

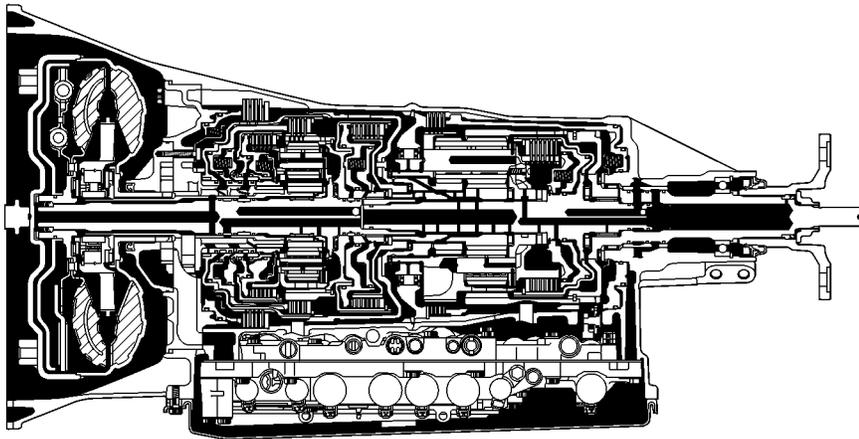
CHASSIS

AA80E AUTOMATIC TRANSMISSION

DESCRIPTION

An AA80E automatic transmission is used. This automatic transmission is a compact, lightweight and high-capacity 8-speed sport direct shift gearbox.

- In the D position, gear shifting is sporty but comfortable. D position (fixed range mode) is adopted, enabling shift paddle switch operation when the shift lever is in the D position. For details, see page CH-53.
- When the shift lever is in the M position, the 8-speed sports direct shift control offers responsive gear shifting and a direct accelerator pedal feel to suit sporty driving. For details, see page CH-50.

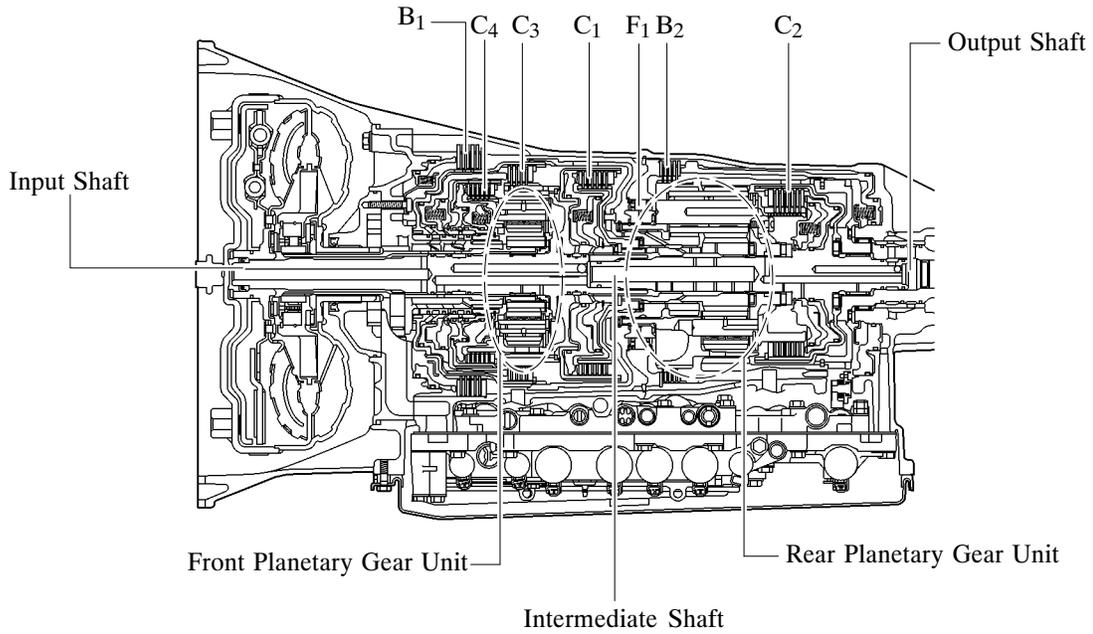


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► Specifications ◀

Engine Type		2UR-GSE
Transmission Type		AA80E
Gear Ratio	1st	4.596
	2nd	2.724
	3rd	1.863
	4th	1.464
	5th	1.231
	6th	1.000
	7th	0.824
	8th	0.685
	Reverse	2.176
Fluid Type		Toyota Genuine ATF WS
Fluid Capacity	Liters (US qts, Imp. qts)	10.5 (11.1, 9.2)
Weight (Reference)*	kg (lb)	95.8 (211.2)

*: The figure shown is the weight of the part including the fluid.



