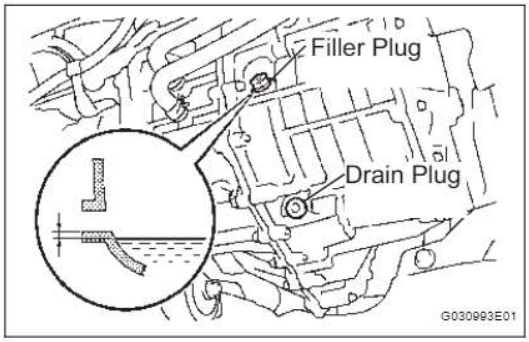
HYBRID TRANSAXLE SYSTEM

ON-VEHICLE INSPECTION

1. CHECK TRANSAXLE FLUID LEVEL

NOTICE:

- **Insufficient or excessive amounts of transaxle oil may be the cause of some trouble.**
- **Place the vehicle on level surface.**
- **Use genuine ATF WS.**



(a) Remove the filler plug.

(b) Ensure that the transaxle oil level is within 0 to 5 mm (0 to 0.20 in.) of the filler plug hole.

NOTICE:

Recheck the transaxle oil level after driving the vehicle when exchanging oil.

HINT:

Transaxle fluid quantity: 3.8 liters (4.0 US qts, 3.3 Imp. qts.)

(c) Check for leaks if the quantity of oil is low.

(d) Install the filler plug with a new gasket.

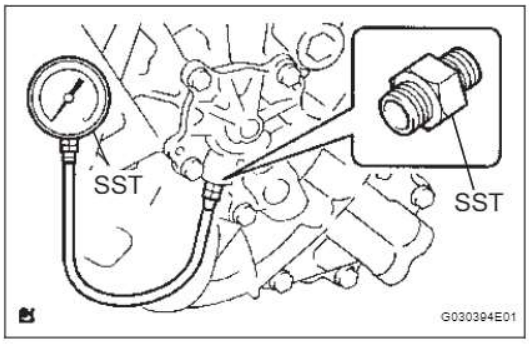
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)

2. INSPECT OIL PRESSURE

NOTICE:

Perform the test at normal operating oil temperature 50 to 80°C (122 to 176°F).

(a) Lift up the vehicle.



(b) Remove the fluid pump cover plug and install SST.

SST 09992-00095 (09992-00112, 09992-00271)

(c) Set the blower switch to HI.

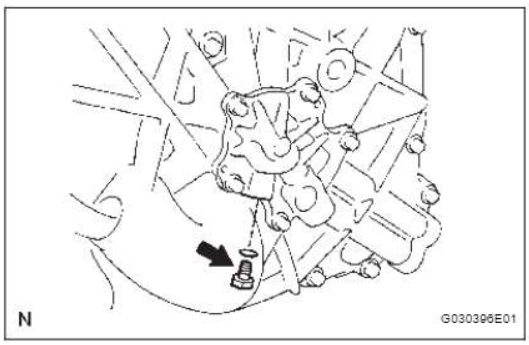
(d) Turn the A/C switch on.

(e) Push the power switch with the brake pedal depressed to start the engine (start the hybrid system).

(f) Keeping the engine speed of 1,200 rpm, measure the oil pressure.

Standard oil pressure:

9.8 kPa (0.1 kgf/cm^2, 1.4 psi) or more



(g) Install a new O-ring and fluid pump cover plug.

Torque: 7.4 N*m (75 kgf*cm, 65 in.*lbf)

HX



3. INSPECT SHIFT LEVER

(a) Inspect the shift lever operation with the hybrid system operating.

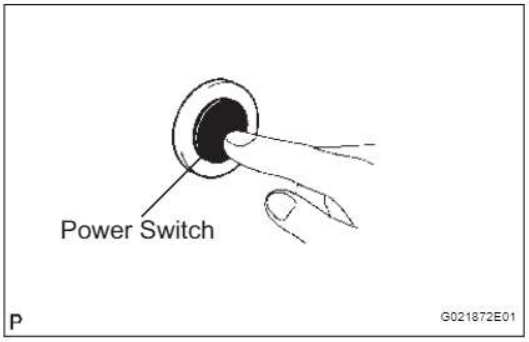
(1) Carry the key into the indoor electrical key oscillator detection area or insert the key in the key slot.

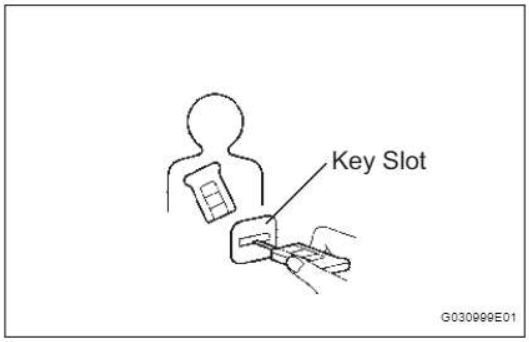
(2) Turn the power switch ON (READY ON) while depressing the brake pedal.
Check that the gear changes according to the shift operation pattern. If the check result is abnormal, replace the shift lever assembly.
HINT:
The shift operation pattern in power switch ON (READY ON) (when the vehicle is stopped) is shown below.

Power Mode	Operation	P	R	N	D	B
Hybrid System in operation (driving possible)	Shift Lever Operation	○→○				
		○→	→	○		
		○→	→	→	○	
			○→	○		
			○→	→	○	
				○→	○	
			○←	○		
					○→	○
				○←	○	
			○←	←	○	
					○←	○
				○←	←	○
			○←	←	←	○
	P Position Switch Operation	○←	←			
		○←	←	○		
		○←	←	←	○	
		○←	←	←	←	○

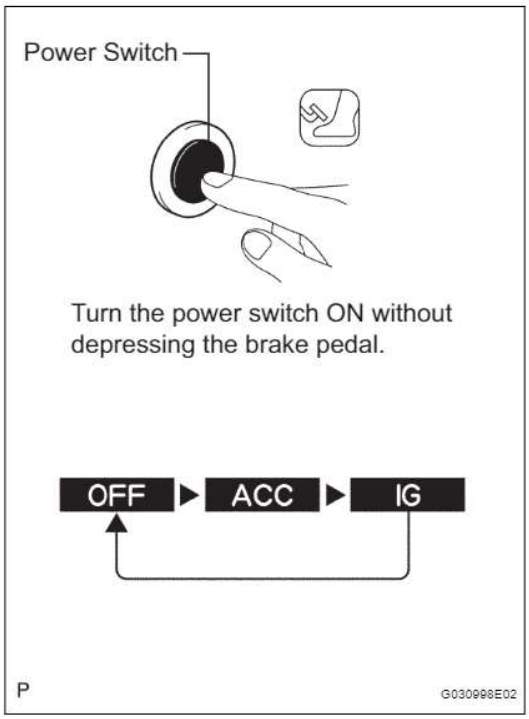
C130921E01

(b) Turn the power switch OFF when the vehicle is stopped.





(c) Inspect the shift lever operation with the power switch's power mode ON (IG).
(1) Carry the key into the indoor electrical key oscillator detection area or insert the key in the key slot.



(d) Turn the power switch ON (IG) without depressing the brake pedal.
HINT:
The power switch's power mode changes between OFF, ON (ACC) and ON (IG) each time the power switch is pressed.

(e) Check that the gear changes according to the shift operation pattern. If the check result is not as specified, replace the shift lever assembly.
HINT:
The shift operation pattern with the power switch's power mode ON (IG) is shown below.

Power Mode	Operation	P	R	N	D	B
Power switch ON (IG) (Driving not possible)	Shift Lever Operation	○		○		
	P Position Switch Operation	○		○		

C130922E01

HX

ELECTRONIC SHIFT LEVER SYSTEM

PRECAUTION

1. NOTICE FOR INITIALIZATION

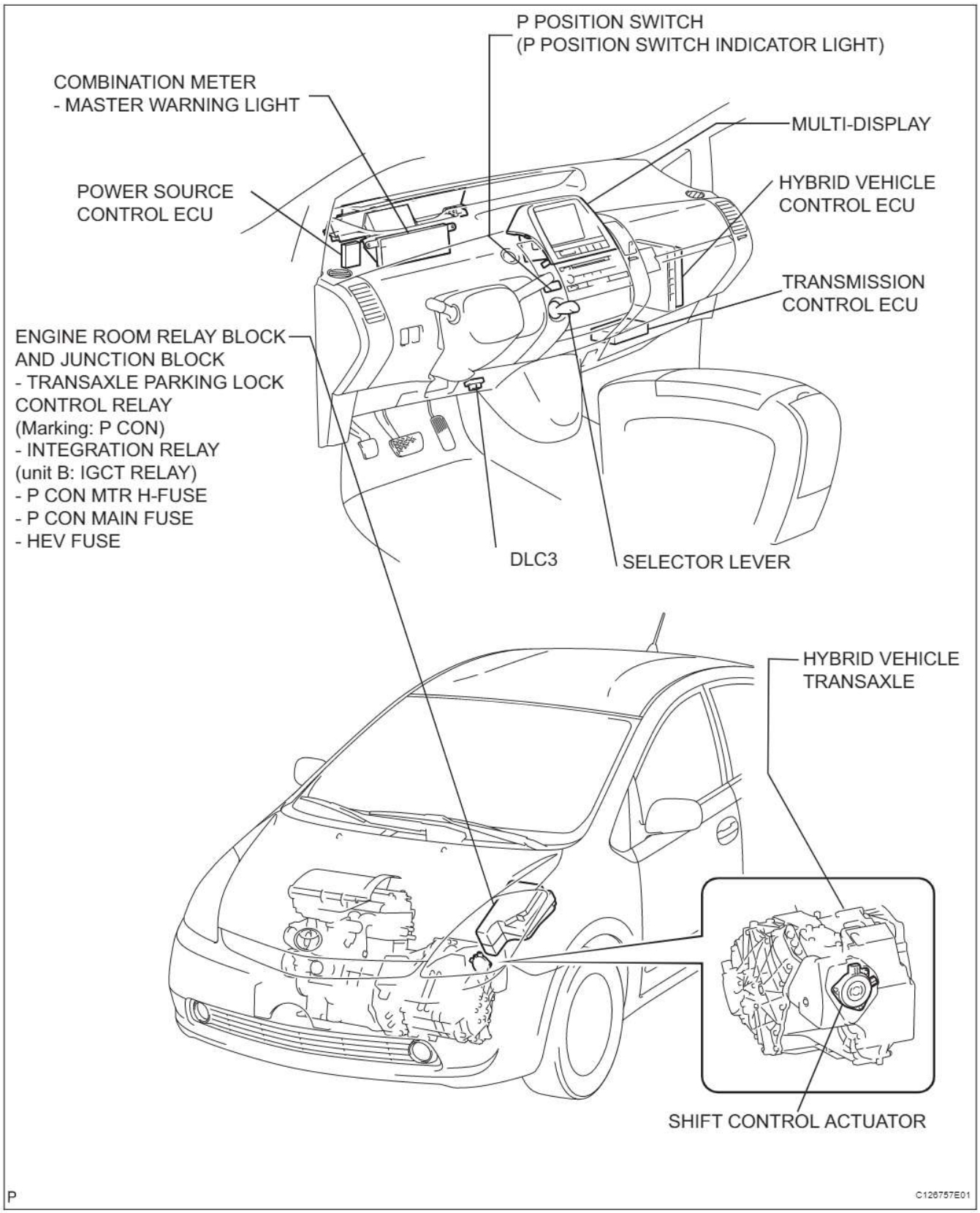
When the cable of the negative (-) battery terminal is disconnected, initialize the following systems after the cable is reconnected.

System Name	See procedure
Power Window Control System	IN-32

2. NOTICE FOR HYBRID SYSTEM ACTIVATION

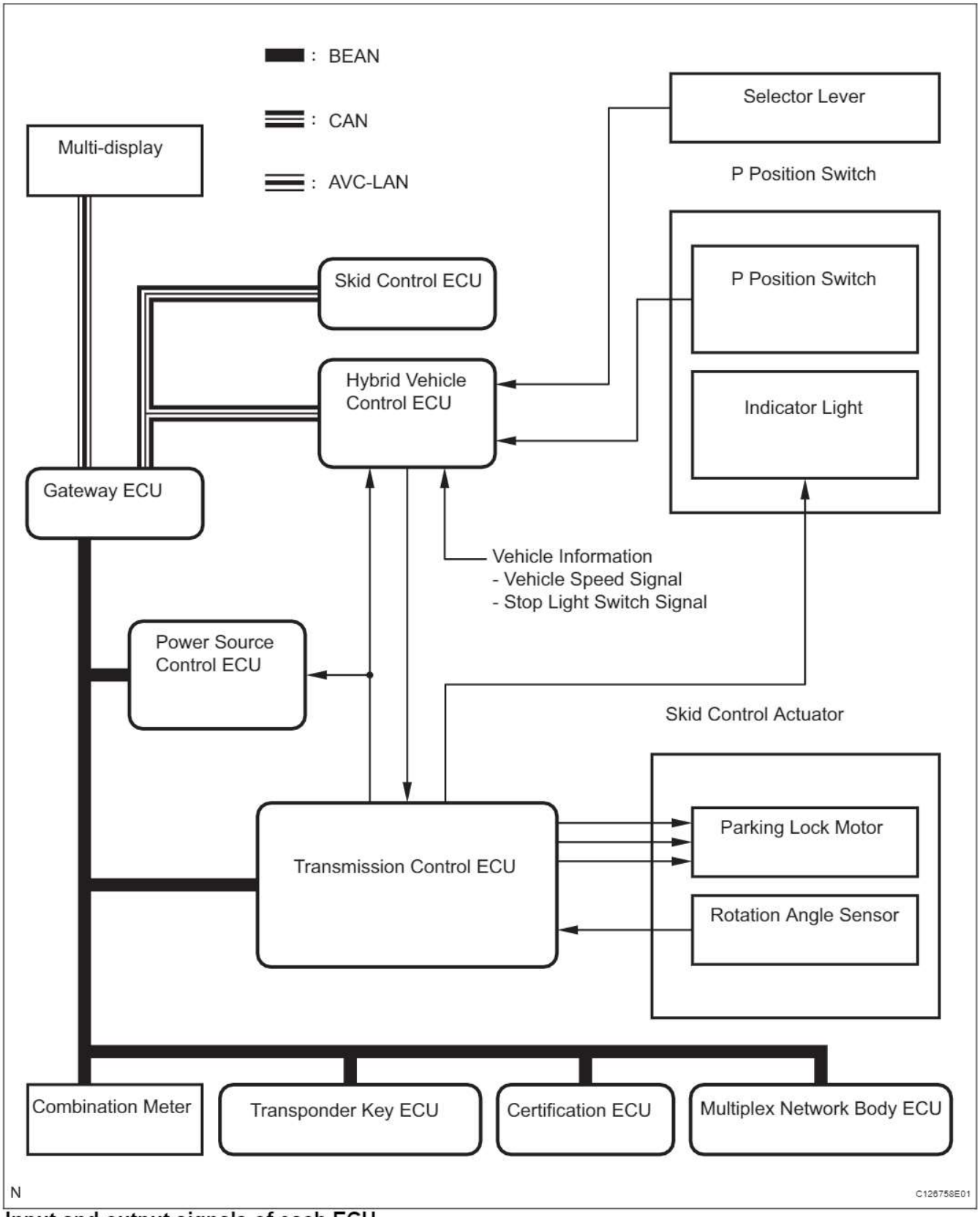
- When the warning light is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.
- With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during reconnection, DTC B2799 may be output.

PARTS LOCATION



HX

SYSTEM DIAGRAM



HX

Input and output signals of each ECU

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication method
Skid Control ECU	Transmission Control ECU	PKB switch signal	CAN, BEAN

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication method
Power Source Control ECU	Transmission Control ECU	Power off preparation signal	BEAN
Main Body ECU	Transmission Control ECU	• Power switch signal • ACC switch signal	BEAN
Transmission Control ECU	Power Source Control ECU	• P position state signal • Transmission control ECU trouble condition signal • Auto P cancel signal • Non-P position state signal • Auto P permit signal	BEAN
Transmission Control ECU	Multi-display	Transmission control ECU trouble signal	AVC-LAN, BEAN
Transmission Control ECU	Combination Meter	Transmission control ECU trouble signal	BEAN
Transmission Control ECU	Transponder Key Amplifier	• P position state signal • Key condition signal	BEAN
Transmission Control ECU	Certification ECU	P position state signal	BEAN

SYSTEM DESCRIPTION

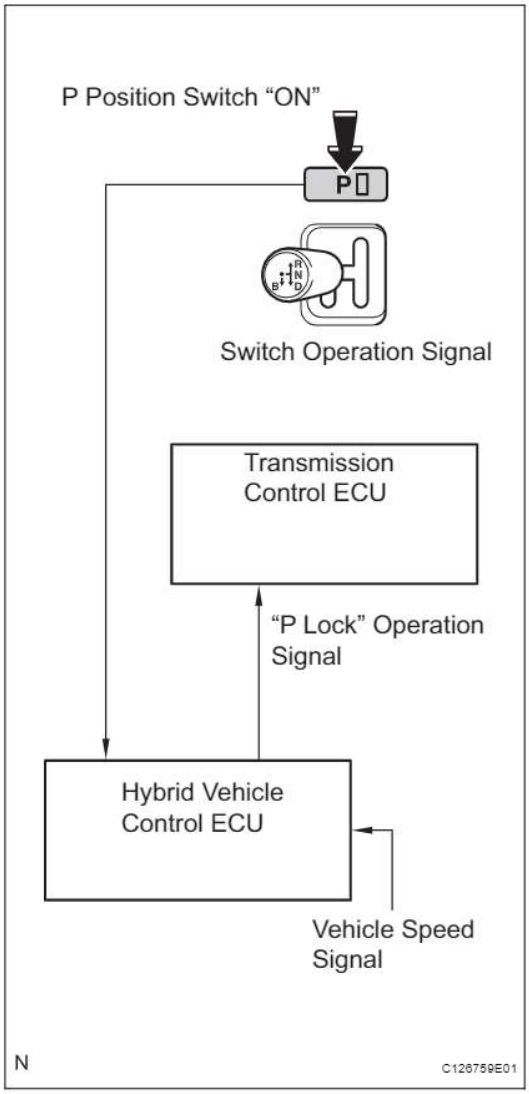
1. SYSTEM DESCRIPTION

The electronic shift lever system electrically controls the parking lock mechanism by using the actuator.
The transmission control ECU controls the shift control actuator, and also controls the entire system based on information from the hybrid vehicle control ECU.
The transmission control ECU detects DTCs when there are any malfunctions in the system, and informs the driver of the malfunction by illuminating the P position switch indicator light and master warning light, and indicating an error message on the multi-display.

2. FUNCTION OF EACH COMPONENT

Parts name	Function
Shift Control Actuator	• Composed of the parking lock motor and the rotation angle sensor. The motor is activated by electric current from the transmission control ECU. • Motor rotation is reduced by the cycloid reduction mechanism in the shift control actuator and then output. • The rotation angle sensor detects the motor rotation angle with the 3 Hall ICs.
Transmission Control ECU	• This ECU activates the shift control actuator based on signals from the hybrid vehicle control ECU and the power source control ECU. • This ECU controls the application timing of current to the parking lock motor based on signals from the rotation angle sensor.
Parking Lock Mechanism	The parking lock pawl rotates according to the movement of the parking lock rod when the parking lock motor rotates, and engages with the parking gear on the transaxle side, causing the parking lock mechanism to lock or unlock.
Hybrid Vehicle Control ECU	This ECU sends a P lock or P unlock demand signal to the transmission control ECU based on information from the selector lever and the P position switch.
Power Source Control ECU	This ECU sends a signal with power off information to the transmission control ECU. The transmission control ECU then sends the signal to the hybrid vehicle control ECU.
P Position Switch Indicator Light	This light comes on/goes off to indicate the P lock/unlock status and blinks to indicate a malfunction in the electronic shift lever system.
Combination Meter	A malfunction in the transmission control ECU is indicated by the illumination of the master warning light on the combination meter.
Multi-display	A malfunction in the transmission control ECU is indicated on the multi-display.

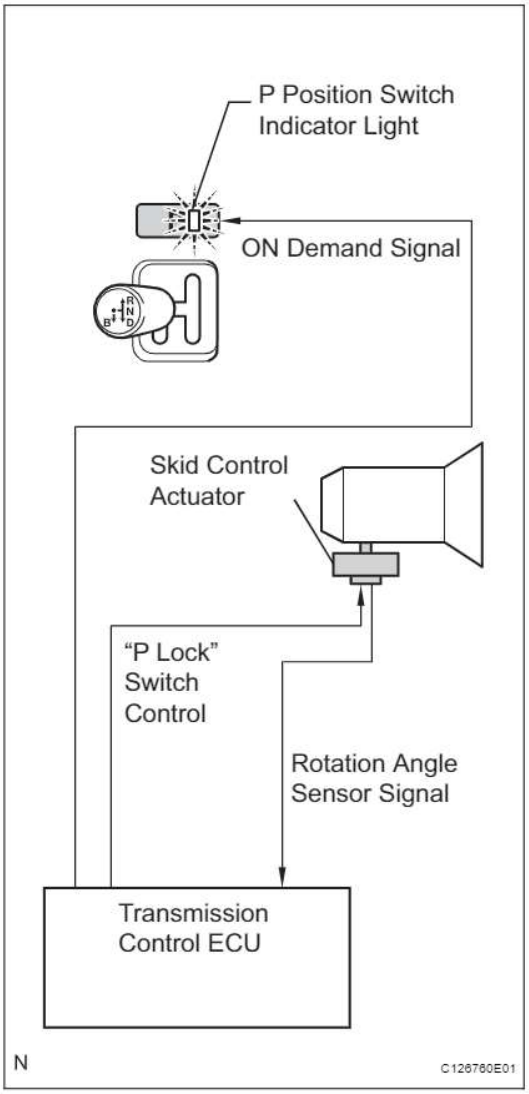
HX



3. OPERATION DESCRIPTION

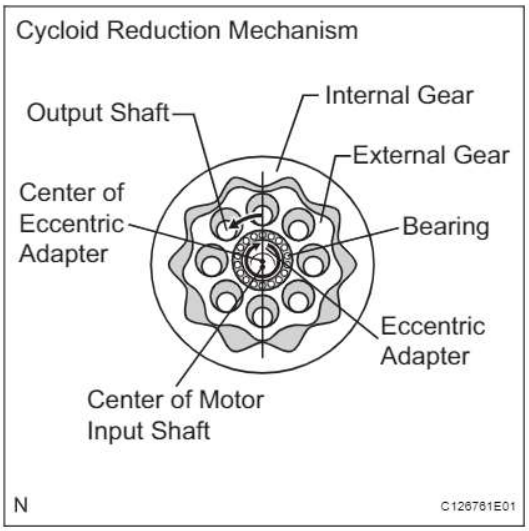
(a) Operation to switch to the P position:
  (1) When the P position switch is turned on to activate parking lock, a signal is sent to the hybrid vehicle control ECU.
  (2) The hybrid vehicle control ECU determines whether "P lock" is possible or not based on this signal and other vehicle information.
  (3) If the hybrid vehicle control ECU determines that "P lock" is possible, it sends a "P lock" operation demand signal to the transmission control ECU.

HX

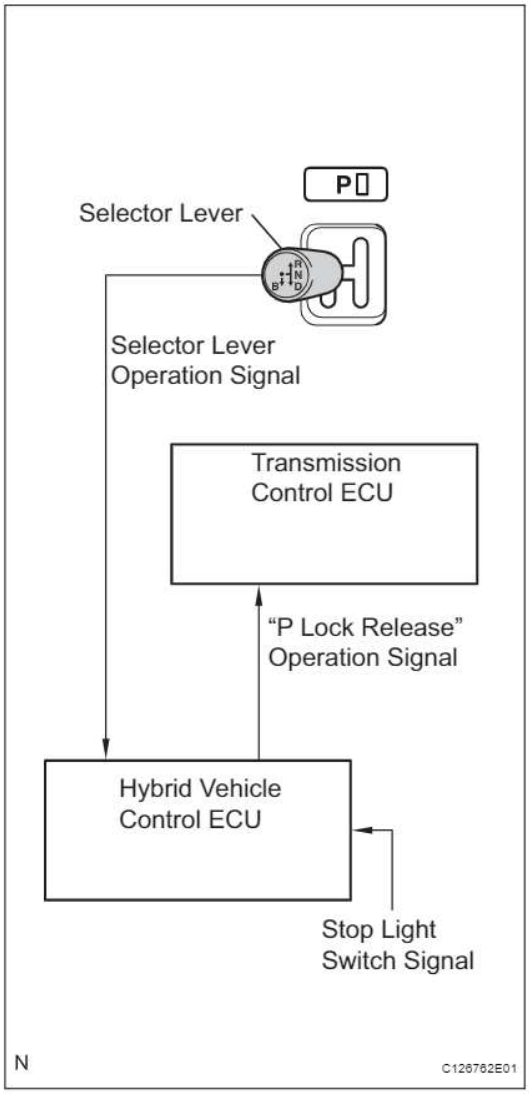


(4) After receiving the signal, the transmission control ECU activates the shift control actuator in order to lock the parking lock mechanism, and turns on the P position switch indicator light.

HX

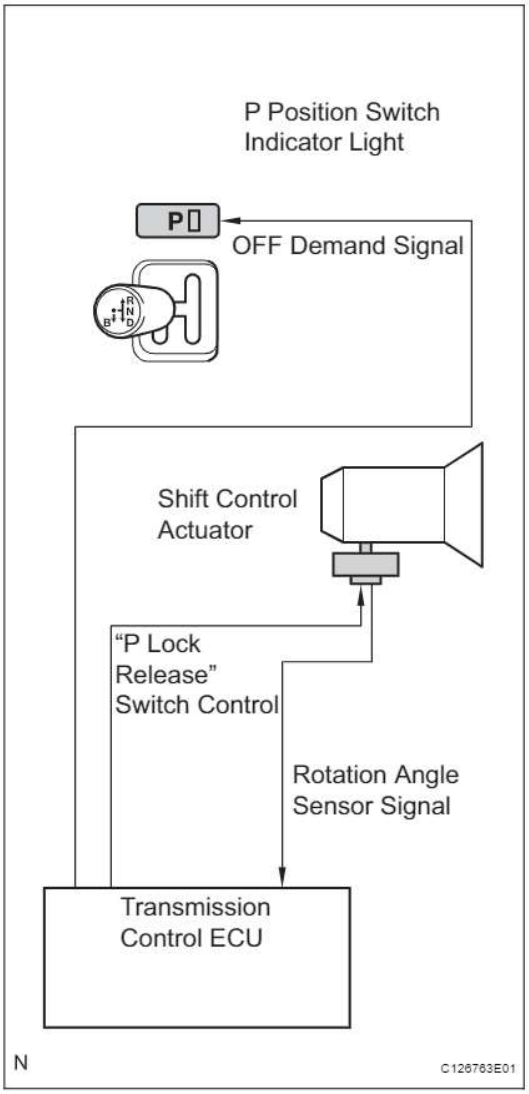


(5) The transmission control ECU controls motor rotation angle based on signals from the rotation angle sensor in the shift control actuator.
HINT:
In the cycloid reduction mechanism, the output shaft is linked to the external gear. Together, they rotate only a single tooth when the eccentric adapter, which is linked to the motor, rotates once. Driving force is increased in this way so that the parking lock mechanism can be switched even when high output is required for parking on a hill, etc.



(b) Operation to switch to a non-P position:
(1) When the hybrid system is started (the vehicle is ready to be driven) and the selector lever is moved to the R, N, or the D position with the brake pedal depressed, a signal is sent to the hybrid vehicle control ECU.
(2) This signal is then sent from the hybrid vehicle control ECU to the transmission control ECU as a "P lock release" operation demand signal.

HX



(3) After receiving the signal, the transmission control ECU activates the shift control actuator in order to unlock the parking lock mechanism, and turns off the P position switch indicator light.

(4) The transmission control ECU controls motor rotation angle based on signals from the rotation angle sensor in the shift control actuator.

4. SHIFT POSITION CHANGE FUNCTION

(a) The electronic shift lever system comprehensively determines vehicle conditions and changes the shift position, as shown in the following chart, by cooperating with the shift control function of the hybrid system (except when the reject function, described later, is in operation).

HX

(b) Other than indicated in the following chart, when the power switch is turned OFF with the vehicle stopped, the shift position is automatically changed to the P position.

Power Status	Operation	P	R	N	D	B
ON (ACC)* (The vehicle cannot be driven.)	Selector lever operation	●	Unable to change the shift position			
	P position switch operation	←	←	←		
ON (IG)* (The vehicle cannot be driven.)	Selector lever operation	●	→	→		
	P position switch operation	←	←	←		
The hybrid system is started. (The vehicle can be driven.)	Selector lever operation	● →	● →	● →	● →	● →
	P position switch operation	←	←	←	←	←

*: The vehicle cannot be driven because the hybrid system has not been started.

● : Current position → : Positions to which the shift position can be changed

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HX

5. REJECT FUNCTION

(a) In the electronic shift lever system, there may be a situation in which a shift change cannot be done for safety reasons. When attempting to move the selector lever in such a situation, the system sounds a reject buzzer inside the meter and changes the shift position as shown in the following table.

Shift operation which causes reject function to operate	Shift position after rejection
Shifting from the P position without depressing the brake pedal	Held in the P position
Shifting to the P position while driving	Changed to the N position
Shifting between forward and reverse positions while driving	Changed to the N position
Shifting to the B position from the position other than D	Changed to the N position

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the electronic shift lever system.
- *: Use the intelligent tester.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3	CHECK COMMUNICATION FUNCTION OF MULTIPLEX COMMUNICATION SYSTEM (BEAN)*

(a) Use the intelligent tester to check if the Multiplex Communication System (MPX) is functioning normally.

Result

Result	Proceed to
MPX DTC is not output	A
MPX DTC is output	B

B → **Go to MULTIPLEX COMMUNICATION SYSTEM**

A

4	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

(a) Use the intelligent tester to check if the CAN communication system is functioning normally.

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B → **Go to CAN COMMUNICATION SYSTEM**

A

5 CHECK FOR DTC*

(a) Check for DTCs and note any codes that are output.
(b) Delete the DTC.
(c) Recheck for DTCs. Based on the DTCs output above, try to force output of the electronic shift lever system DTC by simulating the operation indicated by the DTC.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **Go to step 8**

A

6 PROBLEM SYMPTOMS TABLE

Refer to the problem symptoms table (see page HX-15).

Result

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B → **Go to step 8**

A

7 OVERALL ANALYSIS AND TROUBLESHOOTING*

(a) DATA LIST / ACTIVE TEST (see page HX-19)
(b) Terminals of ECU (see page HX-15)

HX

NEXT

8 REPAIR OR REPLACE

NEXT

END

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Electronic shift lever system

Symptom	Suspected area	See page
P position switch indicator light does not come on.	1. P position switch indicator light circuit	HX-54
	2. Transmission control ECU	HX-15
P position switch indicator light does not go off.	1. P position switch indicator light circuit	HX-54
	2. Transmission control ECU	HX-15

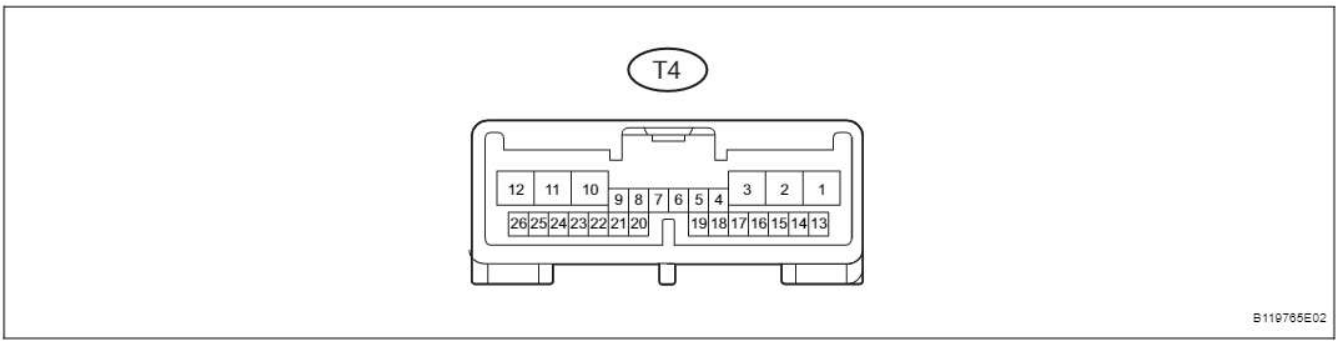
HX

TERMINALS OF ECU

1. CHECK TRANSMISSION CONTROL ECU

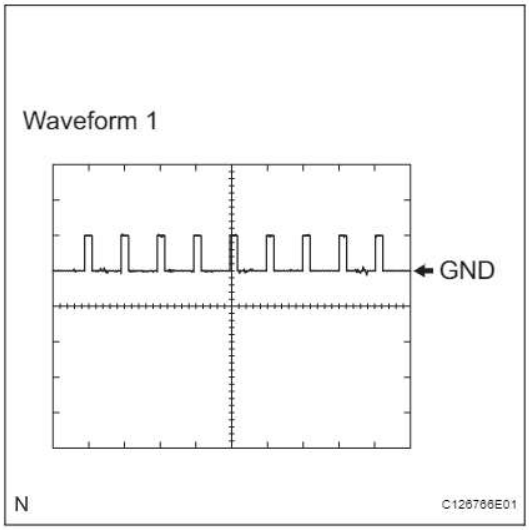
HINT:

Inspect the connectors from the back side while the connector is connected.



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+B (T4-1) - E1 (T4-15)	L - W-B	Power source	Power switch ON (IG)	9 to 14 V
E02 (T4-2) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
E01 (T4-3) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
RZ1 (T4-4) - E2 (T4-16)	L - P	Rotation angle sensor signal	Power switch ON (IG)	4 to 5.5 V
RB (T4-5) - E2 (T4-16)	GR - P	Rotation angle sensor signal	Power switch ON (IG)	4 to 5.5 V
RA (T4-6) - E2 (T4-16)	LG - P	Rotation angle sensor signal	Power switch ON (IG)	4 to 5.5 V
PCON (T4-7) - E1 (T4-15)	LG - W-B	Communication bus	Power switch ON (IG)	Pulse generation (see wave form 1)
PPOS (T4-8) - E1 (T4-15)	W - W-B	Communication bus	Power switch ON (IG)	Pulse generation (see wave form 2)
IND (T4-9) - E1 (T4-15)	R - W-B	P position switch indicator light	P position switch ON	Below 1 V
MWA (T4-10) - E1 (T4-15)	W - W-B	Parking lock motor	Power switch ON (IG)	9 to 14 V
MVA (T4-11) - E1 (T4-15)	R - W-B	Parking lock motor	Power switch ON (IG)	9 to 14 V
MUA (T4-12) - E1 (T4-15)	B - W-B	Parking lock motor	Power switch ON (IG)	9 to 14 V
BATT (T4-13) - E1 (T4-15)	L - W-B	Power source (RAM)	Always	9 to 14 V
BMA (T4-14) - E1 (T4-15)	B - W-B	P CON relay	Power switch ON (IG)	9 to 14 V
E1 (T4-15) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
E2 (T4-16) - Body ground	P - Body ground	Ground	Always	Below 1 V
VC (T4-17) - E2 (T4-16)	O - P	Power source (Rotation angle sensor)	Power switch ON (IG)	4 to 5.5 V
MPX2 (T4-18) - E1 (T4-15)	B - W-B	Multiplex communication	Power switch OFF Power switch ON (IG)	Below 1 V Pulse generation
MPX1 (T4-19) - E1 (T4-15)	GR - W-B	Multiplex communication	Power switch OFF Power switch ON (IG)	Below 1 V Pulse generation
SIL (T4-20) - E1 (T4-15)	W - W-B	Diagnosis tester communication	Power switch ON (IG)	8 V or higher

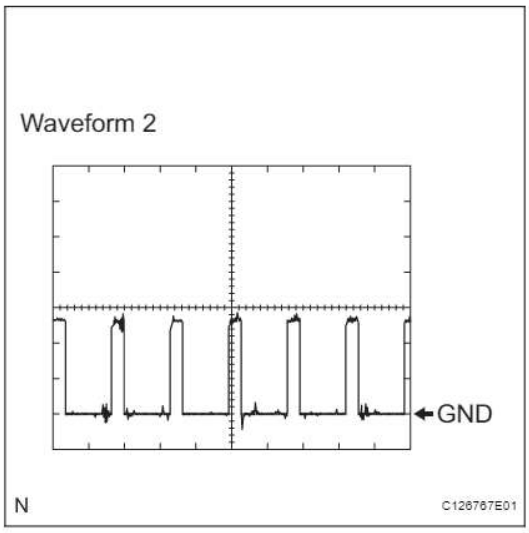
HX



(a) Using an oscilloscope, check the waveform 1.

Waveform 1 (Reference)

Item	Content
Symbols (Terminal No.)	P CON (T4-7) - E1 (T4-15)
Tool setting	5 V/DIV., 20 msec./DIV.
Condition	Power switch ON (IG)



(b) Using an oscilloscope, check the waveform 2.

Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	PPOS (T4-8) - E1 (T4-15)
Tool setting	5 V/DIV., 20 msec./DIV.
Condition	Power switch ON (IG)

HX

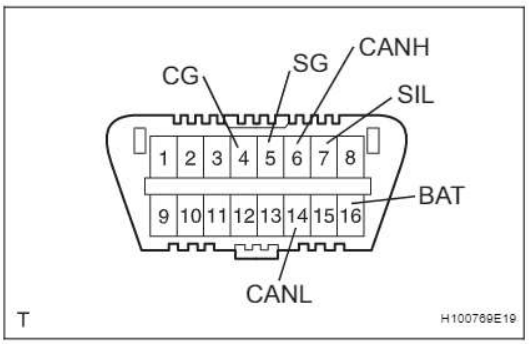
DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) Electronic shift lever system data and the Diagnostic Trouble Codes (DTCs) can be read in the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the intelligent tester to check for malfunctions and perform repairs.

2. CHECK DLC3

The vehicle uses ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 14 V
CANH (6) - CANL (14)	HIGH-level CAN bus line	Power Switch OFF*	54 to 69 Ω
CANH (6) - Battery positive (+)	HIGH-level CAN bus line	Power Switch OFF*	1 MΩ or higher
CANH (6) - CG (4)	HIGH-level CAN bus line	Power Switch OFF*	1 kΩ or higher
CANL (14) - Battery positive (+)	LOW-level CAN bus line	Power Switch OFF*	1 MΩ or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Power Switch OFF*	1 kΩ or higher

NOTICE:

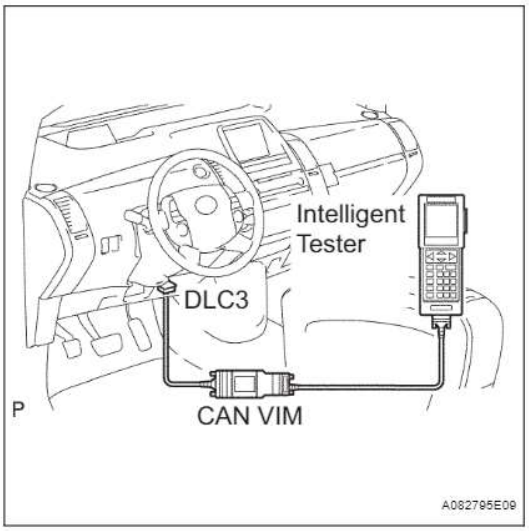
***: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the power switch, any other switches or the doors.**

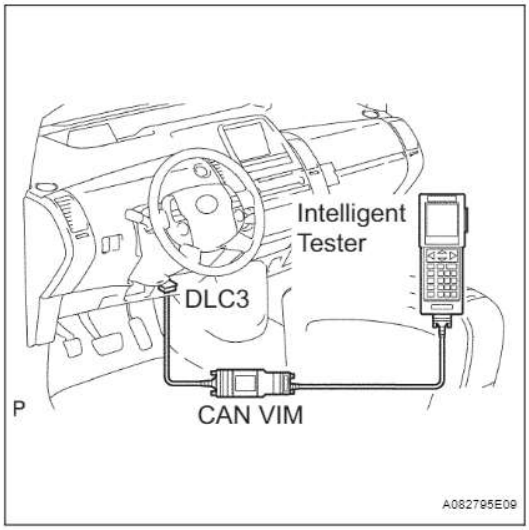
If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

HINT:

Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the power switch ON (IG) and attempt to use the tester. If the displays indicators that a communication error has occurred, there is a problem either with the vehicle or with the tester.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.





DTC CHECK / CLEAR

1. **CHECK DTC**
   (a) Connect the intelligent tester to the DLC3.
   (b) Turn the power switch ON (IG).
   (c) Read the DTC by following the prompts on the tester screen.
   HINT:
   Refer to the intelligent tester operator's manual for further details.
2. **CLEAR DTC**
   (a) Connect the intelligent tester to the DLC3.
   (b) Turn the power switch ON (IG).
   (c) Erase the DTC by following the directions on the tester screen.
   HINT:
   Refer to the intelligent tester operator's manual for further details.

HX

FREEZE FRAME DATA

1. CHECK FREEZE FRAME DATA

(a) The vehicle status, stored during system operation or at the time of an error code detection, can be displayed by the intelligent tester.

(b) Only one record of freeze frame data is stored and the freeze frame data generated during system operation are updated whenever the vehicle status is changed. After storing the DTC, the freeze frame data is not updated.

Tester Display	Measurement Item	Reference Value
SHFT POS P	Shift position display (P)	ON or OFF
SHFT POS N-P	Shift position display (not P)	ON or OFF
MAS CAUTION	Master caution display	DISP or NONDISP
PSW INDICATOR	PSW indicator mode	OFF, ON, FAST, or SLOW
U VOL VAL	U phase voltage value	min: 0 V, max: 20 V
V VOL VAL	V phase voltage value	min: 0 V, max: 20 V
W VOL VAL	W phase voltage value	min: 0 V, max: 20 V
BATT VOL VAL	BATT voltage value	min: 0 V, max: 20 V
IG (+B) VOL VAL	IG (+B) voltage value	min: 0 V, max: 20 V
P SPLY OFF SIG	Power supply off preparation request signal	ON or OFF
LRN LOCK POS	Completion of learning lock position	OK or NG
LRN UNLOCK POS	Completion of learning unlock position	OK or NG
TRIP CNTR	Number of trip counter after learning	min: 0, max: 65535
MTR MAIN RELAY	Main relay for motor drive	ON or OFF
ELCTRCL KEY SIG	Signal of electrical key condition	ON or OFF
CURRENT U	U phase current-carrying status	ON or OFF
CURRENT V	V phase current-carrying status	ON or OFF
CURRENT W	W phase current-carrying status	ON or OFF
U VOL	U phase voltage status	ON or OFF
V VOL	V phase voltage status	ON or OFF
W VOL	W phase voltage status	ON or OFF
BATT VOL	BATT voltage status	ON or OFF
IG VOL	IG (+B) phase voltage status	ON or OFF
ACC SIG	ACC condition signal	ON or OFF
INIT CNTRL	Initial drive control completed	OK or NG
DTCT LOCK POS	Completion of detecting lock position	OK or NG
DTCT UNLOCK POS	Completion of detecting unlock position	OK or NG
SHFT RANGE	P/Not P movable shift range	SET or UNSET
MAIN RELAY	Main relay	NORMAL or ABNOML
VHCL COND	Vehicle condition	STOP or MOVE
FAIL RANK	Fail rank	min: 0, max: 255
ECU TYPE	Type of ECU	min: 0, max: 65535
DETAIL INFO1	Detailed information 1	Failure information is displayed in hexadecimal
DETAIL INFO2	Detailed information 2	Failure information is displayed in hexadecimal
DETAIL INFO3	Detailed information 3	Failure information is displayed in hexadecimal

HX

FAIL-SAFE CHART

If the transmission control ECU detects a malfunction, the fail-safe functions shown in the table below are activated.

DTC No.	Fail-safe Function	Problem Symptoms
C2300 C2301	Only the P position release operation is possible and the shift control actuator is activated.	• The shift position is not indicated on the meter. • Although the shift position is indicated on the meter, the vehicle cannot be driven.
C2303	-	The battery is dead.
C2304 C2305 C2306	The transaxle parking lock control relay is turned off.	The parking lock mechanism cannot be switched.
C2307	The transaxle parking lock control relay is turned off.	• The shift position is not indicated on the meter. • Although the shift position is indicated on the meter, the vehicle cannot be driven.
C2311	-	The parking lock mechanism cannot be switched.
C2312	-	The hybrid system does not start up.
C2318	-	The parking lock mechanism cannot be switched on a hill.

HX

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the power switch ON (IG) and press the intelligent tester main switch on.

(c) Read the DATA LIST by following the directions on the tester screen.

Transmission control ECU

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SHFT POS P	Shift position display (P) / ON or OFF	ON: Parking lock is in P position OFF: Parking lock is in non-P position	-
SHFT POS N-P	Shift position display (not P) / ON or OFF	ON: Parking lock is in non-P position OFF: Parking lock is in P position	-
MAS CAUTION	Master caution display / DISP or NONDISP	DISP: Malfunction occurs in this system NONDISP: Malfunction does not occur in this system	-
PSW INDICATOR	PSW indicator mode / OFF, ON, FAST, or SLOW	OFF: Parking lock is in non-P position ON: Parking lock is in P position FAST: Actuator takes long time to switch between the P position and non-P position SLOW: Malfunction occurs in this system	-
U VOL VAL	U phase voltage value / min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V	-
V VOL VAL	V phase voltage value / min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V	-
W VOL VAL	W phase voltage value / min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V	-
BATT VOL VAL	BATT voltage value / min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V	-
IG (+B) VOL VAL	IG (+B) voltage value / min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V	-
P SPLY OFF SIG	Power supply off preparation request signal / ON or OFF	ON: Power is turned off by power source control ECU after receiving power switch OFF signal OFF: Any other condition	-
LRN LOCK POS	Completion of learning lock position / OK or NG	OK: Lock position learning is complete NG: Lock position learning is not complete	-
LRN UNLOCK POS	Completion of learning unlock position / OK or NG	OK: Unlock position learning is complete NG: Unlock position learning is not complete	-
TRIP CNTR	Number of trip counter after learning / min: 0, max: 65535	Actual number of trip counter	Reset the trip counter after 1,000 times

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
MTR MAIN RELAY	Main relay for motor drive / ON or OFF	ON: Motor drive main relay on OFF: Motor drive main relay off	-
ELCTRCL KEY SIG	Signal of electrical key condition / ON or OFF	ON: Electrical key is recognized OFF: Electrical key is not recognized	-
#CODE	Number of diagnosis code / min: 0, max: 255	Actual number of diagnosis code	-
CURRENT U	U phase current-carrying status / ON or OFF	ON: U phase current flows OFF: U phase current does not flow	-
CURRENT V	V phase current-carrying status / ON or OFF	ON: V phase current flows OFF: V phase current does not flow	-
CURRENT W	W phase current-carrying status / ON or OFF	ON: W phase current flows OFF: W phase current does not flow	-
U VOL	U phase voltage status / ON or OFF	ON: U phase voltage is 6 V or more OFF: U phase voltage is less than 6 V	-
V VOL	V phase voltage status / ON or OFF	ON: V phase voltage is 6 V or more OFF: V phase voltage is less than 6 V	-
W VOL	W phase voltage status / ON or OFF	ON: W phase voltage is 6 V or more OFF: W phase voltage is less than 6 V	-
BATT VOL	BATT voltage status / ON or OFF	ON: BATT voltage is more than 10 V OFF: BATT voltage is 10 V or less	-
IG VOL	IG (+B) phase voltage status / ON or OFF	ON: +B voltage is more than 10 V OFF: +B voltage is 10 V or less	-
ACC SIG	ACC condition signal / ON or OFF	ON: ACC condition signal is normal OFF: ACC condition signal is interrupted	-
INIT CNTRL	Initial drive control completed / OK or NG	OK: Initial drive control is complete NG: Initial drive control is not complete	-
DTCT LOCK POS	Completion of detecting lock position / OK or NG	OK: Detection of lock position is complete NG: Detection of lock position is not complete	-
DTCT UNLOCK POS	Completion of detecting unlock position / OK or NG	OK: Detection of unlock position is complete NG: Detection of unlock position is not complete	-
SHFT RANGE	P/Not P movable shift range / SET or UNSET	SET: P/Not P movable shift range is set UNSET: P/Not P movable shift range is unset	-
MAIN RELAY	Main relay / NORMAL or ABNOML	NORMAL: Main relay is normal ABNOML: Main relay is fault	-
VHCL COND	Vehicle condition / STOP or MOVE	STOP: Vehicle is stopped MOVE: Vehicle is running	-
ECU TYPE	Type of ECU / min: 0, max: 65535	Actual type of ECU	-

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

HINT:

- When the DTC C2300, C2301, C2304, C2305, C2306, C2307, C2311 and C2312 are detected, DTC P3102 indicating the electronic shift lever system malfunctions are detected for the hybrid system as well. Because of this, the hybrid system DTCs must be cleared after clearing the electronic shift lever system DTCs.
- Remove the P CON MAIN fuse to erase DTCs C2300, C2301, C2303, C2304, C2305, C2306 and C2307 because they cannot be erased with the intelligent tester.
- When a DTC is detected, the master warning light comes on and an error message is indicated on the multi-display.
- The indicator blinks quickly when it takes a long time to switch between the P position status and the P position release status.

