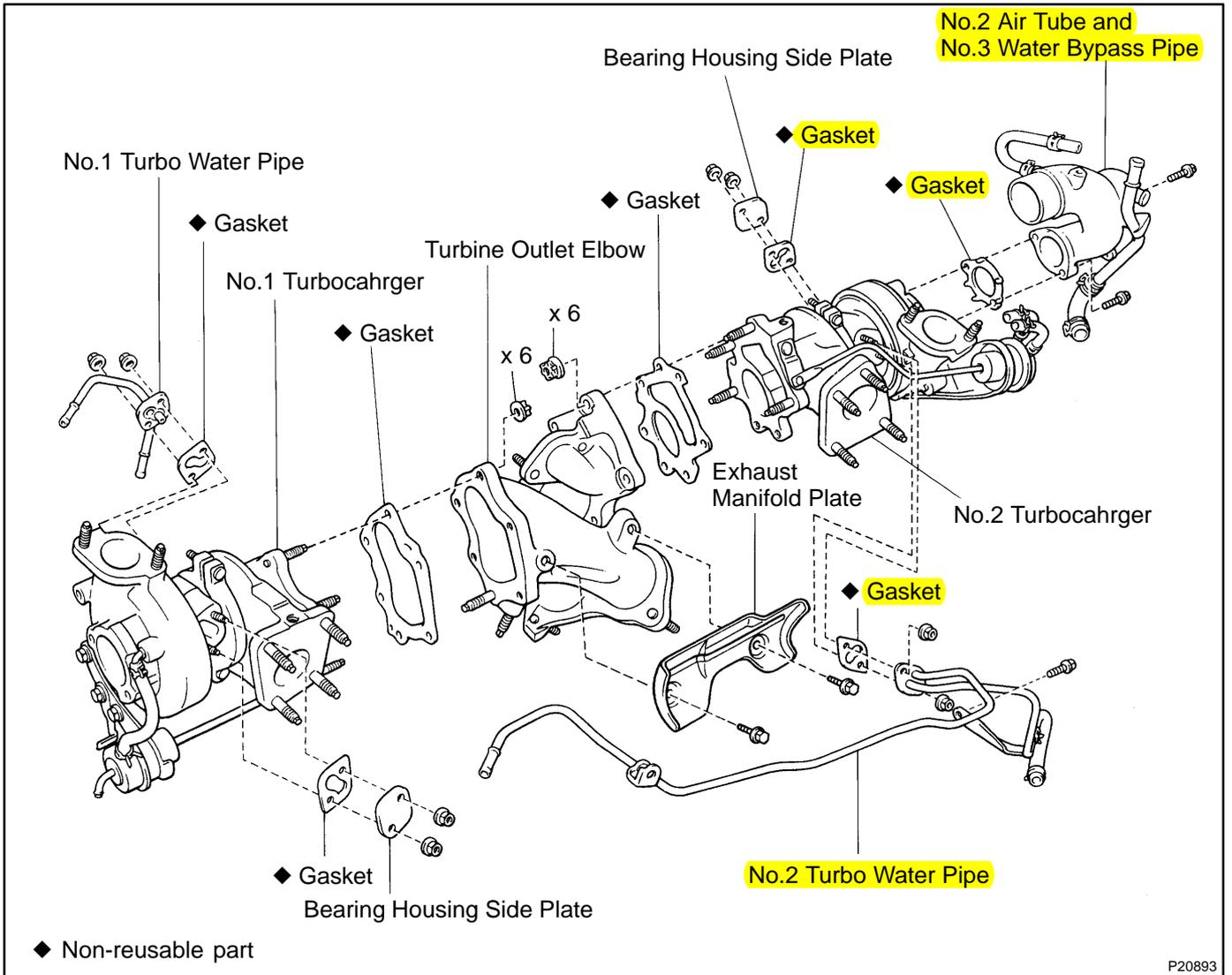


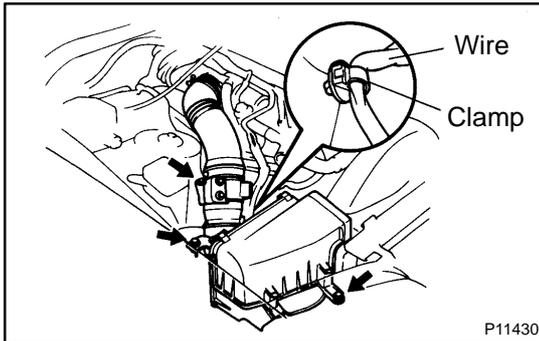
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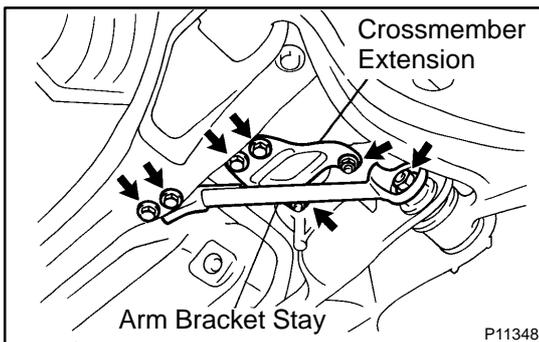
REMOVAL

