

2013 Toyota Camry ATF Total Exchange (summer edition)

Important to note:

Date is July 3rd, 2015, Friday. Air temperature is 72 deg-F. Mileage is at 41,792. ATF temperature is 80 deg-F (due to brief run to pump ATF out via the cooler line). Once the car is started, ATF temperature rises really quickly, it reaches 113 deg-F (the max temperature for level setting) before the car gets a chance to settle on ~700 rpm idle). Level set action needs to be taken quickly. For this reason, over fill the ATF before setting the level.

Toyota document indicates that, after the initial steady over flow, it would reduce to a trickle, and then replace the overflow plug. My observation is that, the flow never reduces to a trickle. After initial steady flow, it then turns to a heavy, splashy kind of "trickle". I hesitated at the first time, then have to wait till the ATF temperature drops back to 95 deg-F. The reason, I believe, is that the temperature is rising quickly, and the ATF level is agitated due to running transmission. Second time is the charm. Just don't wait for the never-happen slow trickle that Toyota tells you. When you are under the car watching the flow, you'll notice the flow pattern change. Once that happens, quickly replace the plug. Maybe it'd be a slow trickle in winter temperatures.

Prepare for 9 quarts of ATF-WS. Use 8 quarts for the exchange, and the last quart for the level setting.

Complete procedure:

Step 1: Raise the car and make it level

I used a floor jack to raise front and rear of the car. Place one floor jack at one corner, and use scissors jack at other three corners. Scissors jack can be continuous adjusted to make the car level. Level should be checked against the bottom of the ATF pan. I have three cars in the family, so the scissors jacks come in handy.



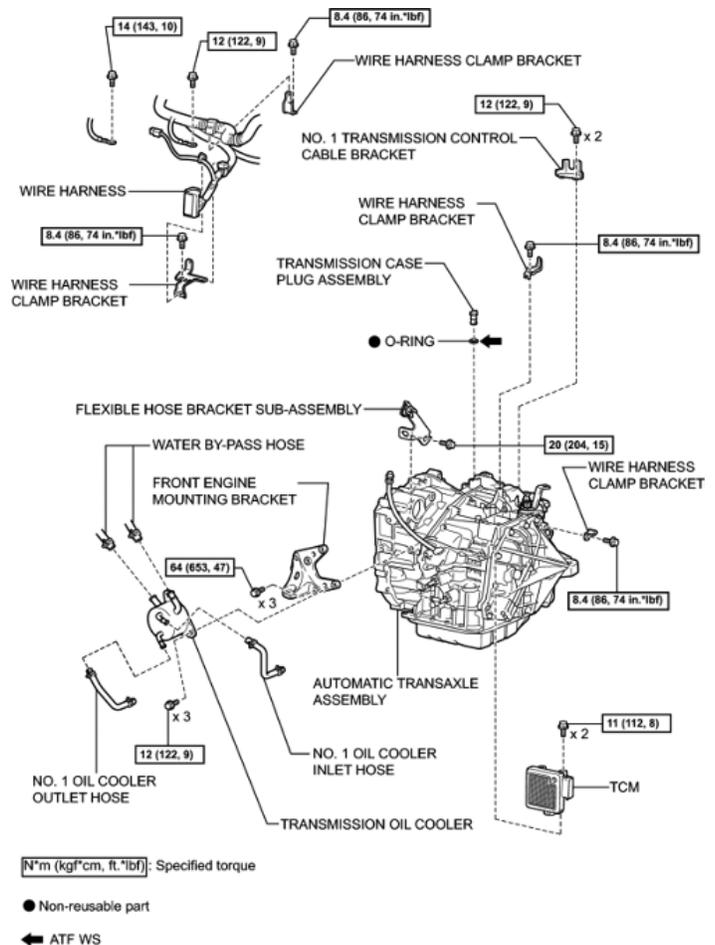
Step 2: Remove the under-carriage splash panel and the wheel well trim piece. There are three screws on the wheel flow regulator in front of the wheel (no need to take the driver side wheel off, there is enough room once the suspension relaxes). There are other three screws along the front edge of the splash panel. There are also three plastic push fasteners. Pry the center up using the small flat screw driver. Use WD-40 to lubricate to avoid breakage. The wheel well piece has two 10mm screws, and one plastic pin behind the wheel well liner. Push in on the center to remove the pin.

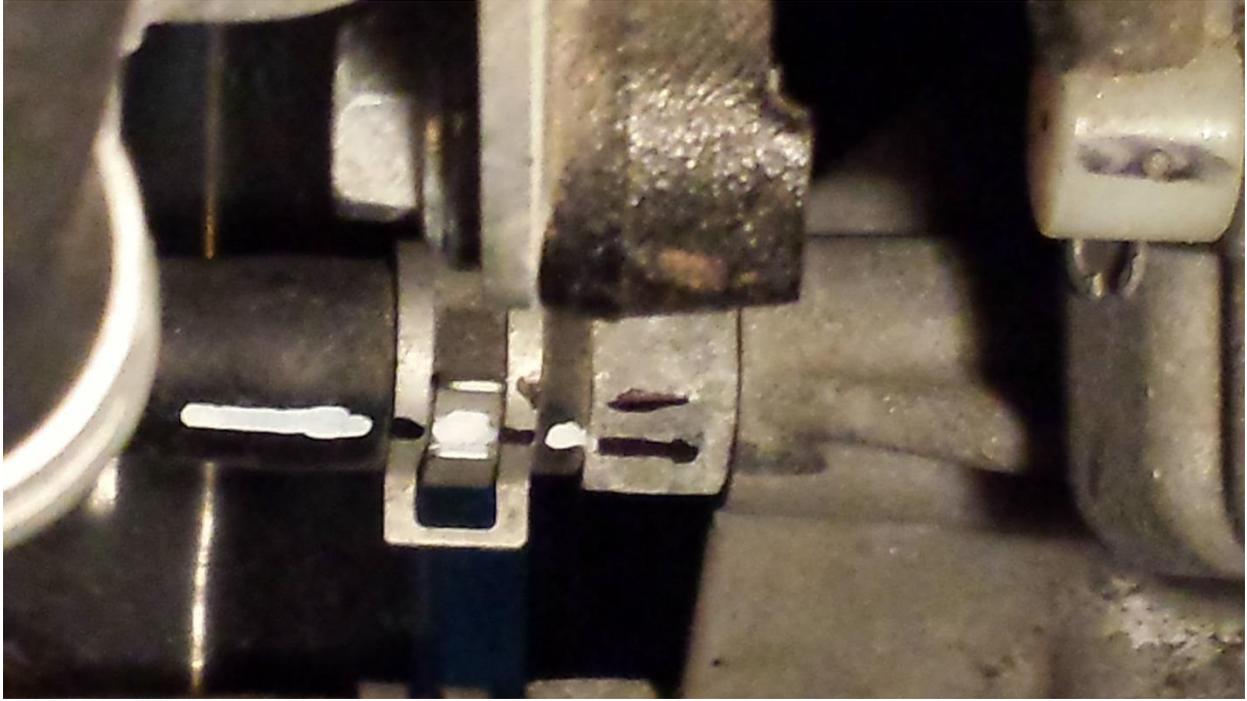
Step 3: Loosen the refill plug with a 13/16 inch, 6-point socket (it fits better than 24mm socket), but don't remove. Loosen the overflow plug with a 6-mm Allen key. Use a graduated bucket to catch the ATF. Wait till ATF slows, then remove the plastic straw piece using the same Allen key. There are almost 2 quarts of ATF coming out. Then replace the plug to a finger tight. This is a good time to replace the soft aluminum crush washer. I planned to do it later per Toyota document, but at the level adjustment later, I had to rush, and could not replace the washer.