DTC No.	Detection Item	Trouble Area	P Position Switch Indicator Light Condition	HINT	See page
C2300	ACT System Malfunction	- Shift control actuator - Transaxle parking lock control relay - Transmission control ECU - Wire harness or connector	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-24
C2301	Shift Changing Time Malfunction	- Shift control actuator - Transmission control ECU	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-31
C2303	Relay Malfunction (+B Short)	- Transaxle parking lock control relay - Transmission control ECU - Wire harness or connector	Normal - P position status: the P position switch indicator light is on. - P position release status: the P position switch indicator light is off.	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-32
C2304	Open or Short Circuit in "U" Phase	- Shift control actuator - Transmission control ECU - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-35
C2305	Open or Short Circuit in "V" Phase	- Shift control actuator - Transmission control ECU - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-35

DTC No.	Detection Item	Trouble Area	P Position Switch Indicator Light Condition	HINT	See page
C2306	Open or Short Circuit in "W" Phase	- Shift control actuator - Transmission control ECU - Transaxle parking lock control relay - Wire harness or connector	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-35
C2307	Power Source Malfunction	- Transmission control ECU - Wire harness or connector - Parking lock motor (Shift control actuator)	Blinks slowly	If DTC C2318 is output simultaneously, perform troubleshooting for DTC C2318 first.	HX-40
C2310	Open or Short Circuit in BATT	- P CON MAIN fuse - Transmission control ECU - Wire harness or connector	Normal - P position status: the P position switch indicator light is on. - P position release status: the P position switch indicator light is off.	-	HX-42
C2311	HV Communication Line Malfunction	- Transmission control ECU - Hybrid vehicle control ECU - Wire harness or connector	Blinks slowly	-	HX-44
C2312	Power Source Control ECU Communication Line Malfunction	- Transmission control ECU - Power source control ECU	Normal - P position status: the P position switch indicator light is on. - P position release status: the P position switch indicator light is off.	-	HX-47
C2315	HV System Malfunction	- Hybrid vehicle control ECU - P position switch - Transmission control ECU - Wire harness or connector	Normal - P position status: the P position switch indicator light is on. - P position release status: the P position switch indicator light is off.	-	HX-50
C2318	Low Voltage Error (Power Supply Malfunction)	- HEV fuse - IGCT relay - Wire harness or connector - Auxiliary battery	Normal - P position status: the P position switch indicator light is on. - P position release status: the P position switch indicator light is off.	-	HX-52

HX

DTC	C2300	ACT System Malfunction

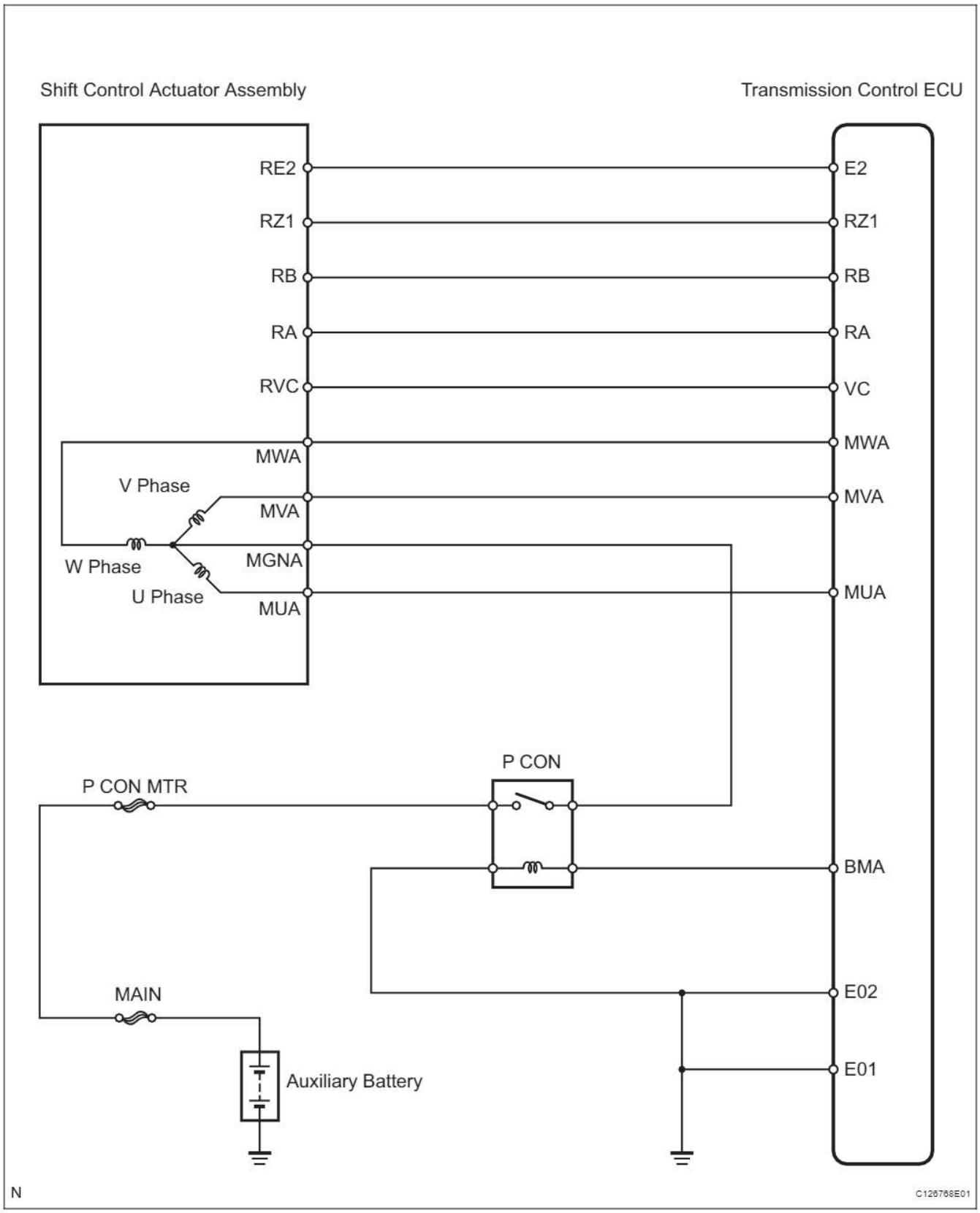
DESCRIPTION

The shift control actuator consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU also detects the rotor rotation angle through the rotation angle sensor to control timing of current application to the coils. The transmission control ECU outputs this DTC when it detects a malfunction in the shift control actuator system.

DTC No.	DTC Detection Condition	Trouble Area
C2300	When both conditions below are met: • Power switch ON (IG). • There is an open or short circuit in the transaxle parking lock control relay and/or shift control actuator, or an internal abnormality in the shift control actuator.	• Shift control actuator • Transaxle parking lock control relay (P CON Relay) • Transmission control ECU • Wire harness or connector

HX

WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT (BESIDES DTC C2300)

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester on.
(d) Read the DTCs.

Result

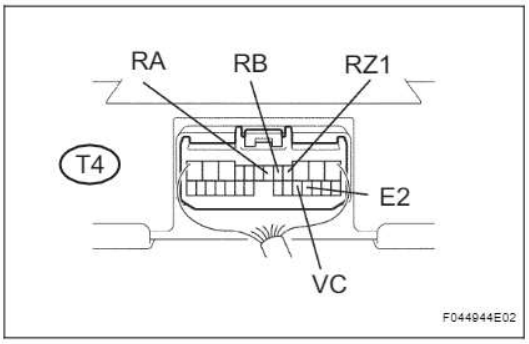
Display (DTC output)	Proceed to
No output	A
C2304, C2305, C2306 and C2318	B

HINT:
If any other codes besides C2300 are output, perform the troubleshooting for those DTCs first.

B → **REPAIR CIRCUIT INDICATED BY OUTPUT CODE**

A

2 CHECK TRANSMISSION CONTROL ECU (VC, RA, RB, RZ1 VOLTAGE)



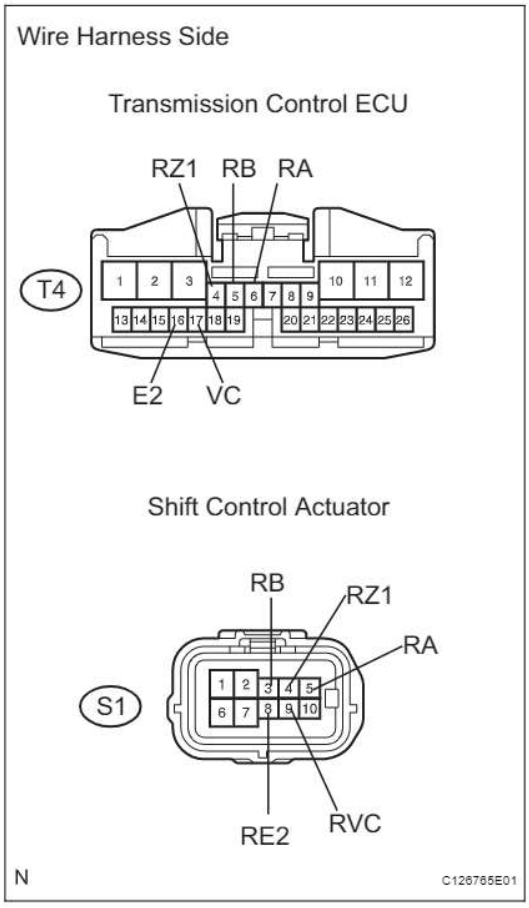
(a) Measure the voltage of the ECU connector.
Standard voltage

Tester Connection	Condition	Specified Condition
T4-4 (RZ1) - T4-16 (E2)	Power switch ON (IG)	4 to 5.5 V
T4-5 (RB) - T4-16 (E2)	Power switch ON (IG)	4 to 5.5 V
T4-6 (RA) - T4-16 (E2)	Power switch ON (IG)	4 to 5.5 V
T4-17 (VC) - T4-16 (E2)	Power switch ON (IG)	4 to 5.5 V

OK → **Go to step 5**

NG

3 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - SHIFT CONTROL ACTUATOR)



(a) Disconnect the T4 ECU connector.
(b) Disconnect the S1 actuator connector.
(c) Measure the resistance of the wire harness side connectors.

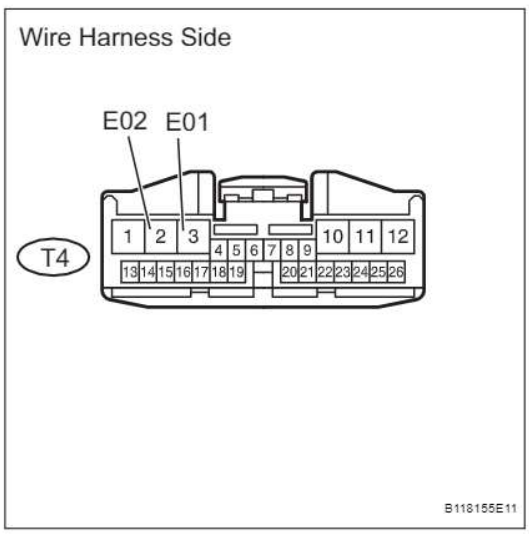
Standard resistance

Tester Connection	Specified Condition
T4-17 (VC) - S1-9 (RVC)	Below 1 Ω
T4-5 (RB) - S1-3 (RB)	Below 1 Ω
T4-6 (RA) - S1-5 (RA)	Below 1 Ω
T4-4 (RZ1) - S1-4 (RZ1)	Below 1 Ω
T4-16 (E2) - S1-8 (RE2)	Below 1 Ω
T4-4 (RZ1) - Body ground	10 kΩ or higher
T4-5 (RB) - Body ground	10 kΩ or higher
T4-6 (RA) - Body ground	10 kΩ or higher
T4-17 (VC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



(a) Disconnect the T4 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection (Symbols)	Specified Condition
T4-2 (E02) - Body ground	Below 1 Ω
T4-3 (E01) - Body ground	Below 1 Ω

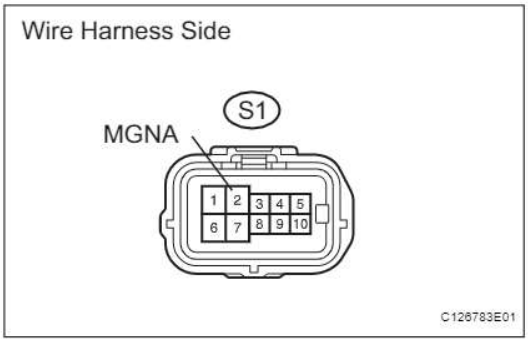
OK → **Go to step 11**

HX

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

5 CHECK WIRE HARNESS (SHIFT CONTROL ACTUATOR - BATTERY)



(a) Disconnect the S1 actuator connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-2 (MGNA) - Body ground	Power switch ON (IG)	9 to 14 V

NG → **Go to step 7**

OK

6 READ VALUE OF INTELLIGENT TESTER (U, V, W VOLTAGE)

(a) Check the DATA LIST for proper functioning of the shift control actuator.

Shift control actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
U VOL VAL	U phase voltage value / min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V	-
V VOL VAL	V phase voltage value / min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V	-
W VOL VAL	W phase voltage value / min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V	-

HX

Standard voltage:
9 to 14 V

NG → **Go to step 10**

OK

REPLACE TRANSMISSION CONTROL ECU

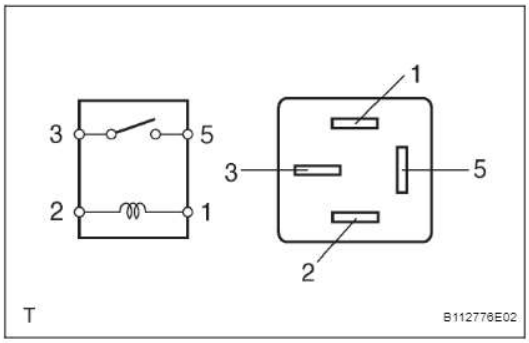
7 INSPECT FUSE (P CON MTR)

(a) Remove the P CON MTR H-fuse from the engine room relay block.
(b) Measure the resistance of the H-fuse.
Standard resistance:
Below 1 Ω

NG → **INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE H-FUSE**

OK

8 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY (Marking: P CON)



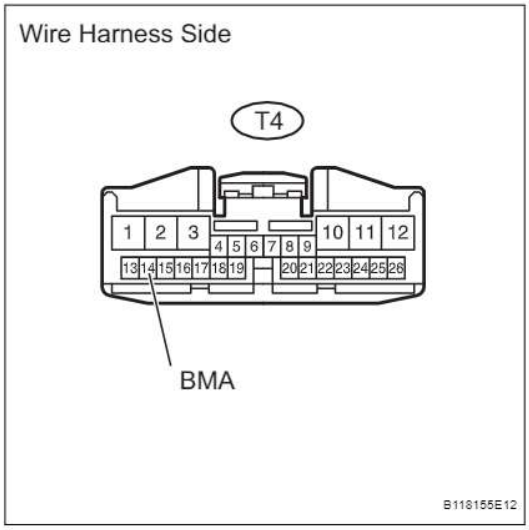
(a) Remove the P CON relay from the engine room relay block.
(b) Measure the resistance of the relay.
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG → **REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY**

OK

9 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



(a) Disconnect the T4 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
T4-14 (BMA) - Body ground	Below 1 Ω

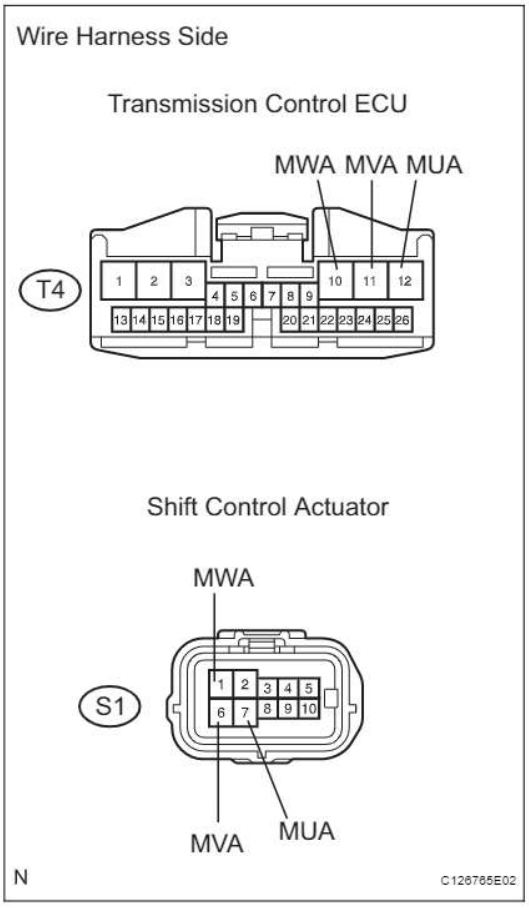
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (TRANSMISSION CONTROL ECU - BODY GROUND)**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (SHIFT CONTROL ACTUATOR - BATTERY)

HX

10	CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - SHIFT CONTROL ACTUATOR)



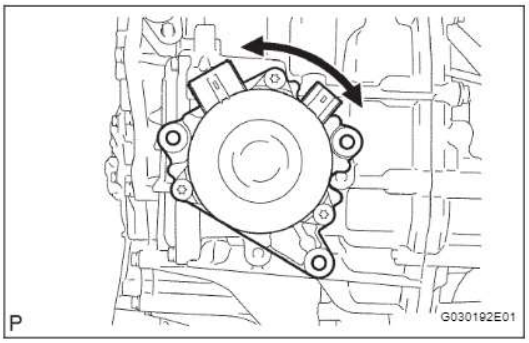
(a) Disconnect the T4 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
T4-10 (MWA) - S1-1 (MWA)	Below 1 Ω
T4-11 (MVA) - S1-6 (MVA)	Below 1 Ω
T4-12 (MUA) - S1-7 (MUA)	Below 1 Ω
T4-10 (MWA) - Body ground	10 kΩ or higher
T4-11 (MVA) - Body ground	10 kΩ or higher
T4-12 (MUA) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

11	INSPECT SHIFT CONTROL ACTUATOR



(a) Remove the 3 bolts and transmission case cover.
(b) Remove the 3 bolts.
(c) Slightly pull the shift control actuator from the hybrid vehicle transaxle so that the shift control actuator can be turned.
(d) Turn the shift control actuator.
OK:
The shift control actuator turns smoothly.
HINT:
There may be an internal actuator abnormality if the actuator does not turn smoothly.

NG → **REPLACE SHIFT CONTROL ACTUATOR**

OK

REPLACE TRANSMISSION CONTROL ECU

DTC	C2301	Shift Changing Time Malfunction

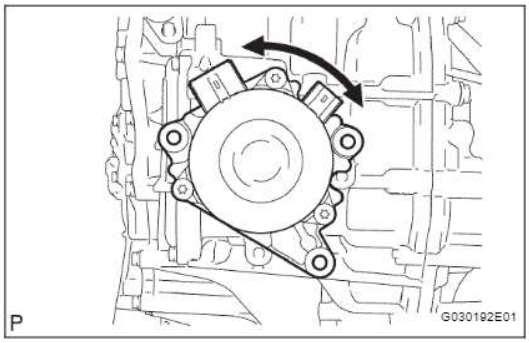
DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and then activates the shift control actuator. At the same time, the transmission control ECU detects the length of time it takes for the parking lock mechanism to switch. The transmission control ECU outputs this DTC when this length of time is longer than specification.

DTC No.	DTC Detection Condition	Trouble Area
C2301	When both conditions below are met: • Power switch ON (IG). • There is an internal abnormality in the shift control actuator for 2 seconds or more (the parking lock motor runs idle).	• Shift control actuator • Transmission control ECU

INSPECTION PROCEDURE

1	CHECK SHIFT CONTROL ACTUATOR



(a) Remove the 3 bolts and transmission case cover.
(b) Remove the 3 bolts.
(c) Slightly pull the shift control actuator from the hybrid vehicle transaxle so that the shift control actuator can be turned.
(d) Turn the shift control actuator.
OK:
The shift control actuator turns smoothly.
HINT:
There may be an internal actuator abnormality if the actuator does not turn smoothly.

NG → **REPLACE SHIFT CONTROL ACTUATOR**

OK

REPLACE TRANSMISSION CONTROL ECU

HX

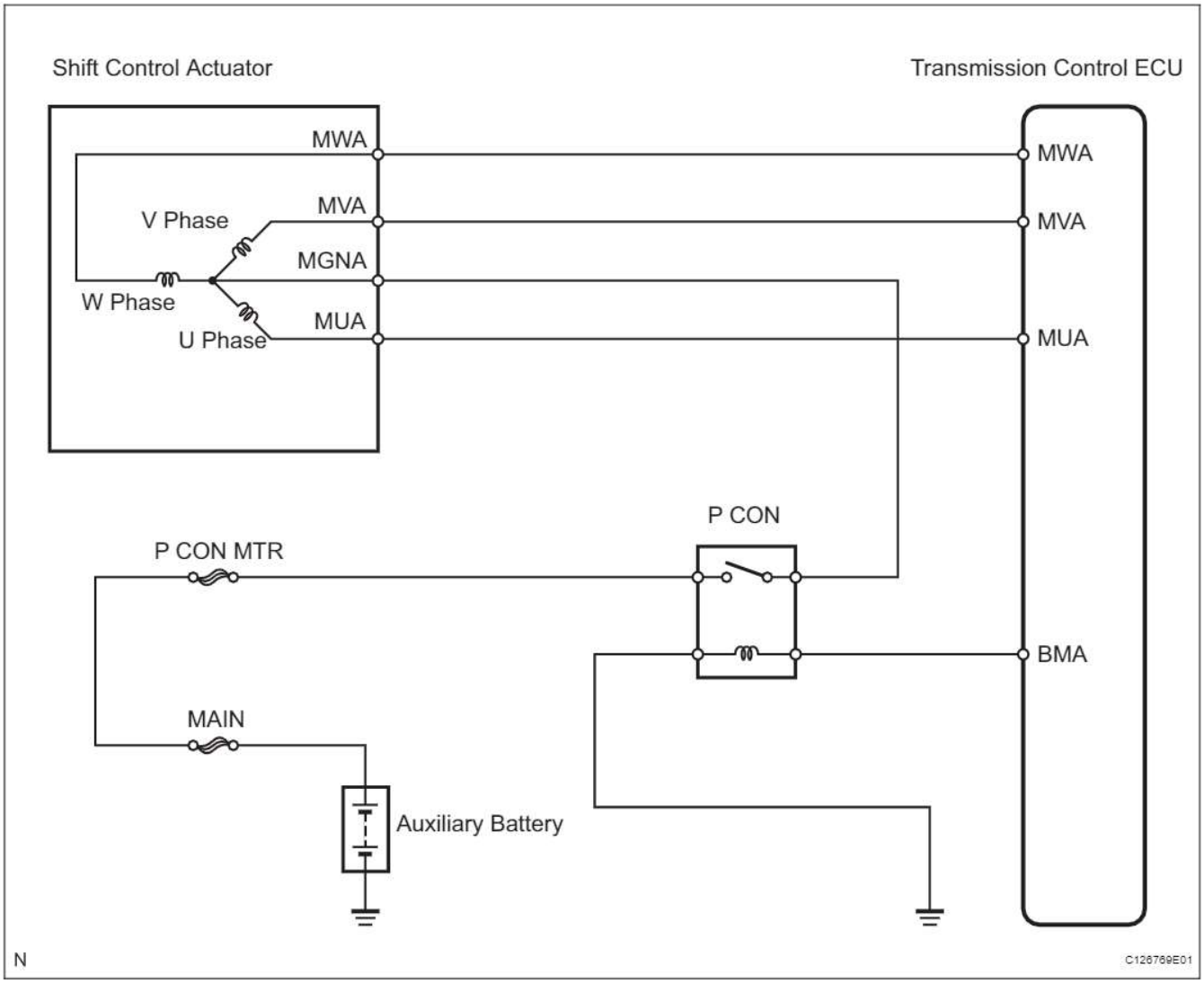
DTC	C2303	Relay Malfunction (+B Short)

DESCRIPTION

The transaxle parking lock control relay (Marking: P CON) is activated by output voltage from the transmission control ECU and supplies power to the shift control actuator. The transmission control ECU outputs this DTC when it detects a malfunction in the transaxle parking lock control relay.

DTC No.	DTC Detection Condition	Trouble Area
C2303	When both conditions below are met: • The transaxle parking lock control relay is off. • Voltage of the transmission control ECU terminals MUA, MVA, and MWA is 6 V or more for 64 msec. or more.	• Transaxle parking lock control relay (P CON relay) • Transmission control ECU • Wire harness or connector

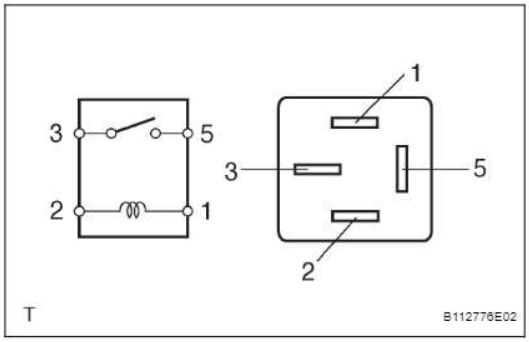
WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY (Marking: P CON)



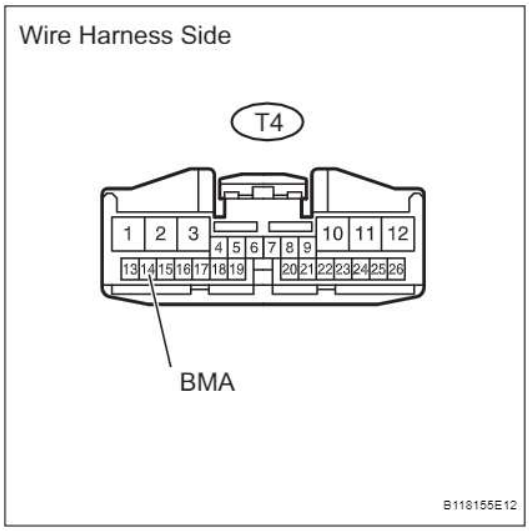
(a) Remove the P CON relay from the engine room relay block.
(b) Measure the resistance of the relay.
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG → REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY

OK

2 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - CONTROL RELAY)



(a) Disconnect the T4 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

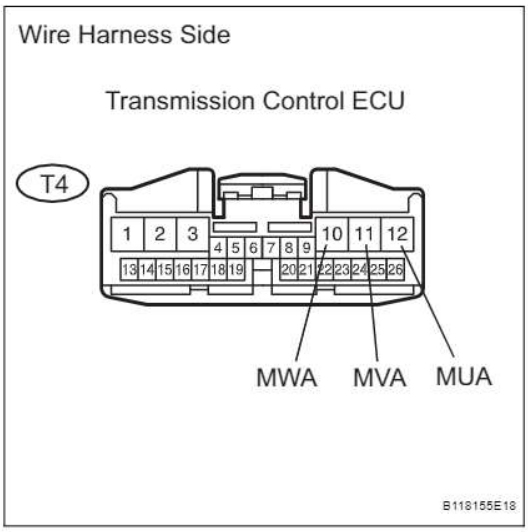
Tester Connection	Specified Condition
T4-14 (BMA) - Body ground	Below 1 V

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

HX

3 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - ACTUATOR)



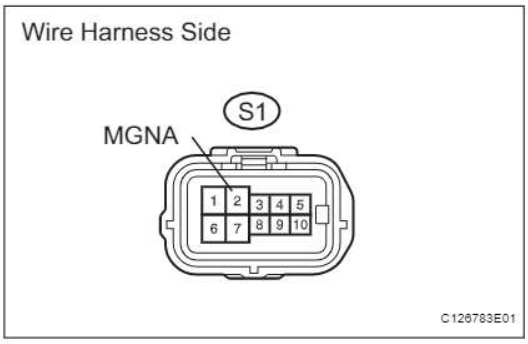
(a) Disconnect the T4 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
T4-10 (MWA) - Body ground	Below 1 V
T4-11 (MVA) - Body ground	Below 1 V
T4-12 (MUA) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 CHECK WIRE HARNESS (SHIFT CONTROL ACTUATOR - CONTROL RELAY)



(a) Disconnect the S1 actuator connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S1-2 (MGNA) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

HX

OK

REPLACE TRANSMISSION CONTROL ECU

DTC	C2304	Open or Short Circuit in "U" Phase

DTC	C2305	Open or Short Circuit in "V" Phase

DTC	C2306	Open or Short Circuit in "W" Phase

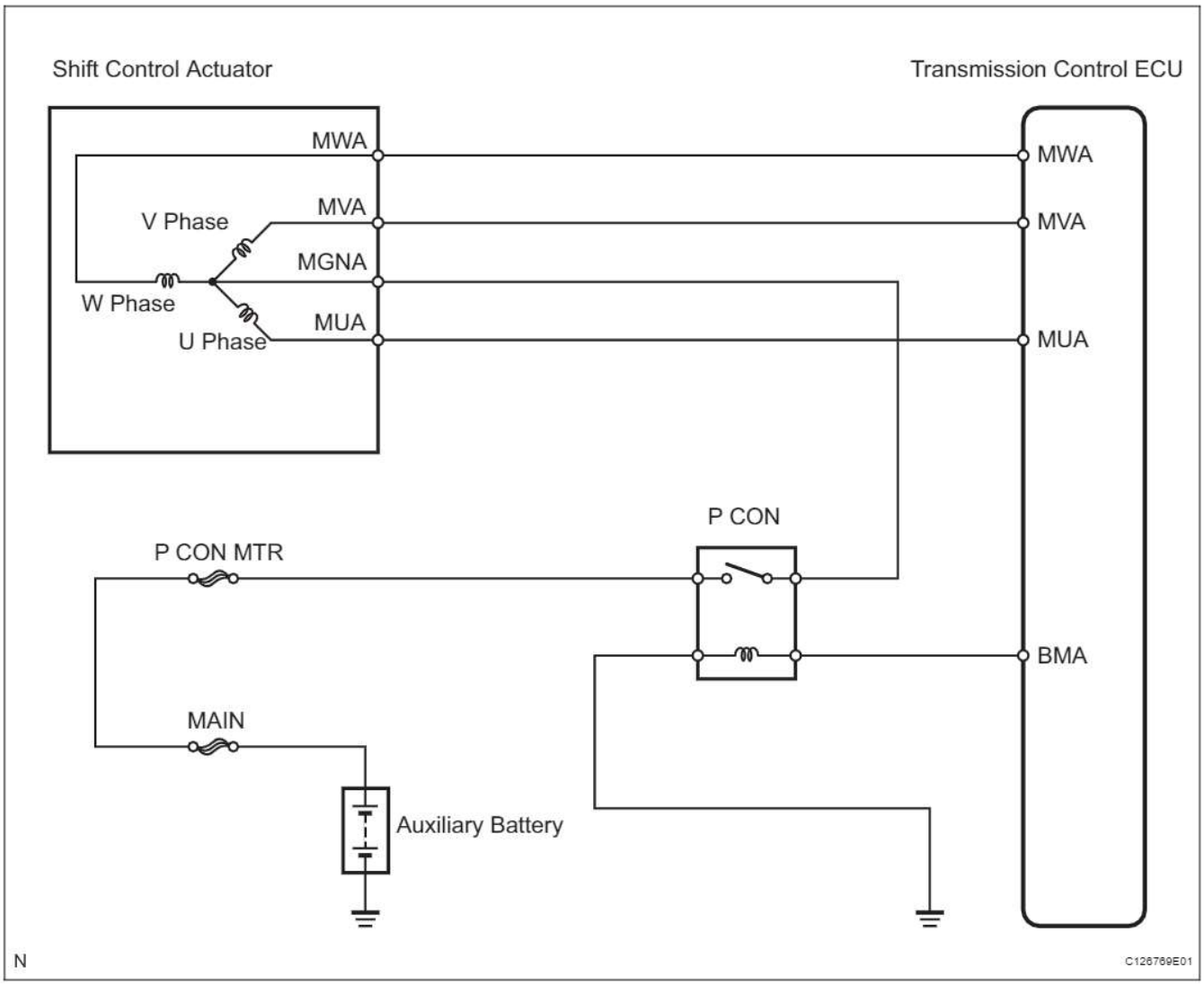
DESCRIPTION

The shift control actuator consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a malfunction in the parking lock motor system.

DTC No.	DTC Detection Condition	Trouble Area
C2304	When both conditions below are met: • Power switch ON (IG) (battery voltage is 8 V or more). • Voltage of transmission control ECU terminal MUA is 6 V or less for 1 second or more.	• Shift control actuator • Transmission control ECU • Transaxle parking lock control relay (P CON Relay) • Wire harness or connector
C2305	When both conditions below are met: • Power switch ON (IG) (battery voltage is 8 V or more). • Voltage of transmission control ECU terminal MVA is 6 V or less for 1 second or more.	• Shift control actuator • Transmission control ECU • Transaxle parking lock control relay (P CON Relay) • Wire harness or connector
C2306	When both conditions below are met: • Power switch ON (IG) (battery voltage is 8 V or more). • Voltage of transmission control ECU terminal MWA is 6 V or less for 1 second or more.	• Shift control actuator • Transmission control ECU • Transaxle parking lock control relay (P CON Relay) • Wire harness or connector

HX

WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester on.
(d) Read the DTCs.

Result

Display (DTC output)	Proceed to
C2304, C2305 and C2306 are detected simultaneously	A
C2304, C2305 and C2306 are not detected simultaneously	B

HINT:

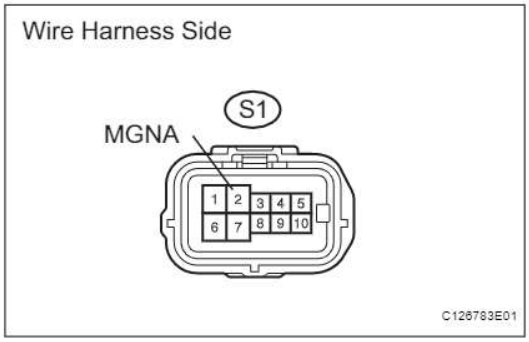
- When DTCs C2304, C2305 and C2306 are detected simultaneously, there may be an open or short circuit between the shift control actuator and the battery.

- When DTCs C2304, C2305 and C2306 are not detected simultaneously, there may be an open or short circuit in the shift control actuator or between the actuator and the ECU.

B → Go to step 6

A

2 CHECK WIRE HARNESS (SHIFT CONTROL ACTUATOR - BATTERY)



(a) Disconnect the S1 actuator connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-2 (MGNA) - Body ground	Power switch ON (IG)	9 to 14 V

OK → Go to step 6

NG

3 INSPECT FUSE (P CON MTR FUSE)

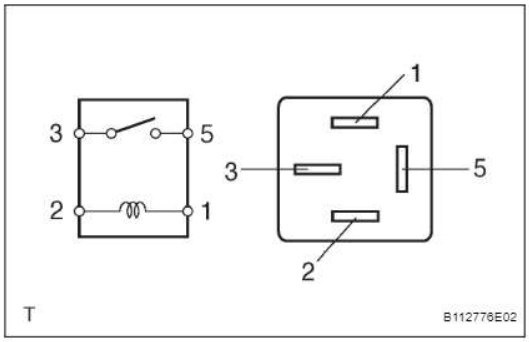
(a) Remove the P CON MTR H-fuse from the engine room relay block.
(b) Measure the resistance of the H-fuse.
Standard resistance:
Below 1 Ω

NG → **INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE H-FUSE**

HX

OK

4 INSPECT TRANSAXLE PARKING LOCK CONTROL RELAY (Marking: P CON RELAY)



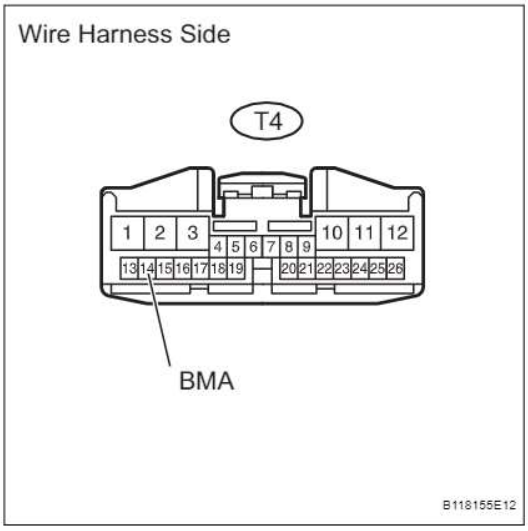
(a) Remove the P CON relay from the engine room relay block.
(b) Measure the resistance of the relay.
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG → **REPLACE TRANSAXLE PARKING LOCK CONTROL RELAY**

OK

5 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



(a) Disconnect the T4 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
T4-14 (BMA) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (TRANSMISSION CONTROL ECU - BODY GROUND)**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (SHIFT CONTROL ACTUATOR - BATTERY)

6 READ VALUE OF INTELLIGENT TESTER (U, V, W VOLTAGE)

(a) Check the DATA LIST for proper functioning of the shift control actuator.

Shift control actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
U VOL VAL	U phase voltage value / min: 0 V, max: 20 V	Actual U phase voltage 9 to 14 V	-
V VOL VAL	V phase voltage value / min: 0 V, max: 20 V	Actual V phase voltage 9 to 14 V	-
W VOL VAL	W phase voltage value/min: 0 V, max: 20 V	Actual W phase voltage 9 to 14 V	-

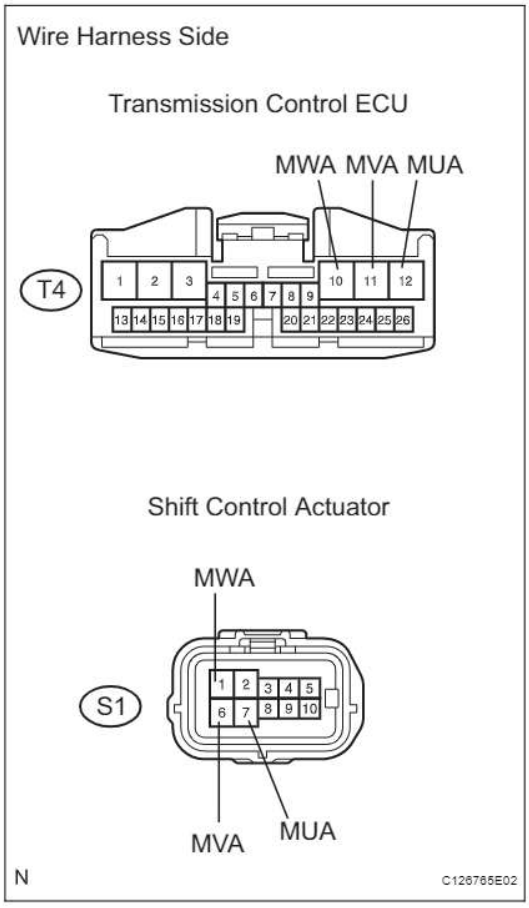
Standard voltage:
9 to 14 V

OK → **REPLACE TRANSMISSION CONTROL ECU**

NG

HX

7	CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - SHIFT CONTROL ACTUATOR)



(a) Disconnect the T4 ECU connector.
(b) Disconnect the S1 actuator connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T4-10 (MWA) - S1-1 (MWA)	Below 1 Ω
T4-11 (MVA) - S1-6 (MVA)	Below 1 Ω
T4-12 (MUA) - S1-7 (MUA)	Below 1 Ω
T4-10 (MWA) - Body ground	10 kΩ or higher
T4-11 (MVA) - Body ground	10 kΩ or higher
T4-12 (MUA) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE SHIFT CONTROL ACTUATOR

HX

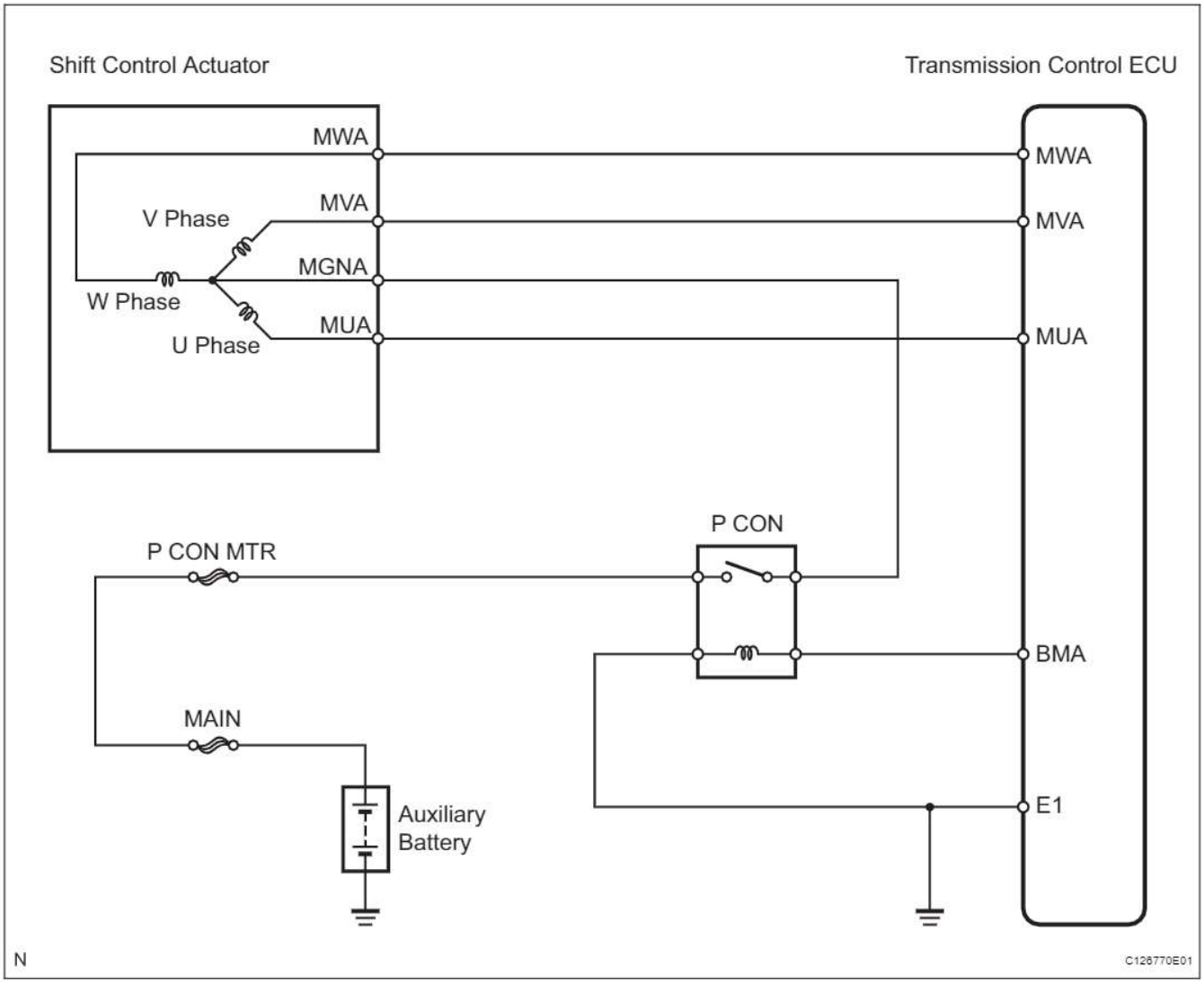
DTC	C2307	Power Source Malfunction

DESCRIPTION

The shift control actuator consists of the parking lock motor and the rotation angle sensor. The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a malfunction in the parking lock motor system and/or the ground circuit.

DTC No.	DTC Detection Condition	Trouble Area
C2307	When both conditions below are met: • Power switch ON (IG) • The parking lock motor current is 50 A or more, or there is an open in the terminal E1 circuit of the transmission control ECU for 0.1 seconds or more.	• Transmission control ECU • Wire harness or connector • Parking lock motor (Shift control actuator)

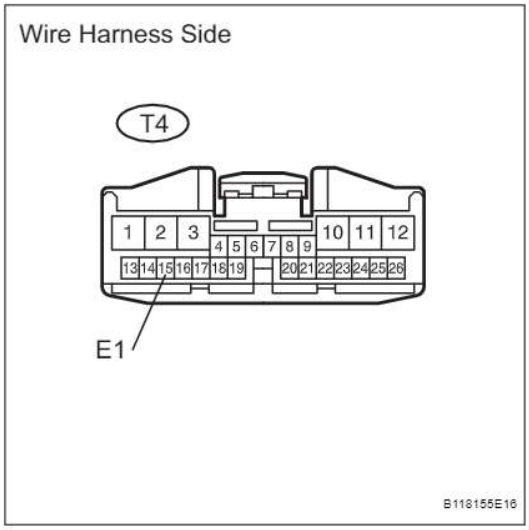
WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



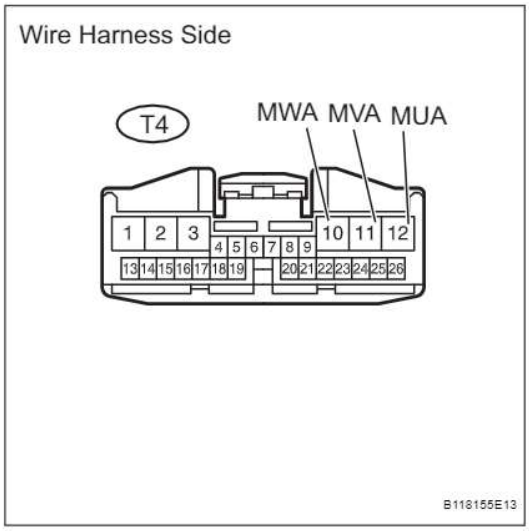
(a) Disconnect the T4 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
T4-15 (E1) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

2 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BODY GROUND)



(a) Measure the voltage of the wire harness and connector.
Standard voltage

Tester Connection	Specified Condition
T4-10 (MWA) - Body ground	Below 1 V
T4-11 (MVA) - Body ground	Below 1 V
T4-12 (MUA) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE TRANSMISSION CONTROL ECU

DTC	C2310	Open or Short Circuit in BATT

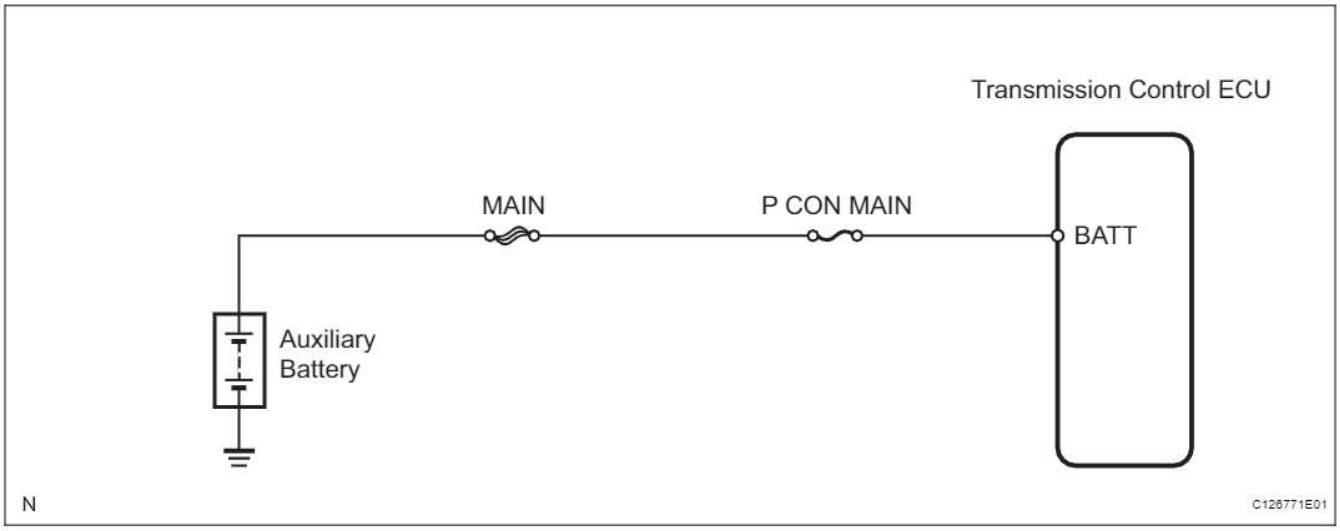
DESCRIPTION

The auxiliary battery voltage is constantly applied to terminal BATT. The terminal BATT voltage is used to power the transmission control ECU memory. The transmission control ECU outputs this DTC when it detects a malfunction related to terminal BATT.