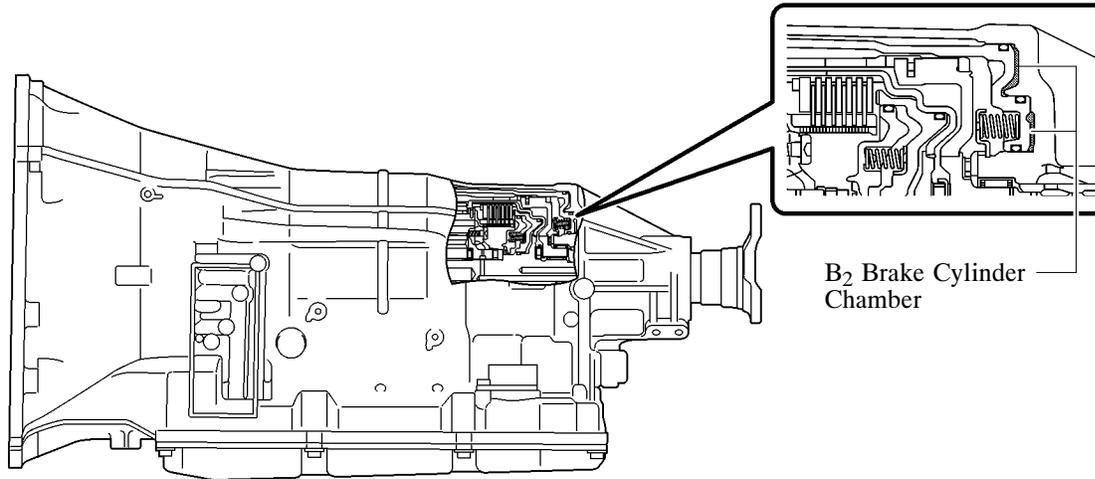
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► Specifications ◀

Engine Type		2UR-GSE	
Transmission Type		AA80E	
C ₁	No.1 Clutch	No. of Discs	
C ₂	No.2 Clutch		
C ₃	No.3 Clutch		
C ₄	No.4 Clutch		
B ₁	No.1 Brake	5	
B ₂	No.2 Brake	4	
F ₁	No.1 One-way Clutch	No. of Sprags	24
Front Planetary Gear Unit		No. of Front Sun Gear Teeth	38
		No. of Inner Pinion Gear Teeth	16
		No. of Outer Pinion Gear Teeth	19
		No. of Ring Gear Teeth	82
Rear Planetary Gear Unit		No. of Middle Sun Gear Teeth	34
		No. of Rear Sun Gear Teeth	30
		No. of Long Pinion Gear Teeth	20
		No. of Short Pinion Gear Teeth	17
		No. of Ring Gear Teeth	74

TRANSMISSION CASE

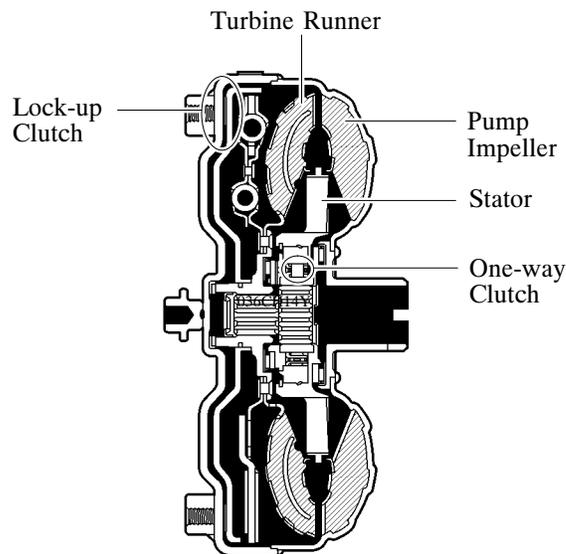
- A die-cast aluminum transmission case that integrates the torque converter housing and extension housing is adopted. As a result of the case construction, a lightweight and highly rigid case is achieved.
- A hydraulic cylinder chamber for the B₂ brake is provided in the back end of the transmission case in order to shorten the overall length of the transmission case.



