

## ENGINE REMOVAL/INSTALLATION [SKYACTIV-D 2.2]

id0110s5800400

### Warning

- A hot engine can cause severe burns. Turn off the engine and wait until it is cool before servicing.
- Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.
- Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the “Fuel Line Safety Procedure”. (See BEFORE SERVICE PRECAUTION [SKYACTIV-D 2.2].)

### Caution

- Secure the steering wheel using tape or a cable to prevent the steering shaft from rotating after disconnecting the steering shaft. If the steering wheel rotates after the steering shaft and the steering gear and linkage are disconnected, the internal parts of the clock spring could be damaged.

### Note

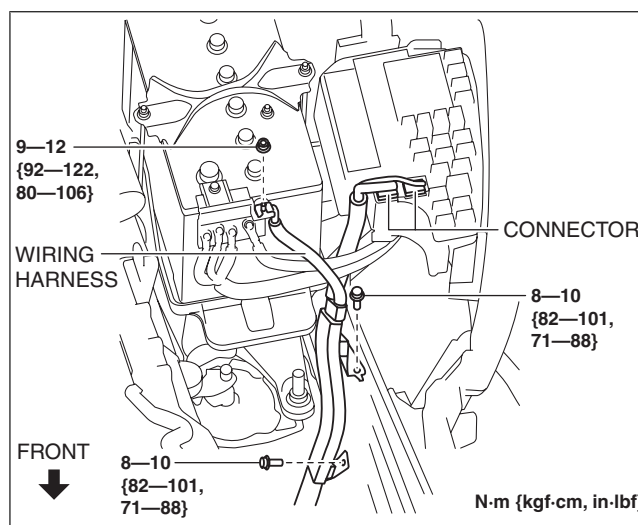
- Perform the engine and transaxle component removal/installation from the lower side of the vehicle after removing the front crossmember component.

### Operation After Replacing Timing Chain

1. After replacing the engine, perform the following procedure.

STEP	ACTION	PAGE/CONDITION
1	Perform KOEO self-test procedure.	(See KOEO/KOER SELF TEST [SKYACTIV-D 2.2].)
2	Switch the ignition off.	—
3	Verify that the check engine light does not illuminate.	—
4	Perform KOER self-test procedure.	(See KOEO/KOER SELF TEST [SKYACTIV-D 2.2].)
5	Perform fuel injector injection amount correction.	(See FUEL INJECTOR INJECTION AMOUNT CORRECTION [SKYACTIV-D 2.2].)
6	Perform timing chain learning procedure.	(See TIMING CHAIN LEARNING [SKYACTIV-D 2.2].)
7	Clear the DTCs.	(See OBD READ/CLEAR DIAGNOSTIC TEST RESULTS [SKYACTIV-D 2.2].)
8	Switch the ignition off.	—

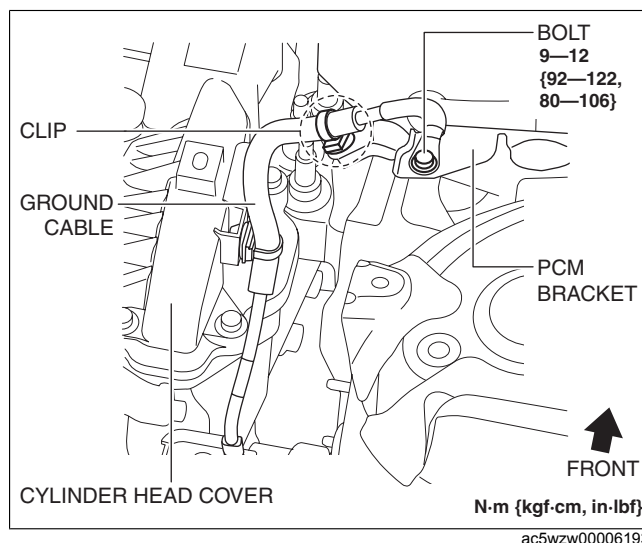
1. Disconnect the negative battery cable. (See NEGATIVE BATTERY CABLE DISCONNECTION/CONNECTION [SKYACTIV-D 2.2].)
2. Remove the engine cover. (See ENGINE COVER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
3. Remove the air cleaner and air hose as a single unit. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
4. Remove the bolts, nut and connector shown in the figure, and set the wiring harness aside.
5. Remove the battery and battery tray. (See BATTERY REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)



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6. Disconnect the ground cable shown in the figure.

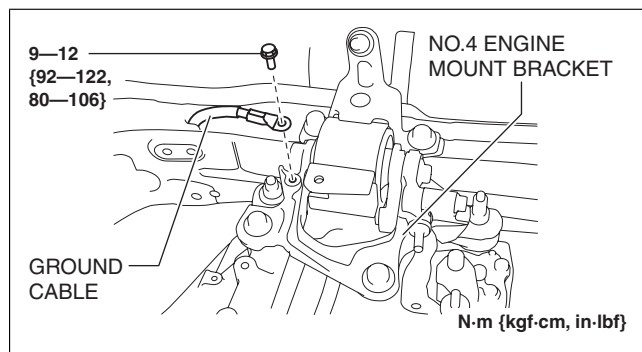
## Right side



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## Left side

7. Remove the following parts as a single unit (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].):
  - Turbocharger air outlet pipe
  - Turbocharger air outlet hose
  - Air intake pipe
  - Charge air cooler inlet hose
8. Drain the engine coolant. (See ENGINE COOLANT REPLACEMENT [SKYACTIV-D 2.2].)
9. Drain the transaxle oil (MTX) or ATF (ATX). (See MANUAL TRANSAXLE OIL REPLACEMENT [D66M-R, D66MX-R].) (See AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GW6A-EL, GW6AX-EL].)
10. Disconnect the selector cable. (ATX) (See AUTOMATIC TRANSAXLE SHIFT MECHANISM REMOVAL/INSTALLATION.)
11. Disconnect the control cable. (MTX) (See MANUAL TRANSAXLE SHIFT MECHANISM REMOVAL/INSTALLATION [D66M-R, D66MX-R].)
12. Remove the clutch release cylinder with the pipe still connected. (MTX) (See CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION [D66M-R, D66MX-R].)
13. Disconnect the brake vacuum hose. (See VACUUM HOSE REMOVAL/INSTALLATION.)
14. Disconnect the fuel main hose and fuel return hose No.1. (See LOWER CASE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
15. Disconnect the upper radiator hose and water hose (upper side of radiator).
16. Disconnect the heater hose. (See A/C UNIT REMOVAL/INSTALLATION.)
17. Remove the front wheels and tires. (See GENERAL PROCEDURES (SUSPENSION).)
18. Remove the front under cover No.1 and No.2. (See FRONT UNDER COVER No.1 REMOVAL/INSTALLATION.) (See FRONT UNDER COVER No.2 REMOVAL/INSTALLATION.)
19. Remove the splash shield. (See SPLASH SHIELD REMOVAL/INSTALLATION.)
20. Disconnect the ATF oil hose from the radiator. (if equipped) (See OIL COOLER REMOVAL/INSTALLATION [GW6A-EL, GW6AX-EL].)
21. Disconnect the lower radiator hose. (See THERMOSTAT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
22. Remove the charge air cooler outlet hose. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
23. Set the front mudguard (RH) aside. (See MUDGUARD REMOVAL/INSTALLATION.)
24. Remove the charge air cooler outlet pipe. (See CHARGE AIR COOLER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
25. Remove the drive belt. (See DRIVE BELT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
26. Remove the A/C compressor with the pipes connected and secure the A/C compressor using wire or rope so that it is out of the way. (See A/C COMPRESSOR REMOVAL/INSTALLATION.)
27. Remove the middle pipe installation nut (catalytic converter side) and secure the middle pipe using wire or rope so that it is out of the way. (See EXHAUST SYSTEM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
28. Remove the propeller shaft. (4WD) (See PROPELLER SHAFT REMOVAL/INSTALLATION.)

