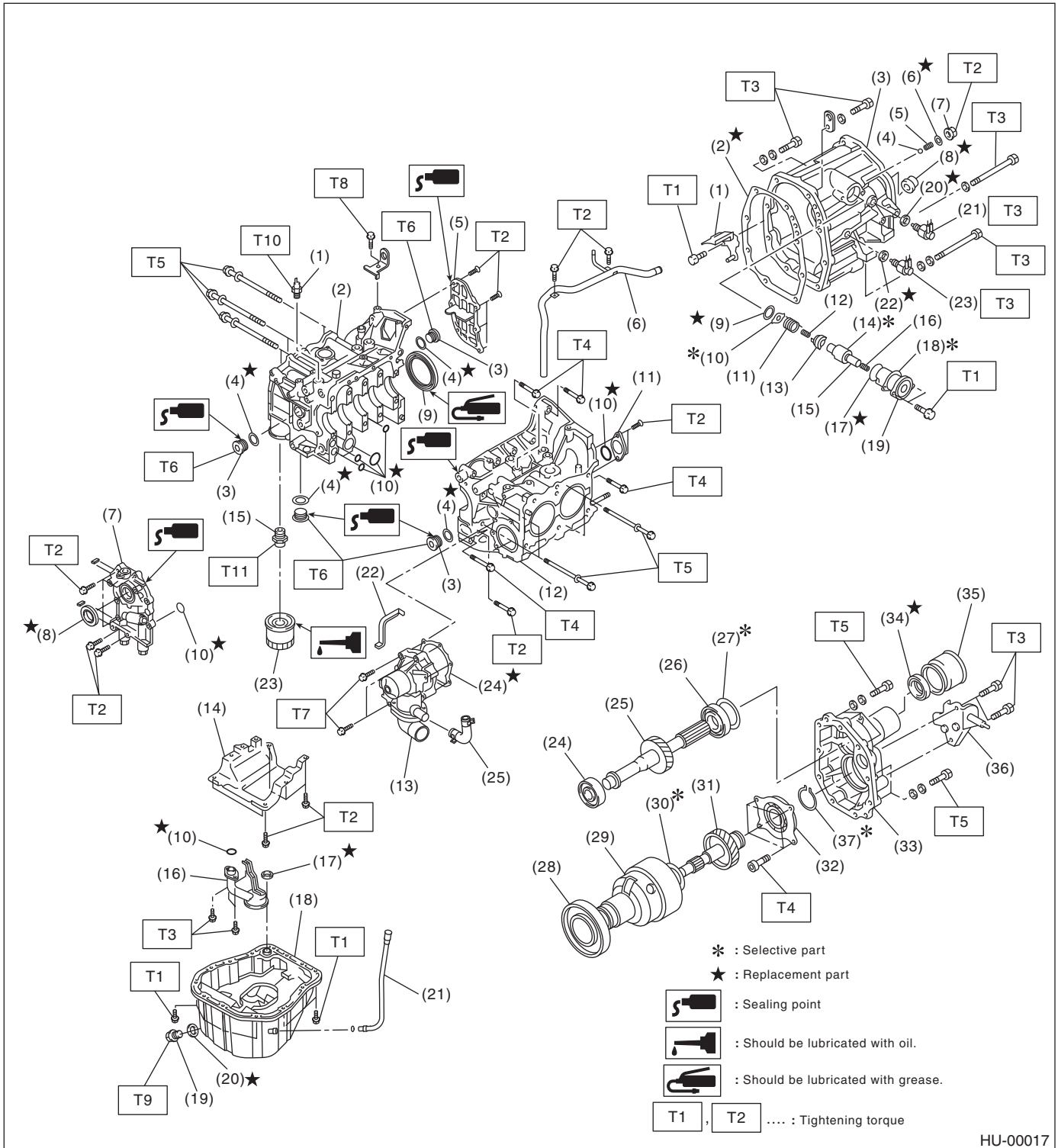


### Example:



HU-00017

## 4. DEFINITIONS OF “NOTE”, “CAUTION” AND “WARNING”

- NOTE:

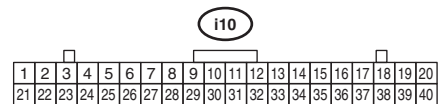
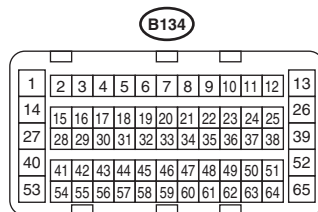
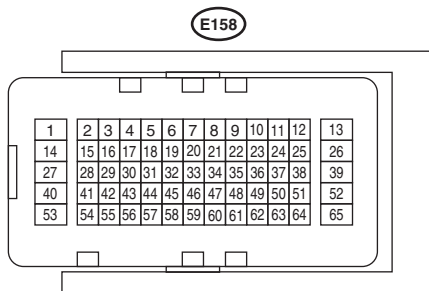
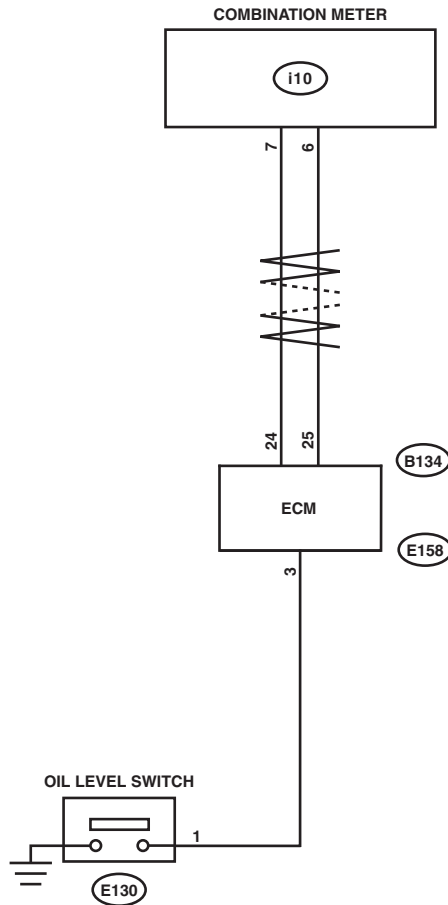
Describes additional information to make works easier.

- CAUTION:

Describes prohibited matters to prevent vehicle or parts damage, or matters that requires special attention during work.