1. ~~DRAIN ENGINE COOLANT~~
2. REMOVE ENGINE UNDER COVER
3. DISCONNECT CRUISE CONTROL ACTUATOR CABLE FROM THROTTLE BODY
4. REMOVE NO.1 AIR HOSE
5. REMOVE AIR CLEANER DUCT



6. REMOVE AIR CLEANER AND MAF METER ASSEMBLY

- (a) Remove the 3 bolts.
- (b) Loosen the hose clamp, disconnect the air hose from the intake air connector.
- (c) Disconnect the MAF meter wire from the clamp on the air cleaner case.
- (d) Disconnect the MAF meter connector, and remove the air cleaner and MAF meter assembly.



7. ~~DISCONNECT THEFT DETERRENT HORN FROM BODY~~

8. ~~REMOVE FRONT LOWER ARM BRACKET STAY~~

Remove the 2 bolts, nut, plate washer and arm bracket stay.

Torque:

Bolts 44 N·m (450 kgf·cm, 33 ft·lbf)

Nut 59 N·m (600 kgf·cm, 43 ft·lbf)

9. ~~REMOVE UPPER FRONT CROSSMEMBER EXTENSION~~

Remove the 2 bolts, 2 nuts and crossmember extension.

Torque:

Bolts 29 N·m (300 kgf·cm, 22 ft·lbf)

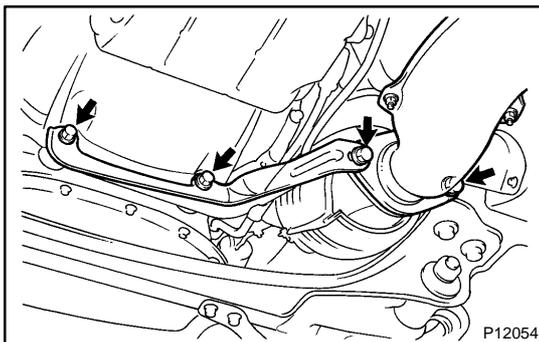
Nuts 33 N·m (340 kgf·cm, 25 ft·lbf)

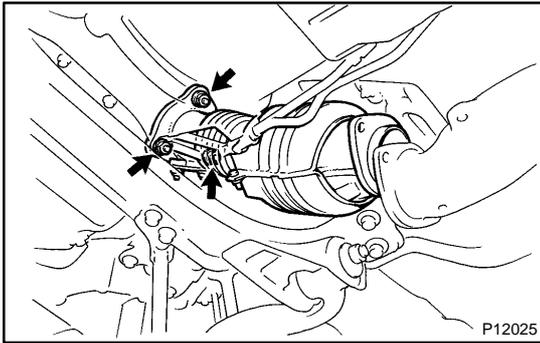
10. REMOVE NO.2 FRONT EXHAUST PIPE

- (a) Remove the 2 bolts and nuts holding the front exhaust pipe to the No.2 front exhaust pipe.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)
- (b) Remove the 2 bolts and pipe support bracket.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
- (c) Disconnect the front exhaust pipe from the No.2 exhaust pipe. Remove the gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.





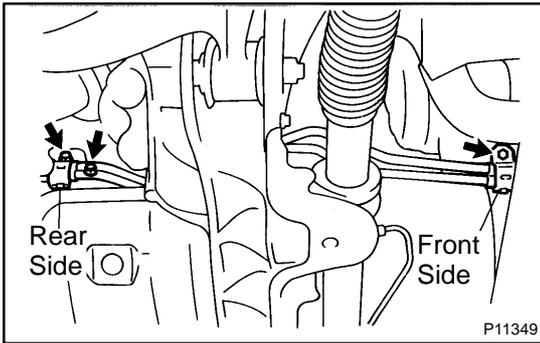
(d) Remove the 3 nuts, No.2 front exhaust pipe and gasket.
HINT:

At the time of installation, please refer to the following items.
Use a new gasket and 3 new nuts.

Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

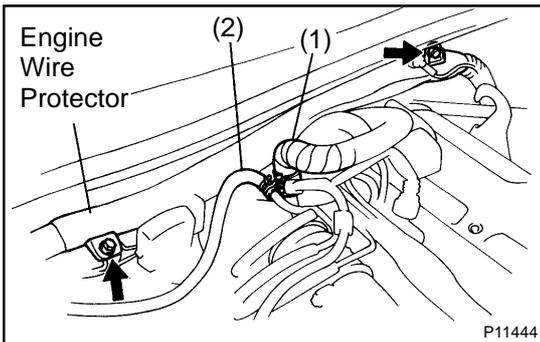
11. REMOVE HEAT INSULATOR FOR NO.2 FRONT EXHAUST PIPE

Remove the 2 bolts, 2 nuts and heat insulator.



