

N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

EM

REMOVAL

1. PRECAUTION

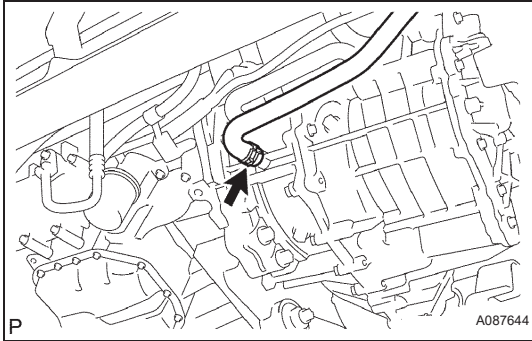
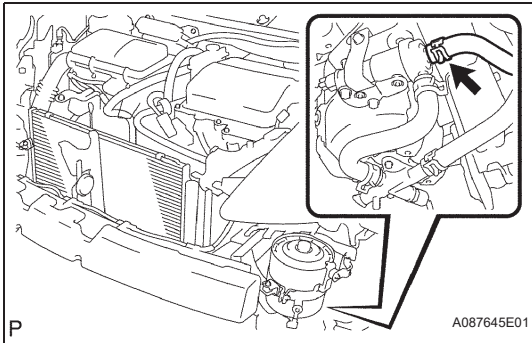
CAUTION:

The hybrid system uses high voltage circuits, so improper handling could cause an electric shock or leakage. During service (e.g. installing or removing the parts, inspection, replacing the parts), be sure to follow the procedures (see page [HV-519](#)).

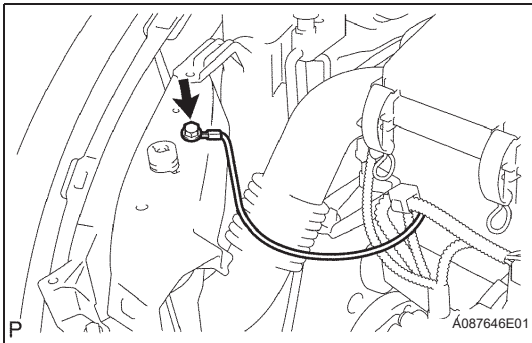
2. REMOVE NO. 2 REAR FLOOR BOARD (See page [CH-4](#))
3. REMOVE REAR DECK FLOOR BOX (See page [CH-4](#))
4. REMOVE NO. 3 REAR FLOOR BOARD (See page [CH-4](#))
5. DISCHARGE FUEL SYSTEM PRESSURE (See page [FU-12](#))
6. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
7. REMOVE SERVICE PLUG GRIP (See page [HB-154](#))
8. REMOVE FRONT WHEELS
9. REMOVE NO. 3 ENGINE UNDER COVER
10. REMOVE NO. 4 CENTER ENGINE UNDER COVER (See page [ET-3](#))
11. DRAIN ENGINE COOLANT (See page [CO-6](#))
12. DRAIN TRANSAXLE OIL (See page [HX-67](#))
13. REMOVE WIPER ARM HEAD CAP
14. REMOVE FRONT WIPER ARM LH (See page [WW-13](#))
15. REMOVE FRONT WIPER ARM RH (See page [WW-13](#))
16. REMOVE HOOD TO COWL TOP SEAL (See page [WW-13](#))
17. REMOVE COWL TOP VENTILATOR LOUVER LH (See page [WW-13](#))
18. REMOVE COWL TOP VENTILATOR LOUVER RH (See page [WW-13](#))
19. REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY (See page [WW-13](#))
20. REMOVE FRONT OUTER COWL TOP PANEL (See page [FU-12](#))
21. REMOVE INVERTER WITH CONVERTER ASSEMBLY
 - (a) Remove the inverter with converter from the vehicle (see page [HV-530](#)).

22. REMOVE NO. 2 RADIATOR ASSEMBLY

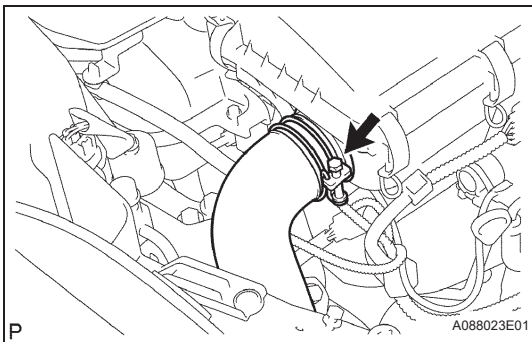
- (a) Remove the No. 2 radiator from the vehicle (see page [CO-33](#)).

**23. DISCONNECT NO. 3 INVERTER COOLING HOSE****24. DISCONNECT NO. 1 HEAT STORAGE WATER BY-PASS HOSE**

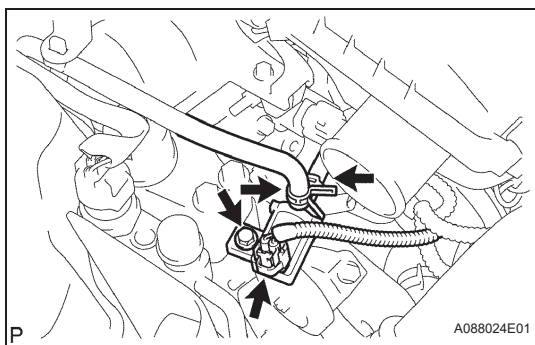
- (a) Disconnect the hose shown in the illustration.

**25. DISCONNECT ENGINE WIRE**

- (a) Remove the bolt, then disconnect the ground cable.

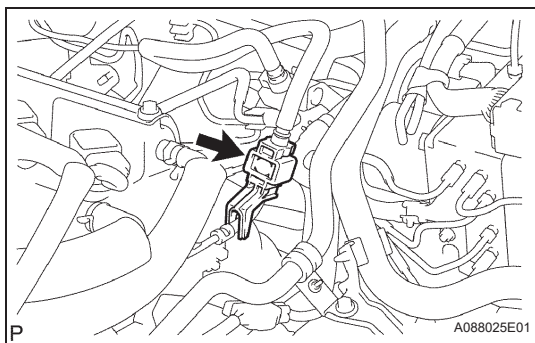
**26. SEPARATE NO. 1 AIR CLEANER INLET**

- (a) Loosen the clamp, then disconnect the air cleaner inlet No. 1 from the air cleaner case.



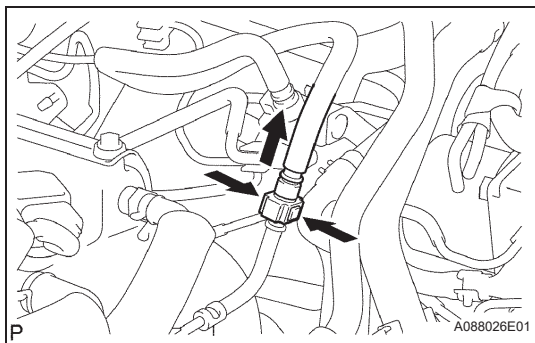
27. REMOVE PURGE VSV

- (a) Disconnect the connector and hose.
- (b) Remove the bolt, then remove the vacuum switching valve assembly.



28. DISCONNECT FUEL TUBE

- (a) Remove the fuel pipe clamp.

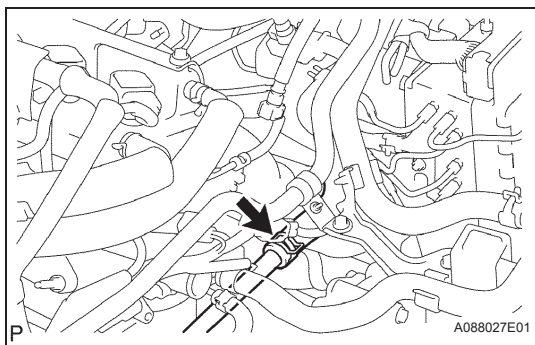


- (b) Disconnect the fuel tube from the fuel delivery pipe.

