ENGINE COMPONENTS PARTS (S05C–TB)

140NF–03

REMOVAL AND INSTALLATION

1. PREPARATION

(a) Clean the engine.
  (1) Cover the openings with tape.
  (2) Using a steam cleaner, clean the engine.

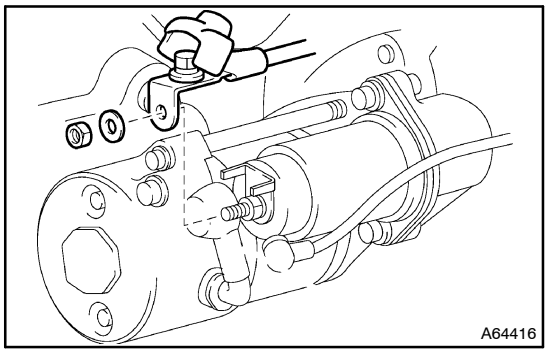
NOTICE:

Do not apply steam directly to the electrical component (generator, starter, etc.).

(b) Mount the engine on a work stand.

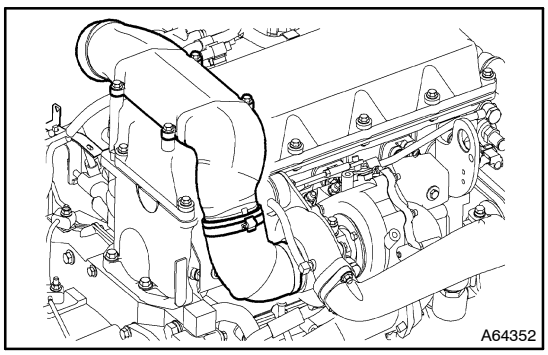
2. REMOVE ELECTRICAL WIRE ASSY

(a) Remove the clip of the wire harness.
(b) Disconnect the negative (–) terminal of the battery.
(c) Disconnect the electrical unit, switch and sensor.



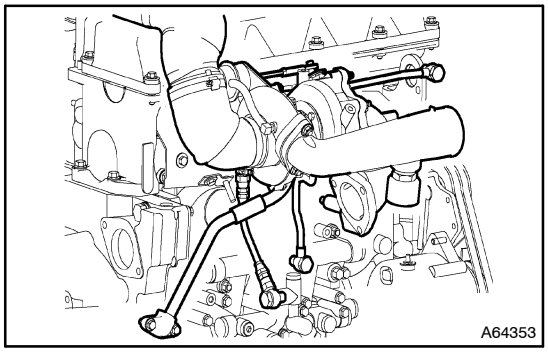
3. REMOVE STARTER ASSY

(a) Put alignment marks on the harness and the starter terminal, and then remove the harness.
(b) Remove the starter from the engine.

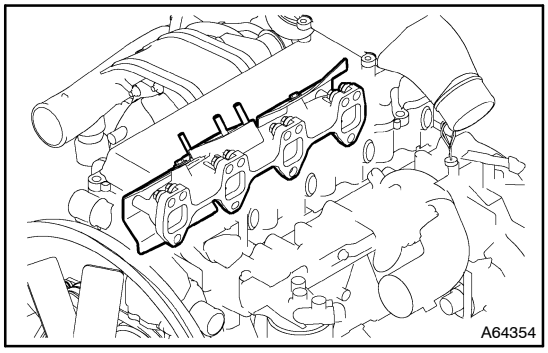


4. REMOVE TURBOCHARGER ASSY

(a) Remove the insulator.
(b) Remove the suction pipe.
(c) Remove the intake pipe.



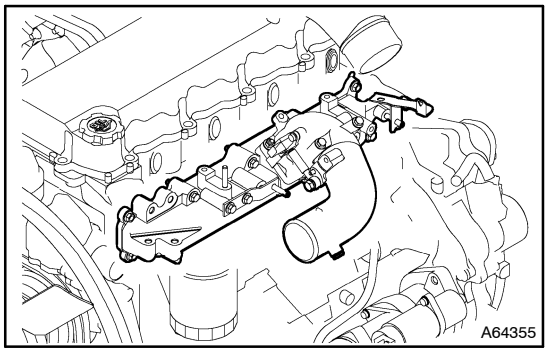
(d) Remove the oil pipe.
(e) Remove the water pipe.
(f) Remove the exhaust pipe.
(g) Remove the 4 bolts.