Step 4: Remove the refill plug, replace the aluminum crush washer on the plug. Pump 2 quarts of fresh ATF (ATF-WS) via the refill port. I used my MityVac and poured 6 quarts in the pump reservoir.

Step 5: Now work from top of the engine bay, remove the bumper lip plastic trim piece by removing all the plastic pins (pry from center). Then the two screws that hold the air intake duct will be exposed, remove them, and then lift up the air duct. With that out of the way, it's easy to access the ATF return hose. Now observe the ATF cooler (or warmer, but I'd call it tuna can), larger diameter hoses on the side of the tuna can are coolant, don't touch those. The smaller diameter hoses are ATF hoses (on the front face of the tuna can), the lower one is the outlet hose from the tuna can, and this is the hose that returns the ATF to the transmission. I choose to open this hose, not at the tuna can end but at the transmission end. The reason is that the ATF nipples on the tuna can look fragile, and I don't want to twist and turn the hose at this nipple. I choose to open the end that connects to the transmission, which is a much stronger fitting. Mark the clamp position on both clamp and hose with a white paint sharpie. This is needed for reinstalling the clamp back to the imprint it made on the hose to avoid leaks at the port. Use a male-to-male fitting (3/8in OD) to connect the hose to a clear tube (3/8in ID), and lead the clear tube to a graduated bucket (or make a direct connection without the fitting with a 3/8-in OD clear tube). Tape the hose and tube to car frame, bumper, and at the catch jug to avoid spills due to movement of hoses. Cover the open nipple on the transmission.



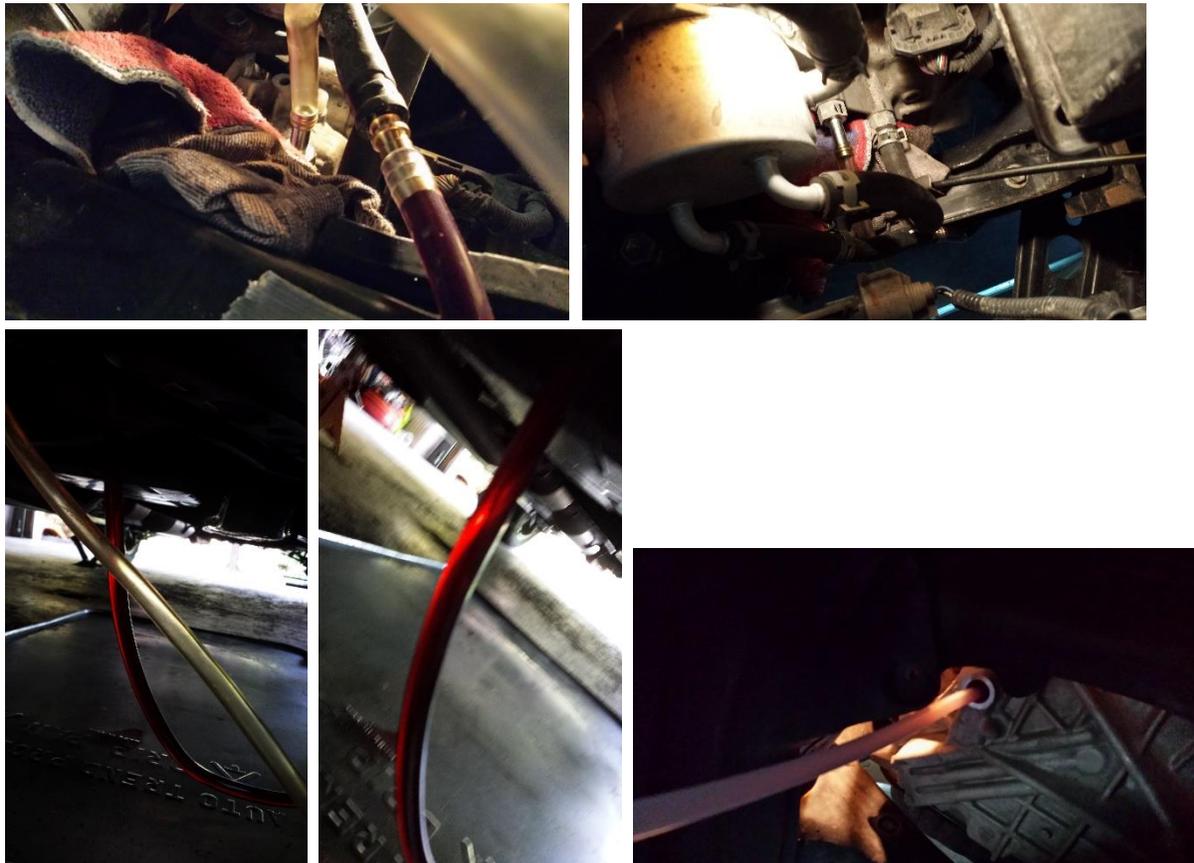


Step 6: Have a helper to start the car. While watching the old ATF getting pumped out, pump the fresh ATF (remaining amount, ~4 quarts) from the MityVac reservoir to the transmission. The MityVac is capable of matching the transmission flow rate with just a few pumps on the MityVac. When the catch jug reaches 4 quart line, signal the helper to stop the car. Then, empty the catch jug, replace the clear tube. Refill the MityVac with two quarts of new ATF. Repeat the pump/dispense motion till 2 quarts ATF is out. You can do it all at once if you have a larger catch jug.