DTC No.	DTC Detection Condition	Trouble Area
C2310	When both conditions below are met: • Power switch ON (IG) • Terminal BATT voltage of the transmission control ECU is 10 V or less for 1 second or more.	• P CON MAIN fuse • Transmission control ECU • Wire harness or connector

HINT:
When there is an open or short in the BATT circuit, information on the actuator position ("P position" or "non-P position") stored in the ECU is cleared every time the power switch is turned OFF. Therefore, the ECU works to recognize the position each time the power switch is turned ON (IG). As a result, the time from when the power switch is turned ON (IG) until "READY ON" is indicated may become longer than normal.

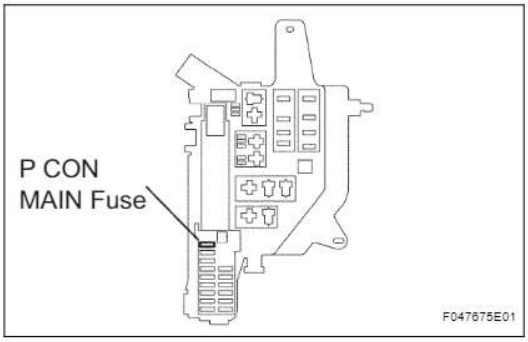
WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1	INSPECT FUSE (P CON MAIN)



(a) Remove the P CON MAIN fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG	INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 READ VALUE OF INTELLIGENT TESTER (BATT VOLTAGE)

(a) Check the DATA LIST for proper functioning of the transmission control ECU.

Transmission control ECU

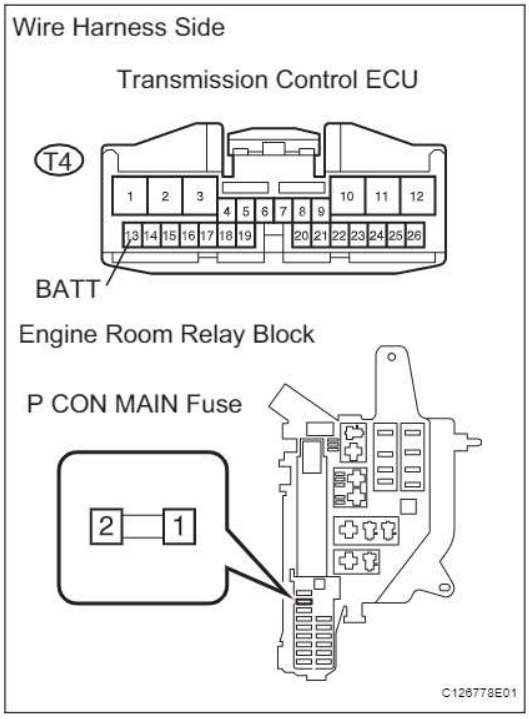
Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
BATT VOL VAL	BATT voltage value / min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V	-

Standard voltage:
9 to 14 V

OK → **REPLACE TRANSMISSION CONTROL ECU**

NG

3 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - P CON MAIN FUSE)



(a) Disconnect the T4 ECU connector.
(b) Remove the P CON fuse from the engine room relay block.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T4-13 (BATT) - 2 (P CON MAIN Fuse)	Below 1 Ω
T4-13 (BATT) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

HX

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (P CON MAIN FUSE - BATTERY)

DTC	C2311	HV Communication Line Malfunction

DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. The transmission control ECU outputs this DTC when it detects a communication error between the hybrid vehicle control ECU and the transmission control ECU.

DTC No.	DTC Detection Condition	Trouble Area
C2311	When both conditions below are met: • Power switch ON (IG) • Signals from the hybrid control ECU cannot be received, or there is a problem with a pulse signal from the hybrid vehicle control ECU for 1 second or more.	• Transmission control ECU • Hybrid vehicle control ECU • Wire harness or connector

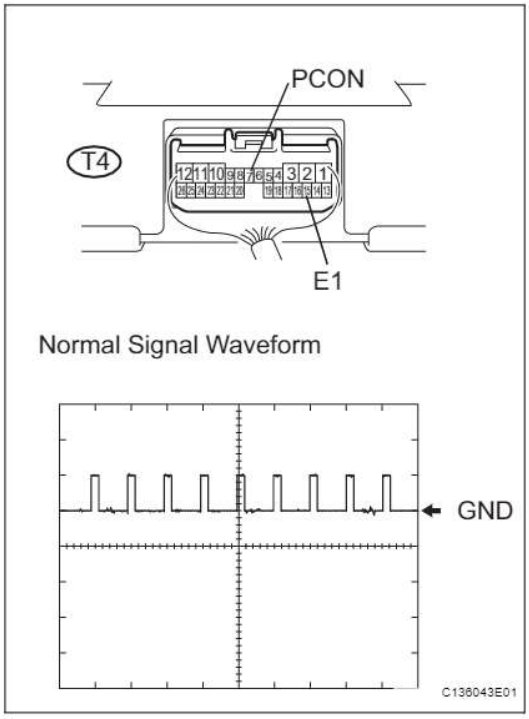
WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1	CHECK TRANSMISSION CONTROL ECU (PCON SIGNAL)



(a) Check output waveform.
(1) Turn the power switch ON (IG).
(2) Using an oscilloscope, check the output waveform of the transmission control ECU connector.
OK:
The output waveform appears as shown in the illustration.

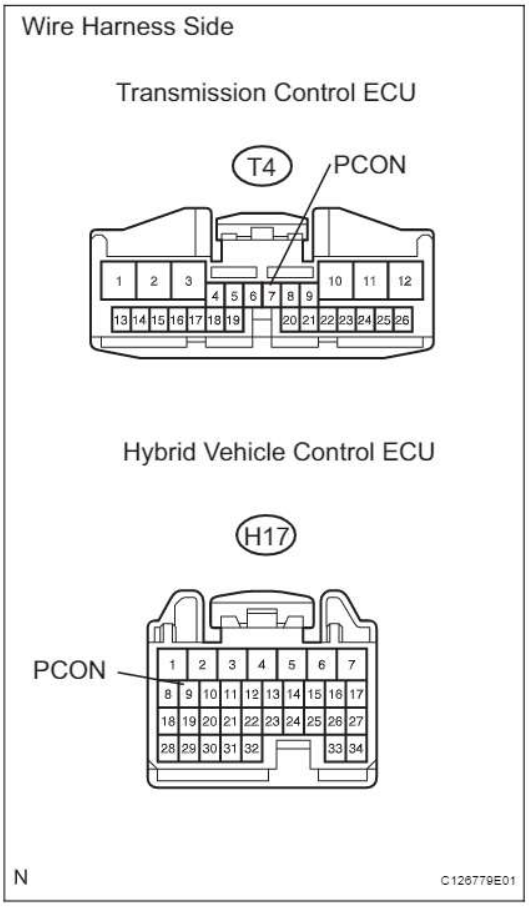
Item	Contents
Symbols (Terminal No.)	PCON (T4-7) - E1 (T4-15)
Tool setting	5 V/DIV., 20 msec./DIV.
Vehicle condition	Power switch ON (IG)

OK → **REPLACE TRANSMISSION CONTROL ECU**

NG

HX

2	CHECK WIRE HARNESS (HYBRID VEHICLE CONTROL ECU - TRANSMISSION CONTROL ECU)



(a) Disconnect the T4 and H17 ECU connectors.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection (Symbols)	Specified Condition
T4-7 (PCON) - H17-9 (PCON)	Below 1 Ω
T4-7 (PCON) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

HX

REPLACE HYBRID VEHICLE CONTROL ECU

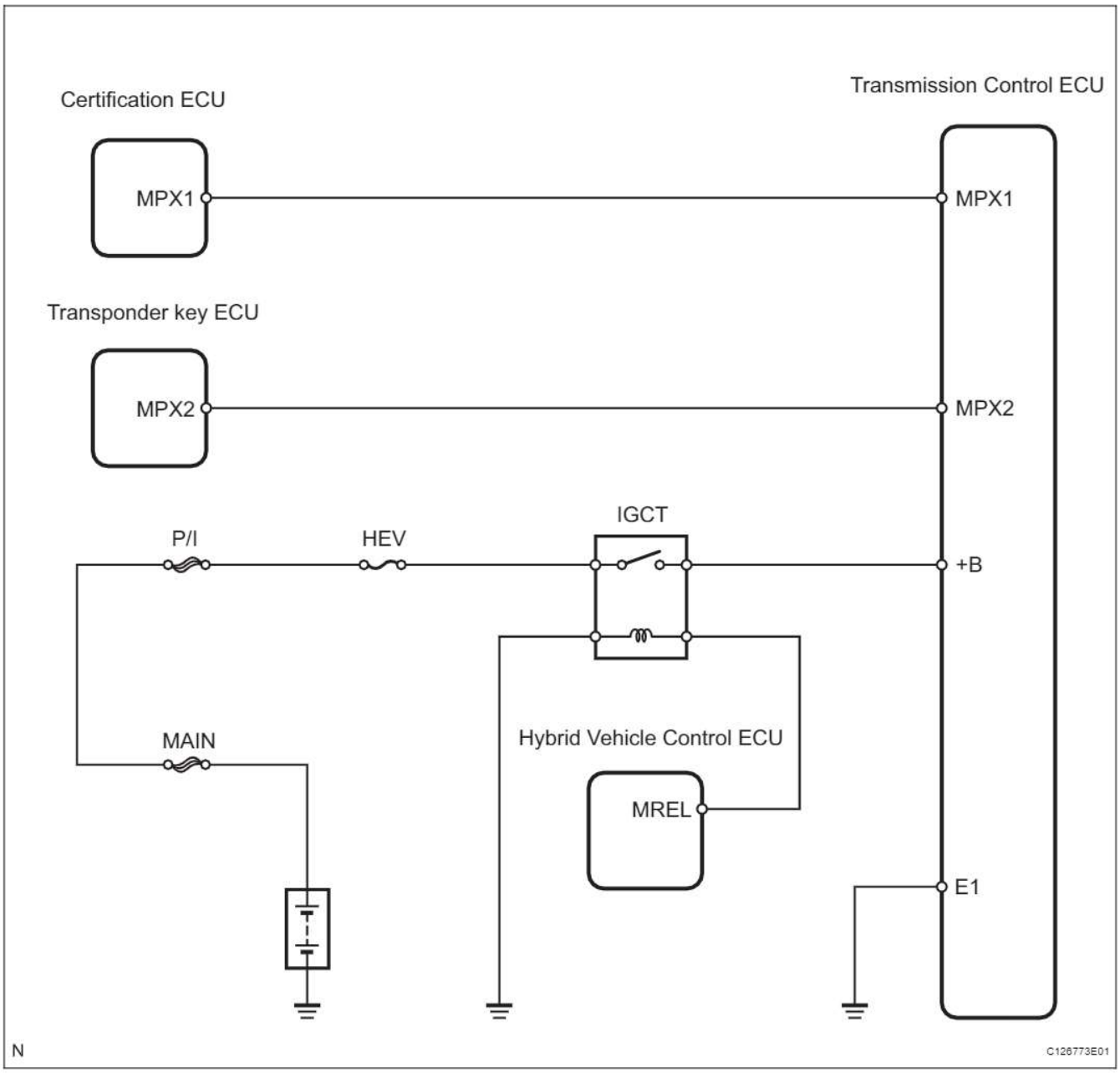
DTC	C2312	Power Source Control ECU Communication Line Malfunction

DESCRIPTION

The transmission control ECU receives power switch condition signals (OFF / ON (ACC) / ON (IG)) from the power source control ECU. The transmission control ECU outputs this DTC when it does not receive the signals.

DTC No.	DTC Detection Condition	Trouble Area
C2312	When both conditions below are met: • Power switch ON (IG) • Signals from the power source control ECU cannot be received for 10 seconds or more.	• Transmission control ECU • Power source control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (P SPLY OFF SIGNAL)

(a) Check the DATA LIST for proper functioning of the transmission control ECU.

Transmission control ECU

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
P SPLY OFF SIG	Power supply off preparation request signal / ON or OFF	ON: Power is turned off by power source control ECU after receiving power switch OFF signal OFF: Any other condition	-

OK:
ON is displayed.

NG → REPLACE POWER SOURCE CONTROL ECU

OK

REPLACE TRANSMISSION CONTROL ECU

DTC	C2315	HV System Malfunction

DESCRIPTION

The transmission control ECU receives a P position switch signal from the hybrid vehicle control ECU and activates the parking lock motor by controlling current, causing the parking lock mechanism to switch. When the hybrid control ECU detects a malfunction with the P position switch or P position signal, it sends an information signal to the transmission control ECU. After receiving this signal, the transmission control ECU outputs this DTC.

DTC No.	DTC Detection Condition	Trouble Area
C2315	When both conditions below are met: • Power switch ON (IG) • A malfunction signal from the hybrid control ECU is received for 1 second or more.	• Hybrid vehicle control ECU • P position switch • Transmission control ECU • Wire harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK OTHER DTC OUTPUT (BESIDES DTC C2315)

HX

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester on.
(d) Read the DTCs.

Result

Result	Proceed to
No output	A
P0851-579, P0852-580, P3102-597, 598 and 599	B

HINT:

- DTCs P0851 and P0852 indicate P position switch malfunctions. DTC P0851-579 indicates "short to ground" and P0852-580 indicates "open" or "short to +B".
- DTC P3102 indicates a P position signal error. DTC P3102-597 indicates "short to ground", P3102-598 indicates "short to +B", and P3102-599 indicates "duty ratio error".

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

REPLACE HYBRID VEHICLE CONTROL ECU

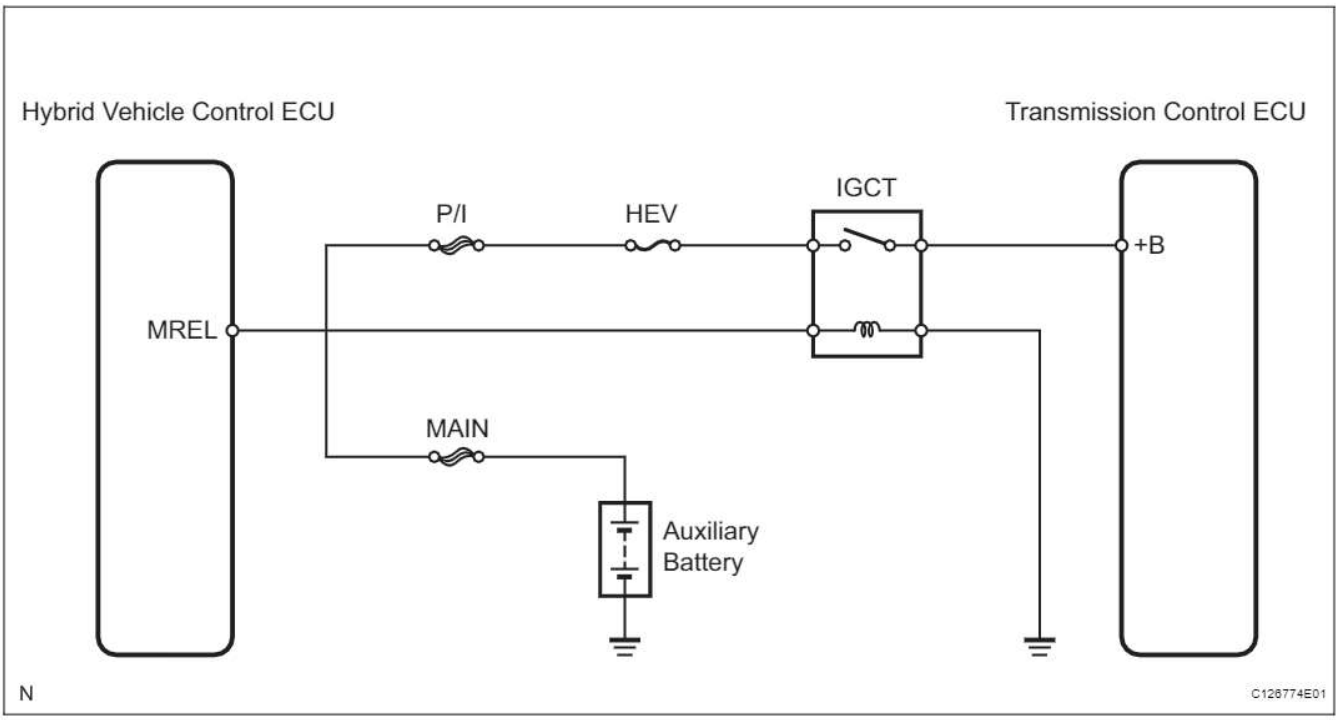
DTC	C2318	Low Voltage Error (Power Supply Malfunction)

DESCRIPTION

The auxiliary battery voltage is applied to terminal +B when the power switch is ON (IG). The transmission control ECU outputs this DTC when the input voltage drops.

DTC No.	DTC Detection Condition	Trouble area
C2318	When both conditions below are met: • Power switch ON (IG) • Terminal +B voltage of the transmission control ECU is 9.3 V or less for 1 second or more.	• HEV fuse • IGCT relay • Wire harness or connector • Auxiliary battery

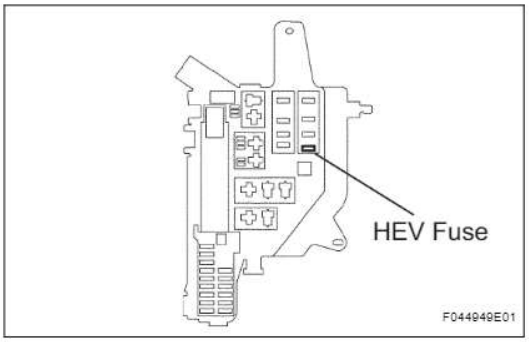
WIRING DIAGRAM



HX

INSPECTION PROCEDURE

1	INSPECT FUSE (HEV)



(a) Remove the HEV fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE**

OK

2	CHECK OTHER DTC OUTPUT (BESIDE C2318)

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester on.
(d) Read the DTCs.

Result

Result	Proceed to
No output	A
P3110-223	B

HINT:
DTC P3110 indicates HV main relay malfunction. DTC P3110-223 indicates "IGCT relay malfunction".

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

3	READ VALUE OF INTELLIGENT TESTER (IG (+B) VOLTAGE)

(a) Check the DATA LIST for proper functioning of the transmission control ECU.

Transmission control ECU

Item	Measurement Item / Range (Display)	Normal Condition
IG (+B) VOL VAL	IG (+B) voltage value / min: 0 V, max: 20 V	Actual power supply voltage 9 to 14 V

Standard voltage:
9 to 14 V

OK → REPLACE TRANSMISSION CONTROL ECU

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK AND JUNCTION BLOCK - TRANSMISSION CONTROL ECU)

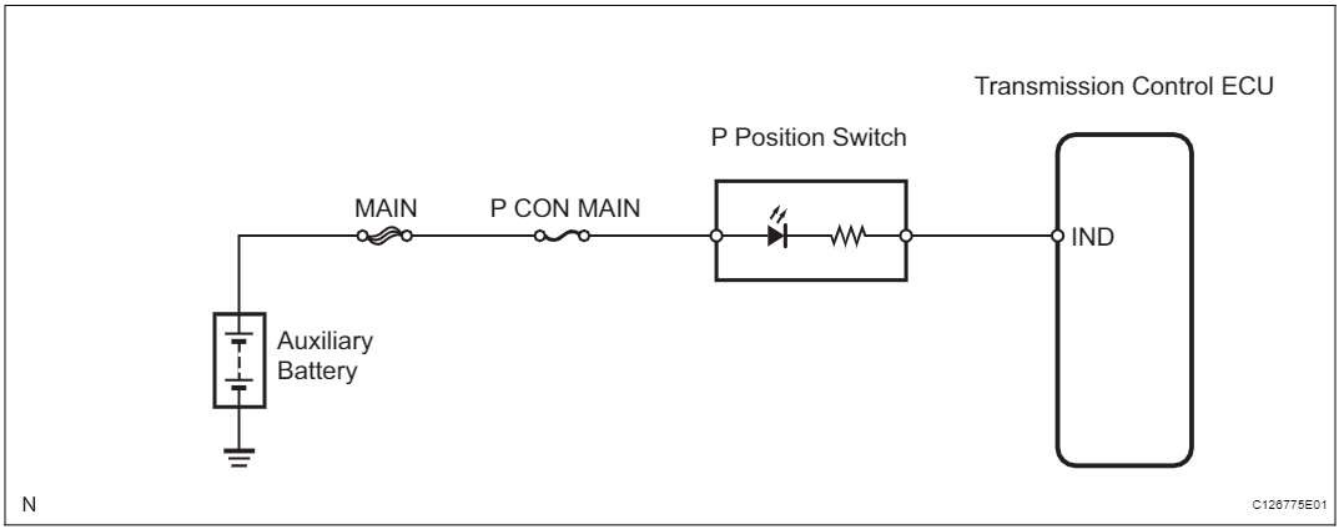
HX

"P" Position Switch Indicator Light Circuit

DESCRIPTION

The parking lock switch indicator light comes on or goes off to indicate the on/off status of the P position switch and blinks to indicate malfunction conditions of the system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK INDICATOR LIGHT

(a) Inspect the indicator light condition by operating the P position switch.

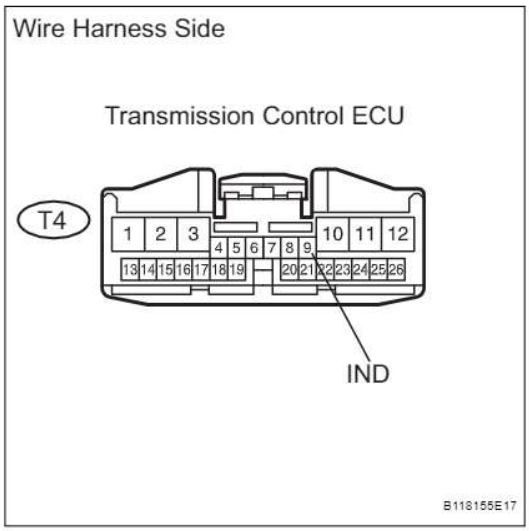
Result

Condition	Proceed to
Indicator light does not go off.	A
Indicator light does not come on.	B

B → Go to step 3

A

2 CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - P POSITION SWITCH)



(a) Disconnect the T4 ECU connector.
(b) Disconnect the M11 switch connector.
(c) Measure the resistance of the wire harness side connector.

Standard resistance

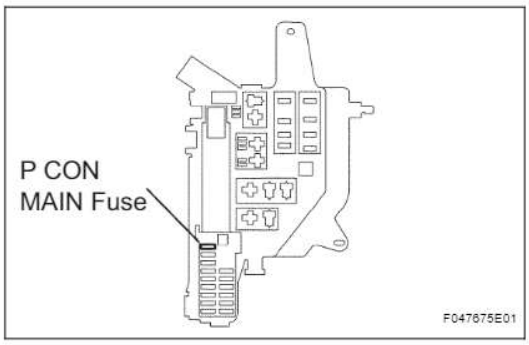
Tester Connection	Specified Condition
T4-9 (IND) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE TRANSMISSION CONTROL ECU

3 INSPECT FUSE (P CON MAIN)



(a) Remove the P CON MAIN fuse from the engine room relay block.
(b) Measure the resistance of the fuse.

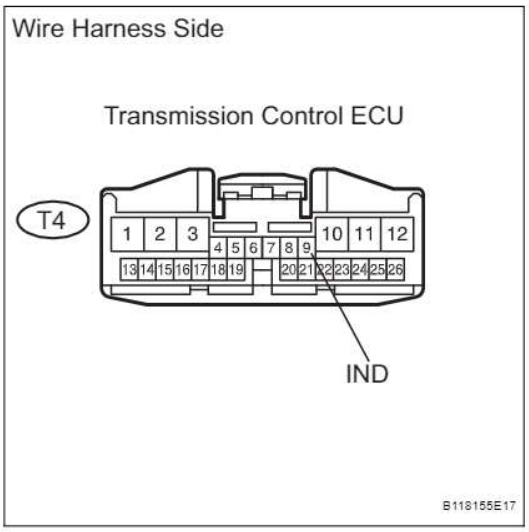
Standard resistance:
Below 1 Ω

NG → **INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE**

HX

OK

4	CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - BATTERY)



(a) Disconnect the T4 ECU connector.
(b) Measure the voltage of the wire harness side connector.

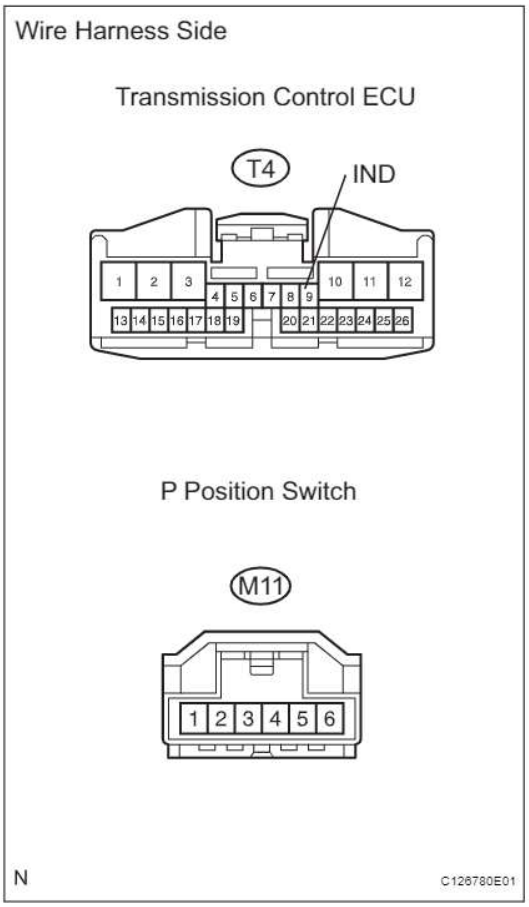
Standard voltage

Tester Connection	Specified Condition
T4-9 (IND) - Body ground	9 to 14 V

OK → REPLACE TRANSMISSION CONTROL ECU

NG

5	CHECK WIRE HARNESS (TRANSMISSION CONTROL ECU - P POSITION SWITCH)



(a) Disconnect the T4 ECU connector.
(b) Disconnect the M11 switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

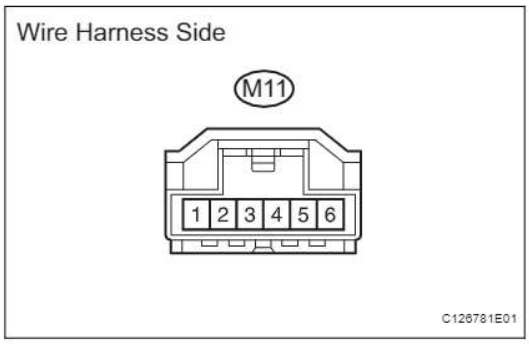
Tester Connection	Specified Condition
T4-9 (IND) - M11-6	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

HX

OK

6	CHECK WIRE HARNESS (P POSITION SWITCH - BATTERY)



(a) Disconnect the M11 switch connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Specified Condition
M11-5 - Body ground	9 to 14 V

OK → REPLACE P POSITION SWITCH

NG

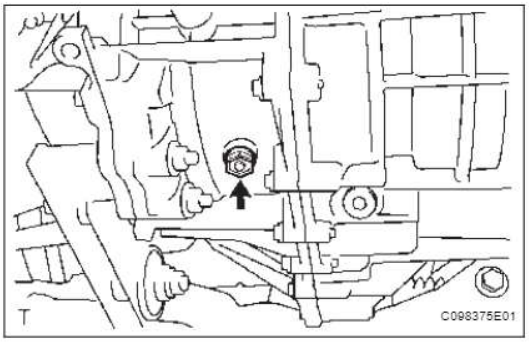
REPAIR OR REPLACE HARNESS AND CONNECTOR

HX

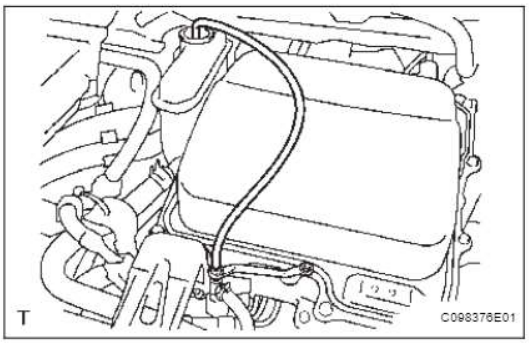
COOLANT

REPLACEMENT

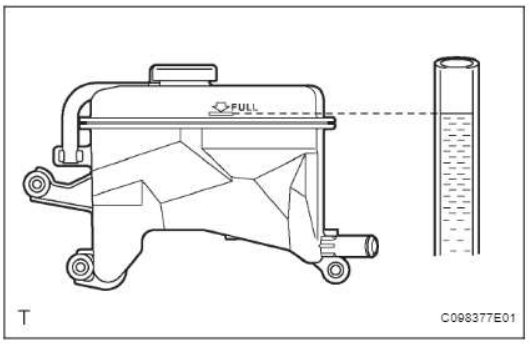
1. **REMOVE ENGINE UNDER COVER LH**
2. **REMOVE ENGINE UNDER COVER RH**
3. **DRAIN COOLANT**
   (a) Remove the transaxle-side reserve tank cap.
   CAUTION:
   Do not remove the reserve tank cap while the engine is hot.



   (b) Remove the plug shown in the illustration and drain the coolant into a container.
   (c) Install the plug with a new gasket.
   Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)



4. **ADD COOLANT**
   (a) Loosen the bleeder plug shown in the illustration and connect a hose.
   NOTICE:
   Insert one end of the hose into the bleeder tank.

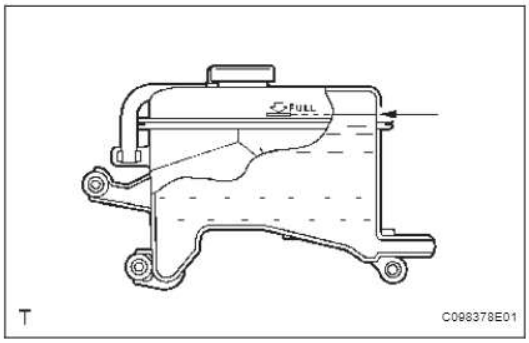


   (b) Add coolant until the level of coolant in the hose attached to the bleeder tank reaches the same level as the FULL line of the reserve tank.
   NOTICE:
   Add genuine Toyota Super LLC coolant.
   (c) Close the bleeder plug.
   (d) Turn the power switch ON (IG) and run the water pump for approximately 20 seconds.
   (e) Turn the power switch OFF. (1*)
   (f) Loosen the bleeder plug and bleed the air from the transaxle.
   (g) Add coolant into the bleeder tank. (*3)
   (h) Repeat the steps *1, *2 and *3.
   Standard:
   Water pump noise becomes softer and coolant circulation in reserve tank improves. Coolant system air bleeding is complete

HX

HINT:
If air remains in the coolant system, the water pump noise becomes louder and the coolant circulation in the reserve tank becomes worse.

(i) Turn the power switch ON (IG) and run the water pump for approximately 5 minutes after completing air bleeding of the coolant system.
NOTICE:
Ensure that the bleeder plug is closed.



(j) Add coolant until the reserve tank is filled up to the FULL mark.

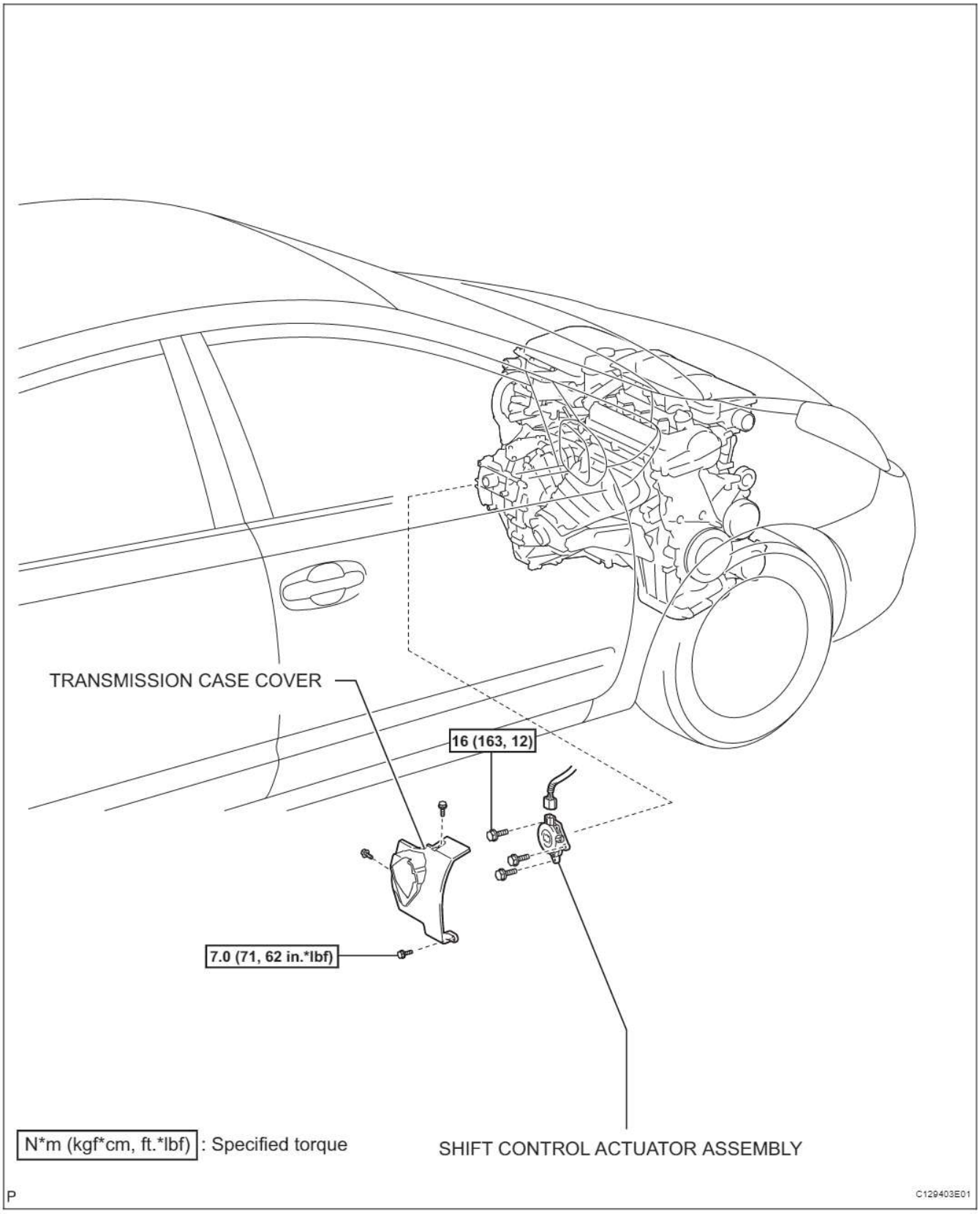
5. CHECK FOR ENGINE COOLANT LEAKAGE

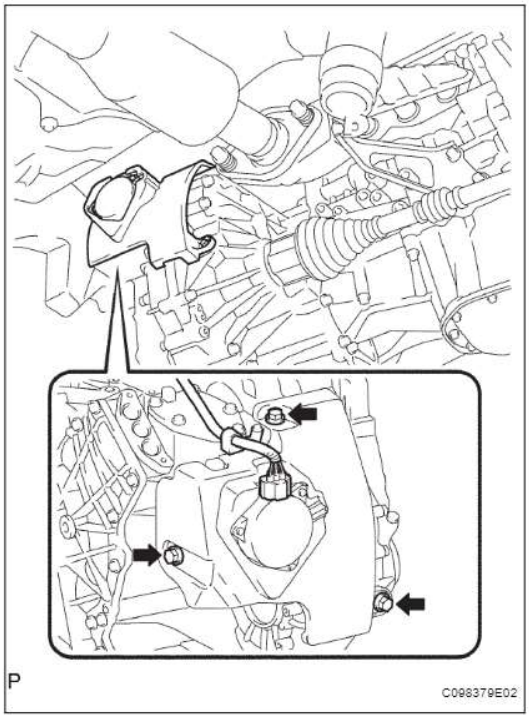
(a) Check for engine coolant leakage (see page CO-9).

HX

SHIFT CONTROL ACTUATOR

COMPONENTS



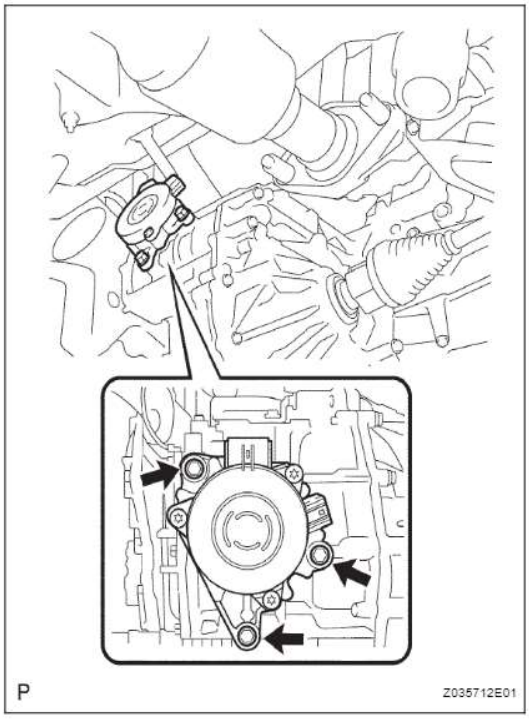


REMOVAL

1. REMOVE SHIFT CONTROL ACTUATOR ASSEMBLY

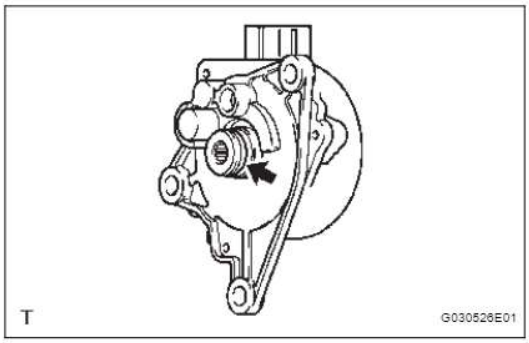
(a) Disconnect the connector.

(b) Remove the 3 bolts and transmission case cover from the hybrid vehicle transaxle.



(c) Remove the 3 bolts and shift control actuator from the hybrid vehicle transaxle.

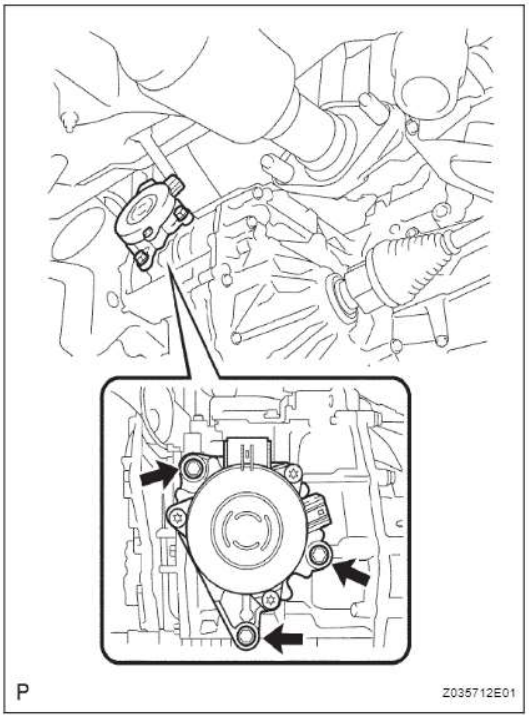
HX



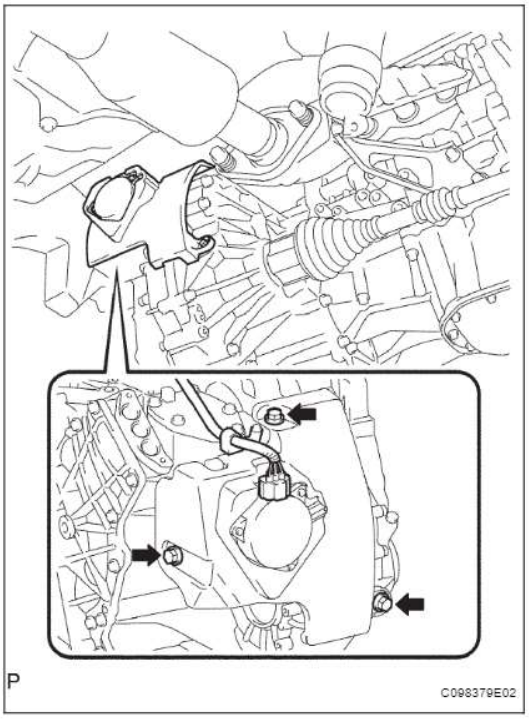
INSTALLATION

1. INSTALL SHIFT CONTROL ACTUATOR ASSEMBLY

(a) Apply a small amount of ATF WS to the O-ring.



(b) Install the shift control actuator to the hybrid vehicle transaxle with the 3 bolts.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)

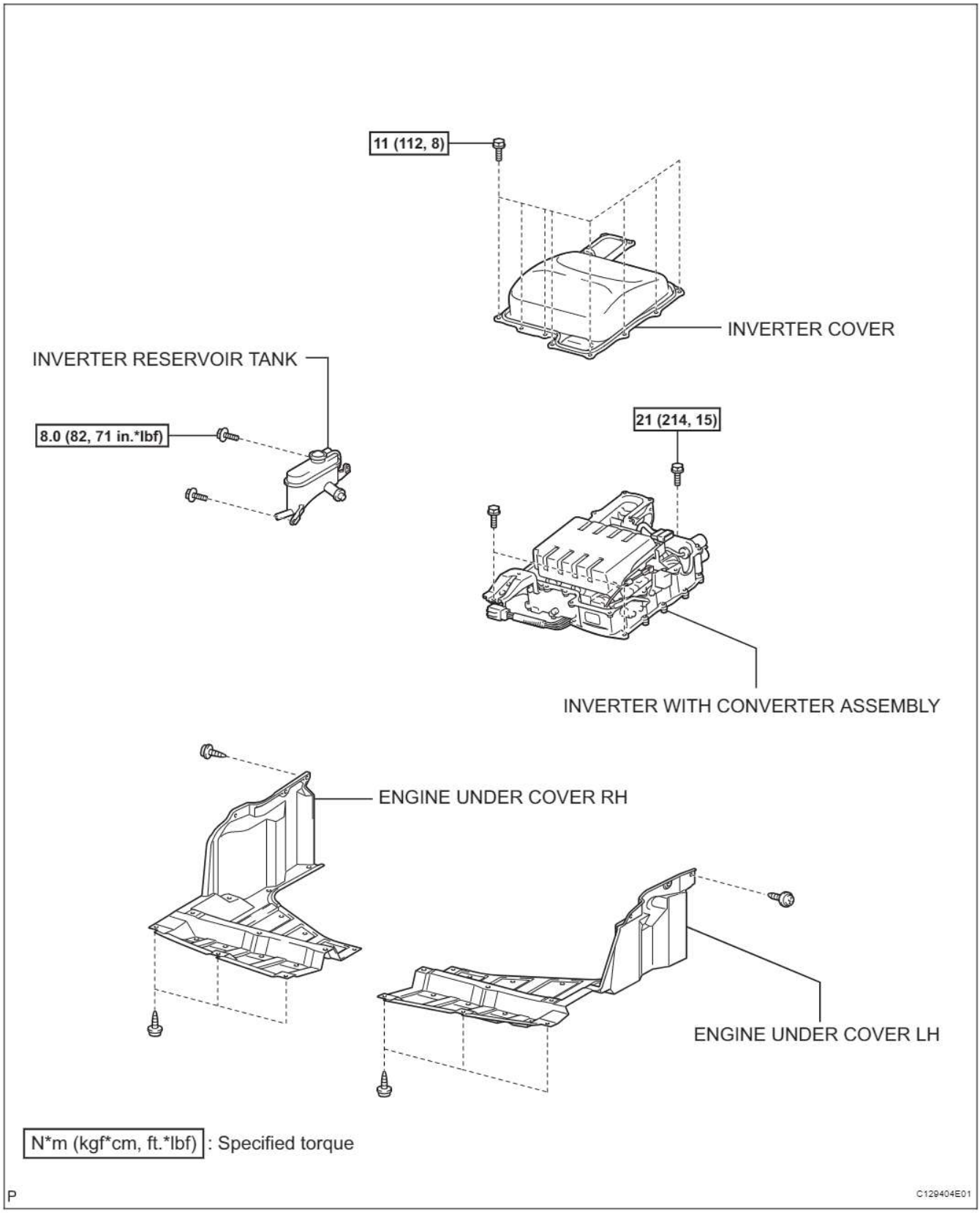


(c) Install the transmission case cover to the hybrid vehicle transaxle with the 3 bolts.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)
(d) Connect the connector.