5. REMOVE EXHAUST MANIFOLD

(a) Remove the insulators.

(b) Remove the exhaust manifold.



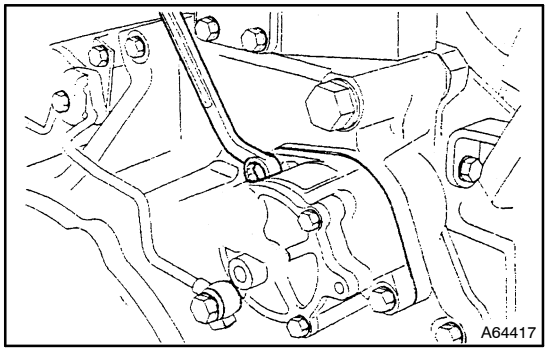
6. REMOVE INTAKE PIPE

7. REMOVE INTAKE MANIFOLD

(a) Remove the injection pipe and fuel filter assembly.

8. REMOVE COMMON RAIL ASSY (See page 11–169)

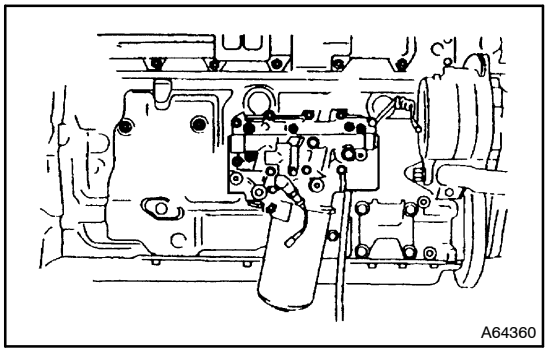
9. REMOVE SUPPLY PUMP ASSY (See page 11–163)



10. REMOVE VACUUM PUMP ASSY

(a) Remove the vacuum lines.

(b) Remove the 2 bolts, vacuum pump and 2 O–rings.

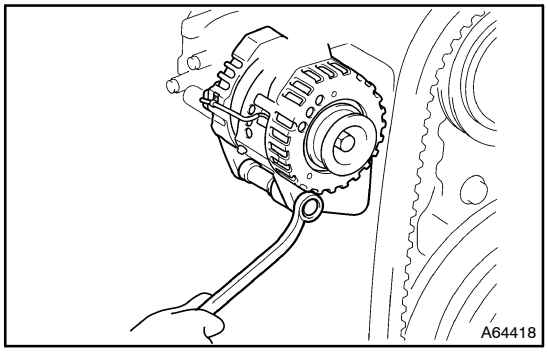


11. REMOVE OIL FILTER SUB–ASSY (See page 17–45)

12. REMOVE OIL COOLER ASSY

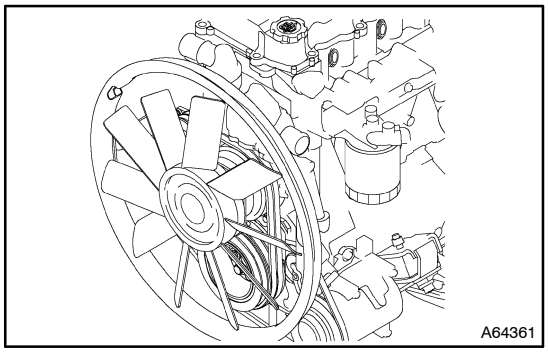
(a) Remove the oil lines.

(b) Remove the oil cooler.