# Oil Level Switch

- CAN communication system <Ref. to WI-141, WIRING DIAGRAM, CAN Communication System.>



LU-03264

# General Description

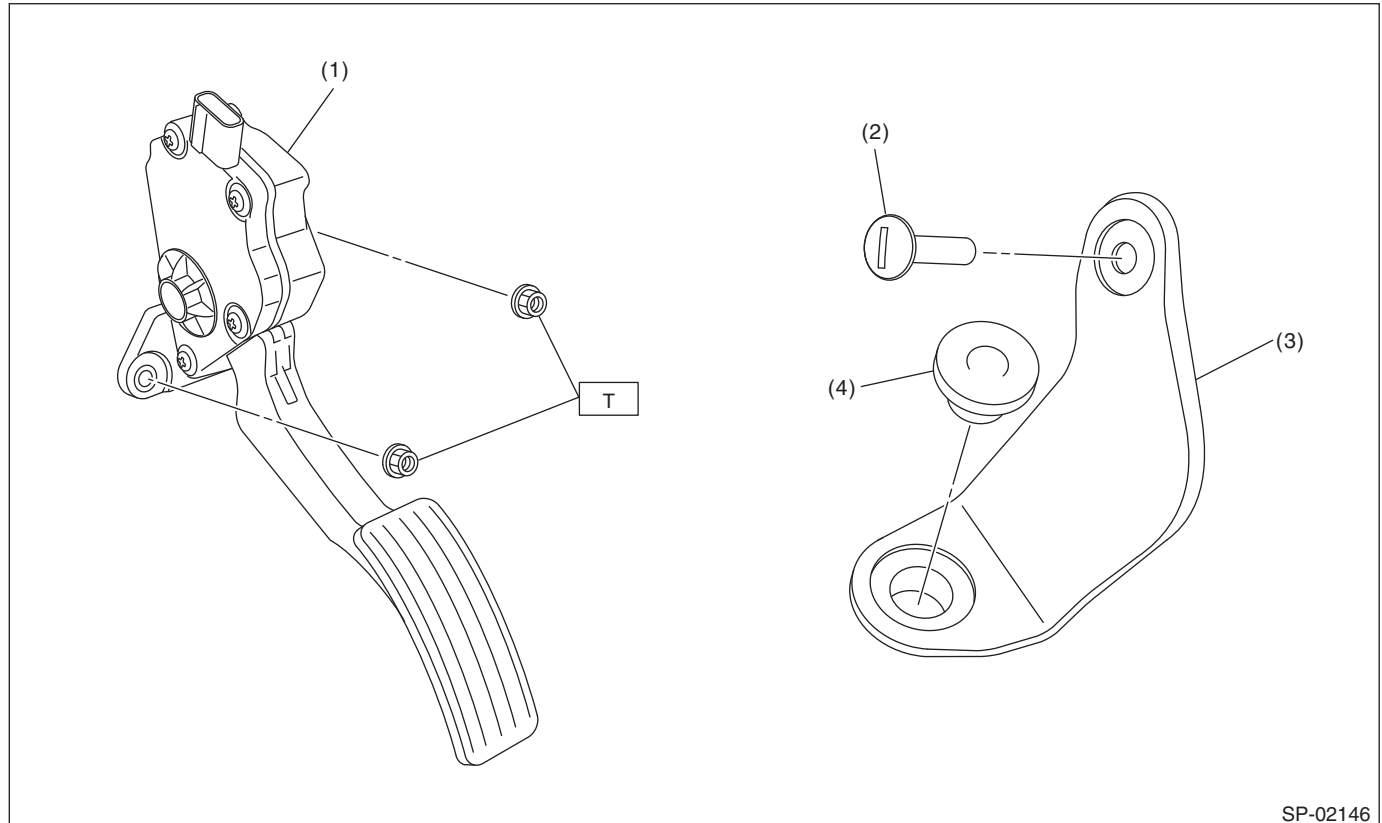
## SPEED CONTROL SYSTEMS

### 1. General Description

#### A: SPECIFICATION

Accelerator pedal	Stroke	At pedal pad	50 — 59 mm (1.97 — 2.32 in)
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#### B: COMPONENT



(1) Accelerator pedal ASSY  
(2) Clip

(3) Accelerator plate  
(4) Accelerator stopper

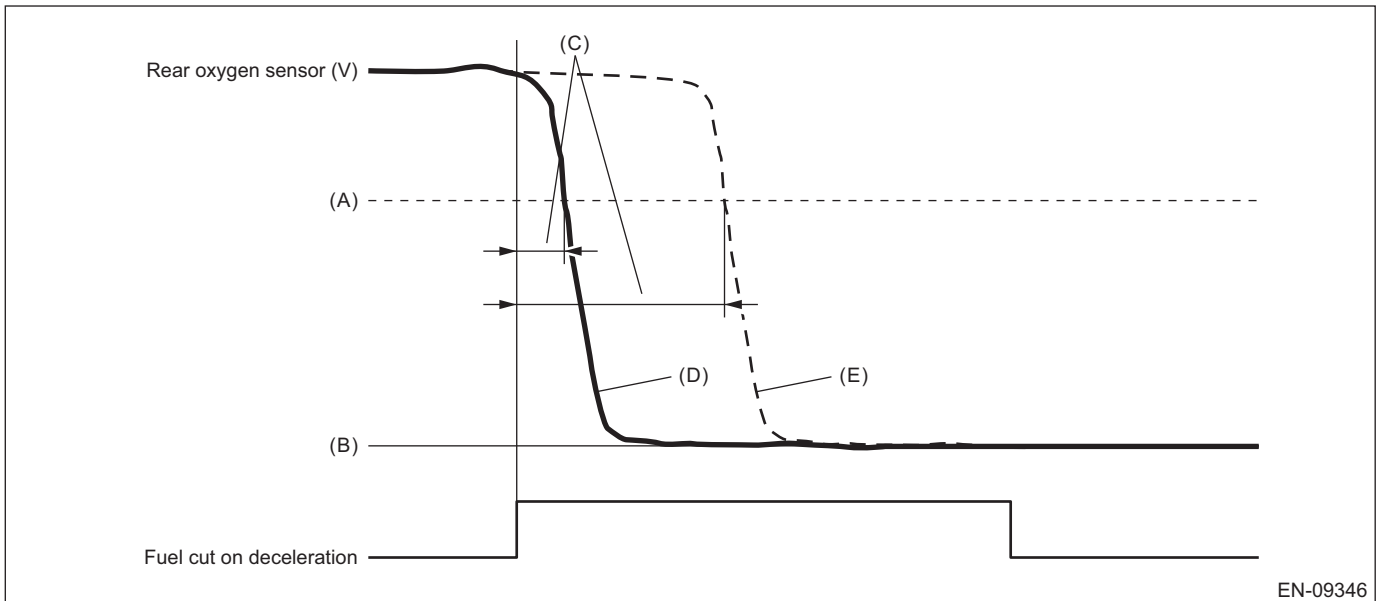
**Tightening torque: N·m (kgf·m, ft·lb)**  
**T: 7.5 (0.8, 5.5)**

#### C: CAUTION

- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

## 5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the beginning of the fuel cut to the beginning of the rear oxygen sensor voltage starting to drop.



EN-09346

- |            |                 |                          |
|------------|-----------------|--------------------------|
| (A) 0.5 V  | (B) 0 V         | (C) Diagnostic parameter |
| (D) Normal | (E) Malfunction |                          |

Judge as NG when the following conditions are established.