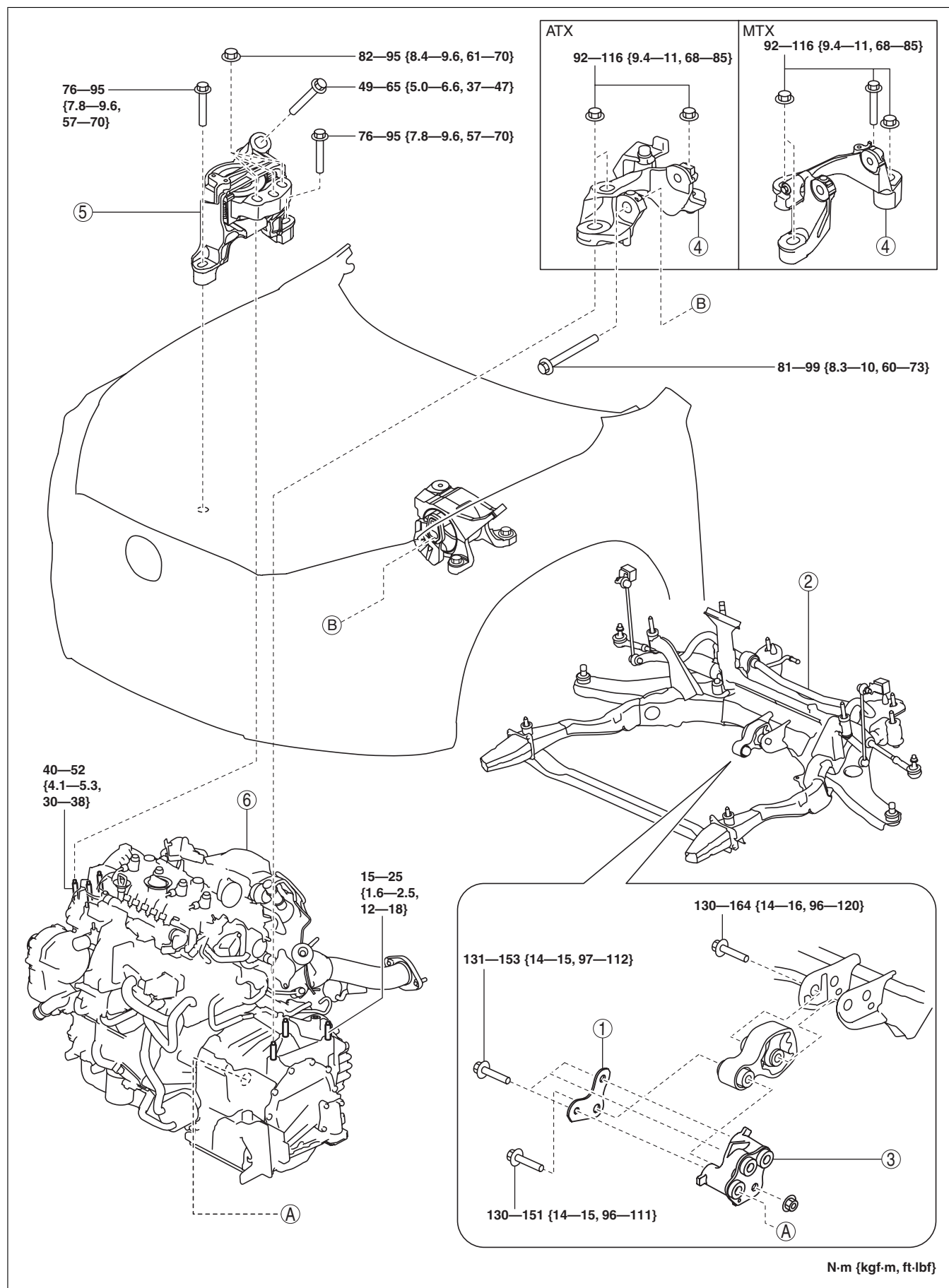


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29. Disconnect the front drive shaft (LH) from the transaxle side and set it aside. (See FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
  30. Disconnect the front drive shaft (RH) from the transaxle side and set it aside. (2WD) (See FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
  31. Remove the drive shaft (RH). (4WD) (See FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
  32. Remove in the order indicated in the table.
  33. Install in the reverse order of removal.
  34. Refill the transaxle oil (MTX) or ATF (ATX). (See MANUAL TRANSAXLE OIL REPLACEMENT [D66M-R, D66MX-R].) (See AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GW6A-EL, GW6AX-EL].)
  35. Refill the engine coolant. (See ENGINE COOLANT REPLACEMENT [SKYACTIV-D 2.2].)
  36. If the engine is replaced, perform "Operation After Replacing Timing Chain". (See Operation After Replacing Timing Chain.)
  37. Start the engine, and inspect and adjust the following:
    - Front wheel alignment (See FRONT WHEEL ALIGNMENT.)
    - Leakage of engine oil, engine coolant, transaxle oil (MTX), ATF (ATX), and fuel.
    - Runout and contact of pulley and belt.
    - Idle speed (See ENGINE TUNE-UP [SKYACTIV-D 2.2].)
    - Engine-driven accessories operation.

**Note**

- If the engine is overhauled and assembled to the vehicle, perform a road test to verify that there is no abnormal vibration and noise.