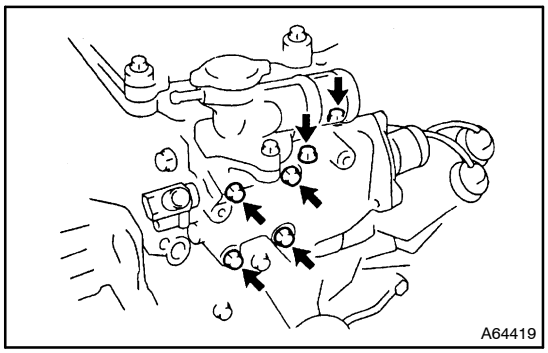


13. REMOVE V BELT AND GENERATOR

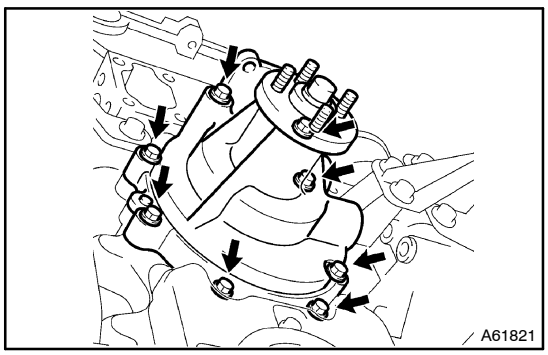
(a) Loosen the V belt adjusting bolt.
(b) Loosen the through bolt.
(c) Remove the V belt, and then remove the generator.



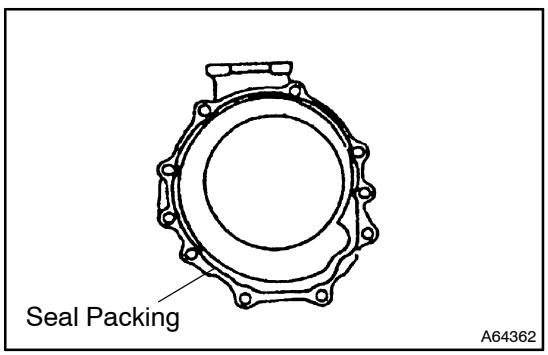
14. REMOVE FAN
15. REMOVE FLUID COUPLING ASSY
16. REMOVE FAN PULLEY



17. REMOVE THERMOSTAT CASE



18. REMOVE WATER PUMP ASSY

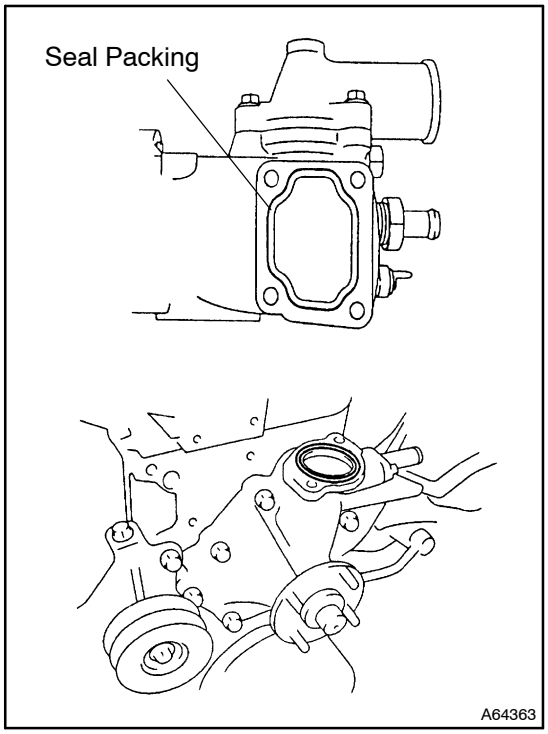


19. INSTALL WATER PUMP ASSY

(a) Clean the cylinder block mounting surface of the water pump.
(b) Apply seal packing to the water pump and install it onto the cylinder block within 20 minutes.
Seal packing: Part No. 08826–00100 or equivalent
Coating width: 1.5 – 2.5 mm (0.059 – 0.098 in.)
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

HINT:

- If more than 20 minutes have passed since the seal packing is applied, do not assemble the parts. After removing the seal packing completely, reapply it to assemble them.
- Do not start the engine for 2 hours after the installation.



20. INSTALL THERMOSTAT CASE

(a) Make sure that the O–ring is attached to the upper flange face of the water pump.

(b) Clean the cylinder head mounting surface of the thermostat case.

(c) Apply seal packing to the thermostat case and install it onto the cylinder head within 20 minutes.
Seal packing: Part No. 08826–00100 or equivalent
Coating width: 1.5 – 2.5 mm (0.059 – 0.098 in.)