So at this moment, we have let out total of 8 quarts of old ATF, and pumped back in 8 quarts of fresh, cheery red ATF. Observe the clear tube, the color was pitch black to begin with, and now is cherry red. Add one last quart of new ATF in MityVac, pump the ATF to the transmission. This is an intentional over fill. Replace the overflow plug with a new aluminum crush washer.

Reconnect the ATF return hose. I also replaced the hose clamp. Make sure the clamp sit properly on the previous imprint on the hose.

And now we are ready for the fun part: level adjustment.



Step 7: Get your laptop that has working Toyota Techstream software. Connect your MVCI cable to the laptop, and the other end goes to the car's OBDII port. Turn the car on, and connect via Techstream. Go to Engine and ECT module, and click on Datalist. Towards the end of the list, you'll find the A/T Oil Temperature 1. The temperature needs to be below 95 deg-F. Now start the car, and circulate ATF by shifting to P and D, hold each position for a few seconds to circulate ATF.

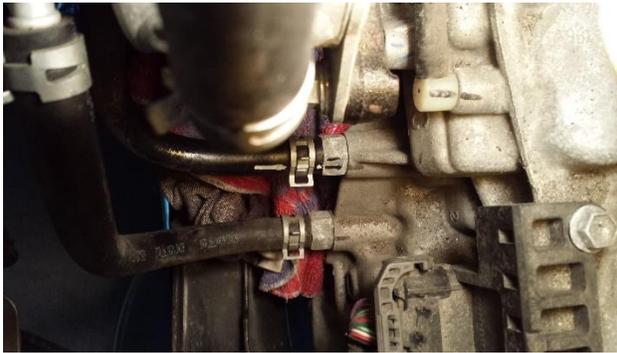
My first try started at 80 deg-F, and when I opened the overflow plug, nothing came out. I then rushed to fill again, which was not needed. I should've waited for the temperature to rise. While I was in a rush, oil temperature rose rather quickly, and oil started to overflow. But I did not recognize that as "slow trickle" per Toyota document. It was not a slow trickle, it was a heavy trickle with a bit splash. Worried losing too much ATF, I put the plug back while the oil temperature passed 113 deg-F, which is the max temperature for the level adjustment.

I waited for an hour and half for the oil temperature to drop back to 95 deg-F, and started again. Before I started, I pumped the remaining ATF into transmission. When I opened the overflow plug with the car running at D position

(this is to drop the RPM to about 700, I can't wait for the car to step the RPM down in P position, the oil temperature is surely going to shoot thru 113 deg-F while waiting for RPM to settle). I see the steady stream of ATF coming out for a few seconds, and then comes the heavy trickle. Now recognizing that, I put back the plug at oil temperature of 108.5 deg-F. It was just a few seconds under the car, and I forget to replace the washer on the overflow plug. Perhaps not a big deal, but the washer should be replaced the first time the plug is removed.

Step 8: Tighten the overflow plug to 29 ft-lbf. Replace and tighten the refill plug to 36 ft-lbf. Some recent Toyota document have misprinted the torque value for the overflow plug. Be aware.

Step 9: Start the car again, check for leaks. When everything is good, shut the car, and button up the under-carriage splash panel, wheel well trim piece, air intake duct in the engine bay, and the top trim piece. Then lower the car carefully, walk around the car to make sure everything is clear, and then go for a test drive.



Sports Shift Up SW	OFF
Sports Shift Down SW	OFF
Sports Mode Selection SW	OFF
Shift SW Status (D Range)	OFF
AT Oil Temperature 1	108.5
NT Sensor Voltage	1.000
NC Sensor Voltage	0.463
Lock Up	OFF
Shift Status	1st
SLT Solenoid Status	ON
SLU Solenoid Status	OFF
SL Solenoid Status	OFF



Final note: If you don't have Techstream and MVCI cable, you can use the alternative procedure by connecting OBDII terminal pin 4 and 13, and operating the shift lever. See the following Toyota document.



ATF REMOVAL – REPLACEMENT

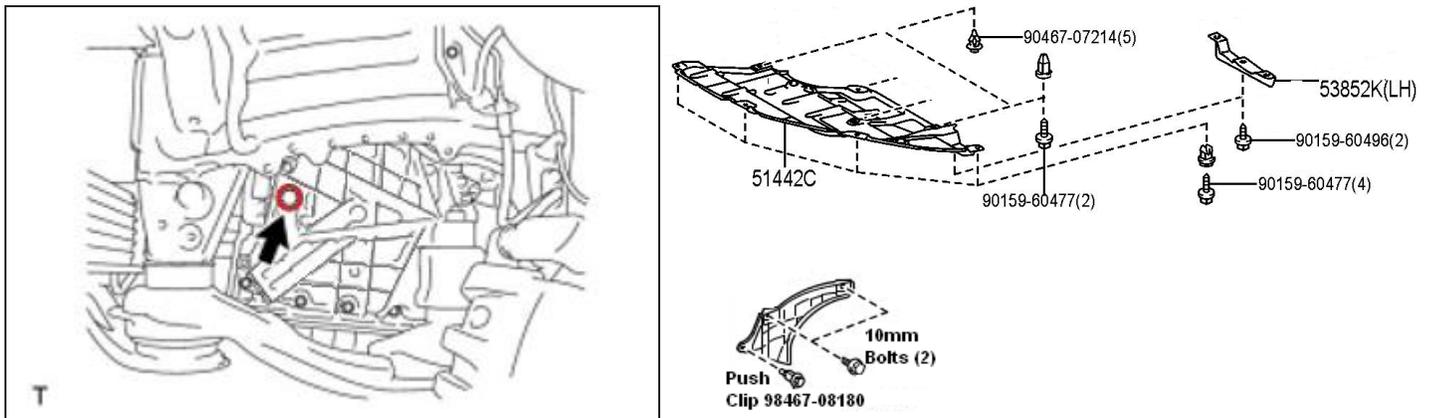
U760E AUTOMATIC TRANSMISSION / TRANSAXLE