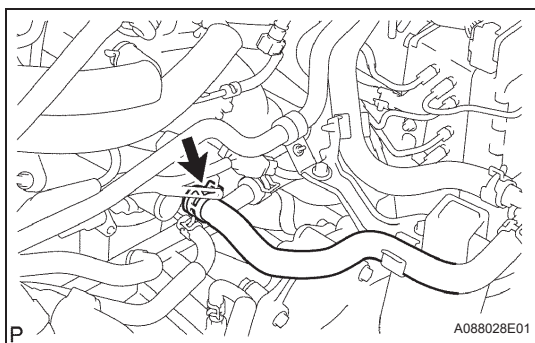
NOTICE:

Even if the fuel tube is stuck and cannot be disconnected, do not use any tools. Push and pull the part with the quick connector pinched to disconnect the tube.

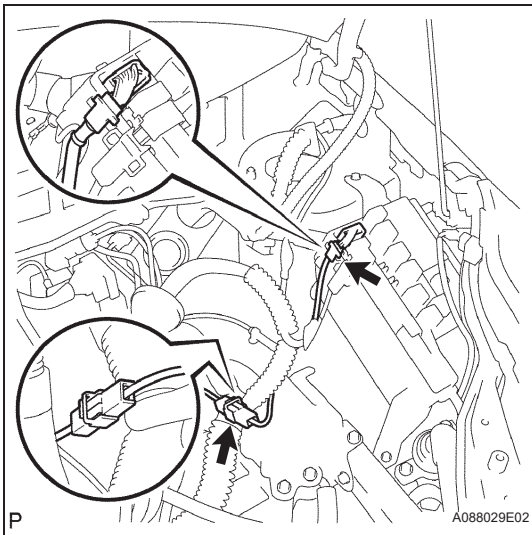
- (c) Cover the disconnected fuel tube and fuel delivery pipe with plastic bags in order to prevent foreign objects from entering them.



29. DISCONNECT HEATER WATER HOSE



30. DISCONNECT NO. 3 HEAT STORAGE WATER BY-PASS HOSE



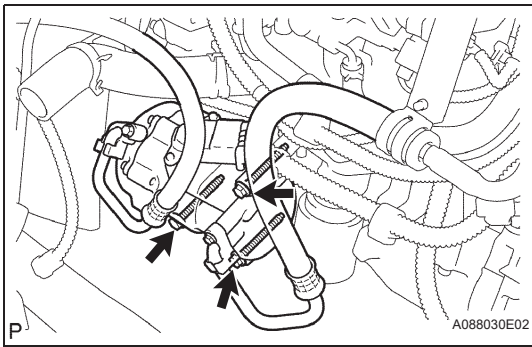
31. DISCONNECT ENGINE WIRE

- (a) Disconnect the connector from the ECM, then pull the engine wire harness to the engine compartment side.

NOTICE:

Do not forcibly pull the engine wire harness to the engine compartment side.

- (b) Disconnect the harness and harness clamp from the engine room main relay block.
- (c) Disconnect the ground cable.

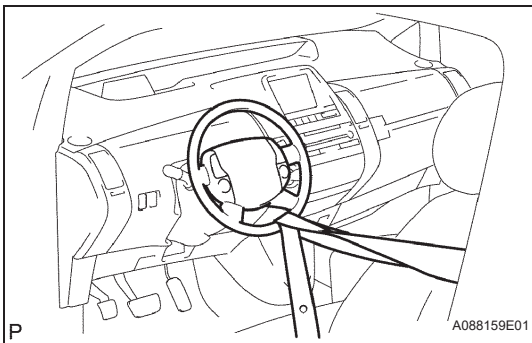


32. DISCONNECT HEATER COMPRESSOR WITH MOTOR ASSEMBLY

- (a) Disconnect the wire harness of the compressor assembly from the harness clamp.
- (b) Remove the 3 bolts, then disconnect the compressor assembly.

HINT:

Disconnect the compressor assembly together with the low-pressure and high-pressure hoses, then secure it to the vehicle side with rope.

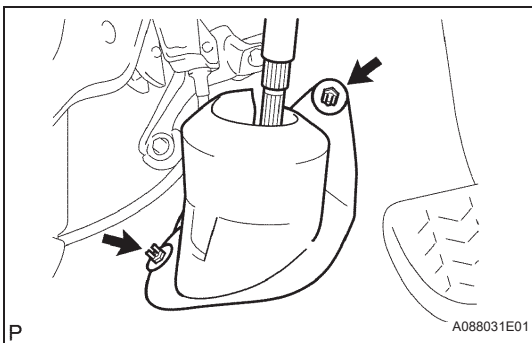


33. DISCONNECT STEERING SLIDING YOKE

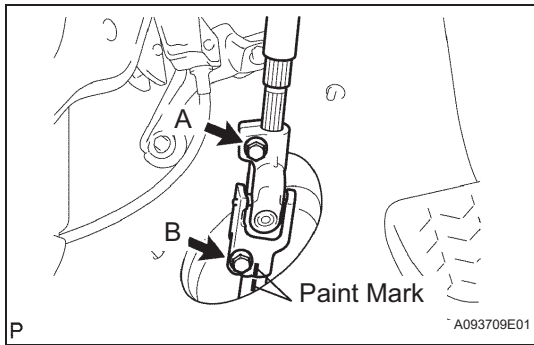
- (a) Install the seat belt as illustrated so that the steering wheel does not turn.

HINT:

This prevents an open circuit of the spiral cable.



- (b) Remove the 2 clips, then remove the column hole cover silencer sheet.



- (c) Loosen the bolt on the column side (A) of the sliding yoke.
- (d) Remove the bolt on the gear side (B) of the sliding yoke.
- (e) Put paint marks on the sliding yoke and intermediate shaft, and then disconnect the sliding yoke.

34. REMOVE FRONT EXHAUST PIPE (See page EX-2)

35. REMOVE FRONT AXLE HUB NUT LH (See page DS-5)

36. REMOVE FRONT AXLE HUB NUT RH

HINT:

Use the same procedures described for the LH side.

37. DISCONNECT FRONT STABILIZER LINK LH (See page SP-28)

38. DISCONNECT TIE ROD END LH (See page DS-6)

39. DISCONNECT TIE ROD END RH

HINT:

Use the same procedures described for the LH side.

40. DISCONNECT NO. 1 FRONT SUSPENSION ARM LOWER LH (See page DS-6)

41. DISCONNECT NO. 1 FRONT SUSPENSION ARM LOWER RH

HINT:

Use the same procedures described for the LH side.

42. DISCONNECT FRONT AXLE HUB LH (See page DS-6)

43. DISCONNECT FRONT AXLE HUB RH

HINT:

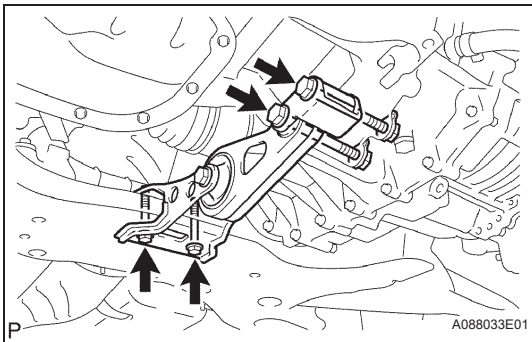
Use the same procedures described for the LH side.

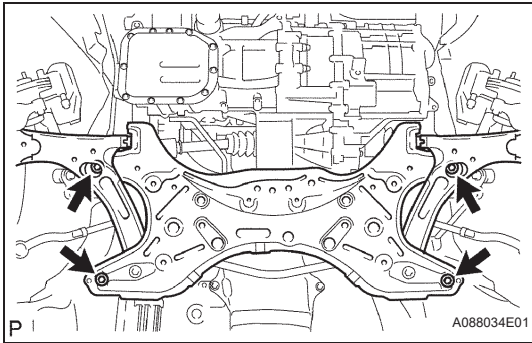
44. REMOVE FRONT DRIVE SHAFT LH (See page DS-7)

45. REMOVE FRONT DRIVE SHAFT RH (See page DS-7)

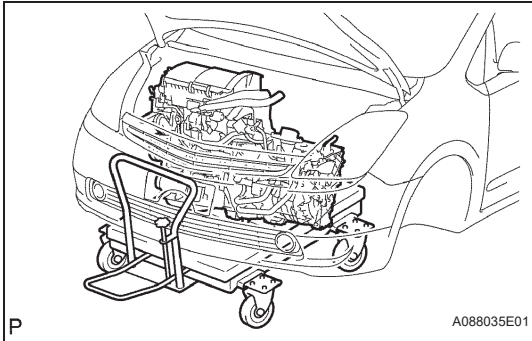
46. REMOVE FRONT SUSPENSION CROSSMEMBER

- (a) Remove the 4 bolts and 2 nuts, then remove the engine moving control rod with bracket.