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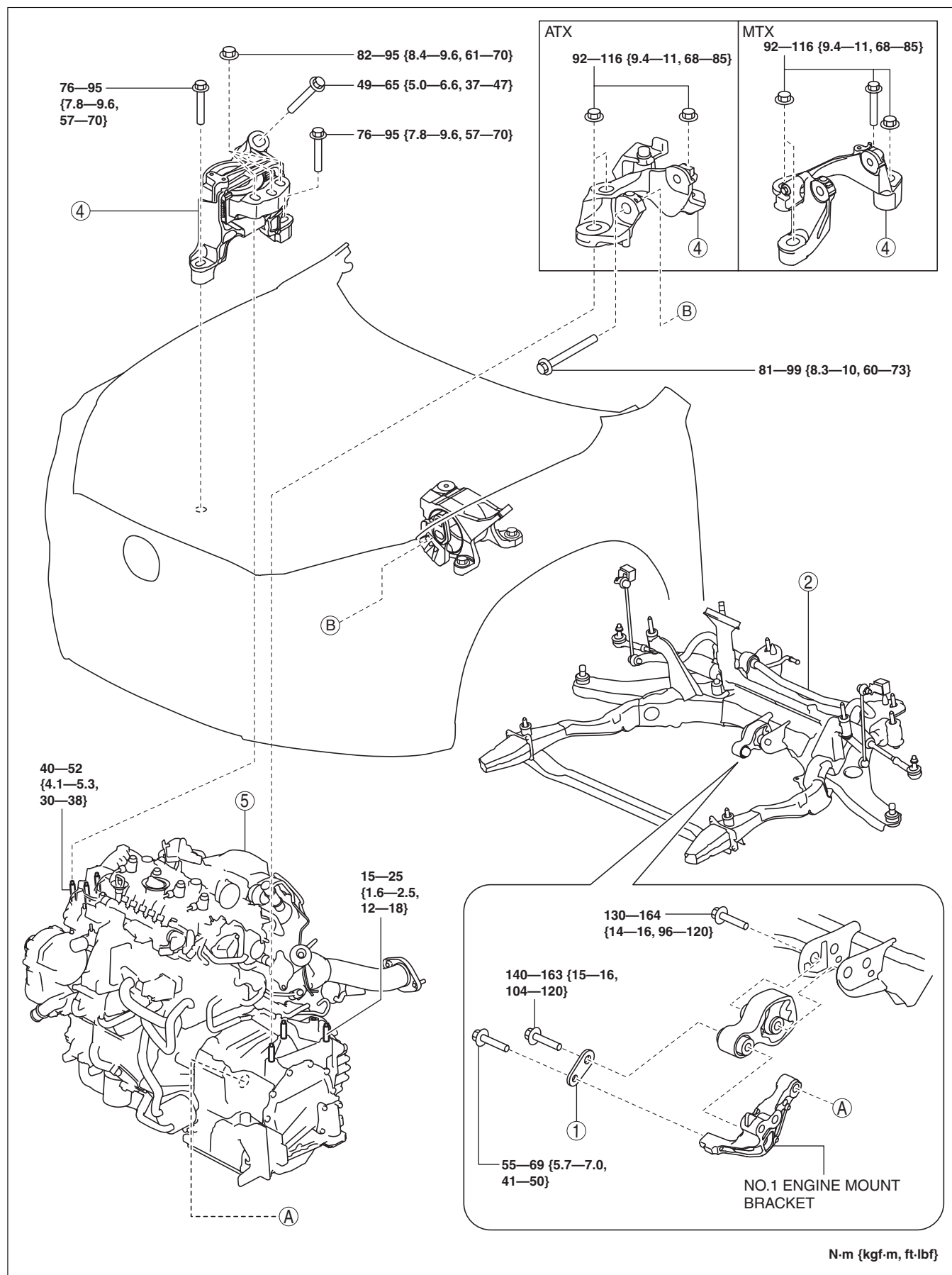
- |   |  |
|---|--|
| 1 | Bracket plate<br>(See Engine Mount Installation Note.) |
|---|--|

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2	No.1 engine mount rubber, front crossmember component (See No.1 Engine Mount Rubber, Front Crossmember Component Removal Note.) (See Engine Mount Installation Note.)
3	No.1 engine mount bracket (See Engine Mount Installation Note.)
4	No.4 engine mount bracket (See No.3 Engine Mount, No.4 Engine Mount Bracket Removal Note.) (See Engine Mount Installation Note.)

5	No.3 engine mount (See No.3 Engine Mount, No.4 Engine Mount Bracket Removal Note.) (See Engine Mount Installation Note.)
6	Engine, transaxle

# 4WD



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|---|--|
| 1 | Bracket plate<br>(See Engine Mount Installation Note.) |
|---|--|

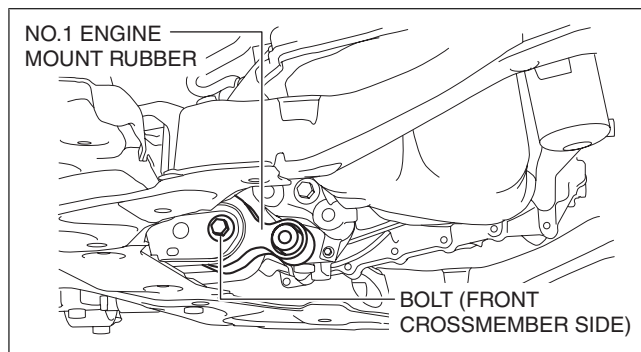
2	No.1 engine mount rubber, front crossmember component (See No.1 Engine Mount Rubber, Front Crossmember Component Removal Note.) (See Engine Mount Installation Note.)
3	No.4 engine mount bracket (See No.3 Engine Mount, No.4 Engine Mount Bracket Removal Note.) (See Engine Mount Installation Note.)

4	No.3 engine mount (See No.3 Engine Mount, No.4 Engine Mount Bracket Removal Note.) (See Engine Mount Installation Note.)
5	Engine, transaxle

### No.1 Engine Mount Rubber, Front Crossmember Component Removal Note

- Loosen the No.1 engine mount rubber installation bolt (front crossmember side) shown in the figure.

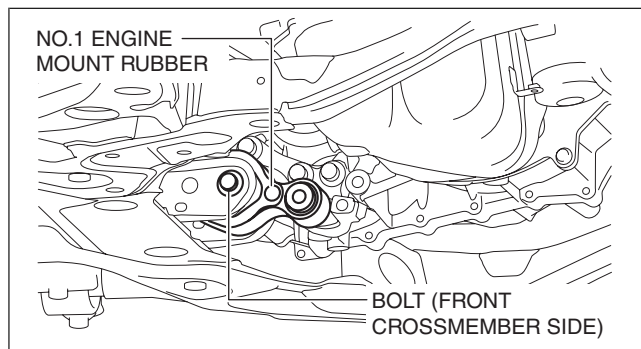
#### 2WD



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#### 4WD

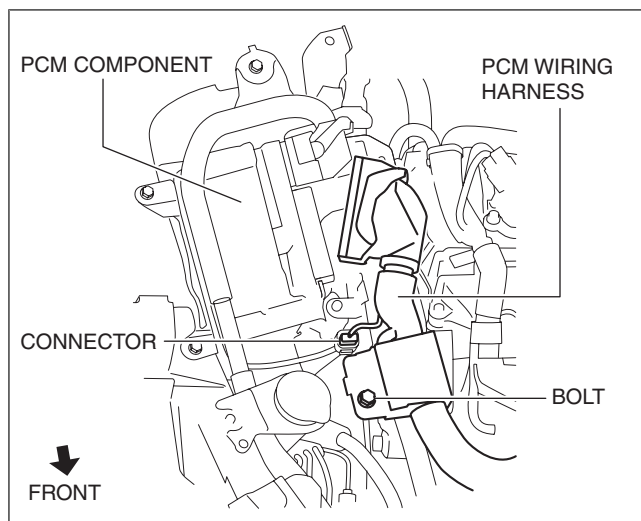
- Remove the No.1 engine mount rubber and the front crossmember component as a single unit. (See FRONT CROSSMEMBER REMOVAL/INSTALLATION.)



