with KDS as instructed after installing the SST components.



7. Install the Dial Gauge fully into the Probe Rod and secure together by hand tightening the locking wingnut.



8. **Carefully**, insert the assembled SST Probe Rod and Dial Gauge into the Cylinder 1 spark plug hole and **carefully** turn the SST Crankshaft Rotator **by hand** clockwise until hand tight.

**CAUTION**

Damage to cylinder head can occur if spark plug hole is cross-threaded. DO NOT use a wrench to tighten the SST rod.

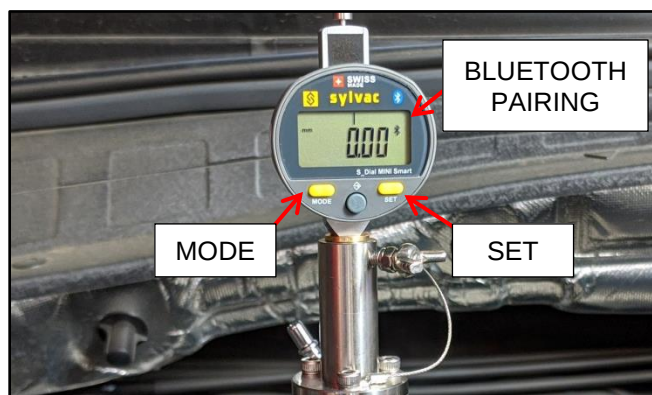


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

9. Turn the Dial Gauge 'ON' by pressing the '**SET**' button.

Reset the Bluetooth connection by pressing both the '**MODE**' and '**SET**' buttons simultaneously and holding for two (2) seconds.

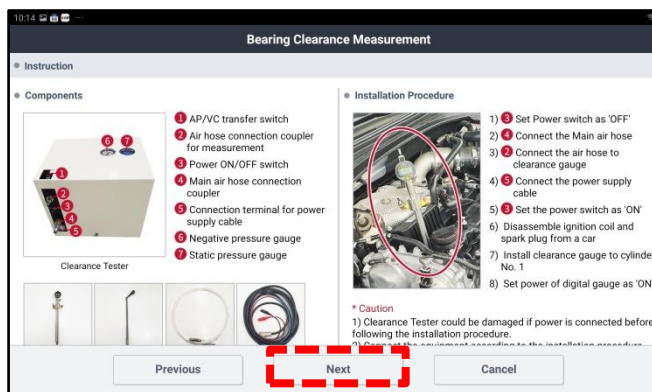
- Bluetooth icon will blink to indicate pairing mode ✂



10. Using the KDS, select '**Next**' on the screen to proceed and begin Top Dead Center (TDC) setup on the KDS.

* NOTICE

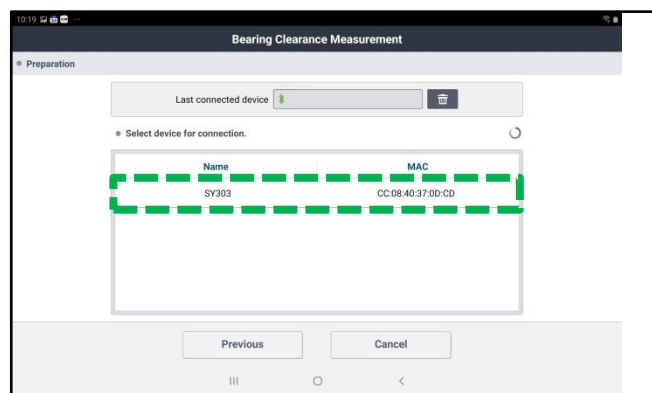
Follow the test procedure and sequence as outlined in this bulletin. DO NOT skip any steps.



11. Pair the Dial Gauge Bluetooth by selecting the device displayed on the screen. Device name is SY303.

❗ IMPORTANT

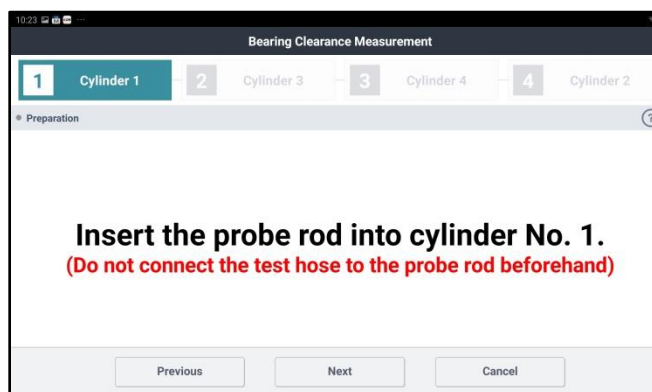
If the KDS is unable to locate the Dial Indicator Bluetooth device, select 'Previous' and repeat steps 9 - 10. Ensure no other Bluetooth devices are near the KDS and Dial Gauge.



12. Once the Dial Gauge is paired to the KDS, the shown screen will appear instructing to insert probe rod into **Cylinder 1**.

* NOTICE

If the probe rod is already inserted into Cylinder 1 from step 8, disregard this message.

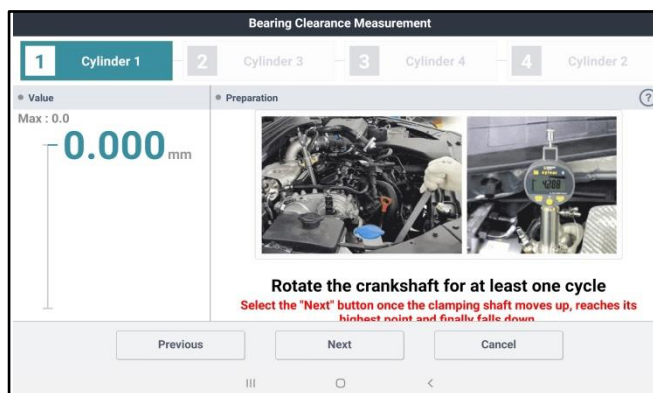


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

13. Insert the SST Crankshaft Rotator and turn the crankshaft clockwise as instructed on the KDS screen.

*** NOTICE**

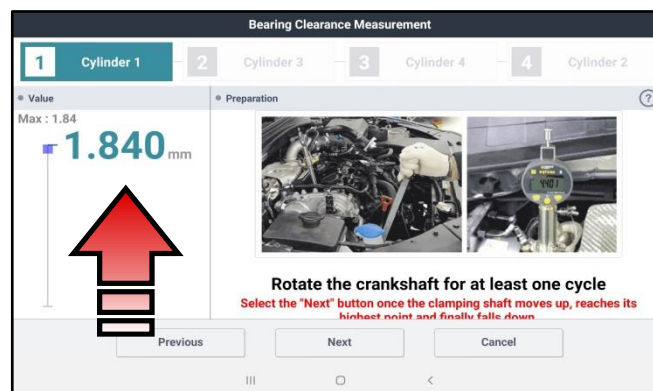
Removal of inner wheel liner and the use of general tools may be required to access and rotate the crank bolt on some 2.0L T-GDI engine models.



14. Initially, the “Value” ‘Max’ reading may not register when rotating crankshaft. Continue to rotate the crankshaft slowly.

❗ IMPORTANT

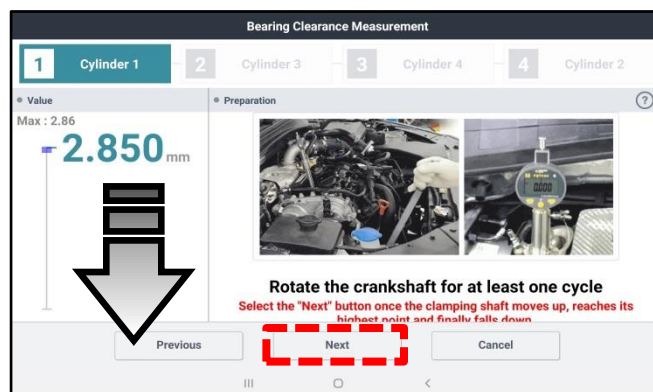
Monitor the displayed reading on the KDS screen/gauge. Turn the crankshaft slowly as the value starts to increase.



15. Once the ‘Max’ value is reached (sample shows Max: 2.86mm), continue to turn just past the ‘Max’ value reading and STOP rotating the crankshaft (sample shows 2.850mm value decreasing).

Note: The KDS may prompt to rotate the crankshaft ‘counterclockwise’ if needed.

Select ‘Next’.



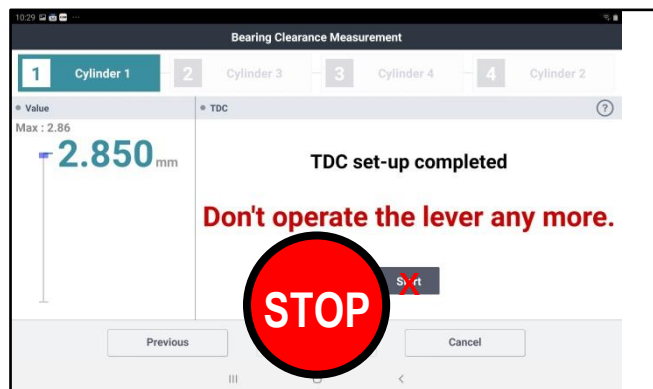
16. If TDC setup is completed successfully:

- **DO NOT** turn the crankshaft rotator.
- **DO NOT** select Start at this time.

STOP on this screen, proceed to step 17 to setup and connect the Engine Bearing Clearance Tester before continuing to the KDS.

*** NOTICE**

If TDC is NOT found, the KDS may display a message that the cylinder was on the exhaust stroke. If so, repeat steps 13-16.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

17. Prepare to setup the Engine Bearing Clearance Tester and components.

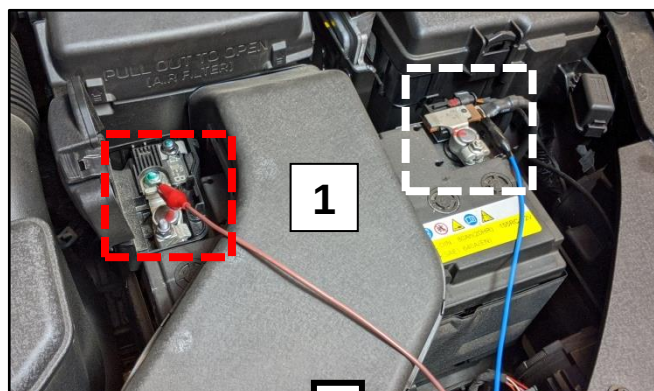
❗ IMPORTANT

DO NOT place the SST box over any paper work (ex. RO) as there is a water drain hole located underneath the box. Ensure that the compressed air supply provides consistent adequate air pressure. **DO NOT** use a portable compressor. Always handle the SST box with care, DO NOT hit, drop, and expose to high heat sources or moisture. Do not remove the cover (unless calibration is necessary).