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TORQUE CONVERTER CLUTCH ASSEMBLY

A compact, lightweight and high-capacity torque converter clutch assembly is used. The torque converter clutch assembly supports flex lock-up clutch control, thus improving fuel economy.



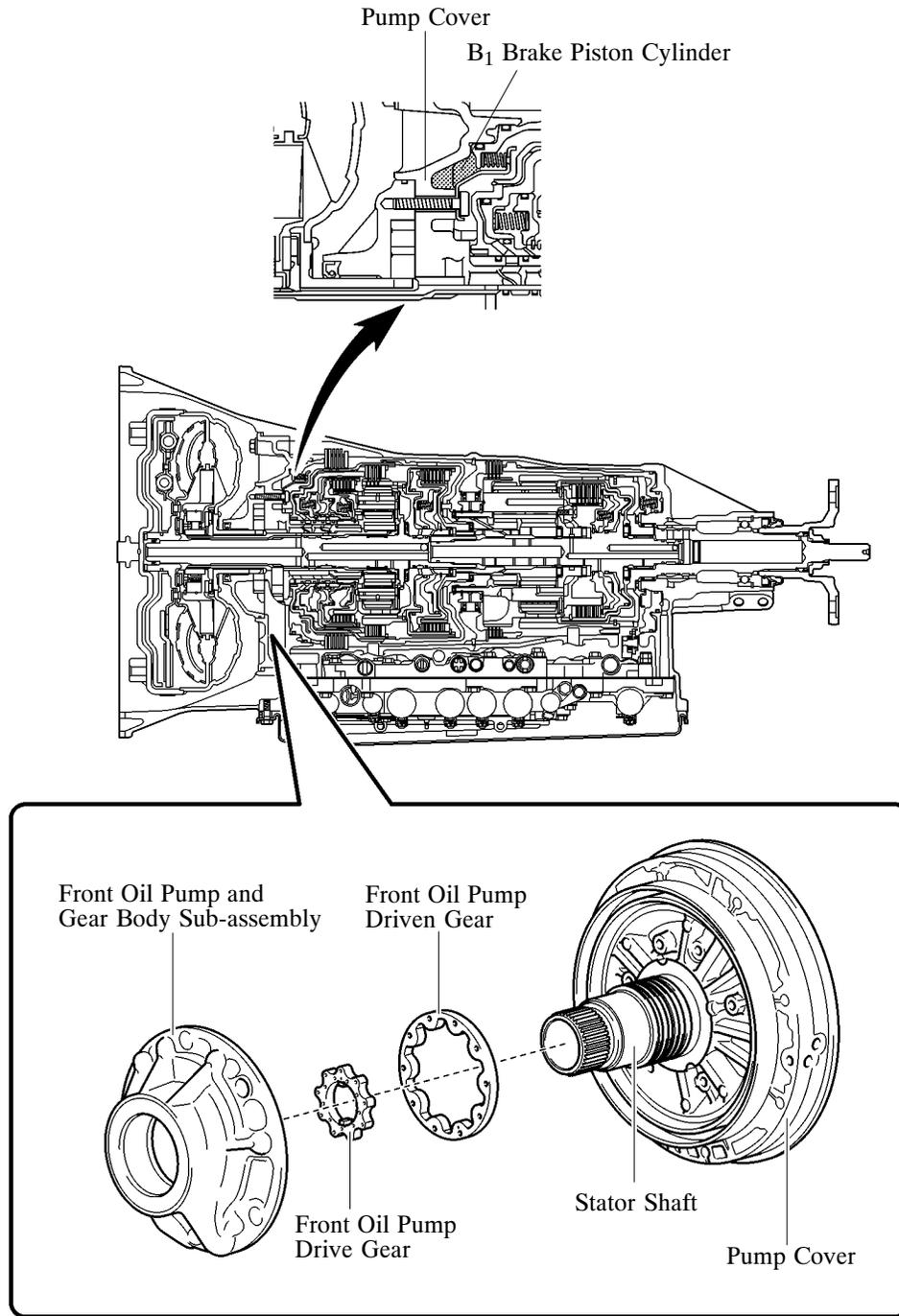
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► Specifications ◀