- (a) Lift the vehicle. [*1]

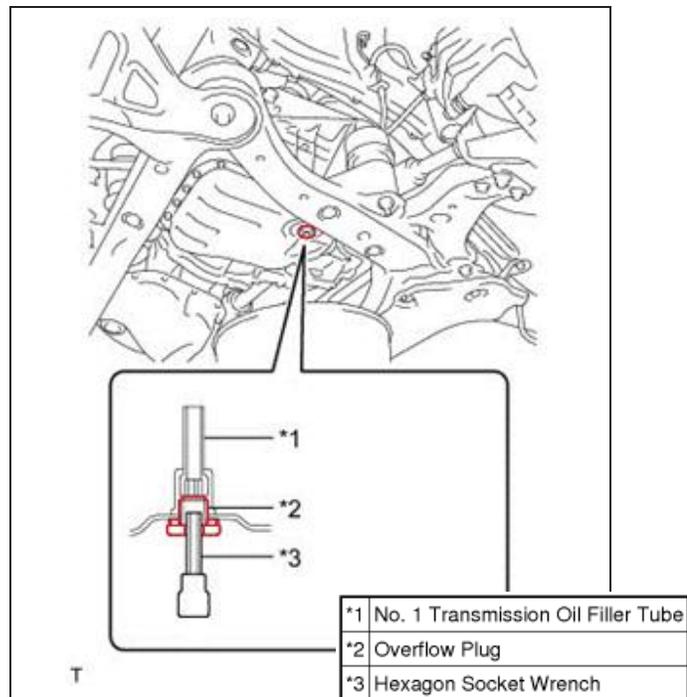
NOTICE: Set the vehicle on a lift so that the vehicle is kept level when it is lifted up.
(make sure the tilt angle from the front to rear of the vehicle is within +/- 1°).

- (b) Remove the front wheel opening extension pad LH, engine under cover LH and front fender apron seal LH.

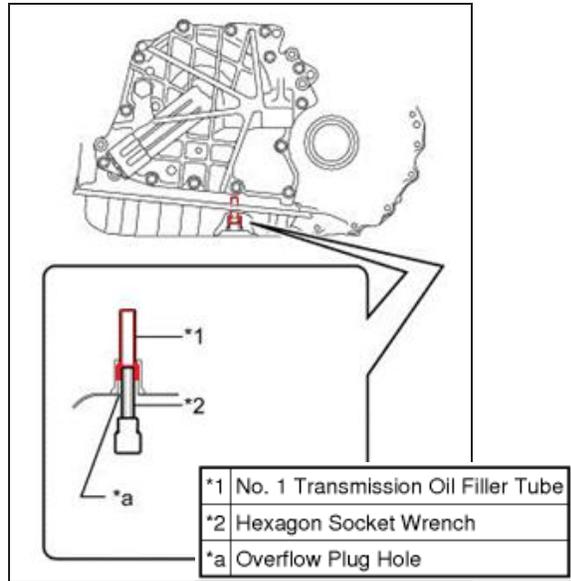
- (c) Remove the refill plug and gasket from the automatic transaxle assembly. [*2]



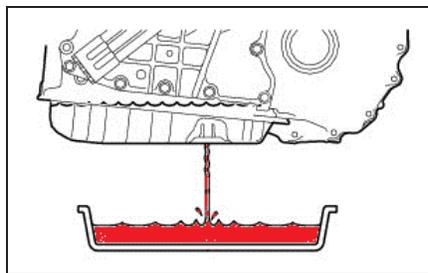
- (d) Using a 6 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transaxle assembly. [*3]



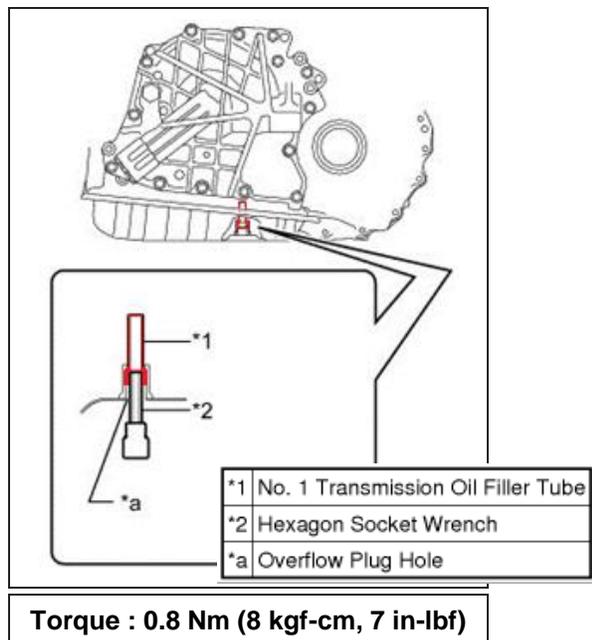
- (e) Using a 6 mm hexagon socket wrench, remove the No. 1 transmission oil filler tube from the transaxle oil pan sub-assembly and drain the automatic transaxle fluid. [*4]



- (f) Measure the amount of fluid drained. [*5]

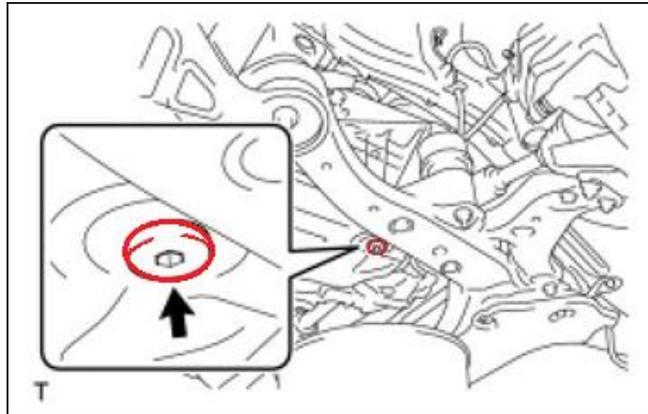


HINT: Note amount and then add the same amount of fluid in step [*8].