Connect the following three (3) items to the SST Bearing Tester Box:

1. Power Cable (12V)
2. Air Compressor Hose
3. Test Hose

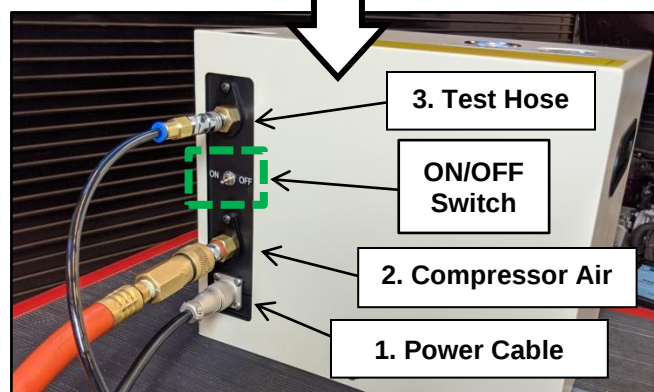
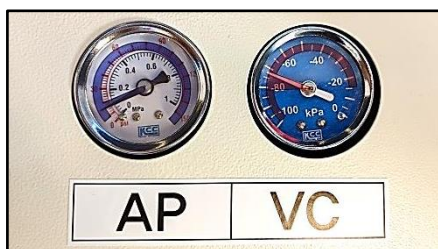
Note: The 12V power cable has red (+) and black (-) connector clamp ends.



18. Turn the Bearing Clearance Tester power switch to the 'ON' position. Gauges should read as follow:

AP (Pressure) Gauge: (0.1 ~ 0.11MPa)

VC (Vacuum) Gauge: (-73 ~ -83kPa)

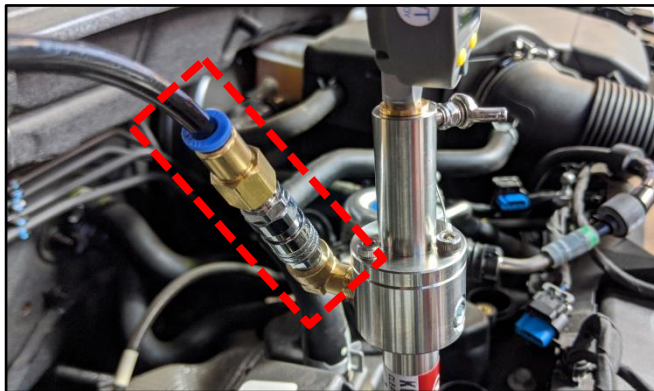


If the gauges do not read within specification, calibration of the SST box is required. Refer to [TSB SST067](#) for details.

19. Carefully, insert and connect the other end of the Test Hose to the Probe Rod fitting.

❗ IMPORTANT

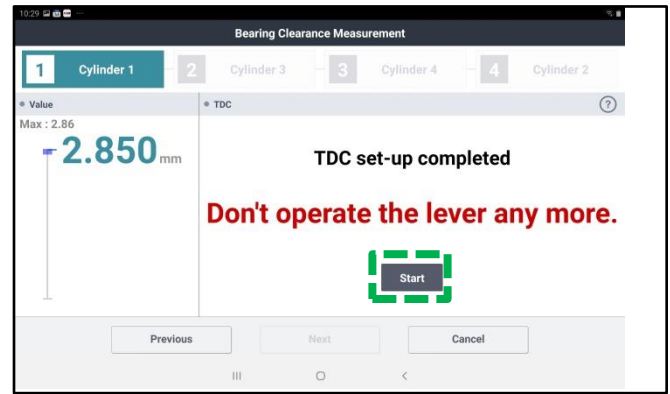
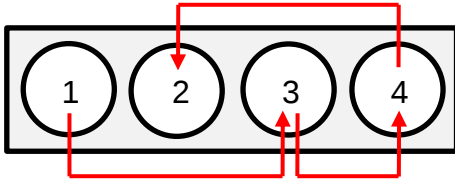
DO NOT touch or turn the Crank Rotator in any direction until instructed to do so on the KDS.



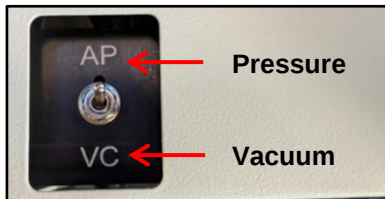
20. Select 'Start'.

*** NOTICE**

The procedure outlined in this bulletin follows the engine's firing order sequence (1, 3, 4, 2).



21. Locate the 'AP/VC' switch on top of the Bearing Clearance Tester Box and switch it to the 'AP' position. Select 'Next' to begin **Cylinder 1** bearing clearance test.

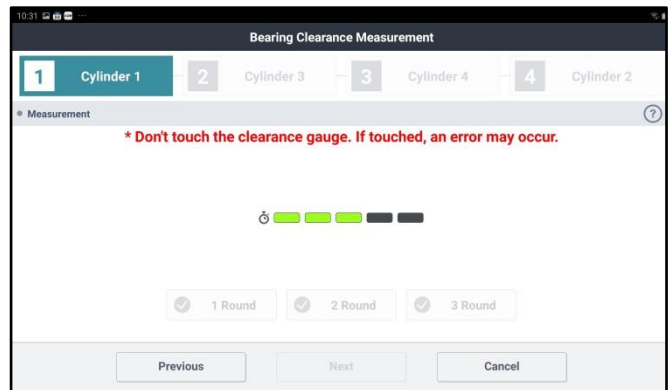
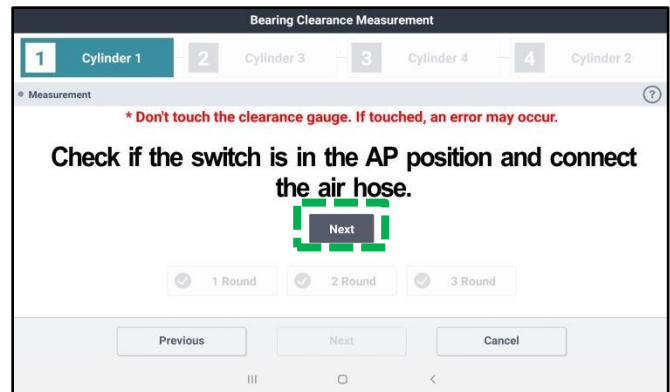


*** NOTICE**

The toggle switch has a 3-way operation. The center is neutral. Always toggle past neutral.

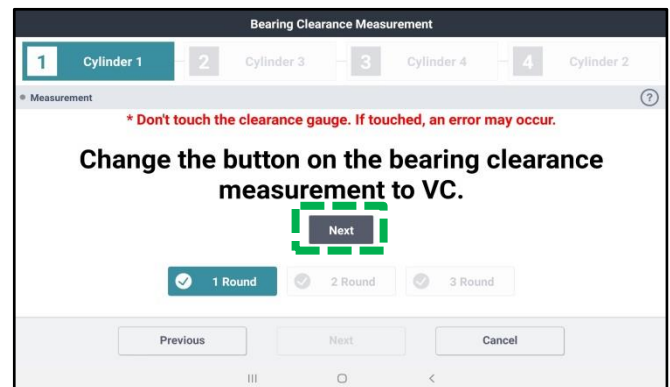
❗ IMPORTANT

DO NOT touch or turn the Crankshaft Rotator in any direction until instructed to do so via KDS. DO NOT touch the clearance gauge, if touched, an error may occur.



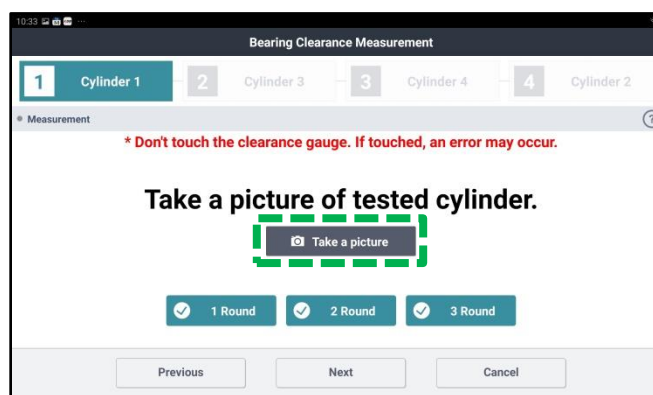
22. The KDS screen will prompt to change the 'AP/VC' switch to the 'VC' position.

Select 'Next' to complete. There are three (3x) rounds per cylinder to complete.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

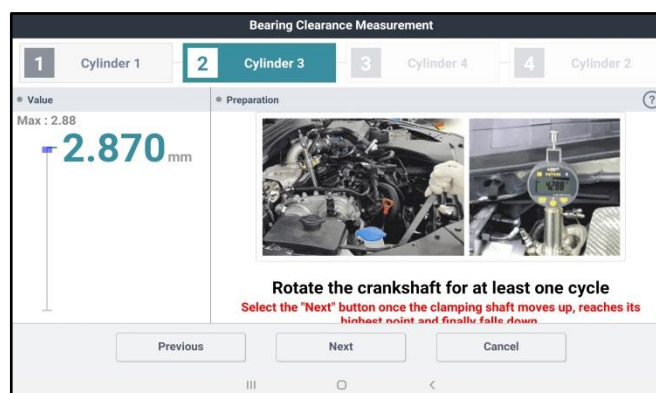
23. Once Cylinder 1 test is completed, the KDS will prompt to take a picture of the tested cylinder. Select **'Take a picture'**.