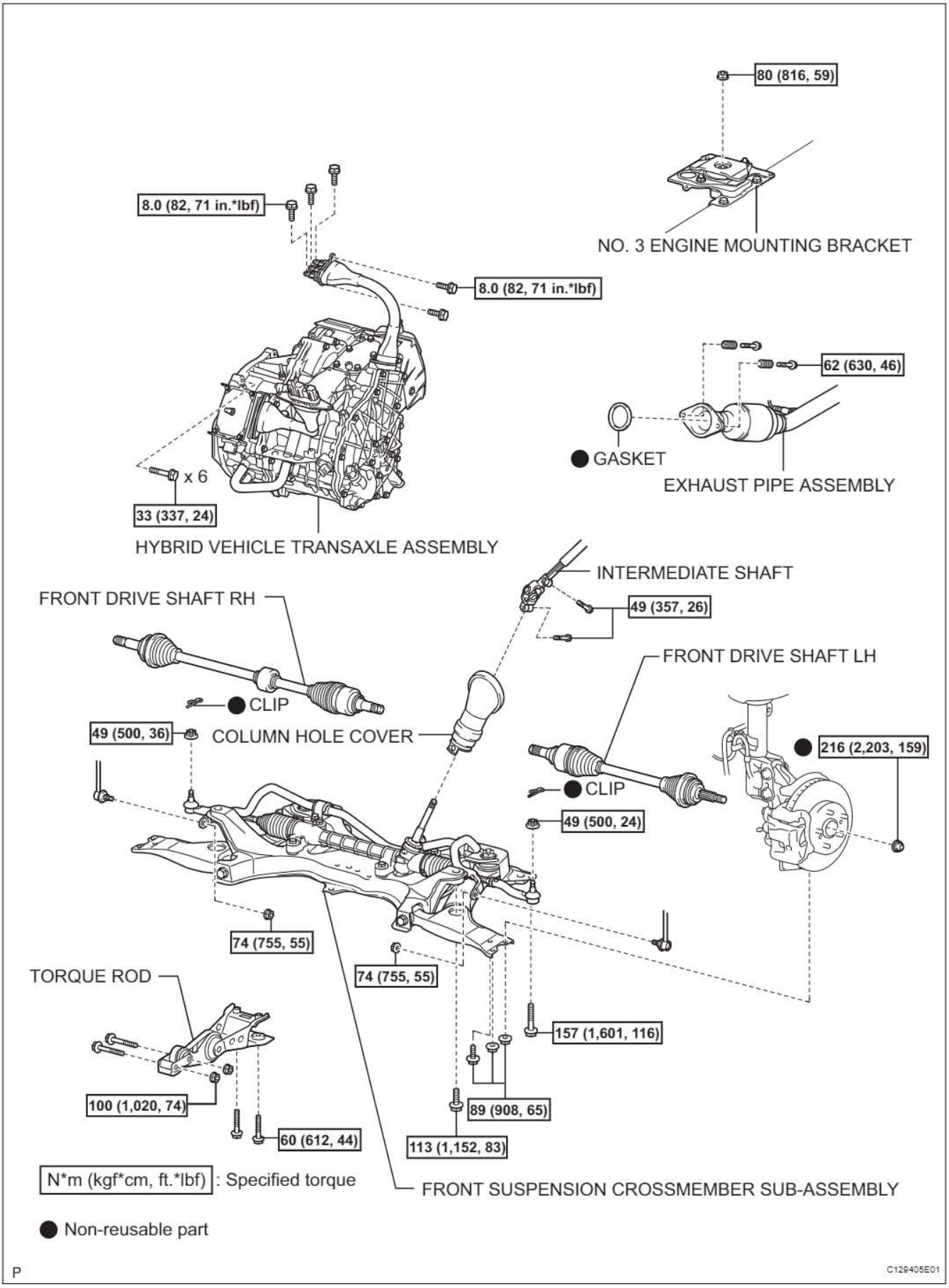
HX

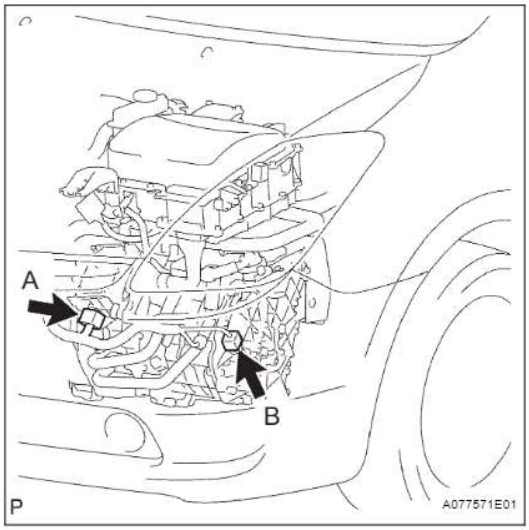
HYBRID VEHICLE TRANSAXLE ASSEMBLY

COMPONENTS



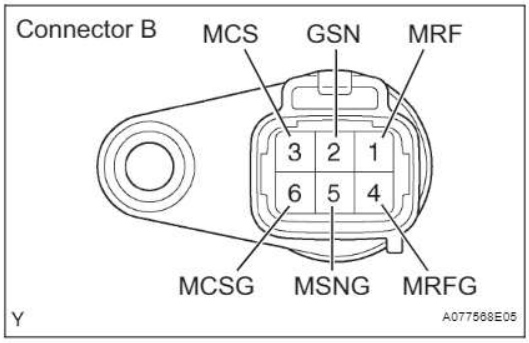
HX

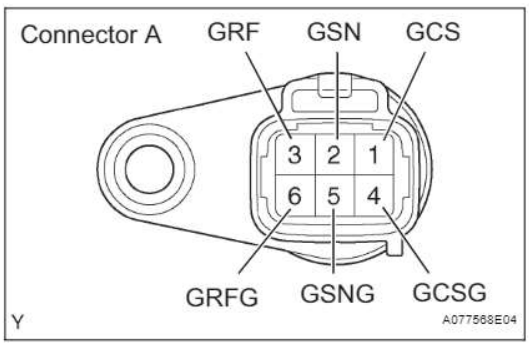

80 (816, 59)
NO. 3 ENGINE MOUNTING BRACKET
8.0 (82, 71 in.*lbf)
8.0 (82, 71 in.*lbf)
62 (630, 46)
GASKET
EXHAUST PIPE ASSEMBLY
x 6
33 (337, 24)
HYBRID VEHICLE TRANSAXLE ASSEMBLY
INTERMEDIATE SHAFT
49 (357, 26)
FRONT DRIVE SHAFT RH
FRONT DRIVE SHAFT LH
CLIP
49 (500, 36)
COLUMN HOLE COVER
CLIP
216 (2,203, 159)
49 (500, 24)
74 (755, 55)
74 (755, 55)
TORQUE ROD
157 (1,601, 116)
100 (1,020, 74)
89 (908, 65)
60 (612, 44)
113 (1,152, 83)
N*m (kgf*cm, ft.*lbf) : Specified torque
FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY
Non-reusable part
P
C129405E01



ON-VEHICLE INSPECTION

1. INSPECT SPEED SENSOR (RESOLVER)





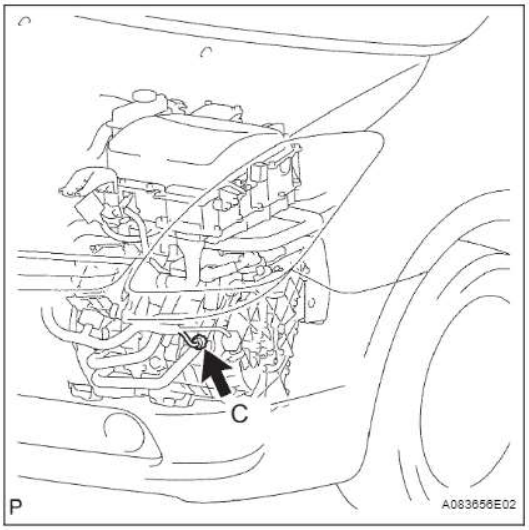
(a) Using an ohmmeter, measure the resistance between the terminals.

Standard resistance

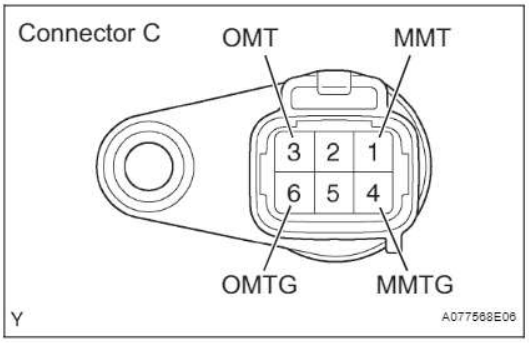
Tester Connection	Specified Condition
A1 (GCS) - A4 (GCSG)	12.6 to 16.8 Ω
A2 (GSN) - A5 (GSNG)	12.6 to 16.8 Ω
A3 (GRF) - A6 (GRFG)	7.65 to 10.2 Ω
B1 (MRF) - B4 (MRFG)	7.65 to 10.2 Ω
B2 (MSN) - B5 (MSNG)	12.6 to 16.8 Ω
B3 (MCS) - B6 (MCSG)	12.6 to 16.8 Ω
All of terminals above - Transaxle housing	10 kΩ or higher

If the results are not as specified, replace the hybrid vehicle transaxle assembly.

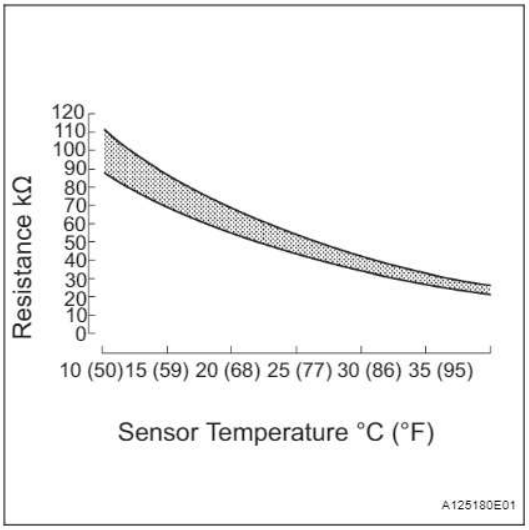
HX



2. INSPECT TEMPERATURE SENSOR



(a) Using an ohmmeter, measure the resistance between the terminals.



Standard resistance

Tester Connection	Specified Condition
C1 (MMT) - C4 (MMTG)	87.3 to 110.5 kΩ at 10°C (50°F) 23.8 to 28.5 kΩ at 40°C (104°F)
C3 (OMT) - C6 (OMTG)	87.3 to 110.5 kΩ at 10°C (50°F) 23.8 to 28.5 kΩ at 40°C (104°F)
All of terminals above - Transaxle housing	1 MΩ or higher

HINT:
The standard varies according to the sensor temperature. If the results are not as specified, replace the hybrid vehicle transaxle assembly.

HX

REMOVAL

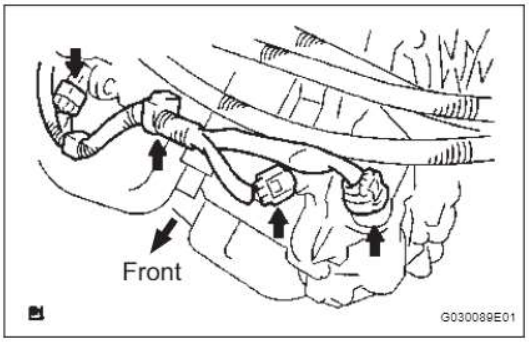
CAUTION:

- **When working on the high voltage systems, always wear insulated gloves.**
- **Keep the removed service plug in your pocket to prevent other technicians from reconnecting it while you are servicing the vehicle.**
- **After removing the service plug grip, do not touch the high voltage connectors and terminals for 5 minutes.**

NOTICE:

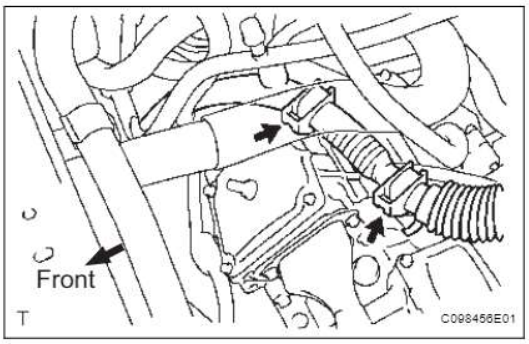
After removing the service plug grip, do not operate the power switch as it may damage the hybrid vehicle control ECU.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SERVICE PLUG GRIP**
   (a) Remove the service plug grip (see page HB-153).
3. **REMOVE FRONT WHEEL**
4. **REMOVE ENGINE UNDER COVER LH**
5. **REMOVE ENGINE UNDER COVER RH**
6. **DRAIN COOLANT**
   (a) Drain the coolant (see page HX-58).
7. **DRAIN TRANSAXLE OIL**
   (a) Drain the transaxle oil (see page HX-1).
8. **REMOVE HOOD SUB-ASSEMBLY**
   (a) Remove the hood (see page ED-2).
9. **REMOVE FRONT WIPER ARM LH**
   (a) Remove the front wiper arm LH (see page WW-13).
10. **REMOVE FRONT WIPER ARM RH**
    (a) Remove the front wiper arm RH (see page WW-13).
11. **REMOVE COWL TOP FRONT PANEL SUB-ASSEMBLY OUTER**
    (a) Remove the cowl top front panel (see page WW-13).
12. **REMOVE INVERTER WITH CONVERTER ASSEMBLY**
    (a) Remove the inverter with converter (see page HV-533).
13. **REMOVE AIR CLEANER ASSEMBLY**
    (a) Remove the air cleaner (see page ES-450).

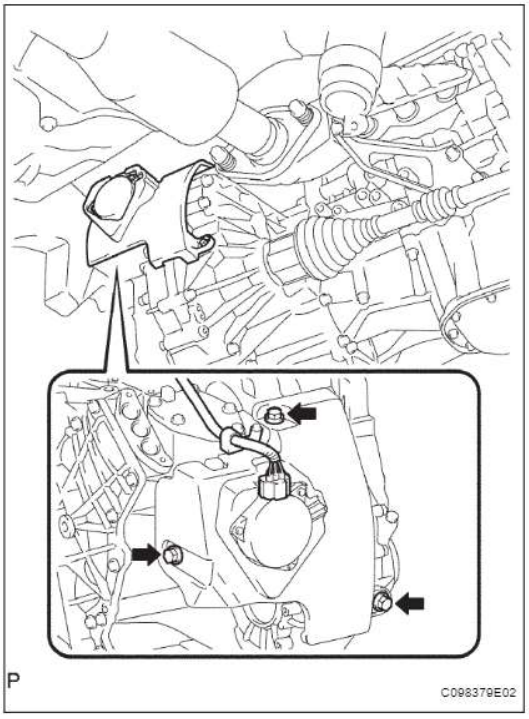


14. DISCONNECT WIRE HARNESS

(a) Disconnect the 3 connectors shown in the illustration and the clamp.

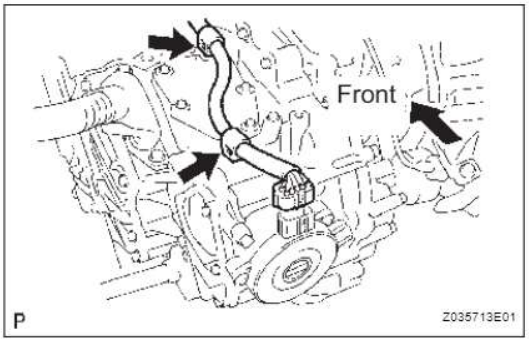


(b) Disconnect the 2 clamps shown in the illustration.

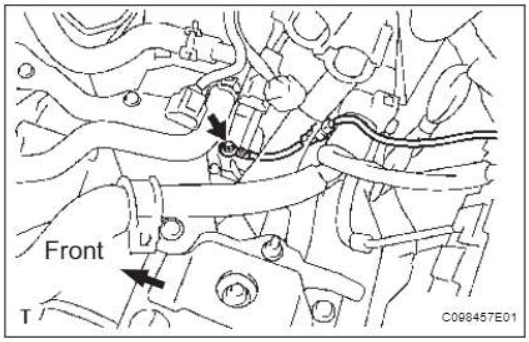


(c) Disconnect the connector.

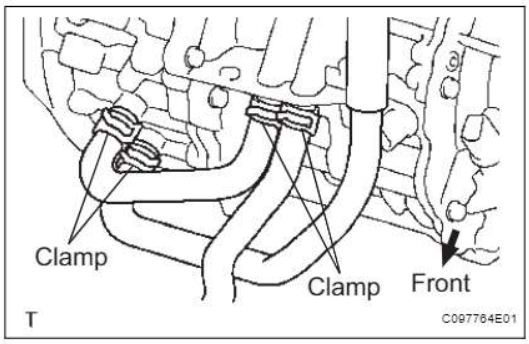
(d) Remove the 3 bolts and transmission case cover from the hybrid vehicle transaxle.



(e) Disconnect the 2 clamps.



(f) Remove the bolt and ground wire.



15. DISCONNECT NO. 4 INVERTER COOLING HOSE

(a) Remove the 4 clamps and disconnect the 3 hoses.

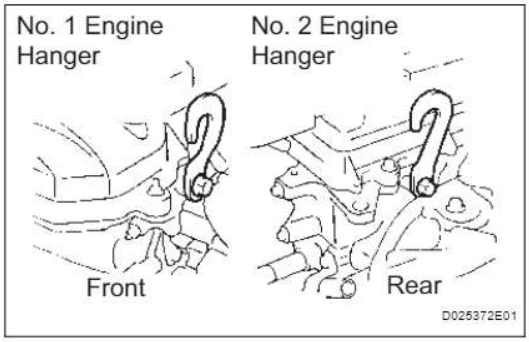
16. REMOVE FRONT DRIVE SHAFT ASSEMBLY

(a) Remove the front drive shaft (see page DS-4).

17. DISCONNECT EXHAUST PIPE ASSEMBLY

(a) Disconnect the exhaust pipe (see page EX-2).

18. REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page EM-96)



19. SUSPEND ENGINE ASSEMBLY

(a) Disconnect the 2 PCV hoses.

(b) Install the No. 1 and No. 2 engine hangers in the correct direction.

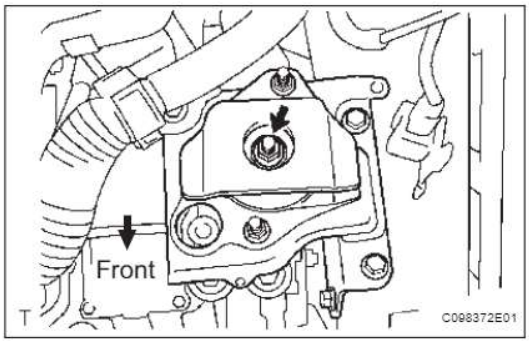
Parts No.:
No. 1 engine hanger:
12281-22021
No. 2 engine hanger:
12281-15040
Bolt:
91512-B1016
Torque: 38 N*m (387 kgf*cm, 28 ft.*lbf)

(c) Attach an engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other parts.

20. SUPPORT HYBRID VEHICLE TRANSAXLE ASSEMBLY

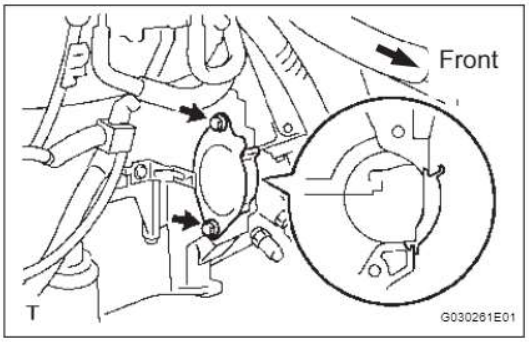
(a) Using a transmission jack, support the hybrid vehicle transaxle.



21. DISCONNECT NO. 3 ENGINE MOUNTING BRACKET

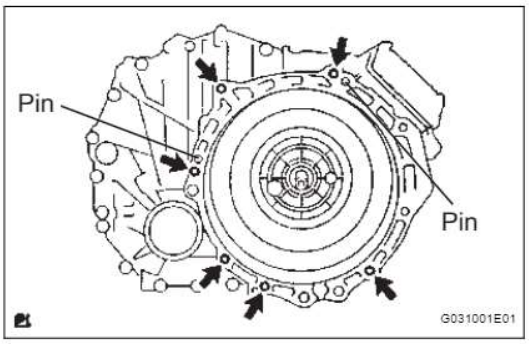
(a) Remove the nut and disconnect the engine mounting bracket from the engine mounting insulator.

HX

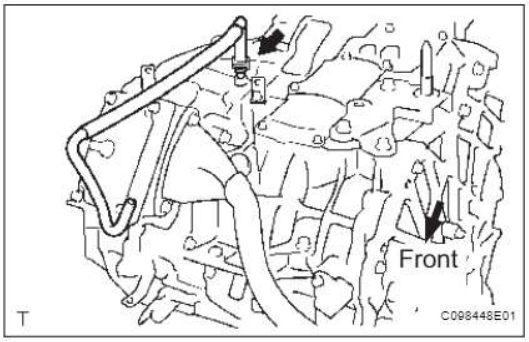


22. REMOVE HYBRID VEHICLE TRANSAXLE ASSEMBLY

(a) Remove the 2 bolts, starter cover and housing side cover.



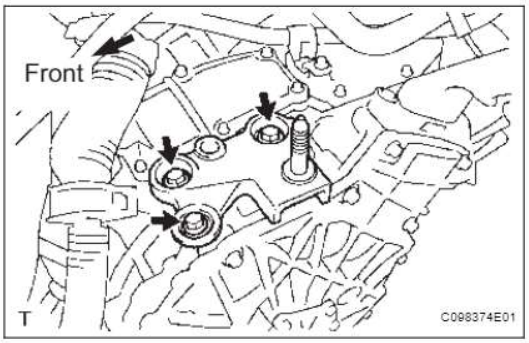
(b) Remove the 6 bolts and hybrid vehicle transaxle.
NOTICE:
To avoid damage to the knock pin, do not pry the connecting portion of the HV transaxle and the engine.



23. REMOVE NO. 6 INVERTER COOLING HOSE

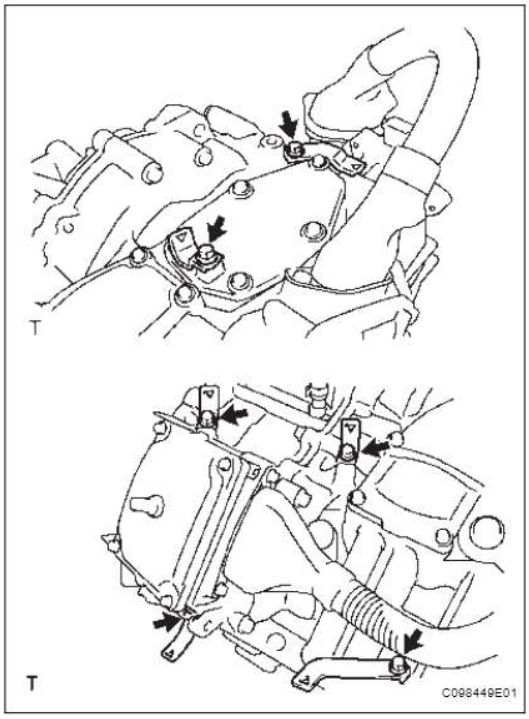
(a) Remove the clamp and inverter cooling hose.

HX



24. REMOVE NO. 3 ENGINE MOUNTING BRACKET

(a) Remove the 3 bolts and engine mounting bracket.



(b) Remove the 6 bolts shown in the illustration and clamp.

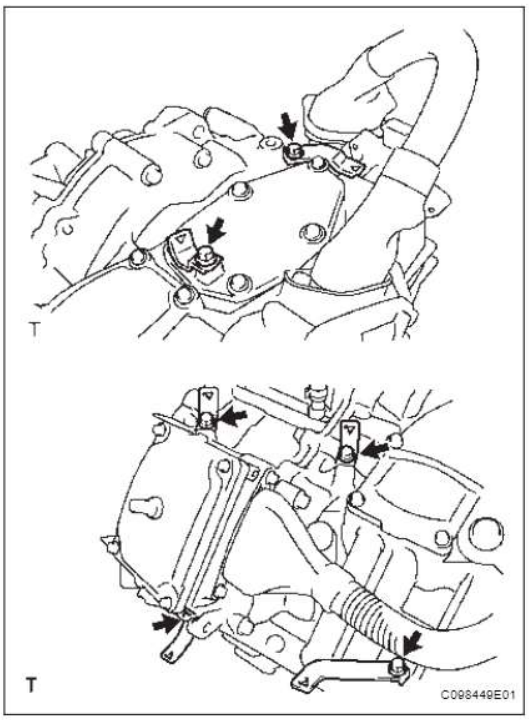
INSTALLATION

CAUTION:

- **When working on the high voltage systems, always wear insulated gloves.**
- **Keep the removed service plug in your pocket to prevent other technicians from reconnecting it while you are servicing the vehicle.**
- **After removing the service plug grip, do not touch the high voltage connectors and terminals for 5 minutes.**

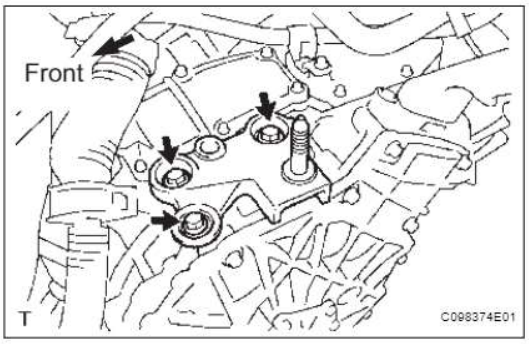
NOTICE:

After removing the service plug grip, do not operate the power switch as it may damage the hybrid vehicle control ECU.

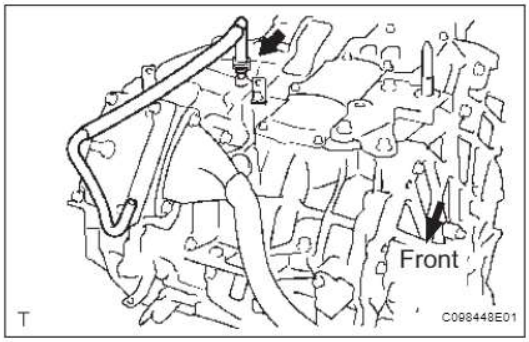


1. INSTALL NO. 3 ENGINE MOUNTING BRACKET

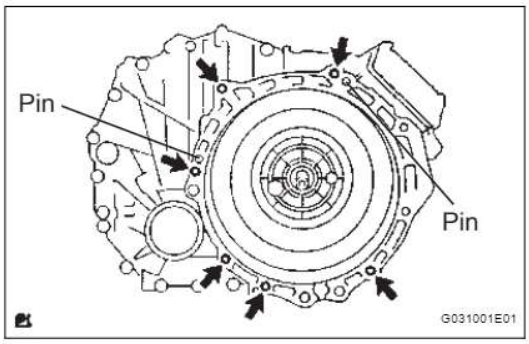
(a) Install the clump in the position shown in the illustration with the 6 bolts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



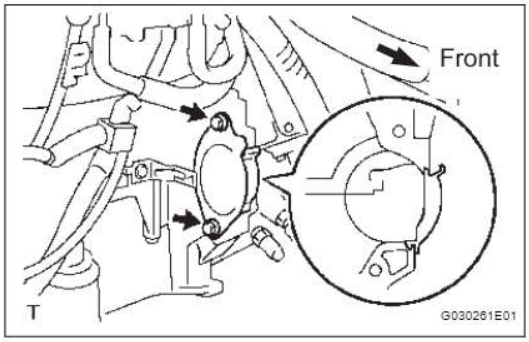
(b) Install the No. 3 engine mounting bracket with the 3 bolts.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)



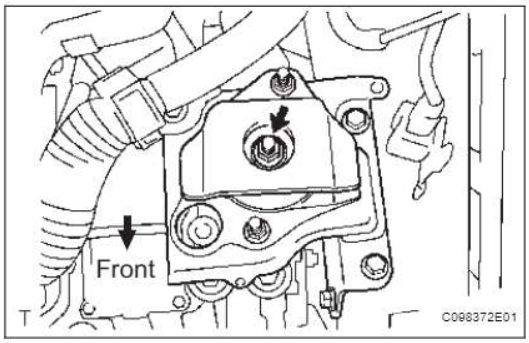
2. **INSTALL NO. 6 INVERTER COOLING HOSE**
   (a) Connect the inverter cooling hose and install the clamp.



3. **INSTALL HYBRID VEHICLE TRANSAXLE ASSEMBLY**
   (a) Install the hybrid vehicle transaxle with the 6 bolts.
   Torque: 33 N*m (337 kgf*cm, 24 ft.*lbf)
   NOTICE:
   - **Ensure that the knock pin is installed on the engine side.**
   - **Place the HV transaxle in a horizontal position and Align the knock pin and its hole. Then tighten the 6 bolts in the positions shown in the illustration.**

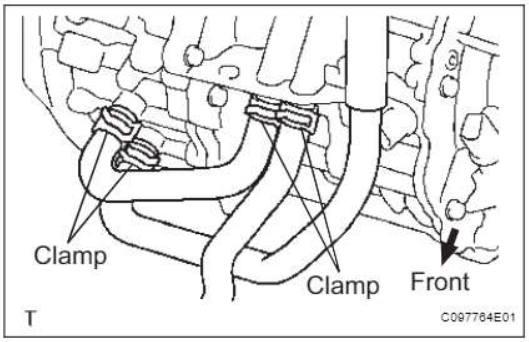


   (b) Install the housing side cover and starter cover with the 2 bolts.
   Torque: 32 N*m (326 kgf*cm, 23 ft.*lbf)



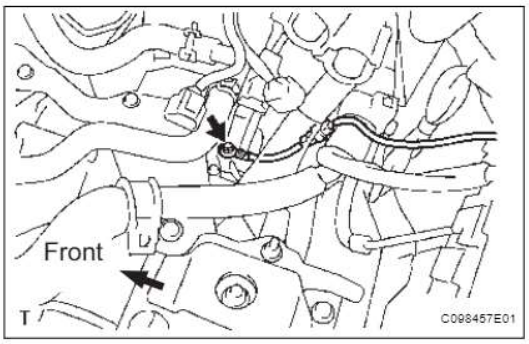
4. **INSTALL NO. 3 ENGINE MOUNTING BRACKET**
   (a) Install the engine mounting bracket to the engine mounting insulator with the nut.
   Torque: 80 N*m (816 kgf*cm, 59 ft.*lbf)
5. **REMOVE NO. 1 ENGINE HANGER**
   (a) Remove the bolt and engine hanger.
6. **INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page EM-106)**
7. **CONNECT EXHAUST PIPE ASSEMBLY**
   (a) Connect the exhaust pipe (see page EX-3).
8. **INSTALL FRONT DRIVE SHAFT ASSEMBLY**
   (a) Install the front drive shaft (see page DS-15).

HX



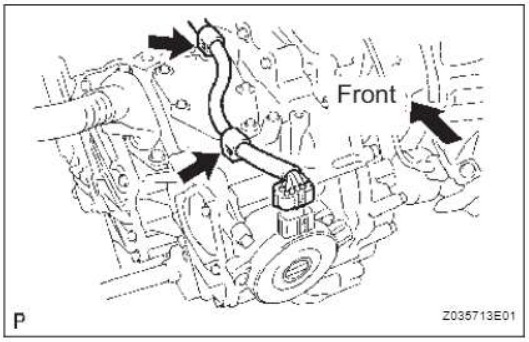
9. CONNECT NO. 4 INVERTER COOLING HOSE

(a) Connect the 3 hoses with the 4 clamps.

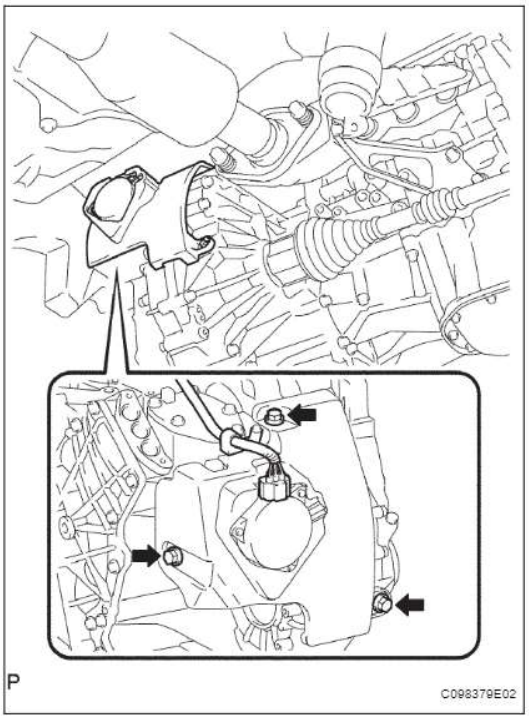


10. CONNECT CONNECTOR

(a) Connect the ground wire with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



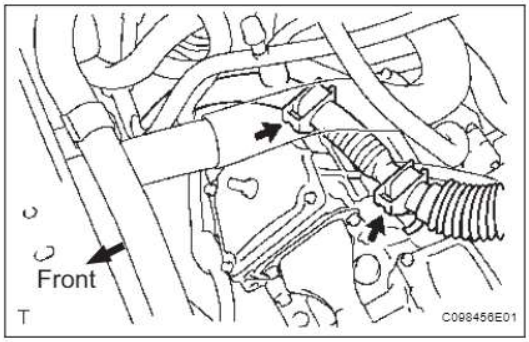
(b) Connect the 2 clamps.

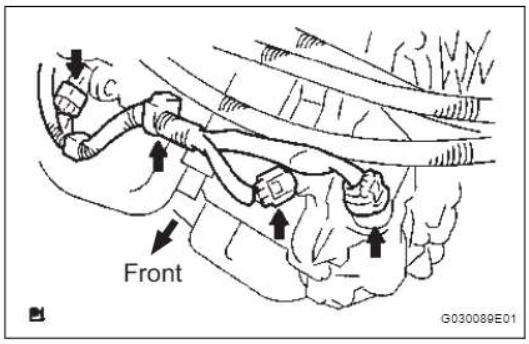


(c) Install the transmission case cover to the hybrid vehicle transaxle with the 3 bolts.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

(d) Connect the connector.

HX





(e) Connect the clamps in the 2 locations shown in the illustration.

(f) Connect the clamp and the 3 connectors shown in the illustration.

11. INSTALL AIR CLEANER ASSEMBLY
(a) Install the air cleaner (see page ES-453).

12. INSTALL INVERTER WITH CONVERTER ASSEMBLY
(a) Install with inverter converter (see page HV-535).

13. INSTALL COWL TOP FRONT PANEL SUB-ASSEMBLY OUTER
(a) Install the cowl top front panel (see page WW-15).

14. INSTALL FRONT WIPER ARM RH
(a) Install the front wiper arm (see page WW-16).

15. INSTALL FRONT WIPER ARM LH
(a) Install the front wiper arm (see page WW-16).

16. INSTALL HOOD SUB-ASSEMBLY
(a) Install the hood (see page ED-4).

17. ADJUST HOOD SUB-ASSEMBLY
(a) Adjust the hood (see page ED-4).

18. INSTALL ENGINE UNDER COVER RH

19. INSTALL ENGINE UNDER COVER LH

20. INSTALL FRONT WHEEL

21. INSTALL SERVICE PLUG GRIP
(a) Install the service plug grip (see page HB-154).

22. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

23. ADD TRANSAXLE OIL
Fluid type:
Toyota genuine ATF WS
Standard capacity:
3.8 liters (4.0 US qts, 3.3 Imp. qts)

24. INSPECT TRANSAXLE OIL
(a) Inspect the transaxle oil (see page HX-1).

25. ADD COOLANT
(a) Add the coolant (see page HX-58).

26. CHECK FOR ENGINE COOLANT LEAKAGE
(a) Check for engine coolant leakage (see page CO-9).

HX

27. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

(a) Inspect and adjust the front wheel alignment (see page SP-2).

28. PERFORM CALIBRATION

(a) Perform calibration (see page PS-13).

29. PERFORM INITIALIZATION

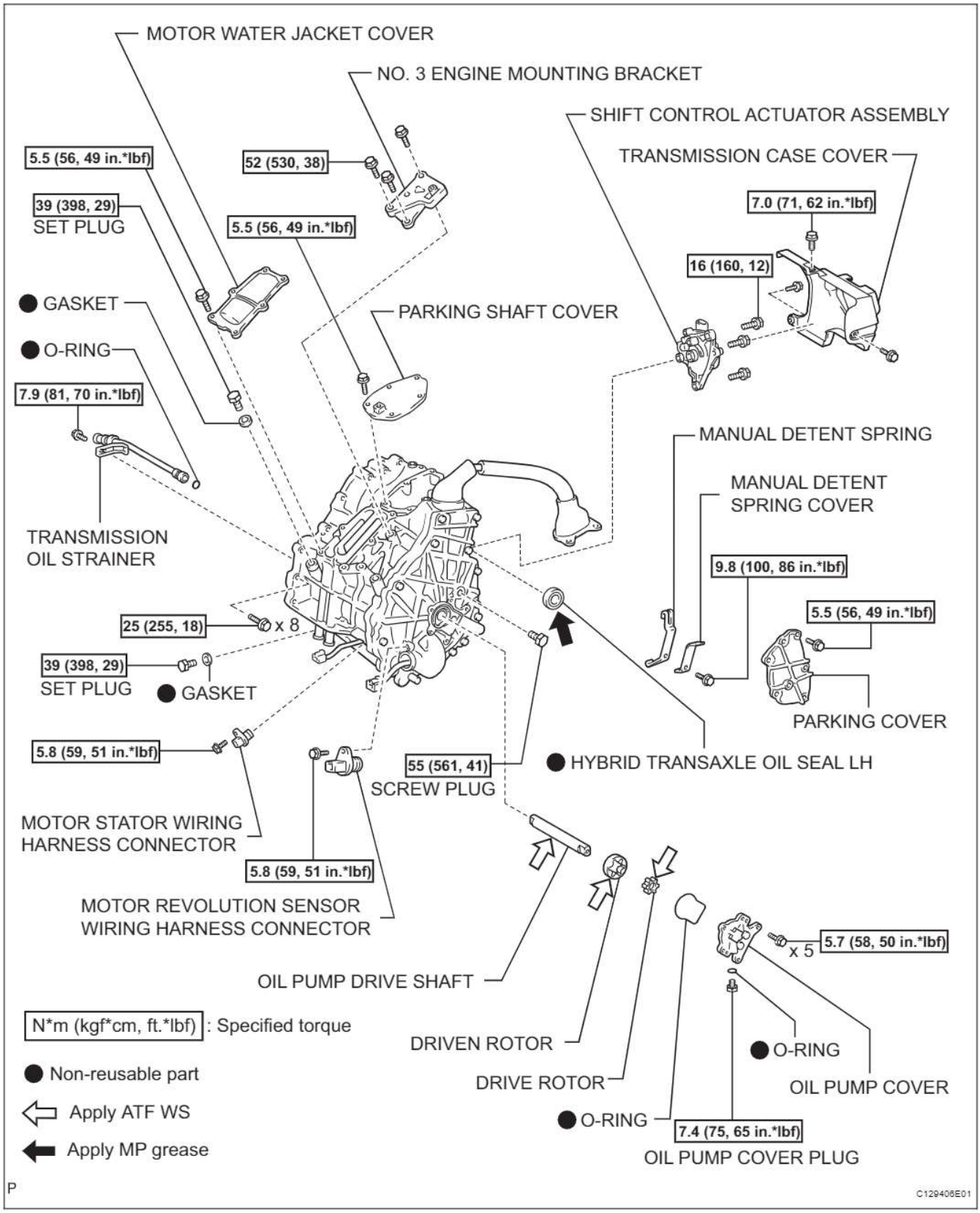
(a) Perform initialization (see page IN-32).

NOTICE:

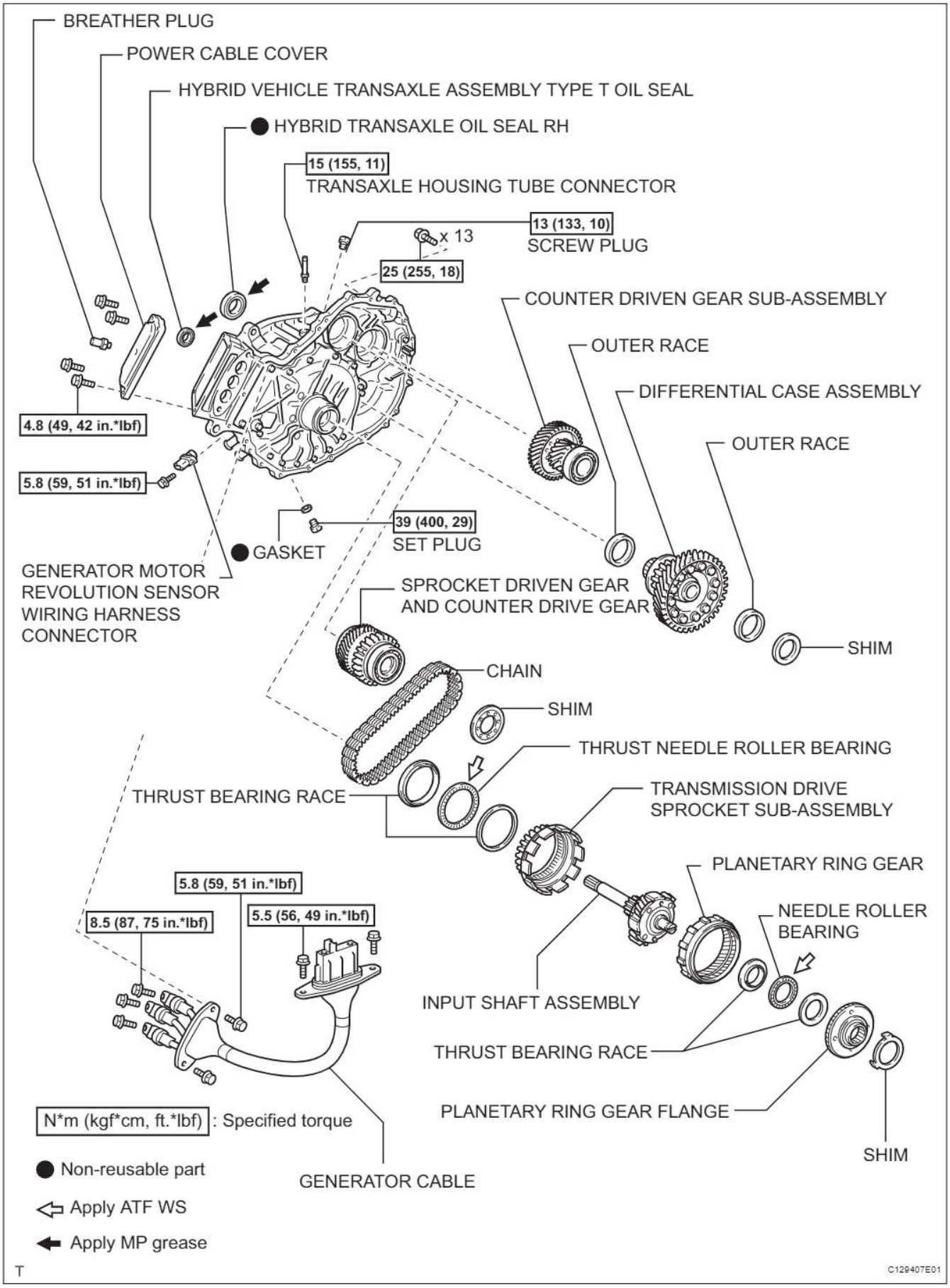
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

HYBRID VEHICLE TRANSAXLE UNIT

COMPONENTS



HX


BREATHER PLUG
POWER CABLE COVER
HYBRID VEHICLE TRANSAXLE ASSEMBLY TYPE T OIL SEAL
HYBRID TRANSAXLE OIL SEAL RH
15 (155, 11)
TRANSAXLE HOUSING TUBE CONNECTOR
13 (133, 10)
x 13
SCREW PLUG
25 (255, 18)
COUNTER DRIVEN GEAR SUB-ASSEMBLY
OUTER RACE
DIFFERENTIAL CASE ASSEMBLY
OUTER RACE
4.8 (49, 42 in.*lbf)
5.8 (59, 51 in.*lbf)
39 (400, 29)
SET PLUG
GASKET
GENERATOR MOTOR REVOLUTION SENSOR WIRING HARNESS CONNECTOR
SPROCKET DRIVEN GEAR AND COUNTER DRIVE GEAR
SHIM
CHAIN
SHIM
THRUST NEEDLE ROLLER BEARING
THRUST BEARING RACE
TRANSMISSION DRIVE SPROCKET SUB-ASSEMBLY
PLANETARY RING GEAR
5.8 (59, 51 in.*lbf)
8.5 (87, 75 in.*lbf)
5.5 (56, 49 in.*lbf)
NEEDLE ROLLER BEARING
INPUT SHAFT ASSEMBLY
THRUST BEARING RACE
PLANETARY RING GEAR FLANGE
SHIM
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Apply ATF WS
Apply MP grease
GENERATOR CABLE
T
C129407E01

DISASSEMBLY

CAUTION:

- **When working on the high voltage systems, always wear insulated gloves.**
- **Keep the removed service plug in your pocket to prevent other technicians from reconnecting it while you are servicing the vehicle.**
- **After removing the service plug grip, do not touch the high voltage connectors and terminals for 5 minutes.**

NOTICE:

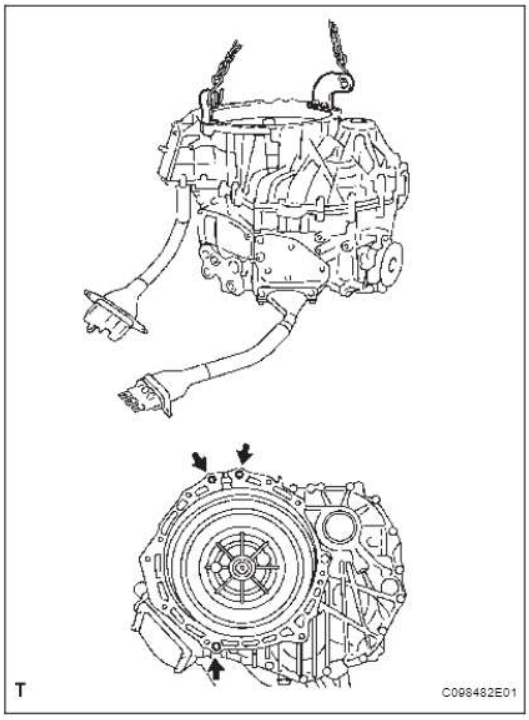
After removing the service plug grip, do not operate the power switch as it may damage the hybrid vehicle control ECU.

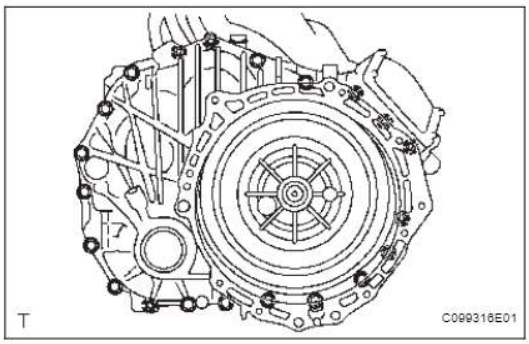
1. **REMOVE HYBRID VEHICLE TRANSAXLE ASSEMBLY**
   (a) Remove the hybrid vehicle transaxle (see page HX-66).

2. **REMOVE HYBRID VEHICLE GENERATOR ASSEMBLY**
   (a) Install the 2 engine hangers in the positions shown in the illustration.
   HINT:
   - Engine hanger: 12281-67070, S1228-11781
   - Bolt: 91642-81045, 91642-81265
   - Nut: 90178-10001, 90179-12147

   (b) Using an engine sling device and chain block, set the transaxle with the generator side facing upward.
   NOTICE:
   - **Place the transaxle on wooden blocks or equivalent.**
   - **Fix the transaxle so that no excessive force is applied to the cable.**

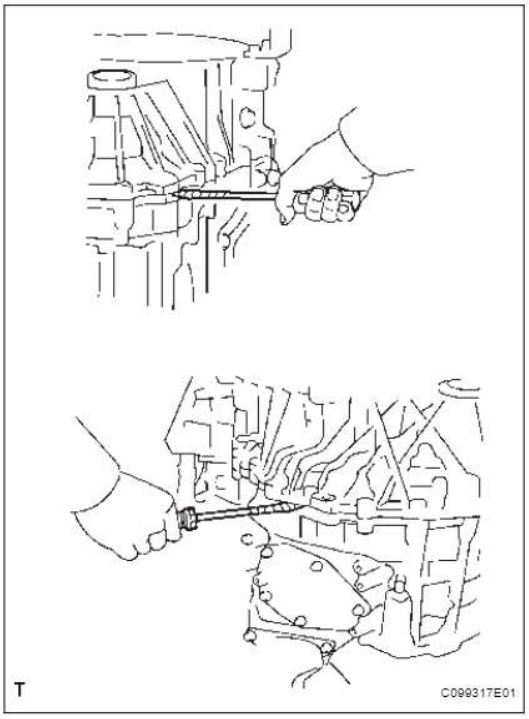
   (c) Remove the drain plug.