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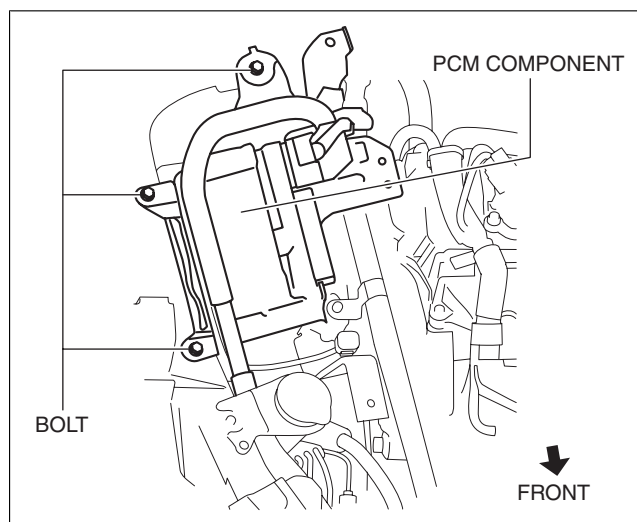
### No.3 Engine Mount, No.4 Engine Mount Bracket Removal Note

- Set the PCM wiring harness and PCM component aside using the following procedure:
  - Disconnect the PCM connector (140 pin side) from the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
  - Remove the bolt and connector shown in the figure and set aside the PCM wiring harness to the engine upper side.



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- (3) Remove the bolt shown in the figure and set aside the PCM component with the PCM connector connected.



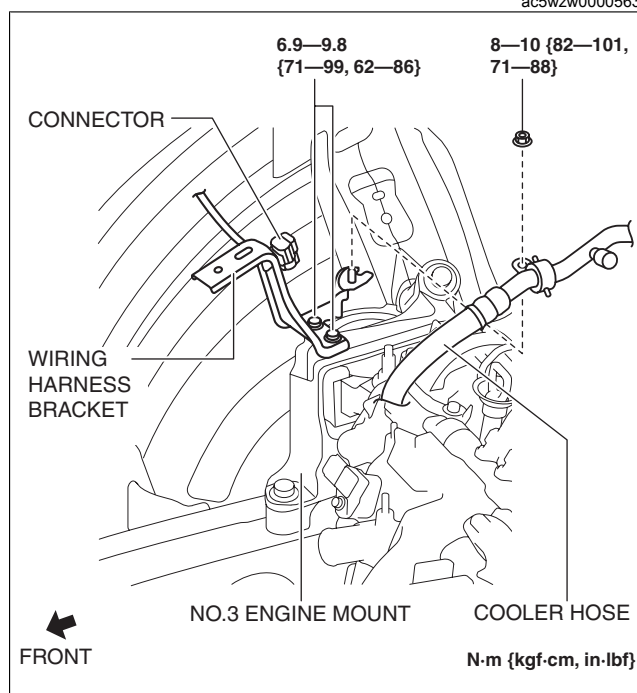
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2. Remove the wiring harness bracket shown in the figure.
3. Remove the seal plate installed to the underside of the oil pan. (See OIL PAN REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].)

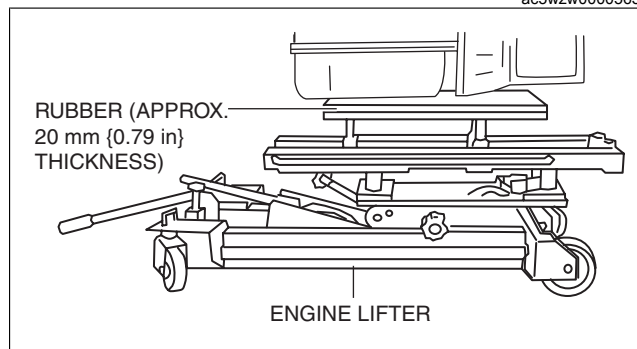
#### Caution

- When supporting the engine and transaxle, insert rubber of appropriate size (approx. 20 mm {0.79 in} thickness) between the engine lifter and the oil pan, transaxle to prevent deformation of the oil pan and damage of the transaxle.

4. Secure the engine and transaxle using a commercially available engine lifter.
5. Remove the No.4 engine mount bracket.
6. Remove the No.3 engine mount.



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### Engine Mount Installation Note

#### Caution

- Slots have been adopted for the No.3 engine mount and No.4 engine mount bracket installation holes. Tighten the installation bolts and nuts so that they are centered on the slots. Otherwise, engine noise or vibration could increase.



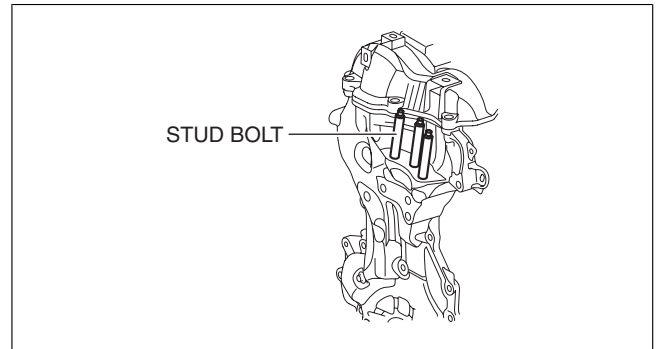
#### Note

- Retighten the engine front cover and transaxle stud bolts when the nuts of No.3 engine mount and No.4 engine mount bracket are loosened.