24. Carefully remove the Test Hose and the Probe Rod from Cylinder 1.

The KDS will request to insert the Probe Rod into Cylinder 3 and prompt to find TDC again. **Repeat steps 13-16.**

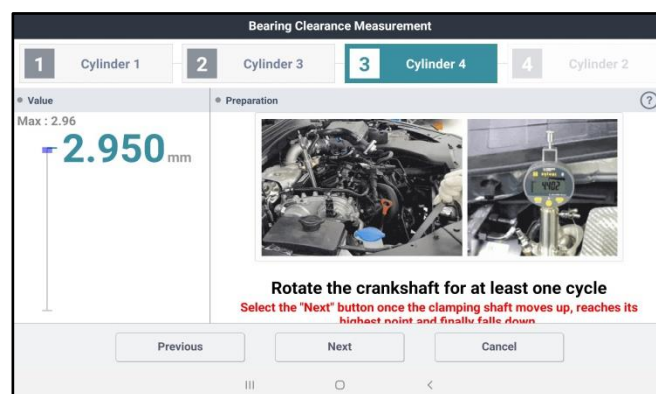
Repeat steps 19-23 to test Cylinder 3 and switching from **'AP → VC'** and take cylinder photo.



25. Carefully remove the Test Hose and the Probe Rod from Cylinder 3.

The KDS will request to insert the Probe Rod into Cylinder 4 and prompt to find TDC again. **Repeat steps 13-16.**

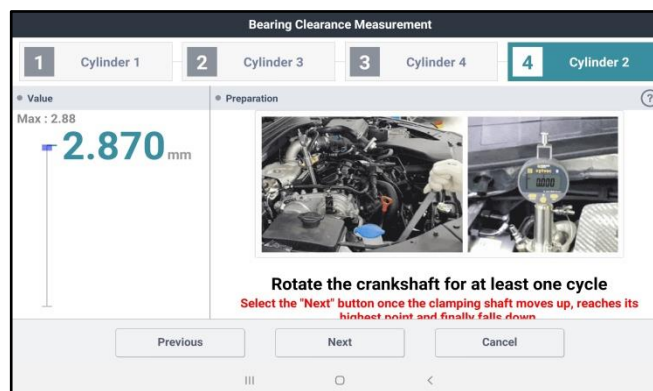
Repeat steps 19-23 to test Cylinder 4 and switching from **'AP → VC'** and take cylinder photo.



26. Carefully remove the Test Hose and the Probe Rod from Cylinder 4.

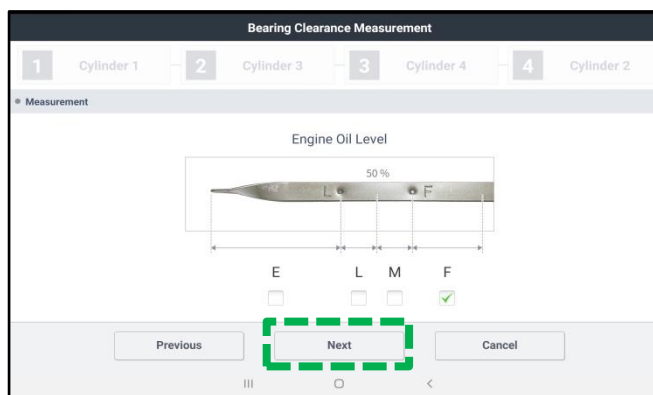
The KDS will request to insert the Probe Rod into Cylinder 2 and prompt to find TDC again. **Repeat steps 13-16.**

Repeat steps 19-23 to test Cylinder 2 and switching from **'AP → VC'** and take cylinder photo.



27. After completing the test of all four (4) cylinders, the KDS will prompt to check the crankcase oil level and to select the appropriate check box on the screen.

Select **'Next'**.



28. If the test result displays **"PASS"**, capture the screen image/screenshot for record keeping.

Select **'Finish'**.

- Re-install all removed parts in the reverse order of removal
- No further action is required

If the test result displays **"NO PASS"**, capture the screen image/screenshot for record keeping. Then proceed to replace the engine assembly per the instructions.

Select **'Finish'**.

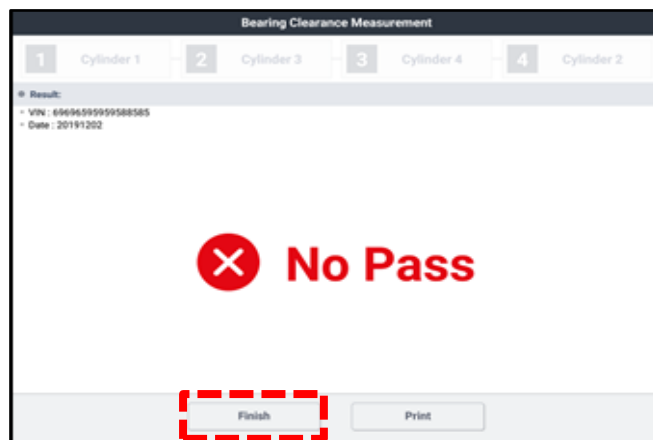
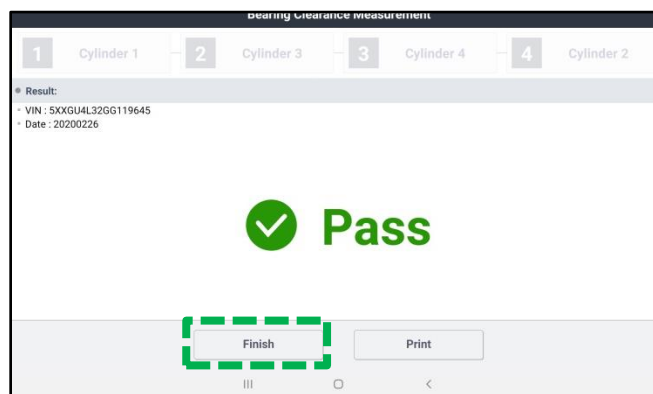
- Proceed to **page 13** to replace the engine assembly as outlined in this bulletin

❗ IMPORTANT

Save a copy of the screenshot for your records. It may be required to submit with a PWA (See Appendix 1 & 2 on page 25 and 28). Attach to the RO hard copy.

★ NOTICE

If the KDS is not connected to the internet, up to five (5) results will stay pending in the queue until the KDS is reconnected with the "Special Inspection" application open. before a sixth (6th) test can be conducted.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
Engine Replacement Procedure:

1. Remove the engine assembly by referring to the “Engine and Transmission (Transaxle) Assembly → Engine and Transmission (Transaxle) Assembly → Repair procedures” chapter in the applicable Shop Manual on KGIS.

Refer to [TSB ENG190](#) for information regarding engine replacement practices.



2. After removal of the engine from the vehicle, remove all components that will need to be transferred by referring to the applicable Shop Manual on KGIS.
3. Place the new engine block on an engine stand.
4. Install all removed components from the old engine block onto the new engine block utilizing all parts from Service Kit I and II. **Be advised of the following notes.**

Tightening torque for Knock Sensor:

13.7 – 17.4 lb.ft (18.6 – 23.5 N.m, 1.9 – 2.4 kgf.m)

Notes:

High Pressure Pump & Roller Tappet:

- Refer to [TSB ENG083](#) for special attention and handling procedures of GDI-specific components.
- When installing the high pressure pump and roller tappet onto the new engine, apply engine oil to the roller tappet, and O-rings of the high pressure pump.

Tightening torques of pump bolts:

**9.4 – 10.9 lb.ft (12.8 – 14.7 N.m,
1.3 – 1.5 kgf.m)**

Tightening torques of pipe flare nut:

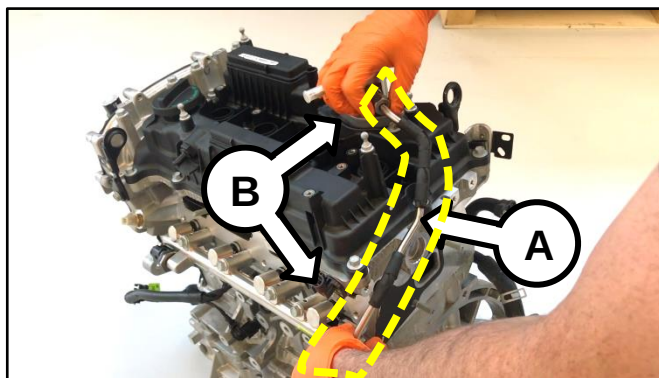
**19.5 – 23.9 lb.ft (26.5 – 32.4 N.m,
2.7 – 3.3 kgf.m)**


★ NOTICE

Refer to [TSB ENG083](#) for gasoline direct injection (GDI) specific information, including related warnings and cautions for handling high fuel pressure system components.

High Pressure Fuel Pipe:

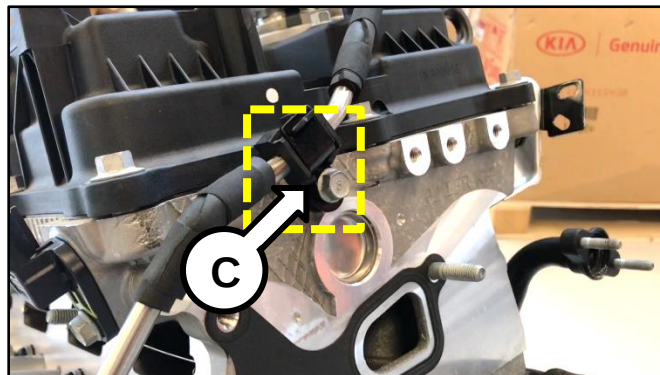
1. Properly position the new fuel pipe (A) and then hand-tighten both flare nuts (B).



2. Install the pipe retaining bracket and bolt (C) and torque to specifications.

*** NOTICE**

If the bracket and bolt are missing, order and install a new bracket and bolt.