- (g) Using a 6 mm hexagon socket wrench, reinstall the No. 1 transmission oil filler tube to the transaxle oil pan sub-assembly. [*6]

(h) Install new gasket 90430-12008 and the overflow plug. [*7]

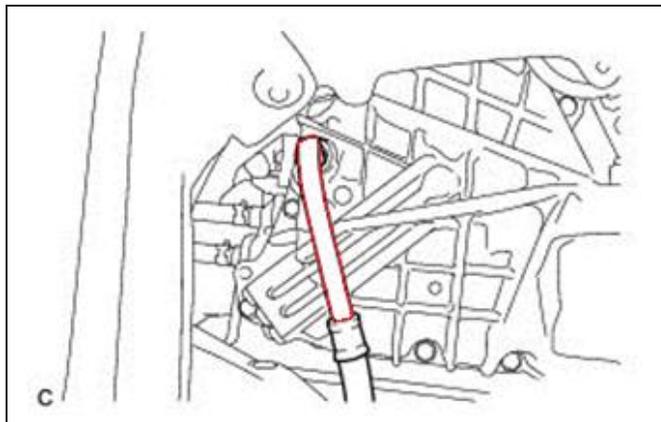


Torque : 40 Nm (408 kgf-cm, 29 ft-lbf)

HINT: Reuse the old gasket if you are doing the full fluid adjust procedure as the plug will be removed again.

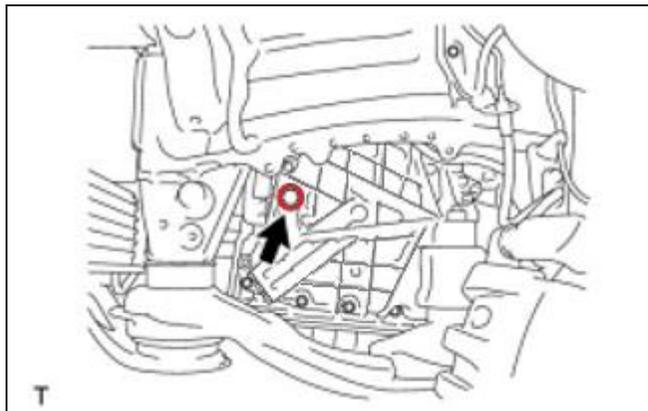
(i) Add fluid to the refill hole using the same amount of fluid drained in step [*5]. [*8]

HINT: If doing the formal fluid adjustment procedure following this removal-replacement, add 8oz. additional ATF on final replacement, this will be drained by the overflow method fluid adjust.



NOTICE: Use Toyota Genuine ATF WS.

(j) Install new gasket 90430-18008 and refill plug to avoid fluid spillage. [*9]



Torque : 49 Nm (500 kgf-cm, 36 ft-lbf)

HINT: Reuse old gasket if you are doing the formal fluid adjust procedure as the plug will be removed again.

- (k) Lower the vehicle. [*10]
- (l) Start the engine. [*11]
- (m) Slowly move the shift lever from P to D, then back to P (keep the shift lever in each position for approximately 3 seconds). [*12]

HINT: Slowly move the shift lever to circulate the fluid through each part of the automatic transaxle assembly.

- (n) Allow the engine to idle for 30 seconds to check for leaks. [*13]
- (o) Turn the ignition switch off. [*14]
- (p) Install the front wheel opening extension pad LH, engine under covers LH and front fender apron seal LH. Then job is Complete.
- (q) Repeat steps [*1] to [*9]. Optional. To achieve a higher percentage of total new fluid.

ATF LEVEL ADJUSTMENT

NOTICE:

- * The U760E automatic transaxle does not have an oil filler tube and oil dipstick. When adding fluid, add fluid through the refill hole on the transaxle case. The fluid level can be adjusted by draining excess fluid (allowing excess fluid to overflow) through the No. 1 transmission oil filler tube of the oil pan.
- * If the transaxle is hot (then the ATF temperature is high), wait until the fluid temperature becomes the same as the ambient temperature before starting the following procedure.
[Recommended starting ATF temperature: around 20°C (68°F)]

ADJUST FLUID TEMPERATURE - USING TECHSTREAM SOFTWARE

- (a) Connect the Techstream to the DLC3 with the ignition switch off.
- (b) Turn the ignition switch to ON and turn the Techstream on.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

- (c) Enter the following menus: Powertrain / Engine / Active Test / Connect the TC and TE1
- (d) Select the Data List menu: A/T Oil Temperature 1
- (e) Select the Active Test menu: Connect the TC and TE1 / ON
- (f) Check the ATF temperature.

NOTICE: If the fluid temperature is below 45°C (113°F), proceed to the next step. [Recommended ATF temperature: 35°C (95°F) or less]

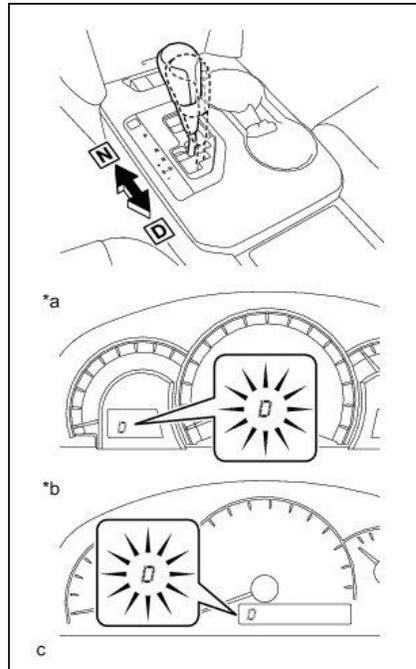
If the fluid temperature is 45°C (113°F) or more, turn the ignition switch off and wait until the fluid temperature drops below 45°C (113°F).

- (g) Depress and hold the brake pedal.
- (h) Start the engine.
- (i) Slowly move the shift lever from P to D, then back to P (keep the shift lever in each position for approximately 3 seconds).

- (j) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

NOTICE: Do not pause for more than 1.5 seconds.

HINT: Performing this operation will cause the vehicle to enter fluid temperature detection mode.



*a	Optitron and Analog Type
*b	Analog Type

- (k) Check that the D shift indicator comes on for 2 seconds.