1. Tighten the engine front cover stud bolts.

#### Tightening torque

40—52 N·m {4.1—5.3 kgf·m, 30—38 ft·lbf}



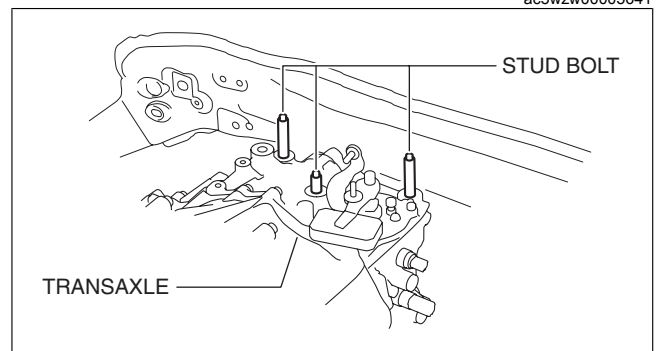
2. Tighten the transaxle stud bolts.

#### Tightening torque

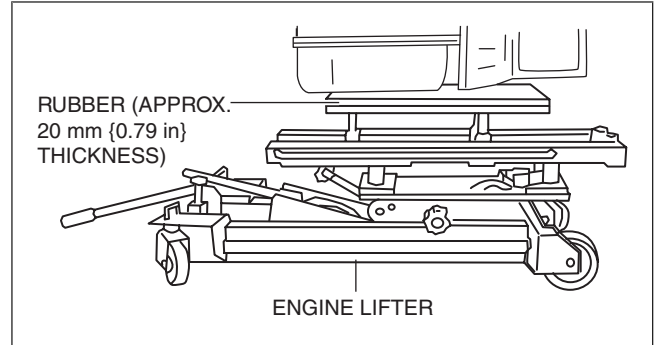
15—25 N·m {1.6—2.5 kgf·m, 12—18 ft·lbf}

#### Caution

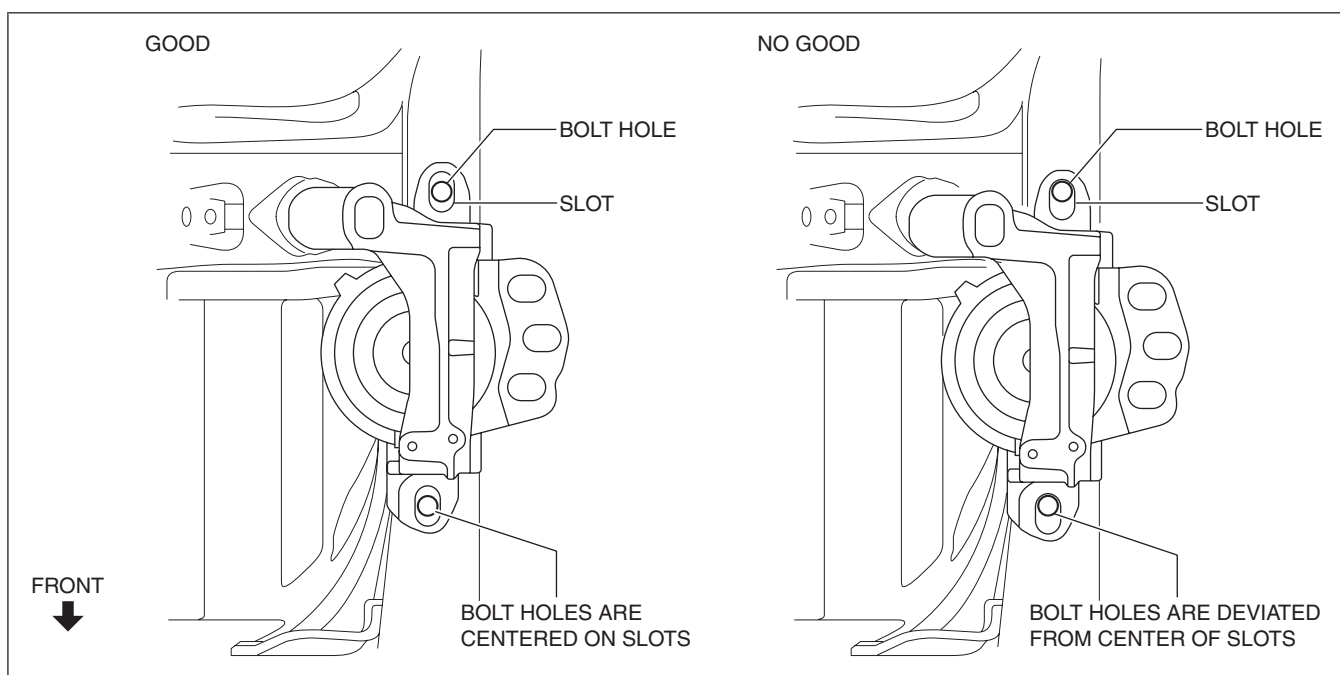
- When supporting the engine and transaxle, insert rubber of appropriate size (approx. 20 mm {0.79 in} thickness) between the engine lifter and the oil pan, transaxle to prevent deformation of the oil pan and damage of the transaxle.



3. Secure the engine and transaxle using a commercially available engine lifter.

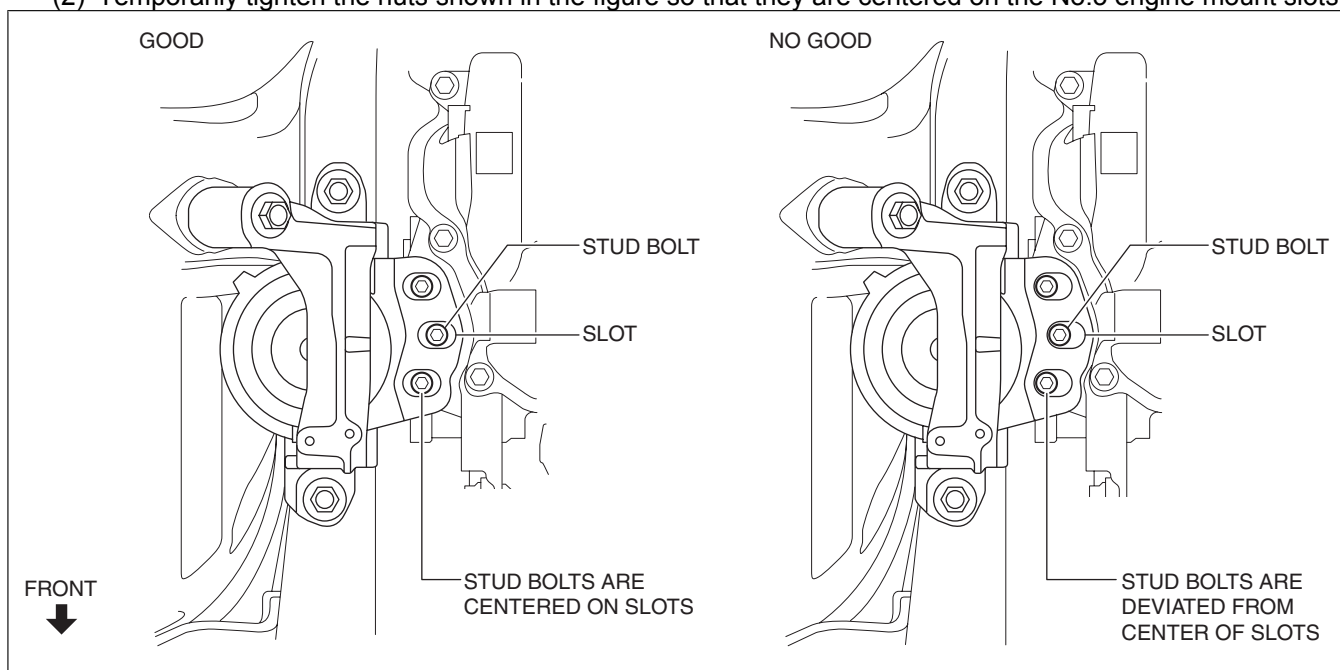


4. Temporarily tighten the No.3 engine mount installation bolts and nuts using the following procedure:  
(1) Temporarily tighten the bolts shown in the figure so that they are centered on the No.3 engine mount slots.