Tightening torque (bracket bolt):

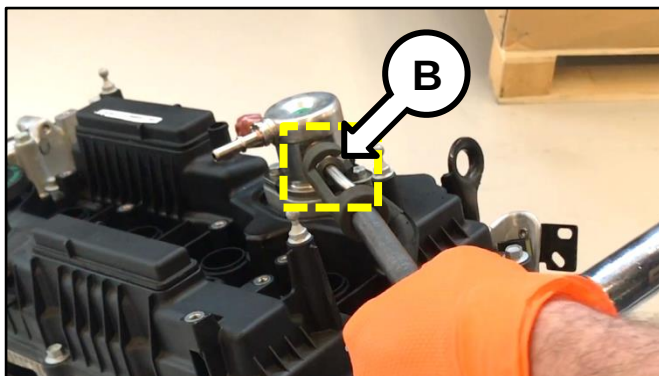
5.8 – 8.7 lb.ft (7.8 – 11.8 N.m,
0.8 – 1.2 kgf.m)

3. Using a click-type/electronic torque wrench and SST 09314-3Q100, torque both flare nuts (B) to specifications.

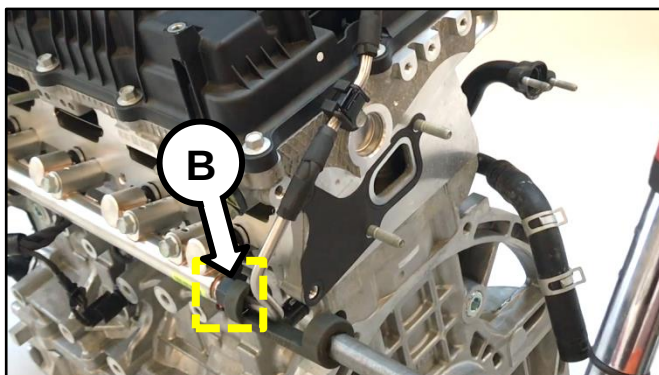
Tightening torque (flare nuts):

19.5 – 23.9 lb.ft (26.5 – 32.4 N.m,
2.7 – 3.3 kgf.m)

[Click here to see a video tutorial of high pressure fuel pipe install \(includes high pressure pump install\).](#)

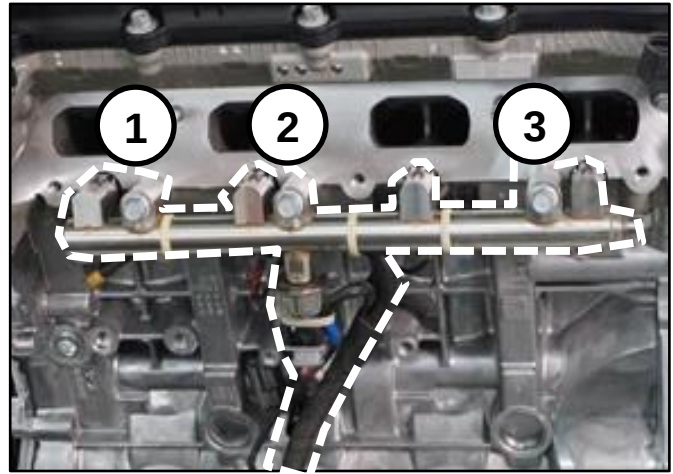
*** IMPORTANT**

The high-pressure fuel pipe bracket and bolt must be installed AND properly torqued prior to torquing the high-pressure fuel pipe flare nuts.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
Delivery Pipe:

- Refer to [TSB ENG083](#) for special attention and handling procedures of GDI-specific components.
- Prior to installing the delivery pipe, be sure to replace all of the injector O-rings and injector retainers.
- Prior to installing the delivery pipe, apply engine oil to the injector O-rings.
- When installing the delivery pipe, use caution not to damage the tip of the injector.
- Be sure to replace the delivery pipe retaining bolts and torque them in the sequence shown.


Tightening torque of bolts:

**13.7 – 17.4 lb.ft (18.6 – 23.5 N.m,
1.9 – 2.4 kgf.m)**

★ NOTICE

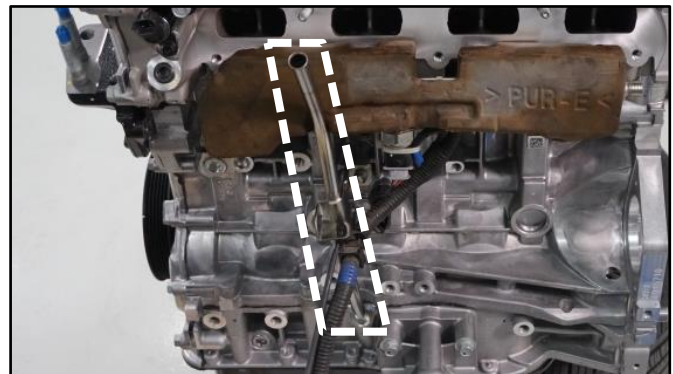
Combustion seals must be compressed after installation and before attempting to install into the cylinder head. Use SST 09353 2B000 (refer to [TSB ENG083](#)).

Dipstick Tube & Dipstick:

- Prior to installing the new tube, lubricate the o-ring located at the bottom of the tube with engine oil.
- Install the red dipstick included in Service Kit I.

Tightening torque of bolt:

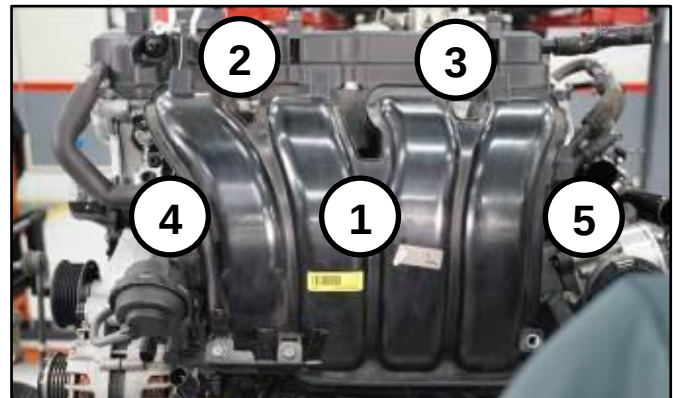
**5.8 – 8.7 lb.ft (7.8 – 11.8 N.m,
0.8 - 1.2 kgf.m)**


Intake Manifold:

- Prior to installation, replace the intake manifold gaskets.
- Torque bolts in the sequence shown.

Tightening torque of bolts:

**13.7 – 17.4 lb.ft (18.6 – 23.5 N.m,
1.9 – 2.4 kgf.m)**

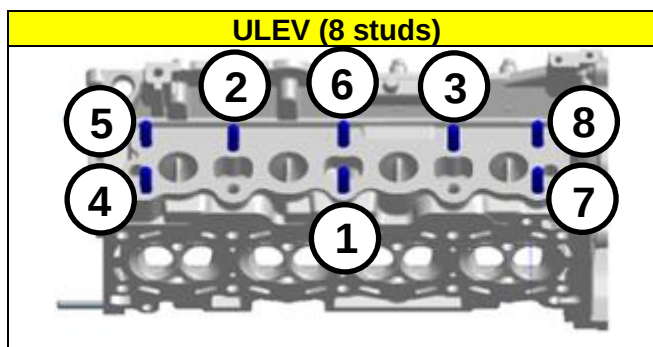
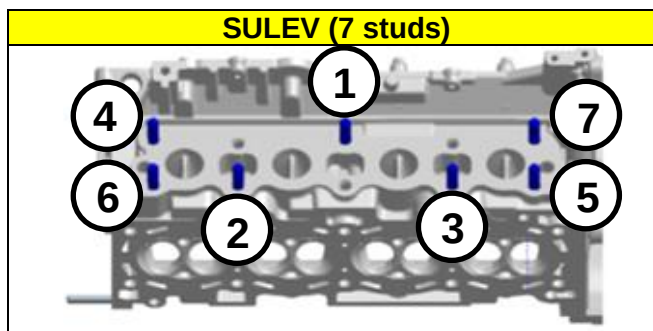


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
Exhaust Manifold:

- All engines supplied under this Product Improvement Campaign have the exhaust manifold studs configured for SULEV engines.
- Using the pictures to the right, check the exhaust manifold stud location and quantity. Relocate as required for ULEV engines and obtain one (1) extra from the removed engine.
- Prior to installation, replace the exhaust manifold gasket and front muffler gasket.
- Torque nuts in the sequence shown.

Tightening torque of nuts:

**36.2 – 39.7 lb.ft (49.0 – 53.9 N.m,
5.0 – 5.5 kgf.m)**



***For 15MY Sorento (XMa) vehicles only: check the underhood emissions label and record whether the label references ULEV or SULEV. This information is needed to select/order the correct replacement engine.**

	KIA MOTORS CORPORATION VEHICLE EMISSION CONTROL INFORMATION		
Conforms to regulations :		2015 MY	
U.S.EPA : T2B5 LDV		OBD : CA II	Fuel : Gasoline
California : ULEV PC		OBD : CA II	Fuel : Gasoline
Group :	EXMAY62-4APE	DFI/HO2S(2)/WU-TWC/TWC	
Evap. :	EXMAY62-130CRE	No adjustments needed.	A402
[WARNING]		3517-20402	
Loaded I/M testing of permanent four-wheel drive or traction control-equipped vehicles must be conducted on a four-wheel drive speed synchronized dynamometer. Otherwise, a non-loaded test procedure must be performed.			

- On Turbo engines, replace the turbocharger oil feed line and gaskets.

Tightening torque of oil feed line bolt:

**8.7 – 13.0 lb.ft (11.8 – 17.7 N.m,
1.2 – 1.8 kgf.m)**

Tightening torque of oil feed line nuts:

**5.8 – 8.7 lb.ft (7.8 – 11.8 N.m,
0.8 – 1.2 kgf.m)**

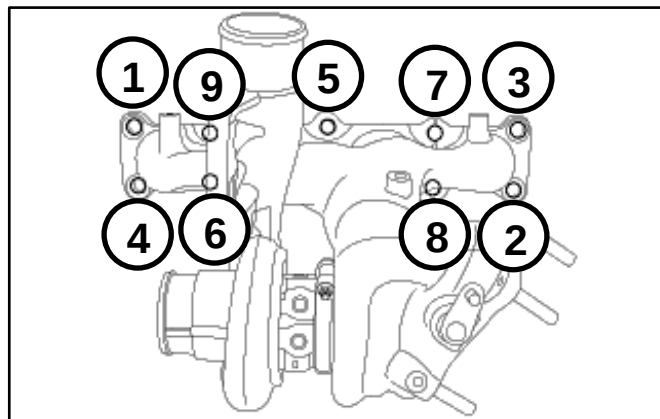
Tightening torque of oil drain line nuts and bolts:

**5.8 – 8.7 lb.ft (7.8 – 11.8 N.m,
0.8 – 1.2 kgf.m)**

- Torque exhaust manifold nuts in the sequence shown.

