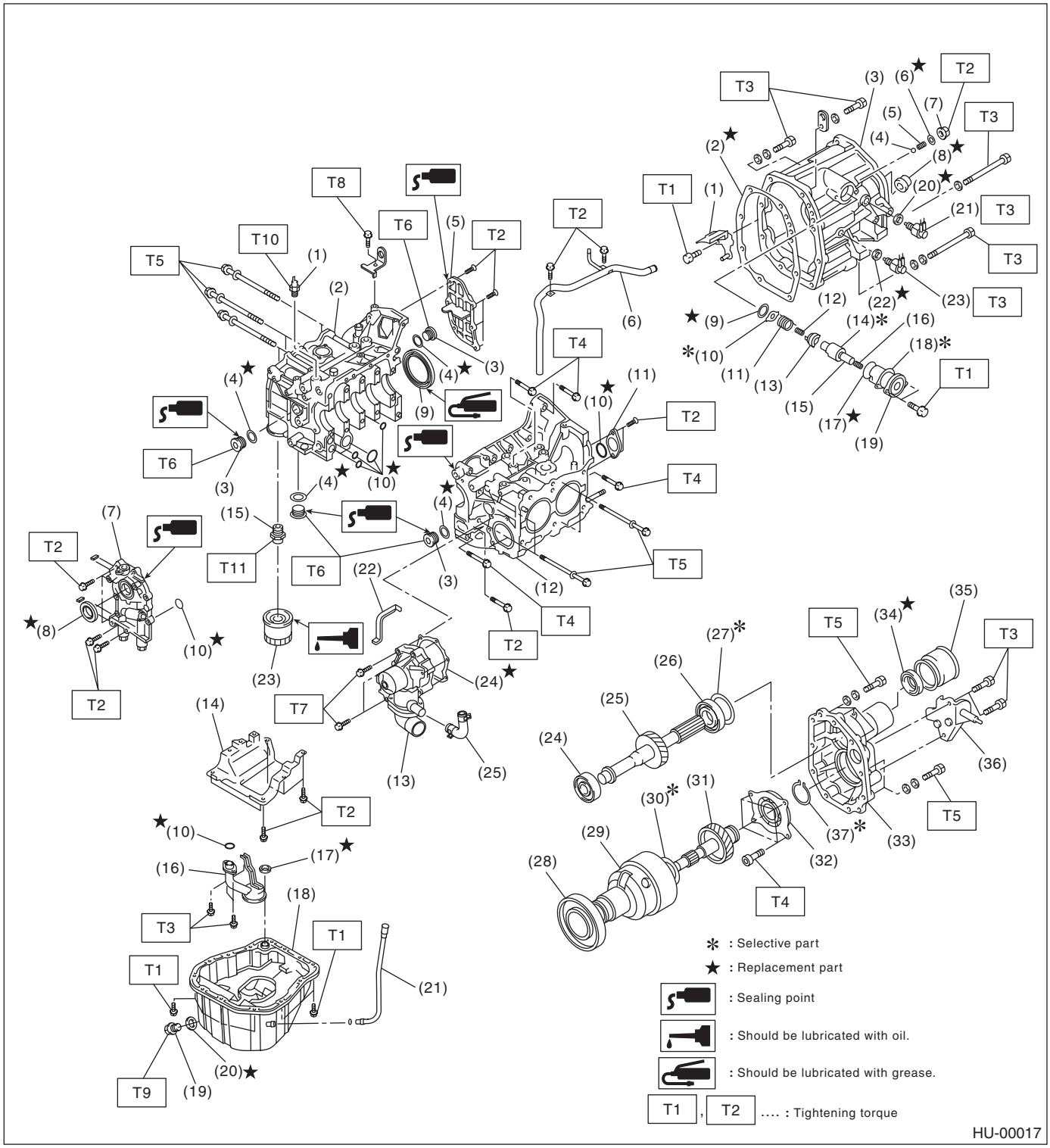
3. COMPONENT

Illustrations are provided for each component. The information necessary for repair work (tightening torque, grease up points, etc.) is described on these illustrations. Information is described using symbol.
To order parts, refer to parts catalogue.

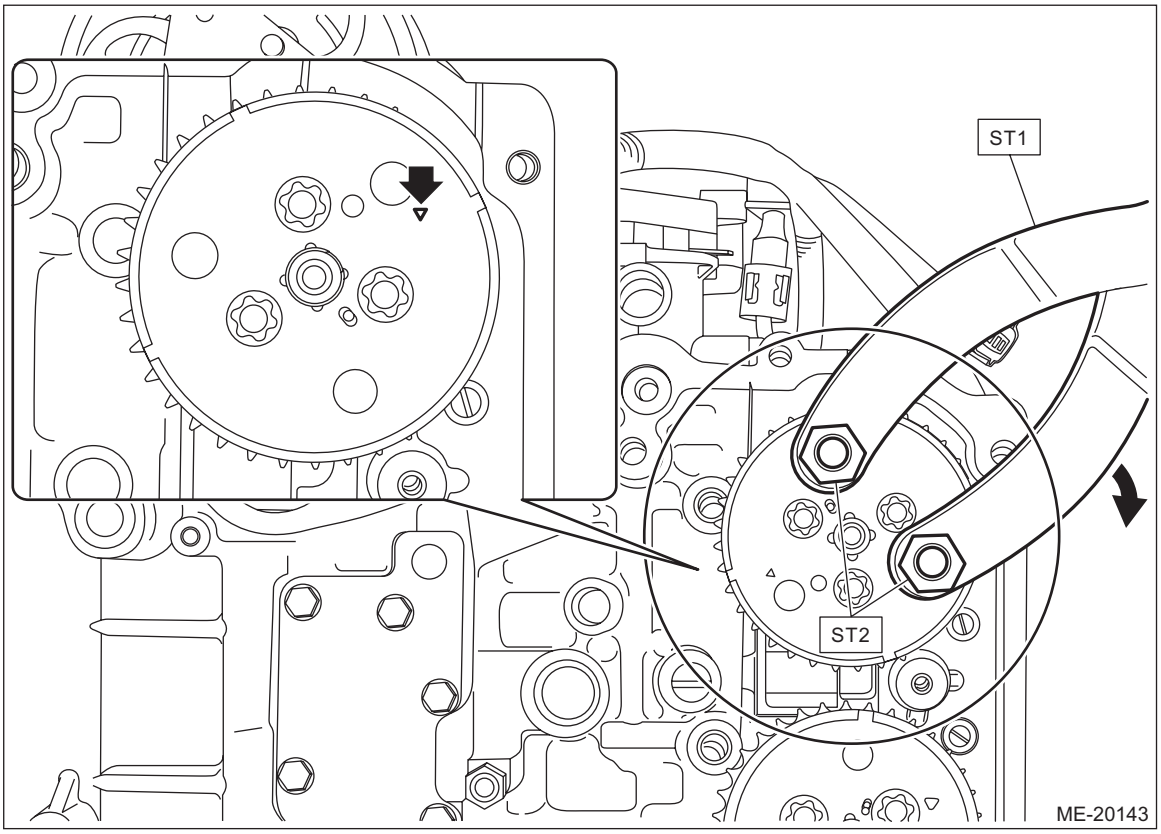
Example:



8) Using ST and by turning the intake cam sprocket LH approximately 180°, align the alignment marks of intake cam sprocket LH to the positions (zero-lift position) as shown in the figure.

CAUTION:
• After this work, when the intake valve and exhaust valve lift at the same time, the valve heads contact each other and valve stem may bend. Do not turn the intake camshaft LH and exhaust camshaft LH to the outside of range of zero-lift (in range where it can be turned lightly by hand).
• Perform the operation carefully since the ST comes off easily.

ST1 18355AA000 PULLEY WRENCH
ST2 18334AA020 PULLEY WRENCH PIN SET

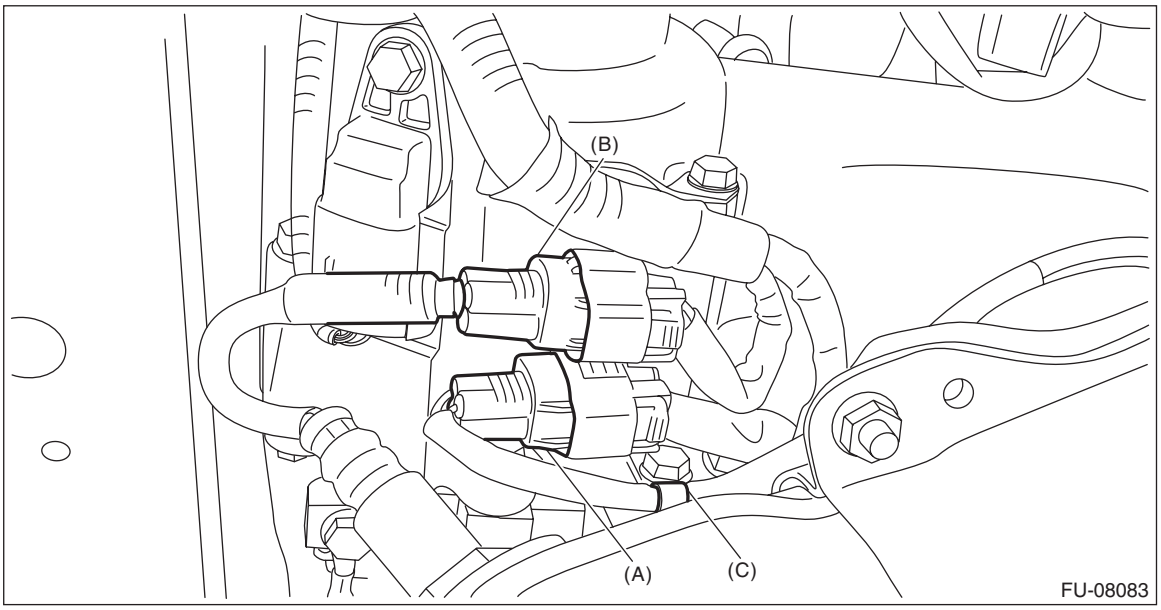


2. Front Exhaust Pipe

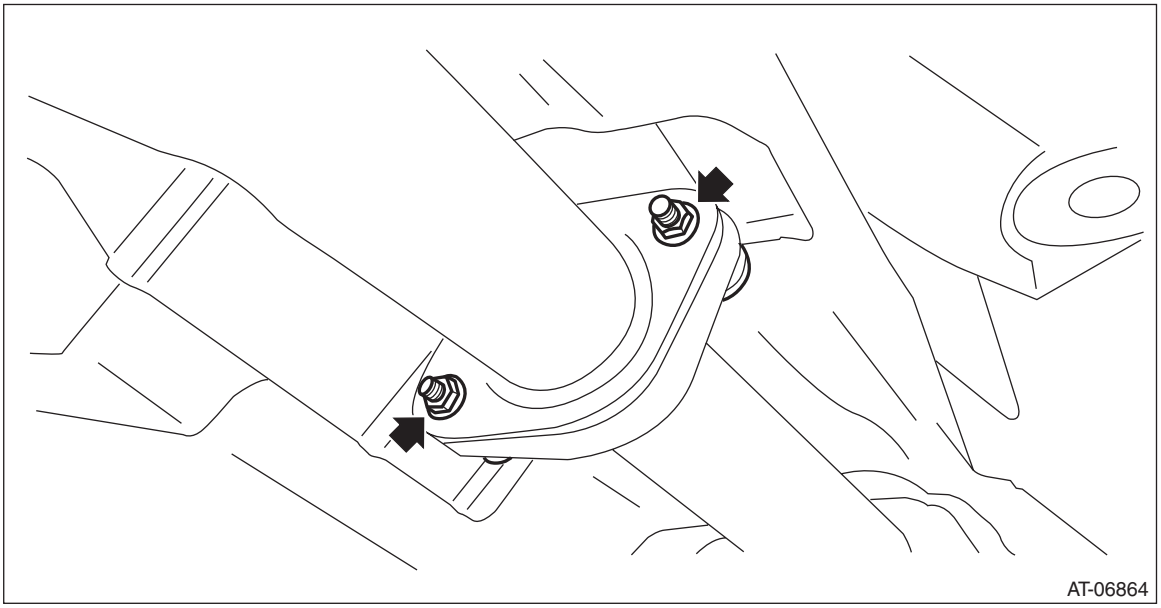
A: REMOVAL

CAUTION:
Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
1) Disconnect the ground cable from battery. <Ref. to NT-6, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the under cover. <Ref. to EI-31, REMOVAL, Front Under Cover.>
4) Disconnect the front oxygen (A/F) sensor connector (A) and rear oxygen sensor connector (B) and remove the clip (C) fastening the harness.