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(2) Temporarily tighten the nuts shown in the figure so that they are centered on the No.3 engine mount slots.



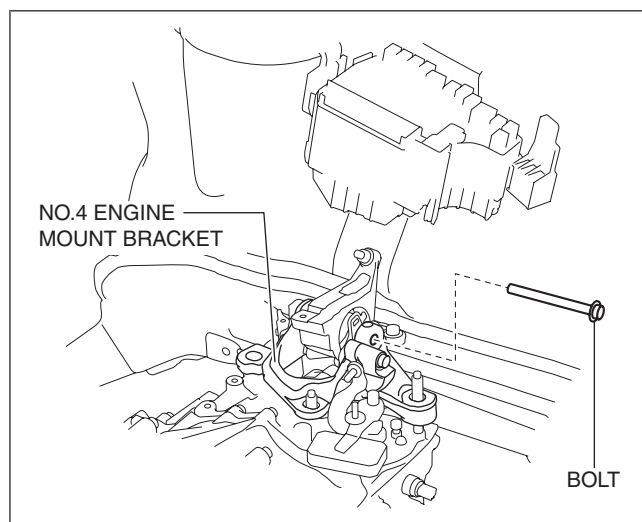
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**Note**

- If the stud bolts are deviated from the center of the slots, align the stud bolts with the center of the slots while slightly moving the engine, and temporarily tighten the installation nuts.

5. Temporarily tighten the No.4 engine mount bracket installation bolt and nuts using the following procedure:

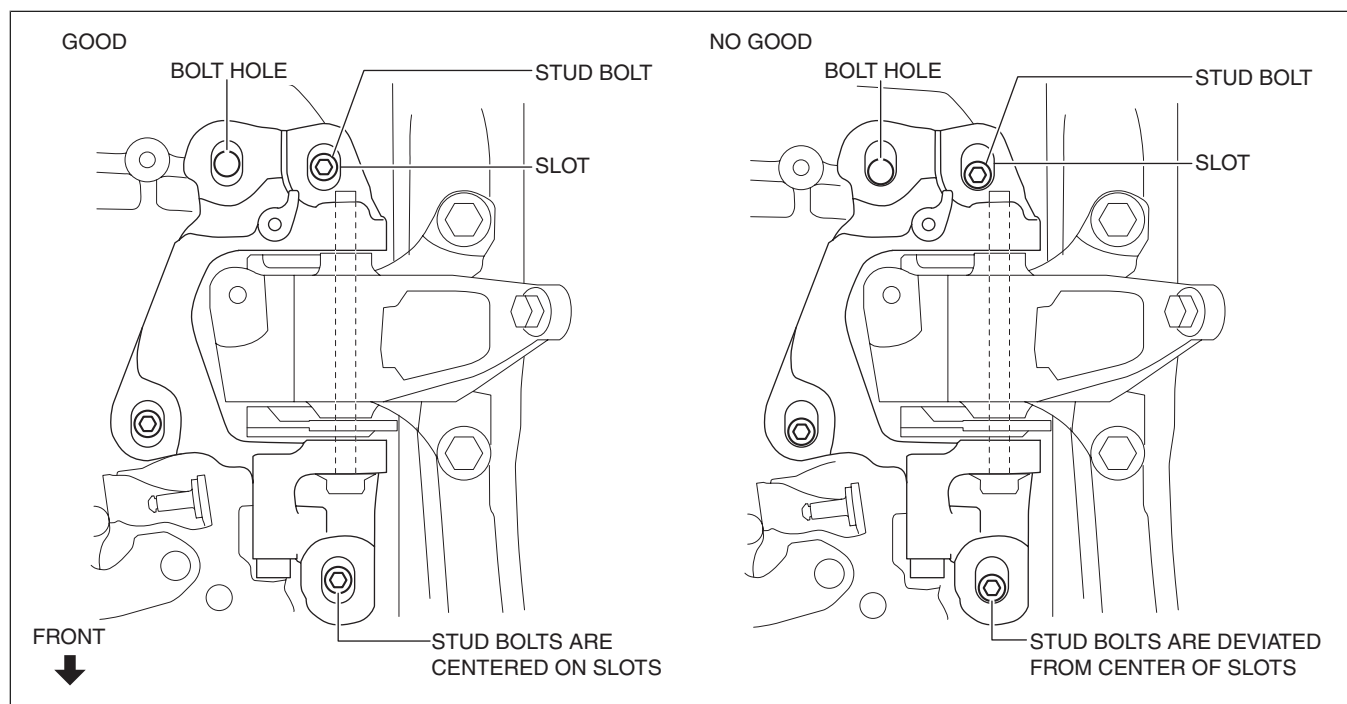
(1) Temporarily tighten the bolt shown in the figure.