Tightening torque of nuts:

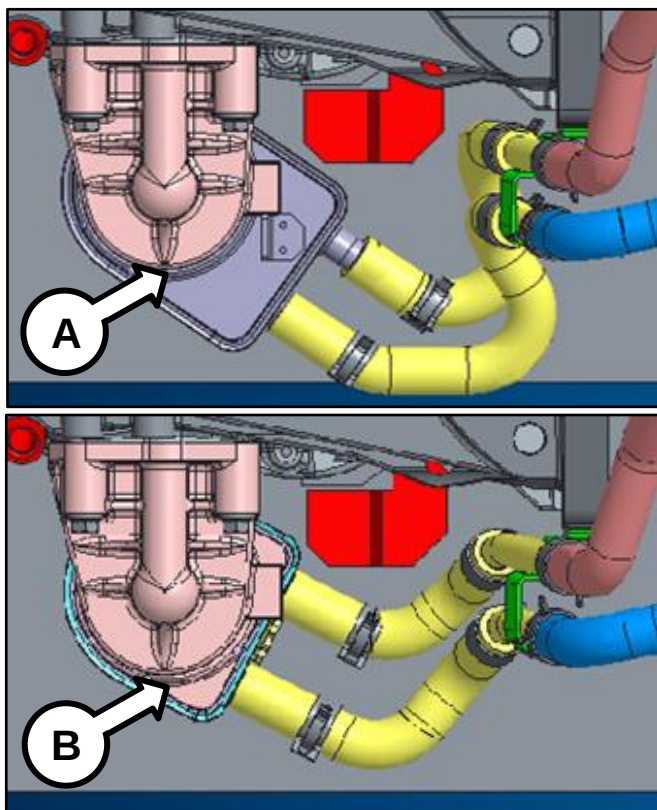
**36.2 – 39.7 lb.ft (49.0 – 53.9 N.m,
5.0 – 5.5 kgf.m)**



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
Oil Cooler Tube Assembly:

New engines may be supplied with a different oil cooler. Use steps below to determine the need for a replacement oil cooler tube assembly.

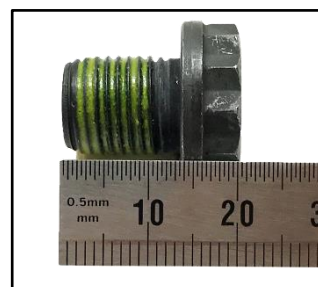
- If the new engine's (bigger) oil cooler (A) does not match the old engine's (smaller) oil cooler (B), replace the oil cooler tube assembly with the improved part. See parts table on page 23.
- If the new engine's (bigger) oil cooler (A) matches the old engine's (bigger) oil cooler (A), reuse the old engine's oil cooler tube assembly.
- If the new engine's (smaller) oil cooler (B) matches the old engine's (smaller) oil cooler (B), reuse the old engine's oil cooler tube assembly.


Drive Plate Bolts:

- Replace all seven (7) drive plate (AT) bolts.

Tightening torque of nuts:

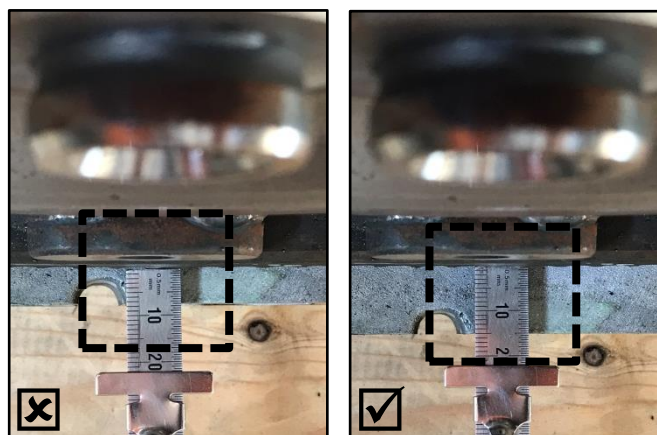
**86.8 – 93.9 lb.ft (117.7 – 125.5 N.m,
12.0 – 13.0 kgf.m)**



Drive Plate Bolt (AT)

Torque Converter

- If the torque converter has moved from the fully inserted position, carefully push inward while rotating the torque converter until it is recessed approximately 9/16 – 5/8" (14 – 16mm) (☑) into the transaxle case when reinstalling the automatic transaxle.



Not Fully Inserted

Fully Inserted

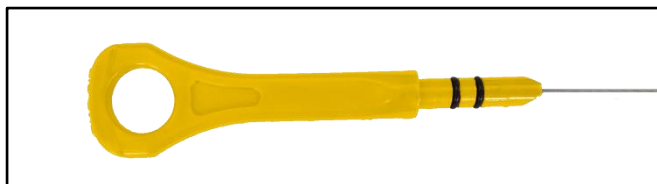
Oil Dipstick Replacement:

For 2011-2013MY vehicles only: If the vehicle is equipped with a YELLOW dipstick, discard the dipstick and replace it with a new ORANGE one.

* NOTICE

If the vehicle is equipped with a RED dipstick, replacement is not necessary.

On all vehicles with an inspection result of "PASS": Change the oil and filter and refill with 5W-30 oil. Use the new (ORANGE) or verified (RED) dipstick to verify proper oil level after oil change and if applicable, reset the maintenance reminder on the instrument cluster.



Yellow Dipstick (P/N: 26611 2G020)



Orange Dipstick (P/N: 26611 2G050QQK)



Red Dipstick (P/N: 26611 2G040)
(NO REPLACEMENT REQUIRED)

5. Reinstall the assembled engine and transmission/transaxle into the vehicle.

Be sure to:

- Fill crankcase with 5W-30 oil (~5.8 quarts).
- Recommended Product: QUARTZ 9000 FUTURE FGC 5W-30 **Full Synthetic** SN PLUS, QUARTZ 9000 FUTURE XT 5W30 **Full Synthetic** SN PLUS, Mobil Super Synthetic 5W30 or above.
If not available, use other brand 5W30 and **Full Synthetic** type with API SN/SN+/SP, ILSAC GF4/GF5 or higher service grade.
- Fill and bleed the cooling system with 50/50 coolant or mixture appropriate for area.
- Pressurize the fuel system before starting the vehicle.
- Reset engine adaptive values and perform steering angle sensor calibration.

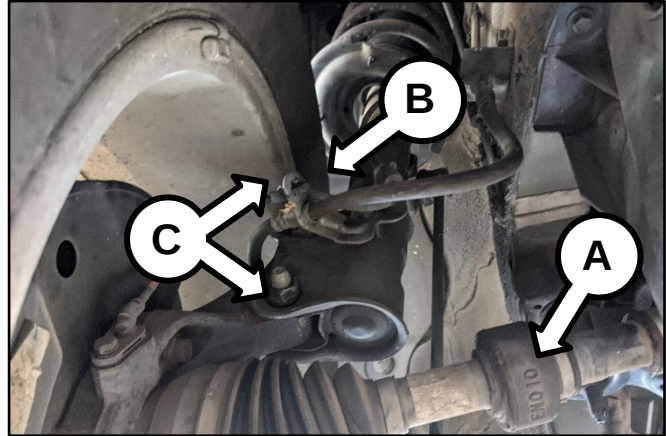
Refer to [TSB ENG190](#) for information regarding engine replacement practices.

6. Confirm that the ROM ID is up-to-date. If not, reflash the ECU to the latest ROM ID available. Refer to PI1803 – Knock Sensor Detection System ECU Logic Improvement
7. Verify proper operation of the vehicle with road test, and **with the engine ON (running), erase any stored DTCs** (e.g., EPS, ESC, and TPMS) that may have been set by this procedure. Verify no leaks exist and ensure engine oil and coolant are at their proper level.

If any DTCs are still active, follow any related diagnosis and repair as needed.

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
Additional Instructions for AWD (XMa) 2.4L models:

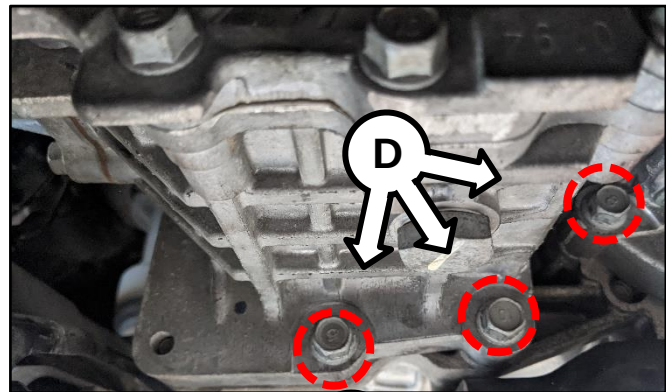
1. Remove the right front drive axle (A) by detaching the brake line and ABS retainer brackets (B) from the strut housing and knuckle then remove the two knuckle/strut retaining bolts (C).



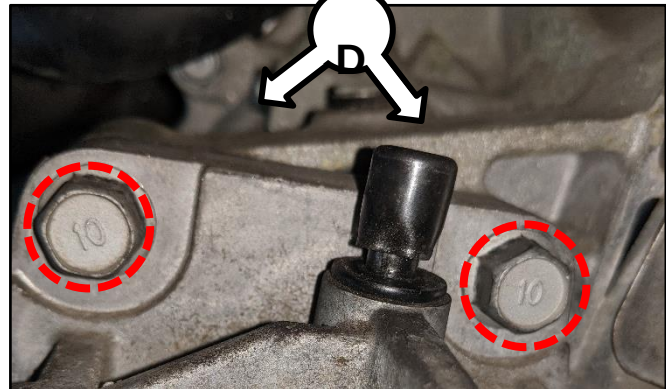
2. Remove the five (5) transfer case retaining bolts (D).

Note: Three (3) located on the bottom.

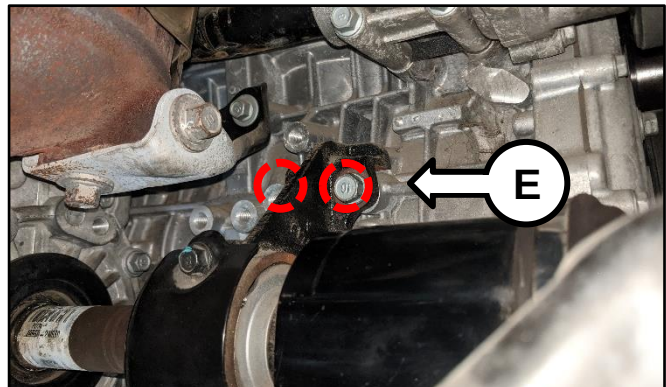
Refer to the chapter in the applicable Shop Manual on KGIS for torque specifications.



Note: Two (2) located on the top.