### Judgment value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed to 0.5 V after the fuel cut started	> 4000 ms

**Time needed for diagnosis:** Less than 1 second

**Malfunction indicator light illumination:** Illuminates when malfunction occurs in 2 continuous driving cycles.

## AO:DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH BANK 1 SENSOR 2

NOTE:

For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DO)(diag)-248, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN BANK 1 SENSOR 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

### 1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for lean → rich.

After the deceleration fuel cut has completed, detect the trouble by calculating the time when the rear oxygen sensor output increases to the predetermined voltages.

Judge as NG when the response time is larger than the threshold value.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>5 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.</b></p> <p>1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F).</p> <p>2) Place the select lever in “P” range or “N” range.</p> <p>3) Turn the A/C switch to OFF.</p> <p>4) Turn all the accessory switches to OFF.</p> <p>5) Read the value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool.</p> <p>NOTE:</p> <ul style="list-style-type: none"> <li>Subaru Select Monitor</li> </ul> <p>For detailed operation procedures, refer to “Current Data Display For Engine”. &lt;Ref. to EN(H4DO)(diag)-46, Subaru Select Monitor.&gt;</p> <ul style="list-style-type: none"> <li>General scan tool</li> </ul> <p>For detailed operation procedures, refer to the general scan tool operation manual.</p>	<p>Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?</p>	Go to step 6.	<p>Replace the mass air flow and intake air temperature sensor. &lt;Ref. to FU(H4DO)-61, Mass Air Flow and Intake Air Temperature Sensor.&gt;</p>
<p><b>6 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR.</b></p> <p>1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F).</p> <p>2) Place the select lever in “P” range or “N” range.</p> <p>3) Turn the A/C switch to OFF.</p> <p>4) Turn all the accessory switches to OFF.</p> <p>5) Open the front hood.</p> <p>6) Measure the ambient temperature.</p> <p>7) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool.</p> <p>NOTE:</p> <ul style="list-style-type: none"> <li>Subaru Select Monitor</li> </ul> <p>For detailed operation procedures, refer to “Current Data Display For Engine”. &lt;Ref. to EN(H4DO)(diag)-46, Subaru Select Monitor.&gt;</p> <ul style="list-style-type: none"> <li>General scan tool</li> </ul> <p>For detailed operation procedures, refer to the general scan tool operation manual.</p>	<p>Subtract ambient temperature from «Intake Air Temp.». Is the obtained value -10 — 50°C (-18 — 90°F)?</p>	Go to step 7.	<p>Check the mass air flow and intake air temperature sensor. &lt;Ref. to FU(H4DO)-61, Mass Air Flow and Intake Air Temperature Sensor.&gt;</p>
<p><b>7 CHECK PCV VALVE.</b></p> <p>Check the PCV valve. &lt;Ref. to EC(H4DO)-62, INSPECTION, PCV Valve.&gt;</p>	<p>Is the check result OK?</p>	Go to step 8.	<p>Replace the PCV valve. &lt;Ref. to EC(H4DO)-60, PCV Valve.&gt;</p>
<p><b>8 CHECK PCV HOSE.</b></p> <p>Check the PCV hose. &lt;Ref. to EC(H4DO)-59, INSPECTION, PCV Hose.&gt;</p>	<p>Is the check result OK?</p>	<p>Repair the poor contact of ECM connector.</p>	<p>Replace the PCV hose. &lt;Ref. to EC(H4DO)-58, PCV Hose.&gt;</p>

## 1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

## 2. EXECUTION CONDITION

Secondary parameters	Execution condition
Main feedback	In operation

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## BF:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH

### DTC detecting condition:

Immediately at fault recognition

### Trouble symptom:

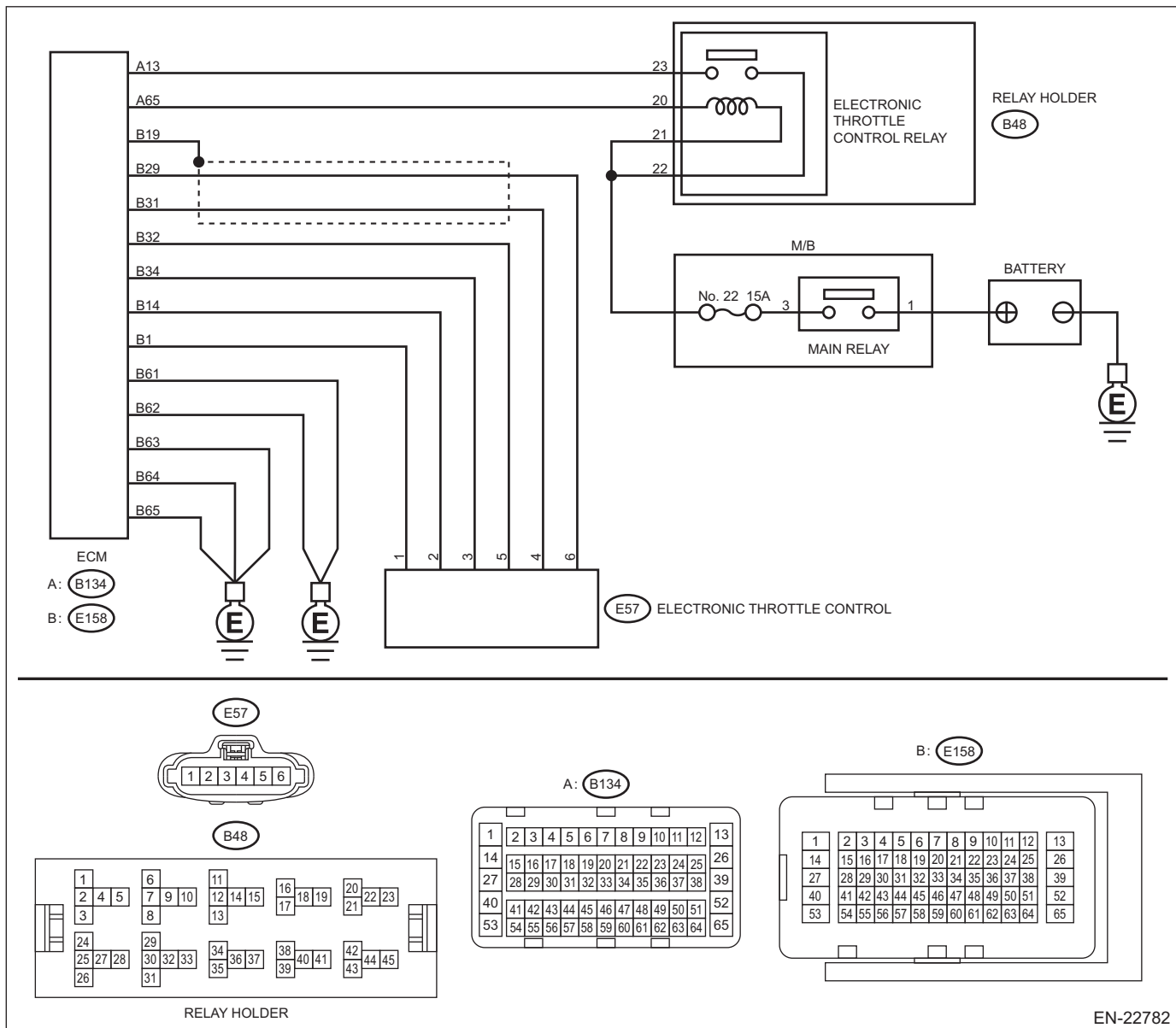
- Improper idling
- Poor driving performance
- Engine stalls.