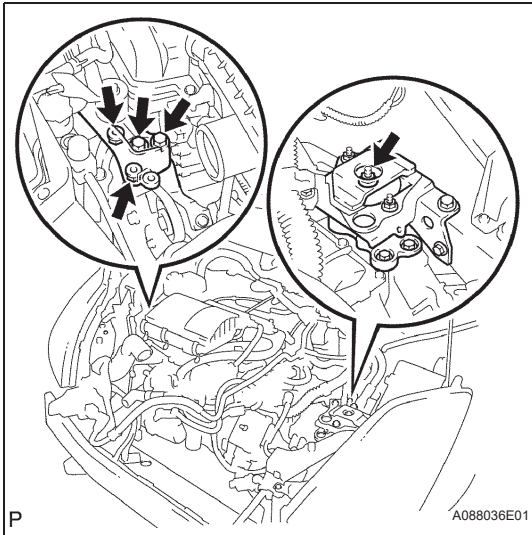


- (b) Remove the 4 bolts, then remove the front suspension crossmember with power steering gear assembly.

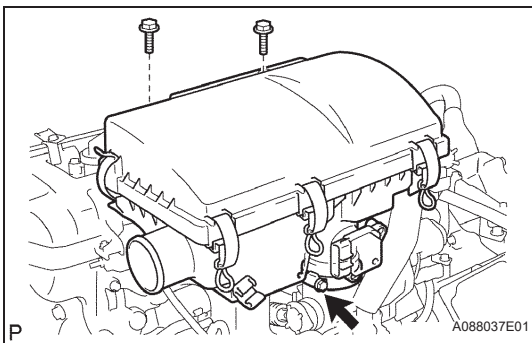


47. REMOVE ENGINE AND TRANSAXLE

- (a) Set the engine lifter as illustrated.

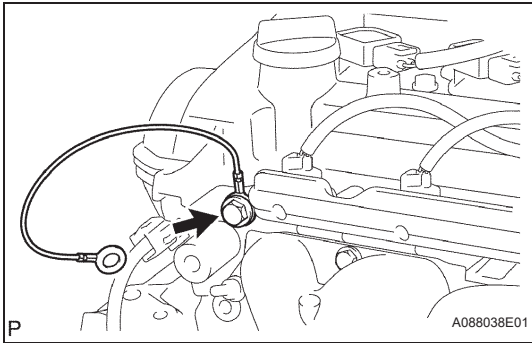


- (b) Remove the 2 bolts and 2 nuts, then disconnect the engine mounting bracket RH and engine mounting insulator RH.
- (c) Remove the nut, then disconnect the engine mounting insulator bracket LH and engine mounting insulator LH.
- (d) Operate the engine lifter, then remove the engine assembly with transaxle from the vehicle.



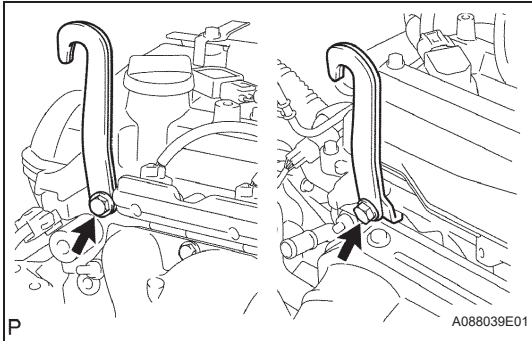
48. REMOVE AIR CLEANER ASSEMBLY

- (a) Disconnect the intake air flow meter connector and wire harness clamp.
- (b) Loosen the clamp, then remove the 2 bolts and air cleaner assembly.



49. REMOVE HYBRID VEHICLE TRANSAXLE ASSEMBLY

- (a) Remove the bolt and ground cable.



- (b) Install the engine hangers to the engine assembly with 2 new bolts as shown in the illustration.

Torque: 40 N*m (408 kgf*cm, 30 in.*lbf)

NOTICE:

Be sure to use new bolts to install the engine hangers.

HINT:

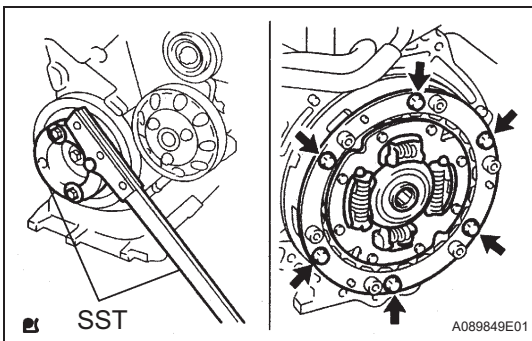
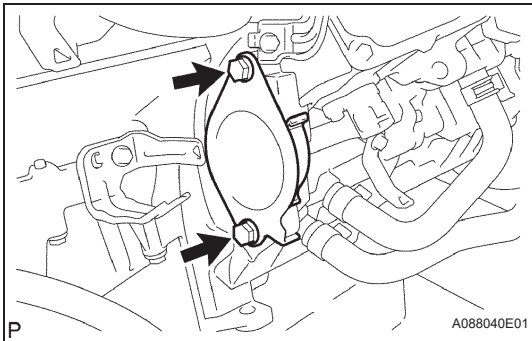
- Engine hanger 12281-21010
- Bolt 91642-81052

- (c) Using a chain block and engine sling device, hold the engine assembly with transaxle.

- (d) Remove the engine wire harness from the engine assembly with transaxle.

- (e) Remove the 2 bolts, then remove the starter hole insulator and flywheel housing side cover.

- (f) Remove the hybrid vehicle transaxle assembly from the engine assembly (see page [HX-66](#)).

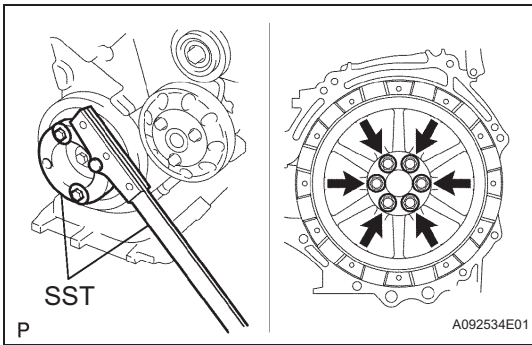


50. REMOVE TRANSMISSION INPUT DAMPER

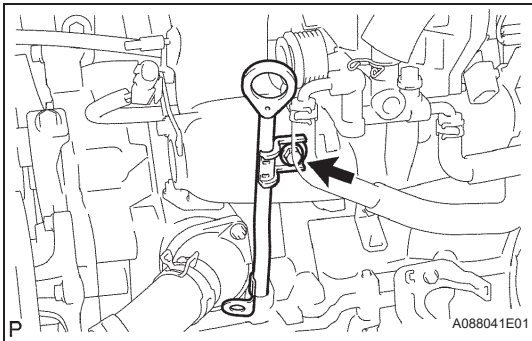
- (a) Using SST, hold the crankshaft.

SST 09213-58013 (91111-50845), 09330-00021

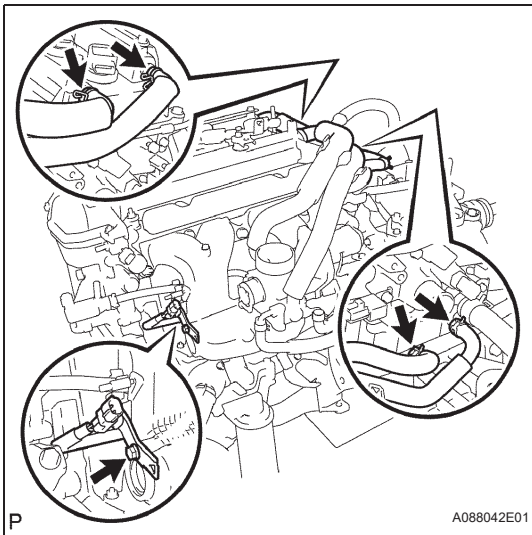
- (b) Remove the 6 bolts, then remove the input damper and input damper cover.