HINT : When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds. If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

- (l) Move the shift lever from N to P.
 (m) Release the brake pedal.
 (n) Select the Active Test menu: Connect the TC and TE1 / OFF

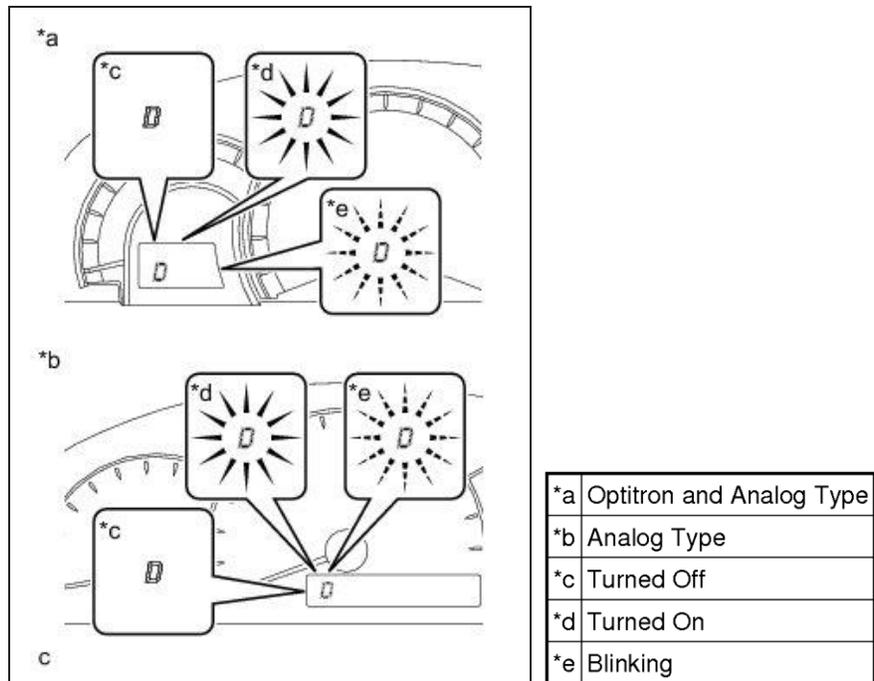
NOTICE: Be sure that terminals TC and TE1 are off. If the terminals are on, the fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT: Disconnecting terminals TC and TE1 activates engine idle speed control mode.

In engine idle speed control mode, engine idle speed control starts when the fluid temperature becomes 35°C (95°F) or more and then engine speed is maintained at approximately 800 rpm.

Even after terminals TC and TE1 are disconnected, fluid temperature detection mode is active until the ignition switch is turned off.

- (o) Warm up the engine with the engine idling until the fluid temperature reaches the fluid level adjustment temperature [35 to 45°C (95 to 113°F)].

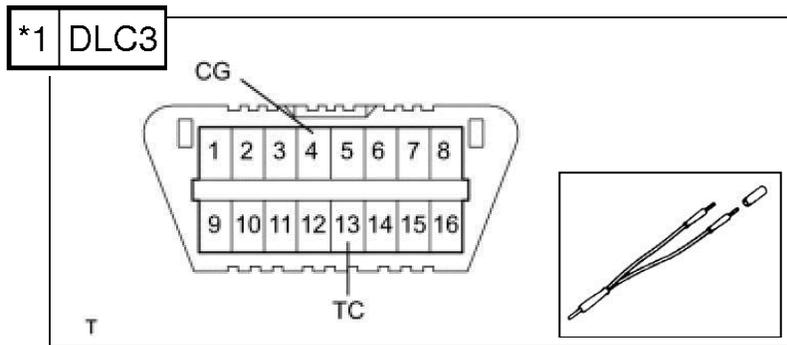


Below Fluid Level Adjustment Temperature	Fluid Level Adjustment Temperature	Above Fluid Level Adjustment Temperature
35°C or less (95°F or less)	35 to 45°C (95 to 113°F)	45°C or more (113°F or more)
Shift Indicator (D) Turned off	Shift Indicator (D) Turned on	Shift Indicator (D) Blinking

NOTICE: If the fluid temperature is within the fluid level adjustment temperature range, immediately proceed to the "Adjust Fluid Level" procedure.
 If the fluid temperature is 45°C (113°F) or more, stop the engine and wait until the fluid temperature drops to 35°C (95°F) or less. Then perform the "Adjust Fluid Temperature" procedure again from the beginning.

ADJUST FLUID TEMPERATURE – NOT USING TECHSTREAM

- (a) Using SST 09843-18040 jumper, connect terminals 13 (TC) and 4 (CG) of the DLC3 with the ignition switch off.



- (b) Depress and hold the brake pedal.
 (c) Start the engine.

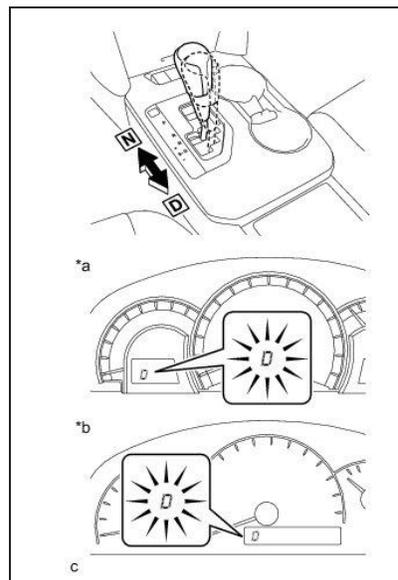
NOTICE: To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

HINT: The indicator lights on the combination meter blink to indicate the DTC output when terminals TC and CG are connected.

- (d) Slowly move the shift lever from P to D, then back to P.
 (e) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

NOTICE: Do not pause for more than 1.5 seconds.

HINT: Performing this operation will cause the vehicle to enter fluid temperature detection mode.



*a	Optitron and Analog Type
*b	Analog Type

- (f) Check that the D shift indicator comes on for 2 seconds.

HINT: When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds. If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

- (g) Move the shift lever from N to P.

- (h) Release the brake pedal.
- (i) Remove SST from terminals 13 (TC) and 4 (CG).