Torque Converter Type	3-Element, 1-Step, 2-Phase
Stall Torque Ratio	1.83

■ OIL PUMP ASSEMBLY

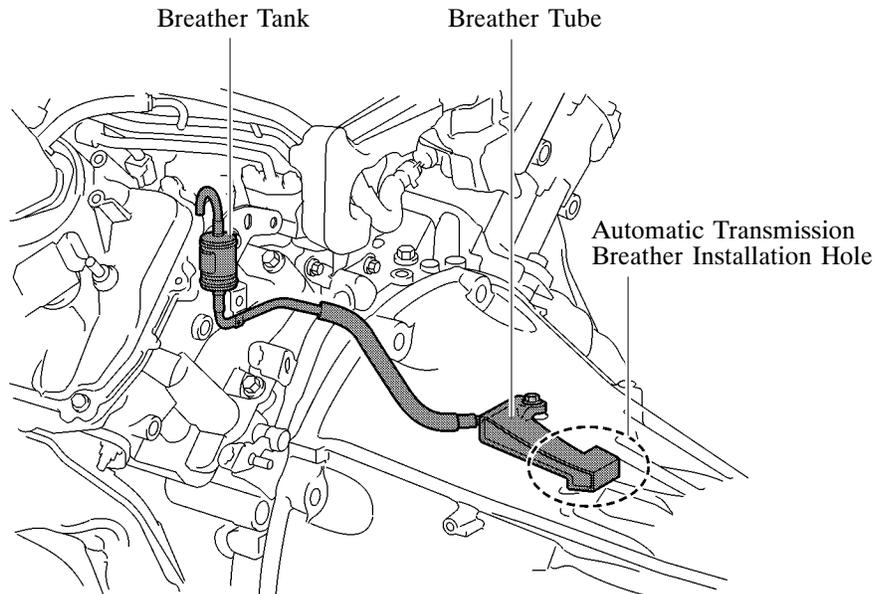
- The oil pump assembly is driven by the torque converter clutch assembly. It lubricates the planetary gear units and supplies operating fluid pressure for hydraulic control.
- The pump cover is made of aluminum to reduce weight.
- A pump cover with an integrated piston cylinder for the B₁ brake is used.



Oil Pump Assembly

■ AUTOMATIC TRANSMISSION BREATHER SYSTEM

- An automatic transmission breather system is adopted, helping to avoid loss of ATF from the breather during sporty driving involving quick turns and rapid braking.
- This system uses the labyrinthine structure of the breather tube to separate bubbles made up of air and ATF into air and liquid, preventing loss of ATF using the breather tank.

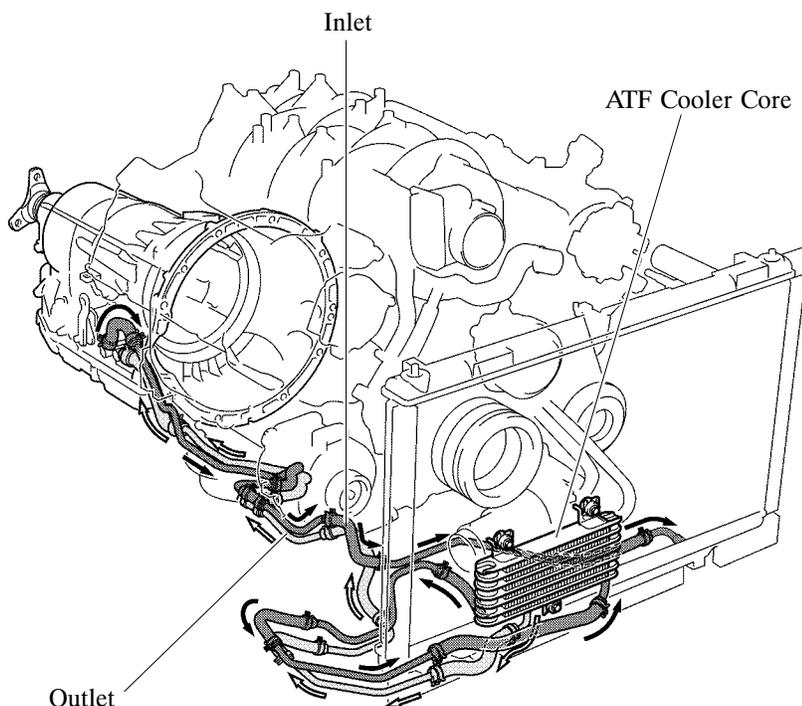


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■ ATF COOLER

An air-cooled type ATF cooler is used to ensure ATF cooling performance for sporty driving.