**51. REMOVE FLYWHEEL**

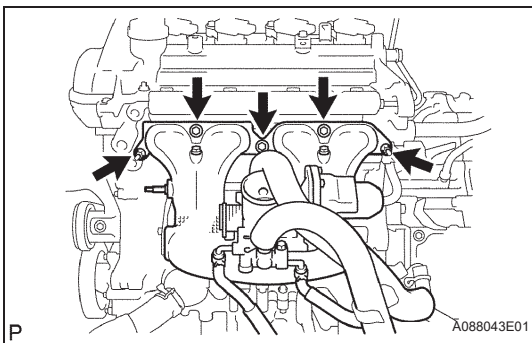
- (a) Using SST, hold the crankshaft.
SST 09213-58013 (91111-50845), 09330-00021
- (b) Remove the 6 bolts and flywheel.

**52. REMOVE OIL DIPSTICK GUIDE**

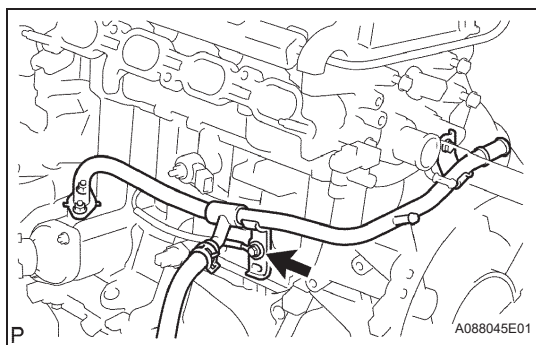
- (a) Remove the dipstick.
- (b) Remove the bolt and dipstick guide.

**53. REMOVE INTAKE MANIFOLD**

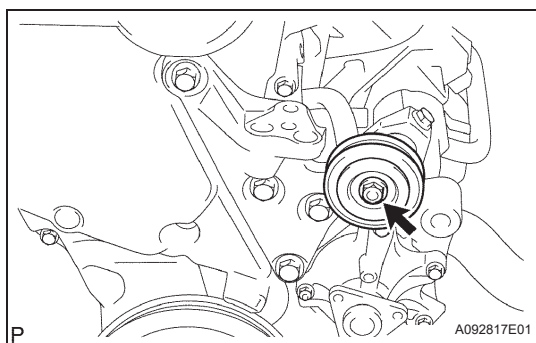
- (a) Remove the bolt and knock control sensor with bracket.
- (b) Disconnect the wiring harness from the bracket.
- (c) Disconnect the ventilation hose.
- (d) Disconnect the water by-pass hose.



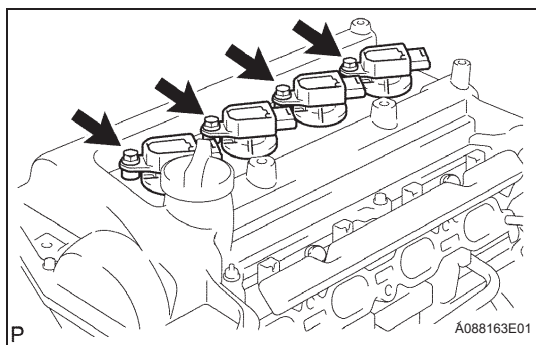
- (e) Remove the 3 bolts and 2 nuts, then remove the intake manifold and gasket.

**54. REMOVE NO. 1 WATER BY-PASS PIPE**

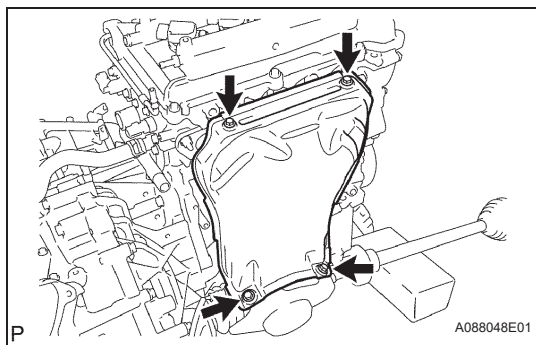
- (a) Remove the bolt, then disconnect the wire harness.
- (b) Remove the 2 nuts and bolt, then remove the water by-pass pipe No. 1 and gasket.

55. REMOVE KNOCK SENSOR (See page ES-459)**56. REMOVE ENGINE OIL PRESSURE SWITCH (See page LU-1)****57. REMOVE DRIVE BELT (See page EM-6)****58. REMOVE IDLER PULLEY**

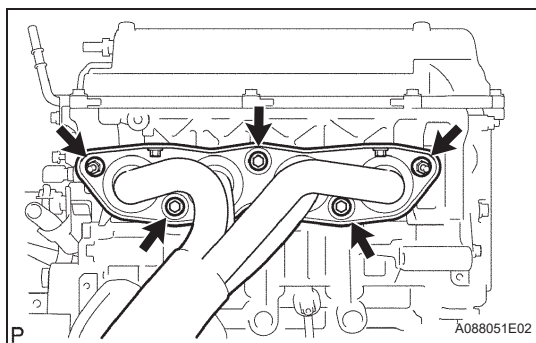
- (a) Remove the nut, then remove the idle pulley assembly from the engine mounting bracket RH.

**59. REMOVE IGNITION COIL**

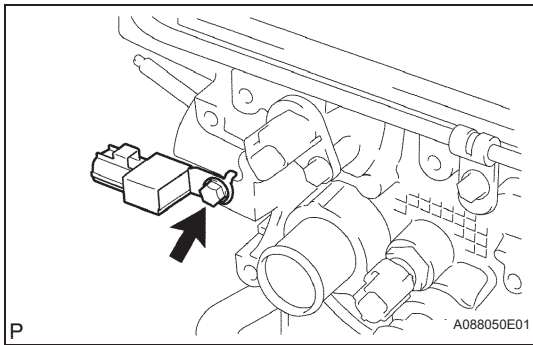
- (a) Remove the 4 bolts and 4 ignition coils.

**60. REMOVE EXHAUST MANIFOLD**

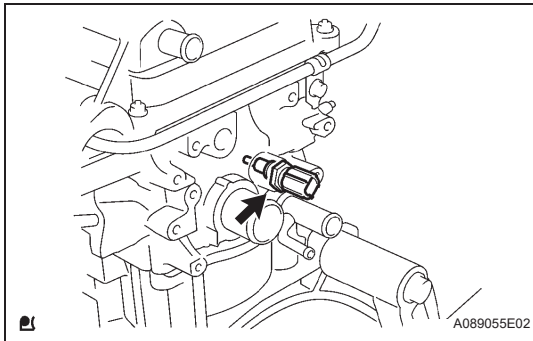
- (a) Remove the 4 bolts and exhaust manifold insulator.



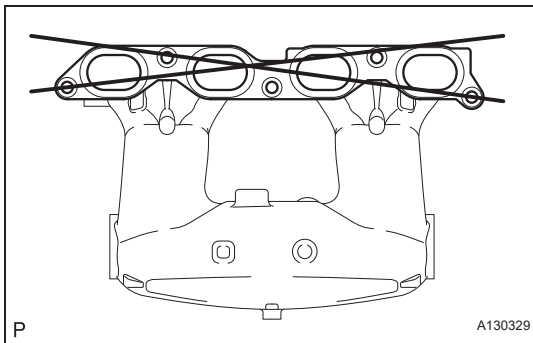
- (b) Remove the 3 bolts and 2 nuts, then remove the exhaust manifold.

**61. REMOVE NOISE FILTER**

- (a) Remove the bolt and noise filter.

**62. REMOVE ENGINE COOLANT TEMPERATURE SENSOR**

- (a) Using a 19 mm deep socket wrench, remove the engine coolant temperature sensor.

**INSPECTION****1. INSPECT INTAKE MANIFOLD**

- (a) Using a precision straightedge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

0.10 mm (0.004 in.)

Using a precision straightedge and feeler gauge, measure the surface contacting the cylinder head for warpage.