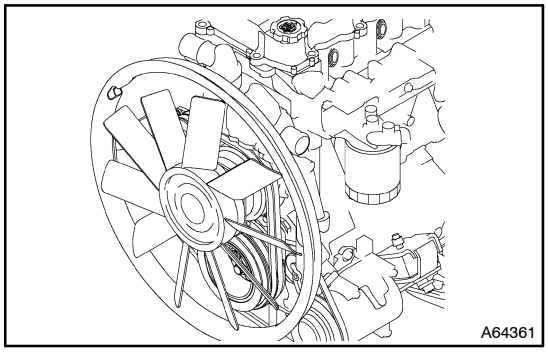
HINT:

- If more than 20 minutes have passed since the seal packing is applied, do not assemble the parts. After removing the seal packing completely, reapply it to assemble them.
- Do not start the engine for 2 hours after the installation.

(d) Tighten the 4 side ones of the thermostat case mounting bolts.
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

(e) Tighten the 2 upper ones of the water pump mounting bolts.
Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)

(f) Install the cooling line.

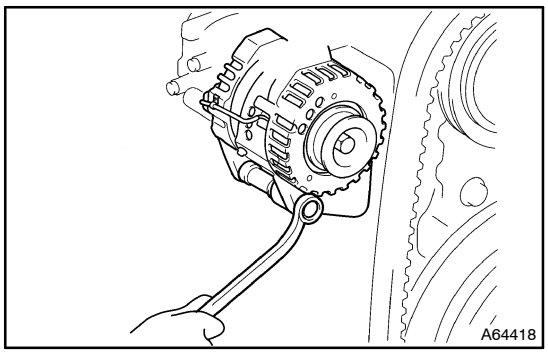


21. INSTALL FAN PULLEY

(a) Install the fan pulley and fan spacer.
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

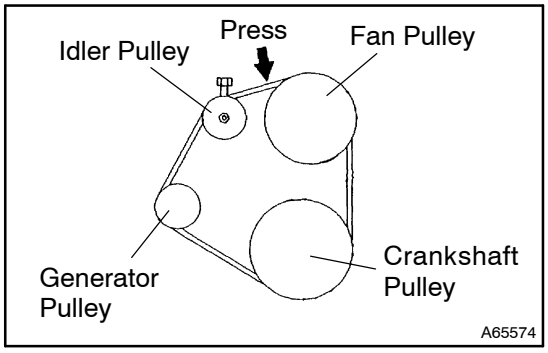
22. INSTALL FLUID COUPLING ASSY
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

23. INSTALL FAN
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



24. INSTALL GENERATOR AND V BELT

(a) Attach the generator provisionally, and install the V belt.



(b) Press the center point of the V belt with a load of approx. 98 N (10 kgf, 22 lb) and adjust the V belt deflection so that it should be within the standard value.

V belt deflection:

New belt	5.5 – 6.5 mm (0.217 – 0.256 in.)
Used belt	6.5 – 7.5 mm (0.256 – 0.295 in.)

Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

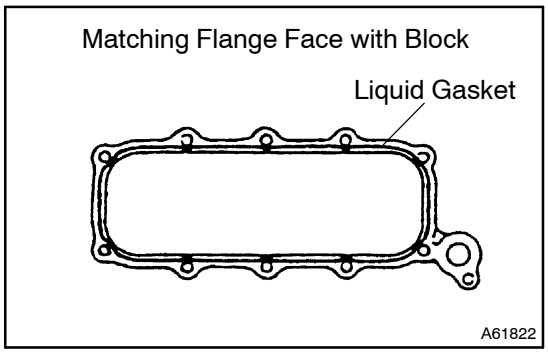
HINT:

- ”New belt” refers to a belt which has been used for less than 5 minutes on a running engine.
- ”Used belt” refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a new belt, run the engine for approx. 5 minutes and recheck the belt tension.

(c) Tighten the V belt adjusting bolt.