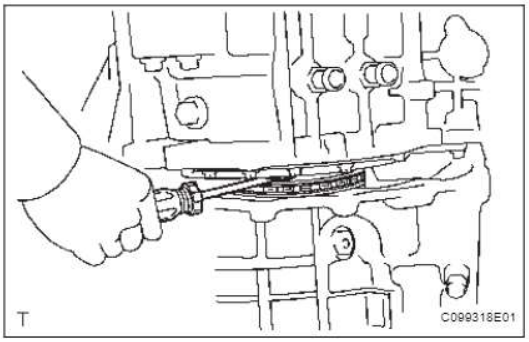
(d) Remove the 21 bolts shown in the illustration.
HINT:
- 13 bolts on the generator side.
- 8 bolts on the motor side.

HX



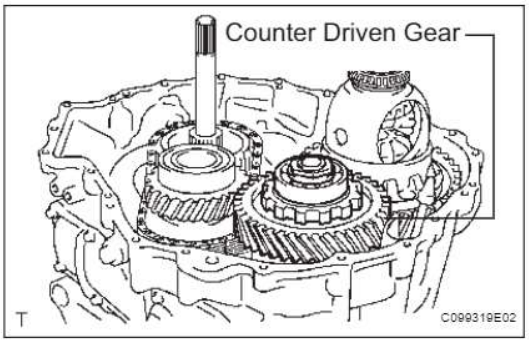
(e) Disconnect the motor and generator by inserting a flat-head screwdriver in the position shown and prying the two apart.
NOTICE:
Be careful not to damage the two faces of each part.

(f) Using an engine sling device and chain block, raise the generator.
HINT:
Raise the generator approximately 30 to 40 mm (1.18 to 1.57 in.).



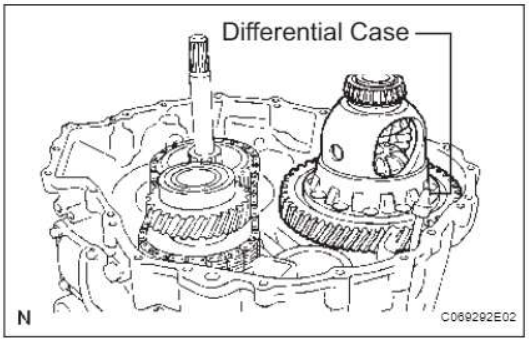
(g) Apply protective tape to the head of a flat-head screwdriver and use it to hold down the chain with input shaft while removing the generator.

HX



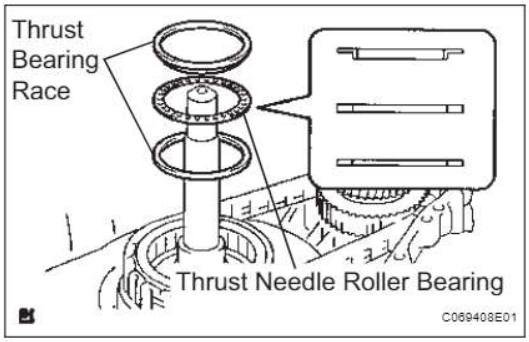
3. REMOVE COUNTER DRIVEN GEAR SUB-ASSEMBLY

(a) Remove the counter driven gear from the HV motor.



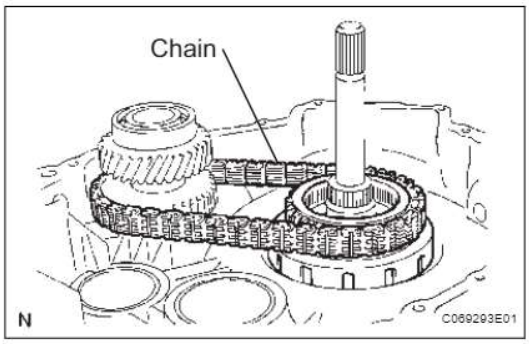
4. REMOVE DIFFERENTIAL CASE ASSEMBLY

(a) Remove the differential case from the HV motor.

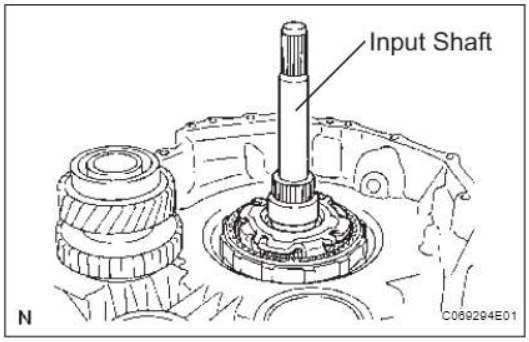


5. REMOVE TRANSMISSION DRIVE SPROCKET SUB-ASSEMBLY

(a) Remove the thrust bearing race, thrust needle roller bearing and No. 1 thrust bearing race.
HINT:
The thrust bearing race may be attached to the generator side.

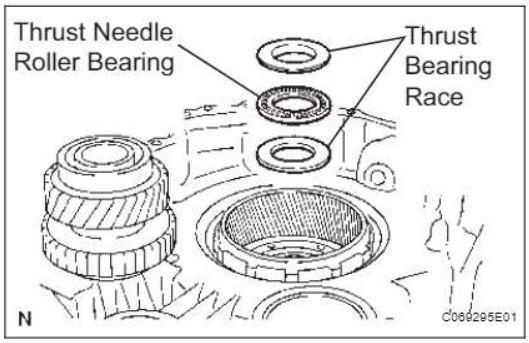


(b) Remove the drive sprocket and chain.



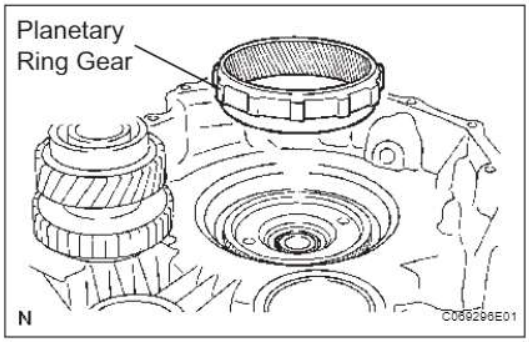
6. REMOVE INPUT SHAFT ASSEMBLY

(a) Remove the input shaft.

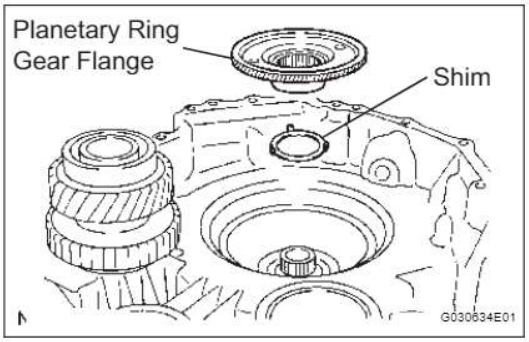


7. REMOVE PLANETARY RING GEAR

(a) Remove the thrust bearing race, thrust needle roller bearing and No. 1 thrust bearing race.
HINT:
The thrust bearing race may be attached to the input shaft side.

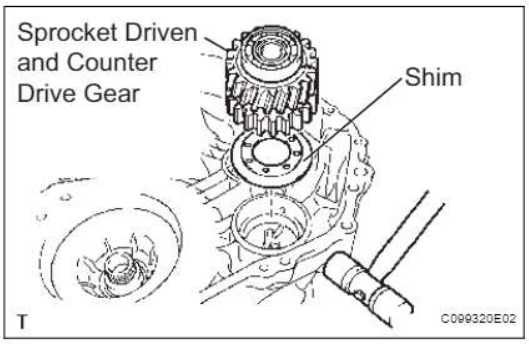


(b) Remove the planetary ring rear.



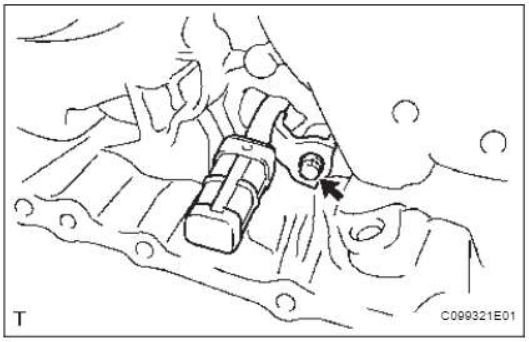
8. REMOVE PLANETARY RING GEAR FLANGE

(a) Remove the planetary ring gear flange and shim.



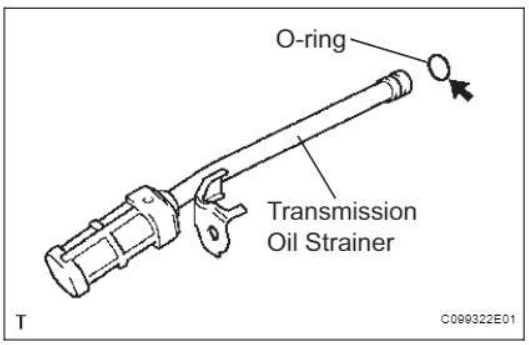
9. REMOVE SPROCKET DRIVEN GEAR AND COUNTER DRIVE GEAR

(a) Using a plastic-faced hammer, tap the motor case and remove the counter drive gear and shim.
HINT:
Remove the counter drive gear while pulling it vertically.

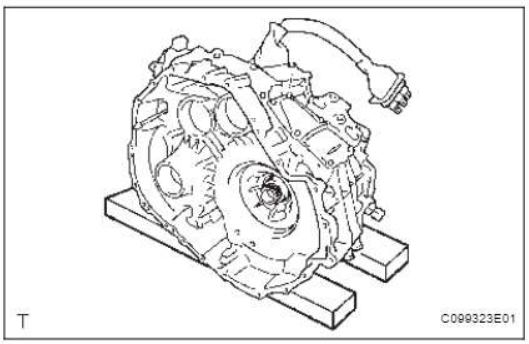


10. FIX TRANSMISSION OIL STRAINER

(a) Remove the bolt and oil strainer.

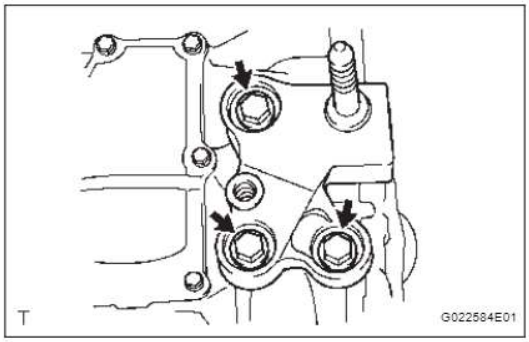


(b) Remove the O-ring from the oil strainer.



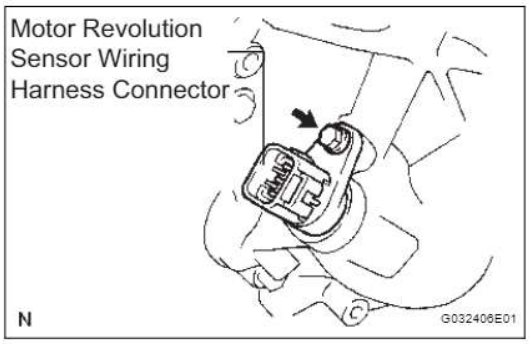
11. REMOVE HV MOTOR ASSEMBLY

(a) Place the motor on wooden blocks or equivalent.



12. REMOVE NO. 3 ENGINE MOUNTING BRACKET

(a) Remove the 3 bolts and mounting bracket.



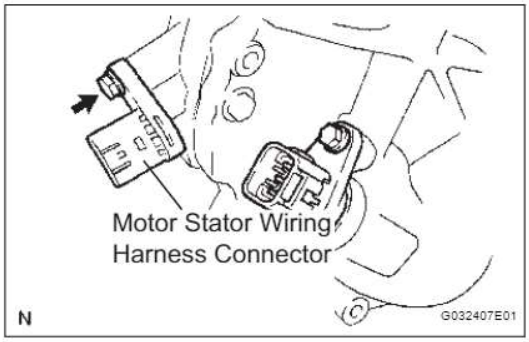
13. REMOVE MOTOR REVOLUTION SENSOR WIRING HARNESS CONNECTOR

(a) Remove the bolt and pull out the HV motor side motor revolution sensor wiring harness connector (gray).

NOTICE:

Do not pull on the connector any more than necessary.

(b) Remove the connector and motor revolution sensor wiring harness connector (gray).



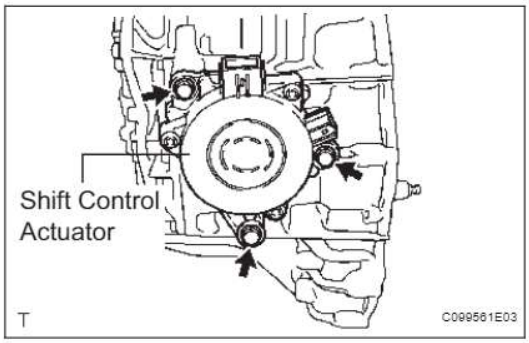
14. REMOVE MOTOR STATOR WIRING HARNESS CONNECTOR

(a) Remove the bolt and pull out the motor stator wiring harness connector (black).

NOTICE:

Do not pull on the sensor connector any more than necessary.

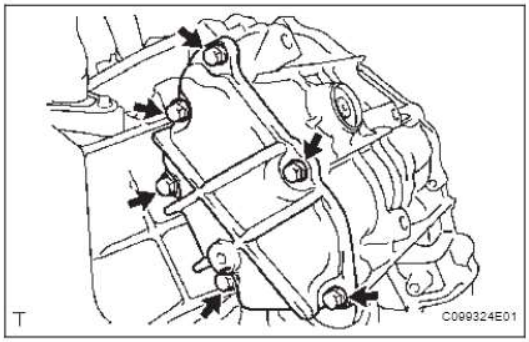
(b) Disconnect the connector and the motor stator wiring harness connector (black).



15. REMOVE SHIFT CONTROL ACTUATOR ASSEMBLY

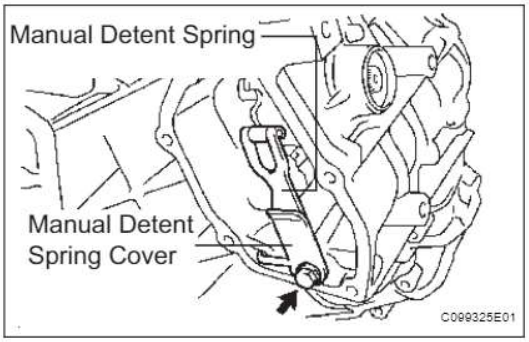
(a) Remove the 3 bolts and shift control actuator.

HX



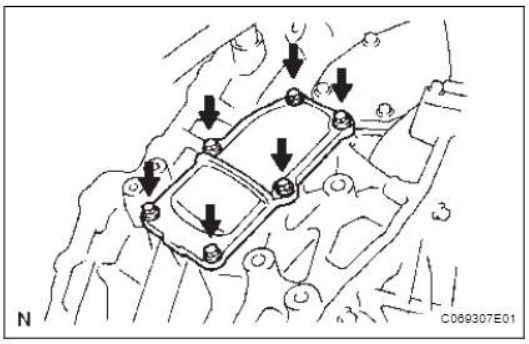
16. REMOVE PARKING COVER

(a) Remove the 6 bolts and parking cover.



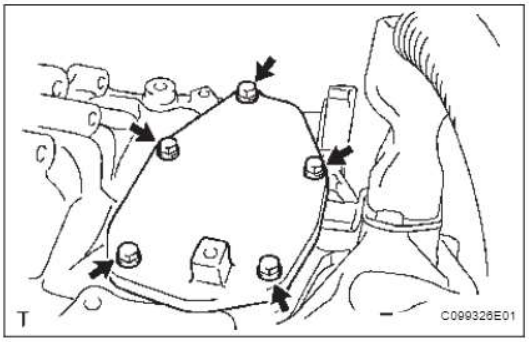
17. REMOVE MANUAL DETENT SPRING SUB-ASSEMBLY

(a) Remove the bolt, manual detent spring cover and manual detent spring.



18. REMOVE MOTOR WATER JACKET COVER

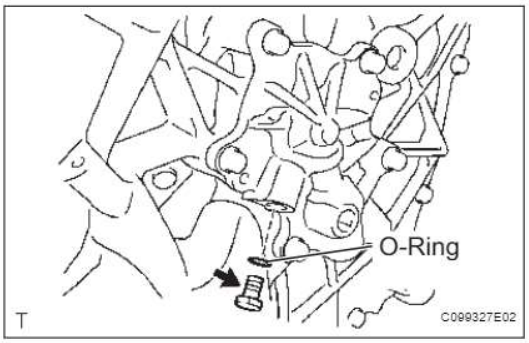
(a) Remove the 6 bolts and motor water jacket cover.



19. REMOVE PARKING SHAFT COVER

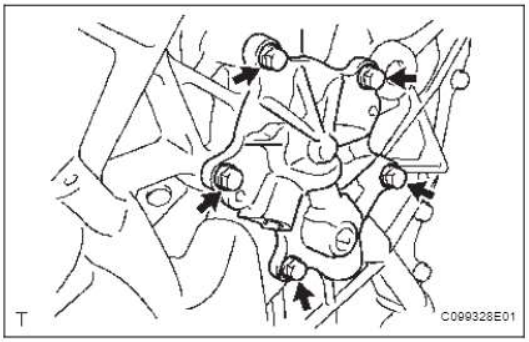
(a) Remove the 5 bolts and parking shaft cover.

HX

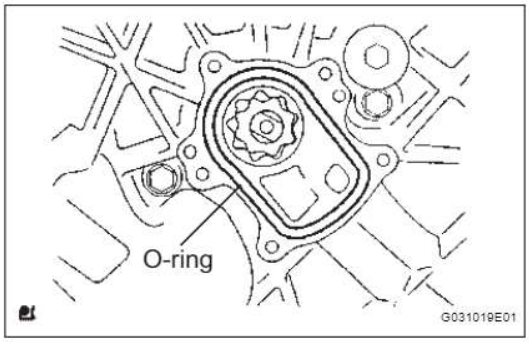


20. REMOVE TRANSMISSION OIL PUMP COVER SUB-ASSEMBLY

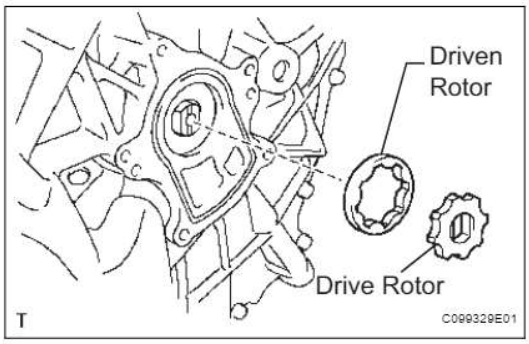
(a) Remove the oil pump cover plug and O-ring.



(b) Remove the 5 bolts and oil pump cover.

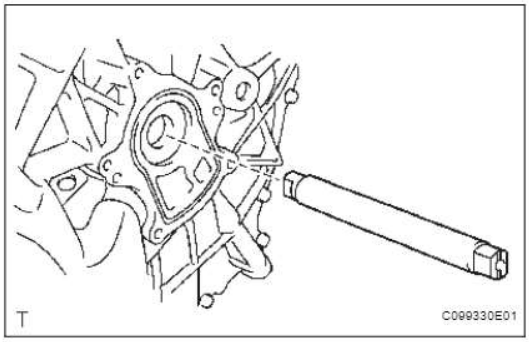


(c) Remove the O-ring.

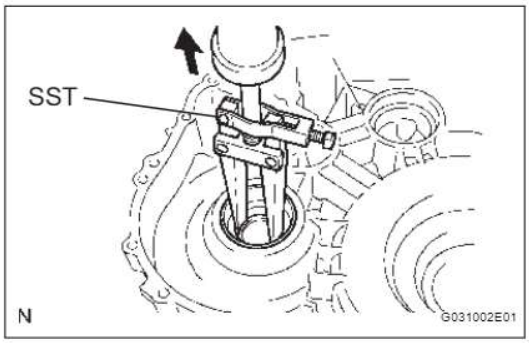


21. REMOVE OIL PUMP DRIVE SHAFT

(a) Remove the oil pump drive rotor and oil pump driven rotor.

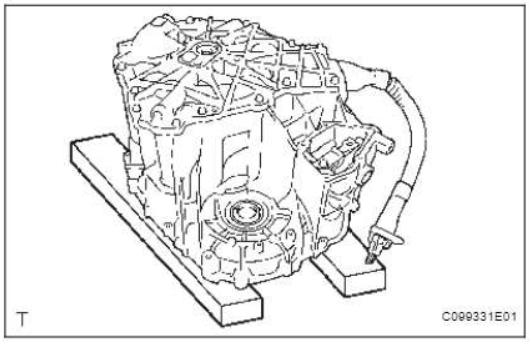


(b) Remove the oil pump drive shaft.



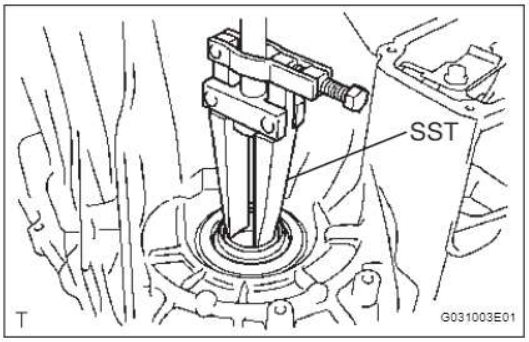
22. REMOVE DIFFERENTIAL CASE LH TAPERED ROLLER BEARING RACE

(a) Using SST, tap out the differential case tapered roller bearing LH outer race and shim.
SST 09308-00010

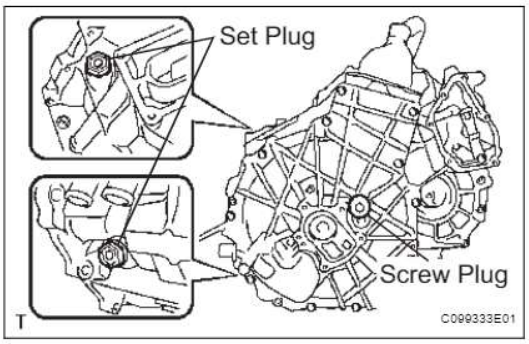


23. REMOVE HYBRID TRANSAXLE OIL SEAL LH

(a) Place the motor on wooden blocks or equivalent.
NOTICE:
Make sure that the parking lock rod does not contact the wooden blocks.

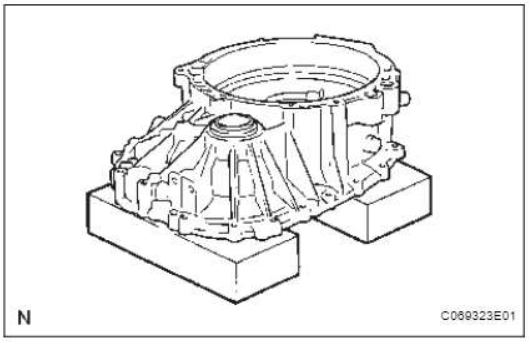


(b) Using SST, tap out the oil seal.
SST 09308-00010



24. REMOVE TRANSAXLE HOUSING AND CASE WITH HEAD STRAIGHT SCREW PLUG

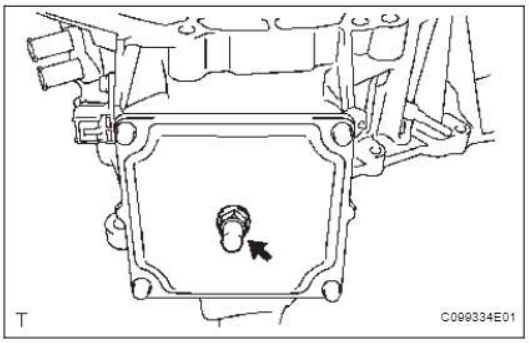
(a) Remove the 2 set plugs and gasket.
(b) Using a 10 mm hexagon wrench, remove the screw plugs.



25. FIX HYBRID VEHICLE GENERATOR ASSEMBLY

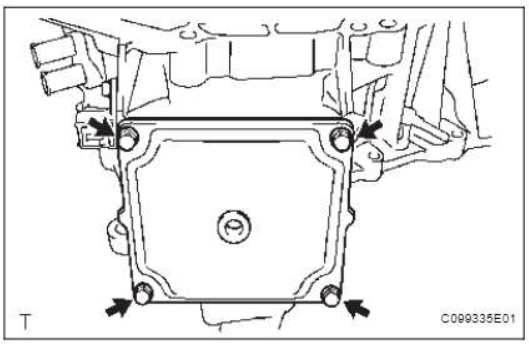
(a) Place the generator on wooden blocks or equivalent.

HX

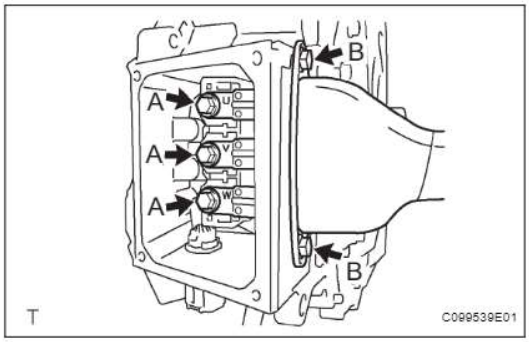


26. REMOVE POWER CABLE COVER

(a) Remove the breather plug.

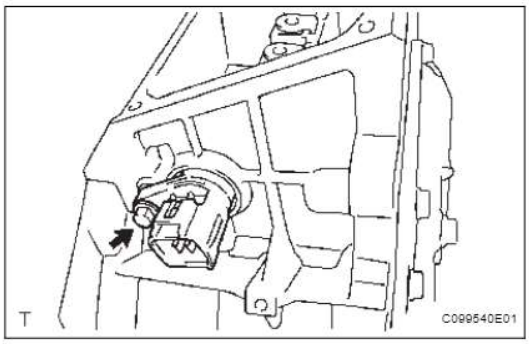


(b) Remove the 4 bolts and power cable cover.



27. REMOVE GENERATOR CABLE

(a) Remove the 5 bolts and generator cable.



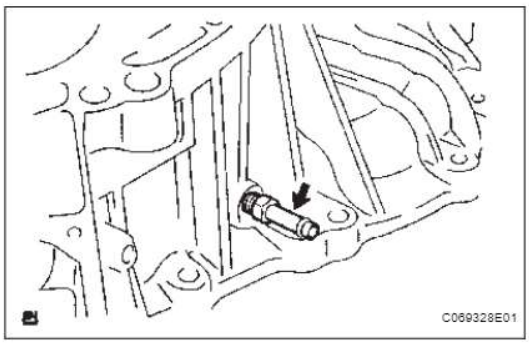
28. REMOVE GENERATOR MOTOR REVOLUTION SENSOR WIRING HARNESS CONNECTOR

(a) Remove the bolt and pull out the HV generator side generator revolution sensor wiring harness connector.

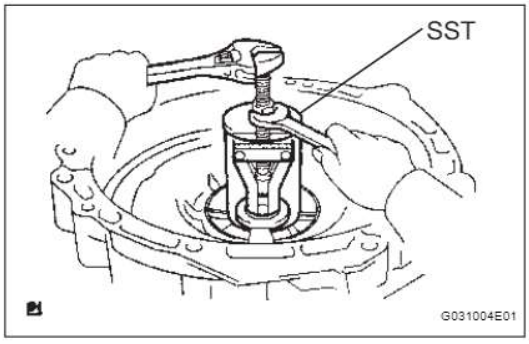
NOTICE:

Do not pull on the sensor connector any more than necessary.

(b) Disconnect the connector and the HV generator side generator revolution sensor wiring harness connector.



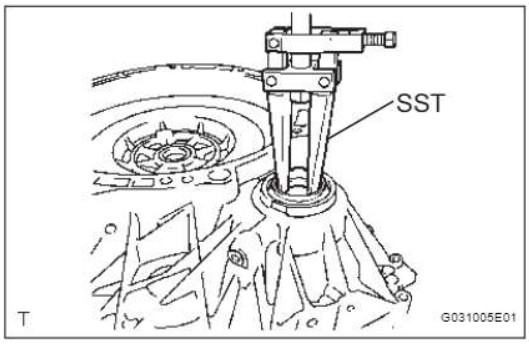
29. REMOVE TRANSAXLE HOUSING TUBE CONNECTOR



30. REMOVE HYBRID VEHICLE TRANSAXLE ASSEMBLY TYPE T OIL SEAL

(a) Using SST, remove the oil seal.

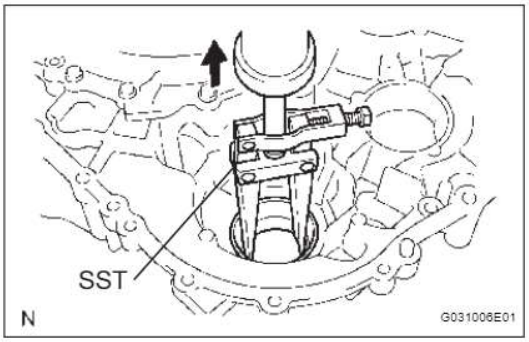
SST 09612-30012



31. REMOVE HYBRID TRANSAXLE OIL SEAL RH

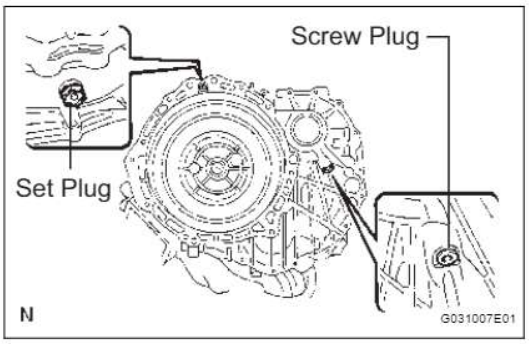
(a) Using SST, tap out the oil seal.

SST 09308-00010



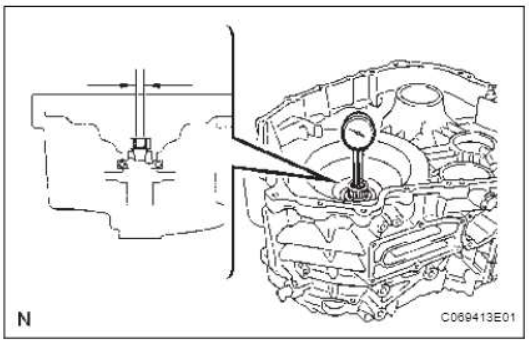
32. REMOVE DIFFERENTIAL CASE RH TAPERED ROLLER BEARING RACE

(a) Using SST, tap out the differential case tapered roller bearing LH outer race.
SST 09308-00010



33. REMOVE TRANSAXLE HOUSING AND CASE WITH HEAD STRAIGHT SCREW PLUG

(a) Remove the set plug and gasket.
(b) Using a 6 mm socket wrench, remove the screw plug.

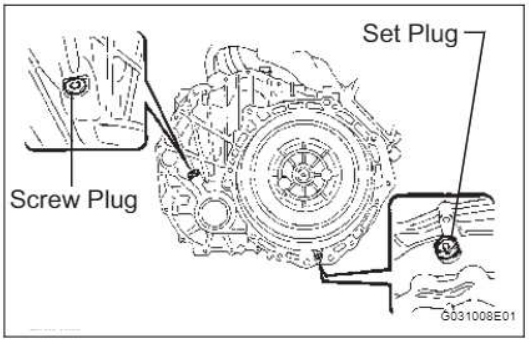


INSPECTION

1. INSPECT HV MOTOR ASSEMBLY

(a) Inspect the inside diameter of the rotor bush.
(1) Using a caliper gauge, measure the inside diameter of the motor rotor bush.
Standard diameter:
20.025 to 20.046 mm (0.7884 to 0.7892 in.)
Maximum diameter:
20.096 mm (0.7912 in.)
NOTICE:
Take the measurement in different locations and use the average of the measurements taken.
If the inside diameter exceeds the maximum, replace the motor assembly with a new one.

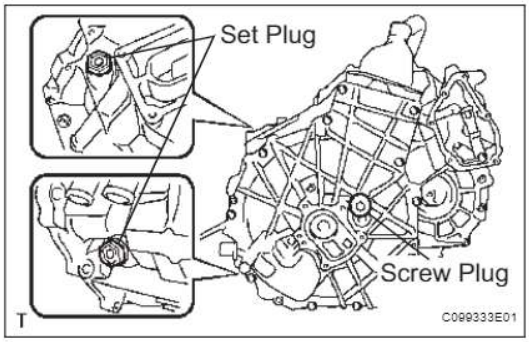
HX



REASSEMBLY

1. INSTALL TRANSAXLE HOUSING AND CASE WITH HEAD STRAIGHT SCREW PLUG

(a) Install a new gasket and the set plug.
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)
(b) Apply liquid sealant 1344 to the first 2 to 3 threads from the end of the screw plug.
NOTICE:
Clean and degrease the screw and screw hole.
(c) Using a 6 mm socket hexagon wrench, install the screw plug.
Torque: 13 N*m (130 kgf*cm, 9 ft.*lbf)

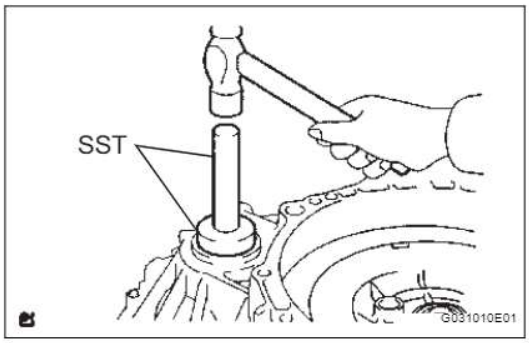


2. INSTALL TRANSAXLE HOUSING AND CASE WITH HEAD STRAIGHT SCREW PLUG

(a) Install a new gasket and the set plug.
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)
HINT:
Tighten the set plug after adding transaxle oil.

(b) Apply liquid sealant 1324 to the first 2 to 3 threads from the end of the screw plug.
NOTICE:
Clean and degrease the screw and screw hole.

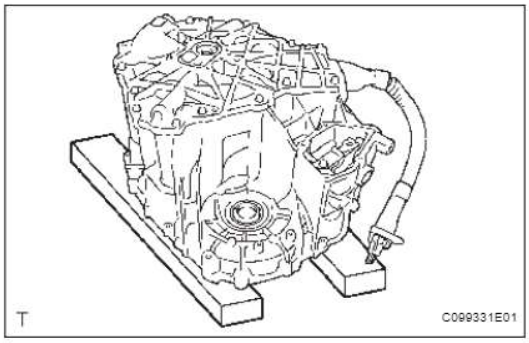
(c) Using a 10 mm socket hexagon wrench, install the screw plug.
Torque: 55 N*m (561 kgf*cm, 41 ft.*lbf)



3. INSTALL HYBRID TRANSAXLE OIL SEAL RH

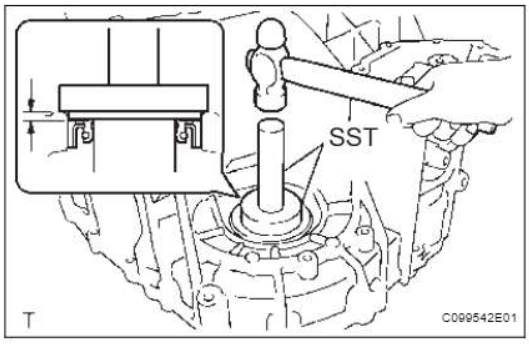
(a) Using SST, tap in a new oil seal.
Oil seal depth:
2.7 +-0.5 mm (0.106 +-0.020 in.)

(b) Coat the lip of the oil seal with No. 2 MP grease.
SST 09350-32014 (09351-32130, 09351-32150), 09950-70010 (09951-07100)



4. INSTALL HYBRID TRANSAXLE TYPE T OIL SEAL LH

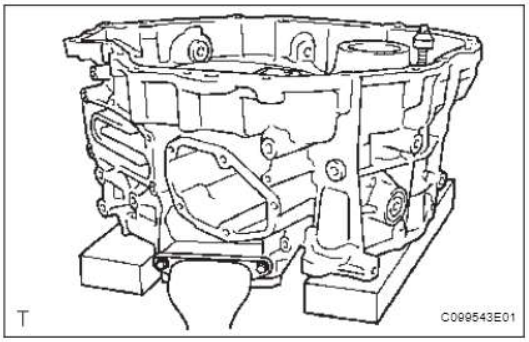
(a) Place the motor on wooden blocks or equivalent.
NOTICE:
Make sure that the parking lock rod does not contact the wooden blocks.



(b) Using SST, tap in the oil seal.
Standard depth:
2.7 +-0.5 mm (0.106 +-0.020 in.)

(c) Coat the lip of the oil seal with MP grease.
SST 09350-32014 (09351-32130, 09351-32150), 09950-70010 (09951-07100)

HX



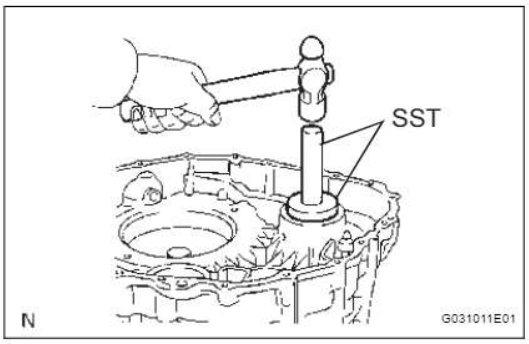
5. ADJUST PRELOAD

(a) Adjust the differential case preload.

(1) Place the motor on wooden blocks or equivalent.

NOTICE:

- **Place the motor horizontally.**
- **Excessive force should not be applied to the cable.**

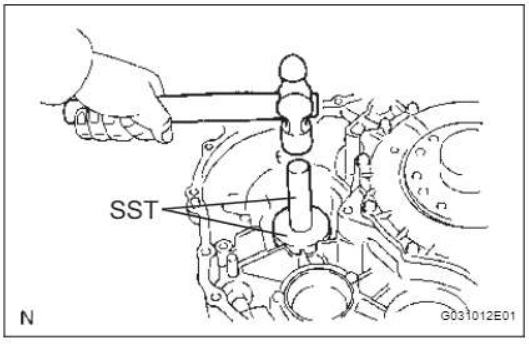


(2) Using SST, tap in the differential case tapered roller bearing LH outer race and shim to the motor.

SST 09950-60020 (09951-00680), 09950-70010 (09951-07100)

NOTICE:

Replace the shim and outer race with new ones if they are deformed or damaged.



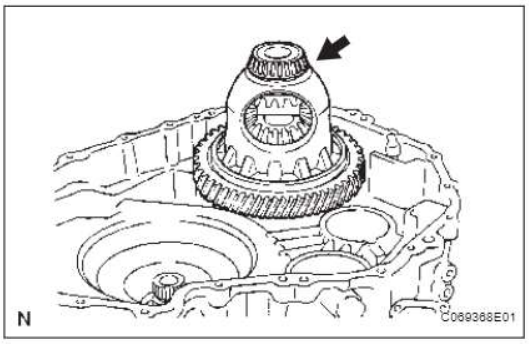
(3) Using SST, tap in the differential case tapered roller bearing RH outer race to the generator.

SST 09950-60020 (09951-00680), 09950-70010 (09951-07100)

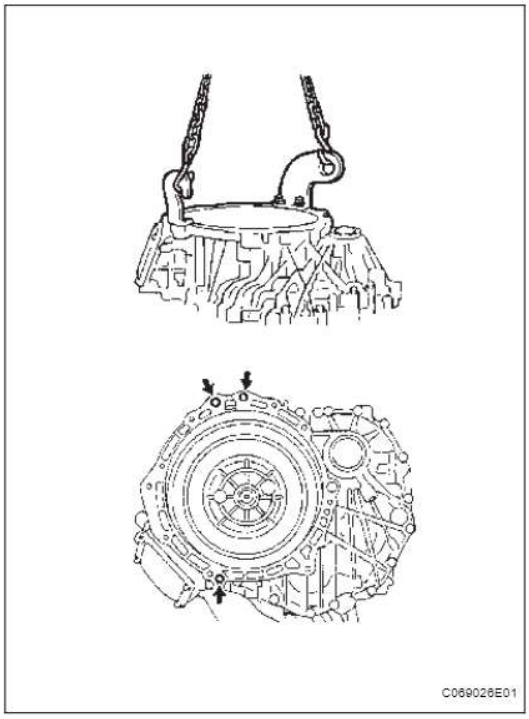
NOTICE:

Replace the outer race with a new one if it is deformed or damaged.

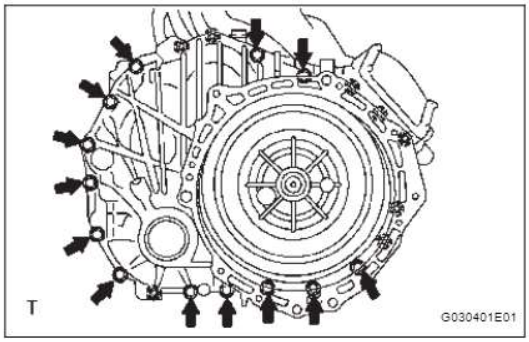
HX



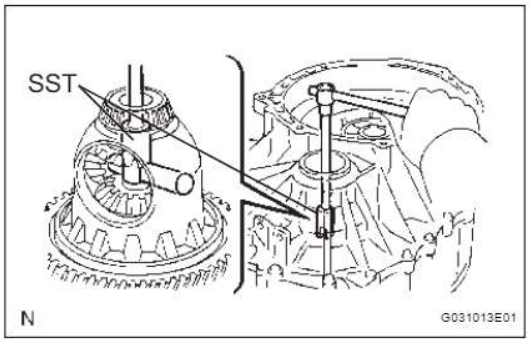
(4) Apply ATF WS to the sliding surfaces of the differential case tapered roller bearing and install the bearing to the motor.



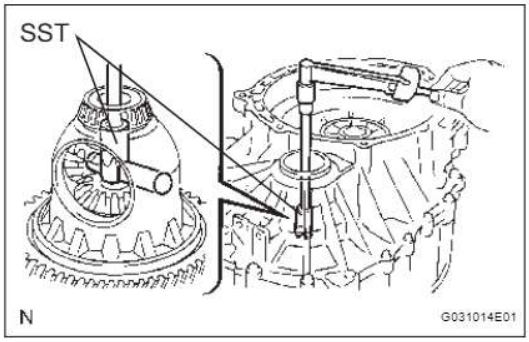
(5) Using an engine sling device and chain block, install the motor to the generator.
HINT:
- Engine hanger: 12281-67070, S1228-11781
- Bolt: 91642-81045, 91642-81265
- Nut: 90178-10001, 90179-12147



(6) Tighten the 13 bolts in the positions shown in the illustration.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)



(7) Using SST, rotate the differential case in both directions to stabilize the bearings.
SST 09564-32011



(8) Using SST, measure the differential preload of the differential case and rotation torque.
SST 09564-32011
Standard preload (Starting torque):
0.98 to 1.57 N*m (9.99 to 16.01 kgf*cm, 8.67 to 13.90 in.*lbf) for new bearing
0.49 to 0.78 N*m (5.00 to 7.95 kgf*cm, 4.34 to 6.90 in.*lbf) for reused bearing
Standard preload (Turning torque):
0.61 to 1.35 N*m (20 rpm) at 20°C (6.2 to 13.77 kgf*cm, 5.4 to 11.95 in.*lbf)

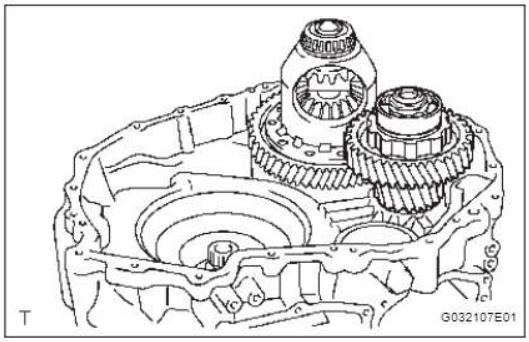
HINT:

- If the preload is not within the specified range, replace the shim with a new one to adjust the preload.
- Remove the motor side tapered roller bearing outer race and shim when replacing the shim.
- Replace the shim and outer race with new ones if they are deformed or damaged.
- As the shim thickness is increased 0.02 mm (0.0008 in.), the preload increases approximately 0.23 N*m (2.4 kgf*cm, 2.04 in.*lbf) accordingly.

Standard shim thickness

Part No.	Thickness	Mark
90564-45040	1.80 mm (0.0709 in.)	1
90564-45041	1.83 mm (0.0720 in.)	2
90564-45042	1.86 mm (0.0732 in.)	3
90564-45043	1.89 mm (0.0744 in.)	4
90564-45071	1.92 mm (0.0756 in.)	50
90564-45072	1.94 mm (0.0764 in.)	51
90564-45073	1.96 mm (0.0722 in.)	52
90564-45074	1.98 mm (0.0780 in.)	53
90564-45075	2.00 mm (0.0787 in.)	54
90564-45076	2.02 mm (0.0795 in.)	55
90564-45077	2.04 mm (0.0803 in.)	56
90564-45078	2.06 mm (0.0811 in.)	57
90564-45079	2.08 mm (0.0819 in.)	58
90564-45080	2.10 mm (0.0827 in.)	59
90564-45081	2.12 mm (0.0835 in.)	60
90564-45082	2.14 mm (0.0843 in.)	61
90564-45083	2.16 mm (0.0850 in.)	62
90564-45084	2.18 mm (0.0858 in.)	63
90564-45085	2.20 mm (0.0866 in.)	64
90564-45086	2.22 mm (0.0874 in.)	65
90564-45087	2.24 mm (0.0882 in.)	66
90564-45088	2.26 mm (0.0890 in.)	67
90564-45089	2.28 mm (0.0898 in.)	68
90564-45090	2.30 mm (0.0906 in.)	69
90564-45091	2.32 mm (0.0913 in.)	70
90564-45060	2.34 mm (0.0921 in.)	19
90564-45061	2.37 mm (0.0933 in.)	20
90564-45011	2.40 mm (0.0945 in.)	No indication
90564-45062	2.43 mm (0.0957 in.)	22
90564-45063	2.46 mm (0.0969 in.)	23

(9) Using an engine sling device and chain block, remove the 13 bolts and generator.

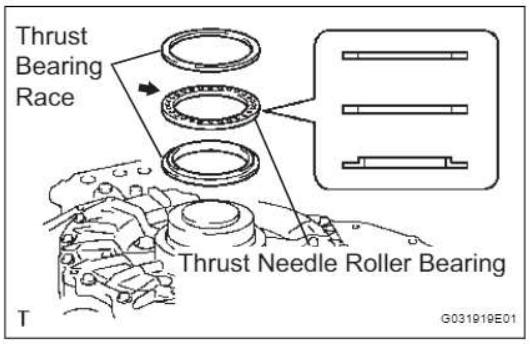


6. INSTALL DIFFERENTIAL DRIVE PINION

(a) Install the differential drive pinion.

NOTICE:

- **Insert the differential drive pinion vertically.**
- **Ensure that the differential drive pinion is fully inserted.**



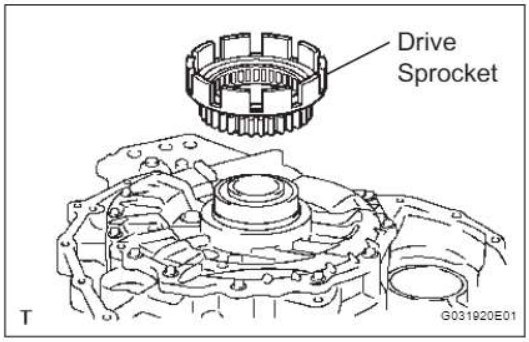
7. SELECT SHIM

(a) Select the input shaft shim.