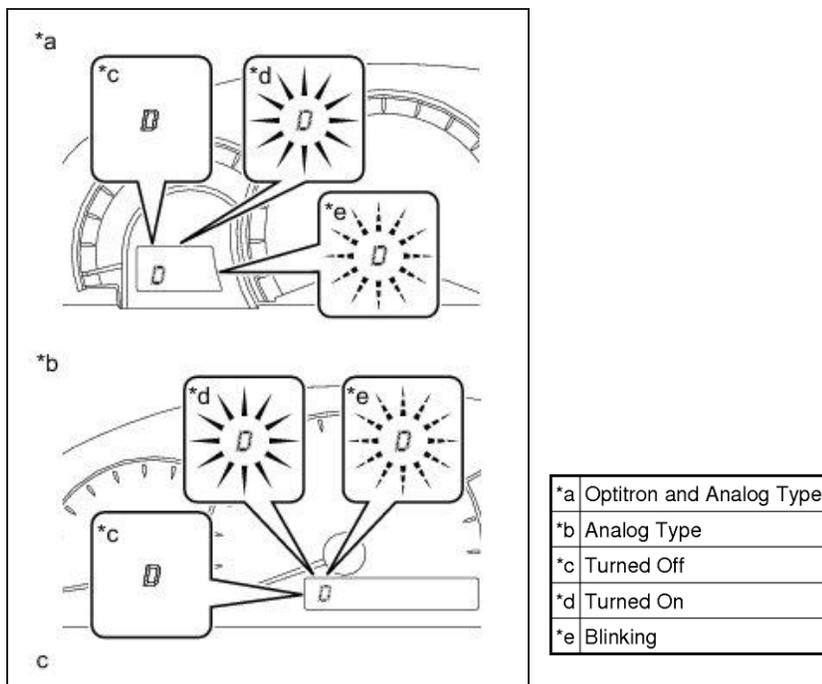
NOTICE: Be sure that terminals TC and CG are not connected. If the terminals are connected, the fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT : Disconnecting terminals TC and CG activates engine idle speed control mode.

In engine idle speed control mode, engine idle speed control starts when the fluid temperature becomes 35°C (95°F) or more and then engine speed is maintained at approximately 800 rpm.

Even after terminals TC and CG are disconnected, fluid temperature detection mode is active until the ignition switch is turned off.

- (j) Allow the engine to idle until the D shift indicator comes on again.



Below Fluid Level Adjustment Temperature	Fluid Level Adjustment Temperature	Above Fluid Level Adjustment Temperature
35°C or less (95°F or less)	35 to 45°C (95 to 113°F)	45°C or more (113°F or more)
Shift Indicator (D) Turned off	Shift Indicator (D) Turned on	Shift Indicator (D) Blinking

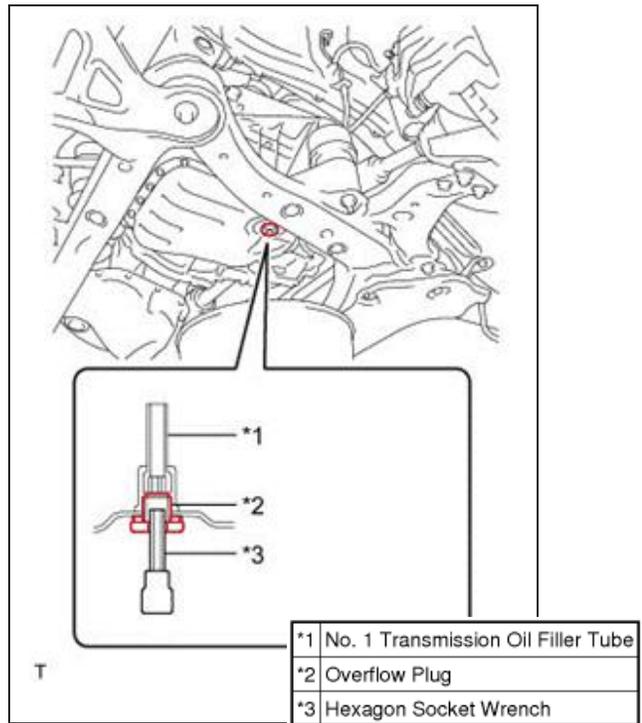
NOTICE: If the fluid temperature is within the fluid level adjustment temperature range, immediately proceed to the "Adjust Fluid Level" procedure.
 If the fluid temperature is 45°C (113°F) or more, stop the engine and wait until the fluid temperature drops to 35°C (95°F) or less. Then perform the "Adjust Fluid Temperature" procedure again from the beginning.

ADJUST FLUID LEVEL

(a) Lift the vehicle.

NOTICE: Set the vehicle on a lift so that the vehicle is kept level when it is lifted up.
(make sure the tilt angle from the front to rear of the vehicle is within +/- 1°).

(b) Using a 6 mm hexagon socket wrench, remove the overflow plug and gasket.



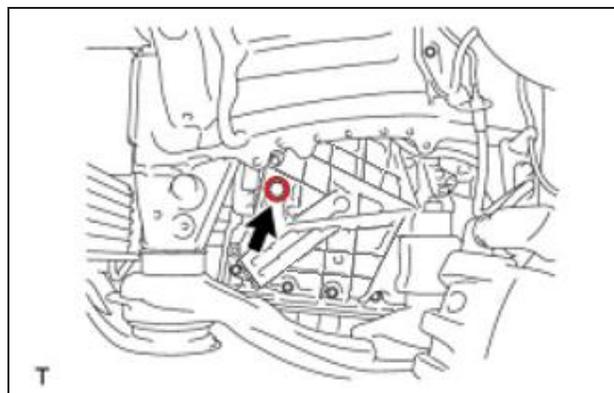
(c) Check the amount of fluid that comes out of the overflow plug hole.

NOTICE: If only a small amount of fluid (approximately 1 cc) comes out of the overflow plug hole, then only fluid remaining in the No. 1 transmission oil filler tube has come out. This condition is not considered as overflow, so it is necessary to add fluid.

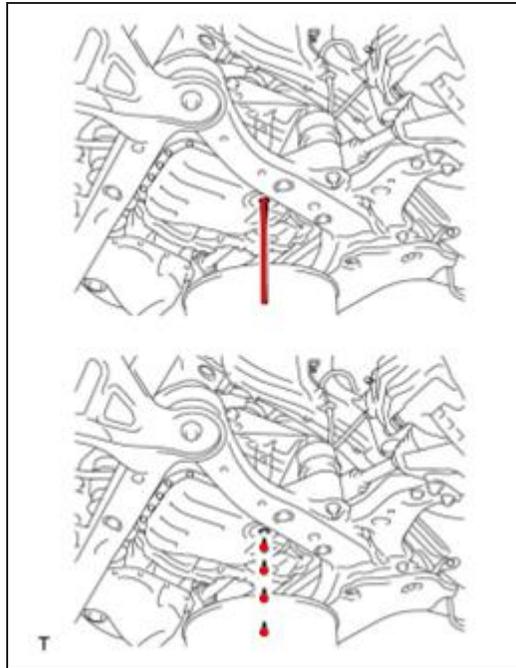
(d) If the fluid overflows

(1)

Remove the refill plug and gasket.