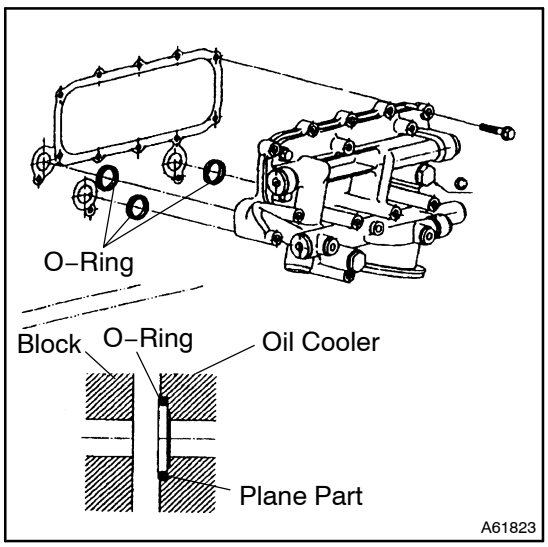
(d) Tighten the through bolt.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



25. INSTALL OIL COOLER ASSY

(a) Clean the cylinder block mounting surface of the oil cooler.



(b) Insert the O–ring into the O–ring groove of the oil cooler.

HINT:

Face the flat area of the O–ring toward the oil cooler for installation.

(c) Apply seal packing to the oil cooler housing and install it onto the cylinder block within 20 minutes.

Seal packing: Part No. 08826–00100 or equivalent

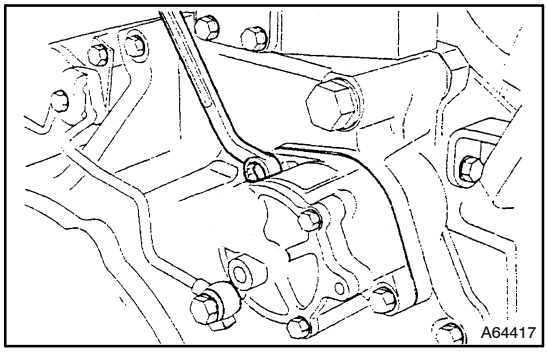
Coating width: 1.5 – 2.5 mm (0.059 – 0.098 in.)

HINT:

If more than 20 minutes have passed since the seal packing is applied, do not assemble the parts. After removing the seal packing completely, reapply it to assemble them.

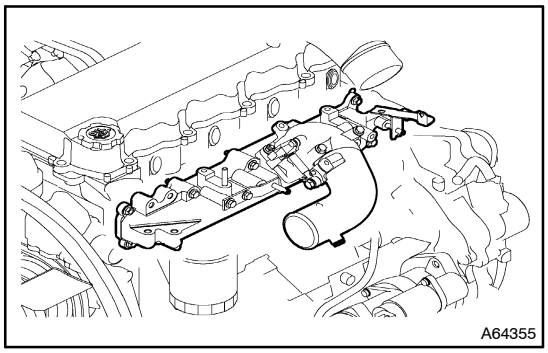
(d) Install the oil line.

26. INSTALL OIL FILTER SUB–ASSY (See page 17–45)



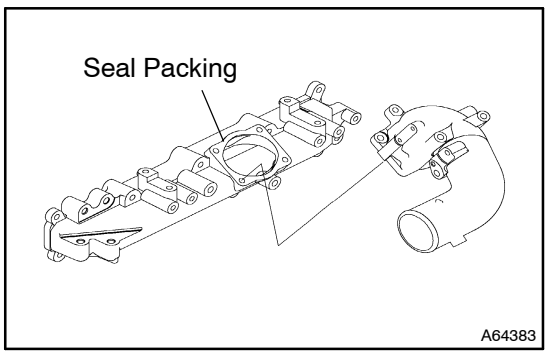
27. INSTALL VACUUM PUMP ASSY
Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)

28. INSTALL SUPPLY PUMP ASSY (See page 11–163)
29. INSTALL COMMON RAIL ASSY (See page 11–169)



30. INSTALL INTAKE MANIFOLD
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

HINT:
Be sure to use a new gasket.