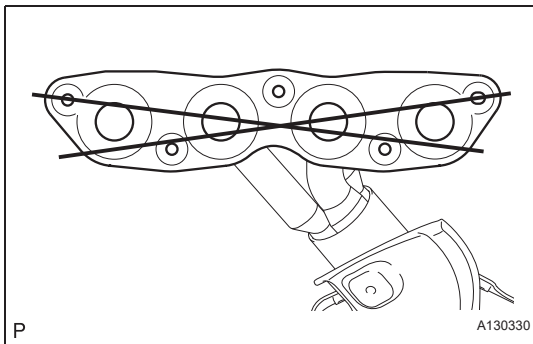
2. INSPECT EXHAUST MANIFOLD

- (a) Using a precision straightedge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

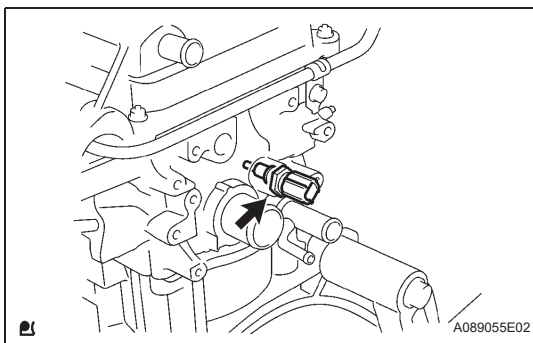
0.70 mm (0.028 in.)

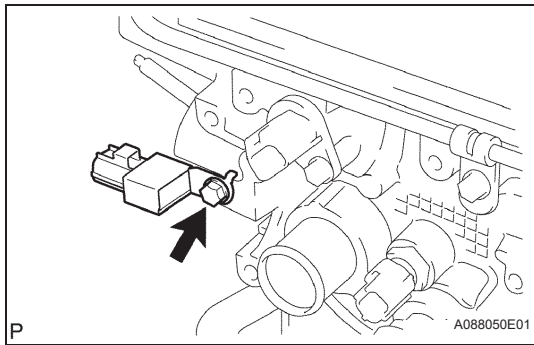
If the warpage is greater than the maximum, replace the manifold.

**INSTALLATION****1. INSTALL ENGINE COOLANT TEMPERATURE SENSOR**

- (a) Install a new gasket, then install the engine coolant temperature sensor.

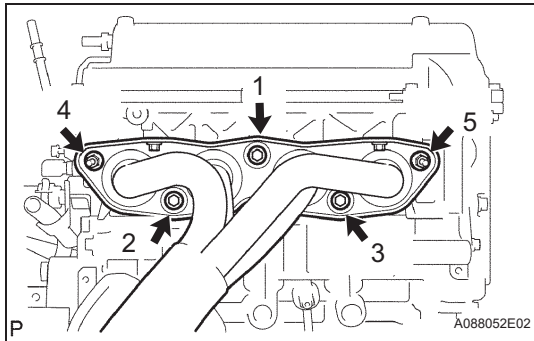
Torque: 20 N*m (204 kgf*cm, 15 in.*lbf)





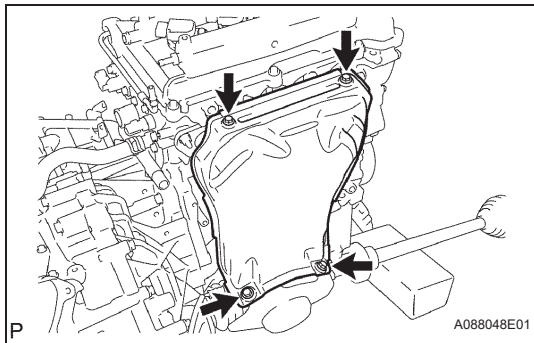
2. INSTALL NOISE FILTER

- (a) Install the noise filter with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

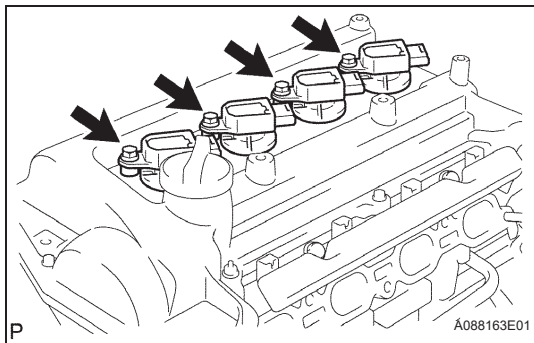


3. INSTALL EXHAUST MANIFOLD

- (a) Install a new gasket, then install the exhaust manifold.
 (b) Tighten the 3 bolts and 2 nuts in the sequence shown in the illustration.
Torque: 27 N*m (275 kgf*cm, 20 in.*lbf)

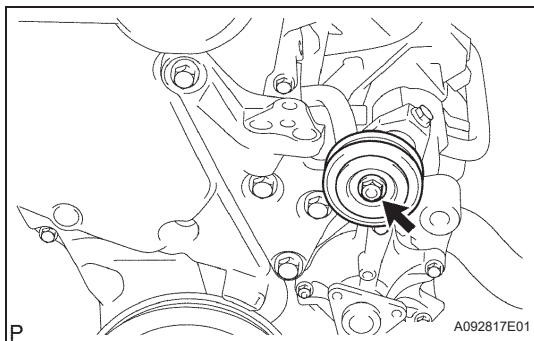


- (c) Install the exhaust manifold insulator with the 4 bolts.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)



4. INSTALL IGNITION COIL

- (a) Install the ignition coil with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



5. INSTALL IDLER PULLEY

- (a) Temporarily install the idler pulley assembly to the engine mounting bracket RH with the nut.
HINT:
 Tighten the nut to the specified torque when installing the drive belt.

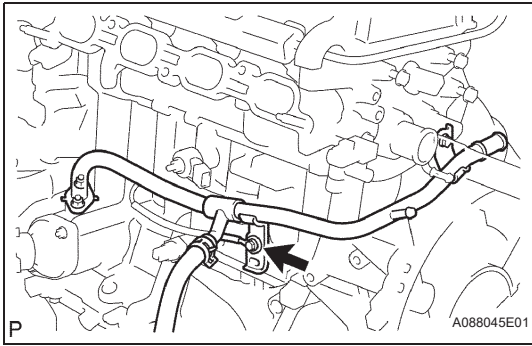
6. INSTALL DRIVE BELT (See page [EM-6](#))

7. INSTALL ENGINE OIL PRESSURE SWITCH (See page [LU-1](#))

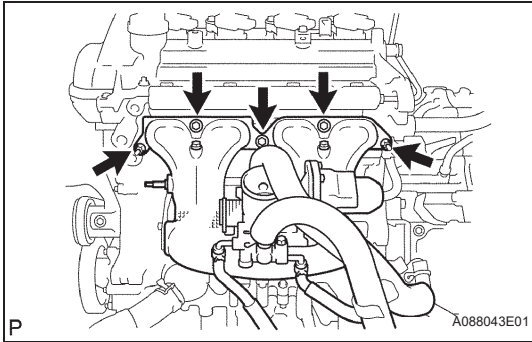
8. INSTALL KNOCK SENSOR (See page ES-460)**9. INSTALL NO. 1 WATER BY-PASS PIPE**

- (a) Install a new gasket, then install the water by-pass pipe with the bolt and 2 nuts.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

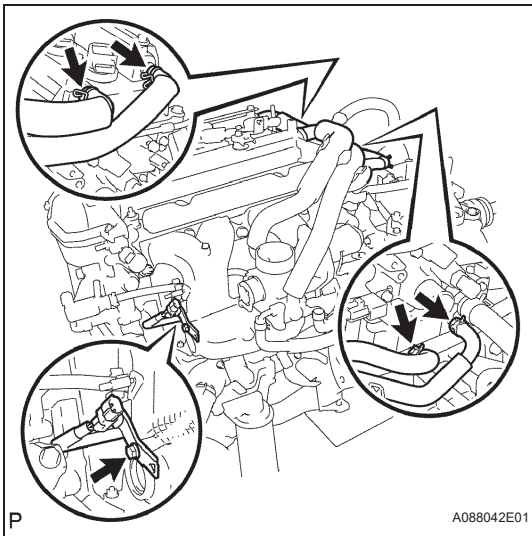
**10. INSTALL INTAKE MANIFOLD**

- (a) Install a new gasket, then install the intake manifold with the 3 bolts and 2 nuts.