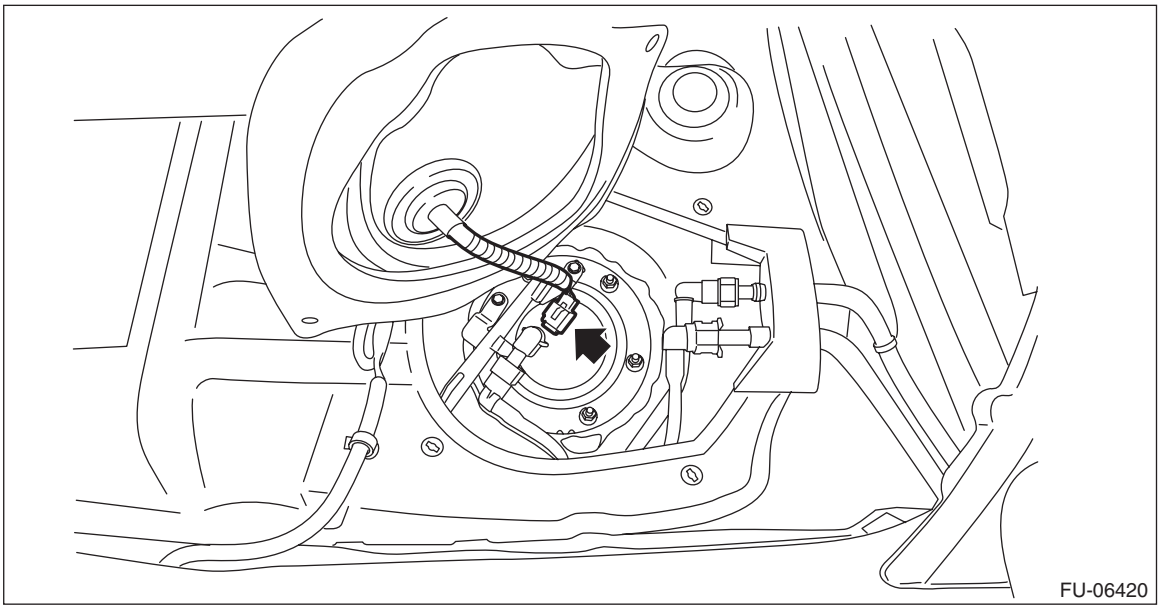


5) Remove the bolts, springs, and nuts securing the rear exhaust pipe to the center exhaust pipe.

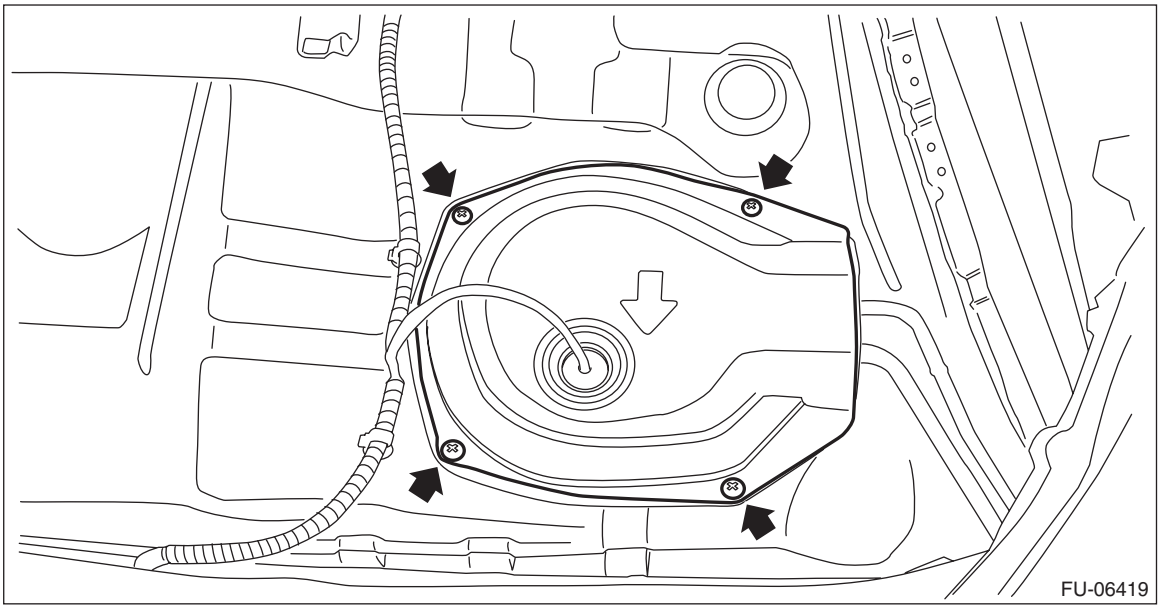


	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start the engine. 2) Read the value of «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Read Current Data For Engine". <Ref. to EN(H4DO w/o HEV)(diag)-37, Subaru Select Monitor.>	Is the value of «Oil Temperature» –40°C (–40°F) or less?	Go to step **2**.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	**CHECK FOR POOR CONTACT.** Check for poor contact between the ECM and engine oil temperature sensor connectors.	Is there poor contact of the ECM or engine oil temperature sensor connectors?	Repair the poor contact of ECM or engine oil temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance of the harness between the ECM connector and engine oil temperature sensor connector. ***Connector & terminal*** ***(B134) No. 29 — (E75) No. 1:*** ***(B134) No. 20 — (E75) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and engine oil temperature sensor connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 20 (+) — Chassis ground (–):***	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and engine oil temperature sensor connector.	Replace the engine oil temperature sensor. <Ref. to FU(H4DO(w/o HEV))-53, Engine Oil Temperature Sensor.>

11) Connect the connector to the fuel sub level sensor.