### CAUTION:

- After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-91, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-69, PROCEDURE, Inspection Mode.>.
- Use the check board when measuring the ECM terminal voltage and resistance.

### Wiring diagram:

Engine Electrical System <Ref. to WI-179, WIRING DIAGRAM, Engine Electrical System.>



EN-22782

# Ignition Timing

## MECHANICAL

9) Install the air cleaner case and the air cleaner element, and connect the connector of the mass air flow and intake air temperature sensor. <Ref. to IN(H6DO)-8, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H6DO)-5, INSTALLATION, Air Cleaner Element.>

10) Connect the ground terminal to battery sensor. <Ref. to RC-3, BATTERY, NOTE, Repair Contents.>

11) Start the engine, turn the timing light to the crank pulley, and check the ignition timing through the chain cover gauge.

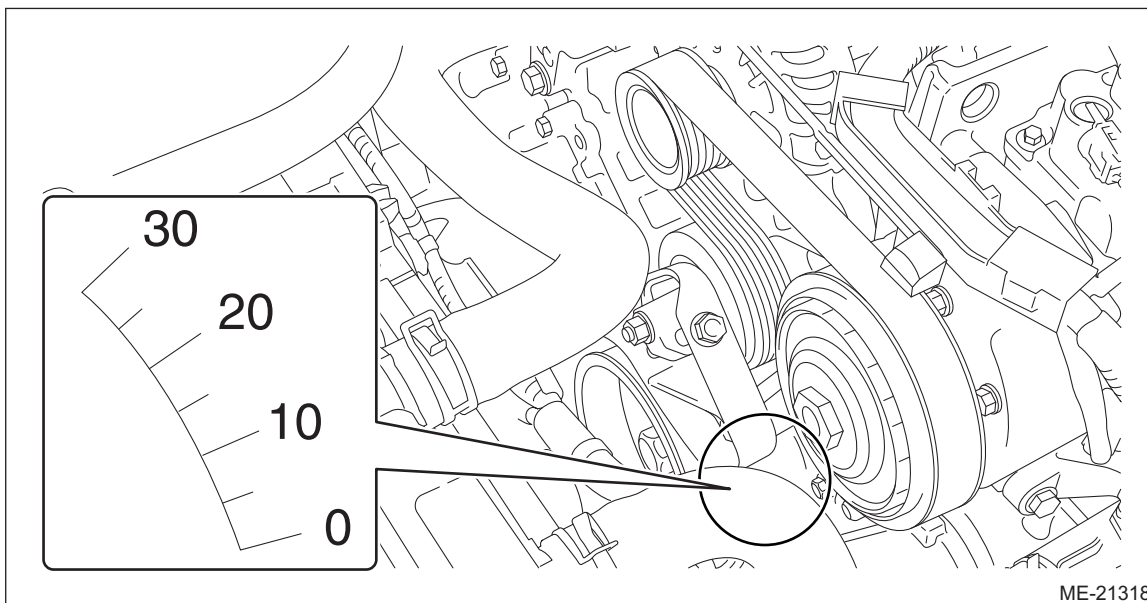
### NOTE:

If ignition timing is out of standard, check the ignition control system. Refer to "Engine Control System". <Ref. to EN(H6DO)(diag)-2, Basic Diagnostic Procedure.>

### **Ignition timing [BTDC/{r/min}]:**

#### **Standard**

**$15^{\circ} \pm 8^{\circ} / 700$**



12) After inspection, install the related parts in the reverse order of removal.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>33 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR.</b> 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. <b>Connector &amp; terminal</b> <b>(E57) No. 2 (+) — Engine ground (-):</b> <b>(E57) No. 1 (+) — Engine ground (-):</b>	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control.	Go to step 34.
<b>34 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. <b>Connector &amp; terminal</b> <b>(E57) No. 2 — Engine ground:</b> <b>(E57) No. 1 — Engine ground:</b>	Is the resistance 1 M $\Omega$ or more?	Go to step 35.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control.
<b>35 CHECK ELECTRONIC THROTTLE CONTROL MOTOR HARNESS.</b> Measure the resistance between electronic throttle control connectors. <b>Connector &amp; terminal</b> <b>(E57) No. 2 — (E57) No. 1:</b>	Is the resistance 1 M $\Omega$ or more?	Go to step 36.	Repair the short circuit in harness between ECM connector and electronic throttle control.
<b>36 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT.</b> Measure the resistance between ECM connector and chassis ground. <b>Connector &amp; terminal</b> <b>(E158) No. 60 — Chassis ground:</b> <b>(E158) No. 61 — Chassis ground:</b> <b>(E158) No. 62 — Chassis ground:</b> <b>(E158) No. 63 — Chassis ground:</b> <b>(E158) No. 64 — Chassis ground:</b> <b>(E158) No. 65 — Chassis ground:</b>	Is the resistance less than 5 $\Omega$ ?	Go to step 37.	Repair the open circuit in harness between ECM connector and engine ground.
<b>37 CHECK ELECTRONIC THROTTLE CONTROL.</b> Measure the resistance between electronic throttle control terminals. <b>Terminals</b> <b>No. 2 — No. 1:</b>	Is the resistance 50 $\Omega$ or less?	Go to step 38.	Replace the electronic throttle control. <Ref. to FU(H6DO)-19, Throttle Body.>
<b>38 CHECK ELECTRONIC THROTTLE CONTROL.</b> Move the throttle valve to the fully opened and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Specified value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector.	Replace the electronic throttle control. <Ref. to FU(H6DO)-19, Throttle Body.>

### 1. OUTLINE OF DIAGNOSIS

- **When cold, the abnormality in the control of target engine speed increase is detected. (P050A)**

- Idle speed diagnosis

Judge as NG when actual engine speed is not close to target engine speed at cold start.