- (b) Connect the water by-pass hose.
 (c) Connect the ventilation hose.
 (d) Install the knock control sensor with bracket with the bolt.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

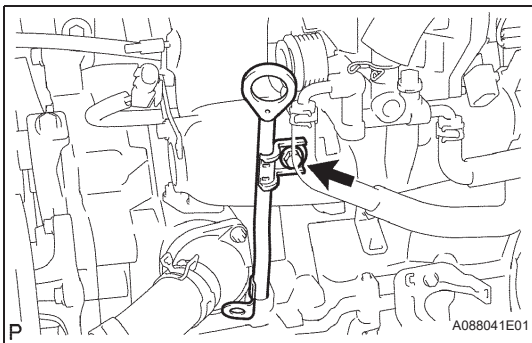
**11. INSTALL OIL DIPSTICK GUIDE**

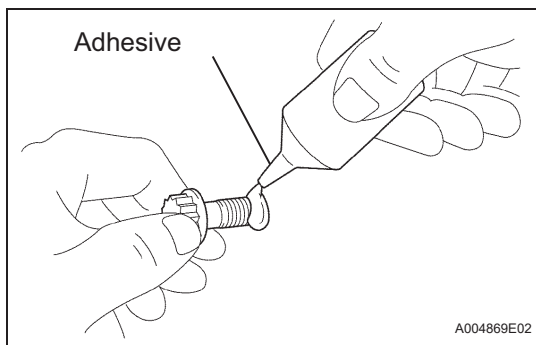
- (a) Apply engine oil to a new O-ring, then install it to the dipstick guide.

- (b) Install the dipstick guide with the bolt.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

- (c) Install the dipstick.





12. INSTALL FLYWHEEL

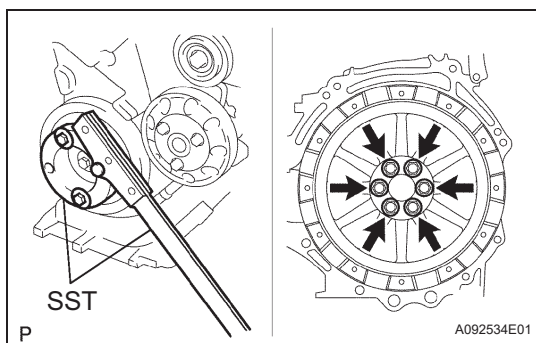
- (a) Apply adhesive to 2 or 3 threads of the bolt end.

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or Equivalent

NOTICE:

Remove any oil from the bolts and bolt holes.



- (b) Using SST, hold the crankshaft.

SST 09213-58013 (91111-50845), 09330-00021

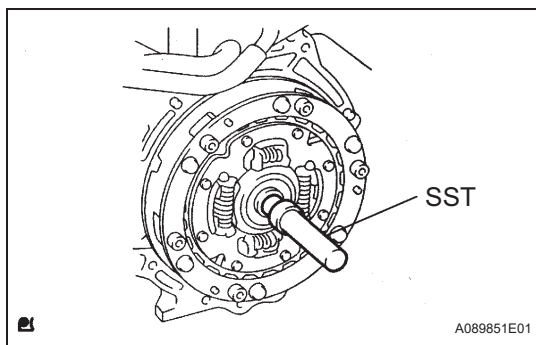
- (c) Install the flywheel with 6 new bolts.

Torque: 49 N*m (500 kgf*cm, 36 in.*lbf)

- (d) After tightening the new bolts to the specified torque, tighten each bolt by an additional 90°.

NOTICE:

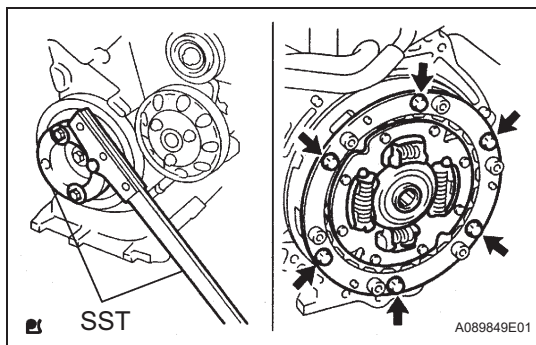
Do not start the engine within 1 hour of installation.



13. INSTALL TRANSMISSION INPUT DAMPER

- (a) Using SST, align the hole of the input damper. Then temporarily tighten the input damper cover with the 6 bolts.

SST 09301-00210



- (b) Using SST, hold the crankshaft.

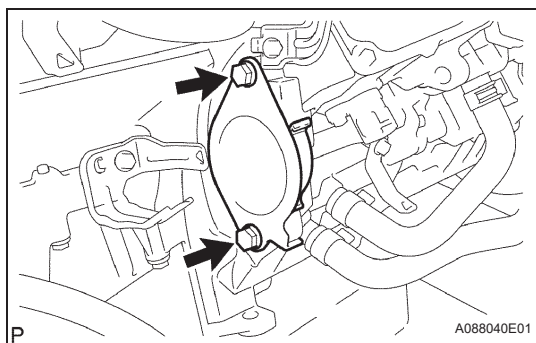
SST 09213-58013 (91111-50845), 09330-00021

- (c) Tighten the 6 bolts.

Torque: 20 N*m (204 kgf*cm, 15 in.*lbf)

14. INSTALL HYBRID VEHICLE TRANSAXLE ASSEMBLY

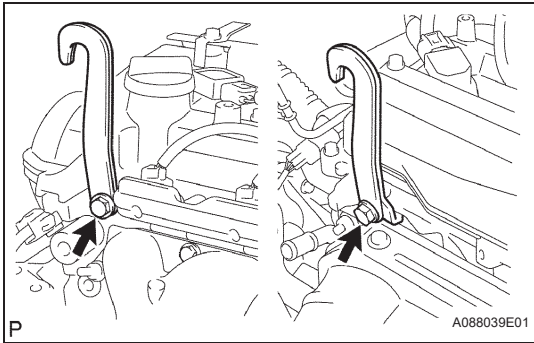
- (a) Install the hybrid vehicle transaxle assembly to the engine assembly with the 6 bolts (see page [HX-70](#)).



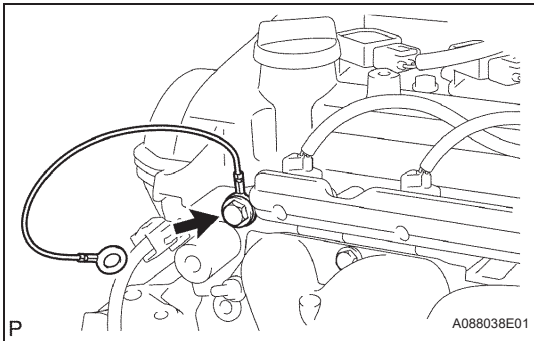
- (b) Install the flywheel housing side cover and starter hole insulator with the 2 bolts.

Torque: 32 N*m (326 kgf*cm, 24 in.*lbf)

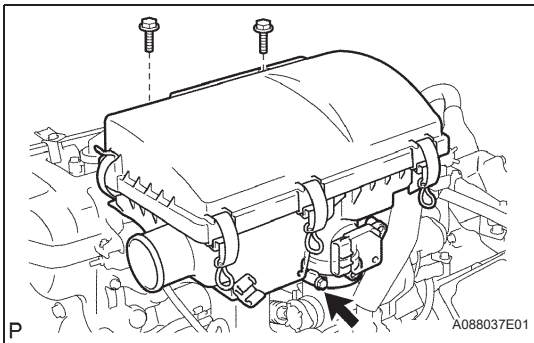
- (c) Install the engine wire harness to the engine assembly with transaxle.



(d) Remove the bolts and engine hangers.



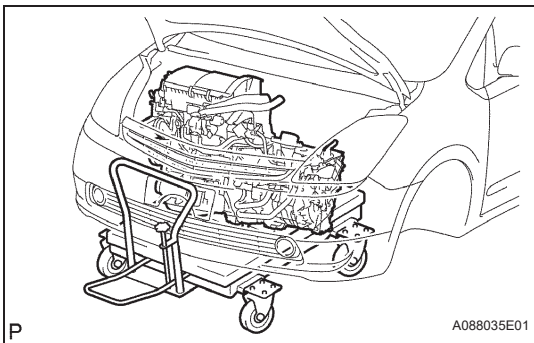
(e) Install the ground cable with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



15. INSTALL AIR CLEANER ASSEMBLY

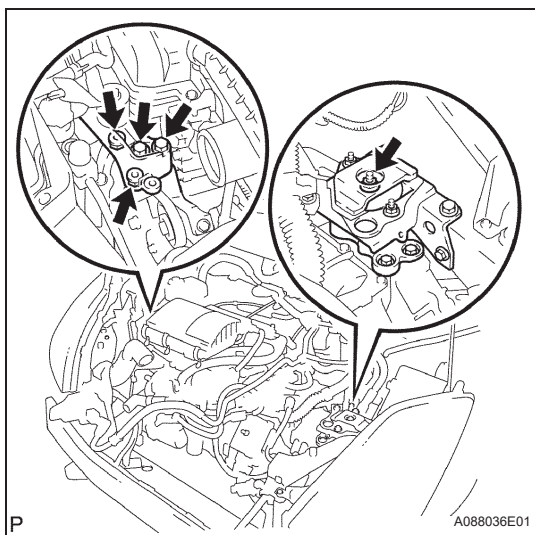
(a) Install the air cleaner with the 2 bolts and tighten the clamp.

Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf) for bolt
3.0 N*m (31 kgf*cm, 27 in.*lbf) for clamp



16. INSTALL ENGINE AND TRANSAXLE

(a) Set the engine lifter as illustrated.
(b) Operate the engine lifter, then install the engine assembly with transaxle to the vehicle.



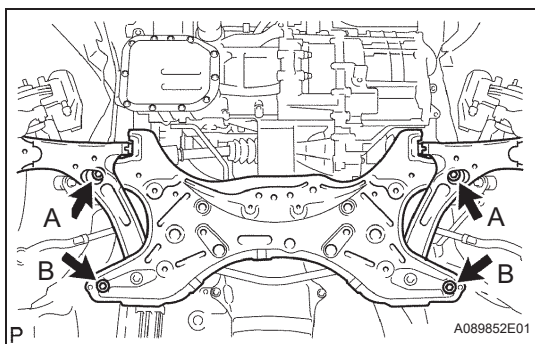
- (c) Connect the engine mounting bracket RH and engine mounting insulator RH with the 2 bolts and 2 nuts.

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

- (d) Connect the engine mounting insulator bracket LH and engine mounting insulator LH with the nut.

Torque: 80 N*m (816 kgf*cm, 59 in.*lbf)

EM

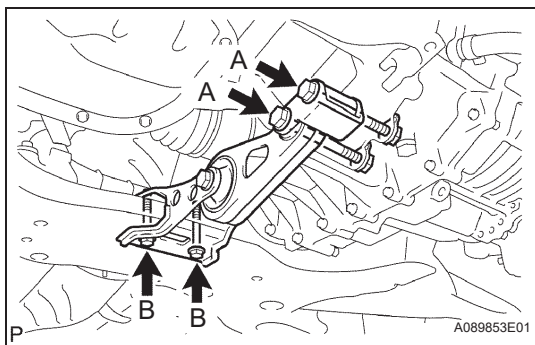


17. INSTALL FRONT SUSPENSION CROSSMEMBER

- (a) Install the front suspension crossmember with power steering gear assembly with the 4 bolts.

Torque: 113 N*m (1,152 kgf*cm, 83 in.*lbf) for bolt A

157 N*m (1,602 kgf*cm, 116 in.*lbf) for bolt B



- (b) Install the engine moving control rod with bracket with the 4 bolts and 2 nuts.

Torque: 100 N*m (1020 kgf*cm, 74 in.*lbf) for bolt A

56 N*m (571 kgf*cm, 41 in.*lbf) for bolt B

18. INSTALL FRONT DRIVE SHAFT LH (See page [DS-15](#))

19. INSTALL FRONT DRIVE SHAFT RH (See page [DS-15](#))

20. INSTALL FRONT AXLE HUB LH (See page [DS-15](#))

21. INSTALL FRONT AXLE HUB RH

HINT:

Use the same procedures described for the LH side.

22. INSTALL NO. 1 FRONT SUSPENSION ARM LOWER LH (See page [SP-20](#))

23. INSTALL NO. 1 FRONT SUSPENSION ARM LOWER RH

HINT:

Use the same procedures described for the LH side.

24. CONNECT TIE ROD END LH (See page [DS-16](#))

25. CONNECT TIE ROD END RH

HINT:

Use the same procedures described for the LH side.

26. CONNECT FRONT STABILIZER LINK LH (See page [SP-29](#))

27. INSTALL FRONT AXLE HUB NUT LH (See page DS-16)

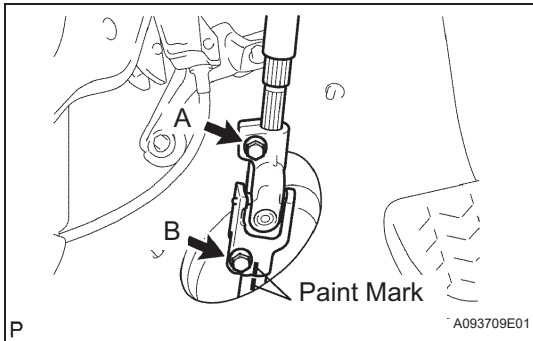
28. INSTALL FRONT AXLE HUB NUT RH

HINT:

Use the same procedures described for the LH side.

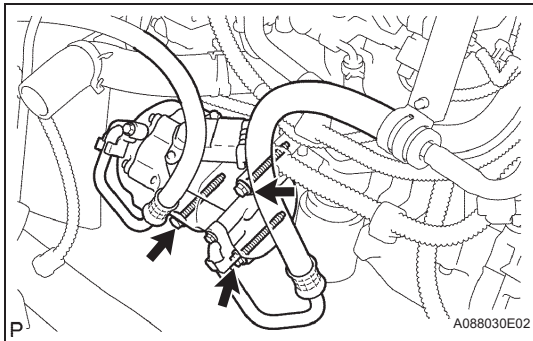
29. CONNECT STEERING SLIDING YOKE

- Align the paint marks, then connect the steering sliding yoke with the bolt.
Torque: 35 N*m (357 kgf*cm, 26 in.*lbf)
- Install the column hole cover silencer sheet with the 2 clips.
- Remove the seat belt from the steering wheel.



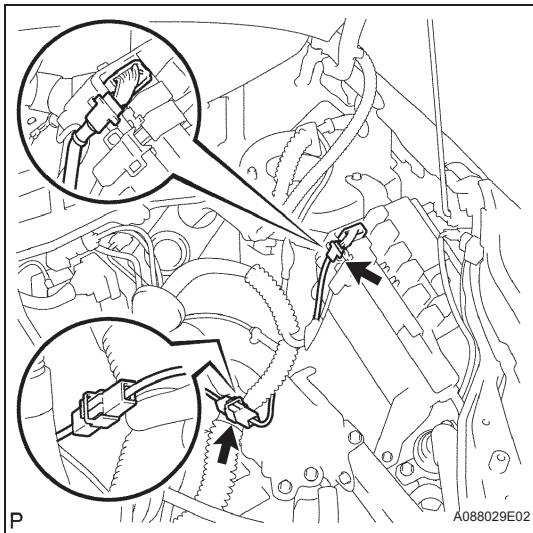
30. CONNECT COOLER COMPRESSOR WITH MOTOR ASSEMBLY

- Install the cooler compressor with the 3 bolts.
Torque: 25 N*m (255 kgf*cm, 18 in.*lbf)



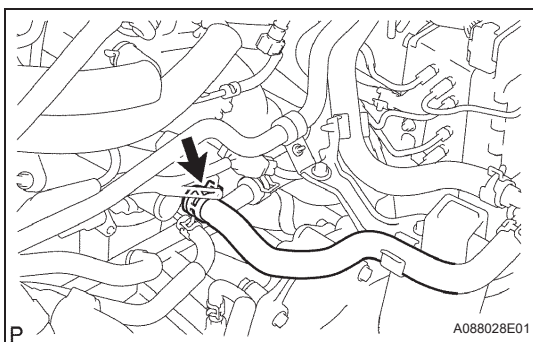
31. CONNECT ENGINE WIRE

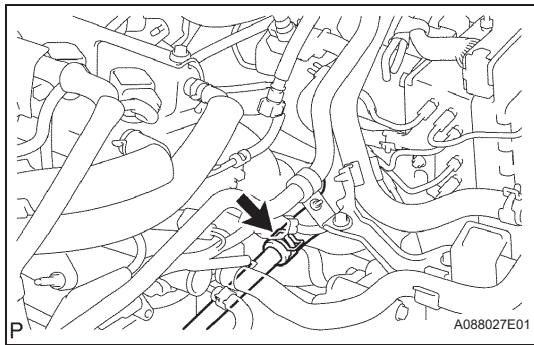
- Connect the ground cable.
- Connect the harness and clamp to the engine room main relay block.
- Push in the engine wire harness, and then connect the wire harness to the ECM.