12. DISCONNECT A/T OIL COOLER TUBES FROM ENGINE

- (a) Remove the bolt and tube clamp, and disconnect the oil cooler tubes from the bracket (front side) on the generator.
- (b) Remove the bolt and tube clamp, and disconnect the oil cooler tubes from the bracket (rear side) on the cylinder block.
- (c) Remove the bolt and tube bracket (rear side) from the cylinder block.



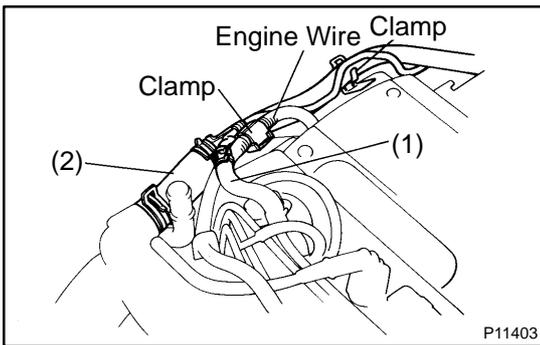
13. DISCONNECT ENGINE WIRE PROTECTOR FROM BODY

Remove the 2 bolts, and disconnect the wire protector from the body.

14. DISCONNECT HOSES

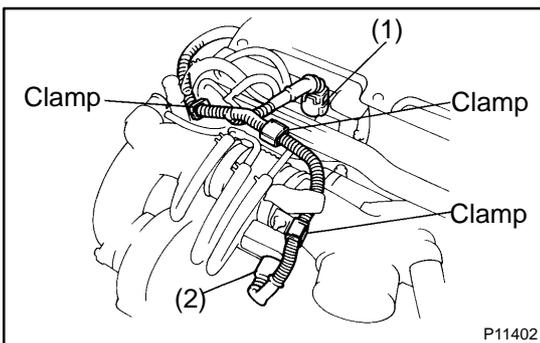
Disconnect these hoses:

- (1) Heater hose from No.3 water bypass pipe
- (2) EVAP hose from No.1 vacuum pipe



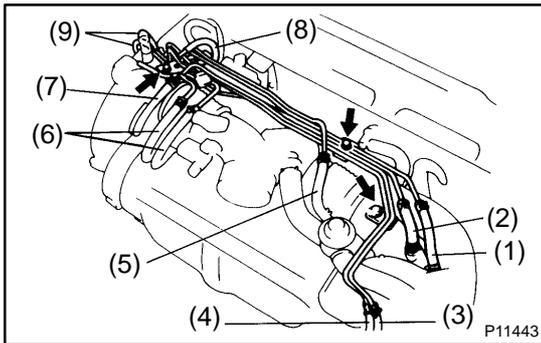
15. DISCONNECT IAC VALVE PIPE FROM NO.2 AIR TUBE

- (a) Disconnect the engine wire from the clamp.
- (b) Disconnect these hoses:
 - (1) Air hose (from No.1 vacuum pipe) from IAC valve pipe
 - (2) Air hose from No.2 air tube
- (c) Disconnect the IAC valve pipe from the clamp.

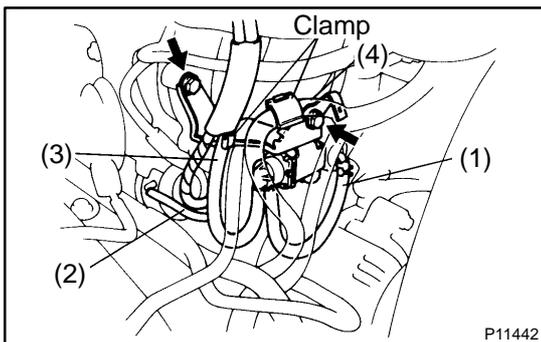


16. DISCONNECT NO.1 VACUUM PIPE FROM AIR TUBES

- (a) Disconnect these connectors:
 - (1) VSV connector for intake air control valve
 - (2) VSV connector for exhaust bypass valve
- (b) Disconnect the engine wire from the 3 clamps.

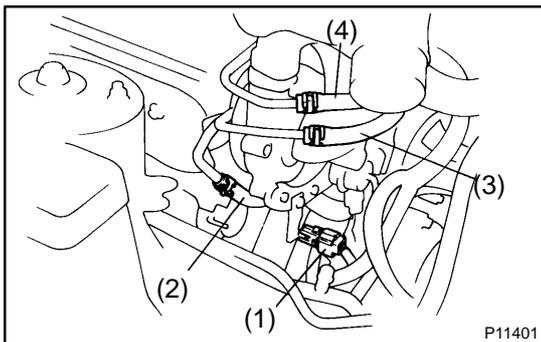


- (c) Disconnect these hoses:
 - (1) Air hose from No.4 air tube
 - (2) Air hose from No.1 air tube
 - (3) Air hose (from VSV for waste gate valve) from vacuum pipe
 - (4) Air hose (from VSV for exhaust gas control valve) from vacuum pipe
 - (5) Vacuum hose (from air bypass valve) from No.1 air tube
 - (6) 2 air hoses (from VSV for exhaust bypass valve) from vacuum pipe
 - (7) Air hose (from No.2 air tube) from vacuum pipe
 - (8) Air hose from VSV for intake air control valve
 - (9) 2 air hoses (from pressure tank) from vacuum pipe
- (d) Remove the 3 bolts, and disconnect the vacuum pipe from the air tubes.