12) Install the service hole cover of fuel sub level sensor.



BD:DTC P0172 SYSTEM TOO RICH BANK 1

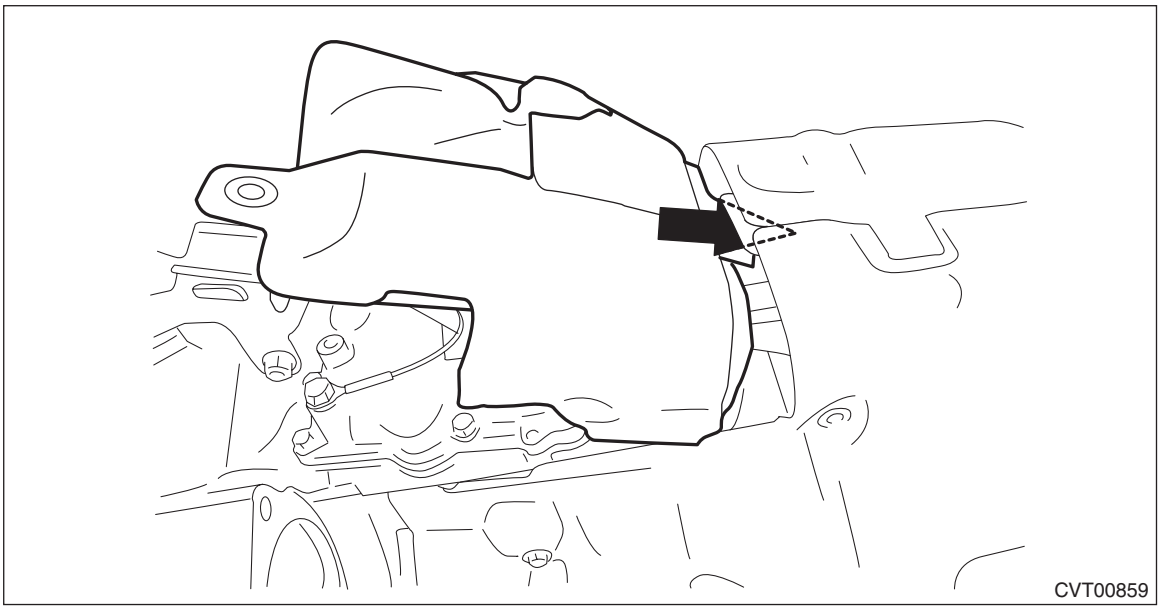
DTC DETECTING CONDITION:
Detected when two consecutive driving cycles with fault occur.
TROUBLE SYMPTOM:
- Improper idling
- Engine stalls.
- Poor driving performance

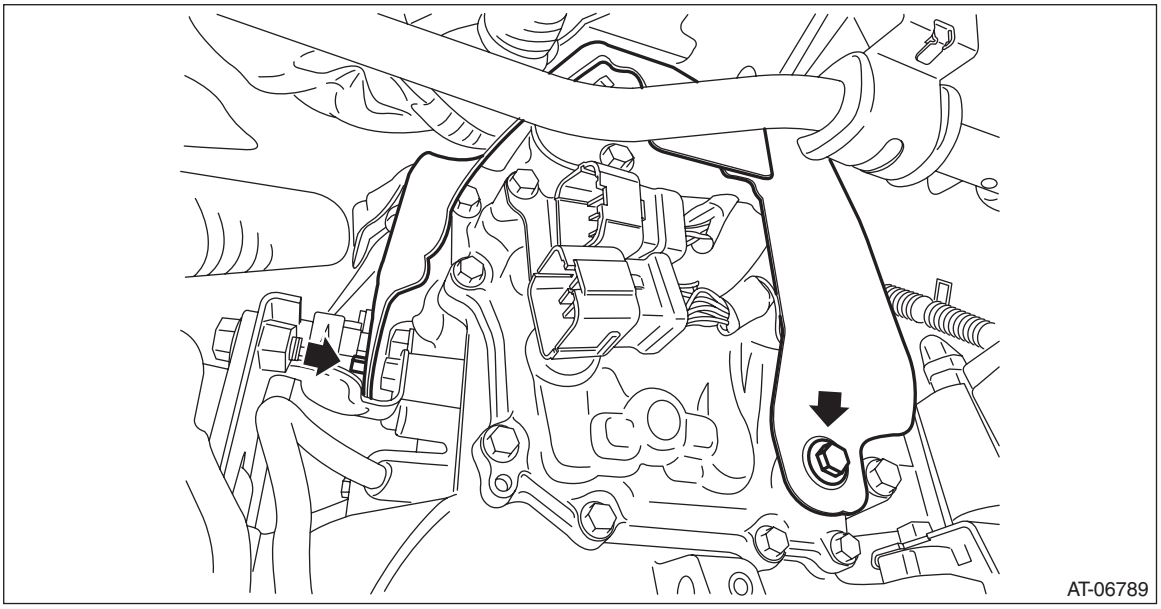
CAUTION:
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO HEV)(diag)-68, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO HEV)(diag)-52, PROCEDURE, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step **3**.
3	**CHECK FUEL PRESSURE.** **WARNING:** **Place "NO OPEN FLAMES" signs near the working area.** **CAUTION:** **Be careful not to spill fuel.** Measure the fuel pressure. <Ref. to ME(H4DO(w/o HEV))-36, INSPECTION, Fuel Pressure.> **CAUTION:** **Release fuel pressure before removing the fuel pressure gauge.**	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm^2, 49 — 58 psi)?	Go to step **4**.	Check the fuel pump and fuel delivery line. <Ref. to FU(H4DO(HEV))-129, INSPECTION, Fuel Pump.> <Ref. to FU(H4DO(HEV))-161, INSPECTION, Fuel Delivery and Evaporation Lines.>
4	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO HEV)(diag)-37, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step **5**.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO(HEV))-42, Engine Coolant Temperature Sensor.>

11) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

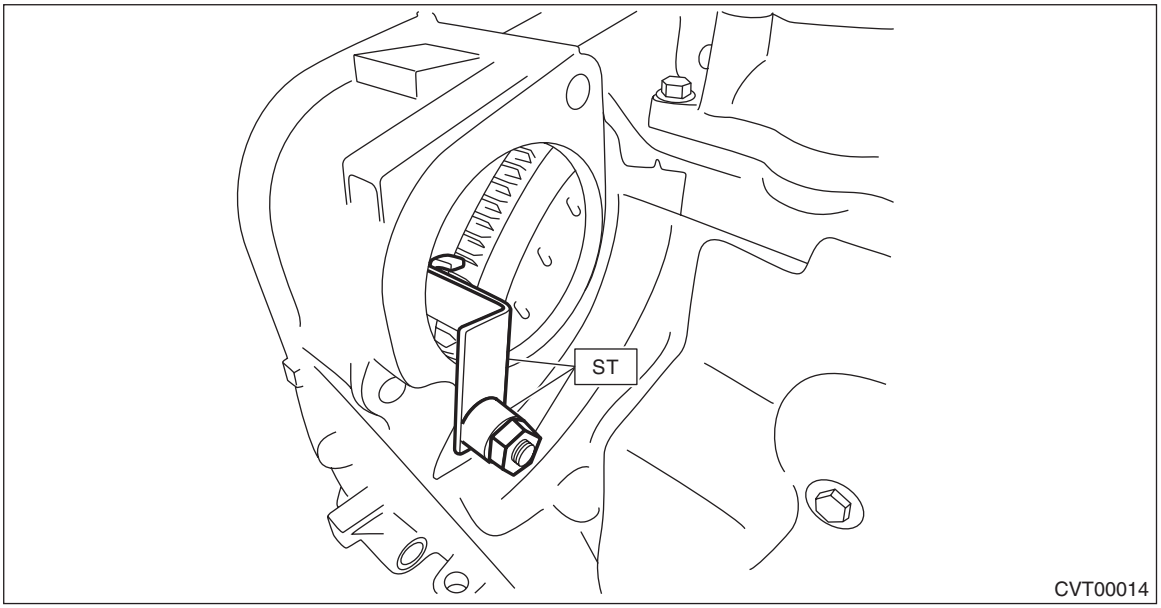




B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Attach the ST to converter case.
ST 498277200 STOPPER SET



2) When completely overhauling the transmission, refill CVTF through the transmission right side plug. <Ref. to CVT(TH58A)-180, Preparation for Overhaul.>
3) Replace the front differential side retainer oil seal. <Ref. to CVT(TH58A)-92, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

4) Install the rear cushion rubber on the transmission. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>
5) Mount the transmission onto the transmission jack.
6) Remove the pitching stopper bracket, if mounted.
7) Install the transmission assembly onto the engine.

CAUTION:
Be careful not to damage the electric oil pump harness.

NOTE:
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

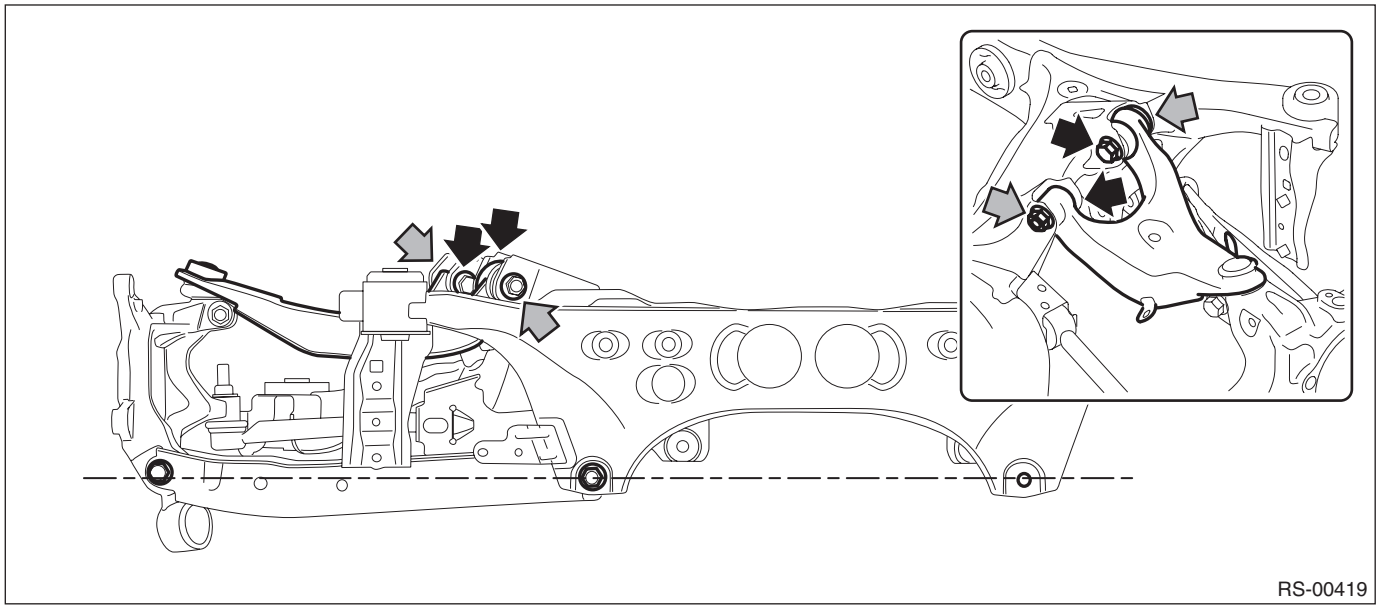
8) Attach the transmission rear crossmember, and install the clip of the electric oil pump cable to the transmission rear crossmember. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>

3. READ FREEZE FRAME DATA

1) On «Start» display, select «Diagnosis».
2) On «Vehicle selection» display, input the vehicle information and select «Confirmed».
3) On «Main Menu» display, select «Each System».
4) On «Select System» display, select «Transmission Control System».
5) On «Select Function» display, select «DTC».
6) On «DTC» display, select «FFD».

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Revolution Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the output clutch output axis rotation speed.	km/h or MPH
ATF Temperature	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Front Wheel Speed	Front wheel rotation speed calculated from the output clutch output axis rotation speed.	rpm
Stop Light Switch	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
Commanded Forward & Reverse Linear Solenoid Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
Actual Forward & Reverse Linear Solenoid Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF

(2) Install the upper arm assembly to the rear sub frame assembly.