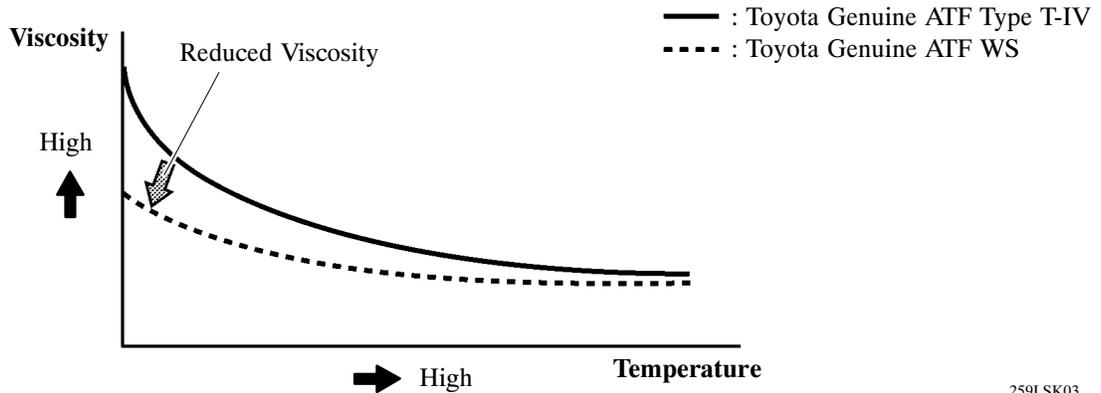
- ATF discharged from the automatic transmission is cooled when passing through the water-cooled ATF cooler in the radiator and the air-cooled type ATF cooler. After ATF is cooled, it returns to the automatic transmission.



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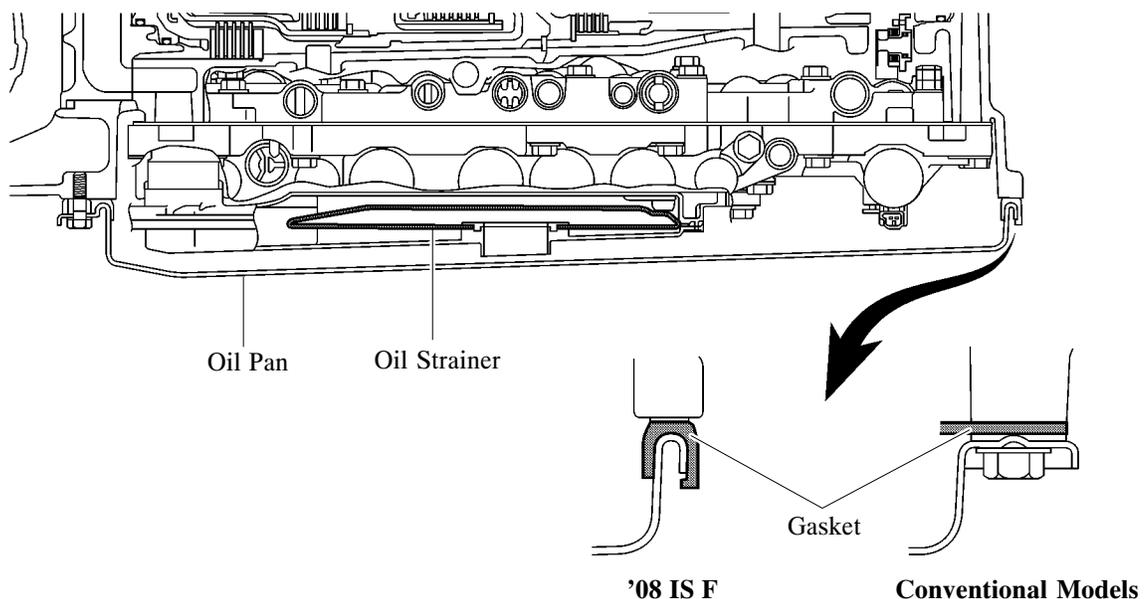
■ TOYOTA GENUINE ATF WS

- Toyota genuine ATF WS is used to reduce the resistance of the ATF and improve the fuel economy by reducing its viscosity in the practical operating temperature range. At higher-fluid temperatures, the viscosity is the same as that of Toyota genuine ATF Type T-IV, to ensure the durability of the automatic transmission.
- There is no interchangeability between the Toyota genuine ATF WS and other types of ATF (Toyota Genuine ATF Type T-IV, D-II).