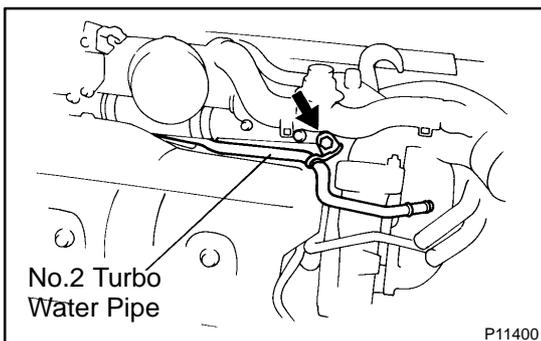
17. REMOVE VSV ASSEMBLY

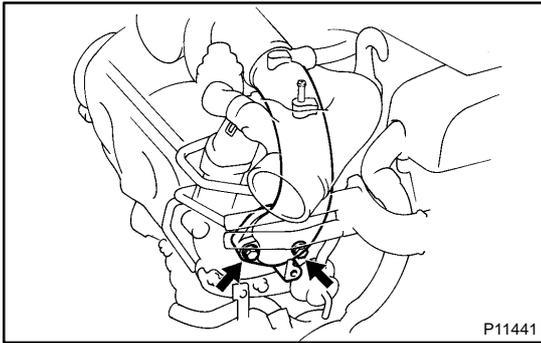
- (a) Disconnect these hoses:
 - (1) Air hose from actuator for waste gate valve
 - (2) Air hose from actuator for exhaust gas control valve
 - (3) Air hose from hose clamp
 - (4) Engine wire from wire clamp
- (b) Remove the 2 bolts.
- (c) Disconnect the 2 VSV connectors, and remove the VSV assembly.



18. REMOVE AIR TUBES AND INTAKE AIR CONNECTOR

- (a) Disconnect the connector and hoses:
 - (1) Crankshaft position sensor connector from clamp
 - (2) Water bypass hose (from water pump) from No.1 turbo water pipe
 - (3) Water bypass hose (from water outlet) from No.1 turbo water pipe
 - (4) Water bypass hose (from water outlet) from No.2 turbo water pipe
- (b) Remove the bolt, and disconnect the No.2 turbo water pipe from the No.4 air tube.





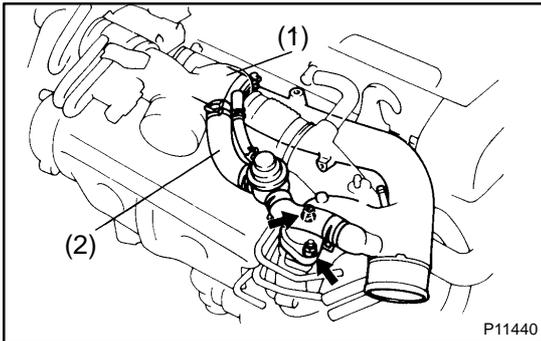
- (c) Remove the 2 bolts, and disconnect the No.1 air tube from the No.1 turbocharger. Remove the gasket.

HINT:

At the of installation, please refer to the following items.

Use a new gasket.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



- (d) Remove the 2 bolts holding the No.4 air tube to the No.1 turbocharger. Remove the gasket.

HINT:

At the of installation, please refer to the following items.

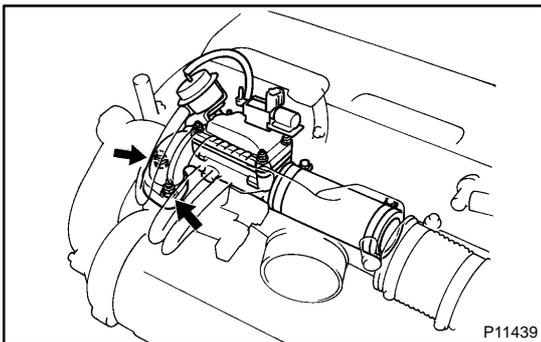
Use a new gasket.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

- (e) Disconnect these hoses, and remove the No.4 air tube and air bypass valve assembly.

- (1) Air hose from No.4 air tube

- (2) Air hose from intake air connector



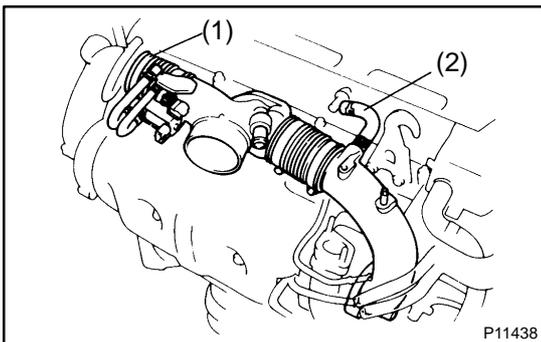
- (f) Remove the 2 nuts, intake air control valve and gasket.