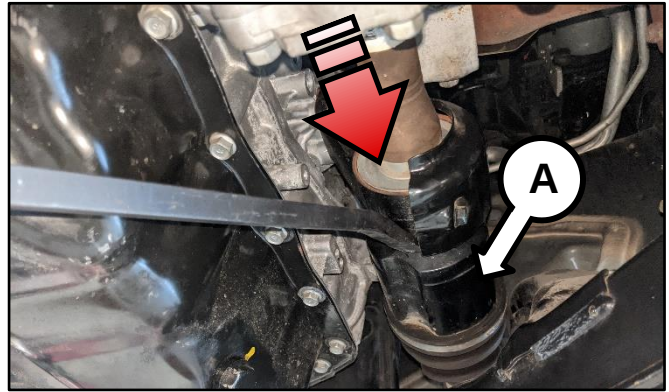


3. Remove the two (2) drive axle bracket retaining bolts (E).

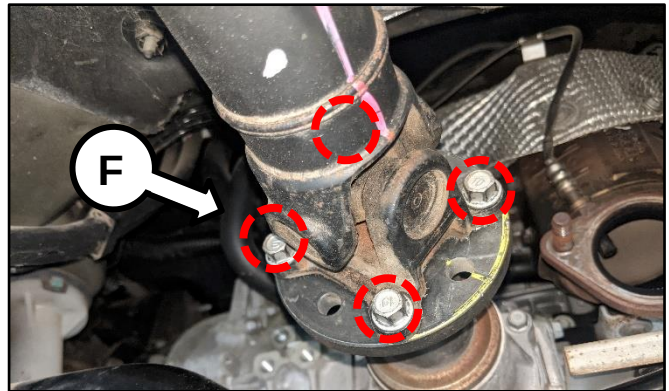


4. Using a pry bar and rubber hammer, strike the axle where shown to release the right front drive axle (A).

Remove the right front drive axle (A) and set aside.



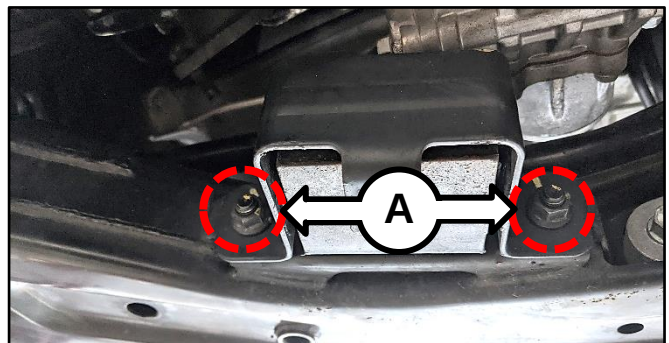
5. Remove the four (4) rear driveshaft retaining bolts (F).



6. Move the transfer case to the right for additional room to allow engine removal.

Additional Instructions for AWD (SL) 2.0L-T models:

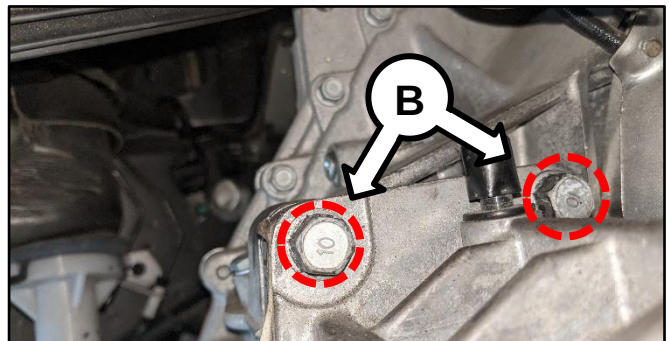
1. Remove the two (2) bottom damper retaining bolts (A).



2. Remove the five (5) transfer case retaining bolts (B).

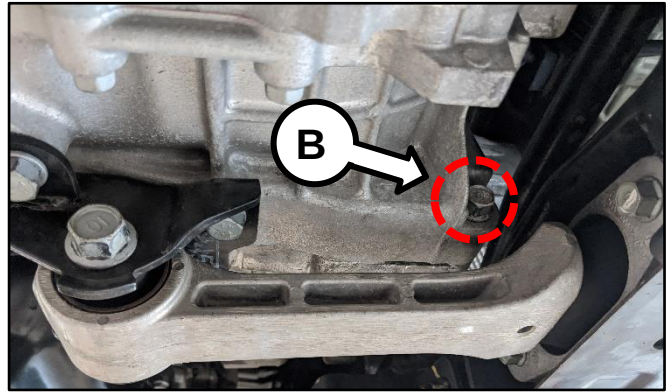
Note: Two (2) located on the top.

Refer to the chapter in the applicable Shop Manual on KGIS for torque specifications.

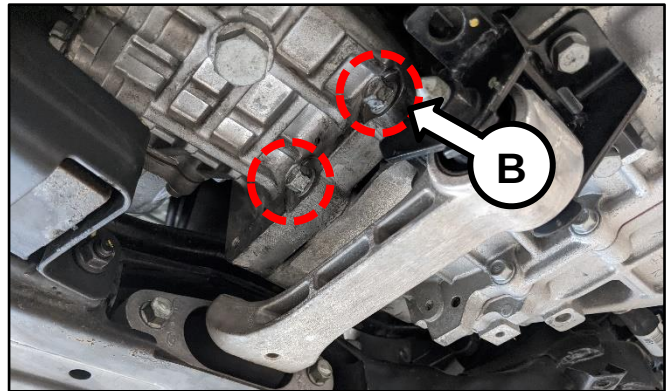


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

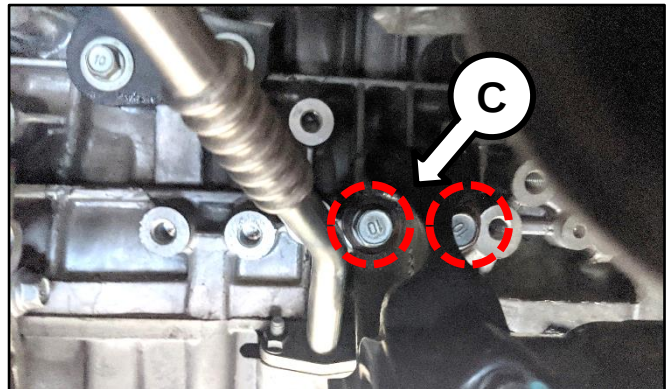
Note: One (1) located on the bottom left.



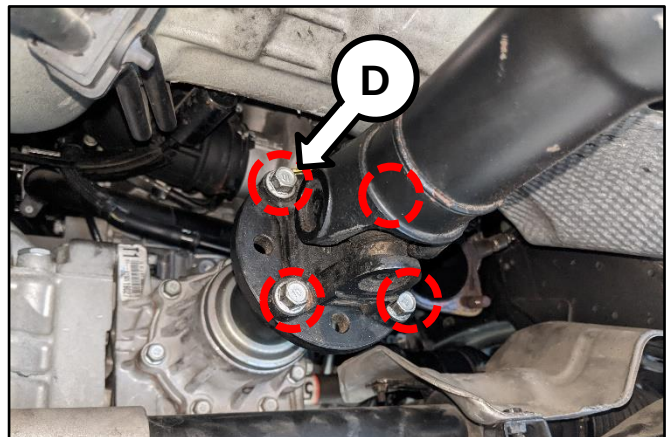
Note: Two (2) located on the bottom right.



3. Remove the two (2) drive axle bracket retaining bolts (C).



4. Remove the four (4) rear driveshaft retaining bolts (D).



5. Move the transfer case to the right for additional room to allow engine removal.

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)**AFFECTED VEHICLE RANGE:**

Model	Production Date Range
Optima (QF/TF)	August 12, 2010 to September 27, 2013
Optima (QF)	August 28, 2013 to May 15, 2014
Sorento (XMa)	April 19, 2011 to February 10, 2014
Sportage (SL)	December 30, 2010 to August 30, 2013

REQUIRED TOOL:

Tool Name	Tool Part No.	Figure	Comments
Torque Wrench Socket	09314 3Q100		Refer to TSB ENG083 for detailed usage instructions
Injector Combustion Seal Ring Installer	09353 2B000		
Click-Type or Electronic Torque Wrench	N/A		Locally Sourced
Bearing Clearance Tester Kit	KQ231 2T110QQK		Auto-shipped to Dealers For troubleshooting assistance, contact the GITA Support Line at: (888) 542-4371. For replacement parts, contact Snap-On Tools at: (888) 542-1011.

REQUIRED PARTS:

Part Name	MY	Model	Part Number		Figure
			2.4GDI	2.0T-GDI	
Engine Long Block	2011-2013	QF	21101 2GK05QQKR*	21101 2GK07QQKR**	
		TF			
		SL	-	21101 2GK07QQKR	
	2012-2013	XMa	21101 2GK09QQKR	-	
	2014	QF	21101 2GK06QQKR	21101 2GK08QQKR	
		XMa ULEV***	21101 2GK11QQKR	-	
		XMA SULEV***	21101 2GK11QQKR	-	

NOTE: You may receive an engine with a part number ending in “QQK” when a part number ending in “QQKR” was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.

*2.4GDI engines for 2011-2013 QF and TF are compatible and interchangeable.

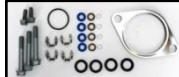
**2.0T-GDI engines for 2011-2013 QF and TF are compatible and interchangeable.

***See page 7 for details about underhood label check.

Continued on page 21.