- **Detect malfunctions of the catalyst advanced idling retard angle control. (P050B)**

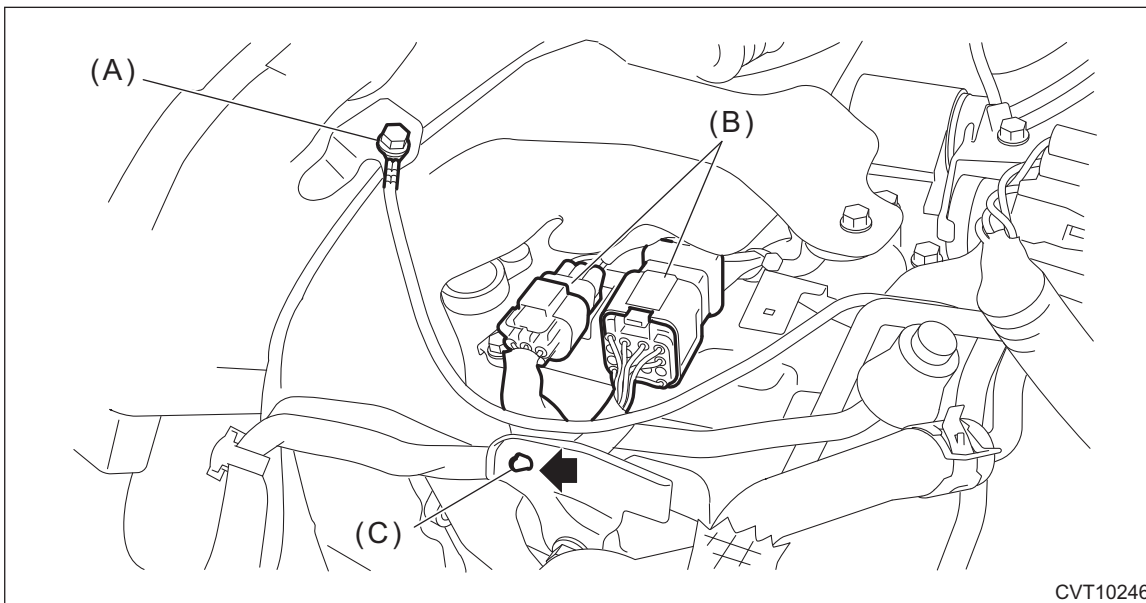
Judge as NG when ECM is not controlling the angle properly during catalyst advanced idling retard angle control.



# Turbine Speed Sensor

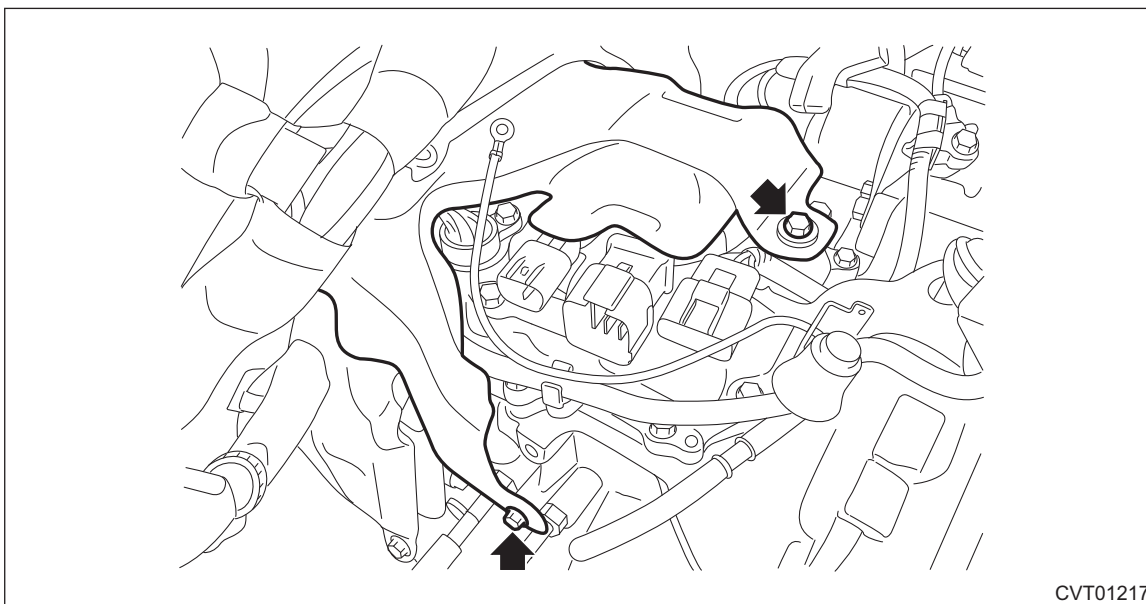
## CONTINUOUSLY VARIABLE TRANSMISSION

4) Disconnect the transmission radio ground terminal and transmission harness connector, and remove the harness clip.



- (A) Transmission radio ground terminal
- (B) Transmission harness connectors
- (C) Harness clip

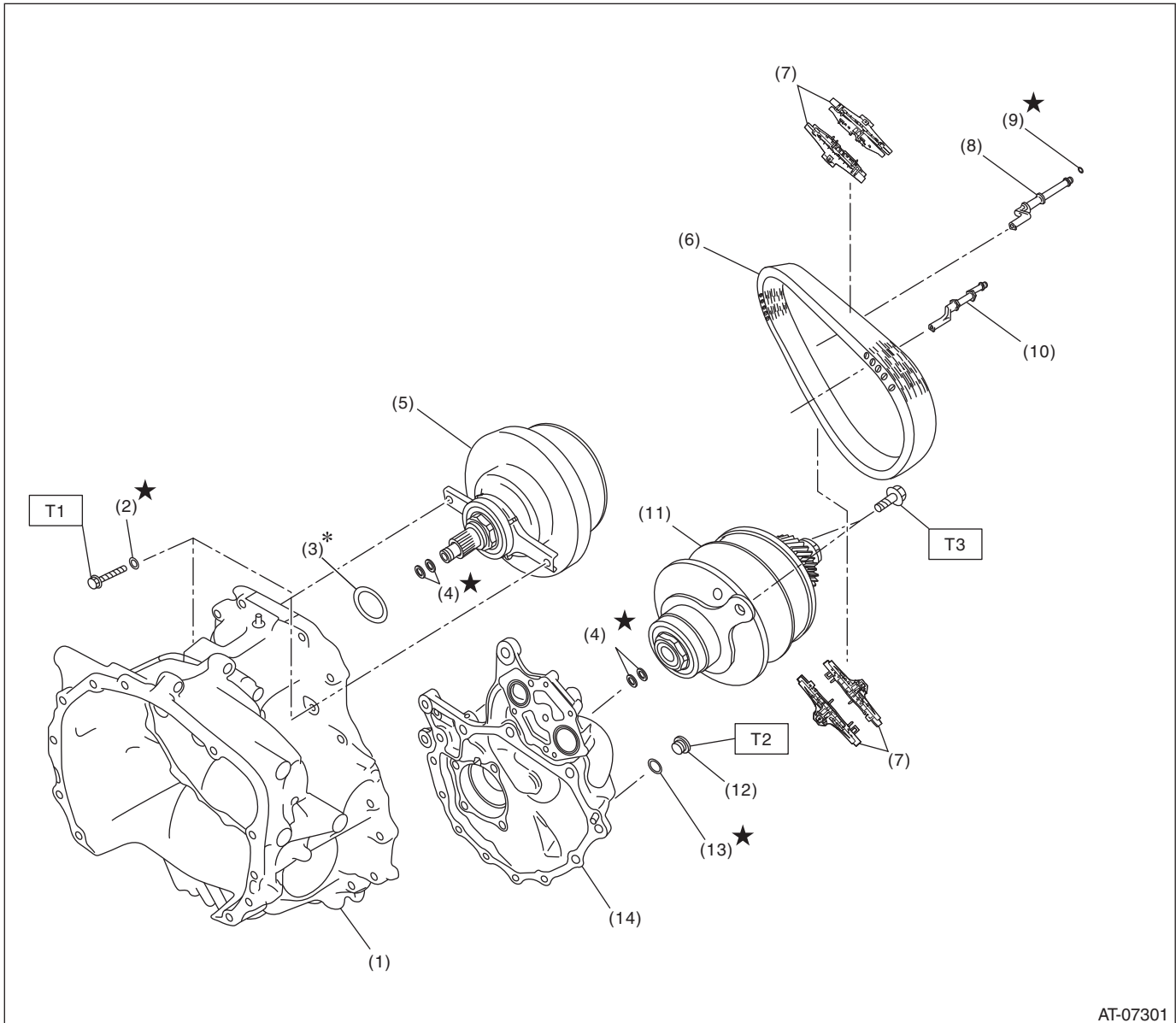
5) Remove the transmission case cover.