■ OIL STRAINER AND OIL PAN

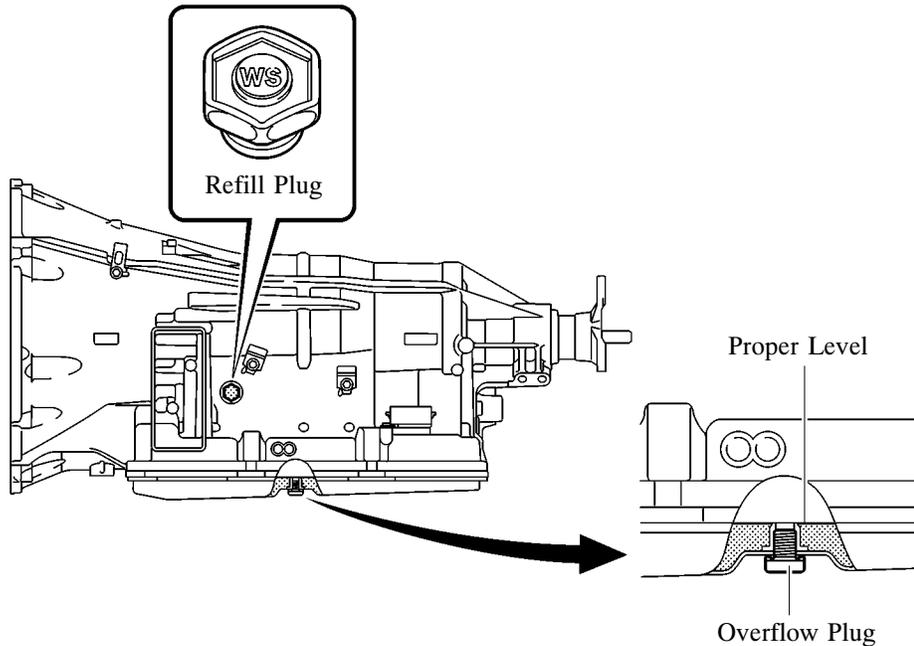
- A felt type oil strainer (in a plastic case) is used because it weighs less, offers excellent debris capturing ability, and is more reliable. This oil strainer is maintenance-free.
- An oil pan gasket made of rubber is used. The deformation amount of this gasket is controlled by the oil pan collars, enhancing sealing performance compared to the conventional type of cork gasket. The enhanced sealing performance reduces the number of bolts used to tighten the oil pan from 20 to 9, contributing to reduction of the automatic transmission weight.



ATF FILLING PROCEDURE

A special ATF filling procedure is used in order to improve the accuracy of the ATF level when the transmission is being repaired or replaced. As a result, the oil filler tube and the oil level gauge used in the conventional automatic transmission have been discontinued, eliminating the need to inspect the fluid level as a part of routine maintenance.

- This filling procedure uses a refill plug, overflow plug, ATF temperature sensor, and the P and N shift range indicators.



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Service Tip

ATF filling procedure using SST (09843-18040)

When a large amount of ATF needs to be filled (i.e. after removal and installation of oil pan or torque converter), perform the procedure from step 1.

When a small amount of ATF is required (i.e. removal and installation of oil cooler tube, repair of a minor oil leak), perform the procedure from step 7.

The vehicle must be cold before beginning this ATF filling procedure.

- 1) Raise the vehicle while keeping it level.
- 2) Remove the refill plug and overflow plug.
- 3) Fill the transmission with ATF WS through the refill plug hole until it overflows from the overflow plug hole.
 - ATF WS must be used to fill the transmission.
- 4) Reinstall the overflow plug.
- 5) Add the specified amount of ATF (specified amount is determined by the procedure that was performed) and reinstall the refill plug.

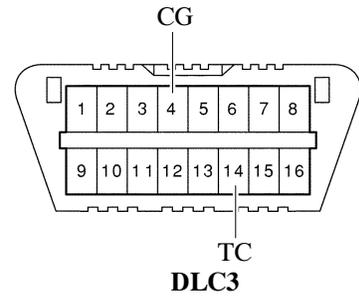
Example:

Procedure	Liters (US qts, Imp.qts)
Removal and installation of transmission oil pan (including oil drainage)	3.7 (3.9, 3.3)
Removal and installation of transmission valve body	4.7 (5.0, 4.1)
Replacement of torque converter	6.7 (7.1, 5.9)

(Continued)

- 6) Lower the vehicle.
- 7) Use the SST (09843-18040) to short the TC and CG terminals of the DLC3.
- 8) Start the engine and allow it to idle.
 - A/C switch must be turned off.
- 9) Slowly move the shift lever from the P position to the M position. Then move the shift lever back to the P position.
- 10) Move the shift lever to the D position, and then quickly move it back and forth between N and D (at least once every 1.5 seconds) for at least 6 seconds (the last movement should leave the shifter in the N position). This will activate oil temperature detection mode.