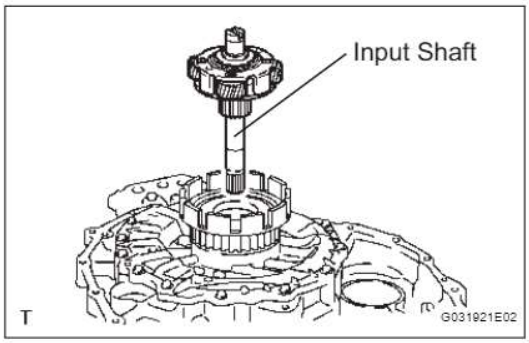
(1) Install the No. 1 thrust bearing race.

(2) Apply ATF WS to the sliding surfaces of the thrust needle roller bearing and install the flange bearing.

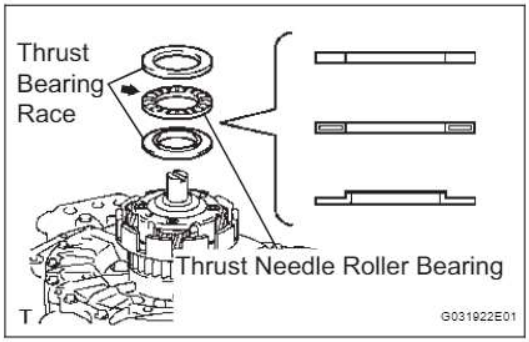
(3) Install the thrust bearing race.



(4) Install the drive sprocket.



(5) Install the input shaft.

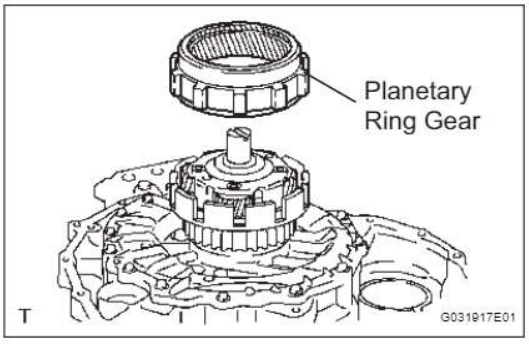


(6) Install the No. 1 thrust bearing race.

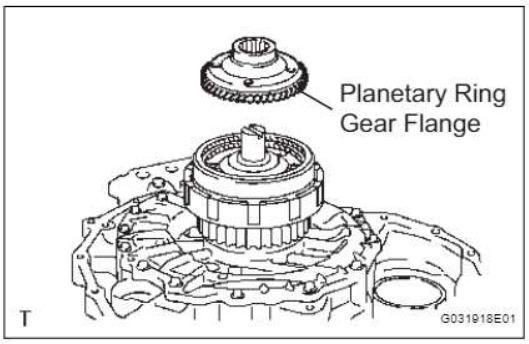
(7) Apply ATF WS to the sliding surfaces of the thrust needle roller bearing and install the flange bearing.

(8) Install the thrust bearing race.

HX

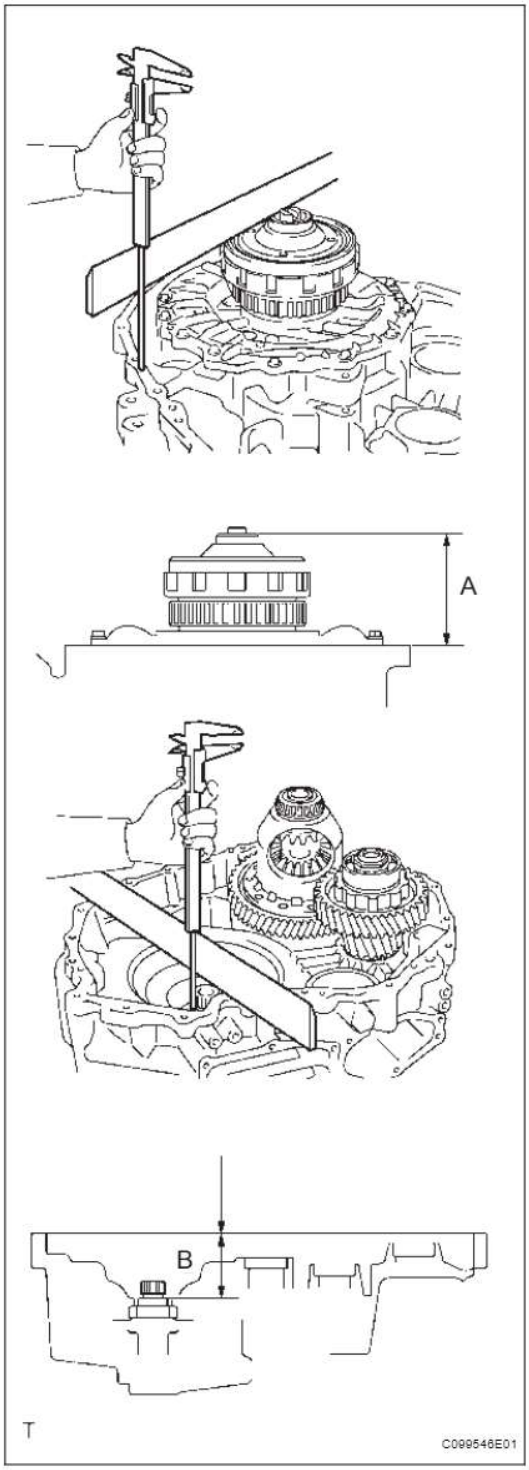


(9) Install the planetary ring gear.



(10) Install the planetary ring gear flange.

HX



(11) Using a straightedge and vernier caliper, measure dimension A as shown in the illustration.

Standard value:

Dimension A = Measured value - width of straightedge used

NOTICE:

- **Measure dimension A without the shim installed.**
- **Take the measurement 3 times each in 3 different locations and use the average of the measurements taken.**
- **Two people are required for this step because it is difficult to keep the straightedge level. One person should hold the straightedge, and the other person measure dimension A.**

(12) Using a straightedge and vernier caliper, measure dimension B as shown in the illustration.

Standard value:

Dimension B = Measured value - thickness of straightedge used

NOTICE:

Dimension B is greater than dimension A.

(13) Select a shim.

Standard value:

Select shim = (Dimension B - Dimension A) - 0.1 mm (0.0039 in.) to 0.4 mm (0.0157 in.)

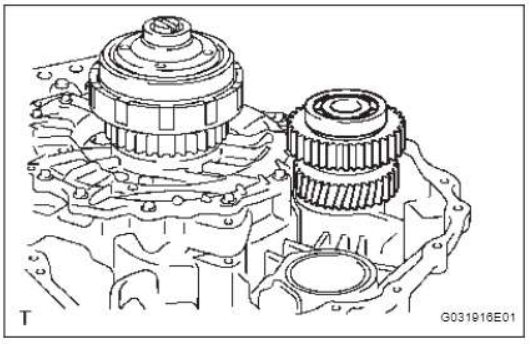
NOTICE:

Subtract 0.1 mm (0.004 in.) to 0.4 mm (0.016 in.) from the difference of Dimension B and Dimension A and select a shim on the basis of the resulting value. This is done because clearance 0.1 mm (0.004 in.) to 0.4 mm (0.016 in.) with the input shaft is required.

Standard shim thickness

Part No.	Thickness	Mark
90564-36021	1.00 mm (0.0394 in.)	1
90564-36022	1.20 mm (0.0472 in.)	2
90564-36023	1.40 mm (0.0551 in.)	3
90564-36024	1.60 mm (0.0630 in.)	4
90564-36025	1.80 mm (0.0709 in.)	5
90564-36026	2.00 mm (0.0787 in.)	6
90564-36027	2.20 mm (0.0866 in.)	7
90564-36028	2.40 mm (0.0945 in.)	8
90564-36029	2.60 mm (0.1024 in.)	9
90564-36030	2.80 mm (0.1102 in.)	10
90564-36031	3.00 mm (0.1181 in.)	11
90564-36032	3.20 mm (0.1260 in.)	12

HX

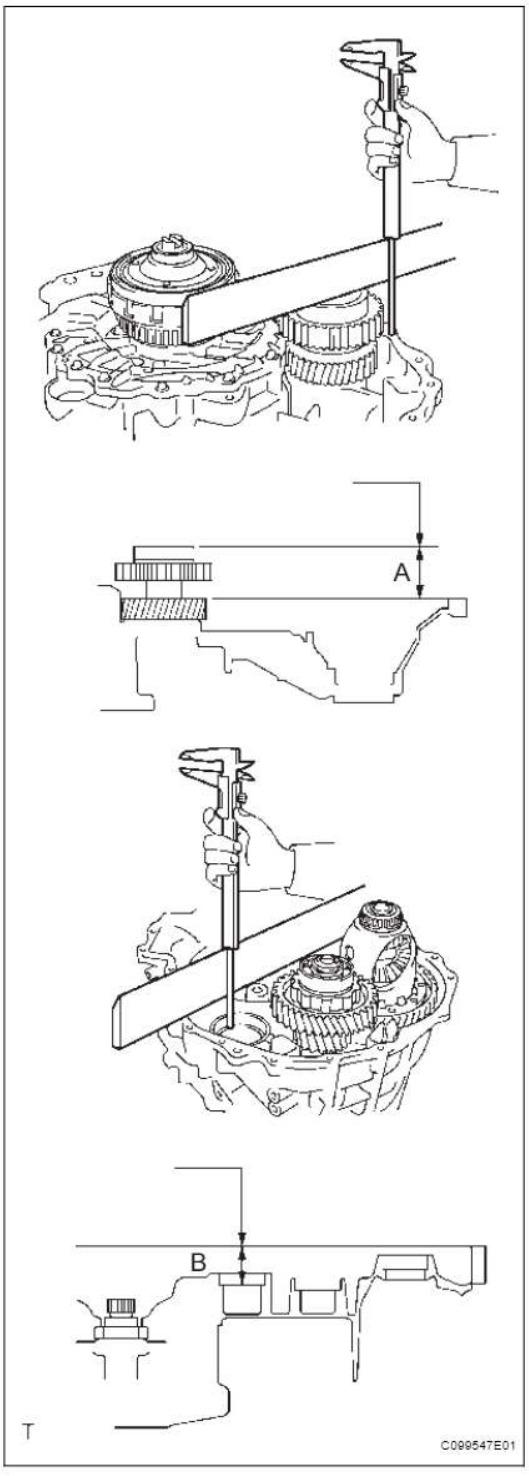


(b) Select a counter drive gear shim.

(1) Install the counter drive gear.

NOTICE:

- **Insert the counter drive gear vertically.**
- **Ensure that the counter drive gear is fully inserted.**



(2) Using a straightedge and vernier caliper, measure dimension A as shown in the illustration.

Standard value:

Dimension A = Measured value - width of straightedge used

NOTICE:

- **Measure dimension A without the shim installed.**
- **Take the measurement 3 times each in 3 different locations and use the average of the measurements taken.**
- **Two people are required for this step because it is difficult to keep the straightedge level. One person should hold the straightedge, and the other person measure dimension A.**

(3) Using a straightedge and vernier caliper, measure dimension B as shown in the illustration.

Standard value:

Dimension B = Measured value - thickness of straightedge used

NOTICE:

Dimension B is greater than dimension A.

(4) Select a shim.

Standard value:

Selected shim = (Dimension B - Dimension A) - 0 mm (0 in.) to 0.1 mm (0.004 in.)

NOTICE:

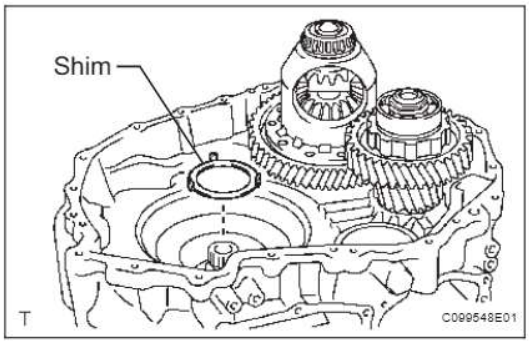
Subtract 0 mm (0 in.) to 0.1 mm (0.004 in.) from the difference of Dimension B and Dimension A and select a shim on the basis of the resulting value. This is done because clearance 0 mm (0 in.) to 0.1 mm (0.004 in.) with the counter drive gear is required.

Standard shim thickness

Part No.	Thickness	Mark
90564-35132	2.20 mm (0.0866 in.)	A
90564-35133	2.25 mm (0.0886 in.)	B
90564-35134	2.30 mm (0.0906 in.)	C
90564-35135	2.35 mm (0.0925 in.)	D

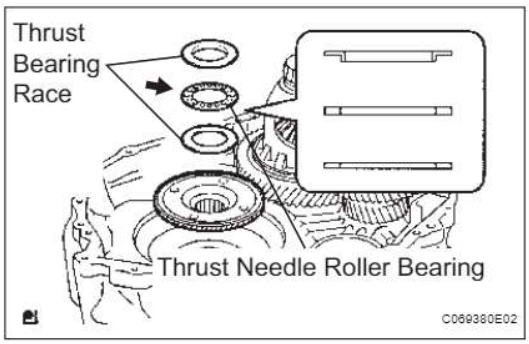
HX

Part No.	Thickness	Mark
90564-35136	2.40 mm (0.0945 in.)	E
90564-35137	2.45 mm (0.0965 in.)	F
90564-35138	2.50 mm (0.0984 in.)	G
90564-35139	2.55 mm (0.1003 in.)	H
90564-35140	2.60 mm (0.1024 in.)	J
90564-35141	2.65 mm (0.1043 in.)	K
90564-35142	2.70 mm (0.1063 in.)	L
90564-35143	2.75 mm (0.1083 in.)	M
90564-35144	2.80 mm (0.1102 in.)	N

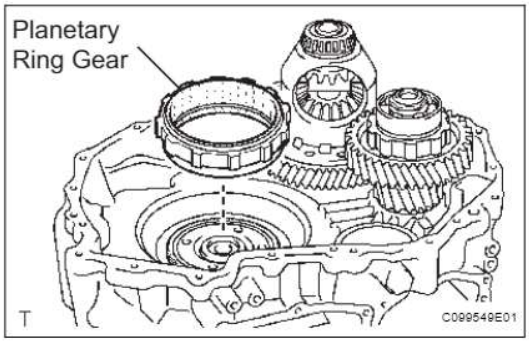


8. INSTALL INPUT SHAFT ASSEMBLY

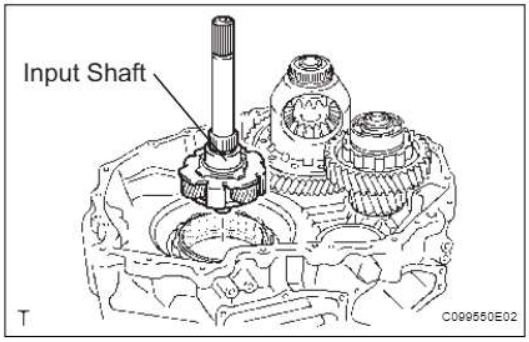
(a) Install the shim selected.



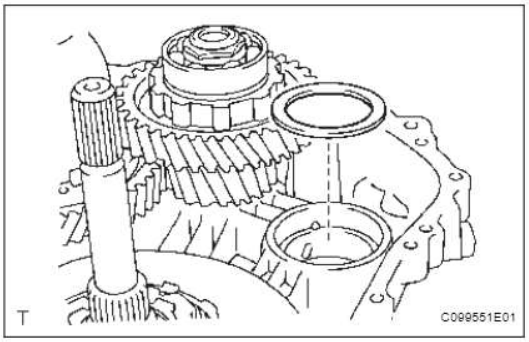
(b) Install the planetary ring gear flange.
(c) Install the thrust bearing race.
(d) Install the thrust needle roller bearing.
  (1) Apply ATF WS to the sliding surfaces of the thrust needle roller bearing and install the flange.
(e) Install the thrust bearing race.



(f) Install the planetary ring gear.

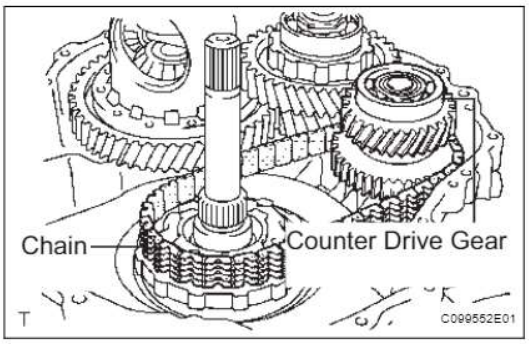


(g) Install the input shaft.

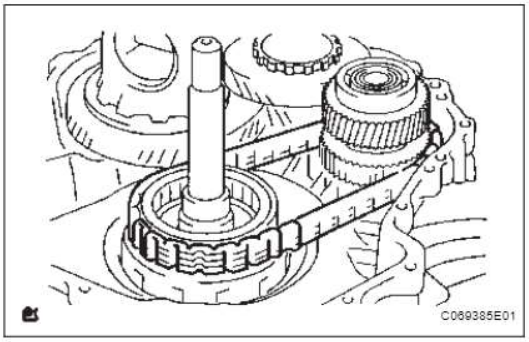


9. INSTALL SPROCKET DRIVEN GEAR AND COUNTER DRIVE GEAR

(a) Install the counter drive gear shim selected.



(b) Install the counter drive gear and chain.
NOTICE:
- **Insert the counter drive gear vertically.**
- **Ensure that the counter drive gear is fully inserted.**



10. INSTALL TRANSMISSION DRIVE SPROCKET SUB-ASSEMBLY

(a) Apply ATF WS auto fluid to the drive sprocket needle roller bearing and put the drive sprocket on the chain.

(b) Align the recesses of the planetary ring gear and the drive sprocket and install the drive sprocket with chain.

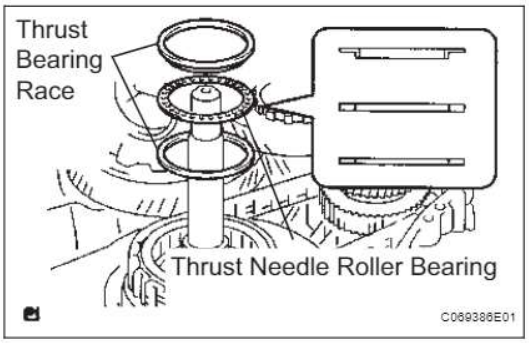
11. INSTALL NO. 2 THRUST BEARING RACE

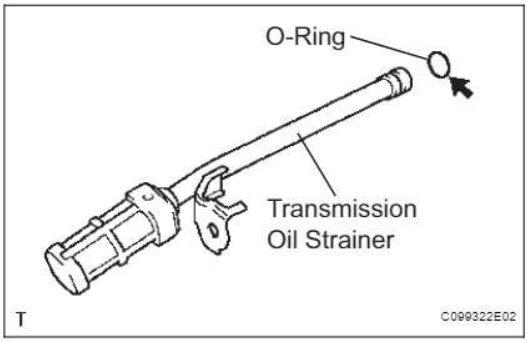
(a) Install the thrust bearing race.

(b) Install the No. 1 drive sprocket thrust needle roller bearing.
(1) Apply ATF WS to the sliding surfaces of the thrust needle roller bearing and install the bearing.

(c) Install the No. 2 thrust bearing race.

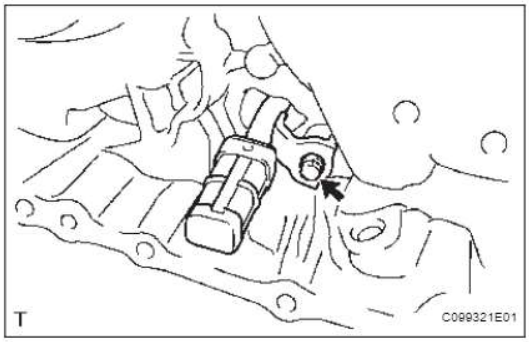
HX



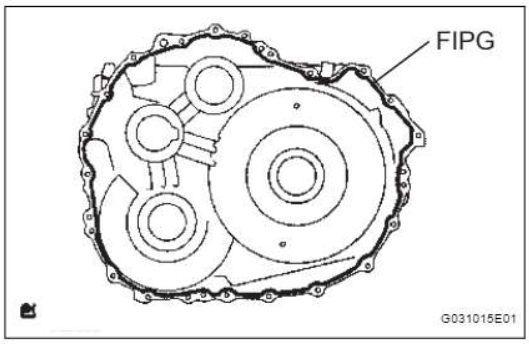


12. INSTALL TRANSMISSION OIL STRAINER

(a) Apply ATF WS to a new O-ring and install the fluid strainer.

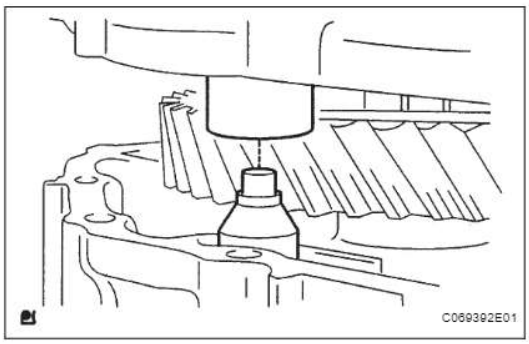


(b) Install the oil strainer with the bolt.
Torque: 7.9 N*m (81 kgf*cm, 70 in.*lbf)

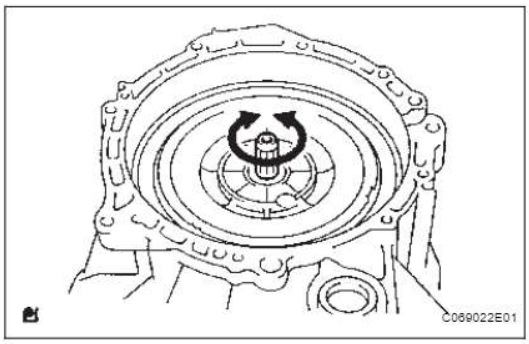


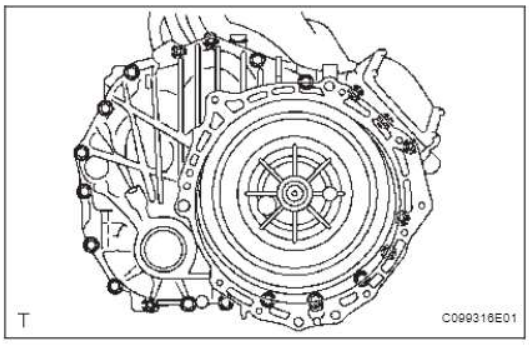
13. INSTALL HYBRID VEHICLE GENERATOR ASSEMBLY

(a) Apply seal packing in a continuous line of beads (diameter 1.5 mm 0.059 in.) to the motor side.
Seal packing:
Toyota Genuine Seal Packing 1281,
Three Bond 1281 or Equivalent
NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**



(b) Using an engine sling device and chain block, install the parking lock rod to the generator so that it is inserted into the cam guide sleeve.
NOTICE:
Rotate the input shaft in both directions so that the gears interlock if the generator cannot be easily installed.



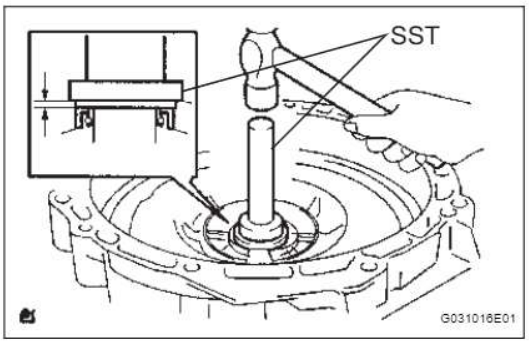


(c) Apply adhesive to the first 2 to 3 threads of the bolt end.
Adhesive:
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent
NOTICE:
Clean and degrease the bolt and bolt holes.

(d) Install the 21 bolts as shown in the illustration.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)
HINT:
- 13 bolts on the generator side

HX

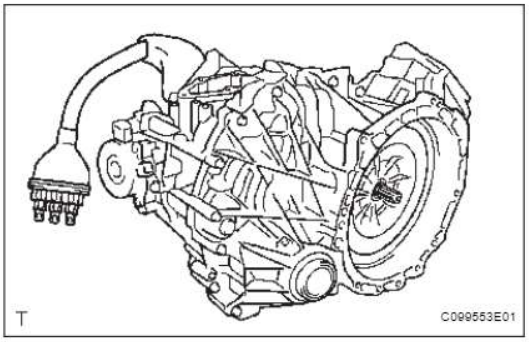
- 8 bolts on the motor side



14. INSTALL HYBRID VEHICLE TRANSAXLE ASSEMBLY TYPE T OIL SEAL

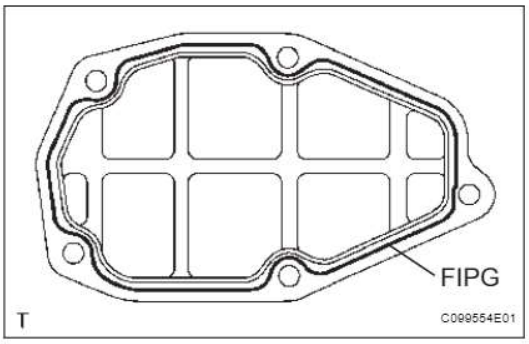
(a) Coat the lip of a new oil seal with MP grease.
NOTICE:
Ensure that no foreign objects adhere to the oil seal lip.

(b) Using SST, tap in oil seal.
Standard depth:
1 to 1.5 mm (0.039 to 0.059 in.)
NOTICE:
Ensure that the oil seal is fitted straight.



15. FIX HYBRID VEHICLE TRANSAXLE ASSEMBLY

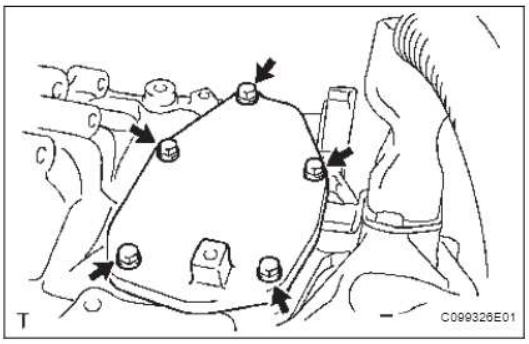
(a) Set the hybrid transaxle as shown in the illustration.



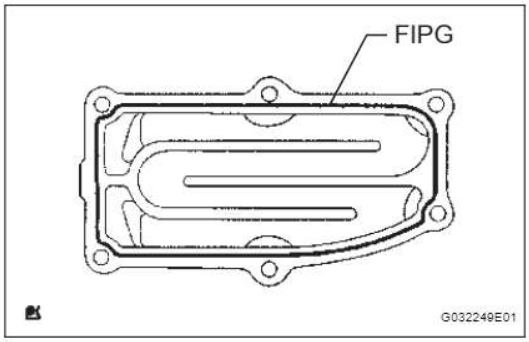
16. INSTALL PARKING COVER

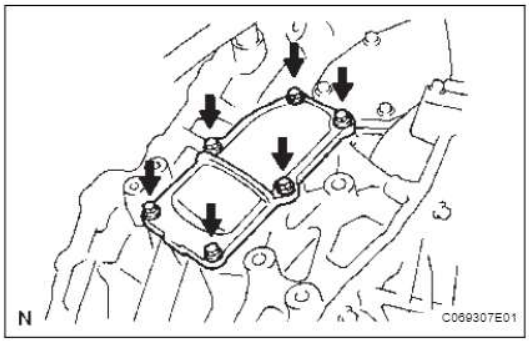
(a) Apply seal packing in a continuous line of beads (diameter 1.5 mm, 0.06 in.) as shown in the illustration.
Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or Equivalent
NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**

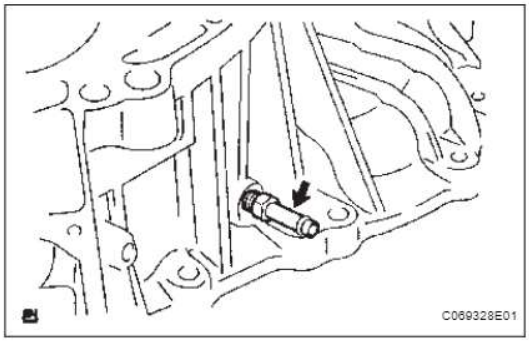
(b) Install the parking shaft cover with the 5 bolts.
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

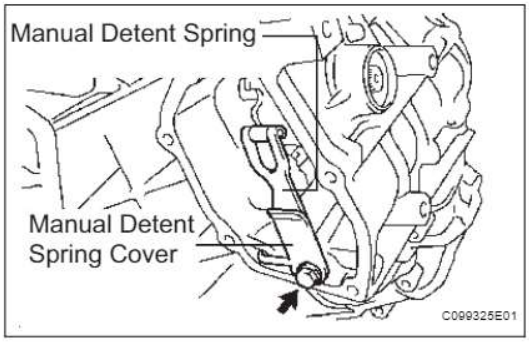


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17. INSTALL MOTOR WATER JACKET COVER

(a) Apply seal packing black in a continuous line of beads (diameter 1.5 mm, 0.06 in.) as shown in the illustration.

Seal packing:
Toyota Genuine Seal Packing 1281,
Three Bond 1281 or Equivalent

NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**

(b) Apply adhesive to the first 2 to 3 threads of each of the 6 bolts. Install the motor water jacket cover with the 6 bolts.

Adhesive:
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)
NOTICE:
Clean and degrease the bolt and bolt holes.

18. INSTALL TRANSAXLE HOUSING TUBE CONNECTOR

(a) Apply adhesive to the first 2 to 3 threads of the bolt and install.

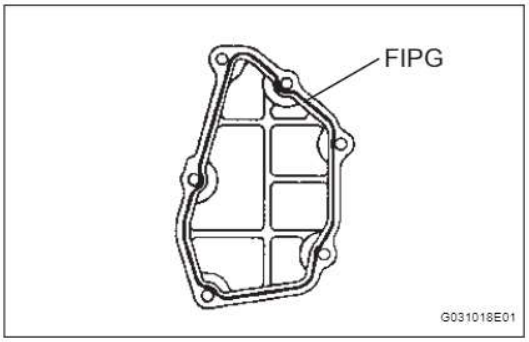
Adhesive:
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)
NOTICE:
Clean and degrease the bolt and bolt holes.

(b) Install the drain plug using a new gasket.
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)

19. INSTALL MANUAL DETENT SPRING SUB-ASSEMBLY

(a) Install the manual detent spring and manual detent spring cover with the bolt.
Torque: 9.8 N*m (100 kgf*cm, 86 in.*lbf)

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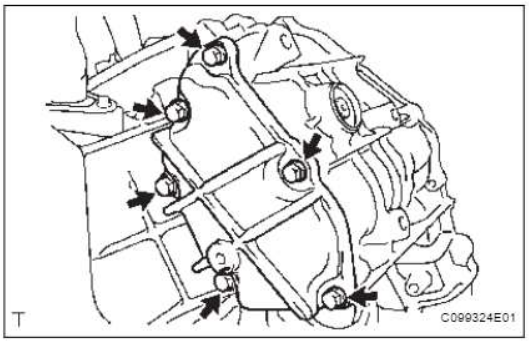


20. REMOVE PARKING COVER

(a) Apply seal packing in a continuous line of beads (diameter 1.5 mm, 0.06 in) as shown in the illustration.

Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or Equivalent

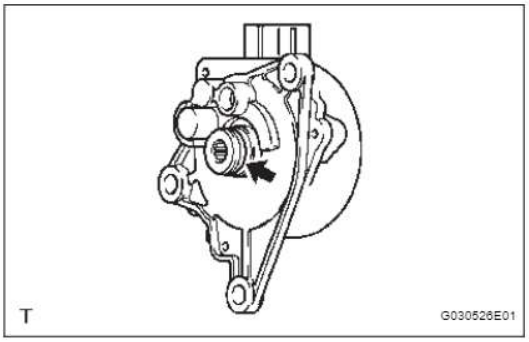
NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**



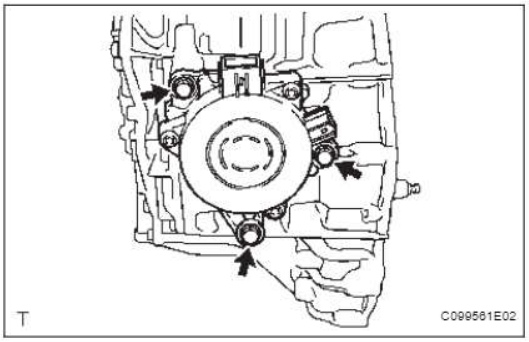
(b) Install the parking cover with the 6 bolts.
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

21. INSTALL SHIFT CONTROL ACTUATOR ASSEMBLY

(a) Apply a small amount of genuine ATF WS to the O-ring.



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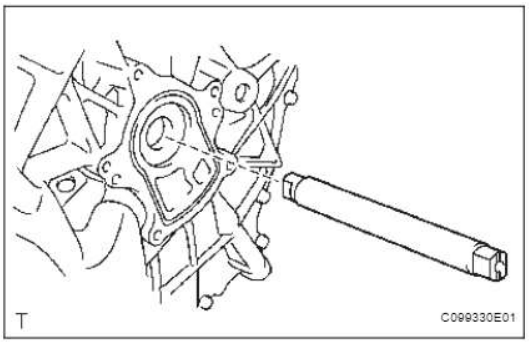


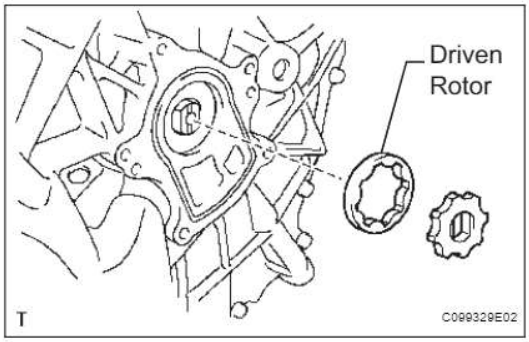
(b) Install the shift control actuator with the 3 bolts.
Torque: 16 N*m (160 kgf*cm, 12 ft.*lbf)

(c) Install the transmission case cover with the 3 bolts.

22. INSTALL OIL PUMP DRIVE SHAFT

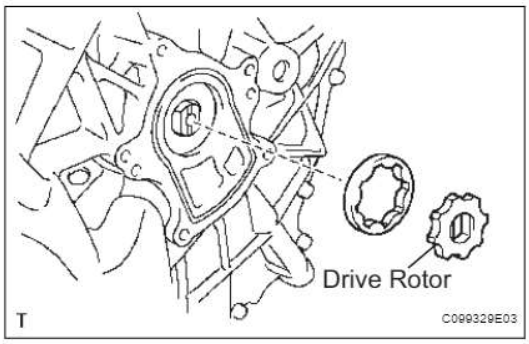
(a) Apply ATF WS to the fluid pump drive shaft and install it.





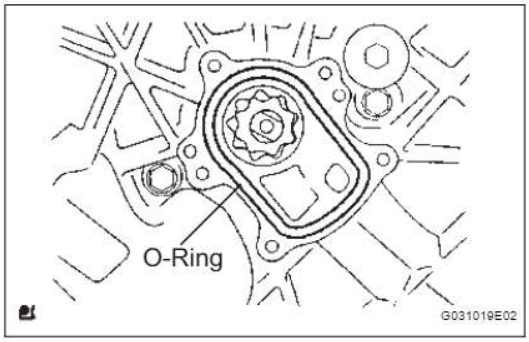
23. INSTALL OIL PUMP DRIVEN ROTOR

(a) Apply ATF WS to the fluid pump driven rotor and install it.



24. INSTALL TRANSAXLE OIL PUMP DRIVE ROTOR

(a) Apply ATF WS to the transaxle fluid pump drive rotor and install it.

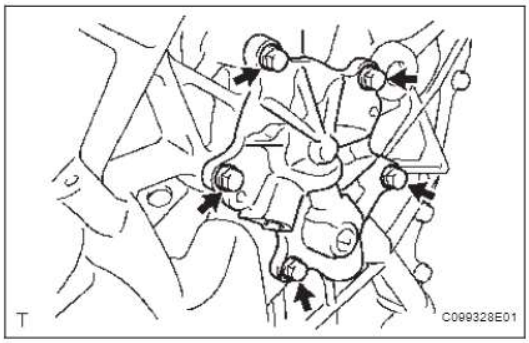


25. INSTALL TRANSMISSION OIL PUMP COVER SUB-ASSEMBLY

(a) Install a new O-ring.

NOTICE:

Ensure that the O-ring is not twisted.



(b) Apply adhesive to the first 2 to 3 threads of the bolt end.

Adhesive:

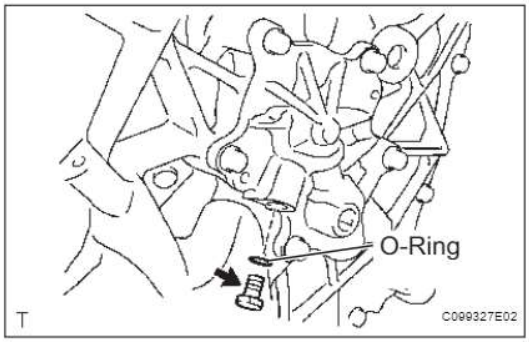
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent

NOTICE:

Clean and degrease the bolts and bolt holes.

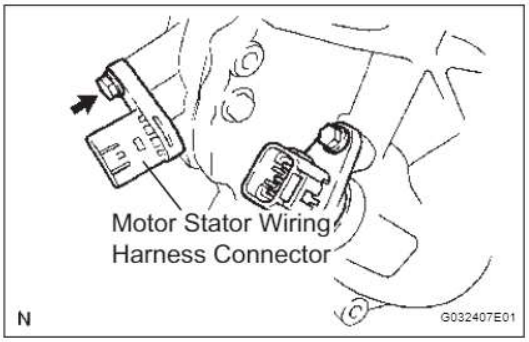
(c) Install the oil pump cover with the 5 bolts.

Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)



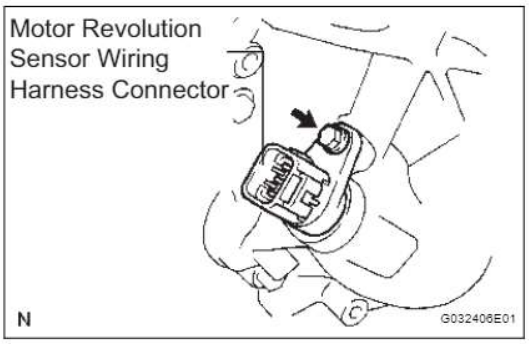
(d) Install a new O-ring and fluid pump cover plug.

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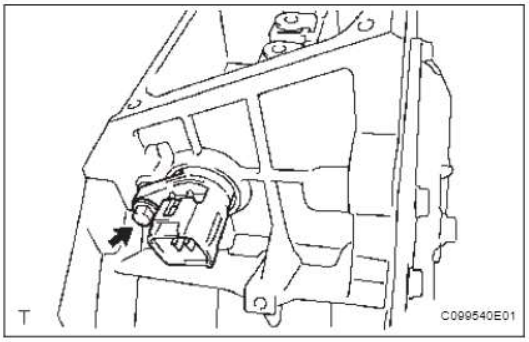
26. INSTALL MOTOR STATOR WIRING HARNESS CONNECTOR

(a) Apply ATF WS to the O-ring and install the motor stator wiring harness connectors (black) with the bolt.
Torque: 5.8 N*m (59 kgf*cm, 51 in.*lbf)



27. INSTALL MOTOR REVOLUTION SENSOR WIRING HARNESS CONNECTOR

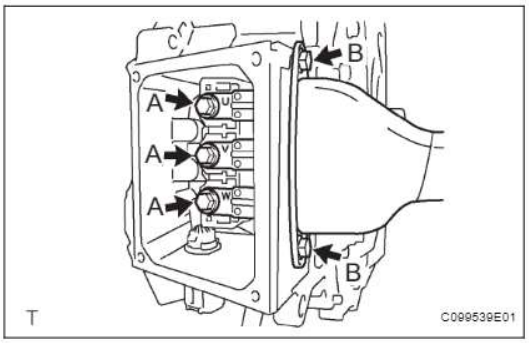
(a) Apply ATF WS to the O-ring and install the HV motor side motor revolution sensor wiring harness connectors (gray) with the bolt.
Torque: 5.8 N*m (59 kgf*cm, 51 in.*lbf)



28. INSTALL GENERATOR MOTOR REVOLUTION SENSOR WIRING HARNESS CONNECTOR

(a) Apply ATF WS to the O-ring and install the HV generator side generator motor revolution sensor wiring harness connector with the bolt.
Torque: 5.8 N*m (59 kgf*cm, 51 in.*lbf)

HX

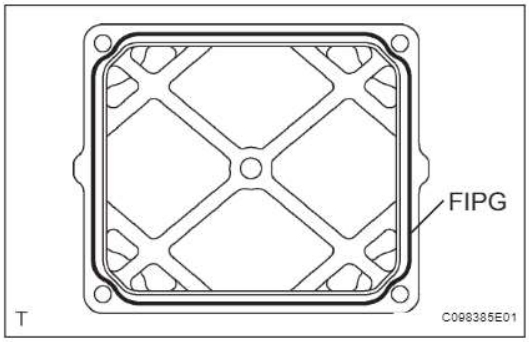


29. INSTALL GENERATOR CABLE

(a) Align the generator cables as shown in the illustration and connect them.
NOTICE:
- **Aligning the letters U, V and W, and connect the cable.**
- **Apply a small amount of ATF WS to the O-ring.**

(b) Apply adhesive to the first 2 or 3 threads of bolts B and install the generator cable with the bolts.
Torque: 5.8 N*m (59 kgf*cm, 51 in.*lbf) (bolt B)
Adhesive:
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent
NOTICE:
Clean and degrease the bolts and bolt holes.

(c) Install the generator cable with the 3 bolts (A).
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf) (bolt A)

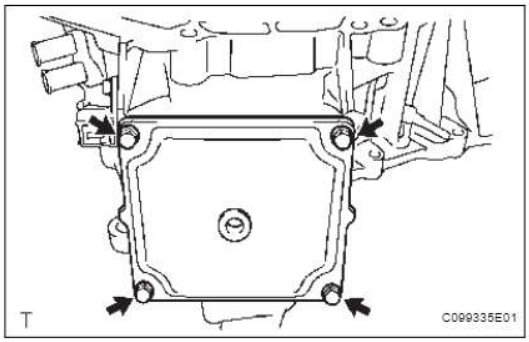


30. INSTALL POWER CABLE COVER

(a) Apply seal packing in a continuous line of beads (diameter 1.5 mm 0.06 in.) as shown in the illustration.

Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or Equivalent

NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**

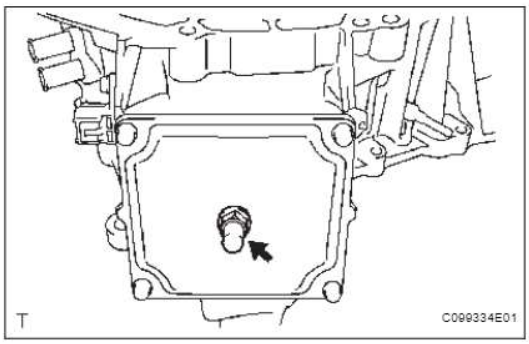


(b) Apply adhesive to the first 2 or 3 threads of the 4 bolts and install the power cable cover.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or Equivalent

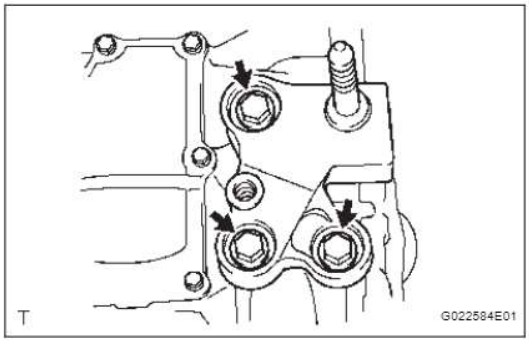
Torque: 4.8 N*m (49 kgf*cm, 42 in.*lbf)

NOTICE:
Clean and degrease the bolts and bolt holes.



(c) Install the breather plug.

Torque: 11 N*m (112 kgf*cm, 8 ft.*lbf)



31. INSTALL NO. 3 ENGINE MOUNTING BRACKET

(a) Apply adhesive to the first 2 or 3 threads of the 3 bolts and install the engine mounting bracket.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or Equivalent

Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)

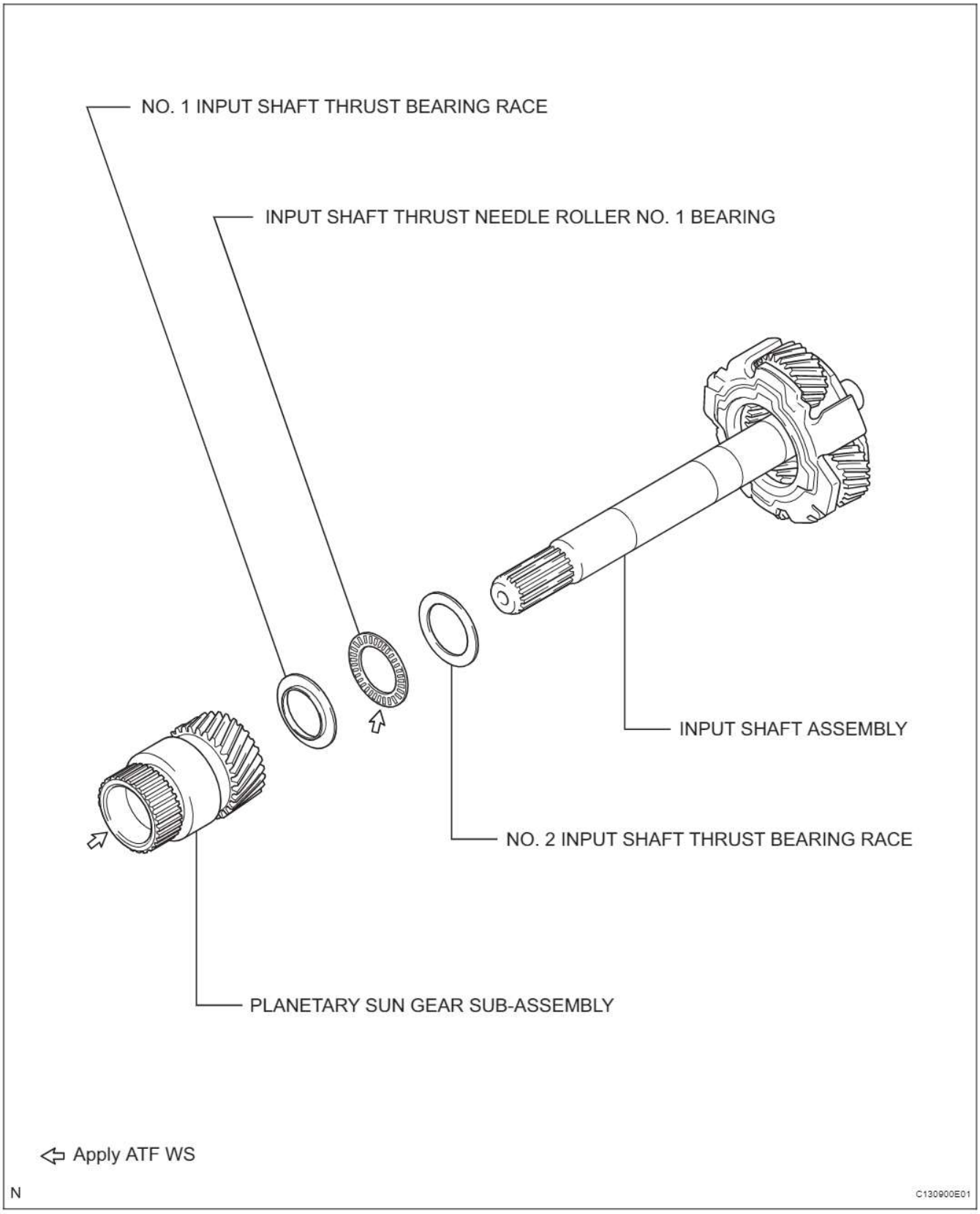
NOTICE:
Clean and degrease the bolts and bolt holes.