HINT:

At the of installation, please refer to the following items.

Use a new gasket.

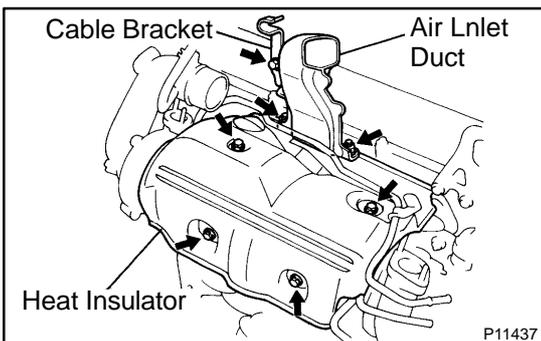
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



- (g) Disconnect these hoses, and remove the intake air connector and No.1 air tube assembly.

- (1) Air hose from No.2 air tube

- (2) PCV hose from No.2 cylinder head cover

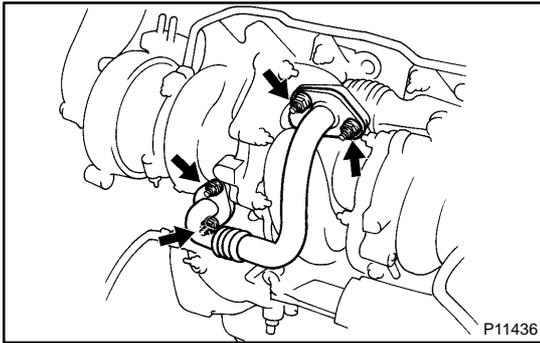


19. REMOVE AIR INLET DUCT

Remove the bolt, 2 nuts, cable bracket and air inlet duct.

20. REMOVE HEAT INSULATOR FOR TURBOCHARGER

Remove the 4 bolts and heat insulator.

**~~21. REMOVE EXHAUST BYPASS PIPE~~**

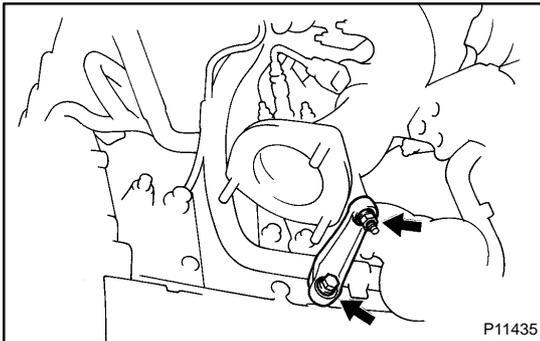
Remove the 4 nuts, bypass pipe and 2 gaskets.

HINT:

At the time of installation, please refer to the following items.

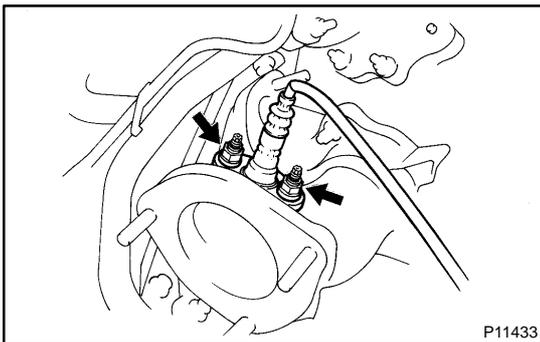
Use 2 new gaskets and 4 new nuts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

**~~22. REMOVE EXHAUST GAS CONTROL VALVE STAY~~**

Remove the bolt, nut and valve stay.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

**~~23. REMOVE HEATED OXYGEN SENSOR~~**

(a) Disconnect the oxygen sensor connector.

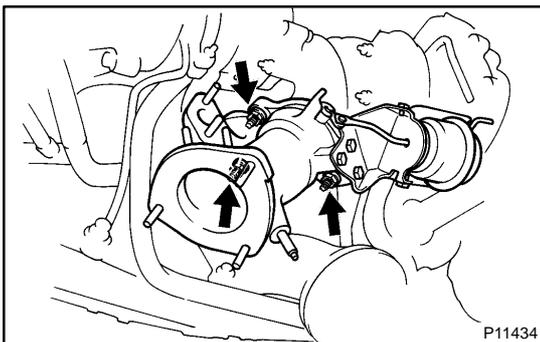
(b) Remove the 2 nuts, oxygen sensor (bank 1 sensor 1) and gasket.

HINT:

At the time of installation, please refer to the following items.

Use a new gasket and 2 new nuts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

**~~24. REMOVE EXHAUST GAS CONTROL VALVE~~**

Remove the 3 nuts, control valve and 2 gaskets.