# General Description

CONTINUOUSLY VARIABLE TRANSMISSION

## 9. PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN



AT-07301

- |                         |                            |
|-------------------------|----------------------------|
| (1) Converter case      | (8) Lubrication pipe       |
| (2) Seal washer         | (9) O-ring                 |
| (3) Shim                | (10) Support rod           |
| (4) Seal ring           | (11) Secondary pulley ASSY |
| (5) Primary pulley ASSY | (12) Plug                  |
| (6) Variator chain      | (13) O-ring                |
| (7) Chain guide         | (14) Drive pinion retainer |

**Tightening torque: N·m (kgf·m, ft·lb)**

**T1: 21 (2.1, 15.5)**

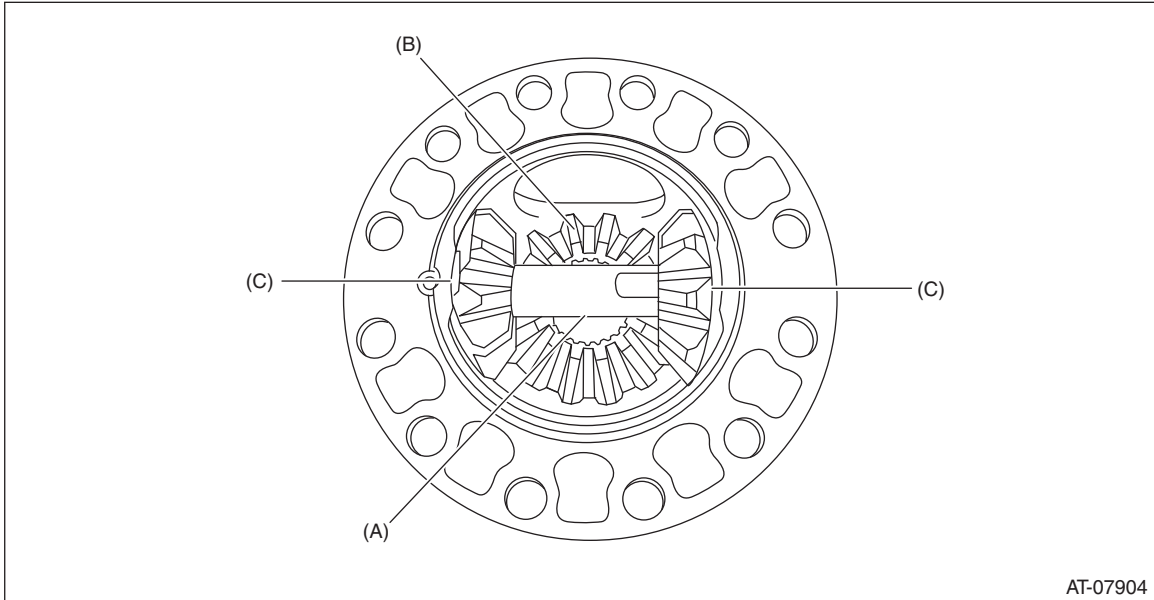
**T2: 25 (2.5, 18.4)**

**T3: 33 (3.4, 24.3)**

# Front Differential Assembly

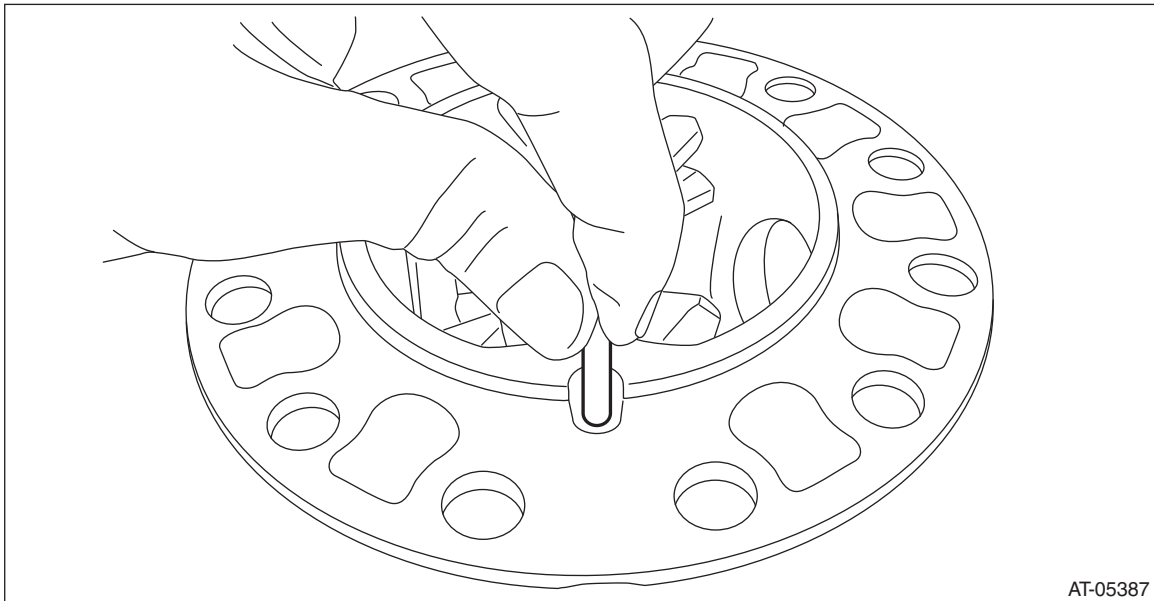
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the differential bevel gear pinions into differential case (LH) and install the pinion shaft.



- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

3) Install the straight pin.