32. INSTALL HYBRID VEHICLE TRANSAXLE ASSEMBLY

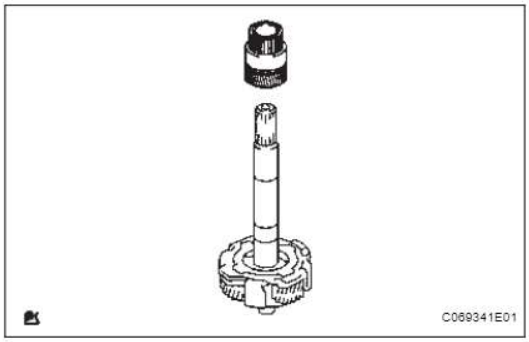
HX

INPUT SHAFT

COMPONENTS



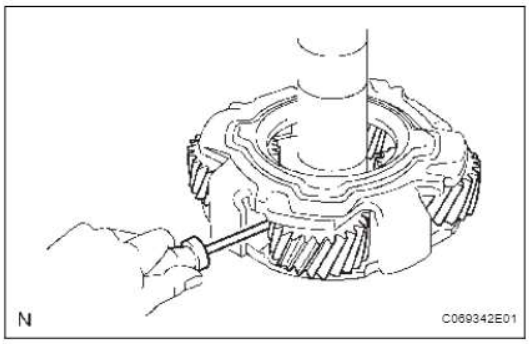
HX



DISASSEMBLY

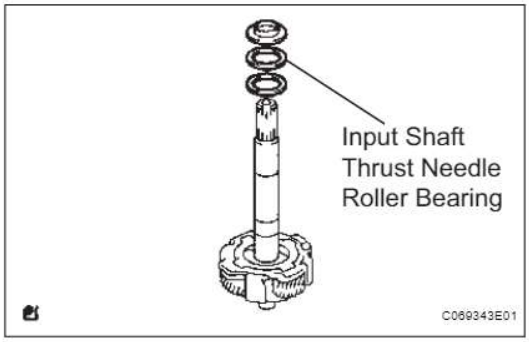
1. REMOVE PLANETARY SUN GEAR SUB-ASSEMBLY

(a) Remove the planetary sun gear from the input shaft.



2. REMOVE INPUT SHAFT THRUST BEARING RACE

(a) Float the input shaft thrust bearing race using a thin flat-head screwdriver if it is attached to the planetary sun gear.



(b) Remove the 2 input shaft thrust bearing races and input shaft thrust needle roller bearing.

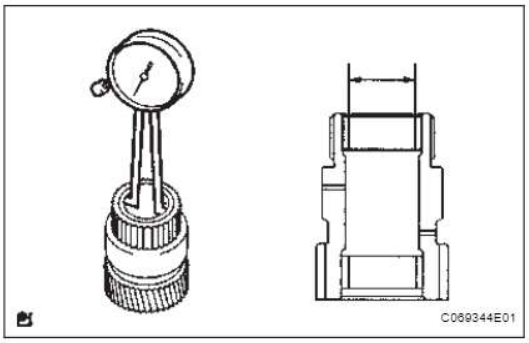
HX

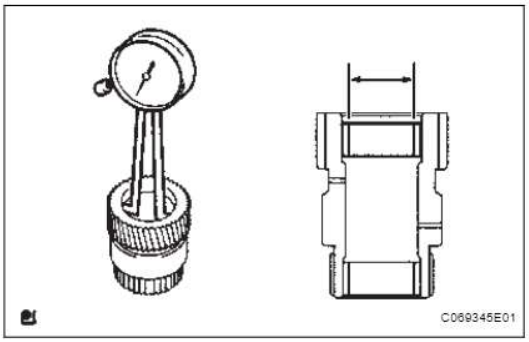
INSPECTION

1. INSPECT PLANETARY SUN GEAR SUB-ASSEMBLY

(a) Ensure that there is no damage or color change in the bush.

(b) Using a caliper gauge, inspect the internal diameter of the planetary gear.

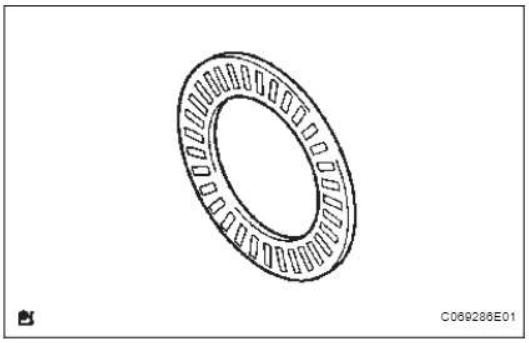




Maximum diameter:
25.596 mm (1.0077 in.)
NOTICE:
Measure the diameter in a number of locations and use the average of the measurements taken.
HINT:
Replace the planetary sun gear with a new one if the measurement exceeds the maximum diameter.

2. INSPECT INPUT SHAFT THRUST NEEDLE ROLLER NO. 1 BEARING

(a) Ensure that there is no abnormal wear or discoloration in the bearing.
HINT:
Replace the input shaft thrust needle roller bearing with a new one if there is abnormal wear or discoloration.

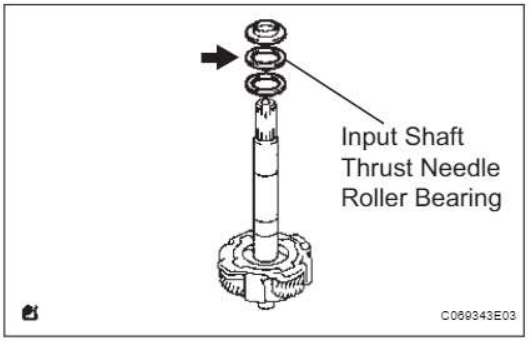


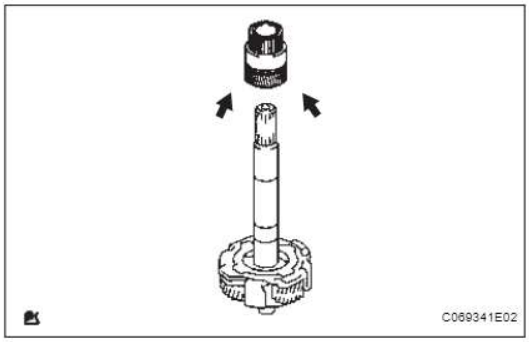
HX

REASSEMBLY

1. INSTALL INPUT SHAFT THRUST BEARING RACE

(a) Apply ATF WS to the sliding surfaces of the bearing and install the 2 input shaft thrust bearing races and input shaft thrust needle roller bearing.





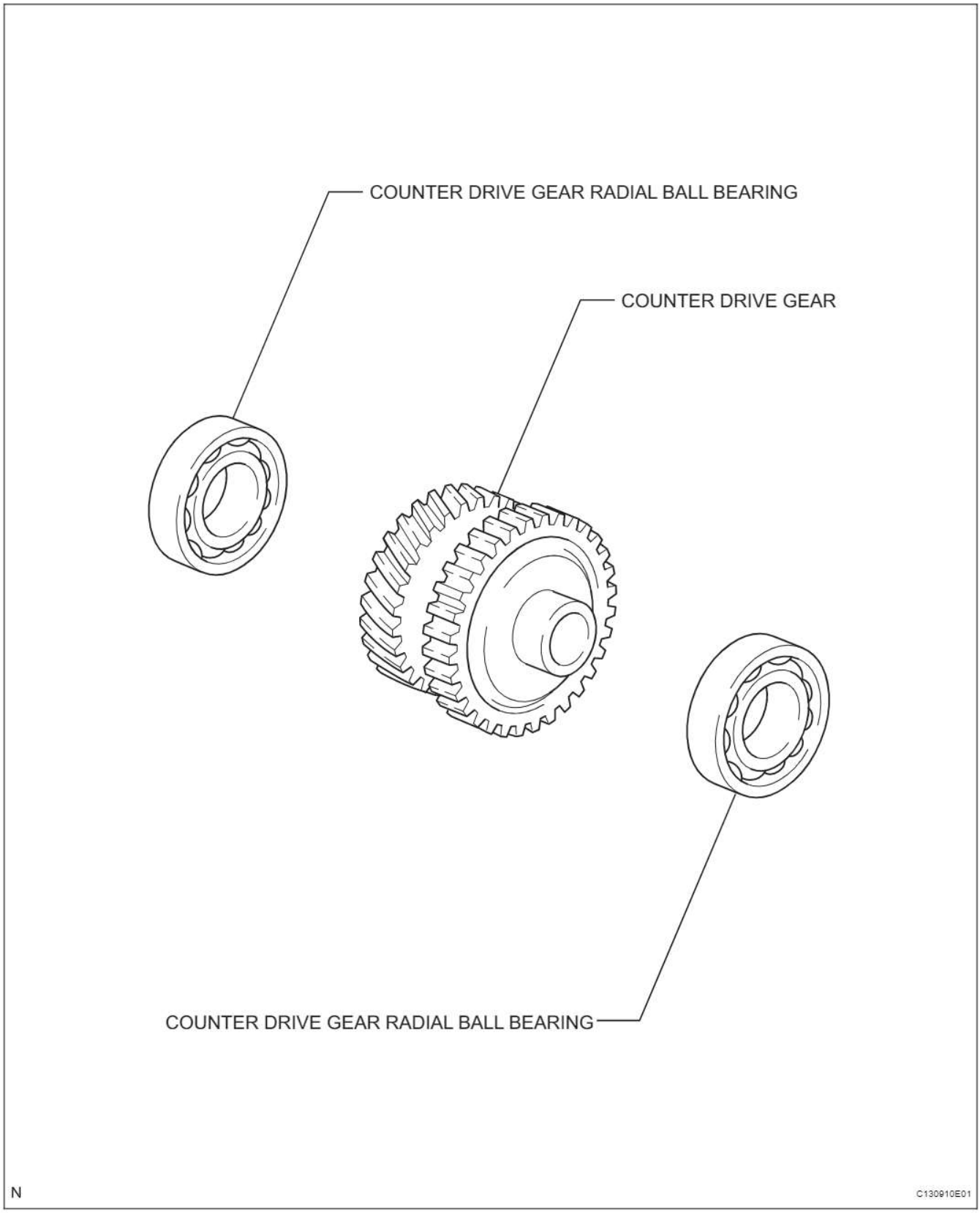
2. INSTALL PLANETARY SUN GEAR SUB-ASSEMBLY

(a) Apply ATF WS to the bush and install the planetary sun gear to the input shaft.

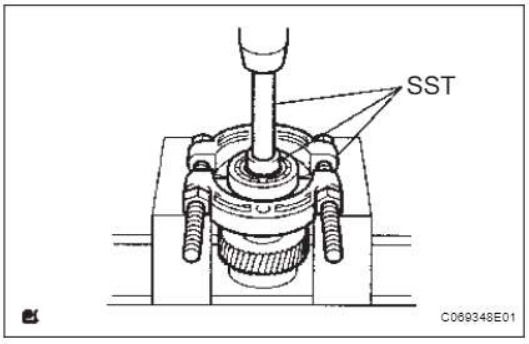
HX

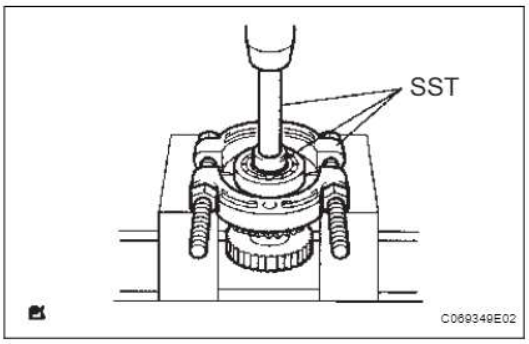
SPROCKET DRIVEN GEAR AND COUNTER DRIVE GEAR

COMPONENTS



HX





DISASSEMBLY

1. **REMOVE COUNTER DRIVE GEAR RADIAL BALL BEARING**

   (a) Using SST and a press, press out the bearing from the counter drive gear.

   SST 09950-00020, 09950-60010 (09951-00330), 09950-70010 (09951-07100)

   (b) Using SST and a press, press out the bearing from the counter drive gear.

   SST 09950-00020, 09950-60010 (09951-00330), 09950-70010 (09951-07100)

HX

INSPECTION

1. INSPECT COUNTER DRIVE GEAR RADIAL BALL BEARING

(a) Check the bearing for abnormal wear or discoloration.
HINT:
Replace the bearing with a new one if abnormal wear or discoloration is found.

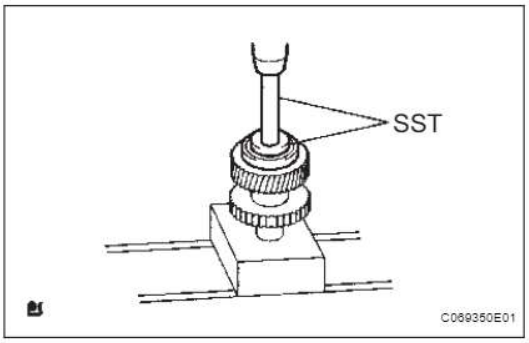
REASSEMBLY

1. INSTALL COUNTER DRIVE GEAR RADIAL BALL BEARING

(a) Apply ATF WS to the 2 bearings.

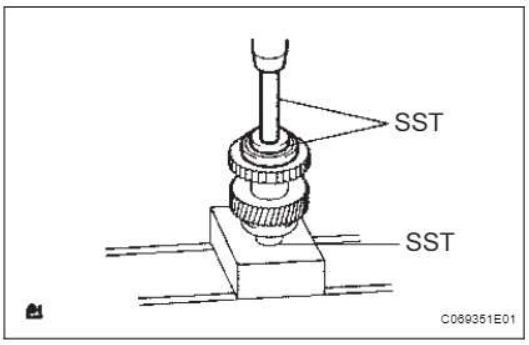
(b) Using SST and a press, press in the bearing to the counter drive gear.

SST 09950-60010 (09951-00330, 09951-00460), 09950-70010 (09951-07100)



(c) Using SST and a press, press in the bearing to the counter drive gear.

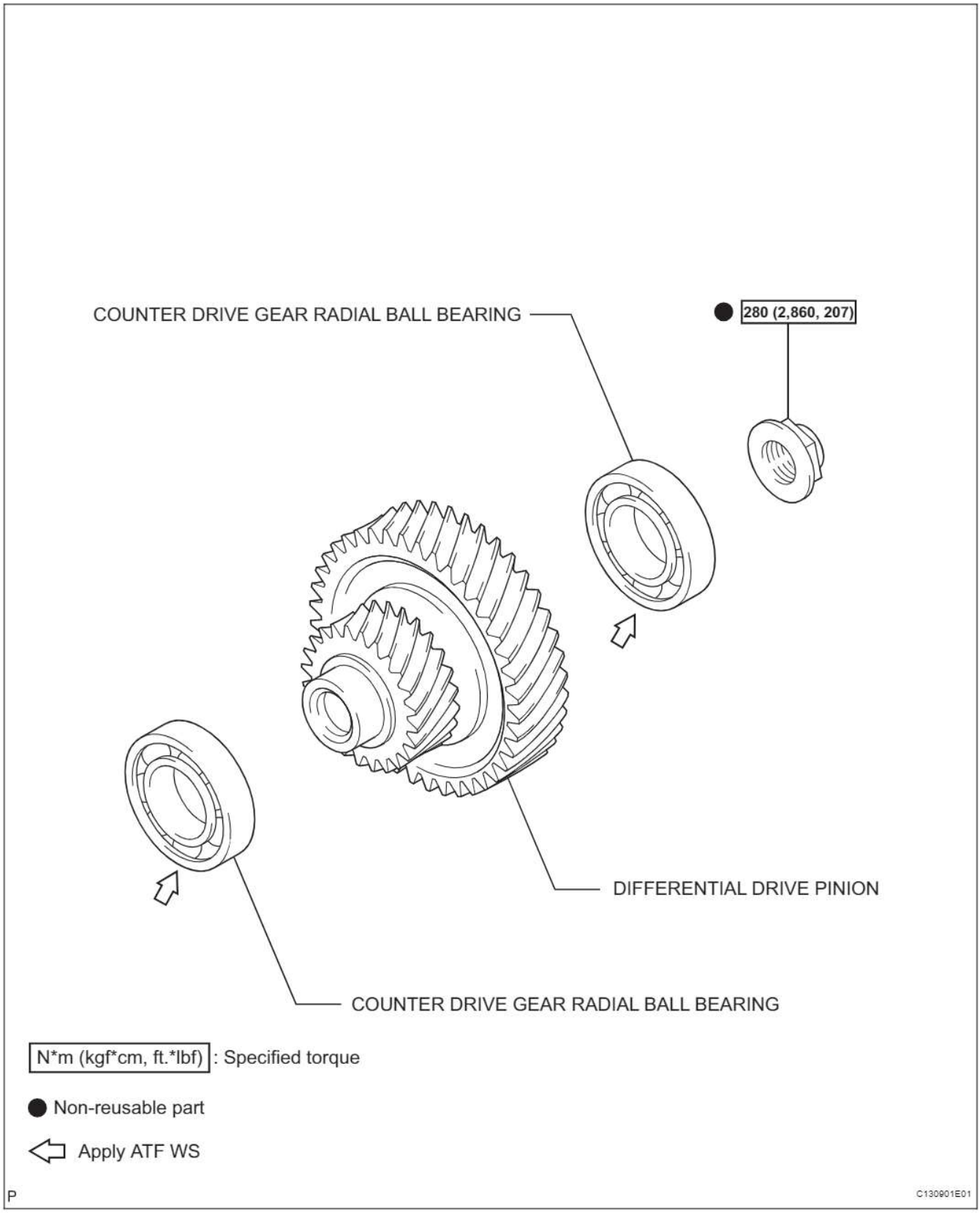
SST 09950-60010 (09951-00330, 09951-00460), 09950-70010 (09951-07100)



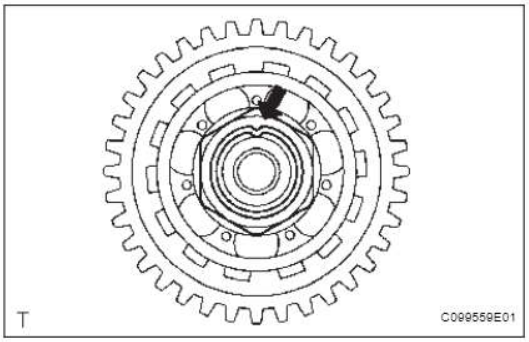
HX

DIFFERENTIAL DRIVE PINION

COMPONENTS



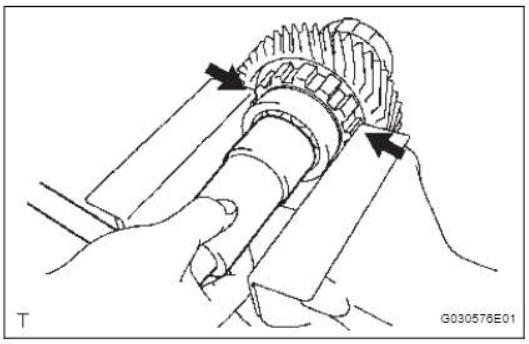
HX



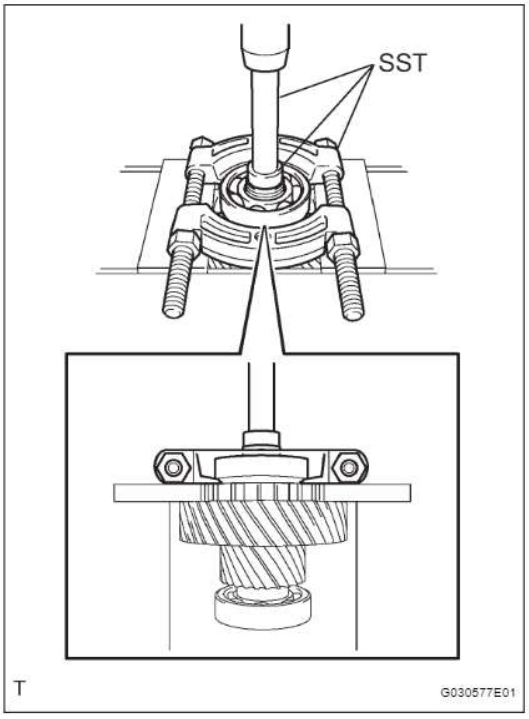
DISASSEMBLY

1. REMOVE COUNTER DRIVE GEAR RADIAL BALL BEARING

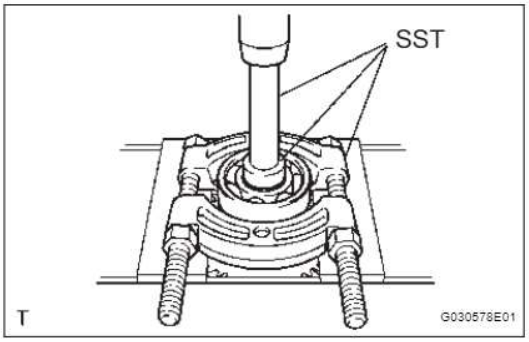
(a) Loosen the staked part of the nut.



(b) Set the differential drive pinion in a vise and remove the nut using a deep socket wrench.
HINT:
Set the drive pinion in a vise as shown in the illustration.



(c) Using SST and a press, press out the bearing from the differential driver pinion.
SST 09527-10011, 09950-00020, 09950-60010 (09951-00360), 09950-70010 (09951-07100)



(d) Using SST and a press, press out the bearing from the differential drive pinion.
SST 09527-10011, 09950-00020, 09950-60010 (09951-00360), 09950-70010 (09951-07100)

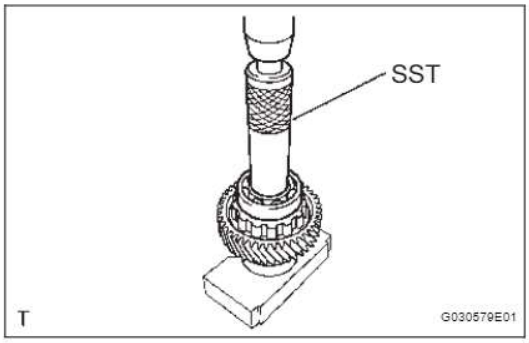
HX

INSPECTION

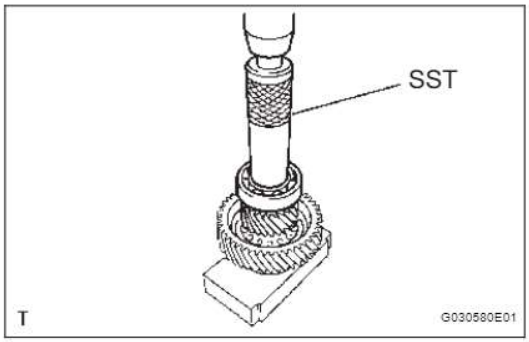
1. **INSPECT COUNTER DRIVE GEAR RADIAL BALL BEARING**
   (a) Check the bearing for abnormal wear or discoloration.
   HINT:
   Replace the bearing with a new one if abnormal wear or discoloration is found.

REASSEMBLY

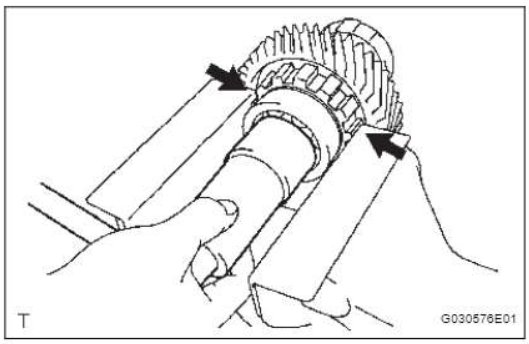
1. **INSTALL COUNTER DRIVE GEAR RADIAL BALL BEARING**
   (a) Using SST and a press, press in the bearing to the differential drive pinion.
   SST 09608-06041



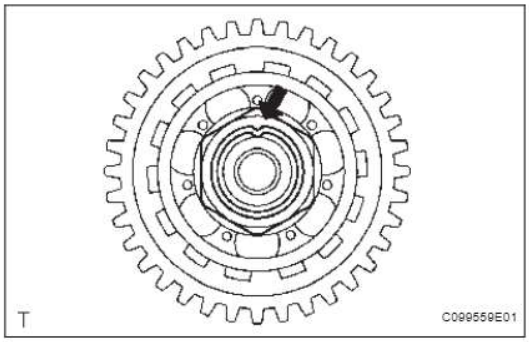
   (b) Using SST and a press, press in the bearing to the differential drive pinion.
   SST 09608-06041, 09950-60010 (09951-00370)



   (c) Set the differential drive pinion in a vise and tighten a new nut using a deep socket wrench.
   Torque: 280 N*m (2,860 kgf*cm, 207 ft.*lbf)
   HINT:
   Set the vise as shown in the illustration.

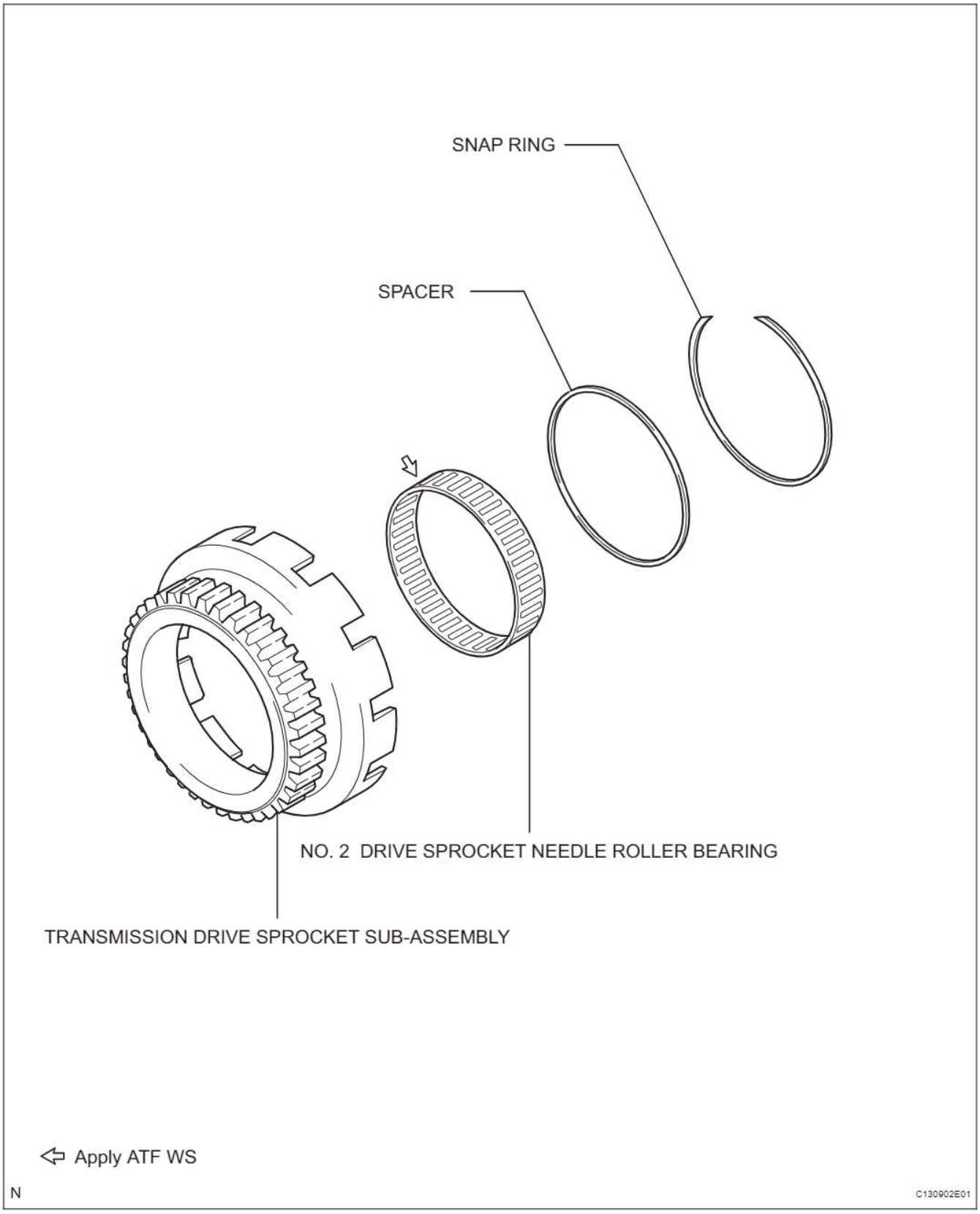


   (d) Stake the nut.

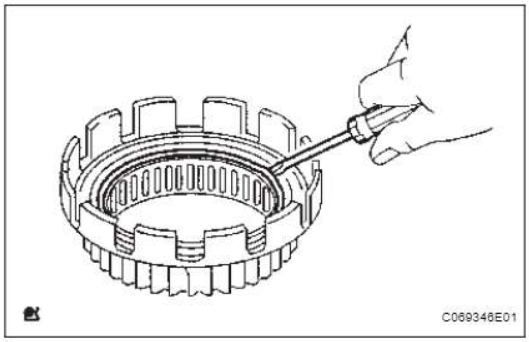


TRANSMISSION DRIVE SPROCKET

COMPONENTS

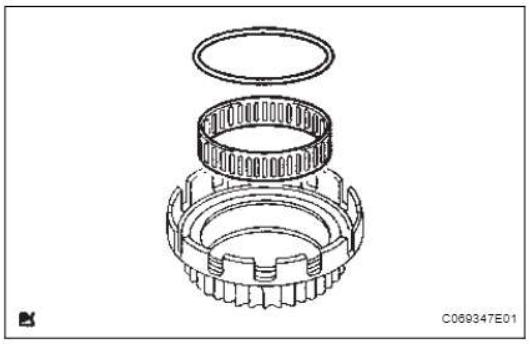


HX



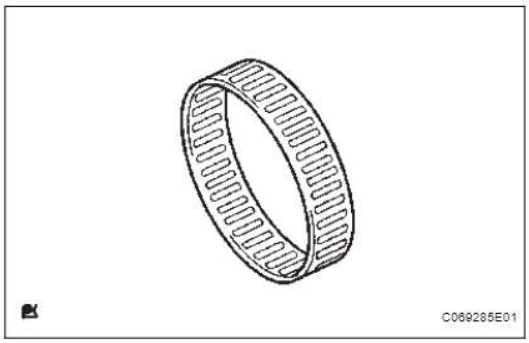
DISASSEMBLY

1. **REMOVE TRANSMISSION DRIVE SPROCKET SUB-ASSEMBLY**
   (a) Using a thin screwdriver, pry out the snap ring from the transmission drive sprocket.



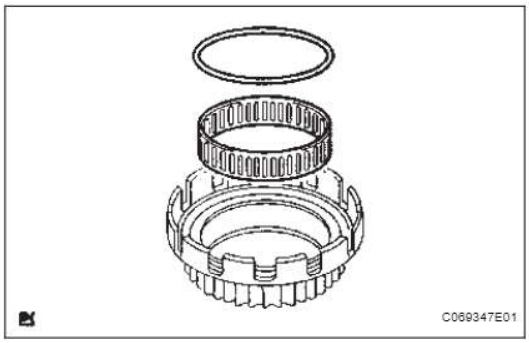
   (b) Remove the spacer and the needle roller bearing from the transmission drive sprocket.

INSPECTION

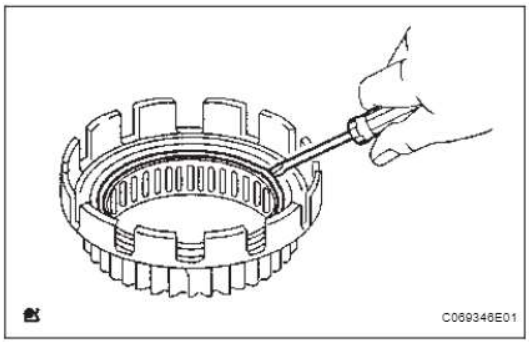


1. **INSPECT NO. 2 DRIVE SPROCKET NEEDLE ROLLER BEARING**
   (a) Check the bearing for abnormal wear or discoloration.
   HINT:
   Replace the needle roller bearing with a new one if abnormal wear or discoloration is found.

REASSEMBLY



1. **INSTALL TRANSMISSION DRIVE SPROCKET SUB-ASSEMBLY**
   (a) Apply ATF WS to the sliding surfaces of the bearing and install the needle roller bearing to the transmission drive sprocket.
   (b) Install the spacer to the transmission drive sprocket.

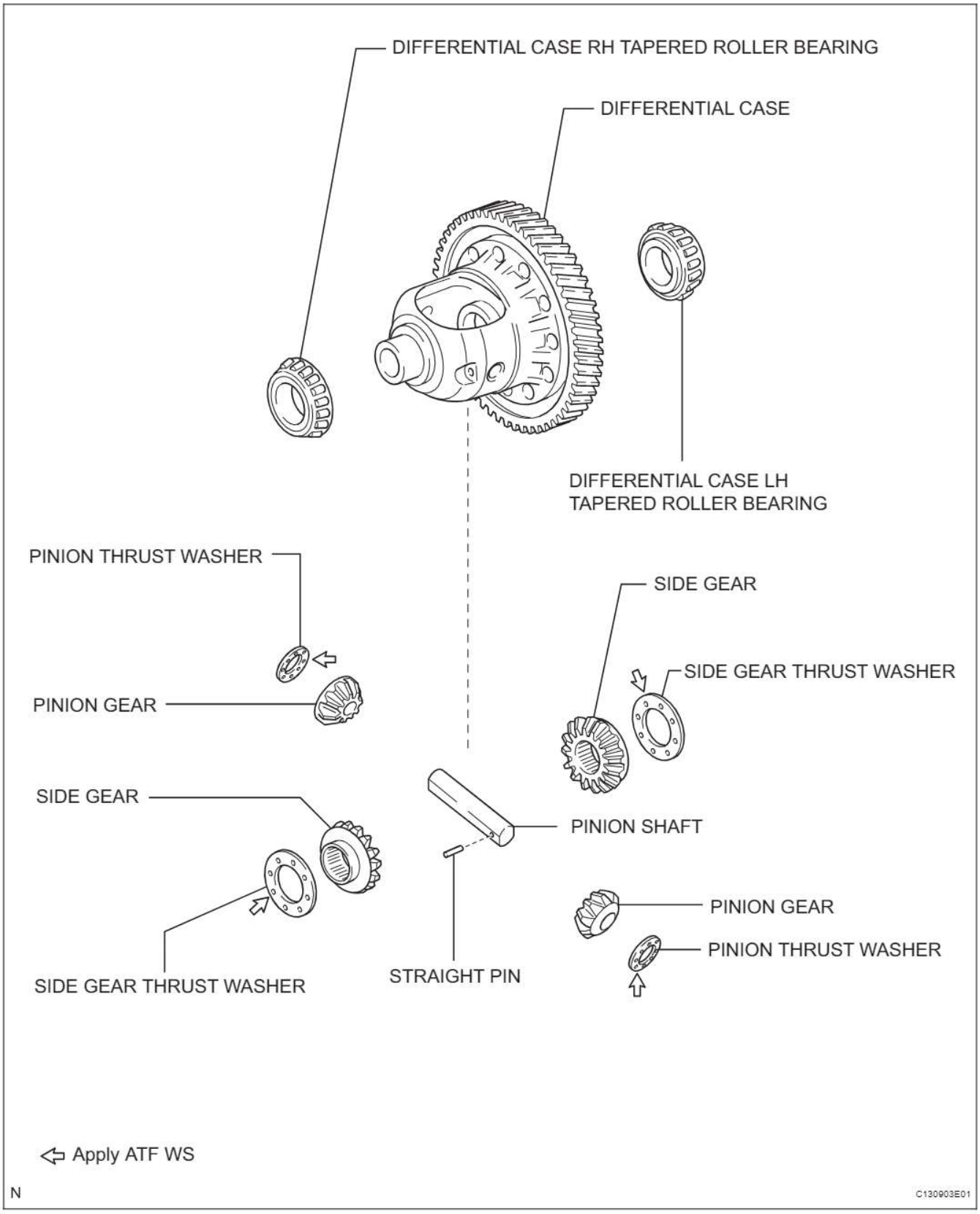


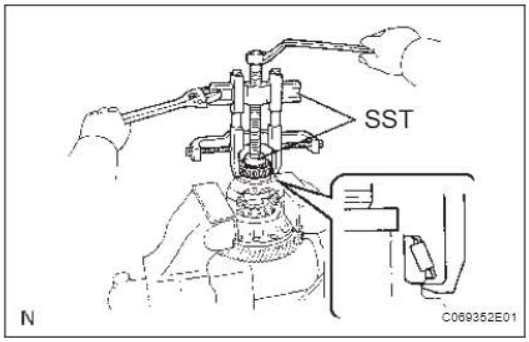
   (c) Using a thin screwdriver, install the snap ring to the transmission drive sprocket.

HX

DIFFERENTIAL CASE

COMPONENTS





DISASSEMBLY

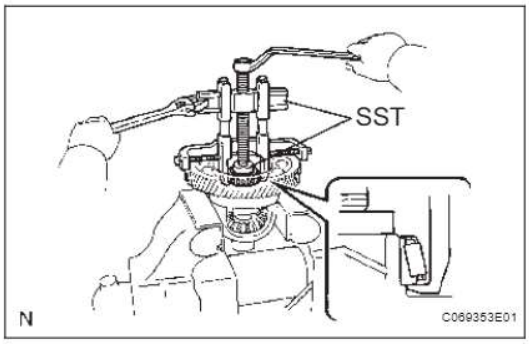
1. REMOVE DIFFERENTIAL CASE LH TAPERED ROLLER BEARING

(a) Set the differential case in a vise.

(b) Using SST, remove the bearing RH from the differential case.

SST 09950-40011 (09951-04010, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09958-04010)

NOTICE:
Apply oil or equivalent to the ends and screw portions of SST.

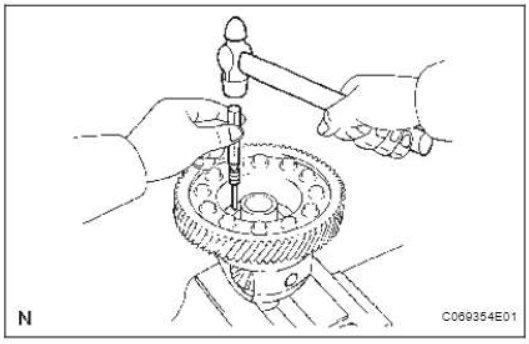


2. REMOVE DIFFERENTIAL CASE RH TAPERED ROLLER BEARING

(a) Set the differential case in a vise.

(b) Using SST, remove the bearing LH from the differential case.

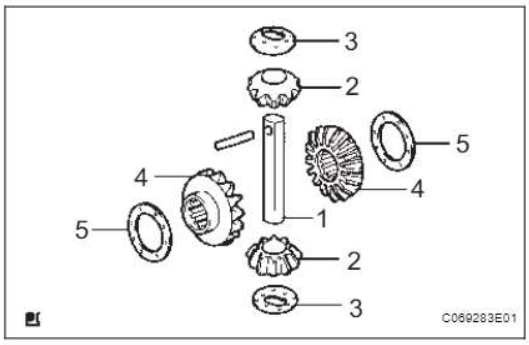
SST 09950-40011 (09951-04010, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09958-04010)



3. REMOVE DIFFERENTIAL CASE

(a) Set the differential case in a vise.

(b) Tap out the straight pin from the differential case with a 5 mm pin punch.



(c) Remove the following parts from the differential case.

Number	Part	Number of Parts
1	Pinion shaft	1
2	Pinion	2
3	Pinion thrust washer	2
4	Side gear	2
5	Side gear thrust washer	2

HX

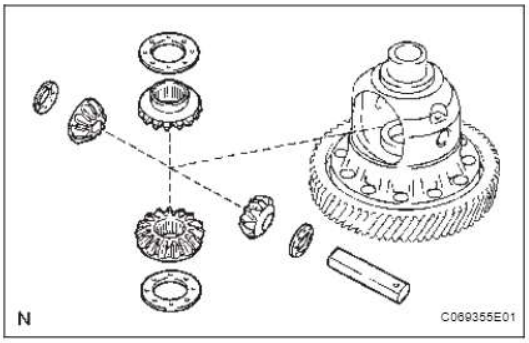
INSPECTION

1. INSPECT DIFFERENTIAL CASE TAPERED ROLLER BEARING

(a) Check the bearing for abnormal wear or discoloration.
HINT:
Replace the bearing with a new one if abnormal wear or discoloration is found.

REASSEMBLY

1. INSTALL DIFFERENTIAL CASE

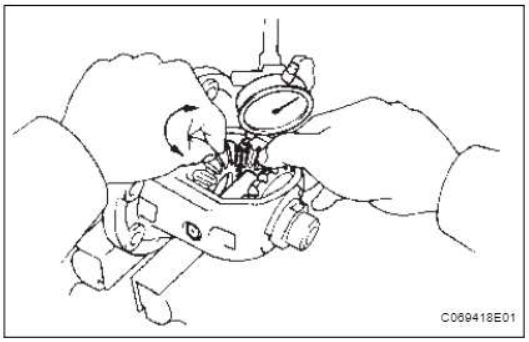


(a) Apply ATF WS to the side gear thrust washer and install it to the side gear.

(b) Apply ATF WS to the side gear thrust washer and install it to the pinion.

(c) Install the side gear and pinion to the differential case.

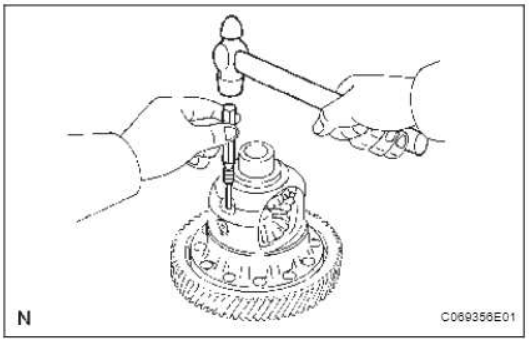
(d) Install the pinion shaft to the differential case so that the straight pin holes of the pinion shaft and differential case are aligned.



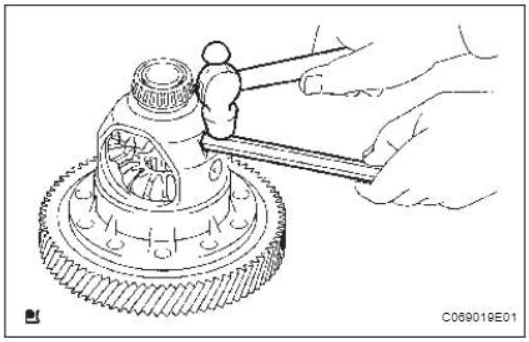
(e) Set the pinion side and inspect the side gear backlash.
Standard backlash:
0.05 to 0.20 mm (0.0020 to 0.0079 in.)
HINT:
- Replace the side gear thrust washers with the same size for both the right and left side gears if the value is outside the specified range.
- Ensure that rotation is smooth if side gear backlash is within the specified range.

If the backlash exceeds the specified range, replace the side gear thrust washer with thinner one.
If the backlash is less then the specified range, replace the side gear thrust washer with thicker one.
Standard side gear thrust washer thickness

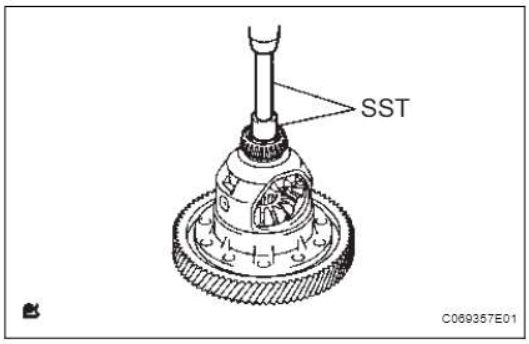
Part No.	Washer thickness
41361-22140	0.95 mm (0.0374 in.)
41361-22020	1.00 mm (0.0394 in.)
41361-22150	1.05 mm (0.0414 in.)
41361-22030	1.10 mm (0.0433 in.)
41361-22160	1.15 mm (0.0453 in.)
41361-22040	1.20 mm (0.0472 in.)



(f) Using a 5 mm pin punch, tap in the straight pin to the differential case.



(g) Using a chisel, caulk the external circumference of the differential case straight pin hole.

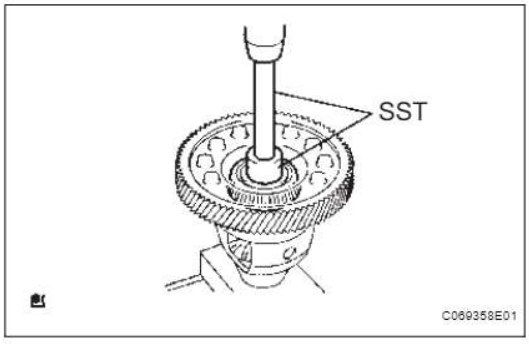


2. INSTALL DIFFERENTIAL CASE RH TAPERED ROLLER BEARING

(a) Using SST and a press, press in the bearing RH to the differential case.

SST 09710-22021 (09710-01031), 09950-70010 (09951-07100)

HINT:
There are 24 bearing rollers in bearing RH.



3. INSTALL DIFFERENTIAL CASE LH TAPERED ROLLER BEARING

(a) Using SST and a press, press in the bearing LH to the differential case.

SST 09710-22021 (09710-01031), 09950-70010 (09951-07100)

HINT:
There are 22 bearing rollers in bearing LH.

HX

GENERATOR CABLE

REMOVAL

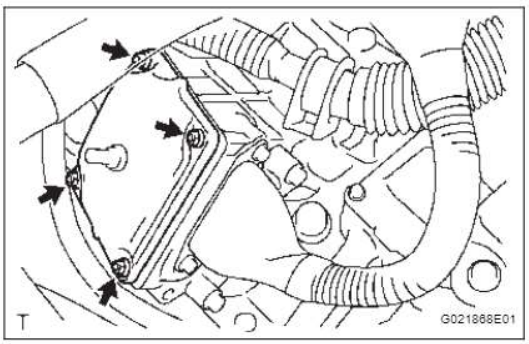
CAUTION:

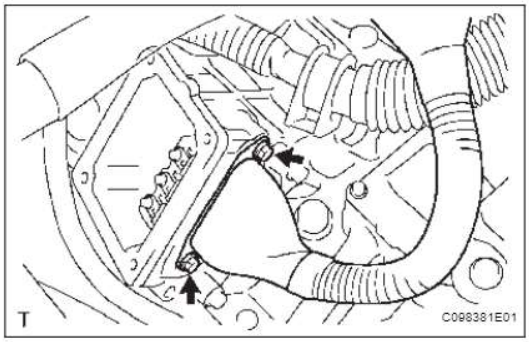
- **When working on the high voltage systems, always wear insulated gloves.**
- **Keep the removed service plug in your pocket to prevent other technicians from reconnecting it while you are servicing the vehicle.**
- **After removing the service plug grip, do not touch the high voltage connectors and terminals for 5 minutes.**

NOTICE:

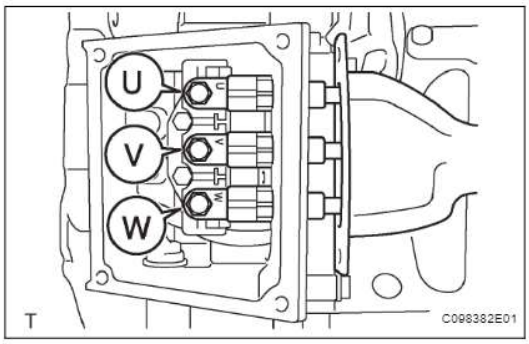
After removing the service plug grip, do not operate the power switch as it may damage the hybrid vehicle control ECU.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SERVICE PLUG GRIP**
   (a) Remove the service plug grip (see page HB-153).
3. **REMOVE ENGINE UNDER COVER LH**
4. **REMOVE ENGINE UNDER COVER RH**
5. **DRAIN COOLANT**
   (a) Drain coolant (see page HX-58).
6. **REMOVE FRONT COWL TOP PANEL OUTER SUB-ASSEMBLY**
   (a) Remove the cowl top front panel (see page FU-12).
7. **REMOVE INVERTER WITH CONVERTER ASSEMBLY**
   (a) Remove the inverter with converter (see page HV-530).
8. **REMOVE GENERATOR CABLE**
   (a) Check that there is no voltage.
   CAUTION:
   Ensure that insulated gloves are worn when carrying out this procedure.
   (1) Remove the 4 bolts and power cable cover.