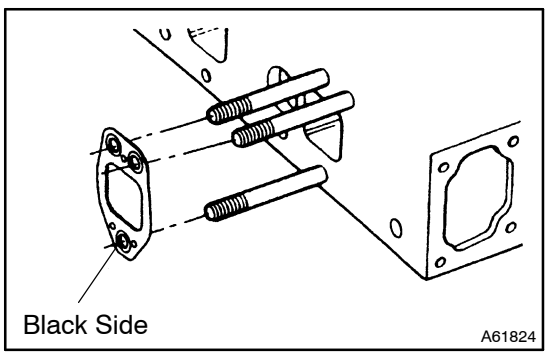


31. INSTALL INTAKE PIPE

(a) Clean the matching face of the intake manifold and intake pipe.

(b) Apply seal packing to the intake manifold and install it onto the intake manifold within 20 minutes.
Seal packing: Part No. 08826–00080 or equivalent
Coating width: 1.5 – 2.5 mm (0.059 – 0.098 in.)
Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)

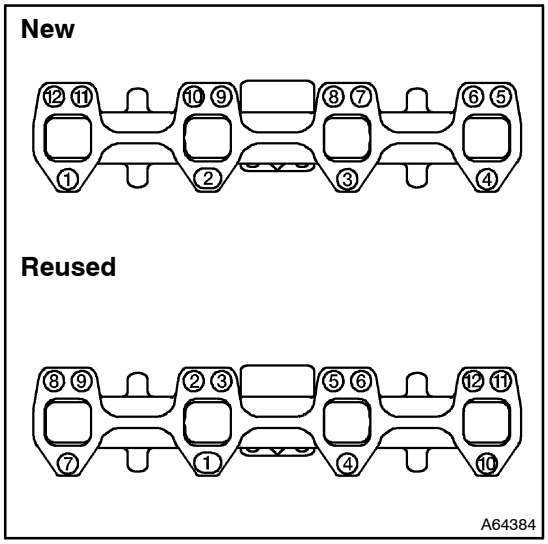
HINT:
If more than 20 minutes have passed since the seal packing is applied, do not assemble the parts. After removing the seal packing completely, reapply it to assemble them.



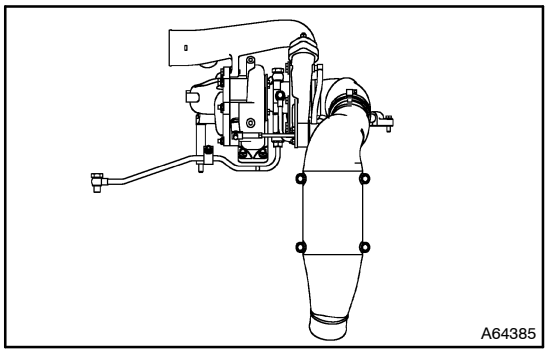
32. INSTALL EXHAUST MANIFOLD

(a) Install the exhaust manifold gasket so that the black side could face the exhaust manifold.

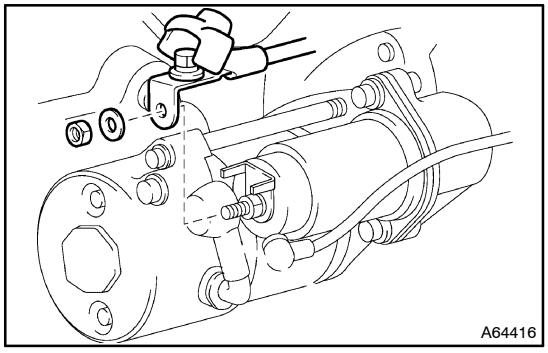
HINT:
Be sure to use new gaskets.



(b) Install the exhaust manifold onto the cylinder head and tighten the inner mounting nuts, in the order shown in the illustration.
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)
(c) Tighten the same nuts according to the same procedure again.
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)
HINT:
Be sure to carry out the tightening procedure in order.
(d) Install the insulators.



33. INSTALL TURBOCHARGER ASSY
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)
HINT:
Be sure to use new gaskets.



34. INSTALL STARTER ASSY
(a) Tighten the bolts and nuts.
Torque: 154 N·m (1,570 kgf·cm, 114 ft·lbf)
(b) Connect the harness at the alignment marks.
(c) Connect the battery cable.
Torque: 13.5 N·m (137 kgf·cm, 10 ft·lbf)

35. INSTALL ELECTRICAL WIRE ASSY