NOTICE:

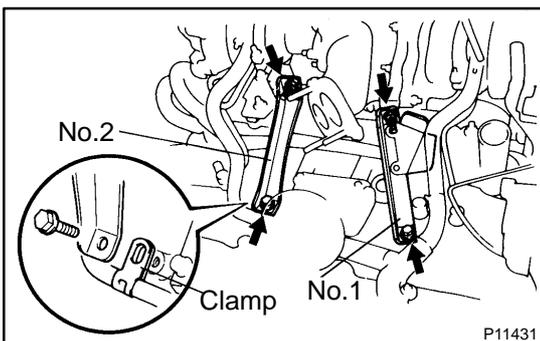
The control valve is ceramic. Do not drop or knock the control valve.

HINT:

At the time of installation, please refer to the following items.

Use 2 new gaskets and 3 new nuts.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

**~~25. REMOVE NO.1 TURBOCHARGER STAY~~**

Remove the bolt, nut and turbocharger stay.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

26. REMOVE NO.2 TURBOCHARGER STAY

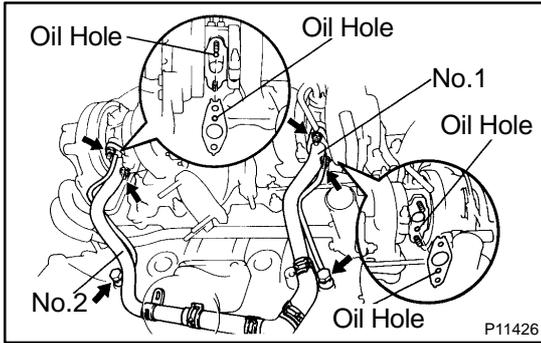
Remove the bolt, nut and turbocharger stay.

HINT:

At the time of installation, please refer to the following items.

Install the turbocharger stay and No.1 turbo oil pipe clamp with the bolt and nut.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



27. REMOVE NO.1 TURBO OIL PIPE

- (a) Remove the union bolt holding the turbo oil pipe to the cylinder block. Remove the 2 gaskets.

HINT:

At the time of installation, please refer to the following items.
Use 2 new gaskets.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

- (b) Remove the 2 nuts, and disconnect the turbo oil pipe from turbocharger. Remove the gasket.

HINT:

- ◆ At the time of installation, please refer to the following items.
- ◆ Use a new gasket.
- ◆ Align the oil holes of the gasket and turbocharger housing.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- (c) Disconnect the turbo oil hose from the turbo oil outlet on the No.1 oil pan, and remove the turbo oil pipe.

28. REMOVE NO.2 TURBO OIL PIPE

- (a) Remove the union bolt holding the turbo oil pipe to the cylinder block. Remove the 2 gaskets.

HINT:

At the time of installation, please refer to the following items.
Use 2 new gaskets.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

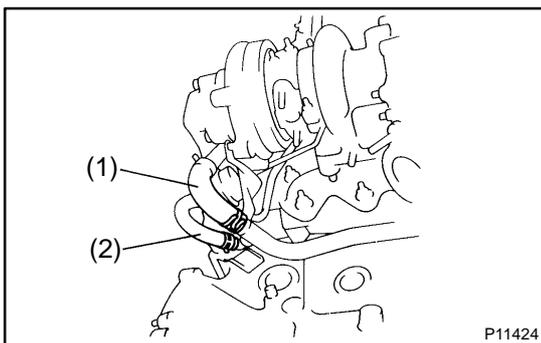
- (b) Remove the 2 nuts, and disconnect the turbo oil pipe from turbocharger. Remove the gasket.

HINT:

- ◆ At the time of installation, please refer to the following items.
- ◆ Use a new gasket.
- ◆ Align the oil holes of the gasket and turbocharger housing.

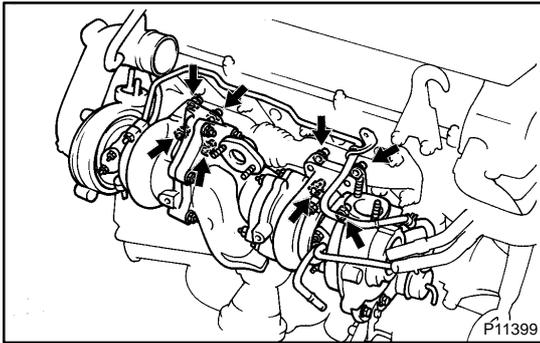
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

- (c) Disconnect the turbo oil hose from the turbo oil outlet on the No.1 oil pan, and remove the turbo oil pipe.



29. REMOVE TURBOCHARGERS AND TURBINE OUTLET ELBOW ASSEMBLY

- (a) Disconnect these hoses:
 - (1) Heater hose (from No.3 water bypass pipe) from No.2 water bypass pipe
 - (2) Water bypass hose (from No.2 turbo water pipe) from No.2 water bypass pipe



- (b) ~~Remove the 8 nuts holding the turbochargers to the exhaust manifold.~~

HINT:

- ◆ At the time of installation, please refer to the following items.
- ◆ Use 8 new nuts.
- ◆ Uniformly tighten the nuts in several passes.