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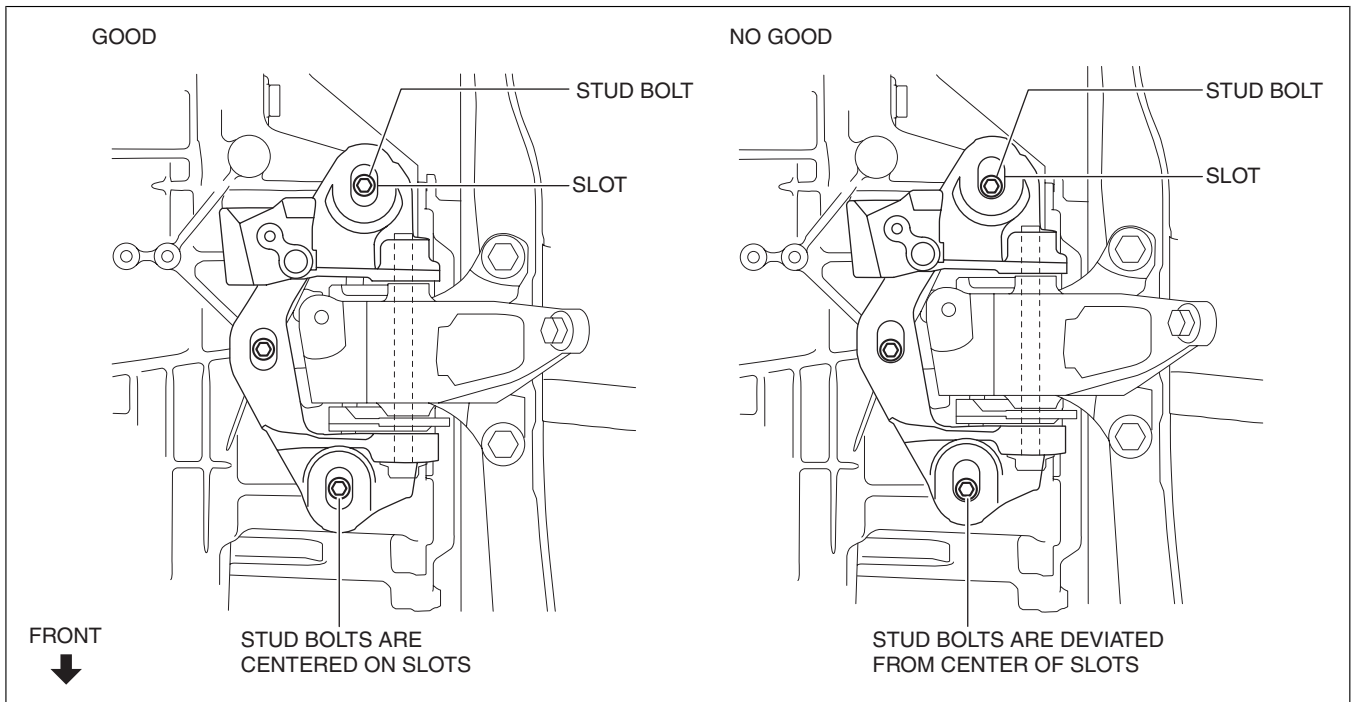
(2) Temporarily tighten the nuts shown in the figure so that they are centered on the No.4 engine mount bracket slots.

### MTX



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## ATX



### Note

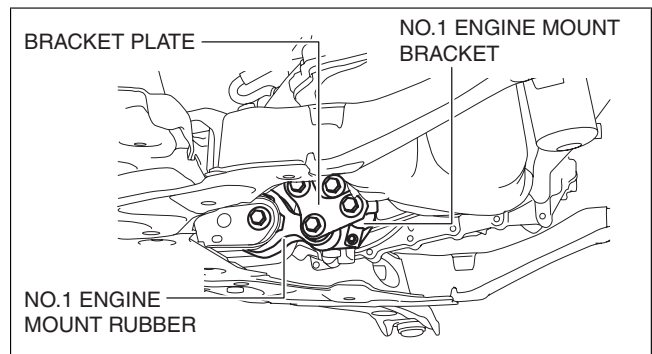
- If the stud bolts are deviated from the center of the slots, align the stud bolts with the center of the slots while slightly moving the transaxle, and temporarily tighten the installation nuts.

6. Install the No.1 engine mount rubber and the front crossmember component as a single unit. (See FRONT CROSSMEMBER REMOVAL/INSTALLATION.)

7. Temporarily tighten the following parts:

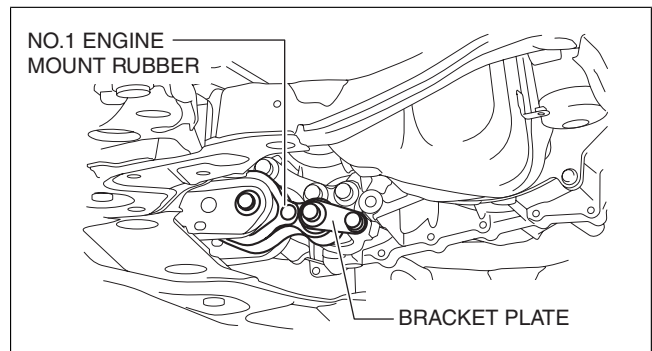
### 2WD

- No.1 engine mount bracket, No.1 engine mount rubber and bracket plate



### 4WD

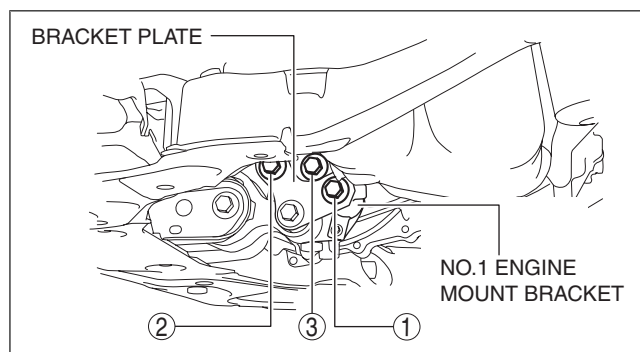
- No.1 engine mount rubber and bracket plate



8. Tighten the No.1 engine mount bracket and bracket plate installation bolts in the order shown in the figure. (2WD)

#### Tightening torque

131—153 N·m {14—15 kgf·m, 97—112 ft·lbf}

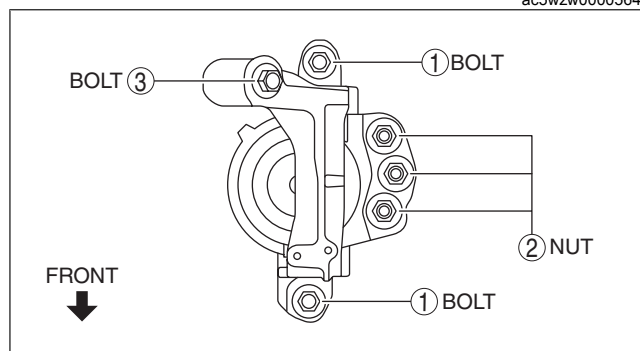


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9. Tighten the No.3 engine mount installation bolts and nuts in the order shown in the figure.