SUBJECT:

THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Part Name	Engine	Part Number	Figure
Dipstick	11-13MY 2.4GDI and 2.0T-GDI	26611 2G050QQK	
Oil Filter	All 2.4GDI and 2.0T-GDI	26300 35504	
Drain Plug Washer	All 2.4GDI and 2.0T-GDI	21513 23001	
Service Kit I	2.4GDI	21111 2GK50QQK	
	2.0T-GDI	21111 2GK60QQK	
Service Kit II	2.4GDI and 2.0T-GDI	21111 2GK70QQK	
Drive Plate Bolts	2.4GDI and 2.0T-GDI	23311 25050 (AT)	
		23231 25200 (MT)	
Oil Cooler Tube Assembly (replacement is conditional, refer to page 12)	2.4GDI	25470 2G050QQK	
	2.0T-GDI	25470 2G650QQK	

***Oil Cooler Tube assembly replacement is conditional, refer to page 17.**

SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
WARRANTY CLAIM INFORMATION FOR:

Model	Claim Type	Causal P/N	Qty.	Test Result	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
Opt. (QF)	R	23060 2G400	0	PASS	(SC147) BCT Inspection PASS & LOF	171A29I3	1.1 M/H	26300 35504	1
								21513 23001	1
					(SC147) BCT Inspection PASS Dipstick Replacement, & LOF	171A29I2		26611 2G050QQK	1
								26300 35504	1
								21513 23001	1
				NO PASS	(SC147) <u>2.4L GDI</u> BCT Inspection NO PASS , & Engine Replacement	171A29R4	5.8 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(11-13MY) 21101 2GK05QQKR	1
								(14MY) 21101 2GK06QQKR	
					(SC147) <u>2.0T-GDI</u> BCT Inspection NO PASS , & Engine Replacement	171A29R5	6.3 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(11-13MY) 21101 2GK07QQKR	1
								(14MY) 21101 2GK08QQKR	
				NO TEST	(SC147) <u>2.4L GDI</u> Engine Replacement Only	171A29R6	6.4 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(11-13MY) 21101 2GK05QQKR	1
								(14MY) 21101 2GK06QQKR	
					(SC147) <u>2.0T-GDI</u> Engine Replacement Only	171A29R7	6.9 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(11-13MY) 21101 2GK07QQKR	1
								(14MY) 21101 2GK08QQKR	

NOTE: You may receive an engine with a part number ending in "QQK" when a part number ending in "QQKR" was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.

SUBJECT:

THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Model	Claim Type	Causal P/N	Qty.	Test Result	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
Opt. (TF)	R	23060 2G400	0	PASS	(SC147) BCT Inspection PASS & LOF	171044I3	1.1 M/H	26300 35504	1
								21513 23001	1
					(SC147) BCT Inspection PASS Dipstick Replacement, & LOF	171044I2		26611 2G050QQK	1
								26300 35504	1
								21513 23001	1
				NO PASS	(SC147) <u>2.4L GDI</u> BCT Inspection NO PASS , & Engine Replacement	171044R4	5.8 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK05QQKR	1
					(SC147) <u>2.0T-GDI</u> BCT Inspection NO PASS , & Engine Replacement	171044R5	6.3 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1
				NO TEST	(SC147) <u>2.4L GDI</u> Engine Replacement Only	171044R6	6.4 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK05QQKR	1
					(SC147) <u>2.0T-GDI</u> Engine Replacement Only	171044R7	6.9 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1

NOTE: You may receive an engine with a part number ending in "QQK" when a part number ending in "QQKR" was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Model	Claim Type	Causal P/N	Qty.	Test Result	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
Spo. (SL)	R	23060 2G400	0	PASS	(SC147) BCT Inspection PASS & LOF	171045I3	1.1 M/H	26300 35504	1
								21513 23001	1
					(SC147) BCT Inspection PASS , Dipstick Replacement, & LOF	171045I2		26611 2G050QQK	1
								26300 35504	1
								21513 23001	1
				NO PASS	(SC147) <u>2.0T-GDI 2WD</u> BCT Inspection NO PASS , & Engine Replacement	171045R4	6.2 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1
					(SC147) <u>2.0T-GDI AWD</u> BCT Inspection NO PASS , & Engine Replacement	171045R5	6.6 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1
				NO TEST	(SC147) <u>2.0T-GDI 2WD</u> Engine Replacement Only	171045R6	6.8 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1
					(SC147) <u>2.0T-GDI AWD</u> Engine Replacement Only	171045R7	7.2 M/H	21111 2GK60QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								21101 2GK07QQKR	1

NOTE: You may receive an engine with a part number ending in "QQK" when a part number ending in "QQKR" was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.

SUBJECT:

THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Model	Claim Type	Causal P/N	Qty.	Test Result	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
Sor. (XMa)	R	21020 2G010	0	PASS	(SC147) BCT Inspection PASS & LOF	171A30I3	1.1 M/H	26300 35504	1
								21513 23001	1
					(SC147) BCT Inspection PASS , Dipstick Replacement, & LOF	171A30I2		26611 2G050QQK	1
								26300 35504	1
								21513 23001	1
				NO PASS	(SC147) <u>2.4L 2WD</u> BCT Inspection NO PASS , & Engine Replacement	171A30R4	5.6 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(12-13MY) 21101 2GK09QQKR	1
								(14MY ULEV) 21101 2GK11QQKR	
								(14MY ULEV <u>or</u> SULEV) 21101 2GK11QQKR	
					(SC147) <u>2.4L AWD</u> BCT Inspection NO PASS , & Engine Replacement	171A30R5	6.0 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(12-13MY) 21101 2GK09QQKR	1
								(14MY ULEV) 21101 2GK11QQKR	
								(14MY ULEV <u>or</u> SULEV) 21101 2GK11QQKR	

NOTE: You may receive an engine with a part number ending in "QQK" when a part number ending in "QQKR" was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

Model	Claim Type	Causal P/N	Qty.	Test Result	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
Sor. (XMa)	R	21020 2G010	0	NO TEST	(SC147) <u>2.4L 2WD</u> Engine Replacement Only	171A30R6	6.2 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(12-13MY) 21101 2GK09QQKR	1
								(14MY ULEV) 21101 2GK11QQKR	
								(14MY ULEV <u>or</u> SULEV) 21101 2GK11QQKR	
					(SC147) <u>2.4L AWD</u> Engine Replacement Only	171A30R7	6.6 M/H	21111 2GK50QQK	1
								21111 2GK70QQK	1
								(AT) 23311 25050	1
								(MT) 23231 25200	
								(12-13MY) 21101 2GK09QQKR	1
								(14MY ULEV) 21101 2GK11QQKR	
								(14MY ULEV <u>or</u> SULEV) 21101 2GK11QQKR	

NOTE: You may receive an engine with a part number ending in "QQK" when a part number ending in "QQKR" was ordered. Both part numbers are interchangeable and acceptable in the warranty claim.

NOTE: Refer to Warranty Bulletin 2017-09 for details regarding oil and coolant reimbursement requirements.

Use sublet code 'X3' with a maximum allowed amount of \$50.00 for engine oil reimbursement.

Use sublet code 'RX' for reimbursement of rental expense.

If the replacement of the Oil Cooler Tube Assembly was required, please manually enter the applicable Oil Cooler Tube Assembly part number to the claim's related parts section.

If replacement of any engine related components are needed to complete the inspection in addition to consequential damage from an engine failure, these components should be covered (Warranty or Goodwill) using a separate claim under a new line using the same Repair Order. See Warranty Bulletin 2017-09 for more detailed information on claim submission and processing.

Dispose of old parts in accordance with local, state, and Federal regulations.

Beginning April 1, 2018, entire engine cores with the starter bracket ear intact will be required to be received by KMA in order for dealers to receive their core deposit refund. If not received or if starter bracket ears are broken, the dealer core deposit will be forfeit.

★ NOTICE

VIN inquiry data for this repair is provided for tracking purposes only. Kia retailers should reference SC147 when accessing the WebDCS system.

Appendix 1 (Warranty Claim Authorization)

Scenario		Description	Action Required
1	Campaign - TSB # SC147 Case for Warranty Authorization TEST- NO PASS	Engine BCT Inspection <u>Completed</u> NO PASS R&R Engine	No TL PWA or involvement needed – claim will be auto-approved if a NO PASS test record is received via KDS “Special Inspection” feature.
2	Campaign - TSB # SC147 Case for Warranty Authorization NO TEST	Engine BCT Inspection <u>cannot be completed</u> ; Crank does not rotate, hole in block, or other engine failure.	TL PWA required for all dealers – Video of condition* Video requirement examples below are for illustration purposes, individual requirements will vary based upon the condition reported: • Video should be continuous and show the VIN (most convenient VIN plate) and pan to show the engine condition • For engine seizures, attempt to turn over engine with breaker bar in video • For hole in engine block, show hole in video • For engine smoking condition (piston ring sealing), show smoke in video
3	Campaign - TSB # SC147 Case for Warranty Authorization TEST PASS- OTHER CONDITION	BCT Inspection <u>Completed</u> PASS , but other engine condition requires engine replacement	TL PWA required for all dealers – Video of condition* • The requirements for NO TEST to obtain authorization will apply • The claim should be submitted as NO PASS engine replacement
4	Engine Replacement AFTER SC147 Recall is Completed. <u>Refer to PI1803Y/Z</u>	Engine Replacement Required but SC147 Inspection/engine replacement already completed from prior visit	Refer to TSB <u>PI1803Y/Z</u> repair procedures <i>*additional requirements may apply on an individual dealer basis</i>

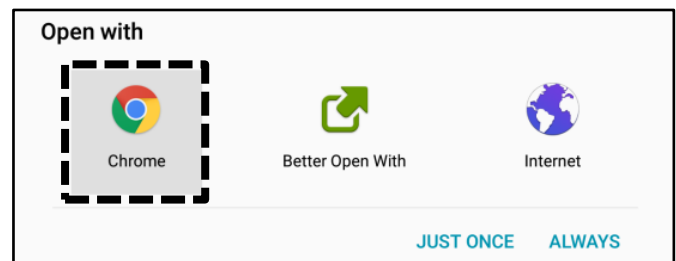
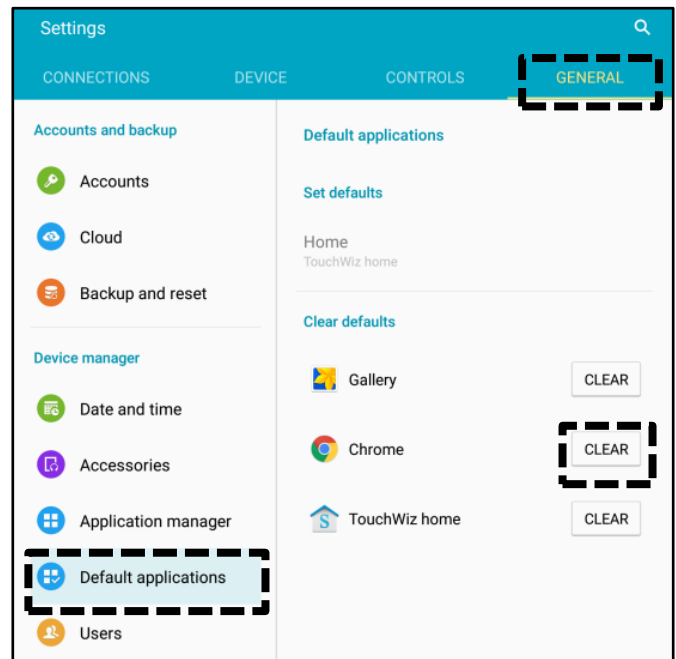
Appendix 2 (Video Capture & Upload)

Note: Additional information required to open a Techline case including but not limited to screenshot of the stored DTC(s), ROM ID and Bearing Clearance Test (BCT) results.