Tightening torque:
Upper arm assembly — rear sub frame assembly: 90 N·m (9.18 kgf-m, 66.4 ft-lb)

3) Connect the upper arm assembly and the housing assembly - rear axle.

Tightening torque:
Upper arm assembly — housing assembly - rear axle: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

4) Install the rear sub frame assembly in the reverse order of removal. <Ref. to RS-16, INSTALLATION, Rear Sub Frame.>
5) Route the rear ABS wheel speed sensor cable to the upper arm assembly.
6) Install the rear wheels.

Tightening torque:
Except for C4 model: 120 N·m (12.24 kgf-m, 88.5 ft-lb)
C4 model: 100 N·m (10.20 kgf-m, 73.8 ft-lb)

7) Inspect the wheel alignment and adjust if necessary.
- Inspection: <Ref. to FS-7, INSPECTION, Wheel Alignment.>
- Adjustment: <Ref. to FS-11, ADJUSTMENT, Wheel Alignment.>

CAUTION:
When the wheel alignment has been adjusted, perform the following VDC setting mode.
– Model without EyeSight: VDC sensor midpoint setting mode <Ref. to VDC-25, VDC SENSOR MID-POINT SETTING MODE (MODELS WITHOUT EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>
– Model with EyeSight: Neutral of Steering Angle Sensor & Lateral G Sensor 0 point setting <Ref. to VDC-25, NEUTRAL OF STEERING ANGLE SENSOR & LATERAL G SENSOR 0 POINT SETTING (MODEL WITH EyeSight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDC-CM&H/U).>
– Model with EyeSight: Longitudinal G sensor & lateral G sensor 0 point setting <Ref. to VDC-26, LONGITUDINAL G SENSOR & LATERAL G SENSOR 0 POINT SETTING MODE (MODEL WITH Eye-Sight), ADJUSTMENT, VDC Control Module and Hydraulic Control Unit (VDCCM&H/U).>

8) Connect the battery ground terminal.
9) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-18, PROCEDURE, Auto Headlight Beam Leveler System.>

D: ASSEMBLY

1. BUSHING - REAR AXLE HOUSING

Do not remove the housing assembly - rear axle because the bushing - rear axle housing cannot be replaced. If it is removed, replace the housing assembly - rear axle.

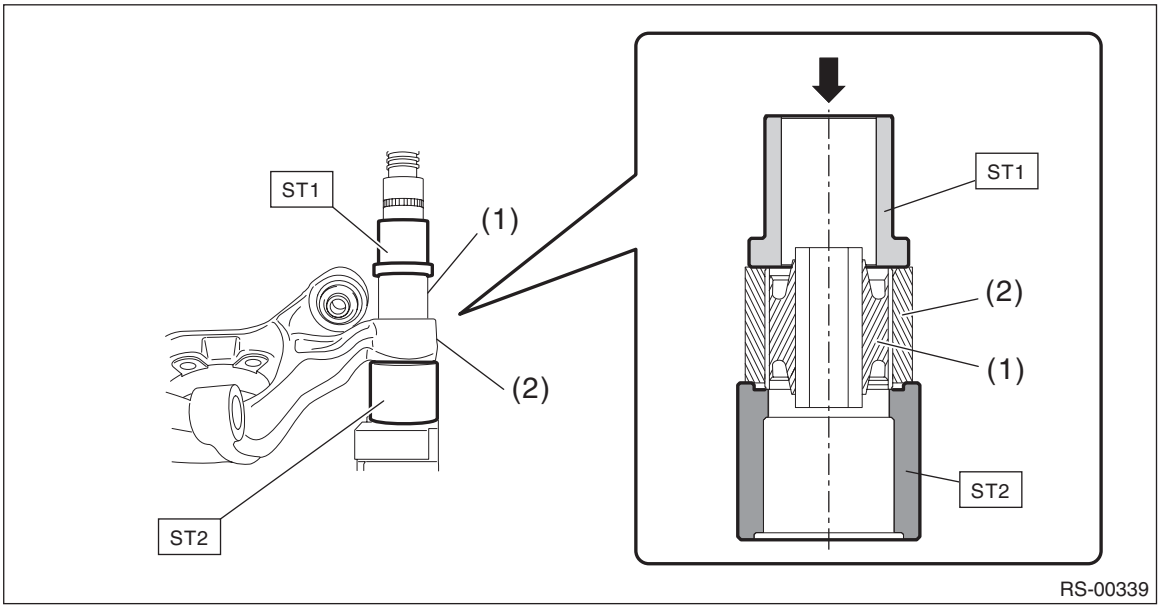
2. BUSHING - TRAILING LINK

1) Before assembly, inspect the following items and replace any faulty part with a new one.
- Perform visual check for damage or bend on the trailing link.
- Visually check the bushing for abnormal cracks, fatigue or damage.

2) Press-fit the bushing using ST and the hydraulic press.

CAUTION:
Make sure to press the bushing straight in.

Preparation tool:
ST1: BUSHING REMOVER (20099FG000)
ST2: INSTALLER & REMOVER (BASE) (20099PA010)



(1) Bushing (2) Housing ASSY - rear axle

2. Power Steering System

A: WIRING DIAGRAM

Refer to “Electric Power Steering System” in the wiring diagram.
- Gasoline engine model: <Ref. to WI(w/o HEV)-101, WIRING DIAGRAM, Electric Power Steering System.>
- HEV model: <Ref. to WI(HEV)-94, WIRING DIAGRAM, Electric Power Steering System.>

B: ELECTRICAL SPECIFICATION

Refer to Control Module I/O Signal of “POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)”. <Ref. to PS(diag)-10, ELECTRICAL SPECIFICATION, Control Module I/O Signal.>

C: INSPECTION

Refer to “POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)”. <Ref. to PS(diag)-2, Basic Diagnostic Procedure.>