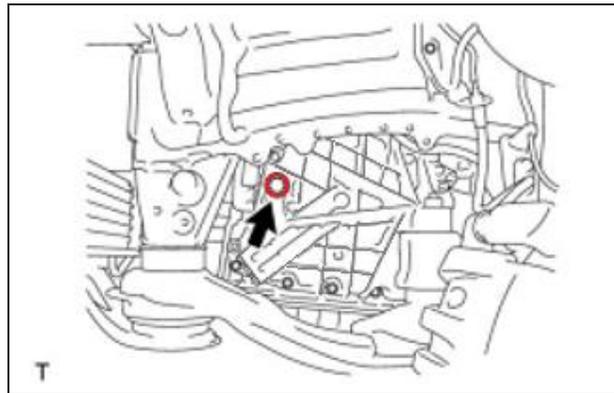
(2) Wait until the fluid flow slows and only drips come out.



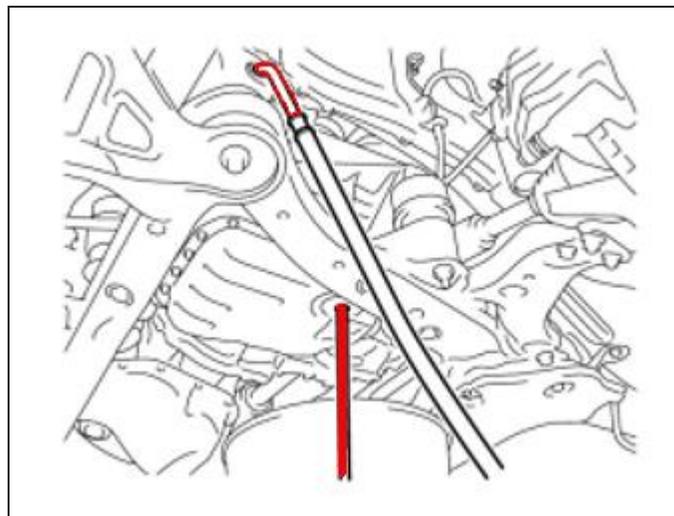
(e) If the fluid does not overflow

(1)

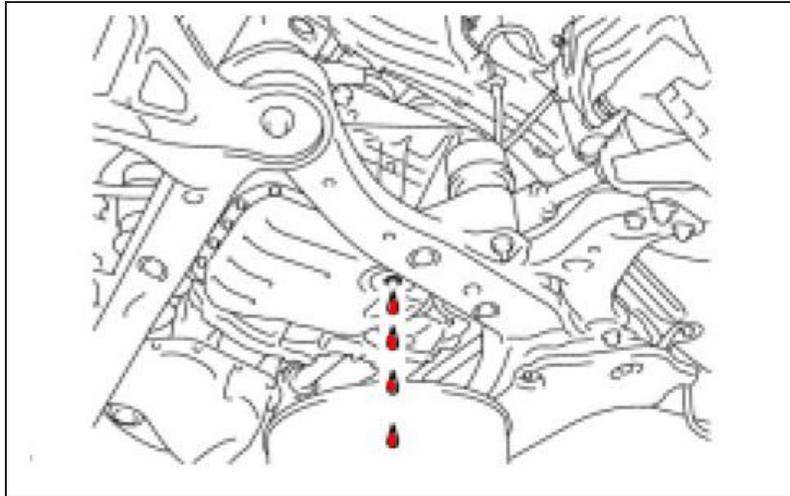
Remove the refill plug and gasket.



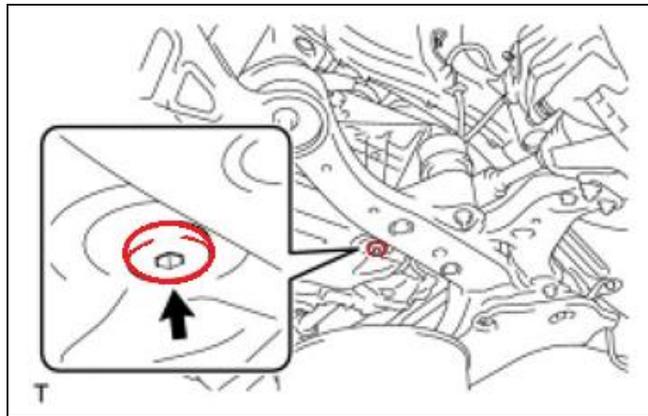
(2) Add ATF through the refill hole until fluid comes out of the overflow plug hole.



- (3) Wait until the fluid flow slows and only drips come out.

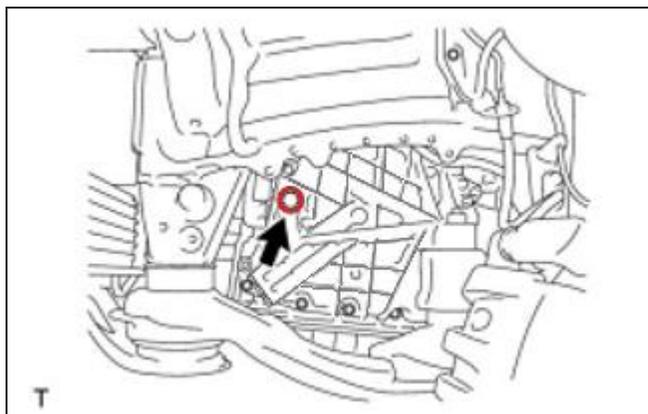


- (f) Install new gasket 90430-12008 and the overflow plug.



Torque : 40 Nm (408 kgf-cm, 29 ft-lbf)

- (g) Install new gasket 90430-18008 and refill plug.



Torque : 49 Nm (500 kgf-cm, 36 ft-lbf)

- (h) Lower the vehicle.
(i) Turn the ignition switch off.

HINT: Turning the ignition switch off exits fluid temperature detection mode.

(j) Remove the Techstream from the DLC3 (when using the Techstream).

REBUILD WORK

- (a) Lift the vehicle.
- (b) Clean each part.
- (c) Check for fluid leaks.
- (d) Install the front wheel opening extension pad LH, engine under covers LH and front fender apron seal LH.
- (e) Lower the vehicle.