Standard: The shift range indicator “N” goes off for 4 seconds.



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- 11) Return the shift lever to the P position and disconnect the terminals TC and CG of the DLC3.
- 12) Idle the engine to raise the ATF temperature.
- 13) When shift range indicator “P” turn on, lift the vehicle up immediately.
 - The shift range indicator “P” indicates the ATF temperature according to the following table.

ATF Temperature	Lower than Optimal Temperature	Optimal Temperature	Higher than Optimal Temperature
Shift Range Indicator “P”	OFF	ON	Blinking

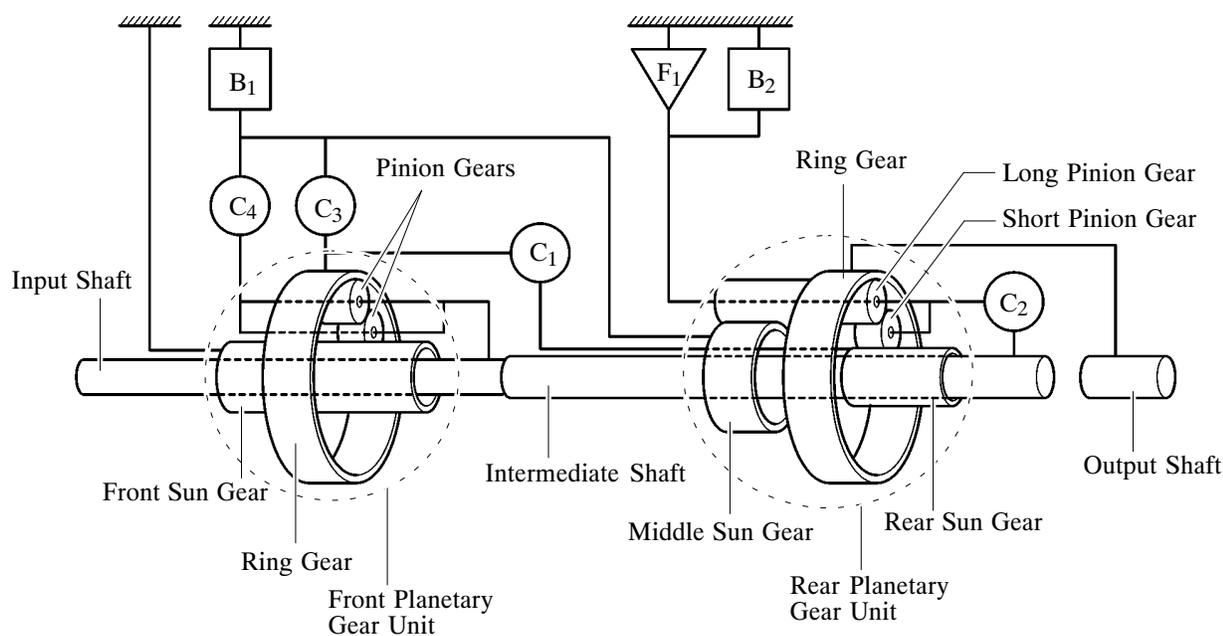
- 14) Remove the overflow plug and adjust the oil quantity.
 - If the ATF overflows, go to step 17, and if the ATF does not overflow, go to step 15.
- 15) Remove the refill plug.
- 16) Add ATF through the refill plug hole until it flows out from the overflow plug hole.
- 17) When the ATF flow slows to a trickle, install the overflow plug and a new gasket.
- 18) Reinstall the refill plug and a new O-ring (if the refill plug was removed).
- 19) Lower the vehicle.
- 20) Turn the engine switch OFF to stop the engine.

For details about the ATF filling procedures, see the 2008 LEXUS IS F Repair Manual (Pub. No. RM08D0U).