The Chrome™  browser should be used to access the Techline portal. Follow the steps below to clear the default browser if it is other than Chrome™.

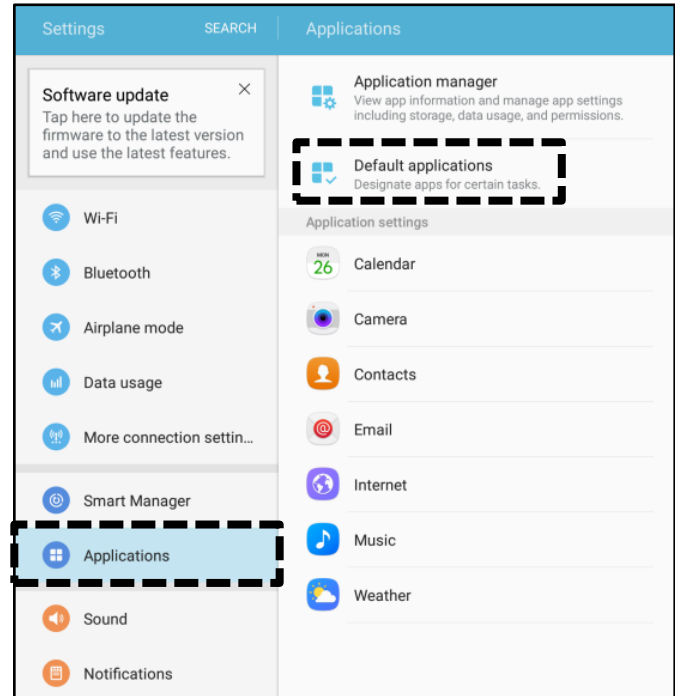
For KDS Tab 10.1 Tablets:

1. Select “Settings” from the App Screen.
2. Select the “General” tab at the top.
3. Select “Default Applications”.
4. If “Internet” is the default browser, select the CLEAR button.
If “Chrome” is the default browser, further action is not required.
5. When opening the Techline portal, select “Chrome” and select Always”.

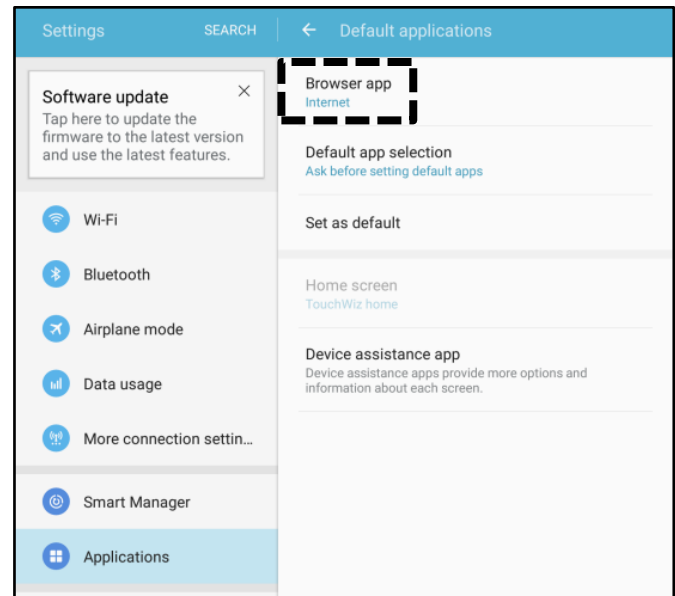


SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)
For KDS Tab S2 Tablets:

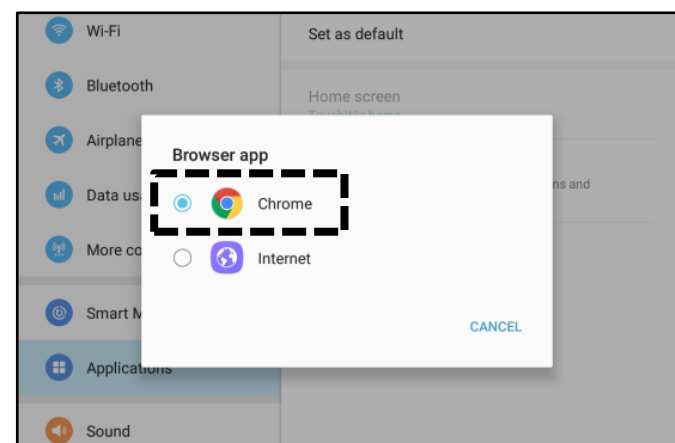
1. Select "Settings" from the App Screen.
2. Select "Applications".
3. Select "Default Applications".



4. Select "Browser app".



5. Ensure "Chrome" is selected.



Attaching Video to a Techline Case:

1. Open K-Support in the device Chrome™ browser or select the “Techline” button on KDS home page.

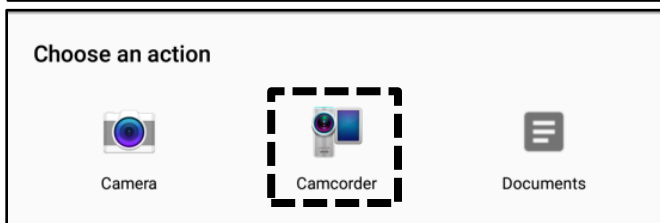
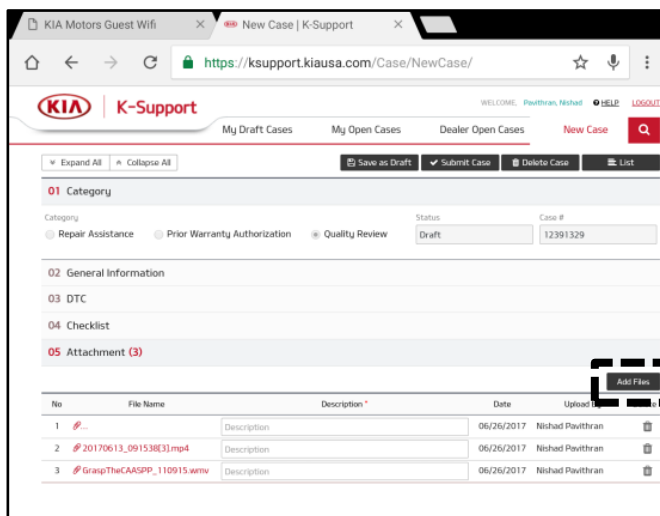
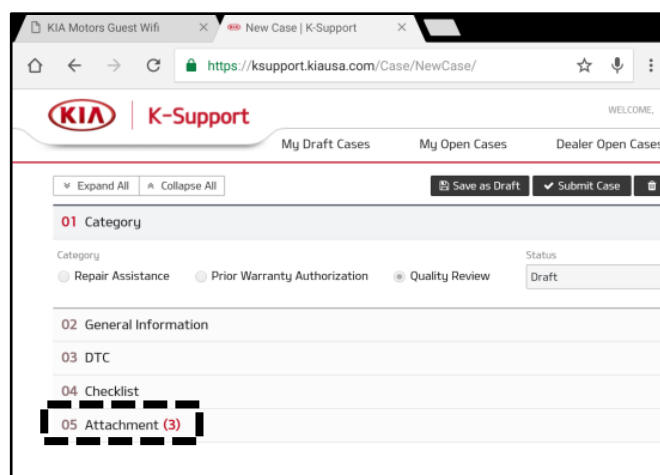
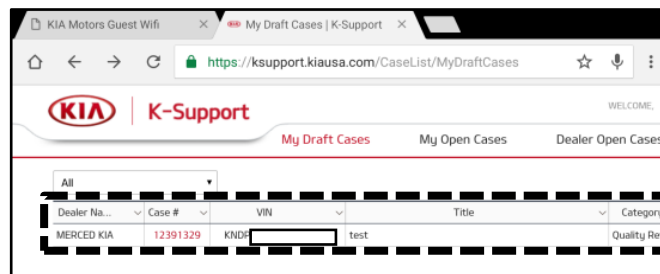
<https://ksupport.kiausa.com>

2. Open your existing Techline case for the vehicle requiring a video capture by selecting the case number.

3. Select “Attachment”.

4. Select “Add Files”.

5. Select “Camcorder” and the video camera will open.



SUBJECT: THETA II ENGINE INSPECTION AND/OR REPLACEMENT (SC147)

6. Start by recording the VIN. Ensure sun glare is not reflecting off windows or other objects.

Without stopping the recording, capture the area of the vehicle displaying the issue. i.e.;

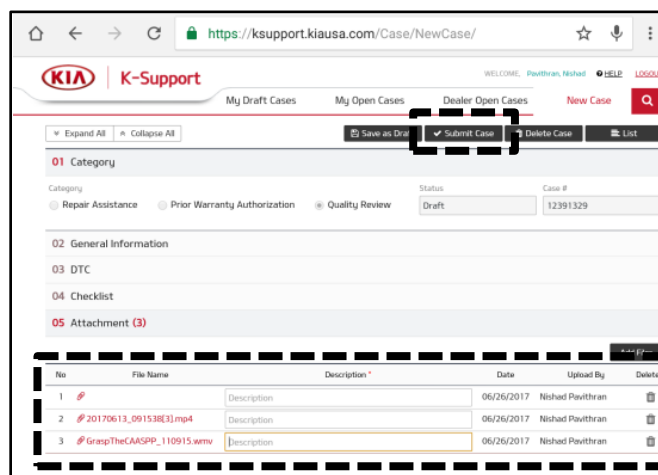
- Engine Noise – record the engine.
- Hole In Block – record the side of the engine with the damage.
- Seized Engine – record a technician trying to turn the engine over with a torque wrench.



★ NOTICE

NOTE: Ensure the video size is set to “Limit to email”. Only record the VIN and the engine exhibiting the concern. Any additional information will increase the size of the video and make it difficult to upload or download.

7. Stop the video when you captured what is needed. Select “OK” to use this capture or “RETRY” to capture the video again.
8. Ensure a description of the recording. For example, engine knock or smoke from exhaust.
9. Select “Submit Case”.



10. Select “Yes” when the confirmation message below appears.

Note: Selecting anything other than “Yes” will not save the video capture.