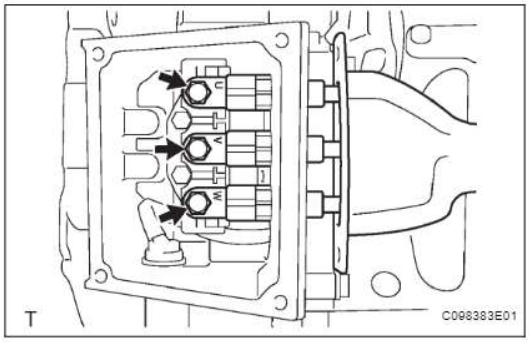




(2) Remove the 2 bolts from the generator cable.

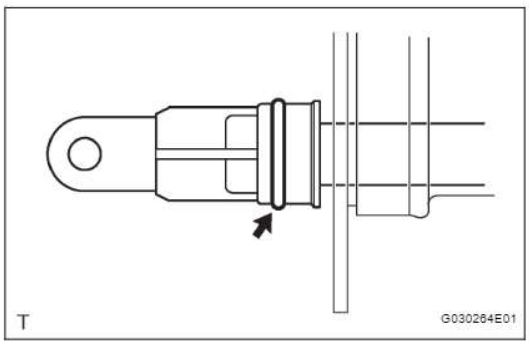


(3) Inspect the voltage between each of the 3 phase AC terminals (U to V, V to W, U to W) and body ground using the Toyota electrical tester.
Standard value:
0 V
HINT:
Use the Toyota Electrical Tester on measured ranges of DC 400 volts or more.



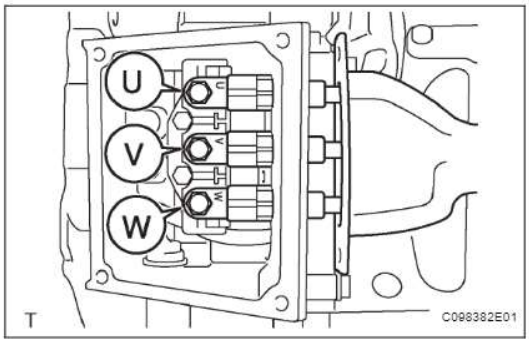
(b) Remove the 3 bolts and generator cable.

INSTALLATION



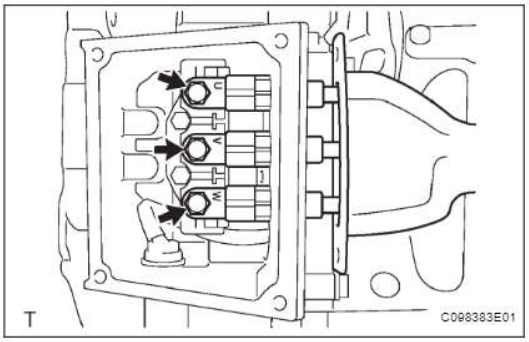
1. INSTALL GENERATOR CABLE

(a) Apply a small amount of ATF WS to the generator cable's O-ring.

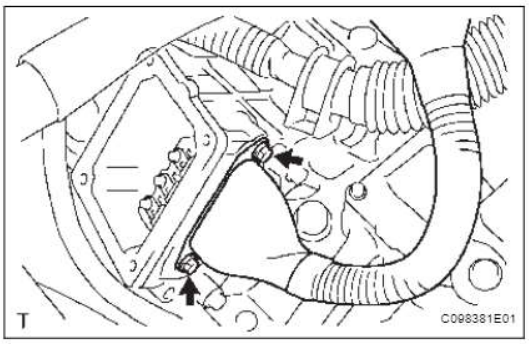


(b) Connect the generator cable as shown in the illustration.
NOTICE:
- **Align the letters U, V and W, and connect the cable.**
- **Ensure that no foreign objects are attached to the O-ring when connecting the cables.**

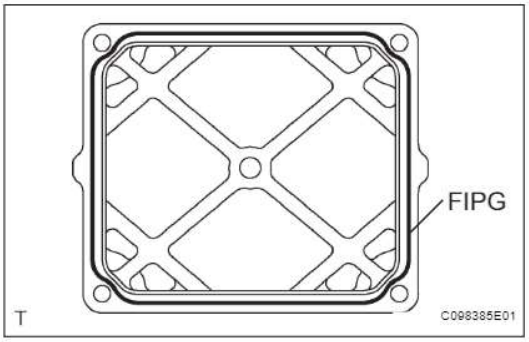
HX



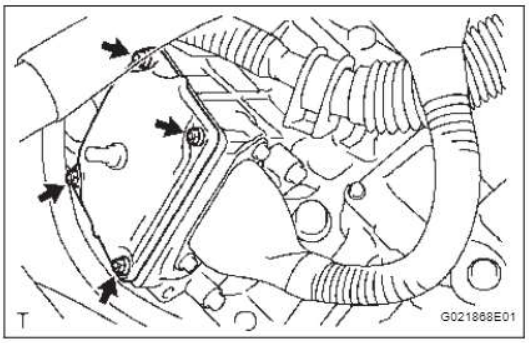
(c) Install the generator cable (terminals) with the 3 bolts.
Torque: 8.5 N*m (87 kgf*cm, 71 in.*lbf)



(d) Install the generator cable with the 2 bolts.
Torque: 5.8 N*m (59 kgf*cm, 51 in.*lbf)



(e) Apply seal packing in a continuous line of beads (diameter 1.5 mm (0.059 in.) to the power cable cover.
Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or Equivalent
NOTICE:
- **Clean and degrease the installation surfaces.**
- **Install within 10 minutes of applying seal packing.**
- **Ensure that no foreign objects are inserted when the power cable cover is attached.**



(f) Install the power cable cover with the 4 bolts.
Torque: 4.8 N*m (49 kgf*cm, 42 in.*lbf)

2. **INSTALL INVERTER WITH CONVERTER ASSEMBLY**
   (a) Install the inverter with converter (see page HV-535).
3. **INSTALL FRONT COWL TOP PANEL OUTER SUB-ASSEMBLY**
   (a) Install the cowl top front panel (see page FU-19).
4. **INSTALL ENGINE UNDER COVER RH**
5. **INSTALL ENGINE UNDER COVER LH**
6. **INSTALL SERVICE PLUG GRIP**
   (a) Install the service plug grip (see page HB-154).
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
8. **ADD COOLANT**
   (a) Add coolant (see page HX-58).

9. CHECK FOR ENGINE COOLANT LEAKS

(a) Check for engine coolant leaks (see page CO-9).

10. PERFORM INITIALIZATION

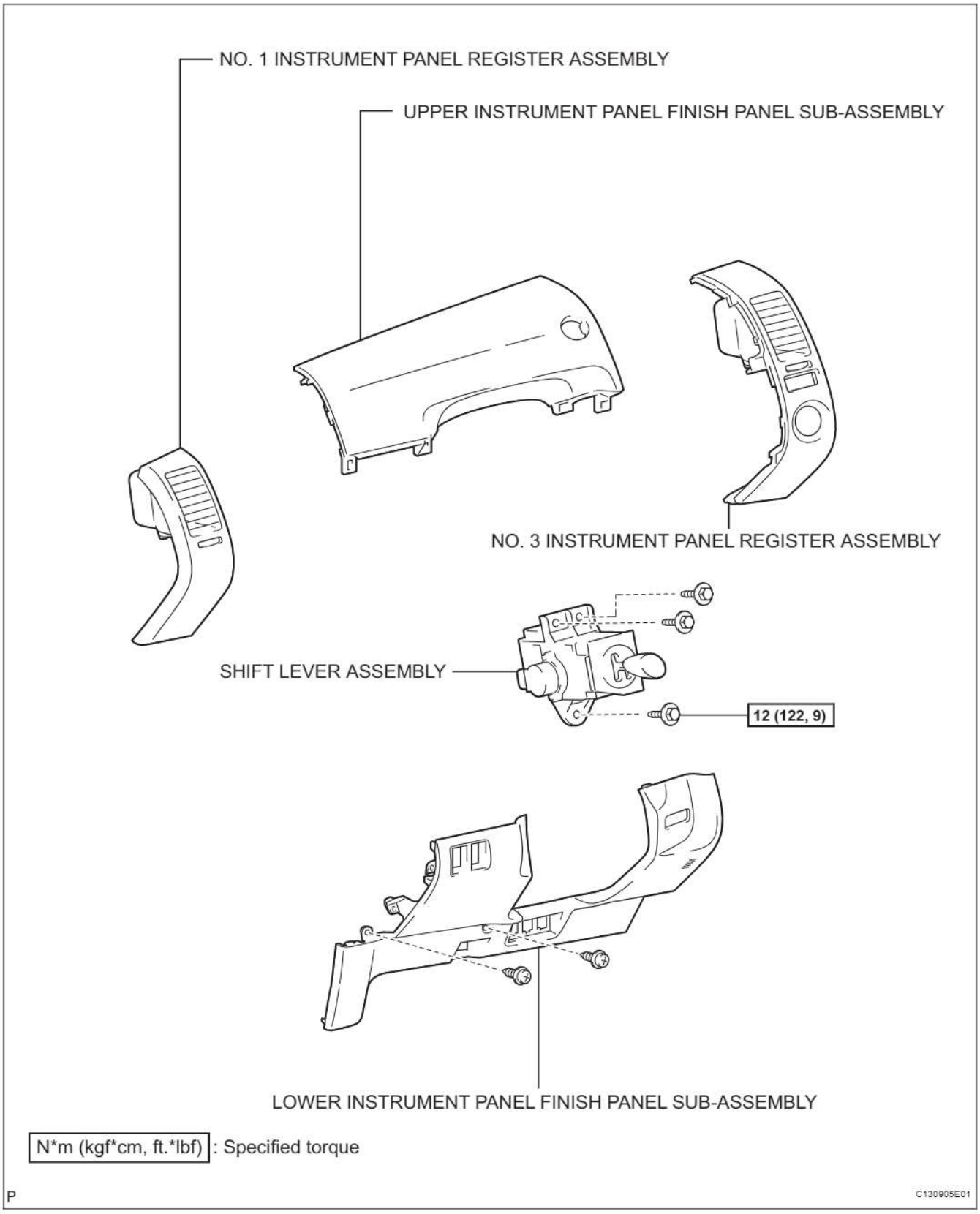
(a) Perform initialization (see page IN-32).

NOTICE:

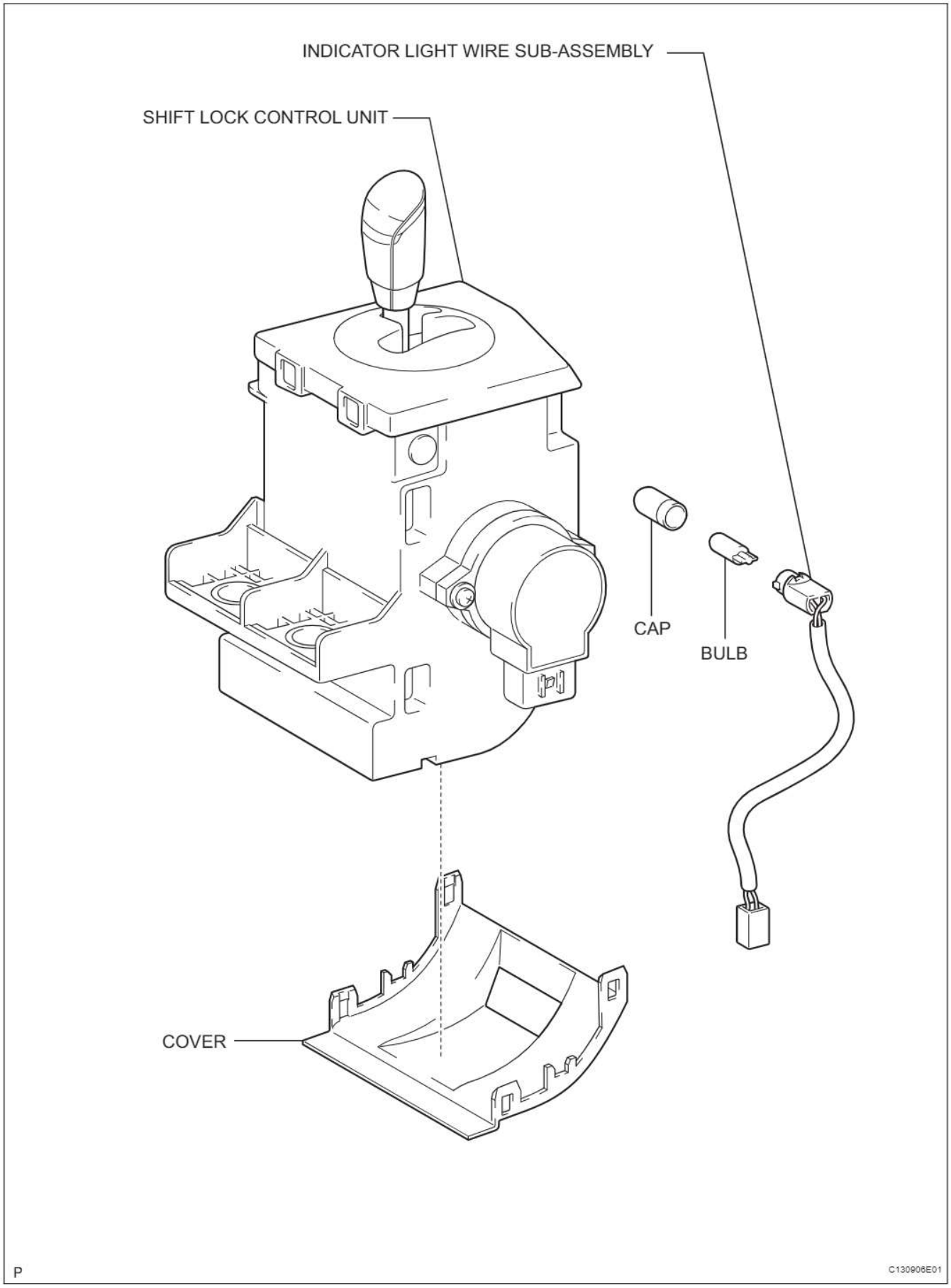
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

SHIFT LEVER

COMPONENTS

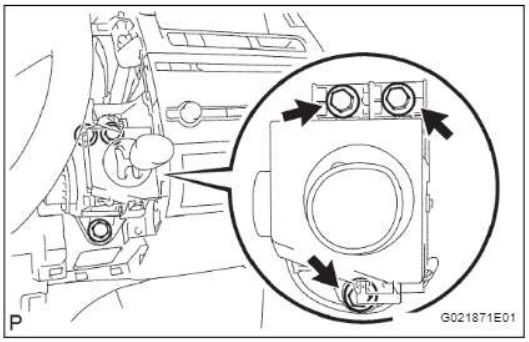


HX


INDICATOR LIGHT WIRE SUB-ASSEMBLY
SHIFT LOCK CONTROL UNIT
CAP
BULB
COVER
P
C130906E01

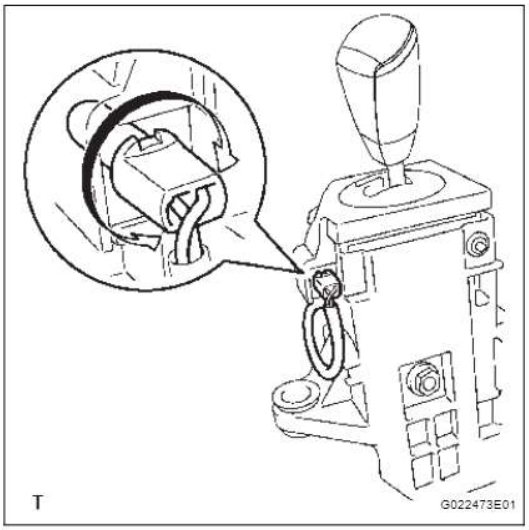
REMOVAL

1. REMOVE NO. 1 INSTRUMENT PANEL REGISTER ASSEMBLY (See page IP-5)
2. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (See page IP-6)
3. REMOVE UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (See page IP-6)
4. REMOVE NO. 3 INSTRUMENT PANEL REGISTER ASSEMBLY (See page IP-6)
5. REMOVE SHIFT LEVER ASSEMBLY
   (a) Remove the 3 bolts.
   (b) Disconnect the 2 connectors and remove the shift lever.



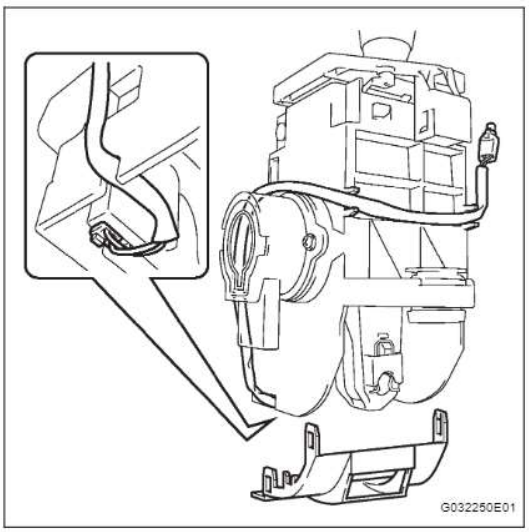
DISASSEMBLY

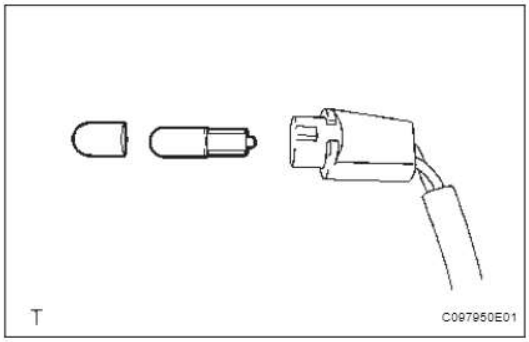
1. REMOVE INDICATOR LIGHT WIRE SUB-ASSEMBLY
   (a) Remove the position indicator light wire from the position indicator housing.



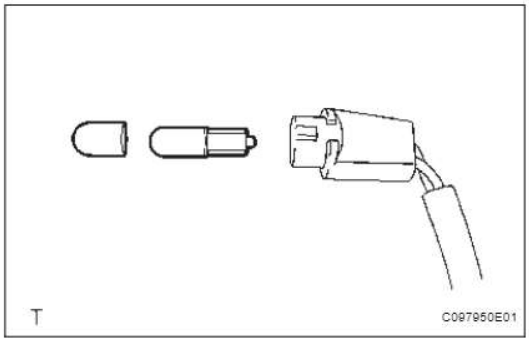
HX

   (b) Remove the cover.
   (c) Disconnect the connector from the 3 clamps and remove the position indicator light wire.





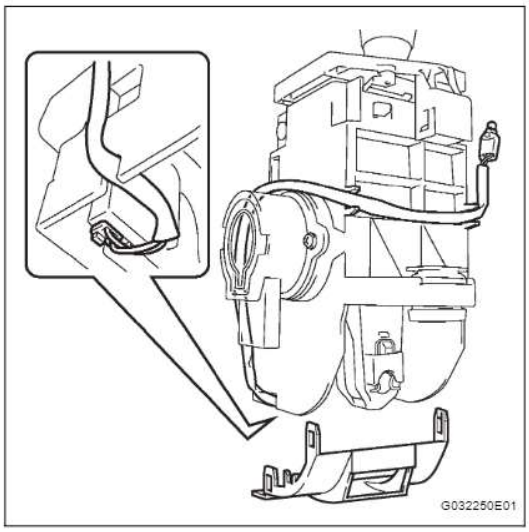
(d) Remove the bulb and cap from the position indicator light wire.



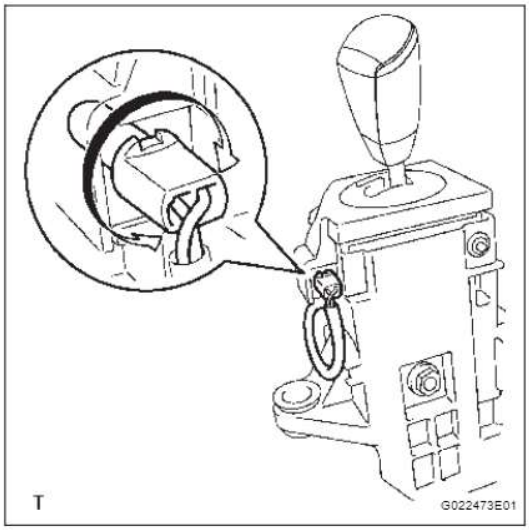
REASSEMBLY

1. INSTALL INDICATOR LIGHT WIRE SUB-ASSEMBLY

(a) Install the bulb and cap to the position indicator light wire.

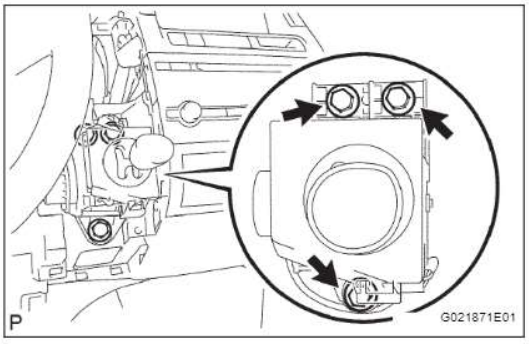


(b) Connect the connector to the 3 clamps.
(c) Install the cover.



(d) Install the position indicator light wire to the position indicator housing.
NOTICE:
Securely attach the wire by twisting to the right.

HX



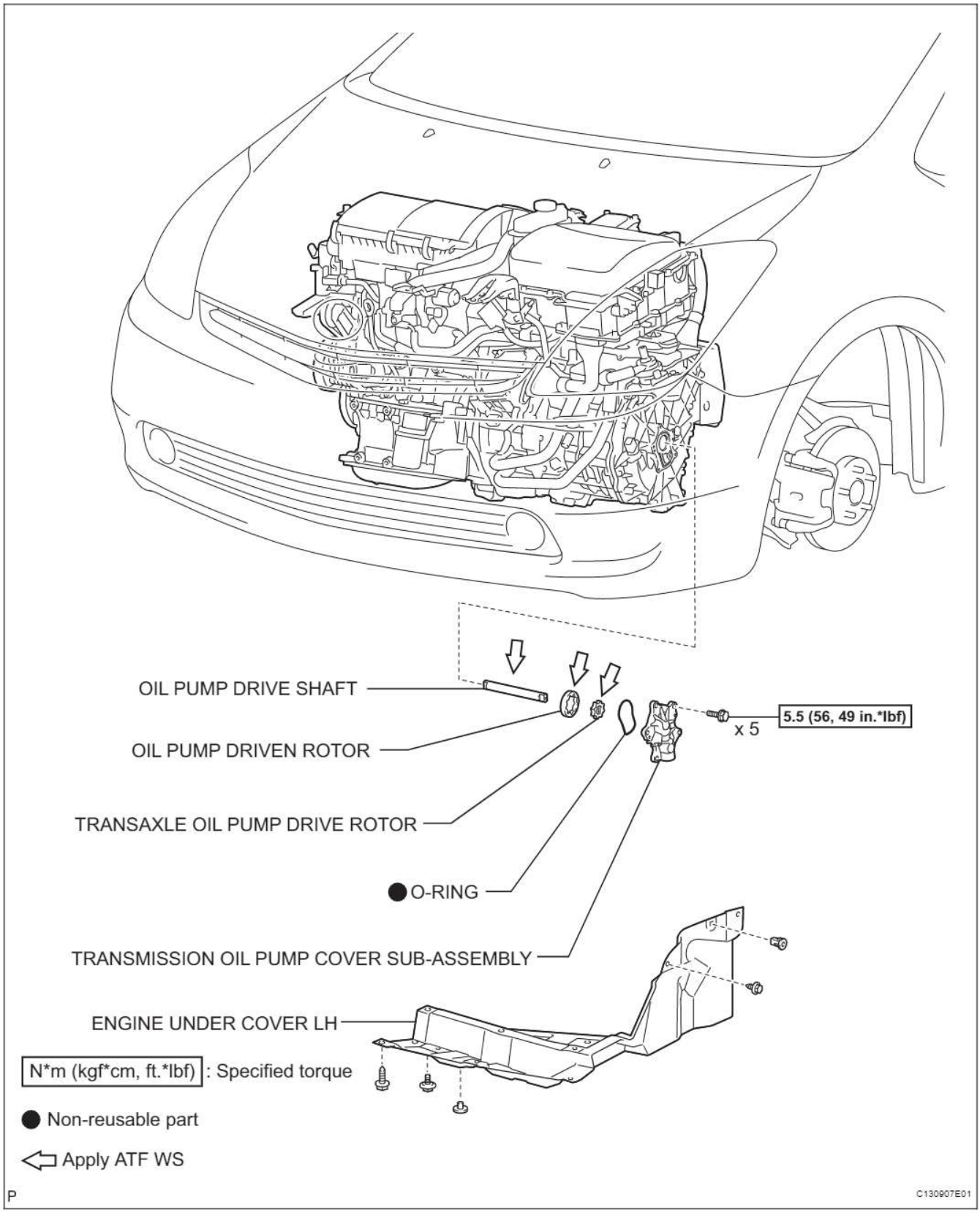
INSTALLATION

1. **INSTALL SHIFT LEVER ASSEMBLY**
   (a) Connect the 2 connectors to the shift lever.
   (b) Install the shift lever with the 3 bolts.
   Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)
2. **INSPECT SHIFT LEVER ASSEMBLY**
   (a) Inspect the shift lever (see page HX-2).
3. **INSTALL NO. 3 INSTRUMENT PANEL REGISTER ASSEMBLY (See page IP-13)**
4. **INSTALL UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (See page IP-13)**
5. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (See page IP-13)**
6. **INSTALL NO. 1 INSTRUMENT PANEL REGISTER ASSEMBLY (See page IP-13)**

HX

OIL PUMP DRIVE SHAFT

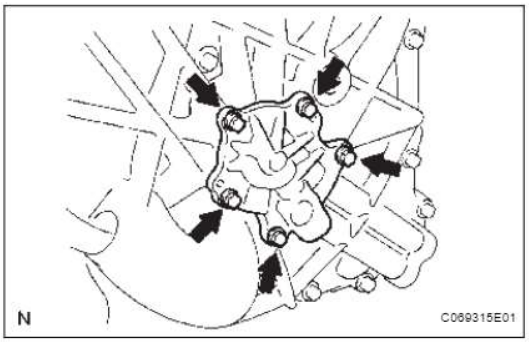
COMPONENTS



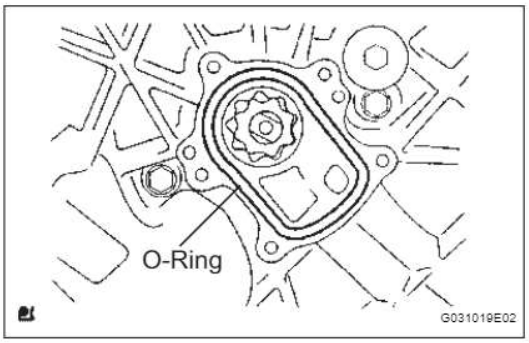
HX

REMOVAL

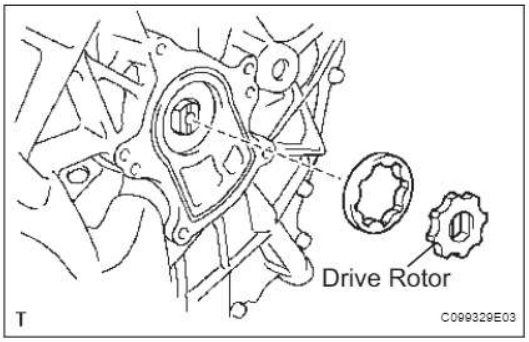
1. **REMOVE FRONT WHEEL LH**
2. **REMOVE ENGINE UNDER COVER LH**
3. **DRAIN TRANSAXLE OIL**
   (a) Drain transaxle oil (see page HX-1).
4. **REMOVE TRANSMISSION OIL PUMP COVER SUB-ASSEMBLY**
   (a) Remove the 5 bolts and oil pump cover.



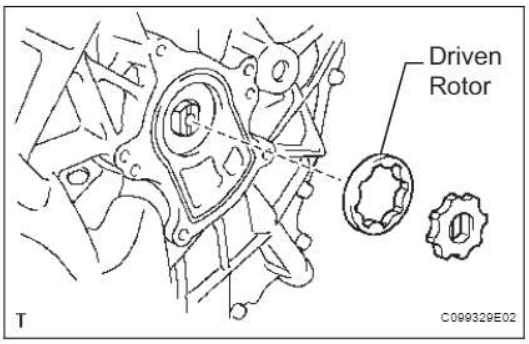
   (b) Remove the O-ring.



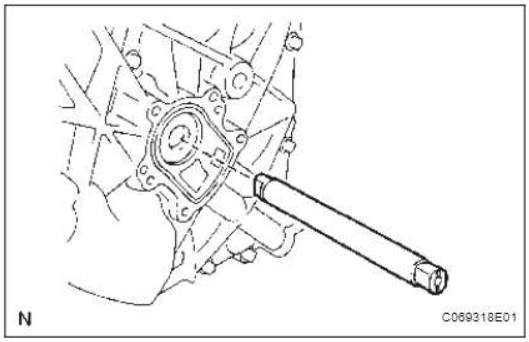
5. **REMOVE TRANSAXLE OIL PUMP DRIVE ROTOR**
   (a) Remove the transaxle oil pump drive rotor from the hybrid vehicle transaxle.



6. **REMOVE OIL PUMP DRIVEN ROTOR**
   (a) Remove the oil pump driven rotor from the hybrid vehicle transaxle.

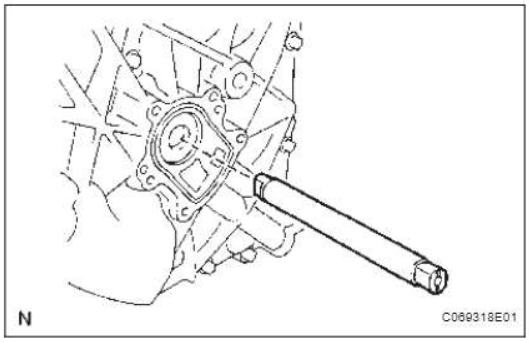


HX

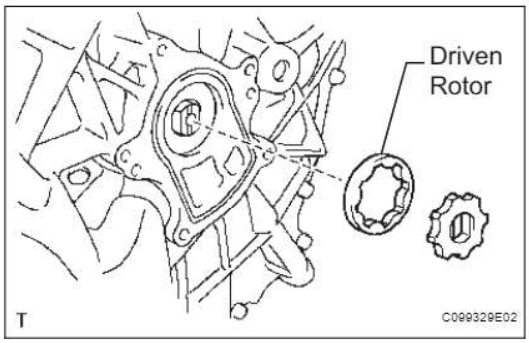


7. **REMOVE OIL PUMP DRIVE SHAFT**
   (a) Remove the oil pump drive shaft from the hybrid vehicle transaxle.

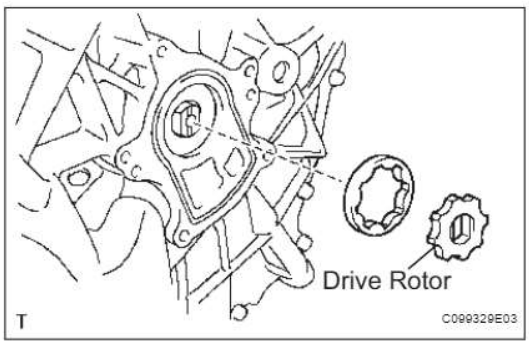
INSTALLATION



1. **INSTALL OIL PUMP DRIVE SHAFT**
   (a) Apply ATF WS to the oil pump drive shaft and install it to the hybrid vehicle transaxle.
   HINT:
   Use genuine ATF WS.

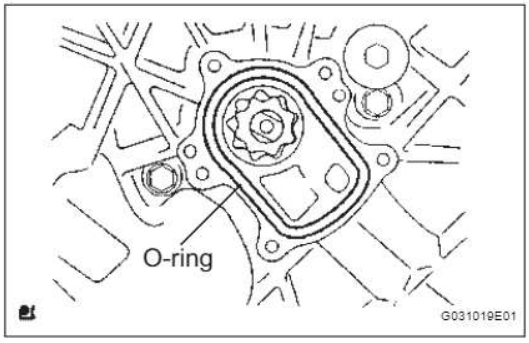


2. **INSTALL OIL PUMP DRIVEN ROTOR**
   (a) Apply ATF WS to the oil pump driven rotor and install it to the hybrid vehicle transaxle.
   HINT:
   Use genuine ATF WS.

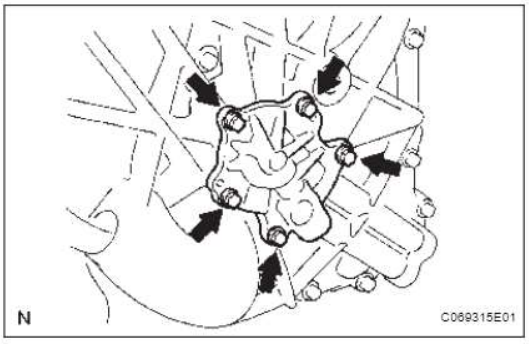


3. **INSTALL TRANSAXLE OIL PUMP DRIVE ROTOR**
   (a) Apply ATF WS to the oil pump drive rotor and install it to the hybrid vehicle transaxle.
   HINT:
   Use genuine ATF WS.

HX



4. **INSTALL TRANSMISSION OIL PUMP COVER SUB-ASSEMBLY**
   (a) Install a new O-ring to the hybrid transaxle.
   NOTICE:
   Do not twist the O-ring when installing it.



(b) Apply adhesive to the first 2 or 3 threads of the bolt end.
Adhesive:
Toyota Genuine Adhesive 1344,
Three Bond 1344 or Equivalent
NOTICE:
Clean and degrease the bolts and bolt holes.
(c) Install the oil pump cover with the 5 bolts.
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

5. **INSTALL FRONT WHEEL**

6. **ADD TRANSAXLE OIL**
Fluid type:
Toyota genuine ATF WS
Standard capacity:
3.8 liters (4.0 US qts, 3.3 Imp. qts)

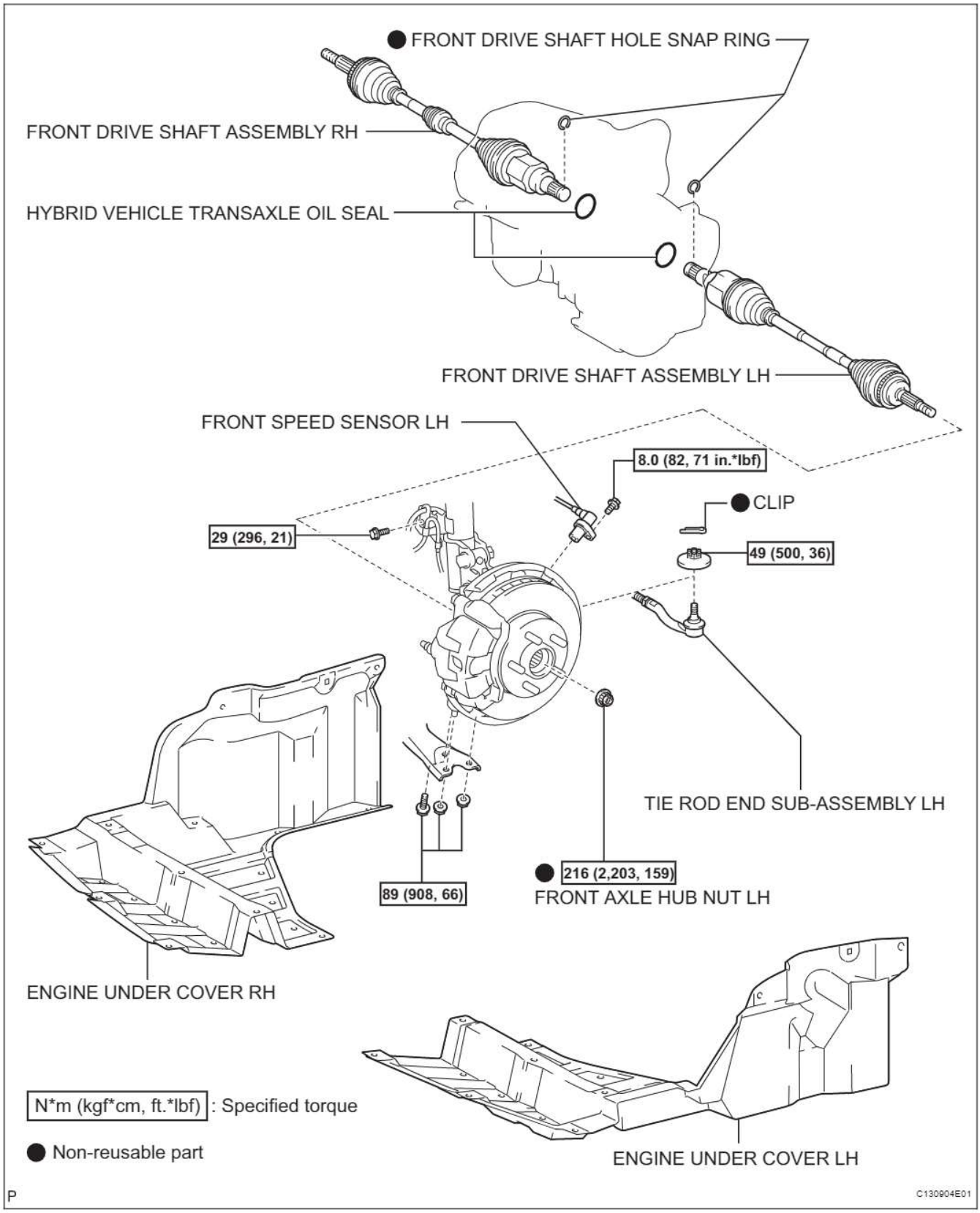
7. **INSPECT TRANSAXLE OIL**
(a) Inspect transaxle oil (see page HX-1).

8. **INSTALL ENGINE UNDER COVER LH**

HX

HYBRID TRANSAXLE OIL SEAL

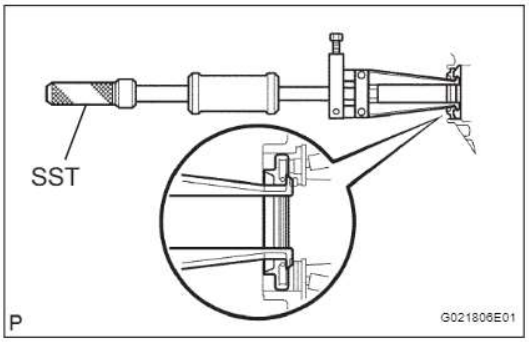
COMPONENTS

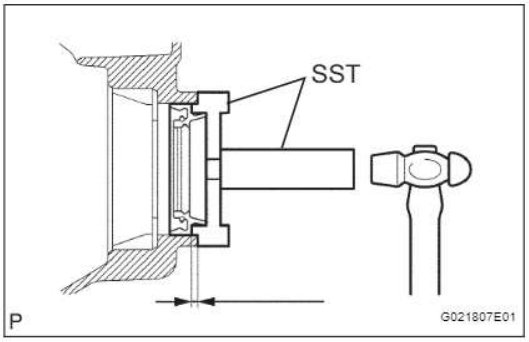


HX

REPLACEMENT

1. **REMOVE FRONT WHEEL**
2. **REMOVE ENGINE UNDER COVER LH**
3. **REMOVE ENGINE UNDER COVER RH**
4. **DRAIN TRANSAXLE OIL**
   (a) Drain transaxle oil (see page HX-1).
5. **REMOVE FRONT DRIVE SHAFT ASSEMBLY LH**
   (a) Remove the drive shaft (see page DS-7).
6. **REMOVE FRONT DRIVE SHAFT ASSEMBLY RH**
   (a) Remove the drive shaft (see page DS-7).
7. **REMOVE HYBRID TRANSAXLE OIL SEAL**
   (a) Using SST, tap out the oil seal.
   SST 09308-00010





8. **INSTALL HYBRID TRANSAXLE OIL SEAL**
   (a) Apply a small amount of No. 2 MP grease to the lip of a new oil seal.
   (b) Using SST, tap in the oil seal to the standard depth.
   Standard depth:
   2.7 +-0.5 mm (0.106 +-0.020 in.)
   SST 09950-70010 (09951-07200), 09350-32014 (09351-32130, 09351-32150)
9. **INSTALL FRONT DRIVE SHAFT ASSEMBLY RH**
   (a) Install the front drive shaft (see page DS-15).
10. **INSTALL FRONT DRIVE SHAFT ASSEMBLY LH**
    (a) Install the front drive shaft (see page DS-15).
11. **INSTALL FRONT WHEEL**
12. **ADD TRANSAXLE OIL**
    Fluid type:
    Toyota genuine ATF WS
    Capacity:
    3.8 liters (4.0 US qts, 3.3 Imp. qts)
13. **INSPECT TRANSAXLE OIL**
    (a) Inspect the transaxle oil level (see page HX-1).
14. **INSTALL ENGINE UNDER COVER RH**
15. **INSTALL ENGINE UNDER COVER LH**
16. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
    (a) Inspect and adjust the front wheel alignment (see page SP-2).

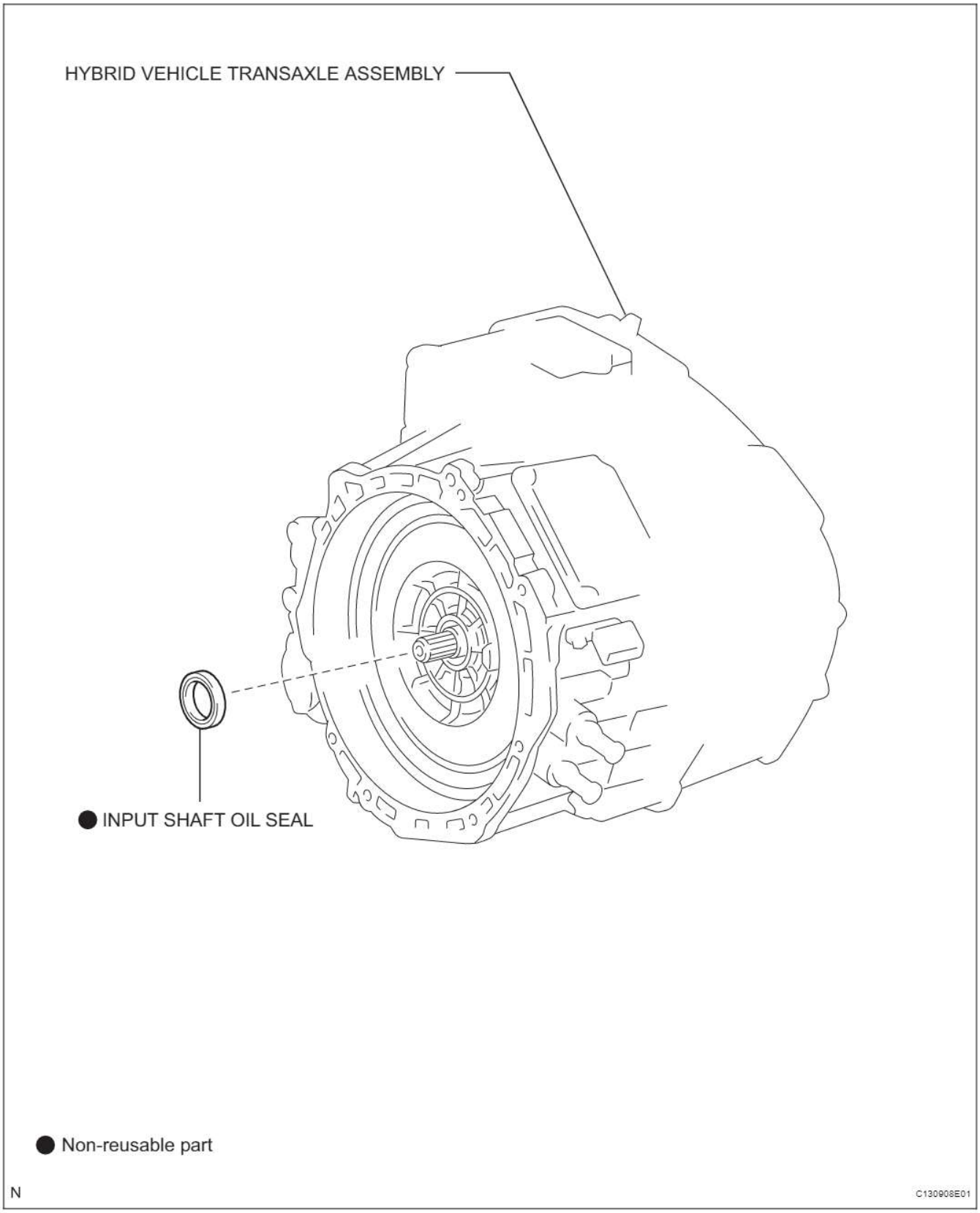
HX

17. PERFORM CALIBRATION

(a) Perform calibration (see page PS-13).

INPUT SHAFT OIL SEAL

COMPONENTS



HX

REPLACEMENT

CAUTION:

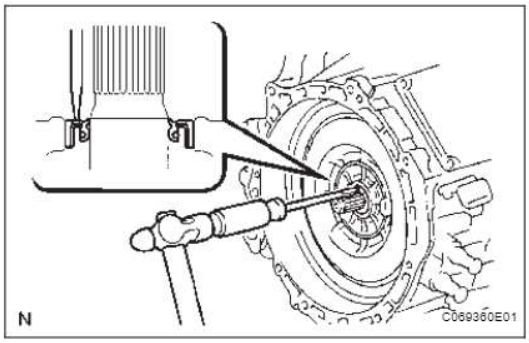
- **When working on the high voltage systems, always wear insulated gloves.**
- **Keep the removed service plug in your pocket to prevent other technicians from reconnecting it while you are servicing the vehicle.**
- **After removing the service plug grip, do not touch the high voltage connectors and terminals for 5 minutes.**

NOTICE:

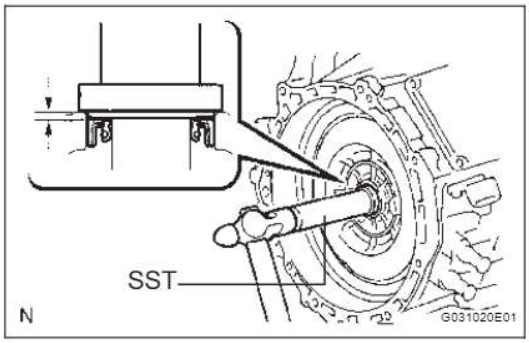
After removing the service plug grip, do not operate the power switch as it may damage the hybrid vehicle control ECU.

1. **REMOVE HYBRID VEHICLE TRANSAXLE ASSEMBLY**
   (a) Remove the hybrid vehicle transaxle (see page HX-66).

2. **REMOVE INPUT SHAFT OIL SEAL**
   (a) Insert a flat-head screwdriver into the metal portion of the oil seal and pry out the oil seal.
   NOTICE:
   Do not damage the input shaft and transaxle housing when inserting the screwdriver or removing the oil seal.



3. **INSTALL INPUT SHAFT OIL SEAL**
   (a) Apply a small amount of No. 2 MP grease to the lip of a new oil seal.
   (b) Using SST, install the oil seal.
   SST 09388-40010
   Standard depth:
   1.0 to 1.5 mm (0.039 to 0.059 in.)
   NOTICE:
   - **Ensure that no foreign objects adhere to the oil seal lip.**
   - **Ensure that the oil seal is not at an angle.**



4. **INSTALL HYBRID VEHICLE TRANSAXLE ASSEMBLY**
   (a) Install the hybrid vehicle transaxle (see page HX-70).

HX