D: NOTE

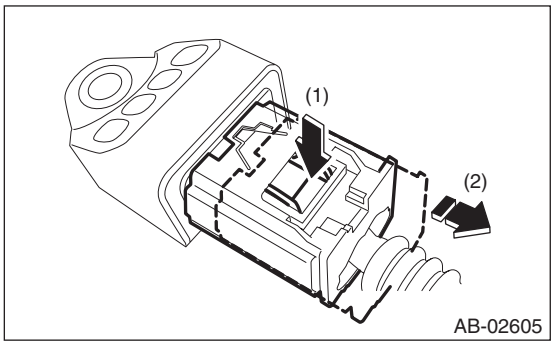
For procedure of each component in the power steering system, refer to the respective section.
- Steering wheel: <Ref. to PS-9, Steering Wheel.>
- Universal joint assembly - steering: <Ref. to PS-16, Universal Joint.>
- Steering column: <Ref. to PS-21, Steering Column.>
- Electric power steering gearbox: <Ref. to PS-25, Electric Power Steering Gearbox.>
- Power steering control module: <Ref. to PS-40, Power Steering Control Module.>

9. SIDE AIRBAG SENSOR AND CURTAIN AIRBAG SENSOR

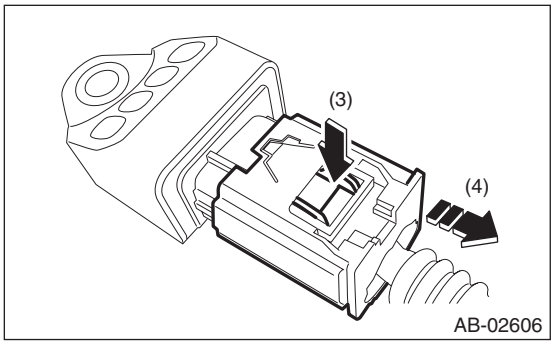
1) How to disconnect:

CAUTION:
When pulling the slide lock or disconnecting connector, be sure to hold the connector, not the harness.

(1) Push the lock arm.
(2) Holding outer part, pull it one step in the direction of arrow.

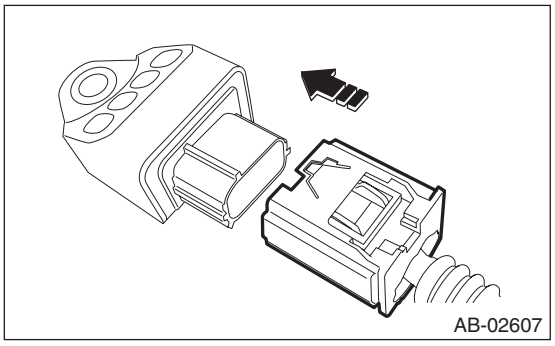


(3) Push the lock arm again.
(4) Holding outer part, pull it in the direction of arrow to disconnect the connector.



2) How to connect:

CAUTION:
Be sure to insert the connector in until it is locked. Then pull it gently to make sure that it is locked.
Holding the connector, push it in securely until a clicking sound is heard.



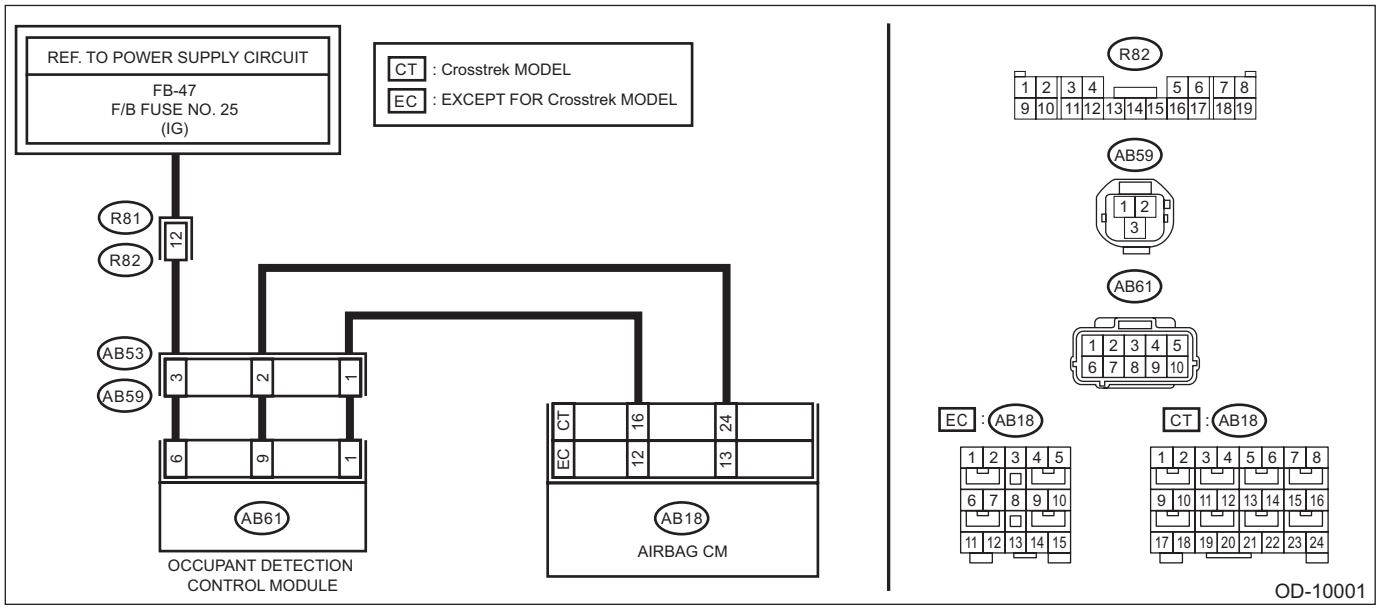
15.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC B1650 OCCUPANT DETECTION SYSTEM MALFUNCTION

DIAGNOSIS START CONDITION:
Ignition voltage is 8 V to 16 V.
DTC DETECTING CONDITION:

- Occupant detection sensor is faulty.
- Occupant detection control module is faulty.
- Occupant detection harness is faulty.
- Fuse No. 25 is blown out.
- Rear airbag harness is faulty.