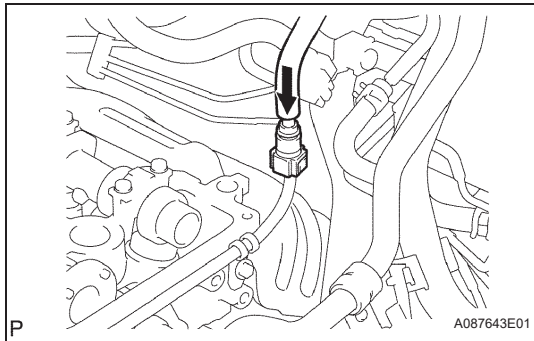
32. CONNECT NO. 3 HEAT STORAGE WATER BY-PASS HOSE

- Connect the No. 3 heat storage water by-pass hose.





33. CONNECT HEATER WATER HOSE

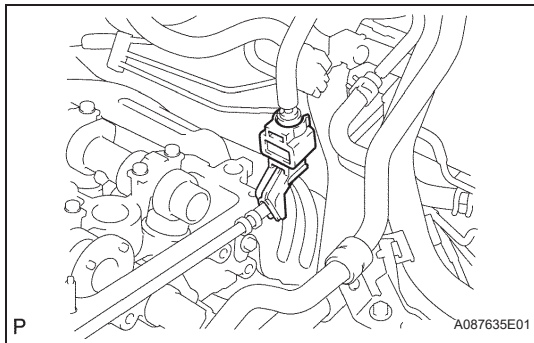


34. CONNECT FUEL TUBE

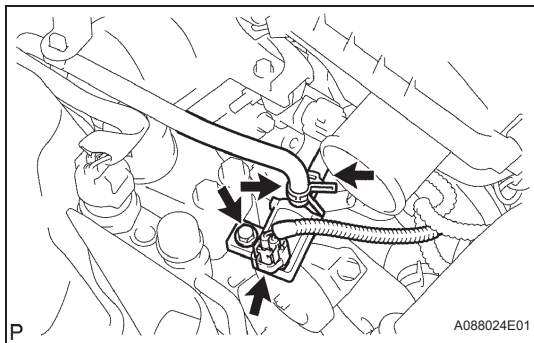
- (a) Push the fuel tube into the fuel delivery pipe until it makes a "click" sound.

HINT:

- If the fuel tube is connected too tightly, apply a light coat of engine oil to the tip of the fuel delivery pipe.
- After connecting, check that the fuel tube is securely connected by pulling it.

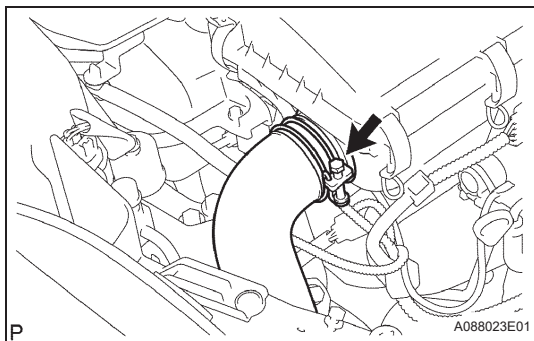


- (b) Install the fuel pipe clamp.



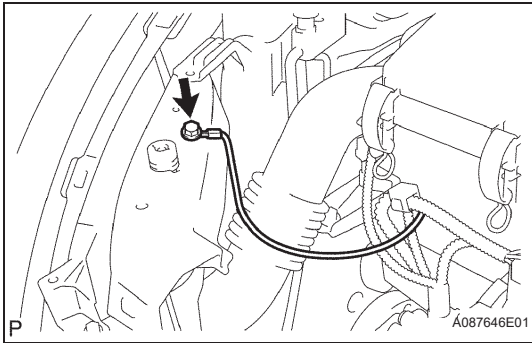
35. INSTALL PURGE VSV

- (a) Install the purge VSV with the bolt.
Torque: 7.5 N*m (76 kgf*cm, 5.5 in.*lbf)
- (b) Connect the hose and connector.

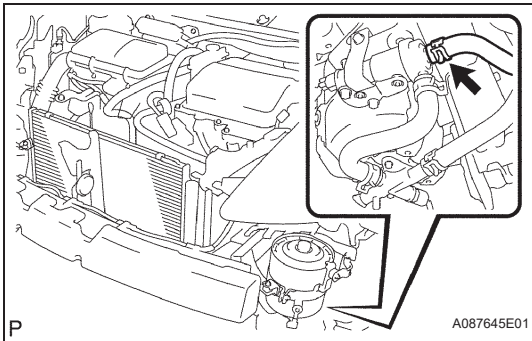


36. CONNECT NO. 1 AIR CLEANER INLET

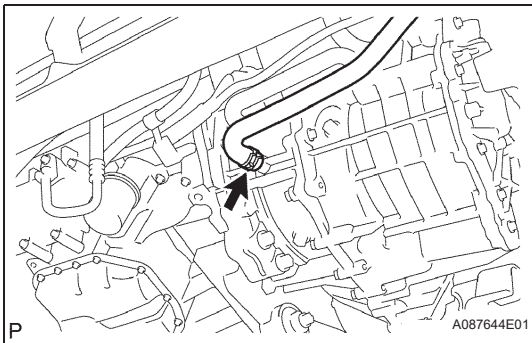
- (a) Connect the No. 1 air cleaner inlet to the air cleaner case, and then tighten the clamp.
Torque: 3.0 N*m (31 kgf*cm, 27 in.*lbf)

**37. CONNECT ENGINE WIRE**

- (a) Connect the ground cable with the bolt.

**38. CONNECT NO. 1 HEAT STORAGE WATER BY-PASS HOSE**

- (a) Connect the hose as shown in the illustration.

**39. CONNECT NO. 3 INVERTER COOLING HOSE****40. INSTALL NO. 2 RADIATOR ASSEMBLY**

- (a) Install the radiator to the vehicle (see page [CO-34](#)).

41. INSTALL INVERTER WITH CONVERTER ASSEMBLY

- (a) Install the inverter with converter to the vehicle (see page [HV-535](#)).

42. INSTALL FRONT COWL TOP PANEL OUTER (See page [FU-19](#))**43. INSTALL WINDSHIELD WIPER LINK AND WIPER MOTOR ASSEMBLY (See page [WW-16](#))****44. INSTALL COWL TOP VENTILATOR LOUVER RH****45. INSTALL COWL TOP VENTILATOR LOUVER LH****46. INSTALL HOOD TO COWL TOP SEAL****47. INSTALL FRONT WIPER ARM LH (See page [WW-16](#))****48. INSTALL FRONT WIPER ARM RH (See page [WW-16](#))****49. INSTALL WIPER ARM HEAD CAP****50. ADD TRANSAXLE OIL (See page [HX-74](#))****51. INSTALL SERVICE PLUG GRIP (See page [HB-154](#))****52. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL (See page [CH-7](#))****53. INSTALL NO. 3 REAR FLOOR BOARD (See page [CH-8](#))****54. INSTALL REAR DECK FLOOR BOX (See page [CH-8](#))**

55. INSTALL NO. 2 REAR FLOOR BOARD (See page [CH-8](#))
56. ADD ENGINE COOLANT (See page [CO-7](#))
57. CHECK FOR TRANSAXLE FLUID LEVEL (See page [HX-74](#))
58. CHECK FOR ENGINE COOLANT LEAKS (See page [CO-2](#))
59. CHECK FOR FUEL LEAKAGE (See page [CO-2](#))
60. CHECK FOR ENGINE OIL LEAKS
61. INSTALL FRONT WHEELS
Torque: 103 N*m (1,050 kgf*cm, 76 in.*lbf)
62. ADJUST FRONT WHEEL ALIGNMENT
(a) Adjust the front wheel alignment (see page [SP-2](#)).
63. INSTALL NO. 3 ENGINE UNDER COVER
64. INSTALL NO. 4 CENTER ENGINE UNDER COVER
65. 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.