PLANETARY GEAR UNIT

1. Construction

- The 8-speed configuration has been achieved by using 2 planetary gear units, creating an 8-speed automatic transmission.
- A Ravigneaux type gear unit is used as the rear planetary gear unit. The gear unit consists of pairs of sun gears (middle and rear) and planetary pinion gears (long and short) with different diameters within a single planetary gear.
- A centrifugal fluid pressure canceling mechanism is used in the C_1 , C_2 , C_3 , and C_4 clutches that are applied when shifting from 2nd → 3rd, 3rd → 4th, 4th → 5th, 5th → 6th, 6th → 7th and from 7th → 8th. For details, see page CH-18.



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2. Function of Components

Component		Function
C_1	No.1 Clutch	Connects the front planetary ring gear and rear sun gear.
C_2	No.2 Clutch	Connects the intermediate shaft and rear planetary carrier.
C_3	No.3 Clutch	Connects the front planetary ring gear and middle sun gear.
C_4	No.4 Clutch	Connects the front planetary carrier and middle sun gear.
B_1	No.1 Brake	Prevents the middle sun gear from turning either clockwise or counterclockwise.
B_2	No.2 Brake	Prevents the rear planetary carrier from turning either clockwise or counterclockwise.
F_1	No.1 One-way Clutch	Prevents the rear planetary carrier from turning counterclockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speeds.

3. Transmission Power Flow

General

Shift Lever Position	Shift Solenoid Valve								Clutch				Brake		One-way Clutch	
	SL1	SL2	SL3	SL4	SL5	SR	SL	SLU	C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	F ₁	
P	○					○										
R				○		○	○					○		○		
N	○					○										
D	1st	○				○			○						○	
	2nd	○				○	○		○				○			
	3rd	○		○		○			○		○					
	4th	○			○	○	○	Δ	○			○				
	5th	○	○			○	○	Δ	○	○						
	6th		○		○	○	○	Δ		○		○				
	7th		○	○		○	○	Δ		○	○					
	8th		○			○	○	○	Δ		○			○		
D*	D8	1st	○				○		○						○	
		2nd	○				○	○		○				○		
		3rd	○		○		○			○		○				
		4th	○			○	○	○	Δ	○			○			
		5th	○	○			○	○	Δ	○	○					
		6th		○		○	○	○	Δ		○		○			
		7th		○	○		○	○	Δ		○	○				
		8th		○			○	○	○	Δ		○			○	
	D7	1st	○				○			○						○
		2nd	○				○	○		○				○		
		3rd	○		○		○			○		○				
		4th	○			○	○	○	Δ	○			○			
		5th	○	○			○	○	Δ	○	○					
		6th		○		○	○	○	Δ		○		○			
		7th		○	○		○	○	Δ		○	○				
	D6	1st	○				○			○						○
		2nd	○				○	○		○				○		
		3rd	○		○		○			○		○				
		4th	○			○	○	○	Δ	○			○			
		5th	○	○			○	○	Δ	○	○					
		6th		○		○	○	○	Δ		○		○			
	D5	1st	○				○			○						○
		2nd	○				○	○		○				○		
		3rd	○		○		○			○		○				
		4th	○			○	○	○	Δ	○			○			
		5th	○	○			○	○	Δ	○	○					

○: ON Δ: In accordance with flex lock-up or lock-up

(Continued)

*: When in D position (fixed range mode)

Shift Lever Position		Shift Solenoid Valve								Clutch				Brake		One-way Clutch	
		SL1	SL2	SL3	SL4	SL5	SR	SL	SLU	C ₁	C ₂	C ₃	C ₄	B ₁	B ₂	F ₁	
D*	D4	1st	○					○			○						○
		2nd	○				○	○			○				○		
		3rd	○		○			○			○		○				
		4th	○			○		○	○	Δ	○			○			
	D3	1st	○					○			○						○
		2nd	○				○	○			○				○		
		3rd	○		○			○			○		○				
	D2	1st	○					○			○						○
		2nd	○				○	○			○				○		
	D1	1st	○							○	○					○	○
M	M1	1st	○							○	○				○	○	
	M2	2nd	○				○	○	○	Δ	○				○		
	M3	3rd	○		○			○	○	Δ	○		○				
	M4	4th	○			○		○	○	Δ	○			○			
	M5	5th	○	○				○	○	Δ	○	○					
	M6	6th		○		○		○	○	Δ		○		○			
	M7	7th		○	○			○	○	Δ		○	○				
	M8	8th		○			○	○	○	Δ		○			○		

○: ON Δ: In accordance with flex lock-up or lock-up

*: When in D position (fixed range mode)