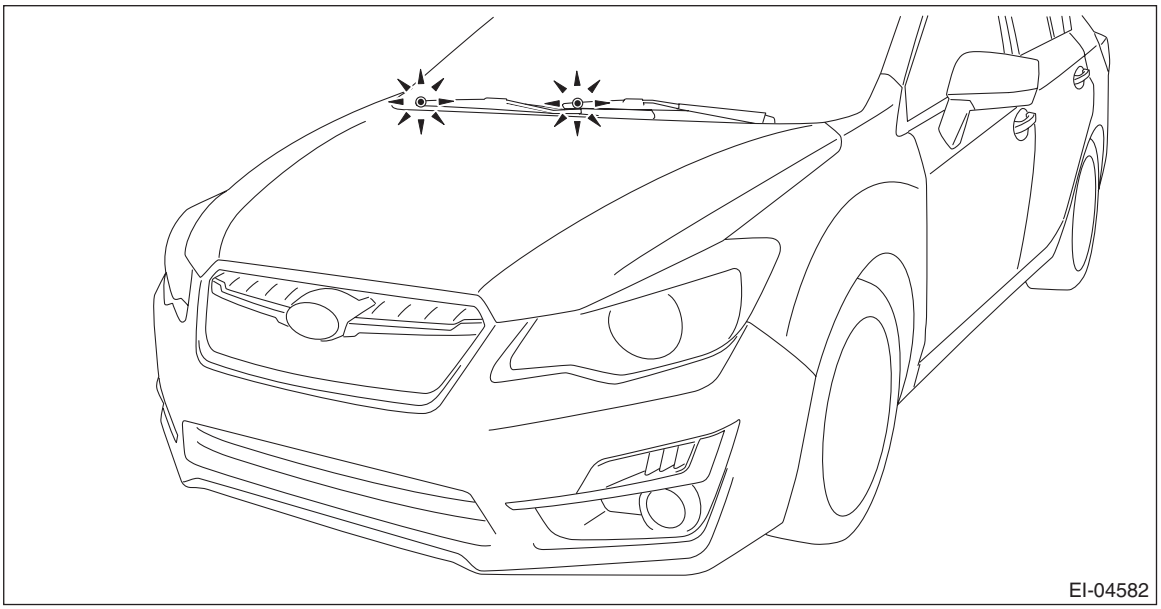
CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to AB(diag)-4, CAUTION, General Description.>
WIRING DIAGRAM:
Occupant detection system <Ref. to WI(w/o HEV)-179, WIRING DIAGRAM, Occupant Detection System.> <Ref. to WI(HEV)-158, WIRING DIAGRAM, Occupant Detection System.>



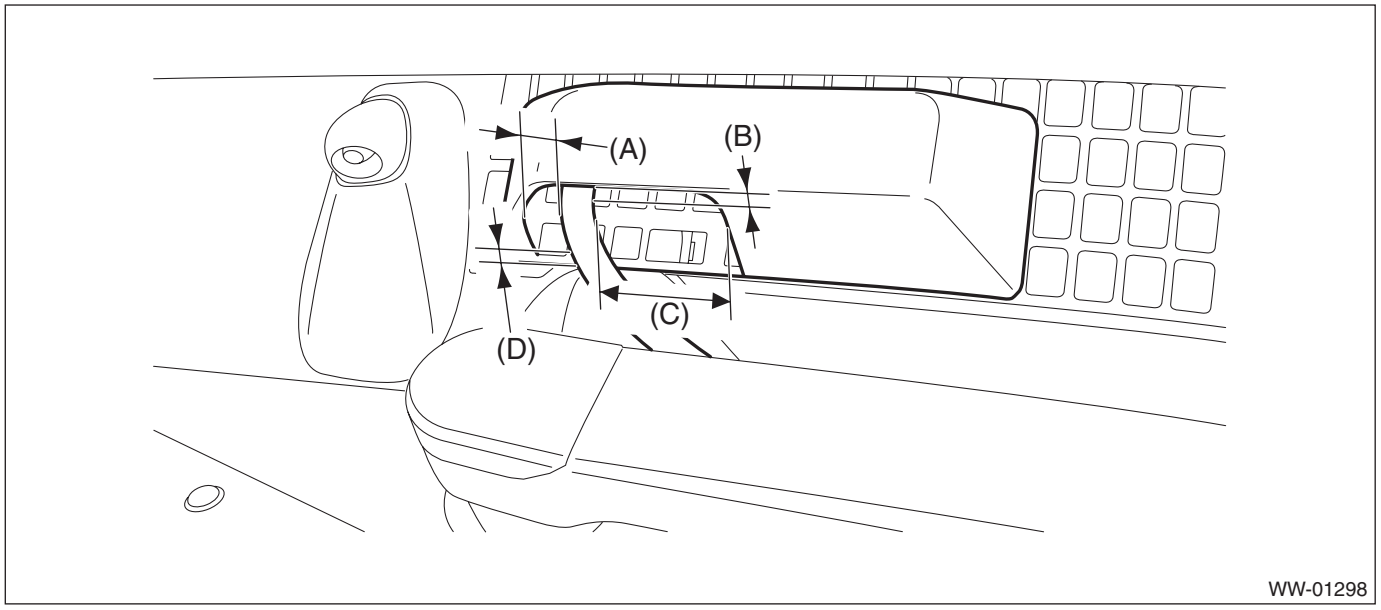
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC of the occupant detection system. <Ref. to OD(diag)-16, OCCUPANT DETECTION SYSTEM, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is any of DTC B1760, B1761, B1771, and B1795 detected?	Perform the diagnosis according to DTC.	Go to step **2**.

C: ADJUSTMENT

1) Operate the windshield wiper once.
2) Check that the wiper blade is aligned with the point mark.



3) Make sure that there is a gap of 1 mm (0.04 in) or more between the hose and the cover - joint and between the hose and the joint - washer hose during windshield wiper operation.



(A) Gap between hose and cover - joint outer side
(B) Gap between hose and cover - joint upper side
(C) Gap between hose and cover - joint inner side
(D) Gap between hose and cover - joint lower side

4) If there is a gap between the hose and the cover - joint, a gap between the hose and the joint - washer hose and misalignment of the point mark, remove and install the windshield wiper. <Ref. to WW-27, REMOVAL, Front Wiper Arm.>