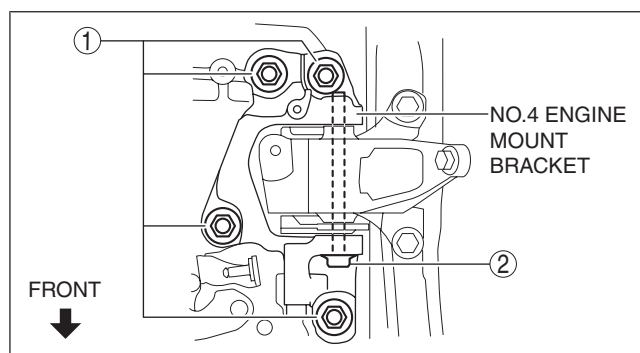
#### Tightening torque

No.	Tightening torque
1	76—95 N·m {7.8—9.6 kgf·m, 57—70 ft·lbf}
2	82—95 N·m {8.4—9.6 kgf·m, 61—70 ft·lbf}
3	49—65 N·m {5.0—6.6 kgf·m, 37—47 ft·lbf}



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10. Tighten the No.4 engine mount bracket installation bolt and nuts in the order shown in the figure.  
MTX

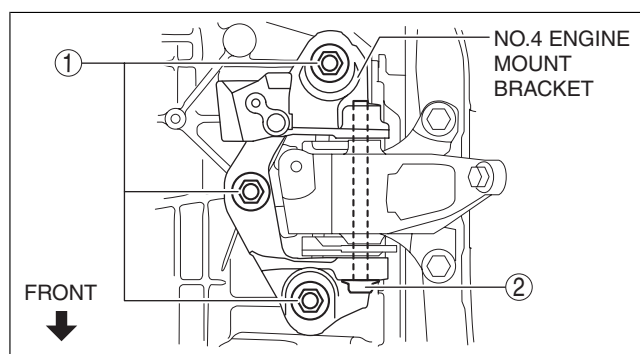


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#### ATX

#### Tightening torque

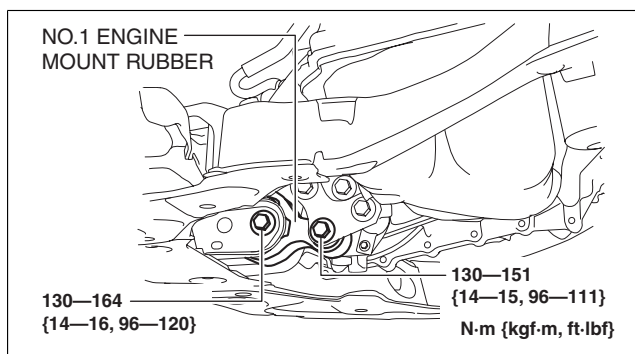
No.	Tightening torque
1	92—116 N·m {9.4—11 kgf·m, 68—85 ft·lbf}
2	81—99 N·m {8.3—10 kgf·m, 60—73 ft·lbf}



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11. Tighten the No.1 engine mount rubber installation bolts.

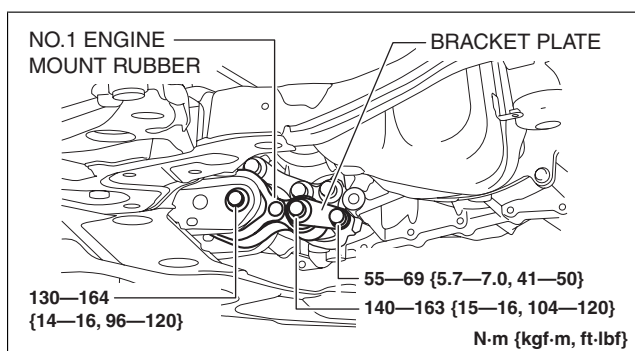
## 2WD



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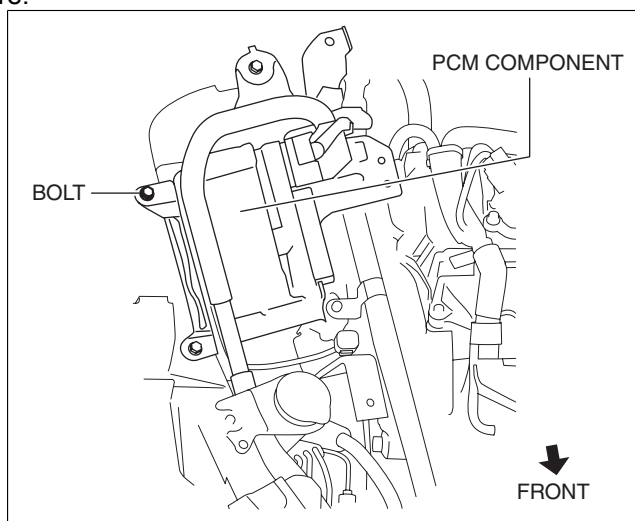
## 4WD

12. Install the seal plate. (See OIL PAN REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].)
13. Install the wiring harness bracket, cooler hose and connector.



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14. Install the PCM component using the following procedure:
  - (1) Temporarily tighten the bolt as shown in the figure.

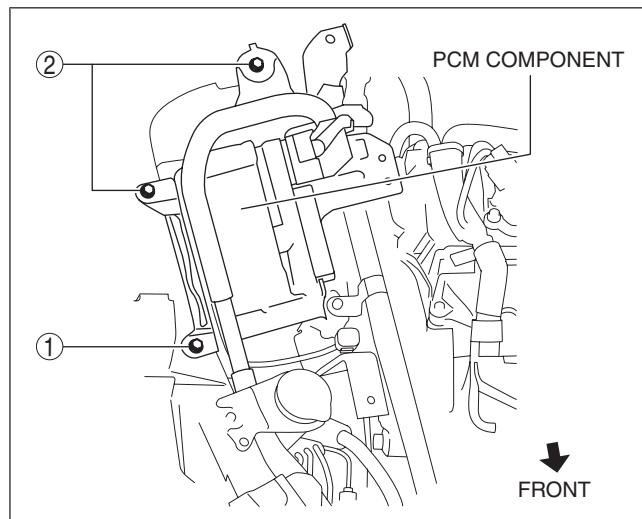


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- (2) Tighten the PCM component installation bolts in the order shown in the figure.

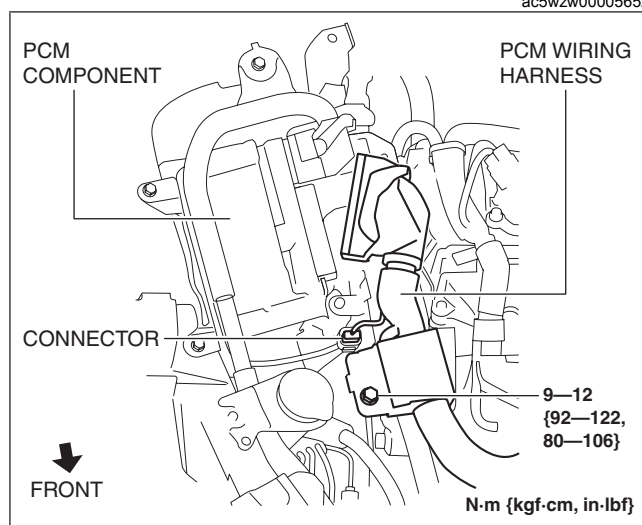
**Tightening torque**

**9—10 N·m {92—101 kgf·cm, 80—88 in·lbf}**



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- (3) Install the bolt and connector as shown in the figure.  
(4) Connect the PCM connector (140 pin side) to the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)



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