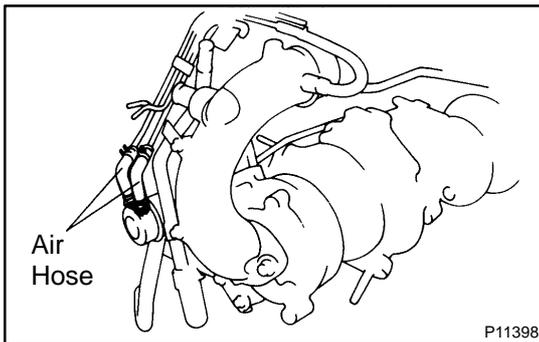
Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

- (c) ~~Remove the 2 turbochargers and turbine outlet elbow assembly.~~

- (d) Remove the 2 gaskets.

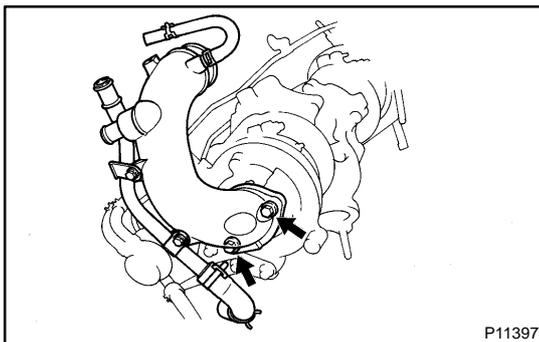
HINT:

At the time of installation, please refer to the following items.
Use 2 new gaskets.



30. REMOVE NO.1 VACUUM PIPE FROM NO.2 TURBOCHARGER

Disconnect the 2 air hoses from the actuator for the exhaust bypass valve, and remove the vacuum pipe.



31. REMOVE NO.2 AIR TUBE AND NO.3 WATER BYPASS PIPE ASSEMBLY FROM NO.2 TURBOCHARGER

Remove the 2 bolts, the air tube, bypass pipe assembly and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

~~32. REMOVE EXHAUST MANIFOLD PLATE FROM TURBINE OUTLET ELBOW~~

Remove the 2 bolts and manifold plate.

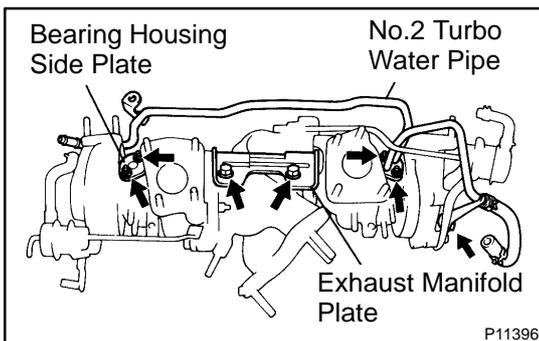
33. REMOVE NO.2 TURBO WATER PIPE FROM NO.2 TURBOCHARGER

Remove the 2 nuts, water pipe and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)



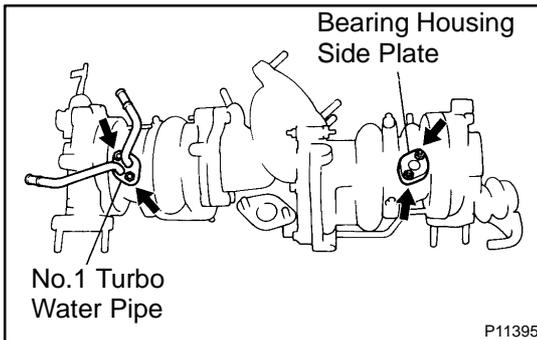
~~34. REMOVE BEARING HOUSING SIDE PLATE FROM NO.1 TURBOCHARGER~~

Remove the 2 nuts, housing plate and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)

**~~35. REMOVE NO.1 TURBO WATER PIPE FROM NO.1 TURBOCHARGER~~**

Remove the 2 nuts, water pipe and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)

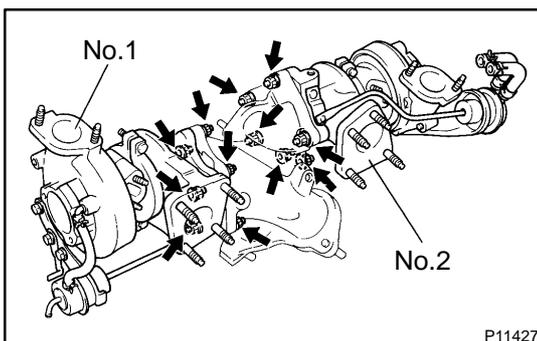
36. REMOVE BEARING HOUSING SIDE PLATE FROM NO.2 TURBOCHARGER

Remove the 2 nuts, housing plate and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

Torque: 9.0 N·m (90 kgf·cm, 80 in.-lbf)

**~~37. REMOVE NO.1 TURBOCHARGER FROM TURBINE OUTLET ELBOW~~**

Remove the 6 nuts, turbocharger and gasket.