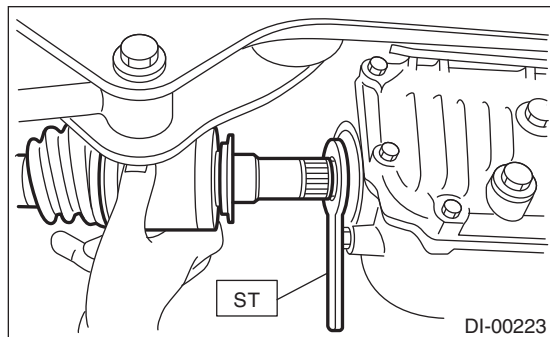


# Rear Drive Shaft

## DRIVE SHAFT SYSTEM

### Preparation tool:

**ST: OIL SEAL PROTECTOR (28099PA090)**



5) Install the rear differential assembly to the rear sub frame assembly. <Ref. to DI-23, INSTALLATION, Rear Differential (VA-type).>

### CAUTION:

**Be sure to use a new self-locking nut.**

6) Install the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler and model with Reverse Automatic Braking)

### Tightening torque:

**7.5 N·m (0.8 kgf·m, 5.5 ft·lb)**

7) While pressing the brake pedal, tighten the new axle nuts to the specified torque.

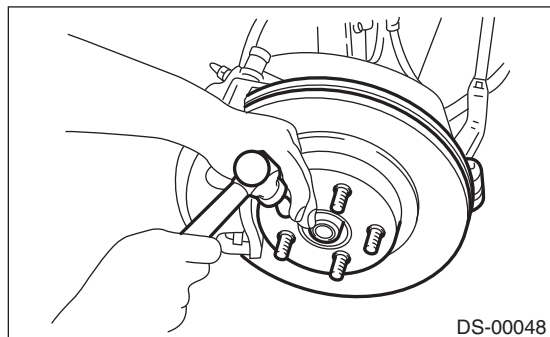
### CAUTION:

**Do not load the rear axle before tightening the axle nut. Doing so may damage the hub unit bearing.**

### Tightening torque:

**240 N·m (24.5 kgf·m, 177 ft·lb)**

8) Lock the axle nut securely.



9) Fill differential gear oil.

10) Install the rear wheels.

### Tightening torque:

**120 N·m (12.2 kgf·m, 88.5 ft·lb)**



11) Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) <Ref. to LI-30, PROCEDURE, Auto Headlight Beam Leveler System.>

## C: DISASSEMBLY

1) Using a flat tip screwdriver or pliers, loosen the boot band on the large end of boot (DOJ).

# General Description

POWER ASSISTED SYSTEM (POWER STEERING)

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18363AA050</p>	18363AA050	BOLT	<ul style="list-style-type: none"> <li>Used for removing and installing the cradle.</li> <li>Used together with HANGER (18360AA040).</li> </ul>
 <p>STSSM4</p>	—	SUBARU SELECT MONITOR 4	<p>Used for setting of each function and troubleshooting for electrical system.</p> <p>NOTE: For detailed operation procedures of Subaru Select Monitor 4, refer to “Application help”.</p>

## 2. GENERAL TOOL

TOOL NAME	REMARKS
Steering wheel puller	Used for removing the steering wheel.
Circuit tester	Used for measuring resistance, voltage and current.
DST-i	Used together with Subaru Select Monitor 4.
Chain sling	<ul style="list-style-type: none"> <li>Used for hanging power unit.</li> <li>Diameter: 6 mm (0.24 in) or 6.3 mm (0.25 in)</li> <li>Length: 0.8 — 1 m (2.6 — 3.3 ft)</li> <li>Chain inner width: 8.5 mm (0.33 in) or more</li> <li>Chain external width: 23.5 mm (0.93 in) or less</li> <li>Load capacity: 1.2 t (2646 lb) or more</li> </ul>
Shackle	<ul style="list-style-type: none"> <li>Two units used for hanging power unit.</li> <li>Attached to both end of chain sling and connected to engine hook.</li> <li>Load capacity: 250 kg (551 lb) or more</li> </ul>
Sling belt	<ul style="list-style-type: none"> <li>Used to remove and install the cradle.</li> <li>Width: 35 — 40 mm (1.38 — 1.57 in)</li> <li>Length: 2 m (6.6 ft)</li> <li>Load capacity: 1 t (2205 lb) or more</li> </ul>
Shackle	<ul style="list-style-type: none"> <li>Used to remove and install the cradle.</li> <li>Load capacity: 500 kg (1103 lb) or more</li> </ul>
C-clamp	Used when inspecting steering gearbox assembly.

## 7. Subaru Select Monitor

### A: OPERATION

For detailed operation procedures, refer to “Application help”.

### B: INSPECTION

#### 1. COMMUNICATION FOR INITIALIZING IMPOSSIBLE

##### DTC detecting condition:

- Defective harness connector
- Defective CAN communication

##### Trouble symptom:

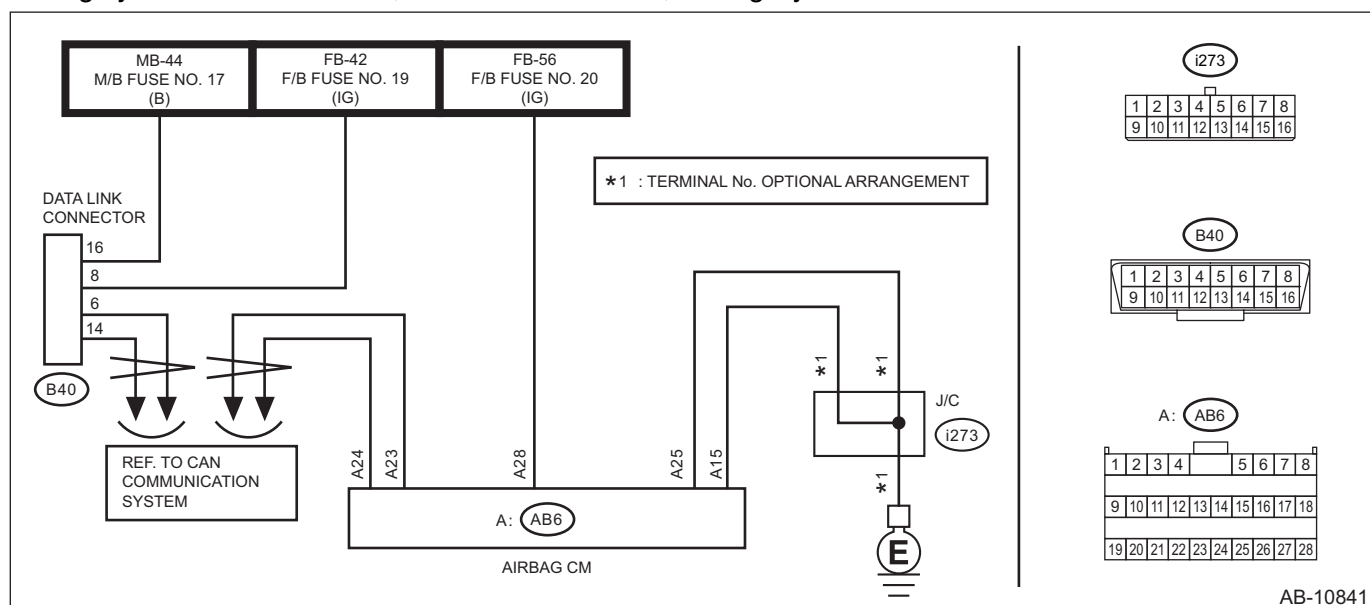
Communication is impossible between the airbag control module and the Subaru Select Monitor.