HINT:

- ◆ At the time of installation, please refer to the following items.
- ◆ Use a new gasket and 6 new nuts.
- ◆ Uniformly tighten the nuts in several passes.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

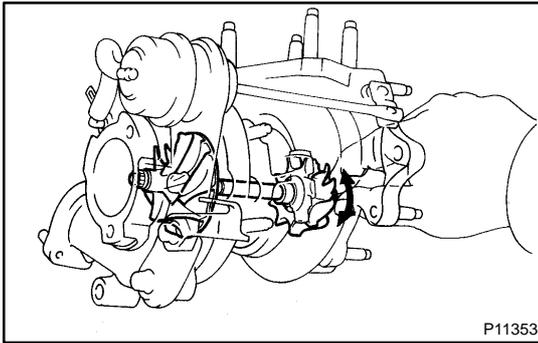
~~38. REMOVE NO.2 TURBOCHARGER FROM TURBINE OUTLET ELBOW~~

Remove the 6 nuts, turbocharger and gasket.

HINT:

- ◆ At the time of installation, please refer to the following items.
- ◆ Use a new gasket and 6 new nuts.
- ◆ Uniformly tighten the nuts in several passes.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

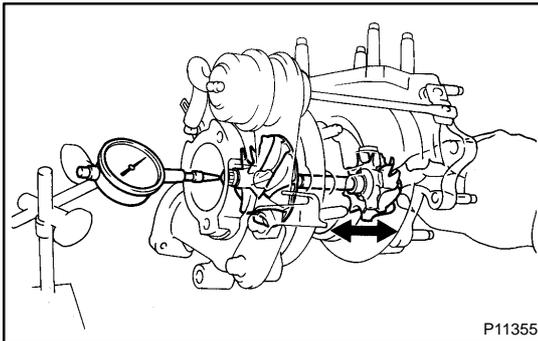


INSPECTION

1. INSPECT TURBINE SHAFT ROTATION

Grasp the edge of the turbine wheel and turn it. Check that the impeller wheel turns smoothly.

If the impeller wheel does not turn or if it turns with a drag, replace the turbocharger assembly.



2. INSPECT AXIAL PLAY OF TURBINE SHAFT

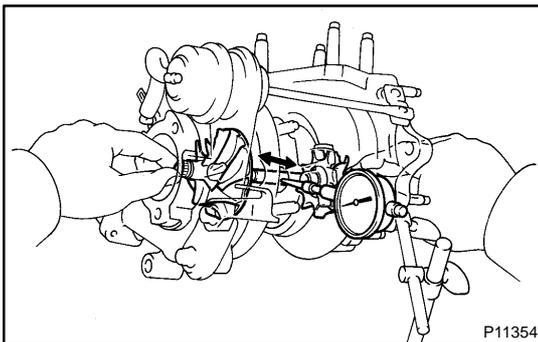
(a) Using a dial indicator, insert the needle of the dial indicator into the air tube side.

(b) Move the turbine shaft in an axial direction, measure the axial play of the turbine shaft.

Maximum axial play:

0.110 mm (0.0045 in.)

If the axial play is greater than maximum, replace the turbocharger assembly.



3. INSPECT RADIAL PLAY OF TURBINE SHAFT

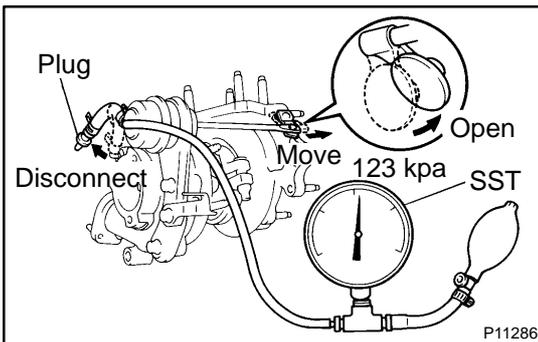
(a) Using a dial indicator, insert the needle of the dial indicator into the oil outlet hole and set it in the center of the turbine shaft.

(b) Move the turbine shaft in a radial direction, measure the radial play of the turbine shaft.

Maximum radial play:

0.162 mm (0.0064 in.)

If the axial play is greater than maximum, replace the turbocharger assembly.



4. INSPECT WASTE GATE VALVE OPERATION

(a) Disconnect the actuator air hose from the housing, and plug the hose end.

(b) Using SST, apply approx. 120 kPa (1.22 kgf/cm², 17.4 psi) of pressure to the actuator.

SST 09992-00242

(c) Move the actuator push rod, and check that the waste gate valve is open.

If operation is not as specified, replace the No.1 turbocharger assembly.

NOTICE:

Never apply more than 187 kPa (1.91 kgf/cm², 27.2 psi) of pressure to the actuator.

(d) Reconnect the actuator air hose to the housing.