##### CAUTION:

**Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to AB(diag)-4, CAUTION, General Description.>**

##### Wiring diagram:

Airbag system <Ref. to WI-93, WIRING DIAGRAM, Airbag System.>



Step	Check	Yes	No
1	<b>CHECK SUBARU SELECT MONITOR.</b> Connect the Subaru Select Monitor to another vehicle, and check for the communication with «Airbag».	Go to step 2.	Replace or repair the Select Monitor.
2	<b>CHECK IGNITION SWITCH.</b> Check that the ignition switch is ON.	Go to step 3.	Turn the ignition switch to ON, and select «Airbag» from «Each System» on the Subaru Select Monitor.
3	<b>CHECK BATTERY.</b> 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Go to step 4.	Charge or replace the battery.
4	<b>CHECK BATTERY TERMINAL.</b> Check the battery terminal.	Go to step 5.	Replace or tighten the battery terminal.

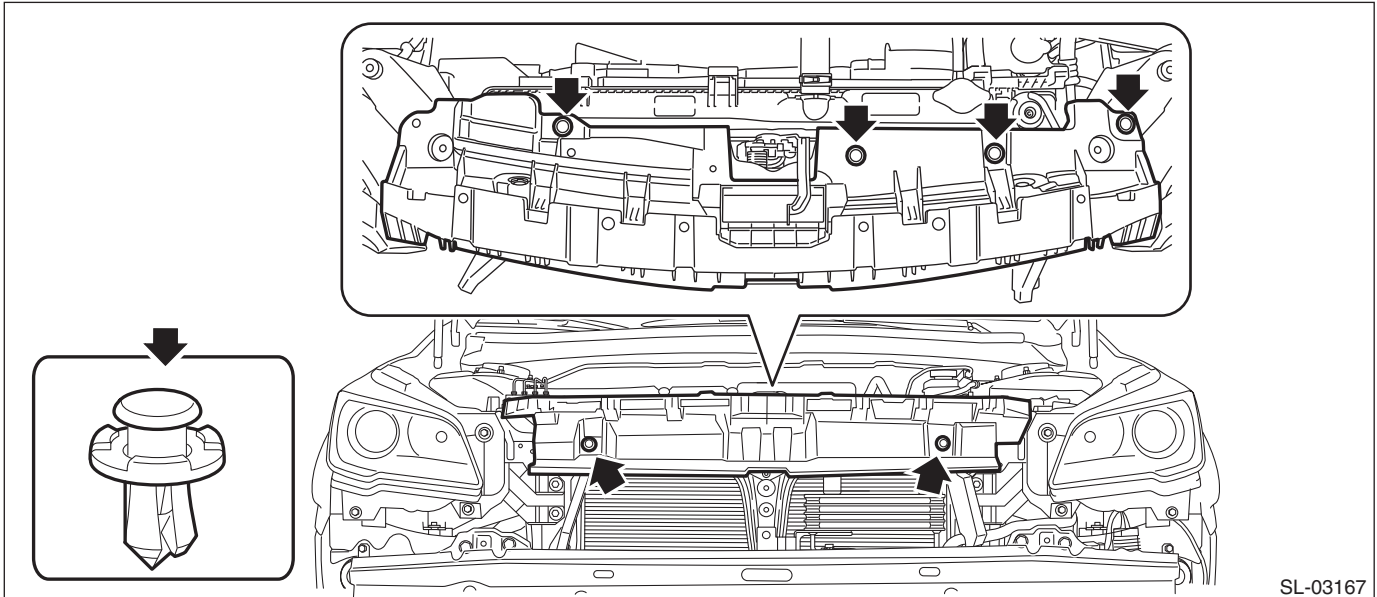
# Front Hood Lock Assembly

## SECURITY AND LOCKS

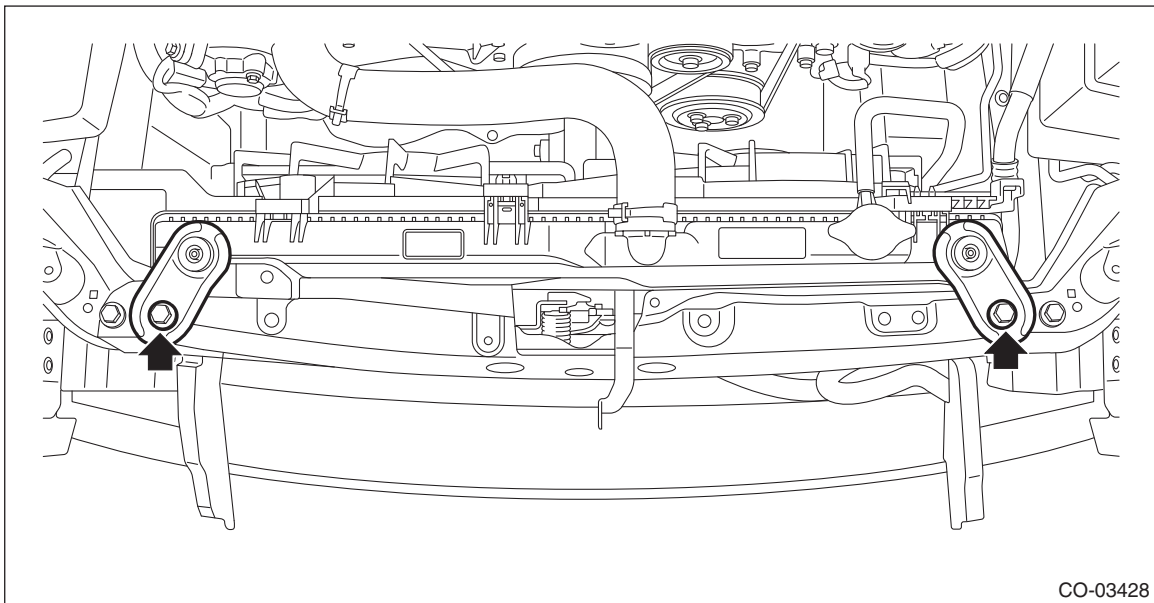
### 17. Front Hood Lock Assembly

#### A: REMOVAL

- 1) Disconnect the ground terminal from battery sensor. <Ref. to RC-3, BATTERY, NOTE, Repair Contents.>
- 2) Open the front hood.
- 3) Remove the air intake duct. <Ref. to IN(H4DO)-12, REMOVAL, Air Intake Duct.>
- 4) Remove the bumper face - front. <Ref. to EI-32, REMOVAL, Front Bumper.>
- 5) Remove the bracket - grille.



- 6) Remove the radiator upper brackets.



- 7) Remove the lock assembly - front hood.